GSE Scale Systems

Models 550/570 Programmable Weigh Indicators (PWI)

Technical Reference Manual

Version 4.0

GSE scale systems

Excellence In Weighing Technology

GSE SCALE SYSTEMS PUBLISHING GROUP
The Complete Programming Guide to the GSE 550/570 Indicators

Published by:

GSE Scale Systems Solutions Group
23640 Research Drive
Farmington Hills, MI 48335
U.S.A.

Fourth Edition, September 1994

Part number: 39-10-28983

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Chapter 1 Introduction

1.1 About This Manual

GSE Inc. has developed a series of precision weighing instruments which are technically advanced, offering users high quality weighing systems with application innovation. In other words, including high precision weighing a GSE Programmable Weigh Indicator (PWI) can be molded around a specific application by customizing its setup to meet the users needs. This Technical Reference Manual contains information covering the Model 550 and 570 Weigh/Count indicators, all operating instructions, available options, installation information, and technical information on system customization for your particular weighing application. Many examples and programming techniques are included in each chapter. Supplementary to this manual is a publication titled "ENGINEER'S NOTEBOOK". This includes advanced macro and setpoint techniques commonly used in many 550 and 570 applications.

The basic layout of the manual sub-divides each feature of the 550 indicator into a chapter to allow for a more focussed explanation. Where applicable, combining one feature with another is called out to the reader's attention. Quick setup or reference information is separated from the rest of the information in each chapter with a gray background. In many sections of this manual it refers to the indicator as a "550". This by no means implies that the other indicators in the 500 series are excluded in the explanation. This strictly allows for simplicity in reading and writing this manual. If there is any information that is not included in one model over another it will be called out directly to your attention. ie. (Model 570 Only). Even though not directly addressed, the 550/570 manual covers a great amount of technical information which runs parallel to other GSE products. ie. (Models 450, 552, 553, 574, 9250, etc.)

Information in this manual is subject to change without notice due to correction or enhancement and does not represent a commitment on the part of GSE, Inc. The information described in this manual is solely the property of GSE, Inc. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording and sold for any monetary figure without the express written permission of GSE. This also includes both the software used for computer simulation of GSE hardware and its firmware. Custom setup files that have not been developed by GSE are neither the property nor the responsibility of GSE. It is highly recommended that all application software written for the 550 to be backed on disk in ASCII text form.

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- IBM, PC/AT, PC/XT and PS/2 are registered trademarks of International Business Machines Corporation.

- Lotus is a trademark of Lotus Corporation.

This is the fourth edition of the Technical Reference Manual and was released in September, 1994 as Version 4.0. It integrates and updates a variety of separate, previously released, manuals, updates, supplements, bulletins and version 3.0. The information contained in this manual has been prepared specifically for indicators with Main Board PC745 revisions D thru G and Firmware release date of September, 1994. If your indicator contains earlier board revisions or release dates, refer to previously released technical reference documentation.

1.2 The 500 Series

There are two closely related weigh indicator models which are covered in this reference manual. The Model 550 for weighing applications (Refer to Figure 1, Model 550 Indicator) and the Model 570 for weighing and parts counting applications. The 570 is identical except a portion of its software is structured for counting. The keypad is slightly different. The 570 has a sample key and a split print/enter key.

Figure 1 Model 550 Indicator

If you are using either a model 550 or a model 570, this manual will provide you with technical information common to both instruments. The section on Parts Counting Operations in Chapter 6 is for the Model 570 only. Other sections of the manual which are pertinent to only one model will indicate the appropriate model to which the information is targeted.

We will be discussing information primarily concerned with electronic indicators in this manual. When a weigh system is mentioned, we are discussing the integration of the Model 550 or 570 indicator to a load cell scale platform. The GSE Model 550 or 570 has been designed to display outputs from either GSE manufactured platforms or platforms built by other manufacturers.

The Model 550 and 570 indicators are built to give you years of industrial quality weighing in the most demanding environments. They provide outstanding accuracy and durability when matched with any of our GSE platforms or load cells. Every weighing application is different, and with this in mind, the 550 and 570 indicators have been designed to permit customization of output to computers or printers through programmable software transmitted through RS-232 or 20mA current loop outputs.

1.3 Common Weighing Applications

The focus of this manual is to provide operation, setup and customization information of the Model 550 and 570 indicators, however it is important to understand the application capabilities of these instruments. Following is a list of typical weighing applications which other users have found GSE weighing systems beneficial to their operations:

- Small parts weighing
- Large parts weighing
- Parts counting
- Vehicular truck loading (Truck in / Truck Out)
- Tank weighing
- Process industry weighing
- Inventory control
- Order picking
- Floor and Hopper Scales
- Conveyor weigh systems control
- Batching (mixing)

Refer to Chapter 16 Macro Programming Operations for specific information on how to combine the features of the 550 indicator to customize your own weighing system.

1.4 Reader's Guide

The Technical Reference Manual for Model 550 and 570 indicators is a comprehensive textbook on the operation of GSE Weigh/Count indicators. Some chapters contain more technical information than the average user needs to know, or even cares about. As you begin to use this manual, keep one thing in mind. It is not necessary to read all of this manual. The manual has been designed to provide you with the technical information for which you are looking. Don't try to treat it like a novel which must be read from cover to cover.

If you are a first time user of the GSE Model 550 or 570 Indicator, we suggest reading the following chapters:

Chapter 1	Introduction
Chapter 2	Installation Instructions
Chapter 3	Basic Weighing Parameter Setup Mode
Chapter 5	Weighing Mode
Chapter 7	Calibration Mode

If you are skilled at GSE Model 550 or 570 indicator applications, try these chapters:

Chapter 4	Parameter Setup Mode (Advanced)
Chapter 16	Macro Programming Operations
Chapter 20	Database
Chapter 21	Setpoints and Logic I/O

If you are installing an option on your Model 550 or 570 indicator, all installation information is included in its respective chapter. ie. Database Module (chapter 20).

If you are using a GSE Model 570 indicator, read:

Chapter 6	Counting Mode

If you are diagnosing an indicator or system problem, read:

Chapter 29	Troubleshooting

1.5 Features

The GSE Model 500 Series Weigh Indicators are precision instruments with industrial environment capability. The following list shows the available features of this accurate and durable weigh system component:

- Highly Visible Display
  Brilliant 0.75 inch high 6 digit vacuum fluorescent display is clearly readable even at a distance.
- Durable
  Stainless Steel Washdown Enclosure and sealed elastomer keypad provides superior protection against chemicals and hostile environments.
- High Capacity
  Capable of powering up to 10 load cells (350 ohm) for demanding applications such as floor, truck, tank and hopper scales.
- Versatile Communications
  Programmable RS-232, 4 - 20 mA current loop, and 0 - 10VDC variable gain outputs.
- Versatile swivel stand for table or wall mounting.
- Time and Date Clock (Battery backed) option.
- Front Panel Calibration and linearization procedure.
- Full scale response time from 0.06 to 8 seconds
- Two Open Drain (FET) logic setpoint outputs
- Selectable weighing units: lb., kg., oz, g, etc.
- Storage and recall of ID and specified data.
- DC or AC power operation
- Six user defined registers for custom communication.
- Weighing increments: 1, 2, 5, 10, 20, 50, and 100.
- Remote key activations (8 possible).
- RS-232 output triggered by time-date clock.
- Remote Display capability.
- External relay module with up to 8 setpoints, expandable to 32 outputs (option).
- Expandable memory for increased data storage.

1.6 Available Options

Not all of the total capability and functionality of the Model 550 or Model 570 indicators are included in the standard version of these instruments. To take advantage of additional functionality, field installed options are available from GSE. These options consist of hardware and software, and can be installed in the field. It is not necessary to return the instrument to GSE for installation of options. Refer to the options respective chapter for details of the options installation instructions (Chapters 18 thru 26). The following listing details all available options for both indicators:

- Analog Output Option:
  Provides 4 - 20mA current loop and variable gain 0 - 10VDC outputs.
- Cable Options: Scanner/ Keyboard Cable, Thermal (Label or Bar Code) Printer (Eltron) Cable, RS-232 dot matrix printer Cable Option
- Compatible Peripheral Options:
  Alpha- numeric Keyboard (ASCII)
  Scanner (Laser Pen)
  Label Printer (Thermal)
  Document Printer (Dot Matrix)
- Database Option:
  Adds capability for creating database records consisting of fields, with ability to store and recall data.
- Database Memory Options:
  24kB storage
  120kB storage
  These options increase internal storage memory for the database option
- Memory Expansion Option:
  Increases internal memory from 512 bytes to 4kB using E2 memory.
- Multi-Scale Capabilities Option:
  Permits using one indicator with more than one platform.
- Process Control Interface Option:
  Permits the indicator to drive up to 4 daisy chained relay modules, and increases relay Inputs or Outputs up to 32 I/O (Requires Relay Module Option)
- Relay Module Option:

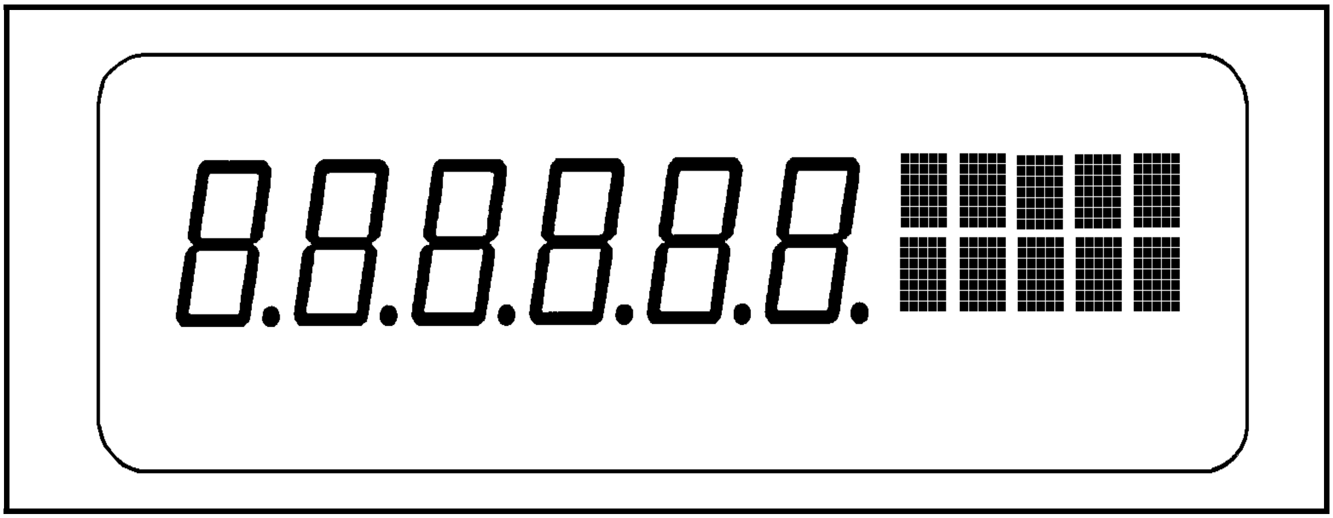

Figure 2 Front Panel Display

External box permitting the indicator to drive 2 relay outputs

- Time & Date Option:
  Adds capability of battery backed time of day and date.

- Severe Transient Voltage Suppression:
  Protects the indicator f
- rom power line transients damage.

- Panel Mount Kit (option)

1.7 Display

There are two sections to the display: a large numeric display and a smaller two line 10 character dot matrix display to the right of the numeric display. Refer to Figure 2, Front Panel Display.

The six large numeric digits are used to display numeric data, such as Gross Weight, Net Weight or Tare Weight. The dot matrix display has several purposes. Typically, the first two characters of the upper line will show the weighing units of the displayed data. The last three characters indicate a CENTER ZERO condition when applicable (-->O<--). The lower line of the dot matrix portion of the display will specify the type of data, such as Gross, Net, Tare, etc.. The dot matrix display is also used for specific messages during operation and setup.

1.8 Keyboard

The 550 and 570 indicators have very similar keyboards. The Model 550 keyboard is shown in Figure 3 and the Model 570 keyboard is shown in Figure 4. Note that there are two keys which are different, the rest are identical in title and function. The Model 550 has a PRINT key, and this key is labeled SAMPLE on the Model 570. In addition, the Model 550 has an ENTER key, and this key is labeled PRINT/ENTER on the Model 570 keyboard.

The Model 550 and 570 each feature a simplified keyboard for operator interface. The function of each key is described below. Some of these keys have additional functions when in the Setup Mode.

ZERO press to reset the current weight reading to zero.

UNITS press to select the available displayed units, such as pounds, ounces, grams, kilograms, etc.

SELECT press to select the programmed operating mode such as NET Weight, TARE Weight, GROSS Weight, Time-Date, etc.

ID press to enter, store and use the ID parameters. (Six identification names

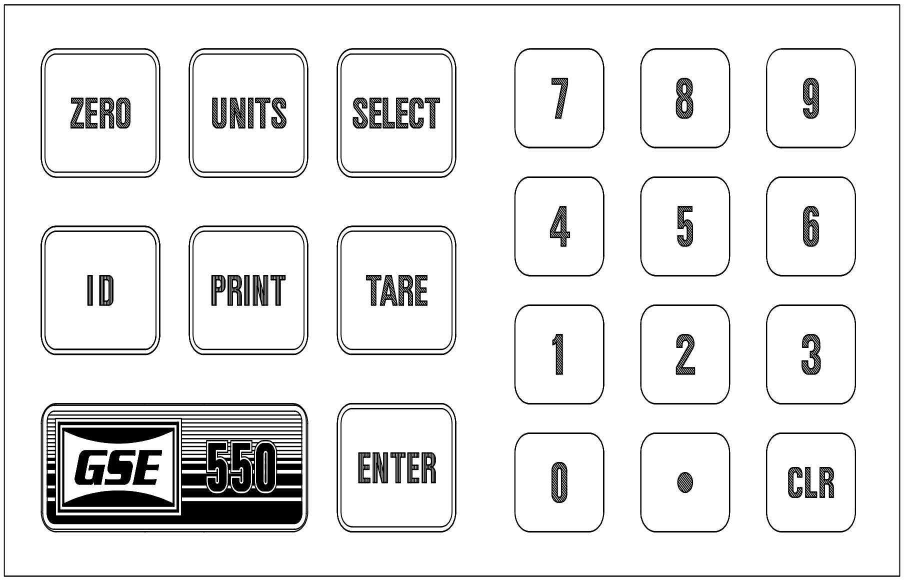

Figure 3 Model 550 keyboard

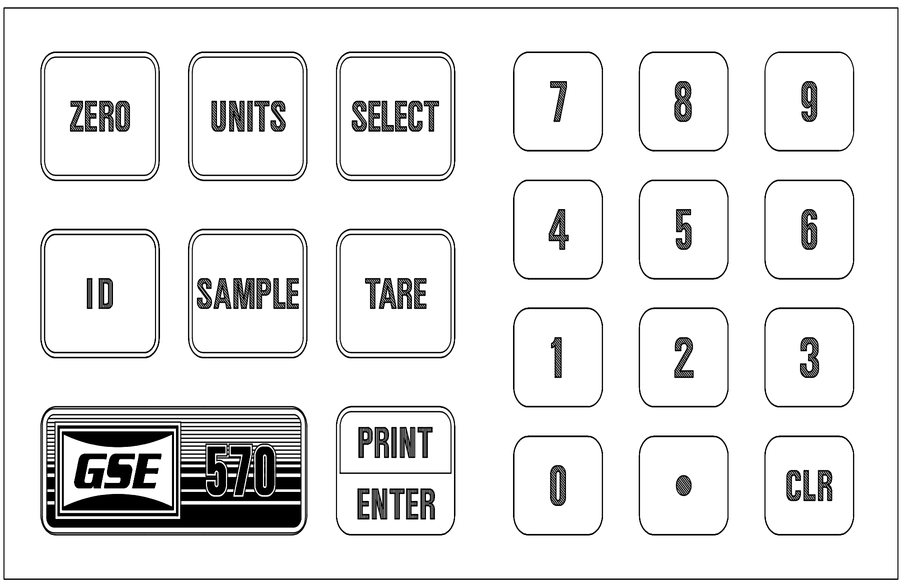

Figure 4 Model 570 keyboard

you can create to describe part numbers, bin locations, or information titles for your weighing operation.)

PRINT (Model 550 indicator only) press to send data to a printer, computer or other device.

SAMPLE (Model 570 indicator only) press to establish a piece weight when there is a sample weight on the weighing platform.

TARE press to establish a Tare Weight.

ENTER (Model 550 indicator only) press to enter and store ID information.

PRINT/ENTER (Model 570 indicator only) is a dual purpose key. Press to send information to a printer, computer or other device. This key is also used to enter ID information.

0 thru 9. press these keys to enter number digits 0 thru 9. Press the decimal point key to establish a decimal point.

CLR press this key to correct a number entry mistake prior to entering it in memory.

UNITS,TARE, ID and PRINT keys are also used when making character entries to create ID parameters. Refer to Chapter 14 for the method of creating alphanumeric ID entries.

1.9 Operating Modes (Brief Explanation)

If you have a Model 550 indicator, there are four modes of operation available to you: The Weighing mode, Calibration mode, Accumulation mode and the Setup mode. If you have a Model 570 indicator, there are five modes of operation available to you: The Weighing mode, Counting mode, Calibration mode, Accumulation mode and the Setup mode.

Setup mode provides you access to the seventeen groups of Parameter registers physically resident within the indicator. By entering data in the Parameter registers, you can customize your weighing operation to remember the different programming information for your particular weighing application.

Chapter 2
Installation Instructions

This section of the manual outlines the installation of the 550/570 weighing and counting indicators. Please take the time to review these important guidelines and step-by-step procedures.

> **IMPORTANT:**
>
> The Model 500 Series Weigh Indicators do not include an on/off switch and therefore must be installed near a power outlet socket which is easily accessible, in keeping with UL/CSA approval requirements.

2.1 Locating the Instrument

Table-Top Use

The Model 500 Series of indicators has been designed with a versatile swivel bracket which permits you to tilt the instrument face to any desired angle. When the indicator is placed on a table, the non-slip rubber feet prevent scratching and slipping across the surface when keys are pressed.

Permanent Mounting

The swivel bracket has four mounting holes which also permit the indicator to be securely fastened to a fixed surface. The holes are 0.28" diameter (0.7 mm) to accommodate 1/4" (or M6 metric) fasteners. For details regarding the mounting hole pattern and overall dimensions, refer to the Appendix.

Environment Suitability

The standard Model 550 and 570 indicators are supplied in a sealed stainless steel enclosure and may be used in a washdown environment. Care must be taken to insure that the AC power socket outlet is properly protected! The keypad is made of silicon rubber. Specifications are available for the reactions of this material to various solvents.

The display window is made from a polycarbonate material. The gasket for the display is a white closed-cell polyethylene foam which is resistant to water, detergent, and alcohol. However, the display gasket may be adversely affected by aliphatic and aromatic hydrocarbons.

The rear panel gasket is made from a PORON (registered trademark) cellular urethane. It is unaffected by mild inorganic acids and bases. It will exhibit modest swelling with oils, greases and other linear hydrocarbons. Strong polar solvents will greatly swell the gasket, possibly reducing its effectiveness.

2.2 Opening the Instrument

Disassembling Rear Panel

1. Remove AC power by unplugging the indicator from the power outlet socket. Make sure the indicator is completely disconnected from the power source. Disconnect any additional umbilical cables from their source connectors.

2. Remove the rear panel which is attached to the housing by quantity eight 8 mm hex head screws. Use a #2 Phillips head screwdriver.

> **CAUTION**
>
> Any operation which involves opening the enclosure should be performed by qualified service personnel only after disconnecting power! Hazardous voltage is accessible within the enclosure.

Refer to Figure 5 for a view of the rear panel.

3. Carefully lift the rear panel from the enclosure and disconnect the switch panel ribbon cable from the main PC board.

Reassemble Indicator and Rear Panel

1. Reconnect the switch panel ribbon cable and move the rear panel into position. Tighten down the strain relief to insure a firm grip on each cable.

2. Mount the rear panel to the instrument and

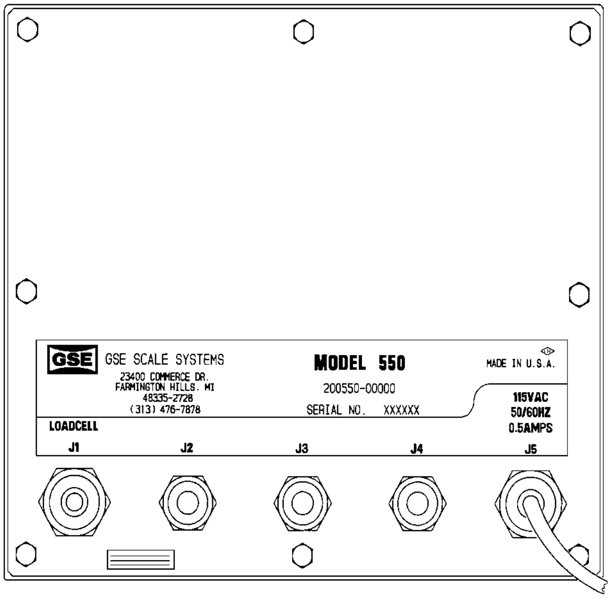

Figure 5 Rear Panel

tighten screws until the gasket is compressed enough so that the flange of the rear panel begins to contact the main enclosure. This will ensure the best environmental seal and maximum EMI, RFI and ESD shielding performance. Test the instrument for proper operation.

2.3 Load Cell Connections

Transducer Excitation

The indicator is designed to be connected to any (Wheatstone bridge design) strain-gage based force measuring transducer. The indicator supplies 10 VDC developed from +5VDC and -5VDC referenced to common for the excitation voltage. The maximum excitation supply current available for the load cell(s) is 375 mA which corresponds to the ability to drive the equivalent of a quantity of eleven 350 ohm load cells.

Cable Recommendations

A high quality cable having an overall braided shield and 16 to 24 AWG stranded wire is recommended for the connection to the weigh platform. The load cell cable should be routed into the Indicator enclosure through the strain relief marked J1 on the rear panel of the indicator. The indicator is supplied with a rubber boot installed into the J1 strain relief to accommodate cables with diameters between 0.158" and 0.22". Larger cables with diameters between 0.231" and 0.394" can be accommodated by removing the rubber boot.

Sense Lead Connections

Four or six lead platforms can be accommodated by the Indicator. (Refer to Table 1, Load Cell Connections.) Six lead cables include an additional two wires for the purpose of sensing the actual excitation voltage at the load cell terminals within the weigh platform. This connection compensates for variations in the resistance of the excitation wiring. If the platform does have six leads, the two jumpers (E3 and E4) next to the J8 connector inside the indicator enclosure should be cut or removed. If the jumpers remain in place, then the sense leads simply act to reduce the resistance of the excitation leads. These sense jumpers do not exist on Model 550 indicators with the main board revision PC-745-B and earlier (board serial numbers preceding 851). If four lead

Load Cell Function	**GSE Platform Color Code**
+ Excitation	Red
- Excitation	Black
+ Signal	White
- Signal	Green
+ Sense	Red (optional)
- Sense	Black (optional)

Table 1 Load Cell Connections

platforms are used on the earlier Model 550 units, the (+) sense must be jumpered to the (+) excitation and

the (-) sense must be jumpered to the (-) excitation at the J8 connector in order for the indicator to perform properly.

2.4 Load Cell Installation

Load Cell Installation

1. Strip back the jacket of the weigh platform load cell cable approximately 1.25" from the end of the cable.

2. Using a small screwdriver, create an opening in the braided shield, just past the end of the jacket. Pull the wires out of the braided shield.

3. Strip back the insulation of each conductor wire 1/4".

4. Twist the strands of each conductor. To prevent fraying, tin the twisted strands using a soldering iron and solder.

5. Loosen the J1 strain relief and route the load cell cable through.

6. View the main PC board and locate the lever connector labeled J8. Connect the four or six conductors to the proper terminals as described in Table 1 . Refer to your weigh platform color wiring code for proper colors for each connection. Load cell functions are noted on the PC board next to the connector. Operate the lever connector by applying a firm direct force to the end of the lever and inserting the lead in place as shown in Figure 6. A small screwdriver can be used to apply force to the lever. Test all connections by pulling lightly on each conductor.

NOTE:
The PC board mounting nut is also used to establish the earth ground reference for the circuitry on the PC board and thus the nut must always be in place when the instrument is powered up!

NOTE:
For load cells with 6 conductors, two small jumper wires (E3 and E4, next to J8 on the Main PC Board) must be cut for external sensing to be operational. For a complete explanation, refer to the Sense Lead Connections section in this chapter.

2

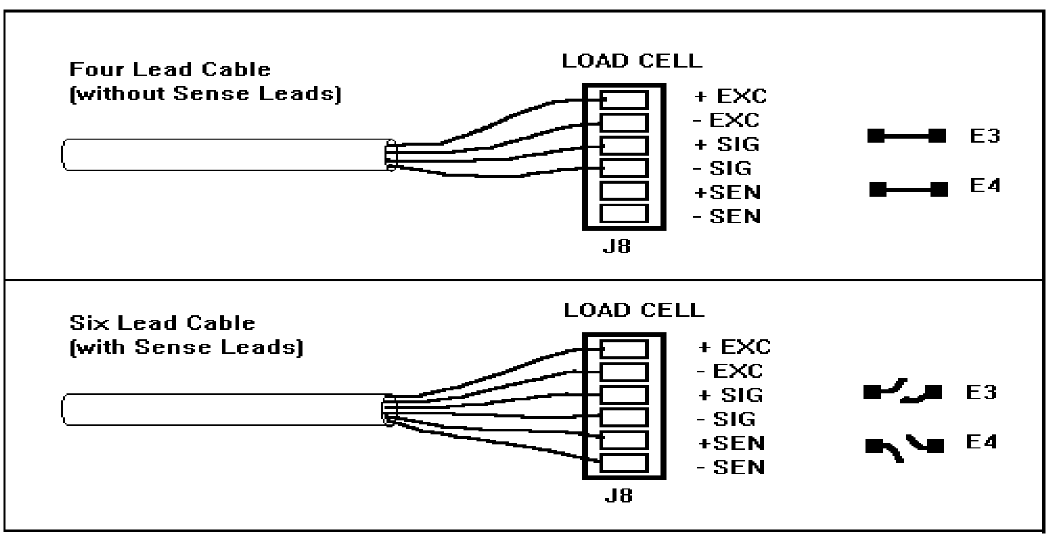

Figure 6 Load Cell Connections

7. Connect the load cell shield to the mounting nut labeled SHIELD. A 7 mm socket wrench should be used (9/32" is the closest english socket equivalent). The shield should be grounded to the indicator chassis by wrapping it around the PC board mounting stud next to the J8 connector or by using a ring terminal (recommended). For optimum shielding effectiveness, keep the length of the shield between the stud and the end of the cable jacket to an absolute minimum! This is important in order to reduce the effects of EMI, RFI, and ESD on the indicator.

8. Pull any excess cable back out of the instrument through the strain relief until there is no slack between the shield connection and the strain relief. Tighten down the strain relief securely to insure a firm grip on the cable.

Chapter 3 Parameter Setup Mode (Basic Setup)

3.1 Parameter Setup Mode

Recall that there are two parts to the Indicator display. There is a large six digit alpha-numeric display on the left side of the indicator and ten small dot matrix displays in two rows of five each to the right of the numerical display. Both sides of the display will be used during parameter setup procedures. To access the Setup Mode and make changes, press:

1 0 0 <SELECT> 2 3 6 4 0 <ID> <ENTER>

The text convention used in this manual for keystrokes means you should press the "1" key followed by the "0" key followed by the "0" key followed by the key labeled "SELECT" followed by the keys labled 2,3,6,4,0, followed by the key labeled "ID" followed by the key labeled "ENTER". The Indicator will respond with the display showing:

**P101.__ __ Scl 1
Enbld**

The indicator will use the large display to tell you that you are entering the Setup Mode and will use the smaller display to prompt you to enter the programming security code. If you only want to review the setup, press:

1 0 0 <SELECT> <ENTER>

The indicator will now tell you that you can make no modifications to the setup. If you want to make any changes to the setup press:

2 3 6 4 0 <ID> <ENTER>

The indicator will briefly inform you that it will permit you to make modifications to the setup and then display the first of the available setup parameters. If you enter the wrong code or do not press any keys within 5 seconds, you will be denied access to the Setup Mode.

NOTE:

While at any point of the Setup Mode, you can press **<ZERO>** to return to the Weigh Mode. The indicator will then prompt you through the exit. process.

The procedures which were just explained consist of a Parameter number and a security code. The entire key stroke sequence to modify a Parameter is:
1 0 0 <SELECT> 2 3 6 4 0 <ID> <ENTER>
Let's take a closer look at this sequence. The "100" in this instance is Parameter 100 (more about Parameters in a moment), and the "23640" is the security code. (This coincidently happens to be the street address of GSE!) If the security code is not used, the Parameters can be monitored, but not changed. If the security code is included, then the Parameters can be modified. But, what is a Parameter? Parameters are special dedicated memory registers within the indicator. There are over 1,200 different Parameters which can be addressed and modified by the user, and each one has a dedicated task to remember. They are always identified by the letter "P" preceding a 3 or 4 digit number, followed by a decimal point, followed by 1 or 2 digits. An example of a Parameter number is "P150.01" which is a Units Setup Parameter, which remembers that the calibration units in the indicator has been set to kilograms. If you wanted ounces instead, set Parameter P150.02. How do you know which number is which Parameter, and what does it do? Thats what this manual is all about. It will provide you with Setup Parameter lists, explain the function, tell you how to change the Parameter, then explain the functional operation of the indicator. The manual has been divided into two basic types of discussion, one called **Parameter Setup** which is discussing changes to the Setup Parameters which customize your application, and **Weighing Operations** which is a functional description of how to operate the indicator once Setup Parameters have been set. Parameter Setup is covered in Chapter 4 and Weighing Operations is covered in Chapter 5.

3.2 Basic Weighing Parameter Setup

P101.XX Scale 1
P102.XX Scale 2
P103.XX Scale 3
P104.XX Scale 4

This parameter allows 1 thru 4 scales to be enabled. Each of the four scale enablement parameters has three selections:

3

P101.00 Scl 1 Disbl

This parameter is used to disable scale 1. When disable is selected, its setup and calibration are erased from EEPROM memory.

P101.01 Scl 1 Saved

This parameter is used to save setup and calibration data while still disabling scale 1. When disable is selected, its setup and calibration are retained in EEPROM memory, while the scale is disabled. Scale 1 may not be selected from the weigh mode in this setup.

P101.02 Scl 1 Enbld

This parameter is used to enable scale 1. When enable is selected, its setup and calibration are retained in EEPROM memory, and scale 1 may be selected from the weigh mode.

P102.00 thru **P104.02** are identical to **P101.00** thru **P101.02** for scales 2, 3 and 4 when the Multi-Scales option is installed.

P110.- - F.S.=

This parameter is used to determine the scaling of the instrument. Enter the intended full scale capacity of the connected load cell or weighing platform and press **<ENTER>**. Any value from 0.01 to 1,000,000 can be entered here. If you enter a value over 99,999, the indicator will round off the last three digits to .K, such as 100.K for 100,000. Press **<SELECT>** to save your choice and continue to the next parameter. As an example, if a 200 lb rated platform is to be used only up to 150 lb, then enter 150 for P110. This will insure an overload indication at applied loads greater than 150 lb and provide the greatest precision.

P111.XX 1 div

This parameter is used to define the weighing divisions (i.e. the count-by and decimal point placement). The selection made here will also determine the resolution of the indicator such that resolution equals the full scale value entered into P110 divided by the value selected for P111. If uncertain of the choice, press **<CLR>** and the indicator will automatically assign a division size based on a resolution of 10,000. Otherwise press **<ENTER>** to cycle through the available choices. When the correct selection is displayed, press **<SELECT>** to proceed to the next parameter.

> **NOTE:**
>
> In order to comply with NIST H-44 regulations, when the displayed increment is 10 or more and the data is exactly zero, the displayed and printed data will include more than one zero. For example, if the count-by is 10 the zero indication would be 00.; if the count-by is 500, zero would be shown as 000..

P112.XX ZTapr

This parameter determines the Zero Track aperture. This sets the window for Zero Tracking measured in terms of the divisions specified in parameter P111. Selection 0 will disable the zero track feature. Press **<ENTER>** to cycle through the available selections. When the correct choice is displayed, press **<SELECT>** to advance to the next parameter. Remember that you could key in the selection number (in tenths of a division) and press **<ENTER>** to make a selection and then press **<SELECT>** again to advance to the next parameter.

P113.XX ZTdly

This parameter sets the time period that must elapse before the zero can be tracked off. This time is selectable from 0.0 to 10.0 seconds in increments of 0.1 seconds. Press **<ENTER>** to cycle through the available choices. When the correct choice for your application is displayed, press **<SELECT>** to advance to the next parameter.

P114.XX Mot'n

This parameter defines the amount of instability (in divisions as determined in P111) that will constitute Motion (the time is set in P115 below). Presence of Motion on the platform will delay any ZERO or TARE operations and will blank the Units Name (lb, kg, etc.) until motion is removed. Selecting P114.00 disables motion inhibition. Press **<ENTER>** to cycle through the available selections. When the correct choice is displayed, press **<SELECT>** to advance to the next parameter.

P115.XX MtDly

This parameter sets the time delay period for the Motion status. The scale must be stable within the number of divisions set in P114 for the time period set here for the Motion status to be removed. Press **<ENTER>** to cycle through the available choices. When the correct choice is displayed, press **<SELECT>** to advance to the next parameter.

P116.XX Filtr

This parameter establishes the display response time in terms of seconds, or how long the indicator takes to respond to a full scale weight. The higher the value selected, the longer the response time, but more stability will be achieved. Press **<ENTER>** to display the available selections. When the correct choice is displayed, press **<SELECT>** to advance to the next parameter.

A. Filtering Background:

The filter selections for the 550/570 indicator determine how the display responds to a changing weight signal. Faster filter selections allow the indicator to respond quickly to an applied weight at the risk of causing some instability due vibration or wind currents. Slower selections will provide more stability in the presence of vibrations at the cost of a longer time to settle on a final value.

B. Standard Filter

Setup parameter P116 has fourteen standard selections, choices 0 through 13. The response time of the selections is rated in terms of the time required for the indicator to reach a final steady state after the application of a full scale load. Selection zero provides the fastest response, thus the least amount of filtering while selection thirteen provides the slowest response and the most filtering.

C. Auto-Filter

The Auto-filter selections attempt to combine the best of both choices. When the weight is changing rapidly (such as an item is placed on a scale), the indicator automatically switches to the fastest filter selection, ie 1/8 second full scale response time. However when the weight appears to be settling around a final value the filter automatically switches back to the specified filter selection. This may work well in some situations such as a check weighing application, but it may prove less repeatable in a filling application which requires a consistent response in order to compensate for free-fall and other factors.

The criteria used by the indicator to determine when to switch to the fastest filter selection and when to return to the selected filter selection is proportional to the selected increment, parameter P111. Therefore if the auto-filter is not performing as desired, the increment may be adjusted upward to improve the stability or downward to improve the response time (if the application does not require a specific increment).

Refer to table 2, Filter Setup selections for a complete list of all the selections for P116. Note that all these choices also apply for Multi-Scale applications, ie P126,

Selection		Effective Full Scale Response Time (seconds) *
Standard Filter	Auto-Filter	
0	N/A	0.12
1	21	0.16
2	22	0.25
3	23	0.33
4	24	0.50
5	25	0.67
6	26	1.0
7	27	1.3
8	28	2.0
9	29	2.7
10	30	4.0
11	31	5.3
12	32	8.0
13	33	11.0

Table 2 Filter Setup Selections

P136 and P146 for a 2nd, 3rd and 4th scale respectively.

* Note that for the auto-filter selections, the full scale response times listed are not indicative of the time required for the indicator to respond to a full scale input

change but rather an indication of the relative filtering that will be performed when the weight signal has achieved a steady state. In effect, selection 30 has the same steady state filtering effect as selection 10.

P117.XX Rate=

This parameter specifies how often the display is updated with new data. For example, if 0.05 is selected, the indicator will write data to the display every time an Analog/Digital conversion is made, since the A/D converter updates every 0.05 second, selections from 0.05 to 20.0 seconds are available. This parameter also sets the transmission rate for continuous transmits. Press **<ENTER>** to cycle through the available selections. When the correct one is displayed, press **<SELECT>** to advance to the next parameter.

P118.XX Zrnge

This parameter specifies how much zero can be removed in terms of % of Full Scale. This is ideal for tank weighing applications to prevent accidental ZERO operations and for Canadian applications which have a 4% or less requirement. Press **<ENTER>** to cycle through the available selections. When the correct one is displayed, press **<SELECT>** to advance to the next parameter.

P119.XX Linrz

This parameter enables or disables the Multi-Point Linearization feature. Press **<ENTER>** to toggle between the enable or disable selection. When the correct one is displayed, press **<SELECT>** to advance to the next parameter. When all selections are complete, press **<ZERO>**. If any of the calibration related parameters were changed, such as Full Scale, the indicator will now prompt you to perform a calibration.If you wish to re-calibrate, press **<ENTER>** and refer to the section on Calibration operation.If you do not wish to perform a calibration at this time, press **<CLR>** to skip the calibration. If any changes were made, the indicator will inform you and ask you to press **<ENTER>** to save the modifications. To undo any changes, press **<CLR>**. Then press **<ENTER>** again to exit the Setup Mode.

NOTE:
If you should decide to return to the Setup Mode during the exit process , press any key other than **<ENTER>** or **<CLR>**.

P120 to **P129**

govern the same basic weighing setup as **P110** thru **P119** except instead of applying to scale 1, it sets up scale 2.

P130 to **P139**

govern the same basic weighing setup as **P110** thru **P119** except instead of applying to scale 1, it sets up scale 3.

P140 to **P149**

govern the same basic weighing setup as **P110** thru **P119** except instead of applying to scale 1, it sets up scale 4.

Chapter 4
Parameter Setup (Advanced)

The models 550/570 weighing and counting instruments contain many advanced features which can add a great deal of flexibility and capability over and above the functionality of a basic setup. This section will describe these advanced features, how they are set up, and how they operate. Understanding the functionality of these advanced features will permit you to customize the 550 or 570 for most weighing and counting applications.

4.1 Getting Into the Parameter Setup Mode

Before starting to program the advanced features of the 550 to suit your application, let's review the procedures for getting into the setup mode, and how to program parameters. Some of these steps were previously covered in Chapter 3 Basic Weighing Parameter Setup.

1. To access the Setup Mode, press the parameter number you wish to view or change then press <**SELECT**>. For example:
   <1> <1> <8> <SELECT>

2. The system uses the large display to tell you that you're entering the Setup Mode and the smaller display to prompt you to enter the programming code.

> **NOTE:**
>
> You can enter the number of any other parameter you wish to view or change. However the indicator will prompt you with the message "Key In Code" so that you can key in a different parameter number.

If you are simply going to review the setup, press **<ENTER>** and the system will briefly display that no modification (-No- Mods!) can be made to the instrument setup before proceeding to the desired parameter.

If you want to make changes to the setup, press
<2> <3> <6> <4> <0> <ID> <ENTER>
and the 550 will briefly inform you that modifications are permitted and will then display the desired setup parameter. By entering the password "23640" the 550 will permit the operator to make parameter changes.

If changes are made to any parameters, they may be cancelled during the exit process. If no keys are pressed after you press **<SELECT>**, the 550 will automatically return to the Weigh Mode.

4.2 Using the Parameter Setup Mode

Once you have entered the Setup Mode the following general rules apply. Press **<SELECT>** to move from parameter to parameter. To move directly to a specific parameter, enter its number and press **<SELECT>**. To back up one parameter, press **<.><SELECT>**.
If modifications are allowed, press **<ENTER>** to review the sub-set of available choices for each parameter selected.

You can make a specific parameter sub-set selection by entering its number and pressing **<ENTER>**.
For prompted questions, respond by pressing **<ENTER>** for "yes" and **<CLR>** for "no".

If you only want to review a parameter when first entering the Setup Mode, but later decide to make changes, press **<1> <0> <0> <SELECT>** and enter the program code as described above. You will then be returned to the parameter you were reviewing, and be able to make changes.

While in the Setup Mode, the first digit of the large numeric portion of the display is always a P. The subsequent 3, 4 or 5 digits up to the decimal point indicate the currently selected parameter number. The current selection for the current parameter is indicated in the digits to the right of the decimal point. If the current selection is too large to fit in the available space, then triple dashes are shown in each digit after the decimal point, for example: "P114.==" If the parameter is strictly a key-in type, then a single dash is shown in each digit to the right of the decimal point.
The top line of the dot matrix display area shows the parameter name or use. The bottom line describes the current selection for the parameter.

4.3 Exiting the Parameter Setup Mode

At any point within Setup Mode, you can press **<ZERO>** to return to the Weigh Mode.
If you initially keyed in the security code to allow changes, you will be asked if you want to perform a calibration. Press **<ENTER>** to perform a calibration. Press **<CLR>** to skip the calibration routine. Pressing any other key returns to the Setup Mode. Refer to chapter 7 for details on calibration.

If you made any changes to the setup, the system will ask you to press **<ENTER>** to save any modifications. If you press **<CLR>**, the system will ask you to press **<ENTER>** if you want to undo modifications. Press any other key to return to the Setup Mode. The system will prompt you to press **<ENTER>** to exit.

4.4 Parameter Types

There are two types of setup parameters in the 550, **KEY-IN** and **SELECTABLE.** Key-in parameters, require a numeric entry followed by the **<ENTER>** key. Key-in parameters are identified by a pair of dashes on the right side of the data portion of the display.

Selectable parameters are identified by a pair of digits indicating the parameter selection number. Selectable parameters provide you with a sub-set series of choices which may be displayed by pressing the **<ENTER>** key. You can also make your choice by directly keying in the selection number. For example, parameter P112 contains over 100 different selections. You could press the **<ENTER>** key to cycle through the selections, or you could key in the selection number and press **<ENTER>**. If you want to return to the first selection, press **<0> <ENTER>**. To locate a particular selection number refer to the parameter listings in Table 3.
All of the programmable parameters are divided into the following groups:

P101 to P104 set up the Multi-Scale option operation. This permits inputs from up to 4 scales in the 550, and allows three choices for each scale: disable, save, or enable for scales 1 thru 3.

P110 to **P119** govern basic weighing setup which includes full scale definition, indicator precision, display update rates and linearization enable for Scale 1.

P120 to **P129** govern basic weighing setup for Scale 2 which includes full scale definition, indicator precision, display update rates and linearization enable. This Parameter group is available if **P102** is set to enable for Scale 2.

P130 to **P139** govern basic weighing setup for Scale 3 which includes full scale definition, indicator precision, display update rates and linearization enable. This Parameter group is available if **P103** is set to enable for Scale 3.

P140 to **P149** govern basic weighing setup for Scale 4 which includes full scale definition, indicator precision, display update rates and linearization enable. This Parameter group is available if **P104** is set to enable for Scale 4.

P150 to **P158** set up the selection of units, their order of appearance and the custom units feature.

P160 to **P165** set up Model Number, Tare operation and Accumulation functions.

P166 to **P169** disable certain keyboard functions.

P170 to **P172** setup the analog output option.

P180 to **P188** set up the counting mode setup selections which includes auto sampling, auto-enhance, sample size, accuracy and counting internal resolution. These parameters apply only to the counting operations and are not operational in the weighing operations.

P192 to **P193** selects the filter selection used during a sampling routine. Enforced accuracy during sample routine set at P183 then reverts back to the original filter during normal counting operations.

P200 to **P209** set up the basic communication protocols. Thr baud rate, number of data bits, parity, number of stop bits.

P210 to **P242** set up the selection criteria for Custom Transmits 1 through 4. (Parameters P1000 through P4000 customize the data to be transmitted).

P250 to **P251** set up the network capabilities of the 550. There are 255 addresses available.

P290 to **P292** set up the remote display capabilities of the 550.

P300 to **P309** assign the sequence of mode appearance when the **< SELECT >** key is pressed during weighing mode operation.

P400 to **P401**set up the custom PIN# (access code) for the entire unit and the quick cal mode.
P410 to **P412** set up the unit to meet OIML specifications. These parameters include international character set selections.

P420 to **P422** allows for automatically controlling the shutting off of the LCD backlight or VF display.

P460 to **P489** specify a fixed number of decimal places for each of the 30 variables (VARS). Each variable may have its decimal point fixed to a value between 0 (x.) and 5 places (x.xxxxx).

P500 to **P515** set up the Time-Date and Alarm operations.

P600 to **P637** are set aside for custom naming parameters 0 thru 37.

P650 to **P654** set up the Naming Parameters for database recalled time and the 4 alarms.

P660 to P689 are for naming the 30 variables (VARS).

P691 to P694 are for naming the 4 registers (REGS).

P700 to **P725** are for setting up the six possible ID parameters in addition to enabling Truck In-Out Weighing.

P731 to **P746** are for setting up database parameters. They are available if Parameter **P720** has been set to database or menu. They are used to define databases 1 thru 16. Note that the database module must be installed in order for these parameters to appear.

P800 to **P816** are for Macro Setup.

P850 to **P866** name Macros 0 thru 16.

P870 to **P886** selects whether a macro is allowed to be invoked once or multiple times. Macro 0 thru 16 can be set individually.

P900 to **P982** are for the Input Interpreter setup.

P1000, P2000, P3000 and **P4000** are for the 1st through 4th Custom Transmits, and define the data to be transmitted.

P5003 to **P5094** selects the method by which any of the parameters are written to E^2.

P5100 to **P8261** are for setting up the 32 Setpoints relating to outputs or internal use. There are 3 choices for each setpoint which include disable, output or input. Diagnostic and Database use.

4.5 Character Entry

When alphabetic and other non-numeric characters are being entered into the 550, the **<UNITS>** **<PRINT>** **<ID>** and **<TARE>** keys assume the functions of arrow keys similar to those found on a computer keyboard (see Figure 7 Keypad Cursor Keys) at the end of chapter. The **<UNITS>** key scrolls forward through the list of characters; **<PRINT>** key scrolls backward through a list of characters; **<ID>** can be used as a backspace key; **<TARE>** key advances to the next location.

When you encounter a parameter that accepts this type of information, press **<UNITS>** key and the 550 will place an "A" in the dot matrix portion of the display. The **<UNITS>** and **<PRINT>** keys are then used to cycle through the possible selections of upper-case and lower-case letters, numerics and the standard set of punctuation symbols, starting with the letter A. Holding down **<UNITS>** or **<PRINT>** keys will cycle you through more quickly. When the desired character is displayed, press **<TARE>** arrow key to move to the next location where an "A" will be displayed so you can select the next character. This operation is in effect when entering ID data and while in Setup Modes **P157, P600-P694, P157-P158, P701 - P711, P800 - P816, P850 - P865** and **P1000 - P4000**. Refer to Figure 8 Character Listing for the available characters and their order of appearance at the end of this chapter.

4.6 Parameter Listing (P101 - P65010)

This section contains a listing of all of the setup parameters contained within the 550 Counting/Weigh System. Refer to table 3, Parameter Listing (Software Map). We have attempted to list all of the parameters, however, in some cases where the number of available selections is repetitive, reasonably obvious, (as in the case of parameter **P300** series: Operational Modes)are too numerous to list individually, an example and a range has been substituted for the unlisted parameters. In the case of Parameter **P5100** series: Setpoints, we have listed the full complement for only the first of the 32 existing setpoints.

Some parameters in this list may not appear, based upon which parameters you have previously selected or whether a particular option has been installed.

The Chart below shows all the parameter selections in the 550 system. An Asterisk (*****) next to a parameter indicates a manufacturer default setting.

***** = Manufacturer (GSE) Default Setting.
***** = Factory Default Setting

PARAMETER #		SELECTION	DESCRIPTION
MULTI-SCALE			
P101.00 Scl 1		Disbl	Disable Scale 1
P101.01 Scl 1		Saved	Disable Scale 1, Save Setup and Calibration
P101.02 Scl 1	*	Enbld	Enable Scale 1
P102.00 Scl 2 through **P104.00 Scl 4**			Same as parameter **P101** for Scales 2 thru 4.
BASIC INSTRUMENT SETUP (SCALE 1)			
P110.- - F.S.=		XXX.XXX	Full Scale Capacity of Platform Load Cell.
	*	100.00	
P111.00 1 div		00001	Set Count-By and Decimal Point
P111.01		00002	
P111.02		00005	
P111.03		.0001	
P111.04		.0002	
P111.05		.0005	
P111.06		.001	
P111.07		.002	
P111.08		.005	
P111.09	*****	.01	
P111.10		.02	
P111.11		.05	
P111.12		.1	
P111.13		.2	
P111.14		.5	
P111.15		1.	
P111.16		2.	
P111.17		5.	
thru			
P111.23		500.	

PARAMETER #	SELECTION		DESCRIPTION
P112.00 Ztapr		OFF	Set Zero Track Aperture in terms of divisions
P112.01		0.1 d	
P112.02		0.2 d	
P112.03		0.3 d	
P112.04		0.4 d	
P112.05	*	0.5 d	
thru			
P112.ºº		20.0d	
P113.00 ZTdly		0.05s	Set Zero Track TIme Delay in seconds.
P113.01		0.1 s	
P113.02		0.2 s	
P113.03		0.3 s	
P113.04		0.4 s	
P113.05		0.5 s	
P113.06		0.6 s	
P113.07		0.7 s	
P113.08		0.8 s	
P113.09		0.9 s	
P113.10	*	1.0 s	
thru			
P113.ºº		10.0s	
P114.00 Mot'n		OFF	Define Motion in terms of divisions.
P114.01		0.1 d	
P114.02		0.2 d	
P114.03		0.3 d	
P114.04		0.4 d	
P114.05		0.5 d	
P114.06		0.6 d	
P114.07		0.7 d	
P114.08		0.8 d	
P114.09		0.9 d	
P114.10	*	1.0 d	
thru			
P114.ºº		20.0d	

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PARAMETER #	SELECTION	DESCRIPTION
P115.00 MtDly	0.05s	Define Motion in terms of seconds.
P115.01	0.1 s	
P115.02	0.2 s	
P115.03	0.3 s	
P115.04	0.4 s	
P115.05	0.5 s	
P115.06	0.6 s	
P115.07	0.7 s	
P115.08	0.8 s	
P115.09	0.9 s	
P115.10	* 1.0 s	
thru		
P115.ºº	10.0s	
P116.00 Filtr	.012 s	Set Indicator response time in terms of seconds
P116.01	.16 s	
P116.02	.25 s	
P116.03	.33 s	
P116.04	.50 s	
P116.05	.67 s	
P116.06	* 1.0 s	
P116.07	1.3 s	
P116.08	2.0 s	
P116.09	2.7 s	
P116.10	4.0 s	
P116.11	5.3 s	
P116.12	8.0 s	
P116.13	11. s	
Auto-sample		
P116.21	.16 s	
P116.22	.25 s	
P116.23	.33 s	
P116.24	.50 s	
P116.25	.67 s	
P116.26	1.0 s	
P116.27	1.3 s	
P116.28	2.0 s	
P116.29	2.7 s	
P116.30	4.0 s	
P116.31	5.3 s	
P116.32	8.0 s	
P116.33	11. s	

PARAMETER #	SELECTION	DESCRIPTION
P117.01 Rate=	0.1s	Sets display update rate as updates per second.
P117.02	* 0.2 s	
P117.03	0.3 s	
P117.04	0.4 s	
P117.05	0.5 s	
thru		
P117. ºº	20.0s	
200 selections		
P118.00 Zrnge	0.01%	Specify how much zero can be removed in terms of percent of Full Scale.
P118.01	0.02%	
P118.02	0.05%	
P118.03	0.1%	
P118.04	0.2%	
thru		
P118.12ºº	* 100.%	
P119.00 Linrz	* Disbl	Enables/disables Multi-Point Linearization.
P119.01	Enbld	
SCALE 2 BASIC WEIGHING		
P120.-- F.S.= through **P129.01 Linrz**		Basic Weighing Setup for Scale 2. Same as parameters P110 through P119.
SCALE 3 BASIC WEIGHING		
P130.-- F.S.= through **P139.01 Linrz**		Basic Weighing Setup for Scale 3. Same as parameters P110 through P119.
SCALE 4 BASIC WEIGHING		
P140.-- F.S.= through **P149.01 Linrz**		Basic Weighing Setup for Scale 4. Same as parameters P110 through P119.

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PARAMETER #	SELECTION	DESCRIPTION
UNITS SETUP		
P150.00 UNITS	* =lb	Set calibration units as pounds.
P150.01	=kg	Set calibration units as kilograms.
P150.02	=oz	Set calibration units as ounces.
P150.03	=g	Set calibration units as grams. pounds.
P150.05	=N-m	Set calibration units as Newton-meters.
P150.06	????1	Set Calibration Units as Custom Units 1.
P151.00 UNIT1	* =lb	Sets the power-up units as pounds
P151.01	=kg	Sets the power-up units as kilograms
P151.02	=oz	Sets the power-up units as ounces
P151.03	=g	Sets the power-up units as grams
P151.04	=ftlb	Sets the power-up units as foot-pounds
P151.05	=N-m	Sets the power-up units as Newton-meters
P151.06	????1	Sets the power-up units as Custom Units 1
P151.07	????2	Sets the power-up units as Custom Units 2
P151.08	lb oz	Sets the power-up units as pounds-ounces
P152.00 UNIT2	=lb	Sets the second units as pounds
P152.01	* =kg	Sets the second units as kilograms
P152.02	=oz	Sets the second units as ounces
P152.03	=g	Sets the second units as grams
P152.04	=ftlb	Sets the second units as foot-pounds

PARAMETER #	SELECTION	DESCRIPTION
P		
P152.05	=N-m	Sets the second units as Newton-meters
P152.06	????1	Sets the second units as Custom Units 1
P152.07	????2	Sets the second units as Custom Units 2
P152.08	lb oz	Sets the second units as pounds-ounces
P152.09	=NONE	Disables the second appearing units
P153.00 UNIT3	=lb	Sets the third units as pounds.
P153.01	=kg	Sets the third units as ounces
P153.03	=g	Sets the third units as grams
P153.04	=ftlb	Sets the third units as foot-pounds
P153.05	=N-m	Sets the third units as Newton-meters
P153.06	????1	Sets the third units as Custom Units 1
P153.07	????2	Sets the third units as Custom Units 2
P153.08	lb oz	Sets the third units as pounds-ounces
P153.09	* =NONE	Disables the third units.
P154.00 UNIT4	=lb	Sets the fourth units as pounds
P154.01	=kg	Sets the fourth units as kilograms
P154.02	=oz	Sets the fourth units as ounces
P154.03	=g	Sets the fourth units as grams
P154.04	=ftlb	Sets the fourth units as foot-pounds
P154.05	=N-m	Sets the fourth units as Newton-meters
P154.06	????1	Sets the fourth units as Custom Units 1
P154.07	????2	Sets the fourth units as

4

PARAMETER #	SELECTION	DESCRIPTION
		Custom Units 2
P154.08	lb oz	Sets the foruth units as pounds-ounces
P154.09	* =NONE	Disables the fourth units
P155.- -Ucon1	* 1.000	Enter the conversion factor for the 1st Custom Units.
P156.- -Ucon2	* 1.000	Enter the conversion factor for the 2nd Custom Units.
P157.- -Unam1	* ????1	Enter the name of the 1st Custom Units.
P158.- -Unam2	* ????2	Enter the name of the 2nd Custom Units.
MODEL TYPE, TARE & ACCUMULATION		
P160.00 Model	* 550	Shows the System model type
P160.01	570	
P161.00 TrSAV	* Disbl	Select whether or not you want to saveTare Weight on power-down
P161.01	Enbld	
P162.00 TrNEG	* Disbl	Select whether or not to be able to tare out negative numbers
P162.01	* Enbld	
P163.00 TrRND	Disbl	Elect whether or not to round off tare values.
P163.01	* Enbld	
P164.00 AcRTZ	0.01%	Enter how close the platform must be to zero in
P164.01	0.02%	terms of Full Scale in order to perform an
P164.02	0.05%	Accumulation
P164.03	* 0.1%	
P164.04	0.2%	
P164.12	100.%	
P165.00 AcFnc	BOTH	Select whether to add, subtract or be able to do
P165.01	* ADD	do both when accumulating.
P165.02	SUB	
KEY DISABLING		
P166.00 AutoT	Disbl	Enable/disable use of auto-tare operation.

PARAMETER #	SELECTION	DESCRIPTION
166.01	* Enbld	
P167.00 KybdT	Disbl	Enable/disable keyboard tare operation
P167.01	* Enbld	
P168.00 KybdS	Disbl	Enable / disable numeric keyboard Weigh Mode selections
P168.01	* Enbld	
P169.00 GrENT	* Disbl	Enable / disable keyboard entry of the Gross Weight (NOT H-44)
P169.01	Enbld	
ANALOG OUTPUT OPTION		
P170.00 A-out	* off	Turn Analog Output option on or off (if installed).
P170.01	on	
P171.00 Parm	Gross	If P170.01 is selected, this establishes which of the numeric parameters the Analog Output option will be based upon, most commonly Gross or Net.
P171.01	Net	
P171.02	Tare	
P171.03	GrTOT	
P171.04	GrT+C	
P171.05	GrT-C	
P171.06	NtTOT	
P171.07	NtT+C	
P171.08	NtT-C	
P171.12	TrGrs	
P171.13	TrNet	
P171.14	TrTar	
P171.91	Reg#1	
P171.92	Reg#2	
P171.93	Reg#3	
P171.94	Reg#4	
P172.- -F.S.=	XXX.XXX	The value entered here sets the weight which will set the Analog Output voltage to 10 volt (or output current to 20 mA)

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PARAMETER #		SELECTION	DESCRIPTION
PARTS COUNTING MODE (570)			
P180.00 ASmpl		off	Turn Auto Sample Accept on
P180.01		on	or off
P181.00 AEnhn		off	Turn Auto-Enhance on or off
P181.01		on	
P182.00 SmpSz		None!	Sets default sample size
P182.--		1 to 9999	
P183.00 %Accy		None!	Sets Piece Weight Accuracy
P183.--		90.00 to 99.96	Select in .04% increments
P184.00 AcDsp		off	Display Current Piece
P184.01		on	Weight Accuracy
P185.00 ErFac		0.1 to 20	Accuracy Error Factor
P186.00 PreSm		None!	Pre-Sample Scale Switch
P186.01		Scl1	Scale 1
P186.02		Scl2	Scale 2
P186.03		Scl3	Scale 3
P186.04		Scl4	Scale 4
P187.00 AftSm		None!	After-Sample Scale Switch
P187.01		Scl1	Scale 1
P187.02		Scl2	Scale 2
P187.03		Scl3	Scale 3
P187.04		Scl4	Scale 4
P188.— Res1	*	Count res/scl 1	Scale 1 count resolution value entered.
P189.— Res2		Count res/scl 2	Scale 2 count resolution value entered.
P190.— Res3		Count res/scl 3	Scale 3 count resolution value entered.
P191.— Res4		Count res/scl 4	Scale 4 count resolution value entered.
SAMPLING			
P192.00 SmpFl	*	None!	Selects filter used during sampling.
P193.00 AcEnf	*	off	Enforce accuracy during sample.
P193.01 AcEnf		on	Set at P183.
TRANSMISSION PROTOCOL			
P200.00 Baud		19200	Set the baud rate for both Print and Comm ports
P200.01	*	9600	
P200.02		4800	
P200.03		2400	
P200.04		1200	
P200.05		600	
P200.06		300	
P200.07		150	

PARAMETER #	SELECTION	DESCRIPTION
P201.00 #data	7bits	Select the number of data bits for the transmission
P201.01	* 8bits	
P202.00 Par'y	* none	Select the parity for all transmissions.
P202.01even		
P202.02	odd	
P203.00 #stop	* 1bit	Select the number of stop bits for all transmissions
P203.01	2bits	
P204.00 ComHS none		Select the type of handshake used by the Com Port for sending and receiving.
P204.01	CTS	
P204.02	* Xon	
P204.03	both	
P205.00 PrnHS	* none	Select the type of handshake used by the Print Port
P205.01	CTS	
P206.00 RxCom	off	Enable or disable the receiver for the Com Port.
P206.01	* on	
P207.00 TxRTZ	0.01%	Select a return range for use with the weighment transmission in percentage of Full Scale.
P207.01	0.02%	
P207.02	0.05%	
P207.03	* 0.1%	
P207.04	0.2%	
P207.05	0.5%	
P207.12	100.%	
P208.00 Width	=0	Select the number of characters transmitted for numeric parameters if a fixed width format is used for the Custom Transmits.
P208.01	=1	
P208.02	=2	
P208.03	=3	
P208.04	=4	
P208.08	* =8	
P208.15	=15	
P209.00 TxHld	* delay	Will delay or abort a transmission when the transmit buffer is full
P209.01	abort	

PARAMETER #	SELECTION		DESCRIPTION
1ST TRANSMIT SELECTIONS			
P210.00 Send1		off	Disable the 1st Transmit
P210.01	*	onreq	Send the 1st Transmit on request
P210.02		cont.	Send the 1st Transmit continuously
P210.03		wghmt	Send the 1st Transmit after each weighment
P211.00 Port		Comm	Select port for 1st Transmit.
P211.01	*	Print	
P212.00 Mot'n		off	Enable/disable motion delay for 1st Transmit
P212.01	*	delay	
2ND TRANSMIT SELECTIONS			
P220.00 Send2	*	off	Determine when 2nd Transmit will be sent
P220.01		onreq	
P220.02		cont	
P220.03		wghmt	
P220.04		onrq2	
P221.00 Port	*	Comm	Select port for 2nd Transmit.
P221.01		Print	
P222.00 Mot'n		off	Enable/disable motion delay for 2nd Transmit.
P222.01	*	delay	
3RD TRANSMIT SELECTIONS			
P230.00 Send3	*	off	Determine when 3rd Transmit will be sent
P230.01		onreq	
P230.02		cont	
P230.03		wghmt	
P230.04		onrq2	
P231.00 Port	*****	Comm	Select port for 3rd Transmit.
P231.01	Print		
P232.00 Mot'n		off	Enable/disable motion delay for 3rd Transmit.
P232.01	*****	delay	

PARAMETER #	SELECTION		DESCRIPTION
4TH TRANSMIT SELECTIONS			
P240.00Send4	*	off	Determine when 4th Transmit will be sent.
P240.01		onreq	
P240.02		cont.	
P240.03		wgmt	
P240.04		onrq2	
P241.00 Port	*	Comm	Select port for 4th Transmit.
P241.01	Print		
P242.00 Mot'n		off	Enable/disable motion delay
		for	4th Transmit.
P242.01	*	delay	
NETWORKING			
P250.00 NtWrk	*	Disbl	Disable network capabilities.
P250.01 NtWrk		TxTri	Enable multi-drop RS-485.
P251.00 Addrs	*	0	Select node address from 0-254.
		thru	
P251.— Addrs		254	
REMOTE DISPLAY			
P290.00 Echo	*	Disbl	Disable transmitting units display to remote device.
P290.01 Echo		Comm	Echo unit’s display to remote device out the comm port.
P290.02 Echo		Prntr	Echo units’s display to remote device out the printer port.
P291.02 Echo	*	<STX>	Transmit any ASCII character or control code to remote device <u>before</u> echoing unit’s display.
P292.03 Echo	*	<ETX>	Transmit any ASCII character or control code to remote device <u>after</u> echoing unit’s display.

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PARAMETER #	SELECTION	DESCRIPTION
OPERATIONAL MODES		
P300.00 MODE0 *	Gross	Select the operating mode that will appear first after power-up.
P300.01	Net	
P300.02	Tare	
P300.03	GrTOT	
P300.04	GrT+C	
P300.05	GrT-C	
P300.06	NtTOT	
P300.07	NtT+C	
P300.08	NtT-C	
P300.11	Tm/Dt	
P300.12	TrGrs	
P300.13	TrNet	
P300.14	TrTar	
P300.30	Qty	
P300.31	QtTOT	
P300.32	QtT+C	
P300.33	QtT-C	
P300.34	Pc-Wt	
P300.35	APW*K	
P300.36	%Accy	
P300.37	Sampl	
P300.50	Rtime	
P300.51	A1Tim	
P300.52	A2Tim	
P300.53	A3Tim	
P300.54	A4Tim	
P300.60	Var#10	
P300.61	Var#11	
P300.62	Var#12	
P300.63	Var#13	
P300.64	Var#14	
P300.65	Var#15	
P300.66	Var#16	
P300.67	Var#17	
P300.68	Var#18	
P300.69	Var#19	
P300.70	Var#20	
P300.71	Var#21	
P300.72	Var#22	
P300.73	Var#23	
P300.74	Var#24	
P300.75	Var#25	
P300.76	Var#26	

PARAMETER #	SELECTION	DESCRIPTION
P300.77	Var#27	
P300.78	Var#28	VAR#28 not accessible by **<78> <SELECT>**
P300.79	Var#29	
P300.80	Var#0	
P300.81	Var#1	
P300.82	Var#2	
P300.83	Var#3	
P300.84	Var#4	
P300.85	Var#5	
P300.86	Var#6	
P300.87	Var#7	
P300.88	Var#8	
P300.89	Var#9	
P300.91	Reg#1	
P300.92	Reg#2	
P300.93	Reg#3	
P300.94	Reg#4	
P300.99	None!	

PARAMETER #	SELECTION	DESCRIPTION

PARAMETER #	SELECTION	DESCRIPTION
P301.00 MODE1	Gross	Select the operating mode that will appear next after pressing the <**SELECT**> key
P301.1 thru **P301.99**	* Net	These 62 selections are the same as P300.00 MODE0
P302.00 MODE2 thru **P309.00 MODE9**	Gross	Select the operating mode that will appear next after pressing the <**SELECT**> key
P302.1 thru **P309.99**		These selections (MORE THAN 350) are the same as P300.00 MODE0
P302.2	* Tare	
PIN NUMBER		
P400.— PIN	* None	This parameter allows for a new user access code to be defined. (**P**ersonal **I**dentification **N**umber)
P401.— QCAL	* None	This parameter allows for a new user Quick Cal. access code to be defined.

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PARAMETER #	SELECTION	DESCRIPTION
EUROPEAN SPECIFIC MODIFICATIONS		
P410.— OIML	* Disbl 9990 (CODE)	Disable OIML specifications. This parameter assumes that the OIML version keypad is being used. Code must be entered to change selection.
P410.— OIML	* Enbld 9991 (CODE)	Enable OIML specifications. This parameter assumes that the OIML version keypad is being used. Code must be entered to change selection.
INTERNATIONAL CHARACTERS		
P411.00 LANG	* USA	The system has the ability to display international characters. Thirteen languages are selectable. Refer to the section on international character set for more information on this capability.
P411.01 LANG	Frnce	
P411.02 LANG	Germn	
P411.03 LANG	UK	
P411.04 LANG	Dnmrk	
P411.05 LANG	Swedn	
P411.06 LANG	Italy	
P411.07 LANG	Spain	
P411.08 LANG	Japan	
P411.09 LANG	Norwy	
P411.10 LANG	Dnmk2	
P411.11 LANG	Spn2	
P411.12 LANG	LatAm	

PARAMETER #	SELECTION	DESCRIPTION
PRESET CHARACTERS **P412.00 PrSET** **P412.01 PrSET**	* Disbl Enbld 2 Tare 3 GrTOT 4 GrT+C 5 GrT-C 6 NtTOT 7 NtT+C 8 NtT-C 31 QtTOT 32 QtT+C 33 QtT-C 34 APW 35 APW*K	Preset-able parameters can be flagged or not if a value is directly entered into them. If these parameters are printed or transmitted a “P” is placed in front of the parameter name. If enabled, any recalled data to these registers will also indicate that the data in the register has been placed there by other means. The letter “P” will appear in the display in front of the parameter’s name if this feature is enabled. It will also print out with the letter “P” prepended in front of the parameter name. If any of these parameters are renamed and preset is enabled, the first character in the rename area must be the flagging character. Include the first character in the rename as the prepended flagging character.

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PARAMETER #	SELECTION	DESCRIPTION
DISPLAY CONTROL		
P420.00 Dsply	OFF	Shut off the LCD backlight or the VF display.
P420.01 Dsply	* ON	LCD backlight or the VF display functions as normal.
P420.02 Dsply	AUTO	Shut off the LCD backlight or the VF display based around the specifications selected in parameters **P421** and **P422**..
P421.00 WtThr	2d	LCD backlight or the VF display will shut off if there is no display activity between the selected number of graduations. (**P420** set for AUTO).
P421.01	4d	
P421.02	* 6d	
P421.03	8d	
thru		
P421.12	26d	
P421.13	28d	
P421.14	30d	
P421.15	32d	
P422.00 TmOut	1/2 min.	LCD backlight or the VF display will shut off if there is no activity after the selected time requirements. This would be since the last key press or weight change. (**P420** set for AUTO)
P422.01	1	
P422.02	2	
P422.03	3	
P422.04	4	
P422.05	* 5	
P422.06	10	
P422.07	15	
P422.08	20	
P422.09	25	
P422.10	30	
P422.11	35	
P422.12	40	
P422.13	45	
P422.14	60	
P422.15	120	
		Refer to chapter 16, Macro Commands for controlling the display from a macro.

PARAMETER #	SELECTION		DESCRIPTION
VARIABLE DECIMAL PLACES			
P480.00 VarDP		=0	Sets Var#0 Decimal at x.
P480.01		=1	Sets Var#0 Decimal at x.x
P480.02		=2	Sets Var#0 Decimal at x.xx
P480.03		=3	Sets Var#0 Decimal at x.xxx
P480.04		=4	Sets Var#0 Decimal at x.xxxx
P480.05		=5	Sets Var#0 Decimal at x.xxxxx
P480.06	*	=Auto	Sets Var#0 Decimal at automatic
P460 through **P489**	*		Sets the significant digits following the decimal point for the 30 Variables, the same as parameter **P480**.

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PARAMETER #	SELECTION	DESCRIPTION
TIME-DATE AND ALARM PARAMETERS		
P500.SS Time	HH:MM	Enter correct time here if needed.
P501.YY Date	DA/MO	Enter correct date here if needed.
P502.00TmDat	* no	Determine whether or not the time and date will
P502.01	yes	be displayed upon power-up.
P503.00AM/PM	no	Determine whether time will use 12 hour or 24
P503.01	* yes	hour clock.
P504.00A1Sel	* off	Set the operating conditions for Alarm 1. Off dis-
P504.01	intvl	ables alarm; INTVL sets an interval; daily sets
P504.02	daily	alarm for once a day.
P505.SS A1Tim	HH:MM	Set time factor for Alarm 1.
P506.00 A2Sel	* off	Set the operating conditions for Alarm 2.
P506.01	intvl	
P506.02	daily	
P507.SS A2Tim	HH:MM	Set time factor for Alarm 2.
P508.00 A3Sel	* off	Set the operating conditions for Alarm 3.
P508.01	intvl	
P508.02	daily	
P509.SS A3Tim	HH:MM	Set the time factor for Alarm 3.
P510.00 Style	* U.S.A	Determine the style of the Time-Date display.
P510.01	Int'l	
P511.00 RtDsp	* Time and Date	
P511.01	Time Only	
P511.02	Date Only	
P511.03	Number	
P512.00 A1Dsp	* Time and Date	Alarm#1
P512.01	Time Only	
P512.02	Date Only	
P512.03	Number	
P513 thru **515**	*	Same as **P512** for Alarms #2 through #4

PARAMETER #	SELECTION	DESCRIPTION
NAMING PARAMETERS		
P600.-- Gross		Naming Parameters for Gross Reg Parameter 0 (Enter same as P701)
P601 through **P637**		Naming Parameters 1 thru 37 (Enter same as P701)
P650.-- Rtime		Naming Parameters for Recalled Time (Enter same as P701)
P651.-- A1Tim		Naming Parameters for Alarm #1 (Enter same as P701)
P652 through **P654**		Naming Parameters for Alarms #2 through #4 (Enter same as P701)
P660.-- Var#10		Naming Parameters for Var #10. (Enter same as P701)
P661 through **P679**		Naming Parameters for Vars #11 through #29. (Enter same as P701)
P680.-- Var#0		Naming Parameters for Var #0. (Enter same as P701)
P681 through **P689**		Naming Parameters for Vars #1 through #9. (Enter same as P701)
P691.-- Reg#1		Naming Parameters for Reg #1. (Enter same as P701)
P692 through **P694**		Naming Parameters for Regs #2 through #4. (Enter same as P701)

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PARAMETER #	SELECTION	DESCRIPTION
ID PARAMETERS AND TRUCK IN/OUT WEIGHING		
P700.- -idSIZE	* #1=12	Determine whether or not the ID will be used, and, if used, its size. If set to zero, ID is not used the corresponding odd-numbered parameter that will provide the name will not appear.
P701.- -NAME1	* None!	Appears only if size **P700** is 1 or greater
P702.- -idSIZE	* #2= 0	See **P700** above.
P704.- -idSIZE	* #3= 0	See **P700** above.
P706.- -idSIZE	* #4= 0	See **P700** above.
P708.- -idSIZE	* #5= 0	See **P700** above
P710.- -idSIZE	* #6= 0	See **P700** above
P720.00 iduse	* Std.	Determines whether ID use is standard or for
P720.01	Truck	Truck In/Out Weighing.
P721.00 iduse	* Seq'n	Specifies the type of ID number that will be used
P721.01	Smal#	to reference the stored truck weight if Truck #In/Out Weighing is used.
P721.02	Big	
P721.03ID	#6	Only Small and Big # permit storage of Tare Weights.

PARAMETER #	SELECTION	DESCRIPTION
P722.00 In Tx	* none	Specifies which of the four Custom Transmit setups will be transmitted during an incoming weighment.
P722.01	#1	
P722.02	#2	
P722.03	#3	
P722.04	#4	
P722.05	#1&2	
P722.06	#1&3	
P722.07	#1&4	
P722.08	#2&3	
P722.09	#2&4	
P722.10	#3&4	
P722.11	1,2,3	
P722.12	1,2,4	
P722.13	1,3,4	
P722.14	2,3,4	
P722.15	ALL	
P723.00OutTx	* none	Specifies which of the four CustomTransmit setups are transmitted during an outgoing weighment.
P723.01	#1	
P723.02	#2	
P723.03	#3 .	
P723.04	#4	
P723.05	#1&2	
P723.06	#1&3	
P723.07	#1&4	
P723.08	#2&3	
P723.09	#2&4	
P723.10	#3&4	
P723.11	1,2,3	
P723.12	1,2,4	
P723.13	1,3,4	
P723.14	2,3,4	
P723.15	ALL	

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PARAMETER #	SELECTION	DESCRIPTION
P724.00TSvTx	* none	Specifies which of the four Custom Transmit setups are sent during a Tare Storage.
P724.01	#1	
P724.02	#2	
P724.03	#3	
P724.04	#4	
P724.05	#1&2	
P724.06	#1&3	
P724.07	#1&4	
P724.08	#2&3	
P724.09	#2&4	
P724.10	#3&4	
P724.11	1,2,3	
P724.12	1,2,4	
P724.13	1,3,4	
P724.14	2,3,4	
P724.15	ALL	
P725.00 TFdTx	* none	Specifies which of the four Custom Transmitsetups are sent during a Tare Found.
P725.01	#1	
P725.02	#2	
P725.03	#3	
P725.04	#4	
P725.05	#1&2	
P725.06	#1&3	
P725.07	#1&4	
P725.08	#2&3	
P725.09	#2&4	
P725.10	#3&4	
P725.11	1,2,3	
P725.12	1,2,4	
P725.13	1,3,4	
P725.14	2,3,4	
P725.15	ALL	

PARAMETER #	SELECTION	DESCRIPTION
DATABASE SETUP		
P731.XX		This parameter is used to setup the columns for database 1. **P731** is available if **P720** has been set to either database or menu. The entry procedure is the same as for **P701**.
P732 through P746		These parameters are used to set up databases 2 through 16. They are available if **P720** has been set to either database or menu. The entry procedure is the same as for **P701**.
MACRO PROGRAMMING		
P800.00 Mac 0	* XXXXX	Enter macro #0 setup.
P801.00 Mac 1	* XXXXX	Enter macro #1 setup.
P802.00 Mac 2	* XXXXX	Enter macro #2 setup.
P803.00 Mac 3	* XXXXX	Enter macro #3 setup.
P804.00 Mac 4	* XXXXX	Enter macro #4 setup
P805.00 Mac 5	* XXXXX	Enter macro #5 setup.
P806.00 Mac 6	* XXXXX	Enter macro #6 setup.
P807.00 Mac 7	* XXXXX	Enter macro #7 setup.
P808.00 Mac 8	* XXXXX	Enter macro #8 setup.
P809.00 Mac 9	* XXXXX	Enter macro #9 setup.
P810.00 Mac10	* XXXXX	Enter macro #10 setup.
P811.00 Mac11	* XXXXX	Enter macro #11 setup.
P812.00 Mac12	* XXXXX	Enter macro #12 setup.
P813.00 Mac13	* XXXXX	Enter macro #13 setup.
P814.00 Mac14	* XXXXX	Enter macro #14 setup.
P815.00 Mac15	* XXXXX	Enter macro #15 setup.
P816.00 Mac16	* (#16/Special macro)	Enter macro #16 setup.
MACRO NAMES		
P850.-- Mac0	* None!	Macro #0 (see chp. 16)
P850.--	XXXXX	Key in Macro Name.
P851.-- Mac1	* None!	Macro #1 (see chp. 16)
P851.--	XXXXX	Key in Macro Name.
P852 through **P866**	* XXXXX	Macros #2 through #16

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PARAMETER #	SELECTION	DESCRIPTION
MULTI - MACRO		
P870.00 Mac 0	* Multi	Allow for multiple requests of macro 0 by placing the request on the macro stack.
P870.01 Mac 0	Singl	Allow for a single invoking of this macro within small time slot..
P871.00 Mac 1	* Multi	Allow for multiple requests of macro 1 by placing the request on the macro stack.
P871.01 Mac 1	Singl	Allow for a single invoking of this macro within small time slot..
P872.00 Mac 2	* Multi	Allow for multiple requests of macro 2 by placing the request on the macro stack.
P872.01 Mac 2	Singl	Allow for a single invoking of this macro within small time slot..
P873.00 Mac 3	* Multi	Allow for multiple requests of macro 3 by placing the request on the macro stack.
P873.01 Mac 3	Singl	Allow for a single invoking of this macro within small time slot..
Thru		
P886.00 Mac 16	* Multi	Allow for multiple requests of macro 16 by placing the request on the macro stack.
P886.01 Mac 16	Singl	Allow for a single invoking of this macro within small time slot..
INPUT INTERPRETER		
P900.00 RxInp	Disbl	Formats data received through the serial port
P901.00 RxTrm		Formats data sent through the
P901.10 RxTrm	<LF>	Line Feed serial port
P910.00 RxTyp	Unusd	Unused
P910.01	Char	Character
P910.02	Line	Line
P920 through **P980**		Input specifications #2 through #8

PARAMETER #	SELECTION	DESCRIPTION
CUSTOM TRANSMIT SETUP		
P1000 XXXXX	XXXXX	Enter information for 1st Custom Transmit.
P2000 XXXXX	XXXXX	Enter information for 2nd Custom Transmit.
P3000 XXXXX	XXXXX	Enter information for 3rd Custom Transmit.
P4000 XXXXX	XXXXX	Enter information for 4th Custom Transmit.

PARAMETER #		SELECTION	DESCRIPTION
WRITE PARAMETER TO E^2			
P5003.00 GrTOT		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5003.01 GrTOT		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5003.02 GrTOT	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5006.00 NtTOT		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5006.01 NtTOT		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5006.02 NtTOT	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5021.00 ID 1:		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5021.01 ID 1:		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5021.02 ID 1:	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5022.00 ID 2:		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5022.01 ID 2:		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5022.02 ID 2:	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION	DESCRIPTION
P5023.00 ID 3:	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5023.01 ID 3:	OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5023.02 ID 3:	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5024.00 ID 4:	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5024.01 ID 4:	OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5024.02 ID 4:	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5025.00 ID 5:	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5025.01 ID 5:	OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5025.02 ID 5:	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5026.00 ID 6:	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5026.01 ID 6:	OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5026.02 ID 6:	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

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PARAMETER #		SELECTION	DESCRIPTION
P5031.00 QtTOT		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5031.01 QtTOT		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5031.02 QtTOT	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5034.00 APW		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5034.01 APW		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5034.02 APW	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5051.00 RTime		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5051.01 RTime		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5051.02 RTime	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5052.00 A1Tim		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5052.01 A1Tim		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5052.02 A1Tim	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION	DESCRIPTION
P5053.00 A2Tim	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5053.01 A2Tim	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5053.02 A2Tim	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5054.00 A3Tim	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5054.01 A3Tim	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5054.02 A3Tim	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5060.00 Var 10	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5060.01 Var 10	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5060.02 Var 10	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5061.00 Var 11	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5061.01 Var 11	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5061.02 Var 11	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION		DESCRIPTION
P5062.00 Var 12		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5062.01 Var 12		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5062.02 Var 12	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5063.00 Var 13		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5063.01 Var 13		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5063.02 Var 13	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5064.00 Var 14		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5064.01 Var 14		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5064.02 Var 14	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5065.00 Var 15		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5065.01 Var 15		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5065.02 Var 15	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION	DESCRIPTION
P5066.00 Var 16	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5066.01 Var 16	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5066.02 Var 16	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5067.00 Var 17	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5067.01 Var 17	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5067.02 Var 17	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5068.00 Var 18	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5068.01 Var 18	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5068.02 Var 18	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5069.00 Var 19	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5069.01 Var 19	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5069.02 Var 19	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

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PARAMETER #	SELECTION	DESCRIPTION
P5070.00 Var 20	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5070.01 Var 20	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5070.02 Var 20	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5071.00 Var 21	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5071.01 Var 21	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5071.02 Var 21	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5072.00 Var 22	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5072.01 Var 22	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5072.02 Var 22	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5073.00 Var 23	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5073.01 Var 23	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5073.02 Var 23	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION	DESCRIPTION
P5074.00 Var 24	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5074.01 Var 24	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5074.02 Var 24	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5075.00 Var 25	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5075.01 Var 25	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5075.02 Var 25	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5076.00 Var 26	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5076.01 Var 26	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5076.02 Var 26	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5077.00 Var 27	NoSav	The stated parameter will **not** be written to E^2 at any time.
P5077.01 Var 27	OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5077.02 Var 27	* Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION		DESCRIPTION
P5078.00 Var 28		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5078.01 Var 28		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5078.02 Var 28	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5079.00 Var 29		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5079.01 Var 29		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5079.02 Var 29	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5080.00 Var 0		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5080.01 Var 0		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5080.02 Var 0	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5081.00 Var 1		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5081.01 Var 1		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5081.02 Var 1	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION		DESCRIPTION
P5082.00 Var 2		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5082.01 Var 2		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5082.02 Var 2	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5083.00 Var 3		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5083.01 Var 3		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5083.02 Var 3	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5084.00 Var 4		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5084.01 Var 4		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5084.02 Var 4	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5085.00 Var 5		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5085.01 Var 5		OnReq	The stated parameter will be written to E^2 on request by executing the macro command “n%v”. Refer to chapter 16, Macro Programming.
P5085.02 Var 5	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION		DESCRIPTION
P5086.00 Var 6		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5086.01 Var 6		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5086.02 Var 6	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5087.00 Var 7		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5087.01 Var 7		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5087.02 Var 7	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5088.00 Var 8		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5088.01 Var 8		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5088.02 Var 8	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5089.00 Var 9		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5089.01 Var 9		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5089.02 Var 9	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #		SELECTION	DESCRIPTION
P5091.00 Reg 1		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5091.01 Reg 1		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5091.02 Reg 1	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5092.00 Reg 2		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5092.01 Reg 2		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5092.02 Reg 2	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5093.00 Reg 3		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5093.01 Reg 3		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5093.02 Reg 3	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.
P5094.00 Reg 4		NoSav	The stated parameter will **not** be written to E^2 at any time.
P5094.01 Reg 4		OnReq	The stated parameter will be written to E^2 on request by executing the macro command "n%v". Refer to chapter 16, Macro Programming.
P5094.02 Reg 4	*	Auto	The stated parameter will automatically be written to E^2 as the parameter is changed.

PARAMETER #	SELECTION	DESCRIPTION

PARAMETER #	SELECTION	DESCRIPTION

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PARAMETER #	SELECTION	DESCRIPTION

SETPOINT SETUP

The setup of setpoints is covered more completely in Chapter 21. Some of the parameters listed below may or may not appear depending upon previous selections. Since there are 32 setpoints within the System and the programming for each is the same with the exception of the parameter numbers, we have included only the parameters for Setpoint #1. The parameter numbers begin with **P5100** for Setpoint #1 up through **P8200** for Setpoint #32.

PARAMETER #	SELECTION	DESCRIPTION
P5100.0 SPt 1	* Disbl	Enable / Disable setpoint operation
P5100.1	Outpt	Enable / Disable setpoint output
P5100.2	Input	Enable / Disable setpoint input
P5110.0 Activ	* Above	Output active if weight is above target value
P5110.1	Below	Output active if weight is below target value.

PARAMETER #	SELECTION	DESCRIPTION
P5110.2	Betwn	Output active if weight is between target values.
P5110.3	Outsd	Output active if weight is not between target values.
P5110.4	Tare	Output active if <**TARE**> key is executed.
P5110.5	Zero	Output active if <**ZERO**>key executed
P5110.6	Acc	Output active if **ACC** operation occurs
P5110.7	Mot'n	Output active if motion occurs.
P5110.8	NotMt	Output active if motion ceases.
P5110.9	alwys	Any de-activation is momentary.
P5110.º	never	Output will not become active on its own. An activate command within a Macro or an RS-232 message is necessary to activate this setpoint.
P5111.0 Hold	* 0.0	No extra delays.
P5111.1	0.1	1/10 second minimum activation time.
P5111.2	0.2	2/10 second minimum activation time.
P5111.3	0.3	3/10 second minimum activation time.
P5111.º	25.0	25.0 second minimum activation time.
P5112.0 Macro	0	Macro 0 will execute when setpoint activates.
P5112.1 Macro	1	Macro 1 will execute when setpoint activates.
P5112.2 Macro	2	Macro 2 will execute when setpoint activates.
P5112.3 Macro	3	Macro 3 will execute when setpoint activates.
P5112.4 Macro	4	Macro 4 will execute when setpoint activates.
P5112.5Macro	5	Macro 5 will execute when setpoint activates.
P5112.6Macro	6	Macro 6 will execute when setpoint activates.
P5112.7Macro	7	Macro 7 will execute when setpoint activates.

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PARAMETER #		SELECTION	DESCRIPTION
P5112.8Macro		8	Macro 8 will execute when setpoint activates.
P5112.9Macro		9	Macro 9 will execute when setpoint activates.
P5112.º Macro		10	Macro 10 will execute when setpoint activates.
P5112.º Macro		11	Macro 11 will execute when setpoint activates.
P5112.º Macro		12	Macro 12 will execute when setpoint activates.
P5112.º Macro		13	Macro 13 will execute when setpoint activates.
P5112.º Macro		14	Macro 14 will execute when setpoint activates.
P5112.º Macro		15	Macro 15 will execute when setpoint activates.
P5112.º Macro	*	none	No macro will execute when setpoint activates.
P5113.0 Mot'n	*	Ign'd	Motion ignored (motion has no effect).
P5113.1		Inhib	Setpoint state not changed if motion present.
P5114.0 Basis	*	new #	Lower Activate Target value is a specific value.
P5114.1		% val	The entered Lower Activate value for this setpoint is a % multiplier of another variable to be specified.
P5114.2		diff	The entered Lower Activate value for this setpoint is subtracted from another to be specified variable.
P5115. AL	*	XXX.XXX	Activate value (Lower limit if **P5110** is set to between or outside). Note if **P5114** is " % val " or is " diff " then this value is a percentage of or difference of another value.
P5116.0 Based		Var #	Based on one of 30 variables, P60 - P89, which ar accessible during normal operation.
P5116.1		SPt 1	Based on one of setpoint #1's values.

PARAMETER #	SELECTION	DESCRIPTION
P5116.2 thru P5116.º	SPt 2 thru SPt32	Based on one of setpoint #2's values. Based on one of setpoint #32's values.
The set of available choices for **P5117** depends upon the selection made in **P5116**. If set for **P5116.0** you will be able to select from the set immediately below: if set for any other selection, you will be restricted to the second set of selections below.		
P5117.0 Value P5117.1 P5117.2 thru P5117.9	Var#0 Var#1 Var#2 Var#9	Based on variable #0 Based on variable #1 Based on variable #2 Based on variable #9 (also includes VARS 10 thru 29, P60 thru P79)
	OR	
P5117.0 Value	AL	Based on the lower activation parameter.
P5117.1	AU	Based on the upper activation parameter.
P5117.2	DL	Based on the lower de-activation parameter.
P5117.3	DU	Based on the upper de-activation parameter
P5118.0 Basis	new #	The Upper Activate Target value is a specific value
P5118.1	% val	The entered Upper Activate value for this setpoint is a % multiplier of another (to be specified) variable
P5118.2	diff	The entered Upper Activate value for this setpoint is subtracted from another (to be specified) variable.
P5119. AU	XXX.XX	Activate value upper limit. Note if P5118 is " % val " or is " diff " then this value is a percentage of or difference of another value

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PARAMETER #	SELECTION	DESCRIPTION
P5120.0 Based	Var #	Based on one of 30 variables, P60 - P89, which are accessible during normal operation
P5120.1	SPt 1	Based on one of setpoint #1's values
P5120.2	SPt 2	Based on one of setpoint #2's values
P5120.º	SPt32	Based on one of setpoint #32's values

The set of available choices for **P5121** depends upon the selection made in **P5120**. If set for **P5120.0** you will be able to select from the set immediately below: if set for any other selection, you will be restricted to the second set of selections below.

PARAMETER #	SELECTION	DESCRIPTION
P5121.0 Value	Var#0	Based on variable #0.
P5121.1	Var#1	Based on variable #1.
P5121.2	Var#2	Based on variable #2.
P5121.9	Var#9	Based on variable #9. (also includes VARS 10 thru 29, P60 thru P79)
	OR	
P5121.0 Value	AL	Based on the lower activation parameter
P5121.1	AU	Based on the upper activation parameter
P5121.2	DL	Based on the lower de-activation parameter
P5121.3	DU	Based on the lower de-activation parameter
P5130.0 DeAct	Above	Output de-active if wt. above target value.
P5130.1	* Below	Output de-active if wt. below target value.
P5130.2	Betwn	Output de-active if wt. between target values.
P5130.3	Outsd	Output de-active if wt. not between target values.
P5130.4	Tare	Output de-active if **<TARE>** key executed.
P5130.5	Zero	Output de-active if **<ZERO>** key executed.

PARAMETER #	SELECTION	DESCRIPTION
P5130.6	Acc	Output de-active if ACC operation occurs.
P5130.7	Mot'n	Output de-active if motion occurs.
P5130.8	NotMt	Output de-active if motion ceases.
P5130.9	Alwys	Any activation is momentary.
P5130.10	never	Output will not become de-active on its own.
P5131.0 Hold	* 0.0	No extra delays.
P5131.1	0.1	1/10 second minimum de-activation time.
P5131.2	0.2	2/10 second minimum de-activation time.
P5131.3	0.3	3/10 second minimum de-activation time
thru	thru	
P5131.º	25.0	25.0 second minimum de-activation time
P5132.0 Macro	0	Macro 0 will execute when setpoint de-activates
P5132.1	1	Macro 1 will execute when setpoint de-activates.
P5132.2	2	Macro 2 will execute when setpoint de-activates
P5132.3	3	Macro 3 will execute when setpoint de-activates
P5132.4	4	Macro 4 will execute when setpoint de-activates
P5132.5	5	Macro 5 will execute when setpoint de-activates
P5132.6	6	Macro 6 will execute when setpoint de-activates
P5132.7	7	Macro 7 will execute when setpoint de-activates
P5132.8	8	Macro 8 will execute when setpoint de-activates
P5132.9	9	Macro 9 will execute when setpoint de-activates
P5132.	10	Macro 10 will execute when setpoint de-activates
P5132.	11	Macro 11 will execute when setpoint de-activates.
P5132.	12	Macro 12 will execute when setpoint de-activates

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PARAMETER #	SELECTION	DESCRIPTION
P5132.	13	Macro 13 will execute when setpoint de-activates
P5132.	14	Macro 14 will execute when setpoint de-activates
P5132.	15	Macro 15 will execute when setpoint de-activates
P5132.	* none	No macro will execute when setpoint de-activates
P5133.0 Mot'n	* Ign'd	Motion ignored (motion has no effect)
P5133.1	Inhib	Setpoint state not changed if motion present.
P5134.0 Basis	new #	Lower De-activate Target value is a specific value.
P5134.1	* % val	The entered Lower De-activate value for this setpoint is a % multiplier of another (to be specified) variable.
P5134.2	diff	The entered Lower De-activate value for this setpoint is subtracted from another (to be specified) variable
P5135. DL:	* XXX.XXX	De-activate value (Lower limit if P5130 is set to between or outside). Note if P5134 is " val " or is " diff " then this value is a percentage of or difference of another value.
P5136.0 Based	Var #	Based on one of 30 variables, P60-P89, which are accessible during normal operation.
P5136.1	* SPt 1	Based on one of Setpoint #1's values.
P5136.2	SPt 2	Based on one of Setpoint #2's values
thru P5136.º	thru SPt32	Based on one of Setpoint #32's values

PARAMETER #	SELECTION	DESCRIPTION

The set of available choices for **P5137** depends upon the selection made in **P5136**. If set for **P5136.0** you will be able to select from the set immediately below: if set for any other selection, you will be restricted to the second set of selections below.

P5137.0 Value	Var#0	Based on variable # 0
P5137.1	Var#1	Based on variable # 1
P5137.2	Var#2	Based on variable # 2
thru	thru	
P5137.9	Var#9	Based on variable # 9 (also includes VARS 10 thru 29, P60 thru P79)
	OR	
P5137.0 Value	* AL	Based on the lower activation parameter.
P5137.1	AU	Based on the upper activation parameter.
P5137.2	DL	Based on the lower de-activation parameter.
P5137.3	DU	Based on the upper de-activation parameter.
P5138.0 Basis	new #	Upper De-activate Target value is a specific value
P5138.1	% val	The entered Upper De-activate value for this setpoint is a % multiplier of another (to be specified) variable.
P5138.2	diff	The entered Upper De-activate value for this setpoint is subtracted from another (to be specified) variable.
P5139. AU:	XXX.XX	De-activate value upper limit. Note if **P5138** is " % val " or is " diff " then this value is a percentage of or difference of another value.
P5140.0 Based	Var #	Based on one of 30 variables, P60 - P89, which are accessible during normal operation.
P5140.1	SPt 1	Based on one of setpoint #1's values.
P5140.2	SPt 2	Based on one of setpoint #2's values.
P5140. ° SPt32		Based on one of setpoint #32's values.

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PARAMETER #	SELECTION	DESCRIPTION
The set of available choices for **P5141** depends upon the selection made in **P5140**. If set for **P5140.0** you will be able to select from the set immediately below; if set for any other selection, you will be restricted to the second set of selections below.		
P5141.0 Value	Var#0	Based on variable # 0.
P5141.1	Var#1	Based on variable # 1
P5141.2	Var#2	Based on variable # 2
thru	thru	
P5141.9	Var#9	Based on variable # 9 (also includes VARS 10 thru 29, P60 thru P79)
	OR	
P5141.0 Value	AL	Based on the lower activation parameter.
P5141.1	AU	Based on the upper activation parameter
P5141.2	DL	Based on the lower de-activation parameter
P5141.3	DU	Based on the lower de-activation parameter
P5150.0 Par 0	* Gross	Select the parameter that the setpoint will be based upon.
P5150.1 Par 1	Net	
P5150.2 Par 2	Tare	
P5150.3 Par 3	GrTOT	
P5150.4 Par 4	GrT+C	
P5150.5 Par 5	GrT-C	
P5150.6 Par 6	NtTOT	
P5150.7 Par7	NtT+C	
P5150.8 Par 8	NtT-C	
P5150.º Par12	TrGrs	
P5150.º Par13	TrNet	
P5150.º Par14	TrTar	
P5150.º Par30	Qty	
P5150.º Par31	Qty-Tot	
P5150.º Par32	Qty-Tot + C	
P5150.º Par34	APW	
P5150.º Par35	AW*K	
P5150.º Par36	%Accy	
P5150.º Par80	Var#0	
P5150.º Par81	Var#1	
P5150.º Par82	Var#2	
P5150.º Par83	Var#3	
P5150.º Par84	Var#4	

PARAMETER #	SELECTION	DESCRIPTION
P5150.º Par85	Var#5	
P5150.º Par86	Var#6	
P5150.º Par87	Var#7	
P5150.º Par88	Var#8	
P5150.º Par89	Var#9	(also includes VARS 10 thru 29, P60 -P79)
P5150.º Par91	Reg#1	
P5150.º Par92	Reg#2	
P5150.º Par93	Reg#3	
P5150.º Par94	Reg#4	

The above listing of parameters ranging from P5100.0 thru **P5150.º** are the detailed listings only for Setpoint 1. Parameters **P5200** thru **P8200** are used for Setpoints 2 thru 32. The remaining setpoints have not been listed in detail, however you can substitute the Parameter number of the desired setpoint number into the above listing.

MACRO SETUP (ACTIVATE)

PARAMETER #	SELECTION	DESCRIPTION
P5160.X Actv		Activate Macro
P5160.0		Macro #0
P5160.1	Macro #1	
through		
P5160.--		Macro #15
P5160.--		None!

MACRO SETUP (DE-ACTIVATE)

PARAMETER #	SELECTION	DESCRIPTION
P5161.X Actv		De-Activate Macro
P5161.0		Macro #0
P5161.1		Macro #1
through		
P5161.--		Macro #16
P5161--		None!

INFORMATION AND DIAGNOSTIC PARAMETERS

The following parameters **P60000** to **P65010** are part of a separate group that may be reached from any mode by entry of one of their parameter numbers. Some may require installation of Option modifications to the System.

PARAMETER #	SELECTION	DESCRIPTION
P60000. E2Ins	* 512	Displays the amount of E^2 memory.

PARAMETER #	AUTO-CONFIGURATION	DESCRIPTION
P60001. E2Avl	308	Displays amount of available E^2 memory.
P60002. RAMsz	8192	Displays amount of installed RAM.
P60003. RAMdy	4803	Displays amount of dynamically allocated RAM.
P60004. RAMav	4760	Displays amount of available RAM.
P60005. #Rows	0	Shows number of stored data rows.
P60010 dbRAM	24256 (Option)	Database Memory
P60011 dbAve		Available RAM
P60012 dbUse		In Use Ram
P60013 BlkSz		Contiguous RAM available
P60014 dbase Error		Database results check
P60021 - P60036		Databases #1 - #16
P60100. 1994	*GSE*	Displays copyright assertion.
P60101. 0550-	01007	Displays software revision code.
P60102. Aug 22	1994	Displays date code of the software.
P60200. B SN	XXXXX	Displays Main PC Board serial number.
P60201. AudTr	XXXXX	Displays Audit Trail number.
P60202. I SN1	XXXXX	Displays Instrument serial number.
P61100. DAC	XXXX	Displays coarse gain value.
P61101. Gain	XXX.X	Displays effective system gain.
P61102. CAL	Factr	Displays fine calibration factor.
P61103. FSmVv	XXXXX	Displays full scale mV/V output of connected load cell or platform.
P61104. Crrnt	mV/V	Displays an approximation of the current mv/V output of connected load cell or platform.

PARAMETER #	AUTO-CONFIGURATION	DESCRIPTION
P61105. CalZr	Cnts	Displays the last cal zero offset in counts.
P61106. CalZr	mV/V	Displays the last cal zero offset in mv/V.
P61107. ReZro	Wght	Displays amount of weight in default units zeroed out through use of **<ZERO>** key since last cal.
P61108. ZrTrk	Wght	Displays amount of weight in default units tracked off by the zero track feature since last use of the **<ZERO>** key.
P61110. -CAL-	WGHT1	Displays weight used for the first cal point of the Multi-Point Linearization feature (if enabled).
P61111. -CAL-	FACT1	Displays cal adjustment factor for weights less than or equal to the weight shown in the preceeding parameter.
P61112. -CAL-	WGHT2	Displays weight used for the 2nd cal point of the Multi-Point Linearization feature (if enabled).
P61113. -CAL-	FACT2	Displays cal adjustment factor for weights less than or equal to the weight shown in the preceeding parameter.
P61114. -CAL-	WGHT3	Displays weight used for the 3rd cal point of the Multi-Point Linearization feature (if enabled).
P61115. -CAL-	FACT3	Displays cal adjustment factor for weights less than or equal to the weight shown in the pre ceeding parameter.

4

PARAMETER #	INFORMATION	DESCRIPTION
P61116. -CAL-	WGHT4	Displays weight used for the 4th cal point of the Multi-Point Linearization feature (if enabled).
P61117. -CAL-	FACT4	Displays cal adjustment factor for weights less than or equal to the weight shown in the preceeding parameter.
P61118. -CAL-	WGHT5	Displays weight used for the 5th cal point of the Multi-Point Linearization feature (if enabled).
P61119. -CAL-	FACT5	Displays cal adjustment factor for weights less than or equal to the weight shown in the preceeding parameter.

The following parameters are set aside for scales 2, 3 and 4. The information parameters for scale 1, P61102 through P61119 holds true for scales 2, 3 and 4 respectively. These parameters will only become apparent when the 2nd, 3rd or 4th scales are enabled. See Parameters 101 through 104.

P61120 through P61139 (Scale 2)		
P61140 through P61159 (Scale 3)		
P61160 through P61179 (Scale 4)		

PARAMETER #	INFORMATION	DESCRIPTION
P62000. Dsply	Test	Performs a display test when you press **<ENTER>**
P64000. Send	Setup	Will send all current setup information out a designated port when you press **<ENTER>**
P64100. LnCnt	XXXXX	Displays the line count of the setup ransmission.
P64101. ErCnt	XXXXX	Displays the number of errors which have ocurred on the Indicator
P64102. 1stEr	None!	Indicates the first error which occurred on the Indicator since this parameter was last cleared.
P64103. Debug	Off/ON	Enables/disables transmission of error messages out a designated port as they occur.
P64200.Macro	Debug	This parameter will record each command executed after a macro is invoked. All branching, sub-routines, etc. are recorded in the order they are executed. This is a powerful troubleshooting tool.

4

PARAMETER #	INFORMATION	DESCRIPTION
P65000. Copy	A->B	Used during installation of additional storage memory.
P65001. Deflt	All	Used to reset all parameters to the factory default when the **<ENTER>** key is pressed (if changes have been allowed).
P65002 Deflt	-CAL	Used to reset all parameters except the cal values when the **<ENTER>** key is pressed (if changes have been allowed.
P65010 dbase	Reset	Default all database setups. This parameter will default all column settings and all data stored.

PARAMETER #	INFORMATION	DESCRIPTION

Table 3 Software Map

4

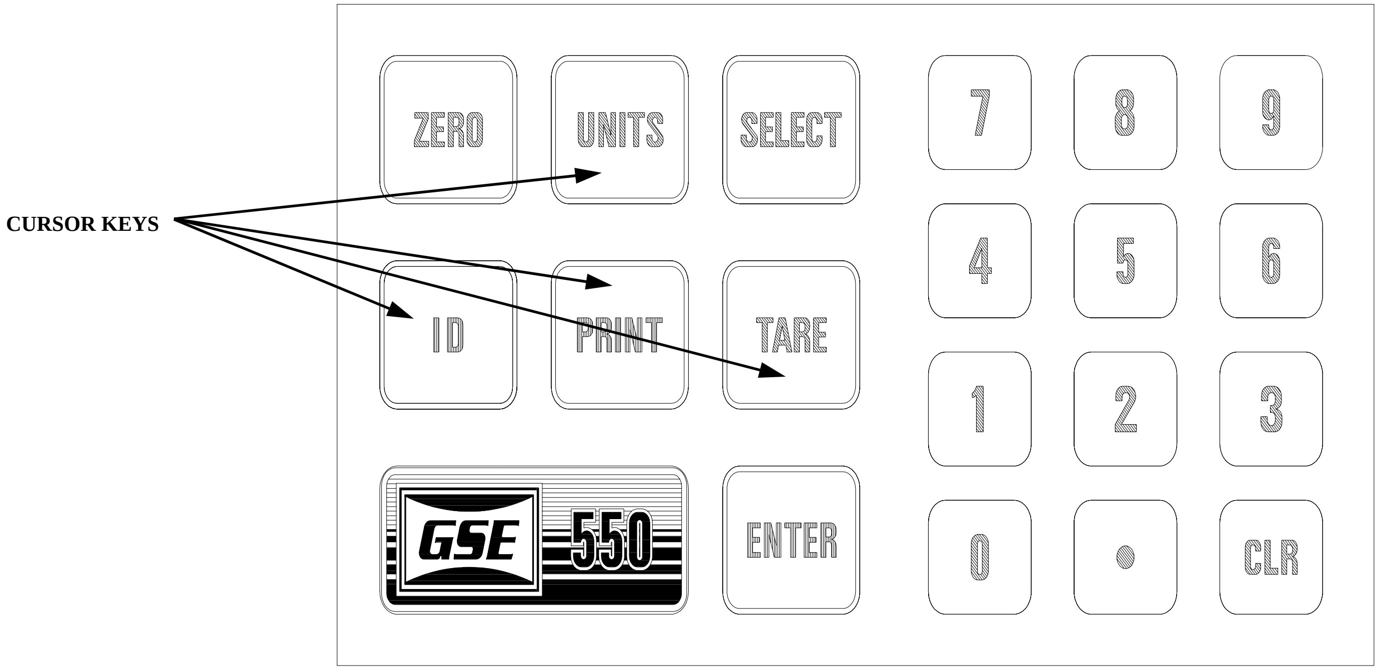

Figure 7 Keypad Cursor Keys

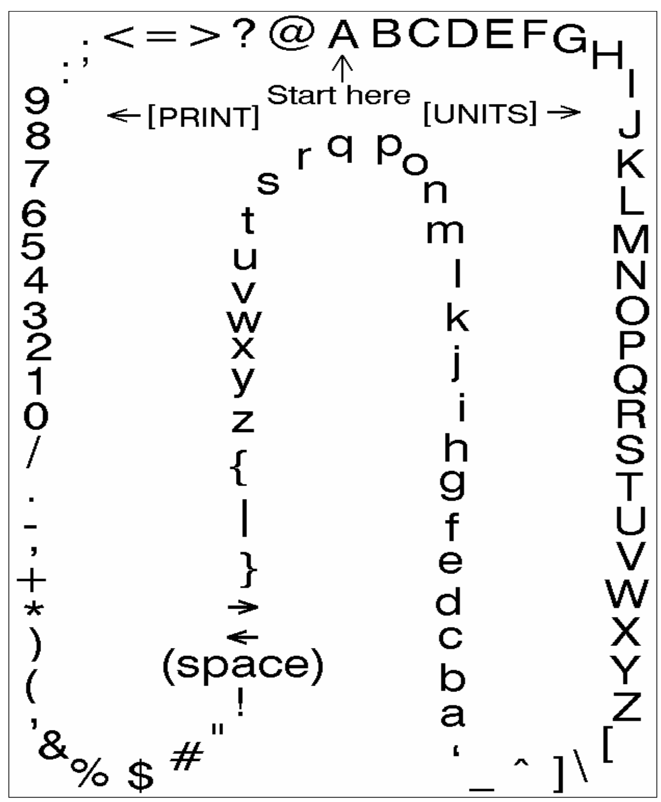

Figure 8 Character Listing

Chapter 5
Weighing Mode

5.1 About The Weighing Mode

The front panel keys take on a different function depending on which indicator (550/570) is selected. The front panel keys also take on a different function depending on which mode is selected. This chapter will define the front panel key operation for the weigh mode.

5.2 Weighing Mode (Key Operations)

SCALE SELECT

Pressing **<40> <SELECT>** will toggle through all enabled scale inputs. One scale input is accessed at one time.

> **NOTE :**
>
> When motion exists, the units designation will go out and any Zero, Tare and Accumulate operations are postponed until motion ceases. Print operations are also motion inhibited if selected (Parameters 212, 222, 232 and 242.

The 550 does not have a dedicated scale select button. The following combination of keys must be pressed in order to select one of the four allowed scale inputs. Note that additional scale inputs beyond the standard one scale input are optional.

scale #1	**<41> <SELECT>**
scale #2	**<42> <SELECT>**
scale #3	**<43> <SELECT>**
scale #4	**<44> <SELECT>**

Additional scale input boards must be installed and enabled for proper use of the scale select operation.

ZERO

Press **<ZERO>** to zero the current quantity/ weight reading. When the meter is at Center Zero the international center-of-zero indication will appear on the upper line of the dot matrix display. This indication is a right and left arrow pointing to a circle. If a Custom Unit's **name** is greater than 2 characters, the Center Zero indication is not displayed. If in the quantity mode pressing **<ZERO>** will set the current mode to a gross zero quantity. If in the weigh mode, pressing **<ZERO>** sets the current mode to Gross Weight. Refer to figure 9, Model 550

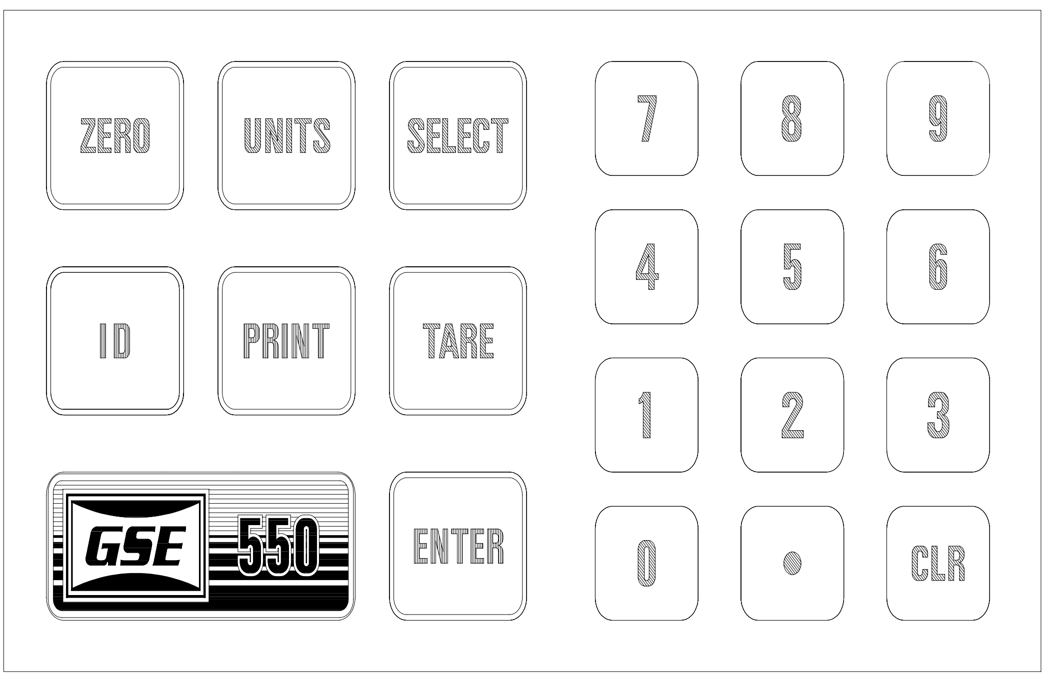

Figure 9, Model 550 Keyboard

Keyboard.

UNITS

Pressing the **<UNITS>** key in the quantity has no effect. Pressing **<UNITS>** from the weigh mode will toggle the displayed units through the available selections. Converted units are automatically rounded to the appropriate increment. If the "lb/oz" units selection is used, the first digits of the numeric display will read the value for pounds, the last digits will read ounces, and since the upper line of the dot matrix display is used to show the units, there is no center zero indication. As with other units designations, the characters showing units will blank out when motion is present.

SELECT

Pressing **<SELECT>** will toggle you through the Net Weight, Tare Weight and Gross Weight, Quantity, APW or other enabled operating modes. Refer to the Mode Selection parameters, **P300 - P309**.

TARE

Pressing **<TARE>** by itself will perform an auto-tare. A Net Zero is then displayed. You can enter a known Tare Weight into the 550 by keying in the number and pressing **<TARE>**. In either case, the indicator will be placed in the Net Mode, unless you are in the Tare Mode. Auto-Tare and / or Keyboard Tare may be disabled in the Setup Mode (P166, P167).

PRINT

Press to send custom specified data to a printer, computer or other device. (see custom transmit, chapter 15).

ENTER

This key is used as an **<ENTER>** key following certain numeric entries.

As entries are keyed into the entry buffer, the **<PRINT/ENTER>** key will complete the entry for the 570 and the **<ENTER>** key for the 550.

ID

This key has four functions, entering ID's, truck operations, macro menu selection and database access. The exact function of this key depends on the selectable internal setup.

UNITS, PRINT, TARE and ID

The **<UNITS>** and **<PRINT>** keys double as **Up** and **Down** arrow keys respectively. While having accessed any mode or parameter which requires a character entry, the **<UNITS>** key will scroll through a set of ASCII characters. The **<PRINT>** key will scroll through the set in reverse. The **<TARE>** key or Right Arrow when pressed will move over to the next character position. The **<ID>** key or Left Arrow will backup to the previous character.

As entries are keyed into the entry buffer, the **<PRINT/ENTER>** key will complete the entry for the 570 and the **<ENTER>** key for the 550.

When in the weigh or quantity modes, the unit is ready to accept a structured ASCII file for custom setups. The custom setup is received through the units bi-directional communications port (J2).

0 thru 9 and "."

Press these keys to enter 0 thru 9. Press the decimal point key to establish a decimal point.

CLR

Press this key to clear a numeric entry mistake prior to entering it into memory.

Chapter 6 Counting Mode

6.1 Parts Counting Mode (Model 570 Only)

This section discusses counting operations which are only available with the model 570 *counting* indicator. If you have a model 550 indicator, you can skip over this section on Counting Operations and Counting Operation Setup. Counting Operations is the ability of the model 570 indicator to "count" the quantity of parts on the weigh platform. In order for the indicator to accomplish this, a sampling operation has to be performed to establish the actual weight of one of the pieces to be counted.

COUNTING MODE (Sample Key Operation)

If the **<SAMPLE>** key is pressed alone (not preceded by a numeric entry, the Model 570 indicator will perform an auto-tare, establishing a net zero as a starting point. The current net weight will then be actively displayed and the prompt "Add XX" will be shown, where "XX" is the value set by parameter **P182**. If the specified number of parts are then added, then the **<SAMPLE>** or **<ENTER>** keys may be pressed to accept the sample. If a different number of parts are added, then the actual

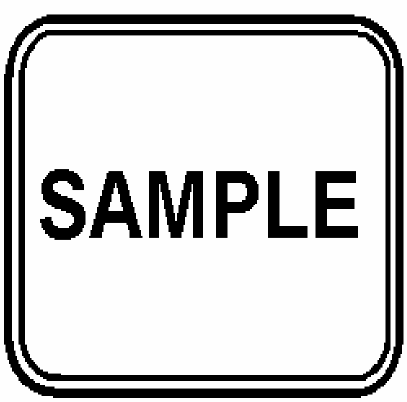

Figure 10, Sample Key

number of parts added should be keyed in and then press the **<ENTER>** or **<SAMPLE>** keys. The subsequent results depend on the selections made for the auto-enhance and minimum accuracy selections. Refer to those sections for further information.

If a numeric entry precedes the **<SAMPLE>** key then the indicator does not perform an auto-tare. The entry is assumed to be the number of parts already present on the scale platform. If when the entry is made the current mode is GROSS, GrTot, GrT+C, or GrT-C then the stored tare weight is assumed to be from a previous weighment and is cleared out. Otherwise, any previous tare is assumed to be for a container that is in use and the tare is retained and the current net weight is used to calculate the piece weight based on the entered sample size. This allows for the situation where the tare weight of the container (if any) is consistent and has already been established. Then the parts may be added and the number of parts may be keyed in.

Note however, that the first method is the recommended approach and will eliminate the possibility of inappropriate tare weights from affecting the piece weight calculation.

SAMPLING TO DETERMINE A PIECE WEIGHT

Although the sampling process may be performed in a number of ways, the recommended method is to place an empty box or empty container on the scale platform, and then press **<SAMPLE>**. The 570 indicator will then perform an auto-tare resulting in a zero net weight. The display will then prompt you to **Add xx** where the "xx" is the sample quantity of parts (sample size) set by parameter P182. The weight of the requested number of parts is then added by the indicator. Press the **<ENTER>** key. If the sample's total weight was sufficient, the piece weight will be calculated and the sample quantity will be displayed. Otherwise, you may be prompted to **add** additional parts. The exact prompts will depend on whether the auto-enhance and/or minimum accuracy assurance features have been enabled. The minimum amount of weight required for the sample routine to meet the selected accuracy requirements for the specified scale capacity is considered.

If the weight of the sample is un-detectable or barely detectable then the message **Code 32 ADD MORE!** is displayed briefly. This will most often occur when the **<ENTER>** key is pressed without adding any parts. If the parts were in fact placed on the scale, either the parts are too light to count on that capacity platform or a much larger quantity of parts must be hand counted in order to perform the sample.

NEGATIVE SAMPLING TO DETERMINE A PIECE WEIGHT

In order to perform a negative sample routine, place a full or partially full container of parts on the scale and press **<SAMPLE>**. The 570 indicator will then perform an auto-tare resulting in a zero net weight. The display will then prompt you to **Add xx** where the "xx" is the sample quantity of parts (sample size) set by parameter P182. In this case, the prompt **Add xx** actually means **Take** parts from the container. Proceed to remove the requested number of parts. The weight of the requested number of parts is then added by the indicator. Press the **<ENTER>** key. If the sample's total weight was sufficient, the piece weight will be calculated and the sample quantity will be displayed. Otherwise, you may be prompted to **Take** additional parts. The exact prompts will depend on whether the auto-enhance and/or minimum accuracy assurance features have been enabled. The minimum amount of weight required for the sample routine to meet the selected accuracy requirements for the specified scale capacity is considered. Continue to enhance, as desired. Key in the tare weight of the empty container, add the parts removed for sampling back into the container. The quantity displayed will be the total quantity in the container.

If the weight of the sample removed is un-detectable or barely detectable then the message **Code 32 ADD MORE!** is displayed briefly. This indicates that more weight must be removed adding to the overall sample weight. This will most often occur when the **<ENTER>** key is pressed without taking out any parts. If the parts were in fact taken from the scale, either the parts are too light to count on that capacity platform or a much larger quantity of parts must be hand counted out in order to perform the sample.

USE OF THE AUTO-ENHANCE FEATURE

When the auto-enhance feature is enabled, after a sample operation is performed, the 570 indicator calculates the number of parts which may be added to the scale while keeping the 570 indicator's uncertainty of the number of parts on the platform within +/- 1/3 of a part. If the total number of parts which may be counted without error is more than the number sampled, the 570 indicator will briefly display the maximum number of parts which can be used to perform an auto-enhance. If additional parts are added, while keeping the total displayed quantity less than or equal to the displayed maximum enhance amount, as soon as motion ceases the 570 indicator will re-calculate the piece weight based on the new larger quantity. Then the 570 indicator will display the new maximum enhanceable quantity and the process will repeat. However the 570 indicator has a minimum threshhold of the piece weight for which enhancements can occur. This minimum enhanceable piece weight is 0.0084% of capacity. If the piece weight is less than this amount then enhancements are not possible and the message **Can't Enhnc** will be displayed.

Whenever a piece weight is keyed in, the 570 indicator will clear it's calculated accuracy register and the last sample register since neither the accuracy nor the sampled quantity of the entered piece weight are known. Therefore, auto-enhancements are not possible with entered piece weights.

USING THE MINIMUM ACCURACY ASSURANCE FEATURE

The minimum accuracy feature is designed to insure that parts counting operations will result in a pre-specified minimum accuracy. This is accomplished either by requiring the sampled parts to meet or exceed a minimum weight, or when the enhance feature is enabled, by requiring additional enhancements after the initial sample operation has been performed before a large number of parts may be counted. In the case of the enhance feature being disabled, if the weight of the sampled parts is insufficient to guarantee the required accuracy (as set by P183) then the operator will be prompted to **Add xx** parts. The specific number represented by the "xx" is the additional number of parts which are need to be hand-counted and added to the scale in order for the accuracy to be achieved.
However, if the enhance feature <u>has</u> been enabled, the possible results of a sampling operation can be detailed as follows:

ACHIEVED ACCURACY IS LESS THAN REQUIRED:

Achieved accuracy is insufficient to allow an enhancement to occur with at least 5 additional pieces: The 570 indicator will prompt the operator with **Add xx** parts, where the quantity "xx" is the number of additional parts required to allow either enhancements to be achieved, or the number required to achieve the required accuracy, whichever is less. Add the specified number of parts and then press **<ENTER>** or add even more parts

Required	**Capacity**		**0.0028 lb**	**0.016 lb**	**0.070 lb**
Accuracy		**0.00056 lb**	**0.0032 lb**	**0.018 lb**	**0.080 lb**
	0.028%	**0.00064 lb**	**0.0035 lb**	**0.020 lb**	**0.094 lb**
90%	**0.032%**	**0.00070 lb**	**0.0040 lb**	**0.024 lb**	**0.112 lb**
91%	**0.035%**	**0.00080 lb**	**0.0047 lb**	**0.028 lb**	**0.140 lb**
92%	**0.040%**	**0.00094 lb**	**0.0056 lb**	**0.035 lb**	**0.187 lb**
93%	**0.047%**	**0.00112 lb**	**0.0070 lb**	**0.047 lb**	**0.280 lb**
94%	**0.056%**	**0.00140 lb**	**0.0094 lb**	**0.070 lb**	**0.370 lb**
95%	**0.070%**	**0.00187 lb**	**0.0140 lb**	**0.093 lb**	**0.560 lb**
96%	**0.094%**	**0.00280 lb**	**0.0185 lb**	**0.140 lb**	**0.700 lb**
97%	**0.140%**	**0.00370 lb**	**0.02800 lb**	**0.175 lb**	**0.940 lb**
98%	**0.185%**	**0.00560 lb**	**0.0350 lb**	**0.235 lb**	**1.400 lb**
98.48%	**0.280%**	**0.00700 lb**	**0.0470 lb**	**0.350 lb**	**1.750 lb**
99%	**0.350%**	**0.00940 lb**	**0.0700 lb**	**0.438 lb**	**2.800 lb**
99.20%	**0.470%**	**0.01400 lb**	**0.0875 lb**	**0.700 lb**	**4.680 lb**
99.40%	**0.700%**	**0.01750 lb**	**0.1400 lb**	**1.170 lb**	**14.000 lb**
99.60%	**0.875%**	**0.0280 lb**	**0.2340 lb**	**3.500 lb**	
99.68%	**1.400%**	**0.04670 lb**	**0.7000 lb**		
99.8%	**2.340%**	**0.14000 lb**		**200 lb**	
99.88%	**7.000%**		**50 lb**	**Platform**	
99.96%		**10 lb**	**Platform**		
	2 lb	**Platform**		**0.056 lb**	
Percent of	**Platform**		**0.014 lb**	**0.064 lb**	

Table 4, Minimum Sampled Weight Accuracy Requirements

and key in the TOTAL number of parts on the scale and press **<ENTER>**.

The 570 indicator will display the current quantity on the numeric display and the message **Enhn# xx** will be shown on the alpha display, where the "xx" is the total maximum number of parts that may be on the scale in order for an enhancement to occur. Additional parts may then be added, up to the number shown. As soon as motion ceases, if the quantity displayed is more than the original sampled amount and less than the displayed maximum enhance amount then the piece weight will be re-calculated. Then the achieved accuracy will be re-evaluated. If the required accuracy still has not been achieved, another enhancement will be required and this step will be repeated with a larger maximum enhance amount. If more parts than specified are added, the display will read **Code 53 Accy >Req'd** indicating that the required accuracy has not been achieved and counting may not continue.

ACHIEVED ACCURACY MEETS OR EXCEEDS SETUP REQUIREMENTS:

Achieved accuracy is insufficient to allow an enhancement to occur: The message **Can't Enhnc** is displayed briefly. This will not normally occur unless the sampled number of parts was very large and / or the piece weight was relatively small.
Sampled amount is sufficient to allow enhancements: The maximum number of parts which can be counted and allow an enhancement to occur is displayed briefly and the quantity is then displayed.
In order for a given accuracy to be achieved, the weight of the sampled parts must meet or exceed a specific minimum. Table 4, Minimum Accuracy Weight Requirements shows the required sample weight for various accuracy requirements on a variety of platform capacities.

Note however, that parts counting based on weight is dependent on a reasonably consistent part weight. Some plastic parts vary in weight from piece to piece by 10% or more. Attempting to count these items with a high degree of accuracy will require a very large hand-counted random sample of the items during the piece weight calculation process. The minimum accuracy assurance is intended to guide the operator in sampling parts with a fairly consistent piece weight.

COUNTING PARTS

There are several approaches toward counting parts on the 570 indicator. A few of the primary methods are described below:

Method 1: Counting a specific number of parts
Place empty container on platform (optional)

Press **<Sample>**. The 570 indicator tares the instrument to a zero net weight. The display shows the current net weight and the prompt: **Add 10** (the actual number is programmable by the setup parameter P182).
Place the specified number of parts on the scale.

Press **<ENTER>** or **<SAMPLE>**. (Or add any number of parts, key in the number added, then press **<ENTER>** or **<SAMPLE>**) The 570 indicator then calculates the piece weight of the sample parts. (If the number of parts added were insufficient to achieve the required accuracy (as set by P183), then you will be prompted to add an additional number of parts. Add the specified number of parts and press **<ENTER>**).
Add the additional parts to be counted.

Method 2: Counting out a specific number of parts with piece weight enhancement.
Place empty container on platform. (optional).

Press **<SAMPLE>**. The 570 indicator tares the instrument to a zero net weight. The display shows the current net weight and the prompt: "Add 10" (the actual number is programmable via setup parameter P182).

Place the specified number of parts on the scale.

Press **<ENTER>** or **<SAMPLE>.** The 570 indicator then calculates the piece weight of the sample parts and momentarily displays the maximum number of parts which may be added for a piece weight enhancement to occur. Then the minimum achieved accuracy is displayed.

If a greater accuracy is desired, add additional parts but not more than the maximum enhanceable quantity.
As soon as motion ceases, the 570 indicator will recalculate the piece weight and then briefly display the new maximum number of pieces which can be added and still accurately enhance the piece weight.
Repeat as many times as desired.

Add the additional parts to be counted.

Method 3: Counting the total number of parts on hand with a known container weight

Place the full container of parts on the weigh platform.

Press **<SAMPLE>**. The 570 indicator tares the instrument to a zero net weight. The display shows the current net weight and the prompt: **Add 10** (the actual number is programmable using setup parameter P182).

Remove the specified number of parts from the box.

Press **<ENTER>** or **<SAMPLE>**. The 570 indicator then calculates the piece weight of the sample parts.

Key in (or barcode scan) the tare weight of the container.

The displayed (negative) quantity then is the total number of parts in the container.

RECOMMENDED SETUP

In order achieve optimum counting results, certain setup parameter selections should be set. These parameters and their recommended settings are specified below.

P112 Zero Track aperture:
Make sure the zero track aperture is not set larger than the weight of parts that will be counted. If the smallest parts to be counted are 0.01 #, and the displayed increment **P111** is 0.05#, make sure the zero track aperture is set to less than 2/10 of a division (0.01 divided by 0.05 = 0.2).

P114 Motion Definition:
The definition for motion affects how much variation in weight can be allowed when the piece weight is calculated. Setting this as low as possible without having constant motion is optimal. Normally a setting of around 0.4 divisions will suffice.

P115 Motion Delay:
A delay of around one second normally works quite well. A longer delay may be desired if a very large filter selection is made.

P116 Filter:
The filter selection can be very instrumental in optimizing the accuracy of the piece weight calculation. GSE recommends a filter setting of 4 seconds. While this will increase the time required to sample and count parts, a significant increase in piece weight accuracy will be achieved. If the environment has more than average vibration an ever higher setting may be beneficial.

One of the AUTO-FILTER selections may prove to be the best choice. This filter provides very extensive averaging while the applied weight is stable yet responds more quickly than a standard slow response filter when a significant change in weight occurs. The auto-filter selections are choices numbered 21 through 33 with selection #30 being a 4 second response auto-filter.

P119 Linearization:
For optimum sampling results, it is strongly recommended that a multipoint linearization calibration be performed on your scale. The smallest calibration weight should be near 0.1% of capacity. Subsequent calibration weights will be dependent upon your platform's performance and should be based upon the occurrence of a difference between the displayed and applied weight.

P160 Model:
The "570" model must be selected in order for the counting capabilities to be operational and for the **<SAMPLE>** and **<PRINT>** keys to perform as labeled!

P162 Negative Tare:
Set this selection for "enabled". This will allow a tare to be performed even if the gross weight is slightly less than zero. This may occur if a container is not used.

P163 Tare Rounding:
Disable the tare rounding selection. If tare rounding were enabled it would prevent the 570 from determining the precise weight before the sample parts were added, resulting in a possible source of error in the piece weight calculation.

6.2 Front Panel Key Operation (Counting Related)

All of the Model 570 front panel keys operate normally for weighing modes. The Model 570 keys which change function during counting related modes are listed below:

<ZERO>
This key will zero the indicator, and establish the current signal from the weighing platform as a gross weight of zero. When the **<ZERO>** is executed from the quantity (Qty) mode, the 570 Indicator will remain in the quantity mode and any existing tare weight will be cleared. If the **<ZERO>** is executed from any of the other counting modes, the current mode will be changed to the GROSS mode.

<UNITS>
The only counting modes for which the **<UNITS>** key is defined are the piece weight modes, APW and APW*K. During these two modes the **<UNITS>** key will toggle the units through the units as selected in setup modes **P151** through **P154**. In the other counting modes the **<UNITS>** key is ignored.

<SELECT>
The **<SELECT>** key will advance the 570's mode to the next mode as programmed in setup mode **P300** thru **P309**. Alternatively, keying a mode number then pressing **<SELECT>** will change the 570's current mode to be the mode whose number was keyed in.
<ID>

The **<ID>** key will perform as it does in most other weigh modes, depending on the selection for setup parameter **P720**. Refer to Chapter 14 for standard ID operation, Chapter 17 for Truck In/Out Weighing, and Section 20 for database

<SAMPLE>
The **<SAMPLE>** key is used to calculate a piece weight based on a sample of parts to be counted.

<TARE>
The **<TARE>** key can be used to perform auto-tare or keyboard tare operations. When a new tare is stored, if the current mode is the QUANTITY mode, the current mode will remain the quantity mode. If the current mode is any other counting mode, the mode will change to the net mode. This operation is the same as most other weigh modes.

<PRINT/ENTER>
This key is used for two purposes. First to cause a transmit of data out the 570's serial port(s) and second, to initialize the accumulate total to some value.
If an entry has been keyed in, the 570 will prompt "MOD Ac?" briefly and then "ENTER = MOD!". Press the <ENTER> key to store the entered number as the new quantity total. Or press any other key to prevent changing the current quantity total value.
If this key is pressed without an entry, the custom transmit setups (if any) will be transmitted.
<CLR>

The **<CLR>** key will cause the prompt "CLEAR ACs?" followed by "ENTER = CLR!". Pressing **<ENTER>** will clear all the accumulate totals (gross, net, and qty) to zero. Pressing any other key will abort the clearing of the totals.

6.3 Parts Counting Parameter Setup (Model 570 only)

P180 ASmpl
Auto Sample Accept: This parameter affects the

6

sampling process. If set for "off", the **<ENTER>** key must be pressed after the sample is placed on the platform. However, when **P180** is set to "on", the Indicator will automatically accept the applied weight as the requested sample size. The criteria for weight acceptance is that motion occur and the weight is not at a center of zero condition.

P181 AEnhn
Auto-Enhance: Setting this parameter to "off" prevents the auto-enhance feature from operating. The "on"selection allows the Indicator to auto-enhance the piece weight whenever the necessary criteria are met.

P182 SmpSz

Default Sample Size: This parameter specifies the sample amount which the operator is prompted to add after the **<SAMPLE>** key is pressed. Any whole number between 1 and 9999 may be entered here. 10 is the factory default.

> **NOTE:**
>
> The following range of parameters P180 thru P187 only apply to the Model 570 Weighing and Counting Indicator

P183 %Accy
Required Piece Weight Accuracy for Sample Acceptance: The value entered here specifies minimum piece weight accuracy which must be achieved in order for a sample to be accepted. If an applied sample weight is insufficient to achieve the accuracy specified, the operator will be prompted to add a specific number of parts in order to achieve that accuracy. The choices available are no minimum accuracy required (displayed as "none") or 90.0% to 99.96%, in 0.04% increments. Key in the desired percentage then **<ENTER>**. Entries will be rounded down to the next lower available accuracy increment. Enter [0] for no accuracy requirement. This results in a minimum sample weight of slightly greater than the zero-track aperture, P112. Press **<ENTER>** to cycle through the available choices starting at the previously selected choice.

P184 AcDsp
Accuracy Displayed: With this parameter set for "on", the accuracy of the current piece weight is shown on the display, above the "Qty" indication, whenever the weight is not in motion. For example, after performing a sample operation the Indicator might show " 10. 98.3% Qty". If this parameter is selected as "off" then the top line of the alpha numeric display will only be used to indicate motion.

P185 ErFac
Accuracy Error Factor: This parameter should normally be set to 1. However this is intended to allow GSE's dealers to adjust the 570 accuracy calculations to compensate for less than ideal environment conditions. Conditions such as air currents, widely varying temperature conditions, poor load cell performance, and significant vibrations due to heavy machinery operating nearby or poor support conditions can increase the sampling error of the 570. For example, entering a value of 2 would reduce the claimed accuracy of the 570 indicator in half for a given sample weight. The entered value may be between 0.1 and 20. Numbers less than one will increase the calculated accuracy of the indicator. Since the indicator's decision as to when it can and cannot enhance is based upon the it's calculated accuracy, the value entered here will affect the maximum number of pieces which may be added and still allow the enhancement to take place.

P186 PreSm
Pre-Sample: This parameter permits 5 choices; none, scale 1, scale 2, scale 3 and scale 4. If the parameter is set to a particular scale number, if the operator presses the **<SAMPLE>** key, the indicator will switch to Scale 1, 2, 3 or 4. If "none" has been selected, the indicator will remain on the presently selected scale.

P187 AftSm

MODE #	**DESCRIPTION**
30 31	Quantity Quantity Total
32	Quantity Total Plus Current
33	Quantity Total Minus Current
34	Piece Weight
35	Piece Weight x 1000
36	Percentage Accuracy Achieved
37	Last Sampled Amount

Table 5, Counting Modes

After Sample: This parameter permits 5 choices; none, scale 1, scale 2, scale 3 and scale 4. If the parameter is set to a particular scale number, after a sample is completed, the indicator will switch to Scale 1, 2, 3 or 4. If "none" has been selected, the indicator will remain on the presently selected scale.

P188 - P191 ResX
These parameters will allow for entering a value that will represent the resolution size for determining the displayed quantity. The ‘X’ denotes scale 1 thru 4. Each scale’s resolution can be set individually.

6.4 COUNTING MODE LISTING

The **<SELECT>** key will advance the 570's mode to the next mode as programmed in the setup mode P300 - P309. Alternatively, keying a mode number then pressing **<SELECT>** will change the 570's current mode to be the mode whose number was keyed in. The following eight modes are Model 570 counting related. See table 5.

30 QUANTITY

The current net weight is divided by the current piece weight, resulting in the current quantity. This value may not be entered.

31 QUANTITY TOTAL

This mode displays the current total accumulated quantity. The value displayed is the result of previous additions of the displayed quantity to the previous total quantity.

It operates the same as mode 3, the gross total mode. The largest value that can be displayed is 999,999. If a larger value is achieved, the display will read "Code04 #> Dsply". However the stored total is still active and accumulates may continue to occur. These larger values may be printed without any problem. If the value exceeds 3,000,000 internal rounding will be performed. Theoretically this value is 16,777,216.

32 QUANTITY TOTAL PLUS CURRENT

This parameter holds the accumulated quantity plus the currently displayed quantity. For example if the quantity total register (parameter 31) holds a value of 100 and 13 more parts were added to the scale, then this register (parameter 32) will yield a quantity of 113.

33 QUANTITY TOTAL - CURRENT

This parameter holds the accumulated quantity minus the currently displayed quantity. For example if the quantity total register (parameter 31) holds a value of 200 and 10 more parts were added to the scale, then this register (parameter 33) will yield a quantity of 190.

34 PIECE WEIGHT

This register holds the value of the average piece weight established after a sample routine.

35 PIECE WEIGHT x 1000

This register holds the value of the average piece weight times 1000. This value is calculated after the piece weight value is established.

36 PERCENTAGE ACCURACY ACHIEVED

This register contains the percentage of accuracy achieved after a sample routine. Refer to table 4 to determine the percentage of full scale weight that must be added to the platform to achieve the desired accuracy requirements.

37 LAST SAMPLED AMOUNT

This register holds the quantity of the last sample size used during a sampling routine. An example might be 10 pieces. The factory uses 10 as a default sample size.

Chapter 7
Calibration Mode

7.1 Introduction

This chapter includes methods of calibration for previous software versions as well as the later calibration methods. The earlier methods of calibration will be called out in their respective section’s heading ie. **(earlier versions)**. These section’s method of operations are not valid on later software versions.

7.2 Calibration Mode

1. The Calibration Mode can be entered in one of two ways:

   A. From the **Weigh** Mode by pressing: **1 0 0 <SELECT> 2 3 6 4 0 <ID> <ENTER>**

   Proceed to make the necessary parameter adjustments in P110 through P119 for scale #1, then press **<ZERO>**. (Parameters 120 thru 129 setup scale #2, parameters 130 thru 139 setup scale #3 and parameters 140 thru 149 setup scale#4.

   B. From the **Setup** Mode by pressing **<ZERO>.**

2. The system will prompt you to calibrate the unit by displaying **ENTER =CAL!** Press

> **NOTE:**
> Pressing the **<CLR>** key at any point in the calibration routine will back you up one step.

<ENTER> to proceed. ***If*** multiple scales are enabled, the unit will prompt, **Keyin Scl #**. Key in the scale number and press **<ENTER>**. Pressing **<CLR>** at the **ENTER = CAL!** prompt will let you exit the Setup Mode without calibration.

3. When the calibration mode is entered, the following message is displayed:

   "New Zero?"

   This is one of five selections. Press <**SELECT>** to scroll through each of the five selections. All five calibration selections are stated below. Press **<ENTER>** when viewing the desired selection. If load cell linearization is enabled (P119-scl#1, P129-scl#2, P139-scl#3 and P149-scl#4) the calibration modes accessible are identified by an asterisk (*****).

   a) "New Zero?" *
   b) "Last Zero?"
   c) "Temp Zero?"
   d) "Only Zero?" *
   e) “Cal Reset” *

Each of the calibration methods are explained in more detail below.

a) New Zero?:

New calibration (Establishing the first or a new calibration)

The system will display the dead load (which may not be in precise units) that is present on the scale. The system is assuming a "NO LOAD" condition. At this point the unit requests that you remove any extraneous load. Do so, then press **<ENTER>**. After **<ENTER>** is pressed a new zero is established and this is reflected on the main display along with the following prompt:

"Adj'g Zero"

Immediately followed by the following prompt.

Keyin CalWt

The system is waiting for the actual calibration value to be entered as it prompts "**KeyIn CalWT**". At this point you can place the calibration weight on the platform, key in the weight value and then press **<ENTER>**.

> **NOTE:**
> If you key in a cal weight and press **<ENTER>** without adding any weight since the last calibration weight, the indicator will prompt you to **Add CalWT**. Add the weight and press **<ENTER>**.

Entering Numeric Values:

Where appropriate, numeric values may be entered using the numeric keypad.

If an error is made in entry, the **<CLR>** key will clear the entry from the entry buffer (on display) before the **<ENTER>** key is pressed.

The system will perform the calibration, display the value of the calibration weight and prompt you by displaying **CAL OK?** At this point, the accuracy of the calibration can be checked by weight without leaving the Calibration Mode.

If the calibration was accurate, press **<ENTER>**.

The system will prompt you to save the new calibration plus any other changes that were made. Press **<ENTER>** to save and then **<ENTER>** to exit.

If the calibration is not accurate, press **<CLR>**.
The system will return to the **New Zero?** prompt.
Proceed as described in step 3 of this section.

NOTE:
If the calibration weight was less than 5% of capacity or if there was a large change in the calibration, the system will prompt you with the message **ReCal Req'd**. Press **<ENTER>** and you will be returned to step 3 of this procedure, or press **<CLR>** to obtain the **CAL OK?** prompt as described above and override the re-calibration requirement. However, we recommend you perform a re-calibration in order to avoid any serious inaccuracy.

b) "Last Zero?":

Re-Cal (with cal weight already applied)

This capability allows a re-calibration to be performed without removing the applied weight, if, during a calibration check, the calibration is found to be out of tolerance. This is especially beneficial when the unit is used with large capacity applications such as tank weighing (remote platforms).

This operation is achieved by pressing the **<ENTER>** key at the "**Last Zero?**" prompt during the calibration procedure.

The scenario where this feature would be used is as follows:

a) A scale is to be checked for compliance with local weights and measures regulations.

b) The unit is zeroed with a press of the **<ZERO>** key.

c) The necessary load is applied to verify accuracy.

d) The weight indication is found to be out of tolerance.

e) The calibration mode is accessed, either using the method described above for Quick Cal or by the normal method. Note that the calibration weight is still applied!

f) At the "Last Zero?" prompt, the **<ENTER>** key is pressed.

g) The instrument briefly displays the message: "Using Last0", followed by the usual: "Units = xx" indicating the proper units for the keying in of the calibration weight. The unit is using the zero established with the last use of the **<ZERO>** key during the weigh mode as the new calibration zero.

h) Next the display prompts: "Keyin CalWt".

i) The operator keys in the currently applied weight, such as **50000 <ENTER>**. The unit then adjusts the calibration parameters to bring the system into calibration.

j) Next the display prompts "Cal OK?". The weight may then be removed and if necessary re-applied to assure the inspector that the calibration has properly adjusted.

k) Once the inspector is satisfied with the calibration press the **<ENTER>** key to save the calibration.

l) Next the usual prompt "Save Mods?" followed shortly by "Enter = Save" is displayed. Press **<ENTER>** to save the new calibration factors.

m) The next prompt, "Enter = Exit" is similarly responded to by the **<ENTER>** key and the unit returns to the weigh mode.

c) "Temp Zero?":

Re-Cal (without establishing new zero)

In some applications it is desirable to perform a calibration without removing the currently applied load. This is particularly useful in tank weighing applications where it might be a particularly time consuming and costly ordeal to completely drain the tank being weighed.

Pressing the **<ENTER>** key at the "Temp Zero?" prompt during the calibration procedure causes the unit to temporarily zero the displayed weight so that additional weight may be added to assure the calibration of the system. The zero determined during the previous calibration is not affected.

For example, with a tank containing an unknown amount of material (remote scale):

a) Access the calibration mode, ie:

From the **Weigh** Mode by pressing:
1 0 0 <SELECT> 2 3 6 4 0 <ID>
<ENTER>

Note: Accessing the calibration mode with a remote keyboard:

100 <SELECT>
54321 <ID> <ENTER>

b) Toggle to the “Temp Zero?” routine with the **<SELECT>** key.

c) At the "Temp Zero?" prompt press:

<ENTER>

The displayed value is zeroed out.

d) Apply the calibration weight to the tank.

e) Key in the value of the calibration weight:

1000<ENTER>

f) The numeric display should show the entered value.

g) Remove the calibration weight from the tank. The display should return to zero. If the display reads as specified, at the "Cal OK?" prompt press:

<ENTER>

Otherwise, to repeat the calibration process, press

<CLR>

and then repeat steps (b) through (g).

h) To save the newly determined calibration weight, at the "Enter = Save" prompt, press:

<ENTER>

i) Then to return to the weighing modes, at the "ENTER = EXIT" prompt, press:

<ENTER>

and the unit will return to the weigh mode.

d) "Only Zero?"

(Calibration Re-zeroing:)

If it is desired to only re-establish the calibration zero of the unit without affecting the established gain, this may be done during the calibration process by pressing the **<ENTER>** key at the "Only Zero?" prompt. After doing so, the display will flash the calibration units message and then "Adj Zero!" for one second. Then the display will advance to the "Cal OK?" prompt.

This may be useful in tank weighing applications where the re-zero parameter **(P118)** is set very low in order to prevent inadvertent re-zeroing. A build-up of sludge may be zeroed out in this manner.

For example, with the connected scale platform cleared of any extra weight:

a) Access the calibration mode, ie:

From the **Weigh** Mode by pressing:
1 0 0 <SELECT> 2 3 6 4 0 <ID>
<ENTER>

Note: Accessing the calibration mode with a remote keyboard:

100 <SELECT>
54321 <ID> <ENTER>

b) Toggle to the “Only Zero?” routine with the **<SELECT>** key.

c) At the "Only Zero?" prompt press:

<ENTER>

The displayed value is zeroed out.

The display will briefly flash: "Adj Zero!" and then: "CAL OK?"

Press **<ENTER>** to accept the newly established zero or **<CLR>** to re-do the calibration. Following the proceeding prompts to exit and save all changes.

The unit's calibration zero is now set to establish the platform's gross zero at the current input signal from your scale platform.

NOTE:
If the keyed in weight exceeds Full Scale by +4% or falls below 0.1% of Full Scale, an error message will be displayed. If you forgot to add the calibration weight before pressing **<ENTER>**, the unit will prompt you to do so. In this case, place the calibration weight on the scale and press **<ENTER>**.

If an overload exists or the previously set instrument gain is too high, the indicator will display an overload message. In this case, press **<CLR>** and the unit will reduce the current instrument gain and return you to step 2 so you can re-start the calibration.

The system will perform the calibration, display the value of the calibration weight and prompt you by displaying **CAL OK?** At this point, the accuracy of the calibration can be checked by weight without leaving the Calibration Mode.

If the calibration was accurate, press **<ENTER>**.

The system will prompt you to save the new calibration plus any other changes that were made. Press **<ENTER>** to save and then **<ENTER>** to exit.

If the calibration is not accurate, press **<CLR>**.
The system will return to the **New Zero?** prompt. Proceed as described in step 3 of this section.

NOTE:
If the calibration weight was less than 5% of capacity or if there was a large change in the calibration, the indicator will prompt you with the message **ReCal Req'd**. Press **<ENTER>** and you will be returned to step 3 of this procedure, or press **<CLR>** to obtain the **CAL OK?** prompt and override the re-calibration requirement. However, we recommend you perform a re-calibration in order to avoid any serious inaccuracy.

e) "Cal Reset"

The “Cal Reset” adjusts the zero and gain factors of the amplifier on the A/D. The parameters being adjusted are listed below.

P61100 DAC
P61102 Cal Factr
P61105 CalZr Cnts

When reset, these parameters are ajusted to the lowest possible values. Refer to the chapter on Information Parameters for a more detailed explanation on the gain factors.

Normally a Cal Reset is performed if the amplifier is locked in at extremely high gain factors and will not allow a new calibration to be performed. If an over or under load condition exists while in the Cal mode, press **<CLR>** to perform a Cal Reset. This has the same effect as pressing the **<ENTER>** key at the Cal Reset prompt. After a Cal Reset is performed, the unit goes back to the “**New Zero?**” prompt. The **<SELECT>** key will toggle to the desired calibration routine.

After performing a Cal Reset, a re-calibration should be performed before exiting the calibration or setup modes. The reset will not be saved unless a re-cal is performed and changes are saved.

7.3 Calibration Mode (earlier versions)

1. The Calibration Mode can be entered in one of two ways:

   A. From the **Weigh** Mode by pressing:
   1 0 0 <SELECT> 2 3 6 4 0 <ID> <ENTER> <ZERO>

> **NOTE:**
>
> A calibration reset is performed if the amplifier is locked in at extremely high gain factors and will not allow a new calibration to be performed.

   B. From the **Setup** Mode by pressing **<ZERO>.**

2. The indicator will prompt you to calibrate the

meter by displaying **ENTER =CAL!** Press **<ENTER>** to proceed. Pressing **<CLR>** will let you exit the Setup Mode without calibration.

3. The indicator will display the dead load (which may not be in precise units) that is present on the scale and prompt you by displaying **NO LOAD?** This requests that you remove any extraneous load. Do so, then press **<ENTER>**.

4. The indicator will zero the display and prompt you by displaying **KeyIn CalWt** . At this point you can place the calibration weight on the platform, key in the weight value and then press **<ENTER>**.

NOTE:
If the keyed in weight exceeds Full Scale by +4% or falls below 0.1% of Full Scale, an error message will be displayed. If you forgot to add the calibration weight before pressing **<ENTER>**, the indicator will prompt you to do so. In this case, place the calibration weight on the scale and press **<ENTER>**.

If an overload exists or the previously set instrument gain is too high, the indicator will display an overload message. In this case, press **<CLR>** and the indicator will reduce the current instrument gain and return you to step 2 so you can re-start the calibration.

5. The indicator will perform the calibration, display the value of the calibration weight and prompt you by displaying **CAL OK?** At this point, the accuracy of the calibration can be checked by weight without leaving the Calibration Mode.

   A. If the calibration was accurate, press **<ENTER>**.

      The indicator will prompt you to save the new calibration plus any other changes that were made. Press **<ENTER>** to save and then **<ENTER>** to exit.

B. If the calibration is not accurate, press **<CLR>**. The indicator will return to the **NO LOAD?** prompt. Proceed as described in step 3 of this section.

NOTE:
If the calibration weight was less than 5% of capacity or if there was a large change in the calibration, the indicator will prompt you with the message **ReCal Req'd**. Press **<ENTER>**and you will be returned to step 2 of this procedure, or press **<CLR>** to obtain the **CAL OK?** prompt as described in step 5 and override the re-calibration requirement. However, we recommend you perform a re-calibration in order to avoid any serious inaccuracy.

CALIBRATION RE-ZEROING UPDATE

Beginning with Indicator firmware 450550-01003, date code April 02, 1992 and later, an alternative has been added to the calibration process. If it is desired to only re-zero the indicator, this may be done by pressing the **<SELECT>** key at the **No Load?** prompt. After pressing **<SELECT>**, the display will flash the calibration units message and then **New Zero!** for one second. Then the display will advance to the **Cal OK?** prompt.

This is useful in tank weighing applications where the re-zero parameter **P118** is set very low in order to prevent inadvertent re-zeroing. A build-up of sludge may be zeroed out in this manner.

7.4 Multi-Point Linearization

If the load cell signal input to the 550 has good repeatability and stability, then using multi-point linearization during calibration may significantly improve the ultimate accuracy of the data displayed by the 550. Setup Mode parameter **P119** enables or disables this feature. Initially, the same basic procedures as a normal calibration are used to perform a multi-point linearization. All of the prompts provided will be exactly the same up to the **CAL OK?** prompt (steps 1-3a thru 3e described in previous sections of this chapter)

At this point, the system will prompt you with **Keyin Pnt 2** which will instruct you to key in the second calibration point. Simply add the weight which you want to use for the next calibration point, then key in the total applied weight and press **<ENTER>**. You may wish to add weight until the displayed weight differs from the actual applied weight and then perform the next calibration at that point.

Up to five calibration points may be established using this procedure. However if fewer calibration points are required, simply press **<ENTER>** without entering a value at the **Keyin PntX** prompt. Refer to figure 11 for a 5 point calibration example. The values demonstrated here are keyed in at each successive calibration point.

If items are consistantly being weighed on either the high or low end of the cell capacity, the points of calibration can be skewed to either end of the spectrum.

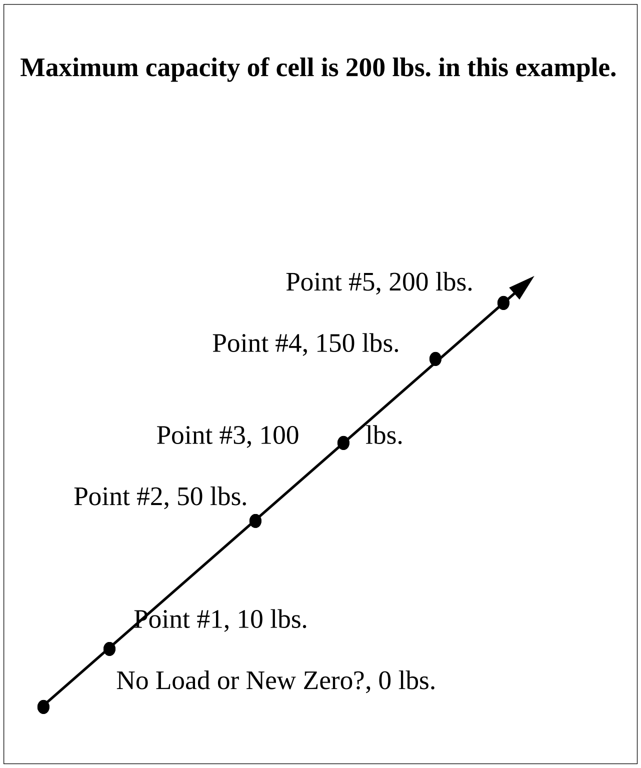

Figure 11 Five Point Linearization Graph

Multi-point linearization can compensate for a cell being non-linear. Refer to Figure 12.

After the last point is established, the system will prompt with **CAL OK?**. Press the **<ENTER>** key to accept the calibration or press **<CLR>** to backup and redo the last point as described below.

If you make a mistake at any point in the linearization process, simply press the **<CLR>** key. The system will backup one step in the procedure to the previous linearization point.

After the linearization has been completed, the changes must be saved by pressing **<ENTER>** at the **ENTER = SAVE** prompt. Otherwise the previous calibration data will remain in effect.

EXAMINING CALIBRATION RESULTS

Information Mode parameters **P61110** through **P61119** may be used to review the data established during the multi-point linearization. For each point, you may review the calibration weight and the established linearization factor.

LINEARIZATION DATA

If Multi-Point Linearization is enabled (P119), the ten Parameters **P61110** thru **P61119** show the calibration weights used and the resulting calculated factors. Otherwise the message **Not Used** is displayed. Refer to Chapter 28 for functional details on Parameters **P119** and **P61110** thru **P61119**.

MEMORY STORAGE REQUIREMENTS

When you enable Multi-Point Linearization, the indicator reserves 41 bytes of storage space. If less than 5 calibration points are used, then the unused storage memory (8 bytes per unused point) is made available for other features after the calibration is performed.

7.5 Quick Calibration

Quick Cal Introduction

Another variation of the calibration process is the Quick Calibration mode procedure. This calibration method allows a user to perform a calibration without getting into the setup parameters. Calibrated weights are required.

Quick Cal Commands

In order to provide a somewhat faster method of accessing the calibration mode of the unit, an alternate method is available. From the weigh modes, follow these steps:

100 <SELECT>

54321 <ID> <ENTER>

The display will briefly read: "Quick Cal!" and then the standard prompt, "New Zero?" will appear. At this point the calibration process may proceed as normal. Press **<SELECT>** to toggle through the calibration selection types. Press **<ENTER>** when viewing the desired selection. Refer to the first part of this chapter for a detailed explanation of each selection. If load cell linearization is enabled (P119-scl#1, P129-scl#2 and P139-scl#3) the calibration modes accessible are identified by an asterisk (*****).

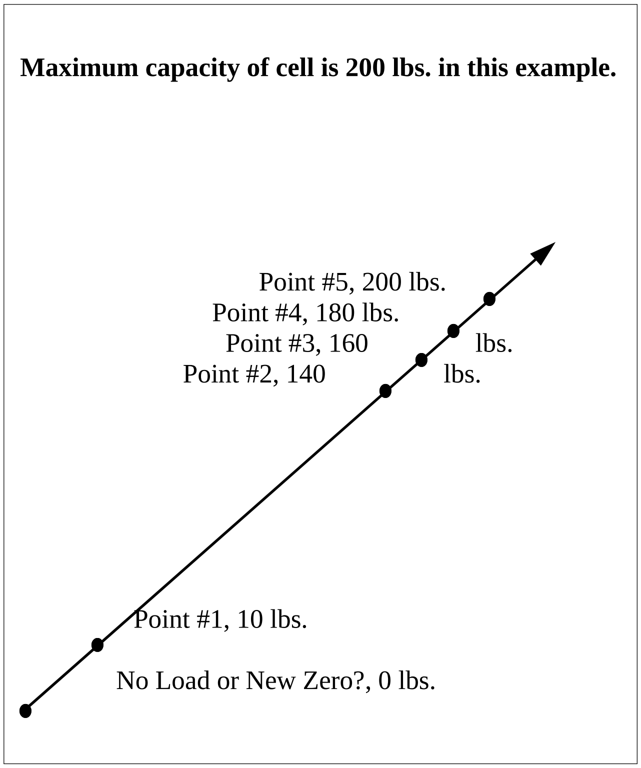

Figure 12 Five Point Linearization Graph (high end)

a)	**"New Zero?"**	*****
b)	**"Last Zero?"**	
c)	**"Temp Zero?"**	
d)	**"Only Zero?"**	*****
e)	**"Cal Reset"**	*****

Other Quick Cal methods

In order to provide a somewhat faster method of accessing the calibration mode of the unit, an alternate method is available. From the weigh modes, the following data stream should be received through the COMM port:

100%s54321%i%e

The display will briefly read: "Quick Cal!" and then the following selections will appear, starting with "**New Zero?**". If load cell linearization is enabled (P119-scl#1, P129-scl#2 and P139-scl#3) the calibration modes accessible are identified by an asterisk (*****).

a)	**"New Zero?"**	*****
b)	**"Last Zero?"**	
c)	**"Temp Zero?"**	
d)	**"Only Zero?"**	*****
e)	**"Cal Reset"**	*****

Refer to the first part of this chapter for a detailed explanation of each selection.

Another variation of the calibration process is the linearization procedure. Linearization can be quite useful in improving the absolute accuracy of larger capacity systems which often exhibit poor linearity. This feature is documented elsewhere.

7.6 Quick Calibration (earlier versions)

Quick Cal Introduction

In order to round out the 550's capabilities, a few variations to the calibration process have been made available. For the standard calibration operation, the **<ZERO>** key is pressed at the "No Load" prompt. These alternate calibration methods are implemented by pressing one of the other front panel keys at the "No Load" prompt, as described below.

Another variation of the calibration process is the linearization procedure. Linearization can be quite useful in improving the absolute accuracy of larger capacity systems which often exhibit poor linearity. This feature is documented elsewhere.

Quick Cal Commands

In order to provide a somewhat faster method of accessing the calibration mode of the 550 indicator, an alternate method is available. From the weigh modes, follow these steps:

100 <SELECT>

54321 <ID><ENTER>

The display will briefly read:"Quick Cal!" and then the standard prompt, "NO Load?" will appear. At this point the calibration process may proceed as normal.

Re-Cal (with cal weight already applied)

This capability allows a re-calibration to be performed without removing the applied weight, if, during a calibration check, the calibration is found to be out of tolerance. This is especially beneficial when the 550 is used with large capacity platforms such as truck scales. This operation is achieved by pressing the **<Zero>** key (instead of the **<Enter>** key) at the "No Load?" prompt during the calibration procedure.

The scenario where this feature would be used is as follows:

a) A scale is to be checked for compliance with local weights and measures regulations.

b) The 550 indicator is zeroed with a press of the **<Zero>** key.

c) The necessary load is applied to verify accuracy.

d) The weight indication is found to be out of tolerance.

e) The calibration mode is accessed, either using the method described above for Quick Cal or by the normal method. Note that the calibration weight is still applied!

f) At the "No Load?" prompt, the **<Zero>** key is pressed.

g) The instrument briefly displays the message: "Using Last0", followed by the usual: "Units = xx" indicating the proper units for the keying in of the calibration weight. The indicator is using the zero established with the last use of the **<Zero>** key during the weigh mode as the new calibration zero.

h) Next the display prompts: "Keyin CalWt".

i) The operator keys in the currently applied weight, such as **50000 <Enter>**. The indicator then adjusts the calibration parameters to bring the system into calibration.

j) Next the display prompts "Cal OK?". The weight may then be removed and if necessary re-applied to assure the inspector that the calibration has properly adjusted.

k) Once the inspector is satisfied with the calibration press the **<Enter>** key to save the calibration.

l) Next the usual prompt "Save Mods?" followed shortly by "Enter = Save" is displayed. Press **<Enter>** to save the new calibration factors.

m) The next prompt, "Enter = Exit" is similarly responded to by the **<Enter>** key and the indicator returns to the weigh mode.

Re-Cal (without establishing new zero)

In some applications it is desirable to perform a calibration without removing the currently applied load. This is particularly useful in tank weighing applications where it might be a particularly time consuming and costly ordeal to completely drain the tank being weighed.

Pressing the **<Tare>** key at the "No Load?" prompt during the calibration procedure causes the indicator to temporarily zero the displayed weight so that additional weight may be added to assure the calibration of the indicator. The zero determined during the previous calibration is not affected.

For example, with a tank containing an unknown amount of material:

a) Access the calibration mode, ie:

100<SELECT>

54321 <ID><ENTER>

b) At the "No Load?" prompt press

<Tare>

The displayed value is zeroed out.

c) Apply the calibration weight to the tank.

d) Key in the value of the calibration weight:

1000<Enter>

e) The numeric display should show the entered value.

f) Remove the calibration weight from the tank. The display should return to zero. If the display reads as specified, at the "Cal OK?" prompt press:

<Enter>

Otherwise, to repeat the calibration process, press

<CLR>

and then repeat steps (b) through (f).

g) To save the newly determined calibration weight, at the "Enter = Save" prompt, press:

<Enter>

h) Then to return to the weighing modes, at the "ENTER = EXIT" prompt, press:

<Enter>

and the indicator will return to the weigh mode.

4) Calibration Re-zeroing:

If it is desired to only re-establish the calibration zero of the indicator without affecting the established gain, this may be done during the calibration process by pressing the **<SELECT>** key at the "No Load?" prompt. After doing so, the display will flash the calibration units message and then "New Zero!" for one second. Then the display will advance to the "Cal OK?" prompt.

This may be useful in tank weighing applications where the re-zero parameter **(P118)** is set very low in order to prevent inadvertent re-zeroing. A build-up of sludge may be zeroed out in this manner.

For example, with the connected scale platform cleared of any extra weight:

a) Access the calibration mode, ie:

100 <SELECT>

54321 <ID><ENTER>

b) At the "No Load?" prompt press

<SELECT>

The display will briefly flash: "Units = xx"followed by:"New Zero!" and then:
"CAL OK?"

Press **<ENTER>** to accept the newly established zero or **<CLR>** to re-do the calibration.

The indicator's calibration zero is now set to establish the platform's gross zero at the current input signal from your scale platform.

7.7 Quick Calibration Personal Access Code

P401— QCAL

The Model 550 offers the ability to personalize the access code for entering the **Quick Calibration** mode. The factory default method for entering the **Quick Cal** mode is listed below.

From the **Weigh** Mode press:
1 0 0 <SELECT> 54321 <ID> <ENTER>

The display will briefly read: **"Quick Cal!"** and then the following selections will appear, starting with "**New Zero?**". If load cell linearization is enabled (P119-scl#1, P129-scl#2, P139-scl#3 and P149-scl#4) the calibration modes accessible are identified by an asterisk (*****).

a)	**"New Zero?"**	*****
b)	**"Last Zero?"**	
c)	**"Temp Zero?"**	
d)	**"Only Zero?"**	*****
e)	**“Cal Reset”**	*****

Parameter **P401** allows a **new code** to be entered for gaining access to the **Quick Cal** mode. The **ARROW** keys allow for entering in the new code. This code can be alpha-numeric and up to 49 characters in length.

Pressing the **<UNITS>** key will scroll through the numeric values. The **<TARE>** key will move to the next digit. The **<ENTER>** key will enter your keyed in digits as the new Quick Cal access code.

If an alpha-numeric code is necessary, press the **<TARE>** key before any other keys. This will put the unit in the alpha-numeric entry mode. The letter **“A”** will appear at the start of each character entry. The **<UNITS>** key will scroll through the ASCII character set. The **<TARE>** key will move to the next character. The **<ENTER>** key will enter your keyed in characters as the new Quick Cal access code.

The **<ID>** key will return to the previous character entry. The **<PRINT>** key will scroll through the full ASCII

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character set in reverse. Holding this key down will scroll through the ASCII set very quickly. Pressing the key momentarily will step to the previous character. If by accident the character of choice is passed up, pressing the **<PRINT>** key will allow the operator to return to any previous characters without having to scroll forward through the complete set again.

Exiting the unit while saving all changes will validate the new Quick Cal code.

To enter the Quick Cal mode after a new code is entered, press the following keys.

From the **Weigh** Mode press:

1 0 0 <SELECT> <Personalized Code> <ID> <ENTER>

CLEARING NEW QUICK CAL ACCESS CODES

The Quick Cal access code only allows access to the Quick Cal mode. It does not lock out access to the setup mode or the standard calibration mode. Refer to Parameter P400 for locking out these modes (Refer to the chapter on Personal Identification Numbers). This means that parameter P401 can be accessed and changed by non-authorized parties if parameter P400 is not personalized.

If for any reason the Quick Cal access code is to be changed, press the following key combination at parameter P401.

401 <SELECT> <23640> <ID> <ENTER>
<CLR>
“Enter=Dflt”

Press the **<ENTER>** key and the GSE factory default code will be reinstated.

Chapter 8
Accumulation Mode

8.1 Parameter Setup

P164.XX AcRTZ

This parameter determines the minimum weight (in terms of Full Scale established by P110) that the Gross Weight must **fall below** after an Accumulation before the next Accumulation can take place. This can be used to prevent unintended multiple Accumulations. The selections range from 0.01% to 100%.

P165.XX AcFnc

This parameter allows additions, subtractions or both when Accumulation Mode 03 (GrTot) or Accumulation Mode 06 (NtTot) is selected during operation. If you designate both, the unit will ask the operator which operation is to be performed before each accumulation within these two modes.

8.2 Accumulation (Memory Modes) Operations

The unit contains a series of memory registers into which weighing data may be accumulated. The way *accumulations* operate depends on selections made during the Setup Mode.

P165.XX AcFnc

This parameter permits the unit to perform additions, subtractions or both when Accumulation Mode 03 (GrTot) or Accumulation Mode 06 (NtTot) is selected during operation.

If you designate **both**, the unit will request which operation you wish to perform before each accumulation within these two modes.

8.3 PERFORMING ACCUMULATIONS

First, enter the desired Accumulation Mode either by pressing the **<SELECT>** key until one of the Accumulation Modes appears on the display, or by entering an Accumulation Mode number shown in Table 6 and followed by pressing **<SELECT>**. Once in an Accumulation Mode, press the **<.>** key to add or subtract the displayed total. Accumulate operations are motion delayed. If motion is occurring when an accumulation is requested, the Mot'n Delay prompt is displayed until motion ceases. During this time, press **<CLR>** to abort the accumulation. There are six Accumulation Modes with corresponding Mode Numbers as shown in Table 6. The order of appearance of these modes can be assigned when setting up parameters **P300 - P309**. Refer to the section on Operation Modes. The modes which show the Total plus or minus the Current Weight can let you see how the current total would be affected if the current weight were added in or subtracted out. This can be used in an application permitting filling to total target weight.

When an Accumulation is made, both the Gross and Net totals are affected. The unit may be set up to add or subtract from the accumulated totals, or to perform both operations (P165). If set up for **both**, the unit will ask you which operation you wish to perform before completing the Accumulation. You will then press **<SELECT>** to subtract or **<ENTER>** to add.

While Modes 04 or 07 are selected only additions are possible; While Modes 05 or 08 are selected, only subtractions are possible. Normally, the four accumulate modes which include the current weight (Modes 04, 05, 07 and 08) actively change as the applied load varies. However, after an accumulation occurs, these values are frozen at their new accumulate total values until the Gross Weight again falls below the value set by parameter P164. At that time, these values again resume their active state.

8.4 INITIALIZING ACCUMULATE TOTALS

The Accumulation Registers may be reset to a new

ACCUMULATION MODE	MODE #
Gross Total	**03**
Gross Total Plus Current	**04**
Gross Total Minus Current Wt.	**05**
Net Total	**06**
Net Total Plus Current Weight	**07**
Net Total Minus Current	**08**

Table 6 Accumulation Mode Numbers

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NOTE:

Automatic accumulations can be accomplished through the use of setpoints and macros. Refer to the sections on Setpoints and Macros for an explanation of these features.

number. This would permit you to enter a total from the previous day or shift to continue the accumulation, or to reset the number to 0. Simply enter the desired number and press **<ENTER>**. You will then be prompted by a display of **MOD AC?** for 1 second followed by **ENTER =MOD**. Press **<ENTER>** to complete the change or any other key to abort the modification of the accumulation total.

The **<CLR>** key may be used to reset both the net and gross totals to zero. The prompt **CLEAR ACS?** will appear briefly followed by **ENTER =CLR!** Press **<ENTER>** to complete the clearing or press any other key to abort the clear operation.

NOTE:
If parameter P412 is **enabled**, any parameter that allows for data to be directly entered, changed, cleared or recalled into it is flagged with the letter "P" in front of the parameters name. Refer to chapter 34 Pre-setable Parameters on Data Registers and ID's for a listing of parameters that fall under this category. *All* accumulation parameters fall under this category. More information can be found in the OIML chapter.

8.5 PREVENTING DOUBLE ACCUMULATIONS

A setup parameter (P164) can help to prevent accidental double accumulations. This parameter lets you choose a percent of capacity that the gross weight must **fall below** before a second accumulation can take place.

If an accumulate is attempted without first removing the last accumulated weight, the message **CLEAR WGHT!** is displayed briefly and the operation is aborted.

Chapter 9 Units

9.1 Units Parameter Setup

P150.XX UNITS

This parameter specifies the weighing units which are used to calibrate the unit. These include pounds, kilograms, ounces, grams, ft-lb and newton-meters (for torque measurement), and the Custom Units which will be defined later in P155 (Custom Units are indicated by " ????1 " which appear in the lower part of the dot matrix display).

P151.XX UNIT1

This parameter specifies the weighing units which will be displayed by the indicator after power-up. These are not necessarily the same as the calibration units set in parameter P150 above. The choices here are the same as for P150 with the additions of a second Custom Units and lb/oz. Lb/oz will let you display a weight in pounds with any fraction left over displayed in ounces.

P152.XX UNIT2

This parameter specifies the second weighing units selectable with the **<UNITS>** key during operation. The choices are the same as parameter P151 with the addition of "none". The "none" selection will disable the second units selection.

P153.XX UNIT3

This parameter specifies the third weighing units selectable with the **<UNITS>** key during operation. The choices here are the same as parameter P152.

P154.XX UNIT4

This parameter specifies the fourth weighing units selectable with the **<UNITS>** key during operation. The choices are the same as parameter P152.

P155.- - Ucon1

This parameter allows input of a units conversion factor for the first custom weighing units. The Custom Units feature lets you establish custom units not available from the standard selections, such as tons or troy ounces. The conversion factor used to convert from the calibration units to the custom units will be entered in parameter P155. Simply key in the multiplication factor that will convert the calibration units (entered in P150) to the desired custom units. Refer to Table 7 Conversion Factors for a list of conversion factors. For example, if your calibration units are pounds and you want to use custom units of troy-ounces, you would enter the conversion factor of 14.5833 into this parameter (since there are 14.5833 troy-ounces in each pound) and press **<ENTER>**.

When you enter a conversion factor for custom units, the entered value is the ratio of the custom units to the calibration units. For example, if grams are the calibration units and the custom units are troy ounces, then enter 0.0321507 (troy oz./gm). However, if the

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Custom Units	Pounds	Ounces	Grams	Kilograms	Ft-Lb	Nm
Pennyweight (dwt)	**291.6667**	**18.22917**	**0.643051**	**643.051**		
Troy Ounce (ozt)	**14.5833**	**0.911458**	**0.03215072**	**32.1507**		
Grain (GN)	**7000.0**	**437.5**	**15.432436**	**15432.36**		
Carat (ct)	**2267.57**	**141.7476**	**5.0**	**5000.02**		
Ton (T)	**0.0005**					
Inch-Ounces (in-oz)					**192.0**	**141.612**
Inch-Pounds (in-lb)					**12.0**	**8.85075**
Kilogram-Centimeters					**13.8255**	**10.1972**
Kilogram-Meters					**0.138255**	**0.101972**

Table 7 Conversion Factors

NOTE:

Conversion factors are stored to an accuracy of 1 part in 16,000,000. However, the displayed value will be rounded off to 4 or 5 digits of precision.

calibration units are the custom units, then enter the ratio of custom units to pounds. For example, if troy ounces is the calibration units then enter 14.5833 (troy oz./lb.). It is not intended that torque units be mixed with force units, such as lb-ft with lb. Do not attempt to mix different types of units when setting up the indicator. If you do, the converted units may be meaningless.

P156.- - Ucon2

This parameter allows input of a conversion factor for a second custom weighing unit. The rules for making an entry here are the same as for parameter P155. After keying in the conversion factor press **<ENTER>**.

P157.- - Unam1

This parameter allows the input of up to five characters as the name of the first custom units. To accomplish this, the **<ID> <TARE> <UNITS>** and **<PRINT>** keys to scroll through the ASCII character set (See Figure 13). Press the **<UNITS>** and an upper-case "A" will appear in the display. Then press either the **<UNITS>** or **<PRINT>** key to cycle through the possible selections of upper-case and lower-case letters, numbers and a set of punctuation and other symbols. (See Figure 14). Holding the **<UNITS>** or **<PRINT>** key down will step you through the choices more quickly. When the desired character is shown, press the **<TARE>** key to move to the next location. You can use the **<ID>** key to move the cursor location to the left like a backspace key. When finished, press **<ENTER>** and your selection will be shown on the display. Then press **<SELECT>** to advance to the next parameter. For example, if you are weighing in tons you could use the following procedure once parameter P157 is displayed to enter the correct name.

1. With the prompt **UNAM1 = XXXX** in the dot matrix display, press **<UNITS>** to move to the

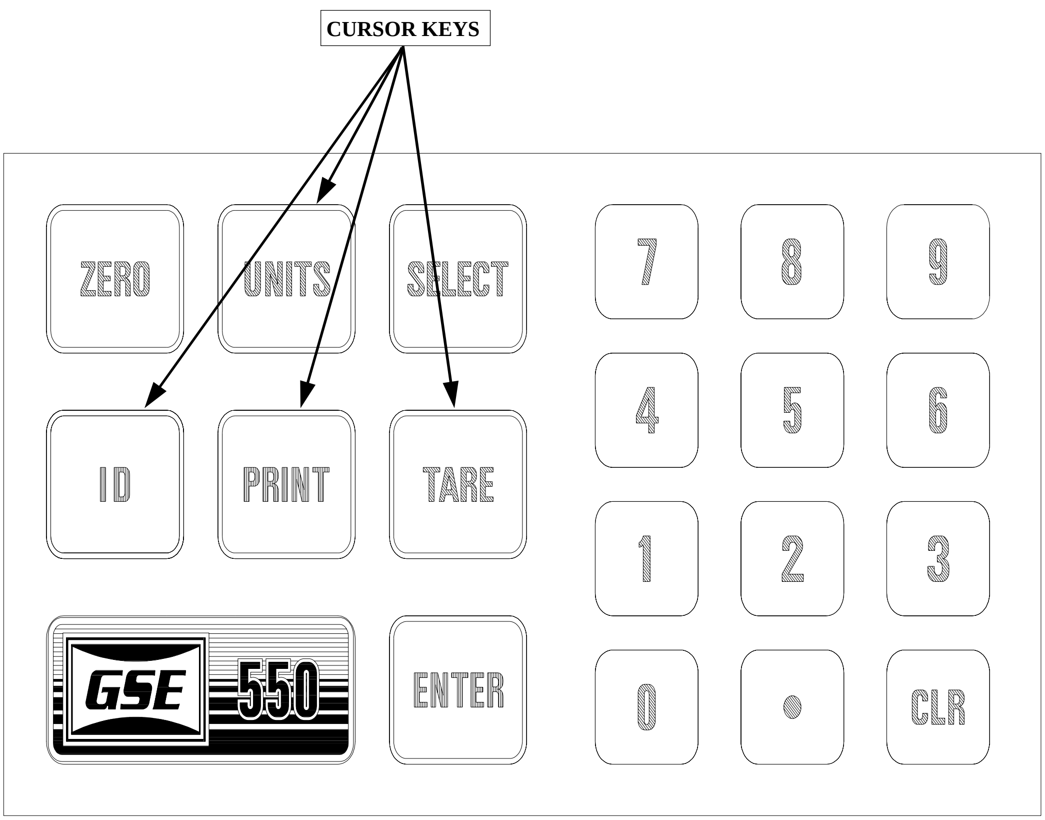

Figure 13 Keypad Cursor Keys

first character position. An "A" will appear.

2. Press and hold the **<UNITS>** key and cycle through the alphabet until the letter "T" appears. If you go to far, use the **<PRINT>** key to back up.

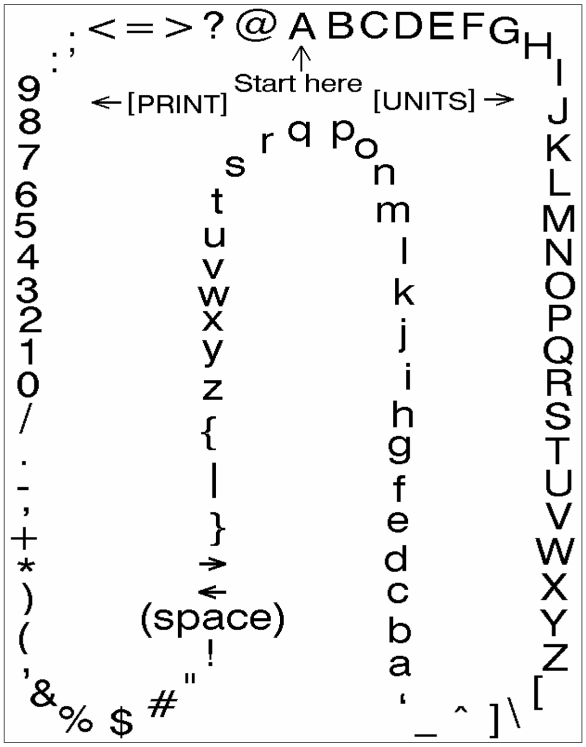

Figure 14 Character Listing

3. Press **<TARE>** to move to the second character position. Repeat step 2 to select the letter "O".

4. In a similar fashion repeat these steps until you have the name "TONS" spelled out.

5. When finished, press **<ENTER>** to save your entry. Press **<SELECT>** to move on to the next parameter.

P158.- - Unam2

This parameter lets you enter the name of the second custom units that you may be using. Use the procedure previously explained for P157 to enter the desired name.

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Chapter 10
Tare Operations

10.1 Tare Operations Parameter Setup

P161.XX TrSAV

Determine whether or not you want to save the tare weight value upon power-down.

This feature will prove to be valuable in applications such as Tank Weighing. If power is removed from the meter while the tank contains material, the net value will not be lost if the unit is set for "Tare Saved".

P162.XX TrNEG

Enables bi-directional operation by permitting a negative tare. This should be used only if required for a specific application.

P163.XX TrRND

This parameter will select whether or not the Tare Weight will be rounded off for calculations. If the application must be NIST approved, this must be set to P163.00 which guarantees that Net + Tare = Gross.

Figure 15 Tare Key

Chapter 11 Remote Keys and Local Keypad

11.1 Remote Key Connections (Invoke Macros)

Macros are small software programs (programmable functions) which you can create to automatically perform a repetitious operation. The indicator has the capability to select from a remote location up to six different macros which you have created.

The indicator provides connections for up to six remote keys or momentary switch closures. Closing these connections will start the corresponding macro. The macros may be set up to perform whatever commands are required for an application. For instance a ZERO command, a TARE command, a PRINT command or a whole series of commands and or prompts may be performed by a Macro. The remote key connections are located at pin positions 1 through 5 on connector J6. Refer to Chapter 16 Macro Programming Operations for information regarding the operation, setup and capabilities of Macros.

The open circuit voltage across one of the switches is +5 VDC. A closed switch will conduct about 0.25 mA. Therefore a low voltage switch with gold contacts is recommended to insure the long term integrity of the switch closure. Mercury wetted switches will also perform well.

A momentary closure is all that is required. The associated macro will be started at the time of the switch closure. The remote keys do not repeat when held closed the way the front panel keys do. They are active only once.

If an application requires that a switch remain closed for extended periods then certain restrictions must be observed to insure proper operation of the indicator. Refer to Tables 8 and Table 27 and note the two groups of keys. Group 1 is returned to J6 pin 1, and Group 2 is returned to J6 pin 2. A remote key switch that may remain closed for an extended period of time must be the only switch connected into a group.

For example, a remote key which may remain closed for a while is connected to J6 pins 1 & 4. Any other momentary switches may only be connected to remote keys 3, 4, and 5.

An "extended period of time" for a remote key to be held closed is defined as a period overlapping another key (front panel or remote key) being pressed while the first key is still being held closed.

REMOTE KEY CABLE RECOMMENDATIONS

Multi-conductor cable with wires between 28 and 20 AWG and having an overall foil shield with drain wire or a braided shield should be used. Insulation resistance of the cable's wires should be 30 V minimum. Use a cable with the required number of conductors. Unused conductors are undesirable since they can act as antennae and radiate electrical noise into and out of the indicator enclosure.

Only one conductor should be inserted into each position of the J6 connector. If more than two switches are going to be used, then the multiple connections required for the J6 pins 1 or 2 should be made at the switches themselves, not inside the J6 connector.

REMOTE KEY AND SETPOINT CONNECTIONS

1. If strain relief J2 will be used, strip back the cable's jacket back 4.5"; if strain relief J4 is used, strip back the jacket 8". Retain enough of the cable's shield or drain wire so that it may be terminated to the rear panel stud adjacent to the strain relief.

2. Strip back the insulation of each wire about 1/4".

3. Twist the stranded wires together for ease of insertion into the connector. Smaller wire sizes may also be tinned if desired, but be sure to leave only a minimum amount of solder on the wire or it will not fit into the connector.

4. Refer to Table 8, Remote Key Connections, to determine the required connections for your remote key application.

5. Refer to Chapter 21, Setpoints and Logic I/O for Relay Module Setpoint Outputs and connections, to determine the appropriate connections for use of the setpoint logic output connections.

6. Loosen the rear panel strain relief to be used, preferably J2 or alternatively J4 if J2 is already being used. Feed the cable into the enclosure through the strain relief.

7. Connect the wires into the appropriate positions of the J6 connector by pressing down on the white lever for that position while inserting the stripped wire. Release the lever when the wire is completely inserted.

8. After all wires have been connected, tie-wrap the wires together as close to the connector as possible. This will restrict the movement of a wire in case it were to come loose from the connector, preventing it from coming into contact with hazardous voltages. Tie-wraps are provided with each instrument in a bag along with the User's Guide.

9. Secure the cable's shield to the rear panel stud adjacent to the chosen strain relief.

10. Pull any excess cable back out of the instrument until there is no slack in the cable between the strain relief and the shield connection.

11. Retighten the strain relief securely so that even if the external cable is pulled or twisted the internal cable is unaffected.

Example #1: Remote Tare Operation

A momentary switch or contact closure should be connected across pins 1 and 3 on the J6 connector. This momentary closure will in turn invoke macro 0. The macro can be programmed to execute any commands from chapter 16 Macro Operations. However, this example will simply execute a "tare" operation. Simply place these two characters into macro #0 (%t).

Macro Number	Remote Key Pin numbers on J6
0	1 & 3
1	1 & 4
2	1 & 5
3	2 & 3
4	2 & 4
5	2 & 5

Table 8 Remote Key Connections

Macro #0
800%s23640%i%e%c%e
%%t%e
%z

Example #2 Remote Print Operation

A momentary switch or contact closure should be connected across pins 1 and 4 on the J6 connector. This momentary closure will in turn invoke macro 1. The macro can be programmed to execute any commands from chapter 16 Macro Operations. However, this example will simply execute a "print" operation. Simply place these two characters into macro #1 (%p). (Use a % e for a Model 570). Refer to chapter 15 Communications to setup your custom printout. Note that the factory has applied a default custom transmit in the unit. This is also presented in chapter 15 Communications.

Macro #1
801%s23640%i%e%c%e
%%p%e
%z

Example #3 Remote Zero Operation

A momentary switch or contact closure should be connected across pins 1 and 5 on the J6 connector. This momentary closure will in turn invoke macro 2. The macro can be programmed to execute any commands from chapter 16 Macro Operations. However, this example will simply execute a "zero" operation. Simply place these two characters into macro #2 (%z).

Macro #2
802%s23640%i%e%c%e
%%z%e
%z

Example #4 Remote Start Operation

A momentary switch or contact closure should be connected across pins 2 and 3 on the J6 connector. This momentary closure will in turn invoke macro 3. The macro can be programmed to execute any commands from chapter 16 Macro Operations. However, this example will activate setpoint 1 output. Simply place these three characters into macro #3, (1%A).

Setpoint #1 must be enabled and both its activation and deactivation specifications defined. These are located starting at P5100. Setpoints can be defined to function independently regardless any other indicator operations. In this case, the activation specification of the setpoint will not be defined to function independently. The activation side of the setpoint will be determined as the remote key is pushed. The macro in turn will execute the correct commands to activate the setpoint. The setpoint should be set to "activate never". This will eliminate the setpoint from activating independently. The macro commands "1%A" override this setting.

The setpoint's deactivation side will operate independently. It should be setup to deactivate automatically regardless of any operator interface to do so. Refer to the chapter on Setpoints for more information on defining a setpoints specifications.

Macro #3
803%s23640%i%e%c%e
1%%A%e
%z

<u>Other</u> <u>Remote</u> <u>Operations</u>

Other remote key operations might include accumulations, activate a valve, activate a conveyor, emergency stop, etc. Refer to chapter 16 Macro Programming Operations for macro commands.

11.2 The 550/570 Keypad

The keypad matrix shown in figure 16, is utilized with three GSE model versions. The 550 and 570 U.S.A. versions are defined with this matrix as well as the 550i (international) version.

The 550 keypad mating connector J7 does **not** have pins 11 and 12 stuffed on the main board. The traces on the board at the keypad connector J7 for pins 11 and 12 are still fully supported by the processor software. These additional pins can be accessed if necessary from the non-component side of the board. A simple momentary short across any of these additional pins as well as the connector pins will be acknowledged by the processor as an input defined in the key definition table. Refer to table 9 for a definition of the extended key definitions.

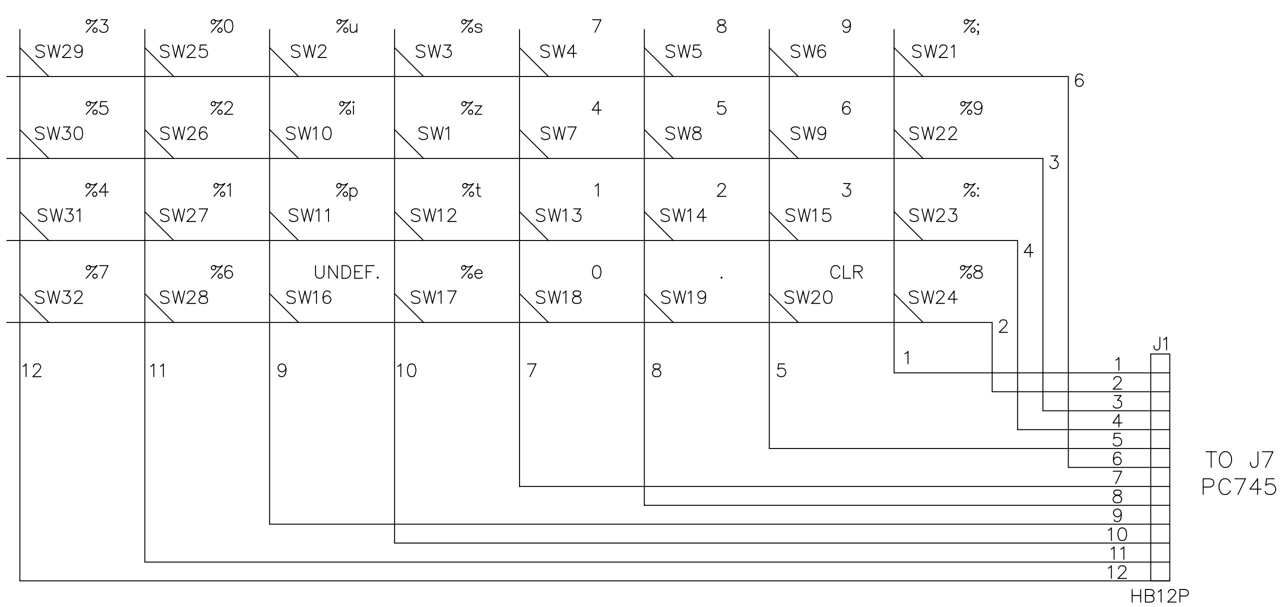

Figure 16 Local Keypad Pin Definitions Schematic

MODEL	M570	M550	M550i
KEYPD ASSY	420744-25504	420744-26092	420744-29622
KEYPD P/N	44-35-25501	44-35-25533	44-35-29397
SW1	ZERO, %z	ZERO, %z	→0←, %z
SW2	UNITS, %u	UNITS, %u	⇥, %p
SW3	SELECT, %s	SELECT, %s	→T←, %t
SW4	7	7	7
SW5	8	8	8
SW6	9	9	9
SW7	4	4	4
SW8	5	5	5
SW9	6	6	6
SW10	ID, %i	ID, %i	F1, %i
SW11	SAMPLE, %p	PRINT, %p	F2, %?
SW12	TARE, %t	TARE, %t	F3, %s
SW13	1	1	1
SW14	2	2	2
SW15	3	3	3
SW16	--	--	--
SW17	PRINT/ENTER, %e	ENTER, %e	↵, %e
SW18	0	0	0
SW19	•	•	•
SW20	CLR, %c	CLR, %c	CLR, %c
SW21	% ;	% ;	% ;
SW22	%9	%9	%9
SW23	% :	% :	% :
SW24	%8	%8	%8
SW25	%0	%0	%0
SW26	%2	%2	%2
SW27	%1	%1	%1
SW28	%6	%6	%6
SW29	%3	%3	%3
SW30	%5	%5	%5
SW31	%4	%4	%4
SW32	%7	%7	%7

Table 9 Local Keypad Pin Matrix Definitions

Chapter 12 Key Disabling Parameter Setup

12.1 Key Disabling

For reasons of simplicity, security or conformance to local "**legal for trade regulations**", certain applications may require the disabling of some keyboard functions.

P166.XX AutoT

This parameter will **enable** or **disable** use of the auto-tare operation. If disabled, only keyboard-entered tare weights are allowed.

P167.XX KybdT

This parameter will permit an Auto-Tare but if enabled, prevent keyboard entry of tare weights.

P168.XX KybdS

This parameter will **disable** or **enable** the **<SELECT>** key following a numeric entry while in the Weigh Modes. Enabling this parameter will let you access operational modes which have not been selected as a mode at P300-P309 (Refer to Chapter 13 Selectable Operating Modes.

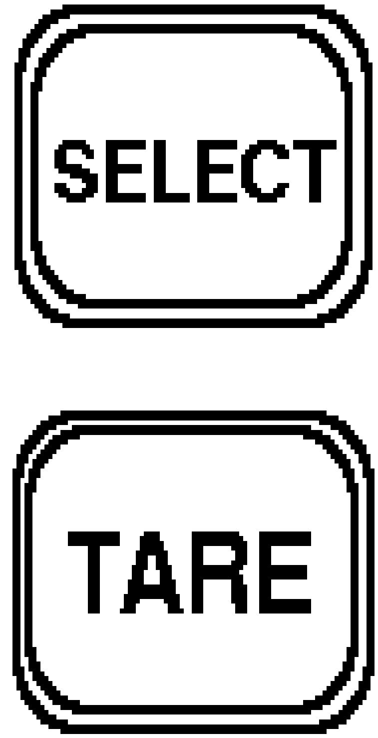

Figure 17 Select & Tare Keys Disabled

Chapter 13 Selectable Operating Modes

13.1 Selectable Operating Modes

P300 through P309

These parameters assign the order of appearance of the available operational modes when the **<SELECT>** key is pressed during weighing or counting. The mode assigned by P300 would appear first (after the power-up messages); the mode assigned to P301 would appear next, followed by the mode assigned to P302, etc. In this way, you can select for display only the operating modes that will actually be used, including any of the Accumulation Modes and Data Registers. The possible selections are listed in the following table. (Note that those modes that are not among the ten selectable modes assigned in P300 - P309 may still be accessed during weighing by keying in the corresponding mode number and pressing **<SELECT>**. The direct access of modes and registers may be inhibited by selecting disabled in parameter P168.

The first three of the ten selectable modes inserted are factory defaulted to Gross, Net and Tare. If desired these three default parameters "can" be changed.

Examples:
As mentioned any of the data registers can be added to the ten selectable modes. A practicle example for adding a VAR to the selectable mode table would allow easy access for changing setpoint target values. Another example mentioned are the accumulation modes. Instead of remembering which accumulation mode to select and the individual keys to get there, add the specific accumulation mode to the table. Refer to Table 10, Parameter ID Numbers for a complete listing.

Parameter	ID	Transmitted Name
Gross Weight	00	Gross
Net Weight	01	Net
Tare Weight	02	Tare
Gross Total	03	GrTOT
Gross Total + Current	04	GrT+C
Gross Total - Current	05	GrT-C
Net Total	06	NtTOT
Net Total + Current	07	Nt+C
Net Total - Current	08	Nt-C
Time / Date	11	Tm/Dt
Truck IN / OUT Gross Wt.	12	TrGrs
Truck IN / OUT Net Wt.	13	TrNet
Truck IN / OUT Tare Wt.	14	TrTar
ID #1 (alpha-numeric, 49 characters max.)	21	(programmed in P701)
ID #2 (alpha-numeric, 49 characters max.)	22	(programmed in P703)
ID #3 (alpha-numeric, 49 characters max.)	23	(programmed in P705)
ID #4 (alpha-numeric, 49 characters max.)	24	(programmed in P707)
ID #5 (alpha-numeric, 49 characters max.)	25	(programmed in P709)
ID #6 (alpha-numeric, 49 characters max.)	26	(programmed in P711)

Table 10 Parameter ID Numbers

Table continued

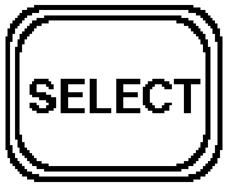

Figure 17.1 Select Key

Note:
Parameters 30 through 37 are applicable only to the model 570 indicator and are for counting applications only.

Parameter	ID	Transmitted Name
Quantity	**30**	**Qty**
Quantity Total	**31**	**Qty TOT**
Quantity Total + Current	**32**	**Qty T + C**
Quantity Total - Current	**33**	**Qty T - C**
Average Piece Weight	**34**	**APW**
Average Piece Weight times 1000	**35**	**APW*K**
Percent Accuracy	**36**	**% Accy**
Last Sample	**37**	**Sampl**
Recalled Time	**50**	**R time**
Alarm 1 Time (positive number)	**51**	**A1 Tim**
Alarm 2 Time (positive number)	**52**	**A2 Tim**
Alarm 3 Time (positive number)	**53**	**A3 Tim**
Alarm 4 Time (positive number)	**54**	**A4 Tim**
Variable #0 (fractional values, real #s, 10^{-37} to 10^{+37}	**80**	**Var 0**
Variable #1 (fractional values, real #s, 10^{-37} to 10^{+37}	**81**	**Var 1**
Variable #2 (fractional values, real #s, 10^{-37} to 10^{+37}	**82**	**Var 2**
Variable #3 (fractional values, real #s, 10^{-37} to 10^{+37}	**83**	**Var 3**
Variable #4 (fractional values, real #s, 10^{-37} to 10^{+37}	**84**	**Var 4**
Variable #5 (fractional values, real #s, 10^{-37} to 10^{+37}	**85**	**Var 5**
Variable #6 (fractional values, real #s, 10^{-37} to 10^{+37}	**86**	**Var 6**
Variable #7 (fractional values, real #s, 10^{-37} to 10^{+37}	**87**	**Var 7**
Variable #8 (fractional values, real #s, 10^{-37} to 10^{+37}	**88**	**Var 8**
Variable #9 (fractional values, real #s, 10^{-37} to 10^{+37}	**89**	**Var 9**
Register #1 (whole #s, integer)	**91**	**Reg 1**
Register #2 (whole #s, integer)	**92**	**Reg 2**
Register #3 (whole #s, integer, + or -)	**93**	**Reg 3**
Register #4 (whole #s, integer)	**94**	**Reg 4**
Status Character (O, M or <space>)	**97**	**Stat**
Currently Displayed Data	**98**	**(variable, depending on current display)**

Table 10 continued, Parameter ID Numbers

Parameter	ID	Transmitted Name
Variable #10 (fractional values, real #s, 10^{-37} to 10^{+37}	60	Var10
Variable #11 (fractional values, real #s, 10^{-37} to 10^{+37}	61	Var11
Variable #12 (fractional values, real #s, 10^{-37} to 10^{+37}	62	Var12
Variable #13 (fractional values, real #s, 10^{-37} to 10^{+37}	63	Var13
Variable #14 (fractional values, real #s, 10^{-37} to 10^{+37}	64	Var14
Variable #15 (fractional values, real #s, 10^{-37} to 10^{+37}	65	Var15
Variable #16 (fractional values, real #s, 10^{-37} to 10^{+37}	66	Var16
Variable #17 (fractional values, real #s, 10^{-37} to 10^{+37}	67	Var17
Variable #18 (fractional values, real #s, 10^{-37} to 10^{+37}	68	Var18
Variable #19 (fractional values, real #s, 10^{-37} to 10^{+37}	69	Var19
Variable #20 (fractional values, real #s, 10^{-37} to 10^{+37}	70	Var20
Variable #21 (fractional values, real #s, 10^{-37} to 10^{+37}	71	Var21
Variable #22 (fractional values, real #s, 10^{-37} to 10^{+37}	72	Var22
Variable #23 (fractional values, real #s, 10^{-37} to 10^{+37}	73	Var23
Variable #24 (fractional values, real #s, 10^{-37} to 10^{+37}	74	Var24
Variable #25 (fractional values, real #s, 10^{-37} to 10^{+37}	75	Var25
Variable #26 (fractional values, real #s, 10^{-37} to 10^{+37}	76	Var26
Variable #27 (fractional values, real #s, 10^{-37} to 10^{+37}	77	Var27
Variable #28 (fractional values, real #s, 10^{-37} to 10^{+37} (not accessible normally)	78	Var28
Variable #29 (fractional values, real #s, 10^{-37} to 10^{+37}	79	Var29

Table 10 continued, Parameter ID Numbers

Chapter 14 Data Registers and ID's (Programmable)

14.1 Introduction

The 550 utilizes a great number of numeric data registers which are constantly being updated during normal operation or for other general uses. ie.(Accumulation registers, Standard weighing/counting registers and so on. Each register is defined with two (2) parts or fields, the "*name*" and the "*data*" field. Any of these registers can be printed out a specified port by custom transmit or a macro. Depending on how the registers are formatted for transmission, the "*name*" field can be omitted from the transmission. However, the "*name*" portion associated with the "*data*" portion of the register is **adjustable**, meaning the name **can** be changed. This section will define and explain six (6) types of data registers that have the capability of being **custom named** or adjusted. In reference to the 550 the six registers are called out as Variables (VARS), Data Registers (REGS), Weighing/Counting Parameters, Tm/Dt, Alarms and ID's (Alpha-numeric strings or simply "strings").

14.2 Weighing Parameters

Weighing parameters can be custom named, making their intended usage more specific to the scale user. These parameters are pre-named for standard weighing and counting purposes. Some applications might require a custom name. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting Weighing/Counting parameters, VARS, REGS and ID"s as column headings.

Naming Weighing Parameters (P600-P602)

P600. - - Gross
Accessing this parameter sets the "naming" for the Gross Weight parameter.

P601. - - Net
Accessing this parameter sets the "naming" for the Net Weight parameter.

P602. - - Tare
Accessing this parameter sets the "naming" for the Tare Weight parameter.

Accumulation Weighing Parameters (P603-P608)

P603. - - GrTOT
Accessing this parameter sets the "naming" for the Gross Total parameter.

P604. - - GrT+C
Accessing this parameter sets the "naming" for the Gross Total Plus Current Gross parameter.

P605. - - GrT-C
Accessing this parameter sets the "naming" for the Gross Total minus Current Gross parameter.

P606. - - NetTOT
Accessing this parameter sets the "naming" for the Net Total parameter.

P607. - - NtT+C
Accessing this parameter sets the "naming" for the Net Total plus Current Net parameter.

P608. - - NtT-C
Accessing this parameter sets the "naming" for the Net Total minus Current Net parameter.

14.3 Time and Date Parameters

The Time and Date parameter can be custom named, making its intended usage more specific to the scale user. This parameter are pre-named (Tm/Dt). Some applications might require a custom name. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting Weighing/Counting parameters, VARS, REGS and ID"s as column headings.

Naming Time/Date Parameter (P611)

P611. - - Tm/Dt
Accessing this parameter sets the "naming" for the Time/ Date parameter.

14.4 Truck Parameters

Truck parameters can be custom named, making their intended usage more specific to the scale user. These parameters are pre-named for standard truck weighing purposes. Some applications might require a custom name. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting Weighing/Counting parameters, VARS, REGS and ID"s as column headings.

Naming Truck Weighing Parameters (P612-P614)

P612. - - TrGrs
Accessing this parameter sets the "naming" for the Truck Gross parameter.

P613. - - TrNet
Accessing this parameter sets the "naming" for the Truck Net parameter.

P614. - - TrTar
Accessing this parameter sets the "naming" for the Truck Tare parameter.

14.5 Counting Parameters

Counting parameters can be custom named, making their intended usage more specific to the scale user. These parameters are pre-named for standard counting purposes. Some applications might require a custom name. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting Weighing/Counting parameters, VARS, REGS and ID"s as column headings.

Naming Counting Parameters (P630-P637)

P630. - - Qty
Accessing this parameter sets the "naming" for the Quantity parameter.

P631. - - QtTOT
Accessing this parameter sets the "naming" for the Quantity Total parameter.

P632. - - QtT+C
Accessing this parameter sets the "naming" for the Quantity Total plus Current Quantity parameter.

P633. - - QtT-C
Accessing this parameter sets the "naming" for the Quantity minus Current Quantity parameter.

P634. - - APW
Accessing this parameter sets the "naming" for the Average Piece Weight parameter.

P635. - - APW*K
Accessing this parameter sets the "naming" for the Average Piece Weight times 1000 parameter.

P636. - - %Accy
Accessing this parameter sets the "naming" for the Percentage of accuracy achieved after a sample parameter.

P637. - - Sampl
Accessing this parameter sets the "naming" for the Last Sampled Amount parameter.

14.6 Alarm and Recalled time Parameters

Alarm parameters can be custom named, making their intended usage more specific to the scale user. These parameters are pre-named for standard alarm purposes. Some applications might require a custom name. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting Weighing/ Counting parameters, VARS, REGS and ID"s as column headings.

Naming Alarms (P650-P654)

P650. - - Rtime
Accessing this parameter sets the "naming" for the recalled time parameter.

P651. - - A1Tim
Accessing this parameter sets the "naming" for Alarm number 1.

P652. - - A2Tim
Accessing this parameter sets the "naming" for Alarm number 2.

P653. - - A3Tim
Accessing this parameter sets the "naming" for Alarm number 3.

P654. - - A4Tim
Accessing this parameter sets the "naming" for Alarm number 4.

14.7 Numeric Parameter Setup (VARS and REGS)

Variables (VARS) and Registers (REGS) can be named, making their intended usage much more apparent to the scale user. The unit has ten (30) VARS and four (4) REGS that can have a custom name associated with each. The name can be any length so as it does not exceed 49 characters. The name length greater than ten characters is fine if its sent to a printer. Only the first ten characters will be displayed in the ten character auxiliary display (2-lines, 5x7 dot matrix) when the data entry mode is accessed. If the name is five characters or less in length, the bottom line (five characters) of the ten character auxiliary display will still show the word "value". This is part of the default name as it would be displayed if the variable or register had not been named. If it is desirable to have the variable name five characters or less, simply add a (space) to the sixth character name location. No matter what character length is specified it will be used as the column name if the parameter is specified as a column in a database. Refer to chapter 20 Database (option) for more information on setting VARS, REGS and ID"s as column headings.

Naming VARS (P660-P689)

P660. - - Var10
Accessing this parameter sets the "naming" for Variable #10.
P661. - - Var11
Accessing this parameter sets the "naming" for Variable #11.

P662. - - Var12
Accessing this parameter sets the "naming" for Variable #12.

P663. - - Var13
Accessing this parameter sets the "naming" for Variable #13.

P664. - - Var14
Accessing this parameter sets the "naming" for Variable #14.

P665. - - Var15
Accessing this parameter sets the "naming" for Variable #15.

14

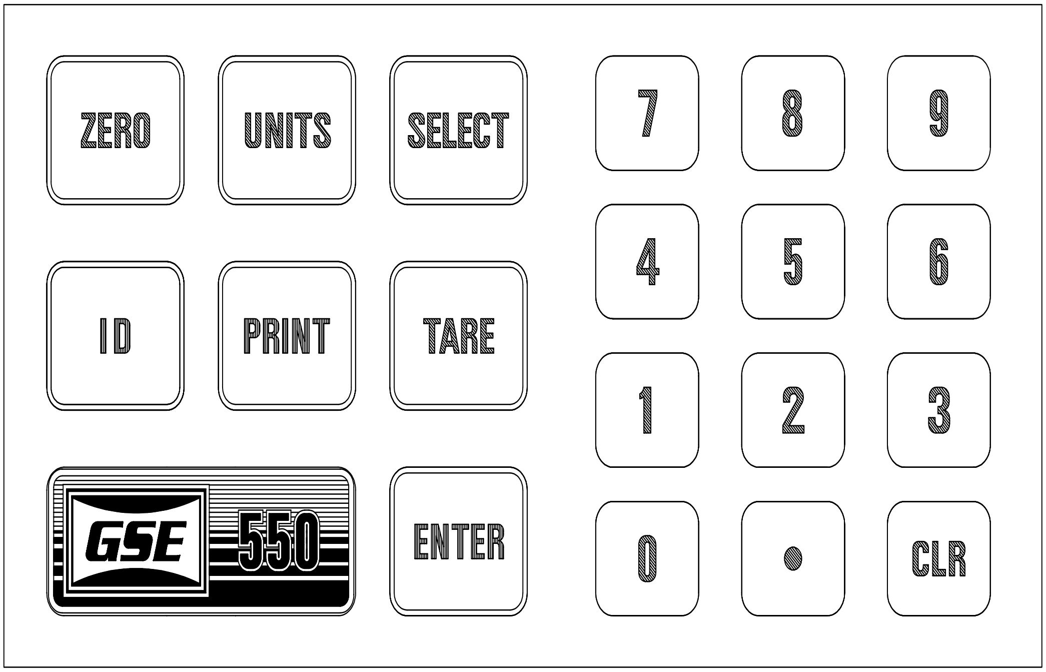

Figure 18 Keyboard Cursor Keys

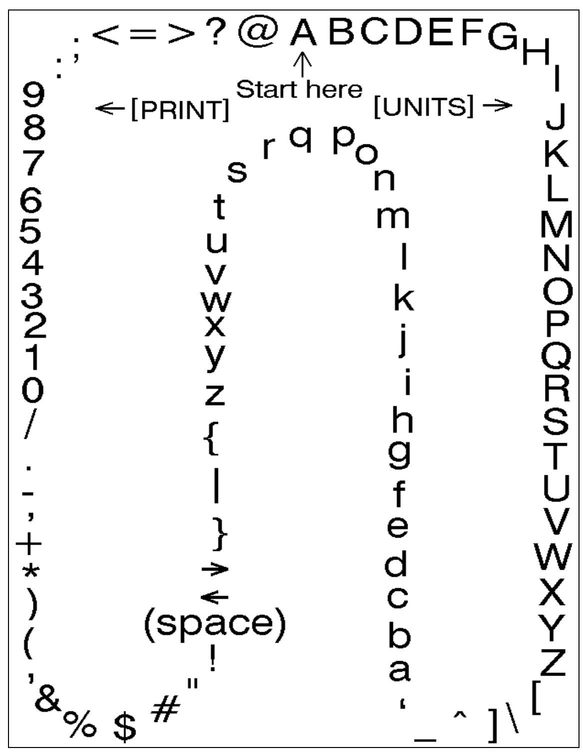

Figure 19 Character Listing

P666. - - Var16
Accessing this parameter sets the "naming" for Variable #16.

P667. - - Var17
Accessing this parameter sets the "naming" for Variable #17.

P668. - - Var18
Accessing this parameter sets the "naming" for Variable #18.

P669. - - Var19
Accessing this parameter sets the "naming" for Variable #19.

P670. - - Var20
Accessing this parameter sets the "naming" for Variable #20.

P671. - - Var21
Accessing this parameter sets the "naming" for Variable #21.

P672. - - Var22
Accessing this parameter sets the "naming" for Variable #22.

P673. - - Var23
Accessing this parameter sets the "naming" for Variable #23.

P674. - - Var24
Accessing this parameter sets the "naming" for Variable #24.

P675. - - Var25
Accessing this parameter sets the "naming" for Variable #25.

P676. - - Var26
Accessing this parameter sets the "naming" for Variable #26.

P677. - - Var27
Accessing this parameter sets the "naming" for Variable #27.

P678. - - Var28
Accessing this parameter sets the "naming" for Variable #28.

P679. - - Var29
Accessing this parameter sets the "naming" for Variable #29.

P680. - - Var 0
Accessing this parameter sets the "naming" for Variable #0.

P681. - - Var 1
Accessing this parameter sets the "naming" for Variable #1.

P682. - - Var 2
Accessing this parameter sets the "naming" for Variable #2.

P683. - - Var 3
Accessing this parameter sets the "naming" for Variable #3.

P684. - - Var 4
Accessing this parameter sets the "naming" for Variable #4.

P685. - - Var 5
Accessing this parameter sets the "naming" for Variable #5.

P686. - - Var 6
Accessing this parameter sets the "naming" for Variable #6.

P687. - - Var 7
Accessing this parameter sets the "naming" for Variable #7.

P688. - - Var 8
Accessing this parameter sets the "naming" for Variable #8.

P689. - - Var 9
Accessing this parameter sets the "naming" for Variable #9.

ie. --15.05 Peak Value

--25.50 Target SP1

---1.31 Gallons

Naming REGS (P691-P694)

P691. - - Reg#1
Accessing this parameter sets the "naming" for Register

#1.

P692. - - Reg#2
Accessing this parameter sets the "naming" for Register #2.

P693. - - Reg#3
Accessing this parameter sets the "naming" for Register #3.

P694. - - Reg#4
Accessing this parameter sets the "naming" for Register #4.

ie. ----205 ITEM NUMBER

----100 BOXES

----10 Time Delay

14.8 Character Entry (NAME)

When alphabetic and other non-numeric characters are being entered into the 550, the **<UNITS> <PRINT> <ID>** and **<TARE>** keys assume the functions of arrow keys similar to those found on a computer keyboard (see Figure 18 Keypad Cursor Keys). The **<UNITS>** key scrolls forward through the list of characters; **<PRINT>** key scrolls backward through a list of characters; **<ID>** can be used as a backspace key; **<TARE>** key advances to the next location.

When you encounter a parameter that accepts this type of information, press **<UNITS>** key and the unit will place an "A" in the dot matrix portion of the display. The **<UNITS>** and **<PRINT>** keys are then used to cycle through the possible selections of upper-case and lower-case letters, numerics and the standard set of punctuation symbols, starting with the letter A. Holding down **<UNITS>** or **<PRINT>** arrow keys will cycle you through more quickly. When the desired character is displayed, press **<TARE>** key to move to the next location where an "A" will be displayed so you can select the next character. This operation is in effect when entering ID data and while in Setup Modes **P157, P600-P694, P157-P158, P701 - P711, P800 - P816, P850 - P865** and **P1000 - P4000**. Refer to Figure 19 Character Listing for the available characters and their order of appearance.

14.9 Store Entry (VARS and REGS)

The second part of a Var or Reg is the data portion. Data can be entered directly from the front panel or from a macro. A few specific keystrokes will allow entry of data into the selected Var or Reg. The following examples showing data entries with selected keystrokes must start from the weigh or count mode.

Entering a Value into a VAR

ie. **<80> <SELECT>**
<XXX.X>
<ENTER>
<SELECT>

The above method will work for all 30 VARS except VAR #28. Its entry mode cannot be accessed in this manner. Pressing **<78> <SELECT>** from the front keypad will access the setpoint status mode. Refer to chapter 21 on Setpoints. VAR#28 however can be accessed in the same manner as the other VARS from within a macro. One example is the “copy” command. Refer to chapter 16 on Macros. Setpoints can also be based on VAR#28 in the same manner as the other VARS. VAR#28 will print as all the others are able to.

(Variables)

(Parameter **60**)
Retains the name and data fields for Var#10.

(Parameter **61**)
Retains the name and data fields for Var#11.

(Parameter **62**)
Retains the name and data fields for Var#12.

(Parameter **63**)
Retains the name and data fields for Var#13.

(Parameter **64**)
Retains the name and data fields for Var#14.

(Parameter **65**)
Retains the name and data fields for Var#15.

(Parameter **66**)
Retains the name and data fields for Var#16.

(Parameter **67**)
Retains the name and data fields for Var#17.

(Parameter **68**)
Retains the name and data fields for Var#18.

(Parameter **69**)
Retains the name and data fields for Var#19.

(Parameter **70**)
Retains the name and data fields for Var#20.

(Parameter **71**)
Retains the name and data fields for Var#21.

(Parameter **72**)
Retains the name and data fields for Var#22.

(Parameter **73**)
Retains the name and data fields for Var#23.

(Parameter **74**)
Retains the name and data fields for Var#24.

(Parameter **75**)
Retains the name and data fields for Var#25.

(Parameter **76**)
Retains the name and data fields for Var#26.

(Parameter **77**)
Retains the name and data fields for Var#27.

(Parameter **78**)
Retains the name and data fields for Var#28. **This VAR is not accessible in the same manner as the other VARS.**

(Parameter **79**)
Retains the name and data fields for Var#29.

(Parameter **80**)
Retains the name and data fields for Var#0.

(Parameter **81**)
Retains the name and data fields for Var#1.

(Parameter **82**)
Retains the name and data fields for Var#2.

(Parameter **83**)
Retains the name and data fields for Var#3.

(Parameter **84**)
Retains the name and data fields for Var#4.

(Parameter **85**)
Retains the name and data fields for Var#5.

(Parameter **86**)
Retains the name and data fields for Var#6.

(Parameter **87**)
Retains the name and data fields for Var#7.

(Parameter **88**)
Retains the name and data fields for Var#8.

(Parameter **89**)
Retains the name and data fields for Var#9.

Entering a Value into a REG

ie. **<91> <SELECT>**
<XX>
<ENTER>
<SELECT>

(Registers)

(Parameter **91**)
Retains the name and data fields for Reg#1.

(Parameter **92**)
Retains the name and data fields for Reg#2.

(Parameter **93**)
Retains the name and data fields for Reg#3.

(Parameter **94**)
Retains the name and data fields for Reg#4.

"Data" field (Characteristics)

There are a few specifics that are highly worth noting pertaining to the data fields of the Vars and Regs. There are some differences between the two types. The Vars will allow entries of all fractional and whole number sets (1, 2, 2½,...). This infers all negative values as well (-1, -2, -2½,...), and zero (0). The Regs on the other hand will allow entries of integers only. Members of the set of positive whole numbers (1, 2, 3,...), negative whole numbers (-1, -2, -3,...), and zero (0). The term "whole number" is defined as complete, non-fractional. When entering a negative value from the front panel the **<UNITS>** key will gain access to a negative sign. When in the viewing mode of the Regs the **<ZERO>** key will increment the selected register by one. The **<ID>** key will decrement the selected register by one. When in the viewing mode of either the Vars or Regs, the **<CLR>** key will reset the selected parameter to zero.

14

14.10 Decimal Point Parameter Setup (VARS)

(P460.XX - P489.XX)
The number of significant digits to the right of the decimal point can be set (selected) for all thirty (30) of the variables. The following is an example of all seven decimal point selections for Var#0. Pressing a number 0 - 6 followed by the **<ENTER>** key will go directly to your selection. Subsequently pressing the **<ENTER>** key will scroll through all seven decimal point selections.

Fixed Decimal Point

P480.00
Sets the number of decimal places to 0 digits.
(x.)

P480.01
Sets the number of decimal places to 1 digit.
(x.x)

P480.02
Sets the number of decimal places to 2 digits.
(x.xx)

P480.03
Sets the number of decimal places to 3 digits.
(x.xxx)

P480.04
Sets the number of decimal places to 4 digits.
(x.xxxx)

P480.05
Sets the number of decimal places to 5 digits.
(x.xxxxx)

Automatic Decimal Point

P480.06
Sets the number of decimal places to automatic.

P460 thru P489

Sets the significant digits to the right of the decimal point for VARS #0 thru #29, the same as parameter P480 (VAR#0).

14.11 Rounding (VARS and REGS)

(VARS)

Several factors are considered when rounding a VAR. A VAR rounds internally to an accuracy of 1 part in 3,000,000. The "550 Simulator" software will have a greater accuracy. The range of a VAR is +/-1 x 10^{38}. Rounding occurs only when the entered value exceeds six significant digits on the display. The unit analyzes the entered value and determines the best way this value will be represented on the six digit display. The displayed value will be rounded up or down accordingly and will eliminate any trailing zeros. The internal value will remain intact up to the stated accuracy of 1 part in 3,000,000. A VAR will print the value exactly the way its represented on the display with the exception of the decimal point. If there are no significant digits to the right of the decimal point, the decimal point will not print out.

ie.	123.9997	entered
	124.	displayed
	124	printed

Note: If the VAR is set for a fixed decimal point (P460-P489) then all digits including zeros to the right of the decimal point will be transmitted.

ie.	123.9997	entered
	124.00	displayed
	124.00	printed

Rounding will occur on a value entered into a VAR if the entry has a greater number of digits to the right of the decimal point. A VAR will either round up or down and is dependant on the number of decimal places selected.

ie. Setting of 3 decimal places.

1)	10.0005	entered
	10.000	displayed
	10.000	printed
2)	10.00051	entered
	10.001	displayed
	10.001	printed

ie. Setting of 2 decimal places.

(dollars and cents)

5.1	entered
5.10	displayed
5.10	printed

(REGS)

A REG retains **"whole" numbers only**. Any fractional portion of a number entered will round up or down to the nearest whole number. The accuracy of a REG is 1 part in 3,000,000. The full range is +/-1 x 10^{38}.

ie.	20.4	entered
	20	displayed
	20	printed
	20.5	entered
	21	displayed
	21	printed
	-100.55	entered
	-101	displayed
	-101	printed

14.12 Exponential Numbers (VARS)

Very Large Numbers

The VARS will retain very large numbers. A value entered that is greater than 999999 will be represented on the display in exponential form (Scientific Notation). The value will however print out in full decimal form, rounded to an accuracy of 1 part in 3,000,000.

ie.

1)	1000000	entered
	1.Exp6	displayed
	1000000	printed
2)	1234567	entered
	1.23457Exp6	displayed
	1234570	printed
3)	123456789	entered
	1.23457Exp8	displayed
	1234567000	printed
4)	fixed to 2 decimal places.	
	12345678	entered
	1.23457EXP7	displayed
	12345678.00	printed

Very Small Numbers

The VARS will also retain very small numbers. A value that is less than 0.00001 will be represented in exponential form (Scientific Notation). The value will however print out in full decimal form, rounded to an accuracy of 1 part in 3,000,000.

14.13 Write VARS to E^2

Parameters P5060 thru P5089 allow for if and when a VAR will be written to E^2. This includes VAR numbers 0 thru 29 (30 VARS).

The three methods of writing a VAR to E^2 are No SAVE, ON REQUEST and AUTOMATICALLY. Selecting “NO SAVE” will never write a VAR to E^2. Selecting “ON REQUEST” will only write to a specified VAR number by executing a write to E^2 macro command (n% v). Refer to chapter 16, Macro Commands. AUTO will automatically write a VAR to E^2 as its changed. The GSE default for all VARS is “AUTO”. This will allow for backward compatibility with existing custom program operations that must have a VAR written to E^2.

14

Vars and Setpoints (033193 and earlier)

The following procedure must be followed in order to retain a value in non-volatile E^2.

A value stored in a VAR will be lost when the power is removed from the instrument. In order to retain the value of a VAR to E^2, there are two alternatives. If the VAR is "named" or a Setpoint is based on a VAR, its value will be retained. During normal operation its not desirable for the setpoint target values to be lost when the power is removed. In any case, the VAR will be written to E^2. If neither of the procedures is followed above than the VAR will not be written to E^2, hence its value will be reset to zero at power-up.

14.14 Incrementing Registers (REGS)

A REG can also be used as a counter (P91 - P94). When viewing a REG it can be incremented or decremented by one by pressing the **<ZERO>** or **<ID>** key respectively. The maximum value allowable in the display is 999,999 and the minimum value allowable in the display is -99,999. If either of these limits is exceeded the display will read "**# > Dsply**". This message means that the number in the display is greater than its capabilities for displaying it. Until the REG is incremented or decremented back into the acceptable range, the message will remain on the display. Internally this value is retained and has an accuracy of 1 part in 3,000,000. The 550 Simulator software theoretically has an accuracy of 1 part in 16,777,216. in either case, If these values are exceeded, its possible the register will give random results. The internal value is always transmitted during print operations. The REGS will accept a value entered into them directly. This allows counters to be reset to any initial value. Simply access the REG, key in the desired value and press **<ENTER>**. The **<CLR>** key resets a REG to zero. Any values entered or calculated (macros) that exceed the above limitations will be rounded. The full range of a REG is +/-1 x 10^{38}. If this range is exceeded, a math error will occur and an over-range message will flash briefly.

The REGS can also be accessed and incremented/ decremented serially and from within a macro (see chapter 16 Macro Programming Operations. A reg can also be incremented each time a print operation is performed. This is dependant on the REG'S format code selected (see Chapter 15 Communications).

14.15 Write REGISTERS (REGS) to E^2

Parameters P5091 thru P5094 allow for if and when a REG will be written to E^2. This includes REG numbers 1 thru 4 (4 REGS).

The three methods of writing a REG to E^2 are No SAVE, ON REQUEST and AUTOMATICALLY. Selecting “NO SAVE” will never write a REG to E^2. Selecting “ON REQUEST” will only write to a specified REG number by executing a write to E^2 macro command (n%v). Refer to chapter 16, Macro Commands. AUTO will automatically write a REG to E^2 as its changed. The GSE default for all REGS is “AUTO”. This will allow for backward compatibility with existing custom program operations that must have a REG written to E^2.

REGS (033193 and earlier)

A REG is always written to non-volatile E^2 as it changes so at power-up the REG value is retained.

14.16 Alarm Registers

The instrument has four (4) register locations set aside for use with the internal clock feature. The first three alarms can be set to trip on an "interval" or "Daily" basis. When a specific alarm is tripped a single macro associated with the alarm is invoked. Macro 12, 13 or 14 are associated with alarms A1, A2 and A3 respectively. A time value can be entered into each of these three alarms at parameters P505, P507 and P509 respectively. These values can be viewed but not changed at parameters P51, P52 and P53 respectively. There is also a fourth register accessible only through a macro. The macro command "n%K" will accept a timed interval of n seconds, then call macro 15. This value is viewed at parameter P54. The parameter P50, retains the value of the recalled time. In any event, these five (5) registers are accessible from within a macro (P50, P51, P52, P53 and P54). There are some restrictions associated with the use of these registers within macros. Only positive numbers can be entered or copied into them. Fractional part of value copied to these parameters will be truncated. Special attention should be considered when performing any calculations on these registers. Make sure the results of all calculations fall within the guidelines stated above. If these guidelines are not heeded, strange values will be reflected in the results.

Using Alarms for Time/Date Calculations

The recalled time (refer to the Database documentation) and the four alarms (for both invoking macros at specified times or intervals) may be used for general purpose time/date calculations if the alarm is set to off in the setup mode. This could be used to print expiration dates or to perform longer term rate calculations, such as pounds per hour. Note: Short term rate calculations (pounds per second) require more resolution on the time scale than one second!

All time/date type parameters are stored as a numerical value, the number of seconds elapsed since midnight on Jan. 1, 1970. As of April 1, 1992, this value is around 702,086,400 and it increases at 86,400 seconds per day.

The alarm parameters are numbered parameter 51 through 54. If the alarms are set to be on (interval or daily) in the setup mode, then a value may not be entered (via a front panel entry) into that alarm. However the alarm be manipulated using the macro math and copy commands. If an enabled alarm is changed, then that alarm will be invoked when the specified time occurs (except alarm 4 which may only be set to invoke a macro by using the "n%K" macro command).

The method of displaying these time/date type parameters when they are selected in the weigh mode may be set as required to be either a numeric value, a time, a date, or a time and date by using setup parameters P511 through P515, for recalled time, and alarms one through four respectively. Please be aware that recalled time is not saved during a power-down condition unless the clock module or the database RAM module is installed in the indicator. If neither is installed, the value for Rtime will come up random upon power-up.

Expiration Date Example:

Copy current time to alarm 1 (named 'expiration date'). Add ten days worth of seconds to the current time to get an expiration date ten days from now.

11,51%C
864000;51%+

A Rate Example (for a decreasing weight):

to store the initial data:

Copy gross wt to var #0. Copy current time to alarm 1.

0,80%C
11,51%C

then later on:

Subtract current gross wt from previously saved gross wt. Subtract previously saved time from current time. Copy elapsed time, in hours, to var #1. (Note that math cannot be performed on a mix of variable types, ie a time type and a regular number.)

0,80%-
11,51%-
51,81%C

Divide time difference by the number of seconds per hour. Note that division was performed after copying to the var in order to maintain the fractional portion of an hour! Divide weight difference by elapsed time to get change in weight per hour.

3600;81%/
80,81%/

Also, the alarms may now be selected as a parameter in a custom transmit setup.

14.17 ID Parameter Setup

Introduction

Included within the indicator are six ID registers capable of holding alpha-numeric data. These ID's may be used to hold various pieces of data to be included in data transmissions to computers or printers. Use of these ID's may vary depending on the application. Some possible uses include part number, bin #, employee #, shift # and lot # to name a few. Each of the six ID's has two associated setup parameters. The first is the maximum number of characters that will ever need to be entered as the ID value. The second is the name of the ID. If the size of the ID is set to 0, then that ID is not used and the setup parameter for its name will not appear. The name may be 49 characters in length. However, it is recommended that the programmed names be abbreviated to five characters since only the first 5 characters of the name will be displayed to the operator. If abbreviated names are used for the ID's, more descriptive names can be programmed into the Custom Transmit to provide more descriptive printouts. For each enabled ID, some additional storage memory is required. Refer to chapter 19 Memory Expansion (OPTION), for more information on memory storage. Refer to chapter 15 Communications, for ID operation and uses in transmissions.

Enabling an ID
(P700 - P711) all "even" numbered parameters.

To conserve memory space, the indicator allows the size of the "data" field portion of the ID to be selected. The data field can be any value from 0 - 49 characters. Make sure the maximum number of characters is selected with respect to the maximum number of characters to be entered by the operator. This will depend on the application. If unsure of ID size, make an exaggerated selection. Average ID sizes are between 8 - 12 characters. The indicator is factory defaulted to 12 characters. If an ID size is set to "0", it will be disabled. The "name" portion of the ID will not appear for this ID. All selections must be keyed in. ie.

<15> <ENTER>.

P700
Selects size for ID #1

P702
Selects size for ID #2

P704
Selects size for ID #3

P706

Selects size for ID #4

P708
Selects size for ID #5

P710
Selects size for ID #6

Naming ID's
(P700 - P711) all "odd" numbered parameters.

The second part of the ID is the "name" field. An ID name can be up to 49 characters in length. Naming an ID is performed in the same manner as naming Vars and Regs. When alphabetic and other non-numeric characters are being entered into the indicator, The **<UNITS> <PRINT> <ID>** and **<TARE>** keys assume the functions of arrow keys similar to those found on a computer keyboard (see Figure 18 Keypad Cursor Keys). The **<UNITS>** key serves as an up arrow to scroll forward through the list of characters. The **<PRINT>** key is used as a down arrow key to scroll backward through the list of characters. The **<ID>** key can be used as a left arrow key for backspacing. The **<TARE>** key is used as a right arrow key to advance to the next location.

When you encounter a parameter that accepts this type of information, press **<UNITS>** and the indicator will place an "A" in the ten character dot matrix portion of the display. The **<UNITS>** and the **<PRINT>** keys together are then used to cycle through the possible selections of upper-case and lower-case letters, numerics and the standard set of punctuation symbols. The selection set starts with the letter "A". Holding down the **<UNITS>** or **<PRINT>** keys will cycle through the selections more quickly. When the desired character is displayed, press **<TARE>** to move to the next location where an "A" will be displayed for the start of the next character selection. After the complete information is selected press **<ENTER>**.

This operation is in effect when entering ID "data" and while in Setup Modes **P157, P158, P600 - P689, P691 - P694, P701 - P711, P800 - P815, P850 - P865** and **P1000 - P4000**. Refer to Figure 19, Character Listing for available characters and their order of appearance.

P701
Selects name for ID #1

P703
Selects name for ID #2

P705
Selects name for ID #3

P707
Selects name for ID #4

P709
Selects name for ID #5

P711
Selects name for ID #6

14.18 View an ID

To access the first ID parameter while in the Weigh Mode, press **<ID>**. The numeric display will read "id X" where "X" is the number of the first enabled ID. The upper line of the dot matrix display will show the first five characters of the ID name and the lower line will show the first five characters of the ID value. To access any other enabled ID, either press **<X> <SELECT>** where "X" is the number of the ID, or press **<SELECT>** repeatedly. Press **<SELECT>** at the last enabled ID to exit the ID Mode. You may press **<ID>** at any time to exit the ID Mode.

14.19 Store an ID Entry

Entering Data into an ID

If the ID value will be entirely numeric simply access the ID, key in the ID value and press **<ENTER>**. Once an entry is started, an arrow symbol will appear in the upper line of the dot matrix display. The entered digits will then appear on the second line and will scroll across the lower then the upper line. You may enter up to the maximum number of digits programmed in the Setup Mode. Once an entry has been started, the **<ID>** key acts as a BACKSPACE key. If **<ID>** is pressed with only one character on the display, the entry mode would be canceled and the previous display would appear.

Pressing **<CLR>** when first viewing the ID will let you clear the existing ID contents. The ID may then be accessed again for the new entry. **<CLR>** may be pressed at any point during entry to clear the entered characters.

If **<TARE>** is pressed after the ID is accessed, the current ID data is copied into the entry buffer and the last character of the existing ID entry would be shown in the last (bottom right) position on the display. This lets you add characters to the end of an existing entry or modify the last characters by using the backspace function.

Alphabetic and other characters may be entered at any point by pressing the **<UNITS>** key. An "A" will appear in the display. At this point the **<UNITS>** and **<PRINT>** keys are used to scroll up and down through the entire standard ASCII character set. The **<ID>** key can be used to backspace, shifting all the previously entered data down toward the lower right corner, with the last character being lost. Pressing **<TARE>** would shift the entire previous entry toward the left thus making room for a new character. This new character would be an "A". If the entry length exceeds the setup size, the error message "Entry >> Max!" is displayed briefly. The extra characters which surpass the setup size are automatically eliminated and the remaining entry is then displayed. Press **<ENTER>** to store the remaining entry.

Storing Data into an ID

After completing your entry, press **<ENTER>** to store it as the new ID value and move to the next enabled ID. If the ID was the last enabled ID, then the unit will resume the mode which was active when **<ID>** was first pressed. To advance to the next ID without changing the data for the current ID, press **<ENTER>** without making an entry.

14.20 Write PARAMETERS to E^2

Parameters P5003 thru P5094 allow for if and when a parameter will be written to E^2. This includes the accumulation registers, the IDs, specific counting parameters, specific T/D parameters, alarms, VARS and REGS.

The three methods of writing a parameter to E^2 are No SAVE, ON REQUEST and AUTOMATICALLY. Selecting “NO SAVE” will never write a parameter to E^2. Selecting “ON REQUEST” will only write to a specified parameter number by executing a write to E^2 macro command (n%v). Refer to chapter 16, Macro Commands. AUTO will automatically write a parameter to E^2 as its changed. The GSE default for all parameters is “AUTO”. This will allow for backward compatibility with existing custom program operations that must have a parameter written to E^2.

Chapter 15 Communications

15.1 Communication Protocol Parameter Setup

P200.XX Baud

This parameter determines the baud rate that will be used by the Print and Comm Ports. The baud rate specifies the rate at which characters are transmitted and received in terms of bits per second. The selections range from 150 to 19,200 baud.

> **NOTE:**
> Since P200 to P208 establish the communications protocol for both the Print and Comm Ports. Make sure that all peripheral devices which you connect to the indicator are set to the same selected baud rate.

P201.XX #data

This parameter will set the number of data bits for the transmission to either 7 or 8 (if 7 bits is selected, then extended ASCII codes, those greater than decimal 127, will not be transmitted from the indicator).

P202.XX Par'y

This parameter sets the parity of the transmission to none, even or odd.

P203.XX #stop

This parameter sets the number of stop bits to 1 or 2. The number of stop bits has an affect only on outgoing transmissions. As long as incoming transmissions have at least 1 stop bit, the indicator will correctly receive data.

P204.XX ComHS

This parameter sets the handshake for the Comm Port to none, CTS (hardware), XON (software) or both. This setting applies to transmissions sent and received by the indicator.

P205.XX PrnHS

This parameter sets the handshake for the printer port to none or CTS (hardware).

P206.XX

RxCom enables or disables the RS232 receiver for accepting communications through the Comm Port.

P207.XX TxRTZ

This parameter sets a return range for use when you elect to transmit once per weighment and is only meaningful if the "wghmt" selection is made in parameter P210, P220, P230 or P240. After the applied weight exceeds the percentage of Full Scale specified by P207, a transmission will take place as soon as motion ceases, regardless of the motion selections made in P212, P222, P232 or P242. Before a second transmission can take place, the GROSS Weight must fall below this threshold. If the 100% selection is made, then one transmission will take place every time motion ceases, as long as the Gross Weight is not within +/-2 divisions of zero. Note that motion is defined by parameters P114 and P115.

P208.XX Width

This parameter sets the number of characters (0 through 15) that are transmitted for numeric parameters if a fixed width format is used within the Custom Transmit. If more characters than specified by this parameter are needed to represent the data being sent, then more characters will be sent.

P209.XX TxHld

This parameter lets you select whether a transmission will be held up or aborted when the transmit out buffer becomes full. Some explanation of the transmission routine of the indicator may help determine your selection here: There are two transmit buffers in the indicator, one for the Print Port and one for the Comm Port. Each is 256 bytes in size. The indicator places the data to be transmitted into the appropriate transmit buffer. As soon as this happens, the transmission of data begins. If the entire transmission will not fit into the buffer, the indicator will check the selection for this parameter. If the selection is "hold", then the indicator will wait for additional room to become available in the buffer so that it may resume filling the buffer. If no space is made available within two seconds, then the warning message "tx on hold" will be displayed until buffer space becomes available. At this time the message "tx cont'd" will be displayed. If the **<CLR>** key is pressed, the transmission will be aborted. During the time that the indicator is attempting to fill the buffer with data to transmit, it is not performing its regular task of determining the currently applied weight and updating the display, the setpoint outputs or the analog output. If "abort" is selected, then as soon as the transmit buffer becomes full, the transmission will be immediately aborted. A warning message, "tx abort", will appear for one second. In any case, any characters which were already in the buffer when a transmission is aborted will remain in the buffer and will be transmitted when the handshake is re-established. The buffered characters are lost only if the indicator is powered down.Therefore, P209 should normally be set for delay in order to insure against undesirable loss of transmitted data. Only in the case of critical setpoint or analog output control applications should the abort selection be made.

15.2 Cable Connection Information

Refer to Figure 20 which shows the rear panel view of the Indicator. Note that three rear panel strain reliefs are available for various cable connections. There are more options available for the Indicator than cable ports. It is not possible to make connections to every available option feature in one indicator. The menu of possible external connections could include:

Printer Port, RS-232
Printer Port, 20 mA current loop
Communication Port
Barcode Scanner
Remote PC Keyboard
External Setpoint Option (two setpoint outputs)
Process Control Interface Option
Analog Output Option 0-10 VDC or 4-20 mA
Relay Module Option
Multi-Scale Capabilities Option

Therefore, if more than three of these features are required in any one application, then planning is required to combine connections for some of the options into one cable. This should be accomplished in a manner which will reduce the required number of cables to a maximum of three. Note that the external Setpoint Option is provided with a dedicated cable and may not be combined with other cables.

IMPORTANT
The 500 series of indicators do not include an on/off switch and therefore must be installed near a power outlet socket that is easily accessible. This is in keeping within UL/CSA approval requirements.

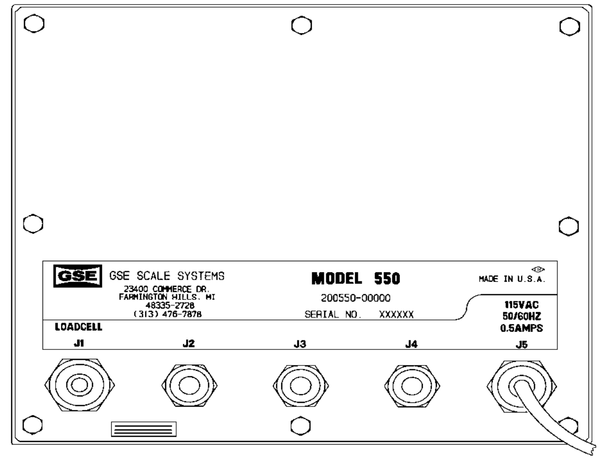

Figure 17 Rear Panel

Several interface cables specifically designed for connection to the indicator are available.

15.3 Communication Connections

If communication cables exist, they should be routed into the indicator through the rear panel strain relief marked J4 (J2 may also be used if J4 is already in use). These strain reliefs are designed to accommodate cables ranging in diameter from 0.187" to 0.312". Wires may range in size from 28 to 20 AWG. Insulation resistance

CAUTION

Any operation which involves opening the enclosure should be performed by qualified service personnel only after disconnecting the power! Hazardous voltage is accessible within the indicator.

should be rated at a minimum of 30 volts. Use a cable with a braid or a foil shield and drain wire. A braided shield will perform better in high electrical noise environments. The capacitance rating of the cable should be low for long cable runs.

The shield for the communications cable should be grounded to the closest available rear panel stud inside the indicator, keeping the length of the shield between the stud and the end of the cable jacket to an absolute minimum, and the length of unshielded wires to a minimum. This is important in order to reduce the effects of EMI, RFI, and ESD on the indicator operation.

Communication Port Connections

There are several different ways of communicating from the indicator to another smart device, and your application will dictate the required connections and the required number of conductors. Refer to Table 11. COMM Port Connections, which lists six different communication methods, and the required connections. It is also necessary to define which of the six methods you are using to the software in the indicator. Parameter P204 of the setup mode is used to determine the handshaking used by the indicator for the Communication (Comm) Port. If P204 is set for "com HS Xon" or "com HS both" then connections to both RX and TX are required. If either "Com HS CTS" or "Com HS both" are selected, then the CTS and RTS physical wiring connections must be made. The communication port may be used in a uni-directional manner if desired and the appropriate bi-directional connections may be omitted.

Print Port Connections

The print port is a transmit only output port from the indicator. Two physical methods of serial communication are available through the print port. Either RS-232 or 20 mA current loop may be used. Transmissions directed out the print port will provide the signals for both of these transmissions. Connections to either or both may be made. However the transmitted data for the print port RS-232 and 20 mA outputs cannot differ from each other with regard to software protocol. The possible connections to each are described in Table 12, PRINT Port Connections.

Peripheral Inputs

Function	Connections
Bi-directional with software handshake, or Bi-directional with no handshake, or Uni-directional with software handshake.	TX RX GND
Bi-directional with hardware handshake or "both" handshake.	TX RX CTS RTS GND
Uni-directional with hardware handshake (transmit only).	TX CTS GND
Uni-directional with hardware handshake (receive only).	RX RTS GND
Uni-directional with no handshake (transmit only).	TX GND
Uni-directional with no handshake (receive only).	RX GND

Table 11 COMM Port Connections

Function	Connections
RS232 with hardware handshake.	TX CTS GND
RS232 with no handshake.	TX GND
20 mA Active with no handshake.	OUT GND
20 mA Active with handshake.	OUT GND CTS
20 mA Passive with no handshake (cut or remove jumper E2).	OUT IN
20 mA Passive with handshake (cut or remove jumper E2).	OUT IN CTS GND

Table 12 PRINT Port Connections

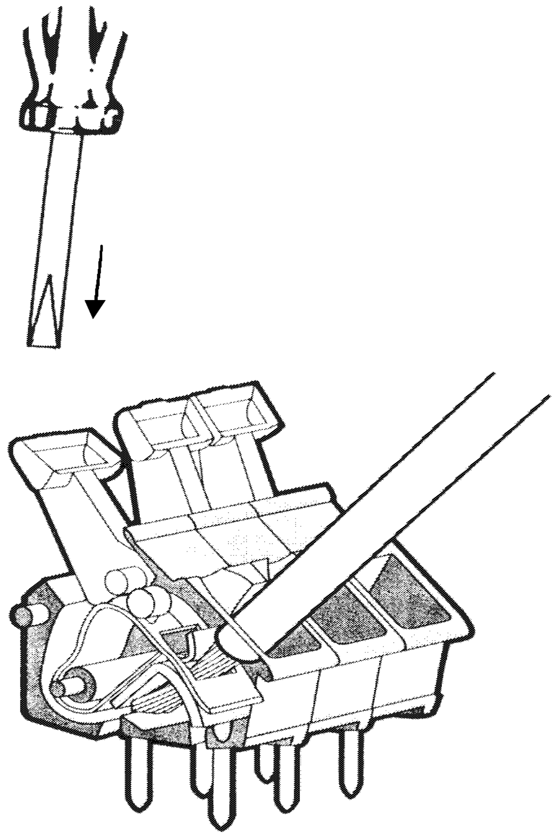

Figure 21 Connector

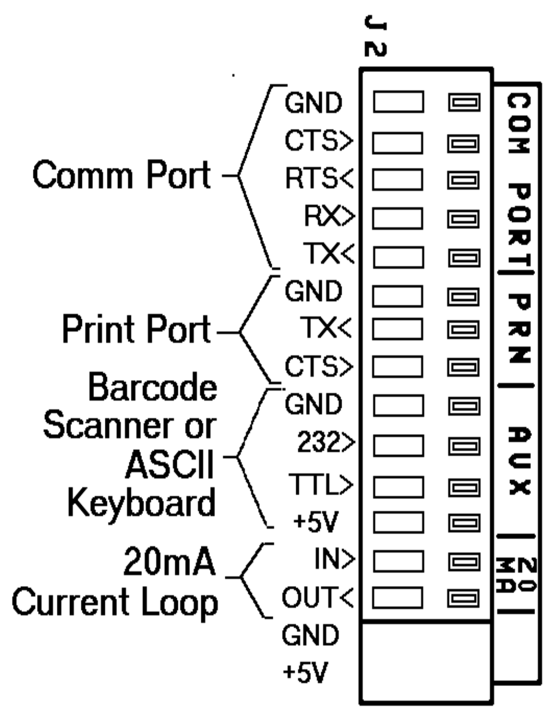

Figure 22 RS232 Ports (J2)

The indicator permits up to two other peripherals to send RS-232 data. These inputs to the indicator are intended for use with barcode scanners and external keyboards.

Both a TTL input and an RS-232 input are provided, along with connections for +5 volts and ground. GSE provides a cable which at one end will connect to the terminal strip on the main board inside the indicator and the other end will provide the mating connector to the keyboard and barcode scanners that GSE provides as peripheral devices.

Communications Cables

1. Strip back the jacket of the communications cable 7" for the J4 strain relief, and 8" for the J2 strain relief.

2. Strip the insulation of each conductor back 1/4".

3. Twist the strands of each wire so that no strands are loose. If desired, tin the wires to insure the strands will not come loose. Use a minimal amount of solder so that the wire will fit into the connector.

> **NOTE:**
> Transmissions received by the indicator through the Comm port or from an external keyboard or a barcode device are all or'd together inside the indicator. Only one external device can be sending data to the indicator at any one time. Otherwise communications errors, garbled data, and unpredictable results may occur! Care must be taken in the implementation of these devices to insure proper operation.

4. Cables for the Print Port, Comm Port or peripheral devices can be routed through any one of the available rear panel strain reliefs, J2 or J4 (J3 is a larger size and is intended for use with various external options). Loosen the strain relief and route the cable(s) through.

5. Ground the shield to the stud adjacent to the strain reliefs at either J2 or J4, whichever is closer.

6. The RS-232 ports and their functions are imprinted on the main PC board. Refer to Figure 22, Table 11 and Table 12 to determine your required connections.

7. Insert each wire into its proper connection on J2 of the main PC board, as described for your chosen connection configuration in Table 11 COMM Port and Table 12 PRINT Port. Then secure all of the wires together with a tie wrap (supplied in a bag with the User's Guide) adjacent to the J2 connector. This will insure that in case a single wire comes loose, it will not come into contact with a hazardous voltage!

8. Once the wires and shield have been connected, pull any excess cable out of the instrument through the strain relief to eliminate any slack between the shield termination and the strain relief. Then securely tighten the strain relief.

15.4 Custom Transmit (Selections) Parameter Setup

The Model 550/570 indicators include setup tables for four Custom Transmits. The next group of parameters determine the available selections for enabling these features.

P210.XX Send1

This parameter determines when the data specified by the 1st Custom Transmit is transmitted: P210.00 disables transmissions; P210.01 enables transmissions when the **<PRINT>** key is pressed; P210.02 selects a continuous print function which will send a transmission each time the display is updated (per P117); P210.03 will transmit once per weighment (refer to P207).

P211.XX Port

This parameter determines which port the 1st Custom Transmit data will be sent out, either the Print or Comm Port.

P212.XX Mot'n

This parameter enables or disables motion delay on the transmission. The selection of this parameter applies to all selections for P210 above except for P210.03.

P220.XX Send2

This parameter selects when the 2nd Custom Transmit will occur: P220.00 disables transmissions; P220.01

enables transmissions when the **<PRINT>** key is pressed; P220.02 selects a continuous print function which will send a transmission each time the display is updated; P220.03 will send a transmission once per weighment; P220.04 will let the operator designate which transmission (1st-4th) to send when the **<PRINT>** key is pressed. For the last selection, P220.04, if the selections for P210, P220, P230 and P240 consist of both "onreq" and "onreq2". When the **<PRINT>** key is pressed in the Weigh Mode the prompt Send 1-4? will be displayed. Pressing **<1>**, **<2>**, **<3>** or **<4>** will send the corresponding Custom Transmit. Any other key entry will abort the print request. If none of the four transmissions are set for "onrq2", then when **<PRINT>** is pressed, all transmissions which are set for "onreq" will be sent. In effect, selecting P220.04 gives the operator the choice of which transmission to send.

> **NOTE:**
> If multiple transmissions are established and some, but not all are to be motion delayed, then the last one(s) should be motion delayed. If the first is motion delayed, the subsequent transmissions will all be motion delayed also, regardless of their setup selections.

P221.XX Port

This parameter selects whether the 2nd Custom Transmit will be sent out through the Print or Comm Port.

P222.XX Mot'n

This parameter enables or disables motion delay on the 2nd Custom Transmit. The selection of this parameter applies to all selections for P220 above except for P220.03.

Parameters P230 to P232 and P240 to P242 deal with the 3rd and 4th Custom Transmits in the same manner as described for the 2nd Custom Transmit in P220 to P222 above.

15.5 Communications (Receive) Operations

Any command that the Model 500 Series of Weigh Indicators is capable of executing can be sent in from a remote source via a serial, asynchronous RS-232 communication link. Application uses for this capability include barcode input of data, host computer interfacing and the transmission of setup files directly into the indicator. (Also refer to chapter 28, Parameter Download and Upload).

COMMAND LANGUAGE

The command language used by the indicator is based upon use of the percent (%) character. Any character received after a percent character is treated as a command, provided it is a recognized code. Any invalid commands that are received are ignored. Lower case characters are used for the commands which represent keys on the indicator front panel. Capital letters and a few other characters are used for commands designed primarily for use within Macros. (The indicator % command character is similar in nature to "ESCape" codes used to program printers).

Table 14 shows a listing of RS-232 Keyboard Commands used to simulate the front panel keys. Additional commands are available as described in Chapter 16 on Macro Programming Operations, however the branching Macro commands are not designed to be executed via RS-232 input and will not perform any useful function.

If an entry is in process and a carriage return is received, then the entry is cleared. Otherwise the carriage return does not affect the operation of the indicator. However, every carriage return that is received is counted by the indicator as a means of tracking down errors.

Commands may also be sent to the indicator as single 8 bit characters which is the character with the high bit set. Sending these extended ASCII codes is not normally necessary and it is better to simply send the "%" character followed by the appropriate command.

RECEIVING DATA

The indicator has a 256 byte received data buffer. When characters are received, they are stored in this buffer until the indicator has a chance to process the received data. When the buffer has 240 characters buffered, leaving room for only 16 more, the indicator will de-assert its handshake output, as specified by setup parameter P204. In other words, the indicator will

> NOTE:
> P201 must be set to 8 bits in order for this feature to work properly.

Refer to chapter 16 Macro Programming Operations, for a more detailed definition of each command.

DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL
- FACTORY USE -	%VT	8BH	139
- FACTORY USE -	%FF	8CH	140
- FACTORY USE -	%CR	8DH	141
- FACTORY USE -	%SO	8EH	142
- FACTORY USE -	%SI	8FH	143
- FACTORY USE -	%DLE	90H	144
- FACTORY USE -	%DC1	91H	145
- FACTORY USE -	%DC2	92H	146
- FACTORY USE -	%DC3	93H	147
- FACTORY USE -	%DC4	94H	148
- FACTORY USE -	%NAK	95H	149
- FACTORY USE -	%SYN	96H	150
- FACTORY USE -	%ETB	97H	151
- FACTORY USE -	%CAN	98H	152
- FACTORY USE -	%EM	99H	153
- FACTORY USE -	%SUB	9AH	154
- FACTORY USE -	%ESC	9BH	155
- FACTORY USE -	%FS	9CH	156
- FACTORY USE -	%GS	9DH	157
- FACTORY USE -	%RS	9EH	158
- FACTORY USE -	%US	9FH	159
- FACTORY USE -	%SP	A0H	160
Disable Input	n%!	A1H	161
DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL

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Specify Port	n%"	A2H	162
Selected Scale	%#	A3H	163
Send Entry	%$	A4H	164
%	%%	A5H	165
Send Control Codes	%&	A6H	166
- FACTORY USE -	%'	A7H	167
IF Input	n%(	A8H	168
Clear Keypad/RS-232	n%)	A9H	169
multiply	%*	AAH	170
add	%+	ABH	171
- FACTORY USE -	%,	ACH	172
subtract	%-	ADH	173
- FACTORY USE -	%.	AEH	174
- FACTORY USE -	%/	AFH	175
Macro 0	%0	B0H	176
Macro 1	%1	80H or B1H	128 or 177
Macro 2	%2	81H or B2H	129 or 178
Macro 3	%3	82H or B3H	130 or 179
Macro 4	%4	83H or B4H	131 or 180
Macro 5	%5	84H or B5H	132 or 181
Macro 6	%6	85H or B6H	133 or 182
Macro 7	%7	86H or B7H	134 or 183
Macro 8	%8	87H or B8H	135 or 184
Macro 9	%9	88H or B9H	136 or 185
Macro 10	%:	8AH or BAH	138 or 186
DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL
Macro 11	%;	BBH	187

Macro 12	%<	BCH	188
Macro 13	%=	BDH	189
Macro 14	%>	BEH	190
Macro 15	%?	BFH	191
Sets the DELAY time for future %P (PAUSE) commands.	n%@	C0H	192
ACTIVATE setpoint "n"	n%A	C1H	193
BREAK (Abort running of current macro)	%B	C2H	194
COPY parameter to auxillary display (entry buffer)	%C	C3H	195
COPY value of parameter "n" to parameter "m".	n,m%C	C3H	195
DEACTIVATE setpoint "n"	n%D	C4H	196
END "IF" statement	%E	C5H	197
"IF" setpoint "n" is deactivated.	%F	C6H	198
GET operator input.	%G	C7H	199
- FACTORY USE -	%H	C8H	200
Weight Conversion	%I	C9H	201
Jump to Tag	%J	CAH	202
Sets up timer to invoke macro 15.	n%K	CBH	203
DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL
- FACTORY USE -	%L	CCH	204
IF the current mode	n%M	CDH	205

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is mode "n".			
IF NOT	%N	CEH	206
IF setpoint "n" activated	n%O	CFH	207
PAUSE	%P	D0H	208
Send "n"th custom transmit.	n%Q	D1H	209
IF register "n", is not zero.	n%R	D2H	210
SOUNDS Beeper	%S	D3H	211
TAG current position.	%T	D4H	212
- FACTORY USE -	%U	D5H	213
IF setpoint input "n" is active.	n%V	D6H	214
WAIT for operator to press any key.	%W	D7H	215
- FACTORY USE -	%X	D8H	216
IF operator presses <ENTER>.	%Y	D9H	217
- FACTORY USE -	%Z	DAH	218
SAVE entry.	%[	DBH	219
IF no entry.	%\	DCH	220
RETRIEVE entry.	%]	DDH	221
GO TO macro "n"	n%^	DEH	222
IF Database error "n"	n%_	DFH	223
- FACTORY USE -	%`	E0H	224
- FACTORY USE -	%a	E1H	225
DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL
- FACTORY USE -	%b	E2H	226
CLR	%c	E3H	227
- FACTORY USE -	%d	E4H	228

ENTER ENTER/PRINT (570)	%e %e	E5H E5H	229 229
- FACTORY USE -	%f	E6H	230
- FACTORY USE -	%g	E7H	231
- FACTORY USE -	%h	E9H	232
ID	%i	E9H	233
- FACTORY USE -	%j	EAH	234
- FACTORY USE -	%k	EBH	235
- FACTORY USE -	%l	ECH	236
- FACTORY USE -	%m	EDH	237
- FACTORY USE -	%n	EEH	238
- FACTORY USE -	%o	EFH	239
PRINT SAMPLE (570)	%p %p	F0H F0H	240 240
- FACTORY USE -	%q	F1H	241
- FACTORY USE -	%r	F2H	242
SELECT	%s	F3H	243
TARE	%t	F4H	244
UNITS	%u	F5H	245
- FACTORY USE -	%v	F6H	246
- FACTORY USE -	%w	F7H	247
- FACTORY USE -	%x	F8H	248
- FACTORY USE -	%y	F9H	249
DESCRIPTION	RS-232 (ASCII)	8 BIT HEX	8 BIT DECIMAL
ZERO	%z	FAH	250
- FACTORY USE -	%{	FBH	251
- FACTORY USE -	%|	FCH	252
- FACTORY USE -	%}	FDH	253

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- FACTORY USE -	%~	FEH	254
- FACTORY USE -	%DEL	FFH	255

Table 13 Extended ASCII Commands

KEY	RS232 ASCII COMMAND	8 BIT HEX	8 BIT DECIMAL
ZERO	%z	FAH	250
UNITS	%u	F5H	245
SELECT	%s	F3H	243
ID	%i	E9H	233
PRINT SAMPLE	%p	F0H	240
TARE	%t	F4H	244
PRINT ENTER	%e	E5H	229
CLR	%c	E3H	227

Table 14 RS232 Keypad Commands

transmit an XOFF character and / or change the level of its CTS output to -12v. If the transmitting device continues to send more than 16 characters after the indicator's handshake output has been de-asserted then characters may be lost. This situation constitutes an over-run error and is indicated by the message ovrun error.

As soon as the available room in the data receive buffer increases to at least 24 characters, the indicator re-asserts its handshake outputs, informing the transmitting device that it is OK to resume transmitting. Note however that the hardware handshake output of the indicator is always asserted and de-asserted when appropriate, regardless of the selection for P204. This has been designed-in for trouble-shooting purposes.
It is assumed that if you do not want to use the hardware handshake line then you will not connect it. For this situation it would not matter if the line changed state during a transmission.

While in the Weighing Mode, the indicator checks its receive buffer and processes any received data approximately every 1/20th of a second. While in the Setup Mode, the received data is processed more rapidly.

15.6 Communications (Transmit) Operations

The indicator provides a customized transmit mode which can be used to arrange up to 4 different transmissions to send a variety of information to other devices. A custom transmit can be made up of variable information displayed or stored by the indicator, fixed ASCII characters and control codes. Up to 999 elements may be programmed for transmission in each of the four custom transmit setups, with each fixed character and programmed parameter counting as one element. As a maximum example, 12 parameters and 987 fixed discrete characters may be programmed for transmission.

CREATING A CUSTOM TRANSMIT SETUP

Before attempting to set up a Custom Transmit, determine ahead of time exactly what information you want to send. Advance to the Custom Transmit Setup of choice. For example, press **<1> <0> <0> <0> <SELECT>** for the 1st Custom Transmit.

NOTE:
If entering this mode from the Weigh Mode, you will be asked to enter the Software Security Code. Enter the code as explained in Chapter 3 and the mode will be advanced to the specified parameter, in this case P1000.

To insure a fresh start, you should clear out the previous contents of the Custom Transmit Setup by pressing the **<CLR>** key. The indicator will prompt you with "Key # to CLR" which asks you to enter the number of Custom Transmit Setup entries that should be deleted. Since the maximum number of entries in the setup is 999, keying a number larger than this insures that any previous setup is completely deleted. So, key in 1000 and then **<ENTER>**.

Enter the first element to be transmitted in the manner described for text, control code, or parameter, in the following sections. Repeat for each of the next elements. When complete, you may want to review the Parameter Setup in Chapter 4 for data transmission. When all parameter setups are complete, press **<ZERO>** to exit back to the Weigh Mode.

BASIC TRANSMIT INFORMATION

A default Custom Transmit is programmed into the indicator at the factory. This may be useful for your application. It may be modified to suit your purposes or cleared completely. The indicator is in an Insert Mode when data is entered into a Custom Transmit Setup. Entered data does not overwrite existing data. Instead, it is stored at the current location within the Custom Transmit Setup, immediately in front of the data that was at that location before the entry was begun. If previously entered data needs to be changed, you would first enter the new data, then delete the old data by using the **<CLR>** key.

There are several sub-modes of operation in the Custom Transmit Setup Mode. These are:

- Viewing the previously set up transmission and entering new characters.
- Expanding a special code to determine its setting.
- Selecting a parameter to be transmitted.
- Selecting the format for the selected parameter.

There are three different types of entries that can be made into the Custom Transmit Setup.

- Fixed Text
- Control Codes and Extended codes such as carriage returns, line feeds, etc.
- Items such as Gross Weight, ID numbers, Date, Time, etc.
- These entries are explained in the following sections.

NUMERIC DISPLAY DURING SETUP

During the setup of a Custom Transmit, the numeric display will show PXYYY. , where the X indicates the number of the transmit (1-4), and the YYY indicates the number of the current entry location (starting at location 000). For example, when the first character of the 1st Custom Transmit Setup is displayed in the lower right corner of the dot matrix display, the numeric display would read P1000. When the fourth character of that setup is displayed, the numeric display would read P1003.

DOT MATRIX DISPLAY DURING SETUP

The character programmed at the current location within the Custom Transmit Setup will be shown in the lower rightmost position of this display. Any preceding characters are shown ahead of it on the second and first lines of the display. For instance, if part number were entered, the display would show:

ART_N
UMBER

Special characters are used to represent the characters required to transmit parameters, control codes, ASCII extended codes, and the end of the table. Parameters are represented by a compound p/a while control codes and extended codes are represented by a single character combination c/c. These special characters may be expanded to clarify their use by pressing the **<PRINT>** key. Control codes, standard ASCII characters and extended codes (greater than 127 decimal) are expanded to their decimal value. In addition, control codes are also shown with their standard two or three character abbreviation and their control character representation. For example, the carriage return would be shown as:
< CR > ^M=13.

Extended codes are shown with the letters EXT-* where the * is replaced by the corresponding ASCII character. The parameter codes are expanded to a five character representation of their name along with a 3 digit code representing the selected format for that parameter. For example, the Gross Weight being transmitted in format 3 would be depicted as: F:003 GROSS

The Dot Matrix Display is also used to prompt you through the process of selecting an item for transmission and during the process of deleting a previous setup.

FIXED TEXT SETUP

The Fixed Text portion of a transmission is entered into the setup where it is to appear within the transmitted data. A maximum of 49 characters may be entered at any one time before pressing **<ENTER>**. Press the **<UNITS>** key to begin an entry. This places an A in the lower right position on the display. Use the **<UNITS>** and **<PRINT>** keys to scroll forward or backward through all possible characters. Press **<TARE>** when the desired character is displayed. This shifts the chosen character to the left making room for the next character, which is first displayed as an "A". This new character is then set to its desired value. Press **<UNITS>** to backup through the setup if required. When the text entry is complete, press the **<ENTER>** key to store the data.If an alpha keypad is available, then the text characters may be entered directly. Alpha keypads can used in a variety of ways such as with the GSE computer simulation of the indicator, by connecting a computer in terminal mode to the Comm Port of the indicator, by using the alpha keypad sold with the GSE Model 625, or by downloading a setup file from a computer through the Comm port of the indicator.

NOTE:
Be careful when downloading the % character which is used to execute commands. If a % character is part of the transmit setup, then a double percent character %% must be entered. For those who prefer, the ASCII characters may be entered one at a time using their 3 digit decimal code number preceded by a decimal point entry. For example, to enter the letter Z you would press **<.> <0> <9> <0> <ENTER>**. This entry procedure is the same as for ASCII control codes (see following section).

CONTROL CODE SETUP

ASCII Control Codes (0 to 31) and Extended Codes (128 to 255) can only be programmed by keying in a decimal point followed by the three digit decimal value of the desired character. For instance, to transmit a line feed (which has a decimal value of 10), you would key in **<.> <0> <1> <0>** and press **<ENTER>**. A special code has been created which combines a carriage return with a line feed: .256 **<ENTER>**. However, this code still takes up two elements in the Custom Transmit Setup. Refer to Table 15, ASCII Control Codes for a for a complete list of codes.

PARAMETER SETUP

CONTROL CODE	DECIMAL VALUE	ABBREVIATION	DEFINITION
^@	000	NUL	Null Character
^A	001	SOH	Start of Header
^B	002	STX	Start of Text
^C	003	ETX	End of Text
^D	004	EOT	End of Transmission
^E	005	ENQ	Enquire
^F	006	ACK	Acknowledge
^G	007	BEL	Bell
^H	008	BS	Backspace
^I	009	HT	Horizontal Tab
^J	010	LF	Line Feed
^K	011	VT	Vertical Tab
^L	012	FF	Form Feed
^M	013	CR	Carriage Return
^N	014	SO	Shift Out
^O	015	SI	Shift In
^P	016	DLE	Data Link Escape
^Q	017	DC1	Device Control 1
^R	018	DC2	Device Control 2
^S	019	DC3	Device Control 3
^T	020	DC4	Device Control 4
^U	021	NAK	Negative Acknowledge
^V	022	SYN	Synchronous Idle
^W	023	ETB	End Transmission Block
^X	024	CAN	Cancel
^Y	025	EM	End of Medium
^Z	026	SUB	Substitute
^[	027	ESC	Escape
^\	028	FS	Field Separator
^]	029	GS	Group Separator
^^	030	RS	Record Separator
^(underline)	031	US	Unit Separator

Table 15 ASCII Control Codes

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Parameter	ID	Transmitted Name
Gross Weight	00	Gross
Net Weight	01	Net
Tare Weight	02	Tare
Gross Total	03	GrTOT
Gross Total + Current	04	GrT+C
Gross Total - Current	05	GrT-C
Net Total	06	NtTOT
Net Total + Current	07	Nt+C
Net Total - Current	08	Nt-C
Time/Date	11	Tm/Dt
Truck IN/OUT Gross Wt.	12	TrGrs
Truck IN/OUT Net Wt.	13	TrNet
Truck IN/OUT Tare Wt.	14	TrTar
ID#1	21	ID 1
ID#2	22	ID 2
ID#3	23	ID 3
ID#4	24	ID 4
ID#5	25	ID 5
ID#6	26	ID 6
Note:	ID Parameters 30 through 37 are applicable only to the 570/574 units and are used for counting applications only.	
Quantity	30	Qty
Quantity Total	31	Qty TOT
Quantity Total + Current	32	Qty T+C
Quantity Total - Current	33	Qty T-C
Avg. Piece Weight	34	APW
Avg. Piece Wt. times 1000	35	APW*K
% Accuracy	36	%Accy
Last Sample	37	Sampl
Recalled Time	50	R time
Alarm 1 Time	51	A1 Tim
Alarm 2 Time	52	A2 Tim

Parameter	ID	Transmitted Name
Alarm 3 Time	53	A3 Tim
Alarm 4 Time	54	A4 Tim
Variable #10	60	Var10
Variable #11	61	Var11
Variable #12	62	Var12
Variable #13	63	Var13
Variable #14	64	Var14
Variable #15	65	Var15
Variable #16	66	Var16
Variable #17	67	Var17
Variable #18	68	Var18
Variable #19	69	Var19
Variable #20	70	Var20
Variable #21	71	Var21
Variable #22	72	Var22
Variable #23	73	Var23
Variable #24	74	Var24
Variable #25	75	Var25
Variable #26	76	Var26
Variable #27	77	Var27
Variable #28	78	Var28
Variable #29	79	Var29
Variable #0	80	Var 0
Variable #1	81	Var 1
Variable #2	82	Var 2
Variable #3	83	Var 3
Variable #4	84	Var 4
Variable #5	85	Var 5
Variable #6	86	Var 6
Variable #7	87	Var 7
Variable #8	88	Var 8
Variable #9	89	Var 9
Register #1	91	Reg 1
Register #2	92	Reg 2

Table 16 Parameter ID Numbers

Parameter	ID	Transmitted Name
Register #3	93	Reg 3
Register #4	94	Reg4
Post Time	96	Ptime
Status Character	97	Stat
Currently Displayed Data	98	Data is variable depending on currently displayed data.

Parameter	ID	Transmitted Name

Table 16 continued, Parameter ID Numbers

Selection	Example	Description
8	"1235."	Print decimal even if data has no fractional portion
16	"+1235"	Print + sign for positive data
32	"1235 Gross"	Do NOT print the parameter's units
64	"2720 lb Gross"	Print the data in default units (as opposed to current units)
128	"1235 lb"	Do NOT print the parameter's name

Table 17 Numeric Parameter Formats

Selection	Example	Description
0	" 27.49"	Fixed width, right justified, left spaces filled
1	"0027.49"	Fixed width, right justified, left zeroes filled
2	"27.49 "	Fixed width, left justified, padded w/spaces on right
3	"27.49"	Minimum width

Table 18 Numerical Parameter Field Width

Parameters stored by the indicator are added to a transmit by pressing the **<ENTER>** key while you are at the desired location of the Transmit Setup. The display will read Pick Parm: for about one second, then the display will read Parm= Gross. Press the **<UNITS>** or **<PRINT>** keys to scroll through the possible selections such as Net, Tare, ID #1, etc. Parameters may also be chosen by directly keying in their parameter number followed by **<ENTER>**. This simplifies creation of a computer based setup file. The available parameters and their numbers are listed in Table 16, Parameter ID Numbers. When the desired parameter is displayed, press the **<ENTER>** key.After the parameter is selected, the display will briefly show Set Formt, followed by Formt = 000. Enter a 3 digit code that specifies the exact way in which the parameter will be transmitted. A number between 000 and 255 are the possible entries. In most cases a format entry of 000 will suffice and the format entry process can be effectively ignored. However, if you want to send a parameter in a particular way, you must add up the values from a set of choices for that parameter and enter the sum as the format code. The format selections vary somewhat depending on the type of parameter that you selected. These are explained in the following section.

NUMERIC PARAMETER FORMAT SELECTIONS

The selections for the numeric parameters calculated by the Model indicator (GROSS, NET, etc.) are described in Table 17, Numeric Parameter Formats and Table 18, Numerical Field Width. Note that the names of the units are sent in a variable width of up to 6 characters, consisting of a leading space followed by up to 5 characters of units name. Similarly, when selected, parameter names are always sent following the data and after the units name (if sent). The length of the parameter name will always be 5 characters for numeric parameters as this is the same name that is displayed when the parameter is selected during the Weigh Mode. If a more descriptive name is desired for the transmission, the format can be selected to send the data only with the descriptive name programmed into the Custom Transmit Setup as fixed text immediately preceding or following the transmitted data. Additional format options for the numeric parameters are divided into two categories as shown in Table 18. The first is Fixed Width where a specific number of digits are always transmitted for the data. The other variation is Minimum Width where only the digits necessary to represent the data are sent, so that fewer characters are sent for weights closer to zero. In any case, all transmitted data is formatted to the same

selection	Example	Description
1	"06:56:51 pm 05/15/93"	Includes seconds with time
2	"18:56 05/15/93"	24 hour time format
4	"06:56 pm May 15, 1993"	Print date spelled out
8	"06:56 pm Wed 15, 1993"	Print day of week
16	"06:56 pm 15/05/93"	International date format
32	"1235"	Print as # of seconds elapsed since midnight January 1, 1970
64	"05/15/92"	Do NOT print time
128	"06:56 pm"	Do NOT print date

Table 19 Time / Date Format Selections

Format	Example	Description
32	"1235"	Print as # of seconds elapsed since midnight January 1, 1970
68	"May 6, 1992"	Complete U.S.A. date
72	"Mon 05/06/92"	U.S.A. date with day of the week
80	"06/05/92"	International date
92	"Mon 6 May, 1992"	Complete International date with the day of the week
129	"01:11:30 pm"	12 hour time with seconds, without the date
131	"13:11:30"	24 hour time with seconds

Table 20 Time / Date Format examples

number of decimal places as would be displayed. Choose ONE of the four choices in Table 18 and add its value to that selected from Table 17. If a fixed width is chosen, the fixed width that will be used is specified with setup parameter P208.XX as a value between 0 and 15. Also, the plus or minus sign, when printed, is included in the fixed width. If the transmitted data cannot be represented in the specified fixed width, additional characters are sent if needed. Thus very small values for fixed width, especially zero or one, will produce the same result as a minimum width selection! These same selections apply to the vars, parameters 80-89, except that the units related selections (selections 32 and 64) are not applicable. These 2 choices may be ignored.

TIME/DATE PARAMETER FORMAT SELECTIONS

Time-Date is set up at the factory to transmit the format as: 16:56 pm 05/15/91. If this is satisfactory then the format code of 000 should be used. Otherwise, add up the indicated format codes for each of your selections in Table 19, Time / Date Format Selection. After adding up the selections from Table 19, the total should be entered as the format code for the Time/Date parameter. Each specific combination of choices results in the transmission of a specific number of characters. The number of transmitted characters is not dependent on the current time or date. An example of several combinations are shown Table 20, Time / Date Format Examples. Note that transmission of a parameter name along with the Time/Date is not available as a format choice. Additional text, such as Today's Date: , may be programmed as fixed text into the Custom Transmit

Selection	Example	Description
0	"Part #:10-40-5503 "	ID with name, fixed width (width set at P700-P712)
1	"Part #:10-40-5503"	ID with name, minimum width
128	"10-40-5503 "	ID without name, fixed width (width set at P700-P712)
129	"10-40-5503"	ID without name, minimum width

Table 21 ID Parameter Formats

Selection	Description
0	Print the decimal point even if the data has no fractional value
16	Print a + sign for positive data
128	Do NOT print the parameter's name

Table 22 Basic Format Selections

Selection	Description
32	Increment number before it is transmitted
36	Decrement number before it is transmitted
64	Increment number after it is transmitted
68	Decrement number after it is transmitted
96	Increment number twice, once before and once after it is transmitted
100	Decrement number twice, once before and once after it is transmitted

Table 23 General Purpose Register Format Selections

Character	Description
O	Overload or Underload condition
M	Motion exists
(space)	No Overload or Underload or Motion exists

Table 24 Status Character Interpretation

Format Code	Effect	Example
0	**Send Name**	**"Stat M"**
128	**Do NOT send Name**	**"M"**

Table 25 Status Format Selection

Setup in front of the Time/Date parameter entry. Refer to the section on Fixed Text and use of the % character.

TIME / DATE TRANSMIT CODE UPDATE

Format code 32 allows a time / date type variable (current time, recalled time, and alarms 1 - 4) to be transmitted as a numeric value in terms of the number of seconds elapsed since Jan 1, 1970. This is useful in uploading time / date information to a computer for use in a spreadsheet application.

ID PARAMETER FORMAT SELECTIONS

The six programmable ID parameters available in the indicator may be included in a transmission. Choose a name to send along with the data. If sent, the name will precede the data of the ID. If a space is desired between the name and the data then that should be programmed into the name of the ID. However, it is often beneficial to name the ID in an abbreviated form that will fit into the 5 character display for the benefit of the operator who keys in the ID during everyday use. If you limit the name to 5 characters, the ID data can be sent without its shortened name but with a more descriptive name programmed into the Custom Transmit Setup as Fixed Text. Your second decision is to determine the number of characters transmitted for the ID data. This can be either the number of characters keyed in as the ID data, or the maximum data size programmed for that ID. Refer to parameters P701, P703, P705, P707, P709 and P711 for programming the maximum size of an ID. All four possible format choices are shown in Table 21, ID Parameter Formats. No addition of choice values is required.

NOTE:
The selection made in parameter P208 does not affect the transmission size.

15.7 Identification (ID) Operations

The six programmable ID parameters available in the indicator instrument may be included in a transmission. You will first want to decide if you want the name of the ID sent along with the data. If sent, the name will precede the data of the ID. If a space is desired between the name and the data then that should be programmed into the name of the ID. However, it is often beneficial to name the ID in an abbreviated form that will fit into the 5 character display for the benefit of the operator who keys in the ID during everyday use. If so, then the ID data can be sent without its shortened name but with a more descriptive name programmed into the Custom Transmit Setup as Fixed Text. Your second decision determines the number of characters transmitted for the ID data. This can be either the number of characters keyed in as the ID data, or the maximum data size programmed for that ID. Refer to parameters P701, P703, P705, P707, P709 and P711 for programming the maximum size of an ID. All four possible format choices are shown in Table 21. No addition of choice values is required.

NOTE:
The selection made in parameter P208 does not affect the transmission size.

GENERAL PURPOSE REGISTER FORMAT SELECTIONS

The indicator has four general purpose registers (parameters# 91 - 94) that that can be used for the printing of incrementing and decrementing values, such as box numbering, or for Truck In/Out Weighing as the truck ID (refer to Chapter 17 for more information on Truck In/Out Weighing). The formatting choices are shown in Table 22 and 23. The values in Table 23 allow for incrementing or decrementing the transmitted number, before or after it is transmitted. You do NOT have to make a selection from Table 23. Add in the indicated value for each of the following format selections based upon your response to the following choices: Finally choose a field width value from Table 18 and add it to that determined from Tables 22 and 23. Remember that if the parameter name is transmitted, it is always sent following the data. The length of the

15

```
1 = must be set
0 = must NOT be set
• = don't care (but still affects final output)
+ = defined in comment
```

```
Bit 15 is currently unused.  It could be used to tell the indicator that a different ordering of the
bits are in use.  This alternate order would allow for a more logical arrangement of the bits for
selecting various formats.
```

```
This chart does not apply to time/date parameters.  Unit settings do not apply to vars and regs.
Decimal point printing does not apply to regs.
```

REF. ROW#	MSBs	<——>	<——>	LSBs	Comments
0	1 1 1 1 5 4 3 2	1 1 1 0 9 8	7 6 5 4	3 2 1 0	**Bit Numbers**
1	3 1 2 6 8 4 7 3 1 0 6 8 9 9 8 4 2 6	2 1 0 0 5 2 4 2 1 5 8 4 2 6	1 2 6 3 1 8 4 2 6	8 4 2 1	**Add these numbers to set selections.**
2	· · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · + + + +	· · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · · ·	**Width = (0 thru 15) x 256. This will set the width bits (0 = use P208).**
3	· 0 0 · · 0 1 · · 1 0 · · 1 1 · · 0 0 · · 0 1 · · 1 0 · · 1 1 ·	· ·	· 0 · · · 0 · · · 0 · · · 0 · · · 1 · · · 1 · · · 1 · · · 1 · ·	· ·	**Use current units Use UNIT 1 Use UNIT 2 Use UNIT 3 Use default units (cal units) Use UNIT 4 Use A/D Graduations (uses raw data, regardless of parm # Currently undefined (could be used for mV/V)**
4	· · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · + · · + · + · · ·	· + · · + · · · · · · · · · · · · · · ·	**0 = use DP, 1 = Xmit entire number without DP (DP removed before conversion to binary and after unit conversion) 0 = use DP if needed, 1 = always use DP 0 = don't use '+', 1 = use '1' 0 = print units, 1 = don't print units 0 = print parameter name, 1 = don't print parameter name**
5	· · · 0 · · · 0 · · · 0 · · · 0	· · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · ·	· · 0 0 · · 0 1 · · 1 0 · · 1 1	**Fixed width, Right justify. (Space padded) Fixed width, Right justify. (0 padded) Fixed width, Left justify. (Space padded) Minimum width**
6	· · · 1 · · · 1 · · · 1 · · · 1	· · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · ·	· · 0 0 · · 0 1 · · 1 0 · · 1 1	**Decimal point aligned (future) Use Binary Format - NOTE - Changes meaning of bits 3 and 4 Print parameter name only - right justified Print parameter name only - left justified**
7	· · · 1 · · · 1 · · · 1 · · · 1	· · · · · · · · · · · · · · · ·	· · · 0 · · · 0 · · · 1 · · · 1	0 · 0 1 1 · 0 1 0 · 0 1 1 · 0 1	**convert data to char and transmit convert data to int and transmit convert data to long int and transmit convert data to IEEE 4-byte binary float and transmit**

Table 26, Advanced Formatting Codes

parameter name will always be 5 characters for these parameters as this is the same name that is displayed when the parameter is selected during the Weigh Mode. If a more descriptive name is desired it can be programmed into the Custom Transmit Setup to be part of the fixed text transmission immediately preceding or following the data being transmitted.

STATUS PARAMETER

This parameter was added so that the indicator could transmit some information regarding its status, specifically concerning motion and overload conditions. The transmitted status will consist of a single character having three possible values as described in table 24 Status Character Interpretation. The only applicable format code for the status parameter is for the inclusion or exclusion of the parameter's name, Stat, which has a format code of 128, as shown in table 25 Status Format Selection.

<ID> Key Usage in the VAR modes (update)

Beginning with Indicator firmware revision code 01003, date code April 02, 1992 and later, the **<ID>** key is now operational while in the var modes (viewing vars 0 thru 9). The only modes in which the **<ID>** key will not perform the operation as specified in P720 are modes 91 - 94, which are the General Purpose Registers.

15.8 Additional Formatting Codes (Advanced Customization)

Additional formatting capabilities have been included in the 550 for advanced customization of parameters transmitted. Refer to table 26, Advanced Formatting Codes.

Row Ref#.

0 Reading vertically from right to left are bit locations 0 thru 15. The 0 bit is the least significant and 15 is the most significant.

1 Reading these numbers vertically, they are added to a lower level (3 digit) set format code to further customize the parameter. Note that these values are only added if it is represented by a ‘1’ in any of the Row Ref#s 3 thru 7 in table 26. Multiple numbers may be added together if the table shows multiple ‘1s’.

2 This row shows a set of ‘+’ signs. The plus signs are aligned under specific numbers in Row Ref 1. Any Row Ref sections with “+” signs are fully defined in the commenting section. Follow these directions to determine the format codes. This particular Row Ref allows for defining the width bits of an individual parameter. If the maximum width of a parameter is to be 3, then by definition of the stated comment you would multiply 3 times 256. The result is 768. This number is then added to a lower level format code for the parameter being formated.

3 This section allows formatting of a specified parameter to a specific type of “units”. Note that these values are only added if it is represented by a ‘1’ in any of the Row Ref#s 3 thru 7 in table 26. Multiple numbers may be added together if the table shows multiple ‘1s’.

4 This row shows a set of ‘+’ signs. The plus signs are aligned under specific numbers in Row Ref 1. Any Row Ref sections with “+” signs are fully defined in the commenting section. Follow the directions under the comments column to determine the format codes. This particular Row Ref allows for defining whether the decimal point, the plus sign, the units and the parameter name is printed. for example, if the decimal point is to be removed you would use the first selection of the stated comment and add the value ‘4’ from Row Ref# 1 under the plus sign, to the lower level format code for the parameter being formated.

5 This section allows formatting of a specified parameter to a specific width while right/left justifying and padding with 0s or spaces.Note that these values are only added if it is represented by a ‘1’ in any of the Row Ref#s 3 thru 7 in table 26. Multiple numbers may be added together if the table shows multiple ‘1s’

6 This section allows formatting of a specified parameter for decimal point alignment, binary format, print parameters name right/left justified. These values are only added if represented by a ‘1’.Note that these values are only added if it is represented by a ‘1’ in any of the Row Ref#s 3 thru 7 in table 26. Multiple numbers may be added together if the table shows multiple ‘1s’ (providing combination is logical based on comments).

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7 This section allows formatting of a specified parameter to a char, int, long or IEEE 4-byte binary float and then transmit. These values are only added if represented by a '1'.Note that these values are only added if it is represented by a '1' in any of the Row Ref#s 3 thru 7 in table 26. Multiple numbers may be added together if the table shows multiple '1s' (providing combination is logical).

Example:

This advanced formatting capability allows format codes greater than 3 digits in length to be entered in the custom transmit tables. ie. 3 digit format code (128), 5 digit format code (16384). This example of a 5 digit format code (16384) is derived from table 26 which will format the selected parameter to be *printed using the second selected units* set in P152. Format code 128 would print the same parameter without the name but in the units specified in P151.

Find in Row Ref# 3 the comment showing **use UNIT 2**. Reading across from right to left, find a '1' under the value 16384 in Row Ref# 1.

15.9 Printing Operations

Pressing **<PRINT>** will print either the data which appears on the display, or the stored data and other information that was entered into a Custom Transmit Setup, depending upon how the transmission parameters have been set up (refer to the section on Custom Transmit setup). A default Custom Transmit Setup is programmed into your indicator at the factory. An example of which is shown below. The font size of the text is a function of the printers capabilities.

ID#1:
9876.54 lbs Gross Weight
9864.20 lbs Net Weight
12.34 lbs Tare Weight

There are 4 Custom Transmits that may be set up in the indicator. To print a set up transmit, press **<n> <PRINT>** where "n" corresponds to one of the four Custom Transmits. 1 = Custom Transmit 1, 2 = Transmit 2, etc.

Although all transmissions are usually begun by pressing the **<PRINT>** key, an exception is the Continuous Print feature which will transmit the programmed data each time the display is updated. This feature is particularly useful with a remote display or an interface with a computer that is monitoring the process. If the receiving device (printer, display or computer) goes off line, is powered-down or for any other reason cannot receive the data being sent, the message Tx On Hold will appear for a few seconds.

Press **<CLR>** to abort the transmission. If this situation occurs while using the Continuous Print feature, the continuous transmission is suspended, but can be resumed by pressing the **<PRINT>** key.

15.10 Input Interpreter

Description
The Input Interpreter is a new feature that has been added to the GSE Model 500 Series Weigh and Counting Indicators. This feature, when enabled, operates on data received through the indicator's serial port. It enables the indicator to be programmed to perform complex custom applications, as well as recognize specific commands which may be unique to other indicators. This option permits the GSE indicator to be programmed to emulate identical commands from Weigh Indicators manufactured by other companies.

The Input Interpreter consists of 8 input specifications. Each specification operates independently and can be Line type, Character type, or left unused. When the received data matches one of the specifications, a macro can be initiated.

A Character type input specification will match a single received character. Although the specification may be several characters long, only the first character is compared. When a match occurs, all preceding data is cleared, and if a macro number is programmed, it is invoked.

With Line type input specifications, the received data is held in a buffer until a terminating character is received. This terminating character is programmable, but the default is a decimal 10, which is an ASCII LINEFEED. All Line type input specifications use the same terminating character.

When the terminating character is received, the data in the buffer is compared against the Line type input specifications. If a match is found and a macro number is programmed, it is invoked. Whether or not a match is found, the buffer will be cleared of all data up to and including the terminating character.

Line specifications may contain text, control codes and parameters. If there are no parameters, the received data is simply compared against the specification, and they must be identical to be considered a match.

If there are parameters in the line specification, characters from the received data will be stored into that parameter. Characters before the parameter in the line specification must match characters in the received data. A match occurs when data has been stored into all parameters in the line specification.

Input specification format lines may be up to 255 characters long, however the input interpreter's input buffer is only 49 characters long, which is the maximum number of received data characters that may be interpreted. When this buffer fills up it is cleared.

Setup

The Input Interpreter is an advanced software feature. In order for it to function properly, it must be set-up properly. The setup is stored in electronically erasable programmable read-only memory (EEPROM) along with all the other scale setup information.

General Setup

The Input Interpreter may be enabled or disabled at setup Parameter 900. All remaining input interpreter setup parameters are always retained regardless of the setting of this parameter. When this parameter is enabled, all received serial data is captured and used by the input interpreter. When it is disabled, all serial data is received and used by the instrument's command processor.

The line type input specification terminating character is programmed at Parameter 901. For values from 0 to 99, the value is displayed on the numeric display, while the ASCII interpretation of it is shown on the lower line of the character display. For values greater than 99, only the value is displayed on the lower line of the character display.

For each of the eight input specifications, there are three parameters which must be set-up: type, format line and macro number.

Input Specification Type

The Type is programmed at parameter 9X0, (where X is the input specification number, 1 through 8). The choices for type are: 0 - Unusd (unused), 1 - Char (character) and 2 - Line (line). Enter the number of your selection followed by the **<ENTER>** key to select a specific selection or press **<ENTER>** by itself to scroll through the selections.

When the type is set to unused, the other two parameters for that input specification are not accessible and will not be retained in EEPROM. However, they are not cleared until exiting the setup mode, so changing the type to unused and then back to char or line does not affect the input specification format line and macro setups.

Input Specification Format Line

The format line is programmed at Parameter 9X1, (where X is the input specification number, 1 through 8). The format line is displayed on the lower line of the character display, the edit position is the last character on the right. The numeric display shows the edit position's offset from the first character of the format line. A solid box character indicates the end of the format line, a small PA indicates a parameter and a small CC indicates a control code. Here the following keys perform special functions:

<ID> Moves the edit position left

<TARE> Moves the edit position right

<PRINT> (Model 550) Expands character at edit position

<SAMPLE> (Model 570) Expands character at edit position

<UNITS> Enter Alphanumeric entry mode

<ENTER> With no entry, enters the parameter select mode Following an entry, inserts entry into format line at edit position.

<CLR> With edit position at the end of the format line will ask if you want to delete the entire line;press

<ENTER> for yes, any other key for no. Otherwise it deletes the character at the edit position.

In the Alphanumeric entry mode the **<UNITS>** key and the key beneath it (**<PRINT>** on the Model 550 and **<SAMPLE>** on the Model 570) are used to scroll up and down through the ASCII character set. The **<ID>** key acts as a backspace, removing the character at the edit

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position and moving the edit position to the left one character. The **<TARE>** key moves the edit position one character to the right and places an "A" there.
In the parameter select mode the **<UNITS>** key and the key beneath it (**<PRINT>** on the Model 550 and **<SAMPLE>** on the Model 570) are used to scroll up and down through the available parameters. The parameter number is displayed in the last 2 digits of the numeric display, If you know the parameter number you may enter it directly. When the name of the parameter you want is displayed, pressing **<ENTER>** will insert it into the format line at the edit position.

Control codes are inserted by entering ".XXX", when XXX is the decimal code for the control code. For example, ".013" **<ENTER>** inserts a carriage return at the edit position.

Use caution when using a "%" in the format line. In order to match a "%" in the received data, the format line must contain two percent signs, or "%%". To enter two percent signs in the setup mode requires that 4 percent signs be sent to the scale. A single percent sign has a special meaning for the input interpreter, which is discussed in the section For Programmers Only.

Input Specification Macro Number

The macro number is programmed at Parameter 9X2, (where X is the input specification number, 1 through 8). Here you select the number of the macro you want to initiate when a match is found. The choices are 0 through 15 (macro number) and 16 (no macro). Enter the number of your selection followed by the **<ENTER>** key to select a specific selection or press **<ENTER>** by itself to scroll through the selections.

Operation

There are a few aspects of the Input Interpreter which deserve to be highlighted. Failure to fully understand these concepts may result in unacceptable operation of the Input Interpreter.

Termination Character

How you handle your terminating character is very important! Let's assume that you want the Indicator to execute a macro when it receives the word "START" through it's serial port. So you set up the input specification #1 to be line type, the format line to "START" and the macro number to 0. The terminating character is set to 13, which is a carriage return.
This setup will work fine if what is sent to the scale is "START" followed by a carriage return. But if a line feed is sent following the carriage return, this will only work the first time, because the linefeed will remain in the buffer and be taken as the first character of the next transmission.

There are two ways around this. First, if you know the transmissions will always include a linefeed, then set the terminating character to 10 (linefeed) and insert the carriage return at the end of the format line.

Alternately, you could set up another input specification to be character type, with a linefeed as the format line, and no macro. This way, the linefeed will simply clear the buffer, which was already done by the carriage return, so in effect the linefeed is ignored. This would allow all line type input specifications to handle transmissions with or without a linefeed.

Multiple Parameters

Any Line type input specification may contain several parameters. Suppose you want the scale to receive and interpret the following transmission:
T1.234,PWT.05< CR >

The objective is to store "1.234" into the TARE register, ".05" as the PIECE-WEIGHT, and execute a macro when done. This can be accomplished by setting up an input specification as line type, with a format line of "T<pa=TARE>,PWT<pa=APW>", macro number set to 0, and the terminating character set to 13 (carriage return). Here <pa=TARE> means to insert the parameter TARE at that point in the format line.

If we receive an incomplete transmission, for example: T1.234,PW<cr> the data "1.234" will be stored in the TARE register, however nothing will be stored in the PIECE-WEIGHT register. The macro will not be executed, because a match occurs only when data is stored into all the parameters in the format line.

In some applications, you may not want the value in the parameters to change unless a match has occurred. This can be accomplished by setting up the input specification to store the data into a unused variable (VAR), and have the macro copy the value into the desired parameter (TARE, QUANTITY, etc...) using the "%C" macro command.

Trailing Data

In an input specification with at least one parameter, any data following the last parameter's data but preceding the terminating character will be ignored. For example: a format line of "T<pa=TARE>" will match received data of "T1.234" and "T1.234 hello there".

To prevent this, "%5s" may be appended to the end of the format line, as in "T<pa=TARE>%5s". What this does is tell the input interpreter to store up to five characters of trailing data in a dummy parameter. If the received data contains trailing data, data will be stored into two parameters, TARE and the dummy. Since the format line contains only one parameter, a match has not occurred, and the macro is not executed.

Multiple Matches

The input specifications are checked in order from one to eight. If the received data could match more than one input specification, the first one checked that generates a match has priority. Once a match occurs, the comparison stops. The other input specifications are not checked.

Disabling the Input Interpreter

When enabled, the input interpreter software intercepts all received data, except for the following circumstances: Input interpreter is disabled in the setup mode, parameter 100 and above. To download a new setup to the scale while input interpreter is enabled, you must enter the setup mode manually by entering "100<select>23640<id><enter>" from the scale's keypad.

The macro commands %G, %W and %Y suspend the input interpreter while waiting for operator input. The input interpreter is suspended during database unloads.

Under these conditions, received data is accepted directly into the scale's command/entry buffer.

Using an I.D. as a Parameter

When I.D.s (parameter 21 through 26) are used as parameters, spaces in the received data are treated different than other characters. Leading spaces in the received data are ignored. The first non-space character is the first character stored in the I.D.. Data will continue to be stored into the I.D. until the next space, the end of the received data, or the maximum size of the I.D. is reached.

Advanced concepts

This section is included for use by programmers knowledgeable in the "C" programming language. If this does not include you, feel free to skip this section. An understanding of the concepts presented here is not necessary to using the input interpreter. It will however, allow a higher degree of flexibility in your custom applications.

For Programmers Only!

As you read the previous Trailing Data Section, you probably thought to yourself, "That %5s looks like a format string from a C language printf or scanf function!". You're right! A derivative of scanf is the heart of the line type input interpreter specification with parameters. This knowledge can be useful, as we'll see below.

There are three components used by the input interpreter: the input string, the format string and a parameter address list. The input string consists of the data up to but not including the terminating character.

The format string is derived from the format line which is input in the setup mode and stored in EEPROM. At power-up or when exiting the setup mode (when the display says "Doing Setup") the format line is scanned and all parameters are replaced by format codes appropriate to their type. The address list is also built so that scanf will know where to store the data for each parameter. One additional address is added to the end of the list, that of the dummy parameter for the trailing data previously discussed.

The format code for most parameters is "%f", for floating point data. The ID parameters are strings whose length is programmable through the setup mode, so their format code is "%Xs", where X is the programmed length, (i.e. "%20s" for a string length of 20). The time/date parameters, 50 through 54 are unsigned long type data, so their format code is "%lu".

It is possible to override these format codes by inserting a "%" immediately before the parameter in the format line. Then you can enter your own format code ahead of the "%". If you have multiple parameters you have to insert your format codes ahead of the first overridden parameter's format code.

This can be useful for parsing fixed-width data that contains no delimiters, because the maximum field width can be specified. For example, "%5f%6f%<pa=VAR1> %<pa=VAR2>" will store the first 5 characters of data in floating point format into VAR1, and the next 6 characters in floating point format into VAR2.

An interesting but not very useful application is to override the format for an unsigned long parameter, 50 through 54, with "%lx". This will interpret the incoming

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data as hex! "%lo" will interpret it in octal!

Back to more worthwhile things now, an asterisk immediately following the percent sign will cause a field to be scanned but not stored. So if you know that there is a floating number in the incoming data that you want to ignore, use "%*f" to skip over it, or to skip a single character use "%*c".

This is not meant to be a tutorial on the uses of the scan function. Many resource books are available which go into much further depth. We have tried to suggest some possible ways of using it's characteristics to good advantage.

parameter Setup Reference

Parameter	Selections	Description
900	0	Interpreter Disabled
	1	Interpreter Enabled
901	0 - 255	Line TypeTermination Character

(in the following, X is the input specification number, 1 through 8)

9X0	0	Unused *
	1	Character Type
	2	Line Type
9X1*		Text, Parms, Format Line control codes
9X2*	0 - 15	Macro Number
	16	No macro

(* when specification Type is set to unused, parameters 9X1 and 9X2 for that specification are not accessible.)

15.11 Input Interpreter Examples

The following input interpreter example shows how the 550 can be programmed to receive a tare followed by a units identifier. A macro is invoked which tests the transmitted units name and adjusts the data before storing it away as the new tare value. Refer to the next few pages for input interpreter examples.

Example 1: **Units identifier**

File Name: TAREINP.SET   (on disk from GSE)

```
100%s23640%i%e          Access Setup
                        Modes, Allowing
                        Changes

700%s12%e               P700.--  1SIZE#1=12
701%sTare units%e       P701.--  NAME1 Tare
                        units

800%s%c%e               P800.81  Macro # 0
lb;21%%-%e              0001 subtract
80,2%%C%e               0007 copy register
GOTlbtare!%%P%e         0012 pause
%%N%e                   0023 if not
kg;21%%-%e              0024 subtract
.4535925;80%%*%e        0030 multiply
80,2%%C%e               0042 copy register
GOTkgtare!%%P%e         0047 pause
%%N%e                   0058 if not
not  Tared%%P%e         0059 pause
%%E%e           0070 end if


900%s1%e                P900.01  RxInp Enbld
901%s10%e               P901.10  RxTrm <LF>

910%s2%e                P910.02  RxTyp Line
911%s%c%e               P911.04  RxFmt
%e80%e%e                Var#0
 %e
%e21%e%e                ID #1:
.013%e                  <CR> ^M=13
912%s0%e                P912.00  RxMac   0

920%s0%e                P920.00  RxTyp
                        Unusd
930%s0%e                P930.00  RxTyp
                        Unusd
940%s0%e                P940.00  RxTyp
                        Unusd
950%s0%e                P950.00  RxTyp
                        Unusd
960%s0%e                P960.00  RxTyp
                        Unusd
970%s0%e                P970.00  RxTyp
                        Unusd
980%s1%e                P980.01  RxTyp Char

981%s%c%e               P981.01  RxFmt
.026%e          <SUB>^Z=26
982%s16%e        P982.16  RxMac
                none

%z              Exit Setup Mode
```

Below are two lines of sample data transmissions which would be converted to lb and stored as tare weights when received by a 550 with setup specified above:

50kg
50 kg

The next two lines of sample data transmissions would be stored as tare weights without any units adjustments.

100lb
100 lb

The following four lines of sample data transmissions would **not** be stored as tare weights.

50xx
50 xx
50 xxsd
100 lbd

Example 2: Process AIAG Barcodes

Another potentially useful application for the GSE Input Interpreter is to process scanned in AIAG barcodes. For those not familiar with the AIAG standard, the following will provide a brief primer on the subject:

AIAG:	Automotive Industry Action Group
Identifier:	The first character(s) of the barcoded data which indicates the type of data in that barcode.
Type:	AIAG uses Code 3 of 9.
Usage:	This barcode is typically required to be used by suppliers on shipments to the automotive manufacturers.

The following are a few of the most commonly used identifiers:

P	Part No.
Q	Quantity
S	Serial No.
V	Vendor No.

The setup file below shows how the 550 may be setup to properly store away data scanned from AIAG barcodes.

File Name: AIAGINP.SET (on disk from GSE)

100%s23640%i%e	Access Setup Modes, Allowing Changes
700%s12%e	P700.-- 1SIZE#1=12
701%sVndr:%e	P701.-- NAME1
Vndr:	
702%s10%e	P702.-- 1SIZE#2=10
703%sP/N:%e	P703.-- NAME2 P/N:
704%s10%e	P704.-- 1SIZE#3=10
705%sS/N:%e	P705.-- NAME3 S/N:
800%s%c%e	800.12 Macro # 0
Vend#saved%%P%e	0001 pause
801%s%c%e	P801.12 Macro # 1
Qty saved%%P%e	0001 pause
802%s%c%e	P802.12 Macro # 2
Part#saved%%P%e	0001 pause
803%s%c%e	P803.12 Macro # 3
S/N saved%%P%e	0001 pause
900%s1%e	P900.01 RxInp Enbld
901%s10%e	P901.10 RxTrm <LF>
910%s2%e	P910.02 RxTyp Line
911%s%c%e	P911.03 RxFmt
V%e	
%e21%e%e	Vndr:
.013%e	<CR> ^M=13
912%s0%e	P912.00 RxMac 0
920%s2%e	P920.02 RxTyp Line
921%s%c%e	P921.03 RxFmt
Q%e	
%e91%e%e	Reg#1
.013%e	<CR> ^M=13
922%s1%e	P922.01 RxMac 1
930%s2%e	P930.02 RxTyp Line
931%s%c%e	P931.03 RxFmt
P%e	
%e22%e%e	P/N:
.013%e	<CR> ^M=13
932%s2%e	P932.02 RxMac 2
940%s2%e	P940.02 RxTyp Line

941%s%c%e	P941.03 RxFmt
S%e	
%e23%e%e	S/N:
.013%e	<CR> ^M=13
942%s3%e	P942.03 RxMac 3
950%s0%e	P950.00 RxTyp Unusd
960%s0%e	P960.00 RxTyp Unusd
970%s0%e	P970.00 RxTyp Unusd
980%s0%e	P980.00 RxTyp Unusd
%z	Exit Setup Mode

Several test transmissions were tested with a 550 having the setup above. These are shown below along with their respective results:

Transmitted or Barcoded <u>Data</u>	**<u>Result</u>**
Q123	stores "123" into Reg 1.
Q 234	stores "234" into Reg 1. (leading space ignored)
Q 345hello	stores "345" into Reg 1. (hello is stripped off since Reg 1 is a numeric field.)
Q321 987	stores "321" in Reg 1. (" 987" is lost due to space)
P10-40-5503	stores "10-40-5503" into ID 2.
P 09-30-0238	stores "09-30-0238" in ID 2 (does not store leading space!)
P200550-00000	stores "200550-000" in ID 2 (loses last two "0"'s since ID size is only ten!
MPNOT STORED	nothing stored! "M" not defined, "P" not first.
MP NOT STORED	nothing stored! "M" not defined, "P" not first.
S112233	stores "112233" into ID 3.
S112-233	stores "112-233" into ID 3.
S112-233x	stores "112-233x" into ID 3.
S112,233x	stores "112,233x" into ID 3.
VCRYSTAL SEMI	stores "CRYSTAL" into ID 1. (the " SEMI" is lost due to the space.)
VCRYSTALSEMI	stores "CRYSTALSEMI" into ID 1.
V987654	stores "987654" into ID 1.
V 987 654	stores "987" into ID 1. (the leading space is stripped and the space in the middle caused the " 654" to not be stored.)
V"GSE INC."	stores ""GSE" into ID 1 (strips off trailing "INC."" due to space)

Example 3: Input Interpreter with Spaces in input

This example shows the method which will allow the input interpreter to include spaces in the scanned in data. Refer to the following excerpt of a 550 setup file:

900%s1%e	P900.01 RxInp Enbld
901%s10%e	P901.10 RxTrm <LF>
910%s2%e	P910.02 RxTyp Line
911%s%c%e	P911.08 RxFmt
T%%[^%e	
.013%e	<CR> ^M=13
]%%%e	
%e21%e%e	ID #1:
912%s0%e	P912.16 RxMac 0

The input specification shown tells the indicator to take every character except the <LF> character. The 'T' at the beginning of the specification should be set to the appropriate identifier for your specific application and the number 49 following the percent character should be set to match the size of the ID specified for that input, ie the same value as P700 if the parameter is ID1.

Tips on Using the <u>Input Interpreter</u> with the 450/550/570/574 *Simulator Software*

The 550 simulator can be a valuable tool in testing out various setups for the 550. For the most part it works just the same as the 574 itself. The primary difference is in the handling of RS-232 I/O.

1. Enable and setup the 550 simulator to interpret a specific format unique to your application.
2. Create an ASCII text file identical to the format set in the unit.
3. Press **<ALT> <F1>** and setup the com input to receive the ASCII text file created.
4. Run the test several times with the correct data ASCII file and also with an ASCII file with incorrect

information. This will verify that the simulator will respond to only the data required.

550 Simulator Software GSE Part#: 460550-SIM

This includes the 450/550/570/574 simulator software.

15.12 Miscellaneous Custom Transmit Examples

Example #1: ASCII MODBUS

This is an example of how to set up a custom transmit for the ASCII MODBUS communication.

100%s23640%i%e	Access Setup Modes, Allowing Changes
1000%s%c1000%e	P1000. Custom Transmit #1
:%e	- Header
.309%e	Check Sum 8 - Calculates the same code as LRC
.401%e	MDBUS Start
.001%e	<SOH> - Address
.006%e	<ACK> - Function
.000%e	<NUL> - Register H.O. - could be based on
.001%e	<SOH> - REgister L.O. - var w/ frmt 4269
%e0%e%e4269%e%e	Gross Format = 4269 - The weight in the requested
.300%e	Check Stop - format
.310%e	Check PrnLo
.400%e	MDBUS Stop
.256%e	<CR> <LF>
%z	Exit Setup Mode

Chapter 16 Macro Programming Operations

16.1 Overview:

The purpose of creating macros is to provide a simple method of performing complex or repetitive operations. Each macro consists of a stored sequence of keystrokes which may be "played back" or "executed" at some future time. The macros may be created and edited in a way similar to the Custom Transmit setup mode. Also, a "LEARN" mode allows a simple method for storing keystrokes as they are executed.

Determining Macro Needs

Before programming a MACRO, one must first determine what it is that the instrument is to accomplish. While this may seem obvious, many times this important step is bypassed. The procedure can be broken down into very basic steps such as:

1 Tare scale to zero.
2 Prompt operator to enter a part number and store it to a register.
3 If the pieceweight exists in the database, place the scale in the quantity mode, prompt the operator to add parts to be counted an go to step seven.
4 If the part number does not exist, prompt the operator through a sampling routine.
5 Establish pieceweight
6 Store pieceweight in database with associated part number.
7 Place unit in quantity mode and prompt operator to add parts to be counted.
8 Print ticket with actual weight, part number, pieceweight and quantity.

The next step is to determine the implementation of these steps. Determine the condition which will invoke the macro. This could be a setpoint (which could be based on the actuation of the **tare** key or the occurrence of some weight condition), an alarm (for periodically occurring events), etc.

Once the setup has been broken down into what the macros, setpoints, and alarms each will do, specific setpoints, macros, variables, and alarms should be allocated to each operation. Pay careful attention as to the fact that if the alarms are used, each alarm is tied to a specific macro. Then break down each macro into the actual commands which will need to be executed.

For the example described above the following steps could be implemented:

1. Operator presses **<TARE>** key. This auto-tares the scale.

2. Macro Prompts operator “**ENTER PART#**”.

3. Operator enters part number.

4. Macro searches the database for the pieceweight associated with the entered part number.

5. If the part number exists in the database, the macro places the scale in the quantity mode. Go to step 10.

6. If the pieceweight does not exist associated with the entered part number, the macro runs the operator through a sampling routine . The macro will prompt the operator “**ADD SMPLE**”.

7. The operator adds the sample and presses **<ENTER>**.

8. The macro establishes the pieceweight and adds it to the database.

9. The macro places the unit in the quantity mode prompting the operator to “**ADD PARTS**”.

10. The operator adds the parts to be counted and presses **<ENTER>**. The system prints a ticket.

Macro Setup Modes:

The MACRO setup modes begin at P800 (for MACRO 0) through P816 (for MACRO 16).

Each character entered into a macro's setup is indexed by the two digits following the decimal point on the large numeric display. The first character entered into macro 0 is stored at location P800.00, the second at P800.01, etc... These two digits will be referred to as the macro's entry number. The number applies specifically to the entry displayed in the last position on the display.

To access MACRO 0's setup, press **<800> <SELECT>.** The display will then show the last programmed entries in MACRO 0's setup. Thus the two digits after the decimal point indicate the number of entries currently stored in the macro. If MACRO 0 is not yet setup, the display will show: "P800.00 Mac 0 ". The upper line of the dot matrix display indicates the macro number selected, ie "MAC 0" through "MAC16". The solid block indicates the end of the macro's definition.

Front Panel Key Definitions During Macro Setup

The **<TARE>** and **<ID>** keys are used to scroll the macro's setup across the lower line of the dot matrix display. The **<TARE>** key increments the macro's entry number and moving the displayed setup entries toward the left, thus making room for the next entry in the last position on the display. Similarly the **<ID>** key, decrements the macro's entry number and moving the displayed setup entries toward the right. The **<TARE>** key will 'wrap' around to the beginning of the macro when the end is reached, and vice-versa for the **<ID>** key. If however any entry is in process, the **<ID>** key acts as a backspace and the **<TARE>** appends an "A" on to the end of the entry.

As in all other setup modes, the **<ZERO>** key will allow you to exit the setup mode and the **<SELECT>** key will advance the unit to the next parameter, ie the next macro setup.

The **<UNITS>** key acts as it does in other alpha setup modes, that is it will begin an entry by placing an "A" on the display if an entry is not yet in process and it will advance the last entered character to the next sequential value if an entry is in process. Refer to Chapter 14 regarding alpha entries for more information.

The **<CLR>** key can be used to delete any one character out of a macro. Simply move the undesired character to the last position on bottom line of the dot matrix display (using the arrow keys) and then press **<CLR>**.

In order to clear out the complete setup of a macro, scroll the setup until the BLOCK which signifies the end of the macro setup is located in the last position of the display. (From the beginning of a macro, press the **<ID>** key, once.) Then press **<CLR>**. The message "Clear All?" will appear. Press **<ENTER>** to proceed and clear out the entire macro, or press any other key to prevent clearing the macro.

Maximum Macro Size

Two factors limit the size to which macros may grow: EEPROM (**U9** and **U11**) and available RAM. Additional EEPROM may be purchased and installed to increase the amount of data which may be stored in the setup of the unit. However once macros (or custom transmit setups, for that matter) get extremely large (> 2K of EEPROM) you may run into insufficient RAM to load the macro or edit the macro. If the database option is installed, additional RAM may be allocated to general use, allowing the macros and other setups to increase further in size.

To allocate 8K of your database option memory to general use, access P65010 and press **<2> <ENTER>**. This will decrease the available database memory by 8K.

Standard Macro Setup Method

As mentioned previously, there are two basic methods of setting up the MACROS. The first involves using the front panel 'cursor' keys as described above to enter the required characters, while the second makes use of the learn mode. In practice, you may find that using the two methods in conjunction with each other to be the quickest approach.

Using the cursor keys for alpha and punctuation entry, the required characters are simply scrolled onto the display. The number keys can be used within the same entry for entering numeric data. Pressing the **<ENTER>** key stores the entered data into the macro. The **<ENTER>** key may be pressed after keying in any number of characters.

Macro Setup LEARN Mode

Using the "LEARN" mode simplifies macro setup quite a bit for programming macros which are to execute commands that can also be performed using the front panel keys.

The "LEARN" mode is accessed by pressing **<ENTER>** then **<SELECT>**. The unit immediately goes to the weigh mode. From this point onward any commands which are entered are "recorded" by the macro. (The macro learn mode can learn unlimited keystrokes at a time.) Press the keys which the macro will have to execute when it is running. When all the required commands have been entered, key in **<100> <SELECT>** and the unit will return to the macro setup mode with the entered commands stored away. These commands can then be edited by clearing out any undesired entries and inserting any additional characters. (If you are using the M550/574 simulator, the learn mode can be exited by pressing **<ALT> <F10>**.)

Macro Setup Example

For the first example we will setup a very simple macro to allow for a remote **<ZERO>** switch. This is easily accomplished by programming a "%z" into macro 0. To do so, follow these steps:

800< SELECT >

If the display reads "Setup Keyin Code:" then key in **23640 <ID> <[ENTER>**. Then, to clear any previous setup press:

<CLR> <ENTER>

Then to enter in the "%" character, press:

<UNITS> (up arrow)

once. This will produce an "A" in the display. Then press:

<PRINT> (down arrow)

twenty eight times and the displayed character will cycle to the "%" character. (Note that if the **<PRINT>** key is held down, after about one second it will auto-repeat and quickly cycle through the choices.) Then press:

<TARE> (right arrow)

once. This will move the entered "%" to the left and place an "A" in the last position. Then press:

<PRINT> (down arrow)
thirty nine times and the displayed character will cycle to the "z" character. Then press

<ENTER>.

However the "%" character (and the "z") may be entered using fewer down arrow entries. If the starting character is keyed in as a "." using the **<.>** key, then the down arrow only need be pressed nine times instead of twenty eight times. Refer to the proximity of these two characters in Figure 21, Character Listing, for further clarification.

This same example, using the "LEARN" mode would be implemented as follows:

800 <SELECT>

If the display reads "Setup Keyin Code:" then key in **23640 <ID> <ENTER>**.

Then, to clear any previous setup press:

<CLR> <ENTER>

To begin the "LEARN" mode, press:

<ENTER> <SELECT>

Then to "LEARN" the **<ZERO>** key, press:

<ZERO>

To return to the macro setup mode, keyin:

100 <SELECT>

As you can see, the LEARN mode can simplify the setup of some basic macros.

16.2 Methods of Invoking Macros

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Macros may be executed from 6 sources:

1. Setpoints,
2. RS-232 comm port,
3. Alarms
4. Other macros
5. Macro Menu
6. Remote keys

A macro may not begin executing during the setup mode, however a macro may enter the setup mode. It will, however terminate upon exiting the setup mode. Any setpoint may be setup to invoke any macro when the setpoint is activated and/or deactivated (*Software* Setpoints only in the 574 only. The 550 has both Hardware and Software Setpoint capabilities). A command sent into the unit through the comm port may also be used to invoke any macro with the character sequence "%n", where 'n' is the desired macro number for macro 0 - 9 (i.e. %3 will execute macro 3), while various punctuation characters are used for macros 10 - 15. Also, the special codes which are generated by the function keys F1 through F10 on the GSE remote keypad are decoded as macros 1 through 10. Alarms and remote keys are tied to specific macros. Refer to Table 27, Macro Invoking Commands for a summary on the ways each macro may be invoked.

One macro may invoke another macro in one of two ways. It may "call" the other macro, in which case upon completion of the second macro, control returns to the first macro. This allows macros to act as "subroutines". The second method is for the first macro to "jump to" another macro. In this case the first macro will not be resumed when the "jumped to" macro is completed. The commands for each method are specified in Table 27, Macro Call Commands.

If a setpoint invokes a macro while another macro is in process, the newly invoked macro is "pushed" onto a macro stack (ie the fact that it needs to be executed is noted). When the currently executing macro is completed then the "pushed" macro is executed. The macro stack allows for up to 16 macros which are awaiting execution to be tracked by the 550. If more than 16 macros are invoked the message "Macro Error" will be displayed. All macros awaiting execution and the currently executing macro will be canceled.

When one macro "calls" another macro, the calling macro's next command is "pushed" onto the macro stack. This is how the place where execution is to resume is noted by the macro. However it is necessary to not use multiple "nested" macro "calls" (in excess of 15) in order to prevent overflowing the macro stack.

A macro invoked by an alarm or a setpoint while another macro is in progress is noted and that macro will be executed once the macro(s) in progress are completed. A macro being invoked by a remote key will be ignored if another macro is running. If the currently running macro attempts to accept operator (using one of the designated commands) then the remote key input will be ignored and discarded. However if the running macro completes execution without checking for operator input, then the remote key will be processed at that time. Any macro can be invoked when any setpoint is activated and / or deactivated. he "menu" option allows any macro that has been named to be invoked through a menu using the **<ID>** key.

Naming Macros and the Macro Menu

Macros may be named. If a macro is named, that macro can appear in a menu which allows an operator to invoke one of the named macros through the unit's front panel, if setup parameter P720 is set to "Menu".

Macros are named starting at P850 for macro 0 and continuing through P866 for macro 16. The method of naming is exactly the same as that for naming the IDs, ie P701 - P711.

To make use of this feature, first name all of the macros which will need to be invoked by the operator. Use a name that will be meaningful to the operator of the unit and that will look good on the two line by five character display. If an entry is expected of the operator at the time that the macro is invoked, make sure the name suggests that an entry be made. Also make sure that P720 is set to "Menu".

Then, when the operator is using the scale, press the **<ID>** key to display the name of the first named macro. Then, if necessary, press the **<SELECT>** key to advance the menu selection to the next named macro. When the required selection is displayed, press the **<ENTER>** key to invoke that macro or if the macro is written to accept an entry, key in the data prompted for and then press **<ENTER>**.

In order for a macro to accept operator input when it is invoked, it must be written appropriately. Keying in some data and pressing **<ENTER>** at the macro merely causes the data to be placed in the unit's entry buffer. Then the first command in the macro will simply act upon the information in the entry buffer. For instance if the macro started out with "80%s" to select var #0 and the operator had pressed "**123 <ENTER>**" to invoke the macro from the menu, then the unit would attempt to execute "**12380 <SELECT>**". This would bring up the "Setup Keyin Code" prompt as the unit attempted to access the setup mode. This is not at all what was intended!

If the macro does not require operator input when it is invoked, it is recommended that the entry buffer be cleared in some manner at the very beginning of the macro. This will prevent a macro from executing erroneously if an operator does make an entry.

Example 1:	(used as the very first entry in a macro named "Keyin Targt"):
;80%C	Copy entry into Var #0. If no entry is made, Var #0 is cleared.

Example 2: (same as above except requires operator input):

%\	IF NO ENTRY
Keyin Targt%G	Re-prompt operator.
0%^	Re-start this macro (macro 0)
%E	END IF
;80%C	Store entry in Var #0.

Example 3:	(when operator input is not required):
1%c	Start an entry (in case entry not in progress), then clear entry.

16.3 Methods of Aborting Macros

In the event that a macro is aborted by the user pressing **<CLR> + <SELECT>** simultaneously, sometimes it is desirable that some additional checking be performed such as turning off certain setpoints (setpoint outputs not valid on 574 - contact GSE. The 550 allows for both hardware and software setpoint capabilities) or resuming the operation. This is now possible with the addition of a 17th macro (macro #16) that is automatically invoked whenever a macro is aborted.

There are two other ways that macro 16 can be invoked, by performing a "goto macro 16", ie "@%^", or by naming it and invoking it through the macro menu.

16.4 Serial and RS-232C and Keypad Input

Alternate Macro Setup Method

One variation of using the front panel cursor keys to enter non-numeric data is to use an external keyboard with an RS-232 interface with the instrument. This can speed up the entering of operator prompts and other characters since they can be keyed in directly. One such device is the remote keyboard previously sold with the GSE Model 550/570/625 Scale. If you have a PC computer, you may use a communication program, such as Scale-Link or Procomm to transmit data directly into the unit. One important item to remember is that in order to enter a "%" character into a macro, two "%"s must be keyed in. Another is that the computer's **<ENTER>** key will clear any entry in process.

Another method is to use the Model 550/574 Simulator (M550.EXE) which runs on most any personal computer (IBM compatible). Contact your GSE sales person for more details on its availability and requirements. (Part# GSE 550 Simulator Software: 460550-SIM)

Operator and Serial Input Before and During Macros

Keypad and serial port inputs are not processed during macros, except during macro commands which specifically look for operator input. Any data entered through either of these inputs will be buffered (saved) until the macro either looks for operator input or the macro completes.

If a macro needs to perform some commands transparent to the user of the scale, the macro should first save the operator's entry (using the "%[" command) then perform its necessary operations, and then restore the saved entry (with the "%] command). If an entry is not in process when the save entry is issued, then the saved value indicates an empty buffer. In this case, the %] command puts nothing in the entry buffer.

For example:

%[	Save operator entry.
1;91%+	Add one to parameter 91 (Reg #1).
0,81%+	Add Gross Wt to parameter 81.
%]	Restore operator entry.

The example macro shown above could be invoked once every second by an alarm and the operator would not even be aware that a macro was executing.

Carriage Return

The <CR> received via RS-232 acts the same as the front panel **<ENTER>** key if the 550 is in an ID mode or if a macro is executing. The ID modes include the data entry mode for ID 1 - 6, Truck in/out weighing, macro menu, or the database menu.

550's Command Structure

The 550 treats the percent (%) character as a special character. Whenever the unit receives a percent, the next character is flagged to be processed as a command. If a percent is to be literally entered into the unit, then two percent characters must be entered. If the character following a percent is not defined as a command the unit will display the message "Entry Error" for one second.

All of the commands of the 550 consist of a percent character followed by some other character.
Macros can perform the same operations as any front panel key operation, ie **<ZERO>**, **<TARE>**, **<PRINT>**, etc... However many additional commands have been added, primarily to adequately support setpoint control applications and operator input. Special Macro commands allow for special functions. The available commands are shown in Table 28, Macro Commands.

Exiting ID modes

A variation to the **<SELECT>** command has been defined. The command **<*> <SELECT>** will cause the unit to exit the ID mode if it is currently in an ID mode. Outside the ID modes, the "*%s" command has no effect.

When a macro is invoked asynchronous to the operator's involvement with the 550, ie due to a setpoint or an alarm, then it may so happen that the operator has placed the unit in an ID mode. If this is a realistic possibility for a macro, then that macro should use the "*%s" at the start of the macro if the macro is going to attempt to change modes of the unit. For instance, if the unit is displaying the current value of ID #1 and a macro is invoked which must set the current mode to mode 84, the "*%s" will exit the ID mode allowing the subsequent "84%s" command to work as intended.

16.5 Disabled Keys

Disabling an operation does not prevent that operation from being performed by a macro. This applies specifically to:

P166 Auto-Tare Enable/Disable
P167 Keyboard Tare Enable/Disable
P168 Keyboard Select Enable/Disable

These operations can be disabled from being used by the operator and yet still allow a macro to use them. For example, if **P168** is set to disabled, the scale operator cannot access any modes except those specified at setup mode **P300 - P309**, but all modes may be accessed by a macro.

16.6 Suspension of the Weight Conversion Process

While macros are being executed, the weight conversion process is put on hold except during certain macro commands. Thus the current gross, net, etc... weights are not being calculated, the display is not updated, any continuous transmissions are not occurring, and the analog and setpoint outputs are not being changed. The macro commands which do perform the weight conversion process are those which allow for operator input (%G, %W, %P, and %Y). These commands perform the weight conversion process every 1/20th of a second while they are active. Also, the %I command performs the weight conversion process once.

The suspension of the weight conversion process has been done to speed macro execution. In most cases macro execution will be so quick that suspending the weight conversion process will not have any adverse effect. However if the weight conversion process does need to be performed during macro execution, use of the %I command at the appropriate location will do the job. This may be necessary in an application where a macro is in a loop waiting for a setpoint to indicate that the weight has fallen below a threshold. If the %I were not part of that loop, the setpoint would never deactivate since the weight would not be determined during that time.

16.7 Preventing and Aborting Macro Operation

If the instrument is set up such that a macro is stuck in a loop or a macro needs to be aborted for any reason, press the **<CLR>** and **<SELECT>** keys at the same time. This will abort any macro(s) currently executing. "Macro Abort" will appear on the instrument. However, if the instrument's setup is such that macro(s) are continually being re-invoked (due to an improper setpoint setup or a errant alarm setup) then performing the macro abort command described above will only momentarily alleviate the condition. Instead, power down the unit by unplugging it from the AC outlet. Then re-apply power and press the clear key during the power-up message "HELLO Model 550". This will cause macro execution to be inhibited. This allows you to access the setup modes and correct the condition. Macro execution will be re-enabled upon exiting the setup mode or upon removing power and re-powering the unit. Refer to Table 27 for Macro Call Commands.

Macro Command Details

Many of the commands listed in the preceding tables require additional information regarding their exact usage, capability, and implementation. Following is a list of each command along with this additional information and an example on how it could be used.

Examples can be provided in various forms. One would be to describe the keystrokes required to enter the setup from the front panel however this can be very tedious to show the scrolling of each character onto the display. A second approach would be to show the alpha characters as if they could be keyed in directly. This somewhat impedes the flow of the macro and in understanding exactly what it does. A third alternative would be to show the macro as it would appear if it were already keyed into a macro's setup. This third approach has been chosen to present the subsequent examples. Remember however that if these are to be entered into an instrument, the **<ENTER>** key would need to be pressed after each line to enter in the keyed in data. Also, if the setup is to be sent in to the unit via RS-232 then the **<ENTER>** would be sent in as a "%e" and all occurrences of the "%" character would require an additional "%" character accompanying it.

Detailed Explanation of Each Macro Command

x%a Set the target accuracy to be achieved

This command allows the percentage of accuracy to achieve during a sample routine to be changed to a specific percentage. The value of “x” can be a value between 90 and 99.96. Values below 90 will eliminate an accuracy requirement. Values above 99.96 will

16.8 Macro Commands

Macro Commands (Tables)

Macro Number	Macro "Call" or RS-232 Input	Macro "Go-To"	Alarms	Remote Key Pin Numbers on J6	Non-ASCII 8-bit RS-232 Character (decimal value)	Remote Keyboard F-Key #
0	%0	0%^	---	1 & 3	176	---
1	%1	1%^	---	1 & 4	128 or 177	F1
2	%2	2%^	---	1 & 5	129 or 178	F2
3	%3	3%^	---	2 & 3	130 or 179	F3
4	%4	4%^	---	2 & 4	131 or 180	F4
5	%5	5%^	---	2 & 5	132 or 181	F5
6	%6	6%^	---	---	133 or 182	F6
7	%7	7%^	---	---	134 or 183	F7
8	%8	8%^	---	---	135 or 184	F8
9	%9	9%^	---	---	136 or 185	F9
10	%:	:%^	---	—	138 or 186	F10
11	%;	;%^	---	—	187	---
12	%<	<%^	Alarm 1 (P504)	—	188	---
13	%=	=%^	Alarm 2 (P506)	—	189	---
14	%>	>%^	Alarm 3 (P508)	—	190	---
15	%?	?%^	Alarm 4 (n%K)	—	191	---
16	—-	@%^	—-	—	192	—-

Table 27 Macro Call Commands

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch- ing	Math Com- mands	Com- muni- cations
x%a	Set the target accuracy to be achieved.					
*%a	Set the target accuracy to the default.					
?%a	Displays the current target accuracy.					
%a	If accuracy has been achieved, process the following commands.			X		
n%A	ACTIVATE setpoint "n".	X				
%b	Suspend macros and perform sample.					
%B	BREAK (Abort running of current macro).					
n%B	Remove all occurances of specified macro from macro stack.					
*%B	Delete all macros from macro stack.					
n%C	COPY Command copies specified parameter to the display. (entry buffer)				X	
n,m%C	COPY value of parameter "n" to parameter "m". If only one parameter is specified it is copied into the entry buffer.				X	
fmt;nF%C	Format a parameter in the Entry Buffer					X
nU,m%C	Access "Unrounded" gross and net values				X	
%d	Turn display off.					
0%d	Turn display on. (restores as always ON)					
A%d	Restores display as on with AUTO shutoff					
B%d	Force backlight off always (LCD module)					
0B%d	Force backlight on always (LCD module)					
n%D	DEACTIVATE setpoint "n".	X				
%E	END "IF" statement.			X		

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch- ing	Math Com- mands	Com- muni- cations
x%f	Check to see IF a Presetable Parameter is preset.			X		
n%F	"IF" setpoint "n" is deactivated, process following commands. For further information, refer to the explanation of IF commands (if output or input deactivated).	X		X		
n%g	Check IF a specific sample error has occured.			X		
?%g	Displays current state of sample error flags.				X	
%G	GET operator input. (Wait until operator makes an entry and then presses [ENTER].		X			
(message) %I	Perform Weight Conversion Process. ie calculate currently applied weight, update numeric display, and setpoint and analog outputs. If an optional message precedes the %I command, then that message is displayed during the process. Otherwise the dot matrix portion of the display will show the standard information for the current mode.	X	X			
xxx%j	Check to see IF remote key is held. This command also includes checking front panel keys. (xxx = decimal value)		X	X		
n%J	JUMP to TAG. This command is used in conjunction with the %T (TAG) command in order to allow looping within a macro.			X		
%k	Put current filter selection in entry buffer.				X	
n%k	Set filter selection (n = 0 thru 7) or (15 thru 17 auto-filter)					
*%k	Resets the filter selection to default as defined in parameter P116.					
n%K	Sets up a timer to invoke macro 15 in "n" seconds.			X		

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch-ing	Math Com-mands	Com-muni-cations
%L	Display the "number selection" of the currently selected language.				X	
n%L	Change language selection on the fly. The variable "n" can be selections 0 - 12.					
cn,p,p%m	The %m command allows for modifying and testing of strings stored in ID's. The %m command uses a prefix character to select between various sub commands. [c] [n], [p], [p] . . . %m - c = command character - n = string (ID) number - p = additional parameters					
n%M	IF the current mode is mode "n", then process the following macro commands. For further information, refer to the explanation of IF commands.			X		
%N	NOT IF: This command marks the spot where macro execution resumes if the previous IF statement result was false. For further information, refer to the explanation of IF commands.			X		
n%O	IF setpoint "n" is activated, process the following commands. For further information, refer to the explanation of IF commands.	X		X		
(message) %P	PAUSE for programmable time (set using the %@ command), while performing the weight conversion process. Default delay time is one second. If the optional message precedes the %P command, then that message is displayed during the PAUSE. Otherwise the standard information for the current mode is displayed.		X			
n%Q	Sends the "n"th custom transmit, as programmed in the setup mode. The value for "n" can be 1, 2, 3, or 4.					X

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch- ing	Math Com- mands	Com- muni- cations
%r	IF RTS Asserted			X		X
0%r	Deassert RTS					X
1%r	Assert RTS					X
n%R	IF register "n", is not zero, process the following commands. "n" can be 1, 2, 3, or 4 for parameters 91 - 94). For further information, refer to the explanation of IF commands.			X		
%S	SOUNDS the beeper for 1/2 second.		X			
n%T	TAG current position for later JUMP (n %J). Refer to the section describing jumping for further information.			X		
n%U	If TX buffer is empty (COM or Print) n = (1 or 2) com or print.			X		
n*%U	Clears the specified transmit buffer. n = (1 or 2) com or print.			X		
n%v	If parameter "n" is followed by %v it will be written to E^2. Available parameters are located at P5003 thru 5094. Must set for "On Request".					
n%V	IF setpoint input "n" is active, process the following macro commands. For further information, refer to the explanation of IF commands.		X	X		
(message) %W	WAIT for operator to press any key. If the optional message precedes the %W command, then the message is displayed while awaiting the operator to press a key.		X			X
%X	Request current display from remote. (Diagnostic command)					X

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Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch-ing	Math Com-mands	Com-muni-cations
(message) %Y	IF the operator presses [ENTER] then the following macro commands are executed. IF any other key is pressed, macro execution will resume after the ELSE (% N) or ENDIF (%N) command. For further information, refer to the explanation of IF commands.		X	X		X
n%^	GO TO macro "n". The currently executing macro is aborted and the macro specified by the "n" is begun. Execution will NOT return to the current macro when the GO TO'd macro is complete. Refer to TABLE 1 regarding macro invocation methods to clarify the possible values for "n".			X		
%[	Saves any in process entry into a temporary buffer so it can be retrieved later when it is needed.		X			X
%]	Retrieves the last saved entry into the entry buffer.		X			X
n,m%+	Adds the value of parameter "n" to parameter "m" and stores the result in parameter "m".				X	
n,m%-	Subtracts the value of parameter "m" from parameter "n" and stores the result in parameter "m".				X	
n,m%*	Multiplies the values of parameter "n" times parameter "m" and stores the result in parameter "m".				X	
n,m%/	Divides the value of parameter "n" by parameter "m" and stores the result in parameter "m".				X	
%\	IF there is NO entry in the entry buffer, then the following macro commands are executed. Otherwise macro execution resumes at the first command following the %N (ELSE) or %E (ENDIF) command. Refer to the information regarding branching for further information.		X	X		X

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch- ing	Math Com- mands	Com- muni- cations
x%@	Sets the DELAY time for future %P (PAUSE) commands. "x" can be between 1/20 and 5 million seconds.		X			
n%_	IF DATABASE ERROR "n" has occurred, then execute the following macro commands. Otherwise subsequent commands are skipped until the occurrence of a ELSE or ENDIF command.			X		
%+	math addition command				X	
%-	math subtraction command				X	
%*	math multiplication command				X	
%/	math divide command				X	
n%,	Take square root of parameter n.				X	
x;n%,	Raise parameter n to the power of x.				X	
n,m%,	Raise parm m to power of value parm n.				X	
n%.	Rounds parm n to default weight units				X	
.xx;n%.	Rounds parm n to specific multiple of .xx				X	
xx;n%.	Rounds parm n to specific multiple of xx				X	
n,m%.	Rounds parm m to value of parm n.				X	
-x;n%,	Take the x inverse of parameter n.				X	
.3333;n%,	Take cube root of parameter n.				X	
n%"	Specify Port Command 1%" specifies the comm port 2%" specifies the print port					X
%$	Send entry (ASCII text) command					X
%&	Send Control Codes Command					X
%#	Selected Scale Command					
n%!	Disable Input Command		X	X		X
n%(	"IF INPUT" command		X			X
n%)	Clear Keypad and/or RS-232 Receive Buffer (flush entry buffer)					X

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Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch-ing	Math Com-mands	Com-muni-cations
xx,yy%C	Determine String Length command			X		
xx,yy%- or aaaa;yy %-	Compare Two Strings command			X		
n>mP%'	Compares parameter n to parameter m to determine "IF" parameter n is greater than parameter m.			X	X	
n<mP%'	Compares parameter n to parameter m to determine "IF" parameter n is less than parameter m.			X	X	
n=mP%'	Compares parameter n to parameter m to determine "IF" both parameters are equal to each other.			X	X	
n>x%'	Compares parameter n to variable x (variable x is any number embedded in the program) to determine "IF" the specified parameter is greater than variable x.			X	X	
n<x%'	Compares parameter n to variable x (variable x is any number embedded in the program) to determine "IF" the specified parameter is less than variable x.			X	X	
n=x%'	Compares parameter n to variable x (variable x is any number embedded in the program) to determine "IF" the specified parameter is equal to variable x.			X	X	
n>%'	Compares parameter n to "0" to determine "IF" the specified parameter is greater than "0".			X	X	
n<%'	Compares parameter n to "0" to determine "IF" the specified parameter is less than "0".			X	X	
n=%'	Compares parameter n to "0" to determine "IF" the specified parameter is equal to "0".			X	X	

Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch-ing	Math Com-mands	Com-muni-cations
n#mP%'	Compares parameter n to parameter m to determine "IF" parameter n is not equal to parameter m.			X	X	
n#x%'	Compares parameter n to variable x (variable x is any number embedded in the program) to determine "IF" the specified parameter is not equal to variable x.			X	X	
n#%'	Compares parameter n to "0" to determine "IF" the specified parameter is not equal to "0".			X	X	

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Macro Command	Description	Setpoint Related	Operator Input/ Output	Branch-ing	Math Com-mands	Com-muni-cations
%{	**This macro command signifies the start of a group. The %{ is used along with IF commands and supporting IF commands (%N, %E) to perform AND, OR and Nested IF operations. The %} is also used with the %{ which ends the group.**			X	X (boolean)	
%}	**This macro command signifies the end of a group. The %} is used along with IF commands and supporting IF commands (%N, %E) to perform AND, OR and Nested IF operations. The %{ is also used with the %} which starts the group.**			X	X (boolean)	
%|	**An OR operation can be accomplished by placing a %| between the IF commands. The next command after the %| should be an IF command or a %C followed by an IF**			X	X (boolean)	

Table 28 Macro Commands

THE FOLLOWING COMMANDS ARE USED TO PERFORM THE OPERATIONS AVAILABLE FROM THE UNIT's FRONT PANEL.

Each key's precise effect is dependant on the Instrument's current mode of operation.

Macro Command	Description
%c	Performs the **<CLR>** key operation.
%e	Performs the **<ENTER>** key operation.
%i	Performs the **<ID>** key operation.
%p	Performs the **<PRINT>** key operation.
%s	Performs the **<SELECT>** key operation.
%t	Performs the **<TARE>** key operation.
%u	Performs the **<UNITS>** key operation.
%z	Performs the **<ZERO>** key operation.
%`	Performs the **<40> <SELECT>** key operation.

Table 29 Macro Commands for the Front Panel

automatically select the highest selection of achieved accuracy requirements and default to 99.96 percent.

97%a

***%a Set the target accuracy to the default**

Executing this command will default the accuracy requirements during a sample routine to the value entered in parameter P183.

?%a Displays the current target accuracy

This command displays the current target accuracy percentage set in parameter P183. This value is set in the entry buffer and can be used in math calculations.

%a If accuracy has been achieved, process the following commands.

This command is an "IF" statement which allows a decision to be made based on whether or not the accuracy set in parameter P183 has been achieved.

%a	IF accuracy achieved
Acc'y OK!%P	Prompt operator
%N	ELSE
Acc'y BAD!	Prompt operator
%E	END IF

n%A Activate setpoint n

This command can be used to cause any setpoint to become activated, regardless of the conditions which have been setup to cause it to activate. The 'n' must be a number between 1 and 32 which specifies the exact setpoint number to activate.

One common use for this would be to provide an operator with a prompt and then after the response is given by the operator the setpoint would become activated.

Example: (M574 has no hardware outputs, contact GSE for external setpoint information. The 550 offers both hardware and software capabilities).

STARTFILL?%W	Prompt operator and wait for any key.
1%A	Activate setpoint #1.

For this example the setpoint could be set for 'activate never' which would prevent the setpoint from being activated except by this command.

Note that if the conditions for the setpoint to become de-active were present when the "1%A" command was executed then the setpoint output signal would remain active only until the next weight conversion process was completed.

An interesting and sometimes useful feature of this command is that setpoints which are not enabled may also be activated and de-activated. Thus if a setpoint is only to change state based on events that occur during a macro, the setpoint would not require any setup and could be setup as 'disabled'.

%b Suspend macros and perform Sample Routine

The %b command performs the sample operation similar to the %p command except that macros are suspended until either the sample is completed (accuracy achieved) or the sample is aborted.

The prompt “Accy < Req’d” is shown until the accuracy is achieved. This prompt or a related prompt may be shown. The **<SAMPLE>** and **<ENTER>** keys are suspended. The **<CLR>** key will abort the operation while the appropriate prompt is being displayed.

%b	sample
Add Smple%G	get operator entry
%p	sample (enter)

%B Break (abort macro)

This command will cause the macro that it occurs in and any macro that called this macro to be aborted. A possible use would be to allow the operator an 'out' from an otherwise continuous loop.
Example:

Done?%Y	Prompt operator and wait for response.
%B	If operator response is YES (ie **<ENTER>**) then stop macro execution.
%E	End of IF statement.

The capabilities of the %B command have been extended. Previously the %B command would simply abort the currently running macro and any macro that called the current macro. However any macro that was invoked by an event (such as a setpoint output or input or input interpreter match - setpoint inputs/outputs are not valid on the M574. The 550 will accommodate for both setpoint inputs and outputs.) would still be on the stack and would begin executing after the current macro was aborted.

n%B Remove specific macro from the macro stack

Any any specific macro may be removed from the macro stack with "x%B" command, where x is a macro number from 0 to 9, :, ;, >, =, <, and ?. This may be useful in applications where a currently running macro is in a loop and is checking for the condition which would invoke the macro. The looping macro then calls the necessary macro directly and then needs to delete the no longer needed macro from the macro stack.

***%B Remove all macros from the macro stack**

The command "*%B" may be used to abort all macros, the currently running chain of macros and any macros that were pushed during the current chain of macros.

n%C Copy parameter to auxiliary display (entry buffer)

The "n" can be any parameter 0 through 98. If this command is used in a macro its usually during an entry mode of some sort. For instance, if the displayed weight were to be entered into VAR#0 the sequence of commands would look something like the following.

80%s	Select VAR#0
98%C	Bring up displayed wt.
%e	enter
0%s	return to gross mode

or briefly display a parameter on the auxiliary display.

91%C	Bring REG#1 to display
%P	Pause for 1 second.
%c	Clear display

This command can be used in many different ways for data manipulation. There are other commands that can same memory space by manipulating the data differently but end up with the same results.

n,m%C Copy value of parameter n to m.

The value of the first parameter is copied into the second parameter. Valid values for n and m are most parameter IDs between 0 and 94 that are numeric parameters. The copy command can be used to accomplish various tasks such as saving away the current gross weight or preparing for a mathematical operation.
Example:

0,80%C	Copy gross weight to Var #0. Any setpoint based on Var #0 would now be effectively based on the gross weight at that moment.

Caution: If a copy is done to a continually updated parameter (ie gross, net, gross total + current, etc...) the copied data will be overwritten by the newest current data as soon as the next weight conversion process has been completed.

Caution: If a copy of the gross or net is done, the value copied is the rounded value of the parameter, not the internal resolution. If the internal resolution value is required, it is available by using the command "nU,m% C". This command is explained just ahead.

Another simple example would be to have a setpoint which set to be active above, based on the Gross wt exceeding the value of Var #0. When the setpoint is activated, the gross weight is copied to Var #0. This is effectively a peak capturing macro. The following example will demonstrate this, heeding the caution note provided above.
Example:

4,80%C	Copy gross (gross total + current equals gross if gross total = 0) to Var #0.
80%s	Select Var #0 to display peak.
n%C	Copy parameter to the entry buffer.

Another variation of the copy command allows a parameter to be copied into the entry buffer. In this case, the parameter would be displayed and could then be entered into another dissimilar parameter (such as copying var #0 into ID #3), printed, or used in a prompt!
Example:

1%i	Access ID #1.
2%C	Copy tare weight to display.
%e	Store current tare into ID 1.

fmt;nF%C Formatted Parameter Copy

When a parameter is copied into the entry buffer, it may now be formatted with the same choices that are available in the custom transmit. This is accomplished by entering the desired format code, followed by a semicolon (;), followed by the desired parameter number, followed by the letter "F" or 'f', followed by the copy command "%C". For example:

fmt = 3 digit format code.
n = 1 or 2 digit parameter number.

128;0F%C will format the gross weight (parameter 0) format it per code 128 (without parameter name) and put the result into the entry buffer.

This would normally be followed by another copy:

;21%C to copy the result to ID1.

or a transmit command:

%$ to send the result out the selected port.

Valuable uses for this command include allowing easy conversion of time/date numeric values into strings, copying a weight in the current units to another parameter, and formatting data for a transmission without the use of a custom transmit.

For instance, previously the time/date could only be copied by a macro with "11%C". This would cause the numeric value that represents the current time/date to be put into the entry buffer. Now however, if only the date were required, the command **64;11F%C** could be issued. This would put the time/date in format 64 (date only), such as 1/7/94, into the entry buffer. This value could then be easily copied into an ID or transmitted.

nU,m%C Unrounded Gross and Net

Occasionaly it has been desirable to allow a macro access to the unrounded value of the gross or net weights. This is now possible through a slight variation of the %C and math commands. Appending a 'U' or 'u' to the gross or net parameter number within a "%C" command or math command causes the unrounded value to be used. For instance:

n = 0 or 1, parameters gross or net respectively.
m = any other numerical register that will not round or truncate.

0u,88%C Copies the unrounded gross weight to var #8.

1U,83%* Multiplies the unrounded net weight by var #3, storing the result in var #3.

This capability can be useful in applications where calculations are being done based upon weight and additional precision is required beyond what is being shown on the display.

Note that this feature is only intended for use in copying from the gross or net weight, not to the gross or net weight. Copying to these parameters is not common since the values of the gross and net are constantly being recalculated and any values copied to these parameters would be overwritten by the next weight conversion process.

%d Display On/Off

The display may be turned off with a macro command, "%d", or turned back on with "0%d". Turning the display off provides about a 13% improvement in the execution time of the instrument. This may be helpful in some macro situations. It will also decrease power consumption of the instrument somewhat.

This command may be useful in blanking the display during macro operations.

An alarm can be programmed to invoke a macro on an interval basis and check a setpoint **active** on motion. If no motion exists, the display in blanked.

32%F
%d
%E

On the other hand, a setpoint can be activated on motion or above a threshold value and invoke a macro to turn the display on. Add 0%d to the macro invoked by this setpoint.

This example might increase battery life in some instances.

The %d command controls both the display and backlight if an LCD module is connected. Regardless of which display is connected, %d blanks the entire display and 0%d restores the display as **always on**. A%d restores the display as on with automatic shutoff. This option will automatically shut off the backlight only on an LCD module. Weight change, keypress, or RS-232 input restores the backlight/display. The B%d command forces the backlight **off always** if an LCD is connected and the command 0B%d will force the backlight **always on**. Both B%d and 0B%d have no effect on VF display module.

n%D Deactivate setpoint n

This command can be used to cause any setpoint to become de-activated, regardless of the conditions which have been setup to cause it to de-activate. The 'n' must be a number between 1 and 32 which specifies the exact setpoint number to de-activate.

One common use for this would be to provide an operator with a prompt and then after the response is given by the operator the setpoint would become activated.

Example: (M574 has no hardware outputs, contact GSE for external setpoint information. The 550 will accommodate both setpoint inputs and outputs.)

STOP LINE?%WPrompt operator and wait for any key.
1%D De-activate setpoint #1.

For this example the setpoint could be set for 'de-activate never' which would prevent the setpoint from being de-activated except by this command.

Note that if the conditions for the setpoint to become active were present when the "1%D" command was executed then the setpoint output signal would remain de-active only until the next weight conversion process was completed.

An interesting and sometimes useful feature of this command is that setpoints which are not enabled may also be activated and de-activated. Thus if a setpoint is only to change state based on events that occur during a macro, the setpoint would not require any setup and could be setup as 'disabled'.

%E End if

This statement is used at the end of an IF statement. It defines where the macro will resume execution if the statement was not true (if there was not an else clause) or where the execution will resume if the original statement was true and an ELSE clause is used.

x%f Check status of Preset Parameters

The macro command, x%f, has been created, where x is one of the preset-able parameters as listed below. This command performs an "IF parameter x is preset" which allows a macro to check the "preset" status of the specified parameter.

Preset-able Parameters

2	Tare
3	GrTOT
4	GrT+C
5	GrT-C
6	NtTOT
7	NtT+C
8	NtT-C
31	QtTOT
32	QtT+C
33	QtT-C
34	APW
35	APW*K

%F Test IF setpoint n is Deactivated
("IF" Output or Input is deactivated)

This is one of several IF statements. This command allows macro execution to be conditional based on the state of a specific setpoint.
Example:

1%F	IF setpoint 1 is de-activated...
	READY ??? %Y IF operator is ready...
1%A	ACTIVATE setpoint 1.
%E	END of IF statement. IE the next command is where macro execution would resume if setpoint 1 was active.
1%F	IF setpoint 1 is de-activated...
%B	ABORT macro execution.
%E	END of IF statement. IE the next command is where macro execution would resume if setpoint 1 was active.

n%g IF sample error

This command will perform a branching operation IF a specific sample error occurs. The following listing shows the error number along with the error description. IF the statement holds true then the macro falls through to the next commands. If the statement doesn't hold true then the macro will branch to the ELSE portion of the macro.

0	SAMPLE OK
1	SAMPLE TOO SMALL
2	SAMPLE NOT ACCURATE
3	SAMPLE SIZE ERROR
4	SAMPLE CAN'T BE COUNTED
5	SAMPLE ABORTED ACC
6	SAMPLE ABORTED CLR
7	ENTERED APW
8	SAMPLE ABORTED TARE

This macro command functions similar to the database command n%_ , IF database error.

?%g Status error flag

This command when executed will place the sample error flag number in the entry buffer. The error flag numbers are shown above in the n%g section. Placing this number in the entry buffer will allow it to be transferred to a numeric register. Placed in a numeric register the macro math capabilities can now perform calculations on the flag value.

%G Get operator input

This command is used to accept operator input. A prompt of up to 10 characters in length may precede the "%G" command. This would normally be used to

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request that the operator key in some data. When this command is executed, the unit will display the preceding prompt (if any) and then wait for the operator to key in some data and then press **<ENTER>**. If the **<CLR>** key is pressed after an entry is begun by the operator, the original prompt is re-displayed. After the operator presses the **<ENTER>** key, macro execution will resume. Any entry that the operator had made is held in the unit's entry buffer. Thus the next command in the macro will be operating on the entry that the operator had made.

For instance, if the next command following the "%G" is a "%t" (assuming the instrument is in a mode where the tare key is defined to store tare weights, ie modes 0-8, 12-14, and 30-37), then the operator's entry would be stored away as the tare weight. If the operator had keyed in nothing and pressed **<ENTER>**, the auto-tare operation would take place instead since that is the way the **<TARE>** key works.

Note that often some imagination is required to come up with a prompt that will be understandable and fit into two lines of 5 characters each! The limited prompt size does have the advantage that short prompts may be read more quickly. If a prompt of less than ten characters is used, blank spaces will be added to the end of the prompt before it is displayed.
Example:

80%s	Select var #1.
KeyinTargt%G	Prompt operator and wait for response.
%e	Store away operator entry.

Refer to the notes concerning the "%[" commands to see how you can save an operator entry for use later in a macro.

%I Perform weight conversion and update all outputs

As previously discussed, in the weight conversion process is normally suspended during macro execution. The "%I" command will execute this process one time. This command may be useful in a macro within a loop which is checking a setpoint status in order to cause the setpoint's status to be re-evaluated.

The weight conversion process includes calculating the various current weight parameters and updating the outputs to the setpoints, analog output, display, and continuous transmits.

This command is required immediately after an accumulate [.] command in order for the accumulate to take place.

A message may precede the "%I" command, in which case the normally displayed information such as units, center-of-zero, and parameter name are suppressed.

Example:

1%A	Activate setpoint 1.
%T	Tag this position in the macro in order to jump back to this point later on.
Fill-ing..%I	Perform weight conversion process once.
1%O	If setpoint 1 is activated...
%J	Jump to the tagged spot in this macro.
%N	ELSE
DONE!%P	1 second prompt
%E	End of the "IF" statement.

The ability to jump to a previous location within a macro so as to continuously display a prompt is provided by the commands %T and %J. The "%T" command must first be used to TAG the location where the macro execution is to proceed after it sees a JUMP.

xxx%j Check IF Remote Keys or Local Keypad Keys are Held Closed

Macros Allow "IF KEY HELD" to be performed by macro, Europe especially for remote keys. Could be accomplished similar to the macro abort command, **<CLEAR> <SELECT>** simultaneously.

Implemented with the xxx%j command, where xxx represents the decimal value of the key to check, ie 176 == remote key 1 to 3. Refer to the Macro table (#27) and the keypad table (Chapter 15, tables 13 & 14 for codes. To perform "IF KEY NOT HELD", precede key number with the '#' character.

Note: This command is not functional on the simulator.

%J Jump Command (see also %T)

The ability to jump to a previous location within a macro is provided by this command, “%J”. The "%T" command must first be used to TAG the location where the macro execution is to proceed after it sees a JUMP.

Whenever a "%T" is encountered during macro execution its location within the macro is noted. Then when a "%J" command is encountered, the macro checks if a "%T" command has been encountered in the current macro. If so macro execution proceeds to the location where the most recent "%T" was found. If a "%T" has not occurred, the "%J" has no effect on macro execution.

TAGS occurring in other macros have no effect on JUMPS within a given macro. In other words, a JUMP will not occur from one macro to another macro. Also, macro execution will not JUMP to a TAG which is not executed due to its location within a macro's IF or ELSE statements.
The Tag (%T) and Jump (%J) commands allow **multiple tagged locations** to be used. This allows the looping within a loop during a macro. Up to ten tagged locations may be used. Previously, any entry preceding a Tag or Jump command was ignored and the entry would remain in the unit's entry buffer. That is still the case unless the entry preceding the Tag or Jump is a single numeric character. For instance, if a location in a macro is Tagged with a **1%T** then to Jump back to that location would require a **1%J**. A zero preceding the Tag or Jump is the same as the Tag or Jump without any entry.

Once a certain tag number is used in a macro, it should not be used again in that macro or in any macro that is called by first macro unless that tag will no longer need to be jumped referenced. For example:

%T	Tag (#0)
	command
	command
	command
1%T	Tag (#1)
	command
	command
4%_	IF row not found...
1;91%-	Decrement counter (parameter 91).
1%R	IF counter (parameter 91) is not 0...
%J	Jump to Tag (#0)
%E	END IF
4%_	IF row not found...
1%J	Jump to Tag (#1)
%E	END IF
PrintDONE%P	prompt

%k Put filter selection into entry buffer.

This command puts the currently selected filter selection to be placed into the entry buffer. This value can be 0 thru 7 for standard filter and 15 thru 17 for auto-filter.

This command when executed will place the filter selection number into the entry buffer. Placing this number in the entry buffer will allow it to be transferred to a numeric register. Placed in a numeric register the macro math capabilities can now perform calculations on the this value.

n%k Dynamically set the filter value

This command is used to change the filter selection on the fly. The “n” can be a value from 0 - 7 for standard filter selections and 15 - 17 for auto-filter selections.

Note that this change in filter selection is temporary. On power-up the filter selection will always be specified at parameter P116.

Example:

Changing from a fast filter to a slower filter between ingredients of a batch can help create more accurate mixes. The fast filter allows for quick averaging during the dispensing of an ingredient. The slower filter at the end of the ingredient fill will calculate a more averaged value. This value might determine the target value of the next ingredient to fill. In some cases it is very critical that the next ingredient to fill is changed proportional to the variation of the previously filled ingredient.

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***%k Reset to default filter selection**

Executing this command will default the filter selection to to the value entered in parameter P116.

n%K Timed interval of n seconds, then call macro 15

This command is a form of an alarm which is set by a macro. This should be used when a macro needs to cause another macro to be executed at some time in the future. The time delayed macro will always be macro 15!

For example, if a macro executes the command "60%K" then 60 seconds later macro 15 will be invoked. If another macro is executing when the 60 seconds elapses then the need to execute macro 15 will be noted (pushed onto a stack) and when the previously invoked macros are completed then macro 15 will execute.

Example:

1%A	Activate setpoint #1.
90%K	After 90 seconds, invoke macro 15.

This is the end of this macro.

Macro 15:

This macro is invoked 90 seconds later...
1%D De-activate setpoint #1.

The preceding macro shows how a macro may be used to energize a relay for a specific period of time.

%L Display current language selection

This command can be used to determine the language character set in use. When this command is executed, it will display the number of the currently selected language. The number will be 0 - 12.

This can be useful if a verification of what types of characters were used to print labels. A transaction row stored to a database can hold this number. This number must be stored to a VAR or REG.

n%L Change language selection

This command is used to change the character set selection. Refer to the chart in the OIML section of this manual for language selections. The "n" can be a value from 0 - 12 for thirteen language selections.

If sending transmissions to a printer, make sure the printer will accept the international characters.

Selection of a different character set might be useful in areas where multi-lingual labels have to be printed.

Note that this change in language selection is temporary. On power-up the language selection will always be specified at parameter P411.

cn,p,p%m Modify/Test Strings (ID's)

The %m command allows for modifying and testing of strings stored in ID's. The %m command uses a prefix character to select between various sub commands. The general format is:

[c][n],[p],[p]...%m
- c = command character
- n = string (ID) number
- p = additional parameters

In the following commands where start position is specified, 1 = first character!

Also, a parameter may supply a value by replacing the value with the parameter (vars and regs) followed by 'P', ie: 80P for var #0. (T/D parms (LONGS) are not allowed.)

Current commands include:

M - a function similar to BASIC's MID$ - puts a sub portion of the string in place of the same string.

p1 = start position [default is first char.]
p2 = number of characters [default is last char. requires p1]

U - makes all alphabetical characters in the string uppercase

L - makes all alphabetical characters in the string lowercase

P - puts the position of a character found in the string into entry_buf

p1 = character to look for
p2 = start position [def. to first char.]
p3 = number of characters [def. to last char. req's p2]

I - if character is in string

p[1-3] = same as for command P

The above sub commands may either be upper case or lower case.

Examples:

Table 30 contains examples where Var 0 = 2, Var 1 = 3, and ID 1 contains the strings across the top of table 30.

The following macro example shows how the 'I' sub command is used for determining if a character is in a string or not.

```
12345abcde;21%C       copy '12345abcde' to ID 1
I21,W%m               If 'W' in ID 1
{macro commands}      do these commands
%N                    otherwise
I21,c,2,3%m           If 'c' is in characters 2 - 4 of ID 1
{macro commands}      do these commands
%N                    otherwise
I21,5%m               If '5' in ID 1
{macro commands}      do these commands {these
```

	commands executed due to the contents of ID 1}
%N	otherwise
{macro commands}	do these commands
%E	end if

The 'P' sub command may be combined with other macro commands to determine if a character is in a specific place or not.

12345abcde;21%C	copy '12345abcde' to ID 1
P21,a%m	get position of 'a' in ID 1
;84%c	copy position to var 4
84=4%'	if var 4 is 4 {if 'a' is in 4th pos.}
{macro commands}	do these commands
%N	otherwise
84>4%'	if var 4 > 4 {if 'a is beyond pos. 4}
{macro commands}	do these commands {these are executed}
%E	end if

n%M Test if mode == n

This IF type macro command allows for the macro execution to vary depending on the current mode of the instrument. For example, this command could be used in a macro which performs auto-accumulations or de-accumulations. The macro could be invoked every time the weight exceeded some threshold. Then the mode would be checked by the macro. If the mode were "GRT+C" or "GRT-C" then a positive or negative accumulation could be done. If the current mode was any other mode, nothing would happen. Refer to the in-depth explanation of the IF statement operations. Example:

4%M	test if current mode is mode 4

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	1234567890	**abcdefg**	**AbCdE12345**	**abcdeabcde**
M21,3,4%m	3456	cdef	CdE1	cdea
M21,7%m	7890	gh	2345	bcde
M21,80P,81P%m	234	bcd	bCd	bcd
M21,81P,1%m	3	c	C	c
U21%m	1234567890	ABCDEFGH	ABCDE12345	ABCDEABCDE
L21%m	1234567890	abcdefgh	abcde12345	abcdeabcde
P21,b%m	0	2	2	2
P21,b,4%m	0	0	0	7
P21,1,1,3%m	1	0	0	0
P21,C%m	0	0	3	0

Table 30, Examples of Modify/Test Strings

(GRT+C)	
.%I	perform accumulate command.
91%s	Select register #1
%z	increment box counter.
4%s	
%N	otherwise
5%M	test if current mode is mode 5 (GRT-C)
.%I	perform accumulate command.
91%s	Select register #1
%i	decrement box counter
4%s	

%N else (otherwise)

The else command is used after an IF command. It defines where macro execution will resume if the test in the IF statement proved FALSE. Refer to the in-depth explanation of the IF statement operations.

n%O Test if setpoint n Activated

This IF command may be used to cause macro execution to vary depending on the state of one of the setpoints. Replace the 'n' with the number of the setpoint to be tested. One valuable use of the setpoint test is to check whether one variable is less than or greater than another value, or whether it is between two values. Refer to the in-depth explanation of the IF statement operations.
Example:

12%O	Test if setpoint 12 is active...
-OK!-%P	Display "OK" message for one second.
%N	ELSE
OutOfSpec!%W	Display "OutOf Spec!" warning until a key is pressed.
%E	End of IF statement.

%P Pause macro for 1 second, performing weight conversion process

The PAUSE command puts macro execution on hold for one second. This can be used for brief prompts or for delays required in setpoint operations. The length of delay has been made programmable as of EPROMS dated 9201XX through the use of an additional command, "x%@". The "x%@" command must be preceded by a numeric value between 0.05 and 5,000,000. This is 1/20 of a second and over 57 days. All "%P" commands which occur after the "x%@" command will delay the specified amount of time, until either another "x%@" command redefines the delay time or the instrument is powered down or re-initialized.

While the delay is elapsing the weight conversion process is occurring.

If a prompt precedes the %P command then that prompt is displayed on the 10 character dot matrix display while the delay is elapsing.
Example:

7%@	Preset delay time to be 7 seconds.
Wait-ing..%P	Display message while delaying 7 seconds.

n%Q Mode independent, send nth custom transmit

This command allows any one of the 4 custom transmits to be sent at any point in time, regardless of the current mode. The port and motion delay status is still as specified for the that custom transmit in setup mode P210 - P240.

Example:

1%Q	Send 1st custom transmit.
2%Q	Send 2nd custom transmit.
3%Q	Send 3rd custom transmit.
4%Q	Send 4th custom transmit.

n%r Assert and De-assert Handshake

The following commands allow for the RTS to be used as a tri-state control for the RS-422/485 transceiver chip.

%r	IF RTS asserted
0%r	De-asserts Handshake
1%r	Asserts Handshake

These commands are only functional if h/w handshake is disabled. Also **do not** use if network is enabled at parameter P250.

n%R Test if register n is not = 0, where n = 1 - 4

This IF command allows macro execution to vary depending on whether one of the four register's value is currently zero. One common use for this is for testing the value of a loop counter for operations which must repeat a certain number of times. Refer to the in-depth explanation of the IF statement operations.

Example:

91%s	Select REG #1 viewing mode.
10%e	Initialize to process 10 boxes.
%T	Tag position for branch back to here later on.
WeighBox%W	Prompt operator and WAIT for any key.
4%s	Select Gross Total + Current mode.
.%I	Perform accumulate.
1%Q	Send 1st custom transmit.
91%s	Select Reg #1 viewing mode.
%i	Decrement REG #1.
1%R	IF REG #1 is *not* equal to 0 then execute next commands. Otherwise skip the next commands and proceed to an ELSE or END IF.
AGAIN%P	Prompt operator for one second.
%J	JUMP to TAG.
%E	ENDIF: continue with next command if reg 1 = 0.
%S	SOUND beeper for 1/2 second.
DONE!%P	Prompt operator for one second.
%S	SOUND beeper for 1/2 second.
2%Q	PRINT 2nd custom transmit data (for totals).

%S SOUND beeper for .5 sec

This simply turns on the beeper for one half second. If a longer beep is required, this command may be used multiple times in succession if a delay is implemented between the %S commands. The delay could be either the %P or multiple %I commands depending on the effect desired. Note however that this command does not delay the execution of the next command in the macro at all. Refer to the example above for an implementation of the %S command

%T TAG current position for later jump (see also %J)

This command marks or TAGS a location in the macro so that a branch may come back to this point from further on within the same macro. This is used in conjunction with the "%J" command to JUMP back to the tagged location.

Whenever a "%T" is encountered during macro execution its location within the macro is noted. Then when a "%J" command is encountered, the macro checks if a "%T" command has been encountered in the current macro. If so macro execution proceeds to the location where the most recent "%T" was found. If a "%T" has not occurred, the "%J" has no effect on macro execution.

TAGS occurring in other macros have no effect on JUMPS within a given macro. In other words, a JUMP will not occur from one macro to another macro. Also, macro execution will not JUMP to a TAG which is not executed due to its location within a macro's IF or ELSE statements.

Refer to the previous example for an example of a TAG and JUMP.

The Tag (%T) and Jump (%J) commands allow **multiple tagged locations** to be used. This allows the looping within a loop during a macro. Up to ten tagged locations may be used. Previously, any entry preceding a Tag or Jump command was ingnored and the entry would remain in the unit's entry buffer. That is still the case unless the entry preceding the Tag or Jump is a single numeric character. For instance, if a location in a macro is Tagged with a **1%T** then to Jump back to that location would require a **1%J**. A zero preceding the Tag or Jump is the same as the Tag or Jump without any entry.

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Once a certain tag number is used in a macro, it should not be used again in that macro or in any macro that is called by first macro unless that tag will no longer need to be jumped referenced. For example:

%T	Tag (#0)
	command
	command
	command
1%T	Tag (#1)
	command
	command
4%_	IF row not found...
1;91%-	Decrement counter (parameter 91).
1%R	IF counter (parameter 91) is not 0...
%J	Jump to Tag (#0)
%E	END IF
4%_	IF row not found...
1%J	Jump to Tag (#1)
%E	END IF
PrintDONE%P	prompt

%U IF TX Buffer Empty

The "%U command has been created. It performs an "IF Current TX Buffer Empty" command. This allows testing the currently selected transmit buffer (as specified with the %" command) of the instrument to determine if all characters put into the buffer have been sent. This can be useful for error checking within macros on the instrument. If a transmit command is performed and there are characters that continue to remain in the transmit buffer then the connected device probably has its handshake to the instrument deasserted.

This command can also be useful in applications where the scale dealer has taken the initiative to further multiplex the instrument transmission to 'talk' to a third device.

In addition, the number of characters remaining in the buffer may be determined by preceding the %U command with a 1 (for comm port) or 2 (for print port). The number of characters remaining in the buffer will be put into the entry buffer. It may then be copied into a parameter and then tested further. The size of each of the transmit buffers is 127 bytes.

1*%U clears the com buffer and 2*%U clears the print buffer.

n%v Write Parameter to E^2

Parameters 5003 thru 5094 allow for selecting whether a parameter value is written to E^2 or not. In order for the "n%v" macro command to work properly, the specific parameter in question should be set to "On Request". The factory default is "Auto". If it is not required that a parameter is to be saved to E^2 automatically when its value changes then set the parameter to "On Request". Executing the n%v command will save it to E^2 if and only when this command is executed.

Example:

81%v	Save Var#1 to E^2

n%V Test IF setpoint input "n" is activated

This is one of several IF statements. This command allows macro execution to be conditional based on the state of a specific setpoint input. It provides a similar test as that of the %O, except for a setpoint input as opposed to an output. Setpoint inputs are available only with the use of the GSE Process Control Interface (PCI). Refer to the in-depth explanation of the IF statement operations.

%W WAIT for keypress

This operator input type command is used to cause macro operation to be suspended until the operator presses any key. It can be used in situations where an operator must decide when a process may continue, or where operator acknowledgment of a prompt provided by instrument must occur. Normally a prompt would be provided before the %W command. The prompt would be displayed on the dot matrix display while awaiting the operator's key press.
Example:

WeighBox%W	Prompt operator and WAIT for any key.
1%Q	Print 1st custom transmit.

%X Request current display from remote

Another new macro command is the %X command which causes the displayed information to be echoed out the instrument's COM port in a format that can be processed by another 450 or 550 indicator that is setup as a remote display.

.... More information pending ....

%Y IF yes

This is yet another IF type command. It allows conditional operation of the macro based upon operator input. A prompt, normally in the form of a question, should precede the %Y command. The operator would respond by pressing either the **<ENTER>** key as an affirmative (YES) response or any other key for a negative (NO) response.

If the **<ENTER>** key is pressed, the macro will proceed to execute the subsequent commands up until the ELSE command, if present.

If any other key is pressed, the macro will skip the commands up until either the ELSE (%N) or ENDIF (%E) commands.
Refer to the in-depth explanation of the IF statement operations for additional discussion.
Example:

1%F	IF setpoint 1 is de-activated...
READY ??? %Y	IF operator is ready...
1%A	ACTIVATE setpoint 1.
%E	END of IF statement (the next command is where macro execution would resume if setpoint 1 was active)

n%^ =, GOTO macro n where n can be 0 - 9 or :, ;, <, >, or ? for macros 0 - 15 respectively

The GOTO command is most often used when one runs out of room in a macro and it becomes necessary to branch to another macro. Using this method of executing another macro (as opposed to the %X method) prevent the possibility of overflowing the macro stack.

For certain special applications, the GOTO command provides another valuable capability. That is having the correct macro number to be executed be a calculated number. This can be accomplished by performing a calculation and then copy the result into the entry buffer and follow that with the %^ command. Refer to the following example where each time macro 11 is invoked, Reg #1 is decremented and the resultant macro is called. This could be implemented into a multi-step process where macro execution stops in between the steps.

Example:

91%s	Select Reg 1 as the current parameter.
%i	Decrement Reg 1.
0%s	Select the gross as the current mode.
91%R	IF register is not = 0...
91%C	Copy the value of Reg 1 to the entry buffer.
%^	GOTO the macro specified by the value of Reg1.
%N	ELSE
91%s	Select Reg 1 as the current parameter.
10%e	Reset macro GOTO counter to 10 for next time.
0%s	Select the gross as the current mode.
0%^	GOTO macro 0.

%[SAVE current ENTRY
%] RETRIEVE saved ENTRY

The SAVE ENTRY command can be useful in many situations. It is most often used in conjunction with the %G command. For instance, when the Gross weight must be displayed while an operator is prompted to key in a value which is be stored in a Var, the SAVE ENTRY command can be used to temporarily save the entry while the proper mode is selected to store the value away. In order for the %[command to have any benefit it must be followed at some time by the RETRIEVE ENTRY command, %]. This command will append its information to any entry currently in the buffer.

This command when used without an entry preceding it does not clear out the saved entry. This was the case in previous versions of eproms prior to 031594.

Example:

0%s	Select the Gross mode as the current mode.
KeyinTargt%G	Prompt operator for target weight.
%[	SAVE the operator ENTRY.
80%s	Select Var #0 as the current mode.
%]	Retrieve the entry saved previously.
%e	Store the retrieved into Var #0.

Specify Port: %"

The RS-232 port used by the %$ command is specified with this command. The format is:

1%"	specifies the comm port.
2%"	specifies the print port.

After the x%" command has been issued, that port will remain in effect for all subsequent uses of the %$ and %/ & commands until either the instrument is reset (by power-down or exiting the setup mode) or the %" command is issued again. The handshaking and protocol specified in the setup modes for the specified port will be used.

When the instrument re-initializes, the port which would be used by the %$ and the %& commands defaults to that specified by P211 of the setup mode.

Refer to the "Send control codes" %& command for examples.

Send Entry: %$

This command allows a macro to send ASCII text out either of the serial ports of the instrument. The port used is specified by the %" command (see above). The text preceding the %$ command is transmitted immediately without any terminating characters. Up to 49 characters may precede the %$ command. Multiple %$ commands may be used if more characters are required.

Refer to the "Send control codes" %& command for examples.

Send Control Codes: %&

This command allows a macro to send any character value out either of the serial ports of the instrument. This is intended to allow the sending of control codes (such as form feed, carriage return, etc...) and extended ASCII codes (>127). The port used is specified by the %" command (see above). The decimal value of the characters that must be transmitted should precede the % & command. Multiple codes may be sent at once; the decimal values must be separated by a comma. The specified codes will be transmitted immediately exactly as specified. Up to 49 characters may precede the %& command. Multiple %& commands may be used if more characters are required.

The valid decimal values which may precede this command are from 0 to 255. Also, a value of 256 may be used to cause both a carriage return and line feed to be sent.

Examples:

1%%"	Specify comm port.
27,74,18%&	Send <ESC> <J> <18> to advance paper 18/216". (Epson command)
Hello 550 instrument.%$	Send text.
256,12%&	Send <CR>, <LF>, and a <FF>.

Selected Scale Number Command (%#):

When the Multi-Scale option is employed with the 550, it is sometimes helpful if the macro can perform differently depending on which scale is currently selected. The "**% #**" macro command may be used either to append the scale number to the entry buffer or to perform an IF clause within a macro based on the currently selected scale. The three possible implementations of this command are described below:

A. Appending the Current Scale Number into the Entry Buffer:

A1. Without an Entry in Process:

When the **%#** command is not preceded by an entry, the currently selected scale number will be put into the entry buffer. This could be used to store the current scale number into a parameter in order to allow it to be printed. For instance, the following example stores the current scale number into Reg 1 (parameter 91).

802%s%c%e	P802.16 Macro # 2
%%#%e	0001 scale #
;91%%C%e	0002 copy register
91%%s%e	0006 select
%%P%e	0009 pause
0%%s%e	0010 select

In the above example the %# is replaced by the current scale number, ie 1, 2, 3, or 4. Then the next line of the macro effectively becomes x;91%C, where x is the one through four character. Thus the current scale number is put into Reg 1.

A2. With an Entry in Process:

When the **%#** follows an entry, if the last character of the entry is not the number one through four, then that last character is deleted and replaced by the current scale number. This can be useful in copying or adding the current weight to a separate parameter for each scale, such as in calculating separate total weights for each connected scale. Refer to the following examples:

801%s%c%e	P801.19 Macro # 1
0,8 %%#%e	0001 scale #
%%C%e	0006 copy register
8 %%#%e	0007 scale #
%%s%e	0010 select
%%P%e	0011 pause
0%%s%e	0012 select
800%s%c%e	P800.14 Macro # 0
scale= # %%#%e	0001 scale #
!%%P%e	0011 pause

In these examples, since the character preceding the %# command is a space (ie not 1 through 4) then the space is replaced by the current scale number. In the first example, this results in "0,8x%C" where the 'x' is the number one through 4. Thus if scale one is selected, the weight is copied to Var 1, scale 2's weight would be copied to Var 2, etc...

B. Performing an IF Command based on the Currently Selected Scale:

If the character preceding the **%#** command is the number '1', '2', '3', or '4' then an IF command is performed. If the currently selected scale's number matches the number preceding the command, then the subsequent commands are executed up to an ELSE command. Otherwise, the subsequent commands are skipped until the ELSE or ENDIF command is encountered. Refer to the IF command explanation for further clarification on IF command operation. The following example will help clarify this usage:

803%s%c%e	P803.32 Macro # 3

Using 1%%#%e	0001 scale #
small%%N%e	0009 if not
large%%E%e	0015 end if
scale.%%p%e	0021 Print

Another application for this usage of the **%#** is when setpoints are being used with the multi-scale option. Since the setpoints cannot be setup to be based upon a particular scale, when a setpoint is reached the current scale may be checked and then the appropriate action may be taken by the macro.

Disable Input Command (%!)

Operator input via either the front panel keypad or the RS-232 input or both may be programmed to be ignored until otherwise specified.

%!	Re-enable both front panel and keypad input.
1%!	Disable front panel keypad input.
2%!	Disable RS-232 input.
3%!	Disable input from either source.

This command can be used within a macro to insure that operator input is processed from only one source or the other. For instance, in an application where a computer is connected to the instrument and may at any time send a request to print the custom transmit or to download a database, a macro could disable RS-232 input during operator input requests (%G, %W, and %Y).

Disabling RS-232 input does not prevent the unit from receiving characters, it simply suspends the processing of data in the unit's receive buffer. When that buffer becomes full, the instrument's handshake will automatically be de-asserted informing the connected device to temporarily stop transmitting.

Caution: Since the unit has only one actual receive input to the processor, disabling the RS-232 input disables the processing of all serial input coming into the J2 connector on the pins marked "RX>", "232>", and "TTL>". It cannot discern between computer input, remote ASCII keyboard input, or barcode input.

"IF INPUT" Command

It is possible to test for operator input via the front panel, or for RS-232 input having been received. The IF command, "%(" may be used in the same manner as the other IF type commands. Possible applications include allowing a macro to continue looping until an operator has pressed a key, or causing a macro to abort if RS-232 input has been received, allowing the unit to process a series of commands received from a computer. Also note that the character being checked is not cleared when it is found to have occurred. It must be subsequently cleared or used as part of an entry.

The variations of the "IF INPUT" command are as follows:

%(	If Keypad or RS-232 input
1%(	If Keypad input
2%(	If RS-232 input

For example:

%T	TAG position in macro.
ABC Scale%P	Prompt Operator for one second
Call ABC%P	Second prompt.
555- 1234%P	Third prompt.
%(	IF keypress
%N	otherwise
%J	JUMP to TAG
%E	END IF
%)	CLEAR RS-232 buffer and keypad character. (flush entry buffer).

The "%(" has another capability; it performs a "If input equals" command. If a numeric value between 3 and 255 precedes the %(command, then the decimal value of the input (RS-232 or keypad) will be compared to that decimal value, and the following statements will be executed only if the input equals the number. Refer to an ASCII chart or Table in the appendix for the decimal values of the front panel keys. The decimal for the numeric keys is 48 through 57 for the [0] through [9] keys respectively.

Note that comparing an entered character or key does not remove it from the input buffer. This allows a single entry to be compared against multiple possibilities. To clear the input buffers refer to the %) command to clear all entered characters or use the %W command to remove only the next key from the buffer.

The %(command works on both the keypad (which takes precedence) and the serial port, either one of which may be disabled with "%!". Therefore if required a specific character may be checked for on a specific input source.

(The following example utilizing remote key inputs is not valid on the 574) Previously, the 550's remote keys could only be used to invoke a macro. However with the advent of this feature, remote keys may be used for operator input within a macro. The decimal value to be used to check for the remote keys is 176 through 181, as shown in Table 27, Macro Call commands.

Refer to the following example which is based on having a remote switch connected to J6 pins 1 & 3 (code 176) labeled "YES" and another switch wired to pins 2 & 4 (code 180) labeled "NO". Remote key commands are not valid on the 574.

%T	Tag this position.
Batch NOW?%I	Prompt and perform weight conversion process.
%(	IF input...
%N	otherwise...
%J	Jump to tag.
%E	ENDIF
176%(	IF "YES" remote key pressed...
%)	clear keypress.
1%A	activate setpoint 1.
2%^	goto macro 2 to complete process.
%N	otherwise...
180%(	IF "NO" remote key pressed...
%)	clear keypress.
%3	call macro 3 for report printout.
%N	otherwise...
%)	clear keypress.
%E	ENDIF
%J	Jump to tag.

To calculate values for front panel keys or extended ASCII commands, add 128 to the decimal value.

Lower case “c” has a decimal value of 99. The front panel clear command is “%c”. This is an extended ASCII command of lower case “c”. The value 128 is added to 99 for a sum of 227. This is the value that is prepended to the %(command if the **<CLR>** key press is being looked for while a macro is running.

227%(	IF **<CLR>** is pressed.

Determine “IF” a character entered is above or below a certain value.

The capability of the %(command has been further expanded.

1. To determine whether an entered character is at or above a certain character value, perform the following version of the "IF INPUT" command:

xxx>%(	where xxx is the decimal value of the character being compared against.

2. Similarly, to determine whether an entered character is at or below a certain character value, perform the following version of the "IF INPUT" command:

xxx<%(	where xxx is the decimal value of the character being compared against.

3. Finally, to append the next entered character to an existing entry, bring up the existing entry (using either a %C or %]) and follow it with a "G" then %(. The "G" will be replaced by the entered character. The entry can then be saved or copied as required:

%]	get previous entry
G%(	append next character
%[	save as new entry

Example:

Determine if the next operator input character is between 0 and 9:

%%[%e	clear saved entry.
%%T%e	
EnterP/N:%%I%e	prompt operator for entry
%%(%e	if an entry has been made...
%%N%e	
%%J%e	
%%E%e	
2%%T%e	
%%(%e	if an entry has been made...
48>%%(%e	if character is greater than or equal to the number "0".
57<%%(%e	if character is less than or equal to the number "9".
%%]%e	retrieve entry thus far
G%%(%e	get next character and append to entry...
%%[%e	save new entry
%%N%e	otherwise (if not between 0 and 9)
229%%(%e	if next key is [ENTER]...
%%]%e	retrieve entry....
;21%%C%e	and copy it into ID 1.
%%B%e	and then break (done!).
%%N%e	otherwise (if not between 0 and 9 and not [ENTER])

233%%(%e	if next key is [ID]...
%%]%e	retrieve entry....
%% %e	back-space one character
%%[%e	save new entry
%%N%e	otherwise (if not any of above characters)
Must!be0-9%%P%e	warn of improper entry...
%%E%e	end if
%%]%e	retrieve entry for display
%%\%e	if no entry...
%%J%e	jump to start
%%N%e	otherwise (valid entry has begun)
%%I%e	display entry
2%%J%e	jump back for next character

CLEAR Keypad and/or RS-232 Receive Buffer "%)"

A macro may clear out either the one character keypad buffer, the RS-232 receive buffer, or both buffers. Refer to the following variations to the command:

%)	Clear both the RS-232 receive buffer and the keypad buffer.
1%)	Clear the front panel keypad buffer.
2%)	Clear the RS-232 receive data buffer.

Determine String Length: xx,yy%C

This macro command allows comparisons to be made on alpha-numeric data:

where 'xx' represents a numeric parameter ID and 'yy' an alpha parameter ID.

If an alpha type parameter (ID 1 - 6) is copied to a numeric type parameter (Vars, Regs, tare, etc...), then the numeric parameter is set to the number of characters entered in the alpha parameter. This can be used in conjunction with a setpoint to insure an operator entry always consists of a certain number of characters. Note that the numeric parameter may be any numeric parameter, including the time/date parameter ID's 50 - 54.

Examples:

%T	Tag location
Enter ID%G	Prompt and get operator entry.
%\	If no entry...
%J	Jump to tag.
%E	End IF
;21%C	Store entry in ID 1.
21,88%C	set Var 8 = to number of characters entered.
1%F	If setpt 1 is inactive... (setpt 1 would be setup to be active between the desired range for number of characters entered.
EntryMust%P	Warn operator
be 5 long!%P	Complete warning.
%J	Jump to Tag.
%E	End IF.

Compare Two Strings: xx,yy%-
or... aaaa;yy%-

This macro commands allow comparisons to be made on alpha-numeric data: where 'xx' and 'yy' represent alpha parameter ID's, and 'aaaa' represents alpha text.

This variation of the subtract command actually operates the same as a standard IF statement. Two alpha values are compared to determine if they are exactly the same. This ability allows a simple method of verifying the proper entry of an access code. Also, this command may be used in critical data entry situations where the operator is required to key in a value twice in order to insure that a mistake is not made.
Example:

New ?Targt%Y	Prompt operator, if [ENTER]...
%N	Otherwise
%B	Break... ie abort macro.
%E	End IF.
191823;26%C	Store correct code into ID 6.
%T	Tag location.
EnterCode:%G	Prompt operator, get code entry.
;26%-	Compare entry to correct code. if same...
EnterTargt%G	Prompt operator, get target weight entry.
;80%C	Store entry into Var #0.
%N	otherwise
WrongCode!%P	Warn operator for one second.
%J	Jump to tag for re-entry of code.
%E	End IF

n,m%+ The ADD macro command

This command is used to perform the addition of two numeric values. Specifically, the value of the first parameter (whose parameter ID = "n") is added to the value of the second parameter (whose ID is "m") and the result in stored in parameter "m". IE "n" + "m" -> m.

Example:

80,81%+ Add value of parameter 80 (Var #0) to value of parameter 81 (Var #1) and store result in Var #1. <80> + <81> result stored in <81>

Note: In the math examples, the use of the <> around a parameter ID is intended to represent the value of the parameter as opposed to the parameter ID itself. Also the "=>" indicates "is stored into". This is used instead of the equals sign to reduce confusion.

n,m%- The SUBTRACT macro command

This command is used to perform the subtraction of two numeric values. Specifically, the value of the second parameter (whose parameter ID = "m") is subtracted from the value of the first parameter (whose ID is "n") and result in stored in parameter "m". (i.e. < n > - < m > difference stored in < m >).

Example:

80,81%- Subtract value of parameter 81 (Var #1) from value of parameter 80 (Var #0) and store result in Var #1. <80> - <81> difference stored in <81>

n,m%* The MULTIPLY macro command

This command is used to perform the multiplication of two numeric values. Specifically, the value of the first parameter (whose parameter ID = "n") is multiplied by the value of the second parameter (whose ID is "m") and the result is stored in parameter "m". IE "n" x "m" => m.

example:

80,81%* Multiply the value of parameter 80 (Var #0) to the value of parameter 81 (Var #1) and store result in Var #1. <80> x <81> the product stored in <81>

n,m%/ The DIVIDE macro command

This command is used to perform the division of two numeric values. Specifically, the value of the first parameter (whose parameter ID = "n") is divided by the value of the second parameter (whose ID is "m") and result in stored in parameter "m" ("n" ÷ "m" the quotient stored in "m")

Example:

80,81%/ Divide the value of parameter 80 (Var #0) by the value of parameter 81 (Var #1) and store the result in Var #1. <80> ÷ <81> the quotient stored in <81>.

Often times both of the values to be used in a calculation must be retained. Since the second parameter specified in the command is also used to store the result, a COPY may be performed of the second parameter before the math operation is done.

In the following example Reg #1 is used as a counter to keep track of the number of boxes weighed on the scale each day. The Gross Total parameter holds the total weight of boxes processed that day.

Example:

91,80%C COPY box counter (REG #1) to Var #0.
3,80%/ Divide the total weight (Parameter 3) by the # of boxes.

Var #0 now holds the average weight.

%\ IF NO ENTRY...

This command test the "entry buffer" to check if in fact an entry was actually made. It is most often used after an operator has been prompted to make an entry with the % G command. In some applications, it may be desirable to simply leave a value unchanged if the operator simply presses < ENTER > without making an entry. However other situations may require that the operator definitely key in a value. This command can be used together with the TAG and JUMP commands to repeat a %G prompt until the operator actually makes an entry. In other applications, a default value may need to be entered if the operator has not made the requested entry.

Example:

80%s	Select var #1.
%T	TAG this location to allow a branch back to here.
KeyinTargt%G	Prompt operator and wait for response.
%\	IF NO ENTRY...
%J	JUMP back and re-prompt operator.
%E	ENDIF
%e	Store away operator entry.

x%@ Set delay for subsequent PAUSE commands

This command allows the delay incurred during the PAUSE command to be set to the desired time duration.

The variable delay for the macro's pause (%P) command, x%@, has been enhanced. The delay may now be fractional (with resolution to around 1/20th of a second) and may be as long as 5 million seconds. This is over 57 days.

n%_ IF DATABASE ERROR

This command can be used to check for any error or a specific error that may have occurred during the last DATABASE operation. If the "n" preceding the %_ command is omitted then the IF clause can be interpreted as "IF ANY DATABASE ERROR". If a numeric value precedes the %_ command then the IF clause is testing for that specific error number. If 0%_ is used, the IF clause is effectively "IF NO DATABASE ERRORS". Using these commands virtually any database error that may occur can be handled appropriately within a macro. The error code definitions are listed below.

0	No error occurred.
1	Bad entry. Did not meet criteria for the parameter being accessed.
2	Invalid database selection. Database not defined.
3	Invalid column selection. Specified column not defined in current database.
4	Record not found.
5	Out of Data Storage Memory
6	Sumcheck error. The accessed row's data appears corrupted.
7	List Corrupt. The list of rows stored in memory is not in tact.
8	Operation aborted. The search, print, sort, or upload was aborted.
9	"IDtooLong!"

Example 1:

%_	IF ANY DATABASE ERROR...
Any Error%P	Displays prompt if any error occurred.
%E	ENDIF

Example 2:

4%_	IF RECORD NOT FOUND...
%5	Call macro 5 (if error 4 occurred).
%E	ENDIF

Comparing a Parameter's Numeric Value as to whether its (>, <, = or not equal) another Parameter's Numeric Value,

"IF" commands (>, < , = or #)%'

The **(%')** command is used to compare two parameters to each other or compare a parameter to a fixed number. The compare function is dependent on what equation character precedes the (%') ie. (>, <, = or #). Some of the same comparisons performed below can be accomplished using setpoints. These commands in some respect expand these capabilities within a macro.

1. Comparing two parameters can be done in four ways, greater than, less than, equal to or not equal to. The statements below are used to **compare any** parameter to another. ("n" is the variable compared to the "m" variable). The "P" should be placed immediately following the m variable so as the firmware recognizes it as a parameter and does not mistake it for a fixed number. The %' is the completion of the compare statement.

n>mP%'

n<mP%'

n=mP%'

n#mP%'

Examples: Compare VAR#0 to VAR#1 in all four respects (>, <, = and #).

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Example #1: (greater than)

80>81P%'	"IF" var#0 is **greater than** var#1.
1%Q	Print 1st custom transmit
%N	Else
2%Q	Print 2nd custom transmit
%E	End If

Example #2: (less than)

80<81P%'	"IF" var#0 is **less than** var#1.
1%A	Activate setpoint 1.
%N	Else
2%A	Activate setpoint 2.
%E	End If

Example #3: (equal to)

0;80%C	Reset Var#0 to 0.
LABELCOUNT%G	Prompt operator.
%[	Save entry
81%s	Access Var#1
%]	Retrieve entry
%e	Enter
1%T	Tag #1
80=81P%'	"IF" var#0 is **equal to** var#1.
%B	Abort macro
%N	Else
1%Q	Print 1st custom transmit
1;80%+	add 1 to var#0
1%J	Jump to Tag #1.
%E	End If

Example #4 (not equal to)

80#81P%'	"IF" var#0 is **not equal to** var#1.
1%^	Goto macro #1.
%N	Else
2%^	Goto macro #2.
%E	End If

2. Comparing a parameter's value to a fixed value can be done in four ways, greater than, less than, equal to or not equal to. The statements below are used to **compare any** parameter to any fixed value. ("n" is the variable compared to the "x" variable, where "x" equals a fixed number). The (%') is the completion of the compare statement.

n>x%'

n<x%'

n=x%'

n#x%'

Examples: Compare a "parameter" to the value "10".

Example #1: (greater than)

0;89%C	Reset Var#9 to 0.
22%A	Activate setpoint #22.
2%T	Tag point 2.
LINE ON%I	A/D conversion prompt.
0,89%C	Copy gross wt. to Var#9.
89>10%'	"IF" Var#9 is **greater than** "10".
22%D	Deactivate setpoint 22.
STOP LINE%P	1 second prompt.
%N	Else
2%J	Jump to Tag 2.
%E	End If

Example #2: (less than)

1%T	Tag point 1.
WAIT!%I	A/D conversion prompt.
30<10%'	"IF" Quantity is **less than** "10".
1%J	Jump to Tag 1.
%N	Else
2%Q	Print 2nd custom transmit.
%E	End If

Example #3: (equal to)

0;91%C	Reset Reg#1 to 0.
LABELCOUNT%G	Prompt operator.
%[	Save entry
91%s	Access Reg#1
%]	Retrieve entry
%e	Enter
1%T	Tag #1
91=10%'	"IF" Reg#1 is **equal to** "10".
2%Q	Print 2nd custom transmit (accumulation label).
%N	Else
1%Q	Print 1st custom transmit (standard transaction label)
1;91%+	add 1 to Reg#1
1%J	Jump to Tag #1.
%E	End If

Example #4 (not equal to)

31#10%'	"IF" Quantity Total is **not equal to** "10".
1%^	Goto macro #1.

%N	Else
2%^	Goto macro #2.
%E	End If

3. Comparing a parameter's value to zero (0) can be done in four ways, greater than, less than, equal to or not equal to. The statements below are used to **compare any** parameter to zero (0). ("n" is the variable compared to zero). The (%') is the completion of the compare statement.

n>%'

n<%'

n=%'

n#%'

Example #1: (greater than "0")

94>%'	"IF" Reg#4 is **greater than "0"**.
1;91%+	Add 1 to Reg#1 (increment counter).
1%Q	Print 1st custom transmit
%N	Else
1;91%-	Subtract 1 from Reg#1 (decrement counter)
2%Q	Print 2nd custom transmit
%E	End If

Example #2: (less than "0")

80<%'	"IF" var#0 is **less than "0"**.
1%A	Activate setpoint 1.
%N	Else
2%A	Activate setpoint 2.
%E	End If

Example #3: (equal to "0")

9%T	Tag #9
93=%'	"IF" Reg#3 is **equal to "0"**.
1%^	Goto macro 1.
%N	Else
1%Q	Print 1st custom transmit
1;93%-	Subtract 1 from Reg#3
9%J	Jump to Tag #9.
%E	End If

Example #4 (not equal to "0")

80#%'	"IF" var#0 is **not equal to "0"**.
1%^	Goto macro #1.
%N	Else
2%^	Goto macro #2.
%E	End If

16.9 General Notes on Math Commands

In the math examples, the use of the < > around a parameter ID is intended to represent the value of the parameter and not the parameter itself. Also, the "=>" indicates "stored into". This is used instead of the equals sign to reduce confusion.

Any numeric parameter ID may be used (i.e. not the ID's, parameters 21 thru 26) with the various math commands. However it is not possible to combine time / date parameters (parameters 11 and 50 thru 54) with the other numeric parameters, except for the copy command (%C).

Example:

11,81%+	NOT ALLOWED!

Instead:

11,80%C	Copy time / date value to var #0
80,81%+	Add var #0 (time / date value) to var #1

Often, both of the values to be used in a calculation must be retained. Since the second parameter specified in the command is also used to specify the result, a COPY may be performed on the second parameter before the math function is executed.

In the following example, Reg #1 is used as a counter to keep track of the number of boxes weighed on the scale each day. The Gross Total parameter holds the weight of boxes processed that day.

Example:

91,80%C	COPY box counter (REG #1) to Var #0
3,80%/	Divide the total weight (Parameter 3) by the quantity of boxes. Var #0 now holds the average weight.

The Math and Copy Commands

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%+	add
%-	subtract
%*	multiply
%/	divide
%C	copy

These commands operate on variables. You can supply an actual value as the first parameter by using a semi-colon (;) as the separator.

For example:

1,81%C	copies the value of parameter 1 to parameter 81.

however...

1;81%C copies the number 1 to parameter 81.
This ability eliminates the need for a macro to change modes simply to save away an operator entry. Thus most macros should be able to perform a task without changing modes and therefore appear invisible to the operator when desired.

For example:

KeyinTargt%G	GET operator input for target wt.
;81%C	Copy entry to parameter 81 (Var #1).

Note in the above example that if the operator simply presses **<ENTER>** without entering any data, then Var #1 will be cleared to zero. Use of the "%\" IF ENTRY macro command could be used to handle this situation in a different manner.

The immediate copy command also works for alpha parameters, such as ID's 1 through 6.

For example:

big part;21%C	copies the words "big part" to ID 1 (parameter P21).

In the case of subtracts and divides, the first parameter is the value subtracted or divided by, respectively.

For example:

2;81%/	divides parameter 81 by 2.
1;81%-	subtracts 1 from (ie decrements) parameter 81.

This capability can be used with operator entries in the following manner:

KeyinPart#%G	Prompt for part number entry.
;21%C	Store operator entry to ID 1 (parameter 21).

Also, the "%+" command can now be used with alpha parameters (ID 1 -6) to concatenate (paste together) two strings.

For example, if ID 1 holds a first name and ID 2 holds a last name:

Joe ;21%C	Set ID 1 to be "Joe ".
Smith;22%C	Set ID 2 to be "Smith".
21,23%C	Copy ID 1 to ID 3.
22,23%+	Append ID 2 to the end of ID 3. ID 3 should now be "Joe Smith".

These math commands can also operate on time type parameters (P51 - P54), however both parameters must be of the same type! The only exception is the "%C" COPY command. For instance, you cannot add Var #1 to alarm 1. Copy one or the other parameter to a parameter of the type which the result will be and then perform the math operation.

Exponent / Root Math Operations

The (%,) command allows square roots to be determined. Also a value may be raised to a power (ie x^{y}). This command works with a parameter or an immediate value, as described in item 1, by using the comma (,) or the semicolon (;) respectively.

For example:

81%,	Take the square root of parameter 81. The result is stored in parameter 81.
3;81%,	Raises the value of parameter 81 to the third power, ie $<81>^{3}$.
.33333;82%,	Take the cube root of the value of parameter 82, ie $<82>^{.33333}$.
83,81%,	Raises the value of parameter 81 to the power specified by the value of parameter 83, ie $<81>^{<83>}$.
-1;84%,	Takes the inverse of parameter 84, ie $<84>^{-1} = 1/<84>$

16.10 Rounding

Rounding Weight Data

When **weight data** is copied (using the %C command) or used in any macro math operation, the data used is the data after it has been rounded to the displayed increment (in default units).

For example:

0,80%C places the rounded data into parameter 80. This weight data is pre-rounded to the default weight units displayed increment (per P111).

The 80%**.** command allows for rounding **weight data** (or other parameters) to different increment sizes other than the displayed increment (per P111).

Explicit Rounding

Any parameter, such as the vars or regs, may be rounded in one of two manners. The parameter may be rounded to the displayed increment or to any desired increment. For example:

.02;80%**.**	rounds parameter 80's data to the nearest multiple of 0.02
20;80%**.**	rounds parameter 80's data to the nearest multiple of 20.
81,80%**.**	rounds parameter 80's data to the nearest multiple of parameter 81's data.

NOTE: If a weight parameter is added successively to a var, after several additions, the resultant value may be not be a multiple of the weight increment, therefore it is recommended to use the "%." command after each addition if standard rounding is required.

16.11 Using Alarms for Time/Date Calculations

The recalled time and the four alarms may be used for general purpose time/date calculations if the alarm is set to off in the setup mode. This could be used to print expiration dates or to perform longer term rate calculations, such as pounds per hour. Note that short term rate calculations (pounds per second) require more resolution on the time scale than one second!

All time/date type parameters are stored as a numerical value, the number of seconds elapsed since midnight on Jan. 1, 1970. As of April 1, 1992, this value is around 702,086,400 and it increases at 86,400 seconds per day.

The alarm parameters are numbered parameter 51 through 54. If the alarms are set to be on (interval or daily) in the setup mode, then a value may not be entered (via a front panel entry) into that alarm. However the alarm be manipulated using the macro math and copy commands. If an enabled alarm is changed, then that alarm will be invoked when the specified time occurs (except alarm 4 which may only be set to invoke a macro by using the "n%K" macro command).

The method of displaying these time/date type parameters when they are selected in the weigh mode may be set as required to be either a numeric value, a time, a date, or a time and date by using setup parameters P511 through P515, for recalled time, and alarms one through four respectively. Please be aware that recalled time is not saved during a power-down condition unless the clock module or the database RAM module is installed in the instrument. If neither is installed, the value for Rtime will come up random upon power-up.

Expiration Date Example:

11,51%C	Copy current time to alarm 1 (named 'expiration date').
864000;51%+	Add ten days worth of seconds to the current time to get an expiration date ten days from now.

A Rate Example (for a decreasing weight):

to store the initial data:

0,80%C	Copy gross wt to var #0.
11,51%C	Copy current time to alarm 1.
	then later on:
0,80%-	Subtract current gross wt from previously saved gross wt.
11,51%-	Subtract previously saved time from current time.
51,81%C	Copy elapsed time, in hours, to var #1. (Note that math cannot be performed on a mix of variable types, ie a time type and a regular number.)
3600;81%/	Divide time difference by the number of seconds per hour. Note that division was performed after copying to the var in order to maintain the fractional portion of an hour!
80,81%/	Divide weight difference by elapsed time to get change in weight per hour.

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Also, the alarms may be selected as a parameter in a custom transmit setup.

16.12 Prompting Commands

A few of the commands listed in Table 28 include in their description a reference to an "optional (message)". This means that if a message is included in the macro just before one of these commands, then that message will be displayed to the operator while that macro command is being executed and until something different is displayed. When these prompting commands are displaying their prompt, the weight conversion process is being performed.

16.13 Branching Commands

There are two methods of branching within a macro. Both are described below

TAG and JUMP commands

This pair of commands is normally used when a set of macro commands must be executed multiple times. The TAG (%T) command is inserted into the macro point in the macro where the execution is to resume after a JUMP (%J) command. The %J command is inserted in the macro at the point where execution is to loop back to the TAG command. Normally a JUMP is located within an IF statement in order to prevent a never ending loop. However there are several other methods of achieving this goal.

Basic looping example:

%T	Tag this position in the macro in order to jump back to this point later on.
Fill-ing..%I	Perform weight conversion process once, while displaying prompt.
1%O	If setpoint 1 is activated...
%J	Jump to the tagged spot in this macro.
%E	End of the "IF" statement.
%S	SOUND beeper.
DONE%P	Display "DONE" message for one second.

The preceding example shows how a branch can be used to indicate to the operator the current state of a process control application. While the setpoint is active, the filling is occurring. The JUMP command keeps looping back and re-displaying the message until the setpoint becomes deactivated. When it does, the message "DONE" is displayed for one second.

Note that this same effect could be achieved if the point to be branched to was at the beginning of a macro by simply using the GOTO command, #%^. However many times more efficient use of the macros can be achieved by looping back into the middle of a macro.
However, be aware that the TAG and JUMP commands cannot be used to loop between different macros. Both the TAG and JUMP must occur within the same macro.

IF Statements

The IF type MACRO commands can be quite useful in order to allow varying conditions to affect which MACRO commands are executed and which are skipped.

The operation of these commands are fairly simple. The rules are listed below:

a. If the tested condition is found to be TRUE then:

The subsequent commands in the MACRO are executed up until an ELSE (%N) command is encountered.
If an ELSE (%N) command is encountered before an ENDIF, the macro will skip subsequent commands between the ELSE and the ENDIF.

Once an ENDIF is encountered, the IF statement is completed. Any subsequent ELSE or ENDIF commands would have no effect unless they follow another IF statement.

b. If the tested condition is found to be FALSE then:

The subsequent commands in the macro are skipped until the occurrence of an ENDIF (%E) or an ELSE (%N) MACRO command. Execution of the macro commands will resume after either of these commands.
If an ELSE or ENDIF command does not exist in the remainder of the macro, then the remainder of the macro is skipped and the macro terminates in the normal manner. Specifically, if the macro was called from another macro, then macro execution will resume in the calling macro after the point where the 2nd macro was called.

If an ELSE command is used, the ENDIF has no effect except to define the point in the macro whereafter commands will be executed regardless of the last IF commands effects.

While this capability is quite powerful, there are some limitations. The nesting of 'IF' statements is allowed, however only one 'ENDIF' (%E) is required. All previous 'IF' statements are considered completed at the occurrence of an 'ENDIF'. Also, all ELSE statements apply equally to all previous IF statements which have not yet been followed by an ENDIF.

If nested IF statements are required for an application, the nested IF may occur within a called macro, since that macro will not be called if the condition to call it did not occur.

Refer to the following example:

Simple Branching Example:

12%O	Test if setpoint 12 is active...
-OK!-%P	If so, display "OK" message for one second.
%N	ELSE (otherwise)
OutOfSpec!%W	Display "OutOf Spec!" warning until a key is pressed.
%E	End of IF statement.

In the preceding IF example, IF setpoint 12 was active then the prompt "-OK-" is displayed for one second. If setpoint 12 was deactive, the prompt "Out Of Spec!" is displayed until the operator presses any key.

A More Complex Branching Example:

1%O	IF Setpoint #1 is activated...
2%O	IF Setpoint #2 is activated...
3%O	IF Setpoint #3 is activated...

The next two statements would be executed only if setpoints 1, 2, and 3 were activated:

5%t	set tare wt to 5#.
7%A	ACTIVATE SETPOINT #7.
%N	ELSE

These next two statements would be executed only if setpoints 1, 2, or 3 were de-activated:

10%t	set tare wt to 10#.
8%A	ACTIVATE SETPOINT #8.
%E	End if statement.

The next statements would always be executed, regardless of setpoints 1, 2, and 3's status.

4%s	Select gross total mode.
0%e	Clear gross total.

16.14 Nested "IF" Statements (Boolean Math Operations) %{, %} and %|

Nested IFs:

There are two new macro commands that allow for logical nesting of IF type statements. The maximum number of levels deep that may occur in a nest is 254. This section contains pseudo code showing how nesting may be implemented followed by the actual commands to perform the pseudo code. Old macros that do not use this nesting format will still work without any modifications. As before, placing a tag within an if structure can cause problems because execution of the tag cannot be guaranteed.

Theory of operation

If an IF statement is false, then execution will continue after either the first ELSE or ENDIF not enclosed in braces. If the IF statement is true, then execution will continue until an ELSE or ENDIF is encountered that is
not enclosed in braces. An ELSE will then cause execution to continue after it encounters an ENDIF not enclosed in braces.

In summary, any %N, %E, and %| (see following information for %|) are effectively ignored if they occur within a pair of braces that are subsequent to an IF command.

Definition of pseudo code:

```
IF    => any macro command that performs a conditional test
{     => %{ new macro command signifying start of a group
}     => %} new macro command signifying end of a group
ELSE  => %N macro command "NOT IF"
ENDIF => %E macro command "END IF"

x     => any applicable parameter
```

Indenting is used to distinguish between nested levels of IF statements.

PSEUDO CODE 1

```
IF x > -1 AND x < 6          /* The AND is done by two subsequent */
{                            /* IF statements                     */
 IF x < 4
 {
  IF x = 0
   [various commands]
  ELSE                       /* x not equal to 0 */
  IF x = 1
   [various commands]
  ELSE                       /* x not equal to 1 */
  {
   IF x = 2
         [various commands]
```

```
      ELSE                /* x not equal to 2 */
          [various commands]
      ENDIF               /* closes "IF x = 2" */
     }
    ENDIF                 /* closes "IF x = 0" */
   }
   ELSE                   /* x >= 4 */
   {
    IF x = 4
      [various commands]
    ELSE                  /* x not equal to 4 */
      [various commands]
    ENDIF                 /* closes "IF x = 4" */
   }
   ENDIF                  /* closes "IF x < 4" */
}
ELSE                      /* x <= -1 or x >= 6 */
{
 IF x < 0
   [various commands]
 ELSE                     /* x >= 0    (x >= 6) */
   [various commands]
 ENDIF                    /* closes "IF x < 0" */
}
ENDIF                     /* closes "IF x > -1 AND x < 6" */
```

MACRO CODE 1

```
810%s%c%e          P810.XX  Macro #10
80>-1%%'%e         0001 compare
80<6%%'%e          0007 compare
%%{%e              0012 Start Group
80<4%%'%e          0013 compare
%%{%e              0018 Start Group
80=0%%'%e          0019 compare
ZERO%%P%e          0024 pause
%%N%e              0029 if not
80=1%%'%e          0030 compare
ONE%%P%e           0035 pause
%%N%e              0039 if not
%%{%e              0040 Start Group
80=2%%'%e          0041 compare
TWO%%P%e           0046 pause
%%N%e              0050 if not
THREE%%P%e         0051 pause
%%E%e        0057 end if
%%}%e              0058 End Group
%%E%e        0059 end if
%%}%e              0060 End Group
%%N%e              0061 if not
%%{%e              0062 Start Group
80=4%%'%e          0063 compare
FOUR%%P%e          0068 pause
%%N%e              0073 if not
FIVE%%P%e          0074 pause
%%E%e        0079 end if
%%}%e              0080 End Group
%%E%e        0081 end if
%%}%e              0082 End Group
%%N%e              0083 if not
%%{%e              0084 Start Group
80<0%%'%e          0085 compare
NEG%%P%e           0090 pause
%%N%e              0094 if not
Large%%P%e         0095 pause
%%E%e        0101 end if
%%}%e              0102 End Group
%%E%e        0103 end if
```

AND/OR Operations

An AND operation on two IF commands can be accomplished by placing one IF directly after the next IF.

An OR operation can be accomplished by placing a %| between the IF commands. The next command after the %| should be an IF command or %C followed by an IF. The operation of the %| command is as follows:

1 If the previous IF was TRUE then the %| will skip the next command regardless of what it is. It will also skip all consecutive %C commands that immediately follow the %| and the subsequent command. However, if the immediately subsequent command is a %{ then all commands are skipped until the matching %}. Execution will then continue immediately following the %}.
2 If the previous IF was FALSE then the execution will continue with the command immediately following the %|.

Skipping of subsequent %C commands allows the %C to be used to supply the argument for the subsequent IF statement such as 91%C%O

The following truth table shows what AND and OR do. X and Y represent two different IF conditions. A 0 means that the condition is FALSE and 1 means that the condition is TRUE. The AND column shows if both X AND Y are TRUE. 0 means that X AND Y are not TRUE and 1 means that both X and Y are TRUE. The OR column shows if either X or Y is TRUE. A 0 means that both X and Y are FALSE. A 1 means that either X or Y is TRUE or both are TRUE.

```
X Y | AND | OR
----+-----+---
0 0 |  0  | 0
0 1 |  0  | 1
1 0 |  0  | 1
1 1 |  1  | 1
```

ANDs and ORs may be combined to create more complex conditional code. With the brace commands, %{ and %} for nesting IFs, priority may be used as well. To exemplify this the following truth tables show a few simple combinations. W, X, Y, and Z are IF commands.

W X Y Z	W AND X AND Y OR Z
0 0 0 1	1
1 0 0 0	0
1 1 0 0	0
1 1 1 0	1
1 0 1 1	1
1 1 0 1	1
0 0 1 1	1

W X Y Z	W AND X AND { Y OR }
0 0 0 1	0
1 0 0 0	0
1 1 0 0	0
1 1 1 0	1
1 0 1 1	0
1 1 0 1	1
0 0 1 1	0

W X Y Z	W AND X OR Y AND Z
0 0 0 1	0
1 0 0 0	0
1 1 0 0	0
1 1 1 0	0
1 0 1 1	1
1 1 0 1	1
0 0 1 1	1

This macro language does NOT follow the standard precedence rules for AND and OR. In the macro language, ANDs and ORs are evaluated sequentially. The example "W AND X OR Y AND Z" is equivalent to "{ { W AND X } OR Y } AND Z", not "{ W AND X } OR { Y AND Z }" as one might expect.

Example of OR with the %C in the macro language

1%O	Is setpoint 1 on?
%|	OR
91%C=0%%'	(reg 1 contains a var number) var [x] = 0?

16.15 Macro Debug: P64200

The Macro Debug feature records steps and branches that are taken during macro execution. If the expected results are not achieved during the execution of a macro, this info mode may be accessed to determine exactly which branches were taken. This is often very helpful during initial macro debug of complex macro operations.

The recorded macro steps may either be viewed on the display or sent out on of the serial ports to a computer or printer. The macro debug mode operates as follows:

a) When first accessing the Macro Debug mode, the display will momentarily show P64200 "Macro Debug". Then after one second, if there is any macro execution history in memory, then the last executed macro command will be shown. Please note that the entire history buffer is cleared whenever a macro is changed and every time the unit performs its setup (display reads "Doing Setup") which happens upon power-up and when saving changes.

b) The last two digits of the main numeric display indicates the macro number where the macro command was executed.

c) The top line on the dot matrix display shows the offset counter which indicates the distance from the beginning of the macro where the command is located.

d) The bottom line shows the one single element of the macro at the current position in the history buffer, such as "%G", "1", or "A".

e) Press the **<ID>** or **<TARE>** keys to move forward or backward respectively within the history buffer. If the end of the buffer is reached, the display will show "ENDof TABLE". Pressing the **<ID>** key will go to the last character of the history buffer while pressing **<TARE>** will move to the first character in the history buffer.

f) A numeric value may precede the **<ID>** or **<TARE>** keys to move multiple steps in their respective directions. A decimal point preceding either the **<ID>** or **<TARE>** keys will move forward or backward one loop in the history buffer.

g) The amount of history recorded depends on the amount of available RAM. As mentioned previously, if the GSE database option is installed then 8K of the database RAM may be allocated for general use. If this is done then ten times the amount of macro history is recorded. Refer to the database option manual for further details.

h) Pressing the **<PRINT>** key will print out the history buffer. The prompt "1 for Comm", "2 for Prntr" will appear next. Press **<1>** or **<2>** accordingly. If the currently displayed location is the last item in the history buffer, then the entire history buffer is printed. Otherwise the buffer is printed from the currently displayed location to the end of the buffer.

i) If desired, the history buffer may be cleared out be pressing the **<CLR>** key from within the Macro Debug mode. This may be useful if a new macro is about to be tested.

16.16 Macro Download

The setup download for macros includes a counter which indicates the relative offset of each line from the beginning of the macro. It is transmitted preceding the comments for each line. This counter has been added to assist in finding the exact location to which the macro debug listing is referring. Refer to the following excerpt as an example. (This macro is designed to be called as a subroutine to check for the operator keying the proper code before proceeding. If the incorrect code is keyed, the operator is allowed two more attempts.)

```
815%s%c%e            P815.66  Macro #15
3;93%%C%e            0001 copy register
%%T%e                0006 tag position
EnterCode:%%G%e      0007 get operator entry
;26%%C%e             0018 copy register
91823;26%%-%e        0022 subtract
%%N%e                0031 if not
WrongCODE!%%P%e      0032 pause
1;93%%-%e            0043 subtract
3%%R%e               0048 if register not zero
%%J%e                0050 jump to tag
%%N%e                0051 if not
%%B%e                0052 break
%%E%e                0053 end if
```

16.17 Print/Download Individual Macro Setup

Individual macro setups can be printed or downloaded to a line printer or PC. This may be useful when editing a custom setup that requires only modifying a single macro. The entire setup does not have to be re-uploaded to the unit.

Individual macros that are implemented quite frequently can be saved to a PC for later use. This feature will allow you to add individual routines to your macro library.

Simply access the setup mode and enter the unit's access code. Step to the macro that is to be printed. Proceed with the following steps to print macro#0.

ie. **<800> <SELECT>**
<PRINT>

The unit will respond with the following two part prompt.

1 for Com   flash prompt
2 for Print

Press **<1>** to direct the macro out the Com port or **<2>** to direct the macro out the print port.

16.18 Miscellaneous Database Applications Notes

The items listed below regarding the database operations may not be of interest unless you have already used the database for applications.

1. Recalls are allowed on a column of time/date type, ie parameters 50 through 54. This will allow the P50 - P54 alarm parameters to be more easily used for general purpose numeric needs.

2. When the recalled time/date and alarm parameters (P50 - P54) are used in a database, the format for printing these parameters is based on the setup selection P511 through P515. This allows a printout of stored time/date type parameters to print only time, only date, time and date both, or simply a number. Also the default headings of these columns of a printout are specific to be "Time" or "Date" when appropriate.

   Also, the settings for setup parameters P503 for 12/24 hour format and P510 for USA/Int'l date format will have their appropriate effects on the printed out database if the parameters have been set to time and/or date.

3. The string "ENDofDB" <CR> will define the end of a database. This must occur at the beginning of a row and terminated by a <CR>. It does not need to be enclosed in quotes.

   Accordingly, the database download command has an additional option. Pressing **[3]** or **[4]** will cause a pre-amble to be sent which selects the proper database and then the upload command. Also, the downloaded data is followed by the string "ENDofDB". These features allow a downloaded database to be easily re-uploaded back into a 550 with no keypresses required by the operator. This is helpful when one attempts to paste together database files on their computer.

4. If an alpha field in a computer database file which is to be loaded into the unit's database is enclosed in quotes, the quotes must be the first character of the field. Otherwise, the quotes are loaded as part of the data, as any other character would be. This allows quotes to be part of the loaded data as long as the quotes are not the first character.

5. It is virtually impossible for the database module to lose its initialization. Even if the modules are not handled properly, or the module or EPROM are inserted incorrectly. However, proper installation is highly recommended.

Chapter 17 Truck Weighing

17.1 Introduction

One of the applications for which the 550 is very well suited is the operation of Truck Weighing. This application takes into account the two most frequent situations; dumping or pickup. In Truck **dumping**, the initial weight of the truck coming in (Truck In) is heavier than when the truck is leaving (Truck Out). In Truck **pickup,** the initial weight of the truck coming in (Truck In) is lighter than when the truck is leaving (Truck Out).

The Truck In / Out capability makes use of the **<ID>** key to permit entry of truck identification (ID) numbers. The ID's are stored within the system with the incoming weight of the truck. When the truck is on the way out, the In-Weight is compared to the Out-Weight. The instrument then considers the lower of the two weights to be the Tare Weight, the larger to be the Gross Weight, and the difference to be the Net Weight. Tare Weights may be permanently stored in the system to determine truck weights with a single weighment. One or more of the Custom Transmits may be sent, providing either a ticket documenting the amount of weight picked up or dropped off, or sending the data to a computer or remote display. This feature makes the instrument an ideal weight unit for dump site weighing, gravel pit weighing, and many other truck weighing applications.

This feature includes the ability to establish and store the tare weight of a vehicle, clear any or all stored weights or transmit the currently stored truck weights.

The Truck In/Out feature works in a relatively preset manner. It can be customized to some extent with its setup, and even further with the use of macros. However if complete customization is required then the Database Option should be implemented and the operation can be designed to perfectly fit the intended application.

Incompatibility:
When Truck In/Out operation has been selected, the Macro Menu feature and the Database Option are not available.

17.2 Setup

Enabling Truck In/Out Weighing:

To enable the Truck In/Out feature, parameter **P720** is set to selection 1, "**ID use: Truck**". Selecting this feature causes the subsequent setup parameters, P721 -

P725, to become accessible. The available choices for P720 are documented in Table 31 Parameter P720 ID Use Selections.

Selection	Selection Name	Description (Specifies the use of the <ID> key from the weigh modes)
0	**Std.**	**The ID key is used only to access the six ID parameters. (Refer to chapter 14 on ID's).**
1	**Truck**	**Enables Truck In/Out Weighing. (Required for Truck In/Out Weighing).**
2	**Menu**	**Allows 'named macros" to be selected and invoked with the ID key. (Refer to chapter 16 on methods of invoking macros).**
3	**dbase**	**Causes the database command menu to be displayed. This choice is available only if the database option module is installed. (Refer to chapter 20 on Databases).**

Table 31 Parameter P720 ID Use Selections

Selecting ID Type:

Four different types of Truck ID's are selectable with the Truck In/Out feature. The differences between the types is primarily in the size and type of characters which may be used for the ID. Based on the needs of the application, choose one of the four types as described in Table 32 Type of ID P721 Selections.

Also, be aware that the larger the number of bytes per row, the lower the total number of truck weights which can be stored at any one time. If it is necessary to have a

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Selection #	Selection Name	Total number of bytes stored per truck weight	Advantages	Limitations
0	Seq'n	4	-Largest possible number of stored weights for a given amount of EEPROM installed. - Automatically assigns truck numbers.	- Cannot make use of pre-numbered trucks. - Cannot permanently store tare weights.
1	Small	5	- Allows use of pre-numbered trucks. - Can permanently store truck tare weight.	- Truck ID must be less than 65535. - Truck ID must be numeric.
2	Big #	6	- Allows truck ID numbers up to 16777215. - Can permanently store truck tare weight.	- Truck ID must be numeric.
3	ID #6	3 + (P710)*	- Truck ID may be any size and include non-numeric characters. - Can permanently store truck tare weight.	- Uses the largest amount of memory per stored truck weight.

Table 32 Type of Truck ID P721 Selections

* Note that if selection 3, ID #6, is chosen then **P710 must be set** to the size of ID required for the application. Anywhere from one to 49 characters may be specified.

larger number of weights stored, an additional EEPROM may be installed. Refer to the Number of Rows section for more information.

17.3 Transmission Setups

There are four separate events which may occur with the Truck In/Out feature. These are:

Truck In,
Truck Out,
Tare Stored, and
Tare Recalled

The data transmissions sent by the 550 during the four "Truck In/Out" events are fully programmable and must be set appropriately in order for the correct results to be printed. Normally these transmissions are used to print tickets for the truck's driver however they may also be for any other purpose, such as printing a log of all truck activity.

All transmissions are accomplished through the use of the four Custom Transmits which are part of the instrument's standard setup. There is a setup parameter for each event which specifies which of the Custom Transmits are sent when that event occurs. Any combination (from none to all) of the four Custom Transmits may be specified for each event.

As each event occurs, the unit checks its setup to determine which transmissions are to be sent.

Not every Truck In/Out application will make use of all four events. First determine which of these four events will be occurring in your application. Next, define on paper the desired appearance of the ticket for these events. If a significant portion of multiple tickets are similar, then these portions may be generated by a single custom transmit. After reviewing your data transmission needs, specify which of the four custom transmits will be used to create the tickets.

Once the appropriate transmissions have been determined, setup P722 to specify which Custom Transmit(s) will be sent out during the "Truck In" event. Similarly, setup P723, P724, and P725 to specify which transmissions will be sent during the other three Truck In/Out events. The available choices are listed in Table 33.

Based on your selection for P721, use the appropriate one of the following tables (34, 35 and 36) to determine the required parameters to use when setting up the Custom Transmits for Truck In/Out weighing.

Number	Custom Transmits
0	None
1	1
2	2
3	3
4	4
5	1 & 2
6	1 & 3
7	1 & 4
8	2 & 3
9	2 & 4
10	3 & 4
11	1, 2, & 3
12	1, 2, & 4
13	1, 3, & 4
14	2, 3, & 4
15	1, 2, 3, & 4

Table 33 Choices for P722, P723, P724 & P725

17.4 METHODS OF OPERATION

Storing the Gross Weight during incoming and comparing the Gross Weight during outgoing are motion delayed events. Thus if motion is occurring at these times, the prompt Mot'n Delay will appear until motion ceases. As with all other motion delayed operations the **<CLR>** key can be pressed to cancel the pending command. Therefore, the parameters for motion delay before transmitting (**P212**, **P222**, **P232**, and **P242**) have no effect on the automatic transmissions sent during Truck In/Out Weighing regardless of their setting. To adjust the determination of motion refer to setup parameters **P114** and **P115**. However, **P211**, **P221**, **P231** and **P241** do specify the port that each of these Custom Transmits will use.

17.5 SEQUENTIAL OPERATION

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Incoming Truck (full or empty):

1. Truck drives onto scale.
2. Operator presses **<ID>**.
3. The instrument prompts: Keyin ID #.
4. Operator presses **<ENTER>**.
5. When motion ceases, the unit determines the next sequentially available ID and stores the In Weight. Also, any Custom Transmits specified by **P722** are sent. Normally a ticket would always be printed to record the assigned number.
6. The printed ticket is handed to the driver of the truck.

Outgoing Truck (full or empty):

1. Truck driver drives onto scale and hands operator the tag which was printed for the truck when it came in.
2. Operator presses **<ID>**.
3. The unit prompts: Keyin ID #.
4. Operator keys in the sequential truck number from the ticket and then presses **<ENTER>**.
5. When motion ceases, the unit compares the

Item	Event			
	Truck IN	Truck OUT	Tare Stored	Tare Recalled
Truck ID	Par #93	Par #94	---	---
Stored Weight	Par #0	---	---	---
Truck Gross	---	Par #12	---	---
Truck Tare	---	Par #14	---	---
Truck Net	---	Par #13	---	---

Table 34 P721 Sequential Number

Item	Event			
	Truck IN	Truck OUT	Tare Stored	Tare Recalled
Truck ID	Par #94	Par #94	Par #94	Par #94
Stored Weight	Par #0	---	Par #2	---
Truck Gross	---	Par #12	---	Par #12
Truck Tare	---	Par #14	---	Par #14
Truck Net	---	Par #13	---	Par #13

Table 35 P721 Small or Big Number

Item	Event			
	Truck IN	Truck OUT	Tare Stored	Tare Recalled
Truck ID	Par #26	Par #26	Par #26	Par #26
Stored Weight	Par #0	---	Par #2	---
Truck Gross	---	Par #12	---	Par #12
Truck Tare	---	Par #14	---	Par #14
Truck Net	---	Par #13	---	Par #13

Table 36 P721 ID #6

incoming weight to the outgoing weight and copies the higher of the two weights to the Truck Gross Weight register (parameter #12), the lower weight to the Truck Tare Weight register (parameter #13), and the difference to the Truck Net Weight register (parameter #14). The In-Weight and the Truck ID are then deleted from memory.

6. Then the Custom Transmit(s) specified by **P723** are sent.

17.6 SMALL, BIG # OR ID #6 OPERATION

Incoming Truck (full or empty):

1. Truck drives onto scale.
2. Operator presses **<ID>**.
3. The unit prompts: Keyin ID #.
4. Operator keys in number of truck and presses **<ENTER>**.
5. When motion ceases, the instrument searches memory to see if the entered ID is already stored away. Since this is an **In Weight**, the ID should not be found and the unit prompts **WEIGH IN** and stores the In Weight along with the ID. The specified (parameter **P722**) transmissions (if any) then take place.

17.7 STORING A KEYED IN TARE WEIGHT:

1. Operator presses **<ID>**.
2. The unit prompts: Keyin ID #.
3. Operator keys in the Tare Weight to be stored, then **<TARE>**.
4. The unit prompts: Save Tare? ...Keyin ID#.
5. Operator keys in number of truck and presses **<ENTER>**.
6. The unit prompts Tare Saved. Then the unit stores the entered tare along with the entered truck ID. If the truck ID was previously in memory, then the new Tare Weight over-writes the old data. Then the specified (parameter **P724**) transmission(s) (if any) take place.

Storing An Auto Tare Weight:

1. Empty truck is driven onto scale.
2. Operator presses **<ID>**.
3. The unit prompts: Keyin ID#.
4. Operator presses **<TARE>**.
5. The unit prompts: Save Tare? ... Keyin ID#.
6. Operator keys in number of truck and presses **<ENTER>**.
7. The unit prompts Tare Saved. Then the unit stores the weight of the truck as Tare Weight along with the entered truck ID. If the truck ID was previously in memory, then the new Tare Weight over-writes the old data. Then the specified (parameter **P724**) transmission(s) (if any) take place.

Outgoing Truck (full or empty):

1. Truck drives onto scale.
2. Operator presses **<ID>**.
3. The unit prompts: Keyin ID #.
4. Operator keys in the number of the truck and presses **<ENTER>**.
5. When motion ceases, the unit searches memory to see if the entered ID is in fact stored away. Since this is an out-weight, the ID should be found and the unit prompts WEIGH OUT and recalls the In Weight. The unit then compares the incoming weight to the outgoing weight and stores the higher of the two weights as the Truck Gross Weight (parameter 12), the lower as the Truck Tare Weight (parameter 14) and the difference as the Truck Net Weight (parameter 13). Then the specified (parameter **P722**) transmissions (if any) take place. The In Weight along with the truck ID is then deleted from memory.

   If the recalled weight is a stored Tare Weight, then the message Tare Found is displayed instead of WEIGH OUT. Then the specified (parameter **P725**) transmissions (if any) take place. Also the Tare Weight remains in memory, it is not deleted as with the In Weight.

NOTE:

If additional expanded memory (E^2) is to be added after truck tare weights have already been stored, the following procedure must be performed. All trucks should have exited the yard. Make sure that the stored tare weights are printed out to hard copy or stored to a computer file. The stored truck tare weights will be lost when the additional E^2 is added. Before adding the E^2 to U9 and U11 (Model 574 - U1 and U2) check parameters 60000 through 60005 (Model 550 - U9 and U11). These values will change after its added. A special procedure must be performed in order for the unit to recognize the number of additional truck tare values (ROWS) to be stored. Parameter 60005 will not update until one of the setup modes below 60000 is entered and the access code is entered, **<23640> <ID> <ENTER>**. When exiting the setup mode all changes must be saved. Verify parameter 60005 has recalculated the number of rows to be allowed for tare storage. Proceed to re-enter the truck tare values. This can be done manually or by modifying the computer file with the same keystrokes used in manual entry.

17.8 PRINTING THE STORED IN WEIGHTS / TARE WEIGHTS

1. Operator presses **<ID>**.
2. The unit prompts: Keyin ID #.
3. Operator presses **<PRINT>**.
4. The unit prompts: Print Data? ... ENTER toPRN.
5. Operator presses **<ENTER>**.
6. The unit transmits the stored In Weights out through the port specified by **P221**. The format for the printing is fixed and consists of a heading line followed by lines of truck IDs along with their associated In Weights. Stored Tare Weights are marked Tare Weight.

17.9 CLEARING OPERATIONS

A Specific Stored In Weight/Tare Weight:

1. Operator presses **<ID>**.
2. The unit prompts: Keyin ID #.
3. Operator presses **<CLR>**.
4. The unit prompts: Clr ID Row ? ... ENTER ID#.
5. Operator keys in number of truck and presses **<ENTER>**.
6. The unit prompts Row Clr'd and then deletes the specified ID and data from memory.

Clearing all the Stored In Weights/Tare Weights:

1. Operator presses **<ID>**.
2. The unit prompts: Keyin ID #.
3. Operator presses **<CLR>**.
4. The unit prompts: Clr ID Row ? ... ENTER ID #.
5. Operator presses **<CLR>** again.
6. The unit prompts: All ID Clr ? ... ENTER toCLR.
7. Operator presses **<ENTER>**.
8. The unit prompts: Sure? ??? ... ENTER toCLR.
9. The instrument prompts Prntg Data and then transmits all the stored In Weights out the port specified by **P221**. The format for the print is fixed and consists of a heading line followed by lines of truck IDs along with their associated In Weights. Stored Tare Weights are marked Tare Weight.. All stored weights are then cleared. If the Seq'n storage method has been selected, then the sequential number is reset so that the next stored weight is ID 1.

17.10 AUTOMATIC CLEARING OF THE STORED WEIGHTS

Once Truck In/Out Weighing has been enabled, if any setup parameters are changed which would affect the format of the stored data (such as changing the size of ID #6 if ID#6 were selected) or that would change the remaining amount of storage room (such as modifying the Custom Transmit setups) then as the changes are being saved, the unit will warn that the stored In Weights will have to be cleared. After the Save Mods? ... ENTER =SAVE prompt and the **<ENTER>** key is pressed, the next prompts will be #Rows diff! ... Clr ID Rows? ... Enter toCLR. Pressing **<ENTER>** will then result in Sure? ??? ... Enter toCLR. Pressing **<ENTER>** again will then result in the stored weights being printed out in the same format as described in the Printing the Stored In Weights section. The standard exit sequence then proceeds. Pressing any other key will bring the unit back into the Setup Mode where further changes can be made before exiting.

17.11 MEMORY USE

The number of rows (incoming weights) which can be stored in the unit is dependent on how some of the other features are set up within the unit and on how much storage memory has been installed.

Access parameter **P60000** to see how much storage memory is currently installed in the instrument. Access parameter **P60001** to see how much of that memory is not being used. This does not include usage by the Truck In/Out feature since this feature automatically uses up all the remaining storage memory. Access parameter **P60005** to determine the actual number of rows which may be stored with the current configuration. The amount of storage memory required for each In-Weight storage is dependent on the selection for parameter **P721** and is shown in Table 37, Truck In / Out Memory Usage.

NOTE:
All of the stored truck weights are stored in terms of displayed increments. Therefore if parameter **P111** is changed, then the stored weights are no longer usable and they will have to be cleared.

P721: ID#	Bytes per Row
Seq'n	4
Small	5
Big#	6
ID#6	3 plus the value set for parameter P710, ID 6 size.

Table 37 Truck In / Out Memory Usage

17.12 Example Setups

EXAMPLE #1: Truck IN/OUT (Sequential ID#)

100%s23640%i%e Access Setup Modes, Allowing Changes

NAME IN/OUT SEQUENTIAL ID REGISTERS
693%sTRUCK ID#%e P693.-- Reg#3 TRUCK ID#
694%sTRUCK ID#%e P694.-- Reg#4 TRUCK ID#

SETUP INSTRUMENT FOR SEQUENTIAL TRUCK ID OPERATION
720%s1%e P720.01 IDuse: Truck
721%s0%e P721.00 I.D.# Seq'n
722%s1%e P722.01 In Tx #1
723%s2%e P723.02 OutTx #2
724%s0%e P724.00 TSvTx none
725%s0%e P725.00 TFdTx none

1ST CUSTOM TRANSMIT (TRUCK IN)
1000%s%c1000%e P1000. Custom Transmit #1

.002%e	<STX>
Weigh In:%e	
.256%e	<CR> <LF>
.010%e	<LF>
%e11%e%e0%e%e	Tm/Dt Format = 0
.256%e	<CR> <LF>
%e93%e%e0%e%e	TRUCK ID# Format = 0
.256%e	<CR> <LF>

2ND CUSTOM TRANSMIT (TRUCK OUT)

2000%s%c1000%e	P2000. Custom Transmit #2
.002%e	<STX>
Weigh Out:%e	
.256%e	<CR> <LF>
.010%e	<LF>
%e11%e%e0%e%e	Tm/Dt Format = 0
.256%e	<CR> <LF>
%e94%e%e0%e%e	TRUCK ID# Format = 0
.256%e	<CR> <LF>
.256%e	<CR> <LF>
%e12%e%e0%e%e	TrGrs Format = 0
.256%e	<CR> <LF>
%e14%e%e0%e%e	TrTar Format = 0
.256%e	<CR> <LF>
%e13%e%e0%e%e	TrNet Format = 0
.256%e	<CR> <LF>

%z

```
Weigh In:

11:51 am 06/09/94
15 TRUCK ID#
```

<u>**EXAMPLE #2:**</u> ID#6

100%s23640%i%e	Access Setup Modes, Allowing Changes

NAME ID#6 (IN/OUT TRUCK ID) Alpha-Numeric

710%s12%e	P710.-- ID SIZE#6=12
711%sTRUCK ID: %e	P711.-- NAME6 TRUCK ID:

SETUP INSTRUMENT FOR TRUCK ID#6 OPERATION

720%s1%e	P720.01 IDuse: Truck
721%s3%e	P721.03 I.D.# ID #6
722%s1%e	P722.01 In Tx #1
723%s2%e	P723.02 OutTx #2

```
Weigh Out:

11:57 am 06/09/94
15 TRUCK ID#

10280 lb TrGrs
  7540 lb TrTar
  2740 lb TrNet
```

1ST CUSTOM TRANSMIT (TRUCK IN)

1000%s%c1000%e	P1000. Custom Transmit #1
.002%e	<STX>
%e11%e%e0%e%e	Tm/Dt Format = 0
.256%e	<CR> <LF>
%e26%e%e0%e%e	TRUCK ID: Format = 0 *(ID#6)*
.256%e	<CR> <LF>

2ND CUSTOM TRANSMIT (TRUCK OUT)

2000%s%c1000%e	P2000. Custom Transmit #2
.002%e	<STX>
%e11%e%e0%e%e	Tm/Dt Format = 0
.256%e	<CR> <LF>
%e26%e%e0%e%e	TRUCK ID: Format = 0 *(ID#6)*
.256%e	<CR> <LF>
.256%e	<CR> <LF>
%e12%e%e0%e%e	TrGrs Format = 0
.256%e	<CR> <LF>
%e14%e%e0%e%e	TrTar Format = 0
.256%e	<CR> <LF>
%e13%e%e0%e%e	TrNet Format = 0
.256%e	<CR> <LF>

%z

11:51 am 06/09/94
TRUCK ID: ABC-123

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Example #3: (ID#6 with stored tare weights)

11:57 am 06/09/94
TRUCK ID: ABC-123

10280 lb TrGrs
7540 lb TrTar
2740 lb TrNet

100%s23640%i%e	Access Setup Modes, Allowing Changes

NAME ID#6 (IN/OUT TRUCK ID) Alpha-Numeric

710%s8%e	P710.-- ID SIZE#6= 8
711%sTRUCK ID#%e	P711.-- NAME6 TRUCK ID#

SETUP INSTRUMENT FOR TRUCK ID#6 OPERATION

720%s1%e	P720.01 ID use: Truck
721%s3%e	P721.00 I.D.# ID #6
722%s1%e	P722.01 In Tx #1
723%s2%e	P723.02 OutTx #2
724%s3%e	P724.03 TSvTx #3
725%s7%e	P725.04 TFdTx #1&4

1ST CUSTOM TRANSMIT (TRUCK IN)

1000%s%c1000%e	P1000. Custom Transmit #1
Weigh In Ticket:%e	
.256%e	<CR> <LF>
Truck ID: %e	
%e26%e%e128%e%e	ID#:6 Format = 128
.256%e	<CR> <LF>
.010%e	<LF>
Gross Wt: %e	
%e0%e%e128%e%e	Gross Format = 128

```
.256%e                  <CR> <LF>
.256%e                  <CR> <LF>
```

2ND CUSTOM TRANSMIT (TRUCK OUT)

```
2000%s%c1000%e          P2000.  Custom Transmit #2
Weigh Out Ticket:%e
.256%e                  <CR> <LF>
Truck ID: %e
%e26%e%e128%e%e         ID#:6  Format = 128
.256%e                  <CR> <LF>
.010%e                  <LF>
Truck Gross Wt: %e
%e12%e%e128%e%e         TrGrs  Format = 128
.256%e                  <CR> <LF>
Truck Tare Wt:  %e
%e14%e%e128%e%e         TrTar  Format = 128
.256%e                  <CR> <LF>
Truck Net Wt:   %e
%e13%e%e128%e%e         TrNet  Format = 128
.256%e                  <CR> <LF>
.256%e                  <CR> <LF>
```

```
Weigh In Ticket:
Truck ID: 123

Gross Wt: 10160 lb
```

continued on next page.

3RD CUSTOM TRANSMIT (TARE STORED)

```
3000%s%c1000%e          P3000.  Custom Transmit #3
Tare Stored Ticket:%e
.256%e                  <CR> <LF>
Truck ID: %e
%e26%e%e128%e%e         ID#:6  Format = 128
.256%e                  <CR> <LF>
.010%e
Stored Tare Wt: %e
%e2%e%e128%e%e          Tare Format = 128
.256%e                  <CR> <LF>
.256%e                  <CR> <LF>
```

```
Weigh Out Ticket:
Truck ID: 123

Truck Gross Wt: 10160 lb
Truck Tare Wt:   8500 lb
Truck Net Wt:    1660 lb
```

4TH CUSTOM TRANSMIT (TARE RECALLED)

```
4000%s%c1000%e          P4000.  Custom Transmit #4
(Recalled Tare Weight)%e
.256%e                  <CR> <LF>

%z                      Exit Setup Mode
```

Tare Stored Ticket:
Truck ID: 123

Stored Tare Wt: 8500 lb

(Recalled Tare Weight)

17

17.13 Invoke a "Macro" From the Truck IN/OUT Software

Macros tie all the capabilities of the unit together. The following is an example of how to invoke a macro from the Truck IN/OUT software. A good background with macros and setpoints is necessary. This example (technique 1025) is taken directly from the GSE Scale Systems' Engineer's Notebook. This publication is a collection of macro code examples and techniques put together by the engineers at GSE. All examples are complete and pre-tested at GSE. Contact GSE for more information on the Engineer's Notebook.

The following example performs an accumulation of the net weight.

OBJECTIVE: Configure the unit to invoke a macro after the "out" weightment is performed of a Truck IN/OUT operation. This technique will tie the capabilities of the truck IN/OUT software with the unit's macro capabilities.

PROCEDURE: SET UNIT FOR TRUCK USE

720%s1%e	P720.01 IDUSE: Truck

MACRO "0" (accumulate truck net wt.)

800%s%c%e	P800.24 macro # 0
13,6%%+%e	add
91%%s%e	select
0%%e%e	enter
%%s%e	select
91,13%%C%e	copy

SETPOINT "32"

8200%s1%e	P8200.1 SPt32 Enbld (output)
8210%s0%e	P8210.0 Activ above

8211%s0%e	P8211.0 Hold 0.0 S
8212%s0%e	P8212.0 Macro 0
8213%s0%e	P8213.0 Mot'n Ign'd
8214%s0%e	P8214.0 Basis New # (Fixed)
8215%s1.000000%e	P8215. AL: 1.
8230%s1%e	P8230.1 DeAct Below
8231%s0%e	P8231.0 Hold 0.0 S
8232%s16%e	P8232.X Macro none
8233%s0%e	P8233.0 Mot'n Ign'd
8234%s0%e	P8234.0 Basis New # (Fixed)
8235%s1.000000%e	P8235. DL: 1.
8250%s13%e	P8250.X Par13 TrNet

CONCLUSION: The truck net wt. register and the setpoint are the “**key**” to this whole operation. The truck net wt. is not calculated until an “out weighment” is performed. Until then this register retains the last calculated value until the next out weighment or a new value is entered into this register from within a macro. Once an out weighment is performed and motion stops a new truck net wt. is calculated. The setpoint is set to trip when the truck net weight reg. exceeds 1 pound (any number greater than 0). Note that the setpoint is based on the “Truck Net Wt.” Once the setpoint is tripped a macro is set to be invoked. This particular example will perform an accumulation to the truck net weight. After the macro operations are executed the final step in the macro is to insert a “0” into the truck net wt. reg. This will reset the setpoint to allow it to be tripped after the next out weighment is performed.

Chapter 18 Time / Date Setup (OPTION)

(Time/Date Option GSE Part#: 200550-00TD0)

18.1 Time and Date Operations

The standard unit includes a Time-Date feature which is non-battery backed. This means that when the feature is used, the time and date must be entered every time the instrument is powered up. The unit can be set up to prompt you to enter the time and date at power up. If entering the time and date at each power up is considered undesirable, a battery-backed Time-Date option is available at additional cost. The Time-Date feature permits printouts with time and day of the week and the date in many possible formats. When enabled, alarms can be used to cause certain events to occur at pre-timed intervals.

NOTE:
In the following discussion, HH is a 2 digit representation for hours, MM is minutes, SS is seconds, MO is month, DA is day and YR is year. When the unit is powered up, the time and date clock is set to Jan 1, 1970, 00:00:00 am (the UNIX computer standard). If the clock is not reset at powerup, either by the operator or by having the time-date option chip installed, the current time and date will be the elapsed time since power-up. The alarms, if enabled, will also show that as their setting prior to their setup.

It is recommended that the unit be set up so that the time and date are displayed upon powerup (P502). Time and date are displayed in the large numeric display in the format HH.MM.SS and MO.DA.YR (or DA.MO.YR if set for the international style). If not battery-backed, the upper line of the character display reads enter. The lower line of the character display reads time or date as appropriate. If the battery-backed time-date option is installed, time and date are each displayed for about 3 seconds and no changes are permitted. If desired, you can press **<ENTER>** to end the Time-Date display before the 3 seconds is over. A new Time and Date value can also be keyed in by accessing the setup parameters as described in the Advanced Setup, section.

Viewing Time And Date

While in the Weigh Mode, the time and date can be displayed simultaneously by pressing **<11> <SELECT>**. The date is then displayed on the large numeric display in the format MO.DA.YR (or DA.MO.YR for international style) and the time is displayed on the dot matrix display in the format HH:MM:SS. The time may be displayed in a 24 or 12 hour format with an am or pm displayed as appropriate, depending on the setup of time-date. Press **<SELECT>** to return to where you were.

Entering Time

As mentioned previously, a new time may be entered at power-up or into P500 by keying in HH.MM.SS in a 24 hour format. Hours and minutes entries must be separated by a decimal point. Seconds entry is optional, and if omitted, they are initially set to zero. To specify seconds, they also must be separated from minutes by a decimal point. Leading zeroes need not be entered. For example, if you enter 8.9.45 and press **<ENTER>**, the time will be set to 08:09:45; if you enter 15.02 and press **<ENTER>** the time is set to 15:02:00.

If time is entered improperly, the prompt try h.m.s is displayed.

Entering Date

A new date may be entered at power-up or into P501 by keying in MO.DA.YR (or DA.MO.YR if international format was selected) followed by the **<ENTER>** key. Month, day and year entries must be separated by decimal points. Leading zeroes need not be entered. For example, if you enter 5.1.92 and press **<ENTER>** the date is set to 05/01/92. If the date is entered improperly, the prompt try m.d.y (or try d.m.y for international format) is displayed.

Time / Date Parameter P502 Update

Beginning with Indicator (Model 550 - included on M574) firmware revision code 01003, date code April 02, 1992 and later, time / date may now be entered at power-up if P502 is set for "yes", whether or not the battery backed time / date module has been installed. This will give end users the ability to adjust the time without having to know the setup access code for the indicator.

Time / Date transmit code update

Beginning with indicator (Model 550 - included on M574) firmware revision code 01003, date code April 02, 1992 and later, a new choice for the custom transmit format of time / date has been added, format code 32. This allows a time / date type variable (current time, recalled time, and alarms 1 - 4) to be transmitted as a numeric value in terms of the number of seconds elapsed since Jan 1, 1970. This should be useful in uploading time / date information to a computer for use in a spreadsheet application.

18.2 Time and Date Parameter Setup

P500.SS Time

This parameter displays the current time setting displayed in a military-style 24 hour format. The dot matrix portion of the display shows Time HH:MM while the seconds are shown to the right of the decimal in the numeric display. A new time may be entered by keying in the desired entry as HH.MM.SS with the seconds optional. Note that the hour and minutes entries must be separated by a decimal point. For example, if you enter 8.9.45, the time will be set to 08:09:45; if you enter 15.02, the time will be set to 15:02:00.

P501.YR Date

This parameter displays the current date setting. If P510 is set to USA, the dot matrix display will show Date MO/DA; if P510 is set to International, the dot matrix will show Date DA/MO. The year is shown in the rightmost digits of the numeric display. Depending on whether the USA or International date display is used, a new date may be entered by keying in the correct digits in the format MO.DA.YR or DA.MO.YR followed by the **<ENTER>** key. Note that the months, day and year entries must be separated by a decimal point. For example, if you enter 5.1.92, the date will be set to 05/01/92.

P502.XX TmDat

This parameter determines whether the time and date will be displayed upon power-up: P502.00 sets Time-Date to no; P502.01 sets Time-Date to yes. Having Time and Date appear upon power-up for systems not having the optional clock installed can be a very beneficial way of prompting the operator to key in the time and date.

NOTE:
The optional battery-backed Time-Date function must be installed for the correct time and date to appear upon power-up.

P503.XX AM/PM

This parameter determines whether time will be displayed in a 12 hour or 24 hour format. The selection here does not change the display method for the setup modes and the time must always be entered into P500 or upon power-up using the 24 hour format.Three alarms have been built into the instrument to perform various operations through the execution of a Macro. Parameters P504 through P509 are used to set up the alarms.

P504.XX A1Sel

This parameter sets the operating conditions for the first alarm. The available choices are: off, intvl, and daily. Off is the default selection which means the alarm is not used. Interval means that the alarm will be executed on an interval basis, such as every 5 seconds, every 17 seconds, or every 2 hrs and 20 minutes. The start of the interval is at midnight of each day. If the desired interval does not divide evenly into a 24 hour period, the second alarm after midnight will be closer to the previous alarm than is normal. The daily selection actuates the alarm at a certain time of the day, every day. This feature may be useful for performing certain operations once a day, perhaps at shift change, such as clearing totals or counters. If Alarm 1 is used it will automatically invoke Macro 12.

P505.SS A1Tim

This parameter specifies the interval or the time of day for Alarm 1. This is entered as h.m or h.m.s for hours, minutes and seconds. For example: 0.0.10 for a 10 second interval, 0.3 for a 3 minute interval, or 8.0.0 for an 8:00 am alarm. Enter the desired value and press **<ENTER>**.

P506.XX A2Sel

This parameter specifies the use of Alarm 2, with the same choices as P504. If Alarm 2 is used it will automatically invoke Macro 13.

P507.SS A2Tim

This parameter specifies the time for Alarm 2, which is set in a similar fashion as P505. Enter the desired value and press **<ENTER>**.

P508.XX A3Sel

This parameter specifies the use of Alarm 3, with the same choices as P504. If Alarm 3 is used it will automatically invoke Macro 14.

P509.SS A3Tim

This parameter specifies the time for Alarm 3, and is set in a similar fashion as P505. Enter the desired value and press **<ENTER>**.

P510.XX Style

This parameter provides the time and date format you desire, either USA (MO/DA/YR) or International (DA/MO/YR). The selection made here does not affect the printing of time and date since print format is specified with the format entry during the Custom Transmit setup.

P511.XX RtDsp

This parameter provides five selections for the recall display. P511.00 selects Time and Date, P511.01 selects time only, P511.02 selects date only, and P511.03 selects number.

P512.XX A1Dsp

This parameter provides five selections for the Alarm #1 display. P512.00 selects Time and Date, P512.01 selects time only, P512.02 selects date only, and P512.03 selects number.

P513 through P515

This parameter provide five selections each for the Alarms #2 thru #4. Setup is identical to P512.

18.3 Alarms

Setting Alarms (P504 - P509)

P504.XX A1Sel

This parameter sets the operating conditions for the first alarm. The available choices are: off, intvl, and daily. Off is the default selection which means the alarm is not used. Interval means that the alarm will be executed on an interval basis, such as every 5 seconds, every 17 seconds, or every 2 hrs and 20 minutes. The start of the interval is at midnight of each day. If the desired interval does not divide evenly into a 24 hour period, the second alarm after midnight will be closer to the previous alarm than is normal. The daily selection actuates the alarm at a certain time of the day, every day. This feature may be useful for performing certain operations once a day, perhaps at shift change, such as clearing totals or counters. If Alarm 1 is used it will automatically invoke Macro 12.

P505.SS A1Tim

This parameter specifies the interval or the time of day for Alarm 1. This is entered as h.m or h.m.s for hours, minutes and seconds. For example: 0.0.10 for a 10 second interval, 0.3 for a 3 minute interval, or 8.0.0 for an 8:00 am alarm. Enter the desired value and press **<ENTER>**.

P506.XX A2Sel

This parameter specifies the use of Alarm 2, with the same choices as P504. If Alarm 2 is used it will automatically invoke Macro 13.

P507.SS A2Tim

This parameter specifies the time for Alarm 2, which is set in a similar fashion as P505. Enter the desired value and press **<ENTER>**.

P508.XX A3Sel

This parameter specifies the use of Alarm 3, with the same choices as P504. If Alarm 3 is used it will automatically invoke Macro 14.

P509.SS A3Tim

This parameter specifies the time for Alarm 3, and is set in a similar fashion as P505. Enter the desired value and press **<ENTER>**.

Naming Alarms (P650 - P654)

P650. - - Rtime

This parameter sets the naming parameters for recalled time. Entry is the same procedure as for P701.

P651. - - A1Tim

This parameter sets the naming parameters for Alarm #1. Entry is the same procedure as for P701.

P652 thru P654

These parameters set the naming parameters for Alarms #2 thru #4. Entry is the same procedure as for P701.

Character Entry

When alphabetic and other non-numeric characters are being entered into the unit, the **<UNITS>**, **<PRINT>**, **<ID>** and **<TARE>** keys assume the functions of arrow keys similar to those found on a computer keyboard (see Figure 23 Keypad Cursor Keys). The **<UNITS>** key

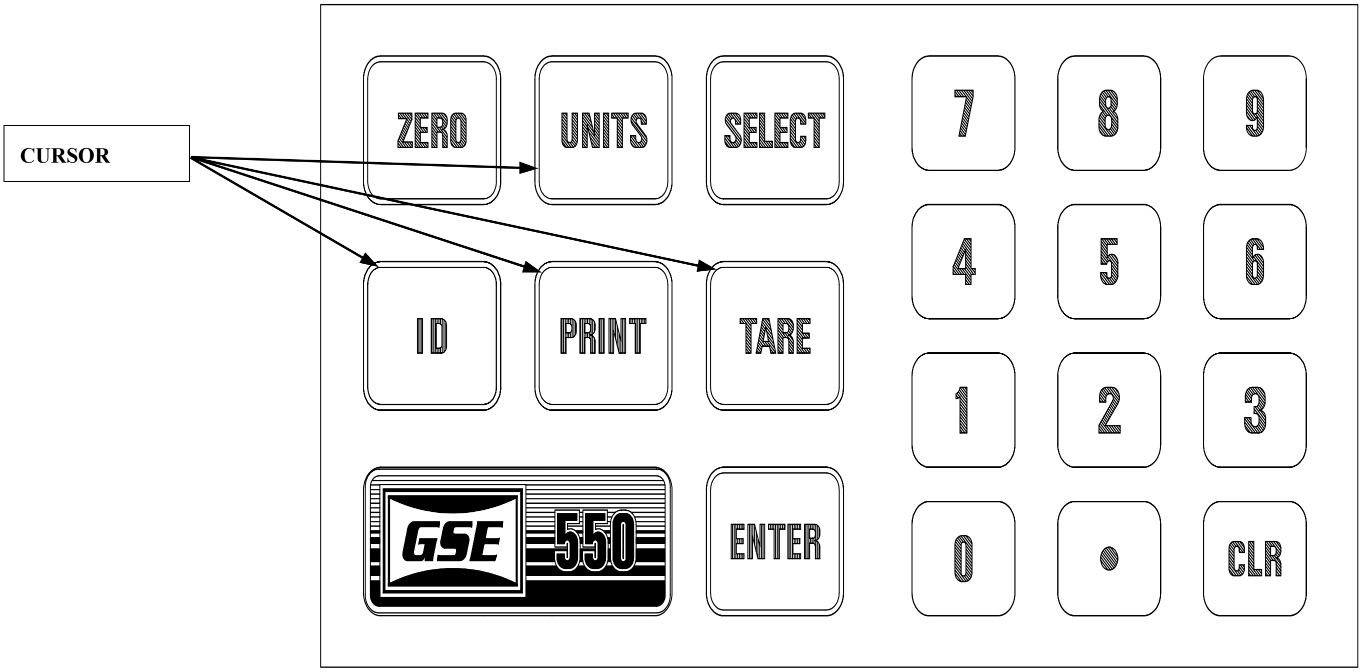

Figure 23 Keypad Cursor Keys

scrolls forward through the list of characters; **<PRINT>** key scrolls backward through a list of characters; **<ID>** can be used as a backspace key; **<TARE>** key advances to the next location.

When you encounter a parameter that accepts this type of information, press **<UP ARROW>** key and the 550 will place an "A" in the dot matrix portion of the display. The **<UP>** and **<DOWN>** arrow keys are then used to cycle through the possible selections of upper-case and lower-case letters, numerics and the standard set of punctuation symbols, starting with the letter A. Holding down **<UP>** or **<DOWN>** arrow keys will cycle you through more quickly. When the desired character is displayed, press **<RIGHT>** arrow key to move to the next location where an "A" will be displayed so you can select the next character. This operation is in effect when entering ID data and while in Setup Modes **P157, P600-P694, P157-P158, P701 - P711, P800 - P816, P850 - P865** and **P1000 - P4000**. Refer to Figure 24 Character Listing for the available characters and their order of appearance.

18.4 Time and Date Battery Backed Option

Description

The GSE Time / Date Option (GSE Part Number 200550-00TD0) is designed to provide battery backed-up time and date for the GSE Model 500 series of Weighing and Counting instruments. While the standard unit has an on-board clock, it requires that the time and date be set every time the unit is powered up. The Time / Date Option provides battery backed time and date which keeps the clock running continuously, even when the unit is powered down. The time and date are programmed (Eastern Standard Time) into the option module at GSE when the module is tested prior to shipment.

Specifications:

Accuracy:	+/- 1 minute per month at 25 degrees Centigrade. The module automatically corrects for leap year.
Battery Life:	Minimum of 10 years with unit power off.

If the unit which requires the time / date option is not new, verify that the firmware currently installed in the unit is not earlier than July 10, 1991. If the firmware is earlier than this date, it will not support the Time / Date

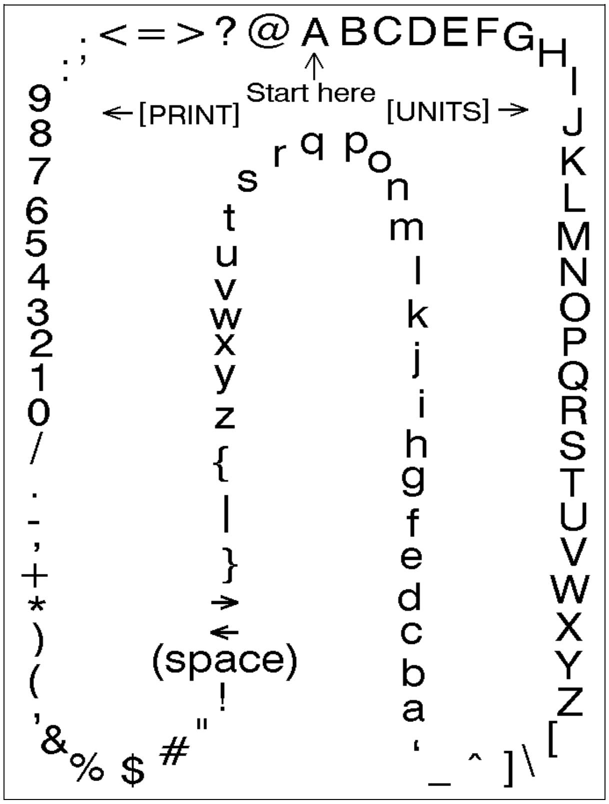

Figure 24 Character Listing

Option. The firmware date code can be checked by accessing one of the setup parameters within the unit. Press the following keys on the unit's keypad:

<60102> <SELECT>

This section is in reference of the model 550. The dot matrix portion of the display will show the date code of the installed firmware. If the date shown is before July 10, 1991, then the firmware will have to be updated in order for the clock option to work. If this is the case, contact GSE for upgrade assistance. If the date shown is after July 10, 1991, proceed with the installation.

Installation Procedure

a. Remove power from the unit by disconnecting the line cord from the AC power source.

b. Take the unit to a static-protected workstation. Wear a static control wrist strap. If this equipment is not available, ground your hands to the chassis before touching any of the internal integrated circuits.

c. Open the unit by removing the rear panel. It is secured by eight screws along the perimeter. Use a medium size phillips-head screwdriver.

d. Carefully lift the rear panel from the enclosure, rotating it about the left edge near the J1 load cell strain relief. Disconnect the keypad ribbon cable from J7 on the main board. Place the rear panel assembly on a table with the circuit board facing up.

e. Refer to figure 25, Time/Date Option Installation on the main board. Locate the U13 RAM IC on the main PC745 board. It is a large 28 pin IC located under the display module, near the display ribbon cable. (Refer to Fig. B on Figure 25).

CAUTION

All electrical connections and access to the inside of the unit should be performed by qualified service personnel only!

f. Use a small screwdriver and carefully pry the chip up and out of its socket. Do this by sliding the end of the screwdriver between the chip and its socket and lifting up slightly, first at one end of the chip and then at the other end. Alternate the ends being pried until the chip is loose. Be careful where the screwdriver is placed so as not to pry the socket out of the board! (Refer to Fig. A on Figure 25).

g. The removed RAM chip may be saved for use as a spare part, or in case the clock chip needs to be removed.

h. On the top of the Time/Date module supplied with this Option is a shiny black circle which indicates the pin 1 location. This end will go toward the top end of the socket, near the U13 marking on the Main PC Board.

i. The socket from which the RAM was removed will have 32 pins. The bottom side of the Time/Date module has 28 pins, two rows of 14

18

pins. The module must be installed shifted toward the bottom of the socket. Refer to Fig. C on Figure 25.

j. Align and place the Time/Date module on top of the socket as described in the previous step. Carefully press the module into the socket. Double check to verify that the proper alignment has been achieved and that no pins have been bent over.

k. Re-apply the power to the unit. The system will automatically recognize that the clock chip has been installed. Make sure the option is working properly before proceeding to the next step. This can be done by viewing parameter 11, recording it, removing the power from the unit, wait a few minutes, re-apply the power and then re-viewing parameter 11. If installation was performed correctly, the data in parameter 11 should have incremented the number of minutes the power was removed.

l. Hold the rear panel assembly at a right angle to the main enclosure with the edge having the keypad cable adjacent to the enclosure.

m. Reconnect the keypad ribbon cable from the back side of the keypad to J7 on the main board. The “bump” on one side of the connector should align with the slot on one side of the J7 header.

n. Lower the rear panel against the enclosure, being careful not to bump the display. Secure the enclosure with the screws which were removed previously in step c.

Time / Date Option Operation

Apply power to the unit and verify proper operation. To verify the time and date values, select the time / date mode. Key in:
<11> <SELECT>

The display will show the date on the large numeric digits and the time on the dot matrix display. For example, for July 16, 1994 at 3:27:23pm the display will appear as follows:

07.16.94 03:27:23pm

Refer to the P500 setup parameters to enter the time and date or to change the format of the time and date. To include the current time and / or date into the data transmissions to a printer or other peripheral, refer to the Custom Transmit Setup in Chapter 15. The Time/Date data is parameter ID 11.

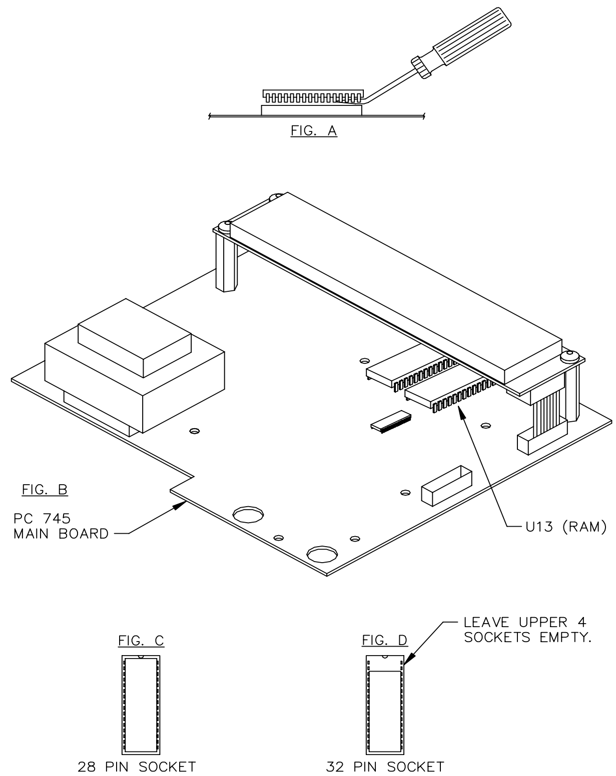

Figure 25 Time/Date Option Installation on Main Board

CAUTION

All electrical connections and access to the inside of the instrument should be performed by qualified service personnel only!

Chapter 19 Memory Expansion (OPTION)

19.1 Memory Expansion Option
(GSE Part #: 09-30-24164)

The 550 uses EEPROM (electrically erasable, programmable, read only memory, also referred to as E^2 memory) to store all setup parameters and other retained data, such as calibration data, accumulated totals, entered ID data, stored data rows, incrementing registers, etc. E^2 memory provides excellent protection against undesirable loss of data.

Included standard with the 550 instruments are two 8 pin sockets for data storage IC's. Each socket can hold either a 512 or a 2K byte E^2. From GSE, one of the sockets has a 512 byte E^2 installed and the other is empty. (The 550 must have at least a 512 byte E^2 chip installed for standard default settings.)

Of these 512 bytes, about 190 are used for all the standard setup parameters in the instrument (including 34 bytes for the default selections for Custom Transmit Setup and ID Setup), leaving 322 for optional setup parameters. The features which use variable amounts of storage are listed in Table 38 along with the calculations to determine the amount required.

While setting up the unit, if the error message EEROM Full! appears after making an entry or selection, then the setup you are attempting will not fit into the currently installed memory storage space. Either reduce the size of storage required or install more memory space by adding memory. The unit automatically senses how much memory has been installed.

> Install the Memory Expansion Option to increase memory to 4K bytes.

If more memory storage space is required, several options are available. One option is to add a second E^2 (2K x 8) to the unit in the empty 8 pin socket labeled U9 (GSE Part #09-30-24164) which can be obtained from GSE, Inc. This will provide a maximum of 2560 storage bytes.
If only a little more storage space is required, the smaller 512 byte E^2 which may also be installed to augment the standard memory storage space.

The second upgrade is to replace the E^2 in U11 with the same larger chip, for a total storage space of 4096 bytes.

19.2 INSTALLATION OF ADDITIONAL MEMORY

When replacing the main E^2 (U11), it is recommended that an E^2 copy be performed first. This will let you

> **CAUTION!**
> The following procedure should be performed only by authorized service personnel!

maintain all of the setup data, including important calibration data, the serial numbers and the audit trail value. The procedure is as follows: (Refer to figure 26 Main Board PC745G & H).

a. Disconnect the unit from the AC power source.

b. Remove the rear cover panel.

c. Install the new E^2 (Part #09-30-24164) in U9.

d. Power up the instrument.

e. Loosely re-attach the rear panel to the enclosure for grounding purposes and reconnect the keypad cable.

f. Allow for changes to be made by keying in **<1> <0> <0> <SELECT> <2> <3> <6> <4> <0> <ID> <ENTER>**

g. Select the Setup Mode **65000** by pressing **<6> <5> <0> <0> <0> <SELECT>**.

h. Press **<ENTER>**. The next prompt reads: Enter Copy?.

i. If you wish to proceed with the copy, press **<ENTER>** again. Pressing any other key will abort the copy.

j. The copy process will begin automatically. A counter will be displayed which increments by one as each byte is copied. It will take about 3 seconds to copy 512 bytes. The number of bytes copied is the smaller of the sizes of either E^2.

k. When the copy is done, the message Copy Done is displayed briefly. Next the messages Power Down ... to Save! are alternately displayed for one second each until either power is removed or until any key is pressed. All parameters will have been copied from the E^2 in U11 to U9, including the instrument and board serial numbers and the Audit Trail counter (parameters **P602XX**). However, these three parameters are cleared from U11 to prevent duplicate serial numbers. Thus U11 contains all its original setup data except these **P602XX** parameters. If **<ZERO>, <SELECT>** or any of the numeric keys are pressed then the **P602XX** parameters are copied back to U11 and deleted from U9. U9 will still contain a copy of all the other stored data except the **P602XX** parameters.

l. Remove the unit from the AC power source.

m. Remove the original E^2 from U11. Move the new E^2 from U9 to the U11 socket. If desired (for more storage room) place an E^2 in the U9 position also. This can be either the E^2 removed from U11 or another E^2.

n. Re-attach the rear panel of the 550 to the enclosure.

o. The instrument is now ready to be used with the upgraded amount of E^2 storage memory.

19.3 Additional Memory and Replacement Part numbers

Additional **GSE part numbers** for the 550 memory expansion are listed below. GSE part #: (09-30-2404) is factory installed in the unit. This is 512 bytes of memory. An additional 2048 bytes of memory can be added for a total of 2560 bytes of memory. The additional E^2 part number is listed below. Replacing both E^2 devices will expand the storage memory to 4096 bytes.

- 512 bytes GSE part #: (09-30-2404)
- 2048 bytes GSE part #: (09-30-24164)

19.4 Expand Memory to 8K or 16K

Additional E^2 is available to expand memory to up to 16K bytes. This is only possible with added RAM to the main board. The GSE 24K database RAM module must be added to the board to accomplish this. A portion of the RAM must be allocated specifically to accomodate the additional E^2 installed. This is accomplished by accessing the setup, entering the access code and then proceeding to P65010. Allocating some of the database memory for general use, press **<2> <ENTER>**. This will reduce the total amount of database memory by 8K bytes. To reverse this and keep all the database module's memory allocated to databases, press **<1> <ENTER>**.

Allocating database memory to general usage can be used to allow variably sized setup modes (such as custom transmit setup and macro setup) to increase when they would otherwise be limited by the occurence of the "Out Of Ram" error message. If this is done, the only limitation on the amount of information entered into these setup modes is the amount of available EEPROM memory.

Refer to chapter 28 for more information on allocating more RAM.

Add the E^2 in the same manner as the other E^2 is installed.

- 8192 bytes GSE part #: (09-30-24645)

Note that with the advent of allocating an additional 8K of RAM to accommodate the additional E^2, only 10K of E^2 is available for use. File setups greater than 10K will result in error messages during lownload or upload. ie “Eprom Full” or “Out of Memory”. Parameter P60000 will show that 16K of E^2 is installed. Only 10K is accessible. A combination of an 8K and a 2K E^2 chip might be more practical, however both combinations will

Mode Number	Description	Memory Use
P119 -	Linearization	When linearization is enabled, 41 bytes of memory are absorbed. Each linearization point will absorb 8 bytes of memory. There are a total of five linearization points. One (1) byte of memory is absorbed when the Linearization Feature is enabled. If less than five points are stored, 8 bytes of memory are freed up per point. If less than 41 bytes of memory are free, the unit will not allow linearization to be enabled.
P600 - P694	Custom Naming Parameters	Parameters 0 - 94 (P600 - P694) can accept a name between 1 - 49 characters. Each character will absorb 1 byte of memory.
P900 - P9XXX	Input Interpreter Setup	There are eight possible interpretations that can be engaged each of which can have a variable number of characters from 1 - 49. If all eight interpretations were used and all 49 characters were stored for each then the total memory required would be 8 x 49 = 392 bytes.
P1000 - P4XXX	Custom Transmit Setups	One byte per size of transmit setup plus two bytes for each parameter transmitted. This applies to each of the four Custom Transmit Setups.
P700 - P712	ID Setups	Add up the entered values for even-numbered parameters: P700, 702, 704, 706, 708 and 710. Then add in the length of each entered name for the odd-numbered parameters: P701, 703, 705, 707, 709 and 711.
P800 - P816	Macros	The memory used by each macro is the size of the Macro Setup minus one for each occurence of a percent (%) character, plus one if the macro is programmed. Add up all the memory used by each of the sixteen macros, P800 thru P816.
P170 - P172	Analog Output Setup	If the analog output is enabled (P170), then 5 additional bytes of memory are used.
P5100 - P8200	Setpoint Setups	Each enabled Setpoint (P5100 thru P8200) uses 33 bytes of memory.
P60 - P89	Variables for Setpoints	For each Variable (P60 thru P89) which is referenced within the setpoint setup, four bytes of storage memory are used.
P720	Truck In / Out Weighing	When Truck In / Out Weighing is enabled (P720), two bytes of storage memory are immediately used and the remaining storage space is allocated to allow the maximim number of rows possible.

Table 38 Memory Storage Requirements

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CAUTION!

Servicing procedures must be performed by qualified service technicians only! Attempts to service this instrument by unqualified personnel may void the warranty!

Figure 28 Main Board PC745G

Chapter 20 Database (OPTION)

20.1 Database Option

(24K Module, GSE Part #: 200550-00TD1)
(120K Module, GSE Part#: 200550-00TD2)

This section describes what applications can be accomplished with the Database Option, Installation of this option, and Operation of the Database Option once it has been installed.

The 550 will accept a 24K or 120K RAM data storage module. The GSE part numbers are 200550-00TD1 and 200550-00TD2 for the 24K RAM and 120K RAM respectively. Each of these modules has the battery backed Time / Date feature.

20.2 Database Applications

DATABASES may be used for several different reasons. Some of the most popular weighing applications include use as a Transaction Recorder, Part Number Look-Up, Quantity on Hand, and Batch Formula Lookup.

Transaction Recorder

Every weighing operation which occurs on the scale is stored to memory with information regarding other pertinent data. This may include time / date, employee ID, job number, part number, number of boxes, customer number, etc...

Normally this type of application would "Make Rows" only. Data would never be recalled. A report would be sent to a computer or printer at the end of the shift, day or week. Then the data would be deleted.

Part Number Look-Up

When a part is weighed, the part number is keyed in. Information about the part such as description, bin location, etc ... is recalled from the DATABASE. The information is used to print a label which is placed on the part. This same concept can be used to recall name and address based upon customer ID.

Quantity On Hand

The DATABASE can be used to keep track of inventory levels of various products which are based on weight (or quantity with the Model 570 units). When an item number is keyed in, the current amount on hand is recalled into the Gross or Net total register. Then an add or subtract accumulation operation is performed, depending on whether an amount is being taken from or added to stock. Then the row is updated with the revised amount on hand. Using a Var for a “safety stock level” a buy report could be generated based on the amount on hand compared to the safety stock amount. Another DATABASE could also be used to keep track of the amounts on order.

Batch Formula Lookup

Many applications require that certain proportions of various ingredients be mixed together when mixing a batch or formula. The DATABASE can store the amounts of each ingredient for a formula, either in terms of a fixed amount or as a percentage of the total batch size. One column of the database could contain the number of the setpoint which needs to be activated to supply the required ingredient.

Certainly there are many other possible uses for the DATABASE option. And since up to 16 DATABASES may be used, several different uses may be combined in one installation.

20.3 What is a Database?

A database is a collection of useful information organized in a specific manner. For instance you can view a telephone directory as a database:

Name	**Telephone Number**	**Address**
Name 1	Telephone Number 1	Address1
Name 2	Telephone Number 2	Address2
Name 3	Telephone Number 3	Address3
Name 4	Telephone Number 4	Address4

Several terms used in this section on Database are defined below:

FIELD: A parameter type, or column name. For instance the field "Name 1" or "Name 2" refers to the data stored in the column defined as **Name** in the above example.

RECORD: One row of a database. A collection of fields as defined by the columns of a database. In the above example, one of the four records shown includes Name 2, Telephone Number 2 and Address 2 fields.

DATABASE: A collection of records.

A DATABASE is defined by the parameters whose data will be stored within it. Each parameter to be stored becomes a column of the database. When rows of data are created using the "Make row" command, copies of the current data of those parameters are stored together in the DATABASE.

Once a row exists, that entire row of data may be recalled by first specifying which column of data is to be searched. If no column is specified then the first column is the default search column. Then the specific data which is to be located is specified. This is done by making an entry at the "Recall Row" command or by storing the search value into the search parameter and pressing **< ENTER >** at the "Recall Row" command without an entry. If a row is found whose data in the search column exactly matches the specified data, then all of the data within that row is copied into the parameters associated with that column.

20.4 Operation (enable or disable database)

The DATABASE feature has been integrated into the unit in such a manner as to be easy to use without the need to program macros for simple applications and to permit easy use of macros for more complex operations.

To accomplish this goal, the ID USE setup mode, P720, will now include four menu selections. The choices for P720 are:

P720.00 Std.

P720.00 Truck

P720.00 Menu

P720.00 Dbase

20.5 Database Setup

The setup mode for macros is accessible only if the DATABASE module and EPROM are installed in the unit. This is required since the DATABASE setups are stored within the DATABASE module itself. (Keeping all DATABASE setup and stored data in the same module improves serviceability since a DATABASE module can be easily moved from one unit to another if replacement of a unit were to become necessary.) Also parameter P720 must be set to "dbase" or "menu". Once these requirements have been met the DATABASE setup modes become accessible.

Up to sixteen separate DATABASES may be setup for use within the unit. Each database has its own setup mode. Refer to the following list of DATABASE setup parameters.

P731 is used to define database 1.

P732 is used to define database 2.

P733 is used to define database 3.

P734 is used to define database 4.

P735 is used to define database 5.

P736 is used to define database 6.

P737 is used to define database 7.

P738 is used to define database 8.

P739 is used to define database 9.

P740 is used to define database 10.

P741 is used to define database 11.

P742 is used to define database 12.

P743 is used to define database 13.

P744 is used to define database 14.

P745 is used to define database 15.

P746 is used to define database 16.

The desired DATABASE setup mode is selected by keying its parameter number followed by the **<SELECT>** key, such as "731 **<SELECT>**" to setup DATABASE 1. In order to allow any changes to be made, the access code, **<23640> <ID> <ENTER>** must be entered at the "Keyin Code" prompt.

If you are using the 550 simulator software, press **<ALT> <D>** from the main screen to allow for enabling a 24K or 120K Dbase. Enter a 0, 1 or 2 for no, 24K or 120K Dbase. Refer to the chapter on 550 Simulation

Software for more information.

Each DATABASE may contain up to 24 columns of data. The setup for a DATABASE consists of selecting the parameter ID's that will be used for its column.

When a DATABASE setup mode is selected, if it has been previously setup then the parameter selected for the first column is shown. Otherwise the display reads "Col 1 END".

To assign a parameter to a column, key in the parameter's ID and press **<ENTER>**. If you are unsure of the parameter you require use the UP and DOWN arrow keys, to locate the required parameter. Press the **<ENTER>** key to save the chosen parameter and advance to the next column. Repeat this procedure for the all columns required for the application.

The LEFT and RIGHT cursor keys, may be used to scroll through the columns which have been setup to review their current selections. Pressing the **<ENTER>** key alone also advances the display to the next column, the same as the **<TARE>** key. If an entry is made at a column which has already been set and then returned to, then the entry will insert a column in front of the current column.

To delete a column definition, press the **<CLR>** key when that column is shown. To delete the all the current selections for the columns of current DATABASE, advance the display to the last choice (which is shown as "Col X END").

If rows have been created in a DATABASE then any attempt to change the definition of the columns will display the prompt "CLEAR DBASE" followed shortly by "ENTER toCLR" to appear. Pressing **<ENTER>** will delete all created rows in the DATABASE, any other key will abort the operation.

20.6 Macro Menus

In order to implement the MENU selection, a new setup mode **(P850 thru P866)** has been added to allow the naming of macros. Macros that are to be user invoked should be named when the macros are being setup. Macros should be given names which will be meaningful to the operator of the indicator, such as "Recll Part#" or "New item" or "Daily Reprt", in order to make the menu as helpful as possible.

If **P720** is set for "Menu", all macros which have been named will become a selection in the menu which appears when the **<ID>** key is pressed from the weigh mode. The **<SELECT>** key advances the display to the next menu choice. (And similar to the setup mode, **<.>** **<SELECT>** steps backward through the choices.) Pressing the **<ENTER>** key first returns the unit to the previous weigh mode (ie the mode before the **<ID>** key was pressed) and then invokes the macro whose name was displayed when the **<ENTER>** key was pressed. The **<CLR>** key will return the unit to the preceding weigh mode.

Macro Name Setup

To name a macro, first access the appropriate setup mode. Macro 0 is named at **P850**, Macro 1 is named at parameter **P851**, etc... Macro 16 is named at **P866**. The names are entered similar to the macro setup mode, with numeric keys where appropriate and using the “cursor” keys to enter alpha characters as needed. When an external alpha input device (such as a computer or keyboard) is available, then the alpha characters may be entered directly. Use of a keyboard makes this setup operation much easier.

Up to ten characters may be entered for the name. Keep in mind, however, that when the menus are selected the name will be displayed on two lines of five characters each. Thus the first five characters will be on the top line and the remaining characters on the bottom line. If less than 10 characters are entered for the name, the remaining positions will be automatically blanked.

20.7 Basic Database Menus

Alternatively, when **P720** is set for "dbase", the basic DATABASE menu is accessed when the **<ID>** key is pressed from one of the weigh modes (any mode below mode 90). It provides a minimal selection of operations which can be viewed by pressing the **<SELECT>** key and invoked by pressing **<ENTER>** with an optional (alpha-)numeric entry. This allows simple database operations to be performed without a large number of confusing choices. These basic operations are described in Figure 27, Selection of Database Operations.

The choices shown comprise what are considered the simple operations. More complex operations could only be performed through the entry of the proper operation code (a numeric entry) followed by the **<SELECT>** key.

Each selection shown above can be invoked in one of two ways. Either an entry can precede the **<ENTER>** key or the **<ENTER>** key may be pressed alone. Both

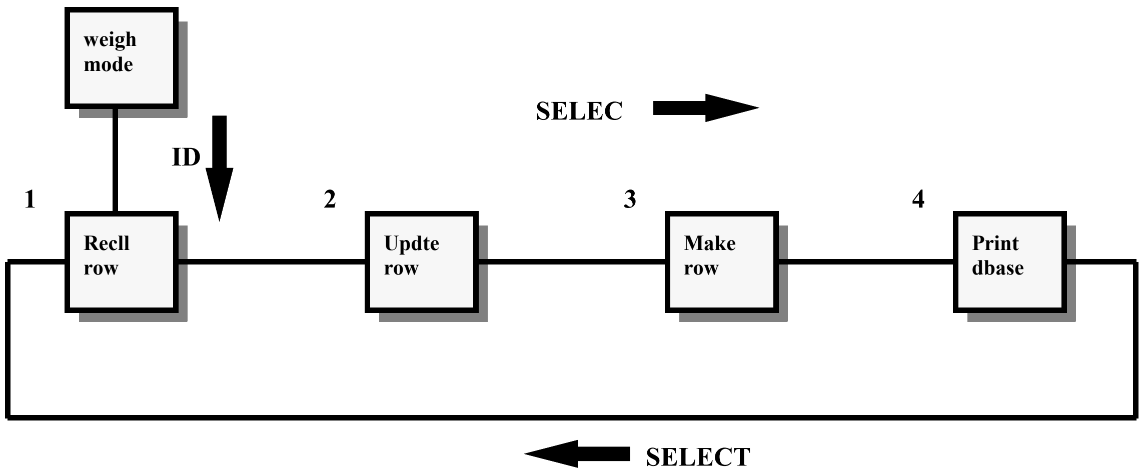

Figure 27 Selection of Database Operations

of these possibilities are described below for each selection.

1 RECALL ROW:

a. **<ENTER>** key alone:

The first row which matches the current data in the parameter which corresponds to the currently selected column in the currently selected DATABASE is located. Then all the other information in that row is copied into the corresponding parameters. Note that the selected column defaults to being the first column unless otherwise specified. Thus if the first column were setup to be ID 1 (parameter 21), and the data stored in ID 1 was "ABC", then the current DATABASE would be searched, starting from the beginning, for a row in which "ABC" was the data in the first column of that row. Then the row which was found would be recalled. If a matching row were not found, then an error message would be displayed briefly. Also the error code is saved so that a macro can test for the occurrence of that error.

The recall operations are used when information is needed regarding an item number, such as the description, target weight, and/or quantity on hand for an item. This particular operation is used when the look-up data has already been entered into the corresponding parameter of the unit.

b. An entry followed by the **<ENTER>** key:

Same as above except that the row which is attempted to be located is the one whose data in the selected column matches the entry that was made.This selection would be used when the information to be searched has not already been entered into the unit.

2 UPDATE ROW:

a. **<ENTER>** key alone:

The most recently accessed row in the current DATABASE is updated with the corresponding data from the parameters defined for that DATABASE. If the last attempt to locate something in the current DATABASE was not successful, then a new row is created.This selection would most often be used after a row of data has been recalled. Then after one or more of the parameters defined as a column have been changed (such as total amount on hand), the row in memory is to be updated with the revised information.

b. An entry followed by the **<ENTER>** key:

The first row in the currently selected DATABASE whose selected column matches the entered data is located. Then this row is updated with the information of the other parameters defined in that DATABASE. Note that the selected column defaults to being the first column unless otherwise specified. Thus if the first column were setup to be ID 1 (parameter 21), and the entry made was "ABC" <ENTER>, then the current

DATABASE would be searched, starting from the beginning, for a row in which "ABC" was the data in the first column. Then the row which was found would be changed so that all the other columns of that row were the same as the current values of their corresponding parameter. If a matching row were not found, then a new row would be created using the values from the corresponding parameters.

3 MAKE ROW:

a. **<ENTER>** key alone:

A new row is created using the corresponding data from the parameters defined for the currently selected DATABASE. Data in any or all columns may be a duplicate of other existing rows. This selection would be used most often when storing transaction data to memory when all data to be stored has already been entered into the unit.

b. An entry followed by the **<ENTER>** key:

A new row is created in the currently selected DATABASE. The entered data is stored in the selected column and the other columns are copies of the data from their corresponding parameters. Data in any or all columns may be a duplicate of other existing rows. This selection would be used most often when storing transaction data to memory when the key field (such as part number) has not already been entered in to the unit.

4 PRINT DATABASE:

a. **<ENTER>** key alone:

This choice is used to cause the stored data to be transmitted out in a format appropriate for a report. A prompt will be displayed requesting which port should be used, ie the print port or the comm port. Enter **<1>** for the comm port and **<2>** for the print port. Refer to the printout documentation for details regarding the format for this transmission. This selection would normally be used to generate hard copy reports of the information stored within the unit. Among other possibilities, this could be quite useful for an end of day report .

b. An entry followed by the **<ENTER>** key:

(This method **MUST** be used when a macro is programmed to print the database.) The only information that can be entered here is the port number. Enter **<1>** for the comm port and **<2>** for the print port. Other than skipping the port choice prompt, this selection operates the same as the selection without the entry. This is a more straight forward method of causing a printout when you don't need to be reminded of the port number choices.

20.8 Advanced Database Menus

As stated before, the four basic commands described above invoke only the simplest database commands. More complex commands are available which allow almost any imaginable operation to be performed. However they are not shown on the basic menu in order to keep that menu simple. The more complex commands would normally be used only in conjunction with a macro since they generally require a whole series of commands to accomplish a particular task.

The more advanced commands are accessed by first pressing the **<ID>** key to access the basic database menu and then keying the command number followed by the **<SELECT>** key. At that time the name of the command is shown on the dot matrix portion of the unit's display. Pressing the **<ENTER>** key will invoke that command. Most commands allow for an entry to precede the **<ENTER>** key. Once the command is executed, most commands will then return to the weigh mode which was in effect before the **<ID>** key was first pressed. Once one of these advanced commands has been selected but before it is invoked (by pressing **<ENTER>**), the other advanced commands may be viewed by pressing the **<SELECT>** key alone. The subsequent advanced commands will then be shown on the display. Pressing the **<ENTER>** key invokes the displayed command. Pressing the **<ID>** key will exit back to the weigh mode which was in effect when the database menu was first accessed.

These advanced commands are diagrammed in Figure 28, Database Advanced Commands in the order that they will appear, along with their respective command numbers.

Please note in the database diagram that the command **<5> <SELECT>** was used to gain access to the advanced commands from the basic commands. Actually, any command number between 5 and 18 could have been entered and the corresponding advanced command would have appeared. In addition, these numeric command selections can be issued from any of the database commands. Once one of the numeric

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commands is issued to gain access to the advanced commands, then all of the database commands become accessible through the scrolling method of repeatedly pressing the **<SELECT>** key until the database command menu is terminated by execution of one of the database commands or by pressing the **<CLR>** key to exit the menu. Each time the menu is accessed, initially only the four basic commands are available.

Each of the advanced commands (numbered 5 through 18) are described in detail below. Please note that the "cursor" keys, Up Arrow, Down Arrow, Right Arrow and Left Arrow) may be used in their standard manner in order to key in alpha-numeric data.

5 FIRST ROW:

a. **<ENTER>** key alone:

The "FIRST ROW" command will cause the very first row of the currently selected DATABASE to be recalled. When used in conjunction with the "NEXT ROW" command, this operation can be quite useful if every stored row is to be sequentially recalled and processed in some manner. An example would be to print out a report using the custom transmit setups in a format which is not possible with the standard printout.

b. An entry followed by the **<ENTER>** key:

An entry preceding the "FIRST ROW" command is not defined and will result in an "ENTRY ERROR" message.

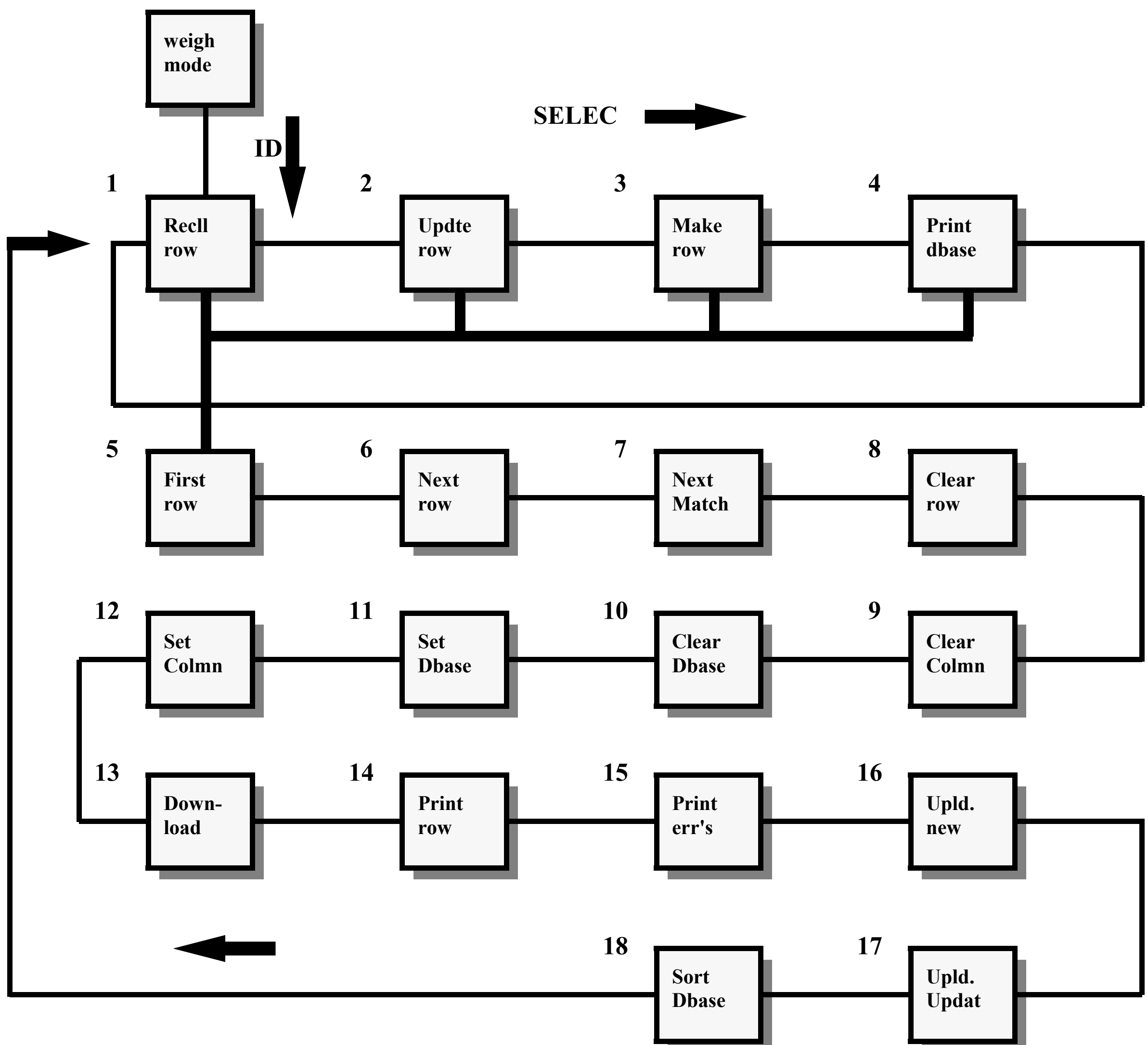

Figure 28 Database Advanced Commands

6 NEXT ROW:

a. **<ENTER>** key alone:

The "NEXT ROW" command will cause the very next row of the currently selected DATABASE to be recalled. This operation can be quite useful when used following the "FIRST ROW" command to allow every stored row to be sequentially recalled and processed in some manner. An example might be to print out a report using the custom transmit setups in a format which would not be possible with the standard printout.

b. An entry followed by the **<ENTER>** key:

An entry preceding the "NEXT ROW" command is not defined and will result in an "ENTRY ERROR" message.

7 NEXT MATCH:

a. **<ENTER>** key alone:

This command operates the same as the "RECALL ROW" command except that the search for the matching record begins with the record following the last accessed record. Specifically, the next row which matches the current data in the parameter which corresponds to the currently selected column in the currently selected DATABASE is located. Then all the other information in that row is copied into the corresponding parameters.

This command would be used successively following a "RECALL ROW" command. It allows multiple occurrences of the same data to be located and processed. For example, every occurrence of a transaction which involved a specific part number could be recalled and printed.

b. An entry followed by the **<ENTER>** key:

This form of the "NEXT MATCH" command operates similar to the entry version of the "RECALL ROW" command except that the search for the matching record begins with the record following the last accessed record. In effect this operates the same as the "NEXT MATCH" command without an entry except that the data being searched for is the entered data.

8 CLEAR ROW:

a. **<ENTER>** key alone:

The "CLEAR ROW" command is used to delete a stored row from memory. When invoked without an entry this command will delete the last accessed row from the currently selected database. However, before deleting the row from memory, the warning message "SURE? ?????" is displayed. Pressing the **<ENTER>** key again will proceed with the command and delete the row from memory. Pressing any other key abort the deletion. This command would normally be used in applications where information is only temporarily stored in the database, such as keeping track of all the item numbers which are currently undergoing a particular process. After that process were completed, then the rows could be deleted.

b. An entry followed by the **<ENTER>** key:

This form of the "CLEAR ROW" command allows the row which is to be deleted to be specified at the time of the deletion. The data entered before pressing the **<ENTER>** key is the value to search for to locate the row to be deleted. Again, the warning message "SURE? ?????" will be displayed and pressing the **<ENTER>** key will proceed with the deletion.

9 CLEAR COLUMN:

a. **<ENTER>** key alone:

The "CLEAR COLMN" command may not be invoked without a numeric entry. If it is invoked without an entry, the "ENTRY ERROR" message will result.

b. An entry followed by the **<ENTER>** key:

The "CLEAR COLUMN" command allows a particular column of a database to be cleared. If the column is a numeric type then the numeric values for that column in each row are set to zero. For alpha numeric types the data is set to be blank. The entered number is the parameter ID of the column which is to be cleared. Again, the warning message "SURE? ?????" will be displayed and pressing the **<ENTER>** key will proceed with the clearing of the column.

This command may be useful in applications such as where the accumulated weight must be deleted periodically. This allows for the total amount of a product which is produced on a shift to be totalized and printed and then cleared for the next shift.

10 CLEAR DATABASE:

a. **<ENTER>** key alone:

The "CLEAR DBASE" command is used to delete the entire stored database. Again, the warning message "SURE? ?????" will be displayed and pressing the **<ENTER>** key will proceed with the deletion. Every row in the currently selected database is then deleted.

b. An entry followed by the **<ENTER>** key:

This form of the "CLEAR DBASE" command allows a non-selected database to be deleted. Again, the warning message "SURE? ?????" will be displayed and pressing the **<ENTER>** key will proceed with the deletion of all the rows in the database. This command will most often be used in transaction applications where information about every transaction is stored. Then at desired intervals (such as the end of the day, week, or shift) all of the stored data can be printed or downloaded to a computer. Afterward, the entire database would normally be deleted.

11 SET DATABASE:

a. **<ENTER>** key alone:

The "SET DBASE" command resets the current database to be the first defined database. Up to 16 databases may be defined within the 550. All database operations are performed on the currently selected database. Therefore it is necessary to first select the required database before performing a series of operations on a specific database. If only one database is used then the "SET DBASE" commands will never need to be used.

b. An entry followed by the **<ENTER>** key:

Key in the number of the database (ie 1 through 16) to be selected followed by the **<ENTER>** key. This sets the current database accordingly and all subsequent database commands will be performed on that database until another "SET DBASE" command is issued.
Multiple databases may be used in many applications. For example, one database may consist of the part number, description, net weight on hand, amount on order, etc ..., while a second database might consist of transaction data for various part numbers, a third database could contain purchase orders for various part numbers along with quantities ordered and their due dates. Other examples are provided in our application examples to be provided in the near future. If a database is attempted to be selected which is not currently setup, the error message "NOT SETUP" is displayed breifly.

12 SET COLUMN:

a. **<ENTER>** key alone:

The "Set Colmn" command is used to specify a column to be the "KEY" column for the next database command. Invoking this command without preceding it with a column number causes the default (ie look-up) column to be reset to the first column of the selected database. This is automatically the case every time the unit is powered up and every time the indicator is re-initialized by exiting the setup mode and saving changes.

b. An entry followed by the **<ENTER>** key:

The entry preceding the **<ENTER>** key must be the parameter ID of one of the columns for the selected DATABASE. The specified column has no immediate effect but will affect the next database command, if it is dependant on the selected column. Normally the selected column will default back to the first column after the first database command is issued. However, if the entry starts with a decimal point then the newly selected key column will remain in effect until the "SET COLMN" command is issued again. However if another DATABASE is selected, if that DATABASE does not include the currently selected column's parameter ID then the key column is reset to the first column. Also, if the unit is re-initialized then the selected column is reset to the first column of the first DATABASE which has been setup. For example, keying [.23] [ENTER] will semi-permanently set the key field for the selected DATABASE to be the column whose parameter ID is 23, ie ID #3.

The "SET COLMN" command can be used to recall a row from memory based on information stored in a column other than the first column. Generally databases should be setup to have the first column be the column which would normally be searched through. However some applications require that a search be performed on other columns during certain special operations. One such example is attempting to determine a part number when only the description is known. Another example is searching through a transaction database (whose first column is part number) for a specific account number.

13 DOWNLOAD:

a. **<ENTER>** key alone:

The "Down-load" command causes the currently selected database to be transmitted out of the unit in a format which could easily be accepted by a computer. The format will the database to be imported into most spreadsheet programs, such as Lotus 123 ©, Quattro ©, and other database type programs. After pressing the **<ENTER>** key on this selection, the prompt: "1 for Comm" followed soon by "2 for Prntr" will appear. Press the **<1>** key to send the transmission out the bi-directional computer port or press the **<2>** key to use the uni-directional printer port. Pressing any other key will abort the transmission. The format for this transmission is compatible with the unit's "UPLOAD" database commands. Backed-up databases may be easily reloaded into the unit.
If the database is being downloaded with the intention of reloading it back into a unit in the future, an alternate format is available by pressing the **<3>** or **<4>** key to specify the comm or print port respectively. This will cause the database to be preceded by the necessary commands to access the database upload command when the file is sent back to the unit later on. The pre-pended information is:

*%s0%s
%i11%sx%e16%s%e

where the "x" would be replaced by the database number being downloaded, ie 1 - 16.

Also, the **<3>** or **<4>** entry causes the last row of data to be followed by a line with "ENDofDB". When the file is reloaded, this causes the database upload mode to be exited.

The "Down-load" command can be very useful for 'backing up' the database (ie saving a copy of the database somewhere else). Also, for applications where transaction information is collected on the scale throughout the day, this can be useful for transferring the collected to a computer for permanent storage, integration into other databases, or further analysis. GSE recommends that any databases that are stored within the unit which are considered valuable be backed up to a computer on a periodic basis in order to safeguard the data. While this instrument provides a reasonably secure storage means, any computer application will recommend that the data be backed up to prevent any loss of your data.

b. An entry followed by the **<ENTER>** key:

A **<1>** or **<2>** may precede the **<ENTER>** key for the "Down-load" command in order to specify the port to be used, **<1>** for the communication port or **<2>** for the printer port. This form of the "Down-load" command bypasses the prompting for the operator to key in a particular port number. (The "number followed by the **<ENTER>** key **MUST** be used when a macro is programmed to print the database.)

14 <u>PRINT ROW:</u>

a. **<ENTER>** key alone:

The "Print row" command causes the current row within the currently selected database to be transmitted out of the unit in a format which will line up well with subsequent issuances of this command. This could be used for selectively building a report. After pressing the **<ENTER>** key on this selection, the prompt: "1 for Comm" followed soon by "2 for Prntr" will appear. Press the **<1>** key to send the transmission out the bi-directional communications port or press the **<2>** key to use the uni-directional printer port.

Also available from this database menu selection is the ability to send the database header which consists of the column names of the selected database. Press **<3>** to send the header out the comm port or **<4>** to use the print port.

Pressing any key other than **<1>** through **<4>** will cancel the transmission request.

The "Print row" command may be used where a report needs to be generated which contains only certain stored rows. This might be implemented in conjunction with a series of "Recll Next" commands. This custom printing could also be implemented by programming a custom transmit appropriately, however with only four custom transmits and up to 16 databases one could easily run out of custom transmit setups.

b. An entry followed by the **<ENTER>** key:

A **<1>** or **<2>** may precede the **<ENTER>** key for the "Print row" command in order to specify the port to be used, **<1>** for the communication port or **<2>** for the printer port . This form of the "Print row" command simply bypasses the prompting for the operator to key in a particular port number. If a **<3>** or **<4>** is entered, then the column headings are printed instead, as described above. (The "number followed by the **<ENTER>** key **MUST** be used when a macro is programmed to print the database.)

15 PRINT ERRS:

a. **<ENTER>** key alone:

The "Print Errs" command is very similar to the "Print DBASE" command except that only rows whose data is suspect are printed. A report format is used which causes multiple rows to line up well on a printout. After pressing the **<ENTER>** key on this selection, the prompt: "1 for Comm" followed soon by "2 for Prntr" will appear. Press the **<1>** key to send the transmission out the bi-directional communications port or press the **<2>** key to use the uni-directional printer port. Pressing any other key will abort the transmission. The "Print errs" command should only be used when problems are suspected in the stored data. This command could also be used periodically to check for problems in the stored data. The resulting transmission will begin with the header line (column names), followed by any rows which were found to be corrupt, followed by a summary indicating the number of rows which were found to be corrupt compared to the total number of rows found. Also if a bad link is detected in the list of rows, then that error is also reported (refer to the Errors section for more details on the "Bad Link" error). At the end of the transmission a form feed character (^L) is sent.

Each row that is stored away is accompanied by a checksum which is used to verify the integrity of the stored data. Every time a row is accessed, its integrity is checked by re-calculating the checksum. If the checksum is found to be incorrect, an error is displayed warning the operator of this condition. Once a row is updated, the checksum is recalculated.

b. An entry followed by the **<ENTER>** key:

A **<1>** or **<2>** may precede the **<ENTER>** key for the "Print errs" command in order to specify the port to be used, **<1>** for the communication port or **<2>** for the printer port . This form of the "Print errs" command simply bypasses the prompting for the operator to key in a particular port number.

16 UPLOAD NEW:

a. **<ENTER>** key alone:

The "Upld. new" command allows the uploading of new rows of data into the 550's database through the bi-directional RS-232 communication port. After pressing the **<ENTER>** key on this selection, the unit will begin reading in rows of data from the comm port. During the upload, the 550 will display a counter indicating the number of rows which have been created. Pressing the **<CLR>** key will abort the process. This should not normally be done until the transmission has first been halted at the source. In the absence of a **<CLR>** key, the unit will continue processing data until a "^Z" (DOS end-of-file character) is received. The format required for the data is a comma delimited ASCII format, with a carriage return and optional line feed after each row. This format is compatible with the instrument's "Down-load" database command. Backed-up databases may be easily reloaded into the Indicator using this selection

The "Upld. new" command can be very useful for restoring 'backed up' databases. Also, for applications where the database required to be stored in the Indicator is available on another computer, this command allows the loading of that information quite simply.
NOTE: Use of a computer communication program, such as Scale-Link or Procomm or GSE 550 Simulation Software Terminal Window (on an IBM or compatible PC), is required on your computer to send and receive files to and from the unit.

b. An entry followed by the **<ENTER>** key:

An entry is not allowed before the **<ENTER>** key for this selection. If an entry occurs, the "ENTRY ERROR" message will be displayed briefly.

17 UPLOAD UPDATE:

a. **<ENTER>** key alone:

The "Upld. Updat" command allows the uploading of new rows or the updating of existing row of data in the instrument's database through the bi-directional RS-232 communication port. After pressing the **<ENTER>** key on this selection, the unit will begin reading in rows of data from the comm port. During the upload, the unit will display a counter indicating the number of rows which have been created. Pressing the **<CLR>** key will abort the process. This should not normally be done until the transmission has first been halted at the source. In the absence of a **<CLR>** key, the unit will continue processing data until a "^Z" (DOS end- of-file character) is received. The format required for the data is a comma delimited ASCII format, with a carriage return and optional line feed after each row. This format is compatible with the unit's "Down-load" database command. Thus backed up databases may be easily reloaded into the unit using this selection

This command is essentially like the "Upld. new" command except that before a row is created, a search of the database is accomplished to verify whether the row already exists. This procedure prevents duplicate rows from being created. However this will slow down the updload significantly, especially for larger databases. Thus the "Upload New" selection should be used whenever possible for faster response.

b. An entry followed by the **<ENTER>** key:

An entry is not allowed before the **<ENTER>** key for this selection. If an entry occurs, the "ENTRY ERROR" message will be displayed briefly.

18 SORT DBASE:

a. **<ENTER>** key alone:

The "Sort DBASE" command allows the sorting of the currently selected database. After pressing the **<ENTER>** key on this selection, the unit will begin sorting the current database based on the current column selection, in a lowest to highest order. If an exact match of data in the current column is found in two records, then the SORT function automatically compares the data in additional columns, starting with the first column and proceeding through to subsequent columns until a non-matching field is found. During the sort, the unit will display a counter indicating the number of rows which have been sorted. Pressing the **<CLR>** key will abort the process. In the absence of a **<CLR>** key, the unit will continue sorting until the end of the database has been reached.

If sorting strictly numeric values, its best to put the values in a *numeric register*. The numeric values will be sorted in numerical order. Numbers placed in an ID or data string will be sorted as a DOS sort. *ie*.

1
10
11
2
20
21
22

If alpha-numeric characters are to be used, a data string or ID must be used as the sort column. The data will be sorted in ID's as a DOS sort. *ie*.

ABC-1.DOC
ABC-10.DOC
ABC-11.DOC
ABC-2.DOC
ABC-20.DOC

The "Sort DBASE" command can be very useful for generating reports which are printed in some significant order, other than the order in which the rows were created. However this operation can be quite slow depending on the number of records being sorted and upon the current order of the records. As an extreme example, a completely disordered database with thousands of records could take a few hours to sort!

Sorting a database **can** take place after working hours or any time when the unit will not be in use. This can be performed by setting an Alarm to invoke a macro which in turn will perform the database sort. The unit must be powered up for this to take place.

b. An entry followed by the **<ENTER>** key:

If an entry is made, then the database is sorted according to the column whose parameter ID was keyed in. This is simply a quicker method of requesting a sort on a column other than the current column. It avoids having to first use the "Set Colmn" command. Also, by entering a period (".") before the parameter ID the sort direction can be reversed to be from highest to lowest.

Another available feature is to sort on a secondary column. This comes into play in cases where two rows have identical data in the primary sort column. The secondary sort column's parameter ID is specified in the entry after a comma (,) or space ( ) following the primary sort parameter ID. Refer to the following examples for clarification on the method of specifying the sort criteria.

11 <ENTER>	Sorts on time / date in ascending order. (oldest to newest)
.11 <ENTER>	Sorts on time/date in descending order. (newest to oldest)
.21, .11 <ENTER>	Sorts on ID 1 in ascending order. If an exact match of ID 1 is encountered, the matching records are sorted according to time/date in descending order. (newest records first).

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.21, .22, .0 <ENTER> Sorts on ID 1 in descending order. If an exact match of ID 1 is encountered, the matching records are sorted according to ID 2 in descending order. If an exact match of ID 1 and ID 2 is found, the matching records are sorted according to the stored gross in ascending order.

20.9 Installing the DATABASE Option

PARTS SUPPLIED:

The DATABASE option consists of a RAM Module, and a copy of a database installation manual.

INSTRUMENT REVISION LEVEL

In order to install the option into a Model 550 or 570, the main board revision level must be PC745C or newer (revision D, etc...). Refer to figure 29 Database Option installation on Main Board.

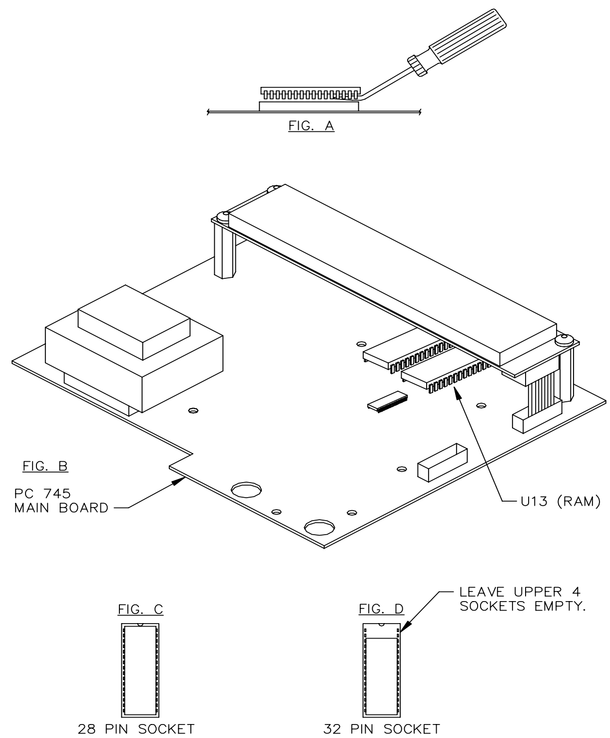


Figure 29 Database Option installation on Main Board

INSTALLATION

a. Disconnect the unit from the AC power source.

b. Open the unit by removing the (8 phillips / hex head screws (8mm) from the rear panel. Then slowly remove the rear panel assembly from the main enclosure, being careful not to damage the cable connecting the keypad to the main board.

c. While it is possible to perform the following steps without removing the display module, you may find it simpler to do so at this time since the parts to be replaced are located below the display.

d. Verify that the 0.3” long wire jumper located next to the EPROM U12, is in the position marked “256K”, not the “<256K position. If it is in the wrong position it must be moved which requires the use of a soldering iron. Refer this procedure to a qualified technician.

e. Check the EPROM U12, installed in the unit. If it has a date code earlier than 930115, then it must be replaced with a later revision. To do so, carefully remove the EPROM from its socket by gently prying a small screwdriver between the chip and its socket, a little at a time at each end. This EPROM may be saved for possible future service requirements

f. Carefully remove the RAM U13, from its socket by gently prying a small screwdriver between the chip and its socket, a little at a time at each end. This RAM should be saved for possible future service requirements.

g. Insert the supplied RAM Module, marked 200550-00TD1 or 200550-00TD2, into the U13 socket, being careful to locate the end with the molded in circle toward the top edge of main board. Be very careful not to bend any of the pins on the module when installing it.

h. Re-assemble the unit. If the display module was removed, replace it now. Re-connect the cable from J7 on the main board to the keypad. Re-secure the rear panel to the main enclosure using the screws removed during dis-assembly. Tighten the screws until the rear panel flange comes in contact with the main enclosure.

> **CAUTION:**
> All electrical connections and access to the inside of the indicator enclosure should be performed by qualified service personnel only!

20.10 PRINT FORMAT

When using the "Print dbase" operation, the format for the transmitted information is fixed and will conform to the following rules:

a. At the top of the first page, headings are printed followed by a blank line. The headings consist of the names of the parameters. If custom names have been defined (using parameters **P600 - P694** and **P701 - P711**) then these defined names will be used, otherwise the default names of parameters will be used in the header.

b. The width of each column of data is set to one plus the larger of the data size and the column size.

c. A space is transmitted between each column to provide separation between columns. All widths specified below do not include the space between columns.

d. The normal printed data size for numeric variables is 8 characters. However if the value is too large to be represented in 8 characters then additional characters are sent for that row, disrupting the alignment of the remainder of that row's data. Data for which units are appropriate will have the data converted to the current units as previously selected in the weigh modes and the units name will be appended.

e. The time / date parameter's format is dependent upon **P503** for 12 or 24 hour format, and upon **P510** for USA or International date format. The width of time / date is 20 characters for 12 hour format and 17 characters for 24 hour format.

f. The width of the six alpha-numeric IDs will be the maximum size as set in their respective setup modes, **P700** through **P710**.

g. Every 55 lines a form-feed, (ASCII 12, $0C)

Part#	Description:	FinalWt.	Max %Error	Tm/Dt
12-345-67	Transistor	0	0	04:39:23 pm 03/31/92
32-20-3929	Capacitor	0	0	08:06:08 am 03/31/92
398-002	Resistor	0	0	08:06:28 am 03/31/92
939-9-321	Diode	0	0	08:06:50 am 03/31/92
24-3456-78	Microprocessor	0	0	11:02:59 am 03/31/92

Figure 30, Sample Database Printout

character will be sent. Immediately afterward, the headings will be re-sent also. Also, after the last record another form-feed will be sent. Refer to the following sample printout for an example of the format used for printing a database.

20.11 DOWN-LOAD FORMAT

The "Down-load" selection, command 13, is used to transmit the contents of one of the instrument's databases in a comma delimited, ASCII file. This format is suitable for uploading the information into a computer's database or spreadsheet or for transmitting to another GSE 500 series instrument using the "Up-load" selection.

The following rules describe the format of the down-loaded data:

a. Each column is separated by a comma.

b. Each record is terminated by a carriage return and line feed.

c. Alpha-numeric parameters (ID 1 through 6) are enclosed in quotes ("").

d. All parameters are sent in a minimum width format, with no leading or trailing zeros or spaces.

e. After the data for all of the stored rows has been sent, the end of the transmission is indicated by the transmission of a row with only "ENDofDB" (without quote marks).

f. The units for weight data is strictly in default weight units, as defined in the unit's setup mode, **P150**. However the units descriptors, such as "lb" or "kg" are not sent along with the data.

g. All of the transmitted data consists of ASCII characters,which is text- printable data, no graphics.

Most parameters are downloaded the same as they would be viewed. However the time / date is handled differently. The data sent for the time / date parameter is the ASCII representation of the numeric value of the number of seconds elapsed since midnight on January 1, 1970. This is the simplest form to allow calculations on time / date to be performed in other spreadsheet and database programs. Some programs may require some manipulation of this value in order for the time / date data to be usable. For instance, Lotus 123 requires the time / date data as the number of days elapsed since the year 1900, with the hours, minutes, and seconds represented as the fractional portion of that value. To achieve this format, the numeric time value received from the unit must be divided by 86400 (# of sec / day) and then add to 25569 (# of days between 1900 and 1970). This value can then be displayed in one of the six display formats depending on the requirements. Format 1 for instance, would produce the date in the form "02-Apr-92" while format 6 would display the time in the "12:05:47 pm" format.

A sample of a database download file is shown below. Note that this is the same data as was used in the printed database example previously discussed.

```
"12-345-67","Transistor",0,0,702059963
"32-20-3929","Capacitor",0,0,702029168
"398-002","Resistor",0,0,702029188
"939-9-321","Diode",0,0,702029210
"24-3456-78","Microprocessor",0,0,702039779
```

20.12 UPLOAD DATA FORMAT

The same rules given above for the format of a downloaded file apply to a file being uploaded into the unit's database. However, the alpha parameters are not required to be enclosed in double quotes ("").

Before a database can be loaded into a unit’s database, the setup must be established to match that of the file. If the uploaded file has more columns than the database setup in the unit, then the additional columns being uploaded are ignored. If the uploaded file has less columns, then the additional columns are cleared out.

20.13 TIME / DATE HANDLING

When parameter 11, the current time / date parameter, is selected to be a column in a database, then whenever a row is created or updated, the current time / date is copied into that row from parameter 11. However when a recall is performed, the recalled time / date is not copied to parameter 11 as this would disrupt the current time / date of the unit. Therefore, when a recall is performed on a database which includes the time / date parameter (ID 11) as a column, the recalled time / date is copied to parameter 50, also known as Rtime for "Recalled Time". Parameter 50 may then be printed using the custom transmits or accessed to view the recalled time/date.

As previously discussed, time / date is handled in a special manner which is somewhat common in computers. It is stored as the number of seconds elapsed since midnight on January 1, 1970. Currently this value is around 710,000,000. At the rate of 86400 seconds per day (60 x 60 x 24), (31,536,000 per year) this value changes quickly. Keeping track of time and date in this manner simplifies the process of calculating the difference between two times. It also compacts the information such that it can be stored in 4 bytes of memory which helps keep the number of memory bytes required to store a row as small as possible.

20.14 INFO MODES

The following modes have been added to the instrument's extensive array of information modes. These modes can be useful in determining the current state of the unit's databases and the memory which is in use by the database.

The first four information modes supply information regarding the amount of installed, available, and already used for by the database option.

P60010 dbRAM 24256 The value shown here, 24256 in this example, indicates how much database memory is currently installed within the unit.

The value will be 0 if the database memory module is not installed, 24256 if the 24K module is installed, and if the 120K module is installed, the value is 122,560. In this case, the top line of the display shows "dbRA**1**" while the bottom line shows "**22560**" (122,560 total).

However, if some of the database memory has been allocated to general usage (normally to allow larger macros) then the amount shown at **P60010** will be reduced by 8192 (8K). Refer to parameter **P65010** for more information on this item.

P60011 dbAvl 24242 This value indicates the remaining amount of RAM available for creating more rows. When this value becomes relatively small, then the database is coming close to running out of room for more records. When this parameter is selected, it may take a while for the unit to add up all of the unused memory. While the unit is calculating, the display will show "Look-ing.."

P60012 dbUse 14 This number indicates the amount of database memory actually used by the databases, for both recording the setup and storing records. When this value is added to the "dbAvl" value, the result should equal the value for **P60010**.

P60013 BlkSz 16384 The Block Size parameter displays the size of the largest contiguous block of memory available for use by the database feature. This parameter will be seldom used. However when either multiple databases of various sizes are used or if rows are updated and / or deleted quite often, the available memory can become quite fragmented. So, if a situation arises where the total amount of available memory, as indicated by **P60011**, is sufficient to create a row and yet the "OutOF Memry" error message results, then the maximum block size parameter can be checked to determine if there is enough memory available in one contiguous block to perform the operation. If there is not enough contiguous memory available, the only remedy is to compact the stored rows. This can only be accomplished by downloading all of the stored database records and the database setup to a computer and default the database using parameter **P65010**. Then reload the setup and the database records using the "Up-load" command.

P60014 dbase Error The results of the last database operation can be checked with this parameter. Each database operation sets a code indicating the results of the operation. The corresponding error message is displayed at this parameter.

The next 16 database information modes display the number of records (rows) created in databases which have been setup. If a database has not been setup, then the parameter for the number of rows within that database is skipped.

Specifically, **P60021** will display the number of rows currently stored within database 1, **P60022** for database 2, etc... with **P60036** indicating the current number of rows stored in database 16.

20.15 DEFAULTING THE ENTIRE DATABASE

P65010 can be used to completely clear out the DATABASE data and setup. However, the deletion is not final until you exit the setup mode and all changes are saved.

Press **<ENTER>** to simply default the database setups. Whether or not any database memory is allocated to general usage is not affected. However if it is desired to allocate some of the database memory for general use,

20

press **<2> <ENTER>**. This will reduce the total amount of database memory by 8K bytes. To reverse this and keep all the database module's memory allocated to databases, press **<1> <ENTER>**.

Allocating database memory to general usage can be used to allow variably sized setup modes (such as custom transmit setup and macro setup) to increase when they would otherwise be limited by the occurrence of the "Out Of RAM" error message. If this is done, the only limitation on the amount of information entered into these setup modes is the amount of available EEPROM memory.

20.16 MEMORY CONSUMPTION

When a database RAM module is completely blank, **P60012** will indicate that 14 bytes are in use. This amount is due to the initialization of the module to make it usable for database operations.

The amount of memory required to create each record (row) in a database is dependent on the database's definition. To determine the amount of memory required per record, use the following procedure.

a. Each row requires 6 bytes for internal purposes.

b. Each column uses four bytes.

c. Alpha-numeric data may require additional memory, depending upon the size of the data. Thus the amount of memory required per row will depend on the actual length of the ID data being stored. Refer to the following notes:

ID data four characters or less in length requires no additional memory.

ID data between five and seven characters in length will require eight additional bytes of memory to store a record. This is in addition to the four bytes required as a minimum for an ID column.

ID data greater than 7 characters in length will require a number of bytes equal to the length of the ID plus one. Again, this is in addition to the four bytes required as a minimum for an ID column. Thus the number of additional bytes required for an ID which is 13 characters in length would be: 13 (size) + 1 (extra) = 14 additional bytes per row.

As an example, for a database which has 3 columns the minimum amount of memory required per row would be:

6 (overhead)
(3 x 4) = 12 (3 columns x 4 bytes per column)
__
18 bytes per row minimum

If any of the columns were ID types (parameters 21 - 26) then additional memory may be required per row, depending on the specific size of the data being stored in the ID(s), as described above.

The amount of memory required to setup a database is twelve bytes plus one additional byte per column defined. Thus a database with three columns uses 12 + 3 = 15 bytes of memory. This small amount of memory usage is probably insignificant in the overall picture of total memory usage, but this information is provided for those applications which require a considerable amount of memory.

Note:
The following procedure should be performed by qualified personnel only!

The following is a macro setup that will determine the exact number of rows that can be created based on the number of columns set in the database. Setup to allow easy execution of the macro by naming macro 0 at parameter P850. Make sure P720 is set to MENU. The execution of the macro will take a while and the time is dependant on what size DBase module is installed. After running the macro, the total number of rows can be viewed in reg#1 (P91) or P60021.

<u>Macro#0</u>

0;91%C	Reset reg# 1
1%T	Tag location
Run..ning%I	idle
%i	id
11%s	Select dbase mode
1%e	select dbase 1
3%s	Make Row
%e	enter
%_	IF any DBase error (if out of memory)
DBASEFULL!%S%P	1 second prompt
%N	ELSE

Error Number	Error Message	Error Description
0	"Done"	No error occurred.
1	"Entry Error"	Bad entry. The entry did not meet the criteria for the parameter being accessed. Possibly entering alpha data into a numeric parameter.
2	"Invld dbase"	Invalid database selection. The database being selected has not been defined (ie not setup).
3	"Invld Colmn"	Invalid column selection. The specified column is not defined in the current database.
4	"Not Found"	Record not found. During a recall operation, the value being searched for has not been located.
5	"OutOf Memry"	Out of Database Memory. There is insufficient remaining unused memory to perform the requested database operation.
6	"Bad Data"	Check-sum error. Each record stored in the unit's database has a checksum stored to insure the integrity of the stored data. This is a numeric value stored within the row which a calculated sum of all the individual bytes within each row. Each time a row is accessed it's checksum is tested. If the checksum does not add up correctly then it is likely that some of the data in the row is corrupted. This situation should not normally occur. If it does occur, it may be due to a hardware defect or a large ESD occurrence.
7	"Bad Link"	The list of rows stored in the current database is corrupt. This situation could cause significant problems. Some stored rows may no longer be accessable while others may be sharing the same memory space as other records. This is another error which should not normally occur. Possible causes may be similar to those for "Bad Data". If this error occurs, it is recommended that all database setups and all database records be downloaded and saved and then reset the database. If this error occurs more than once then the indicator should be serviced.
8	"Funct Abort"	Operation aborted. The search, print, sort, or upload was aborted. This would normally be due to the operator pressing the **<CLR>** key.
9	"IDtoo Long"	The number of characters being recalled into an ID (parameters 21 - 26) was longer than the ID is defined to be (per setup parameter P700 -710). Thus the ID data had to be shortened while it was being recalled.

Table 39 Database Error Codes

1;91%+	increment reg# 1
1%J	Jump to TAG 1
%E	END IF

The previous macro was tested with a GSE 24K database module. Two columns were setup in database #1. These columns were ID#1 and the pieceweight (P34). The total number of rows allowable in the database was shown in reg#1 was 1,101. This could be five times this if using a GSE 120K database module. Total running time of the macro was approximately 3.5 minutes. The ID was entered as five characters.

Remember that the number of columns (parameters) setup in the database structure is proportional to memory consumption. The more columns used the less number of rows can be stored.

20.17 DATABASE ERRORS

If an error occurs during the execution of any database command, then the corresponding error message is displayed for one second. Refer to table 39 for a listing of database error codes. Also the error status of the command is recorded so that a macro can be programmed to react appropriately if a database error occurs. However if a macro is performing the recall operation, then error messages will not be displayed. Therefore it is the responsibility of person programming the macro to check for possible errors at the appropriate times to insure that the operation will occur as expected. For instance, in some applications it may be desirable to prompt the scale operator through the necessary steps to add an item to a database if the item is not found. In other cases, it may be desirable to request verification of the entered value being searched for if all valid values should be in the unit's database.

The macro database error checking command is "n%_" which means IF DATABASE ERROR. This command can be used to check for any database error at all or a specific database error that may have occurred during the last DATABASE operation. If the "n" preceding the %_ command is omitted then the IF clause can be interpreted as "IF ANY DATABASE ERROR". If a numeric value precedes the %_ command then the IF clause is testing for that specific error number. If 0%_ is used, the IF clause is effectively "IF NO DATABASE ERRORS". By using these commands virtually any database error that may occur can be handled appropriately within a macro. The error code definitions are listed below. Refer to the macro documentation for a more thorough explanation of the use of the macro's IF command.

example 1:

%_	IF ANY DATABASE ERROR..Any
Error%P	Displays prompt if any error occurred
%E	ENDIF

example 2:

4%_	IF RECORD NOT FOUND...
%5	Call macro 5 (if error 4 occurred).
%E	ENDIF

In this example macro 5 could be used first to verify the operator's entry and then to request the necessary information to create the record which was not found.

20.18 NOTES REGARDING THE STORING AND RECALLING OF WEIGHT DATA

If the default weight units **P150** are changed on the unit, any weight data stored in a database is not affected. However if it is later printed or recalled, it is assumed by the unit that the stored data is in the current default units of measure. For this reason it is not recommended that the default units of measure be changed if there are records stored in a database which contains weight data.

The value stored in memory for a weight parameter (Gross, Net, Tare, Gross Total, etc...) is the value rounded off to the nearest weight increment as defined in setup parameter **P111**.

When rows are recalled which contain actively calculated weight data, the recalled data will be overwritten as soon as the next weight conversion process occurs which will be immediately unless a macro is running which is post-poning the weight conversion process. Therefore these actively calculated weight parameters would not normally be included in a database if the created records are going to be recalled. If this is a requirement, the macro which is written to perform the recall operation should immediately copy the weight data to another parameter if the recalled weight data will be needed.

The actively calculated parameters include:

Gross,
Net,
Gross Total + Current,
Gross Total - Current,

Net Total + Current,
Net Total - Current,
Quantity (only on the Model 570 Counting Instruments)

20.19 Database Examples

Example #1: Recall piece weights per part numbers.

The following setup combines the database and macro capabilities for establishing and recalling pieceweights. Pressing the **<ID>** key will prompt the operator to enter a part number. Key in the part number and press **<ENTER>**. If the pieceweight associated with that part number does not exist, the unit lets the operator know that the pieceweight does not exist by prompting him "NOT FOUND". This is displayed briefly. The unit then prompts "Add Smple". Place the sample on the scale and press **<ENTER>** for the default sample size or key in a sample size and then press **<ENTER>**. A row is created in the database. The unit is then placed in the quantity mode. If the pieceweight exists, the unit prompts "DATA FOUND" . The unit is then automatically placed in the quantity mode.

```
100%s23640%i%e          Access Setup Modes,
                        Allowing Changes
```

PARTS COUNTING PARAMETER SETUP

```
180%s0%e                P180.00  ASmpl off
181%s0%e                P181.00  AEnhn off
182%s10%e               P182.10  SmpSz    10
183%s98.0000%e          P183.XX  %%Accy 98.00
184%s0%e                P184.00  AcDsp off
185%s1.000000%e         P185.XX  ErFac  1.00
186%s0%e                P186.00  PreSm None!
187%s0%e                P187.00  AftSm None!
```

NAME ID #1

```
700%s12%e               P700.--  1SIZE#1=12
701%sPART#%e            P701.--  NAME1 PART#
```

SETUP DATABASE STRUCTURE

```
720%s3%e                P720.03  iduse: dbase

731%s%i%c%e%e           P731.04  dbase  1
21%e%e                  PART#
34%e%e                  APW
```

MACRO "0" SETUP

```
800%s%c%e     P800.XX  Macro # 0 ENTERID#
%%\%e                   0001 if no entry
%%N%e                   0002 if not
%%[%e                   0003 save entry
1%%i%e                  0004 ID
%%]%e                   0006 get entry
%%e%e                   0007 enter
%%E%e            0008 end if
%%i%e                   0009 ID
11%%s%e                 0010 select
1%%e%e                  0013 enter
1%%s%e                  0015 select
%%e%e                   0017 enter
4%%_%e                  0018 if dbase error
%%N%e                   0020 if not
DATA FOUND%%P%e         0021 pause
30%%s%e                 0032 select
%%B%e                   0035 break
%%E%e            0036 end if
NOT  FOUND%%S%e         0037 sound beeper
%%P%e                   0048 pause
%%p%e                   0049 sample
1%%T%e                  0050 tag position
Add  Smple%%G%e         0052 get operator entry
%%p%e                   0063 sample
%%1%e                   0064 call macro1
1%%g%e                  0065 if sample error
1%%J%e                  0067 jump to tag
%%E%e            0069 end if
2%%T%e                  0070 tag position
%%1%e                   0072 call macro1
%%a%e                   0073 if accurate
%%i%e                   0074 ID
11%%s%e                 0075 select
1%%e%e                  0078 enter
3%%s%e                  0080 select
%%e%e                   0082 enter
-OK!-%%P%e              0083 pause
%%B%e                   0089 break
%%E%e            0090 end if
%%Y%e                   0091 if yes
%%N%e                   0092 if not
ABORTSMPLE%%S%e         0093 sound beeper
%%P%e                   0104 pause
%%B%e                   0105 break
%%E%e            0106 end if
%%e%e                   0107 enter
2%%J%e                  0108 jump to tag
```

MACRO "1" SETUP (“call” subroutine)

```
801%s%c%e               P801.34  Macro # 1
3%%g%e                  0001 if sample error
4%%g%e                  0003 if sample error
5%%g%e                  0005 if sample error
%%B%e                   0007 break
%%E%e            0008 end if
6%%g%e                  0009 if sample error
```

```
ABORTSMPLE%%S%e  0011 sound beeper
%%P%e            0022 pause
%%B%e            0023 break
%%E%e            0024 end if
```

NAME MACRO "0" ALLOWS INVOKING MACRO FROM FRONT PANEL

```
850%sENTERID#%e  P850.--  Mac 0 ENTERID#

%z               Exit Setup Mode
```

Chapter 21 Setpoint and Logic I/ O (OPTIONS)

21.1 Relay Module Options

Relay Output Module (Dual)
GSE Part #: 24550B-100A0

Process Control Interface Module (PCI) Input/Output
GSE Part #: 24550B-100B0

This section describes two versions of relay output options offered by GSE. The setpoint setup is also described in this section along with several common setpoint setup examples.

21.2 Setpoint Parameters and Operations

Included in the Indicator are 32 Setpoints. The first two control logic outputs. The connections for these logic outputs are on J6 of the Main Board (PC-745) and are labeled SP1 and SP2.

All of the setpoints can be configured to trigger certain events such as print, tare, accumulate, zero, etc., when the setpoint activates, deactivates or both. This is accomplished through the use of the Macros.
In this way, many applications can make use of setpoints without actually having a relay or logic output connected to anything. Refer to Chapter 16 for more details on Macros.

Each of the setpoints has selections which specify the conditions which activate (energize) or de-activate (de-energize) them. For the simplest uses, the setpoint would be set up such that the output would activate when the GROSS Weight exceeds a certain value and de-activate when the weight falls below that same value. However, programmability allows the change of state of the setpoint to be based on other factors:

> **Important**
> Keep in mind that the instrument powers down or enters the Setup Mode during operation or when an overload or underload condition occurs, the setpoints will become de-activated. This is of importance when determining a setpoint installation in order to insure safe conditions.

- Any weight (Gross, Net, Tare, total, etc.)
- When the incrementable registers rise above or fall below a value or fall between or outside of two values.
- Upon a certain key press such as **<TARE>**, **<ZERO>**, or **<PRINT>**
- Upon the occurrence of motion.
- Other selections include a minimum on time which effectively simulates a timer relay's operation

The Setpoint Setup parameters are allocated storage memory as needed. That is, if a setpoint is enabled, then the setup for that setpoint is reserved 33 bytes of storage space.

21

SETPOINT SETUP PARAMETERS

The Setpoint Setup parameters and their complete available choices are listed later in this chapter. The basic setup of each parameter and notes pertaining to their use are discussed below. For the sake of brevity, the listed parameter numbers are for Setpoint #1. However, since the possible choices are the same for the other 31 setpoints, simply replace the first two digits in the Parameter Number shown shown in Table 40, Setpoint Numbers to determine the parameter number for any specific setpoint number. The setpoint setups begin at parameter P5100 (for Setpoint #1) and continue through P8200 (for Setpoint #32). To reach any one of the setpoint setups, enter the Setpoint Setup Mode number and press **<SELECT>**. To set up Setpoint #1 press

5100 <SELECT>. You will then be asked to enter the program security code before changes can be made.

<23640> <ID> <ENTER>.

SETPOINT OPERATION

When a setpoint is inactive, only the conditions relating to the activation of the setpoint are checked and reacted to accordingly. Similarly, when a setpoint is active, only the conditions relating to the de-activation of the setpoint are checked and acted upon.

The status of each setpoint is checked and updated once every 1/20th of a second (20 updates per second), with several exceptions as listed below:

Parameter Number	Setpoint Number
P5100	1
P5200	2
P5300	3
P5400	4
P5500	5
P5600	6
P5700	7
P5800	8
P5900	9
P6000	10
P6100	11
P6200	12
P6300	13
P6400	14
P6500	15
P6600	16
P6700	17
P6800	18
P6900	19
P7000	20
P7100	21
P7200	22
P7300	23
P7400	24
P7500	25
P7600	26
P7700	27
P7800	28
P7900	29
P8000	30
P8100	31
P8200	32

Table 40 Setpoint Numbers

- After the execution of a command, the next update may be delayed slightly.
- During continuous transmits, the transmission may delay the setpoint update
- During the execution of a Macro, the setpoint updates are put on hold except during the pause (%P), idle (%I), or get input (%G) commands within the macro, or if a motion delayed command is executed during the Macro.
- During an over-load or under-load condition, all enabled setpoints are de-activated
- When the Setup Mode is accessed, all enabled setpoints are de-activated
- Setpoints based on the Net or Gross Weights are based upon the weight after it is rounded off to the selected display increment (set in P111).

SETPOINT STATUS MODE

Once set up for your application, you may check the status of a particular setpoint by accessing the Setpoint Status Mode. Its state will continue to be updated while in this mode. In addition, any or all setpoints can be set to the active or inactive state.

To reach the Setpoint Status Mode, press **<7> <8> <SELECT>**. The numeric display will read SP-01. The top line of the dot matrix display will indicate whether the setpoint is enabled or disabled. The bottom line will read either Activ or DeAct depending upon the current state of the setpoint.

Once in the Setpoint Status Mode, you can view the status of a particular setpoint by keying in its number and pressing **<ENTER>**. For example, to view the status of Setpoint 13, press 13 **<SELECT>**. You may also view the status of the other setpoints by pressing **<ENTER>** once per setpoint or by pressing **<UNITS>** or **<PRINT>** which assume up and down arrow cursor key functions.

You may change the state of any setpoint while it is being viewed in the Setpoint Status Mode. Press **<.> <1> <ENTER>** to activate <Setpoints;Activate> or press **<.> <0> <ENTER>** to de-activate <Setpoints;Deactivate>. To activate or de-activate a setpoint other than the one you are viewing, key-in its number followed by the **<.> <1>** or **<.> < 0>** command. For example, to select and activate Setpoint #18, press

1 8 <.> 1 <ENTER>.

To change all the setpoints to the activated state while in the Setpoint Status Mode, press

9 9 <.> 1 <ENTER>.
Likewise, to de-activate all setpoints, press

9 9 <.> 0 <ENTER>.

The two logic outputs for SP #1 and SP #2 and the external setpoint option outputs will also change state as these commands are executed. However, a setpoint may not stay in the state you changed it to if the conditions which govern its setup cause it to change to the opposite state.

NOTE:
Setpoints which are not enabled in the Setup Mode will be activated or de-activated by the above commands. They will not change state on their own except to be de-activated upon initial power-up and upon power-down.

To exit the Setpoint Status Mode press **<SELECT>**.

SETPOINT INPUTS

Available with the setpoint option card are up to 16 inputs. These may be connected to various switches such as phot-detectors or proximity switches which provide an open or closed status to the Indicator. Possible uses may include sensing the presence of a container before a filling process is begun or of a truck over an axle-weighing scale.

The first part of setting up a setpoint is to define it as either an **input** or **output** mechanism. Selecting the setpoint as an input allows you to invoke a macro each time the input changes state. A separate macro can be invoked when the input becomes active and for when its deactivated.

Another use of the input capability is to have another macro which is activated by some other condition branch around a section of the macro's commands depending on the state of one of the inputs. This is a conditional branch depending on whether or not the input is active or deactive.

ALTERNATIVE OPERATION

For Indicator units with PC Board Serial No. 851 and lower, the outputs are TTL type which put out a high (+5 V) or a low (+0 V) signal without much current sourcing or sinking ability. For those familiar with the various electronic logic families, the actual logic type used to supply the outputs is an HC chip. What this means in terms of voltage and current drive available is that when an output is at a high state up to 6 mA can be sourced by that output and the output voltage will be a minimum of 4 V. When the output is at a low state, the output will sink up to 6 mA with the voltage at a maximum of 0.2 V. As such these outputs are not designed nor intended to directly drive a relay or any other power device requiring significant amounts of current.

NOTE:
If programming the setup for one of the **early** GSE Weigh Indicators, keep in mind that when the instrument first powers up, the outputs may be in an indeterminate state until the Weigh Mode is begun. For this reason, please be careful when determining a setpoint installation in order to insure safe conditions are kept.

21.3 Setpoint (Input and Output) Parameter Setup

NOTE:
The setpoint setup software reflects remnants of input setups from to 550 instrument in the 574 system. Refer to your 574 technical reference manual for more information on **574** setpoints.

P5100.X SPt 1 through P8200.X SPt32
These parameters are used to set Setpoints 1-32 into use as either an input, an output, or not used (disable). Setpoint inputs are **not** available on the 574.
NOTE:
Some of the setup parameters described in the text below will be displayed only if certain choices were made in a previous setup selection. Thus when setting up a setpoint, the inapplicable parameters will not appear in order to avoid confusion and simplify your choices.

P5100.X SPt 1

This parameter offers 3 selections which either disables, or assigns Setpoint #1 as an output or input.

NOTE:
Parameters P5110 through P5121 all apply to the activation of the setpoint.

P5110.X Activ

This parameter specifies the condition which will activate the setpoint. The following selections are provided: the output becomes active if the weight rises above the target value, falls below the target value, falls between the target values, falls outside the target values, if **<TARE>** is pressed, if **<ZERO>** is pressed, if **<PRINT>** is pressed, if motion occurs, if motion ceases, or always activates. The last selection, never, specifies that the output will become active only through an activate command contained within a Macro or an RS-232 message received through the Comm Port. If never is chosen, parameters P5111 through P5121 will not appear.

NOTE:
The selection of "Above" correspond to greater than or equal to the target value while the selection "Below" corresponds to less than the target value.

P5111.X Hold

This parameter specifies a minimum activation time for the setpoint. Selections from 0.0 seconds to 25.0 seconds minimum activation time are available. 0 seconds is the normal selection. Upon activation, any non-zero selection will keep the setpoint active for the specified minimum period of time regardless of whether the de-activation conditions are met.

P5112.X Macro

This parameter specifies which Macro, if any, will be executed when the setpoint is activated. The Macro can trigger a series of commands such as tare, accumulate, print, increment a counter, etc., when the setpoint is reached.

NOTE:
The following selections are accessible only if the selection for P5110 is above, below, between, outside or above.

P5113.X Mot'n

This parameter specifies whether or not motion will be ignored by the setpoint or will inhibit setpoint activation.

NOTE:
The following selections are accessible only if the selection for P5110 is above, below, between or outside.

P5114.X Basis

This parameter specifies whether the lower activation target value for the setpoint is a specific value or if it is based upon another value. The selections include "new #" where the target value is a specific value, "% val" where the target value for this setpoint is a percentage multiplier of another variable (to be specified later), or "Diff" where the target value for this setpoint is subtracted from another variable (to be specified later). The "%val" and "diff" selections let you base the setpoint on one of the 30 variables (parameters #60-89). These can be easily accessed from the Weigh Mode by setting up the Selectable Modes (P300-P309) parameters accordingly. This permits you to change target values without accessing the Setup Mode.

P5115. AL

This parameter sets the lower setpoint activation value. This is the lower limit if P5110 is set to between or outside. If P5114 is % val or diff, then this value is a percentage of or difference of another value, respectively. Note that percentages can be greater than 100 and diff values can be negative which could make the calculated value larger than the value upon which it is based.

NOTE:
Parameters P5116 and P5117 are accessible only if P5114 is set for % val or diff.

P5116.X Based

This parameter determines the variable that the lower target value for this setpoint is based upon. The selection here may be based on one of 30 variables, P60-P89, which are accessible during normal operation and specified in P5117, or is based on one of the setup values of a particular setpoint.

P5117.X Value

This parameter has two sets of choices, depending on the choice made for P5116. If selection P5116-0 (Var #) is made, then choose which variable upon which the lower activation parameter will be based. If P5116 is set for one of the other setpoints, then choose which of the other setpoint values this parameter is based upon, the lower activation parameter, the upper activation parameter, the lower de-activation parameter, or the upper de-activation parameter.

NOTE:
The next four parameters (P5118 thru P5120) are accessible only if P5110 is set for between or outside.

P5118 Basis

This parameter is similar to P5114 in that you will specify whether the the upper target value for the setpoint is a specific value or will be based upon another value. The selections include new # where the target value is a specific value, % val where the target value for this setpoint is a percentile multiplier of another variable (to be specified later), or the target value for this setpoint is subtracted from another variable (to be specified later).

P5119. AU:

This parameter sets the setpoint upper activation value: This is a keyed-in value with a maximum allowed value of 999,999,900. Note if P5118 is % val or is diff then this value is a percentage of or the difference of another value to be specified later.

NOTE:
The next two parameters are accessible only if P5118 was set for % val or diff.

P5120.X Based

This parameter is the based-upon specifier which determines the variable upon which the upper target of this setpoint is based. The selection here may be based on one of 30 variables, P60-P89, which are accessible during normal operation and specified in P5121, or is based on one of the values of a setpoint also specified in P5121.

P5121.0 Value

This parameter is similar to P5117 in that two sets of choices are available depending upon the selection made in P5120. You can either designate which of the variables the upper target will be based upon or you can specify which of the parameters of the other designated setpoint this parameter will be based upon.

NOTE:
Parameters P5130 through P5140 all pertain to de-activation of the setpoint.

P5130.0 DeAct

This parameter specifies the condition which will de-activate the setpoint. The selections include deactivation if the weight rises above the upper target value, falls below the lower target value, falls between the upper and lower target values, falls outside of the target values, if **<TARE>** is pressed, if **<ZERO>** is pressed, if **<PRINT>** is pressed, if motion occurs, if motion ceases, or if the activation is momentary. A final selection, "never", can be selected so that the output will de-activate only upon an activate command contained in a Macro or an RS-232 message received through the Comm Port. If "never" is chosen, then P5131 through P5141 will not appear.

NOTE:
The "Above" selection corresponds to greater than or equal to the target value while the "Below" selections correspond to less than the target value.

P5131.X Hold

This parameter specifies a minimum de-activation time from 0.0 seconds to 25.0 seconds.

P5132.0 Macro

This parameter specifies which Macro, if any, is to be executed when the setpoint is de-activated. This can trigger a series of commands, such as tare, accumulate, print, increment a counter, etc., when the setpoint is reached.

NOTE:
The following parameter is accessible only if the selection for P5130 was set for above, below, between, outside or always.

P5133.X Mot'n

This parameter specifies whether or not motion affects the setpoint de-activation.

NOTE:
The following parameter is accessible only if the selection for P5130 was set for above, below, between or outside.

P5134.X Basis

This parameter specifies whether the lower target value for the setpoint is a specific value or is based upon another value. "New # "specifies a particular value; "% val" indicates the entered lower de-activate value for this setpoint is a percentage multiplier of another variable to be specified later; "diff " indicates the entered lower de-activate value for this setpoint is subtracted from another variable to be specified later.

P5135. DL:

This parameter lets you enter the lower de-activate value if P5130 is set to between or outside. Note if P5134 is set to % val or diff then this value is a percentage of or difference of another value.

NOTE:
The next two parameters are accessible only if P5134 is set for % val or diff.

P5136.X Based

This parameter determines the variable upon which the target value for this setpoint is based. This may be one of the ten variables that may be accessed during normal operation or one of the setup values of another setpoint.

P5137.X Value

This parameter has two possible sets of choices, depending on the choice made for P5136. If selection P5136-0 (Var #) is made, then you will specify which variable the upper de-activation target value will be based upon. If P5136 specified one of the other setpoints, then this parameter will determine which parameter of the other setpoint this parameter is based upon, either the lower activation parameter, the upper activation parameter, the lower de-activation parameter or the upper de-activation parameter.

NOTE:
The next four parameters (P5138 through P5141) are accessible only if P5130 is set for between or outside.

P5138.X Basis

This parameter specifies whether the upper target value for the setpoint is a specific value or if it is based upon another value. "New #" specifies the upper de-activate target value is a specific value; "% val" specifies that the entered upper de-activate target value for this setpoint is a percentage multiplier of another variable to be specified later; "diff" specifies that the entered upper de-activate target value for this setpoint is subtracted from another variable to be specified later.

P5139. DU:

This parameter is the setpoint upper de-activation value. This is a keyed-in value with a maximum allowed value of 999,999,900. Note if 5138 is "% val" or "diff" then this value is a percentage of or difference of another value.

NOTE:
The next two parameters are accessible only if P5138 is set for % val or diff.

P5140.X Based

This parameter is the based-upon specifier which determines the variable upon which the upper target value of this setpoint is based. The selection determines that it will be one of the ten variables or specifies that it will be based upon one of the setup parameters of another particular setpoint.

P5141.X Value

This parameter has two sets of choices, depending on the choice made for P5140. If selection P5140-0 (Var #) was made, then the choices are restricted to specifying which variable the upper de-activation target will be based on. If P5140 specified one of the other setpoints, then the choices are restricted to naming the particular setpoint setup value, the lower activation parameter, the upper activation parameter, the lower de-activation parameter or the lower de-activation parameter.

P5150.X Par

This parameter is available if Setpoint #1 is set to output by parameter P5100. P5150 offers a selection of 33 parameters that the setpoint will be based upon.

P5160.X Actv

This parameter is available if Setpoint #1 is set to input by parameter P5100. When Setpoint #1 is activated, Macros #0 thru #15 (or none) will be invoked.

P5161.X DeAct

This parameter is available if Setpoint #1 is set to input by parameter P5100. When Setpoint #1 is de-activated, Macros #0 thru #15 (or none) will be invoked.

P5200 through P8200

These parameters each have three selections; disable, output and input, and define setpoints #2 through #32 in the same manner as parameter P5100. These parameters range from P5200 for setpoint #2 through P8200 for setpoint #32.

P8210 through P8261

These parameters each apply to the behavior of the setpoint, and are structured identically to the previous discussion for parameters P5110 through P5161 which detail parameters for setpoint #1. These parameters range from P8210 through P8261 for setpoint #2, P8310 through P8361, for setpoint #3, all the way up to P8210 through P8261 for setpoint #32.

21.4 Setpoint Example Setups (Front Panel Entry)

SETPOINT EXAMPLE #1

A good application example would be to have a macro automatically invoked as a container of parts is placed on the platform. This macro could be programmed to do a number of what would normally be cumbersome operations if done manually. Some macro examples might be to auto-accumulate parts, prompt as a check-weigher (good, bad or over), etc.
The setpoint would be actuated when the *quantity* is above 3 pieces (threshold). As motion settles, the macro would be invoked. The macro would then perform a specific operation, such as an accumulation. As the quantity fell below 2 pieces, the setpoint would reset. Its now ready for the next cycle.

NOTE:
The specific parameter number being set is specified before each **<SELECT>** command on each line. This has been done for clarity. When entering the setup data, the **<SELECT>** key may be pressed to advance to the next parameter.

a. Enable Setpoint 1:
<5> <1> <0> <0> <SELECT> <1> <ENTER>
P5100.1 SPt 1 Enbld

b. Choose proper selections for activation of Setpoint #1:

<5> <1> <1> <0> <SELECT> <0> <ENTER>
P5110.0 Activ Above

<5> <1> <1> <1> <SELECT> <0> <ENTER>
P5111.0 hold 0.0 S

<5> <1> <1> <2> <SELECT> <0> <ENTER>
P5112.X Macro “0”

<5> <1> <1> <3> <SELECT> <0> <ENTER>
P5113.0 Mot'n Ign'd

<5> <1> <1> <4> <SELECT> <0> <ENTER>
P5114.0 Basis new #

<5> <1> <1> <5> <SELECT> <3> <ENTER>
P5115. AL: 3.

c. Choose proper selections for de-activation of Setpoint #1:

<5> <1> <3> <0> <SELECT> <1> <ENTER>
P5130.1 DeAct Below

<5> <1> <3> <1> <SELECT> <0> <ENTER>
P5131.0 hold 0.0 S

<5> <1> <3> <2> <SELECT> <16> <ENTER>
P5132.X Macro none

<5> <1> <3> <3> <SELECT> <0> <ENTER>
P5133.0 Mot'n Ign'd

<5> <1> <3> <4> <SELECT> <0> <ENTER>
P5134.0 New #:

<5> <1> <3> <5> <SELECT> <2> <ENTER>
P5135. DL: 2.

<5> <1> <3> <6> <SELECT> <1> <ENTER>

d. Select the parameter that Setpoint #1 is based upon:

<5> <1> <5> <0> <SELECT> <30> <ENTER>
P5150.0 Par 30 QTY

e. Setpoint Setup is now complete. Proceed to setup macro 0.

21.5 Logic Output Operations

Your indicator includes two open collector type logic outputs. The outputs act as a low (or open ground connection) when they are active and as an open circuit when they are inactive. They can be thought of as a switch that is either open or closed, with the closed connection being to ground. The component providing the output is an FET which in effect makes the output an open drain type. See Table 41, Output Specifications for the related electrical specifications.

These outputs are ideally suited for use with solid state relay devices which have built-in optical isolation, such as the OPTO 22 OAC5 AC output module.

It is not intended that these outputs directly drive inductive loads because they are not protected against back-EMF switching generated voltages! If very light inductive loads are connected anyway, it is recommended that some protection be implemented, such as a diode across the load. Refer to the specifications of the device being connected for additional recommendations.

CONNECTION

The two logic outputs are located on the bottom two connections of J6 on the right edge of the Main Board between the display and keyboard cables. They are labeled SP1 and SP2. The connector is a spring loaded lever connector and accepts 28-20 AWG stranded or solid wire. Press down on the lever, insert the wire into the hole, then release the lever. It is not necessary to tin the stripped wire, however, if tinning is done, be sure to apply only a minimal amount of solder so that the wire will still fit into the terminal block. Multiple wires will not fit into one position on the terminal block. Along with the two logic outputs on the same connector are +5 V and ground, labeled accordingly, in case either is needed in the connected circuit.

Maximum Specifications	I & E
Maximum Applied Voltage	30 VDC
Maximum Current	30 mA
Maximum ON Voltage	0.4 VDC

Table 41 Output Specifications

21.6 Relay Module (OPTION)

Description

The GSE Relay Module Option (GSE Part Number 24550B-100A0) is designed to accept control signals from the GSE Model 500 Series Weigh and Counting Indicators, and provide optically isolated solid state relay outputs. These outputs can be used for controlling external devices such as valves, conveyors, lights, buzzers, or any other external electrical devices.
The enclosure is made of a high temperature polycarbonate plastic and has a weather-tight seal with a DIN protection rating of IP 66, which is similar to a NEMA 4X rating. Refer to figure 31 Relay Module for outline and electrical schematic views of the Relay Module.

Mounting

In many applications it is desirable to attach the GSE Relay Module to a vertical or horizontal or surface. There are two mounting methods provided for the enclosure. Refer to figure 32, Relay Module Option Mounting Dimensions.

When the enclosure cover is removed notice that the cover screw holes go all the way through the enclosure. The mounting screws may use these holes, as long as they don't interfere with the cover screws. Since these holes are outside of the enclosure seal, this does not reduce the enclosure's seal. Two screws with nuts are included for this purpose. Additional screws are available as GSE part number 38-24-3200, the nuts are GSE part number 38-24-1650. The screws used should have a small head diameter no larger than 0.242 inches in diameter, such as a 6-32 fillister head.

A second mounting method involves using the knockouts provided in the back wall of the enclosure. This requires removing the sub-chassis and relay board. It will also compromise the enclosure seal integrity.

Control Connections

The GSE Relay Module includes a captive 6 foot cable which connects to the Indicator to provide the control signals for the module.

A longer cable may be used, but it must be a shielded cable of a type similar to the cable provided. Tests with 200 feet of cable have shown no detrimental effects to the operation of the scale or relay module.

Route the cable into the Indicator through the rear panel strain relief marked J2. The shield connection must be secured with the hex nut on the adjacent stud which secures the main printed circuit board.

Inside the Indicator, the cable's individual wires connect to J6 which is located toward the upper right edge of the circuit board. Inside the GSE Relay Module they connect to the terminal block marked SIGNAL. Table 42, Relay Module Control Connections details each wire termination.

Setpoint Output Connections

Included in the indicator are two open collector type outputs which are controlled by the setups for setpoints one and two. These can be used to control external devices such as low power LED lights or to drive solid state relays such as those provided by the GSE Relay Module Option.

Four connections are provided to make use of the logic outputs. These are the bottom four connections of J6: +5 V, GND, SP1 and SP2.

The +5 V is capable of supplying current of approximately 100 mA. This should be sufficient for most applications. The outputs are not intended to directly drive significant loads!

Normally the +5 V supply would be connected to some value of current limiting resistor (depending on the device being connected), the resistor would connect to the plus side of the device, and the SP1 or SP2 output would be connected to the other side of the device. When the setpoint is not active, the SP1 or SP2 output is an open circuit. When the setpoint is active the indicator output becomes a connection to ground, thus turning on the connected device (Sink Output).

CAUTION
All electrical connections and access to the inside of the indicator and the GSE Relay Module enclosures should be performed by qualified service personnel only!

Externally supplied voltages can also be switched by the logic outputs. In this case the ground connection of the supply must be connected to the indicator common which is provided on the J6 setpoint connector. Be sure that the connected circuitry's ground does not have an earth ground connection or an alternate ground path will be established and the accuracy and stability of the weight reading may be degraded.

Each of the two setpoint outputs is rated to sink up to 30 mA when the output is active. Leakage current into the setpoint output when it is de-active will not exceed 0.01 mA. The voltage applied to the output should not exceed 30 V. When the output is active and sinking up to 30 mA the output voltage will not exceed 0.4 V.

The GSE Relay Module Option accepts the J6 setpoint output signals from the indicator and provides optically isolated solid state relay outputs.

Power Connections

The output wiring of the solid state relays is connected to the upper terminal block inside the GSE Relay Module labeled POWER.

The output wiring enters the enclosure through one of the knock-outs in the enclosure. The relay board prevents the use of the knock-outs on the sides. This leaves 2 available on the top and one on the bottom. They may be pried out with a screwdriver.

One strain relief is provided for the power connections.

Color	Indicator J6 Pin Number	Indicator J6 Pin Name	Relay Board SIGNAL Pin Number
Red	6	+5V	2 & 4
Black	7	GND	1
White	8	SP1	3
Green	9	SP2	5

Table 42 Relay Module Control Connections

CAUTION
All electrical connections and access to the inside of the indicator and the Process Control Interface enclosures should be performed by qualified service personnel only!

Additional cable strain reliefs are available from GSE under part# 26-20-1878. These accommodate cables with outside diameters of 0.236 to 0.512 inches.

Each knock-out can be opened to 2 sizes, (0.91" diameter) which accommodate 1/2" conduit fittings, and (1.14" diameter) which accommodate 3/4" conduit fittings. Since these holes are slightly oversized for these fittings, some fittings may require a gasket or washer for a proper fit. GSE part# 31-20-0156 is a recommended gasket for 1/2" conduit fittings.

The output wiring should be connected as shown in Table 43, Relay Module Power Terminal Block Connections. If DC modules are being used, correct polarity must be observed.

Output Modules

The output modules are supplied separately and must be installed in the proper position on the relay board. Although the relay board is designed to accept 4 output modules, the Indicator only directly supports two hardware setpoint outputs. A larger accessory module is available which permits the Indicator to support up to a total of 32 inputs and outputs.

The positions on the relay board are numbered 0 through 3. Position 0 corresponds to setpoint output 1 and position 1 corresponds to setpoint output 2. Once the modules are installed, they are fastened to the relay board by their own hold-down screw.

Refer to Table 44 Relay Module Available Output Modules for details on modules which are suitable for use in the 24550B-100A0 GSE Relay Module.

Refer to the manufacturers data sheets for further information regarding the holding current, surge current, and other related parameters for each module.

Operation

During operation, when an output is activated, it's corresponding LED will light. An output module must be installed for the LED to function correctly.

Each output module is protected by it's own fuse. The standard fuse is a 5 AMP miniature type that looks very much like a resistor. They are plugged into sockets on the relay board.

Output	Positive	Negative
Setpoint 1	**2**	**3**
Setpoint 2	**4**	**5**

Table 43 Relay Module Power Terminal Block Connection

If there is a problem, the fuse may blow. Note that the LED will still operate even with a blown fuse. If the fuse does blow, always remove power and fix the problem before applying power to the circuit again. The relay board provides space for a spare fuse in addition to the two unused relay positions' fuses. Replacement fuses are available through GSE (Part# 13-10-4500), or use Littlefuse PICO II part# 251005 or BUSS Tinitron Part# A5 or AC5.

Using the GSE RELAY MODULE with older Model 500 Series indicators

GSE Part Number	WRC/Allen Bradley Part#	Type	Nominal Voltage	Minimum Voltage	Maximum Voltage	Amps Max
19-30-0310	**1781-OA5S**	**AC**	**120**	**12**	**140**	**3**
19-30-0320	**1781-OM5S**	**AC**	**240**	**24**	**280**	**3**
19-30-0510	**1781-OC5S**	**DC**	**120**	**5**	**200**	**1**
19-30-0520	**1781-OB5S**	**DC**	**24**	**3**	**60**	**3**

Table 44 Relay Module Available Output Modules

Early Model 500 Series Indicators had TTL setpoint outputs rather than open collector logic outputs. These older units may be identified by the printed circuit board revision letter located in the upper left corner of the board. PC745B indicates an older board, PC745C, PC745D, etc indicate newer boards which will work properly with the GSE Relay Module with no modifications. PC745C began with printed circuit board serial number 000835.

Table 45 Relay Module Control Connections for PC745B shows how the GSE Relay Module should be re-wired to work with a PC745B circuit board.

Using the GSE RELAY MODULE with two indicators

Since there are two unused positions in the GSE Relay Module, it is possible to use those relays for the setpoint outputs of a second indicator. Certainly other combinations are also possible. Since each relay may be used independently of the others, four Indicators could share one GSE Relay Module, with each instrument having one setpoint output relay. For the purposes of this example, we will assume two Indicators with 2 setpoint output relays each.

Refer to Table 45 Relay Module Control Connections for a Second Indicator for the control connections to the second instrument. The first instrument is connected as shown in Tables 42 and 43. This data assumes that both instruments are PC745C revision or later.

Refer to Table 46, Relay Module Setpoint Outputs, for a Second Indicator details the POWER connections for the second Indicators setpoint outputs.

The following parts are available separately from GSE, for connection to the second instrument:

Unfinished control cable
(specify length) part# 22-10-6675

Cable strain relief part# 26-20-1878

Cable anchor part# 31-80-0140

21.7 Process Control Interface (OPTION)

Description

The Process Control Interface Option (GSE Part Number: 24550B-100B0) is designed to accept control signals from the GSE Model 500 Series Weigh Indicators and provide optically isolated solid state relay inputs and outputs. The outputs can be used for controlling external devices such as valves, conveyors, lights, buzzers, or any other external electrical device. The inputs may be used to allow the instrument to sense external events and initiate or modify a process accordingly, such as an operator pushbutton, or a carton on a conveyor, interrupting a light beam sensor.

The enclosure for the Process Control Interface Option is made of a high temperature polycarbonate plastic and has a weather-tight seal with a DIN protection rating of IP 66, which is similar to a NEMA 4X rating.

Mounting

In many applications it is desirable to secure the Process Control Interface to a vertical or horizontal surface. There are two mounting methods provided for the enclosure. Refer to Figure 33, Process Control Interface Option Mounting Dimensions for installation mounting dimensions.

When the enclosure cover is removed notice that the

Color	Indicator J6 Pin Number	Indicator J6 Pin Name	Relay Board SIGNAL Pin Number
Red	6	+5V	6 & 8
Black	7	GND	--
White	8	SP1	7
Green	9	SP2	9

Table 45 Relay Module Control Connections for a Second Indicator

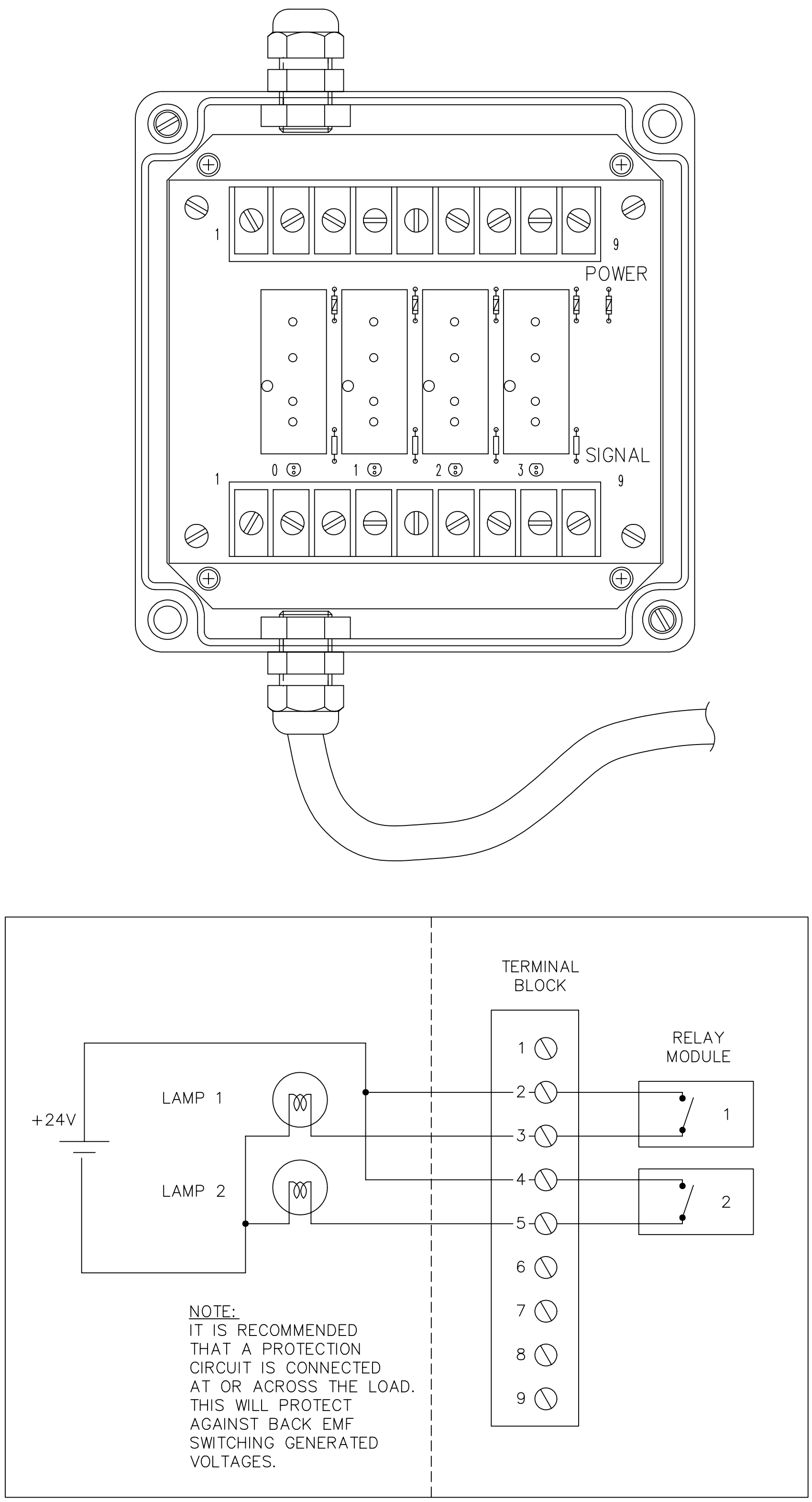


Figure 31 Relay Module

Output	Positive	Negative
Setpoint 1	6	7
Setpoint 2	8	9

Table 46 Relay Module Setpoint Outputs for a Second Indicator

cover screw holes go all the way through the enclosure. The mounting screws may use these holes, if they do not interfere with the cover screws. Since these holes are outside of the enclosure seal, this does not reduce the enclosure's seal. Two screws with nuts are included for this purpose. Additional screws are available as GSE part number 38-24-3200. The nuts are GSE part number 38-24-1650. The screws used should have a small head diameter no larger than 0.242 inches in diameter, such as a #6-32 fillister head.

A second mounting method involves using the knockouts provided in the back wall of the enclosure. This requires removing the sub-chassis and relay board. It will also compromise the enclosure seal integrity.

Control Connections

The Process Control Interface Option (PCI) includes a captive 4 foot cable with a built-in strain relief (GSE Part #: 22-30-27565). This cable connects to the indicator to provide the control signals for the PCI module. The above ribbon cable comes complete with circular jacket. Other cables are available in different lengths non-jacketed. These cables would normally be used in custom panel applications.

GSE Part #: 22-30-3060P (6 inch cable)
GSE Part #: 22-30-3061P (18 inch cable)
GSE Part #: 22-30-3062P (36 inch cable)

Remove the middle strain relief, J3, from the rear of the indicator, leaving the retaining nut in place. Remove and discard the retaining nut from the built-in strain relief on the cable. Then route the cable into the Indicator through this opening, feeding the cable through the retaining nut. Tighten the retaining nut and the strain relief outer clamp nut. The shield connection must be secured with the hex nut on the adjacent stud.

Inside the indicator the ribbon cable's connector plugs into J4 which is located towards the center of the circuit board and is labeled OPTION. Note the notch on one side to prevent reversed mating.

Power Connections

The power wiring of the solid state relays is connected to the upper terminal block inside the Process Control Interface enclosure labeled TB2.

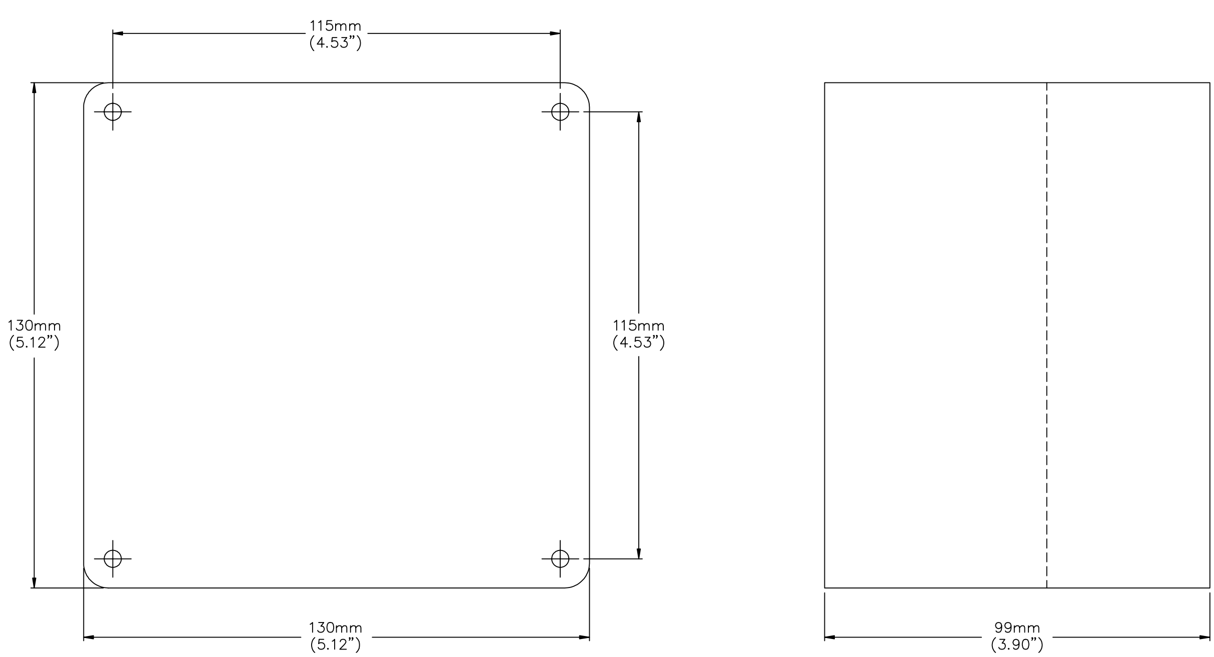


Figure 32 Option Mounting Dimensions (Relay Module)

The power wiring enters the enclosure through one of the knock-outs in the enclosure. The interface board prevents the use of the knock-outs on the left side. The knockouts closest to the corners are too close to the corners to be usable with the strain reliefs. This leaves four holes available on the top, four on the right side and three on the bottom. These may be pried out with a screwdriver. Be sure before you remove a knockout that it is in a usable location!

One strain relief is provided for the power connections. Additional cable strain reliefs are available from GSE under part# 26-20-1878. These strain reliefs accommodate cables with outside diameters of 0.236 to

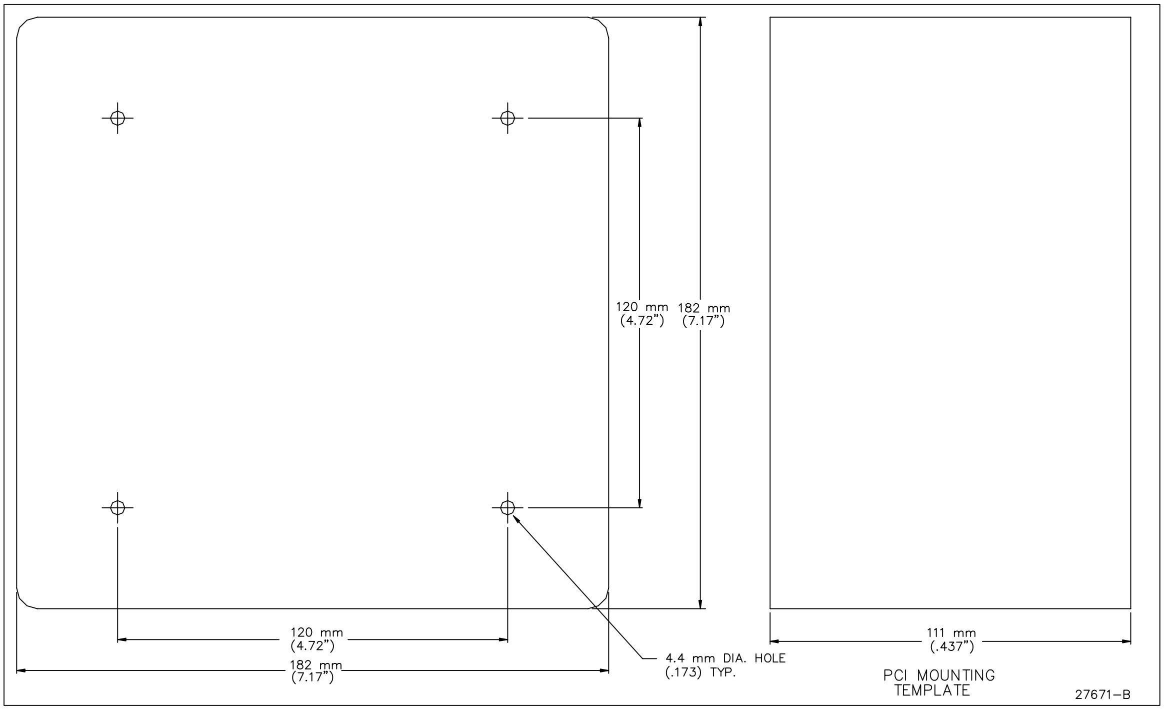


Figure 33 Option Mounting Dimensions (PCI Module)

I/O Module Position	Setpoint Number	Positive Signal	Negative Signal
0	1	1	2
1	2	3	4
2	3	5	6
3	4	7	8
4	5	9	10
5	6	11	12
6	7	13	14
7	8	15	16

Table 47 PCI Input / Output Terminal Connections (TB2)

GSE Part Number	WRC/Allen Bradley Part#	Type	Nominal Voltage	Minimum Voltage	Maximum Voltage	Amps Max
19-30-0310	1781-OA5S	AC	120	12	140	3
19-30-0320	1781-OM5S	AC	240	24	280	3
19-30-0510	1781-OC5S	DC	120	5	200	1
19-30-0520	1781-OB5S	DC	24	3	60	3

Table 48 PCI OUTPUT Modules

GSE Part Number	WRC/Allen Bradley Part#	Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
19-30-1910	1781-IA5S	AC/DC	120	90	140
19-30-1920	1781-IM5S	AC/DC	240	180	280
19-30-1930	1781-IN5S	AC/DC	24	10	60
19-30-1940	1781-IB5S	DC	24	3.3	32

Table 49 PCI INPUT Modules

0.512 inches.

There are two sizes of knockouts. (0.91" diameter) which accommodate 1/2" conduit fittings, and 1.14" diameter which accomodate 3/4" conduit fittings. Since these holes are slightly oversized for these fittings, some fittings may require a gasket or washer for a proper fit. GSE part# 31-20-0156 is a recommended gasket for 1/2" conduit fittings.

The power wiring should be connected as shown in Table 47, PCI Input / Output Terminal Connections (TB2).

If DC modules are being used, correct polarity must be observed.

Input/Output Modules

The input/output modules are supplied separately and must be installed in the proper position on the relay board. The positions on the relay board are numbered 0 through 7. Position 0 corresponds to setpoint 1 and position 7 corresponds to setpoint output 8. (Refer to Table 50). Once the modules are installed, they are fastened to the relay board by their own hold-down screw.

Either an INPUT or an OUTPUT module may be used in any of the setpoint positions. Unused positions may be left empty. Table 48, PCI Output Modules and Table 49 PCI Input Modules detail the available modules which are suitable for use in the 24550B-100B0 Process Control Interface.

Refer to the manufacturers data sheets for further information regarding the holding current, surge current, and other related parameters for each module.

Operation

CAUTION
All electrical connections and access to the inside of the indicator and the Process Control Interface enclosures should be performed by qualified service personnel only!

Setpoint Number	1st Interface Position	2nd Interface Position	3rd Interface Position	4th Interface Position
1 - 8	0 - 7			
9 - 16		0 - 7		
17 - 24			0 - 7	
25 - 32				0 - 7

Table 50 PCI Setpoint Numbering for Multiple Interfaces

During operation, when a setpoint module is activated, it's corresponding LED will light. A module must be installed for the LED to function correctly.

Each module is protected by it's own fuse. The standard fuse is a 5 AMP miniature type that looks very much like a resistor. They are plugged into sockets on the relay board.

If there is a problem, the fuse may blow. Note that the LED will still operate even with a blown fuse. If the fuse does blow, always remove power and fix the problem before applying power to the circuit again. The relay board provides space for a spare fuse in addition to the two unused relay positions' fuses. Replacement fuses are available through GSE (Part# 13-10-4500), or use Littlefuse PICO II part# 251005 or BUSS Tinitron Part# A5 or AC5.

Using the Process Control Interface with older Model 500 SERIES INDICATORS

Early Model 500 Series Indicators had smaller cable holes in the rear panel. To accommodate these older units, a replacement cable is available which uses a smaller strain relief. It may be ordered separately from GSE as Part# 22-30-27564.

Proper operation of the Process Control Interface requires that the indicator have a firmware release date of Nov. 18, 1991 or later. Consult the GSE factory for firmware update information.

Using multiple PROCESS CONTROL INTERFACES with a single Model 500 series indicator

The Process Control Interface was designed to permit the Model 500 Series Indicator to control up to a total of 32 input and output modules. This is accomplished by "chaining" up to four Process Control Interfaces together, the first of which is directly connected to the Indicator. Refer to Table 50 PCI Setpoint Numbering for Multiple Interfaces to relate setpoint numbers with position numbers for each individual interface.

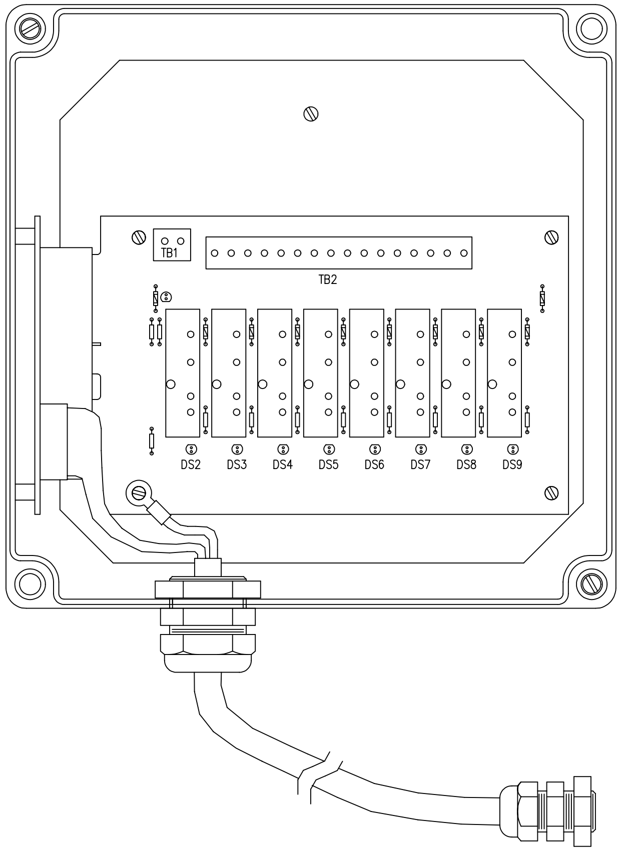
A special cable is available for connection between two Process Control Interfaces. It may be ordered separately from GSE as Part# 22-30-27565. The cable enters the Process Control Interface enclosure through one of the knockouts in the enclosure. It connects to the OPTION OUT connector J2 in the first Process Control Interface and to the OPTION IN connector J1 in the next Process Control Interface.

21.8 Example Setups

The following setup examples are structured such as an ASCII file would be. Entering these setups manually from the front keypad is possible but approached slightly different. A remote keyboard or a terminal would make manual entering of the setup a little easier. If the file were in ASCII form the setup procedure would be the quickest of all approaches. GSE recommends all custom setups should be backed up on a PC and diskette. This will make service calls and resale of the same program much easier.

Example #1:	**Over/Under Indicator**
100%s23640%i%e	Access Setup Modes, Allowing Changes

SET LOWER ACTIVATION SETPOINT LEVEL (ACTIVE BELOW 15 LBS.)



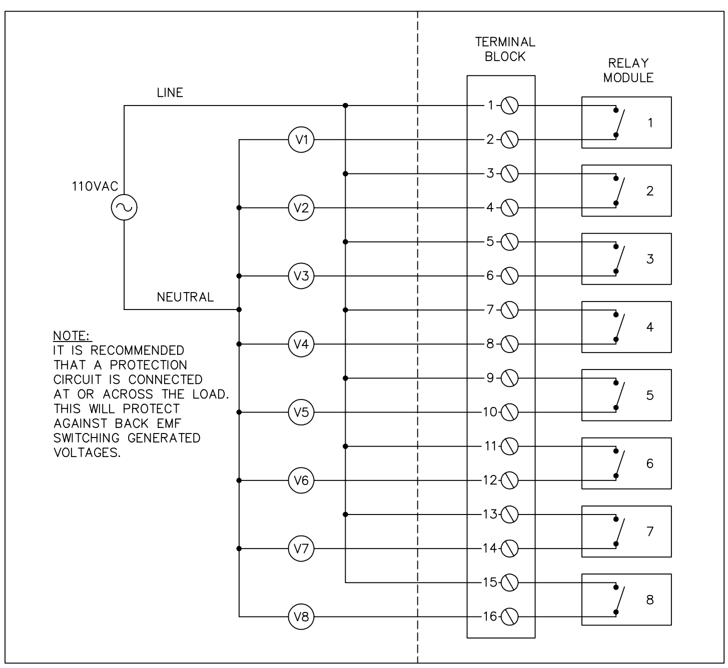


Figure 34 Process Control Interface (PCI)

21

5100%s1%e	P5100.1 SPt 1 Outpt
5110%s1%e	P5110.1 Activ Below
5111%s0%e	P5111.0 hold 0.0 S
5112%s16%e	P5112.X Macro none
5113%s0%e	P5113.0 Mot'n Ign'd
5114%s0%e	P5114.0 Basis new #
5115%s15.000000%e	P5115. AL: 15.
5130%s0%e	P5130.0 DeAct Above
5131%s0%e	P5131.0 hold 0.0 S
5132%s16%e	P5132.X Macro none
5133%s0%e	P5133.0 Mot'n Ign'd
5134%s1%e	P5134.1 Basis %% val
5135%s100.000000%e	P5135. DL: 100.
5136%s1%e	P5136.1 Based SPt 1
5137%s0%e	P5137.0 Value AL
5150%s0%e	P5150.0 Par 0 Gross

SET UPPER ACTIVATION SETPOINT LEVEL (ACTIVE ABOVE 25 LBS.)

5200%s1%e	P5200.1 SPt 2 Outpt
5210%s0%e	P5210.0 Activ Above
5211%s0%e	P5211.0 hold 0.0 S
5212%s16%e	P5212.X Macro none
5213%s0%e	P5213.0 Mot'n Ign'd
5214%s0%e	P5214.0 Basis new #
5215%s25.000000%e	P5215. AL: 25.
5230%s1%e	P5230.1 DeAct Below
5231%s0%e	P5231.0 hold 0.0 S
5232%s16%e	P5232.X Macro none
5233%s0%e	P5233.0 Mot'n Ign'd
5234%s1%e	P5234.1 Basis %% val
5235%s100.000000%e	P5235. DL: 100.
5236%s2%e	P5236.2 Based SPt 2
5237%s0%e	P5237.0 Value AL
5250%s0%e	P5250.0 Par 0 Gross
%z	Exit Setup Mode

Example #2: Latching Relays

100%s23640%i%e	Access Setup Modes, Allowing Changes

NAME VAR#1 FOR SETPOINT 1 TARGET VALUE

681%sSP-1 VALUE%e	P681.-- Var#1 SP-1 VALUE

SET SP-1 ACTIVATION POINT TO 100% OF VAR#1 VALUE

5100%s1%e	P5100.1 SPt 1 Outpt
5110%s0%e	P5110.0 Activ Above
5111%s0%e	P5111.0 hold 0.0 S
5112%s16%e	P5112.X Macro none
5113%s0%e	P5113.0 Mot'n Ign'd
5114%s1%e	P5114.1 Basis %% val
5115%s100.000000%e	P5115. AL: 100.
5116%s0%e	P5116.0 Based Var #
5117%s1%e	P5117.1 Value Var#1

SET SP-1 DE-ACTIVATION POINT TO 95% OF VAR#1 VALUE

5130%s1%e	P5130.1 DeAct Below
5131%s0%e	P5131.0 hold 0.0 S
5132%s16%e	P5132.X Macro none
5133%s0%e	P5133.0 Mot'n Ign'd
5134%s1%e	P5134.1 Basis %% val
5135%s95.000000%e	P5135. DL: 95.
5136%s0%e	P5136.0 Based Var #
5137%s1%e	P5137.1 Value Var#1
5150%s0%e	P5150.0 Par 0 Gross
%z	Exit Setup Mode

Example #3: Activate on <TARE>

100%s23640%i%e	Access Setup Modes, Allowing Changes

NAME VAR#1 FOR SETPOINT 1 TARGET VALUE

681%sSP1 TARGET%e	P681.-- Var#1 SP1 TARGET

SET TO ACTIVATE ON <TARE>, FILL TO TARGET (100% OF VAR#1 VALUE)

5100%s1%e	P5100.1 SPt 1 Outpt
5110%s4%e	P5110.4 Activ Tare
5111%s0%e	P5111.0 hold 0.0 S
5112%s16%e	P5112.X Macro none
5130%s0%e	P5130.0 DeAct Above
5131%s0%e	P5131.0 hold 0.0 S
5132%s16%e	P5132.X Macro none
5133%s0%e	P5133.0 Mot'n Ign'd
5134%s1%e	P5134.1 Basis %% val
5135%s100.000000%e	P5135. DL: 100.
5136%s0%e	P5136.0 Based Var #
5137%s1%e	P5137.1 Value Var#1
5150%s1%e	P5150.1 Par 1 Net
%z	Exit Setup Mode

Example #4: Grading (Up to 32 Ranges)

100%s23640%i%e	Access Setup Modes, Allowing Changes

SET SMALLEST GRADE RANGE

5100%s1%e	P5100.1 SPt 1 Outpt
5110%s2%e	P5110.2 Activ Betwn
5111%s0%e	P5111.0 hold 0.0 S
5112%s16%e	P5112.X Macro none
5113%s1%e	P5113.1 Mot'n Inhib
5114%s0%e	P5114.0 Basis new #
5115%s0.500000%e	P5115. AL: 0.5
5118%s0%e	P5118.0 Basis new #
5119%s10.000000%e	P5119. AU: 10.
5130%s3%e	P5130.3 DeAct Outsd
5131%s0%e	P5131.0 hold 0.0 S
5132%s16%e	P5132.X Macro none
5133%s1%e	P5133.1 Mot'n Inhib
5134%s0%e	P5134.0 Basis new #
5135%s0.500000%e	P5135. DL: 0.5
5138%s0%e	P5138.0 Basis new #
5139%s10.000000%e	P5139. DU: 10.
5150%s0%e	P5150.0 Par 0 Gross

SET 2ND SMALLEST GRADE RANGE

5200%s1%e	P5200.1 SPt 2 Outpt
5210%s2%e	P5210.2 Activ Betwn
5211%s0%e	P5211.0 hold 0.0 S
5212%s16%e	P5212.X Macro None
5213%s1%e	P5213.1 Mot'n Inhib
5214%s0%e	P5214.0 Basis new #
5215%s10.000000%e	P5215. AL: 10.
5218%s0%e	P5218.0 Basis new #
5219%s20.000000%e	P5219. AU: 20.
5230%s3%e	P5230.3 DeAct Outsd
5231%s0%e	P5231.0 hold 0.0 S
5232%s16%e	P5232.X Macro none
5233%s1%e	P5233.1 Mot'n Inhib
5234%s0%e	P5234.0 Basis new #
5235%s10.000000%e	P5235. DL: 10.
5238%s0%e	P5238.0 Basis new #
5239%s20.000000%e	P5239. DU: 20.
5250%s0%e	P5250.0 Par 0 Gross

SET THIRD SMALLEST GRADE RANGE

5300%s1%e	P5300.1 SPt 3 Outpt
5310%s2%e	P5310.2 Activ Betwn
5311%s0%e	P5311.0 hold 0.0 S
5312%s16%e	P5312.X Macro none
5313%s1%e	P5313.1 Mot'n Inhib
5314%s0%e	P5314.0 Basis new #
5315%s20.000000%e	P5315. AL: 20.
5318%s0%e	P5318.0 Basis new #
5319%s30.000000%e	P5319. AU: 30.
5330%s3%e	P5330.3 DeAct Outsd
5331%s0%e	P5331.0 hold 0.0 S
5332%s16%e	P5332.X Macro none
5333%s1%e	P5333.1 Mot'n Inhib
5334%s0%e	P5334.0 Basis new #
5335%s20.000000%e	P5335. DL: 20.
5338%s0%e	P5338.0 Basis new #
5339%s30.000000%e	P5339. DU: 30.
5350%s0%e	P5350.0 Par 0 Gross

%z	Exit Setup Mode

21.9 Relay Contact Protection Circuits

Brief Explanation

All 550/570 logic outputs are ideally suited for solid state relay devices which have built-in optical isolation. It is not intended that these outputs directly drive inductive loads because they are not protected against back-EMF switching generated voltages. If very light inductive loads are connected, it is highly recommended that some protection be implemented. Also, refer to the specifications of the device being connected for additional recommendations.

21.10 Relay I/O 16 Position Card (Option)

(16 Position Board GSE Part #: 420796-30560)
(16 Position Board GSE Part #: 24550B-100C0)

Additional relay boards have been designed for easy mounting in **custom enclosure systems**. These boards have the capability to be stuffed with both input and output modules (16 modules). The part #s shown above do not include the I/O modules (modules sold separately). Part # 420796-30560 is strictly the interface circuitry and relay mount board. There is no mounting hardware or cabling included. Part # 24550B-100C0 includes all panel mounting hardware and interface cabling to 550. The interface circuitry is included on both option boards).

GSE Part #: 22-30-27565 (4 feet cable)

The above ribbon cable comes complete with circular jacket. Other cables are available in different lengths non-jacketed. These cables would normally be used in custom panel applications.

GSE Part #: 22-30-3060P (6 inch cable)
GSE Part #: 22-30-3061P (18 inch cable)
GSE Part #: 22-30-3062P (36 inch cable)

Contact GSE for availability of these items in this section.

Figure 35, Relay Contact Protection Circuits

Chapter 22 Analog Output (OPTION)

22.1 Installation

(GSE, 0-10VDC/4-20mA Output Card)
(GSE Part #: 200550-ALG)

This option must be installed by a factory authorized service technician. Refer to Figure 36, Analog Output Board Installation, for details on the mounting of the analog option card to the main board.

The bottom side of the analog option card, PC765, has a two rows of ten pins each contained within connector J1 on the bottom of the analog option card. This connector interfaces directly to the Main Board PC745 option connector J4. For additional mechanical support, two snap-in spacers are attached to the bottom of the option board through holes near capacitors C10 and C4 on the analog option card. The upper spacer can snap into a hole in the main board next to U17, and the lower spacer snaps into a hole above U23.

NOTE:
On early versions of the Main Board (PC745-B), there is only one hole (next to U17) for the option board mounting. This hole already has a support spacer snapped in from the bottom side which must first be removed. The Main Board may need to be removed in order to remove this spacer. The lower spacer has no hole available at all. In order to provide some support for the board when the lever connectors are being used, it is recommended that the snap portion of the bottom end of this lower spacer be clipped off so that it can rest on the Main Board. If better support is required for a specific installation, a hole (0.187" dia.) may be drilled in the Main Board to align with the spacer, instead of clipping the spacer. If properly placed, the hole will not interfere with any printed circuit traces, except for a part of the ground plane which is acceptable practice.
The PC745-C revision of the Main Board includes both mounting holes with no spacers already in place. In order for the option to work properly in your indicator, the installed firmware (U12 on the Main Board) must be at least 450550p01002, date code 910620. If the firmware is older, contact the factory for a firmware upgrade.

EXTERNAL CONNECTIONS

The output connector J3, located on the analog option card is a three position lever-type connector which requires no soldering and will accept 18 to 22 AWG wire, stranded or solid.

Connect the common wire of the two wire interface to the **GND** connection and connect the other wire to the position marked **V** for voltage output or to the position marked **I** for current output.

Cabling from J3 on the analog output option card to a location external to the indicator is not supplied by GSE. A shielded twisted pair is recommended for optimum performance and immunity to external RFI.
The analog cabling interface may be routed into the 550 or 570 enclosure through any unused strain relief (J2, J3, or J4) on the indicator rear panel. J2 will provide the most direct routing. For additional protection against connection damage, it is recommended that the interface cable be tied to the option card through the hole provided in front of the J3 connector. A tie wrap (included with the option) or similar clamping device may be used.

The shield of the cable should be terminated to earth ground by wrapping it around the shield stud used for the load cell adjacent to strain relief J1 and then tightening the 7mm hex nut.

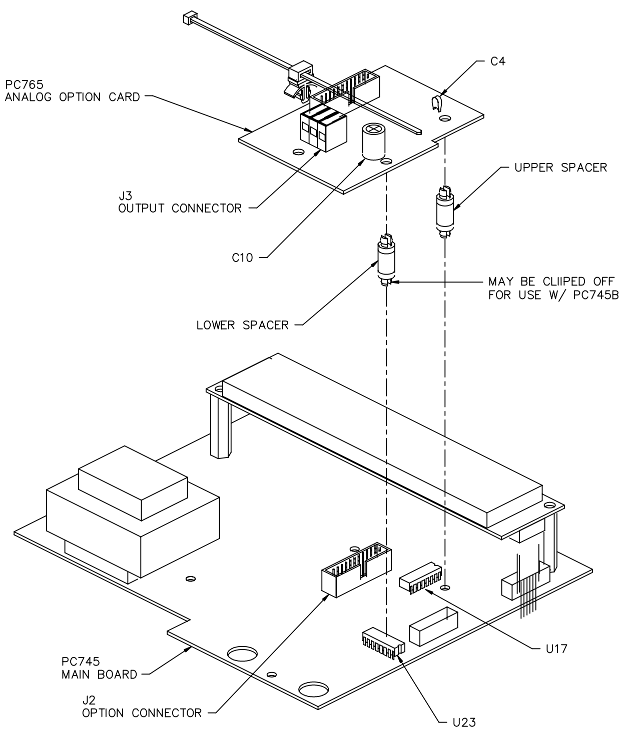


Figure 36 Analog Output Board Installation

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Jumper	Position	Selected Output
E3	Toward J3	4 - 20 mA Output
E4	Toward P3	4 - 20 mA Output
E3	Away from J3	0 - 20 mA Output
E4	Away from P3	0 - 20 mA Output

Table 51 Analog Output Jumper Selections

JUMPER SELECTIONS

The only jumper selections included are used to select either 4 - 20mA current output or 0 - 20mA current output. They are normally shipped from the factory in the 4-20mA position. If the voltage output is being used, then these jumpers have no effect. These jumpers and their positions are described in Table 51 Analog Output Jumper Selections. Note that both jumpers must be moved to implement a selection.

This option board has been adjusted at the factory for accurate results with the jumpers set for 4-20mA. Therefore, if the 0-20mA selection is made, a slight adjustment of the gain and / or zero pots may be necessary in order to maintain the highest accuracy.

ANALOG OUTPUT DRIVING CAPABILITIES

The voltage output is capable of driving a minimum of a 500 ohm load resistance. This corresponds to a maximum output current of 10V / 500 ohm = 20mA. Any lower resistive load may cause damage to the option board and may degrade the signal.

The current output is capable of driving a maximum of a 500 ohm load resistance. This corresponds to a maximum output voltage of 10V /500 ohm x 20 mA = 10 volts.

Any further increase in load resistance beyond this value may result in degradation of the output signal.

The response time of the Analog Option is the same as the display update. The response time is dependant on the filter selection, parameter P116.

The analog output is scaled around the parameter ID selected at parameter P171. The analog output is resolved to 1 part in 4000.

ADDITIONAL NOTES

Neither the voltage nor the current outputs are isolated. That is, the ground connection is common to the indicator ground which is common to earth ground, assuming proper power connections have been made. If the receiving device is not isolated, this may cause ground voltage equalizing currents to flow through the ground wires, thus inducing errors in the output voltage. Therefore, in order to achieve the best results, GSE recommends that the device receiving the Analog Output have an isolated input. If this is not the case, the next best scenario may be achieved by connecting the indicator and the device receiving the Analog Output into the same power outlet receptacle, or assuring a common supply of 120VAC to both devices.

22.2 Analog Output and Macros

Note that when a macro is invoked, any parameter IDs values are suspended unless an A/D conversion is performed. This would require an idle (%I) function to be executed within the macro program. With this in mind, the analog output is suspended within a macro unless the parameter selected at P171 is updated.

22.3 Analog Output Parameter Setup

Three parameters within the Setup Mode are dedicated to the operation of the Analog Output. The Analog Output function is an option which is not supplied as part of the standard indicator. The following three parameters are only applicable to an installed Analog Output option.

P170.XX A-out

This parameter will turn off the Analog Output option (if the option has been installed). If the Analog Output option is installed and enabled in P170, then P171 and P172 will be displayed which set certain operating conditions for the option.

P171.XX Parm

Note:

If the analog option is enabled while scale 4 is enabled, the error message “Hardware Conflict” will be displayed in abbreviated form. Refer to chapter 29 for further information on Hardware Error Messages.

This parameter establishes which of the numeric parameters the Analog Output is to be based upon, most commonly the Net or Gross Weights. The choice may be selected by pressing the **<ENTER>** key and cycling through the choices or by keying in the desired parameter ID number and then pressing **<ENTER>**.

P172.- - F.S.=

This parameter lets you enter a value at which the Analog Output voltage will be set to 10.0V (or the output current to be 20mA). Regardless of the Full Scale selection set in P110, if P172 is set to 200, when the parameter specified by P171 reaches 200, the output will be at its full scale. The default for this parameter (after parameter P170 is set for ON) is the value entered for P110, the Full Scale capacity selection. Once the weight data exceeds the entered scaling value, the output will remain at full scale (10V or 20mA). When the weight data is less than zero, the output will remain at zero (0V or 4mA or 0mA). In addition, this parameter can be set to a negative value. This allows for a positive going output signal for a negative going weight value. For example, setting this setup value to -50 will result in a +5V output when the weight data is at -25 and +10v when the weight data is -50. The value keyed in here is uses the same units as established by parameter P150. As a result, with a constant incoming weight signal, pressing **<UNITS>** to toggle through the available units selections will not affect the output signal. Key in the weight which will correspond to a 10V output and press **<ENTER>**.

NOTE:
In order to eliminate accidental loss of these setup parameters simply toggling OFF and back ON parameter P170 does not reset P171 and P172 to their default values. These parameters are defaulted only if the changes are saved with P170 set for the OFF selection.

22.4 Example Setups

The following setup examples are structured such as an ASCII file would be. Entering these setups manually from the front keypad is possible but approached slightly different. A remote keyboard or a terminal would make manual entering of the setup a little easier. If the file were in ASCII form the setup procedure would be the quickest of all approaches. GSE recommends all custom setups should be backed up on a PC and diskette. This will make service calls and resale of the same program much easier.

Example #1: Basic Operation Setup

The output voltage and current values per the applied weight range are listed in the following table and are based on the setup below. (100 pounds full scale).

170%s1%e	P170.01 A-out on
171%s1%e	P171.01 Parm: Net
172%s100.00%e	P172.-- F.S. = 100

Gross Wt.	Net Wt.	Analog Output
0 lbs	0 lbs	0 V
50 lbs	50 lbs	+5 V
100 lbs	100 lbs	+10 V

Example #2: Analog Output Offset

The objective is to set up a macro that will allow for an analog output "**offset**" from the gross wt. This is accomplished by entering a negative tare value equal to the "low" end gross wt. of -30,000 lbs. The "high" end gross wt. (+30,000) is based on half of the F.S. setting (+60,000) for the analog output. The analog output is based on the Net Wt. The Analog option has a range of 0 to +10 volts. The Gross wt. swing is from -30,000 lbs. to +30,000 lbs. The Net wt. swing is from 0 lbs to 60,000 lbs. The operation is set to view the Gross Wt. mode.

DISABLE TARE OPERATIONS

166%s0%e	P166.00 AutoT Disbl
167%s0%e	P167.00 KybdT Disbl

ANALOG OUTPUT

170%s1%e	P170.01 A-out on
171%s1%e	P171.01 Parm: Net
172%s60000.000000%e	P172.-- F.S. = 60000

MACRO ‘0’

800%s%c%e	P800.24 macro # 0

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80%%s%e	select
-30000%%e%e	enter
80,2%%C%e	copy register
0%%s%e	select

SETPOINT '32'

8200%s1%e	P8200.1 SPt32 Enbld
8210%s9%e	P8210.9 Activ always
8211%s0%e	P8211.0 hold 0.0 S
8212%s0%e	P8212.0 Macro 0
8213%s0%e	P8213.0 Mot,n Ign'd
8230%s10%e	P8230.X DeAct never

CONCLUSION: The following table shows the analog output in respect to the Net wt.

Gross Wt.	Net Wt.	Analog Output
-30,000	0	0 V
0	+30,000	+5 V
+30,000	+60,000	+10 V

Example #3: Match A/D Analog Board resolution with indicator's displayed resolution

The resolution of the A/D is 1 part in 4000. If the full scale of the load cell is 4000 lbs. (P110) and the count by (P111) is set to 1, then the analog output will directly track the units display.

170%s1%e	P170.01 A-out on
171%s1%e	P171.01 Parm: Net
172%s4000.00%e	P172.-- F.S. = 4000

With a tare value of 0.

Gross Wt.	**Net Wt.**	**Analog Output**
0 lbs	0 lbs	0 V
2000 lbs	2000 lbs	+5 V
4000 lbs	4000 lbs	+10 V

Chapter 23 Multi-Scale Capabilities (OPTION)

23.1 Multi-Scale Option Capabilities

(Multi-Scale Input, GSE Part #: 24550B-200A0)

The Multi-Scale Input option provides the 550/570 indicators with the capability to receive input signals from additional load cells. Up to three Multi-Scale Input options may be "daisy chained" to provide a total capacity of four inputs to the indicator. If analog output or Process Control Interface options are in use, the fourth scale input may not be used due to conflicting option addresses.

The Multi-Scale Input option is an accessory to the 550/570 indicators. The Option consists of a Multi-Scale option board in an enclosure with a round jacketed ribbon cable which connects to the main board of the indicator. It may be mounted to the rear panel of the indicator or on an optional mounting plate. The Multi-Scale board and cable are available separately for custom installations.

It is important to note that when the Multi-Scale option enclosure is mounted to the back panel of the indicator, the Multi-Scale option enclosure gasket does not provide a washdown seal for the Multi-Scale option. This is due to the rear panel of the indicator's enclosure bowing under the pressure from the gasket. If a washdown seal is required, the optional mounting plate must be used.

Two jumpers on the Multi-Scale PC board select whether it will be addressed as scale one, two, three, or four. Both jumpers must be in the same position for the Multi-Scale board to function properly. Normally, the scale one position is not used because the scale input on the main board is addressed as scale 1. If it is desired to use a Multi-Scale Input board as scale 1, the main board scale input must be disabled by removing the analog to digital converter chip, U22.

The following accessories for the Multi-Scale Option are available separately from GSE:

GSE Part#	Description
22-30-28043	22 inch Multi-Scale option cable
22-30-28048	60 inch Multi-Scale option cable
44-25-27716	Optional Mounting Plate
420747-27385	Multi-Scale option board
450550-01004	M550 Revision 4 EPROM

The following replacement spare parts are also available separately from GSE:

GSE Part#	Description
10-40-5503	CS5503-JP A/D converter chip, U7
38-31-1200	M5 metric lockwasher
38-31-6216	M5 x 16mm philips screw
44-30-27420	Multi-Scale option enclosure gasket

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23.2 Multi-Scale Parameter Setup

P101.00 Scl 1 Disbl

This parameter is used to disable scale 1. When disable is selected, its setup and calibration are erased from EEPROM memory.

P101.01 Scl 1 Saved

This parameter is used to save setup and calibration data while still disabling scale 1. When disable is selected, its setup and calibration are retained in EEPROM memory, while the scale is disabled. Scale 1 may not be selected from the weigh mode in this setup.

P101.02 Scl 1 Enbld

This parameter is used to enable scale 1. When enabled is selected, its setup and calibration are retained in EEPROM memory, and scale 1 may be selected from the weigh mode.

P102.00 thru P104.02 are identical to **P101.00 thru P101.02** for scales 2, 3 and 4 when the multi-scale option is installed.

23.3 Installation

TOOLS REQUIRED

8mm (5/16") nutdriver or philips screwdriver for removing rear panel screws.

7mm (9/32") nutdriver for cable shield grounding nut. Adjustable open-end wrench for rear panel strain reliefs.

Note: If the Multi-Scale option is being mounted by itself, the 22 inch cable supplied with the Multi-Scale option may be replaced with a 60 inch cable, GSE P.N. 22-30-28048. This will allow the Multi-Scale option to be located a greater distance away from the indicator.

a. Turn off the indicator by disconnecting it from the AC power source.

b. Open the indicator by removing the (8) philips / hex (8mm) head screws from the rear panel. Then slowly remove the rear panel assembly from the main enclosure and disconnect the cable connecting the keypad to connector **J7** of the main board.

> **CAUTION:**
> This procedure should be performed by qualified service personnel only! Hazardous voltages are accessible within the indicator.

c. Remove the center strain relief **J3** from the rear panel of the indicator. Remove the plastic nut from the strain relief on the Multi-Scale option cable. Pass the end of the Multi-Scale option cable through the hole in the rear panel **J3** and also through the plastic strain relief nut. Tighten the strain relief nut.

d. Connect the Multi-Scale option cable connector to **J4 (OPTION)** on the indicator's main board. This connector is keyed so that it can only be plugged in one way.

e. Remove the nut from the stud next to the strain relief **J3**. Place the Multi-Scale option cable's shield terminal over the stud, replace the nut and tighten.

f. Tighten the strain relief's clamp nut so that the cable is held securely in place.

g. Connect the load cell wiring to **J2** of the Multi-Scale option board. If a 6 lead load cell is used jumpers **E1** and **E2** on the option board should be cut.

h. If another option is in use, such as a process control interface, it may be connected to **J3** on the Multi-Scale option board. The cable should enter the Multi-Scale option enclosure through the center hole on the bottom side of the enclosure.

i. Re-assemble the indicator. Re-connect the cable from **J7** of the main board to the keypad. Position the rear panel on the back of the main enclosure.

If the Multi-Scale option is being mounted on the back of the indicator, use five of the longer screws supplied with the Multi-Scale option to secure it to the enclosure, and use three of the original screws to finish securing the rear panel to the main enclosure. Tighten the screws until the rear panel flange comes in contact with the main enclosure.

Otherwise secure the rear panel to the main enclosure using the screws removed during disassembly and install the mounting plate (GSE P.N. 44-25-27716) to the Multi-Scale option enclosure using the hardware provided.

23.4 SETUP

The Multi-Scale Input option requires that the Indicator has a firmware revision of 4 or greater. You may check this by keying in **60101 <SELECT>** on your indicator. The last displayed digit is the revision number of your firmware.

The calibration parameters for each scale are stored in EEPROM. Each additional scale requires 31 bytes of space in the EEPROM. Key in **60001<SELECT>** to see if you have enough space in EEPROM. If not you may need to reduce the size of your custom transmits or macros, or you may wish to expand your EEPROM.

23.5 SCALE ENABLE

Four setup parameters have been added: **101, 102, 103** and **104.** Each one of these corresponds to a scale input (1 through 4) and may be set to: 0 - Disabled, 1 - Saved, and 2 - Enabled. When a scale is disabled, its setup and calibration is lost. When it's saved, its setup and calibration information is retained in EEPROM, however the scale may not be selected from the weigh mode. When it's enabled, its setup and calibration information is retained in EEPROM, and it may be selected from the weigh mode.

See chapter 29, Trouble Shooting if a "Hardware Conflict" error occurs if enabling both **scale 4** and the **analog output** option at the same time.

23.6 SCALE SETUP

When a scale is saved or enabled, the setup parameters may be viewed and / or changed through the setup mode. The following ranges of parameters correspond to the specified scale inputs:

110 through 119	**Scale 1**
120 through 129	**Scale 2**
130 through 139	**Scale 3**
140 through 149	**Scale 4**

The parameters are the same for all four scales:

1X0	**Full Scale**
1X1	**Display Division**
1X2	**Zero Track Aperture**
1X3	**Zero Track Delay**
1X4	**Motion Band Width**
1X5	**Motion Delay**
1X6	**Filter Setting**
1X7	**Display update rate**
1X8	**Zero Range**
1X9	**Linearization Enable**

23.7 SCALE CALIBRATION

Scale calibration is performed the same as a standard Indicator calibration procedure, only when more than one scale is enabled, you will be prompted "**Keyin Chan#**". You then enter the number of the scale you wish to calibrate. When you finish calibrating it, you will again be prompted "**Keyin Chan#**", to allow you to calibrate the other scales. If you don't want to calibrate any more scales, press **<CLR>** to exit. The "**QUICK CAL**" works the same way.

23.8 OPERATION

While in the weigh mode, only one scale may be selected at a time. The GROSS weight, NET weight, TARE, Zero, etc., are for the selected scale. Setpoints and analog outputs, if based on one of these parameters, are based on the currently selected scale.

It should be noted that the filtering for each scale is performed by the circuitry in the Multi-Scale option itself, so a delay is not necessary when switching to another scale. Zero tracking, however, is active only on the selected scale.

23.9 SELECTING THE CURRENT SCALE

Five new pseudo-modes have been added to facilitate selecting the current scale. Note that these commands do not change the indicator's mode, only the selected scale. They are as follows:

40 <SELECT> This command steps to the next enabled scale. If only one scale is enabled, no change is made.

41, 42, 43 and 44 <SELECT>
This command selects scale 1, 2, 3 and 4 respectively, if enabled. If not enabled, "**CodE54 Scl X disabled**" is displayed briefly.

23.10 MACROS (Selecting a scale)

The macro command "%#" has been added to support the multi-scale inputs. There are three different ways to use it.

"%#" by itself returns the current scale number.

"n%#" will test if the current scale is equal to "**n**", similar to the other macro **IF - THEN** statements. "**n**" must be a valid scale number, 1-4.

"cccccccc%#" will replace the last character of "**cccccccc**" with the current scale number. "**cccccccc**" may contain any characters, however if the last character is a 1 through 4, the **IF - THEN** will be performed instead. For example, if the current scale is 4, "**0,80%#%C**" becomes **"0,84%C"**, which copies the current gross weight of the selected scale to a **Var**, **Var#1**

for scale 1, **Var#2** for scale 2, etc., or in this case, **Var#4** for scale 4.

Refer to chapter 16 for more details on the %# command.

23.11 Panel Mount Multi-Scale Input Card Installation

(Panel Mount Multi-Scale Kit, GSE Part Number 24550B-200A2)

The Panel Mount Multi-Scale Input option is an accessory to the GSE Model 550/570 weighing and counting indicators. It consists of a Multi-Scale option board, the cable, a mounting bracket, and all necessary mounting hardware. The Multi- Scale board and cable are available separately for custom installations.

The Panel Mount Multi-Scale Input option allows the GSE Model 550/570 indicators to receive input from additional load cells. Up to three Multi-Scale Input options may be "daisy chained" to provide a total capacity of four inputs to the indicator (only one Multi-Scale Input option will fit in the Panel Mount enclosure). If analog output or Process Control Interface options are in use, the fourth scale input may not be used due to conflicting option addresses.

Two jumpers on the Multi-Scale PC board select whether it will be addressed as scale one, two, three, or four. Both jumpers must be in the same position for the Multi-Scale board to function properly. Normally, the scale one position is not used because the scale input on the main board is addressed as scale 1. If it is desired to use a Multi-Scale Input board as scale 1, the main board scale input must be disabled by removing the analog to digital converter chip, U22.

Accessories

The following parts are available separately from GSE:

GSE Part#	Description
420747-27385	Remote Multi-Scale Opt. Bd.
22-30-3060	6 inch Multi-Scale option cable
22-30-3061	18 inch Multi-Scale option cable
22-30-3062	36 inch Multi-Scale option cable

Above option cables are non-jacketed and would normally be used in custom panel applications.

Spare Parts

The following replacement parts are also available separately from GSE:

GSE Part#	Description
10-40-5503	CS5503-JP A/D converter chip, U7

See also Table 52.

Installation Multi-Scale Card (550 panel mount version)

Tools Required:

- 8mm (5/16") nutdriver or philips screwdriver for removing rear panel screws.
- 7mm (9/32") nutdriver for mounting nuts.
- 6mm (1/4") nutdriver for standoffs.
- Philips screwdriver for mounting screws.

Note: If the Multi-Scale option is being mounted by itself, an 18 inch cable (GSE p/n 22-30-3061) or a 36 inch cable (GSE p/n 22-30-3062) may be purchased. This will allow the Multi-Scale option to be located as close as necessary in custom panel applications.

a. Turn off the indicator by disconnecting it from its AC supply.

b. Open the indicator by removing the (4) M4 nuts from the rear panel cover. Remove the rear panel cover assembly from the main enclosure. Ignore this step if the rear panel cover option is not installed.

c. Remove the five M4 nuts holding the M550 Main Board to the Front Panel. One nut is located near each of the four corners of the board. The fifth nut is located at the other side of the transformer.

CAUTION:
This procedure should be performed by qualified service personnel only! Hazardous voltages are accessible within the indicator.

d. Referring to figure 37, place one of the M4 philips screws through the hole next to the loadcell terminal block J8 from opposite the component side so the threads are protruding through towards the component side of the Main Board.

e. Tighten an M4 male-female spacer to the philips screw inserted in step d.

f. Replace the M550 Main Board on the Front Panel and replace the M4 nuts except for the nut that is next to jumper E7 (program jumper).

g. Tighten an M4 male-female spacer to the stud that protrudes next to jumper E7.

h. Place #8 split lockwasher on top of the M4 male-female spacer next to the loadcell terminal block J8 and tighten an M4 male-female spacer on top.

i. Place the Mounting Bracket on top of the M4 male-female spacer next to jumper E7 and tighten the final M4 male-female spacer over it. Align the Mounting Bracket so it is perpendicular to the top of the M550 Main Board.

j. Connect the Multi-Scale option cable connector to J4 (OPTION) on the indicator's main board. This connector is keyed so that it can only be plugged in one way. (If the Analog option is installed plug the cable connector into J2 on the Analog Option Board.

k. Place the Multi-Scale main board on the standoffs and fasten it with the M4 nuts. Install the M4 philips screw through the Mounting Bracket and the back of the Multi-Scale main board and fasten it with an M4 nut.

l. Connect the load cell wiring to J2 of the Multi-Scale option board. If a 6 lead load cell is used jumpers E1 and E2 on the option board should be cut.

m. If another option is in use, such as a process control interface, it may be connected to J3 on the Multi-Scale option board. The cable should enter the Multi-Scale option enclosure through the center hole on the bottom side of the enclosure.

n. Re-assemble the indicator. Position the rear panel cover on the back of the main enclosure and replace the four M4 nuts. Ignore this step if the rear panel cover option is not installed.

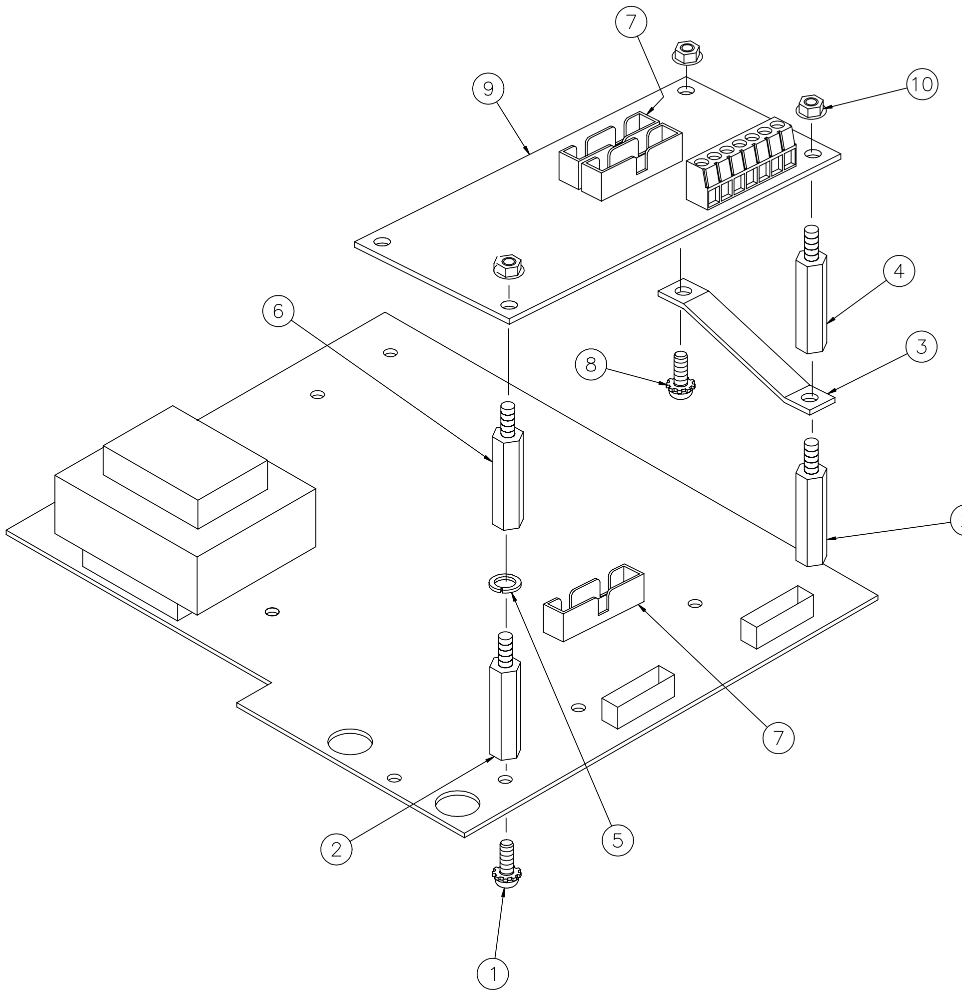

Figure 37, Panel Mount Version Multi-Scale Card Installation

ITEM	INVENTORY NO.	DESCRIPTION	QUANTITY
1	38–26–3010	M4x.7, 10mm FILLIST, PHLPS, SEMS	1
2	17–20–2216	AL5174M06.0–16. 0–22, LYNTRON	2
3	44–25–30691	A, BRACKET, M550PM MULTI–SCALE	1
4	17–20–2216	AL5174M06.0–16. 0–22, LYNTRON	1
5	38–28–1400	#8, SPLT LCKWSH, SP	1
6	17–20–2216	AL5174M06.0–16. 0–22, LYNTRON	1
7	22–30–3060	RIBBON CBL, 2x10–F, DBL, PLR, 6"	1
8	38–26–3010	M4x.7, 10mm FILLIST, PHLPS, SEMS	1
9	420747–27385	REMOTE MULTI–SCALE INP OPT BRD	1
10	38–26–1640	M4–.7, KEPS LOCK NUT, SP	3

Table 52, Panel Mount Version Multi-Scale Card Parts Listing

Chapter 24 Severe Transient Surge Suppression (OPTION)

24.1 Description

STVS Option (GSE Part Number 24550B-102B0)

GSE's STV Suppressor Option has been designed to provide significant protection from the effects of ESD (Electrostatic Discharge), lightning, and other EMI (Electromagnetic Interference) for the 500/570 indicators.

This product consists of a printed circuit board that connects between the platform (load cell) and the weigh indicator's electronics. The board is enclosed in a small stainless steel enclosure designed to mount externally on the back of the indicator enclosure. All of the signals going to or from the load cell pass through transient protection devices to prevent potentially damaging voltages from reaching the sensitive electronic components of the indicator.

Warning:
The STVS does not provide a washdown seal with the back of the Indicator due to the bowing of the indicator's rear panel. If washdown capability is required, refer to the aforementioned mounting plate for stand-alone mounting of the STVS.

A separate mounting plate is also available at additional cost. This allows the STVS enclosure to be mounted external to the indicator in a stand-alone position when it is impractical to mount it on the back of the indicator due to its installation position. The GSE part number for this mounting plate is 44-25-27716.

24.2 Installation Procedure

a. Remove power from the indicator by disconnecting the line cord from the AC power source.

b. Open the indicator by removing the rear panel. It is secured by eight screws along the perimeter. Use either a medium sized phillips head screwdriver or an 8mm (5/16" will also work) hex socket.

CAUTION:
All electrical connections and access to the inside of the Indicator and the STVS Option enclosures should be performed by qualified service personnel only!

c. Carefully lift the rear panel from the enclosure, rotating it about the left edge, near the J1 load cell strain relief. Then disconnect the keypad ribbon cable from J7 on the main board. Lay the rear panel assembly on a table with the circuit board facing up.

d. If a load cell is currently connected to the load cell connector (J8 on the main printed circuit board), disconnect it now. Also disconnect the shield from the adjacent grounding stud using a 7mm (or 9/32") socket.

e. If a six lead load cell is to be connected, eliminate the sense leads jumpers, E3 and E4, next to the J8 connector using a small pair of wire cutters.

f. Route the cable provided with the STVS into the indicator through the rear panel cord grip labeled J1. Do not use the rubber boot supplied with the indicator because the fit is too tight to install properly.

g. Secure the ground lug supplied on the end of the supplied cable to the stud adjacent to the J1 cord grip. This may require a 7 or 8 mm (9/32" or 5/16") socket wrench. Make sure this fastener is tight because it not only grounds the cable, it also grounds the board's electronics.

h. Connect the wires from the cable to the J8 connector as shown in Table 53, STVS to indicator Wiring. Insert each wire into the connector by pressing down on the lever, inserting the stripped wire, and then releasing the lever. Repeat this step for all six wires.

i. If the platform cable has not yet been prepared, strip back the jacket of the cable about 1.25" from the end of the cable.

j. Using a small screwdriver, create an opening in the braided shield, just past the end of the jacket. Pull the wires out of the braided shield. Trim the length of the shield to 1/4".

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Wire Color	Wire Description
Red	+ Excitation
Black	- Excitation
White	+ Signal
Green	- Signal
Blue	+ Sense
Brown	- Sense
Shield	Stud

Table 53 STVS to Indicator Wiring

k. Strip back the insulation of each wire 1/4".

l. Twist the strands of each wire.

m. Loosen the platform connection strain relief on the STVS enclosure. Route the platform cable through the strain relief.

n. Insert each wire of the cable into the proper position of J1 on the STV suppressor board using the lever connector as previously described . Repeat for each wire.

Each position of the suppressor board's connector is labeled with its usage. Refer to the platform being connected for its color code. If you are connecting to a GSE platform, the standard color code is shown in Table 54, GSE Platform Color Code Standard. Note that the shield should be secured to the board mounting stud nearest the cord grip.

o. Pull any excess cable back out of the STVS enclosure then tighten the strain relief securely.

p. Hold the rear panel assembly at a right angle to the main enclosure with the edge having the keypad cable adjacent to the enclosure.

q. Reconnect the keypad ribbon cable from the back side of the keypad to J7 on the main board. The 'bump' on one side of the connector should align with the slot on one side of the J7 header.

r. Lower the rear panel against the main enclosure, being careful not to bump into the display. Re-fasten the rear panel to the enclosure. For the bottom three fasteners, use the screws which were removed previously in step b. For the top five screws, use the longer screws and washers provided with the STVS option. These screws must be tightened such that the enclosure of the STVS contacts the indicator enclosure for optimum protection.

s. Apply power to the indicator and verify proper operation. Setup and calibrate as necessary.

24.3 Additional Protection Notes

a. The platform should be grounded to the same point as the indicator's line cord center ground prong (ground bond wire) in order to achieve optimum protection against the effects of lightning.

GSE Standard Wire Color	Wire Description
Red	+ Excitation
Black	- Excitation
White	+ Signal
Green	- Signal
Blue	+ Sense
Brown	- Sense
Shield	Stud

Table 54 GSE Platform Color Code Standard

b. The scale platform's cable's shield should be connected to the indicator only. Cut back the shield connection at the load cell end of the cable.

Chapter 25 Models 550/570 Peripheral Cable (OPTIONS)

25.1 Options Cable Listing

Refer to the Figures listed in Table 55 Cable Options Listing. These figures show details on the connector pin wiring of GSE manufactured cables. Figures define connections from the indicator to the defined peripheral. The Conductor Color Code is also defined in the respective table.

GSE Cable Part Number	Recommended Cable Use	Pin Wiring: Reference Fig.#
299250-42020	Scanner/Keyboard Adapter Cable	Figure 39
299240-45080	550/570 to Standard Printer	Figure 41
299240-48080	550/570 to Eltron Printer	Figure 43
299250-44080	550/570 to PC/AT Computer	Figure 45
299240-49020	550/570 to PSC Scanner Adapter	Figure 47

Table 55 Cable Options Listing

Scanner/Keyboard Adapter Cable
(GSE Part Number 299250-42020)

This cable interfaces the 550/570 to a barcode scanner and keyboard (both available from GSE). If both a scanner and keyboard are to be connected into one indicator then two of these cables would be required. Since the Scanners and Keyboards are not washdown devices, the connectors used are simply standard D-Type connectors. Note that for use with the symbol laser scanner (LS8125 & LS8525), the adapter (GSE Part # 210625-SSA01) is required in order to use this cable. Cable length is 2 feet.

550/570 Connection	Color	PIN#
232	GREEN	3
TTL	WHITE	2
GND	BLACK	5
+5V	RED	9

Table 56, Scanner/Keyboard Adapter Cable Connections

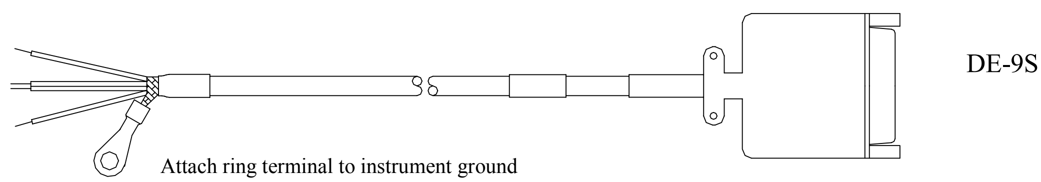

Figure 38, Model 550/570 to Scanner/Keyboard Adapter Cable

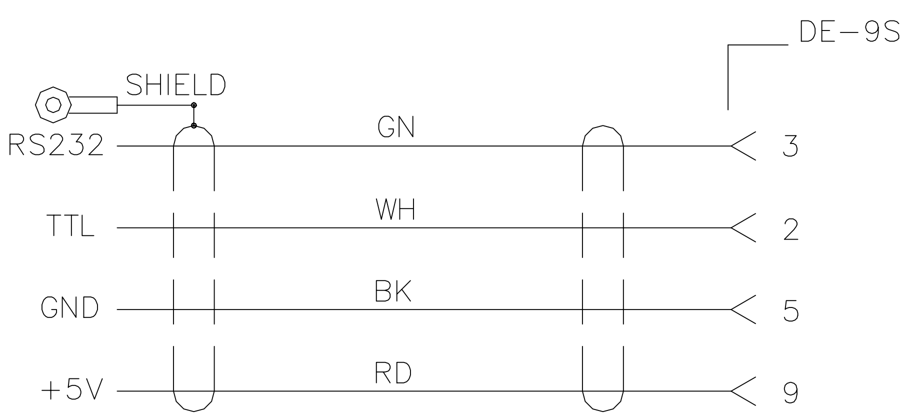

Figure 39, Model 550/570 to Scanner/Keyboard Adapter Cable Wiring Diagram

RS232 Cable for 550/570 to Standard Printer

(GSE Part Number 299240-45080)

This cable is used to interface a 550/570 indicator to a Standard Line Printer. Cable length is 8 feet.

550/570 Connection	Color	PIN#
TX	RED	3 (RXD)
GND	BLACK	7 (GND)
CTS	WHITE	20 (BUSY)

Table 57, Computer Style Printer Cable Connections

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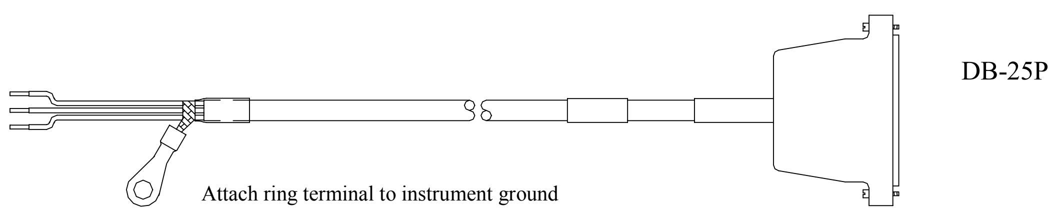

Figure 40, Model 550/570 to Standard Line Printer Cable

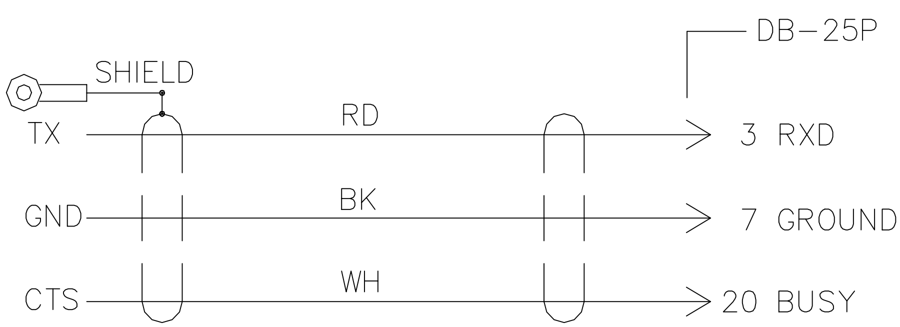

Figure 41, Model 550/570 to Standard Line Printer Cable Wiring Diagram

Model 550/570 to Eltron Thermal Printer
(GSE Part Number 299240-48080)

This cable is used to interface a model 550/570 indicator to an Eltron Thermal Printer. Cable length is 8 feet.

550/570 Connection	Color	PIN#
TX	RED	3 (RXD)
GND	BLACK	5 (GND)
CTS	WHITE	6 (RDY)

Table 58, Model 550/570 to Eltron Printer Cable Connections

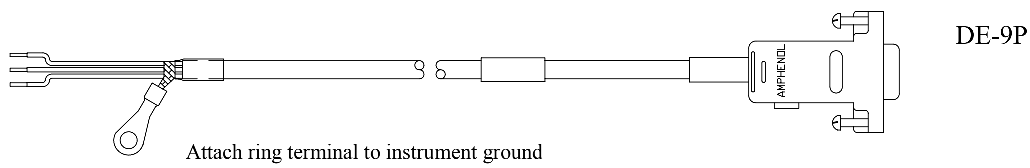

Figure 42, Model 550/570 to Eltron Printer Cable

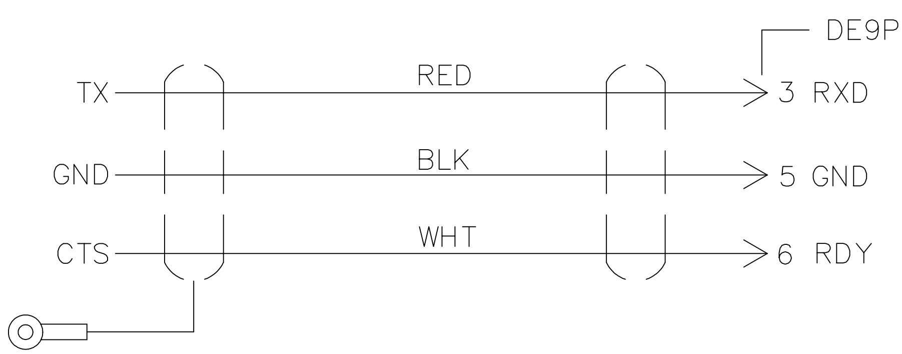

Figure 43, Model 550/570 to Eltron Printer Cable Wiring Diagram

Model 550/570 to PC/AT Computer Cable
(GSE Part Number 299250-44080)

This cable is used to interface a 550/570 indicator to a PC/AT type computer. Cable length is 8 feet.

550/570 Connection	Color	PIN#
TX	RED	2 (RXD)
GND	BLACK	5 (GND)
RX	WHITE	3 (TXD)

Table 59, Model 550/570 to PC/AT Computer Cable Connections

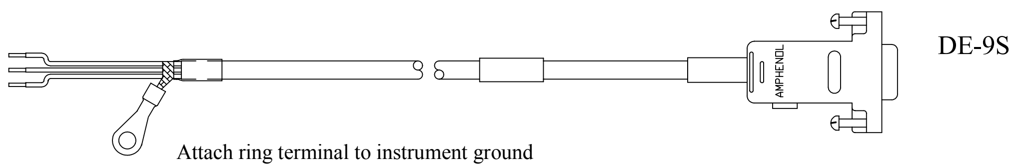

Figure 44, Model 550/570 to PC/AT Computer Cable

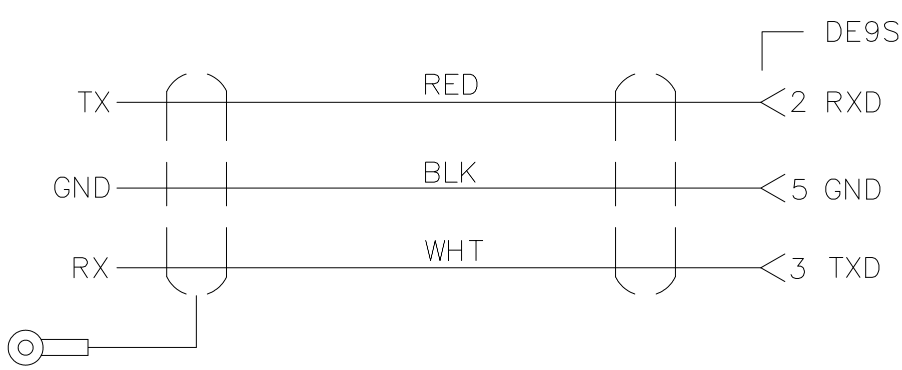

Figure 45, Model 550/570 to PC/AT Computer Cable Wiring Diagram

Model 550/570 Adapter Cable to PSC Scanner

(GSE Part Number 299240-49020)

This cable is used to interface a model 550/570 indicator to a PSC Laser Scanner. Cable length is 2 feet.

550/570 Connection	Color	PIN#
RS232	WHITE	2 (TXD)
GND	BLACK	5 (GND)
+5V	RED	4 (+V)

Table 60, Model 550/570 to PSC Laser Scanner Adapter Cable

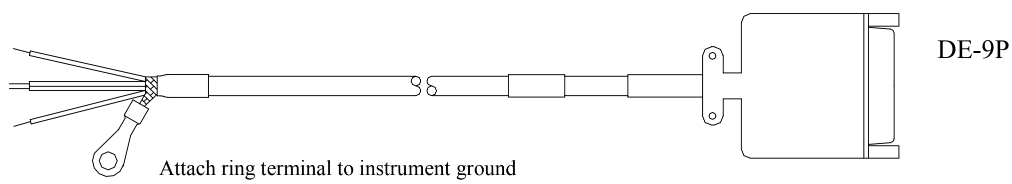

Figure 46, Model 550/570 to PSC Laser Scanner Adapter Cable

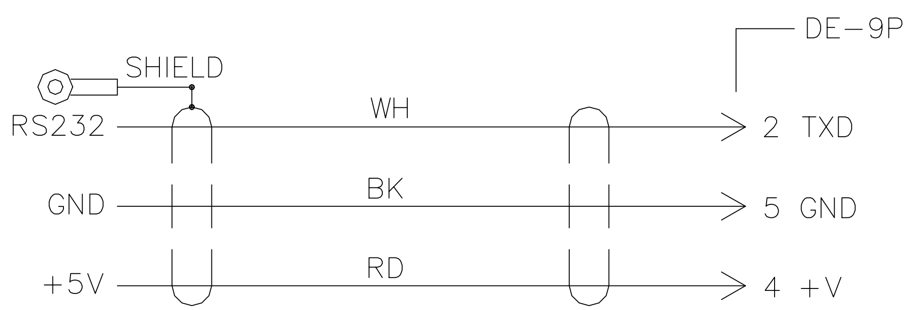

Figure 47, Model 550/570 to PSC Laser Scanner Adapter Cable Wiring Diagram

Chapter 26 Compatible Peripheral (OPTIONS)

26.1 Compatible Peripheral Options

GSE offers a number of very useful peripheral equipment options which should be considered in your weighing system design. Refer to Table 61 Peripheral Equipment Options for a complete listing. Each of these options has been tested and approved for compatibility with the 550/570 indicators. Consult with the GSE factory for additional technical data on a particular piece of optional equipment. The cable options described in Chapter 25 will permit you to easily implement the connection between your Indicator and the Peripheral.

Peripheral Inputs

The indicator permits up to two other peripherals to send RS-232 data. These inputs to the indicator are intended for use with barcode scanners and external keyboards. Both a TTL input and an RS-232 input are provided, along with connections for +5 volts and ground. GSE provides a cable which at one end will connect to the terminal strip on the main board inside the indicator and the other end will provide the mating connector to the keyboard and barcode scanners that GSE provides as peripheral devices.

> **Note:**
> Only one external device can be sending data to the indicator at one time.

NOTE:
Transmissions received by the indicator through the Comm port or from an external keyboard or a barcode device are all or'd together inside the indicator. Only one external device can be sending data to the indicator at any one time. Otherwise communications errors, garbled

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GSE Part Number	Peripheral Equipment Description
210625-KBD00	Personal Computer-style keyboard (TTL interface)
LS8125 LS8525 210625-SSA01	Laser Pen Scanner Symbol Laser Scanner Scanner Adapter (included with Scanner)
249315-00962	Dot Matrix Document Printer (Panasonic Line Printer with RS-232 interface)
41-10-0820 (2" print head) 41-10-0840 (4" print head)	Eltron Thermal Label Printers
41-45-29000	PSC Laser Scanner

Table 61 Peripheral Equipment Options

data, and unpredictable results may occur! Care must be taken in the implementation of these devices to insure proper operation.

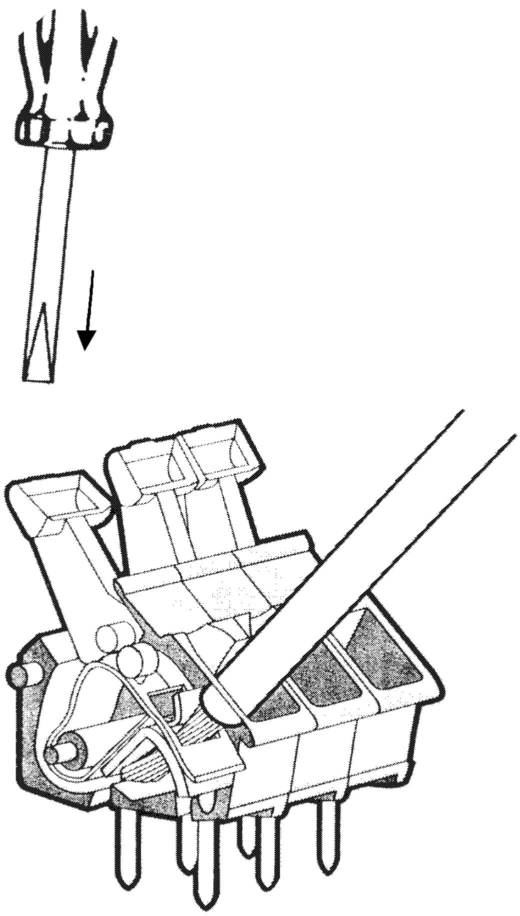


Figure 48 Connector

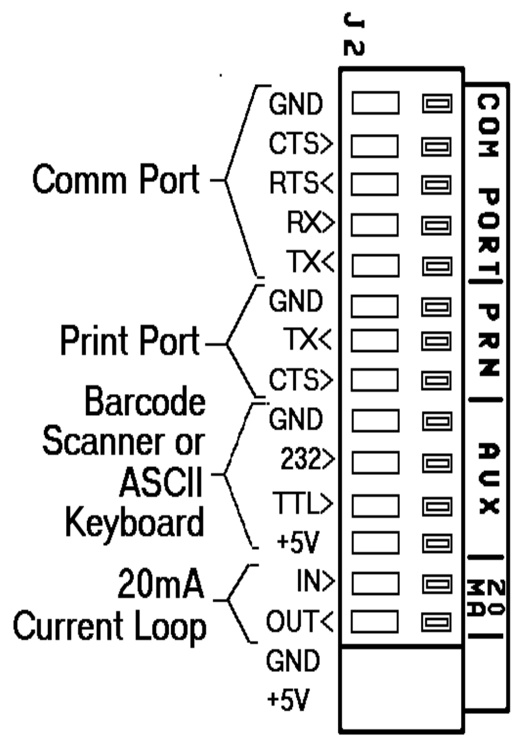


Figure 49 RS232 Ports (J2)

Chapter 27
Other System Operations and Applications

27.1 Tank Weighing (033193 and some earlier versions)

Another application for which the indicator is very well suited is the operation of Tank Weighing. This application involves the in-process weighing of tanks containing liquid or solid contents. The Tank Weighing feature makes the indicator an ideal weight indicator for support structure tanks, drums, portable drum scales and many other tank related weighing applications.

This discussion is another example of using the **<ZERO>** command at the "No Load?" prompt. The usual method used to calibrate a tank scale is to hang a certified calibration weight from the tank. However, very often the maximum weight which can be applied to the tank in this manner is far less than the tank capacity. An alternate recommended calibration procedure is as follows:

a. Start with an empty tank, or as close as possible to empty.

b. In order to achieve the best possible calibration accuracy:

Temporarily set the displayed weight increment of the 550 to around one part in 100,000. (For a 100,000lb. capacity tank, set the displayed increment, **P111**, to 1#.

1 1 1 <SELECT> 2 3 6 4 0 <ID> <ENTER>
1 5 <ENTER>

Set the filter to a very large setting:

1 1 6 <SELECT> 3 3 <ENTER>

c. Access the calibration mode **from the setup mode** by keying in:
<ZERO> <ENTER>

d. At the "No Load?" prompt press **<ENTER>**. The displayed value is zeroed out.

e. Apply the calibration weight to the tank.

f. Key in the value of the calibration weight:
1 0 0 0 <ENTER>.

g. Remove the calibration weight from the tank.

h. Fill the tank with its intended cargo load until the weight displayed is exactly that of the calibration weight.

i. At the "CAL OK?" prompt, press:
<CLR>

j. At the "No Load?" prompt press:
<TARE>.

k. Re-apply the calibration weight to the tank.

l. Key in the amount of the total applied weight:
x 0 0 0 <ENTER>.

m. Repeat steps g. through l. until the desired calibration weight has been achieved, normally near full scale.

Tank Weighing (later than 033193 versions)

This discussion is another example of using the new calibration method for tank calibration. The usual method used to calibrate a tank scale is to hang a certified calibration weight from the tank. However, very often the maximum weight which can be applied to the tank in this manner is far less than the tank capacity. An alternate recommended calibration procedure is as follows:

a. Start with an empty tank, or as close as possible to empty.

b. In order to achieve the best possible calibration accuracy:

Temporarily set the displayed weight increment of the 550 to around one part in 100,000. (For a 100,000lb. capacity tank, set the displayed increment, **P111**, to 1#.

1 1 1 <SELECT> 2 3 6 4 0 <ID> <ENTER>
1 5 <ENTER>

Set the filter to a very large setting:

1 1 6 <SELECT> 3 3 <ENTER>

c. Access the calibration mode **from the setup mode** by keying in:
<ZERO> <ENTER>

d. At the "New Zero?" prompt press **<ENTER>**. The displayed value is zeroed out.

e. Apply the calibration weight to the tank.

f. Key in the value of the calibration weight: **1 0 0 0 <ENTER>**.

g. Remove the calibration weight from the tank.

h. Fill the tank with its intended cargo load until the weight displayed is exactly that of the calibration weight.

i. At the "CAL OK?" prompt, press: **<CLR>**

j. Press **<SELECT>** until "Temp Zero?" prompt is showing, press: **<ENTER>**.

k. Re-apply the calibration weight to the tank.

l. Key in the amount of the total applied weight: **x 0 0 0 <ENTER>**.

m. Repeat steps g. through l. until the desired calibration weight has been achieved, normally near full scale.

Technical Note:

If the Tank is accidently zeroed, its actual content weight can be regained. This is only possible if the Tank was zeroed only once. Parameter P61107 retains the value of the last zeroed off weight. If its zeroed once, the weight is retained in this register. The second press of the zero button effectively zeroes nothing so a zero value is retained in this register.

To regain the actual tank weight, record the value in P61107 and then go to P118 and select the lowest zero range percentage (0.01%). Save this change by exiting to the weigh mode. The display should show the regained tank weight. View P61107 to verify that this value has returned to zero.

It should be noted that to avoid this from happening in the first place, set parameter P118 to 0.01%.

27.2 Gross Entry Mode (P169)

P169.XX GrENT

This parameter when enabled will allow keyboard entry of the Gross Weight data, usually for Truck In/Out Weighing. If this parameter is enabled, the normal operation would be to key in a Tare Weight, the previously determined Gross Weight and then press **<ENTER>**. The entered value is stored in the Gross Weight register. Then the Tare Weight is subtracted and the result is stored in the Net Weight register. Next a transmission of the 4th Custom Transmit (set up at P4000) is initiated. This would normally be used to print a ticket when the Gross Weight has been previously established. Note that after the transmission, the entered Gross data is immediately overwritten by the current weight conversion data.

NOTE:
This procedure is not H-44. This is limited to few applications.

27.3 Battery Operation

Included on the 550's main board is a connector, J10, intended for use with an external D.C. supply. However, any connection made to this connector by any device not explicitly approved by UL for this purpose will void the UL approval. This connector's three pins are described in the table below:

J10 Pinout:

Pin #	Voltage/Usage
1	Ground
2	+8v -> +28v DC @ 1 Amp input: maximum current draw -or- +24v +-10% DC output for charging when AC power is applied. (external regulation required).
3	9.5 VAC +/- 15% This connection is to accommodate a possible future external charging control circuit. It will allow the sensing of the AC supply for charging circuitry and automatic switch-over between AC and DC operation.

Caution: If a battery is connected into this connector, there is NO protection against reversed connections or inadvertent unregulated charging! Therefore external protection, such as fusing (1A-SloBlo) and/or an in series diode, should be implemented to prevent damage to the instrument and/or battery! Additionally, the removal of the AC power cord from the instrument may be advisable, where possible, to further guarantee against charging the battery.

WARNING: Some batteries may explode if they are charged without proper voltage and current regulation!

The standard connector to mate with J10 on the printed circuit board is a 3 position insulation displacement connector, GSE p/n 26-20-3266, which will accommodate 18 AWG wire. A special tool, available from Amp, Inc, is required to properly insert the wires into this connector.

27.4 Panel Mount Version of 550

(M550, GSE Part Number 200550-10001) U.S.A.
(M570, GSE Part Number 200570-10001) U.S.A.
(M550, GSE Part Number 200550-13001) Int.

The 550 and the 570 are offered in a panel mount version. All calibration, general setup and custom programming operations are **identical** to the bracket/ table mount packaged units. The only difference between the two package types is the mechanical aspects of the enclosure and the positioning of both the main board and display. The main board on the panel mount version is rotated 180 degrees from the component side facing toward the display to facing away from the display. This allows for easy serviceability while the unit is mounted to a panel door or wall. The display is mounted to the opposite side of the main board facing the same direction as the keypad. An optional rear cover is offered to protect the unit's main board and components against physical and electrical damage. A single, second scale multi-scale input card is offered and mounts to the main board. The international and U.S.A. versions only differ in front panel key descriptions.

The panel mount version is designed fully for washdown environments. It requires proper installation.

550 Panel Mount Installation

Panel mount dimensions and cutout are shown in figures 50, 51 and 52.

1 Make a cut out in the panel inside these dimensions (H 8.0” to 8.25” x W 9.0” to 9.25”). The corners are typically 0.1R maximum.
2 Remove the 8 hex nuts holding the main board front panel to the back bracket.
3 Make sure the gasket remains on the front panel side. When installed, the gasket will be compressed against the front of the enclosure cutout.
4 Position the main board front panel inside the cutout making sure the keypad is facing in the correct upright position.
5 From the inside of the enclosure apply the back bracket to the opposite side of the main board with the ground lug positioned towards the bottom left just under the transformer.
6 Install the 8 hex nuts from the inside of the panel.
7 Tighten nuts until they just reach the back panel surface. Then tighten each nut 3/4 turn to compress the gasket to the front of the panel.

Panel Mount Version Rear Cover

(Panel Mount Rear Cover, GSE Part Number 44-25-29924)

A rear cover for the panel mount version is offered to protect the main board against physical and electrical damage. The rear cover is shown in figure 51.

The rear cover is fastened separately to the back of the unit. There are four separate mounting screws for this purpose. This allows for easy serviceability without having to remove the panel mounted unit itself.

There are also two slots positioned at the bottom of the cover allowing for power, loadcell, printer, computer, etc. wire routing. All wire strain reliefs and terminals should be positioned below or near this area.

The cover is designed **not** to cover over the panel mounts serial number, power requirements, approvals label. At the top of Figure 51 it shows the side view of the panel mount label flange just outside the rear cover. The label is fastened to this flange shown in the picture.

Panel Mount Version Multi-Scale Input Card

(Panel Mount Multi-Scale Card, GSE Part Number 24550B-200A2)

The panel mount version with rear cover allows for one multi-scale input card. Additional cards can be stack mounted **without** the rear cover or remotely. Refer to chapter 23 for option installation and setup. This option

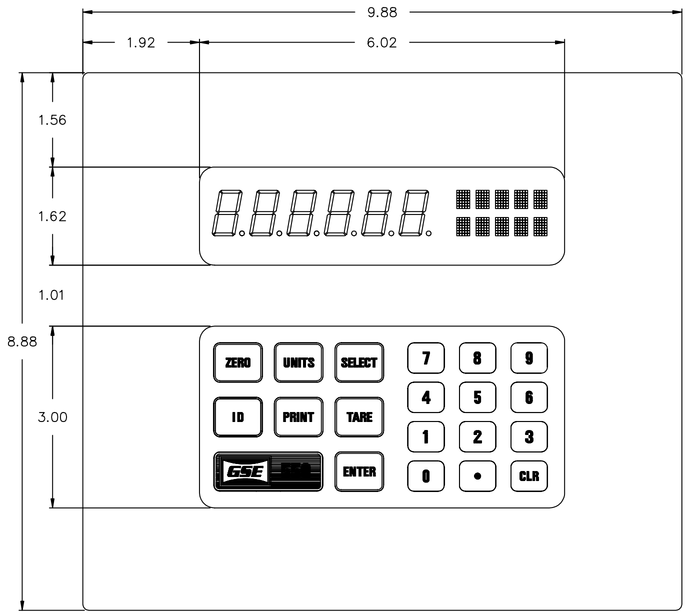


Figure 50, Front view of panel mount version dimensions

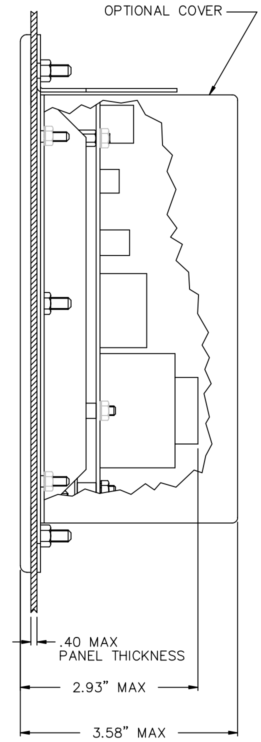


Figure 51, Side view of panel mount version

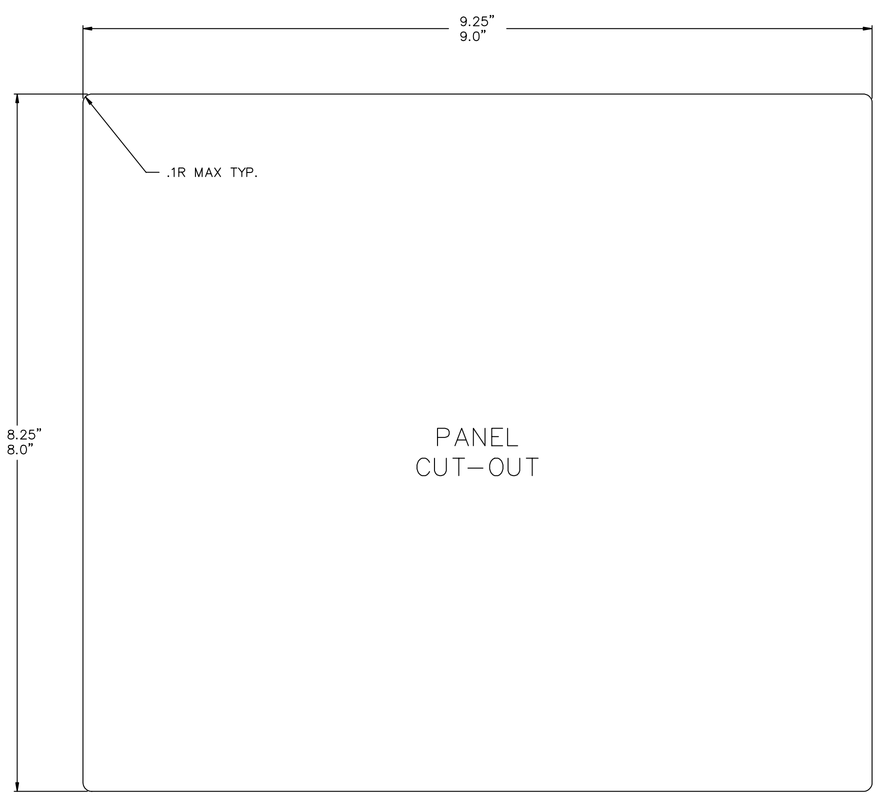


Figure 52, Panel Mount version cutout dimensions is accessed and setup the same as the remote mounted multi-scale cards in chapter 23. The only difference is in board installation and mounting hardware.

27.5 Models 550/570, 230VAC Version

Contact GSE for availability of 230VAC 550/570 units.

Convert 120VAC Version to 230VAC operation

To modify the indicator for 230VAC operation, use the following procedure:

1. Make sure the instrument is unplugged!

2. If modifying a completed indicator, remove rear plate from the enclosure (use an 8mm socket or phillips head screwdriver).

3. On the main printed circuit board, PC745, (above the transformer and to the right of the line filter) there is an insulator tab secured to the board with a white plastic snap-in pin.

   Remove the pin by prying underneath it with a screwdriver. Then bend the insulator tab up toward the transformer. Below it you will find a circular area marked SW1.

4. Remove the two jumpers installed in the positions marked "120".

> **Caution:**
>
> Any operation which involves going inside the enclosure should be performed by qualified service personnel only! Hazardous voltage is accessible within the enclosure.

5. Install a new jumper across the bottom two

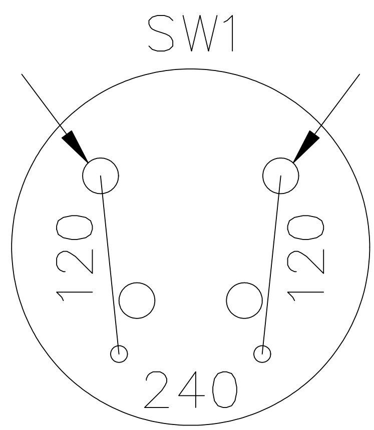


Figure 53, Model 550-230/120 VAC Jumpers

   holes in the position marked "240".

6. Re-install the snap in pin through the insulator and firmly into the board.

   If this modification is being implemented on a complete indicator (as opposed to a board alone) then perform the following steps also.

7. If necessary, change the connected line cord to a type having the required plug for the intended receptacle. Be sure to tie wrap the two line cord wires together next to the J1 connector.

8. Change the rear panel marking to indicate the new operating voltage, "220 VAC". GSE label part number 28-10-27697 should be used.

NOTE: The GSE F/G# for the 230V version of the PC745 board is 420745-27722.

27.6 Networking

The 550 indicator supports address recognition. This allows a further degree of multi-drop communications implementation. This feature is supported by **software**.

It is recommended that **additional hardware** is added such as a 485 transceiver device. Contact GSE for more information.

Setup

When parameter 251, address, is set to a non zero value, then address recognition is enabled.

The **data packet** format recognized by the indicator is defined as follows:

<STX> <ADDRESS> <DATA> <DATA> <DATA> <DATA> <DATA> ... <ETX>

The address is a single byte. There are 250 addresses possible. The address should not be an <STX> or an <ETX>.

The <DATA> can be any information recognized by the instrument. This could be direct commands such as a %p (Print). This would direct the addressed unit to send its custom transmit over the network.

Filling IDs, setting target registers, updating databases, etc. are all possible scenarios.

OPERATION:

When a character is received, it is compared to the start of block character, <STX>. If it is the start character, then the very next character is compared to the address as defined by setup parameter P251. If it matches or if the transmitted address is 0, then the indicator processes all of the subsequent data until the end of block character, <ETX>, is received.

If the received address character is not 0 and it does not match P251, then all of the subsequent data is ignored until the next start of packet character is received.

27.7 Pressure Release Protection

(Pressure Release Protection, GSE Part Number: 44-30-5531)

Some applications require that the 550 be installed in areas where conditions might cause the internal pressure of the unit to change. An **increase** of the internal pressure of the unit may cause the front keypad to balloon out. This is caused when a unit in a cold environment is washed down with a hot pressure hose. Applying this release valve should alleviate this problem.

The pressure release device consists of a porous material that allows air flow and is still moisture tight. Its installed in place of one of the strain reliefs on the back of the unit.

Chapter 28 Information Parameters

28.1 Model Type

160.XX Model

This parameter can not be accidentally changed. Key **9 9 9 0 <ENTER>** to select the Model 550 or key **9 9 9 1 <ENTER>** to select the 570 counting indicator operation. If these codes are entered, the verification prompt "Sure? ???" appears. Press **<ENTER>** to change the model number or any other key to abort the change. The 570 model should not be selected unless the front panel on the indicator is the 570 type, which means that the middle key should be **<SAMPLE>**, not **<PRINT>**.

28.2 Memory Information Parameters

The 550/570 indicators have a series of parameters that are used for informational and diagnostic purposes. They may be reached from any mode by entering their number and pressing **<SELECT>**. There is no prompt for the access code. Once in the Information Mode, you may move about as you would in the Setup Mode: press **<SELECT>** to move to the next parameter, or press **<.> <SELECT>** to back up one parameter.

There are three types of memory used by the indicator: EPROM which contains the program, EEPROM (E^2) which holds the chosen selections of all setup parameters and stored rows of data, and RAM which is used during operation for temporary data storage. The following parameters provide some information about E2 and RAM memory space. Refer to Chapter 19 for information on memory storage.

P60000. E2Ins

This parameter shows the installed amount of EEPROM (E2) memory space. This may help determine how much information can be stored in the indicator when setting up the Custom Transmit and other parameters.

P60001. E2Avl

This parameter shows how much E2 memory space is available for use. If a setup mode entry or selection requires more storage space than is presently available (as indicated by this parameter), the indicator will display a message indicating that condition. You can then refer to P60000 and P60001 to determine how much storage space is installed and available.

P60002. RAMsz

This parameter shows the amount of RAM installed in the indicator. Standard RAM memory on all instruments is 8K (8192 bytes).

P60003.RAMdy

This parameter shows the amount of dynamically allocateable RAM. This is primarily a diagnostic tool to be used by a factory technician in the case of an out of memory error message on the indicator.

P60004. RAMav

This parameter shows the amount of available RAM.

P60005. #Rows

This parameter displays the number of rows of data which can be stored in memory based upon the current setup. This is important in the use of the Truck In/Out Weighing feature.

P60010 dbRAM 24256

The value shown here, 24256 in this example, indicates how much database memory is currently installed within the indicator. The value will be 0 if the database memory module is not installed, 24256 if the 24K module is installed, and if the 120K module is installed, the value is 122,560. In this case, the top line of the display shows "dbRA1" while the bottom line shows "22560". The “1” in the right position of the upper display is part of the lower displays value “122560. If some of the database memory has been allocated to general usage (normally to allow larger macros) then the amount shown at P60010 will be reduced by 8192 (8K). Refer to parameter P65010 for more information on this item.

P60011 dbAvl 24242:

This value indicates the remaining amount of RAM available for creating more database rows. When this value becomes relatively small, then the database is coming close to running out of room for more records. When this parameter is selected, it may take a while for the indicator to add up all of the unused memory. While the Indicator is calculating, the display will show "Looking.."

28

P60012 dbUse 14

This parameter indicates the amount of database memory actually used by the databases, for both recording the setup and storing records. When this value is added to the "dbAvl" value, the result should equal the value for P60010.

P60013 BlkSz 16384

The Block Size parameter displays the size of the largest contiguous block of memory available for use by the database feature. This parameter will be seldom used. However when either multiple databases of various sizes are used or if rows are updated and/or deleted quite often, the available memory can become quite fragmented.

If a situation arises where the total amount of available memory, as indicated by P60011, is sufficient to create a row and yet the "OutOF Memry" error message results, then the maximum block size parameter can be checked to determine if there is enough memory available in one contiguous block to perform the operation.

If there is insufficient memory, the only remedy is to compact the stored rows. This can only be accomplished by downloading all of the stored database records and the database setup to a computer and default the database using parameter P65010. Then reload the setup and the database records using the "Up-load" command.

P60014 dbase Error

The results of the last database operation can be checked with this parameter. Each database operation sets a code indicating the results of the operation. The corresponding error message is displayed at this parameter.

The next 16 database info modes display the number of records (rows) created in databases which have been setup. If a database has not been setup, then the parameter for the number of rows within that database is skipped.

P60021 dbas1 XXXX
through
P60036 dbas16 XXXX

Parameter P60021 will display the number of rows currently stored within database 1, P60022 for database 2, etc... with P60036 indicating the current number of rows stored in database 16. The last database info mode allows the entire database setups to be cleared and determines whether any of the database memory is allocated to general use to allow large macro setups.

28.3 Identification Information Parameters

P60100. 1991

This parameter provides the software copyright statement.

P60101.0550 - 01007

This parameter provides the software revision code. This should match the label on the EPROM at U12 inside the indicator. Refer to this parameter along with P60102 to determine the exact firmware version in your indicator.

P60102. YYMMDD

This parameter provides the date code of the software release.

28.4 Audit Trail Parameter Information

AUDIT TRAIL

The indicator supports a recently accepted technique, called the Audit Trail, to control the modification of calibration and setup parameters. To prevent fraud in weighing, lead seals have generally been used in the past to seal an insturment by a Weights and Measures inspector after having verified its operation and accuracy. The lead seal is placed in such a manner as to prevent the removal of an access plate which would need to be removed to change the setup of the weighing device. However, with the advent of weighing devices that are completely controlled by software, it has become practical to require the keying in of a special code in order to allow changes to the setup parameters. The Audit Trail method is becoming more accepted by Weights and Measures officials as a way of controlling setup changes in electronic scales. Basically, the Audit Trail provides a count of the number of times that calibration or other contolled parameters have been changed. Using this method, the Weights and Measures inspector can verify the operation and accuracy of the instrument and log the Audit Trail counter by recording it in a log book or writing it somewhere on the indicator. The inspector can then verify during future inspections that the Audit Trail counter has not changed since the last approval. If the counter was changed, this would be the equivalent of finding a broken lead seal. In addition, for the indicator to be considered an NIST approved, certain parameters must be set to specific choices. If these parameters are not set to the allowed choices, a warning message NOT H-44! is displayed alternately with the Audit Trail value for one second each.

TRADITIONAL SEALING METHOD

Some states and Canada have not yet accepted the Audit Trail method. Therefore, the traditional method of sealing the indicator is available. A three pin header, E7, is located in the upper right corner of the Main Board, just above the display module. You can place a jumper on this header, which is labelled PROGRAM, in one of two positions, NO or YES. With the jumper in the YES position, the indicator operates the same as it does without the jumper at all. However, the jumper must be removed from the NO position at least momentarily while the indicator is displaying the access code prompt "Setup Keyin" CODE in order to make changes. If this requirement is not met, then when the access code is entered, the warning message Code 16 Check Jumpr is displayed and changes will not be allowed. Once an instrument has been finalized, this jumper is moved to the NO position to prevent further Setup Mode changes. In order to seal the instrument, specially modified rear panel screws are available which have holes through the head. These screws accept a wire which can be sealed using the Weights and Measures inspector's lead seal. These optional sealing accessories are available from GSE for installations which require them.

P60200. B SN

This parameter displays the serial number of the main PC board in the 550. This is a non-enterable information parameter provided for identification and control purposes for GSE and NIST officials or their agents.

P60201. AudTr

This parameter displays the Audit Trail Number which starts at 00000 when the board is new. This number is incremented by 1 when changes are saved after one or more of the NIST controlled parameters (P110 - P119, P150 - P158, P160, P162, P163, P169, P212, P222, P1XXX and P2XXX) are changed or after a calibration is performed. If the indicator is not set up according to NIST standards, the Audit Trail Number will alternate with a display of NOT H-44!

The "NOT H-44" command also checks for the resolution of the indicator. If the resolution is greater than 10,000d then the warning will appear when viewing the audit trail, P60201. Also the zero track for scales 2 thru 4, in the case of multi-scales, are also checked as scale 1 has been.

However, the absence of this message does not guarantee that the indicator is setup to within NIST standards. This warning indication is simply intended to be a tool for the Weights and Measures inspector to help insure that certain selections have not been made.

P60202. ISNX

This parameter shows the serial number of the instrument. This is to provide additional identification and warranty tracking.

28.5 Diagnostic Information Parameters

P61100.DAC

This parameter shows the coarse gain value, a whole number ranging from 100 to 4095. This value may be keyed. Gain shows the effective system gain which is inversely proportional to P61100, normally ranging from 50 to 250 with 2048 maximum.

P61102.CAL

This parameter shows the fine calibration factor established as of the last calibration routine, ranging from 0.5 to 5.0 and normally near 1 (see note below). If Multi-Point Linearization is enabled (P119) then Not Used will appear. Refer to P61110-P61119 for more multi-point linearization information.

P61103.FSmVv

This parameter shows the full scale mv/V output of the connected load cell or platform based upon the current calibration data, ranging from 0.1 to 5.0.

P61104. Crrnt

This parameter shows an approximation of the present mv/V output of the load cell connected to the indicator, ranging from 0 to +/-5.0. The accuracy of this value is approximately +/-2%.

P61105.CalZr

This parameter shows the zero offset in counts recorded by the indicator when the last calibration was performed. This may range from -400,000 to +400,000 with small deadloads resulting in a value near 0.

NOTE:
When making a firmware update in the field, it may be desireable to write the values for the following parameters to avoid a re-calibration: P61100, P61102 and P61105. If the values are written down before removing the old EPROM, they may be keyed-in after the new EPROM is installed and will maintain calibration accuracy unless other changes have been made to the hardware or setup. However the optimum method of restoring a previous setup is to make use of P64000. This parameter will allow the download of the complete setup to a PC or a printer.

P61106.CalZr

This parameter shows the zero offset in mv/V as recorded by the instrument when the last calibration was performed, normally near 0, with a maximum range of +/-4 mv/V.

P61107. ReZro

This parameter shows the amount of weight (in default units) that has been zeroed out though use of the **<ZERO>** key since the last calibration.

P61108. ZrTrk

This parameter shows the amount of weight (in default units) that has been tracked off by the zero track feature since the last use of the **<ZERO>** key.

28.6 Linearization Data Parameter Setup

If Multi-Point Linearization is enabled (P119), the following ten parameters (P61110-P61119) show the calibration weights used and the resulting calculated factors. Otherwise the message "Not Used" is shown.

P61110.Cal WGHT1

This parameter shows the weight used for the first cal point (if Multi-Point Linearization is enabled). A value of 0.000 indicates that a linearization has not yet been performed.

P61111.Cal Fact1

This parameter shows the calibration adjustment factor for weights less than or equal to the weight shown in the preceding parameter.

P61112. through P61119.

This parameter show the calibration weights and their respective factors for the remaining 4 points of the Multi-Point Linearization feature. These values will be transmitted from the indicator when a parameter download is performed (refer to the section on Parameter Download and Upload. However, the actual values will contain a %c command (instead of the %e command that is normally sent with such information) to prevent the linearization values from being loaded into another scale.

The following parameters are set aside for scales 2, 3 and 4. The information parameters for scale 1, P61102 thru P61119 holds true for scales 2, 3 and 4 respectively. These additional parameters will only become apparent when the 2nd, 3rd or 4th scales are installed and enabled. See parameters 101 thru 104.

P61120 thru P61139 (scale 2)

P61140 thru P61159 (scale 3)

P61160 thru P61179 (scale 4)

28.7 Test Mode

P62000.Dsply Test

This parameter performs a test of the display when you press **<ENTER>**. This will illuminate all display elements so that you may examine them to insure that they are all functional. Press **<ENTER>** or any other key to end the test.

28.8 Parameter Download And Upload

Since use of the terms download and upload can create confusion when explaining the sending and receiving of data, we will refer to transmission of the indicator setup data to some external device as download and the receiving of setup information from an external device as upload.

The indicator generates an ASCII transmission (see parameter P64000) which contains all the commands necessary to duplicate the setup data along with comments describing each setup parameter selection. The transmission may be sent to a printer to get a hard copy of the setup to more easily review the setup selections. It could be sent to another Model 500 Series indicator in order to copy the setup from the first one to the second. The data may also be sent to a computer for permanent storage. This would simplify restoration of the setup when servicing is required or an additional indicator with the same setup is needed. The transmitted data contains the selection for every parameter within the indicator, including the information parameters (P60000-P65XXX). However these informational parameters are sent without the commands that would enter these values into a receiving indicator. Refer to the Appendix for an example of the file generated by this parameter.If a significant number of parameters in the indicator are set up for a specific application, it is strongly recommend that parameter P64000 be selected and the final setup downloaded to a computer and saved on disk for backup and future reference.

P64000. Send

This parameter can be used to transmit all the current setup parameter selections out one of the ports. To send this transmission, press **<ENTER>** while this parameter is displayed. The prompt "1" for Comm is displayed briefly, followed by "2" for Prntr. Press the **<1>** key to send the data out the Comm Port; press the **<2>** key to send the data out through the Print Port; press any other key to cancel the download.

P64001 Send All (Download Mode)

This is an additional download mode which appends the necessary commands to save the current value of all the weigh mode parameters which are normally saved within the indicator. If an application requires a certain value to be stored in a Var or a Reg, then these values can be saved in the download file by using this selection. The choices are to send all, by selecting 1 for serial communications and 2 for the printer.

P64100. LnCnt

This parameter simplifies the debugging of a setup file upload. It displays the number of carriage return codes that have been received, acting as a line counter during the upload process. This counter is cleared to 0 every time the access code prompt "Setup Keyin" Code is displayed. Viewing this parameter lets you verify the total number of lines that have been processed during an upload.

P64101. ErCnt

This parameter shows the total number of transmission errors which have occurred to the indicator. This counter is cleared to 0 every time the access code prompt Setup, Keyin Code is displayed. This would normally be used only during an upload in order to determine how many, if any, errors occurred during the upload.

P64102. 1stEr

This parameter indicates the first transmission error which occurred to the indicator since this parameter was last cleared. As with the above parameters, this parameter is cleared to 0 every time the access code prompt Setup, Keyin Code is displayed. If an error has occurred, the display will cycle through four messages indicating the line number, parameter number, and the error message which were present when the error occurred. For example, the messages 1st Er Ocr'd ... Line = 1 ... Parm = 112 ... Entry Error will be each displayed for one second, continuously. This can be very helpful in determining the cause of any problems after an upload. Pressing **<CLR>** from any of these three previous modes (**P64100 - P64102**) will clear all three of these values.

P64103. Debug

This parameter is a selection which when enabled will transmit the warning messages described above for **P64102** through the specified port as soon as the error occurs. This can be especially useful during the upload of a setup file. If no errors occur, there will be no transmission out of the Indicator.

NOTE:
All of the above parameters are functional regardless of whether or not an actual parameter file upload to the indicator is in progress. The error counter will also increment if an error is made while making entries through the front panel.

P64200 Macro Debug

This feature records steps and branches that are taken during macro execution. If the expected results are not achieved during the execution of a macro, this information mode may be accessed to determine exactly which branches were taken. This is often very helpful during initial macro debug of complex macro operations.

The printing of the Macro Debug (P64200) history buffer on a 570 indicator is performed with the **<PRINT/ENTER>** key. To print the Macro Debug history on the 550, press the **<ENTER>** key.

28.9 Utility Parameters

P65000. Copy A to B

This parameter can be used to copy the current setup information during the installation of additional storage memory.

This parameter can also be used to copy the setup information of one E^2 setup to another E^2 for use in a second indicator of identical program use. Note that the firmware date codes should be identical in both units.

P65001.Deflt

This parameter is used to change ALL parameters including calibration to their factory default values. Press **<ENTER>** twice to default the selections. Changes must be saved when leaving the Setup Mode for this operation to take effect! Press **<SELECT>** to see the next parameter.

P65002.Deflt

This parameter works the same as P65001 above except that all the calibration parameters are retained. Press **<ENTER>** twice to default the selections. Changes must be saved when leaving the Setup Mode for this operation to take effect! When you are finished reviewing these informational parameters press **<ZERO>** to return directly to the Weigh Mode.

Defaulting Parameters and the Model 550 or 570 Indicator

When the default setup modes **P65001** and **P65002** are invoked, the model number parameter **P160** determines the model number and the subsequent default values. If the model number is the 570, then the Model 570 default parameters are used. If the model number is the Model 550, then Model 550 default parameters are used.

P65010 dbase Reset

Press **<ENTER>** to simply default the database setups. Whether or not any database memory is allocated to general usage is not affected. However if it is desired to allocate some of the database memory for general use, press **<2> <ENTER>**. This will reduce the total amount of database memory by 8K bytes. To reverse this and keep all the database module's memory allocated to databases, press **<1> <ENTER>**.

Allocating database memory to general usage can be used to allow variably sized setup modes (such as custom transmit setup and macro setup) to increase when they would otherwise be limited by the occurence of the "Out Of Ram" error message. If this is done, the only limitation on the amount of information entered into these setup modes is the amount of available EEPROM memory.

Chapter 29 Troubleshooting

This section of the Technical Reference Manual provides information on error messages, trouble-shooting and servicing the 550 and 570 indicators.

29.1 Error Messages (overview)

The following is a summary of all of the error messages within the Indicator. They are listed below in numerical order. The leading two digits will appear on the numerical portion of the display, and the message will appear on the two lines of dot matrix display. Following each message is a summation of possible causes and probable remedy.

29.2 Operational Mode Error Messages

02 UnderLoad! Input signal less than negative full scale. If this is due to excessive loading, reduce the load. Otherwise check the load cell connections. If a 4 wire load cell cable is being used, check that the sense jumpers are in place. Verify that the capacity selection **P110** is correct. Use the information parameters, especially **P61103** and **P61104**, to check the setup and input signal.

03 Over-Load! Input signal is greater than positive full scale. Use same check as for underload.

04 # > Dsply Number to be displayed will not fit within 6 digits. This will not normally occur for the Gross, Net or Tare Weights but may result while displaying the accumulated totals if the amount exceeds 999,999. Either clear the totals or settle for only being able to transmit the totals.

05 Zero> Max.! An attempt was made to zero out more than allowed per **P118** selection. Use the **<TARE>** key for subtracting off container weights or if large dead-load is always to be present, apply this dead-load during the No Load? prompt during calibration to permanently eliminate the offset.

06 Tare>F.S.! Tare entry was greater than full scale. Most likely the entered tare value was incorrect.

07 Tare < 0 ! Negative tare attempted, but not allowed per **P162**. For auto-tares, the GROSS Weight must be greater than zero unless **P162** is changed to allow negative tares.

29.3 Setup Mode Error Messages

10 Entry>Max! An entry was made which had more characters than allowed. The most likely cause is making an entry for an ID that is longer than the programmed size of that ID.

11 WRONGCODE! The incorrect access code was entered, thus preventing changes. In order to access the Setup Mode, either the proper code must be entered or the **<ENTER>** key must be pressed alone (to view selections without making changes).

12 No Mods! The Setup Mode is being accessed, but changes are prevented.

13 OutOfRange An entry made for a selection was beyond the range of valid choices.

Also, an out of range error will occur during the execution of a macro utilizing the "M%m" command. ie. If the command wishes to strip out characters 5 thru 8 and the string is only set for 2 characters, this error will occur.

14 Must Keyin The choice for the current parameter must be keyed in.

15 Size>998 ! The size of one of the Custom Transmit setups has exceeded

29

the limit.

16 CHECK JUMPR A programming operation was attempted when the program jumper is installed. Installation of this jumper will prohibit any programming changes.

29.4 Hardware Problem Error Messages

21 EEROMerror Error reading data from the EEPROM. Possible U11 or U9 problem.

22 EEROMerror Error writing data to the EEPROM. Possible U11 or U9 problem.

23 CheckU11&9 Supplementary error message for above errors.

24 EEROMFull! The setup being attempted requires more EEPROM than is currently installed.

25 DefltSetup Upon power-up the Indicator has not found the proper codes. Therefore all parameters have been reset to factory default values.

26 Bad Setup The stored data has a checksum error. Check all parameters or re-load setup.

27 RE-BOOT! The Indicator cannot use the EEPROM for data storage, so it is attempting to power-up again to cure the problem.

28 NoRAMAVAIL The current setup requires more RAM than is currently installed. Either contact your dealer or the factory.

29 PIN error This message will appear on power-up or setup if the E^2 is corrupted in the PIN section. Check E^2 for problems. The access code is then defaulted to the factory (GSE) access code. Also refer to Error 11.

Hrdwr Cnflt This message occurs when P-104 (scale #4) is enabled and an attempt is made to enable the Analog Option in the setup parameter P-170. Physically these two options can not be installed together.

29.5 Calibration Error Messages

30 F.S.>MAX! The entered calibration weight, together with the currently applied signal, indicates that the full scale signal will be greater than the allowed maximum of the Indicator. Verify that correct entries have been made for the capacity, **P110**, and for the calibration weight. If all appears correct, refer to the use of the information parameter **P61104**, and determine the output (in mv / volt) of the connected load cell.

31 F.S.<.1mVv The entered calibration weight, together with the currently applied signal, indicates that the full scale signal will be less than the allowed minimum of the Indicator. Verify the proper entries for the capacity, **P110**, and for the calibration weight. If all appears correct, refer to the use of the information parameters, **P61104**, and determine the output (in mv / volt) of the connected load cell.

32 ADD MORE! The applied weight during calibration was less than 0.1% of capacity. More weight than this is required. Refer to **P61104** if this is incorrect.

33 ReCALReq'd The just completed calibration is insufficient to guarantee accurate results due to either the cal weight being less than 5% of capacity or this was the first calibration of this platform to this Indicator and therefore the coarse gain was adjusted by the Indicator.

34 RES> 25K! The current combination of capacity **P110** and increment **P111** result in a resolution greater than 25,000 graduations. This is simply a warning in case this was not intended.

35 RES>100K! The current combination of capacity **P110** and increment **P111** result in a resolution greater than 100,000 graduations. This is not allowed and as soon as any key is pressed the instrument will jump back into the setup mode to parameter **P110** to verify the settings.

36 RES< 100! The current combination of capacity **P110** and increment **P111** result in a resolution less than 100 graduations. This is simply a warning in case this was not intended.

37 RES< 1 !! The current combination of capacity **P110** and increment **P111** result in a resolution less than 1 graduation (i.e. the increment is greater than capacity). This is not allowed and as soon as any key is pressed the instrument will jump back into the Setup Mode to parameter **P110** to verify the settings.

29.6 General Error Messages

41 IDnotUsed! If an ID that has not been setup (i.e. had its size set to a non-zero value in **P700**, **P702**, **P704**, etc.) is accessed (by pressing **3 <ID>** for example), or if no ID's have been setup, then this message will occur.

42 CheckSetup This error occurs if ID usage **P720** is set for Truck In/Out Weighing and either the ID type **P721** is set for ID #6 and its size **P710** is set for zero, or insufficient EEPROM is installed and there isn't room for any rows of data to be stored.

99 Can't Set! An attempt to enter a value for a parameter which is not field changeable, such as the serial numbers or the audit trail counter results in this message.

- - Cksumerror Upon each power-up, the Indicator tests the integrity of its EPROM. If the result is not correct this message is displayed and the Indicator is not usable. Verify that the EPROM (U12) is installed properly (no bent over pins) and that E1 on the main board is in the correct position (for PC745B and earlier, the proper position is 64K+ while the proper position for PC745C is < 256K for normal installations).

29.7 Miscellaneous Messages

- - EntryError This error message is the most commonly used. The primary causes are entering a value preceding a key (such as **<ZERO>**) which is not allowed, entering alpha data for a numeric selection, or entering a fractional value for an entry which only accepts whole numbers. This may occur while in the Setup Mode or one of the operational modes.

29.8 Counting Error Messages

- - Too Small This message indicates that the sample placed on the platform is too small to accurately compute the piece weight.

- - Can't Count This message will appear when there is an insufficient quantity on the platform to perform an accurate count.

29.9 Communications Error Messages

par'y error This indicates that the parity of a received character did not match the parity specified in the Setup Mode, parameter P202. This could also result if the baud rate (P200) or the number of data bits (P201) are incorrect.

ovrun error This indicates an over-run error where an additional character was received while the receive buffer of the 550/570 was full, and thus the extra received character will be lost.

frm'g error This indicates that the stop bit of a received character did not occur when it was expected. This could be the result of an incorrect baud rate (P200), incorrect number of data bits (P201), or incorrect parity setting (P202).

port error This indicates that the 550/570 did not check its receive data register in time, thus missing a character. If this error should occur, please notify your GSE dealer or the factory. To prevent the problem, try reducing the baud rate (P200).

tx on hold This will occur if a data transmission is held up for two seconds of more due to a de-asserted handshake. Refer to the description of parameter P209 for more information.

tx abort This occurs if the **<CLR>** key is pressed when the tx on hold error message is shown or if P209 is set for abort and the transmit buffer becomes full.

tx con'd This will appear briefly when the handshake is re-asserted after the tx on hold message occurs.

Macro error This occurs if a macro is aborted for some reason or if an event occurs which would invoke another Macro while the number of macros awaiting execution already equals 16.

29.10 Service

There are no user-serviceable items in the GSE Models 550 and 570 indicators! Service must be performed by qualified service technicians only! Attempts to service this instrument by unqualified personnel may void the warranty!

29.11 Trouble-Shooting

DATA TRANSMISSION: If a data transmission of any weight-related numeric data such as Gross, Net or Tare, is sent as dashes, an overload or underload (negative overload) condition was in effect. Remove the cause of the overload (or underload) and repeat the transmission. Check also the setup of parameters **P204**, **P205** and **P209**.

DISPLAYED WEIGHT: If an overload or underload occurs due to an electrical overstress (EOS) normally due to lightning or ESD discharge, then press the **<CLR>** key. The message "wait 1" will appear for about 1 second. The A/D converter will then be reset and the system should again be functional. If not, power down for a few seconds. If the Indicator still does not work properly after power-up, check the load cell or platform wiring. If okay, permanent damage may have occurred, most likely at U23, the instrument amplifier.

Component Layout: Refer to Figure 54 Main Board PC745G Component Layout.

CAUTION!
Servicing procedures must be performed by qualified service technicians only! Attempts to service this instrument by unqualified personnel may void the warranty!

Figure 54 Main Board PC745G Component Layout

Chapter 30 Model 550 Simulator Software

30.1 Description
(GSE Part#: 460550-SIM)

This is a very unique and helpful tool to assist in setting up the 550/570 indicator for a specific application. The GSE Model 550 Simulator runs on any IBM compatible computer with at least 640K of memory. While a monochrome monitor will work, a color monitor provides a much more desirable model to work with. A simulated picture of the indicator appears on the computer screen and the computer keyboard provides input to the 550, much the same as the 550's front keypad, except that full alpha input is possible.

30.2 Files

The simulator consists of the following files:

1) M550.EXE .... The simulator program.

2) PRN_M550.EXE .... Utility program for viewing files and help screens.

3) HELPXT.TXT .... The help file layed out for the ten f-keys in a single row.

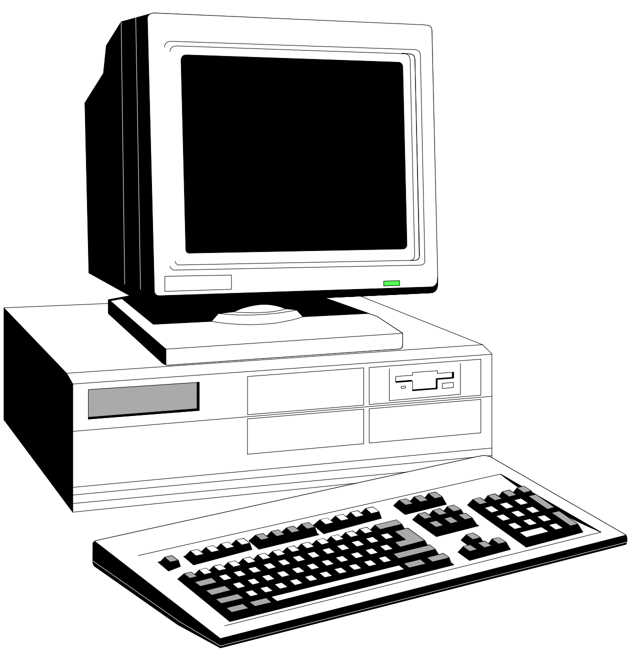


Figure 55 IBM PC or Compatible Computer

4) HELPAT.TXT .... The help file layed out for ten f-keys, two columns of five.

5) HELPXT.TXX .... Same as .txt file above except this file is used when P160 is set for M570.

6) HELPAT.TXX .... Same as .txt file above except this file is used when P160 is set for M570.

In addition there are three other files which are created when the simulator is executed if they are not found to already exist. These files are as follows:

1) M550.DAT .... This file holds the simulators setup. It contains the exact same type of information as the EEPROMS in your M550. If this file does not exist when the indicator is powered up, then the message "Deflt Setup" will appear. Press any key and the simulator will step into the setup mode. The file will be created at that time.

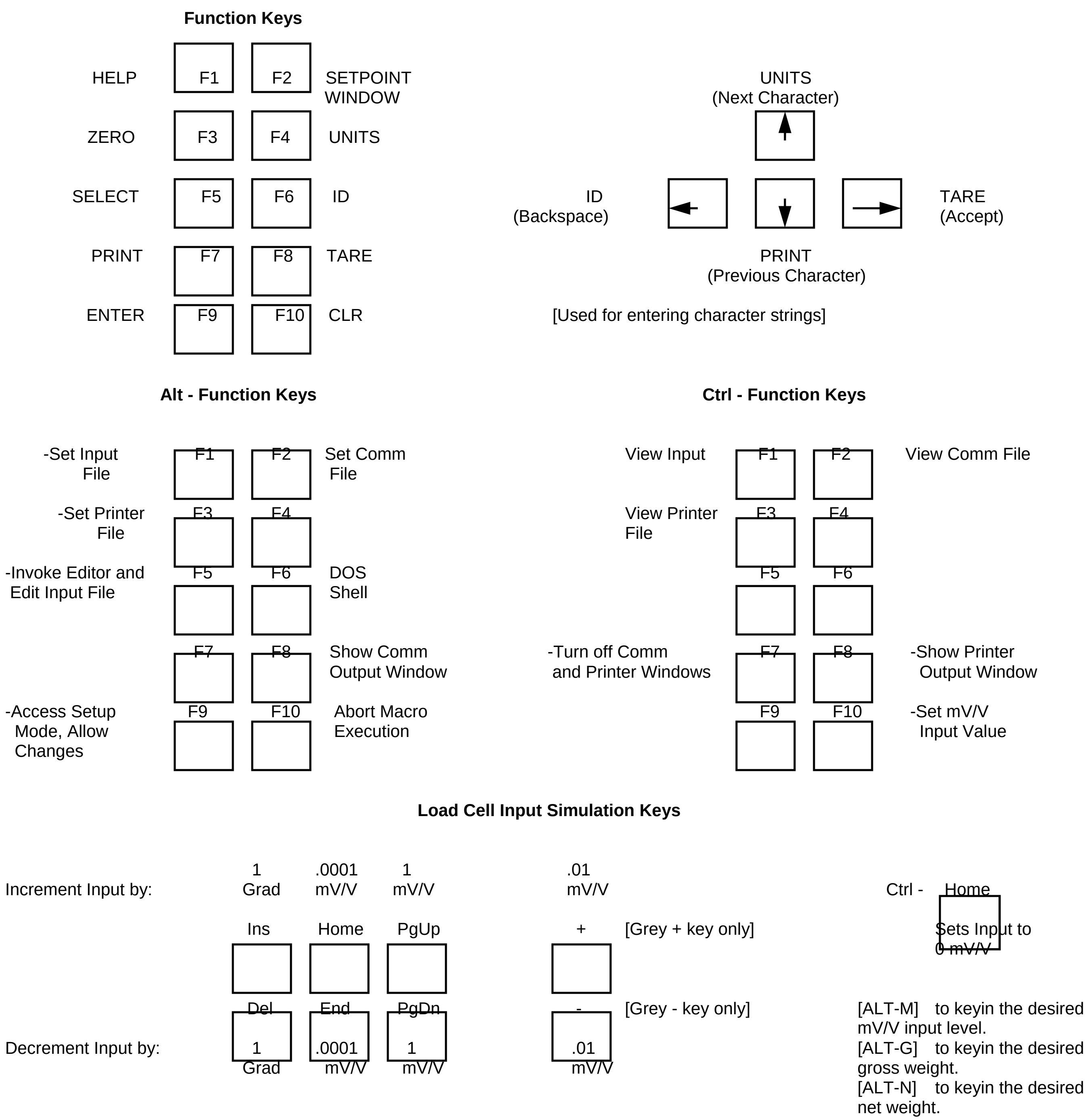
2) M550.STP .... This file keeps track of which files you have specified with the F1 through F3 keys and which help file is your preference based on your previous selection. If the simulator is exited abnormally, this file may get corrupted. If this happens, your file I/O operations may not work correctly. Simply delete the file and a new one will be automatically created.

3) M550.RAM .... This file simulates the database option of the 550/570 indicator. To select the size of the database to be simulated, press [ALT-D]. A menu will appear that shows the current size and instructs you how to change it. Selections are: NONE, 24K and 120K.

30.3 Help Screens

Press the **F1** key to display the help screen. The definition of the function keys will be displayed. Page or scroll up and down to see additional information including the definitions of the keys used to change simulated scale input signal. If the layout of the function keys does not match your keyboard, press [F1] again with the incorrect help screen displayed. The alternate help screen layout will then appear.

AT Layout Help Screen



30.4 Load Cell Simulation

Since the simulator does not provide for a connection to

XT Layout Help Screen

an actual live platform, we have made it possible for you to control the effective input signal to the simulator.

Function Keys

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	SET POINT WINDOW	ZERO	UNITS	SELECT	ID	PRINT	TARE	ENTER	CLR

Key	Function
↑	UNITS (Next Character)
←	ID (Backspace)
↓	PRINT (Previous Character)
→	TARE (Accept)

[Used for entering character strings]

Alt - Function Keys

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
SET INPUT FILE	SET COMM FILE	SET PRINTER FILE		INVOKE EDITOR AND EDIT "INPUT FILE"	DOS SHELL		SHOW COMM OUTPUT WINDOW	ACCESS SETUP MODE ALLOW CHANGES	ABORT MACRO EXECUTION

Ctrl - Function Keys

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
VIEW INPUT FILE	VIEW COMM FILE	VIEW PRINTER FILE				TURN OFF COMM/ PRINTER WINDOWS	SHOW PRINTER OUTPUT WINDOW		SET mV/V INPUT VALUE

Load Cell Input Simulation Keys

Increment Input by:	1 Grad	.0001 mV/V	1 mV/V	.01 mV/V	
	Ins	Home	PgUp	+	[Grey + key only]
	Del	End	PgDn	-	[Grey - key only]
Decrement Input by:	1 Grad	.0001 mV/V	1 mV/V	.01 mV/V	

Ctrl - Home: Sets Input to 0 mV/V

[ALT-M] to keyin the desired mV/V input level.
[ALT-G] to keyin the desired gross weight.
[ALT-N] to keyin the desired net weight.

30

Since most load cells and platforms are rated in terms of their milli-volt per volt (mV/V) output, most of the input simulation keys change the signal in terms of a mv/v amount. In addition, there are two keys which change the simulated input signal by the smallest discernable amount, one graduation (1 grad) of the indicator's A/D converter. The keys used for the simulation are shown above in the copy of the help file.

Also the ability to keyin a specific mV/V value or gross or net weight is possible using the [ALT-M], [ALT-G] and [ALT-N] key combinations respectively. Simply press one of the key combinations and a window will appear instructing you to keyin the appropriate value. Then simply keyin the desired value and press [ENTER].

Whenever the simulated input signal is changed with one of these keys, an additional line of information appears below the numeric digits. This indicates the current status of the simulated input, supplying the number of A/D grads being simulated and the current level of the mV/V signal being simulated. This can supply valuable information when attempting to simulate a calibration situation. Also it can be used to determine the number of A/D graduations per displayed increment for a given calibration.

30.5 File Re-Direction

Capturing Simulator Output: The 550 simulator is capable of making direct use of the comm ports on the PC computer. Comm 1 is associated with the comm port of a standard 550 and comm 2 (if applicable) is associated with the printer port of a standard 550. All "transmissions" performed by the simulator will always be scrolled across a window on the screen and the data may be captured to a disk file. The COMM and PRINTER ports have separate screen windows. This file may be viewed from within the simulator or the file may be used with a communication program to transmit the data after the simulator program is terminated. The Comm 1 port of the PC is configurable as the bi-directional port to the 550 simulator where as, Comm 2 port is configurable as the uni-directional port to the 550 similator.

Data is captured according to the 550 port which is specified for the simulator's transmission. Data sent out the print port is captured into one file while data sent out the comm port is captured into another file.

To specify the file to which comm port data is captured to, press [ALT]-[F2]. A screen will be displayed which shows the status of all the file re-direction and it allows you to specify a new file name. Simply enter the file name and then set the file re-direction ON. Any subsequent transmission out that port will be captured into the specified file.

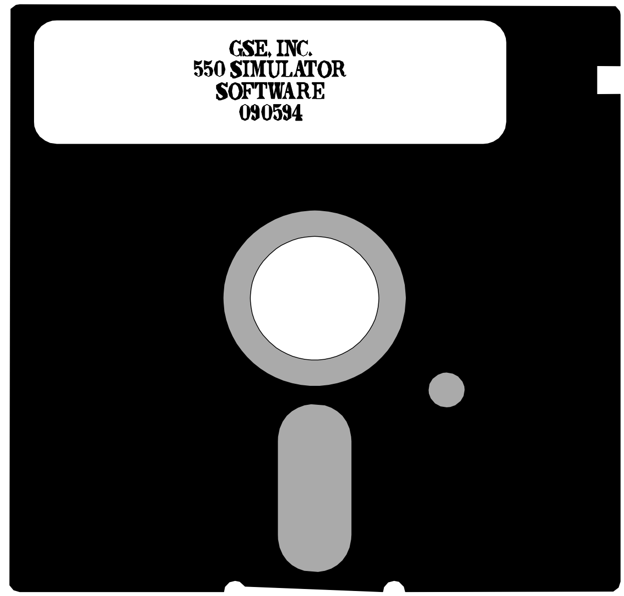


Figure 56 GSE 550 Simulator Computer Disk

Similarly, to capture data sent out the comm port press [ALT]-[F3].

This feature is employed to transfer setups from the simulator to your target 550 indicator. Once the simulator is setup as desired, simply specify a file for either the print or comm port re-direction. Then go to the setup download parameter, P64000, by keying in 64000 [SELECT]. Press [ENTER]. You will be prompted: "1 for COMM" followed quickly by "2 for Prntr". Press the [1] or [2] key, depending on which port you specified for re-direction. The setup will then commence being downloaded to the specified file. After a few seconds of inactivity or upon exiting the simulator, the file buffers are flushed and the entire file is saved to disk.

Loading in a Setup File: Similar to the 550 itself, the 550 simulator's setup can load its setup from a disk file. Simply press [ALT]-[F1], specify the file name to be loaded, turn the file on, and watch as the setup gets loaded into the simulator. A small window will appear in the lower right corner of screen specifying that an input file is being processed. When the entire file has been processed, the window disappears.

As with the 550 itself, the simulator need not be in any particular mode when the setup file is begun to be processed. As long as the 550 or simulator is not in an intermediate mode (such as at the prompt to key in the access code in one of the ID modes, or in the middle of an entry, etc...) then the file may be loaded, assuming the file uses the standard format established by GSE, ie it starts with the access code "23640%i%e" and proceeds with the parameter names and selections.

30.6 Setpoint Window

A window which displays the status of all 32 setpoints appears in the upper right corner of the screen whenever one of the setpoints first change state. The window may be toggled on and off with the [F2] key. The setpoints are represented by the numbers 1 through 32 arranged in

Setpoint Setup	Current State	
	In-Active	Active
Disabled	Black	Gray
Output	Dark Red	Bright Red
Input	Dark Green	Bright Green

Table 62 Setpoint Status Color Chart

eight rows of four numbers. The state of each setpoint is indicated by the color of its number. Refer to table 62.
Setpoint Inputs: Change state of setpoint inputs by holding down [ALT] key then keying in setpoint input number to be changed (on numeric keypad, with Num-Lock on!). (except for setpoint input 3, use [ALT] [3] [3] instead.

For example to change setpoint input 8 from active to de-active, press
and hold the [ALT] key and press [8] on the numeric keypad, then release
the [ALT] key.

Setpoint Status: Refer to the setpoint status window ([F2]) to check on the status of any setpoint at any point in time.

Invoking Macros: Invoke Macros 1 through 10 with [SHIFT-F1] through [SHIFT-F10]. (Other macros may only be invoked with the standard 550 methods such as %0 for Macro 0, or using the macro menu, or via setpoints, etc...)

30.7 Terminating The Program

The simulator program is normally terminated by pressing the [ESC] key. This causes a message to appear asking if you are sure you want to exit the simulator program. Press [Y] or [y] to exit the program or any other key to continue running the simulator.

After the program terminates, several lines of information are displayed on the screen which indicate our address and the version of the simulator that was running.

If for some reason the simulator appears to have locked up your computer, pressing [^C] may still be functional aborting the simulator program.

30.8 Additional Benefits

Other features which make the simulator a valuable tool are listed below:

- Alpha input possible without scrolling through the alphabet or hooking up and external device.
- It forces you to create a computer disk file with the setup provided to a customer. This can be useful during repeat sales, attempting to simulate problems, or setting up a loaner or replacement unit during servicing.
- Portions of previously created indicator setups may often be re-used in other applications, reducing future setup efforts.
- You don't need to have an indicator available to begin setting up an application or experiment with a new idea.
- The state of all 32 setpoints is shown in a window allowing for easy verification of the status of any setpoint.

30.9 Other Interesting Notes

Any of the commands documented in the macro feature may be invoked directly from the keyboard while using the simulator, except those which involve branching such as the IF, ELSE, ENDIF, TAG, and JUMP commands. These commands may be executed however they have no effect.

To execute one of these commands simply press the "%" key ([shift]-[5] on most keyboards) and then the desired command. For instance, enter "1%A" to activate setpoint one or press "%1" to execute macro 1.

To enter the "%" character into a custom transmit (or some other) setup simply press the "%" key twice, ie [%] [%]. This is the same as for sending the "%" character into a real 550 through its serial port.

Work is currently in process to allow an editor to be invoked from within the simulator and possibly to allow a DOS shell to be opened temporarily. Also, we may allow a directory listing to be displayed to help choose a file name to open.

30.10 Communication Terminal Window

The 550 Simulator Software has a Communication Terminal Feature. To access this mode press [ALT-T]. The Communication Terminal Window will appear. The Terminal mode utilizes the bi-directional capabilities of the 550's COMM port. Refer to parameters P20X in the simulator settings for current protocol. Remote serial device must match this protocol.

Transmitted characters or complete files will show in GREEN on the terminal window. Received characters and files will show in RED on the terminal window.

All intended keys on keyboard are functional to the terminal window. Some keys have been defined with a specific function output. These keys are called out in the Terminal Windows help menu.

ie.	[F3]	ZERO
	[F4]	UNITS
	[F5]	SELECT
	[F6]	ID
	[F7]	PRINT
	[F8]	TARE
	[F9]	ENTER
	[F10]	CLR

ie.	[SHIFT] [F1]	MACRO 1
	[SHIFT] [F2]	MACRO 2
	[SHIFT] [F3]	MACRO 3
	[SHIFT] [F4]	MACRO 4
	[SHIFT] [F5]	MACRO 5
	[SHIFT] [F6]	MACRO 6
	[SHIFT] [F7]	MACRO 7
	[SHIFT] [F8]	MACRO 8
	[SHIFT] [F9]	MACRO 9
	[SHIFT] [F10]	MACRO 10

[ALT-C] Clear screen.

Sending / Receiving files

To send a specific file press [ALT-S], a window will appear asking you to keyin a file name. [ALT-D] will give access to a DOS directory listing of files.

To receive a specific file press [ALT-R], a window will appear asking you to keyin a file name. [ALT-D] will give access to a DOS directory listing of files.

Exiting Terminal Window

Press [ALT-X]. This will return operation to the standard 550 Simulator. Press [ESC] [Y] to exit the 550 Simulator and return to the DOS prompt.

Chapter 31 Personal Identification Number

31.1 Introduction

400.— PIN

The Model 550/570 offers the ability to personalize the access code for entering the unit's setup and calibration modes. The factory default method for entering the unit setup mode is listed below.

<100> <SELECT> <23640> <ID> <ENTER>.

Parameter **P400** allows a **new code** to be entered for gaining access to the **setup** mode. The characters keyed in after the **<SELECT>** key and preceding the **<ENTER>** key can be customized. The Numeric Keypad or the **ARROW** keys allow for entering in the new code. This code can be alpha-numeric and up to 49 characters in length.

Pressing the **<UNITS>** key will scroll through the alpha-numeric values. The letter **"A"** will appear at the start of each character entry. The **<UNITS>** key will scroll through the ASCII character set. The **<TARE>** key will move to the next character location. The **<ENTER>** key will enter your keyed in characters as the new **setup mode** access code.

VERY IMPORTANT NOTE:

Once the new code is entered and all changes are saved when exiting back out to the weigh mode, this code is the absolute new setup mode access code. The GSE factory access code will no longer be valid at this point. Non-authorized parties will not be allowed to enter the setup mode without the new code. Make sure this code is not lost. GSE Scale systems is not responsible for lost access codes. However, if the code is lost the unit must be returned to the factory and a fee will be charged for reclaiming the code. GSE Scale Systems does not want to make a practice of this, so it is advisable to record this code in a safe place.

Exiting the unit while saving all changes will validate the new **setup mode** access code.

31.2 Clearing Setup Mode Personal Access Number (Factory Default)

If for any reason the **Setup Mode** access code is to be changed, press the **<CLR>** key at parameter P400.

The unit will respond by prompting "**Enter = Dflt**". Press the **<ENTER>** key and the GSE factory default code will be reinstated.

Chapter 32 Remote Display Operation

32.1 Introduction

P160.XX Model

This parameter allows for setting the 550 to respond as a remote display. When selected the 'remote display' mode allows the displaying of received alpha and numeric data. GSE offers the model 450 and model 550 instruments that double as remote displays. Other manufacturer's instrumentation (remote displays) may be connected to the 550. The data stream transmission will be a consideration for compatibility.

32.2 Select Remote Display Operation (Setup For 450 and 550 Only)

Parameter P-160 in a 450 or a 550 is configurable to allow these units to respond as remote displays to each other or to other GSE instrumentation such as the 574.

To select remote display operation in a 450 or 550, key in the following at parameter P160.XX:

<9992> <ENTER>

The 450 or 550 will respond with **"Sure? ???"**. Press **<ENTER>** to verify remote display operation. The unit will respond to your selection by displaying:

Model RmDsp

Note that earlier versions of the model 450 refered to the Remote Display operation as the Model 451 operation. The enabling code is the same.

32.3 Abort Remote Display Operation (Set to Operate as a Standard Unit)

To abort the Remote Display operation of the 450 and re-enter the setup mode, press **<ZERO> + <SELECT>** simultaneously. Enter the standard 450 access code.

<SELECT> <ZERO> <PRINT> <UNITS> <TARE>
Go to parameter P160 to change the unit back to a standard 450 configuration. Key in **<9990> <ENTER> <ENTER>**.

To abort the Remote Display operation of the 550 and re-enter the setup mode, press **<CLR> + <SELECT>** simultaneously. The 550 will respond with a two choice message.

Dsply Halt

1 for Setup (flash prompt)

2 Mac Abort (hold prompt)

Press "2" and an abort macro command will be sent to the master unit, aborting any macro running. Press "1" and the unit will request the access code to enter the setup mode.

Press:

<100> <SELECT> <23640> <ID> <ENTER>

Go to parameter P160 to change the unit back to a standard 550 configuration. Key in **<9990> <ENTER> <ENTER>**.

32.4 Master Unit with Remote 550 or 450 Display

The 574, 550 and 450 can be interfaced to most serial devices provided they are compatible. With the full power customization capabilities of the GSE instrumentation its fairly easy to interface with another serial device such as remote displays. This section discusses the capabilities of interfacing the 574 with a GSE 450 or 550 indicator used as a remote display. The same cenario can be used for interfacing a 550 (master) to another 550 (slave).

There are advantages of using a GSE instrument as a remote display for a 574, 550 or 450. GSE makes it very easy (selectable) to setup the two instruments to talk to each other. Specific parameters set aside allow for all segments of the 574 display to be transmitted out of the COM or Print port. The remote 450 or 550 can be set (selectable at P-271) to detect this format and display it.

Remote display formats: Display or Text

P290.X Echo

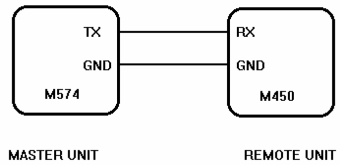


Figure 57 Remote display connections (standard) from 574 to 450 or 550.

This parameter determines the **format** of the information to be transmitted. The two formats allowable are **Display** or **Text**. If this parameter is enabled, the 574's display will be transmitted out either the Com or Print port. The three selections at this parameter are **Echo** = disabled, Comm or Printer.

The **""Echo" Display format"** selection will reflect the identical information in all segments of its display out the selected port to either a 450 or 550.

Note that parameters P290 thru P292 appear only if the unit is set for the master unit. A unit set for remote display operation will not allow access to P290 thru P292. Remote display parameters P270 thru P288 will only appear if the unit is set for remote display use. A unit set as a master unit will not allow access to P270 thru P288. This is only logical so as not to confuse the two modes of operation during setup.

P291.X Start

This parameter allows for a selection of a <u>Start</u> character for the **echo** display mode.

P292.X End

This parameter allows for a selection of an <u>End</u> character for the **echo** display mode.

Once the previous parameters are selected in the master unit for "display" operation, the matching selections must be made in the remote unit. Parameter P-271 should be set for "display" format, P-274 must match the start character selected in parameter P-291 of the master unit. Parameter P-275 must match the end character selected in P-292 of the master unit. The following shows the default transmission from a master unit set to echo its display. The start and end control characters are factory defaults.

Transmitted Format:

<START CONTROL CHARACTER>
<NUMERIC DATA> < SPACE> <UNITS> <SPACE>
<DATA NAME> <END CONTROL CHARACTER>

Data stream:

<STX> <534.03> < > <lb> < > <Gross> <ETX>

The master unit can be set to transmit a unique custom transmission other than echoing its display. Disable the echo mode at P-290. Set up a custom transmit in any of the custom transmit tables and direct it out the Print or Com port. The remote unit must be set for "text" format at P-271 instead of "display".

Three Parts to Display:

The following format should be set in the 574, 550 or 450 custom transmit table to be received by a 450 or 550 remote display.

The **574, 550 and 450 display have three parts**. The main numeric portion, the upper auxiliary display (5 characters) and the lower auxiliary display (5 characters).

The data stream transmitted should be in three main parts with additional start/end control characters. Each piece of data should be delimited with an ASCII space. The first piece of data is usually numeric and will be displayed in the master unit's main display. The second piece of data is generally the 'units' (ie. lb, oz etc.) and is displayed in the master unit's upper auxiliary display. The third piece of data corresponds to the numeric data name and is displayed in the master units lower auxiliary display. This is the format a 450 or 550 (slave) unit will be setup to receive.

The following is an example format of the custom transmission sent (Text) by the master unit. This example shows how a custom or fixed data stream should appear in the master unit in order to be compatible with a 450 or 550 remote display. The remote device should be set for remote display use and to receive a text format (P-271).

Transmitted Format:

<START CONTROL CHARACTER>
<NUMERIC DATA> < SPACE> <UNITS> <SPACE>
<DATA NAME> <END CONTROL CHARACTER>

Data stream:

<STX> <534.03> < > <lb> < > <Gross> <CR>

Start and end control characters are not necessary. They are useful for synchronizing one instruments format to another. Other manufacturer's fixed transmissions might not always have Start or End control Characters.

The **spaces** between the numeric data, units and data name are usually present. The following example shows a common fixed data stream format. Notice the first set of information is numeric. A space is between the first piece of data (numeric) and the units (lb). A space is also present between the units and the data name (gross). The terminating control code is a carriage return <CR>.

ie. **456.73 lb gross<CR>**

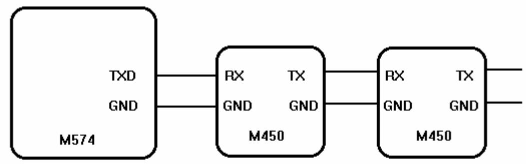


Figure 58 Cascading the Model 450 or 550 (unique address setup) with a 574.

32.5 Model 450 and 550 Remote Display Parameters

P270.X TmOut

Enabling **Time Out** will display the message "Check Cable" after no other transmissions have been received after the time out period has elapsed.

Disabling Time Out will retain the last received updated information on its display.

P271.X Formt

This parameter determines the **format** of the information to be received. The two formats allowable are **Display** or **Text**.

The **"Display format"** selection will reflect the identical information in all segments of its display as on the displays of the 550, 570 or 574 instruments (P290 in the master unit must be set for display, "Echo"). This will enable the master unit to transmit its complete display information to the remote 450 or 550.

The **"Text format"** selection will reflect custom information in the 450 or 550's display received via its COMM Port. This mode can be used for receiving custom information from another GSE instrument but is generally used for receiving fixed formats from Non-GSE equipment.

Receiving Text format introduction:

The **450 and 550 display has three parts**. The main numeric portion, the upper auxiliary display (5 characters) and the lower auxiliary display (5 characters).

The data stream received should be in three main parts with additional start/end control characters. Each piece of data should be delimited with an ASCII space. The first piece of data is usually numeric and will be displayed in the 450 or 550's main display. The second piece of data is generally the units and is displayed in the 450 or 550's upper auxiliary display. The third piece of data corresponds to the numeric data name and is displayed in the 450 or 550's lower auxiliary display. This is the format a master GSE unit will transmit information when its configured to transmit its display information.

The following is a demonstration of the format of the transmission received **"Text"** by the 450 or 550. This is how a custom or fixed data stream should appear to be compatible with 450 remote display operation.

Received Format:

<START CONTROL CHARACTER>
<NUMERIC DATA> < SPACE> <UNITS> <SPACE>
<DATA NAME> <END CONTROL CHARACTER>

Format example:

<STX> <534.03> < > <lb> < > <Gross> <CR>

Start and end control characters are not necessary. All control characters received are selectable and a **“none”** selection for the start or end control character is acceptable. Other manufacturer’s fixed transmissions might not always have Start or End control Characters. The **spaces** between the numeric data, units and data name are usually present. The following example shows a common fixed data stream format. Notice the first set of information is numeric. A space is between the first piece of data (numeric) and the units (lb). A space is also present between the units and the data name (gross). The terminating control code is a carriage return <CR>.

ie. **456.73 lb gross<CR>**

The following information is **strictly** for setup in the 450 and 550 instruments. This feature will allow the 574 to transmit custom data to one of many uniquely addressed remote 450s or 550s.

P272.X Addr

This parameter is only accessable if parameter P271 is set for **Text format**. The address parameter allows each 450 or 550 indicator to have its own unique address selection. The selections are any ASCII character. Scroll through the selections by pressing **<ENTER>**. This will allow 450 or 550 indicators to be cascaded together allowing specific information to be directed to individual units. The Address Control Character should follow the **Start** Control Character in the data stream from the sending device. Remote key operation will not work when cascading indicators. This means that pressing a key on any of the units will not have any direct effect on the master unit. Note that parameters P280 thru P287 must be disabled. These parameters allow for individually disabling the front panel keys from sending out serial commands to remotely effect the master unit. In the case of cascading units, these serial commands would be sent to the adjacent unit which might not be desirable. Disabling all remote key parameters will eliminate one 450 or 550 from sending any remote key commands to any adjacent unit in the link.

Received Format:

<START CONTROL CHARACTER>
<ADDRESS CONTROL CHARACTER>
<NUMERIC DATA> < SPACE> <UNITS> <SPACE>
<DATA NAME> <END CONTROL CHARACTER>

Format example:

<STX> <ESC> <534.03> < > <lb> < > <Gross> <CR>

Cascading Connections:

Remote display operations generally require no handshake lines. A transmit line and a ground line are sufficient. This will make cascading 450 units easier.

Connect the (TX) line from the sending device to the (RX) connection on the 450 COMM Port (J6) 550 COMM Port (J2). Connect the ground line from the sending device to the ground connection on the 450 COMM Port (J6) 550 COMM Port (J2). Any of the two ground connections can be used on the 450 (J6) connector.

The next cascaded 450 should be connected from the previous 450 or 550’s (TX) connection to its (RX) connection. The ground line should be connected between the two units. Refer to figure 58 for cascading connections. Note that the master device in figure 58 is a 574. It could very well be another GSE indicator such as a Model 550 or 570 with an operating macro program. The master device could also be a computer with an operation program.

P274.X Start

This parameter allows for setting the **Start** Control Character received from the master unit. The Start Control Character is used for both the **Display** (echo from master) and **Text** format modes. Press the **<ENTER>** key to scroll through all selections. This selection must match the **Start** Control Character selection set in the P290 parameters in the master unit (P291) or the **Start** Control Character in the custom transmit.

P275.X End

This parameter allows for setting the **End** Control Character received from the master unit. The End Control Character is used for both the **Display** (echo from master) and **Text** format modes. Press the **<ENTER>** key to scroll through all selections. This selection must match the **End** Control Character selection set in the P290 parameters in the master unit (P292) or the **End** Control Character in the custom transmit.

32.6 Remote Keys

The 450 and 550 have the capability to echo serial commands out their COMM Port associated with a specific key press. This will allow the operator to remotely control functions on the master unit. An example of this would be to remotely **zero** the master unit (GSE M574). Pressing

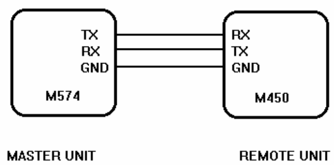


Figure 59 Remote display connections for Remote Keys (450 or 550)

<ZERO> on the 450 unit will transmit a serial command to the 574 specific to performing a zero operation. Note that bi-directional capabilities must be fully intact. The 550 units COMM receive input must be **ON**. A TX, RX and GND cable must be connecting both units COMM Ports. Both the master and remote unit must be setup for **software** handshaking (Xon). This will allow the master unit (550) to transmit its display information while allowing the slave unit (450) to remotely send serial key commands. Refer to figure 59 for Remote Key operation connections. Figure 57 illustrates standard Remote Display operation connections without remote key operation. The master unit must be set for **NO** handshaking.

The following parameters allow for disabling individual remote keys (P280 thru P287).

P280.X ZERO

This parameter allows for enabling or disabling the remote **450** or **550's <ZERO>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **zero** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<ZERO>** key will have no effect on the master unit.

P281.X UNITS

This parameter allows for enabling or disabling the remote **450** or **550's <UNITS>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **units** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<UNITS>** key will have no effect on the master unit.

P282.X SELCT

This parameter allows for enabling or disabling the remote **450** or **550's <SELECT>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **select** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<SELECT>** key will have no effect on the master unit.

P283.X ID (<PRINT> + <UNITS>)

This parameter allows for enabling or disabling the remote **450's <PRINT> + <UNITS>** key combination. This is the **<ID>** key on a 550. If enabled it will have an effect on the master unit. When this key is pressed it will send a **%i** operation command recognized by another GSE indicator to step backwards one step in the ASCII table selection. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **%i** will have no effect on the master unit.

P284.X PRINT

This parameter allows for enabling or disabling the remote **450** or **550's <PRINT>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **print** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<PRINT>** key will have no effect on the master unit.

P285.X TARE

This parameter allows for enabling or disabling the remote **450** or **550's <TARE>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **tare** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be

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connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<TARE>** key will have no effect on the master unit.

P286.X ENTER

This parameter allows for enabling or disabling the remote **550's <ENTER>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send an **enter** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<ENTER>** key will have no effect on the master unit.

P287.X CLEAR

This parameter allows for enabling or disabling the remote **450** and **550's <CLEAR>** key. If enabled it will have an effect on the master unit. When this key is pressed it will send a **clear** operation command recognized by another GSE indicator. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the **<CLEAR>** key will have no effect on the master unit.

P288.X NUMBR

This parameter allows for enabling or disabling the remote **550's** numeric keypad including the decimal point. If enabled it will have an effect on the master unit. When any of the numeric keys are pressed it will send that specific character to another GSE instrument. Both a TX, RX and GND line must be connected between the two units COMM Ports for remote key operation. Both units must be set for software handshake (Xon). If this parameter is disabled the numeric keypad will have no effect on the master unit.

32.7 Remote and Master Unit Parameter Listing in Serial Text Formats

(M450 remote)

160%s9990%e%e	P160.--Model 450
OR	
160%s9992%e%e	P160.--Model RmDsp

270%s0%e	P270.00 TmOut Disbl
271%s0%e	P271.00 Formt Dsply
274%s2%e	P274.02 Start <STX>
275%s3%e	P275.03 End <ETX>
280%s1%e	P280.01 ZERO Enbld
281%s1%e	P281.01 UNITS Enbld
282%s1%e	P282.01 SELCT Enbld
283%s1%e	P283.01 ID Enbld
284%s1%e	P284.01 PRINT Enbld
285%s1%e	P285.01 TARE Enbld
287%s1%e	P287.01 CLEAR Enbld

(M550 remote)

160%s9990%e%e	P160.--Model 550
OR	
160%s9992%e%e	P160.--Model RmDsp

270%s0%e	P270.00 TmOut Disbl
271%s0%e	P271.00 Formt Dsply
274%s2%e	P274.02 Start <STX>
275%s3%e	P275.03 End <ETX>
280%s1%e	P280.01 ZERO Enbld
281%s1%e	P281.01 UNITS Enbld
282%s1%e	P282.01 SELCT Enbld
283%s1%e	P283.01 ID Enbld
284%s1%e	P284.01 PRINT Enbld
285%s1%e	P285.01 TARE Enbld
286%s1%e	P286.01 ENTER Enbld
287%s1%e	P287.01 CLEAR Enbld
288%s1%e	P288.01 NUMBR Enbld

(M450 master)

290%s0%e	P290.00 Echo Disbl
291%s2%e	P291.02 Start <STX> ^B=02
292%s3%e	P292.03 End <ETX> ^C=03

(M550 master)

290%s0%e	P290.00 Echo Disbl
291%s2%e	P291.02 Start <STX> ^B=02
292%s3%e	P292.03 End <ETX> ^C=03

(M574 master)

290%s0%e	P290.00 Echo Disbl
291%s2%e	P291.02 Start <STX> ^B=02
292%s3%e	P292.03 End <ETX> ^C=03

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Chapter 33 (OIML)

33.1 European Specific Modifications

OIML => Organization for International Legal Metrology

OIML Parameter:

An OIML selection parameter, P410, has been created. To prevent accidental switching of this parameter once the parameter is selected, it may only be changed by entering **<9991> <ENTER>** to enable OIML or **<9990> <ENTER>** to disable OIML. It cannot be changed by simply pressing **<ENTER>** alone. When a DEFAULT SETUP (P65001 or 65002) is performed the current state of the OIML selection is NOT affected. This is similar to the operation of the model number parameter.

Enabling the OIML parameter has the following effects:

a. The layout of the keys used on the OIML version of the 550 keypad is assumed. Refer to figures 60 and 61 for a picture of the keypad. Also refer to table 63 for key definitions.

Note that the units key has been eliminated since it is not normally required in Europe. However it can easily be implemented by programming Macro 15 to perform a % u.

The OIML keypad will be included in the 550 version with CE labeling, part number 200550-03000. The keypad is also available separately as GSE part number 44-35-29xxx.

Please note that the inverted 'T' configuration of the keys for scrolling in ASCII characters has been preserved. For example, the middle key in the top row is still the up arrow key even though it is now the print key. (The print key is a down arrow key with the standard keypad and OIML disabled.)

The only complication that arises from this is that the **<SELECT>** key now is the right arrow key. Therefore the operation is somewhat context sensitive. When the F3 key is pressed during an entry, if the preceding entry is purely numeric, the F3 key performs the **<SELECT>** function and the indicator proceeds to the specified mode or parameter. However if the preceding entry contains any non-numeric characters, then the F3 key performs a right arrow function, appending an 'A' to the end of the entry. The F3 key without an entry always performs the **<SELECT>** function.

However, in certain setup modes the right arrow key was used to scroll through the existing entry. Specifically, macros (P800 - P816), input interpreter strings (P911, 921, etc...) and macro debug (P64200) used the right arrow key to scroll to the next character within these

LOCATION	MARKING	FUNCTION	EQUIVALENT SERIAL COMMAND	ARROW KEY
Top row, left key	-> 0 <-	ZERO	%z	—-
Top row, middle key	[]->	PRINT	%p	Up arrow
Top row, right key	-> T <-	TARE	%t	—-
Middle row, left key	F1	ID	%i	Left arrow
Middle row, middle key	F2	Invokes macro 15	%?	Down arrow
Middle row, right key	F3	SELECT	%s	Right arrow
Bottom key	<—- |	ENTER	%e	—-

Table 63, OIML 550i Keypad Key Definitions

Parameter Number	Parameter Name
2	**Tare**
3	**GrTOT**
4	**GrT+C**
6	**NtTOT**
7	**NtT+C**
8	**NtT-C**
31	**QtTOT**
32	**QtT+C**
33	**QtT-C**

Table 64, Pre-setable Parameters

selections while the **<SELECT>** key would advance to the next parameter.

Therefore, these modes will use the **[->T<-]** (tare) key to scroll to the next character within these parameters.

Also, within the macros, the **<PRINT>** previously allowed the printing of selected the macro. Since the **[]->** ([PRINT]) key is now the up arrow key and that key is used to begin alpha entries, it is necessary to press the **<F2>** key to print a specific macro.

b. The overload indication of the indicator, "Code-03 Over-load" and "Code-02 Under-Load", will occur at nine divisions (as defined by P111) above/below capacity (per P110). The overload is still based upon the zero established during calibration of the indicator to the platform. Therefore subsequent use of the front panel zero key will shift the maximum displayed value upward or downward, depending on the amount zeroed out.

c. The name of certain parameters will include an indication of whether the values of those parameters were determined by the indicator or by some other means such as operator entry or memory recall (ie preset). These parameters are located in table 64.

The names in table 64 will be preceded by a "P" if the value is preset, ie not determined by the indicator, when the name is printed or shown on the display. This preset marking ability also applies to the user supplied names which are now possible for all parameters. Refer to the namable weight parameters section for more information.

The tare parameter will be considered <u>not preset</u> when an auto-tare is performed or when it is cleared (by pressing **<0> <TARE>**) or if it is lost after a power-down (if P161 TrSav = Disbl). When the tare is changed in any other manner (ie entering a numeric tare, a value received via serial transmission, recalled from a database, copied from another parameter with the %C command, etc...) then the tare will be considered preset.

The gross, net, and quantity total parameters will be considered <u>not preset</u> if the total value of the parameter is cleared to zero. However, entering a numeric value (or changing it in any of the ways listed above) for an accumulate parameter will cause that parameter and its derivatives it to be considered preset. Performing an accumulation does not affect the preset status of an accumulate parameter.

International Character Set		
3	UK	England
4	Dnmrk	Denmark I
5	Swedn	Sweden
6	Italy	Italy
7	Spain	Spain I
8	Japan	Japan
9	Norwy	Norway
10	Dnmrk2	Denmark II

<table>
<tr><th colspan="12">Re-mapped Characters</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>#</td><td>$</td><td>@</td><td>Æ</td><td>Ø</td><td>Å</td><td>ˆ</td><td>`</td><td>æ</td><td>ø</td><td></td><td>~</td></tr>
<tr><td>#</td><td>¤</td><td>É</td><td>Ä</td><td>Ö</td><td>Å</td><td>ü</td><td>é</td><td>ä</td><td>ö</td><td></td><td>ü</td></tr>
<tr><td>#</td><td>$</td><td>@</td><td>°</td><td>\</td><td>é</td><td>ˆ</td><td>ù</td><td>à</td><td>ò</td><td>è</td><td></td></tr>
<tr><td></td><td>$</td><td>@</td><td>¡</td><td>Ñ</td><td>¿</td><td>ˆ</td><td>`</td><td>¨</td><td>ñ</td><td>}</td><td>~</td></tr>
<tr><td>#</td><td>$</td><td>@</td><td>[</td><td>¥</td><td>]</td><td>ˆ</td><td>`</td><td>{</td><td>|</td><td>}</td><td>~</td></tr>
<tr><td>#</td><td>¤</td><td>É</td><td>Æ</td><td>Ø</td><td>Å</td><td>ü</td><td>é</td><td>æ</td><td>ø</td><td></td><td>ü</td></tr>
<tr><td>#</td><td>$</td><td>É</td><td>Æ</td><td>Ø</td><td>Å</td><td>ü</td><td>é</td><td>æ</td><td>ø</td><td></td><td>ü</td></tr>
<tr><td>#</td><td>$</td><td>á</td><td>¡</td><td>Ñ</td><td>¿</td><td>é</td><td>ü</td><td>í</td><td>ñ</td><td>ó</td><td>ú</td></tr>
<tr><td>#</td><td>$</td><td>@</td><td>[</td><td></td><td>]</td><td>ˆ</td><td>'</td><td>{</td><td>|</td><td>ˆ]</td><td>~</td></tr>
</table>

Table 65, International Character Set

The average piece weight parameters are considered <u>not preset</u> if the piece weight has been directly determined by sampling. If the piece weight is established by any other method (such as those listed earlier) then the APW will be considered preset.

In addition, a new macro command, x%f, has been created, where x is one of the preset-able parameters as listed above. This command performs an "IF parameter x is preset" which allows a macro to check the "preset" status of the specified parameter.

33.2 International Characters

The ability to display international characters has been added. Setup parameter P411 was created to specify the desired language of operation. Pressing **<ENTER>** at

Checksum Code	Function	Description
.300	stop	Stop calculating the checksum but do not transmit yet.
.301	CCITT	International standard CRC
.302	SDLC/HDLC	CRC used by IBM
.303	CRC-16	Most commonly used CRC in the United States
.304	CRC-12	Used when bytes are 6 bits
.305	LRCC-16	16 bit CRC
.306	LRCC-8	8 bit CRC, used by Epson
.307	XMODEM	Registers are shifted left, opposite CCITT method which shifts right. Used with transmissions up to 9600 baud.
.308	Sum 16	2 byte additive checksum
.309	Sum-8	1 byte additive checksum
.310	Send Checksum	Transmit checksum sending LSB first
.311	Send Checksum	Transmit checksum sending MSB first

Table 66, Checksum Format Codes

P411 toggles through the available selections. Refer to table 65 for the specific characters supported for each language.

Table 65 is compatible with a commonly used Epson standard for supporting international characters. Thus if a printer used with the indicator also supports the Epson international character standard, then the special characters can be printed as they are displayed.

When scrolling through the available characters to make an entry, the character in the selected row will appear instead of the character at the top of the column. Therefore these characters may be used wherever an alpha entry is allowed, such as parameter names, macro prompts, custom transmit setups, user entries, etc...

The decimal and hexadecimal representation of each character is shown at the very top of each column for your reference. The indicator simply interprets the listed codes before displaying a character, depending on which character set is specified by setup parameter P411.

Note that the supported language can also be changed on the fly with a macro command x%L, where x is the language selection number as noted in the left hand column of table 65. Note that this change is only temporary; on power-up the language will always be as specified by P411.

33.3 Namable Weight Parameters

The ability to name parameters (such as Vars and Regs) has been extended to include virtually every parameter, including gross, net, tare, etc... This allows these parameters to be named as required in any country or for any application. Examples of such names are for Gross to be re-named simply "G", "Gr", "Brutto", "Br", or whatever may be required.

The names are entered in the P600 area of the setup mode. For example to re-name the time/date, parameter 11, from "Tm/Dt" to "Time", proceed to parameter P611 (600 + 11). Then enter the desired name for the parameter. Refer to section 4.5 of this Technical Reference Manual for assistance with scrolling in alpha entries.

If the OIML features are enabled (P410), then when naming any of the "Preset-able Parameters", as listed in table 64, the first character of the name will only be seen when the parameter has been preset. For example, to cause the tare name to print out as "T" for auto-tares and "PT" for preset tares, the name "PT" should be given to the tare using setup parameter P602.

In order to cause the same name to always be used for one of these parameters, regardless of whether or not it has been preset, enter a space as the first character of the name. The space will be ignored in both the displayed and printed name.

Note that an entered name is used both on the lower line of the display when the parameter is selected and it is transmitted with the parameter when specified in a custom transmit.

33.4 Check-sums on Transmitted Data

In Europe, if a printer is not located adjacent to the indicator then the transmission must include a checksum and a mechanism to re-attempt a transmission in case of errors in order to be PTB approved.

Several different styles of checksums may now be calculated by the indicator to help insure the integrity of the transmitted data. One of these new checksum calculation methods matches that used by Epson in a protocol commonly used in Europe. Together with capabilities of the Input Interpreter (P900), the 550 indicator may now be used with these Epson printers, insuring correct data transfer by re-sending the transmission if the required acknowledge is not received.

A data checksum calculation consists of three commands:

1. Initialize and begin calculating a specific type of checksum starting with the next transmitted character.

2. Stop calculating the checksum (optional). Required only when the checksum is not to be transmitted until after some additional characters are transmitted.

3. Transmit the checksum. Since most supported checksums are two-byte, there are two commands, one for most significant byte (msb) first and one for least significant byte (lsb) first. Both bytes will be transmitted in succession. For single byte checksums, either command may be issued.

Several new codes have been defined which allow these commands to be embedded at the proper locations in a custom transmit or to be done at a particular time within a macro. Similar to the way a carriage return/line feed combination may be programmed into a custom transmit setup by entering .256, the codes for the checksum may be entered as shown in table 66.

To allow one these checksum commands to be issued directly from a macro, use the appropriate code listed above along with the "send control code" command, "% &". For example use 306%& to begin a LRCC-8 checksum.

Refer to app note 1 for an example of how to interface an Epson printer with the 550 indicator using checksums. (TO FOLLOW)

Note that this feature only allows the transmitting of checksums, not the receiving of checksummed data.

33.5 Printer Interface Example

GSE Model 550 to Epson Printer

Implementing Epson "BT-90" Block Transfer (commonly used in Europe)

While there are numerous ways of accomplishing various tasks on the 550 (including the one at hand) below is one possible method.

Note: This example requires the use of M550 firmware dated Dec, 1993 or later (per P60102). The Block Proof character used in he Epson BT-90 interface is known as "LRCC-8".

This implementation uses Macro 0, 1, 2, 3 , Custom Transmit 1, and Reg 91.

Macro 1 is named Print Block so that it can be started from the ID menu.

Macro 0 which is invoked by setpoint 1 upon indicator power-up or after exiting setup mode clears Reg 91. <91> is used to keep track of the state of the interface.

Step 1: When macro 1 is executed, it checks Reg 91 to determine if a print is in progress. If no print is in progress, <ENQ> is sent out the COM port to indicate the beginning of a transmission and Reg 91 is incremented to 1 to prevent other transmissions. If a print is in progress, the message "Can't Send" is displayed if macro 1 is invoked.

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Step 2: The input interpreter #1 is set to execute macro 2 when a <ACK>is received. Macro 2 checks if Reg 91 is 1. If it is, custom transmit 1 is sent and Reg 91 is set to 2.

Step 3: After the transmission is sent, the printer will respond with either an <ACK> or a <NAK>. If <ACK> is received at this point (reg 91 not =1) then macro 2 changes Reg 91 back to 0. This means another transmission could be initiated.

If <AK> is received, the input interpreter #2 will cause macro 3 to run. This macro will send an <ACK> to the printer and set Reg 91 to 1. Then step 2 is repeated.

Custom transmit 1 describes the format of a custom transmit usings CRCs. The file, (LRCC8.SET) contains this implementation.

100%s23640%i%e	Access Setup Modes, Allowing Changes
65010%s1%e%e	P65010. dbase Reset
101%s2%e	P101.02 Scl 1 Enbld
800%s%c%e	P800.06 Macro # 0
0;91%%C%e	0001 copy register
801%s%c%e	P801.36 Macro # 1 PrintBlock
91=%%'%e	0001 compare
1%%"%e	0005 select port
2%%)%e	0007 flush keys
1;91%%C%e	0009 copy register
5%%&%e	0014 send code
%%N%e	0016 if not
Can'tSend!%%P%e	0017 pause
%%E%e	0028 end if
802%s%c%e	P802.25 Macro # 2
91=1%%'%e	0001 compare
2;91%%C%e	0006 copy register
1%%Q%e	0011 custom transmit
%%N%e	0013 if not
0;91%%C%e	0014 copy register
%%E%e	0019 end if
803%s%c%e	P803.18 Macro # 3
91=2%%'%e	0001 compare
1%%"%e	0006 select port
1;91%%C%e	0008 copy register
6%%&%e	0013 send code
851%sPrintBlock%e	P851.-- Mac 1 PrintBlock
900%s1%e	P900.01 RxInp Enbld
901%s0%e	P901.00 RxTrm <NUL>
902%s1%e	P902.01 RxPas Enbld
910%s1%e	P910.01 RxTyp Char
911%s%c%e	P911.01 RxFmt
.006%e	<ACK>^F=06
912%s2%e	P912.02 RxMac 2
920%s1%e	P920.01 RxTyp Char
921%s%c%e	P921.01 RxFmt
.021%e	<NAK>^U=21
922%s3%e	P922.03 RxMac 3
1000%s%c1000%e	P1000. Custom Transmit #1
.002%e	<STX>
.306%e	Check LRCC8
%e0%e%e0%e%e	Gross Format = 0
.256%e	<CR> <LF>
.003%e	<ETX>
.310%e	Check PrnLo
2000%s%c1000%e	P2000. Custom Transmit #2
3000%s%c1000%e	P3000. Custom Transmit #3
4000%s%c1000%e	P4000. Custom Transmit #4
5100%s1%e	P5100.1 SPt 1 Outpt
5110%s9%e	P5110.9 Activ alwys
5111%s0%e	P5111.0 hold 0.0 S
5112%s0%e	P5112.0 Macro 0
5113%s0%e	P5113.0 Mot'n Ign'd
5130%s10%e	P5130.X DeAct never
%z	Exit Setup Mode

33.6 Specific International 550 Versions

U.K. version
(GSE Part #: 200550-03000)
with U.K. line cord specifications.

German version

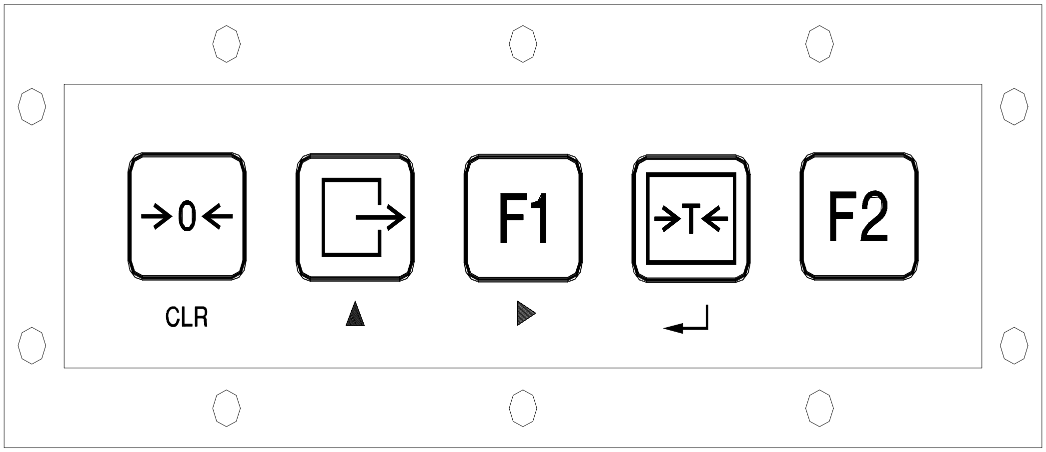

Figure 60, Model 450i International Keypad

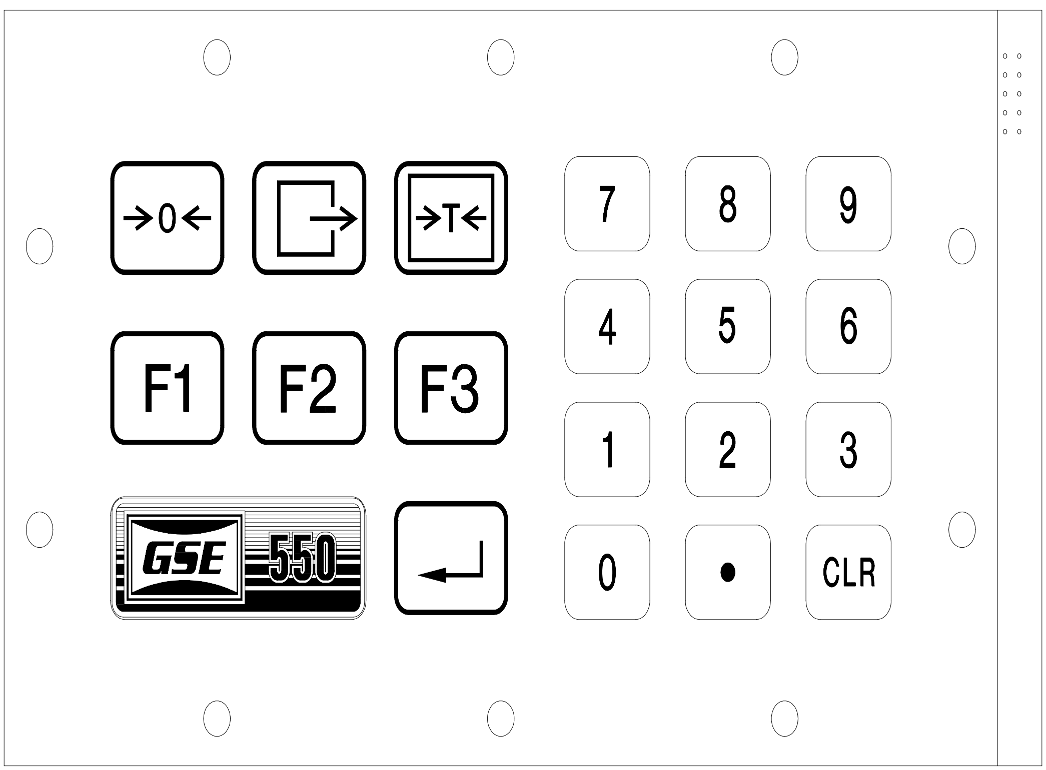

Figure 61, Model 550i International Keypad

(GSE Part#: 200550-04000)
with German line cord specifications.

Chapter 34 Pre-setable Parameters (STANDARD)

34.1 Description

The name of certain parameters will include an indication of whether the values of those parameters were determined by the instrument or by some other means such as operator entry or memory recall (ie preset). These parameters are shown in table 67.

The names shown in table 67 will be preceded by a "P" if the value is preset, ie not determined by the instrument, when the name is printed or shown on the display. This preset marking ability also applies to the user supplied names which are now possible for all parameters. Refer to Chapter 14, Section on Naming Parameters.

Parameter Number	Parameter Name
2	**Tare**
3	**GrTOT**
4	**GrT+C**
5	**GrT-C**
6	**NtTOT**
7	**NtT+C**
8	**NtT-C**
31	**QtTOT**
32	**QtT+C**
33	**QtT-C**
34	**APW**
35	**APW*K**

Table 67 Pre-setable Parameters

The tare parameter will be considered not preset when an auto-tare is performed or when it is cleared (by pressing **<0> <TARE>**) or if it is lost after a power-down (if P161 TrSav = Disbl). When the tare is changed in any other manner (ie entering a numeric tare, a value received via serial transmission, recalled from a database, copied from another parameter with the %C command, etc...) then the tare will be considered preset.

The gross, net, and quantity total parameters will be considered not preset if the total value of the parameter is cleared to zero. However, entering a numeric value (or changing it in any of the ways listed above) for an accumulate parameter will cause that parameter and its derivatives it to be considered preset. Performing an accumulation does not affect the preset status of an accumulate parameter.

The average piece weight parameters are considered not preset if the piece weight has been directly determined by sampling. If the piece weight is established by any other method (such as those listed earlier) then the APW will be considered preset.

In addition, the macro command, x%f, has been created, where x is one of the preset-able parameters as listed above. This command performs an "IF parameter x is preset" which allows a macro to check the "preset" status of the specified parameter. Refer to chapter 16, Macro Programming for more information on this command.

34.2 Setup

P412.X PrSET

This parameter allows for enabling/disabling the preset feature on the instrument.

Appendix A.1 Transmission of Current Settings

Factory Default Settings:

(including remote display settings)

The following is a printout of the setup parameters of the 550 instrument. Parameter P160 defines the unit as a standard 550 indicator or for remote display use. The number 200 parameters in the outlined box below will not appear if the standard 550 is selected. The boxed parameters are specific to the remote display setup.

100%s23640%i%e	Access Setup Modes, Allowing Changes
65010%s1%e%e	P65010. dbase Reset
101%s2%e	P101.02 Scl 1 Enbld
102%s0%e	P102.00 Scl 2 Disbl
103%s0%e	P103.00 Scl 3 Disbl
104%s0%e	P104.00 Scl 4 Disbl
100%s23640%i%e	Access Setup Modes, Allowing Changes
110%s100.000000%e	P110.-- F.S.= 100.0
111%s9%e	P111.09 1 div 0.01
112%s5%e	P112.05 ZTapr 0.5 d
113%s10%e	P113.10 ZTdly 1.0 s
114%s10%e	P114.10 Mot'n 1.0 d
115%s10%e	P115.10 MtDly 1.0 s
116%s6%e	P116.06 Filtr 1.0 s
117%s1%e	P117.01 Rate= 0.1 s
118%s12%e	P118.12 Zrnge 100.%%
119%s0%e	P119.00 Linrz Disbl
150%s0%e	P150.00 UNITS= lb
151%s0%e	P151.00 UNIT1= lb
152%s1%e	P152.01 UNIT2= kg
153%s9%e	P153.09 UNIT3= NONE
154%s9%e	P154.09 UNIT4= NONE
155%s1.000000%e	P155.-- Ucon1= 1.000
156%s1.000000%e	P156.-- Ucon2= 1.000
157%s????1%e	P157.-- Unam1= ????1
158%s????2%e	P158.-- Unam2= ????2
160%s9990%e%e	P160.-- Model 550

OR

160%s9992%e%e	P160.-- Model RmDsp
161%s0%e	P161.00 TrSAV Disbl
162%s0%e	P162.00 TrNEG Disbl
163%s1%e	P163.01 TrRND Enbld
164%s3%e	P164.03 AcRTZ 0.1%%
165%s1%e	P165.01 AcFnc ADD
166%s1%e	P166.01 AutoT Enbld
167%s1%e	P167.01 KybdT Enbld
168%s1%e	P168.01 KybdS Enbld
169%s0%e	P169.00 GrENT Disbl
170%s0%e	P170.00 A-out off
200%s1%e	P200.01 Baud 9600
201%s1%e	P201.01 #data 8bits
202%s0%e	P202.00 Par'y none
203%s0%e	P203.00 #stop 1bit
204%s2%e	P204.02 ComHS Xon
205%s0%e	P205.00 PrnHS none
206%s1%e	P206.01 RxCom on
207%s3%e	P207.03 TxRTZ 0.1%%
208%s8%e	P208.08 Width 8
209%s0%e	P209.00 TxHld delay
210%s1%e	P210.01 Send1 onreq
211%s1%e	P211.01 Port Print
212%s1%e	P212.01 Mot'n delay
220%s0%e	P220.00 Send2 off
221%s0%e	P221.00 Port Comm
222%s1%e	P222.01 Mot'n delay
230%s0%e	P230.00 Send3 off
231%s0%e	P231.00 Port Comm
232%s1%e	P232.01 Mot'n delay
240%s0%e	P240.00 Send4 off
241%s0%e	P241.00 Port Comm
242%s1%e	P242.01 Mot'n delay
250%s0%e	P250.00 NtWrk Disbl
251%s0%e	P251.00 Addrs 0
270%s0%e	P270.00 TmOut Disbl
271%s0%e	P271.00 Formt Dsply
274%s2%e	P274.02 Start <STX>
275%s3%e	P275.03 End <ETX>
280%s1%e	P280.01 ZERO Enbld
281%s1%e	P281.01 UNITS Enbld
282%s1%e	P282.01 SELCT Enbld

A1

283%s1%e	P283.01 ID Enbld
284%s1%e	P284.01 PRINT Enbld
285%s1%e	P285.01 TARE Enbld
286%s1%e	P286.01 ENTER Enbld
287%s1%e	P287.01 CLEAR Enbld
288%s1%e	P288.01 NUMBR Enbld
290%s0%e	P290.00 Echo Disbl
291%s2%e	P291.02 Start <STX>^B=02
292%s3%e	P292.03 End <ETX>^C=03
300%s0%e	P300.00 MODE0 Gross
301%s1%e	P301.01 MODE1 Net
302%s2%e	P302.02 MODE2 Tare
303%s99%e	P303.99 MODE3 None!
304%s99%e	P304.99 MODE4 None!
305%s99%e	P305.99 MODE5 None!
306%s99%e	P306.99 MODE6 None!
307%s99%e	P307.99 MODE7 None!
308%s99%e	P308.99 MODE8 None!
309%s99%e	P309.99 MODE9 None!
400%s%c%e	P400.-- PIN None!
401%s%c%e	P401.-- QCAL None!
410%s9990%e%e	P410.-- OIML Disbl
411%s0%e	P411.00 LANG USA
412%s0%e	P412.00 PrSET Disbl
420%s1%e	P420.01 Dsply ON
421%s2%e	P421.02 WtThr 6d
422%s5%e	P422.05 TmOut 5min
460%s6%e	P460.06 VarDP= AUTO
461%s6%e	P461.06 VarDP= AUTO
462%s6%e	P462.06 VarDP= AUTO
463%s6%e	P463.06 VarDP= AUTO
464%s6%e	P464.06 VarDP= AUTO
465%s6%e	P465.06 VarDP= AUTO
466%s6%e	P466.06 VarDP= AUTO
467%s6%e	P467.06 VarDP= AUTO
468%s6%e	P468.06 VarDP= AUTO
469%s6%e	P469.06 VarDP= AUTO
470%s6%e	P470.06 VarDP= AUTO
471%s6%e	P471.06 VarDP= AUTO
472%s6%e	P472.06 VarDP= AUTO
473%s6%e	P473.06 VarDP= AUTO
474%s6%e	P474.06 VarDP= AUTO
475%s6%e	P475.06 VarDP= AUTO
476%s6%e	P476.06 VarDP= AUTO
477%s6%e	P477.06 VarDP= AUTO
478%s6%e	P478.06 VarDP= AUTO
479%s6%e	P479.06 VarDP= AUTO
480%s6%e	P480.06 VarDP= AUTO

481%s6%e	P481.06 VarDP= AUTO
482%s6%e	P482.06 VarDP= AUTO
483%s6%e	P483.06 VarDP= AUTO
484%s6%e	P484.06 VarDP= AUTO
485%s6%e	P485.06 VarDP= AUTO
486%s6%e	P486.06 VarDP= AUTO
487%s6%e	P487.06 VarDP= AUTO
488%s6%e	P488.06 VarDP= AUTO
489%s6%e	P489.06 VarDP= AUTO
500%s%c	P500.01 Time 14:40
501%s%c	P501.94 Date 09/15
502%s0%e	P502.00 TmDat no
503%s1%e	P503.01 AM/PM yes
504%s0%e	P504.00 A1Sel off
505%s0.0.0%e	P505.00 A1Tim 00:00
506%s0%e	P506.00 A2Sel off
507%s0.0.0%e	P507.00 A2Tim 00:00
508%s0%e	P508.00 A3Sel off
509%s0.0.0%e	P509.00 A3Tim 00:00
510%s0%e	P510.00 Style U.S.A
511%s0%e	P511.00 RtDsp TmDat
512%s0%e	P512.00 A1Dsp TmDat
513%s0%e	P513.00 A2Dsp TmDat
514%s0%e	P514.00 A3Dsp TmDat
515%s0%e	P515.00 A4Dsp TmDat
600%s%c	P600.-- Gross None!
601%s%c	P601.-- Net None!
602%s%c	P602.-- Tare None!
603%s%c	P603.-- GrTOT None!
604%s%c	P604.-- GrT+C None!
605%s%c	P605.-- GrT-C None!
606%s%c	P606.-- NtTOT None!
607%s%c	P607.-- NtT+C None!
608%s%c	P608.-- NtT-C None!
611%s%c	P611.-- Tm/Dt None!
612%s%c	P612.-- TrGrs None!
613%s%c	P613.-- TrNet None!
614%s%c	P614.-- TrTar None!
650%s%c	P650.-- Rtime None!
651%s%c	P651.-- A1Tim None!
652%s%c	P652.-- A2Tim None!
653%s%c	P653.-- A3Tim None!
654%s%c	P654.-- A4Tim None!
660%s%c	P660.-- Var10 None!
661%s%c	P661.-- Var11 None!
662%s%c	P662.-- Var12 None!
663%s%c	P663.-- Var13 None!
664%s%c	P664.-- Var14 None!
665%s%c	P665.-- Var15 None!

666%s%c	P666.-- Var16 None!
667%s%c	P667.-- Var17 None!
668%s%c	P668.-- Var18 None!
669%s%c	P669.-- Var19 None!
670%s%c	P670.-- Var20 None!
671%s%c	P671.-- Var21 None!
672%s%c	P672.-- Var22 None!
673%s%c	P673.-- Var23 None!
674%s%c	P674.-- Var24 None!
675%s%c	P675.-- Var25 None!
676%s%c	P676.-- Var26 None!
677%s%c	P677.-- Var27 None!
678%s%c	P678.-- Var28 None!
679%s%c	P679.-- Var29 None!
680%s%c	P680.-- Var 0 None!
681%s%c	P681.-- Var 1 None!
682%s%c	P682.-- Var 2 None!
683%s%c	P683.-- Var 3 None!
684%s%c	P684.-- Var 4 None!
685%s%c	P685.-- Var 5 None!
686%s%c	P686.-- Var 6 None!
687%s%c	P687.-- Var 7 None!
688%s%c	P688.-- Var 8 None!
689%s%c	P689.-- Var 9 None!
691%s%c	P691.-- Reg 1 None!
692%s%c	P692.-- Reg 2 None!
693%s%c	P693.-- Reg 3 None!
694%s%c	P694.-- Reg 4 None!
700%s12%e	P700.-- □SIZE#1=12
701%s%c	P701.-- NAME1 None!
702%s0%e	P702.-- □SIZE#2= 0
704%s0%e	P704.-- □SIZE#3= 0
706%s0%e	P706.-- □SIZE#4= 0
708%s0%e	P708.-- □SIZE#5= 0
710%s0%e	P710.-- □SIZE#6= 0
720%s0%e	P720.00 □use: Std.
800%s%c%e	P800.00 Macro # 0
801%s%c%e	P801.00 Macro # 1
802%s%c%e	P802.00 Macro # 2
803%s%c%e	P803.00 Macro # 3
804%s%c%e	P804.00 Macro # 4
805%s%c%e	P805.00 Macro # 5
806%s%c%e	P806.00 Macro # 6
807%s%c%e	P807.00 Macro # 7
808%s%c%e	P808.00 Macro # 8
809%s%c%e	P809.00 Macro # 9
810%s%c%e	P810.00 Macro #10
811%s%c%e	P811.00 Macro #11
812%s%c%e	P812.00 Macro #12
813%s%c%e	P813.00 Macro #13

814%s%c%e	P814.00 Macro #14
815%s%c%e	P815.00 Macro #15
816%s%c%e	P816.00 Macro #16
850%s%c	P850.-- Mac 0 None!
851%s%c	P851.-- Mac 1 None!
852%s%c	P852.-- Mac 2 None!
853%s%c	P853.-- Mac 3 None!
854%s%c	P854.-- Mac 4 None!
855%s%c	P855.-- Mac 5 None!
856%s%c	P856.-- Mac 6 None!
857%s%c	P857.-- Mac 7 None!
858%s%c	P858.-- Mac 8 None!
859%s%c	P859.-- Mac 9 None!
860%s%c	P860.-- Mac10 None!
861%s%c	P861.-- Mac11 None!
862%s%c	P862.-- Mac12 None!
863%s%c	P863.-- Mac13 None!
864%s%c	P864.-- Mac14 None!
865%s%c	P865.-- Mac15 None!
866%s%c	P866.-- Mac16 None!
870%s0%e	P870.00 Macro 0 Multiple run
871%s0%e	P871.00 Macro 1 Multiple run
872%s0%e	P872.00 Macro 2 Multiple run
873%s0%e	P873.00 Macro 3 Multiple run
874%s0%e	P874.00 Macro 4 Multiple run
875%s0%e	P875.00 Macro 5 Multiple run
876%s0%e	P876.00 Macro 6 Multiple run
877%s0%e	P877.00 Macro 7 Multiple run
878%s0%e	P878.00 Macro 8 Multiple run
879%s0%e	P879.00 Macro 9 Multiple run
880%s0%e	P880.00 Macro 10 Multiple run
881%s0%e	P881.00 Macro 11 Multiple run
882%s0%e	P882.00 Macro 12 Multiple run
883%s0%e	P883.00 Macro 13 Multiple run
884%s0%e	P884.00 Macro 14 Multiple run
885%s0%e	P885.00 Macro 15 Multiple run
886%s0%e	P886.00 Macro 16 Multiple run
900%s0%e	P900.00 RxInp Disbl
901%s10%e	P901.10 RxTrm <LF>
902%s0%e	P902.00 RxPas Disbl
910%s0%e	P910.00 RxTyp Unusd
920%s0%e	P920.00 RxTyp Unusd
930%s0%e	P930.00 RxTyp Unusd
940%s0%e	P940.00 RxTyp Unusd
950%s0%e	P950.00 RxTyp Unusd
960%s0%e	P960.00 RxTyp Unusd
970%s0%e	P970.00 RxTyp Unusd
980%s0%e	P980.00 RxTyp Unusd
1000%s%c1000%e	P1000. Custom Transmit #1

%e21%e%e0%e%e	ID 1: Format = 0
.256%e	<CR> <LF>
%e0%e%e0%e%e	Gross Format = 0
.256%e	<CR> <LF>
%e2%e%e0%e%e	Tare Format = 0
.256%e	<CR> <LF>
%e1%e%e0%e%e	Net Format = 0
.256%e	<CR> <LF>
2000%s%c1000%e	P2000. Custom Transmit #2
3000%s%c1000%e	P3000. Custom Transmit #3
4000%s%c1000%e	P4000. Custom Transmit #4
5003%s2%e	P5003.2 GrTOT Auto
5006%s2%e	P5006.2 NtTOT Auto
5021%s2%e	P5021.2 P5021.2 Auto
5022%s2%e	P5022.2 P5022.2 Auto
5023%s2%e	P5023.2 P5023.2 Auto
5024%s2%e	P5024.2 P5024.2 Auto
5025%s2%e	P5025.2 P5025.2 Auto
5026%s2%e	P5026.2 P5026.2 Auto
5051%s2%e	P5051.2 RTime Auto
5052%s2%e	P5052.2 A1Tim Auto
5053%s2%e	P5053.2 A2Tim Auto
5054%s2%e	P5054.2 A3Tim Auto
5060%s0%e	P5060.0 Var10 NoSav
5061%s0%e	P5061.0 Var11 NoSav
5062%s0%e	P5062.0 Var12 NoSav
5063%s0%e	P5063.0 Var13 NoSav
5064%s0%e	P5064.0 Var14 NoSav
5065%s0%e	P5065.0 Var15 NoSav
5066%s0%e	P5066.0 Var16 NoSav
5067%s0%e	P5067.0 Var17 NoSav
5068%s0%e	P5068.0 Var18 NoSav
5069%s0%e	P5069.0 Var19 NoSav
5070%s0%e	P5070.0 Var20 NoSav
5071%s0%e	P5071.0 Var21 NoSav
5072%s0%e	P5072.0 Var22 NoSav
5073%s0%e	P5073.0 Var23 NoSav
5074%s0%e	P5074.0 Var24 NoSav
5075%s0%e	P5075.0 Var25 NoSav
5076%s0%e	P5076.0 Var26 NoSav
5077%s0%e	P5077.0 Var27 NoSav
5078%s0%e	P5078.0 Var28 NoSav
5079%s0%e	P5079.0 Var29 NoSav
5080%s2%e	P5080.2 Var 0 Auto

5081%s2%e	P5081.2 Var 1 Auto
5082%s2%e	P5082.2 Var 2 Auto
5083%s2%e	P5083.2 Var 3 Auto
5084%s2%e	P5084.2 Var 4 Auto
5085%s2%e	P5085.2 Var 5 Auto
5086%s2%e	P5086.2 Var 6 Auto
5087%s2%e	P5087.2 Var 7 Auto
5088%s2%e	P5088.2 Var 8 Auto
5089%s2%e	P5089.2 Var 9 Auto
5091%s2%e	P5091.2 Reg 1 Auto
5092%s2%e	P5092.2 Reg 2 Auto
5093%s2%e	P5093.2 Reg 3 Auto
5094%s2%e	P5094.2 Reg 4 Auto
5100%s0%e	P5100.0 SPt 1 Disbl
5200%s0%e	P5200.0 SPt 2 Disbl
5300%s0%e	P5300.0 SPt 3 Disbl
5400%s0%e	P5400.0 SPt 4 Disbl
5500%s0%e	P5500.0 SPt 5 Disbl
5600%s0%e	P5600.0 SPt 6 Disbl
5700%s0%e	P5700.0 SPt 7 Disbl
5800%s0%e	P5800.0 SPt 8 Disbl
5900%s0%e	P5900.0 SPt 9 Disbl
6000%s0%e	P6000.0 SPt10 Disbl
6100%s0%e	P6100.0 SPt11 Disbl
6200%s0%e	P6200.0 SPt12 Disbl
6300%s0%e	P6300.0 SPt13 Disbl
6400%s0%e	P6400.0 SPt14 Disbl
6500%s0%e	P6500.0 SPt15 Disbl
6600%s0%e	P6600.0 SPt16 Disbl
6700%s0%e	P6700.0 SPt17 Disbl
6800%s0%e	P6800.0 SPt18 Disbl
6900%s0%e	P6900.0 SPt19 Disbl
7000%s0%e	P7000.0 SPt20 Disbl
7100%s0%e	P7100.0 SPt21 Disbl
7200%s0%e	P7200.0 SPt22 Disbl
7300%s0%e	P7300.0 SPt23 Disbl
7400%s0%e	P7400.0 SPt24 Disbl
7500%s0%e	P7500.0 SPt25 Disbl
7600%s0%e	P7600.0 SPt26 Disbl
7700%s0%e	P7700.0 SPt27 Disbl
7800%s0%e	P7800.0 SPt28 Disbl
7900%s0%e	P7900.0 SPt29 Disbl
8000%s0%e	P8000.0 SPt30 Disbl
8100%s0%e	P8100.0 SPt31 Disbl
8200%s0%e	P8200.0 SPt32 Disbl
60000%s%c	P60000. E2Ins 4096
60001%s%c	P60001. E2Avl 3696
60002%s%c	P60002. RAMsz 32K
60003%s%c	P60003. RAMdy 5000
60004%s%c	P60004. RAMav 4898
60005%s%c	P60005. #Rows 0

60010%s%c	P60010. dbRAM 24256
60011%s%c	P60011. dbAvl 24242
60012%s%c	P60012. dbUse 14
60013%s%c	P60013. BlkSz 16384
60014%s%c	P60014. dbase Error none
60100%s%c	P60100. □1992*GSE*
60101%s%c	P60101. 0550-01007
60102%s%c	P60102. Sep 91994
60200%s%c	P60200. B SN:00000
60201%s%c	P60201. AudTr 00055
60202%s%c	P60202. I SN:00000
61100%s 1743%c	P61100. DAC 1743
61101%s%c	P61101. Gain 117.499
61102%s1.00000000%c	P61102. CAL Factr 1.00000000
61103%s%c	P61103. FSmVv 2.013
61104%s%c	P61104. Crrnt mv/v mVv0.00000
61105%s 0%c	P61105. CalZr Cnts 0
61106%s%c	P61106. CalZr mv/v 0.00000000
61107%s%c	P61107. ReZro Wght 0.00000000
61108%s%c	P61108. ZrTrk Wght 0.00000000
64100%s0	P64100. LnCnt 0
64101%s0	P64101. ErCnt 0
64102%sNone!%c	P64102. 1stEr None!
64103%s0	P64103. Debug Off
%z	Exit Setup Mode

SECTION A.2 Important FCC Compliance Information

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with this Reference Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CABLES: Shielded cables must be used with this equipment to ensure compliance with the Class A FCC limits

WARNING: Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

SECTION A.3 Specifications

ELECTRONICS / SOFTWARE

Display Update Rate	Selectable, 0.05 - 20 sec.
A / D Conversion Rate	0.05 usec
Response Time (to Full Scale)	Selectable 0.12 sec to 11 sec.
Displayed Resolution	Recommended maximum: 25,000d Ultimate maximum: 100,000d
Internal Resolution	500,000 counts
Auto Zero Range	Selectable from 0.1% to 100% Full Scale
Automatic Zero Track	0.05 to 20.0 displayed counts with selectable delay
Non-linearity	0.005% of Full Scale (input dependent)
Multi-Point Linearization	Up to 5 Calibration Points
Full Scale Capacity	Fully Programmable
Weigh Units	Up to four separate units are selectable from an internal library of unit conversions, two of which may be user-defined for tons, grains, troy-ounces, etc.
Power Input (AC)	120 VAC / 60 Hz standard, 220 VAC / 50 Hz available
Power Input (DC)	8 VDC to 28 VDC compatible
Fuse	0.5 amp Slo-Blo

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DATA STORAGE AND OUTPUT

Data Storage	Up to 100 ID's with associated data
Data Registers	Six ID Data Registers with user-defined labels, permit 0 - 49 character entry
Communications	Port 1: Bi-directional RS-232; Port 2: RS-232 or 20 mA current loop output
Custom RS-232 Output	4 Separate Custom Transmit Tables for special labels, reports, transmitting control characters, etc.
Transmit	On Continuous, Motion Inhibited or On Request.
Baud Rate	Selectable from 300 through 19,200
Protocol	Selectable

LOAD CELL

Load Cell Connection	Six lead with sense, or four lead acceptable
Power	Drives up to ten 350 ohm load cells or equivalent
Signal Range	0.1 to 5 mV/V at Full Scale
Load Cell Excitation	10 VDC, short circuit protected
Load Cell Current	290 ma, maximum

ENCLOSURE

Enclosure	Stainless steel washdown, NEMA 4X design
Switch Panel Type	Molded elastomeric with switch travel. Self-sealing, chemically resistant.
Switch Panel Controls	Zero, Tare, Print, Units, Enter and ID. Additional functions accessed with the Select key. Sample key used on Model 570 only.
Operating Temperature	-10 to 40 degrees C
Size w/o Stand ...	9.5" Wide by 8.375" High by 2.375" Deep
Overall Size	11" Wide by 9" High by 3.625" Deep

Weight	6 lb.

DISPLAY

Display	Six fully active digits plus 10 character dot matrix, vacuum fluorescent
Display Size	0.75" high digits
Display Blanking	At 104% of capacity
Display Increments	1, 2, 5, 10, 20, 50, 100, 200 or 500 Decimal Point (Selectable)
Negative Gross Display	Fully bipolar up to 99,999
Polarity Symbol	sign to left of most significant active digit
Status Indicator	10 character dot matrix display

ADDITIONAL INFORMATION

Time Interval Data Ouput	Set RS-232 transmission based on selected time intervals
Remote Keys	Up to 8 available
Setpoints	2 Open Collector Type Outputs (FET) (2 TTL level setpoint outputs on early versions)
Approvals	USA: NTEP Class III and Class IIIL at 10,000d and UL, USDA Canada: SWA, CSA, Canada W&M PTB
Warranty	One year covering defective parts and workmanship
Truck In / Out Weighing Functions	

OPTIONS

Analog Output	4 to 20 ma, 0-20 mA, and 0 to 10 VDC with software adjustable gain
Battery-backed Time and Date	
Cable Options	
Compatible Peripherals	Printers, keyboard, scanner
Database Options	
Memory Expansion	Up to 4Kbytes
Multi-Scale Capabilities	
Process Control Interface (option)	Up to 32 relay outputs or a combination of **input/output** relays (combination can include up to 16 inputs).
Relay Module Option (option)	Up to 2 relay output module enclosure (relays are separate)
Transient Suppression (option)	Protects against voltage surges on signal input lines

MOUNTING DIMENSIONS

Refer to Figure 62 Indicator Mounting Dimensions for outline and mounting information.

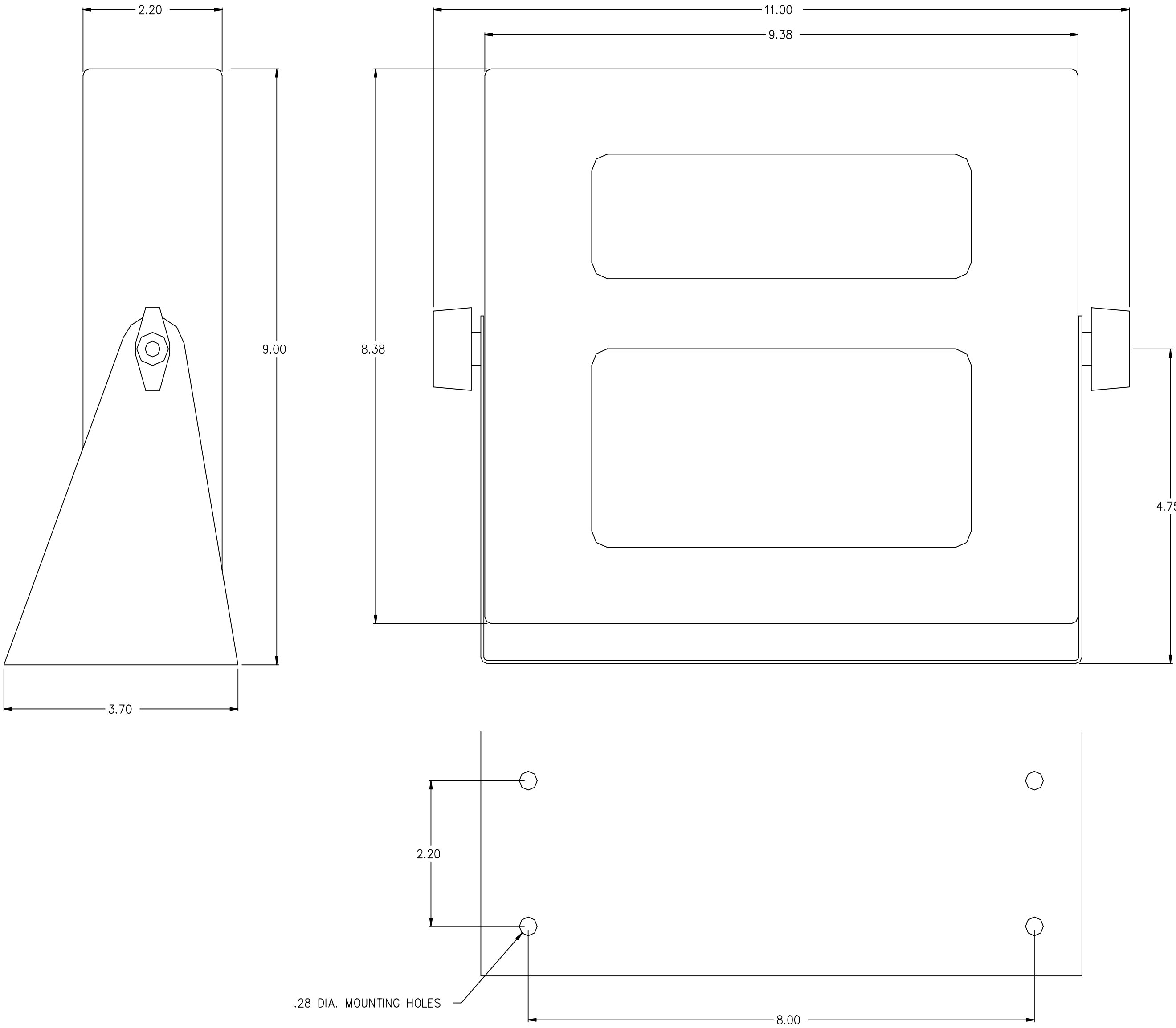

Figure 62 Indicator Mounting Dimensions

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Table 68 ASCII to Hexadecimal Conversion Table

Appendix A.5 Exploded View of Model 550/570

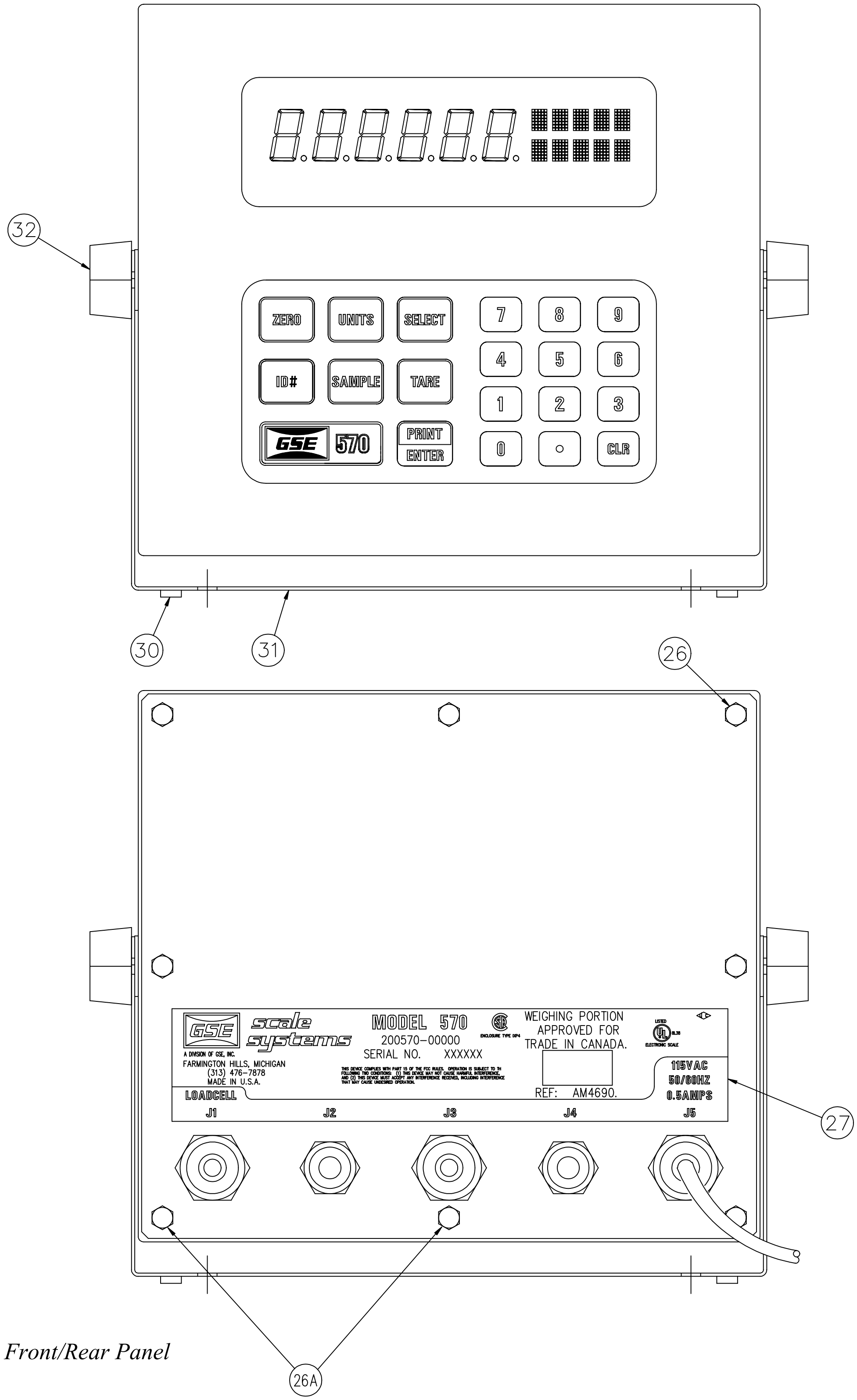

Figure 63 Model 570 Front/Rear Panel

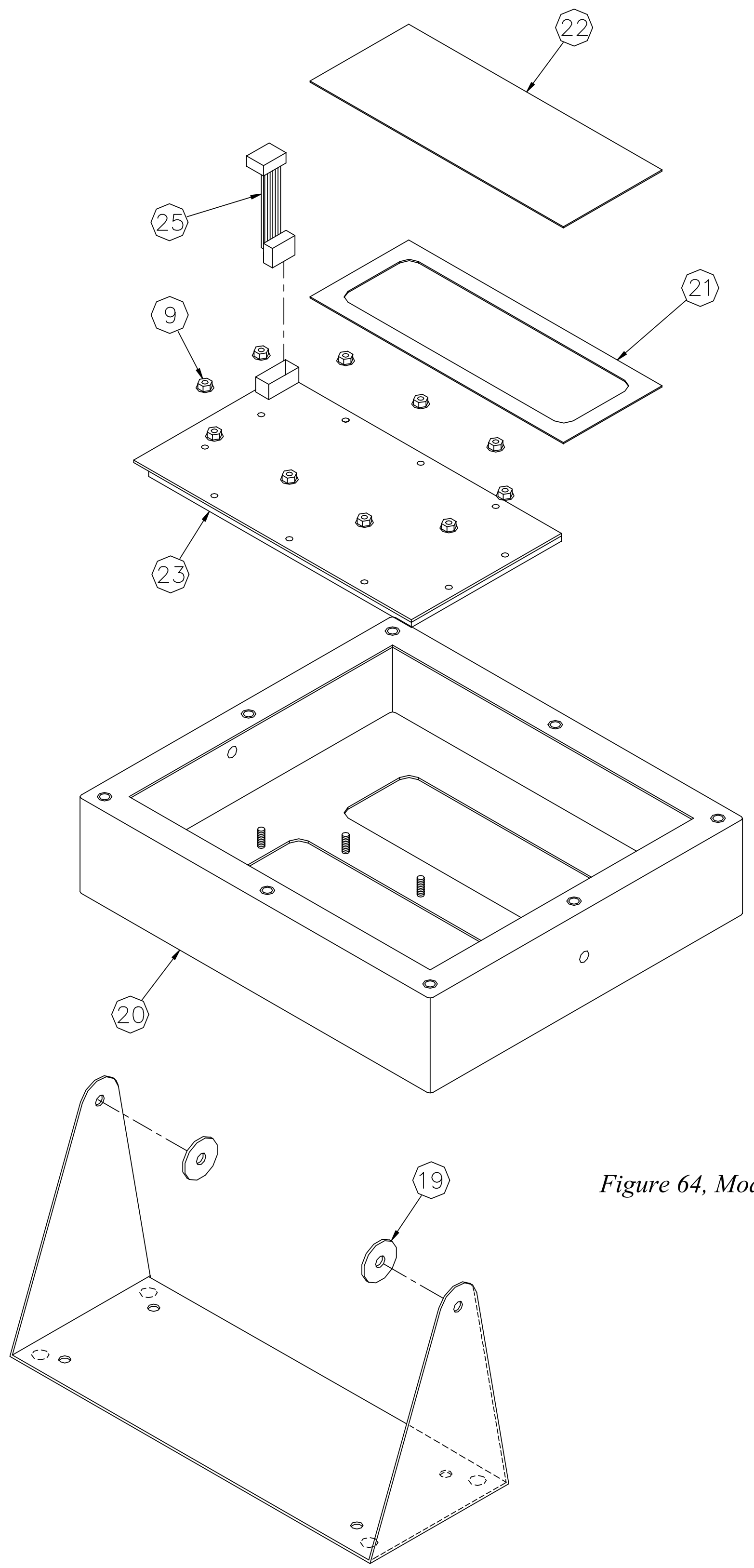

Figure 64, Models 550/570 Exploded View 1

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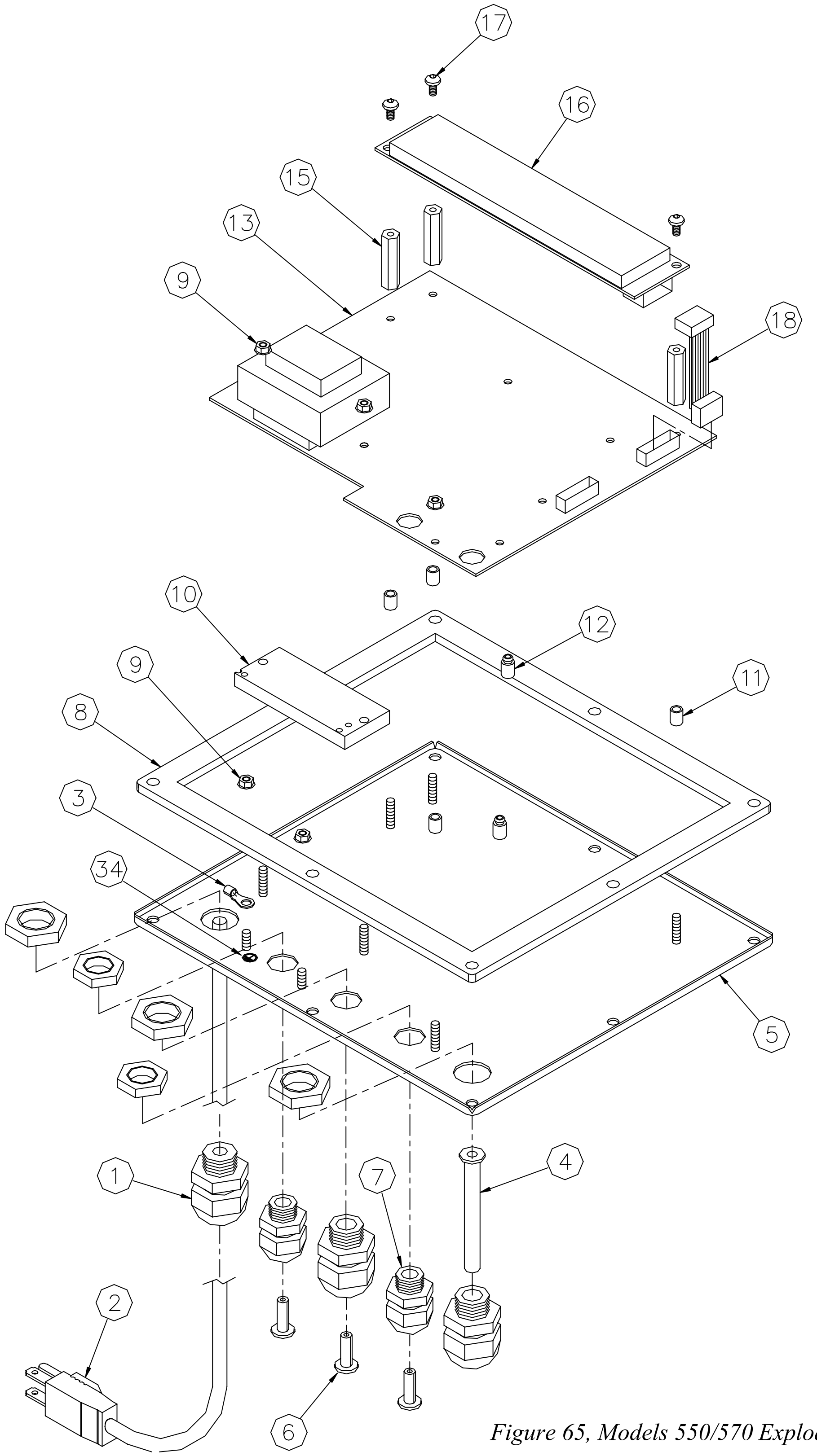

Figure 65, Models 550/570 Exploded View 2

MODEL 550/570 BILL OF MATERIAL			
ITEM	INVENTORY NO.	DESCRIPTION	QUANTITY
1	26-20-1876	LARGE REAR PANEL STRAIN RELIEF	3
2	22-30-1100	AC LINE CORD, U.S. VERSION	1
	22-30-1030	AC LINE CORD, U.K. VERSION	1
3	27-40-0100	GROUND LUG, RING TERMINAL	1
4	31-20-0365	CABLE BOOT, LOAD CELL STRAIN RELIEF	1
5	44-25-25295	REAR PANEL	1
6	31-80-0239	PLUG FOR UNUSED STRAIN RELIEF	3
7	26-20-1873	SMALL REAR PANEL STRAIN RELIEF	2
8	44-30-25503	GASKET, REAR PANEL	1
9	38-26-1640	LOCK-NUT, PC BOARD & GROUND LUG	15
10	17-40-25529	TRANSFORMER SUPPORT BLOCK	1
11	17-40-0138	PC BOARD MOUNTING SPACERS	4
12	17-20-0705	SNAP-IN BOARD SUPPORTS	2
13	420745-25517	MAIN CIRCUIT BOARD, 115 VAC	1
	420745-27722	MAIN CIRCUIT BOARD, 230 VAC	1
15	17-20-3000	STANDOFFS, DISPLAY MOUNTING	3
16	07-12-25500	V.F. DISPLAY MODULE	1
17	38-26-3010	SCREWS, DISPLAY MOUNTING	3
18	22-30-25519	CABLE, DISPLAY	1
19	44-30-25506	RUBBER SWIVEL BRACKET WASHERS	2
20	44-25-25293	HOUSING	1
21	44-30-25507	GASKET, DISPLAY LENS	1
22	31-70-25510	LENS, DISPLAY	1
23	420744-26092	SWITCH PAD ASSEMBLY, MODEL 550	1
	420744-25504	SWITCH PAD ASSEMBLY, MODEL 570	1
25	22-30-25520	KEYPAD CABLE	1
26	38-31-6210	SCREWS, REAR PANEL	6
26A	38-31-27910	TAMPER-PROOF SCREWS, REAR PANEL	2
27	28-10-26116	REAR LABEL FOR MODEL 550, 115 VAC	1
	28-10-26117	REAR LABEL FOR MODEL 570, 115 VAC	1
	28-10-26383	REAR LABEL FOR MODEL 550, 230 VAC	1
	28-10-26384	REAR LABEL FOR MODEL 570, 230 VAC	1
30	31-80-0277	RUBBER PADS, HEX, FOR SWIVEL BRACKET	4
31	44-25-25502	SWIVEL BRACKET	1
32	15-10-4087	KNOBS, FOR SWIVEL BRACKET	2
33	31-80-0175	CABLE TIE, FOR AC LINE CONNECTIONS	1

Table 69, 550/570 Parts Listing

SECTION A.6 Model 550/570 Main Board Parts Listing

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Figure 66 Models 550/570 Main Board (PC745G)

GSE Part Number	Description	Symbol
04-10-104B	0.1UF 50V 20%	C3, C4, C8, C9, C10, C14, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C36, C37, C38, C39, C40, C47, C48, C49
04-10-150A	15PF,200V	C12, C34
04-10-470A	47PF,200V	C11, C13
04-30-106B	10UF 50V	C1, C2, C5, C6
04-30-338B	3300MFD,35V	C55
04-30-477C	470UF25V	C50, C52, C53
04-60-225A	2.2UF,25V	C15, C33, C35
04-60-336A	33UF 10V	C51, C54
04-60-475A	4.7UF35V	C31, C32, C56
04-70-103A	EMIFLT	FL1, FL2, FL3, FL4, FL5, FL6
04-80-100A	10UH 1A CHOKE	L2, L4
04-80-101B	100UH 1A	L5
04-80-331A	330UH 2A	L1
04-80-681A	680UH 0.5A	L3
04-90-1005	BUZZER	AI1
04-90-126A	12.288MHZ CRYSTAL	Y1
06-20-1001	1K, M.F., 1%	R15, R16
06-20-1005	10 MEG OHM M.F. 1%	R4
06-20-10R0	10 OHM M.F 1%	R7, R9
06-20-2000	200 OHM METAL FILM 1%	R2
06-20-2002	20K, M.F., 1%	R1, R5, R10, R11, R12, R13, R14, R18, R19
06-20-24R9	24.9 OHM,M.F.,1%	R17
06-20-4991	4.99K, M.F.,1%	R3, R6, R8
06-20-49R9	49.9 OHM M.F 1%	R22
06-60-25508	RESISTOR PACK,SCALE	RP2

GSE Part Number	Description	Symbol
06-60-5200	4610X-101-203,RN 9X20K	RP1
07-20-4000	BR.RECTIFIER 6A50V	D4
07-40-3000	1N3064	D6, D7, D8, D9, D10
07-40-5817	1N5817,G.I.,20V 1A STKY DIODE	D11
07-40-5822	1N5822,MOT,40V 3A SHOTTKY	D1, D2, D5
07-50-3208	1.5KE8.2A,TRANSZORB	D12, D13
07-50-3209	1.5KE7.5C,6V TRANSZORB	D14, D15
07-50-3233	1.5KE39CA,33V TRANSZORB	D3
08-10-3000	2N7000,N-CH. MOSFET	Q4, Q5
08-20-2500	2N4400,TO-92 40V 600MA	Q1, Q2, Q3
09-12-000B	MM74HC00 , 4-2 IN NAND	U8, U10
09-12-004B	MC74HCU04,HX UNBUF INVRTR	U6
09-12-010A	CD74HCT10E,HCT 3 3-IN NAND	U3
09-12-107B	MM74HC107,DUAL J-K F/F	U16
09-12-138B	CD74HC138E,HC 3-8 DECODER	U15
09-12-151B	MC74HC151,8INP,SELEC/MULT	U20
09-12-157B	MC74HC157A,QUAD 2-INP S/M	U4
09-12-166B	MM74HC166,8BT REGISTER	U21
09-12-194B	MC74HC194,4BT BIDIR SHFT	U14
09-12-393B	HD74HC393,2-4BIT CNTR	U19
09-12-4066B	MC74HC4066,QUADMULTI/DEMU	U18
09-12-594B	SN74HC594N,8BIT SHFT REG	U17
09-30-1496	MAX238CNG,QUAD 232 RX&TX	U1
09-30-2404	512 BYTE E^2	U11
09-30-34064	MC34064P-005,UND.V.SENSOR	U7
09-30-6303Y	HD63C03YP,MICRO,3MHZ	U5
09-30-6910	MS6265-10PC,SRAM,8KX8	U13

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GSE Part Number	Description	Symbol
10-10-4140	AMP01FX,INST AMP,LOW NOIS	U23
10-10-4800	OP177GP,OP-AMP,ULTRA-PREC	U24, U25
10-20-2575	LM2575T-5.0,5V STEP DWN	U27, U28, U29
10-40-0543	MAX543BCPA,D/A,12BT SER	U26
10-40-5503	CS5503AP,A/D,20BT SRL	U22
11-10-2500	CNY17III,OPT COUPLER 70V	U30
13-10-6050	218.500,LTTLFS,FUSE 5X20SB.5A	FU1
13-20-0500	031.3751,5X20MM FH	FH1
20-40-0020	14A-20-16-CSA,SIGNAL 16V@1.2A	TI
26-20-1631	FN405-0.5/02, LINE FILTER	LF1
26-20-3267	640386-3,3-PIN HDR .156	J10
26-20-3800	881545-4,PIN SHORTING JACK	E7
26-20-6010A	3 PIN HDR .1 INCH CENT SEE CM	
26-20-6400	2520-6002UB,3M,20P HDR,.1X.1	J4
26-20-6404	2510-6002UB,10P HEADER.1X.1	J5, J7
26-30-1900	ICE-083-S-TT,ROB.NUG,08DIPSKT	US9, US11
26-30-2100	ICE-163-S-55 RN,16DIP SCKT	US21
26-30-2250	ICE-203-S-TT, RN, 20P DIP SKT	US22
26-30-2260	ICE-243-S-TT ROBISON N.3W SKT	US1
26-30-2470	ICE-326-S-TT, RN, SKT 32-PIN	US12, US13
26-30-5064	117-93-764-41-005 MILLMAX64DP	US5
26-50-2042	256-402, WAGO, 2-TERM SCRWLS	J1
26-50-2050	256-406, WAGO, 6-TERM SCRWLS	J8
26-50-2109	234-509, WAGO, 9 TERM SCRWLS	J6
26-50-2114	234-514, WAGO, 14*TERM SCRWLS	J2
27-60-0100	TP104-01-02,COMPONENTS,RED TP	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9

GSE Part Number	Description	Symbol
31-80-0366	6070B-MT,THRMLY,TO-220 HTSINK	HS1
31-80-0368	188754F0000	
31-80-0473	254-090501-00-0101,FASTEX PIN	
31-80-27589	B, INSULATOR-PC745 XFRMR PINS	
38-20-1100	#4, EXT-TTH-LCKWSH, SP	
38-20-1600	#4-40 HX NUT, SP	
38-20-2100	4-40 X 1/4, BIND, SLTD, SP	
40-20-25518	PC745G-C,M550/570 M/BOARD UL	
09-30-27020	EPROM (BLANK)	U12

GSE Part Number	Description	Symbol

Appendix A.7 Un-Filed Additional Features (EXTRA)

A7.1 Database Download

Another option has been added to the database download feature. It is now possible to use alternate time/date formats in the "DownLoad" output of the database. At the "Down-load" menu selection, press 5, 6, 7, or 8 then [ENTER] to cause time/date parameters columns to be formatted per their type setup parameter, P511-515, for parameters 50-54 respectively.

The choices of five thru eight mirror the choices one thru four respectively except that any time/date parameters are formatted per their specific setup selection as a time, date, time/date, or number.

Refer to the following table for a summary of all the options available at the "Down-Load" database menu.

This new feature allows time/date to be stored in a database and then downloaded to a computer in a time and/or date style format. Previously, it had only allowed downloading time/date parameters in a numeric format which was intended to allow easy manipulation within a computer spreadsheet program. However we have found that many 550 users were interested in viewing only the time or date information alone.

Note, however, that to allow uploading the database information back into a 550 it is necessary to download the time/date parameters as numeric data!

A7.2 Time/Date Format Selections

Several additional Time/Date parameter format selections have been added to increase the versatility of the 550 indicator. Refer to the following table for details regarding the new choices. Of course, these new format selections may be used with recently enhanced formatted copy command in addition to within the Custom Transmit Setups.

Note that all of the new codes are active only when added in with format code 32.

Format Code	Description	Example
32	numeric	771243917

Option Set #1a:

1 (add)	HH (for hours)
2 (add)	MM (for minutes)
4 (sec)	SS (for seconds)

Any of the above three selections may be combined as shown below. However the order will always be hours

A7

Format Choice	Comm	Print	No	Yes	Numeric	Per Setup Mode
1	x		x		x	
2		x	x		x	
3	x			x	x	
4		x		x	x	
5	x		x			x
6		x	x			x
7	x			x		x
8		x		x		x

Format Selections (table unfiled)

first, then minutes, then seconds. Below are examples of the various possible combinations of the new time selections.

33	HH (hours)	11	range: 00 ... 23
34	MM (minutes)	05	range: 00 ... 59
35	HHMM (hrs&min)	1302	range: 0000 ... 2359
36	SS (seconds)	07	range: 00 ... 59
37	HHSS (hrs&secs)	1205	range: 0000 ... 2359
38	MMSS (min&sec)	0428	range: 0000 ... 5959
39	HHMMSS 032947	range: 000000 ... 235959	

Option Set #1b:

8	YYMMDD	+ 32	= 40
9	YYDDMM	+ 32	= 41
10	MMDDYY	+ 32	= 42
11	MMYYDD	+ 32	= 43
12	DDYYMM	+ 32	= 44
13	DDMMYY	+ 32	= 45
14	YYWW + 32	= 46	
15	WWYY + 32	= 47	

Option Set #2:

16	SEC_DAY	# of seconds today. range: 0 ... 86399
64	JULNDATE	day of the year, range: 1 ... 366

Option Set #3

8192 SEPARATOR

x 0		no separator!
x 1	-	dash
x 2	:	colon
x 3	/	backslash
x 4		space
x 5	\	backslash
x 6	.	decimal point
x 7	,	comma

Option Set #4:

128 Do not print name.

You may combine format codes from option set 1a or 1b with Option sets 2, 3, and 4.

Note: Do not add 32 into the total multiple times!

Note: Be aware that unless 32 is added into the total, then the name of the parameter is printed in addition to the other information.

Format Examples:

11:59 pm 12/31/96 Format = #0
11:59:52 pm 12/31/96 Format = #1
23:59 12/31/96 Format = #2
23:59:52 12/31/96 Format = #3
11:59 pm Dec 31, 1996 Format = #4
11:59:52 pm Dec 31, 1996 Format = #5
23:59 Dec 31, 1996 Format = #6
23:59:52 Dec 31, 1996 Format = #7
11:59 pm Tue 12/31/96 Format = #8
11:59:52 pm Tue 12/31/96 Format = #9
23:59 Tue 12/31/96 Format = #10
23:59:52 Tue 12/31/96 Format = #11
11:59 pm Tue Dec 31, 1996 Format = #12
11:59:52 pm Tue Dec 31, 1996 Format = #13
23:59 Tue Dec 31, 1996 Format = #14
23:59:52 Tue Dec 31, 1996 Format = #15
11:59 pm 31/12/96 Format = #16
11:59:52 pm 31/12/96 Format = #17
23:59 31/12/96 Format = #18
23:59:52 31/12/96 Format = #19
11:59 pm 31 Dec, 1996 Format = #20
11:59:52 pm 31 Dec, 1996 Format = #21
23:59 31 Dec, 1996 Format = #22
23:59:52 31 Dec, 1996 Format = #23
11:59 pm Tue 31/12/96 Format = #24
11:59:52 pm Tue 31/12/96 Format = #25
23:59 Tue 31/12/96 Format = #26
23:59:52 Tue 31/12/96 Format = #27
11:59 pm Tue 31 Dec, 1996 Format = #28
11:59:52 pm Tue 31 Dec, 1996 Format = #29
23:59 Tue 31 Dec, 1996 Format = #30
23:59:52 Tue 31 Dec, 1996 Format = #31
852076792 TIME #1: Format = #32
TIME #1: 23 Format = #33
TIME #1: 59 Format = #34
TIME #1: 2359 Format = #35
TIME #1: 52 Format = #36
TIME #1: 2352 Format = #37
TIME #1: 5952 Format = #38
TIME #1: 235952 Format = #39
TIME #1: 961231 Format = #40
TIME #1: 963112 Format = #41
TIME #1: 123196 Format = #42
TIME #1: 129631 Format = #43
TIME #1: 319612 Format = #44
TIME #1: 311296 Format = #45
TIME #1: 9653 Format = #46
TIME #1: 5396 Format = #47
TIME #1: 86392 Format = #48
TIME #1: 2386392 Format = #49
TIME #1: 5986392 Format = #50
TIME #1: 235986392 Format = #51

TIME #1: 5286392 Format = #52
TIME #1: 235286392 Format = #53
TIME #1: 595286392 Format = #54
TIME #1: 23595286392 Format = #55
TIME #1: 96123186392 Format = #56
TIME #1: 96311286392 Format = #57
TIME #1: 12319686392 Format = #58
TIME #1: 12963186392 Format = #59
TIME #1: 31961286392 Format = #60
TIME #1: 31129686392 Format = #61
TIME #1: 965386392 Format = #62
TIME #1: 539686392 Format = #63
12/31/96 Format = #64
12/31/96 Format = #65
12/31/96 Format = #66
12/31/96 Format = #67
Dec 31, 1996 Format = #68
Dec 31, 1996 Format = #69
Dec 31, 1996 Format = #70
Dec 31, 1996 Format = #71
Tue 12/31/96 Format = #72
Tue 12/31/96 Format = #73
Tue 12/31/96 Format = #74
Tue 12/31/96 Format = #75
Tue Dec 31, 1996 Format = #76
Tue Dec 31, 1996 Format = #77
Tue Dec 31, 1996 Format = #78
Tue Dec 31, 1996 Format = #79
31/12/96 Format = #80
31/12/96 Format = #81
31/12/96 Format = #82
31/12/96 Format = #83
31 Dec, 1996 Format = #84
31 Dec, 1996 Format = #85
31 Dec, 1996 Format = #86
31 Dec, 1996 Format = #87
Tue 31/12/96 Format = #88
Tue 31/12/96 Format = #89
Tue 31/12/96 Format = #90
Tue 31/12/96 Format = #91
Tue 31 Dec, 1996 Format = #92
Tue 31 Dec, 1996 Format = #93
Tue 31 Dec, 1996 Format = #94
Tue 31 Dec, 1996 Format = #95
TIME #1: 366 Format = #96
TIME #1: 36623 Format = #97
TIME #1: 36659 Format = #98
TIME #1: 3662359 Format = #99
TIME #1: 36652 Format = #100
TIME #1: 3662352 Format = #101
TIME #1: 3665952 Format = #102
TIME #1: 366235952 Format = #103
TIME #1: 366961231 Format = #104
TIME #1: 366963112 Format = #105
TIME #1: 366123196 Format = #106
TIME #1: 366129631 Format = #107
TIME #1: 366319612 Format = #108
TIME #1: 366311296 Format = #109
TIME #1: 3669653 Format = #110
TIME #1: 3665396 Format = #111
TIME #1: 36686392 Format = #112
TIME #1: 3662386392 Format = #113
TIME #1: 3665986392 Format = #114
TIME #1: 366235986392 Format = #115
TIME #1: 3665286392 Format = #116
TIME #1: 366235286392 Format = #117
TIME #1: 366595286392 Format = #118
TIME #1: 36623595286392 Format = #119
TIME #1: 36696123186392 Format = #120
TIME #1: 36696311286392 Format = #121
TIME #1: 36612319686392 Format = #122
TIME #1: 36612963186392 Format = #123
TIME #1: 36631961286392 Format = #124
TIME #1: 36631129686392 Format = #125
TIME #1: 366965386392 Format = #126
TIME #1: 366539686392 Format = #127
11:59 pm Format = #128
11:59:52 pm Format = #129
23:59 Format = #130
23:59:52 Format = #131
11:59 pm Format = #132
11:59:52 pm Format = #133
23:59 Format = #134
23:59:52 Format = #135
11:59 pm Tue Format = #136
11:59:52 pm Tue Format = #137
23:59 Tue Format = #138
23:59:52 Tue Format = #139
11:59 pm Tue Format = #140
11:59:52 pm Tue Format = #141
23:59 Tue Format = #142
23:59:52 Tue Format = #143
11:59 pm Format = #144
11:59:52 pm Format = #145
23:59 Format = #146
23:59:52 Format = #147
11:59 pm Format = #148
11:59:52 pm Format = #149
23:59 Format = #150
23:59:52 Format = #151
11:59 pm Tue Format = #152
11:59:52 pm Tue Format = #153
23:59 Tue Format = #154
23:59:52 Tue Format = #155
11:59 pm Tue Format = #156
11:59:52 pm Tue Format = #157
23:59 Tue Format = #158
23:59:52 Tue Format = #159
Format = #160
23 Format = #161

59   Format = #162
2359   Format = #163
52   Format = #164
2352   Format = #165
5952   Format = #166
235952   Format = #167
961231   Format = #168
963112   Format = #169
123196   Format = #170
129631   Format = #171
319612   Format = #172
311296   Format = #173
9653   Format = #174
5396   Format = #175
86392   Format = #176
2386392   Format = #177
5986392   Format = #178
235986392   Format = #179
5286392   Format = #180
235286392   Format = #181
595286392   Format = #182
23595286392   Format = #183
96123186392   Format = #184
96311286392   Format = #185
12319686392   Format = #186
12963186392   Format = #187
31961286392   Format = #188
31129686392   Format = #189
965386392   Format = #190
539686392   Format = #191
Format = #192
Format = #193
Format = #194
Format = #195
Format = #196
Format = #197
Format = #198
Format = #199
Tue   Format = #200
Tue   Format = #201
Tue   Format = #202
Tue   Format = #203
Tue   Format = #204
Tue   Format = #205
Tue   Format = #206
Tue   Format = #207
Format = #208
Format = #209
Format = #210
Format = #211
Format = #212
Format = #213
Format = #214
Format = #215
Tue   Format = #216
Tue   Format = #217
Tue   Format = #218
Tue   Format = #219
Tue   Format = #220
Tue   Format = #221
Tue   Format = #222
Tue   Format = #223
366   Format = #224
36623   Format = #225
36659   Format = #226
3662359   Format = #227
36652   Format = #228
3662352   Format = #229
3665952   Format = #230
366235952   Format = #231
366961231   Format = #232
366963112   Format = #233
366123196   Format = #234
366129631   Format = #235
366319612   Format = #236
366311296   Format = #237
3669653   Format = #238
3665396   Format = #239
36686392   Format = #240
3662386392   Format = #241
3665986392   Format = #242
366235986392   Format = #243
3665286392   Format = #244
366235286392   Format = #245
366595286392   Format = #246
36623595286392   Format = #247

Mon 31/12/12   Format = #16475
TIME #1: 366:12:12:31:86393   Format = #16507
TIME #1: 366:53:86393   Format = #16500
TIME #1: 366:23:59:53:86393   Format = #16503
11:59:53 pm 12/31/12   Format = #1

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