Cardinal

Cardinal Scale Manufacturing Co.

748

WEIGHT INDICATING INSTRUMENT

TECHNICAL/OPERATION MANUAL

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8539-M041-O1 Rev H
11/98

Printed in USA

SPECIFICATIONS

Power Requirements ..... 115 VAC 60 Hz @ 0.07A (optional 230 VAC 50/60 Hz @ 0.03A) powering 12-18 VDC, 300-800 mA, wall plug-in UL/CSA listed power supply.
Enclosure Size ..... Desk Top: 11.3"W x 6.5"H x 3"D
NEMA 4X: 13.5"W x 8.6"H x 4.6"D
Operating Environment .. Temperature: 14˚ to 104˚ F or -10˚ to +40˚ C.
Humidity: 90% non-condensing (maximum).
Display..... Standard: 6-digit, 1" high, 7-segment LCD with 30 element bar graph display. Optional: 6-digit, 0.8" high, 7-segment LED with 30 element bar graph display.
Sensitivity ..... 0.45 uV/division (0-3.3 mV/V input), class III.
Signal Input Range..... 1.0 mV min. to 50 mV max. (including dead load boost).
Transducer Excitation ..... 8.0 volts VDC (12 VDC optional).
Number of Load Cells .... 14 each, 350 OHM cells maximum.
Load Cell Cable Length.. 150 feet maximum. Consult factory for other requirements.
30 feet maximum without sense lines.
Resolution ..... 1 part in 20,000 displayed. 1 part in 100,000 internal.
Capacities ..... 1,000 to 10,000 divisions commercial. Up to 20,000 divisions non-commercial.
Tare Capacity ..... 5 digits maximum.
Division Value ..... 1 to 9 x 10, 1, 0.1, 0.01, 0.001 and 0.0001.
Sample Rate ..... 1 to 12 samples per second selectable.
Auto Zero Range ..... 0.5 or 1 through 9 divisions.
Weighing Units ..... Pounds only, kilograms only, pounds/kilograms, tons only, or metric tons only.
Keyboard ..... Membrane type with 27 color-coded keys.

Standard Features:

- Year 2000 compliant Time and Date with selectable date format (mm/dd/yy or dd/mm/yy).
- Six (6) digits of numeric identification.
- Up to eight (8) independent preset weight comparators with logic-level outputs and status display.
- Keyboard or push button tare function.
- Gross, tare, net conversion.
- Programmable bar graph operation displays weight or preset weight comparator status.
- Test key performs display test and internal tests.
- Truck storage for 200 trucks, 24 bit, 16,777,216 maximum accumulator capacity.
- RS232/20mA printer port with selectable baud rate for printers.
- Bi-directional RS232/20mA interface with selectable baud rate can be used to control indicator remotely.
- Auto shut-off feature turns indicator off after period of non-use.
- Automatic sleep mode turns display off when scale is not in use and automatically resumes operation with the application of weight.
- Dual ranging feature with selectable parameters.
- Programmable print format.
- Consecutive number printing.

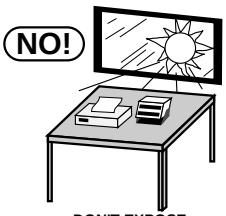
Optional Features:

- Relay output for connection of peripherals to be controlled by preset weight comparators.
- Optional I/O board includes:
  - Analog output with 0-10 VDC and 4-20 MA output.
  - BCD output with status lines.
  - Eight (8) optically-isolated programmable inputs.

INSTALLATION

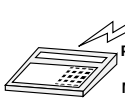
AUTO-ON

AUTO-ON jumper J7, when connected, will cause the indicator to power on automatically whenever power is applied to the power input connector. If power is lost momentarily and then reapplied, the indicator will turn on without pressing the **ON** key. See figure no. 11 for location.



DON'T EXPOSE TO DIRECT SUNLIGHT

DON'T EXPOSE TO TEMPERATURE EXTREMES



PROVIDE ADEQUATE PROTECTION TO MINIMIZE LIGHTNING DAMAGE

DON'T PLACE IN FRONT OF HEATING/COOLING VENTS

PROVIDE GOOD, SAFE GROUND AND CLEAN AC POWER

KEEP THE AREA AROUND THE SCALE CLEAR
TO PROVIDE ADEQUATE AIR CIRCULATION

DOMESTIC/INTERNATIONAL JUMPER (J12 DOM/INT)

Remove the jumper to comly with OIML requirements. The 748 will perform the following functions: 1. A “lamp test” will be performed on power-up.
2. The date format will be day/month/year.
3. The printout of keyboard tare will be designated as “PT.”

LOAD CELL CONNECTIONS WITH OVER 30 FEET OF CABLE

For installations with over 30 feet of cable between the indicator and the load cells, sense wires should be used. The sense wires must be connected between the +SENS, -SENS terminals on the indicator and the +EXCITATION, -EXCITATION wires of the load cells or the +SENS, -SENS terminals of the load cell trim board or the section seal trim board. For the indicator to use the sense wires, the +SENS jumper J1 and the -SENS jumper J3 must be open (see figure no. 11).

CAUTION! When in parallel runs, locate Load Cell cables a minimum of 24" away from all AC wiring.

The Model 748 Weight Indicating Instrument is available in either stainless steel desktop enclosure or a NEMA 4X stainless steel wall-mount enclosure. Determine which enclosure version you have and refer to the appropriate section for installation and interconnection.

DESKTOP ENCLOSURE

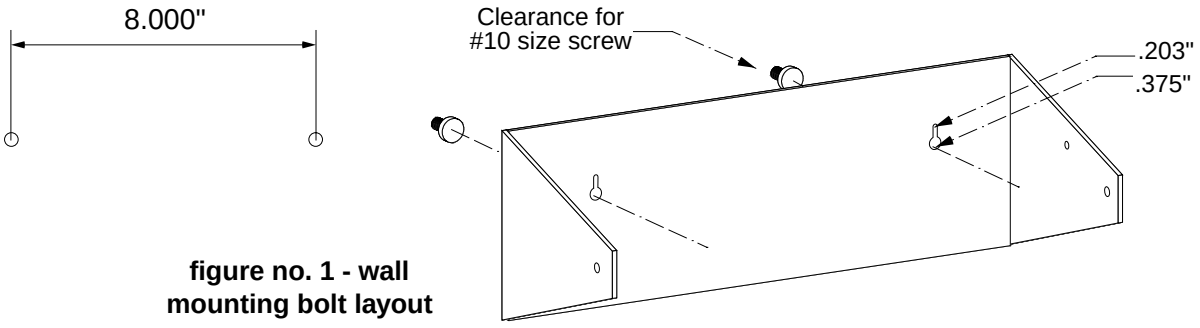


figure no. 1 - wall mounting bolt layout

The 748 desktop enclosure may be mounted on a desktop or other smooth, flat, horizontal surface or may be mounted on a wall. Refer to figure no. 1 for a layout of wall-mounting bolts. Regardless of the manner in which the instrument is installed, the location should be free from temperature extremes and water. It should be a location where the display is easily viewed and the keyboard is within easy reach of the operator. If wall mounted, make certain the structure and mounting bolts are of sufficient strength to retain the 748.

All of the terminations to the desktop enclosure version of the 748 are made on the rear panel via “D” style connectors. See figure no. 2 to see the identification of each of these connectors.

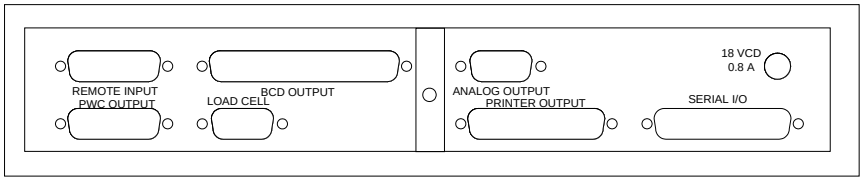
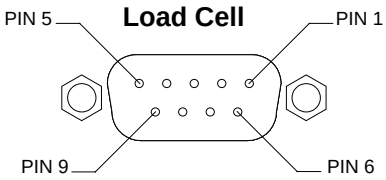


figure no. 2 - connector identification

LOAD CELL CONNECTION

CAUTION! Disconnect any external load cell power supply before connecting load cells to the instrument. Failure to do so will result in permanent damage to the instrument.

The load cell cable is terminated via a 9-pin connector on the rear panel. Figure no. 3 shows the pin identification for the connector. Make certain that the pins are correctly identified before soldering a wire to them. **NOTE!!** If you use sense leads in your load cell installation (as in motor truck scales), jumpers J1 and J3, located on the PC board, should be disconnected or placed on one pin only. If you do not use sense leads, jumpers J1 and J3 must be installed to connect the sense leads to the excitation (refer to figure no. 11). Make certain that the connector retaining screws are used to hold the connector securely to the rear panel.



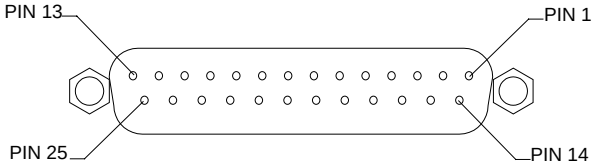
MATING CONNECTOR
CONNECTOR DE-9P
CONNECTOR SHELL DE-24657
SCREW LOCK DE-20419

PIN NUMBER	FUNCTION
1	+ EXCITATION
9	+ SENSE
7	+SIGNAL
2	- SIGNAL
4	- SENSE
6	- EXCITATION
5	SHIELD

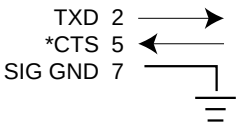
figure no. 3 - load cell connection

PRINTER OUTPUT CONNECTION

If a printer is used, it may be connected to the printer output connector located on the rear panel. Figure no. 4 shows the connections for both RS232 compatible data and 20 mA current loop interfaces for the printer output.



Standard "Printer Connector RS-232C Pin Definitions:



Mating Connector

Part No.	Vendor Part No.
6610-2047	DB-25P CONNECTOR
6610-2218	BACK SHELL

Standard Printer Output Connector
20mA Current Loop Pin Definitions
(indicator has active end)

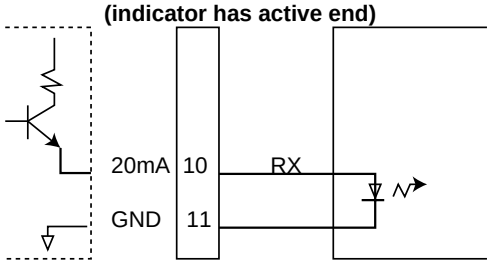


figure no. 4 - printer output connection

NOTE! *RS232 CTS handshake input is enabled during calibration or setup review.

PRESET WEIGHT COMPARATOR LOGIC LEVEL OUTPUT

To automatically switch AC powered external devices at up to eight preset weight values, connect the RB4 or RB8 external relay junction box to the PWC OUTPUT connector. When the displayed weight is equal to or greater than the preset weight (see KEYPAD FUNCTIONS: **PRESET** key), the PWC output changes from 5 volts dc to 0 volts dc or from 0 volts dc to 5 volts dc (see PRESET WEIGHT COMPARATORS, Undrl= in the CALIBRATION section) and will drive solid state relay resistive loads of 200 ohms or greater.

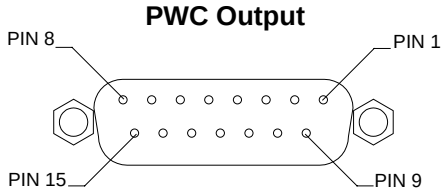


figure no. 5 - preset weight comparator output

PIN NUMBER	FUNCTION
10	PWC #1 OUT
2	PWC #2 OUT
1	PWC #3 OUT
9	PWC #4 OUT
11	PWC #5 OUT
13	PWC #6 OUT
5	PWC #7 OUT
4	PWC #8 OUT
12	COMMON

BI-DIRECTIONAL SERIAL INTERFACE (Serial I/O)

An RS23220mA compatible bi-directional serial interface connector is located on the back of the instrument and may be used for various functions. It will accept serial commands* allowing the 748 to be controlled remotely. Figure no. 6 illustrates the pin layout for this connector.

* See SERIAL INPUT COMMANDS section for details.

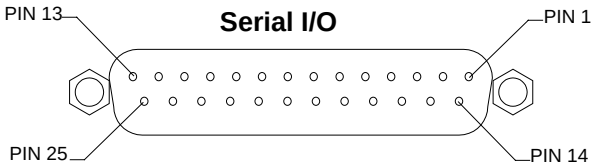
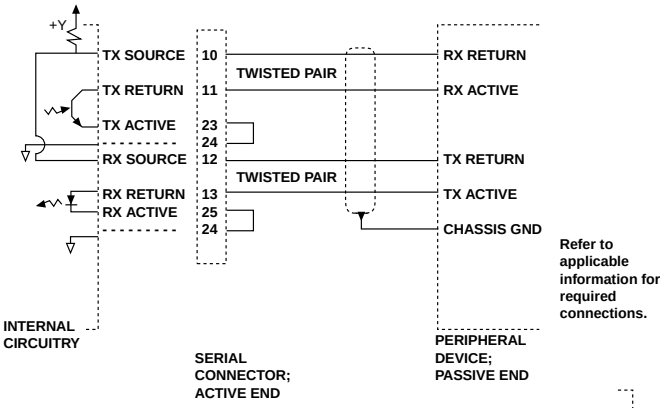


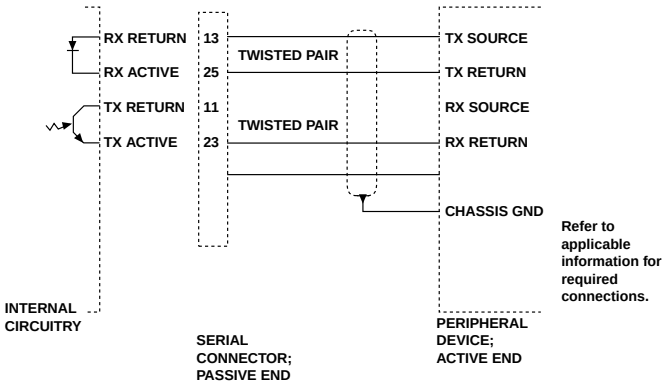
figure no. 6 - bi-directional interface

PIN NUMBER	FUNCTION
7	GROUND
19	GROUND
2	Tx D
3	Rx D
11	Tx D RETURN
13	Rx D RETURN
10	Tx D SRC
12	Rx D SRC
23	Tx D ACTIVE
25	Rx D ACTIVE
24	GROUND
9	+5 VDC
6	+5 VDC



INTERCONNECT CABLE - Example A

CONNECTION DIAGRAM
for 20 mA
CURRENT LOOP OPERATION
Peripheral Device has
PASSIVE END
of Current Loop
(standard enclosure only).



INTERCONNECT CABLE - Example B

CONNECTION DIAGRAM
for 20 mA
CURRENT LOOP OPERATION
Peripheral Device has
ACTIVE END
of Current Loop
(standard enclosure only).

NEMA 4X ENCLOSURES

For desk mounting of the 748 in the NEMA 4X enclosure, it is necessary to order separately a "DESK-MOUNT" kit. Refer to Assembly Instruction for Desk-Mount Kit (8539-M097-O1) for mounting instructions.

The Model 748 in a NEMA 4X enclosure is normally mounted on the wall or some other vertical surface. The enclosure is attached to the wall with four (4) bolts. Refer to Figure No. 7 for the hole layout for the NEMA 4X enclosure.

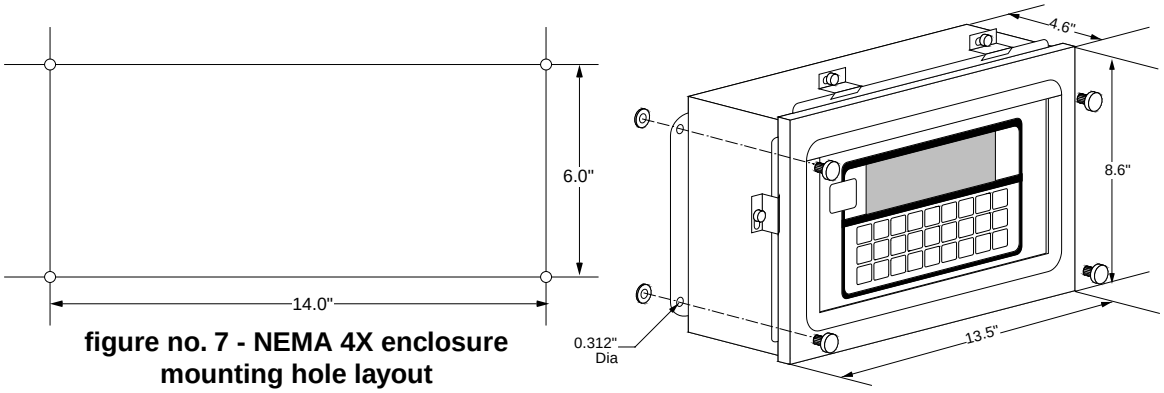


figure no. 7 - NEMA 4X enclosure mounting hole layout

First make certain that the location chosen is free from sudden changes in temperature and that the mounting surface is strong enough to support the enclosure while being close enough to provide the operator easy access to the keyboard. Carefully layout the mounting hole locations then drill and install the anchor bolts. Attach the enclosure to the wall and securely tighten the retaining bolts.

Continue by opening the front cover on the instrument enclosure. Loosen all four (4) retaining screws and rotate each of the clips to the side. DO NOT remove these screws. Fully open the front cover of the instrument exposing the internal printed circuit board.

LOAD CELL CONNECTION

CAUTION! Disconnect any external load cell power supply before connecting load cells to the instrument. Failure to do so will result in permanent damage to the instrument.

Loosen the cable gland connector for the load cell. This gland connector is located on the bottom of the enclosure on the right-hand side. Refer to figure no. 10 for an illustration of the connector layout.

Slip the single cable from the load cell or load cell junction box through the gland connector and into the enclosure. Remove 2" of the outer insulation jacket then remove 1/4" of insulation from each of the four (4) wires and shield without sense leads or six (6) wires and shield with sense leads (refer to figure no. 8). Connect each of the wires to terminal block P1 as shown in figure no. 11. To terminate a wire, first press down on the release bar for the terminal, insert the wire into the terminal opening then allow the release bar to return to its original position, locking the wire in place. Repeat the procedure until all of the wires are in place. NOTE! If the sense leads are NOT used, you must install plug-in jumpers at J1 and J3 adjacent to the terminal block. These jumpers attach the sense leads to the excitation leads. If sense leads ARE used (as in motor truck scales), these plug-in jumpers should be positioned on one plug-in pin only or removed and stored for later use.

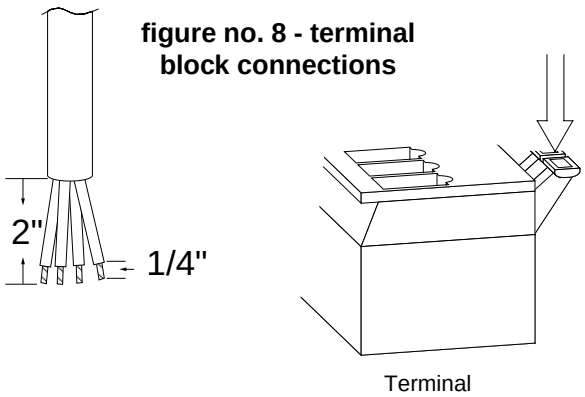


figure no. 8 - terminal block connections

PRINTER CABLE INSTALLATION

Loosen the gland connector adjacent to the load cell cable gland connector (see figure no. 10) and slip the printer cable through it and into the enclosure. Remove 2" of the outer insulating jacket from the cable, then remove 1/4" of insulation from each of the wires (refer to figure no. 8). These wires are to be connected to terminal block P9 at the bottom edge of the printed circuit board. Refer to figure no. 10 for the location of the terminal block.

Note that the printer output can be either RS232 compatible or 20mA current loop. To terminate the wires, first press down the release bar on the terminal. Slip the wire into the terminal opening and release the bar to lock the wire in place.

BI-DIRECTIONAL SERIAL INTERFACE (Serial I/O)

The bi-directional serial interface for the NEMA 4X version of the 748 Weight Indicator is located on the printed circuit board. Note that because of the number of signals involved, there is no terminal block for the bi-directional serial interface. Rather, a 25-pin “D” connector has been provided for the interface. All terminations to this interface must be made to a mating connector (Cardinal part no. 6610-2047) plugged into the serial interface. Figure no. 11 identifies the location of this connector. Refer to the bi-directional serial interface section of the DESKTOP ENCLOSURE INSTALLATION section for identification of the connector pins.

PRESET WEIGHT COMPARATOR

The 748 Preset Weight Comparator comes standard with Logic Level Outputs that can control solid state external devices. An optional relay assembly must be used to power AC powered devices. If your 748 is equipped with the optional feature, PWC relay assembly, be sure to follow the connection instructions under that section to prevent damage to your indicator.

PWC LOGIC LEVEL OUTPUT

To automatically switch external devices at up to eight preset weight values, connect solid state relays to the PWC OUTPUT connector P11 as shown in figure no. 9. When the displayed weight is equal to or greater than the preset weight (see KEYPAD FUNCTIONS: **PRESET** key), the PWC output changes from 0 volts dc to 5 volts dc and will drive solid state relay resistive loads of 200 ohms or greater.

To connect the control cable to the comparator outputs, first loosen the gland connector located on the bottom of the enclosure on your right side. Refer to figure no. 10 for the location of the connector. Slip the cable through this connector and into the enclosure. Remove 2" of the cable insulating jacket then 1/4" of insulation from each of the wires. Refer to figure no. 8, then make the proper terminations on terminal block P11. To terminate a wire, first press the release bar for the terminal, insert the wire into the terminal opening, then allow the bar to return to its original position locking the wire in place.

PWC RELAY ASSEMBLY

To automatically control power to up to eight AC powered devices at programmed weight values, unplug the four-position screw terminal from the relay board and wire as shown in figure no. 9.

Two identical PWC relay boards are configurable for PWC’s 1-4 or 5-8 by removable plug-in jumpers. The relay board(s) are mounted to the NEMA 4X enclosure bottom or back (between the battery cover and the side of the enclosure) or in an external junction box for use the the desktop enclosure.

NEMA 4X Internal PWC Relay Assembly	***Desktop External Relay Junction Box***
-R4: 4 Relay Assembly	RB4: 4 Relay Assembly
-R8: 8 Relay Assembly	RB8: 8 Relay Assembly

OUTPUT (closed)..... 28-240VAC @ 3A maximum for each plug-in relay.
CONTROL INPUT ..... 5VDC @ 12mA from the 748 NEMA 4X main pc board assembly P11 or the desktop PWC OUTPUT connector.
CONNECTION ..... Removable plug-in screw terminals for up to 14 AWG wire.

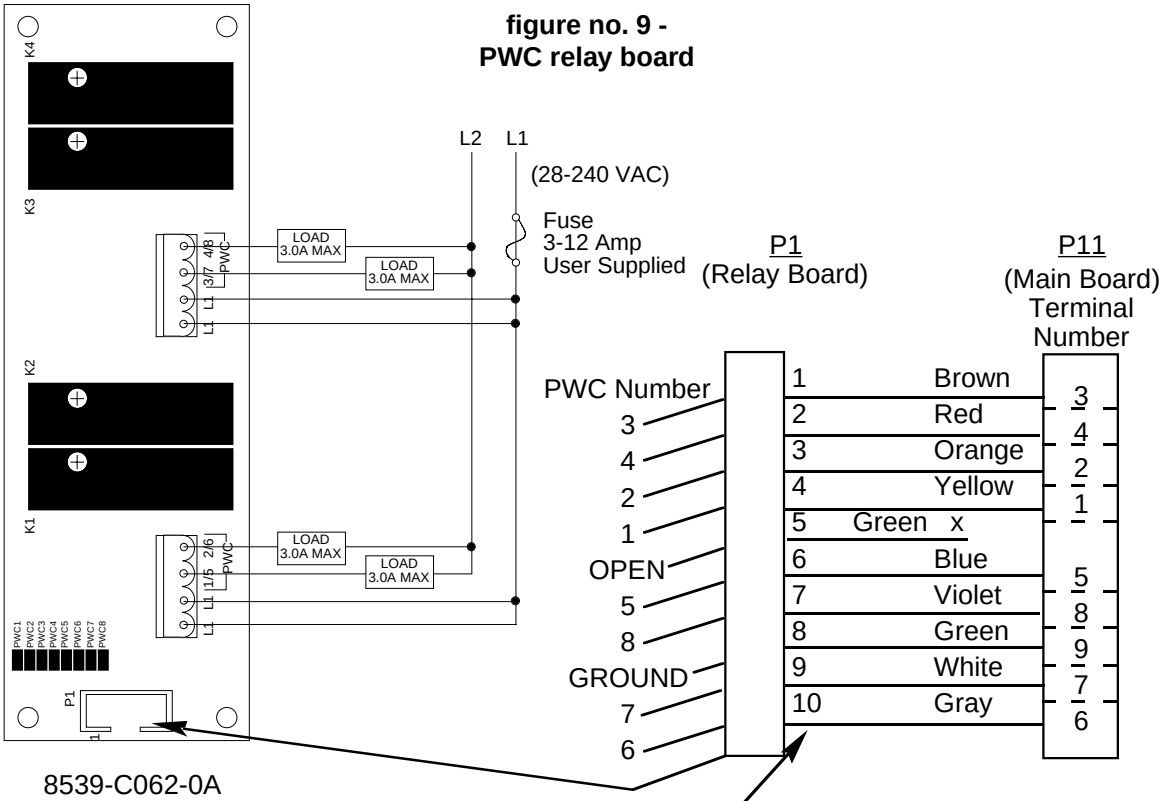
The individual relays can be configured to be on (closed) or off (open) at weights under the preset weight and switch at the preset weight from on-to-off or off-to-on by setting the under weight condition to on or off during setup and calibration or setup review.

EXAMPLE: Undr1=on. . . PWC1 relay is on (closed) for weights under the preset weight and off (open) for weights equal to or over the preset weight.

NEMA 4X MAIN BOARD (P11) TO RELAY BOARD (WIRE) CONNECTION

Connect the PWC cable wires to the printed circuit board connector P11.

figure no. 9 - PWC relay board



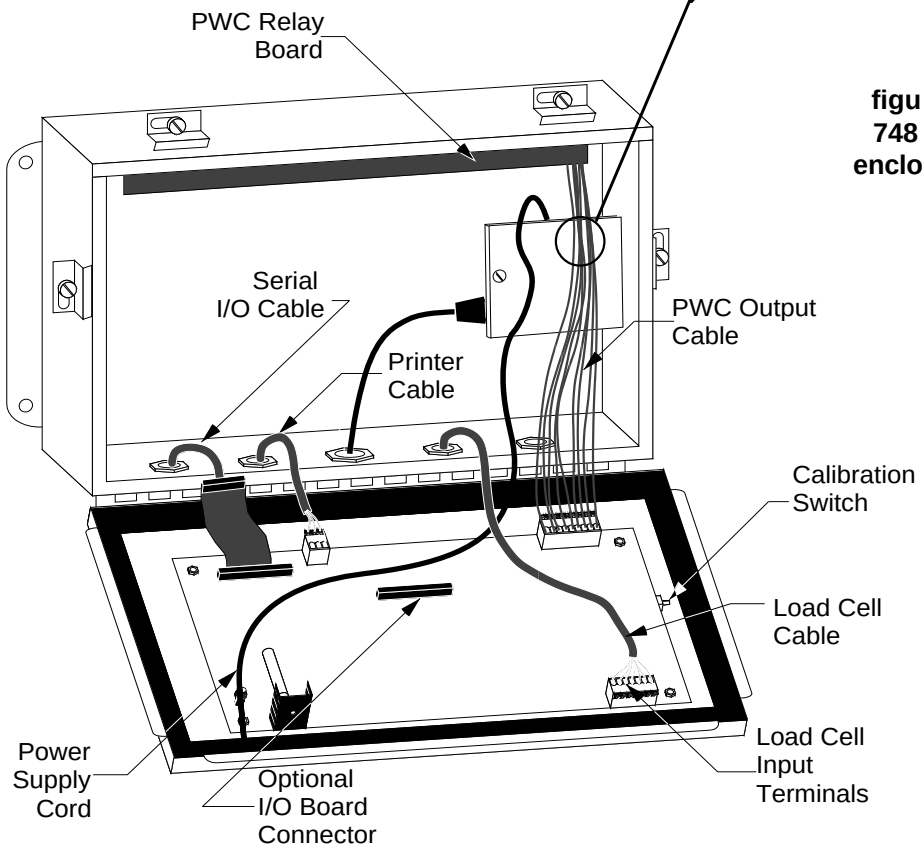
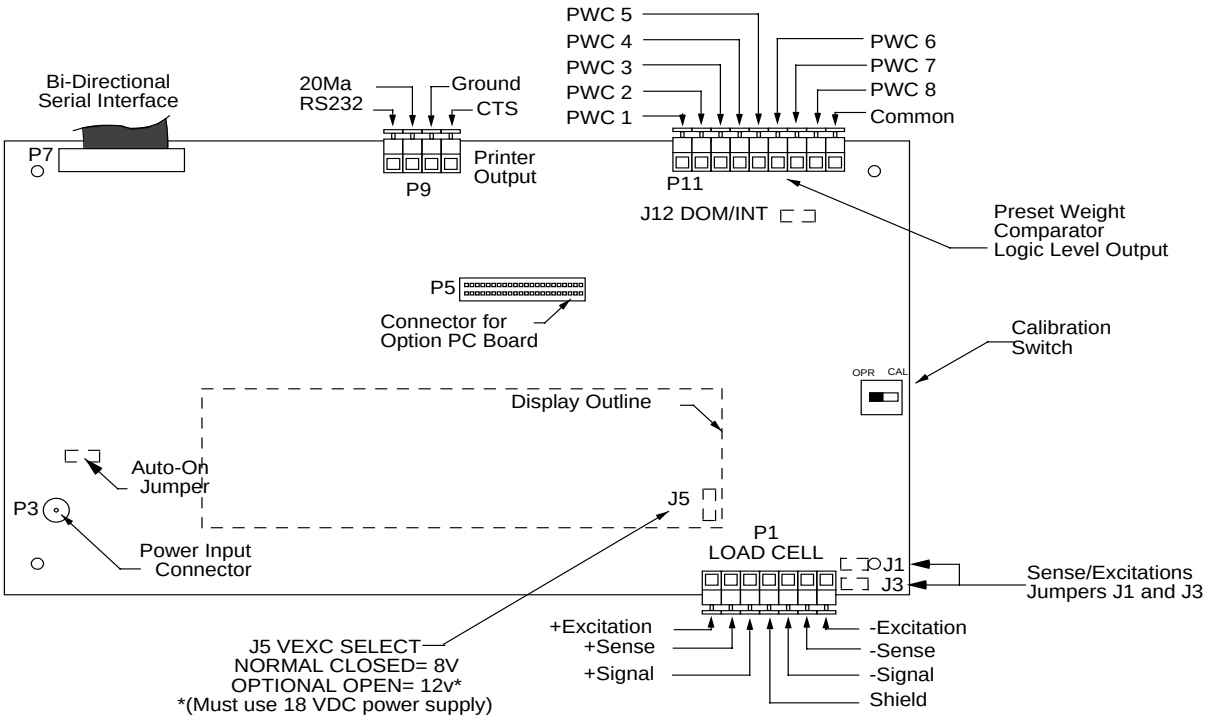


figure no. 10 - 748 NEMA 4X enclosure layout

NOTE! All relays are the normally open type that will open when power to the indicator is lost.

figure no. 11 - PC board layout



NOTE! After all terminations have been made, remove the excess cable from the instrument enclosure and securely tighten each of the cable gland connectors. Do not over-tighten these connectors but make certain they are snug. DO NOT USE TOOLS! Tighten with fingers!

DATA FORMAT SPECIFICATIONS

SERIAL DATA FORMAT

The serial data formats are defined during the setup and review functions. At these times, the number of start, data and stop bits along with the baud rate is selected for the serial interface. Baud rates of 1200, 2400, 4800, 9600 and 19.2K baud are supported.

RECORD FORMAT

The information transmitted from the printer output port depends on the operation mode of the 748 at the time the **PRINT** key is pressed as well as the print format entered. Refer to the CALIBRATION section of this manual for additional information on the programming of the printer output format. Two general formats transmitted are shown in the illustration on.

GROSS WEIGHT MODE:	NET WEIGHT MODE:
*^CR ID^nnnnnn	*^CR ID^nnnnnn
*^CR hh:mm	*^CR hh:mm
*^CR mm/dd/yyyy**	*^CR mm/dd/yyyy**
	*^CR xxxxxx^LB^G
	*^CR xxxxxx^LB^T ^(Man Wt)
	*^CR xxxxxx^LB^N

*Determined by tab settings
**Domestic - dd/mm/yyyy = international

where:

nnnnnn	=	six (6) digits of numeric identification with leading zeros suppressed
hh	=	hours (refer to Setup for information on 12 or 24 hour time format selection)
mm	=	minutes (two (2) digits)
ss	=	seconds (two (2) digits)
MM	=	month (two (2) digits) (refer to Setup for information on date format selection)
dd	=	day (two (2) digits)

yyyy = year four (4) digits)
ID = ASCII letters “I” and “D” to identify data as identification
LB = ASCII letters “L” and “B” to identify weighing units as pounds. May also be KG for kilograms, OZ for ounces
xxxxxx = six (6) numeric digits of weight with decimal point if required and leading zeros suppressed
G = ASCII letter “G” for gross weight
T = ASCII letter “T” for tare weight
N = ASCII letter “N” for net weight
CR = carriage return (followed by LF if Automatic Line Feeds was set to YES during setup)
^ = space (hex 20)
LF = line feed

CONTINUOUS DATA OUTPUT

If, during setup and calibration, the answer to the prompt 5b400? is NO, the weight data will be transmitted in the following format:

CRPzzzzzzDs^uu^m^^ETX

If the prompt 5b400? is answered YES, the weight data will be transmitted in the following formats:

Pxxxxxx^UU^M^SS^CR (no decimal point in weight display)
PxxxxxxD^UU^M^SS^CR (decimal point in weight display)

where:
CR - carriage return (hex 0D)
D - decimal point (embedded where necessary)
ETX - end of text (hex 03)
m - mode, lower case (g=gross, n=net)
M - mode, upper case (G=gross, N=net)
P - polarity (space if positive, - if negative)
s - status, lower case (m=motion, e=entry - input in progress, c=over capacity)
SS - status, upper case (CZ=center-of-zero, MO=motion, BZ=gross weight below zero, ee=entry - input in progress, OC=over capacity)
uu - units, lower case (lb, kg, tn, etc.)
UU - units, upper case (LG, KG, TN, etc.)
xxxxxx - weight with leading spaces
zzzzzz - weight with leading zeros
^ - space

WEIGHT ON DEMAND

If the bi-directional serial has not been setup for continuous output, the 748 will respond to a weight request (ENQ).

The host device (computer) sends:
ENQ - (hex 05)

The 748 will respond:
Sxxxxxx^UU^M^CC^CR - if no decimal point in weight display.
SxxxxxxD6UU6M6CC^CR - if decimal point in weight display.

S - sign (space if weight is positive or a “--” if weight is negative)
xxxxxx - six digits of weight with leading zeros suppression
D - decimal point embedded in weight (if decimal point selected during calibration)
UU - weighing units (lb or kg)
M - weighing mode (“G” if displaying gross weight, “N” if displaying net weight)

motion - space if there is no motion or an “M” if there is motion
CC - weight status (“OC” if weight exceeds scale capacity, “BZ” of the weight is below zero, “MO’ if there is motion)
CR - carriage return (0Dhex)

SERIAL INPUT COMMANDS

The second serial port on the 748 is a bi-directional port and can both receive and transmit serial data. It is possible to control the operation of the 748 by transmitting serial commands to the instrument via this serial port. This is accomplished by transmitting a command string which is then acted upon as if it were received from the instrument’s keyboard. The basic format for this serial command is:

STX KeyCommand [SubCommand] [Weight Value] CKsum ETX

where:
- STX - Start of Text (hex 02) MUST precede ALL serial commands.
- KeyCommand - One of a table of predefined command functions. **Note:** All commands are subject to rejection just as commands from the keyboard.
- SubCommand - Optional command parameter.
- Weight Value - Optional weight value required by some Key Commands. **Note:** The weight value must meet the displayed division, capacity, and decimal point precision of the indicator.
- CKsum - XOR checksum of command (*excluding* STX *and* ETX) **Note:** For instructions on how to calculate the checksum value, refer to the CHECKSUM CALCLATION section of this manual.
- ETX - End of Text (hex 03) MUST terminate ALL serial commands.

The KeyCommand functions are:

KeyCommand - 0
Equivalent Keyboard Key - GROSS
Function - Switch 748 to Gross Weight Mode
Serial Command Format - STX0CKsumETX
Hex Format to Transmit - 02H 30H 33H 30H 03H
Equivalent Computer or Terminal Keys to press - Ctrl B 0 3 0 Crtl C

KeyCommand - 1
Equivalent Keyboard Key - NET
Function - Switch 748 to Net Weight Mode
Serial Command Format - STX1CKsumETX
Hex Format to Transmit - 2H 31H 33H 31H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 1 3 1 Ctrl C
Key Command - 2
Equivalent Keyboard Key - lb/kg
Function - Toggle the 748 beyween Lb and Kg modes
Serial Command Format - STX2CKsumETX
Hex Format to Transmit - 2H 32H 33H 32H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 2 3 2 Ctrl C

KeyCommand - 3
Equivalent Keyboard Key - ON/ZERO
Function - Zero the weight displaly
Serial Command Format - STX3CKsumETX
Hex Format to Transmit - 2H 33H 33H 33H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 3 3 3 Crtl C

KeyCommand - 4
Equivalent Keyboard Key - PRINT
Function - Initiate a print sequence at the printer serial port
Serial Command Format - STX4CKsumETX

Hex Format to Transmit - 2H 34H 33H 34H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 4 3 4 Ctrl C

KeyCommand - 5
Equivalent Keyboard Key - TARE
Function - Enter a Tare weight value
Serial Command Format - STX5xxxxxxCKsumETX
(xxxxxx = the tare weight value)
Hex Format to Transmit - 2H 35H xH xH xH xH xH xH^1 zzH^2 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 5 xxxxxx zz^3 Ctrl C

KeyCommand - 6
Equivalent Keyboard Key - BAR
Function - Enter the Bar Graph Starting (60) and Stop (61) weight values
Serial Command Format - STX60xxxxxxCKsumETX
(xxxxxx = the Bar Graph Starting Weight)
STX61yyyyyyCKsumETX
(yyyyyy = the Bar Graph Stop Weight)
Hex Format to Transmit - 2H 36H 30H xH xH xH xH xH xH^1 zzH^2 3H
(Start weight command)
2H 36H 31H yH yH yH yH yH yH^2 zzH^2 3H
(Stop weight command)
Equivalent Computer or Terminal Keys to press - Ctrl B 6 0 xxxxxx zz^3 Ctrl C
(Start Weight command)
Ctrl B 6 1 yyyyyy zz^3 Ctrl C
(Stop Weight command)

NOTE: This command will not change from the PWC to Bar Graph mode in the display. It must be manually selected.

KeyCommand - 7
Equivalent Keyboard Key - PRESET
Function - Enter the Preset or Trim weight value for one or all eight of the preset weight comparators
Serial Command Format - STX7nxxxxxxCKsumETX
n = the preset or trim weight comparator number (see below).
(xxxxxx = the weight value for the corresponding preset number)
Hex Format to Transmit - 2H 37H nH xH xH xH xH xH xH^1 zzH^2 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 7 n xxxxxx zz^3 Ctrl C

Preset and Trim values for "n." ***Note values for "n" are in HEX.***

1	set preset	1	7	set preset	4	D	set preset	7
2	set trim	1	8	set trim	4	E	set trim	7
3	set preset	2	9	set preset	5	F	set preset	8
4	set trim	2	A	set trim	5	G	set trim	8
5	set preset	3	B	set preset	6			
6	set trim	3	C	set trim	6			

NOTE: This command will not change from the Bar Graph to PWC mode in the display. It must be manually selected.

KeyCommand - 8
Equivalent Keyboard Key - none
Function - Initiates an inquiry (ENQ) of the bi-directional I/O port. This command will cause the displayed weight to transmit out the serial I/O port.

Serial Command Format - STX8CKsumETX
Hex Format to Transmit - 2H 38H 33H 38H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 8 3 8 Ctrl C

KeyCommand - 9
Equivalent Keyboard Key - none
Function - Perform Push Button Tare function. This will set the GROSS weight as the TARE value and switch to the NET mode. **NOTE:** The setup parameter, PbtAr has no effect on this function
Serial Command Format - STX9CKsumETX
Hex Format to Transmit - 2H 39H 33H 39H 3H
Equivalent Computer or Terminal Keys to press - Ctrl B 9 3 9 Ctrl C

[1] The xH xH xH xH xH xH and yH yH yH yH yH yH are the HEX equivalent of each character in the weight value. For example, if the weight value is 1234.1, the HEX equivalent is 31H 32H 33H 34H 2EH 31H.

[2] The zzH is the HEX equivalent of the ChecKsum value. **NOTE:** For instructions on how to calculate the checksum value, refer to the CHECKSUM CALCULATION section of this manual.

[3] Refer to an ASCII character code table of your computer or terminal for the corresponding key(s) to press for the HEX ChecKsum value.

RESPONSES TO SERIAL COMMAND FUNCTIONS

The 748 will respond to every serial command received. The format will serve to indicate the manner in which the serial command was processed. The general format for the response to a serial command is:

Response [RejectCode]

where: Response - ACK if the command was processed
NAK if the command was not processed

RejectCode - If NAK was transmitted to show that the command was not processed, a code number will be transmitted to indicate the reason for rejection of the command

0 - Unable to process command (i.e. Print command sent while weight was unstable)
1 - Invalid Cksum (i.e. checksum incorrectly calculated)
2 - Invalid Character Count (i.e. data length wrong, weight value exceeds scale capacity or wrong division value, etc.)
3 - Invalid Decimal Point position (i.e. decimal point missing or in wrong location)
4 - Invalid Command (i.e. improper command format or invalid KeyCommand)
5 - Invalid Sub-Command (i.e. invalid tare weight, preset number, or preset weight, Bar graph start or stop weight)

CHECKSUM CALCULATION

The checksum (Cksum) for KeyCommands with SubCommands or weight values to be entered (5, 6, and 7) are calculated by XORing each byte of the command, *excluding* the STX and ETX characters. The CKsum is then entered as a two (2) byte ASCII representation of the calculated HEX value. For example:

TARE command (5): STX5xxxxxxCKsumETX (xxxxxx = tare weight value)
Tare Weight Value = 1234
CKsum = **1F** (35h, XOR 31h XOR 32h XOR 33h XOR 34h XOR 2eh)
String to send, 02h 35h 31h 32h 33h 34h 2eh 31h 3fh 03h

Single byte KeyCommands (0, 1, 2, 3, 4, 8 and 9) are NOT XORed, instead the transmitted CKsum is a two (2) byte ASCII representation of the HEX value of the command. For example:

GROSS command (0): STX030ETX
"0" = (30h)
Cksum = 30
String to send, 02h 30h 33h 30h 03h

PRINT command (4): STX434ETX
"4" = 4 (34h)
CKsum = 34
String to send, 02h 34h 33h 34h 03h

CALIBRATION

Your 748 indicator has been thoroughly tested and calibrated before being shipped to you. If you received the indicator attached to a scale, calibration is not necessary. If the 748 is being connected to a scale for the first time or recalibration is necessary for other reasons, proceed as indicated.

The calibration toggle switch is located on the main printed circuit board. If you have a NEMA 4X enclosure you may gain access to this switch simply by opening the door on the enclosure. The calibration switch is identified in figure no. 11.

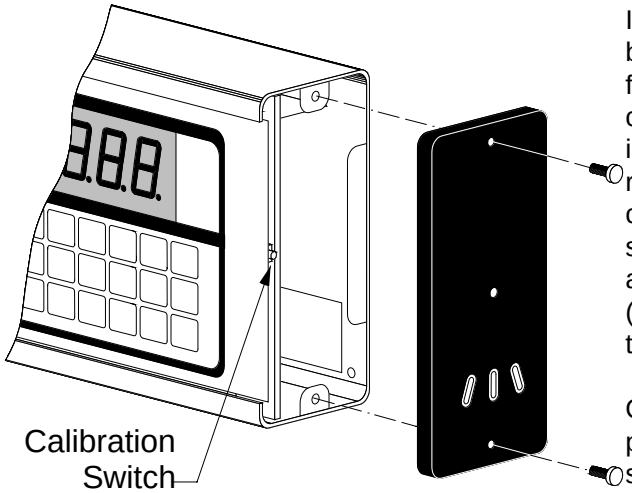


figure no. 12 - calibration switch location

If you have a 748 desktop enclosure, it will be necessary to remove one of the end caps from the enclosure to gain access to the calibration switch. To do this, first remove the instrument from the gimbal mounting by removing the two (2) large knobs. Make certain that the smaller locking screw on one side is first loosened. Next, remove the top and bottom screws from the right end cap (see figure no. 12). The switch is located on the printed circuit board near the center.

Once you have located the calibration switch proceed with the calibration instructions. A summary of the calibration process is shown in graphical form at the end of this section.

SETUP AND CALIBRATION

CAUTION: The membrane keyboard is not to be operated with pointed objects (pencils, pens, fingernails, etc). Damage to keyboard resulting from this practice will NOT be covered under warranty.

0 = no	1 = yes

Press [OFF]. Set the calibration switch on the printed circuit board to the CAL position then press [ON ZERO] and release. Pressing the [PRINT] key will advance to the *PrE:* prompt.

CAUTION: When using the dual ranging feature of the 748, do not attempt to use a division value in the low range that is too small to provide adequate signal strength for stable operation of the instrument. Most scale installations will allow the smaller division to be 1/2 of the larger division value when the dual range feature is used.

The inherent sensitivity and capabilities of the 748 will allow you to select combinations that are beyond the practical limits of today's load cells for dependable, stable performance.

The appearance of such a situation will be instability in the lower range, while the higher range will operate as it should.

DUAL RANGING

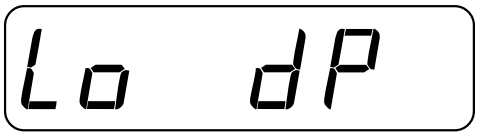
Press [ENTER] to show the current setting. Press [0] to disable or [1] to enable. Press [ENTER] to save the displayed setting. If dual ranging is disabled (0 entered) advance to the **INTERVAL SETTING**, otherwise continue: (**NOTE:** If dual ranging is selected and decimal point locations for both Intervals are not the same, the truck storage feature will be inhibited.)

LOW INTERVAL

Press [ENTER] to show the current setting. Press [0] through [9] to enter the new Interval value and press [ENTER] to save it or to save the current value displayed.

Values are 1 through 9, 10, 20, 30, 40, 50, 60, 70, 80 and 90. (Interval values other than 1, 2, 5, 10, 20 or 50 cannot be used in commercial applications.)

LOW DECIMAL POINT



Press [ENTER] to show the current setting. Press [0] through [4] to enter the desired decimal point location and press [ENTER] to save it or to save the current displayed setting. Must be the same as High Interval to be able to use Truck Storage.

0=XXXXXX 2=XXXX.XX 4=XX.XXXX
1=XXXXX.X 3=XXX.XXX

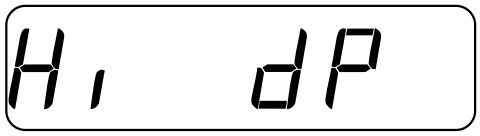
LOW CAPACITY

Press [ENTER] to show the current setting. Press [0] through [9] to enter the new Low capacity value. Then press [ENTER] to save it or to save the displayed value.

HIGH INTERVAL

Press [ENTER] to show the current setting. Press [0] through [9] to enter the new High interval value and press [ENTER] to save it or to save the current displayed setting. Available High interval values are 1 through 9, 10, 20, 30, 40, 50, 60, 70, 80 and 90. Interval values other than 1, 2, 5, 10, 20, or 50 cannot be used in commercial applications.

HIGH DECIMAL POINT



Press ENTER to show the current setting. Press 0 through 4 to enter the desired decimal point location and press ENTER to save it or to save the current setting. Must be the same as Low Decimal Point to be able to use Truck Storage.

0=XXXXXX 2=XXXX.XX 4=XX.XXXX
1=XXXXX.X 3=XXX.XXX

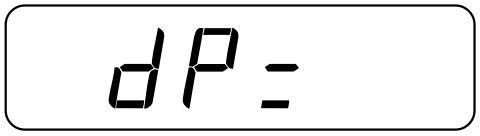
HIGH CAPACITY

Press ENTER to show the current setting. Press 0 through 9 to enter the new High capacity value. Then press ENTER to save it or to save the displayed value.

NOTE! High Capacity must be greater than Low Capacity and High Interval must be greater than Low Interval. ADVANCE TO WEIGHING UNITS.

INTERVAL SETTING

Press ENTER to show the current setting. Press 0 through 9 to enter the new Interval value and press ENTER to save it or to save the current setting. Available interval settings are 1 through 9, 10, 20, 30, 40, 50, 60, 70, 80 and 90. Interval values other than 1, 2, 5, 10, 20, or 50 cannot be used in commercial applications.



Press ENTER to show the current setting. Press 0 through 4 to enter the new decimal point location and press ENTER to save it oo save the current setting.

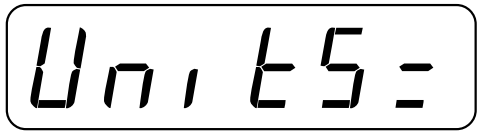
DECIMAL POINT SETTING

0=XXXXXX 2=XXXX.XX 4=XX.XXXX
1=XXXXX.X 3=XXX.XXX

Press ENTER to show the current setting. Press 0 through 9 to enter the new Capacity value. Then press ENTER to save it or to save the displayed setting.

CAPACITY

NOTE! Capacity cannot exceed 999999.



Press ENTER to show the current setting. Press 1 through 6 to enter the new weighing units and press ENTER to save it or to save the current displayed setting.

WEIGHINGUNITS

1=Pounds only

2=Kilograms only

3=Pounds/Kilograms (powers up and Calibrates in Pounds)

4=Kilograms/Pounds (powers up and Calibrates in Kilograms)

5=Tons (tn) only

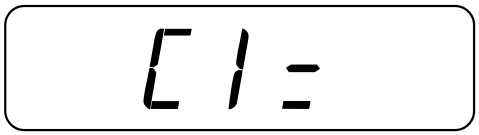
6=Metric Tons (t) only

CALIBRATION

Press ENTER to show the current selection - either YES or NO. Press 0 to bypass the calibration process or press 1 to proceed. Press ENTER after making your selection.

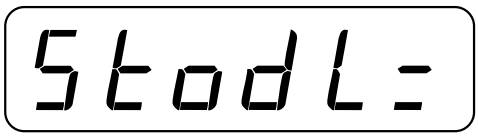
If NO is selected, the 748 will advance to the **ZERO TRACKING RANGE.**

"C" NUMBERS



Press ENTER to show the current value of the C1 number. If the 748 was calibrated previously and you recorded the four (4) "C" numbers, you may enter the value for C1. By entering the "C" numbers previously recorded, you can return to that calibration setting without having to use test weights.* If you wish to use test weights for calibration, leave the C1 value unchanged and press the ENTER key.

STORE DEADLOAD VALUE



If "C" numbers were entered, remove all weight from the scale, press ENTER then press 1 to display YES. Press ENTER to store the current scale weight as the deadload weight.

FIRST CALIBRATION WEIGHT

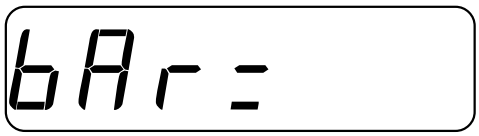
This is the first of two calibration weights: NO LOAD or ZERO and the TEST WEIGHTS or TEST LOAD. Press the ENTER key and the display will show 0 for NO LOAD. If the first calibration weight is to be ZERO or NO LOAD, press the ENTER key again. If the first calibration weight is to be the TEST WEIGHTS, key in the total value of the calibrated test weights. Place these test weights on the scale platform and press the ENTER key. After a few seconds, the display will show:

SECOND CALIBRATION WEIGHT

This is the second of two calibration weights. If the first weight (CAL1) was zero, this weight should be equal to the test weight total. If, however, the first weight was the test weight total, then this weight should be zero. Press the ENTER key. The display will show 0. If this second calibration weight is to be zero, make certain the scale platform is empty then press the ENTER key again. If this second calibration weight is to be the test load, use the numeric keys and enter the total of the calibrated test weights. Place the weights on the scale platform and press the ENTER key. After a few seconds the display will show:

* If any components have been changed that affect calibration and your scale is used in a commercial application and must be “Legal for Trade” you cannot use “C” numbers to re-calibrate.

BAR GRAPH ENABLE/DISABLE

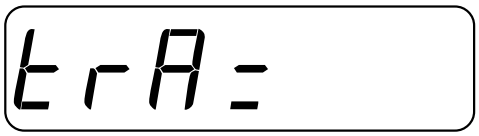


Press ENTER to show the current settting. Press 0 or 1 to enter the new setting and press ENTER to save it or to save the current setting.

no (0) = Bar Graph readout is disabled YES (1) = Bar Graph readout is enabled.

NOTE! If bAr= is set to NO, the BAR key is also disabled and Error will display if the key is pressed.

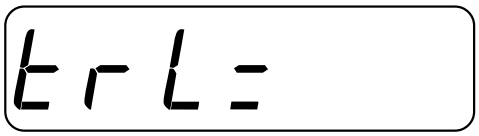
ZERO TRACKING RANGE



Press ENTER to show the current setting. Press 0 through 9 to enter the new automatic zero tracking range. Then press ENTER to save it or to save the current setting.

Allowable values are: 0.0 (disables Zero Tracking), .5 and 1 through 9.

4% ZERO RANGE



Press ENTER to show the current setting. Press 0 or 1 to enter the new limit for zero range. Then press ENTER to save it or to save the current setting.

no = Full Capacity (No Limit) YES = 4% of Scale Capacity

POWER-UP ZERO FEATURE

Press ENTER to show the current setting. Press 0 or 1 to enter the new setting and press ENTER to save it or to save the current setting.

no = No Re-Zero on Power-Up YES = Automatic Re-Zero on Power-Up

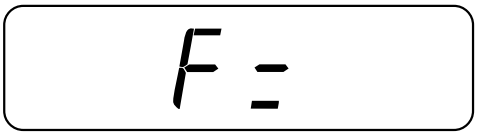
FILTERING

Press ENTER to show the current setting. Press 0 through 3 to enter the new filtering level. Then press ENTER to save it or to save the current filter setting.

0 = No Filtering 2 = Moderate Filtering
1 = Minimal Filtering 3 = Custom Filtering

If you selected 0, 1 or 2, advance to **MOTION RANGE**.

F YOU SELECTED LEVEL 3 FILTERING THEN:



Press ENTER to show the current filter setting. Press 0 through 9 to enter the new filter value (1 to 16). The larger the number, the greater the effect. Then press ENTER to save it or to retain the current setting. Filter is the number of weigh samples that will be averaged before being displayed. If F=6, the weight value placed in the display will be the average of the last six (6) consecutive weigh samples.

BREAK RANGE

Press ENTER to show the current break range setting. Press 0 through 9 to enter the new break range (1 to 64). The larger the number the greater the weight change required to break out of the filtering. Press ENTER to save the new value or to save the current displayed value of break range.

MOTION RANGE

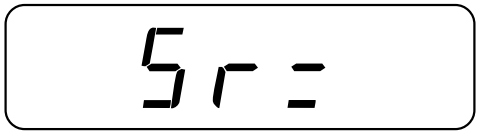
Press ENTER to show the current setting. Press 1 through 9 to enter the new value for the motion range. Weight changes greater than this number of divisions will indicate motion. Press ENTER to save the new setting or to save the current motion range setting.

BLANK ON MOTION

Press ENTER to show the current setting. Press 0 or 1 to enter the new setting. Then press ENTER to save it or to save the current setting.

no = Do Not Blank Display On Motion YES = Blank Display On Motion

SAMPLE RATE



Press ENTER to show the current sample rate. Press 0 through 9 to enter the new Sample Rate (1 to 12 samples per second). Then press ENTER to save it or to save the current setting.

AUTOMATIC SHUTOFF (Battery Operation Only - see SETUP REVIEW)

Press ENTER to show the current setting. Press 0 through 9 to enter the new setting. Then press ENTER to save it or to save the current setting.

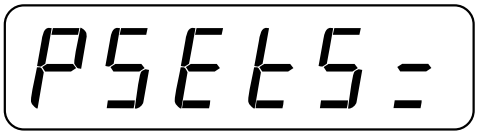
0 = Disable Automatic Shutoff 1 through 9 - Number of Minutes of Inactivity (No Motion) Before Power Off

SLEEP MODE (Battery Operation Only - see SETUP REVIEW)

Press ENTER to show the current setting. Press 0 through 9 to enter the new setting. Then press ENTER to save it or to save the current setting. Weight applied to scale, or key pressed, will enable system operation.

0 = Disable Sleep Mode 1 through 9 - Number of Minutes at Zero (Zero Indicator On) Before Going to Sleep

PRESET WEIGHT COMPARATORS



Press ENTER to show the number of presets. Press 0 through 8 to enter the new number of preset weight comparators. Then press ENTER to save it or to save the current setting.

PWC OUTPUT STATE: UNDER PRESET WEIGHT VALUE

If 1 or more presets were entered, this prompt will appear for each preset entered - the 1 position will indicate the PWC number. Press ENTER to show the current setting for the PWC output. on indicates that the PWC output is high (the PWC relay is on) at weights under or less than the preset weight and will switch to off (the PWC relay is off) at the preset weight and above. oFF indicates that the PWC output is low (the PWC relay is off) at weights under the preset weight and will switch to on (the PWC relay is on) at the preset weight and above. Press the 0 key for off and the 1 key for on.

TRUCK STORAGE

Press ENTER to show the current setting. Press 0 or 9 to enter the new setting. Press ENTER to save the new setting or to save the current setting. This question will not appear if Dual Ranging was selected and the decimal point setting for the High Interval differs from the decimal point setting for the Low Interval.

no = No Truck Storage YES= Truck Storage

PUSH BUTTON TARE

Press ENTER to show the current setting. Press 0 or 1 to enter the new setting. Then press ENTER to save it or to save the current setting.

no = Numeric Tare YES= Push Button Tare Only

AUTO CLEARING OF TARE

Press ENTER to show the current setting. Press 0 or 1 to enter the new setting. Then press ENTER to save it or to save the current setting. Clear tare on completion of the transaction (a negative net weight after display of a positive net weight).

no = No YES = Yes

CONFIGURE SERIAL PORTS

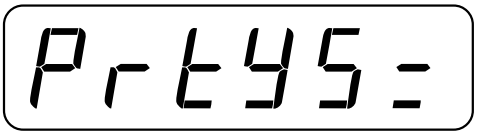
Press ENTER to show the default setting (no). If you wish to configure or review the serial data ports, press the 1 key for YES, then press ENTER to continue. If you do not want to change or review the configuration of the serial port settings, press 0 for NO then press ENTER to continue. If you bypass this section, the 748 will advance to the **PRINTER TAB SETTINGS**.

SERIAL PORT BAUD RATE

Press ENTER to show the current baud rate. Use the numeric keys to enter a new baud rate for the bi-directional serial post. Then press ENTER to save it or to save the current setting.

12 = 1200 Baud 48 = 4800 Baud
24 = 2400 Baud 96 = 9600 Baud 19 = 19.2K Baud

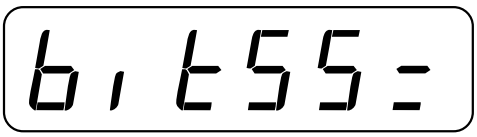
SERIAL PORT PARITY



Press ENTER to show the current setting. Press 0 through 2 to enter the new parity setting for the bi-directional serial port. Then press ENTER to save it or to save the current setting.

0 = No Parity 1 = Odd Parity 2 = Even Parity

SERIAL PORT DATA BITS



Press ENTER to show the current number of data bits. Press 7 or 8 to enter the new number of data bits for the bi-directional serial port. Then press ENTER to save it or to save the current setting.

SERIAL PORT STOP BITS

Press ENTER to show the current number of stop bits. Press 1 or 2 to enter the new number of stop bits for the bi-directional serial port. Then press ENTER to save it or to save the current setting.

CONTINUOUS SERIAL OUTPUT

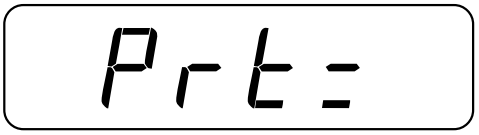
Press ENTER to show the current setting. Press 0 or 1 to disable or enable the continuous output on the bi-directional serial port. Then press ENTER to save it or to save the current setting. A NO response will automatically select weight on demand. Weight is requested by receipt of a 05 (Hex) enq.

no = No Continuous Output YES = Continuous Output

If answered YES to Continuous Output, the display will prompt:

If SB-200A or SB-400A scoreboard is attached, answer YES. If not, answer NO. **NOTE:** If older style SB-200 scoreboard is attached, always answer NO.

PRINTER MODEL SELECTION

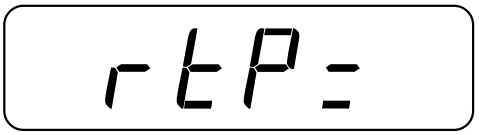


Press ENTER to show the current printer model selection. Press 1 through 3 to enter the new printer model to be used. Then press ENTER to save it or to save the current selection. The selections are as follows:

1 = Standard Printer 3 = P220 (Eltron LP-2622 and LP-2642)
2 = P200 (Elton Companion Plus) 4 = P400 (Epson U590)

If you selected 1,2, or 3, advance to **PRINTER PORT BAUD RATE**.

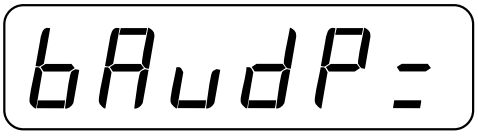
ROTATE PRINT FEATURE



Press ENTER to show the current SETTING. Press 0 or 1 to enter the new setting. Then press ENTER to save it or to save the current selection.

no = normal print output YES = rotate print output 180 degrees

PRINTER PORT BAUD RATE



Press ENTER to show the current baud rate. Use numeric keys to enter the new baud rate for the printer serial port. Then press ENTER to save it or to save the current setting.

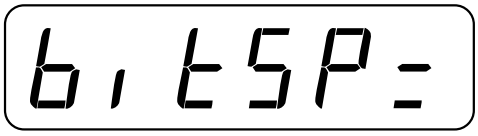
12 = 1200 Baud 48 = 4800 Baud
24 = 2400 Baud 96 = 9600 Baud 19 = 19.2K Baud

PRINTER PORT PARITY

Press ENTER to show the current parity setting. Press 0 through 2 to enter the new parity setting for the printer serial port. Then press ENTER to save it or to save the current setting.

0 = No Parity 1 = Odd Parity 2 = Even Parity

PRINTER PORT DATA BITS



Press ENTER to show the current number of data bits. Press 7 or 8 to enter the new number of data bits for the printer serial port. Then press ENTER to save it or to save the current setting.

PRINTER PORT STOP BITS

Press ENTER to show the current number of stop bits. Press 1 or 2 to enter the new number of stop bits for the printer serial port. Then press ENTER to save it or to save the current setting.

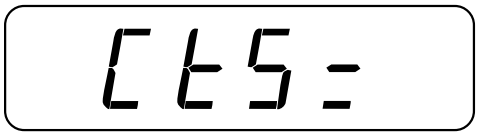
CONTINUOUS PRINTER OUTPUT

Press ENTER to show the current settting. Press the 0 or 1 to enable or disable the continuous serial output on the printer serial port. A NO selection enables print switch operation. Then press ENTER to save it or to save the current setting.

no = No Continuous Output YES = Continuous Output

If answered YES to Continuous Output, the display will prompt:

CLEAR TO SEND (Printer Output Handshake)



Press ENTER to show the current settting. Press 0 to disable or 1 to enable the Clear to Send (Printer Output Handshake) for the printer output. This feature can be used with printers that have small buffers to prevent data overrun. Press ENTER to save it or to save the current setting.

If SB-200A or SB-400A scoreboard is attached, answer YES. If not, answer NO. **NOTE:** If older style SB-200 scoreboard is attached always answer NO.

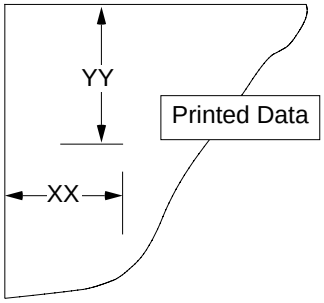
INHIBIT SERIAL DATA

YES/NO to inhibit sending serial data during input. If yes, all serial output will stop while weight is not being displayed (i.e. while inputting id, tare, time, date, presets, bargraph or displaying the current tare value). **NOTE:** YES required for “Legal for Trade” applications.

PRINTER TAB SETTINGS

Press ENTER and the display will show no. If you wish to program or review the location of the printed data on the ticket, press the 1 key to change the display to YES. Otherwise leave the display at no and press the ENTER key to bypass these settings. If YES, press the ENTER key to continue the Printer Tab settings. If no, advance to **CALIBRATION "C" NUMBERS** or to CALdAC if the option board is installed (see **CALIBRATION OF THE ANALOG OUTPUT**).

TAB SETTING (General Format Information)

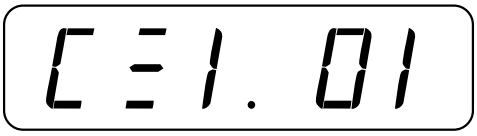


The general format for the input is A = YY.XX where A is the character identifying the data printed, YY is the number of lines down and XX is the number of spaces to the right.

NOTE! Enter 00 in either location, YY or XX, to disable the data from printing.

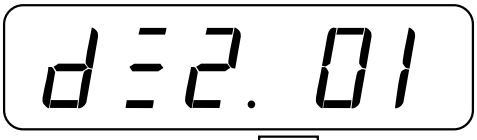
TEMPORARY TRUCK TABBING (if trStbo: YES)

Time (Clock) Location



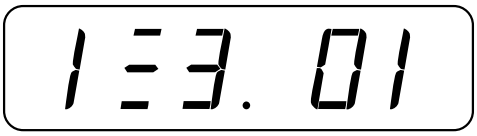
This display shows the current setting of the time (clock). Use the numeric keys to enter the new location then press ENTER to save it or to save the current setting.

Date Location



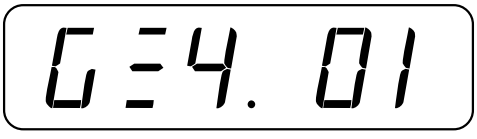
This display shows the current position of the date. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

ID Location



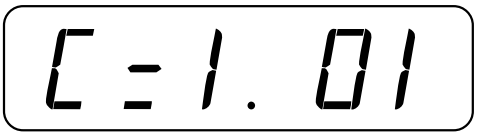
This display shows the current position of the identification. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

Gross Weight Location



This display shows the current position of the gross weight. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

TIME PRINT LOCATION

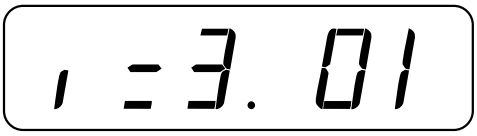


This display shows the current setting for the location of the time (clock) printing. Use the numeric keys to enter the new location then press ENTER to save it or to save the current setting.

DATE PRINT LOCATION

This display shows the current position for printing of the date. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

IDENTIFICATION PRINT LOCATION

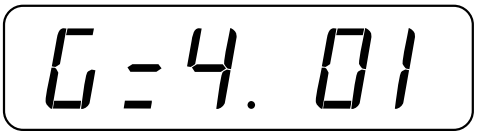


This display shows the current position for printing of the identification. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

CONSECUTIVE NUMBER PRINTING

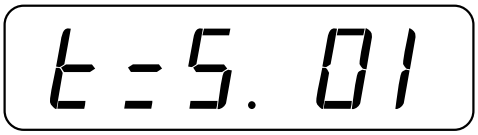
This display shows the current position for printing of the consecutive number. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys to enter the desired value, then press the ENTER key.

GROSS WEIGHT PRINT LOCATION



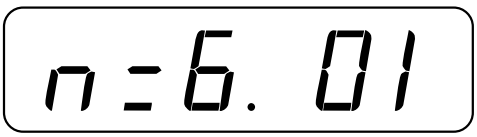
This display shows the current position for printing the gross weight. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

TARE WEIGHT PRINT LOCATION



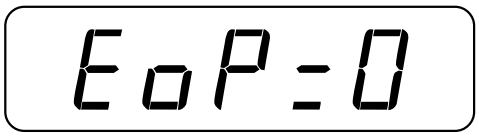
This display shows the current position for printing of the tare weight. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

NET WEIGHT PRINT LOCATION



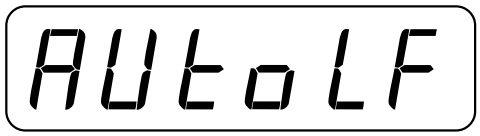
This display shows the current position for printing of the net weight. If you do not wish to change it, press the ENTER key, otherwise use the numeric keys and enter the desired value, then press the ENTER key.

FORM LENGTH



This display shows the number of line feeds executed after the last printed line. If the last printed line is 5 and the form length is 30 lines, enter 25, then press ENTER.

AUTOMATIC LINE FEEDS



Data transmitted from the serial I/O port can be terminated with a single carriage return and either no line feed or a single line feed command. Press the ENTER key to view the current setting. An on display means the data will be terminated with a carriage return AND a line feed, while an oFF display means the data will be terminated with a single carriage return only. Press the 1 key to change the setting to on or the 0 key to change it to oFF. Once the proper setting is displayed, press the ENTER key to save it.

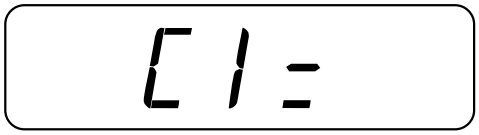
SAMPLE PRINT

This display asks if you wish to have a sample print to verify the printed data locations. Press the ENTER key and the display will show no. If you do not want a sample print, press the ENTER key again. The **CALIBRATION "C" NUMBERS** will be displayed. If you do want a sample print, press the 1 key to change the display to YES then press the ENTER key. Make certain that the printer is on and ready to print first.

REPEAT PRINTER TAB SETTINGS

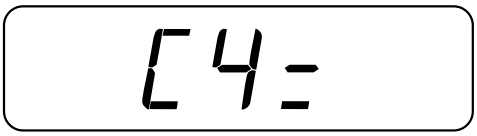
This display asks if you wish to review and change the printer tab setting. Press the ENTER key and the display will show no. If you are satisfied with the settings, press the ENTER key again. If you wish to review or change any of the settings, press 1 to change the display to YES then press the ENTER key. The display will then return to the time print location.

CALIBRATION "C" NUMBERS OR CALDAC (see Calibration of the Analog Output)



The display will show all four (4) calibration or "C" numbers. Each number may be up to three (3) digits in length. By recording these numbers you will be able to return the 748 to its present calibration settings without using test weights simply by entering the four (4) "C" numbers. Note that if

CALIBRATION "C" NUMBERS OR CALDAC (cont)



your scale is used in a commercial application for buying or selling, you may not use the "C" numbers. The "C" numbers may be reviewed during normal operation by pressing the TEST key.

CALIBRATION/SETUP COMPLETED

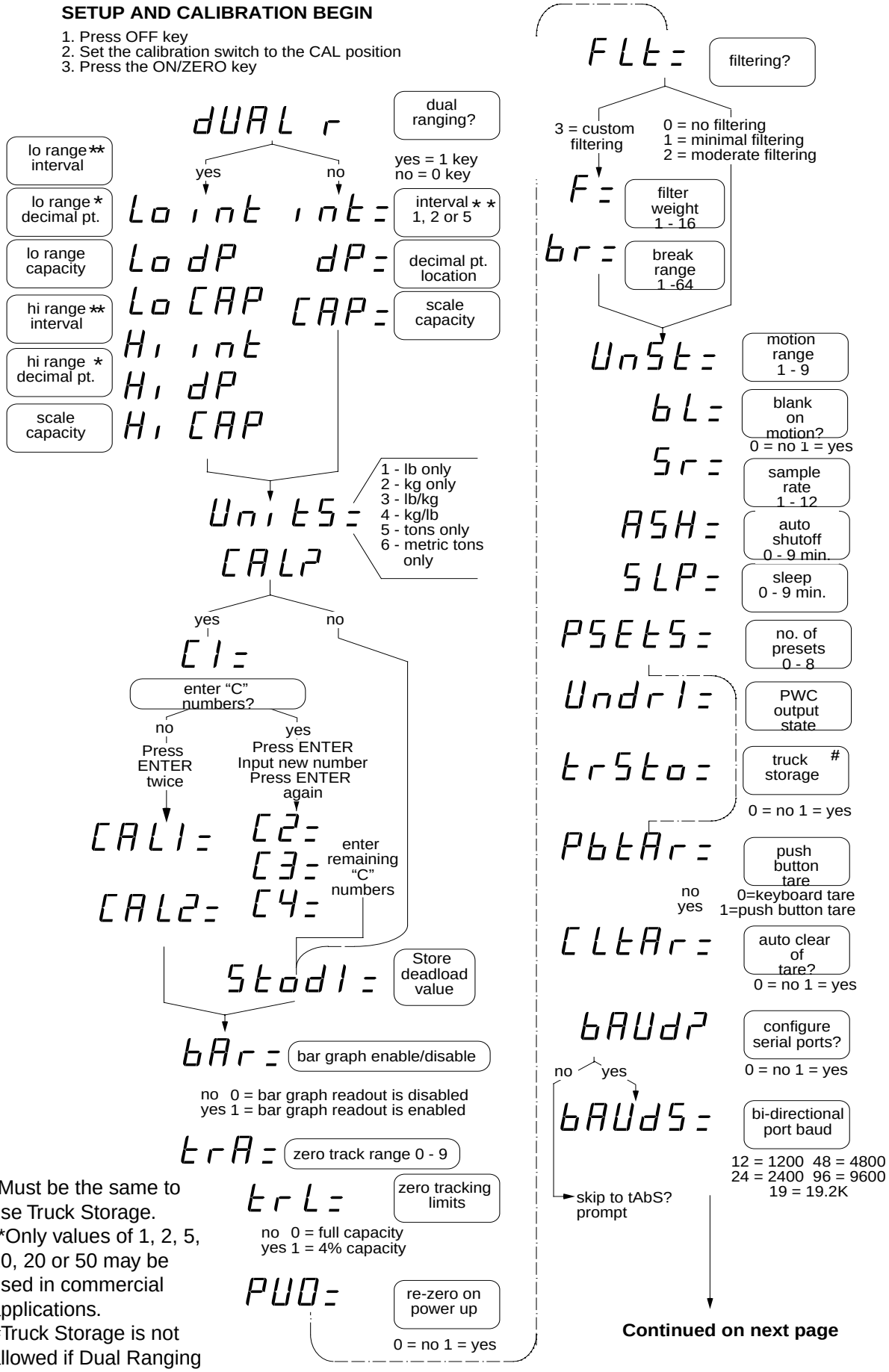
The indicator will return to the first calibration prompt, duAL r2. At this time, calibration can be repeated if necessary. If calibration is complete, set the calibration switch to the OPR position. The indicator will reset, ready for operation. NOTE: The calibration switch can be set to the OPR position anytime during the calibration and setup procedure with all previous data retained.

FINE SPAN ADJUSTMENT

With power applied and displaying weight, set the calibration switch on the printed circuit board to the CAL position. Then press 0 to decrease span or 1 to increase span. Return the switch to the OPR position for normal operation.

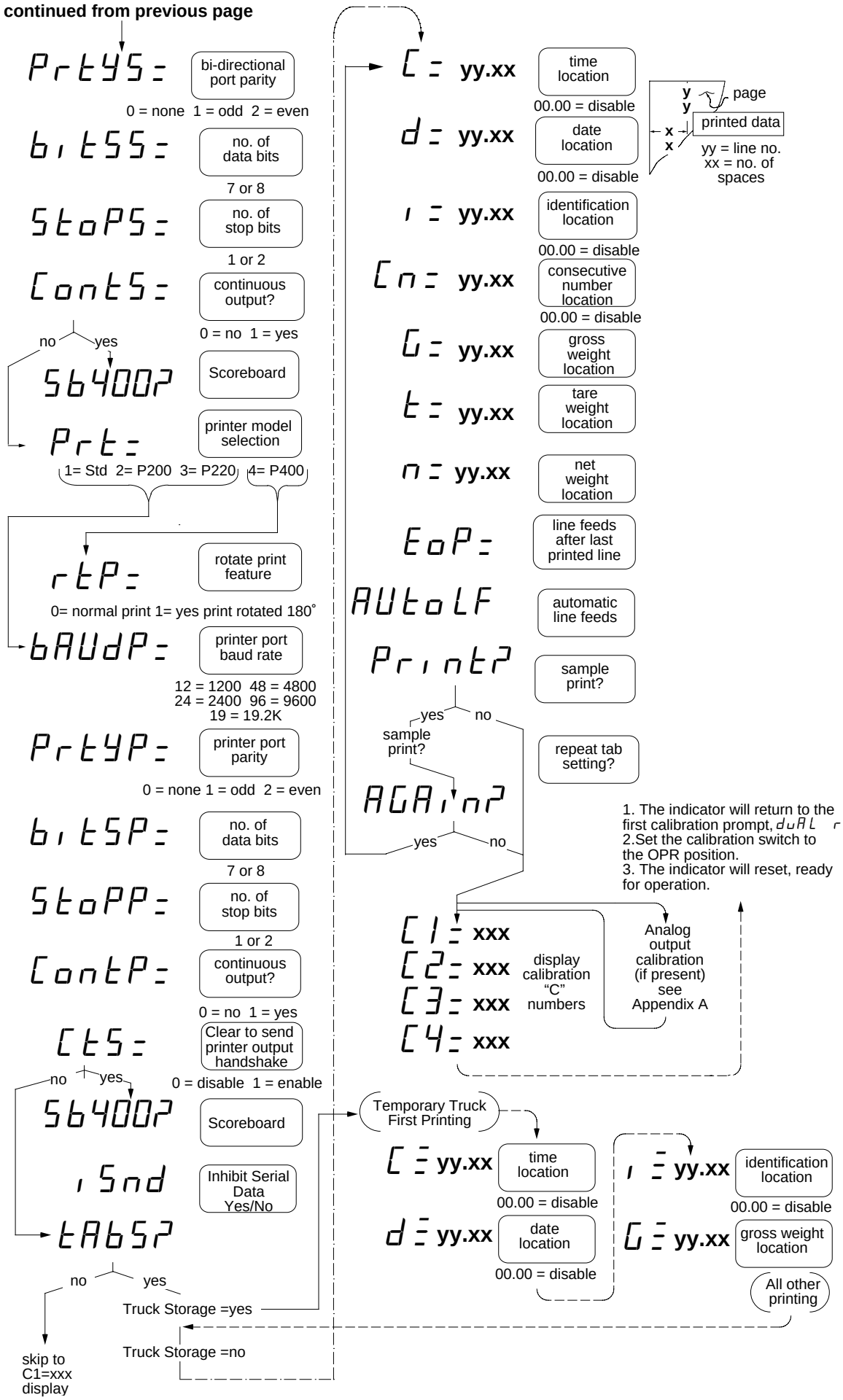
SETUP AND CALIBRATION BEGIN

1. Press OFF key
2. Set the calibration switch to the CAL position
3. Press the ON/ZERO key



*Must be the same to use Truck Storage.
**Only values of 1, 2, 5, 10, 20 or 50 may be used in commercial applications.
#Truck Storage is not allowed if Dual Ranging and Decimal Point locations are not the same.

Continued on next page


continued from previous page
PrtYS=
bi-directional port parity
0 = none 1 = odd 2 = even
biTSS=
no. of data bits
7 or 8
StoPS=
no. of stop bits
1 or 2
ContS=
continuous output?
0 = no 1 = yes
no
yes
SB400?
Scoreboard
PrT=
printer model selection
1= Std 2= P200 3= P220 4= P400
rtP=
rotate print feature
0= normal print 1= yes print rotated 180˚
bAUdP=
printer port baud rate
12 = 1200 48 = 4800
24 = 2400 96 = 9600
19 = 19.2K
PrtYP=
printer port parity
0 = none 1 = odd 2 = even
biTSP=
no. of data bits
7 or 8
StoPP=
no. of stop bits
1 or 2
ContP=
continuous output?
0 = no 1 = yes
CtS=
Clear to send printer output handshake
0 = disable 1 = enable
no
yes
SB400?
Scoreboard
,Snd
Inhibit Serial Data Yes/No
tAbS?
no
yes
skip to C1=xxx display
Truck Storage =yes
Truck Storage =no
C= yy.xx
time location
00.00 = disable
d= yy.xx
date location
00.00 = disable
,= yy.xx
identification location
00.00 = disable
Cn= yy.xx
consecutive number location
00.00 = disable
G= yy.xx
gross weight location
t= yy.xx
tare weight location
n= yy.xx
net weight location
EoP=
line feeds after last printed line
AUtoLF
automatic line feeds
Print?
sample print?
yes
no
sample print?
AGAin?
repeat tab setting?
yes
no
yy
page
xx
printed data
yy = line no.
xx = no. of spaces
1. The indicator will return to the first calibration prompt, duAL r
2.Set the calibration switch to the OPR position.
3. The indicator will reset, ready for operation.
C1= xxx
C2= xxx
C3= xxx
C4= xxx
display calibration “C” numbers
Analog output calibration (if present) see Appendix A
Temporary Truck First Printing
C= yy.xx
time location
00.00 = disable
d= yy.xx
date location
00.00 = disable
,= yy.xx
identification location
00.00 = disable
G= yy.xx
gross weight location
All other printing

SETUP REVIEW

The 748 allows several operational parameters to be reviewed and changed without breaking the calibration seal. These operational parameters are:

- Power Up Zero Reset Enable/Disable
- Blank Display on Motion Enable/Disable
- Auto Shutoff
- Sleep
- Number of Preset Weight Comparators
- Truck Storage Enable/Disable
- Automatic Clearing of Tare Enable/Disable
- Serial Data Port Configuration
  - Baud Rate
  - Parity
  - Number of Data Bits
  - Number of Stop Bits
  - Continuous Output
- Printer Model Selection
- CTS Enable/Disable
- Print Positions (tab settings)
  - Time
  - Date
  - Identification
  - Gross Weight
  - Tare Weight
  - Net Weight

To enable the Setup Review feature, first turn the 748 off by pressing the **OFF** key. Press and hold the **GROSS** key and press and release the **ON/ZERO** key. Release the **GROSS** key. The 748 will respond by showing the prompt for the selection of power-up zeroing (PUO-). Using the same procedure as described in the calibration section of this manual, make the required changes. A chart illustrating the basic procedure is included in the manual for a quick reference but refer to the CALIBRATION section for detailed information if in doubt.

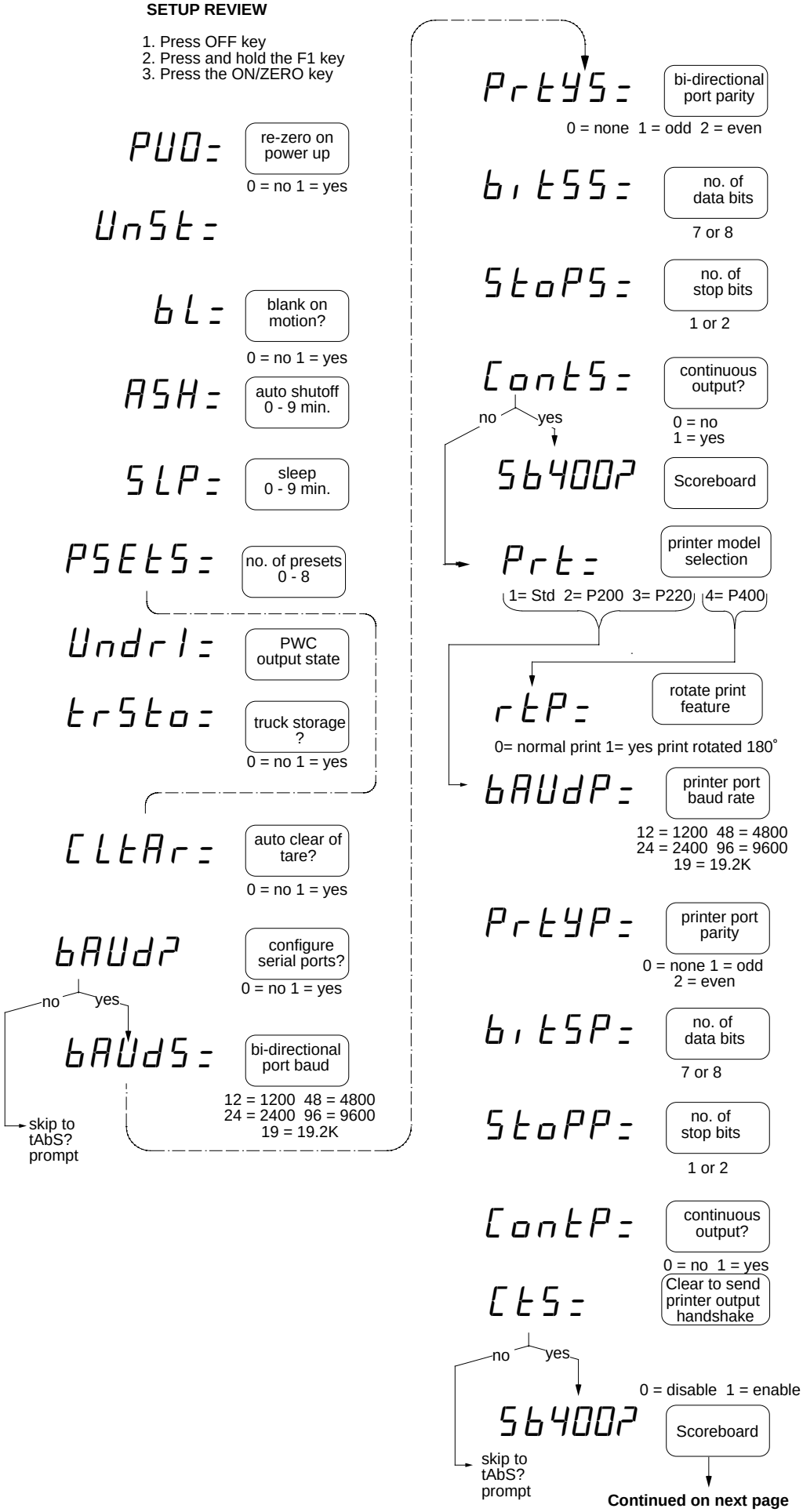
NOTE: By pressing the **PRINT** key, setup review will jump to the Pr t- prompt.

AUTOMATIC SHUTOFF
This feature will automatically turn the 748 off after a predetermined period of inactivity. To turn the instrument back on you must press the **ON/ZERO** key. See ASH- on SETUP REVIEW chart.

SLEEP MODE
If this feature is enabled, the load cell excitation will be reduced and the display will be reduced to one scrolling segment after remaining at zero for the selected time (1 - 9 minutes). Unlike the Automatic Shutoff feature which only requires that there be no motion on the indicator to activate, the Sleep feature requires that the indicator remain at zero (0) to activate. See SLP- on SETUP REVIEW chart.

SETUP REVIEW

1. Press OFF key
2. Press and hold the F1 key
3. Press the ON/ZERO key



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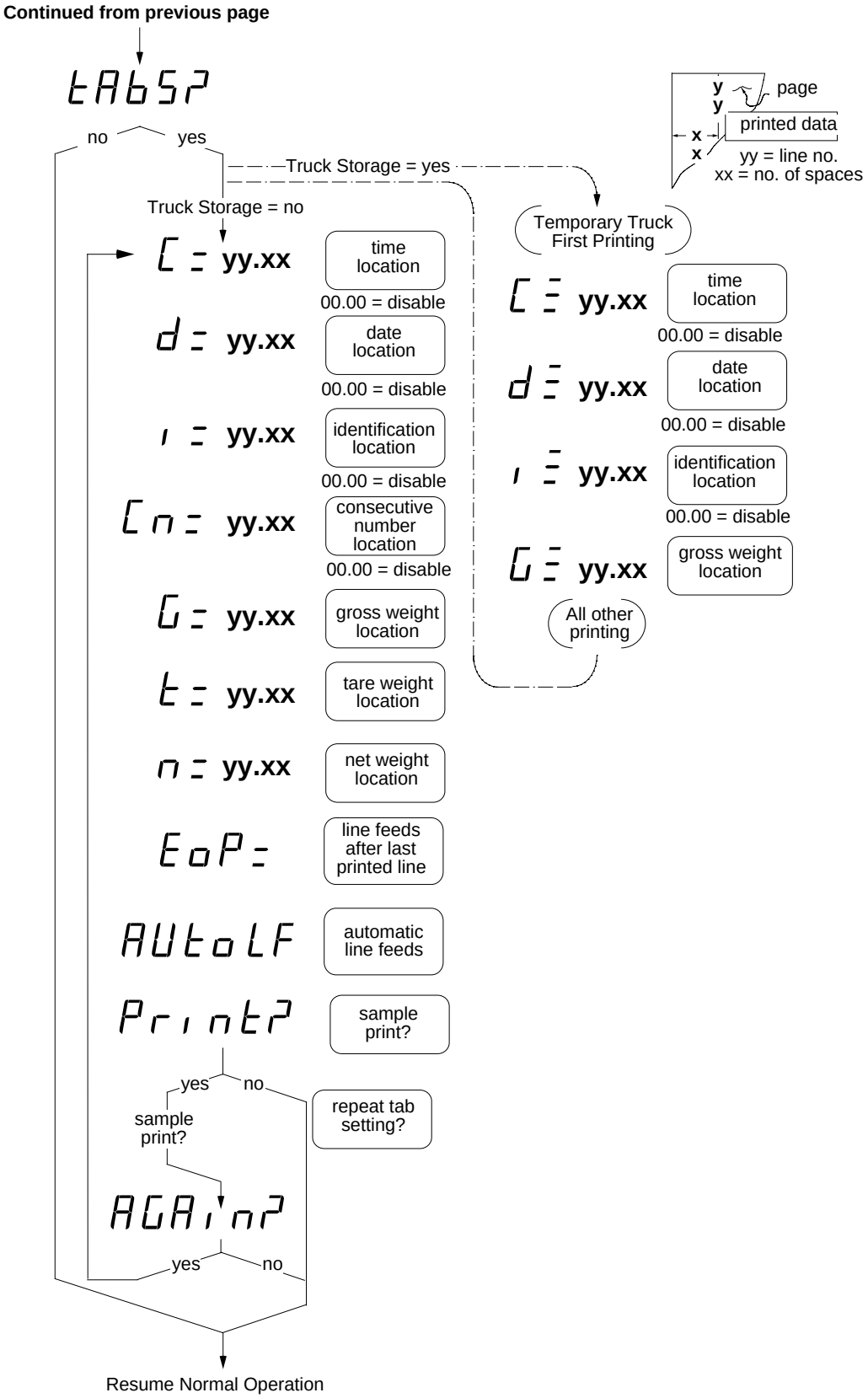

Continued from previous page
tAbSP
no
yes
Truck Storage = yes
Truck Storage = no
y
y
page
printed data
x
x
yy = line no.
xx = no. of spaces
C = yy.xx
time location
00.00 = disable
d = yy.xx
date location
00.00 = disable
i = yy.xx
identification location
00.00 = disable
Cn = yy.xx
consecutive number location
00.00 = disable
G = yy.xx
gross weight location
t = yy.xx
tare weight location
n = yy.xx
net weight location
EoP=
line feeds after last printed line
AUtoLF
automatic line feeds
PrintP
sample print?
yes
no
sample print?
repeat tab setting?
AGAinP
yes
no
Resume Normal Operation
Temporary Truck First Printing
C = yy.xx
time location
00.00 = disable
d = yy.xx
date location
00.00 = disable
i = yy.xx
identification location
00.00 = disable
G = yy.xx
gross weight location
All other printing

KEYPAD FUNCTIONS

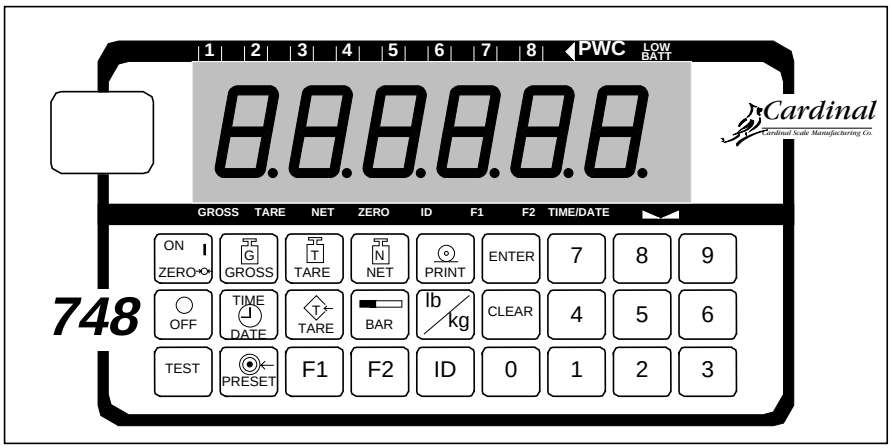
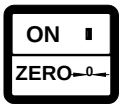


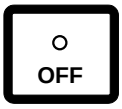
figure no. 13 - keyboard layout

The 748 is equipped with a 27-key keypad. The keypad is used to enter commands and data into the instrument. This section describes each key along with its normal function. It is helpful to refer to the actual instrument while reading this section.

The membrane keyboard is not to be operated with pointed objects (pencils, pens, fingernails, etc). Damage to keyboard resulting from this practice will NOT be covered under warranty.



ON-ZERO KEY
This key performs two (2) functions. Pressing it when the 748 is off will apply power to the instrument. Pressing it when the 748 is on will cause an immediate zeroing of the weight display up to the selected limit of 4% or 100% of the scale's capacity. This selection is made during the setup and calibration of the instrument.



OFF KEY
Pressing this key will turn the 748 off.

TEST KEY
The **TEST** key is used to conduct a test of all display elements. The test consists of six (6) cycles, each lasting two (2) seconds:

1. All horizontal segments and the left 1/3 of the bar graph will turn on (no annunciators).
2. All vertical segments and the center 1/3 of the bar graph will turn on (no annunciators).
3. All annunciators, decimal points and the right 1/3 of the bar graph will turn on.
4. All display elements off.
5. The calibration numbers (C1 - C4).
6. The model no. 748 and the software version X.X.

Following the display test, four (4) calibration numbers (C1, C2, C3 and C4) will be indicated in sequence. These numbers correspond to the settings of the setup parameters as well as the calibration setting of the indicator. It is a good idea to copy these numbers down and place them in a safe location AFTER completion of the calibration process.

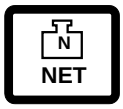
GROSS KEY
The **GROSS** key will cause the weight display to return to the Gross Weight mode. The *Gross* annunciator will be turned on.

Blue

TARE KEY
There are two (2) **TARE** keys on the 748. The top (blue) T**ARE** key is used to momentarily display the stored tare value. The other **TARE** key (red) is used to enter a new tare weight value. If the push button tare is enabled during setup and calibration, pressing the red **TARE** key will cause the current gross weight to be stored as the new tare weight and cause the weight display to change to the net weight display mode (*Net* annunciator turned on). If the push button tare feature was not enabled, pressing the red **TARE** key will cause the current value of the tare weight to be displayed (*Tare* annunciator turned on). The tare weight may be

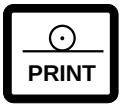
Red

retained by pressing the **ENTER** key or may be changed by keying in the new tare weight value and pressing the **ENTER** key. You may also store the current gross weight as the new tare value by simply pressing the **GROSS** key then pressing the **ENTER** key. Once a tare weight has been entered the display will automatically change to the net weight display mode. **NOTE:** tare weights equal to or greater than the scale capacity cannot be entered.



NET KEY

Pressing the **NET** key will cause the 748 to enter the Net Weight Display mode (*Net* annunciator turned on). If a valid tare weight has not been entered, the 748 will ignore this command.



PRINT KEY

Pressing this key will initiate the transmission of weight data via the printer output port unless the continuous data feature of this port was enabled during setup and calibration. Note that the 748 will not respond to this command unless the weight display is stable and not less than zero. If displaying gross weight, the only weight printed is gross weight. If displaying net weight, the gross, tare, and net weights are printed. Pressing this key during calibration or review will step to the bAUdr prompt.

TIME-DATE KEY

Pressing the **TIME-DATE** key will display the current time. If the time displayed is correct, press **ENTER** to display the date. Note that the time is displayed in a 24 hour format with 12 added to all times after noon, i.e. 3 PM would be 1500. If the time displayed is incorrect, use the numeric keys to enter the correct time and press the **ENTER** key to reset the time and display the date. If the date displayed is correct, press the **ENTER** key to display the consecutive number. If the displayed date is incorrect, use the numeric keys to enter the correct date* and press the **ENTER** key to display the consecutive number. If the consecutive number displayed is correct, press the **ENTER** key to resume normal operation. If the consecutive number displayed is incorrect, use the numeric keys to enter the correct consecutive number (up to six (6) digits) and press the **ENTER** key to resume normal operation.

* Remember to enter the date in the same format (month-day-year or day-month-year) as was selected by the placement of the DOM/INT jumper on the printed circuit board. In the DOM setting, the date format is month-day-year.

NOTE: The *Time-Date* annunciator will blink while the 748 is displaying the time or date and the *ID* annunciator will blink while displaying the consecutive number.

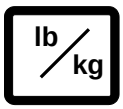
BAR KEY

The **BAR** key is used to control the operation of the 30-element bar graph display. If the bar graph is currently used to display the preset weight comparator status (*PWC* annunciator turned on), pressing this key will return the bar graph to a weight display mode *(PWC* annunciator turned off). In this weight display mode, the bar graph presents an analog representation of a preselected range of weight. If the *PWC* annunciator is off when the **BAR** key is pressed, (bar graph displaying weight), the 748 will allow entry of the bar graph start and stop weights.

Pressing the **BAR** key with the *PWC* annunciator off will result by showing StArt:. Press the **ENTER** key to view the current value of weight where the analog display is to begin. If the weight is correct, press the **ENTER** key to save it, otherwise enter the correct start weight using the numeric keys and press the **ENTER** key to save the new value. The display will now show StoP: which is the prompt for the stop weight or the right end of the bar graph display. Press the **ENTER** key to display the current value of stop weight. If the weight is correct, press the **ENTER** key, otherwise use the numeric keys to enter the new value of stop weights and press the **ENTER** key. The 748 will now resume normal operation using the new start and stop weight values for the bar graph display. Note that when the displayed weight equals the start weight, the left most bar graph element will turn on. As the weight increases, additional bar graph elements will be turned on until the stop weight is reached at which time the right most bar graph element will be turned on. Note that the start and

stop weights may be any value but must be greater than zero and the stop weight must exceed the start weight.

With the *PWC* annunciator turned on, the bar graph elements are used to display the status of the preset weight comparators. When the displayed weight equals or exceeds the value of the weight preset, the two (2) bar graph elements directly beneath the corresponding preset number will be turned on. A maximum of eight (8) preset weight comparators are available.



lb/kg KEY
Pressing this key will change the weighing units to the alternate units if selected during the setup and calibration of the instrument. With pounds displayed (*lb* annunciator turned on) pressing this key will change the weight units to kilograms and the *kg* annunciator will be turned on. Note that this feature must be enabled during setup of the 748.

PRESET KEY
This key performs two (2) functions. If the *PWC* annunciator is turned off when this key is pressed, the bar graph display mode will be changed to show preset weight comparator status and the *PWC* annunciator will be turned on. If the *PWC* annunciator is turned on when this key is pressed, it will allow the target weights for the presets to be entered. This display will show PSEtx- where x is the preset number and can range from 1 to 8 depending on the number of preset weight comparators enabled during setup of the 748. Press the **ENTER** key to display the currently stored value of preset weight. If the weight is correct, press the **ENTER** key to advance to the Trim value. If the weight is incorrect, use the numeric keys to enter the correct weight then press the **ENTER** key to save it and advance to the Trim value. The display will then show trx- which asks for the trim weight for the corresponding preset weight comparator. Note that the x in the display refers to the preset weight comparator number and will vary from 1 to 8. Press **ENTER** to display the stored value of trim. If the Trim value is correct, press the **ENTER** key again to save it. If not, use the numeric keys to enter the correct Trim value and press **ENTER** to save it and advance to the next preset weight comparator. Remember that the trim weight is used to compensate for material in transit and causes the preset to turn on when the displayed weight equals or exceeds the Preset weight value LESS its associated Trim weight value. Also remember that the preset is based on the displayed weight which can be either gross or net weight.

This procedure is repeated for each of the enabled preset weight comparators. During entry of preset and trim weights, the two bar graph elements corresponding to that preset weight comparator will flash. After all selected preset weight comparators have been reviewed, the 748 will return to normal operation. This procedure may be stopped by pressing **CLEAR** on PSEtx- prompt (i.e. after setting PSEt3-, press **CLEAR** to not ask for 4-8).

CLEAR KEY
The **CLEAR** key is used to clear an incorrect entry from the display. If an incorrect entry is made, press the **CLEAR** key and re-enter the correct value. Note that once the **ENTER** key has been pressed, the **CLEAR** key can no longer be used to correct that particular entry.

ENTER KEY
The **ENTER** key serves two (2) purposes. First, when reviewing setup parameters, pressing the **ENTER** key will cause the current setting of the parameter to be displayed. Second, the **ENTER** key is used to signal completion of the entry of data and causes the 748 to process the data entered.

F1 AND F2 KEYS
These keys are used with the Truck Storage feature and serve as function keys. Refer to the TRUCK STORAGE OPERATION section for additional information.

ID KEY
This key is used to display and enter identification numbers for use in printing and in the Truck Storage feature. If the Truck Storage feature was not enabled during the setup and calibration of the instrument, pressing this key will display the current setting of the identification number. If the displayed number is correct, press the **ENTER** key to retain it. If you choose to change the identification number, use the numeric keys to enter up to a six (6) digit identification number and press the **ENTER** key to save it. Note that the *ID* annunciator is turned on when the display is showing an identification number.

0 THROUGH 9 KEYS
These keys are used to enter numeric data during the setup and calibration as well as during normal operation of the instrument.

ANNUNCIATORS

Note that annunciators are turned on to indicate that the display is in the mode corresponding to the annunciator label and that the annunciators flash on and off to indicate that the 748 is waiting for an input from the keyboard for the mode indicated by the flashing annunciator.

GROSS
The *GROSS* annunciator is turned on to indicate that the displayed weight is the gross weight.

TARE
The *TARE* annunciator is turned on to show that the displayed weight is the tare weight.

NET
The *NET* annunciator is turned on to show that the displayed weight is the net weight (gross weight less tare weight).

ZERO
The *ZERO* annunciator is turned on to indicate that the weight is within +/- 1/4 division of the center of zero.

ID
The *ID* annunciator is turned on to indicate that the value displayed is the identification number currently in use.

F1 and F2
The *F1* and *F2* annunciators are used in conjunction with the Truck Storage feature. Refer to the TRUCK STORAGE OPERATION section of this manual for a detailed description of their function.

TIME-DATE
The *TIME/DATE* annunciator is turned on when the display is showing either the time or date.

STABLE
The *STABLE* annunciator is identified with two (2) small triangle shapes and is turned on when the weight display is stable. This means that the change in successive weight samples is less than the motion limits selected during setup and calibration of the instrument.

PWC
The *PWC* annunciator is turned on to indicate that the bar graph elements under the numerals 1 through 8 to the left of the arrow are being used to indicate the preset weight comparator status. When this annunciator is turned off, the bar graph is used to present an analog representation of a selected portion of the weight range.

1 THROUGH 8
These annunciators are actually part of the bar graph display elements. With the PWC annunciator turned on, two (2) bar graph display elements, located beneath each of the eight (8) preset weight numbers, are turned on to indicate that the displayed weight equals or exceeds the corresponding Preset weight comparator value less its Trim weight value.

TRUCK STORAGE OPERATION

Note that the truck storage feature must have been enabled during setup and calibration of the 748 to be operational. If it was not enabled the following functions CANNOT be performed. **NOTE:** The truck storage is disabled if the Dual Ranging Feature has been selected and the decimal point setting for the High Interval differs from the decimal point setting for the Low Interval.

WEIGH IN/WEIGH OUT OPERATION

Weigh in/weigh out operation is accomplished by enabling the TRKSTO option during Setup and Calibration and using Temporary Truck ID numbers. Do not use the Permanent Truck ID numbers for weigh in/weigh out operations.

TEMPORARY TRUCK ID NUMBERS

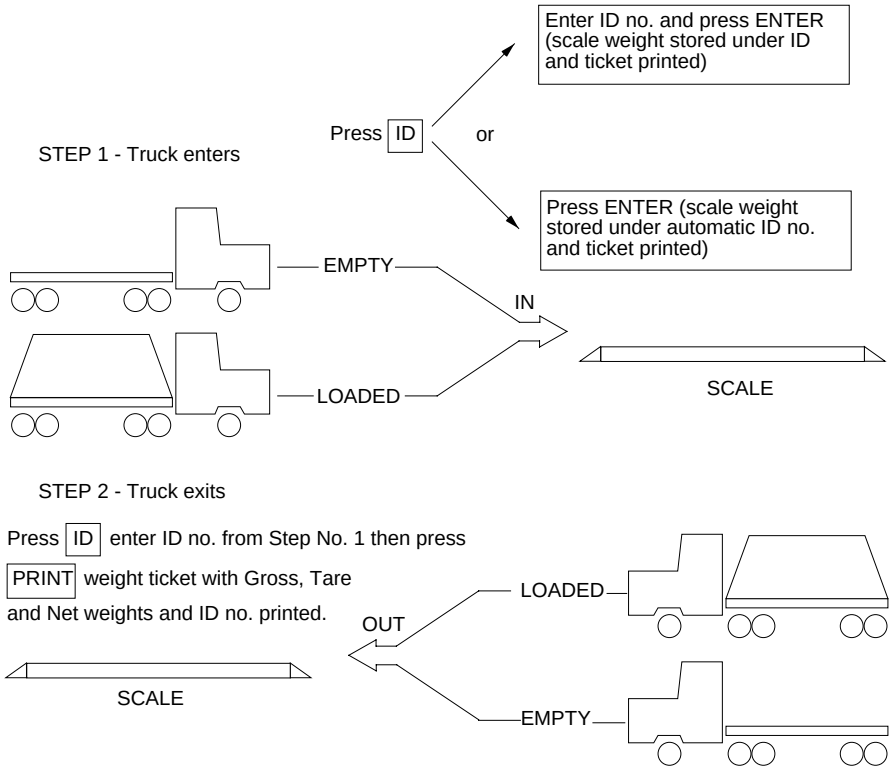
To Store a Temporary Truck Identification and Print a Ticket:

Press **ID**. The *ID* annunciator will flash. Enter up to a six (6)-digit identification number and press the **ENTER** key. The 748 will store the current scale weight under this identification number and print a ticket. If the display shows $Error$, the identification number entered already exists and you must enter a different number.

To Automatically Assign a Temporary Truck Identification Number:

Press **ID**. The *ID* annunciator will flash. Press **ENTER**. A temporary identification number will be assigned to the truck and the truck's weight stored. A temporary ticket showing the identification number and truck weight will be printed.

NOTE! Temporary identification numbers are used when the truck is not a regular visitor to the scale. If the truck is a frequent visitor to the scale, a permanent identification number should be assigned to the truck



PERMANENT TRUCK ID NUMBERS

To Add or Edit Permanent Truck Identification Numbers:

1. Press the **F1** key. The *ID* and *F1* annunciators will flash.
2. Enter up to a six (6)-digit identification number and press **ENTER**.
3. The display will show Stor and the *F1* annunciator will flash.
4. Press the **ENTER** key to view the current value of weight stored, or the scale weight if no weight is stored, for this ID number. This weight value is the tare or empty weight of the truck.
5. If the displayed value is correct, press **ENTER** and proceed to step 7.
6. If the value displayed is in incorrect, key in the correct weight value and press the **ENTER** key.
7. The display will now show ACC.
8. Press **ENTER** to display the current value of the accumulator associated with the ID number.
9. If the displayed value is to remain unchanged, press **ENTER**.
10. To reset the accumulator to zero, press **CLEAR**.

To Print a Permanent Truck Identification Number:

1. Press the **F1** key. The *F1* and *ID* annunciators will flash.
2. Key in the desired identification number and press **PRINT**.
3. A ticket containing the stored weight and accumulated weight along with the ID number will be printed.
4. If the ID number entered does not exist, the display will flash ErrorNr and the 748 will return to normal operation.

To Delete a Permanent Truck Identification Number:

1. Press the **F1** key. The *F1* and *ID* annunciators will flash.
2. Enter the identification number to be deleted then press the **F2** key.
3. The ID number entered along with its associated accumulator will be deleted.
4. The display will then request the next ID number to be deleted.
5. Repeat step two (2) for all ID numbers to be deleted.
6. Press the **F1** key to exit after all desired ID numbers have been deleted.

To Delete ALL Permanent Truck Identification Numbers:

1. Press the **F1** key. The *F1* and *ID* annunciators will flash.
2. Press the **CLEAR** key.
3. The display will show ALL, which asks if all ID numbers are to be deleted.
4. Press the **ENTER** key.
5. The display will show no.
6. To delete all ID numbers, press the **1** key to change the display to YES, then press **ENTER**.
7. If deleting all ID numbers is not desired, with the display showing nO, press the **ENTER** key to return to the ID entry mode indicated by the flashing *F1* and *ID* annunciators.
8. In either case, to exit and return to normal operation, press **F1**.

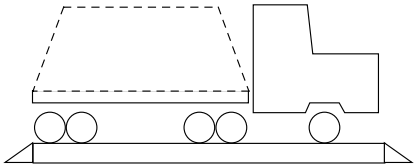
To Clear All Accumulators:

1. Press the **F1** key. The *F1* and *ID* annunciators will flash.
2. Press **ENTER** then press the **CLEAR** key.
3. The display will show ALL which asks if all accumulators are to be cleared.
4. Press **ENTER**.
5. The display will show nO.
6. To clear all accumulators, press the **1** key to change the display to YES, then press **ENTER**.
7. If clearing all the accumulators is not desired, with the display showing nO, press the **ENTER** key to return to the ID entry mode indicated by the flashing *F1* and *ID* annunciators.
8. In either case, to exit and return to normal operation, press the **F1** key.

To Print All Truck ID Numbers:

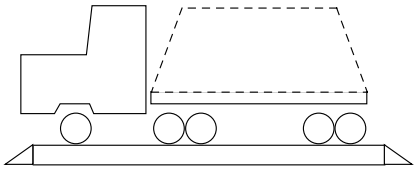
1. Press the **F1** key. The *F1* and *ID* annunciators will flash.
2. Press the **PRINT** key.
3. The display will show Pr int while the printer records all currently stored ID numbers.

Inbound - empty or loaded



SCALE

Outbound - empty or loaded



SCALE

PERMANENT ID NUMBER USE

Step 1- Enter truck permanent ID and tare weight.
Press **F1**
Enter ID number to be assigned
Press **ENTER** - display shows StO=
Press **ENTER** to display value stored in memory or scale weight
Press **GROSS** to enter the scale weight or key-in value
Press **ENTER** - display shows ACC=
Press **ENTER** to show accumulator
Press **ENTER** to save or **CLEAR** to reset and press **ENTER**
Repeat step 1 for all permanent trucks.

Step 2 - Process trucks as required.

Truck pulls on scale
Press **ID**
Enter ID number assigned to truck (see step 1)
Press **PRINT**
Printer records gross, tare, net and accumulated new weights and ID number

NOTE! Regardless of whether the truck to be processed has a temporary or permanent ID number, it is processed in the same manner: Press **ID**, key-in ID number, press **PRINT**.

ERROR CODES

The 748 is equipped with software that indicates when an error in the operation takes place. The following lists the error code displays supported by the 748 along with their meaning. Should you encounter an error display, please refer to this list for the cause.

UnStb — Motion is present when trying to power up, print, zero or perform a push button tare function. CORRECTIVE ACTION: wait for a stable weight display (*STABLE* annunciator on) before performing any of these operations.

UnLod — The weight on the scale exceeds the zero range when powering up. CORRECTIVE ACTION: remove the excess load then press the **ON/ZERO** key.

LoAd — The scale deadload is less than the zero range when powering up. CORRECTIVE ACTION: replace the scale platform or items normally on the scale then press the **ON/ZERO** key.

oF — The 748 is attempting to display a positive number greater than six (6) digits in length or a negative number of more than five (5) digits. CORRECTIVE ACTION: return to Gross Weight mode and review Tare value. May indicate miscalibration.

oL — The load on the scale exceeds the scale capacity plus nine (9) divisions. CORRECTIVE ACTION: remove the over capacity load from the scale platform. May indicate miscalibration.

CALb — EEPROM checksum failure. CORRECTIVE ACTION: recalibrate with “C” numbers or weight.

Error

An invalid keypad entry was attempted:

A. **PRINT** key pressed with a negative weight.
B. **TARE** key pressed to enter a Push button tare value of zero or of a negative value.
C. **ENTER** key pressed to enter a Tare weight value that exceeds the scale capacity.
D. **ENTER** key pressed to enter a Tare weight value that is inconsistent with the scale's division value (i.e. attempt to enter a tare of 123 with scale divisions of 5).
E. **ZERO** key pressed when the gross weight is outside the scale zero weight range.
F. **lb/kg** key pressed to change to kilograms when the kilogram Tare weight value exceeds four (4) digits in length.

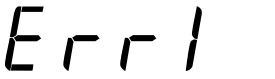
CORRECTIVE ACTION: determine which of the reasons for the error display is applicable and take the appropriate corrective action.

Analog Error High

1. The load cell input is above the range of the indicator. CORRECTIVE ACTION: Check for improper load cell wiring, excessive load, and for output of 1 to 50mV.
2. Load cell or circuit failure. CORRECTIVE ACTION: consult your scale serviceman.

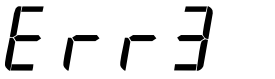
Analog Error Low

1. The load cell input is below the range of the indicator. CORRECTIVE ACTION: Check for improper load cell wiring and for output of 1 to 50mV.
2. Load cell or circuit failure. CORRECTIVE ACTION: consult your scale serviceman.

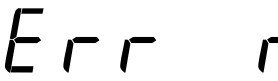


A program checksum mismatch has been detected. CORRECTIVE ACTION: consult your scale serviceman.

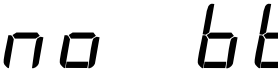
An illegal write to the NOVRAM has been detected. CORRECTIVE ACTION: consult your scale serviceman.



Internal RAM failure. CORRECTIVE ACTION: consult your scale serviceman.



The RAM test has detected one or more failures in the external 748 RAM memory. CORRECTIVE ACTION: consult your scale serviceman.



No battery-backed RAM. The time and date, zero dead load, DAC output calibration, and truck file data has been lost. Operation may proceed by pressing the **CLEAR** key and re-entering the lost data, but the data will be lost when power is removed from the instrument. Consult your scale serviceman to replace the RAM and clock battery-backed IC.

CARE AND CLEANING

1. **DO NOT** submerge indicator in water, pour or spray water directly on instrument.
2. **DO NOT** use acetone, thinner, or other volatile solvents for cleaning.
3. **DO NOT** expose equipment to temperature extremes.
4. **DO NOT** place equipment in front of heating/cooling vents.
5. **DO** clean the indicator with a damp, soft cloth and mild non-abrasive detergent.
6. **DO** remove power before cleaning with a damp cloth.
6. **DO** provide clean AC power and adequate protection against lightning damage.
6. **DO** keep the surroundings clear to provide clean and adequate air circulation.

APPENDIX A I/O OPTION INSTALLATION

This appendix describes the installation of the optional I/O interfaces. This option consists of both a 0 to 10 volt and 4 to 20 MA analog output, a BCD output and eight (8) programmable inputs.

ANALOG OUTPUT

The analog output is an analog representation of the displayed weight. Connections are made via a 9-pin “D” connector located on the back of the instrument. The maximum load resistance for the current output is 500 ohms while the minimum load resistance for the voltage output is 2K ohms. Refer to figure no. 14 for the pin layout for the connector.

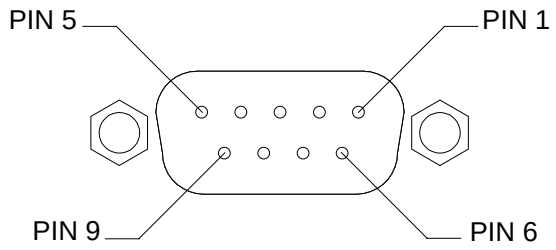


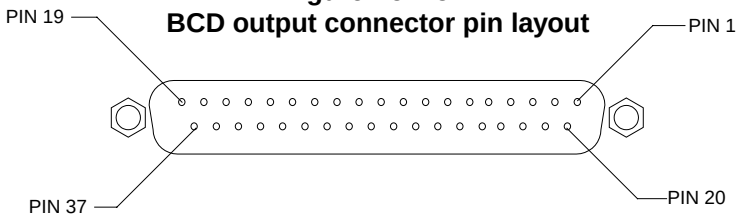
figure no. 14 - analog output connector pin layout

PIN NUMBER	FUNCTION
1	4 to 20 milliampere output
2	not used
3	not used
4	not used
5	0 to 10 VDC output
6	common
7	common
8	common
9	common

BCD OUTPUT

The BCD output provides a parallel logic-level BCD output of the displayed weight. Additional status signals are included. Connections are via a 37-pin “D” connector. Refer to figure no. 15 for the pin layout of this connector.

figure no. 15 -
BCD output connector pin layout



PIN NO.	FUNCTION	PIN NO.	FUNCTION	PIN NO.	FUNCTION
1	ground	8	800	15	gross*/net
20	ground	27	400	34	aux. out
2	800K	9	200	16	aux. in
21	400K	28	100	35	+polarity*
3	200K	10	80	17	data valid
22	100K	29	40	36	over cap.*
4	80K	11	20	18	print
23	40K	30	10	37	input spec.
5	20K	12	8	19	VCC out (200 OHM current limit)
24	10K	31	4		
6	8K	13	2		
25	4K	32	1		
7	2K	14	motion		
26	1K	33	lb*/kg		

NOTE! * indicates a high level when function is true.

OPTICALLY ISOLATED INPUTS

Included with the I/O option are eight (8) programmable inputs that may be used to remotely (up to 100 feet) initiate various functions within the 748. These inputs are accessed via the 15-pin "D" series connector on the back of the instrument enclosure. Four (4) of the inputs are defined while the remaining four (4) are available for special applications and will vary from application to application. Of the four (4) that are defined, one is for Zero, another is for Tare, the third is for Print, and the fourth is for Gross. Figure no. 16 illustrates the layout of this connector and identifies the inputs for Zero, Tare, Print and Gross. Remember that the input must be connected to Gnd to initiate the function.

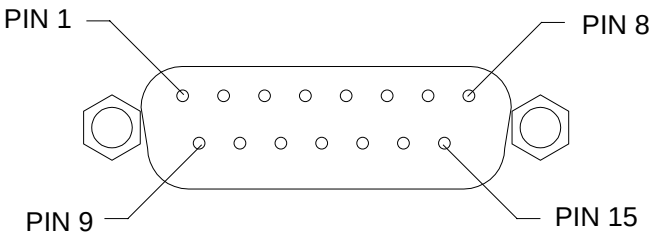


figure no. 16 - logic level connector layout

PIN NUMBER	FUNCTION
1	Zero
9	Tare
2	Print
10	Gross
3	
11	
4	
12	
5	Gnd
13	Gnd

CALIBRATION OF THE ANALOG OUTPUT

The analog output has been calibrated at the factory and should require no other adjustment. If, for some reason, it is found necessary or desirable to readjust this output, the procedure listed below may be used. Note that in order to calibrate the analog output, it is first necessary to enter the Calibration mode by gaining access to the calibration switch. Refer to the CALIBRATION section of this manual for additional information. When the 748 senses that the optional I/O board is present, it will cause the calibration sequence to include the steps necessary to calibrate the analog output. The following describes that process:

Step 1 The display will show CALdAC.

Step 2 Press the **ENTER** key and the display will show NO. If you press **ENTER** at this point, the analog output calibration process will be ended. Press the **1** key to change the display to YES to proceed with Step 3 of the analog output calibration, or press the **0** key to change the display back to no. Press **ENTER**.

Step 3 The display will show bH 0=, the weight below zero for the analog output to be minimum (0 volts or 4 MA). Press **ENTER** to display the displayed setting. Press **ENTER** to store displayed setting, or enter the desired weight and press **ENTER**.

Step 4 The display will show dAC H=, the maximum voltage to be output at capacity. Press **ENTER** to display the displayed setting. Press **ENTER** to store the displayed setting or enter the desired value 00.000 to 10.000 and press **ENTER**.

If the maximum voltage is known, the current output will be:

$$\text{Current} = \left(\frac{\text{setting}}{10}\right) \times 16 + 4 \text{ (mA)}$$

If the maximum current is known, the dAC H= setting will be:

$$\text{dAC H=} \left(\frac{\text{mA} - 4}{16}\right) \times 10 \text{ (volts)}$$

00.000	=	4.0mA
5.000	=	12.0mA
10.000	=	20.0mA

Step 5 The display will show dAC Hi. The voltage and current output will be set to the value entered in Step 4. Adjust the VOLTAGE potentiometer on the I/O board to set the voltage. The SPAN potentiometer may also be used at this time to adjust the current output. These adjustments are shown in figure no. 17. After the adjustment is complete, press the **ENTER** key.

Step 6 The display will show dAC Lo. The voltage output will be set to 0 volts and the current output set to 4 mA. Adjust the OFFSET potentiometer on the I/O board to set the voltage output to zero and/or the current output to 4 milliamperes. On completion, press **ENTER**.

Step 7 The 748 will return to Step 1.

NOTE: Because of interaction between the OFFSET and SPAN adjustments, answer YES to Step 1 and repeat calibration until no further adjustment is necessary.

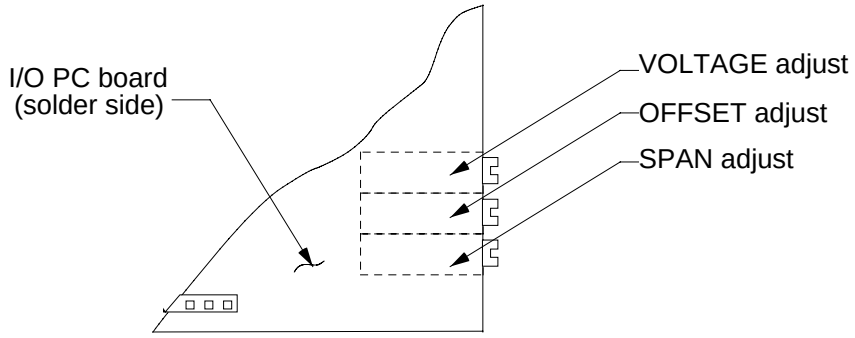
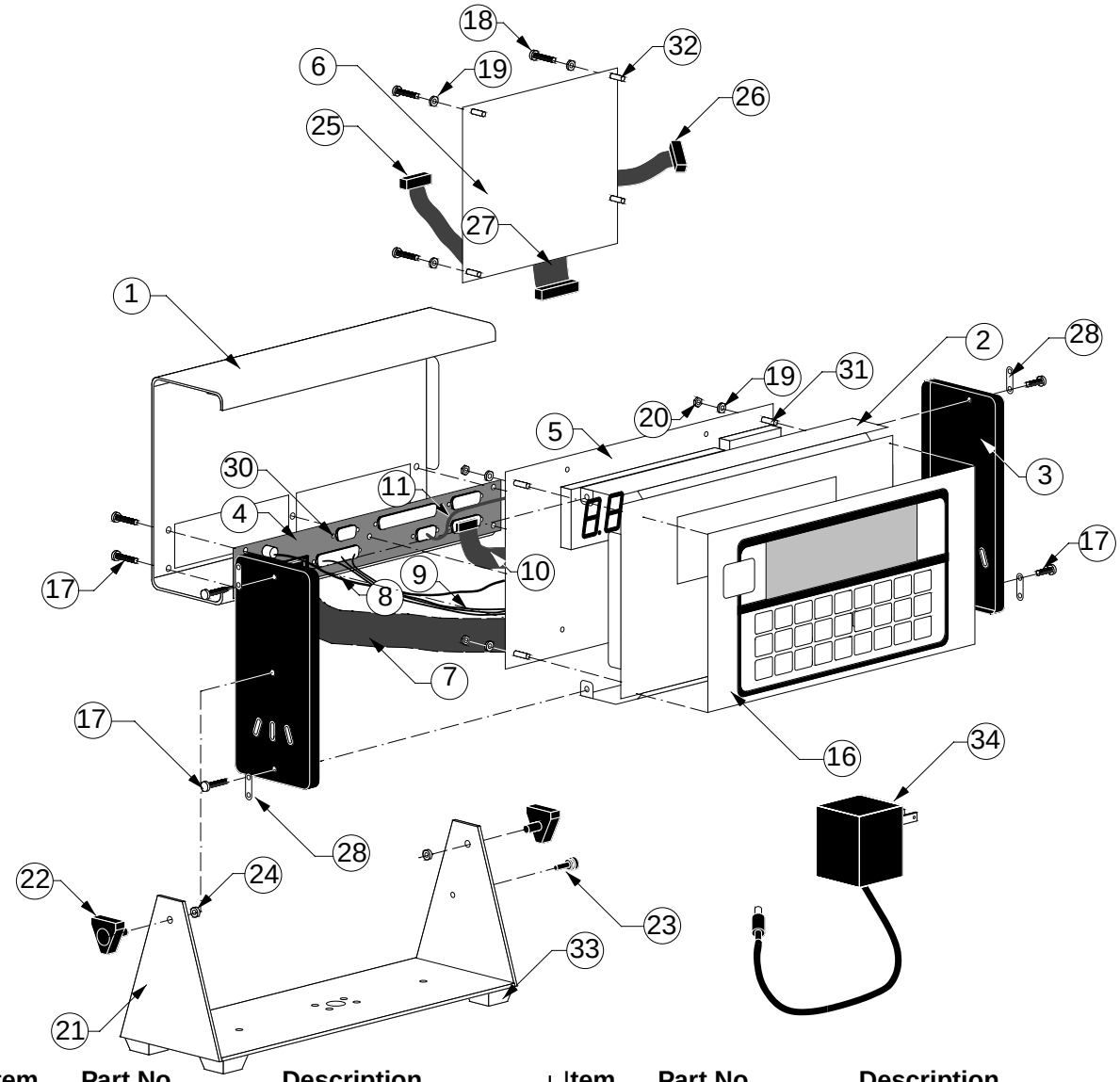


figure no. 17 - analog output calibration adjustment

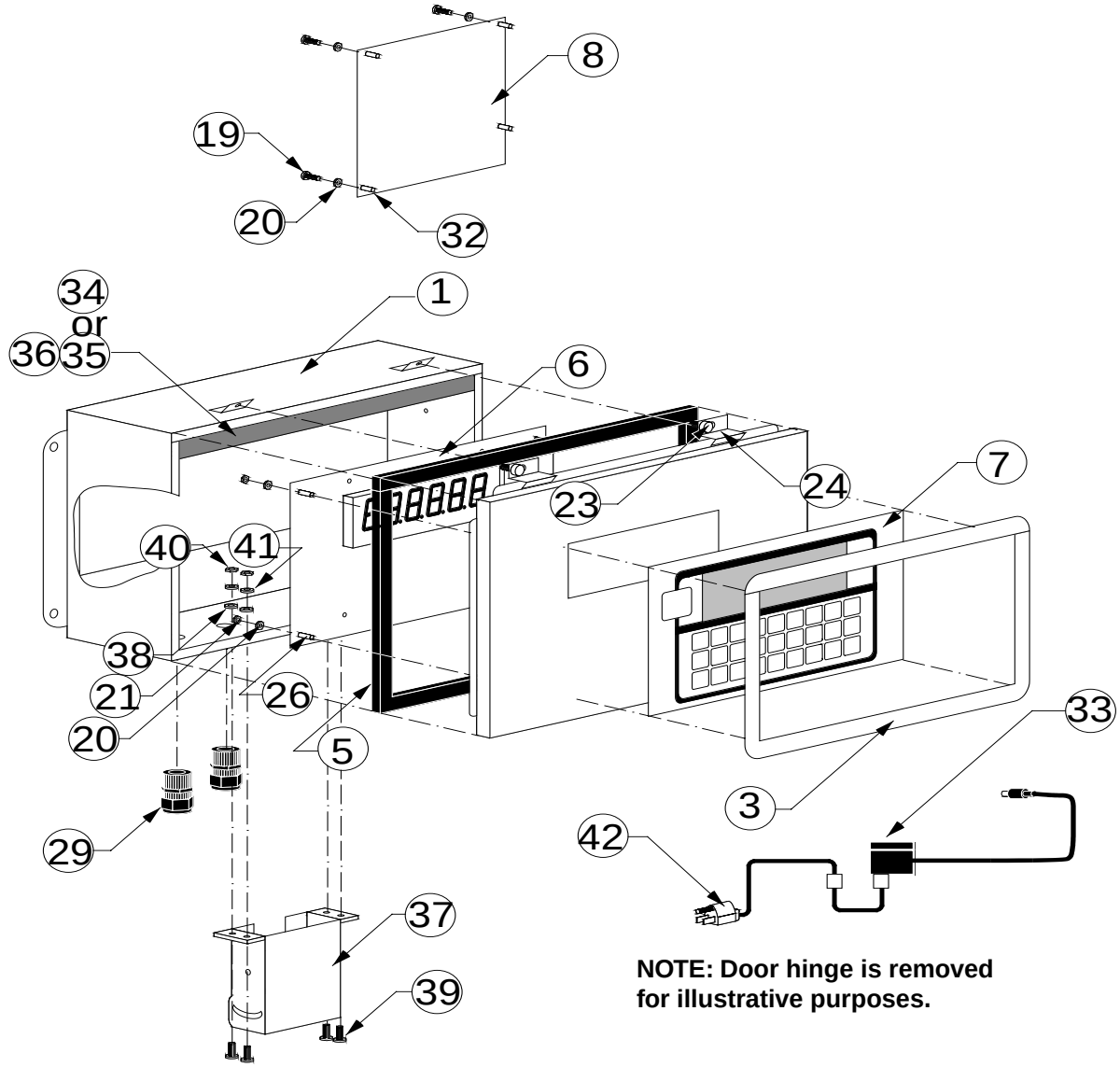
APPENDIX B - PART IDENTIFICATION
figure no. 18 - desktop enclosure



Item	Part No.	Description
1	8539-C009-0A	Back Cover Weldment
2	8539-C010-0A	Front Cover Weldment
3	8539-D005-18	End Cap
4	8539-C011-0A	Connector Panel
5	8539-D094-EA	Main PC Board (LCD)
	8539-D094-FA	Main PC Board (LED)
6	8539-C012-0A	748 Option Board
7	8539-C017-0A	Cable: Duplex Serial
8	8539-B015-0A	Cable: Power Connector
9	8539-B104-0A	Cable: Printer
10	8539-B018-0A	Cable: PWC Output
11	8539-B014-0A	Cable: Load Cell
16	8539-D003-08	Keypad (LCD)
	8539-D003-18	Keypad (LED)
17	6021-1251	Screw Truss Head

Item	Part No.	Description
18	6021-0623	Screw Pan Head
19	6680-0004	Washer Internal
20	6013-0039	Nut Hex 6-32
21	8539-D056-08	Gimbal
22	6540-1052	Knob
23	6021-1199	Thumbscrew
24	6024-0083	Rubber Washer
25	8539-B020-0A	Cable: Analog Output
26	8539-B021-0A	Cable: Remote Input
27	8539-C019-0A	Cable: BCD Output
28	8530-B159-08	Sealing Tab
30	6610-2345	Jack Socket
31	6680-0049	Nylon Spacer .25
32	6680-0121	Nylon Spacer .425
33	6540-1004	Rubber Foot
34	728R90	Power Supply (748)
	728R124	Power Supply (748-A & 748-E)
	6800-1020	Power Supply (748-AV & 748-EV)
	728R901	Power Supply (748-V)

figure no. 19 - NEMA 4X enclosure



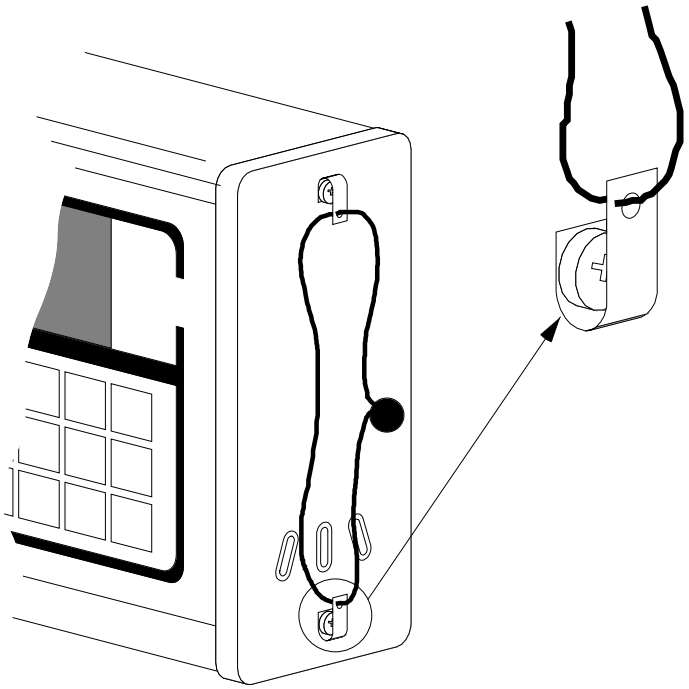
NOTE: Door hinge is removed for illustrative purposes.

Item	Part No.	Description
1	8539-D036-0A	Enclosure Weldment
3	8539-C048-0A	Bezel
5	8530-D114-08	Gasket
6	8539-D094-CA	Main PC Board (LCD)
	8539-D094-DA	Main PC Board (LED)
7	8539-D003-08	Keypad (LCD)
	8539-D003-18	Keypad (LED)
8	8539-C012-0A	748 Option Board
19	6021-0623	Screw, 6-32 x .75
20	6680-0004	Washer Internal
21	6013-0039	Nut Hex 6-32
23	6021-0699	Screw 1/4 -28 x 5/8
24	8530-C088-08	Clamp

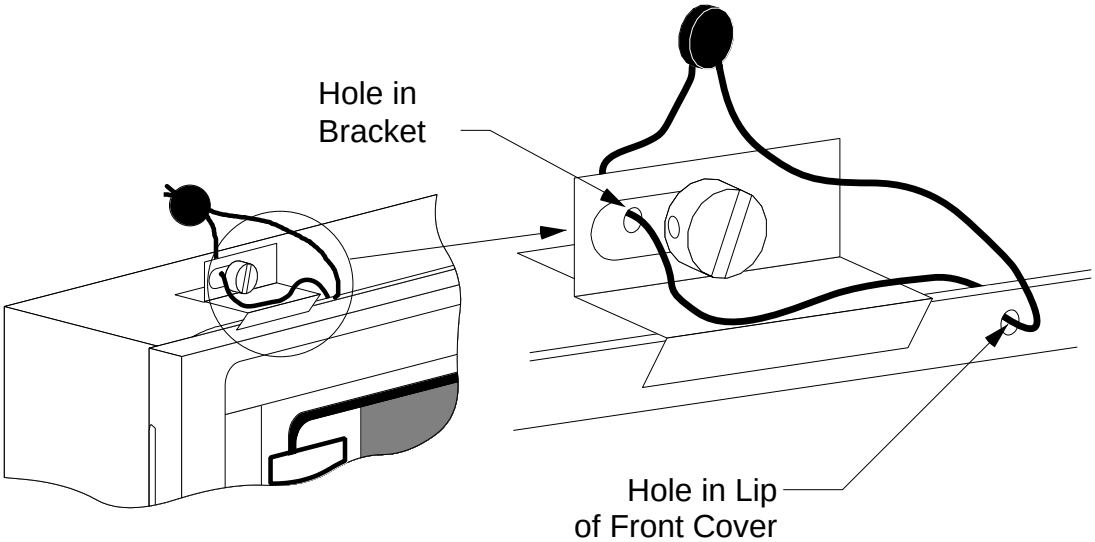
Item	Part No.	Description
26	6680-0049	Spacer Nylon .25
29	6610-2248	Gland Connector
32	6680-0121	Spacer Nylon .425
33	728R90	Power Supply (748-S)
34	8539-C066-0A	4 PWC Relay Assy
35	8539-C067-0A	8 PWC Relay Assy
36	8539-C062-0A	Relay Board Assy
37	8534-D390-08	Mounting Bracket
38	6024-0081	Washer, Rubber
39	6021-1061	Screw, 10-32
40	6013-0297	Hex Nut, #10
41	6024-0037	Lock Washer, #10
42	6980-1014	AC Power Cord

APPENDIX C
CALIBRATION SEAL INSTALLATION

If your Model 748 Weight Indicating Instrument is used in a commercial application it must be tested and sealed by your local weights and measurements official. The 748 is designed to accept a lead and wire security seal to prevent unauthorized access to the calibration adjustments. Installation of this seal differs with the type of enclosure. Refer to the following figures for details on the installation of these seals.



Bend tab over screw head and secure with wire seal. Repeat for the left side endcap.

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IN U.S.A.