WESTERN SCALE CO. LIMITED

OPERATION MANUAL

MODEL DF2500

DIGITAL LOAD CELL

WEIGHMETER

Revision A-2

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About This Manual

This manual describes the installation, calibration and operation of the Model DF2500 Digital Weight Indicator. The manual is divided into sections. Each section provides the information needed to install and use the indicator.

This indicator has many advanced features that will not be required for all installations. If this is your first time installing an indicator, read the Getting Started section. This section provides simplified instructions for getting the indicator running. Once familiar, read the Advanced topics of the Calibration section.

Preface

The DF2500 Digital Weight Indicator is designed to operate with weight sensing devices which incorporate a remote converter. The indicator has no internal converter. It provides power and communications for the remote devices. The remote device may be a digital load cell or a remote converter which complies with the Western Scale Remote Converter Specification.

This indicator cannot be used directly with conventional load cells. Connecting the indicator to conventional load cells without remote converters will damage the indicator and the load cells.

SECTION ONE: GETTING STARTED

Operation

Starting the Indicator

To start the indicator, press [ZERO/ON]. The display will cycle through the indicator's power-up, self-test functions. Each function has a unique display:

[PC]	Program check - verifies the indicator's software.
[r0]	Memory check 0 - verifies the indicator's lower block of random access memory.
[r1]	Memory check 1 - verifies the indicator's upper block of random access memory.
[SP]	Calibration parameter check - verifies the indicator's calibration parameters.
[PL]	Ticket format check - verifies the indicator's preset ticket format.

During these tests, error messages may be displayed. Error messages during tests PC, r0 and r1 indicate a defective indicator. Errors during tests SP and PL will be corrected automatically by retrieving the lost parameters from the indicator's back-up storage. If the indicator is unable to reload its parameters, the display [R1D SP] and [R1D PL] will occur. If this display occurs, the indicator has restored factory default values to the parameters and ticket format. The indicator will require calibration should this occur.

After the self-tests. the display will indicate [888888]. This is the normal power-on display. Push [ZERO] to restore the display. The scale must be empty and within zero range or the display will not clear.

The Keyboard

[ZERO/ON] Push to turn on the indicator if the display is not lit. Turn off the indicator by pressing [SHIFT][ZERO/ON]. When the indicator is running, push to zero the scale. Scale weight must be within zero range, typically 2% of scale capacity, for push to zero to function. When power is first applied, the display will indicate [888888]. This condition can be cleared by pressing [ZERO].

[lb/kg] Push to change units.

[TEST] A multi-function key used to test the indicator and remote converters. Pressing [TEST] will momentarily display [888888] with all annunciators lit. Next the display will momentarily indicate the scale weight. The test button provides a convenient means to display the weight value should the indicator not zero when push to zero is pressed.

The second function of the [TEST] key is for corner diagnostics. Enter the corner to be displayed, 1 through 12, then the [TEST] key. The display cycles as above, except the weight value displayed is the raw count value for the corner selected.

[GROSS/NET] This key toggles between the gross and net display modes. It will only function when a valid tare has been saved.

[TARE/SET] A multi-function key used to save tare weights and set setpoints. Two tare modes are available. Pressing [TARE] with no entered weight will save the current displayed weight as tare. The displayed weight must be stable and positive in order to be saved. If a number has been entered using the numeric keypad, that value will be used as tare. The entered value must not exceed scale capacity. Pressing [SHIFT] then [TARE] will recall the stored tare weight.

Setpoints are entered using the [SHIFT] and [TARE/SET] keys. To view a setpoint, press [SHIFT] (display flashes [S] on the leftmost digit), then the number of the setpoint to view (1 - 6), followed by [TARE/SET]. The setpoint value will display for 5 seconds. To change the setpoint, follow the procedure above to display the setpoint, then enter the setpoint value and press [TARE/SET]. The new value will be saved.

[ADD/TOTAL] The [ADD/TOTAL] key is used for the internal accumulator. To add the current displayed value to the accumulator, press the [ADD/TOTAL]. The current value of the accumulator will be displayed for 5 seconds. To display the current total, press [SHIFT] then [ADD/TOTAL]. The total will display for 5 seconds. During this display time, if you press the [ADD/TOTAL] key again, the number of additions will be displayed. If you press [CLR] while the total is being displayed, the total will be cleared.

[SHIFT] The shift key is used for multiple key functions described under each key.

[P] The print key is used for several printing related functions, depending on which print formats were selected during calibration. Contact your scale installer for information on the print configuration for your indicator.

[CLR] The [CLR] key will clear values entered using the numeric keypad. If no value has been entered, pressing [CLR] will clear the stored tare value. The [CLR] key can also clear the indicator's accumulator (see the [ADD/TOTAL] key for details.

The Display

The display allows for up to 6 digits of resolution. The leftmost digit also displays a mode signal and the sign. A flashing [S] in the mode digit indicates the shift key has been pressed. It will clear automatically when a function has been selected, or, after 10 seconds. A flashing [C] indicates the indicator is in Calibration mode. See the Calibration and Error Messages section of this manual for more information.

A row of annunciators below the numeric display provides the indicator status:

[MTN]	Weight is in motion.
[1]	Optional function.
[2]	Optional function.
[FLT]	Remote converter fault.
[CZ]	Indicator is centered at zero.
[NET]	Display is in Net mode.
[lb]	Units are pounds.
[kg]	Units are kilograms.

Set-Up

This section will step you through the installation of the indicator. Before beginning, take time to plan the installation. You will require the following information to plan your installation:

1. The model, serial numbers and load cell capacity of the remote converters to be connected to the indicator.

Corner	Serial Number	Load Cell Capacity	Full Scale Output
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

2) The distance between the indicator and the remote converters:

Cable distance _____

Wire size _____

3) The calibration information for the scale:

Number of load cells _____

Total load cell capacity _____

Graduation size _____

Decimal point position _____

Scale capacity _____

4) The location of the indicator:

The location of the indicator is important. It should be easily visible to the operator. It should not be in direct sunlight. Direct sunlight may overheat the indicator or damage the Lexan keyboard. The location should be dry and reasonably clean. Effort should be taken to control discharges of static electricity in locations with low humidity.

5) The power source for the indicator:

The power source for the indicator should be free of severe electrical transients. Circuits which operator motors, air conditioners or other high current electrical devices may not be used. In areas with high electrical storm activity, special power precautions should be taken.

6) Record any auxiliary device to be used with the indicator:

Device	Port type	Cable
_____	_____	_____
_____	_____	_____
_____	_____	_____

7) Record any option boards to be installed in the indicator:

Isolated setpoint option _____

Isolated analog output _____

Isolated remote keyboard _____

With the above information, you are ready to start the installation. The next section details the electrical connections to the remote device and the beginning of the calibration procedure.

Installing the Indicator

Complete the wiring of the external devices before connecting the indicator. Wiring should comply with local area electrical codes. Wherever possible cables should be in conduit or be otherwise protected from physical damage. Devices mounted outside should be mounted in suitable enclosures. A general wiring diagram for the indicator is included in the manual section WIRING DIAGRAMS.

Once the external wiring is completed, connect the indicator to the remote devices. Use the strain relief fittings provided to route the cables into the indicator. Insure the connections are secure and the cabling properly dressed. The indicator operates on 12 VDC. A 120 VAC to 12 VDC adapter is supplied with the indicator. Connect the adapter to the indicator, then plug the power supply into a suitable receptacle.

Power Supply Requirements

The correct power supply must be selected when using a DF2500. Please make note of:

1. The number of AC 4 channel or AC single channel remote converters to be driven.
2. The bridge resistance of the load cells in the scale.
3. The presence of any option boards (i.e. setpoint, 4-20 mA output) in the indicator.

These three factors determine the amount of current required from the power supply. Use the following chart to select the appropriate supply.

DF2500 POWER SUPPLY CHART

	LOAD CELL BRIDGE RESISTANCE			
AC QUAD DLC	350Ω		700Ω	
	WITH OPTION BOARDS	WITHOUT OPTION BOARDS	WITH OPTION BOARDS	WITHOUT OPTION BOARDS
1	S	S	S	S
2	HC	S	S	S
3	HC	HC	HC	HC

AC SINGLE DLC	350 Ω		700Ω	
	WITH OPTION BOARDS	WITHOUT OPTION BOARDS	WITH OPTION BOARDS	WITHOUT OPTION BOARDS
1	S	S	S	S
2	S	S	S	S
3	HC	S	S	S
4	HC	S	HC	S
5	HC	HC	HC	HC
6	HC	HC	HC	HC
7	HC	HC	HC	HC
8	HC	HC	HC	HC
9	HC	HC	HC	HC
10	HC	HC	HC	HC

NOTES:
S = STANDARD POWER SUPPLY P/N: 2215.12-18D
HC = HIGH CURRENT SUPPLY P/N: 2215.SWA-1204W

Starting the Indicator

Press the [ZERO/ON] key to start the indicator. The indicator will cycle through a series of self-tests.

[PC] Program check - verifies the indicator's software.

[r0] Memory check 0 - verifies the indicator's lower block of random access memory.

[r1] Memory check 1 - verifies the indicator's upper block of random access memory.

[SP] Calibration parameter check - verifies the indicator's calibration parameters.

[PL] Ticket format check - verifies the indicator's preset ticket format.

During these tests, error messages may be displayed. Error messages during tests PC, r0 and r1 indicate a defective indicator. Errors during tests SP and PL will be corrected automatically be retrieving the lost parameters from the indicator's back-up storage. If the indicator is unable to reload its parameters, the display [R1D SP] and [R1D PL] will occur. If this display occurs, the indicator has restored factory default values to the parameters and ticket format. The indicator will require calibration should this occur.

After the indicator completes the self-test procedure, the display will indicate [888888]. Verify that the four indicator lamps on the power supply board are illuminated. The lamps labelled [CTL], [LOOP] and [AC] may cycle On and Off. This indicates that the indicator is not able to communicate with the remote converters. If the [LOOP] lamp does not illuminate, there is a problem with the external wiring. Confirm that the connections are correct and that all connections are secure. The [LOOP] lamp must be lit when the [CTL] and [AC] lamps are lit or the calibration procedure cannot be completed.

The display may show [01 01] or other error messages at this time. If the [LOOP] lamp is On and these messages occur, there is an address conflict with one of the remote converters. This problem will be corrected during the calibration procedure.

SECTION TWO: CALIBRATION

The indicator is calibrated using the numeric keypad. There are no potentiometers or switches to set. To select Calibrate mode, flip the calibration switch visible through the rear panel of the indicator. The switch is Up for calibration, Down for normal operation. When in calibration mode, the display will show a flashing [C] on the leftmost digit.

The Keyboard

The keyboard overlay changes for calibration mode.

				1	2	3	Weight
				4	5	6	Raw cts
				7	8	9	SELECT
ZERO	lb/kg	TEST	unused	.	0	CLR	ENTER

[ZERO] Press to zero the scale.
[lb/kg] Press to select the units for calibration.
[TEST] Press to test the display. Pressing the remote corner number prior to pressing test will momentarily display the raw count value for that corner.
[unused] This key is not used in calibration.
[0-9 & .] Numeric entry keys.
[CLR] Clear the current numeric entry; exit special set modes.
[Weight] Set display to weight mode, left digit flashes [C].
[Raw cts] Set display to raw counts modes, left digit flashes [A].
[SELECT] Enter the required parameter, then press [SELECT]. The display will recall the current parameter value.
[ENTER] While a selected value is displayed, it can be changed by entering a new value using the numeric keypad then pressing [ENTER].

The Display

The display operates in the same manner as in normal mode. Three possible mode displays may appear in the leftmost digit. [C] is standard calibration mode, displaying weight. [A] is raw counts mode which displays raw counts. Raw counts are the actual numeric values returned from the remote converters. The calibration procedure calculates the factors used by the indicator to convert the raw count values to the weight display. [S] is a special adjustment mode for parameter 22 used when setting corners.

Prior to set-up, the indicator may not be able to communicate correctly with the remote devices and the display may indicate a communications failure. This should be corrected when you set up the corner serial number in the Initial Set-Up section of the calibration. If this is a new calibration, be sure to execute Parameter 1 to preset the indicator's parameter values.

Do not interrupt power during the calibration operation. The normal memory of the indicator is battery protected. Interrupting power should not invalidate the calibration in progress. It is prudent, however, not to interrupt power until the current calibration has been saved to permanent back-up storage (EEPROM). This is done when you exit calibration mode by returning the calibration switch to the operate (Down) position.

The calibration parameters are grouped for ease of use. Many of these parameters do not need to be set for a typical calibration. There are many special purpose functions that are required only in specific applications. This table defines the grouping of the parameters.

To select a parameter, first enter the parameter number then press [SELECT]. The display will recall the current value of the parameter. To change the value, enter the new parameter value followed by [ENTER]. Some parameters will display [r] when selected. Caution should be used when the [r] display is shown. If you are uncertain of the function, press [CLR] to abort the operation.

Group	Application
1 - 8	Initial set-up, required by all installations.
10 - 19	Additional initial options, not required by most installations.
20 - 28	Active calibration system, used to set dead load and span, required for most installations.
30 - 36	Diagnostic function to assist in troubleshooting.
40 - 45	Set-up of the internal weight stabilization system, not required for most installations.
50 - 56	Set-up of the setpoint option.
60 - 64	Set-up of the isolated analog output option.
70 - 79	Serial port and ticket printing set-up.

Before beginning the calibration, select the weight units (lb or kg) you will be using throughout the calibration. You can change the units without affecting calibration, but, for most users, it is easier to stay with one unit of measure.

Remote Converter Set-up

When using multiple remote converters, it is necessary to enter the cell serial numbers immediately after power up while calibrating the indicator. This is the only way to avoid communication errors caused by remote converters initially set to the same cell numbers when shipped from the factory or moved from another scale. Follow these steps when setting up the indicator:

1. Wire the remote converters according to wiring diagram on page 57.

2. Put the DF2500 in calibration mode by placing SW1 in the up position.

3. Power on the indicator; confirm that the DATA LOOP lamp is lit.

   If this lamp is not on, follow these steps:

   a. Check the wiring per above drawing number.
   b. Measure the AC or DC voltage at each remote converter:
      - greater than 30VAC on AC versions.
      - greater than 12VDC on DC versions.
   c. Find faulty remote converters by shorting the DATA lines at each module and watching the DATA LOOP lamp. On AC versions short the INDC lines to eliminate the indicator from the loop.

4. Immediately after power up enter the cell numbers and corresponding serial numbers using parameter 6.

Note: If the indicator shows a communication error "NN 01" where NN is the cell number, power off and on the indicator - continue entering the cell serial numbers starting with the last one entered.

Initial Set-up

Parameter Function

1 Preset the indicator to factory values for all parameters. This function clears all existing parameter values and replaces them with factory preset values. It should only be used at the beginning of calibration.

WARNING: THIS FUNCTION ERASES YOUR CALIBRATION.
USE WITH CAUTION

When the display indicates [r], press [1][ENTER] to preset for Canadian Weights & Measures values or, press [2][ENTER] to preset for U.S. HB44 values.

2 Set the decimal point position. Enter a value from 0 - 4 to set the decimal point position on the display.

8 8 8 8 8 8
4 3 2 1 0 for no decimal point.

When configured for HB44 type display, the decimal point is automatically adjusted for certain decimal/grad size combinations. An example is 1.0 lb/ 0.5 kg graduations. HB44 rules do not allow the display of a non-active decimal digit. The indicator will automatically shift the display to remove the inactive digit when displaying pounds in the above example. The decimal point will return when the display is switched to kilograms. When setting the decimal point position for the above example, use a decimal position of 1.

3 Set the graduation size. Select the graduation size from the following table:

lb	kg
2	1
5	2
10	5
20	10
50	20
100	50
200	100

4 Set the scale maximum capacity. This value must be equal to the full scale capacity of the scale. The value entered is used for quick calibration of the scale and analog options. The display will indicate to [888888] if this value is exceeded during operation.

5 Select type of scale. The system will recognize two types of scales. Enter a value of 0 if this is a hopper scale with individual corner adjustments. Enter a 1 if this is a vehicle scale which requires adjustments by corner pairs or sections. In the active calibration section you can adjust individual corners using the keypad. This parameter, when set to 1, pairs corners to allow easier adjustment of vehicle scales. The paired cells would be 1 & 2, 3 & 4, etc.

6 Set corner serial numbers. This function assigns a communication address to each remote converter by use of its serial number(s). Until this step is complete, the system may display communications errors. Every remote converter will have a unique serial number for each of its inputs. If you are using digital load cells, the serial number is the load cell serial number. Single channel remote converters will each have a unique serial number. Multi-channel remote converters will have a serial number for each channel.

All corner serial numbers must be entered, even if the channel is not to be used. Corners can be disabled after address assignment by entering a serial number of 0. Unassigned corners may cause communication errors. Be sure to enter all serial numbers.

All unused channels must have + and - signal tied to sheild. Failure to do so will cause delays in the update of the display.

To enter a serial number, press [6][SELECT]. The display will show [CEll]. Enter the corner number to be set followed by [ENTER]. Enter the remote converter serial number followed by [ENTER]. The display will indicate [DONE] if the operation was successful. A reply of [Bad] indicates that the serial number was not found. Verify the serial numbers and external connections and try again. The power supply [LOOP] lamp must be illuminated for this procedure to operate correctly.

Once all corner serial numbers are entered, disable any unused corners using the operation above, but with a serial number of 0. At any time a corner can be removed by entering a serial number of 0. The channel can be re-activated by entering its correct serial number.

7 Set total load cell capacity. Enter the total capacity of all the load cells in the system. The total load cell capacity is the sum total of the rated capacity of each load cell.

8 Do a theoretical calibration of the system. Using parameters 4, 6 and 7, this parameter will pre-calibrate the instrument. To execute this function, press [8][SELECT], [1][ENTER].

WARNING: ANY EXISTING CALIBRATION WILL BE LOST WHEN THIS FUNCTION IS EXECUTED

This calibration does not substitute for a standards verified calibration. It should, however, provide an acceptable calibration where standards are not available. Even if you are using standards to calibrate the scale, utilize this function to pre-calibrate the indicator. In the active scale calibration section, parameters 27 and 28 allow the correction of each corner using the load cell manufacturer's calibration sheets.

This parameter is especially useful should a load cell fail during operation of the scale. The scale could continue to operate at reduced accuracy by removing the load cell from the system. This is done by setting the corner serial number for the defective load cell to 0. All other parameters remain the same. When this function is executed, the new calibration will account for the missing load cell. To select this function, press [8][SELECT], then [1][ENTER].

Note: Parameter 5 must be set to 0 when doing a theoretical calibration.

Additional Options

If this is your first time using this indicator, ignore these parameters at this time. Return to them if the remainder of the calibration does not provide all the features you require.

Parameter	Function
10	Set motion window. This parameter allows the adjustment of the motion detector window. The motion window is automatically set to 2 X graduation size when the graduation size is selected.
11	Set motion time. This parameter adjusts the time the motion annunciator stays lit after motion ceases. It is set for 2 seconds by default. The entry is in updates, where a single update is typically .33 seconds. Update speed is variable, however, and must be taken into account (see parameter 19).
12	Set push to zero window. Federal regulations require that indicators have a limited range for the push to zero function. The range is typically limited to 2% of scale capacity. If the indictor is to be certified as legal for trade, this range cannot be adjusted. For non-legal applications, push to zero range can be extended. Do not use push to zero to remove deadload. Parameter 20 in the active calibration section is used for deadload correction. Entry is in percent of scale capacity.
13	Disable auto zero. In some applications, auto zero tracking is not required. This parameter disables auto zero. An entry of 0 disables auto zero tracking. An entry of 1 enables auto zero tracking.
14	Set auto zero tracking window. Auto zero removes a portion of a single graduation, which occurs over time, when the scale is near zero. Federal regulations restrict the portion of a graduation that can be removed to 60%. This parameter allows the adjustment of the auto zero graduation amount from 0% to 100%.
15	Set a fixed tare offset. On certain weighing applications, a fixed tare offset is required. Typical applications are bulk processing where printing of negative weights during batching is not allowed. Entering a weight value for this will force a tare offset when the scale is at zero. The centre of zero indicator will illuminate when the scale is at the tare offset value. Normal tare functions are inhibited when a value is entered in this parameter.

16 Select start-up mode. Federal regulations require that a scale acquire zero when power is applied. To force this function, the indicator will display [888888] on a normal start-up until zero is captured. This function can be defeated for tank or other scales where returning to zero is difficult. Select 0 to disable the all 8's start-up; 1 to enable normal start-up.

17 Selecting starting units. The factory preset function will select the correct units for the country chosen. A 0 in this parameter selects pounds as the starting units; a 1 selects kilograms.

18 Select HB44 display mode. Handbook 44 in the U.S.A. has specific display requirements. These include double dead zeros and shifted decimal places. Setting this parameter to 1 selects HB44 mode. Set this flag to 0 for standard display mode.

19 Set display update speed. This parameter sets the interval between display updates. The shortest update speed will be limited by the number of external devices. The more devices, the longer the communication time required. With all 12 corners enabled, the fastest update speed would be approximately .25 seconds. Each increment of the update parameter equals .05 seconds. The standard setting is 6 or 3 updates per second.

Active Calibration

Parameter Function

20 Set deadload. This function removes the scale deadload or unloaded weight. This weight consists of tanks, weighbridges or other scale structures not included in the active calibrated scale weight. This function should be executed when the scale is empty of all active weight. Press [20][SELECT], [1][ENTER] to remove the deadload. Deadload values are saved individually for each corner of the scale. Removing a cell from the scale by setting its serial number to 0 will also remove that cell's portion of the deadload.

21 Set span. This function allows calibration of the scale with known standards. To set the span, first deadload and zero the scale. Apply a known quantity of standard weights. Enter [21][SELECT]. The display will briefly show [1]. This indicates that this is the first entry in the span table. Enter the weight of the standards followed by [ENTER]. If the display does not briefly display [1], use parameter 23 to reset the linearity correction system before setting the scale span. The standard weights should be at least 10% of the scale capacity.

This indicator has a multi-table linearization system. The span can be set up to 6 times over the range of the scale. For most scales this is not required.

22 Adjust individual corners. This function allows the individual adjustment of each corner (or section) of the scale. Place a known weight on the scale at the corner to be adjusted. Press [22][SELECT], then enter the corner to adjust followed by [ENTER].

The keyboard overlay changes in the corner adjustment mode.

				1	2	3	Increase
				4	5	6	Decrease
				7	8	9	unused
unused	unused	unused	unused	.	0	CLR	unused

With standard weights on the selected corner, use the Increase key to increase the weight and the Decrease key to reduce the weight. The display will flash [S] in the leftmost digit during this mode. Press [CLR] to exit corner set mode. This adjustment should be repeated for each active corner. If you have set parameter 5 to 1, this function will operate on pairs of corners or sections for vehicle type scales.

Note: **The number entered at the "CELL" prompt when making corner or section adjustments is always the cell number. For sections with two cells each hooked to consecutive channels, this would be cell numbers 1,3,5,7, etc. When making cell adjustments, start the procedure by resetting the load cell tables using parameter 26. This is necessary if a bad cell has been replaced which has been over compensated for.**

23 Reset linearity system. This function will reset the linearity system and erase all linearity data. It is selected by pressing [23][SELECT], [1][ENTER].

24 Select next linearity point. This function is used to increment the linearity pointer to the next entry. To increment the linearity pointer, press [24][SELECT], [1][ENTER].

25 Select the previous linearity point. This function is used to decrement the linearity pointer to the previous entry. To decrement the linearity pointer, press [24][SELECT], [1][ENTER].

26 Reset the corner tables. This function will clear all corner adjustment data. To clear the corner data, press [26][SELECT], [1][ENTER].

27 Define the system's standard load cell. The indicator can correct for load cell output variations using the manufacturer's calibration data. This is done by comparing the load cell's real output to the standard expected output. This parameter is set to the standard expected output. Typical values would be 2.00000 or 3.00000 for 2 mv/volt or 3 mv/volt load cells.

28 Set corners using manufacturer's calibration data. This function adjusts the corners using the manufacturer's calibration data. You must have first set parameter 27 to the standard load cell output. To set the corners, press [28][SELECT]. The display will show [CEll]. Enter the corner number followed by [ENTER]. The current calibration value for the load cell will now be displayed. Enter the correct calibration value and press [ENTER].

System Diagnostics

Parameter	Function
30	Display remote converter model number. The indicator can display the model number of each remote converter. Press [30][SELECT], then the corner number, followed by [ENTER]. The model number will be displayed.
31	Display remote converter serial number. The indicator can display the serial number of each remote converter. Press [31][SELECT], then the corner number, followed by [ENTER]. The serial number will be displayed.
32	Display remote converter date of manufacture. The indicator can display the date of manufacture of each remote converter. Press [32][SELECT], then the corner number, followed by [ENTER]. The date of manufacture will be displayed.
33	Display remote converter software revision level. The indicator can display the software revision level of each remote converter. Press [33][SELECT], then the corner number, followed by [ENTER]. The software revision level will be displayed.
34	Display remote converter communications error counter. The indicator can display the communications error counter for each remote converter. Press [34][SELECT], then the corner number, followed by [ENTER]. The communications error counter will be displayed. Large values in the communications error counter, after a short period, indicate a fault in the communications system. This fault may be a defective remote converter or incorrect cabling.
35	Test the indicator's EEPROM. When you exit the calibration mode, you save the set-up parameters to a special type of memory called EEPROM. This is non-volatile memory that is retained when power is removed from the indicator. Values from the EEPROM can be recalled by the indicator on start-up, should the indicator's regular memory contents be lost. This operation is fully automatic. This function provides a means to test the EEPROM. The test is started by pressing [35][SELECT], [1][ENTER]. The display indicates the status of the test. Calibration data is not lost during this test. However, the indicator should not be used if this test fails.

36 Load calibration memory from EEPROM. This function allows the reloading of calibration data from the EEPROM. This is useful if you want to transfer the calibration from another indicator. To load the EEPROM calibration, press [36][SELECT], [1][ENTER]. The contents of the EEPROM will overwrite the existing calibration.

WARNING: THIS FUNCTION WILL OVERWRITE THE EXISTING CALIBRATION. USE THIS FUNCTION ONLY TO LOAD AN EXISTING CALIBRATION FROM ANOTHER INDICATOR.

The Weight Stabilization System

The indicator employs an active weight stabilization system. This system is preset for most applications. Some special applications may require modification of the weight stabilization system.

Parameter	Function
40	Set the number of average registers. This parameter allows changes to the number of averages used by the weight stabilization system. Selections of 1, 2, 5 or 10 are allowed. The actual number of averaging registers is ten times the entered amount.
41	Indicator sensitivity. This value is set in raw counts and determines the indicator's sensitivity. If the weight difference between samples is less than this value, no new values will be loaded into the average registers. If the difference exceeds this value, one new value will be loaded into the average registers. This value must not be altered in a legal for trade weighing application.
42	Load 50% of average registers. If the weight difference between samples exceeds this value, 50% of the average registers will be loaded with the new raw count value.
43	Load 100% of average registers. If the weight difference between samples exceeds this value, 100% of the average registers will be loaded with the new raw count value.
44	Wait timer at 50% load. This timer holds the averaging system at 50% register loading for the entered number of samples.
45	Wait timer at 100% load. This timer holds the averaging system at 100% register loading for the entered number of samples.
46	Temperature Compensation

The Temperature Compensation feature corrects the span value based on the current temperature measured at Cell 1. Follow these steps to apply this feature:

1. Put a fixed set of test weights on the scale. Record the weight and temperature.

$$eg. \qquad w1 = 10002kg \qquad t1 = 22C$$

2. Wait for the temperature to change 10C or more. Record the same information.

$$eg. \qquad w2 = 9996kg \qquad t2 = 5C$$

3. Calculate the Temperature Compensation Factor (TCF) using the following formula:

$$TCF = 1 + \frac{w1 - w2}{w1\ (t1 - t2)}\ x\ 10C$$

$$eg. \qquad 1 + \frac{1002\ kg - 9996\ kg}{10002\ kg\ (22C - 5C)}\ x\ 10C = 1.00035$$

4. Enter the TCF value in parameter 46.

5. Reset the span table using parameter 23 and span the indicator using parameter 21.

Note: **Single Channel remote converters do not currently support this feature.**

47 Freeze threshold value. This is the weight that must be achieved before the highest value is frozen after motion ceases. Use this feature to display the weight when the transducer signal decreases after the load is applied. **Set to zero for Legal for Trade applications.**

48 Displayed number of graduations step 1. This value is the number of graduations displayed before the grad size steps up 1 grad size. To disable, set to 0.

49 Displayed number of graduations step 2. This value is the number of normal graduations displayed before the grad steps up 2 grad sizes. Set to 0 to disable.

Setpoints

The indicator has a 6 channel setpoint option. The isolated setpoint option board must be installed for setpoint operation. A manual is included with the option board detailing installation and connection.

Parameter	Function
50	Set setpoint polarity mask. Each of the six setpoints can operate as normally open or normally closed contacts. The polarity mask sets each setpoint as 0 for open until weight value reached or 1 for closed until weight value reached. The mask is entered as a six digit number with the most significant digit being setpoint 6.
51	Initial value for setpoint number 1. This value is loaded as setpoint 1 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.
52	Initial value for setpoint number 2. This value is loaded as setpoint 2 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.
53	Initial value for setpoint number 3. This value is loaded as setpoint 3 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.
54	Initial value for setpoint number 4. This value is loaded as setpoint 4 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.
55	Initial value for setpoint number 5. This value is loaded as setpoint 5 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.
56	Initial value for setpoint number 6. This value is loaded as setpoint 6 during power-up. The initial value can be changed using the setpoint set-up instructions during normal operation.

Analog Output

The indicator can be equipped with an analog output option. This option will provide for 4-20 mA, 0-5 VDC or 0-10 VDC isolated analog output. The analog output system is capable of 10,000 divisions of accuracy. A manual providing installation and connection details is included with the option board.

Parameter	Function
60	Set analog output span. This parameter sets the weight value used for calculating the analog output signal. This parameter is automatically set to the scale maximum capacity value. It can be altered, if required, for specific applications.
61	Output based on gross or displayed weight. This parameter can be set to allow the analog output to follow the displayed weight, either gross or net, or only the gross weight. A 0 in this parameter forces gross weight only. A 1 tracks the analog output based on the weight displayed, either gross or net.
62	Calibrate analog output zero. This function allows the calibration of the analog output system at zero.

The keyboard overlay changes during the analog output adjustment mode:

				1	2	3	Increase
				4	5	6	Decrease
				7	8	9	unused
unused	unused	unused	unused	.	0	CLR	unused

The analog output will automatically decrease to zero when this function is selected. The display will indicate [DA 0] during this function. Use the Increase and Decrease keys to set the analog output for zero (0 volts or 4 mA). If you hold a key down, the value will continue to change. Press [CLR] to exit this function.

63 Calibrate analog output full scale. This function allows the calibration of the analog output system at full scale. Use the keyboard overlay from parameter 62 for this function. The analog output will automatically be set to full scale when this function is selected. Use the Increase and Decrease keys to adjust for full scale output. If you hold a key down, the value will continue to change. Press [CLR] to exit this function.

64 Preset the analog output system. The analog output system can be preset for current or voltage output. For critical applications, adjustment of the analog output system can be made using parameters 62 and 63.

Serial Ports and Ticket Printing System

The indicator has two RS232 serial ports. Both ports can operate with independent data formats and unique outputs. Port 1 is sued for general communication and connection to a remote computer. Port 2 can also perform general communications or provide customized ticket printing.

Parameter Function

70 Set port 1 communication speed. Port 1 can operate at 7 communications speeds. Select the speed from the following table:

Speed	Value	
300	1	
600	2	
1200	3	
2400	4	
4800	5	
9600	6	* Default value
19200	7	

71 Set port communication format. Port 1 can operate using 20 different data formats. Use the table below to select the correct format:

Value	PBS	Value	PBS	
1	N71	11	N81	* Default value
2	E71	12	E81	
3	O71	13	O81	N = none
4	O71	14	O81	E = even
5	171	15	181	O = odd
6	N72	16	N82	0 = zero
7	E72	17	E82	1 = one
8	O72	18	O82	P = parity
9	O72	19	O82	B = no. of bits
10	172	20	182	S = stop bits

72 Set port 1 mode. Port 1 has seven modes of operation. Each mode is described below:

Mode 1: Output a standard data string whenever the [P] button is pressed during normal operation of the indicator. The weight display must be valid or the request will be ignored until the weight becomes valid. The output string is:

```
WWWWWWWSUUCL
             p   RF
             c
```

W = weight.
U = units, LB or KG.
Spc = space.
CR = carriage return (0DH).
LF = line feed (0AH).

Mode 2: Output when the receive data input (pin 2) is at logic low (-9 VDC). A standard string will be transmitted after each sample whenever the receive data line is held low. One sample time may be required before the string is transmitted. The standard string is:

```
SSWWWWWWWSUUSMMSSCL
Tg              p   p   ptRF
Xn              c   c   ca
```

STX = start of text character (02H).
Sgn = sign: - = negative, spc = positive.
W = weight.
Spc = space.
U = units, LB or KG.
M = Display mode, GR for gross, NT for net.
Sta = status, O = over, M = motion, - = negative,
F = fault.
CR = carriage return (0DH).
LF = line feed (0AH).

Mode 3: Output when the receive data input (pin 2) is at logic high (+9 VDC). A standard string will be transmitted after each sample whenever the receive data line is held high. One sample time may be required before the string is transmitted. The transmitted string is the same as for Mode 2.

Mode 4: Output whenever a ? is received. The standard string from Mode 2 is output after the next sample whenever a ? is received.

Mode 5: Continuous output. The standard string from Mode 2 is output after each sample.

Mode 6: Computer command operation without checksum. A fully interactive command set can be sent from a remote computer to operate the indicator. The command structure is as follows:

SDDDDDDDCC
T mR
X d

STX = start of text (02H).
Cmd = the command character.
D = data, only if required.
CR = carriage return (0DH).

The STX character is optional It is used to clear the input buffer. The command processor works from the CR back allowing the inclusion of data or other characters without consequence. The maximum number of characters sent before the CR must not exceed 20. The indicator may fail to respond to the command if this number is exceeded. Preceding the message with the STX insures the input buffer is cleared before the next message. The indicator ignores LF and other control characters.

The indicator only replies when it receives a valid command. The returned data will reflect the command executed. Some commands may be inhibited, i.e. push to zero, and the return data will reflect the indicator's inability to complete these commands. The return data string is as follows:

SSWWWWWWWSUUSMMSSCL
Tg p p ptRF
Xn c c ca

STX = start of text character (02H).
Sgn = sign, - = negative, spc = positive.
W = weight, 7 characters, may include decimal point.
Spc = space.
U = units, LB or KG.
M = reply type, indicates the type of data.
Cmd = command being replied to.
Sta = status, O = over, M = motion, - = negative,
F = fault.
CR = carriage return (0DH).
LF = line feed (0AH).

The following is a list of commands that can be executed:

Cmd	MM	Data	Function
G	GR	none	Set to gross display.
N	NT	none	Set to net display.
P	TR	none	Capture weight as tare.
T	TR	tare wt	Set tare weight.
R	TR	none	Recall tare weight.
C	TR	none	Clear tare weight.
?	??	none	Poll for weight.
L	??	none	Set units to LB.
K	??	none	Set units to KG.
Z	??	none	Zero the scale.
A	TL	none	Add to accumulator.
S	TL	none	Recall accumulator.
B	LC	none	Recall load counter.
X	TL	none	Clear accumulator.
1	SP	setpoint 1	Set setpoint 1.
2	SP	setpoint 2	Set setpoint 2.
3	SP	setpoint 3	Set setpoint 3.
4	SP	setpoint 4	Set setpoint 4.
5	SP	setpoint 5	Set setpoint 5.
6	SP	setpoint 6	Set setpoint 6.

?? in the MM field above means the indicator will respond with the current display mode it is in. The possible modes are GR for gross weight and NT for net weight. Failure of the indicator to respond with the correct mode or weight indicates that execution of the command was not permitted.

Mode 7: Computer command mode with checksum. This mode is identical to Mode 6 with the inclusion of an 'Exclusive OR' checksum. The checksum is included in both the send and receive data streams. It is sent as a two character string immediately preceding the CR. The checksum is calculated using an 'Exclusive OR' of all characters between the STX and the first character of the checksum. The STX, checksum and CR are not included in the checksum. The single byte calculated is converted into two hexadecimal characters, each representing half of the byte. The most significant 4 bits are sent first. The values are sent in hexadecimal format (0-F).

Mode 8: AD4321 "STREAM" Mode in the following format:

```
      |           |
  HH,HH,SWWWWWWWWUUCL
 11 22  g              RF
        n
```

H1 = status, OL = over, fault, ST = stable,
US = motion.
H2 = mode, NT = net, GS = gross.
Sgn = sign, - = negative, + = positive.
W = weight, 7 digits, may include decimal point.
U = units, LB or KG.
CR = carriage return (ODH).
LF = Line feed (OAH).

73 Set port 2 communication speed. Port 2 can operate at 7 communications speeds. Select the speed from the table listed in parameter 70.

74 Set port 2 communication format. Port 2 can operate using 20 different data formats. Use the table from parameter 71 to select the correct communications format.

75 Set port 2 mode. Port 2 has two modes of operation. Each mode is described below:

Mode 2: Formatted ticket mode. The indicator can print a fully formatted ticket. The section SETTING UP TICKETS describes how to format a ticket. The ticket is printed when the [P] button is pressed during normal operation.

Mode 3: Same as mode 3 in parameter 72.

78
0 = TK4000
1 = Epson TM290-II
2 = Epson/IBM/Citizen

79 Set-up the custom ticket. Keyboard operation and the ticket format display are described in detail in the section SETTING UP TICKETS.

Calibration End

To exit calibration, return the calibration switch to the operate position (switch Down). The display will flash [SSSSSS]. During this time the indicator is saving the calibration data to EEPROM. Do not interrupt this operation. When the display clears, the indicator is ready for operation.

SECTION THREE: ERROR MESSAGES

DF2500 Error Messages

'1' - Invalid Tolerance Selection.
'2' - Graduation Size Invalid.
'3' - Decimal Point Position Invalid.
'4' - Flag Select must be 0 or 1.
'5' - Pushbutton Zero % must be 0 - 99.
'6' - Auto Zero % must be 0 - 99.
'7' - Only Value '1' will reset parameters.
'8' - Only Value '1' will reset span table.
'9' - Span exceeds maximum capacity and/or entry too small.
'10' - Cannot set span using negative values.
'11' - Span table is full.
'12' - Delay maximum = 99/Delay of '0' not permitted.
'13' - 0 = LB: 1 = KG only.
'14' - Average value entry out of range.
'15' - Overweight entry out of range.
'16' - Motion window out of limits.
'17' - Increment only with entry of 1.
'18' - Decrement only with entry of 1.
'19' - Cannot decrement span point <1.
'20' - Parameter memory write error.
'21' - Parameter Chcksum error.
'22' - Program Chcksum error.
'23' - Port 1 setup - entry out of range.
'24' - Port 2 setup - entry out of range.
'25' - Cannot increment span pointer past >8.
'26' - Entry is larger than scale capacity.
'27' - Entry of '0' or '1' only allowed.
'28' - Only setpoint selects of 1-4 valid.
'29' - Only 1 or 2 allowed in 'ADD' selection.
'30' - Scale is invalid (over, negative or in motion).
'31' - Only 1,2,5 or 10 allowed in shift size.
'32' - Holdover delays range is '0 - 30'.
'33' - Tare offset out of limits. 10001 or 100.1 or 10.1 or 1.001 kg maximum.
'34' - Tare pushbutton disabled if Tare offset (parameter 15) is non-zero.
'35' - Span Factor is out of range for Parameter 60.

The fault display indicates the type of fault occurring at the remote converter. The weight display will indicate [NN FF] where NN = the number of the bad remote converter and FF = the type of fault. The following faults are possible:

[01]	No communication.
[02]	Overrange.
[03]	Underrange.
[04]	Self-test failed.
[05]	Power supply voltage low.

SECTION FOUR: SETTING UP TICKETS

Factory Ticket

Set the normal/calibrate switch (SW1) to calibrate (up). Enter the ticket format by pressing [79][SELECT]. In this mode, the display and keypad function differently as follows:

KEY	OPERATION CHANGES TO:
ZERO ON OFF	BACKSPACE
lb/kg	UPLINE
TEST	DOWNLINE
GROSS NET	FORESPACE
TARE SET	EXIT
ADD TOTAL	CLEAR TICKET SETUP
SHIFT	RELOAD FACTORY TICKET SETUP
P	ENTER

To reload factory format, press "SHIFT" key twice. When the horn stops sounding, the entry is complete. The ticket is printed by switching to the normal mode (SW1 down) and pressing "P".

NOTE: Any custom tickets previously entered will be destroyed if the factory ticket format is entered.

Setting Time and Date

Press "10" and "P". Respond to "CLOC" prompt by pressing four digits for hour-hour-minute-minute, then "P".

Respond to "AND" prompt by pressing six digits representing day-day-month-month-year-year, then "P".

Custom Ticket

Before entering a custom ticket format, refer to Page 51 (laser printed) which illustrates the sample printout. The printout will usually be produced on a dot matrix printer.

To begin the procedure, clear the memory of all previous entries by pressing [ADD/TOTAL] twice. When the horn stops sounding, all character positions are clear of spaces (Code 48).
Make a drawing of the desired format for the ticket before starting. Use the Worksheet on Page 52 to layout the codes to use. Enter the character on the intended line number and character number. Type the number representing the desired character, then press [ENTER]. The character is permanently stored in memory (arranged as 40 lines with 43 character per line) and the next character in sequence is displayed.

Character position 00 determines the print size and type of print. This position also determines whether or not to perform a "top of form" search.

For example, the number 36 in position 00, line 00 causes the Top of Form (TOF) search to be suppressed, and the first line of the first ticket to be printed upside down in double wide characters. Refer to the table below. Any codes, other then those listed, in position 00 will cause the line to be ignored by the printer.

Printer control codes used in character position 00 are as follows:

Text Attributes	Normal		Inverse		Mirror	
	TOF Search	Suppress TOF Search	TOF Search	Suppress TOF Search	TOF Search	Suppress TOF Search
Quad	83	67	51	35	19	03
Double Wide	84	68	52	36	20	04
Double High	85	69	53	37	21	05
Single	86	70	54	38	22	06

Print control codes used in character position 00 when parameter 78 is set to 2:

EPSON FX / IBM PROPRINTER

83 TOF, DOUBLE STRIKE
84 TOF, CONTINUOUS EXPANDED
85 TOF, EMPHASIZED
86 TOF, NORMAL
67 DOUBLE STRIKE
68 CONTINUOUS EXPANDED
69 EMPHASIZED
70 NORMAL
51 TOF, DOUBLE STRIKE, COMPRESSED
52 TOF, CONTINUOUS EXPANDED, COMPRESSED
53 TOF, EMPHASIZED, COMPRESSED
54 TOF, COMPRESSED
35 DOUBLE STRIKE, COMPRESSED
36 CONTINUOUS EXPANDED, COMPRESSED
37 EMPHASIZED, COMPRESSED
38 COMPRESSED

CITIZEN IDP-560RS

19 TOF, ENHANCED
20 TOF, RED PRINTING
21 TOF, ENHANCED, RED PRINTING
22 TOF, STANDARD
03 ENHANCED
04 RED PRINTING
05 ENHANCED, RED PRINTING
06 STANDARD

Character position 41 determines the direction of paper feed or the end of the ticket.

Codes for character position 41 are:

- 87 - Line feed toward operator.
- 88 - Line feed away from operator.
- 99 - End of ticket.

Set character position 41 to 0 & parameter 78 to 2 to enable 80 column printing.

Ten different ticket formats can be programmed into the controller. Each format must end with code 99 in character position 41. To initiate a particular format, the operator presses the number associated with that format, then [P]. Pressing [P] alone, selects the first format. Pressing [1], then [P], selects the second; and pressing [2], then [P], selects the third and continuing through the entire range of numbers.

NOTE: The normal/calibrate switch (SW1) must be in the "normal" position (down) to print a ticket.

Character position 42 determines the distance of paper feed in 0.02 inch steps before the next line of print.

Any number from 00 to 99 can be entered.

eg. To move the paper 0.5 inches, enter 25 (0.5 ÷ 0.02 = 25) in character position 42.

Character position 1 through 40 contain the text and data to be printed.

Text and data are inserted in the format by entering the appropriate two digit code at each location. Please refer to the following table for these characters.

TEXT CODES				
0 00	A 17	R 34	$ 52	} 69
1 01	B 18	S 35	% 53	~ 70
2 02	C 19	T 36	& 54	
3 03	D 20	U 37	' 55	
4 04	E 21	V 38	(56	
5 05	F 22	W 39	) 57	
6 06	G 23	X 40	* 58	
7 07	H 24	Y 41	+ 59	
8 08	I 25	Z 42	, 60	
9 09	J 26	[43	- 61	
: 10	K 27	\ 44	. 62	
; 11	L 28	] 45	/ 63	
, 12	M 29	^ 46	| 64	
= 13	N 30	_ 47	b 65	
. 14	O 31	! 49	k 66	
? 15	P 32	* 50	g 67	
@ 16	Q 33	# 51	{ 68	

NOTE: Character per line capacity is 40 for single size, 20 for double, and 10 for quad.

Data codes for character positions 1 - 40 are as follows:

- 76 - Add displayed weight to total.
- 77 - Clear total.
- 78 - Increment load counter.
- 79 - Clear load counter.
- 80 - Print load counter.
- 89 - Time HH:MM (5 characters printed).
- 90 - Date MM/DD/YY (9 characters printed).

All weights are 10 characters in length including kilograms and pounds (leading zeros are blanked).

- 91 - Keypad - entered gross weight (KBD).
- 92 - Scale weight (gross).
- 93 - Tare weight - stored weight or scale weight.
- 94 - Net weight (KBD gross - scale weight).
- 95 - Net weight (gross - tare).
- 96 - Total weight.
- 97 - Displayed weight (scale or net).
- 98 - Identification number (ID), six digits, leading zeros are blanked.
- 99 - Gross weight (scale weight or stored weight).

Note: Gross and tare values are swapped for a positive result.

Use codes 81 to 87 to print weight **WITHOUT** units. Functions are the same as codes 91 to 97 respectively. If ID and/or KBD gross are printed, a prompt appears on the display for the appropriate keypad entry. The most recently entered value is then displayed for acceptance - press [P].

Change to new value by entering the new value and pressing [P]. Any weight must be valid before it can be printed (must not be negative, in motion, or overweight).

To store tare or gross weights by ID for recall at print time, use code 98 follwed by:

48 to prompt for ID only
00 to store scale weight by ID
01 to store scale weight by ID only if new
02 to recall Tare to Gross by ID
03 to recall Tare to Gross by ID and remove from table.

The stored weight identifier ID is printed where code 98 is used.

When printing a ticket, respond to the "Id" prompt by pressing a unique six digit recall number then 'P'.

To print the ID table, press '11' then 'P'.

Clear the ID table by pressing '12' then 'P'.

To print net weight delivered, press "TARE", discharge material, then print gross, tare and net using codes 99, 93 and 95 respectively.

Note: If bad scale error message appears on last discharge, press "Gross" then "ZERO".

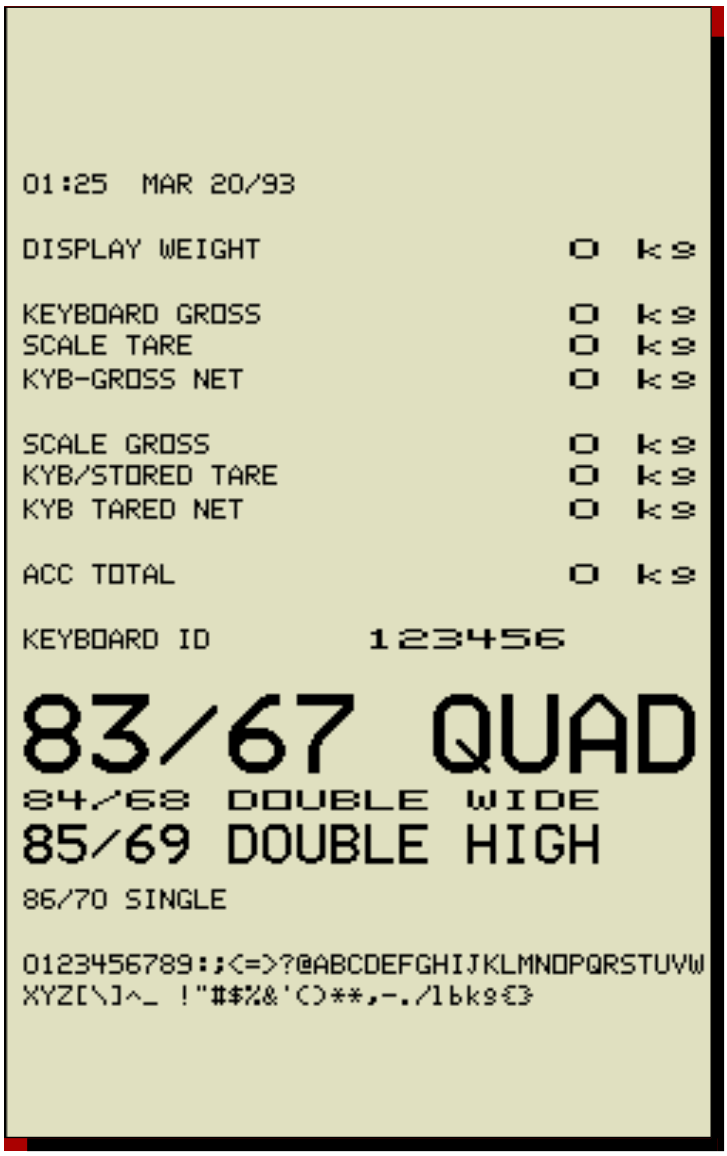
Note: All print control codes perform their designated function in the same order as their line and character position assignment. All data acquisition and/or entry is completed before printing starts.

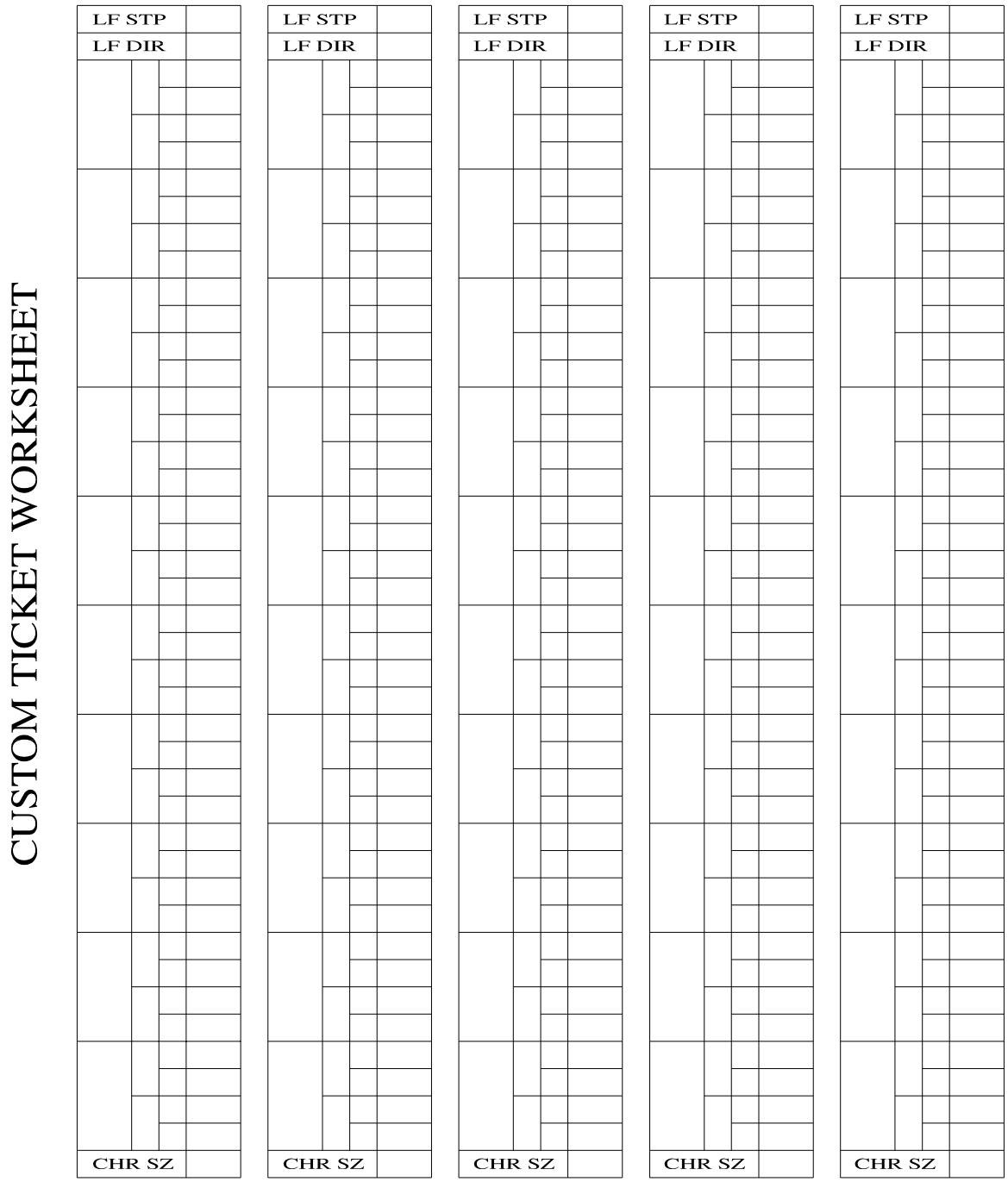
To save the new data and exit the print mode, press [EXIT]. "DONE" is displayed momentarily when the function is complete.

Available on request: **DF2500 Ticket Formatter**

A PC program to design tickets in graphics mode on the computer screen and to download tickets directly to the DF2500.

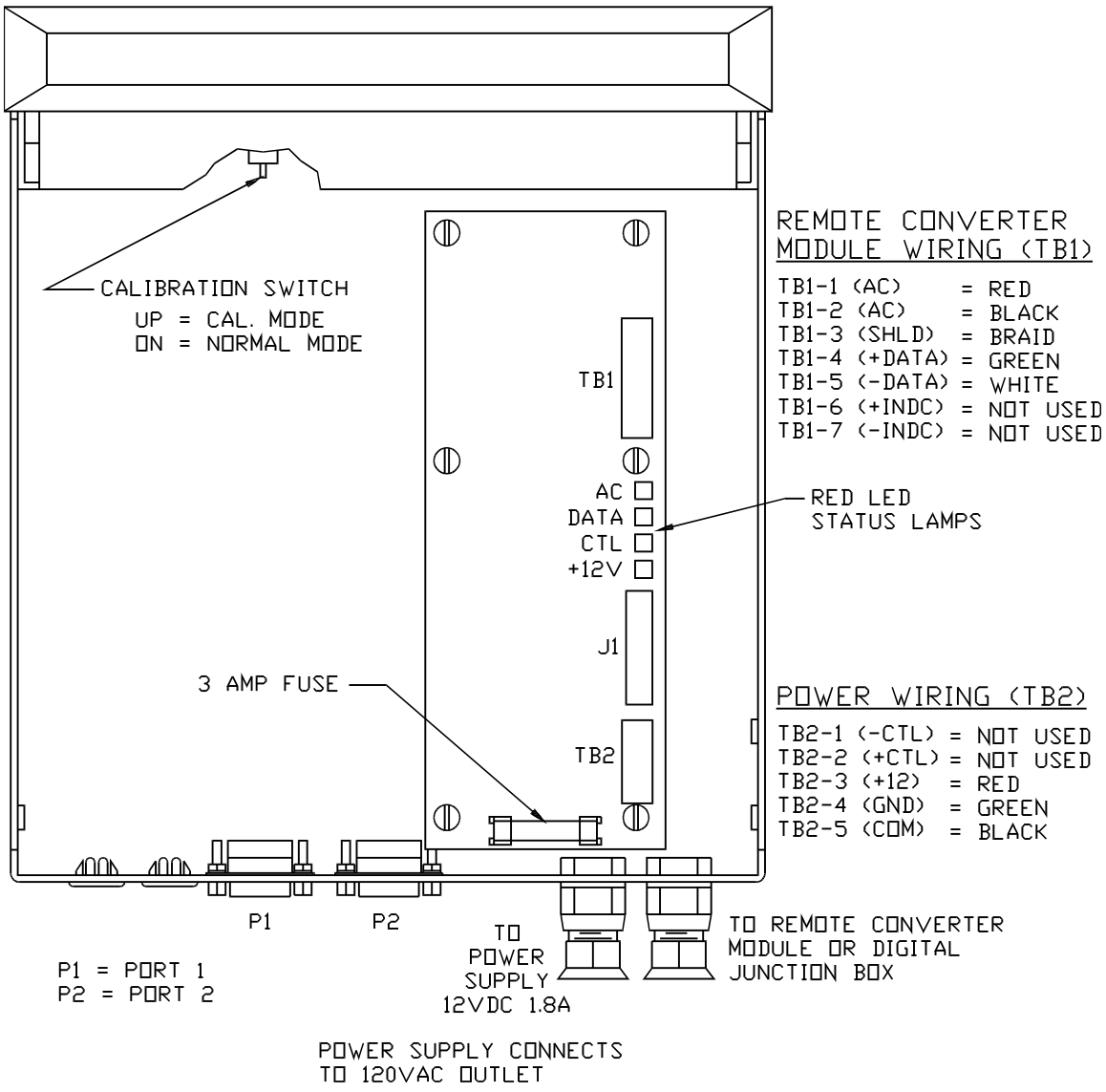
Sample Ticket




CUSTOM TICKET WORKSHEET
LF STP
LF DIR
CHR SZ
TABLE OF CHARACTER CODES
0 00
1 01
2 02
3 03
4 04
5 05
6 06
7 07
8 08
9 09
: 10
; 11
< 12
= 13
> 14
? 15
@ 16
A 17
B 18
C 19
D 20
E 21
F 22
G 23
H 24
I 25
J 26
K 27
L 28
M 29
N 30
O 31
P 32
Q 33
R 34
S 35
T 36
U 37
V 38
W 39
X 40
Y 41
Z 42
[43
\ 44
] 45
^ 46
_ 47
SPACE 48
! 49
" 50
51
$ 52
% 53
& 54
' 55
(56
) 57
* 58
+ 59
, 60
- 61
. 62
/ 63
` 64
a 65
b 66
c 67
{ 68
| 69
} 70
NARROW BLOCK 71
WIDE BLOCK 72
INTERSECTION 73
HORIZONTAL LINE 74
VERTICAL LINE 75

SECTION FIVE: WIRING DIAGRAMS

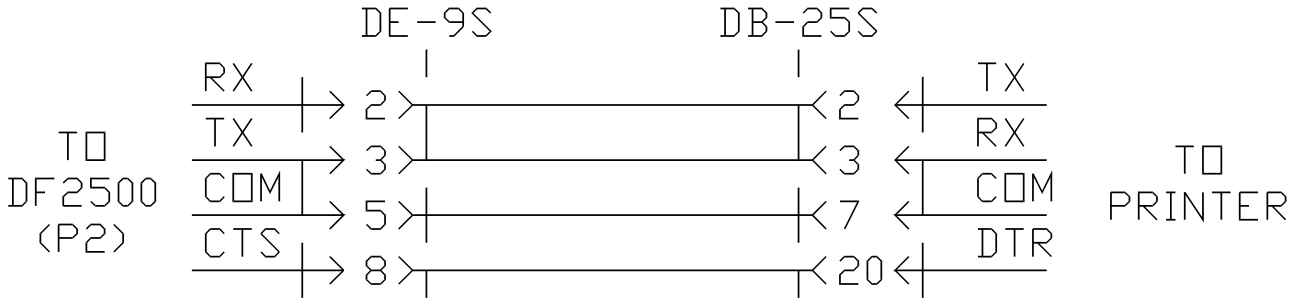
DF2500 Digital Indicator



DF2500 RS232 Connection

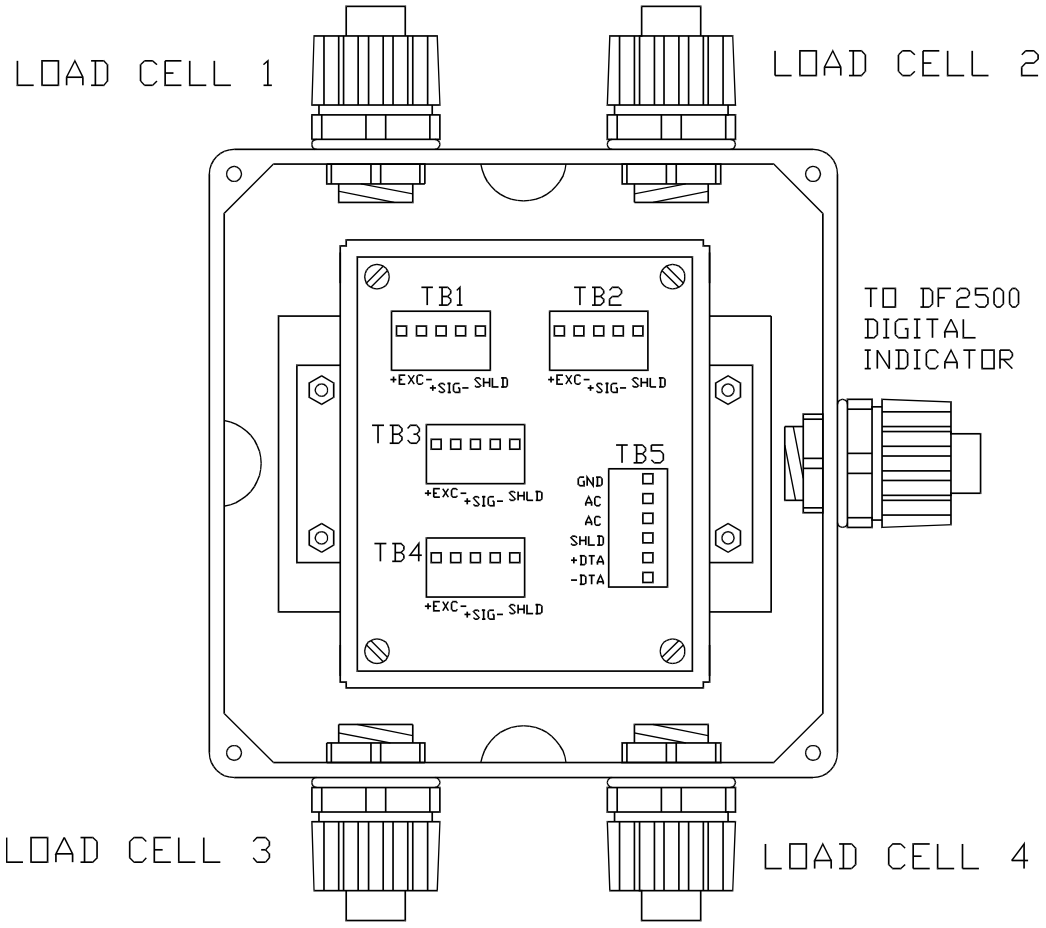
DF2500
PORT 1 (P1)
RS232 CONNECTIONS

DF2500
PORT 2 (P2)
RS232 CONNECTIONS



Remote Converter Interface

REMOTE CONVERTER INTERFACE WIRING
(4 CHANNEL)



REMOTE CONVERTER MODULE WIRING (TB5)

TB5-1 (GND) - NOT USED
TB5-2 (AC) - RED
TB5-3 (AC) - BLACK
TB5-4 (SHLD) - BRAID
TB5-5 (+DTA) - GREEN
TB5-6 (-DTA) - WHITE

Remote Converter Inconnection