Model 8600

Digital Weight Indicator and Controller

INSTRUCTION MANUAL

DORAN SCALES, INC.
1315 PARAMOUNT PKWY
BATAVIA, IL. 60510
1-800-262-6844
FAX: 630/879-0073
http://www.doranscales.com

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Made in USA

SERIAL NUMBER	
CAL ZERO (7.2 CL 0)	
CAL SPAN (7.3 CL 100)	
CAL FACTOR (7.4 CLVAL)	
NORM ZERO (7.5 CN 0)	
NORM SPAN (7.6 CN 100)	
NORM FACTOR (7.7 CN VAL)	

These calibration values should be recorded for future use - see Section 6. Calibration and Section 7. Parameter Setup for information on these values.

Manual Revision : 3.7
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Software Version : M8600
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Date : 12/98

INTRODUCTION

Introducing the Doran Scales, Inc. Model 8600 Digital Weight Indicator. The indicator integrates state-of-the-art technology and software to provide the user with a fully configurable system to provide solutions to most weighing and batching applications. With ease of use and setup in mind, the Model 8600 can be easily set up to perform most of the functions of a Programmable Logic Controller. The Model 8600 has many integrated features and capabilities with a few of them listed below:

- NTEP certification for Class III/IIIL installations to 10000d
- A 7 digit, large 0.80" red LED display for easy reading
- lb/kg/oz/g/lb-oz display units supported
- User programmable units supported
- Fully programmable capacities and display graduations
- 21 (1 hidden) push-button water resistant touch panel for data entry and recall
- Accumulator functions with 10 independent accumulators and accumulation counters
- Setpoint functions with 10 independent setpoint outputs and preacts
- Digital tare function with 10 independent tares
- Fully configurable duplex serial communications port with support for RS232, RS485 or 20ma current loop
- Fully configurable simplex printer port with support for RS232 or 20ma current loop
- Digital keyboard entry of values and calibrations
- EEPROM nonvolatile data storage of all calibration and setup information
- Nonvolatile memory storage of all keyboard entered data for 5 years**
- Time and date functions with selectable print formats
- Microprocessor monitoring system to prevent indicator failure under severe fault conditions
- Easy field board replacement without recalibration
- Easy access to load cell and serial communications without unit disassembly using the Quick Access Cover
- Support for up to 8 350 ohm load cells
- 115/220 VAC 50/60 Hz selectable operation
- Analog and digital filtering field selectable
- 200 Tare/ID truck weigh in/out program
- Full feature, robust batching program
- Easy loading of setpoints, tares, and batching programs via the duplex port

- DC / Battery operation (Optional)
- Peak and Hold Software Package (Optional)
- Solid State relay outputs (Optional)
- Remote push-button support (Optional)

** Battery backed static memory, estimated life time

Please be sure to read the entire manual to ensure obtaining all the benefits that the Model 8600 can provide. If any questions arise, please feel free to contact the Doran Scales Technical Service Department at 1-800-262-6844.

WARRANTY

Doran Scales, Inc. warrants its products to be free from manufacturing defects in materials and workmanship for a period of two (2) years from the date of shipment. Any product found to be defective within this time period may be returned to Doran Scales, Inc., freight prepaid, with prior return authorization for repair or replacement.

Doran Scales, Inc. liability under this warranty is limited to the repair or replacement of the defective product and in no event shall it be responsible for consequential or indirect damages to equipment or personnel caused by misuse, overload, accidental damage, alteration, improper installation or unauthorized opening of the equipment. Under no circumstances will Doran Scales, inc. be responsible for any contingent or consequential damages due to errors in weighing or failure of a Doran Scales, Inc. product to perform properly.

This warranty is in lieu of all other warranties, expressed or implied, and constitutes Doran Scales, Inc. exclusive warranty. There are no other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

To return a product for repair, first contact the Doran Scales, Inc. Service Department at 1-800-262-6844 for a return authorization number. A RMA (return material authorization) is required for any returned product. A delay in the repair can be expected if a product is returned without proper documentation, including the RMA number.

After receiving an RMA number, package the equipment in its original shipping carton. If the original shipping carton is not available, use a sturdy carton that is large enough to allow at least four inches of clearance on all six sides of the equipment.

Clearly mark the package with the RMA number and ship to :

Doran Scales, Inc.
1315 Paramount Pkwy
Batavia, IL 60510
Attn: Service Department

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Section 1. Unpacking and Installation

UNPACKING

Before proceeding to unpack your Model 8600, please note that although it is a highly durable industrial scale indicator, it is also a sensitive weighing instrument. Normal care should be taken when handling and using the indicator. Improper handling or abuse could be damaging and result in costly repairs that may not be covered by the warranty. Immediately notify the shipper if you notice any shipping damage - Doran insures all shipments, but all damage claims must be made directly to the shipper. Please observe the following precautions to insure years of trouble-free service from your Model 8600.

* DO NOT drop the scale indicator (or platform if included).

* DO NOT immerse the scale indicator (or platform if included).

* DO NOT drop objects on the platform (if included).

* DO NOT pick up the scale platform (if included) by the "spider".

Carefully remove the Model 8600 from the shipping carton. Be sure to retain the shipping carton and all packaging material in case reshipment is required.

INSTALLATION

Locate the desired position for the scale indicator. If the indicator is to be permanently mounted to a wall, shelf, or counter, remove the mounting bracket from the indicator. Use the two holes provided in the bracket to affix it to the desired surface. Before mounting the indicator into the bracket, connect the scale platform and any data cables to the indicator. Insert one of the threaded studs into one of the mounting holes on the bracket. Now gently spread the sides of the bracket apart and insert the other stud into the hole on the opposite side. Loosely thread the two knobs back onto the studs. Adjust the indicator to the desired viewing angle and tighten down the knobs.

ELECTRICAL CONNECTIONS

The Model 8600 requires 110 VAC, 50/60 Hz power (220 VAC or DC power optional). Be sure the AC power is not excessively noisy - this can occur if large inductive loads, such as solenoids or motors, are on the same power line. The Model 8600 has a filtered power supply to reduce the effects of normal line noise, but it cannot limit severe fluctuations. If problems occur, noise-producing devices may have to be suppressed to minimize their effect.

Section 2. Quick Setup Guide

LOAD CELL AND DATA COMMUNICATION CONNECTIONS

8600M: The Model 8600M has all the load cell and data communication connections on terminal blocks located behind the Quick Access Cover on the rear cover of the indicator. The cables are fed through watertight fittings on the access plate. It is not necessary to remove the rear cover of the indicator for normal setup and wiring, only the Quick Access Cover needs to be removed.

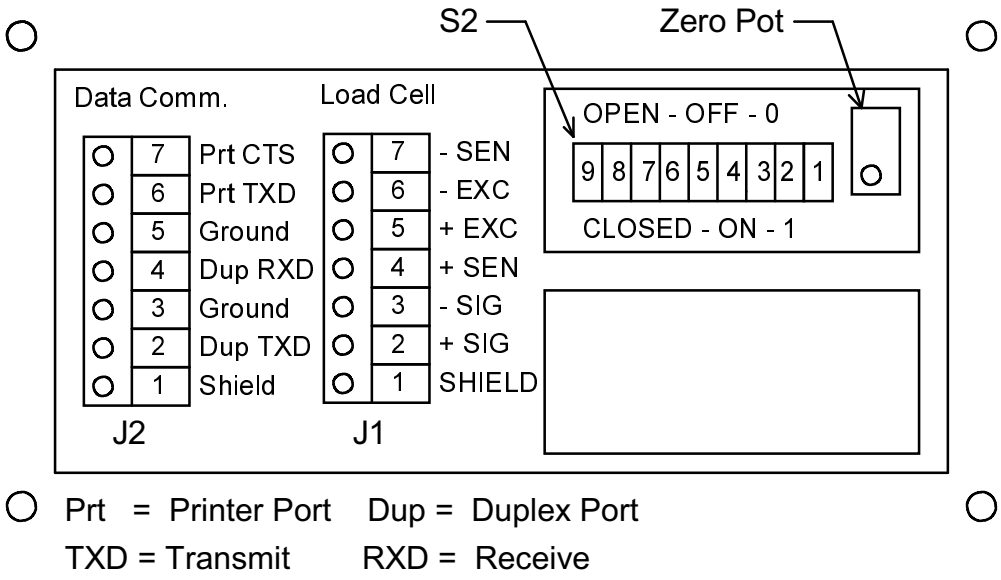


Figure 1. 8600M Quick Access Port Connections

The indicator setup switch S2 and the zero pot are located on the main board beneath the Quick Access board. These components can be accessed by reaching through the opening in the Quick Access board with a nonmetallic object. Note - SW2, #9 must be open before indicator is powered-up.

If remote sensing is to be utilized, the jumper between +Excitation and +Sense and the jumper between -Excitation and -Sense must be cut on the terminal board. This can be accomplished with a sharp knife by cutting the foil between the "//" marks on the board.

There are two communication ports on the Model 8600, a bi-directional (duplex) serial port and an output-only serial printer port. Both ports are default configured as RS232 and the default connections are shown in figure 1. Other configurations are available and can be ordered as required or configured as stated in Section 10.

8600RSS: The Model 8600RSS does not have a Quick Access cover. All connections are on the main board, which is accessed simply by opening the front cover.

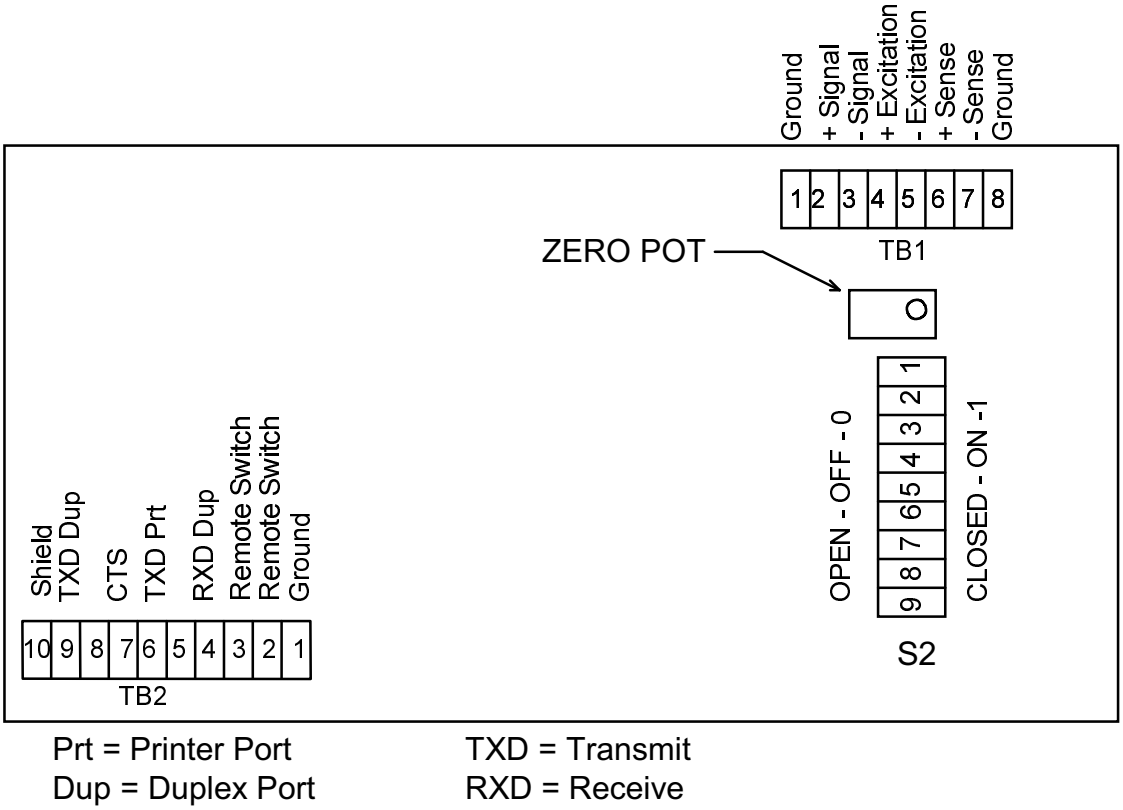


Figure 2. 8600RSS Main Board Connections
(components pictured larger than normal)

There are two communication ports on the Model 8600, a bi-directional (duplex) serial port and an output-only serial printer port. Both ports are default configured as RS232 and the default connections are shown in figure 2. Other configurations are available and can be ordered as required or configured as stated in Section 10.

SELECTING A PRESET CAPACITY AND RESOLUTION

The Model 8600 comes with several preset capacities to choose from, and displayed resolutions of 3000, 6000, 10000, and 20000. If your indicator was not set up at the factory for a specified capacity and resolution and you want to select a preset capacity and resolution, follow these steps:

A. Open the Quick Access Cover on the back side of the indicator by removing the six hex screws. Note the positions of the hex screws with the holes in the heads. (8600RSS: Open front panel to gain access to the main board)
B. Close SW2, #9 to enter the setup mode (see figure 1 or 2).
C. The display should show **1. COnF**. Press ENTER. The display should now show **2. dISP**.
D. Press ACCUM. The display should now show **2.0 grAdS**. Use the RCL or CLR buttons to scroll through the list of available graduations. When the desired setting is displayed, press SETP to save it.
E. Press ACCUM twice so that the display shows **2.2 CAP**. Use the RCL and CLR buttons to scroll up or down through the list of available capacities. When the desired capacity is displayed, press SETP to save.
F. Proceed to ANALOG CALIBRATION.

SELECTING A USER-SPECIFIED CAPACITY AND RESOLUTION

If you want to use a capacity and/or resolution that is not included in the 8600's option list, use this procedure to specify the resolution and capacity (Note - if this procedure is used, you must specify the units that the indicator will operate in, and you will not be able to convert to other units):

A. Open the Quick Access Cover on the back side of the indicator by removing the six hex screws. Note the positions of the hex screws with the holes in the heads. (8600RSS: Open front panel to gain access to the main board)
B. Close SW2, #9 to enter the setup mode (see figure 1 or 2).
C. The display should show **1. COnF**. Press ENTER. The display should now show **2. dISP**.
D. Press ACCUM. The display should show **2.0 grAdS**. Press ACCUM twice so that **2.2 CAP** is displayed.
E. Press the RCL or CLR button to scroll through the capacities until **SELECT** is displayed, and press SETP to save.
F. Press NET/GROSS twice to get back to the **2.0 grAdS** display. Press RCL, and enter the desired graduations using the numeric keypad. Press ENTER to save, or CLR to clear a mistake.
G. Press ACCUM to display the **2.1 bASE** menu. This will be the units that you will be weighing in. Press RCL or CLR to scroll through the selections until the desired base unit is displayed, and press SETP to save.

H. Press ACCUM twice to display **2.3 SCby**. This will be the lowest count-by number (1, 2, or 5). Press RCL or CLR to scroll through the selections and press SETP when the correct one is displayed.
I. Press ACCUM once to display **2.4 dECPt**. This will determine where the fixed decimal point is to be placed. Again, press RCL or CLR to scroll through the list and press SETP to save.
J. Proceed to ANALOG CALIBRATION.

ANALOG CALIBRATION

A. If not already in the setup mode, close SW2 #9 (see figure 1 or 2).
B. Press ENTER to advance to the calibration menu: **7. CAL1**
C. Press ACCUM to advance to the analog out function: **7.8 AOUt**
D. Press RCL to view the internal or raw counts.
E. Remove all weight from the platform and read the number of internal counts from the display - this is the RAWLO value. The reading should be between 1000 and 300,000 counts.
F. Place a test weight on the platform and record the reading - this is the RAWHI value. Use the following formula to calculate the SPAN and full capacity output (RAWFC).

$$SPAN = (RAWHI - RAWLO) \times \frac{CAPACITY}{TESTWEIGHT}$$

$$RAWFC = RAWLO + SPAN$$

(CAPACITY is the capacity of the indicator, TESTWEIGHT is the test weight)

Note: if a test weight equal to the capacity of the scale is used, then RAWFC is the same as RAWHI, and SPAN = RAWHI - RAWLO.

RAWFC must be less than 1,000,000 counts, and SPAN should be at least 200,000 counts.

Typical analog calibration values:

RAWLO: 30,000 to 50,000 counts
RAWHI: 580,000 to 675,000 counts
SPAN: 550,000 to 625,000 counts

These values will give optimum performance up to 20,000 counts displayed resolution with proper filter settings. If a displayed resolution greater than 20,000 counts is desired then set the span range to between 700,000 and 850,000 counts. This means that the dead load reading must be less than 150,000 counts.

If the zero and/or full scale readings are not within these limits, refer to Section 6 for instructions on how to set the analog calibration.

G. Proceed to DIGITAL CALIBRATION.

DIGITAL CALIBRATION

The Model 8600 can be digitally calibrated with any amount of test weight. However, as with any system, the more weight the better the calibration will be throughout the entire active range of the platform or load cell assembly. Follow these steps to perform the digital calibration:

A. If not already in the setup mode, close SW2, #9 (see figure 1 or 2).
B. Press ENTER to advance to the calibration menu: **7. CAL1**
C. Press ACCUM to advance to the calibrate load function: **7.0C Ld**
D. Press RCL to enter calibration. **Etr CAL** will be displayed.
E. Place the test weight on the platform. Enter the test weight value via the keypad and press ENTER. If a mistake is made, press CLR and reenter the weight value. **-WAIT-** then **Etr 0** will be displayed.
F. Remove the weight and press ZERO. **-WAIt-** then **Etr CAL** will be displayed.
G. Press SETP to save the calibration and exit.
H. Open SW2 #9 to exit the setup mode and return to normal operation. Reassemble the indicator.

See Section 5 for more information on the setup mode, see Section 6 for a more detailed description of the digital calibration procedure.

Section 3. Keyboard and Display Operation

KEYBOARD

The Model 8600 touch panel contains 21 push-buttons (1 is hidden) to gain access to data and functions. The keyboard is a non-tactile, polycarbonate panel that is designed to provide a water-tight user interface to the indicator. The indicator can provide an audible feedback, when enabled, when a push-button is pressed to indicate to the operator that a keyboard operation has been initiated. The keyboard is also used extensively in the setup and calibration of the indicator.

ZERO — The ZERO push-button provides push-button gross zero capability. The ZERO function can be limited to full, 1.9% or 4.0% of the scale capacity for "Legal For Trade" applications. When the ZERO function is limited to 1.9% or 4.0%, the reference point is the calibrated zero.

To zero the indicator, when the indicator is stable and within the gross zero limit (100%, 1.9% or 4.0%) press the ZERO button and release. The indicator will come to a zero indication.

TARE — The TARE push-button provides push-button tare entry or access to the 10 individual tare registers for multiple tare recall and entry. When a tare is entered via push-button tare entry or by recalling one of the ten tare registers, the indicator will enter the net mode.

When the 200 Tare Truck In/Out program is selected, the TARE button is used to enter the truck IDs and recall for display, printing or clearing.

The TARE button can be disabled or set up to review only to prevent operator tampering.

See Section 4 for an explanation of the tare function.

PRINT — The PRINT push-button provides the ability to generate a printout of the selected information. A print request can cause information to be sent from the printer and/or the duplex port(s).

When the 200 Tare Truck In/Out program is selected, the PRINT button is used to print a Truck weigh-out ticket. A Truck ID must be entered and recalled using the TARE button.

The PRINT button can be disabled if desired through the setup menu.

UNITS

The UNITS push-button is used to switch between display units. The convert function can be menu selected to switch only between certain units. For example, the UNITS function can be set up to only convert between lb and kg, not allowing the display of oz or g. The UNITS button can be menu enabled or disabled.

Note: If the grams unit is selected, but there aren't enough digits to display the weight fully, the indicator automatically reverts to a kilograms display, even though the grams annunciator is on.

NET/ GROSS

The NET / GROSS push-button is used to select either the net or gross display modes. In the net mode, the current tare will be subtracted from the actual weight on the platform to produce the displayed weight. In the gross mode, the actual platform weight is displayed. The NET/GROSS button can be menu enabled or disabled. The NET/GROSS button is also used for entering negative values when required.

ACCUM

The ACCUM push-button is used to access any one of 10 accumulators and their associated counters for entry, recall, or clearing. Press the button once to access the accumulators, or twice to access the associated counters. The ACCUM button can be menu enabled or disabled. Additionally, the ACCUM button can be menu selected to only allow recall of the accumulator/counter contents to prevent accidental operator erasure.

See Section 4 for an explanation of the operation of the accumulator function.

SETP/ PREACT

The SETP / PREACT push-button is used to access the 10 setpoints and preact registers for entry, recall, or clearing. Each setpoint and its associated preact can be individually accessed. Press the button once to access the setpoints, or twice to access the preacts.

The setpoint value can be menu selected to allow entry of the value digitally (using the numeric keyboard) or directly by placing the actual weight to be entered on the scale platform.

The SETP/PREACT button can be menu enabled/disabled. Additionally, the SETP/PREACT button can be menu selected to allow only recall of the setpoint and preact contents to prevent operator intervention.

See Section 4 for an explanation of the setpoints and preacts.

ENTER

The ENTER push-button is used to enter information into the selected function register.

RCL/ SUBTOT — The RCL/SUBTOT push-button is used to recall information from the selected function register and the accumulator/counter.

It is also used to recall a tare value to be used for all subsequent weighing operations. Upon recall of the tare value, the scale will automatically enter the net mode. The scale can be placed back in the gross mode by pressing the NET/GROSS push-button, if enabled.

CLR/ TOTAL — The CLR / TOTAL push-button is used to clear the selected function register. The push-button is also used for totaling, printing, and clearing the accumulator and counter contents.

NUMERIC KEYS — The numeric portion of the keyboard (0-9) is used for entering value information into the selected function registers. It is also used for data entry of certain information when in the setup mode of the indicator. Also, the numeric keyboard is used for selecting the desired register to operate on. For example, when the ACCUM button is pressed, followed by a '1' and a recall, the indicator will recall the contents of accumulator 1 to the display. The NET/GROSS button is used as a negative sign entry. Press NET/GROSS to enter a negative value.

BATCH — The BATCH button is hidden. It is located between the UNITS and NET/GROSS buttons and is used for starting, stopping, or pausing a batch process. See Section 7 for more information about batch programs.

DIGITAL DISPLAY

The digital display contains seven (7) 0.80", 7-segment LED displays. The display is used for displaying all weight and setup information as well as any error or user instructions. A negative weight or value is signified with a negative sign in the far left of the display.

UNIT ANNUNCIATORS

The Model 8600 supports the display of lb, kg, oz, g and lb-oz. When the indicator is in the lb display mode, the "lb" annunciator will be enabled. When the indicator is in the kg display mode, the "kg" annunciator will be enabled. The same is true for the oz and g display modes. When the indicator is in the lb-oz display mode, both the "lb" and "oz" annunciators will be enabled. If the g display mode is selected but cannot be displayed in 6 digits, the indicator will automatically revert to a kg display (the g annunciator will still be on).

STATUS ANNUNCIATORS

The Model 8600 provides 4 additional status annunciators during normal weighing operations.

"MOT" Indicates that the indicator is in the motion state, meaning that there is movement on the platform. The movement must settle before a stable state is achieved and is indicated when the "MOT" annunciator is off. Any function that is related to stability (i.e. a print request, autoprint, or auto-accumulate) will be initiated upon stability and the display of stability.

"ZERO" Indicates when the displayed weight value is within +/- 0.25 scale divisions of zero. When outside of the band, the annunciator will be off.

"NET" Indicates that the indicator is in the net display mode of operation.

"GROSS" Indicated that the indicator is in the gross display mode of operation.

CAPACITY LABEL

The capacity label is designed to be placed inside a pocket of the touch panel which requires that the indicator be disassembled. It is recommended that the supplied labels be used to ensure full compliance with any regulatory agencies.

SERIAL NUMBER TAG

The serial number tag is mounted on the top of the 8600M to the right, and on the right side of the 8600RSS. The tag will have all of the markings required by most regulatory agencies. The serial number tag is riveted to the enclosure to prevent removal.

Section 4. Normal Mode Operation

In the normal mode of operation, the Model 8600 will provide 10 tare registers, 10 setpoint registers with preacts and 10 accumulators with counters. The function of the TARE, ACCUM and SETP push-buttons are dependent upon their settings in the setup menu.

TARE OPERATION

The Model 8600 has the ability to store 10 separate tare values that can be recalled for tare operations. Any of the 10 values can be changed, cleared, or recalled at any time unless disabled in the setup program. When the indicator is in the net mode, the displayed value is the current weight on the platform minus the currently selected tare value.

A printout of individual or all tares can be generated if needed. To print out an individual tare, press TARE, the tare number, and PRINT. To print out a list of all 10 tare values, press TARE and PRINT.

The way that the tare values are entered and recalled is determined by a selection in the setup menu (see Section 5, menu 5.2 - tArPb). The 4 selections are explained below.

SEt (Most common setting)

When the "SEt" option is selected, any of the 10 tares can be changed or cleared at any time. The tares can be entered either digitally using the numeric keyboard or directly from the scale platform. Select the tare to be changed by pressing the TARE button and then the number of the tare to be changed.

To make the selected tare active, press the RCL button. The indicator will go back to the normal weighing mode, and the display will show the net weight on the platform using the selected tare.

To display the current tare value, press TARE, and then RCL. The value of the current tare will flash rapidly for about 2 seconds and go back to normal weighing.

To enter a tare using the weight currently on the platform, press TARE, the number of the desired tare, and ENTER. The display will flash "EntEr", and the current platform weight will now be stored in the tare register that was selected. The selected tare will now be active, and the indicator will enter the net mode.

To enter the tare value with the numeric keyboard, press TARE, and the number of the desired tare. After doing this, start entering the value using the numeric keyboard. After the first number has been entered, the display will show the value you are entering. When finished, press ENTER and the selected tare will now contain the number just entered. The selected tare will now be active, and the indicator will enter the net mode.

P.t.t.

The P.t.t. option is simpler to use, but allows storage of only one tare at a time, and only platform weight can be entered as a tare value. To enter a weight as a tare value, place the weight on the platform and press TARE. The weight will now be the tare value, and the indicator will be in the net mode.

dIS

The dIS option allows only recalling of the 10 tare values, i.e. the values cannot be changed by the operator. This option would normally be selected to prevent the operator from inadvertently changing or clearing the stored values. To accomplish this, first set the indicator to the "SEt" option, enter the tare values, and set the indicator to the "dIS" option when done.

1tAr

This option offers a single tare as in the P.t.t. option, but the value entry is via the numeric keyboard instead of the platform. To enter a tare, press TARE, the tare weight value, and ENTER. The display will now show the net weight using the tare value just entered.

SETPOINT / PREACT OPERATION

The Model 8600 has 10 setpoints that can be configured separately in a number of ways (see Section 5, menu 5.8 - SEtPt). Each setpoint has a TTL output that willswitch levels when certain conditions, which are programmed in the SEtPt menu, are met. The most common type of setpoint is the continuous setpoint, which trips when the specified weight is on the platform. The setpoints can also be configured as status indicators, meaning they will trip on the specified status condition (motion, center-of-zero, etc.), or as batch indicators (see Section 7 for information on the batch operation mode).

The Model 8600 provides 10 storage registers for setpoint values, and 10 storage registers for preact values. These are used when the specified setpoint is set up as a continuous type. The setpoints are numbered 0 - 9, and each has a separate setpoint and preact register associated with it.

The preact value is designed to offset errors in filling operations due to a time lag in shutting off the material flow. For example, a setpoint can be set up to shut off a valve when 50 lbs of liquid is measured in a vat. If after shutting off the valve, another 2 lbs flows from the fill pipe, there would actually be 52 lbs in the vat, causing an error of 2 lb. To counteract this problem, the associated preact can be set for 2 lb, in which case the setpoint would actually trip at 48 lb, allowing the extra 2 lb to complete the fill. Preact values are simply subtracted from their associated setpoint value to determine the trip point. If the indicator is used in the batch mode, the preact can be set to automatically calculate this preact value (see Section 5, menu 8.2 - PrEAt).

A setpoint or preact printout can be generated if needed. To print out an individual setpoint, press SETP, the number of the setpoint, and PRINT. To print out a list of all 10 setpoints, press SETP and PRINT. To print out preacts, follow the same procedure, but press SETP twice.

The setpoints and preacts are entered using the SETP / PREACT button on the front panel. The way that they are entered is determined by a selection in the setup program (see Section 5, menu 5.5 - SPtPb). The 3 selections are explained below.

SEt (most common setting)

In the SEt mode, the setpoint and preact values can be entered either with the numeric keyboard, or directly from the weight on the platform.

To enter a setpoint value using the keyboard, first press the SETP button, which will cause the display to show "SEtPt" and the number of the setpoint that was changed last. Next, enter the number of the setpoint to be changed and press RCL. The display will now flash the current value for that setpoint. Finally, enter the desired value for that setpoint and press ENTER. The value will now be stored as the setpoint that was specified. If a mistake is made while entering the number, press CLR to clear and reenter the number.

To enter a preact using the keyboard, press the SETPT button twice, which will cause the display to show "PrEACt" and the number of the preact last changed. Next, enter the number of the preact to be changed and press RCL. The display will now flash the current value for that preact. Finally, enter the desired value for that preact and press ENTER. The value will now be stored as the preact that was specified. If a mistake is made while entering the number, press CLR to clear and reenter the number.

To enter a current platform weight as a setpoint, press the setpoint button followed by the number of the desired setpoint, and press ENTER. The setpoint will now be stored as the current platform weight.

Ptt

In the Ptt mode, only the current platform weight can be entered as a setpoint or preact. Entry is the same as in the SEt mode, except that values cannot be entered from the keyboard, only from the platform.

dIS

In the dIS mode, the setpoints and preacts are only available for recall to be reviewed, they cannot be changed or cleared. This mode would normally be chosen to prevent inadvertent erasure or change of the setpoint and preact values by the operator. To accomplish this, in the setup mode, set menu 5.5 SPtPb to "SEt", and reenter the normal weighing mode and enter the desired setpoints and preacts. Finally, reenter the setup mode and set menu 5.5 SPtPb to "dIS" and return to the normal weighing mode. The entered setpoints and preacts will now be protected.

ACCUMULATOR OPERATION

The accumulator feature can be set up to operate as a 10 accumulator/counter function. Each time an accumulation takes place, the associated counter will be incremented by one. When the accumulator is totaled and cleared, the total will be displayed momentarily and printed out if a printer is attached. The accumulator and its counter will then be cleared. The accumulator can be set up to accumulate manually, with a print request, or automatically. Also, the accumulator can be set up to accumulate gross or net weight in any mode.

When the accumulator is set up as a standard accumulator, only manual accumulation of the accumulator can take place. To manually accumulate, press the ACCUM button followed by the number of the accumulator to accumulate to. Press ENTER, and the displayed weight will be added to the selected accumulator. Note that once an accumulation takes place on an initially cleared accumulator, all successive accumulations must take place in the same units (lb, kg, oz, etc.) as the initial accumulation. If not, an error of "Er ACUn" will be displayed by the indicator.

When the accumulator is set up to be a default accumulator upon a print request, every time that PRINT is pressed and the accumulator is the last accumulator operated on (recalled/cleared), then that accumulator will be accumulated into. If the accumulator is not the default accumulator, then an accumulation will not take place.

When the accumulator is set up to perform an accumulation upon every print request by pressing PRINT, all accumulators set up in this manner will be accumulated into.

When the accumulator is set up to perform an auto accumulation every time, an accumulation will take place to every accumulator set up in this manner. An accumulation will take place once and only once upon stability and if the indicator displayed weight is outside of the zero band. Once inside the zero band, the auto function is reset and an auto accumulate can occur again.

When the accumulator is set up to perform an auto accumulation on the default accumulator, the same procedure outlined above will occur. However, an accumulation will take place only if the accumulator is the default accumulator.

To recall an accumulator, simply press ACCUM and the number of the accumulator to recall and press RCL. The current contents of the accumulator will be displayed. To recall the counter contents, press the ACCUM button twice before selecting the desired location.

To print and clear the desired accumulator, press ACCUM and the accumulator number to clear, then press CLR. The contents will be displayed momentarily and sent out of the printer port (or label buffer #1 is sent out of printer port, if function 3.5 "PrF" is set to "LbLbUFF"). Then a message "CLEAr" will flash to signify that the accumulator has been cleared. The indicator will return to normal weighing.

To print the current value of an accumulator without clearing it (subtotal), press ACCUM, the number of the accumulator, and PRINT. To print out a list of all 10 accumulator subtotals, press ACCUM and PRINT. Follow the same procedure to print the counter values, except press ACCUM twice.

Counter values can be preloaded with specific values or cleared if needed. To enter a counter value, press ACCUM twice, the number of the counter, the counter value, and ENTER. To clear a counter without clearing the accumulator value, press ACCUM twice, the counter number, and clear.

Section 5. Parameter Setup

There are several parameters that can be changed on the Model 8600 to provide the greatest amount of flexibility and customization. These are all explained in the following pages. The parameters are reached by entering the setup mode and using the buttons shown below to bring up the various menus. There are 9 main menu selections, each of which contains several parameters that can be changed. The 9 main menus are as follows:

1. General Configuration
2. Display
3. Printer Port Setup
4. Duplex Port Setup
5. Keyboard Setup
6. Accumulator Setup
7. Calibration
8. Setpoint Setup
9. Batch Mode Command List

All menu selections and entered data are saved in an EEPROM for nonvolatile data storage.

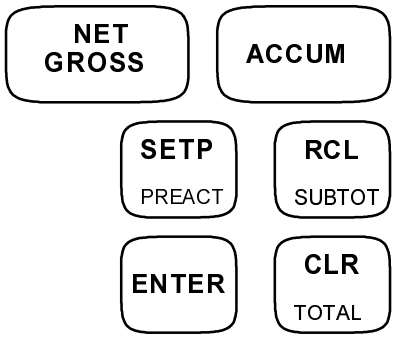


Figure 3. Parameter Setup Buttons

ENTERING / EXITING SETUP

To enter the setup menu, open the Quick Access Cover on the back side of the indicator by removing the six hex screws (8600RSS: open front panel to access main board). Note the positions of the hex screws with the holes in the heads. These screws will have to be reinstalled in their original positions. Once opened, locate the 9 position switch block (SW2) just inside the opening and locate the switch labeled '9' or position 9 (see figure 1 or 2). Close the switch. Note - SW2, #9 must be open before indicator is powered-up. The display will show **1. COnF** to signify that the indicator has entered the configuration setup menu.

To exit the setup mode, simply open the switch labeled position 9 that was closed in the previous procedure. The indicator will momentarily display **SAVSETU** to indicate that the setup menu has been exited and then return to normal weighing. All menu selections will be saved at that time.

Reinstall the cover reversing the procedure followed to remove it. Make sure all the screws are reinstalled in their original positions and the gasket is replaced properly. Tighten the screws as required.

SELECTING MAIN MENUS

When the setup mode is first entered, the display will show **1. COnF**, meaning that you are now at main menu 1 - Configuration. To go to any of the other 8 main menus, press ENTER to go to the next menu, or SETP to go to the previous menu. To select a menu in order to access the parameters within it, press ACCUM.

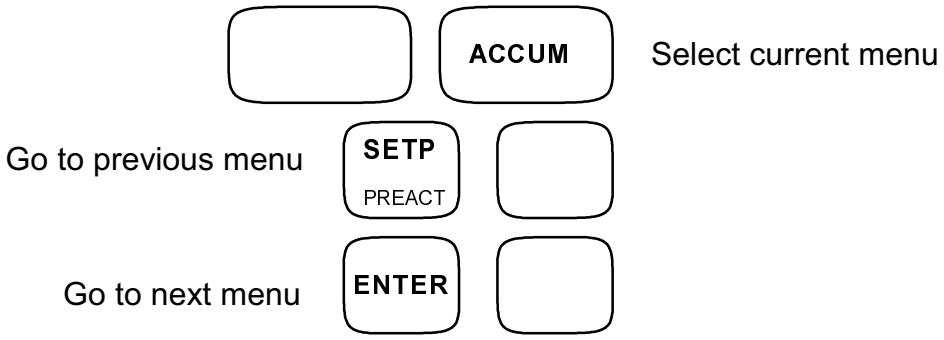


Figure 4. Main Menu Selection Buttons

SELECTING PARAMETERS

Once the ACCUM button has been pressed to select a menu, the parameters in that menu are accessible. To step through the list of parameters for a particular menu, press ACCUM to go to the next parameter, or NET/GROSS to go to the previous parameter. When you reach the parameter you want to review or change, press RCL and the current setting of that parameter will be displayed.

When **6. ACCU** or **8. SETP** menu is selected, the number of the accumulator or setpoint to set up must be specified. After pressing ACCUM, the display will show **ACC_0** or **SEtPt_0**. Select the accumulator or setpoint to setup by pressing its number on the keypad, followed by SETP. For example, to change **8.0 TyPE** of setpoint 2, go to menu **8. SETP** and press ACCUM. Then press '2' on the keypad, and press SETP. The **TyPE** parameter for setpoint 2 will then be displayed. The list of parameters for setpoint 2 then can be accessed by pressing the NET/GROSS or ACCUM buttons as before.

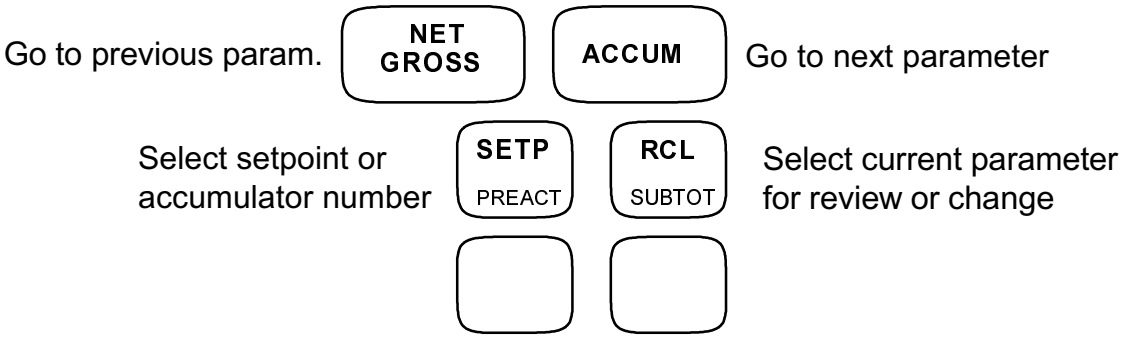


Figure 5. Parameter Selection Buttons

CHANGING PARAMETERS

When the current setting for a parameter is displayed, it can be changed to any of the available settings in the list. To step through the available settings, press RCL to go to the next setting in the list, or CLR to go to the previous setting in the list. When the desired setting is displayed, press either the SETPT or ENTER buttons to save the setting and go back to the parameter list. Pressing SETP again will return to the main menu.

Certain parameters require you to enter a value. If you select one of these parameters and press ACCUM, the current value of that parameter will be displayed. If you don't want to change the value, press ENTER and the indicator will return to the parameter list. To change the value, simply enter the new value on the numeric keypad and press ENTER. The indicator will respond with **dOnE** to signify that the indicator has accepted the new value.

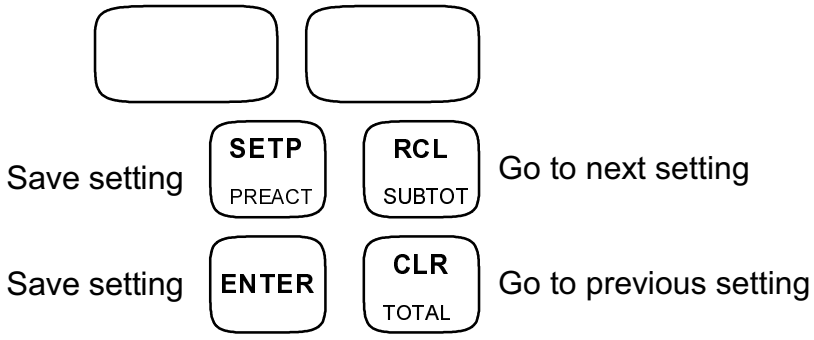


Figure 6. Parameter Setting Selection Buttons

REVIEW/CHANGE PRINT FORMAT LIST

Parameters **3.5 PrtF** and **4.5 PrtF** are print format parameters for the printer and duplex ports, respectively. Each port can print up to 10 lines of information, and each of these lines can be set up independently to print various types of data or text (see the parameter lists on the following pages for a list of these formats). To set up the print format, go to **3.5 PrtF** or **4.5 PrtF**, depending on the one you want to set up, and press RCL. The display will show **LInE 1**. To access the format for this line, press RCL, which will cause the current setting for line 1 to be displayed. To change this format, press RCL or CLR to step through the list of available formats, and press SETP when done. The display will again show **LInE 1**. To set up another line, press ACCUM to increment through the line list, or NET/GROSS to decrement through the list. To exit the print format setup procedure, press SETP at the line listing prompt, and you will be returned to either **3.5 PrtF** or **4.5 PrtF**.

REVIEW/CHANGE BATCH COMMAND LIST

When selecting the batching command list, you can specify any one of 93 commands in up to 76 steps. To enter a command, select main menu **9.bAtLSt**. Once selected, press ACCUM and the first step (00) in the list will be displayed with the current command for that step. To select the step to review or change, press ACCUM to increment to the next step or press NET/GROSS to decrement to the previous step.

There are two ways to select a command for a given step. The easiest way is to enter the 3-digit command number followed by ENTER (the command list is at the end of this section under BATLST). The second way to change the command is to press RCL to increment through the list of valid commands or CLR to decrement through the list. Once completed, press the SETP button to return to the main menu.

USER-SELECTABLE CAPACITIES AND RESOLUTIONS

The Model 8600 includes several preset capacity and resolution settings. The Model 8600 also has the option of letting the user specify the capacity and resolution, using the SELECT option for the **2.2 CAP** parameter. If this is selected, there are 4 things that have to be selected:

1. **2.0 grAdS** - Number of displayed graduations.
2. **2.1 bASE** - Base weighing units (Lb, kg, oz, or g).
3. **2.3 SCby** - Count-by (lowest counting increment - 1, 2, or 5).
4. **2.4 dECPt** - Decimal point placement.

In addition to these parameters, when SELECT is chosen, two other parameters are automatically set up. **1.7 StUUn** - Start-up units is automatically set the same as **2.1 bASE,** and **5.4 UntPb** - UNITS push-button enable is automatically set to OFF. This is necessary because in the SELECT mode, no units conversion is possible.

The full-scale display is the number of graduations multiplied by the count-by, with the specified decimal point. For example, if the number of graduations is specified to be 15000, the count-by is 5, and the decimal point is 0.000, the full scale reading (capacity) would be 75.000 (15000 X 5 = 75000, decimal point is three places).

MAIN MENU EXPLAINED

1. COnF

1.0 dIg F	Digital averaging Determines the number of samples to average
A1	**Auto averaging 1:1 in motion, 64 when stable**
A2	Auto averaging 1:1 in motion, 128 when stable
1	Fixed averaging 1:1 no averaging
2	Fixed averaging 2:1 averaging
4	Fixed averaging 4:1 averaging
8	Fixed averaging 8:1 averaging
16	Fixed averaging 16:1 averaging
32	Fixed averaging 32:1 averaging
64	Fixed averaging 64:1 averaging
128	Fixed averaging 128:1 averaging

1.1 AnL F	Analog Filter Settings Determines rolloff characteristics of the filter. The larger the setting, the faster the response.
1	Analog filter setting of approximately 0.078 Hz
2	Analog filter setting of approximately 0.156 Hz
3	Analog filter setting of approximately 0.313 Hz
4	Analog filter setting of approximately 0.625 Hz
5	Analog filter setting of approximately 1.25 Hz
6	Analog filter setting of approximately 2.5 Hz
7	**Analog filter setting of approximately** 5 Hz

1.2 AZt	Automatic Zero Tracking Small weights will be automatically zeroed out if within the specified divisions. Note: Avoid the combination of high AZT and MAPR settings to prevent the zeroing of valid weights.
OFF	Zero tracking is off or disabled
0.5	**Zero track when within 0.5 divisions**
1	Zero track when within 1 divisions
3	Zero track when within 3 divisions
5	Zero track when within 5 divisions
10	Zero track when within 10 divisions

1.3 Pb0bd	Push-button Zero Band Determines the percent of indicator capacity that a push-button zero will be allowed. Gross mode only.
100	**Zero button has full range zero capability**
1.9	Zero button will only zero when within +/- 1.9 %
4.0	Zero button will only zero when within +/- 4.0 %

1.4 MAPr	Motion Aperture Determines the number of divisions of change that must be realized between display updates before entering a motion state.
OFF	Motion test is disabled, stable at all times
0.5	0.5 division of change must be seen to enter motion
1	**1 division of change must be seen to enter motion**
3	3 divisions of change must be seen to enter motion
5	5 divisions of change must be seen to enter motion
10	10 division of change must be seen to enter motion

1.5 dSPOP	Display Operation Determines how the display will operate
On	**Display remains on all the time**
OFF	Display remains off all the time
Stb	Display will be on only when stable
thr	Display will be on only when outside of the zero band
Stb_thr	Display will be on only when stable and above the zero band

1.6 PUUr0	Power Up Zero Determines which zero reference value to use/restore
AUtO 0	**Perform an auto-zero, scale will come to zero upon power up**
CAL 0	Restore the calibration zero point for a zero reference
Pb 0	Restore the last gross zero point for a zero reference

1.7 StUUn	Start Up Units Determines the display unit that the indicator will be in upon power up
lb	**Start up in pounds (lb)**
kg	Start up in kilograms (kg)
oz	Start up in ounces (oz)
g	Start up in grams (g)
lb-oz	Start up in pounds and ounces (lb, oz)

1.8 dSPM	Display Mode Determines the display mode of the indicator upon power up
grOSS	**Enters the Gross Mode upon power up**
nEt	Enters the Net Mode upon power up

1.9 CntSL	Convert Select Operation Determines how the UNITS push button will convert the display units
5 - ALL	**Will convert to all 5 display units (lb, kg, oz, g, lb-oz)**
4 - no g	Will convert to 4 units (lb, kg, oz, lb-oz)
4 - no LO	Will convert to 4 units (lb, kg, oz, g)
3 - LOLO	Will convert to 3 units (lb, oz, lb-oz)
3 - LkgO	Will convert to 3 units (lb, kg, oz)
2 - Lkg	Will convert to 2 units (lb, kg)
2 - L O	Will convert to 2 units (lb, oz)
2 - g O	Will convert to 2 units (g, oz)

1.A trdLy	Timer Delay Determines the time that the indicator needs to remain in a stable (non-use) state before the indicator will turn off. This is for DC / Battery options only.
On	**Indicator will always be on. To turn off, press and hold the ZERO button. To turn on, press ZERO.**
0.5 minute	Indicator will turn off after 0.5 minute of stability
1.0 "	Indicator will turn off after 1.0 minute of stability
1.5 "	Indicator will turn off after 1.5 minutes of stability
2.0 "	Indicator will turn off after 45.0 minutes of stability
2.5 "	Indicator will turn off after 2.5 minutes of stability
3.0 "	Indicator will turn off after 3.0 minutes of stability
5.0 "	Indicator will turn off after 5.0 minutes of stability
10.0 "	Indicator will turn off after 10.0 minutes of stability
20.0 "	Indicator will turn off after 20.0 minutes of stability
30.0 "	Indicator will turn off after 30.0 minutes of stability
45.0 "	Indicator will turn off after 45.0 minutes of stability
60.0 "	Indicator will turn off after 60.0 minutes of stability

1.b tIME	TIme entry Displays/changes time entry for indicator.
HH.MM.SS	Display and enter time in a 24 hour format only. Display will show the current time. To change time, press CLR and then enter the new current time. Press ENTER and exit the TIME entry parameter. Display will show "DONE" upon entry of new time.

1.C dAtE	Date entry Displays/changes the current date entry for indicator.
MM.DD	Display and enter date in a MM/DD format only. Display will show the current month and day. To change date, press CLR and then enter the new current date. Press ENTER and exit the DATE entry parameter. Display will show "DONE" upon entry of new date,

1.d yEAr	Year entry Displays/changes the current year entry for indicator.
YYYY	Display and enter year in a YYYY format only. Display will show the current year. To change year, press CLR and then enter a 4 digit value between 1995 to 2094 for current year. Press ENTER and exit the YEAr entry parameter. Display will show "DONE" upon entry of new year,

1.E OPEr	Indicator operation Determines the operating mode of the indicator
nOrL	**Normal mode selected.** (see Section 4)
bAtCh	Batching mode selected. (see Section 7)
MOtIOn	In Motion Weighting mode. (see Section 8)
tArE F1	Tare mode 1 selected. Truck in/out program. ID is cleared after transaction. No swap of tare weight. (see Section 8)
tArE F2	Tare mode 2 selected. Truck in/out program. ID is cleared after transaction. The lesser of the stored tare and the truck out gross weight is swapped if necessary to ensure that the printed NET weight will always be positive. (see Section 8)
tArE F3	Tare mode 3 selected. Truck in/out program. ID is not cleared after transaction. No swap of tare weights. (see Section 8)
tArE F4	Tare mode 4 selected. Truck in/out program. ID is not cleared after transaction. The lesser of the stored tare and the truck out gross weight is swapped if necessary to ensure that the printed NET weight will always be positive. (see Section 8)
tArE F5	Tare mode 5 selected. Reserved for future use, do not select.
Pthd n	Peak and Hold, positive selected. Optional. See errata sheet that accompanies the program.
Pthd -	Peak and Hold, negative selected. Optional. See errata sheet that accompanies the program.
Pthd r	Peak and Hold, percentage selected. Optional. See errata sheet that accompanies the program.

1.F t-dFt	Time and Date Print Formats Determines the format of time and/or date when the t_d option is selected in a print list.
nOn	**No format specified**
1	Print date only in format MM/DD/YY
2	Print date only in format DD/MM/YY
3	Print time only in 12 hour format HH:MM:SS AM/PM
4	Print time only in 24 hour format HH:MM:SS
5	Print time/date format MM/DD/YY HH:MM:SS AM/PM
6	Print time/date format MM/DD/YY HH:MM:SS HR
7	Print time/date format DD/MM/YY HH:MM:SS AM/PM
8	Print time/date format DD/MM/YY HH:MM:SS HR

2. dISP

2.0 grAdS	Display graduations Determines maximum number of display graduations
3000	3000 maximum graduations for capacities/resolutions.
6000	6000 maximum graduations for capacities/resolutions.
10000	**10000 maximum graduations for capacities/resolutions.**
20000	20000 maximum graduations for capacities/resolutions.
as specified	When the 2.2 CAP has an option setting of "SELECT" the actual displayed graduations are entered via the numeric keyboard graduations in the base unit as selected by 2.1 BASE. The entered value must be greater than 1000, but no more than 100,000.

2.1 bASE	Base unit for display graduations Determines the base unit to apply the entered graduations in 2.0 GRADS when 2.2 CAP has an option setting of "SELECT". If the 2.2 CAP has an actual capacity selected, the base units is ignored.
lb	**The base unit is lbs. The graduations entered are applied to the lb unit using the selected count-by and decimal point selection.**
kg	The base unit is kg. The graduations entered are applied to the kg unit using the selected count-by and the decimal point selection.

oz	The base unit is oz. The graduations entered are applied to the oz unit using the selected count-by and the decimal point selection.

2.2 CAP	Capacity Determines the capacity of the indicator in lbs.
1.3	Selects 1.3 lb capacity for the indicator.
...	to
1000000	Selects 1,000,000 lb capacity for the indicator. A total of 39 predetermined capacities to choose from. **100 LB is default setting**
SELECt	Uses the entered graduations in 2.0 GRADS, the count-by in 2.3 SCBY and the decimal point selection in 2.4 DECPT to determine the capacity and the format for the display

2.3 SCby	Count by Determines the count-by for the indicator when the 2.2 CAP has an option of SELECT. Otherwise the SCBY is ignored.
1	**Base unit will count by 1**
2	Base unit will count by 2
5	Base unit will count by 5

2.4 dECPt	Decimal point location Determines the position of the decimal point for the selected base unit when the 2.2 CAP has an option of SELECT. Otherwise the 2.4 DECPT is ignored.
0.00000	Displays base unit with selected decimal point
0.0000	Displays base unit with selected decimal point
0.000	Displays base unit with selected decimal point
0.00	**Displays base unit with selected decimal point**
0.0	Displays base unit with selected decimal point
0	Displays base unit with no decimal point
1x	Displays base unit with no decimal point, multiplied by 10, e.g. use 1x and CBY=5 to achieve a count-by of 50.
1xx	Displays base unit with no decimal point, multiplied by 100.

2.5 USrM	User multiplier Provides the multiplier factor for calculation with the selected multiplier base unit as selected in 2.6 USRAN
as specified 0.5 - 9.9...	Enters and recalls the multiplier value based on the replacement unit or base unit as specified in 2.6 USRAN. The displayed value = user multiplier X the replaced unit specified in 2.6 USRAN For example, to display troy oz with a conversion of: 1 ounce (avoirdupois) = 0.911 troy ounce the replacement unit as set in 2.6 USRAN would be set to oz and the multiplier as specified in 2.5 USTM would be entered as 0.911... This would result in a display of troy oz when in the oz display mode.

2.6 USrAn	User replacement unit Determines the unit to replace and the base for the conversion for the user multiplier as specified in 2.5 USRM.
nOnE	**No user multiplier or units specified.**
lb	User multiplier has lb as a base and the user unit replaces the lb unit.
kg	User multiplier has kg as a base and the user unit replaces the kg unit.
oz	User multiplier has oz as a base and the user unit replaces the oz unit.
g	User multiplier has g as a base and the user unit replaces the g unit.

2.7 0bAnd	Zero band Determines the zero band for threshold resetting and zero point registration in percentage. This function is used for gross zero in AP2, net zero in AP3, and in OPER (1.E) - in motion weighing mode.
1	**Zero band is +/- 1 %**
2	Zero band is +/- 2%
3	Zero band is +/- 3%
4	Zero band is +/- 4%
5	Zero band is +/- 5%
6	Zero band is +/- 6%
7	Zero band is +/- 7%
8	Zero band is +/- 8%
9	Zero band is +/- 9%
10	Zero band is +/- 10%

2.8 bAtSd	Batch Sequence Display Enable Enables/Disables display of the current batching step being executed. A 2 digit number representing the current step in the batch list will be displayed.
FLAShOn	**Batch sequence display enabled (flashing).**
OFF	Batch sequence display disabled.
COnt On	Batch sequence display enabled (continuous).

3. SErPrt (Port 2)

3.0 bdrt	Baud rate Determines the baud rate (bps) for serial data
300	300 baud (bits per second)
1200	1200 baud (bits per second)
2400	2400 baud (bits per second)
4800	4800 baud (bits per second)
9600	**9600 baud (bits per second)**
19.200	19.200 kilo baud (bits per second)

3.1 d.b.-P	Data bits and parity Determines the number of bits for each character for the serial data output as well as the parity error checking for each character, if any.
8 dat nP	**8 data bits and no parity for each character, 2 stop bits**
7 dat nP	7 data bits and no parity for each character, 2 stop bits
7 dat OP	7 data bits and odd parity for each character, 2 stop
7 dat EP	7 data bits and even parity for each character, 2 stop

3.2 d.AtO	Data output mode Determines how the serial data will be generated from the port.
tOd	**Transmit on demand. A print is requested when the PRINT push-button is pressed.**
COnt	Transmit data continuously from the port. Based upon the update rate of the display.
AP1	Transmit a print request once for all stable weights.
AP2	Transmit a print request once for all stable weights outside of the zero band. Must return to within the zero band to reset and be able to generate another print request. Is based on gross zero.
AP3	Transmit a print request once for all stable weights outside of the zero band as applied to the displayed zero. Must return to within the zero band to reset and be able to generate another print request.
LOd	Same as TOD except if indicator is in a motion state, the print request will be stored and the next time the indicator becomes stable, a print request will be generated. The function is then reset when printing.
tdO	Will issue a print request every 10-15 seconds regardless of the current state of the indicator (stable or not).

3.3 EOLd	End-of-line delay Determines the time, in milliseconds, between each line of serial data transmitted. Used for printers with no or small buffers.
00 - 99 ms	Determines the amount of time to insert between multiple lines of serial data. **0 ms is default setting.**

3.4 Prtb	Print push-button operation select Determines what test to perform when the PRINT push-button is pressed.
OFF	The PRINT button is disabled.
Stb	**The indicator needs to be stable when a PRINT request is made before a printout will be generated.**
thr	The indicator needs to be above the zero band when a PRINT request is made before a printout will be generated.
bOth	The indicator needs to be both above the zero band and stable when a PRINT request is made before a printout will be generated.

3.5 PrtF	Print format select Determines the print format for each line. Specify an option for each line up to 10 lines.
nOnE	A space is printed if succeeding lines have an option specified. Otherwise, nothing is printed.
8,000	**The format for data in lb, kg, oz, g: STX POL DATA (6 char). lb/kg/oz/g grs/net CRLF**
8000 Lb	Uses the 8000 format to print the pound weight regardless of the currently displayed units.
8000 Kg	Uses the 8000 format to print the kilogram weight.
8000 OZ	Uses the 8000 format to print the ounce weight.
4,200	The format for data in lb, kg, oz, g : STX POL DATA (6 char). lb/kg/oz/g grs/net CRLF
4200 LB	Uses the 4200 format to print the pound weight regardless of the currently displayed units.
4200 Kg	Uses the 4200 format to print the kilogram weight.
4200 OZ	Uses the 4200 format to print the ounce weight.
CCC	Format specific to Condec printers.
A-dPrtr	Format specific to the A&D series of printers
dgh4-20	Format specific to 4-20mA DGH modules
grOSS	Format : "GROSS SP/- 100.00 lb"
nEt	Format : "NET SP/- 100.00 lb"
Id	Format : "ID: 123456" Prints the current ID if in Tare F1 - F4 mode, or user-entered Product ID in any other mode (see Section 9 for instructions).
AddrS	Format: "ADDRS 01"

t d	Format as specified in Time/Date format 1.F T-DFMT
SEL1	Print the characters entered in the 30 character buffer. This can be used for header/footer information.
SEL2	Print the characters entered in the 30 character buffer. This can be used for header/footer information.
dEF SP	Prints the last setpoint used (default) with the format: "SETPOINT 1 : SP/- 100.00 lb"
dEF ACC	Prints the last accumulator used with the format: "ACC 1 : SP/- 100.00 lb"
ACC0-ACC9	Prints the selected accumulator with format: "ACC 1 : SP/- 100.00 lb"
dEF Ctr	Prints the counter of the last accumulator used with format : "CTR 2 : 11"
Ctr0-Ctr9	Prints the counter of the selected accumulator with format: "CTR 2 : 11"
dEF tArE	Prints the last tare used (default) with the format: "TARE 1: 100.00 lb" + "STORED" or "RECALLED or "KEYED"
tArE0-tArE9	Prints the selected tare with the format : "TARE 2: 100.00 lb" + "STORED" or "RECALLED" or "KEYED"
LbLbUFF	Prints selected label buffer
F F	Prints a form feed.
L F	Prints a line feed.
E t	Prints an End-of-Text character.
S T	Print a Start-of-Text character.
Cr LF	Print a carriage return and line feed.
dgh 5	Format specific to 5 volt DGH modules
dgh 10	Format specific to 10 volt DGH modules

3.6 CtS	Clear-to-Send Enables/Disables the hardware CTS line
OFF	**Turns off the CTS handshaking input.**
On	Turns on the CTS handshaking input.

4. SErdUP (Port 1)

4.0 bdrt	Baud rate Determines the baud rate (bps) for serial data
300	300 baud (bits per second)
1200	1200 baud (bits per second)
2400	2400 baud (bits per second)
4800	4800 baud (bits per second)
9600	**9600 baud (bits per second)**
19.200	19.200 kilo baud (bits per second)
38.400	38.400 kilo baud (bits per second)

4.1 d.b.-P	Data bits and parity Determines the number of bits for each character for the serial data output as well as the parity error checking for each character, if any.
8 dat nP	**8 data bits and no parity for each character, 2 stop bits**
7 dat nP	7 data bits and no parity for each character, 2 stop bits
7 dat OP	7 data bits and odd parity for each character, 2 stop
7 dat EP	7 data bits and even parity for each character, 2 stop

4.2 d.AtO	Data output mode Determines how the serial data will be generated from the port.
tOd	**Transmit on demand. A print is requested when the PRINT push-button is pressed.**
COnt	Transmit data continuously from the port. Based upon the update rate of the display.
AP1	Transmit a print request once for all stable weights.
AP2	Transmit a print request once for all stable weights outside of the zero band. Must return to within the zero band to reset and be able to generate another print request. Is based on gross zero (function 2.7).
AP3	Transmit a print request once for all stable weights outside of the zero band as applied to the displayed zero. Must return to within the zero band to reset and be able to generate another print request. Is based on net zero (function 2.7).

LOd	Same as TOD except if indicator is in a motion state, the print request will be stored and the next time the indicator becomes stable, a print request will be generated. The function is then reset when printing.
tdO	Will issue a print request every 10-15 seconds regardless of the current state of the indicator (stable or not).

4.3 EOLd	End-of-line delay Determines the time, in milliseconds, between each line of serial data transmitted. Used for printers with no or small buffers.
00 - 99 ms	Determines the amount of time to insert between multiple lines of serial data. **0 ms is the default setting.**

4.4 Prtb	Print push-button operation select Determines what test to perform when the PRINT push-button is pressed.
OFF	The PRINT button is disabled.
Stb	**The indicator needs to be stable when a PRINT request is made before a printout will be generated.**
thr	The indicator needs to be above the zero band when a PRINT request is made before a printout will be generated.
bOth	The indicator needs to be both above the zero band and stable when a PRINT request is made before a printout will be generated.

4.5 PrtF	Print format select Determines the print format for each line. Specify an option for each line up to 10 lines.
nOnE	A space is printed if succeeding lines have an option specified. Otherwise, nothing is printed.
8,000	**The format for data in lb, kg, oz, g : STX POL DATA (6 char). lb/kg/oz/g grs/net CRLF**
8000 Lb	Uses the 8000 format to print the pound weight regardless of the currently displayed units.
8000 Kg	Uses the 8000 format to print the kilogram weight.
8000 OZ	Uses the 8000 format to print the ounce weight.
4,200	The format for data in lb, kg, oz, g : STX POL DATA (6 char). lb/kg/oz/g grs/net CRLF
4200 Lb	Uses the 4200 format to print the pound weight regardless of the currently displayed units.
4200 Kg	Uses the 4200 format to print the kilogram weight.
4200 OZ	Uses the 4200 format to print the ounce weight.
CCC	Format specific to Condec printers.
A-dPrtr	Format specific to the A&D series of printers
dgh4-20	Format specific to 4-20mA DGH modules
grOSS	Format : "GROSS SP/- 100.00 lb"
nEt	Format : "NET SP/- 100.00 lb"
Id	Format : "ID: 123456" Prints the current ID if in Tare F1 - F4 mode, or user-entered Product ID in any other mode (see Section 9 for instructions).
AddrS	Format: "ADDRS 01"
t d	Format as specified in Time/Date format 1.B T-DFMT
SEL1	Print the characters entered in the 30 character buffer. This can be used for header/footer information
SEL2	Print the characters entered in the 30 character buffer. This can be used for header/footer information.
dEF SP	Prints the last setpoint used (default) with the format: "SETPOINT 1: SP/- 100.00 lb"
dEF ACC	Prints the last accumulator used with the format: "ACC 1: SP/- 100.00 lb"
ACC0-ACC9	Prints the selected accumulator with format: "ACC : SP/- 100.00 lb"
dEF Ctr	Prints the counter of the last accumulator used with format: "CTR 2: 11"

Ctr0-Ctr9	Prints the counter of the selected accumulator with format: "CTR 2: 11"
dEF tArE	Prints the last tare used (default) with the format: "TARE 1: 100.00 lb" + "STORED" or "RECALLED or "KEYED"
tArE0-tArE9	Prints the selected tare with the format: "TARE 2: 100.00 lb" + "STORED" or "RECALLED" or "KEYED"
LbL bUFF	Prints selected label buffer
F F	Prints a form feed.
L F	Prints a line feed.
E t	Prints an End-of-Text character.
S t	Print a Start-of-Text character.
Cr LF	Print a carriage return and line feed.
dgh 5	Format specific to 5 volt DGH modules
dgh 10	Format specific to 10 volt DGH modules

4.6 Addr	Indicator Address Sets the indicator address for networks
00-99	Enter a 2 digit address. DO NOT USE 00 -- it is used as a broadcast address where all indicators will receive the transmission regardless of the indicator address setting. **01=def.**

4.7 PrOt	Protocol for Duplex port Selects between requiring or not requiring a STX ("2") character before transmitting a command to the indicator.
232	**STX is not required before indicator address.**
485	**STX is required before indicator address.**

5. Kb.Pb

5.0 rE_Pb	Remote Push-Button Select Selects the function of the single I/O board digital input. A contact closure between the two positions will activate the digital input. A dry contact or open-collector output can be used. The I/O board option is required for digital input.
OFF	**Disables the digital input.**
Prt	Performs a print request when closed.
0	Performs a zero function when closed.
tArE	Performs a tare function when closed.
UnIt	Performs a unit conversion when closed.
gr-nt	Performs a NET/GROSS function.
1 ShOt	For Batching, the input MUST change from a high to low to high before execution will continue (see rin1 batch command).
dIrECt	For Batching, execution will continue while this input remains low (see rin1 batch command).
hI LO	For Batching, when the input changes from a high to low state, will allow execution, but the input must return high before a second test can be done (see rin1 batch command).
StOP	For Batching, when momentarily low will cause the batching sequence to stop and exit the batching program.
StArt	For Batching, when momentarily low will cause the batching program to execute beginning at step 00, if enabled.
PAUSE	For Batching, when momentarily low will cause the batching sequencing to stop at the current step. If allowed to return high and then returned low again, will cause the sequencing to continue at the present step.

5.1 g-nPb	NET/GROSS push-button enable Enables/Disables the NET/GROSS push-button.
On	**Turns on the NET/GROSS push-button.**
OFF	Turns off the NET/GROSS push-button.

5.2 tArPb	TARE push-button operation select Select the operation or function of the TARE push-button.
SEt	**Select the 10 stored tare function. Can enter a tare value either using the numeric keyboard or directly from the platform. Selection of the tare register required.**
P.t.t.	Selects the single push-button tare function. Disables the 10 stored tares. Tare value can only be entered by a single push-button tare and only from the patform. Digital entry of tare is not allowed.
dIS	Disables the entry of tare values. Enables 10 stored tare recall only. Tare value can not be changed.
1tAr	Enables the single tare entry mode. Disables the 10 stored tares. Tare value can only be entered using the numeric keyboard.

5.3 PrtPb	PRINT push-button enable Enables/Disables the PRINT push-button.
On	**Turns on the PRINT push-button.**
OFF	Turns off the PRINT push-button.

5.4 UntPb	UNITS push-button enable Enables/Disables the UNITS push-button.
On	**Turns on the UNITS push-button.**
OFF	Turns off the UNITS push-button.

5.5 SPtPb	SETPT/PREACT push-button select Selects the function of the SETPT/PREACT push-button.
SEt	**Selects the 10 stored setpoint and preact functions. Entry/recall/clear of setpoint and or preact values can either be done directly from the platform or digitally from the numeric keyboard.**
P.t.t.	Selects the 10 stored setpoint and preact functions. Entry of setpoint and or preact values can only be done through direct entry from the platform. Digital entry of setpoint/preact values is not allowed.
dIS	Disables setpoint/preact value entry. Setpoint or Preact can only be recalled.

5.6 ACCPb	ACCUM push-button select Selects the function of the ACCUM push-button.
On	**Selects the 10 accumulator/counter function. Accumulators can be recalled / cleared. Accumulators can not have values entered through the numeric keyboard. The accumulator value can only be incremented directly from the displayed weight.**
dIS	Selects 10 accumulator / counter function. Accumulators/counters can only be recalled and not cleared. They can be accumulated into.
OFF	Disables the ACCUM push-button. Auto accumulate can still be executed as well as access to the accumulators that do not require a push-button.

5.7 bEEP	Beeper enable Enables/Disables the keyboard beeper.
On	**Turns on the keyboard beeper.**
OFF	Turns off the keyboard beeper.

5.8 dIn 1	Digital 1 Input Selection Selects the function of the I/O board digital input. A contact closure between the two positions will activate the digital input. A dry contact or open-collector output can be used. The I/O Board option is required for the digital input.
OFF	**Disables the digital input.**
Prt	Performs a print request when closed.
0	Performs a zero function when closed.
tArE	Performs a tare function when closed.
UnIt	Performs a unit conversion when closed.
gr_nt	Performs a NET/GROSS function.
1 ShOt	For Batching, the input MUST change from a high to low to high before execution will continue.
dIrECt	For Batching, execution will continue while this input remains low.
hI LO	For Batching, when the input changes from a high to low state, will allow execution, but the input must return high before a second test can be done.

StOP	For Batching, when momentarily low will cause the batching sequencing to stop and exit the batching program.
StArt	For Batching, when momentarily low will cause the batching program to execute beginning at step 00, if enabled.
PAUSE	For Batching, when momentarily low will cause the batching sequencing to stop at the current step. If allowed to return high and then returned low again, will cause the sequencing to continue at the present step.

5.9 dIn 2	Digital 2 Input Selection Selections are the same as for DIN 1.

5.A dIn 3	Digital 3 Input Selection Selections are the same as for DIN 1.

5.b dIn 4	Digital 4 Input Selection Selections are the same as for DIN 1.

5.C dIn 5	Digital 5 Input Selection Selections are the same as for DIN 1.

5.d dIn 6	Digital 6 Input Selection Selections are the same as for DIN 1.

5.E dIn 7	Digital 7 Input Selection Selections are the same as for DIN 1.

6. ACCUM (One accumulator setup per accumulator)

6.0 EnbL	Accumulator enable Enables/Disables the accumulator.
On	**Enable the accumulator. The accumulator must be enabled for any accumulator operation.**
OFF	Disables the accumulator. The accumulator cannot be accessed for any function or operation.

6.1 tyPE	Accumulator Type Selects the way in which an accumulation is to be performed.
Std	**The accumulator can be manually accumulated into directly from the platform.**
PPrt	The accumulator will be accumulated into every time the PRINT push-button is pressed.
AUtA	Selects the auto accumulate function. Every time the indicator is stable and outside the zero band, any accumulator with this setting will be accumulated into. Multiple accumulators can be accumulated into. Only one accumulation will take place and the indicator must return to within the zero band for the function to reset.
dEFPPrt	Selects PRINT push-button accumulate function. Every time the PRINT push-button is pressed AND the accumulator is the default accumulator (i.e. the last recalled/cleared), that accumulator will be accumulated into. Only one accumulator can be accumulated into when more than one accumulator has this setting.
dEFAUtA	Selects the auto accumulate function. Every time the indicator is stable and outside of the zero band AND the accumulator is the default accumulator (i.e. the last recalled/cleared), that accumulator will be accumulated into. The indicator must return to within the zero band to reset the function before another auto accumulate can take place.

6.2 MOdE	Accumulator mode Determines which mode of weight data to accumulate.
grOSS	**Accumulates gross weight independent of the display mode.**
nEt	Accumulated net weight independent of the display mode.

7. CALI

7.0 C Ld	Calibrate load Calibrate the indicator to the loadcell assembly.
EntEr CAL	Enter the zero point or empty state of the load cell assembly and the test weight value for span calibration. When a successful calibration has been accepted, the indicator will display the message "SAV CAL", any other message is an error. Refer to the Calibration section.

7.1 C nOr	Calibrate normal Calibrate the indicator to a simulator to normalize.
PASSWORd	The normalization is password protected and cannot be accessed by field personnel. The calibration should only be done by factory personnel.

7.2 CL 0	Calibrate load zero value This value represents the zero point or empty state of the load cell assembly.
0.000000000	This value can be recalled or changed. Follow the instructions in section 4.3 Value Entry/Recall to access the factor. The value should be recorded in case the value may need to be reentered at a later date if the board is replaced.

7.3 CL 100	Calibrate load span value This value represents the span point or the applied test weight load applied to the load cell assembly.
0.000000000	This value can be recalled or changed. Follow the instructions in section 4.3 Value Entry/Recall to access the factor. The value should be recorded in case the value may need to be reentered at a later date if the board is replaced.

7.4 CLVAL	Calibrate load factor value This value represents the scaling factor for the load applied to the load cell assembly.
0.000000000	This value can be recalled or changed. Follow the instructions in section 4.3 Value Entry/Recall to access the factor. The value should be recorded in case the value may need to be reentered at a later date if the board is replaced.

7.5 Cn 0	Calibrate normal zero value This value represents the normalized zero point of the board. This value is recorded with 0 volts input.
0.000000000	This value can be recalled or changed. It is not recommended that this value be modified since any tampering will affect board operation. **DO NOT CHANGE !!!**

7.6 Cn 100	Calibrate normal span value This value represents the normalized span point of the board. This value is recorded with 1mv/v input.
0.000000000	This value can be recalled or changed. it is not recommended that this value be modified since any tampering will affect board operation. **DO NOT CHANGE !!!**

7.7 CnVAL	Calibrate normal value factor This value represents the normalized factor for the board.
0.000000000	This value can be recalled or changed. It is not recommended that this value be modified since any tampering will affect board operation.

7.8 AOUt	Analog output This displays the current output from the analog to digital converter (raw counts).
0 - 1,000,000	The display will update at a rate determined by the analog filter setting.

7.9 nOUt	Normalized analog output This displays the current normalized output from the analog to digital converter (normalized raw counts).
0	This is the value at a 0 mv/v input.
250,000	This is the value at a 1mv/v input.

8. SEtPt (One setup menu per setpoint)

8.0 tyPE	Setpoint type Determines the setpoint type and operation.
OFF	**Turns the setpoint off.**
COnt	The setpoint is enabled as a continuous output setpoint. Whenever the trip criteria has been met, the output for the setpoint (i.e. setpoint 0 = output 0) will be active, otherwise the output will be inactive.
COntLAt	The setpoint is enabled as a latched continuous output setpoint. Operated the same as the CONT setting except the output will not be made inactive until the indicator returns to within the gross zero band. Once in the zero band, the output will be inactive.
EMPty	This is for future expansion
Cnt 0	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is within the center of zero. When outside the center of zero, the output will be inactive.
MOtIOn	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is in motion. The output will be inactive whe the indicator is stable.
OVERLd	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is in overload. The output will be inactive when the indicator is not in overload.
grOSS	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is in the gross mode. The output will be inactive when the indicator is in the net mode.
nEt	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is in the net mode. The output will be inactive when the indicator is in the gross mode.

bAtIng	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when a batching sequence is currently executing. Once the execution has been completed or stopped, the output will then become inactive.
0 bAnd	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when the indicator is within the gross zero band. When the indicator is outside of the zero band, the output will then become inactive.
PAUSEd	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when a batching sequence is executing and a pause has been inserted or requested. Once the pause state has been exited, the output will become inactive.
ALArM	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when a batching sequence is executing and an alarm command has been issued. The output will become inactive when the batch process is paused or stopped.
dUMP	The setpoint is enabled as a continuous state output setpoint. The setpoint output will be active when a batching sequence is executing and a dump command is executed. Once the dump condition is cleared, the output will then become inactive.
bAt SEt	The setpoint is enabled as a continuous state output setpoint. The setpoint output will become active when the batch command 'SETS' is executed. The output will become inactive when the batch command 'CLRS' is executed.

8.1 SPtOP	Setpoint operation Determines the procedure for determining the trip value for the setpoint.
grOSS	**The setpoint keyboard entered value is compared against the gross weight value of the indicator.**
nEt	The setpoint keyboard entered value is compared against the net weight value of the indicator.
Add rEL	The setpoint keyboard entered value is added to the relative setpoint's keyboard entered value and compared to the gross weight value of the indicator. spval + relspval >= gross weight val

SUb rEL	The setpoint keyboard entered value is subtracted from the relative setpoint's keyboard entered value and compared to the gross weight value of the indicator. spval - relspval >= gross weight val
PEr rEL	The setpoint keyboard entered value is used as a percentage of the relative setpoint's keyboard entered value and compared to the gross weight value of the indicator. Note that the percentage value is limited to valid setpoint values, e. g. if the scale is set for 50 lb. capacity, the highest percentage that can be entered is 50. spval (in %) x relspval (wt) >= gross weight val
AddArEL	The setpoint keyboard entered value is added to the relative accumulator and compared to the gross weight value of the indicator. spval + accval >= gross weight val
SUbArEL	The setpoint keyboard entered value is subtracted from the relative accumulator and compared to the gross weight value of the indicator. spval - accval >= gross weight val
ACCUm	The setpoint keyboard entered value is compared with the currently selected accumulator when function 8.4 "rEL" is set to "nOnE". If function 8.4 "rEL" is set to 0-9 then the setpoint keyboard entered value will be compared with the relative accumulator.

8.2 PrEAt	Preact select Determines the operation of the preact value
OFF	**Disables the preact.**
On	The preact is enabled for the setpoint. The preact value is subtracted from the setpoint before the setpoint value is used in any calculations.
AUtO	The preact is enabled in an auto or learn mode. The preact value is subtracted from the setpoint before the setpoint value is used in any calculations. Once the setpoint is determined, the preact is modified so that the next time the setpoint is calculated with the preact, the error between the setpoint value and the actual value will be reduced.

8.3 trIP	Trip criteria Determines how the setpoint value is compared.
hIghEr	**The output for the setpoint will become active when the gross or net weight value is greater than the setpoint value.**
LOWEr	The output for the setpoint will become active when the gross or net weight value is less than the setpoint value.
InbAnd	The output for the setpoint will become active when the displayed weight is in the setpoint band. The output will become inactive when outside of the specified band for the setpoint.
OUtbAnd	The output for the setpoint will become active when the displayed weight is outside of the band for the setpoint. The output will become inactive when the value is within the band for the setpoint.

8.4 rEL	Relative to... Determines which setpoint or accumulator that the setpoint is relative to in relative calculations.
nOnE	**The setpoint is not relative to anything.**
0 through 9	Selects which setpoint or accumulator 0-9 that the setpoint is relative to. Must be selected for relative calculations.

8.5 bAnd	Setpoint band Selects entry/recall for the setpoint band.
as specified	The value entered determines the band for the setpoint. The value is actually a +/- value that specifies the bandwidth for the setpoint.

9. bAtLSt

9.0 bAtLSt	Command Number	Batching command list Specifies command to be executed at each step up to 76 steps. See Section 7 for a detailed explanation of each command.
nOnE	000	**Issues a STOP for an executing batch.**
SP0-SP9	001 - 010	Activates the specified setpoint output and then waits for the setpoint to trip before deactivating the setpoint output and going on to the next step. (Set function 8.0 to "bAtIng")
ACC0-ACC9	011 - 020	Causes the indicator to accumulate into the specified accumulator in the mode selected for that accumulator.
PAS 0-PAS 9	021 - 030	Causes a pause for a specified amount of time.
Pb tr	031	Causes a push-button TARE into the default tare register.
Pb 0	032	Causes a push-button ZERO only if the indicator is in the gross mode.
Pb Pt	033	Causes a push-button PRINT.
AJOg	034	Causes the indicator to go to the most recent setpoint executed and jog the output until the setpoint is met in a stable state or until the auto jog timer times out.
ALAr	035	Causes an alarm message to be displayed by the indicator. If any setpoints are set as state outputs for the alarm, they will become active.
nEt	036	Places the indicator in the NET display mode.
grS	037	Places the indicator in the GROSS display mode.
grEPt	038	Causes a global repeat for the number of times specified.
UUtSt	039	Causes the batching sequence to halt until the indicator is stable. Can be overridden by pressing the start/pause/stop button.
LrEPt	040	Causes a local repeat for the number of times specified.
SPACE	041	Causes no operation, execution simply passes to the next instruction in the list (useful for allowing for insertion of a command in the future).
dIn1 - 7	042 - 048	Causes the indicator to wait for DIN 1-7 to be true or active before going on to the next step. Pressing the pause button will override the command.

rIn1	49	Causes the indicator to wait for the Remote Digital Input on the main board to be active or true. Pressing the pause button will override the command.
thStb	50	Causes the batching sequence to halt until the indicator is above the 0 band and stable.
dEFSP	51	Activates the currently selected setpoint output and then waits for the setpoint to trip before deactivating the setpoint output and going on to the next step.
dEFAC	52	Causes an accumulation into the currently selected accumulator.
tAr0 - tAr9	053 - 062	Recalls the specified tare register for net weighing during a batching sequence.
SEtS0 - 9	063 - 072	Activates the specified setpoint. The TYPE of the specified setpoint must be set to "BAT SET".
CLrS0 - 9	073 - 082	Deactivates the specified setpoint. The TYPE of the specified setpoint must be set to "BAT SET".
tOtA0 - 9	083 - 092	Totals, prints, and clears the specified accumulator.
tOtdA	93	Totals, prints, and clears the currently selected accumulator.

Section 6. Calibration

The Model 8600 has two calibrations that are done, the first being the analog calibration. This calibration may be needed to compensate for dead load and to match the mv/v output of the load cell to the indicator. The second is the digital calibration, the most frequently used, where the indicator reading is calibrated to match an accurate test weight. The values for the digital calibration should be printed or written and stored in a safe place for possible recall at a later date (see NORMALIZATION later in this section).

ANALOG CALIBRATION

The indicator is initially setup to accept a 1mv/v input from the load cell(s). However, the indicator will accept a much wider range from about 0.6 mv/v to about 2.5 mv/v before a possible change in span switch settings may be required.

The dead load or zero adjustment is set to be slightly above 0.0 mv/v and may have to be adjusted to compensate for any additional fixture or platters placed on the loadcell assembly. When adjustment in zero offset is required, the potentiometer will provide continuous adjustment within the range selected by the DIP switches. Follow these steps to display the internal counts and make adjustments if necessary (see Section 5 for more information about the setup mode).

Enter the setup mode by flipping SW2, #9. Advance to the calibration menu **CAL1** and select **AOUt**. Press RCL to view the internal (raw) counts.

With no weight on the platform, the display should read between 1000 and 300,000 counts (ideal is 30,000 to 50,000). If not, adjust the zero pot (see figure 1 or 2) to bring the reading within the acceptable range. If the zero pot does not provide enough adjustment, set the dip switches (see figure 1 or 2) using the zero offset chart on the next page to bring the reading up (zero up) or down (zero down). Record the final reading - this is the value RAWLO.

Place a test weight on the platform and record the reading. This is the value RAWHI. Use the following formula to calculate the SPAN and full capacity output (RAWFC).

$$SPAN = (RAWHI - RAWLO) \times \frac{CAPACITY}{TESTWEIGHT}$$

$$RAWFC = RAWLO + SPAN$$

(CAPACITY is the capacity of the indicator, TESTWEIGHT is the test weight)

Note: if a test weight equal to the capacity of the scale is used, then RAWFC is the same as RAWHI, and SPAN = RAWHI - RAWLO.

RAWFC must be less than 1,000,000 counts, and SPAN should be at least 200,000 counts. If RAWFC or SPAN are out of range, set the dip switches using the span range chart below to bring them within acceptable limits. If the span is adjusted, the zero reading must be rechecked and readjusted if necessary.

When the span and zero offset are adjusted properly, press SETP to exit the raw count display, and proceed with the digital calibration.

Typical analog calibration values:

RAWLO: 30,000 to 50,000 counts
RAWHI: 580,000 to 675,000 counts
SPAN: 550,000 to 625,000 counts

These values will give optimum performance up to 20,000 counts displayed resolution with proper filter settings. If a displayed resolution greater than 20,000 counts is desired, set the span to between 700,000 and 850,000 counts. This means that the dead load reading must be less than 150,000 counts.

DIP SWITCH SETTINGS

Zero Offset Selection (voltage at signal leads - for mv/v, divide by 10)	SW2 pos 5	SW2 pos 4	SW2 pos 3	SW2 pos 2	SW2 pos 1
35 mv Zero Down	0	1	1	1	1
30 mv Zero Down	0	1	1	0	1
25 mv Zero Down	0	1	0	1	1
20 mv Zero Down	0	1	0	0	1
15 mv Zero Down	0	0	1	1	0
10 mv Zero Down	0	0	1	0	0
5 mv Zero Down	0	0	0	1	0
0 mv Zero Down/Up	0	0	0	0	0
5 mv Zero Up	1	0	1	0	1
10 mv Zero Up	1	0	0	1	1
15 mv Zero Up	1	0	0	0	1

Span Range Selection (Active Live Load)	SW2 pos 8	SW2 pos 7	SW2 pos 6
0.50 - 1.25 mv/v	0	1	1
1.00 - 2.50 mv/v	0	0	1
2.00 - 3.50 mv/v	0	0	0

Setup Mode Selection	SW2, pos 9
Normal Operating Mode	0
Setup Mode	1

NOTE : A 1 in the table represents a closed switch
A 0 in the table represents an open switch

Zero Potentiometer : CCW (Counter Clockwise) = Zero Down
CW (Clockwise) = Zero Up

DIGITAL LOAD CALIBRATION

The Model 8600 can be digitally calibrated with any amount of test weight. However, as with any system, the more weight, the better the calibration will be throughout the entire active range of the platform or loadcell assembly. Calibration can be performed in either of two ways: the empty platform value may be entered first, followed by the test weight value, or the test weight value may be entered first, followed by the empty platform value. Follow these steps to perform the digital calibration (see Section 5 for more information about the setup mode):

Enter the setup mode, advance to the calibration menu **CAL1**, and select the calibration load parameter **C Ld**. Press RCL to enter the calibration mode - **Etr CAL** will be displayed.

If the empty platform value is to calibrated first, make sure the platform is empty and press ZERO. **-WAIT-** then **Ent SP** will be displayed. Place the test weight on the platform, enter the test weight value using the numeric keypad, and press ENTER. If a mistake is made, press CLR and reenter the weight value. **-WAIT-** then **Etr CAL** will be displayed. Press SETP to save the calibration data and exit.

If the test weight value is to be calibrated first, at the **Etr CAL** prompt, place the test weight on the platform. Enter the test weight value using the numeric keypad, and press ENTER. **-WAIT-** then **Etr 0** will be displayed. Remove weight and press ZERO. **-WAIT-** then **Etr CAL** will be displayed. Press SETP to save the calibration data and exit.

When the digital calibration is completed, close SW2 #9 to return to the normal weighing mode, and reassemble the indicator.

If an error message is displayed at any time during calibration, the indicator did not accept the calibration. If this happens, recalibrate the indicator. If the indicator still won't calibrate, refer to Sections 11 and 12.

NORMALIZATION

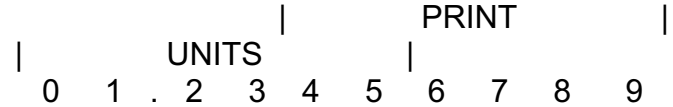
The Model 8600 has been normalized at the factory to a standard voltage input. This means that if the main board needs to be replaced in the future, the indicator will not need recalibration. To take advantage of this feature, **the calibration values must be recorded before the indicator is put into service**. A space has been provided on the inside front cover of this manual for the recording of these values.

Follow the instructions below for recalling the calibration values, and record them in the inside front cover of the manual. If the main board ever needs to be replaced, follow the instructions under "CALIBRATION RESTORE" to enter the values into the memory of the new board. If this is done, the indicator will operate perfectly without being recalibrated.

CALIBRATION VALUE ENTRY/RECALL

There are six calibration values that are saved and recorded by the Model 8600 indicator. Each of these six values can be recalled and changed using the numeric keyboard. The normalization values MUST NOT BE MODIFIED in the field. This could cause the indicator to act in an erratic manner. The calibration load values may be changed in order to restore a replaced board's values.

To review the value, enter the setup mode, go to the calibration menu, select the value to be reviewed, and press ACCUM. Each value is a ten digit number with eight decimal places as shown in the example below. The leftmost digits will be displayed first (01.2345 in the example). Press the PRINT button to review the rightmost digits (456789 in the example). Note that the two middle digits overlap so that they are seen in both displays. Press the UNITS button to show the upper digits again. Press SETP to get back to the calibration menu.



Value entered

To enter a replacement value, simply enter the value using the numeric keypad. The indicator will first clear the value to zero upon the entry of the first digit of the replacement value. Once the replacement value is completely entered, press the ENT button and the indicator will display "DONE" to signify that the value has been stored.

NOTE : DO NOT ENTER 0.0 FOR ANY VALUE AS FAILURE OF THE INDICATOR MAY RESULT.

CALIBRATION RESTORE

If a new main board needs to be installed, the following steps can be performed to avoid recalibrating the indicator, as long as the calibration values from the original board have been recorded. These values should be recorded on the inside front cover of this manual.

To restore the calibration values, first ensure that the new board is operational and all the cables (load cell, printer, etc.) are reconnected. Once this is done, place the indicator in the setup mode. Select the calibration load zero factor (7.2 CAL L 0) and enter the value as recorded from the replaced board. Next, select the calibration load span factor (7.3 CAL L 100) and enter the value as recorded. Finally, select the calibration load value (7.4 CALVAL) and enter the value as recorded.

Once the values have been entered, make sure that the DIP switch settings for Span and Zero offset match the replaced board. Then enter the calibration normal analog output selection (7.8 NOUT). With the platform or loadcell assembly empty, adjust the potentiometer until the reading is at or near zero. Exit the setup mode and the indicator is now ready for use.

Note: When ever the main board is replaced, the parameter selections on the new board should all be set to match the old board. A printout of the calibration can be made after setup is completed for recording the settings.

SETUP AND CALIBRATION PRINTOUT

A printout can be generated with the complete setup and calibration values by connecting a serial printer to the printer port. Press the PRINT button when in the setup mode at the (1. CONF) menu or, upon power up, press and hold the PRINT button. A printout of the setup is initiated when the display shows "PrtCOnF".

DISPLAY SETUP AND CALIBRATION

To view setup and calibration values when not in calibration mode. Press and hold ZERO button, upon power up.

Section 7. Batching Mode Operation

The batching mode provides a fully functional batching indicator to meet even the most demanding of batching applications. The batching function is designed as a 76 step batching process. For each of the 76 steps any one of 93 commands can be executed as part of the batching sequence. The commands must be entered in the setup mode, under main menu 9 - Batch List. A batch sequence is started by pressing the hidden batch button and ends when a 'NONE' command is encountered in a step, or when the hidden batch button is pressed and held. If there are commands issued in steps after a 'NONE' command is executed, they will be ignored.

START/STOP/PAUSE BUTTON

The hidden push-button that exists between the UNITS and NET/GROSS push-buttons is used as the start/stop/pause button. To start the batching sequence, press the hidden button momentarily. The indicator will respond with "START" and the batching sequence will start at step 00. If the hidden button is pressed at any time during the batching process, a pause will be issued and the message "PAUSE" will be displayed momentarily. To restart the batching process, momentarily press the hidden button and the batching process will continue. The indicator will flash "CONT" on the display before continuing. Pressing and holding the hidden button will cause the indicator to stop the batching operation and turn off all of the batching setpoints called in the batching sequence. The indicator will display "STOP" momentarily. When in a pause or stop state, all of the setpoints called in the batching sequence will be disabled.

PAUSES

There are 10 pauses that can be used to pause the batching process either for a period of time in seconds or until the start/stop/pause button is pressed. The length of the pause can only be accessed when it is selected in the batch list setup. If a timer value of 0 is entered for the pause, then the indicator will pause the batch sequence indefinitely until the pause button is pressed. At that time the batch sequence will continue on to the next step.

Each of the 10 available pauses can be set up for different time delays and can be used as many times as needed. For example, if a pause of 2 seconds is needed in 3 different parts of the batch, enter 02 into PAS0 and use PAS0 3 times.

To enter a value into a PAS, go to the step where it is to be used, and select the desired PAS from the command list. When the correct PAS is selected, press ENTER and the current value of that PAS will be displayed (if it hasn't been used yet, the value will be 00). To enter a new value, simply enter the value between 00 and 99 on the numeric keypad and press ENTER again. The display will show "DONE", signifying that the value has been accepted. Press SETP to return to the batch list and continue command selection.

SETPOINTS

The SP0 - SP9 commands initialize the specified setpoints as batching setpoints. All setpoints will be inactive until they are called within the batching program. When execution of the batch sequence reaches a SP0 - SP9 command, the specified setpoint becomes active, and stays that way until the trip criteria is met. The batching sequence will remain at that step in the sequence until the setpoint trips. Once the setpoint trips, the output is disabled and the next step in the batch sequence is executed.

The DEFSP command selects the default setpoint, i.e. the currently selected setpoint, as a batching setpoint. This allows the user to use different setpoints within a batch sequence without changing the command list.

When a setpoint is set for a state type output (COZ, NET MODE, GROSS MODE, PAUSED, etc.) the output will always be continuously true for the validity of the state type selected. For example, for as long as the indicator is within the center of zero and setpoint 0 is selected to output the state of the COZ, the output of setpoint 0 will be active until the indicator goes beyond the center of zero.

When a setpoint is designated as a DUMP setpoint, when the DUMP command is issued as a command in the batching sequence, the setpoint will become active until the gross weight returns to below the setpoint value entered. This is useful for when a dump operation is required to empty a vessel until a threshold or an empty point is met. Once the setpoint is achieved and the dump is completed, the next command will be executed.

The SETS0 - SETS9 and CLRS0 - CLRS9 commands set or clear the specified setpoint, respectively. For example, a SETS0 command will cause setpoint 0 to be active, while a CLRS0 command will cause it to be inactive. In order to use these commands, the specified setpoints must be set as 'BAT SET' in **8.0 tyPE** in the setup menu.

Note: Only those setpoints called out in the batch program will act as batching setpoints; all others will operate as if the indicator is in the normal mode of operation.

ACCUMULATORS

The ACC0 - ACC9 commands cause an accumulation into the specified accumulator. After an accumulation takes place execution continues with the next step.

The DEFAC command causes an accumulation into the default accumulator, i.e. the accumulator that is currently active. This allows the user to accumulate to different accumulators within a batch sequence without changing the command list.

The TOTA0 -TOTA9 commands will total and clear the specified accumulator (and printout the total if a printer is attached).

The TOTDA command will total and clear the accumulator that is currently active.

All accumulators used in a batch sequence should be set up as standard accumulators.

GLOBAL REPEATS

There are two types of repeats that can be used in a batching sequence, a global repeat and a local repeat. A global repeat can be issued that has the number of times to repeat entered at the time the repeat is selected in the batch list selection process. The global repeat, when executed, will return the batching sequence to the first step in the batching sequence and re-execute for the number of times specified. For example, if the global repeat is set for 2, the steps prior to the repeat statement will execute a total of 3 times (the first time through is not considered a repeat). Once the steps prior to the global repeat have repeated for the number of times specified, the sequence will continue to the next step, which may be another batching sequence. Enter a value of 00 to repeat indefinitely.

LOCAL REPEATS

The local repeat also has a "number of times to repeat" value that needs to be entered when selected in the batch list setup process. When the batching sequence executes a local repeat, the batching sequence will return to the step just after the last repeat called or to the beginning of the batching sequence. The local repeat will repeat the steps prior to it the number of times specified. For example, if a local repeat is set for 2, the steps prior to it will execute a total of 3 times. Once the steps have been executed, the next step in the batch sequence will be executed. This allows sub-batches to be executed and nested repeats to be used. A local repeat with a value of 00 can be used to mark the beginning of a repeat loop (a 00 value will cause no repeats).

AUTO JOG

An auto-jog command will automatically return to the last setpoint executed in the batching sequence and test that setpoint to determine if the setpoint is still tripped in a standstill or motionless state. The auto jog command also has a time out value entered in seconds at the time the auto jog is selected in the batching list setup operation. The setpoint retest will re-enable the setpoint if it is not still tripped and execute until the setpoint is tripped in a standstill state or the timer times out. Once the timer times out or the setpoint is tripped in a standstill state, the sequence will continue to execute with the command just after the auto jog command.

TARES

The TAR0 - TAR9 commands cause the weight on the platform to be entered into the specified tare register.

The PB TR command causes the weight on the platform to be entered into the default tare, i.e. the currently selected tare. The indicator will then enter the net display mode.

PUSH-BUTTON FUNCTIONS

The batch sequence can issue commands that mimic the functions of most of the push-buttons on the front panel. The PB TR command causes a push-button tare. The PB 0 command causes a push-button zero. The NET command causes the indicator to enter the net mode of operation, while the GROSS command causes the indicator to enter the gross mode. The PB PR command causes a push-button print to be issued.

DIGITAL INPUTS

There are 7 digital inputs that can be used to read the closed state of limit switches, photoeyes or any other dry contact closure. When an input is called as a command within the batching sequence (dIN1-dIN7), the batching sequence will halt until the input recognizes a closure. Once a closure is recognized, the batching sequence will continue to the next command in the batching list. The waiting function can be overridden by pressing the start/stop/pause push-button. The test for the digital input will only occur at the time the input is called for in the batching sequence.

MOTION

The WTST command causes the batching sequence to halt until the indicator recognizes a stable state ("MOT" indicator off). Once a stable state is recognized, the next step in the batching command list will be executed. The waiting for a stable state can be overridden by pressing the start/stop/pause push-button.

The THSTB command causes a halt until the indicator is stable and above the 0 band.

ALARM

The ALARM command causes an alarm message to be displayed by the indicator. Any setpoints set as alarm state outputs will become active when this command is executed, and stay active until the hidden batch button is pressed or the batch ends.

Section 8. Other Operating Modes

IN MOTION WEIGHING OPERATION

REQUIREMENTS:
To enable IMW operation, flip the S1 located on 8600 to Cal mode, set indicator operation (FUNCTION 1.E) to Motion, make sure setpoints 0&1 (FUNCTION 8.0) are off and data output mode (FUNCTION 3.2 & 4.2) is set to “tOd” for both ports. Set Digital Input Selection (FUNCTION 5.8) to 1_SHOT for DIN 1, DIN 2, and DIN 3. An option type 867 I/O board is also required for this IMW operation. **Note:** When calibrating scale, Function 1.E should be placed in "nOrL" mode.

THEORY OF OPERATION:
When a box passes photoeye 1 (TB1 POS. 3&4 toggles) the 8600 will display real time weight, and begin to recorded samples of stable weights, that are out of the 0 band. These samples are then added to a averaging table. As the box breaks photoeye 2 (TB1 POS. 5&6 closes) the average weight will then be displayed and printed . The display will show the average weight until the box leaves the beam of photoeye 2 (TB1 POS. 5&6 opens). The unit will display "rEAdy" when waiting for a new box. NOTE: After 1st. sample is recorded the unit must go in motion and then back to stable before another sample is recorded to the averaging table.

ERROR CODES:
Error 1 = If two boxes pass photoeye 1 without the first box entering photoeye 2.
Error 2 = If two boxes are present on conveyor at the same time.
Error 3 = If a box passes photoeye 2 without passing photoeye 1 first.
Error 4 = If a box passes both photoeyes without having a stable reading or being outside the 0 band.

An error data string 99999X will then be transmitted out both ports. The data string’s last character (X) will be the type of error code (1 to 4) generated. To reset error alarm message (setpoint 0 active, TB2 POS. 12 closed), clear both photoeyes first (no boxes present at photoeye 1 & 2), then unit will be ready to process next box. The error alarm can also be cleared by pressing “ENTER” key on front panel or close TB1 POS. 7&8.

TARE FUNCTION 1 - 200 TRUCK ID (CLEAR, NO SWAP VALUES)

The 200 truck ID in/out program provides for storing 200 6-digit truck IDs for weighing trucks in and out and generating a ticket for documentation purposes. When a truck ID is entered for the first time for storage, an "in" ticket is printed. When the truck returns after loading/unloading, its ID is entered and an exit ticket is printed. A printout will be generated for either the duplex port or the printer port or both depending on the selection of the PRINT push-button selection. The formats of the tickets for that port are shown below.

The tare function F1 will store a truck ID until the exit ticket is printed. The values will not be swapped. That means that if the tare value entered is more than the exiting truck gross value, the net value printed on the ticket will be negative.

To enter a new truck ID, press TARE and begin entry of the truck ID. Press ENTER to enter the new ID into memory. If the truck ID already exists, an error message will be displayed. Next, if the ID is accepted, enter the tare value. If the tare selected is enabled as a "PTT" mode only, then the platform weight will be entered into the memory. If a "SET" mode is selected, then the tare can be entered digitally or by using the weight on the platform.

Next, to weigh out the truck, press the TARE button. Enter the ID of the truck to be weighed out. If the ID exists, then the truck weight is accepted. Pressing the PRINT button will cause the exit ticket to be printed. If the ID doesn't exist, an error message will be displayed. Once the weigh out ticket is generated, the ID and tare value is erased from memory.

To generate a printout of all the current IDs and tares, press TARE and then PRINT.

Ticket Formats:

```
IN TICKET
ID          123456
GROSS     15000 lb
03/22/94  03:01:00 PM

EXIT TICKET
ID          123456
GROSS    80000 lb
TARE      15000 lb
NET       65000 lb
03/22/94  03:29:00 PM
```

Note: the time and date printout will be in the format specified in setup parameter 1.B (see Section 5).

TARE FUNCTION 2 - 200 TRUCK ID (CLEAR, SWAP VALUES)

Tare function F2 is the same as F1 except that if the "in" weight is greater than the exit weight, the exit weight will be used as the tare weight so that a positive net weight will be printed out (this would be used in unloading applications). If the exit weight is used as the tare weight, the TARE value printed will be followed by the word "SWAPPED".

The ID and tare value will be erased from memory.

TARE FUNCTION 3 - 200 TRUCK ID (NO CLEAR, NO SWAP VALUES)

Tare function F3 operates the same as tare function F1 except the tare value is not erased from memory. To clear an ID/tare combination from memory in this mode, press TARE, the ID number to clear, and CLR.

TARE FUNCTION 4 - 200 TRUCK ID (NO CLEAR, SWAP VALUES)

Tare function F4 is similar to tare function F3 except the lesser of the two values (tare and gross weight) will be swapped so that the printed net weight will be positive.

PEAK AND HOLD - PLUS, MINUS, OR %

These are optional software packages that can be ordered to perform peak and hold functions. They are explained in the errata sheets included with the indicator when ordered.

Section 9. Serial Communications

The Model 8600 is equipped with two serial data ports for interfacing with computers, printers and other serial devices. Port 1 is a duplex (two-way) port that is normally used to interface with a computer or terminal. Port 1 can also be configured as a printer port (see Section 5, parameters 4.2, 4.4, and 4.5). Port 2 is a simplex (one-way) port that is normally used to send data to a printer or data logger. Each port is fully configurable and independent of each other. Each provides up to 10 printable lines with print format options for each line, providing great flexibility. Note: that one of the lines must have a selection or the port will not generate a printout.

PORT 1 - DUPLEX

Port 1 is a duplex (two-way) port, meaning that it can both send and receive data. It is half-duplex, so it cannot send and receive simultaneously -- any data being sent must be completed before data can be received. The 8600 command set allows the operator to perform any of the front panel functions. Also, any data that can be entered, recalled, or reviewed by the front panel push-buttons can also be entered, recalled, or reviewed through port 1.

Port 1 is available for operation in any of 3 configurations: RS232, RS485, or 20 mA current loop. The 8600 is configured for RS232 operation unless one of the other options is ordered. RS232 is the most commonly used communications standard in the computer industry, so almost all computers come with a standard RS232 port. It is used to transfer data between two pieces of equipment, in this case the 8600 and a computer or terminal. RS232 cable length is limited to approximately 50 ft. (longer if a low capacitance cable is used.)

RS485 is necessary when a long cable is to be used, or when more than one scale is to be linked to the same computer. In this case, one end of the cable is connected to the computer, and each scale is connected to a tap or "drop" on the main cable. Each scale must then have a unique scale address so that the scales will not conflict with one another (see Section 5, parameter 4.6). A special serial card usually needs to be installed in the computer to use RS485 communications.

The 20 mA current loop is a fairly common standard for industrial equipment. It is normally used when long cables are needed, or in cases where previously existing equipment is configured for 20 mA service.

Any of these configurations can be ordered with a data cable and DB9 or DB25 connector (the most common computer serial connectors). The RS232 cable usually needs to be wired as a "null modem" cable, which is shown in Section 10. The main board connections are also shown in Section 10. Note that a shielded cable must be used to avoid interference problems from other equipment.

PORT 1 (DUPLEX) COMMAND SUMMARY

The Model 8600 has a standard set of commands that enter and return information from the scale via port 1. The commands must always be preceded by the address of the indicator, which is 01 by default. No other addresses need be used, except in the case where multiple indicators are connected in a network, which would require a separate address for each indicator. All indicators will respond to an address of 00, regardless of the indicator's address. This is intended to be used as a broadcast address, allowing a single command to be sent to multiple indicators simultaneously. Send a carriage return after each command to complete the transmission. **Note: If parameter 4.7 / PROT is set for RS485, a STX character (Control-B, ASCII 2) is require before the address of the indicator.**

If the indicator receives a valid command with no errors, it will acknowledge the reception by sending back an asterisk, followed by a carriage return and line feed (CR+LF). If any message received by the indicator is in error, a question mark followed by a CR+LF will be returned to signify that the command was not received or recognized and must be resent.

Every time port 1 receives valid data, the PRINT push-button indicator will illuminate for approximately 2-3 seconds. If the indicator does not illuminate, the data is not being received properly.

General Scale Commands

General scale commands are one-character commands that perform front panel push-button functions.

G Selects the gross display mode.

N Selects the net display mode.

V Issues a convert-units command.

Z Zeros the indicator -- will execute the zero only when the indicator is in the gross display mode.

P Issues a print request from the printer port.

X Issues a print request from the duplex port.

^P (Control-P character, ASCII 16) Enables the pass-thru feature. After this command is sent, a 0.2S delay is required so that, any futher characters sent will pass straight through to the printer port until a (Control-V, ASCII 22) character is sent. When ^V is sent, the pass-thru feature will immediately be disabled and the duplex port will again receive commands and act on them normally. Note: If this feature is used, both ports must be set to the same baud rate.

Duplex Buffer Commands

Duplex buffer commands are one-character commands that control the duplex buffer. When the duplex buffer is activated, all data that would normally be transmitted out of the duplex port will instead be saved in a 256 character data buffer. The data can then later be retrieved by the D (dump) command. The number of transmissions that can be buffered is dependent on the print format, since some formats take up more space than others, and on the number of lines that are sent. Only port 1 data will be buffered. The buffer commands and the data store in the buffer are both non-volatile. Note: For software rev 2.6 and lower, the printer (port 2) is buffered, and both the buffer commands and the data stored are volatile.

B Starts buffering print data for later polling from a computer or terminal.

U Stops buffering data -- data in the buffer will remain intact until the dump command is received.

D Prints the entire buffer contents to port 1 and clears the buffer.

H Clears the buffer without printing its contents.

Recall Commands

Recall commands are two character commands that make it possible to specify a tare, accumulator, or setpoint as the default. For example, if you have 10 tare values set up in Tares 0 - 9 and you want Tare 5 to be active, use the RT command. Follow each command with the one digit number of the tare, accumulator, or setpoint to be recalled.

RT Recalls the specified tare.

RA Recalls the specified accumulator.

RS Recalls the specified setpoint.

Examples:

01RT5 Makes Tare 5 active.

01RA9 Makes Accumulator 9 active.

Data Transmission Commands

Data transmission commands are two character commands that make it possible to request data from the 8600. For example, to request the value of Tare 5, send 01XT5, and the 8600 will return the value or Tare 5. The data is transmitted through port 1. Follow commands XT, XA, XC, XS, and XP with the one digit number of the tare, accumulator, etc. to transmit. To request a list of Tares, Accumulators, etc, follow the command with an 'L'. All other commands are entered without further data.

XT Transmits the specified tare.

XA Transmits the specified accumulator.

XC Transmits the specified counter.

XS Transmits the specified setpoint.

XP Transmits the specified preact.

XZ Transmits the indicator status string. The scale status string is 7 characters long. Each character is as follows:

char 1	G for gross mode, N for net mode.
char 2	T if over 1% or capacity, SP (space) if below.
char 3	L for Pounds, K for Kilograms, O for Ounce, Z for Pound-Ounce, G for Grams.
char 4	M for motion, S for Stable.
char 5	SP (space) for valid weight, O for overload condition
char 6	0 (zero) if within the center-of-zero, SP if not.
char 7	S if no batch is running, R if a batch is running, P if a batch is paused, A if a batch alarm has been issued, J if a batch auto-jog is in progress.

Examples:	N ZS 0S	Net mode, below 1%, lb-oz units, stable, valid weight (not in overload), in center-of-zero, no batch running.
	GTLM S	Gross mode, above 1%, lb units, in motion, valid weight, out of center-of-zero, no batch running.

XV Transmits the indicator configuration list.

X1 Transmits the contents of the Select 1 storage area. This area holds a maximum of 30 characters that can be entered via the 'E1' command. It can be included in the print format and is usually used for including text on a printout (company name, instructions, etc.).

X2 Transmits the contents of the Select 2 storage area. This area is identical to Select 1, but is separate.

Examples:

01XT5 Transmits the value of Tare 5 from port 1.

01XTL Transmits a list of all 10 Tares.

01XZ Transmits the indicator status string.

01X1 Transmits the contents of the Select 1 storage area.

Data Print Commands

The data print commands are exactly the same as the transmission commands, except that the data is sent from port 2 (printer port) rather than port 1. Follow commands PT, PA, PC, PS, and PP with the one digit number of the tare, accumulator, etc. to print. To print a list of all Tares, Accumulators, etc, follow the command with a 'L' instead of a number. All other commands are entered without further data.

PT Prints the specified tare.

PA Prints the specified accumulator.

PC Prints the specified counter.

PS Prints the specified setpoint.

PP Prints the specified preact.

PZ Prints the indicator status string. See 'XZ' command for an explanation of the status string.

PV Prints the indicator configuration list.

P1 Prints the contents of the Select 1 storage area. This area holds a maximum of 30 characters that can be entered via the 'E1' command. It can be included in the print format and is usually used for including text on a printout (company name, instructions, etc.).

P2 Prints the contents of the Select 2 storage area. This area is identical to Select 1, but is separate.

Examples:

01PA9 Prints the value of accumulator 9 from port 2.

01PAL Prints a list of all 10 Accumulators.

01PV Prints the configuration list.

Data Clear Commands

Data clear commands are two character commands that clear the specified values. Follow commands CT, CA, CC, CS, and CP with the one digit number of the Tare, Accumulator, etc. to clear. All other commands are sent with no further data.

CT Clears the specified tare.

CA Clears the specified accumulator.

CC Clears the specified counter.

CS Clears the specified setpoint.

CP Clears the specified preact.

CM Clears the message from the display (if a message was entered with the EM command).

C1 Clears the Select 1 storage area.

C2 Clears the Select 2 storage area.

Examples:

01CT7 Clears Tare 7.

01C2 Clears the Select 2 storage area.

Data Entry Commands

Data entry commands are two character commands that enter specified data into Tares, Counters, Setpoints, or Select areas, or display messages on the front panel. The ET, EC, and ES commands are to be followed by the one digit number of the Tare, Counter, or Setpoint in which to enter the data. This is then followed by the polarity of the data (space for positive, negative sign for negative), and seven digits of data. A decimal point may be included, but will be ignored. The decimal point will be placed where it appears on the current display (i.e. if the indicator is set to display increments of .01 and the data sent is 0000100, the value would be 1.00). Always send 7 digits with these three commands, using leading zeroes to fill in the high digits if necessary.

The EM command must be followed by seven characters that can be displayed by 7-segment LEDs.

The E1 and E2 commands are to be followed by up to 30 characters of any type (30 characters is the maximum size of the Select areas).

ET Enters the specified data into the specified tare.

EC Enters the specified data into the specified counter.

ES Enters the specified data into the specified setpoint.

EM Displays the specified 7 character message on the front panel. Use only characters that can be accurately displayed with a 7-segment display.

E1 Enters the specified string into the Select 1 storage area. This area holds a maximum of 30 characters and can be included in the print format to print text (company name, instructions, etc.). See the example below.

E2 Enters the specified string into the Select 2 storage area. This area is identical to Select 1, but is separate.

Examples:

01ES4+0000500	Enters the value of 5.00 into Setpoint 4 (if the display is set for two decimal places).
01ET7-0000200	Enters the value of -2.00 into Tare 7.
01EMABCDEFG	Displays "AbCdEFg" on the front panel.
01E1Doran Scales, Inc.	Enters the string "Doran Scales, Inc." into Select area 1.

Batch Commands

Batch commands are one or two character commands that perform batching operations, enter batch commands, and request batch command data. The one character commands are sent as is, with no additional data, but the EB, XB, and PB commands need specific data. Follow the instructions for the appropriate command to enter the data.

J Stops a batching process - has the same effect as pressing and holding the hidden batch button, and is only valid if a batch is in progress.

K Starts a batch process - has the same effect as pressing the hidden batch button when a batch is not currently running.

L Pauses a batching process - has the same effect as pressing the hidden batch button, and is only valid if a batch is in progress.

EB Enters the specified batch command at the specified step - specify the batch step to change, the command to enter at that step, and (optionally) the value associated with the command, if applicable (pause values, grept values, etc.).

The format for the command is: 01EBXXYYYZZ, where XX = the step to modify, YYY = the command to enter at that step, and ZZ = the associated value if applicable. If a command such as PAS0 is entered without specifying a value, the current value for that command will be used.

See Section 5, parameter 9.0 for a list of batch commands.

Examples:

01EB0502133	Enters a PAS0 command into step 05, and gives it a value of 33 sec.
01EB06021	Enters a PAS0 command into step 06 using the previously entered value.
01EB07001	Enters a SP0 command into step 07.

W Saves a remotely entered batch program - this command must be sent after using the 'EB' command (Enter Batch command) to save the commands to nonvolatile memory. If this command is not issued, the entered batch commands will be lost if the indicator is restarted. See the double command 'EB' for information on entering batch commands via the duplex port.

XB Transmits the batch command at the specified batch step. Follow the XB command with the desired step (2 digits) or 'L' to get a listing of the batch program (up to the first 'nOnE' command). If a value is associated with the command, such as a pause value or a grept value, it will be transmitted also.

Examples:

01XB05 Transmits the command at step 05.

01XBL Transmits the entire batch program.

PB Prints the batch command at the specified step. This is the same as XB, except that the data is printed on port 2 instead of transmitted on port 1.

PORT 2 - SIMPLEX

Port 2 is a simplex (one-way) port, meaning that it can send data, but not receive. It is normally used as a printer port, and can be connected to virtually any printer or other data collection device. The way that a print is initiated is controlled by parameters 3.2 and 3.4 (see Section 5), and the format of the printout is controlled by parameter 3.5.

Port 2 can be configured for RS232 or 20 mA operation. As explained under the PORT 1 heading elsewhere in this section, RS232 is the most common serial interface among computers and printers. For this reason, the 8600 comes standard with this configuration. The 20 mA loop configuration is available for systems that require it.

As with port 1, port 2 can be ordered with a data cable and DB9 or DB25 connector. If a connector is ordered, the printer wiring requirements must be specified since the pin assignments vary among printer manufacturers. The main board port wiring connections are shown in Section 10. Note that a shielded data cable must be used to eliminate interference from other equipment.

The baud rate, data bits, and parity settings of the 8600 must match those of the printer being used. The 8600 comes standard with the most common settings, which are: baud rate = 9600, data bits = 8, parity = n. If the printer being used has settings other than these, they can be changed (see Section 5, parameters 3.0 and 3.1).

The data printed by the 8600 depends on the setting of parameter 3.5 (see Section 5). There are a total of 10 lines that can be printed, and each line can be configured to print a different format. You can configure any number of lines up to the maximum of 10. For example, if you want to just print the net weight and nothing else, just set line 1 to NET. Leave all other lines set to NONE. If other lines are to be printed, configure those lines in the same way. Printing will stop at the first line that is set to NONE. The method for configuring each line is detailed in Section 5 under the heading REVIEW/CHANGE PRINT FORMAT LIST.

The printer port also has a selection to enable or disable handshaking (see Section 5, parameter 3.6). This refers to the CTS (Clear To Send) signal that many printers use. If the handshaking is enabled, the CTS line from the printer must be connected to the 8600 main board. This line is supplied if a cable is ordered. See Section 10 for the main board connections.

LABEL BUFFER

The Model 8600 comes equipped with a 2048 character Label Buffer that allows you to customize up to 64 label formats. The programming must be done through the duplex port (port 1) and requires a terminal or computer.

The 2048 character label buffer can be divided up into 64 separate buffers for printing 64 different formats. The total 2048 characters is divided evenly by the number of buffers that have been specified in the 'EN' command. For example, if 16 buffers are to be defined for 16 different formats, then 128 characters will be allocated to each buffer. The label buffer will contain a mixture of control codes that instruct the 8600 what to print, and ASCII characters that will be printed normally.

Formatting the Label Buffer

To format the buffer, you must first specify how many buffers you are going to use. This is done by sending the EN command to the 8600 via the duplex port. For example, send the string "00EN08" to instruct the 8600 to set up 8 buffers, which will each be 256 characters long. Up to 64 buffers may be defined. Sending the string "00XN" will return the number of buffers currently assigned. Each time the EN command is sent to specify the number of buffers, the entire 2048 byte label buffer area is cleared. Therefore, if you want to increase this number, you must reenter each label. This is necessary because the size of each buffer changes according to how many are set-up. See Section 9 of the manual for information on duplex commands.

Once the number of buffers is defined, each buffer must be formatted. To format the buffer, a series of characters must be sent to the 8600 using the list of control codes listed below. All control codes in the format are prefixed with a '\' character, all other characters are treated as literal characters and will be printed as such.

For example, send the string: "00EL01Net:\b\ND\b\u\r\l" to set up buffer number 1. This sequence of control codes and literal characters will result in the printing of:

Net: 5.00 lb (if the current net weight = 5.00 lb)

The "Net:" is literally printed, the \b prints a blank, the "\ND" instructs the 8600 to print the net weight using the current units next, the \b prints another blank, the "\u" prints the current units, "\r" follows with a carriage return and the "\l" instructs the 8600 to print a line feed.

Format the second buffer by sending "00EL02Gross:\b\GD\b\u\r\l". This will result in the printing of the following string:

Gross: 5.50 lb (if the current gross weight = 5.50 lb)

Formatting the Printer (Pass-thru Feature)

Most label printers must be formatted so that they will know what kind of data to expect from the scale and where to place it on the label. The way in which the printer is formatted varies among printer manufacturers. This information is included in the programming manual that accompanies the printer. Regardless of the printer brand though, the printer will need to be formatted using the serial communications port. This can be done by connecting the RS232 port of a computer to the printer with a serial cable, and using a communications program to download the format data. This requires swapping cables back and forth between the computer, scale, and printer. An easier way to do this is to use the 8600 pass-thru feature.

The pass-thru feature redirects characters received from the duplex port to the printer port. The pass-thru feature works as follows: Connect the 8600 duplex port to the RS232 port of the computer and connect the printer port to the printer. When this is done, enable the pass-thru mode by sending a CTRL-P (ASCII 16) command to the scale. Now any characters sent from the computer will pass straight through the scale and on to the printer. The printer can now be formatted by sending individual commands or by downloading a setup file. Note: A 0.2S delay is required from the time the asterisk (*) is received to when the first data character is sent.

When finished formatting the printer, disable the pass-thru mode by sending a CTRL-V (ASCII 22). When the pass-thru mode is disabled, the scale will again accept scale commands from the duplex port without passing them through to the printer port. Note: If the pass-thru feature is used, both ports must be set to the same baud rate.

Example:

To send the string "Made in USA" from a computer connected to the duplex port to a printer connected to the printer port, first send the command: 01^P<CR> (where 01 is the scale address, ^P is a control-P character, and <CR> is a carriage return), then follow the command with: Made in USA^V (where ^V is a control-V character that disables the pass-thru mode).

Selecting and Printing a Label

To select the label buffer to print, press and hold the PRINT button to display the "LBL_XX" prompt, use the numeric keys to select the label (2 digits), and press ENTER. Note that you cannot select a label if its number is greater than the number of labels set up. For example, if you specify 4 labels using the EN command, you can only select labels 1 - 4. If you enter a number greater than 4, the current label will reset to 01. The label can also be selected by sending the RL command via the duplex port. For example, 01RL02 will select label buffer 2.

To print a label, you must set the print format for the simplex or duplex port (depending on which you wish to print from) to LBLBUFF. See Section 5 of this manual for information on setting setup parameters. Once this is done, and the desired label buffer has been formatted and selected, simply press the PRINT button momentarily to print the label. Note: if the PRINT button is held, the label selection display will appear.

Label Buffer Control Codes

The following is a list of permissible control codes, all must be prefixed with a '\' to be used as a control code.

\ An ASCII '\' will be literally printed (type a double backslash "\\" to print a single backslash '\').

b Prints a space (ASCII 32).

r Sends a carriage return (ASCII 13).

l (lower case 'L') Sends a line feed (ASCII 10).

f Sends a form feed (ASCII 12).

GD Prints the current gross weight with decimal point.

GP Prints the gross weight in pounds with decimal point.

GK Prints the gross weight in kilograms with decimal point.

GO Prints the gross weight in ounces with decimal point.

gD Prints the current gross weight without decimal point.

gP Prints the gross weight in pounds without decimal point.

gK Prints the gross weight in kilograms without decimal point.

gO Prints the gross weight in ounces without decimal point.

MT Prints unit status "MOT" or "STB"

ND Prints the current net weight with decimal point.

NP Prints the net weight in pounds with decimal point.

NK Prints the net weight in kilograms with decimal point.

NO Prints the net weight in ounces with decimal point.

nD Prints the current net weight without decimal point. (no polarity)

nP Prints the net weight in pounds without decimal point. (no polarity)

nK Prints the net weight in pounds without decimal point. (no polarity)

nO Prints the net weight in pounds without decimal point. (no polarity)

D Prints the weight currently displayed on the front panel with decimal point.

d Prints the weight currently displayed on the front panel without decimal point.

u Prints the current display units, "lb", "kg", "oz", "lb oz" or "g".

W Prints the current weighing mode either "GS" or "NT".

pD Prints the current displayed weight polarity. Space = positive weight, '-' = negative weight.

pG Prints the gross weight polarity.

pN Prints the net weight polarity.

T0-T9 Prints the value of Tare 0 - Tare 9 with decimal point.

t0-t9 Prints the value of Tare 0 - Tare 9 without decimal point.

A0-A9 Prints the value of Accumulator 0 - Accumulator 9 with decimal point.

AX Prints the value of current selected Accumulator with decimal point.

a0-a9 Prints the value of Accumulator 0 - Accumulator 9 without decimal point.

aX Prints the value of current selected Accumulator without decimal point.

C0-C9 Prints the value of Counter 0 - Counter 9.

CX Prints the value of current selected Counter.

#XX Sends a 2 digit Hex number.

P Prints the Product ID (entered by pressing RCL, followed by the ID number).

H Prints the hour in a "HH" (00-23) format.

U Prints the minutes in a "MM" (00-59) format.

S Prints the seconds in a "SS" (00-59) format.

M Prints the month in a "MM" (01-12) format.

J Prints the day in a "DD" (01-31) format.

y Prints the year in a "YYYY" (1995-2094) format.

Y Prints the year in a "YY" (00-99) format.

m Prints the alpha equivalent of the month in the format "mmm" (JAN-DEC).

I (upper case i) Prints the current scale ID (01-30).

E Uses the next 6 characters in the format to briefly display a message on the front panel.

Q Causes the following printing to be sent to the duplex port and continue until a 'Q' is again received. For example, "\Qdata\Q".

1 Causes the 8600 to print the contents of the receive buffer. This is useful for applications such as bar code readers. The bar code information can be sent to the duplex port from the bar code reader (must be followed by a carriage return), and the label format could be set up to print this information in a specific format (usually used with a special printer, such as the Prodigy printer). A limitation of this feature is that if a string is sent to the 8600 and it recognizes it as a valid command, it will act on it, so only strings that are invalid commands should be sent.

Note: All weight printouts with decimal point are 9 characters (including the decimal point), and all weight printouts without decimal point are 7 characters. Leading zeroes are replaced with spaces.

Duplex Commands for the Label Buffer

RL Recalls (selects) the specified label buffer.

EN Specifies the number of buffers to set up.

EL Formats the specified label.

AL Appends further formatting information to the end of the specified label.

XN Transmits the number of labels that are currently set up over the duplex port.

PN Prints the number of labels that are currently set up over the simplex port.

XL Transmits the format of the specified label over the duplex port.

XLC Transmits the number of the current label over the duplex port.

PL Prints the format of the specified label over the simplex port.

PLC Prints the number of the current label over the simplex port.

Examples:

01EN03	Sets up 3 label buffers.
01EL01Doran\r\l	Sets up label buffer 01 to print "Doran Scales", followed by a carriage return/line feed.
01RL01	Recalls label 01 (makes it the current label).
01XLC	Sends "Label: 01" via the duplex port (if label 1 is the current label as above).
01XL02	Sends the format of label buffer 02 via the duplex port.
01XN	Sends "Buffers: 03" via the duplex port (if 3 buffers are set up as above).

PRINT FORMATS

ID In Tare F1 - F4 modes, the current ID is printed. In any other mode, the Product ID is printed. The Product ID is entered by first pressing the RCL button, followed by the product ID (up to 6 digits). Press ENTER to save the ID. If a mistake is made, press the CLR button and reenter the number. The Product ID will remain in memory and will be printed any time the Product ID is included in either a print list or a customized label buffer. The Product ID will not change until the operator changes it using the above method.

Note: that if ID is not included in the print list, or the 'P' control code is not included in a label buffer, pressing the RCL button will not activate the Product ID entry display.

Section 10. Auxiliary Connections

The following provides information regarding the different configurations available for the printer and duplex ports. A connection diagram for the main printer circuit board is provided. A connection diagram is also provided for the wiring of the Quick Access Port for the load cell inputs and serial communications (Model 8600M only).

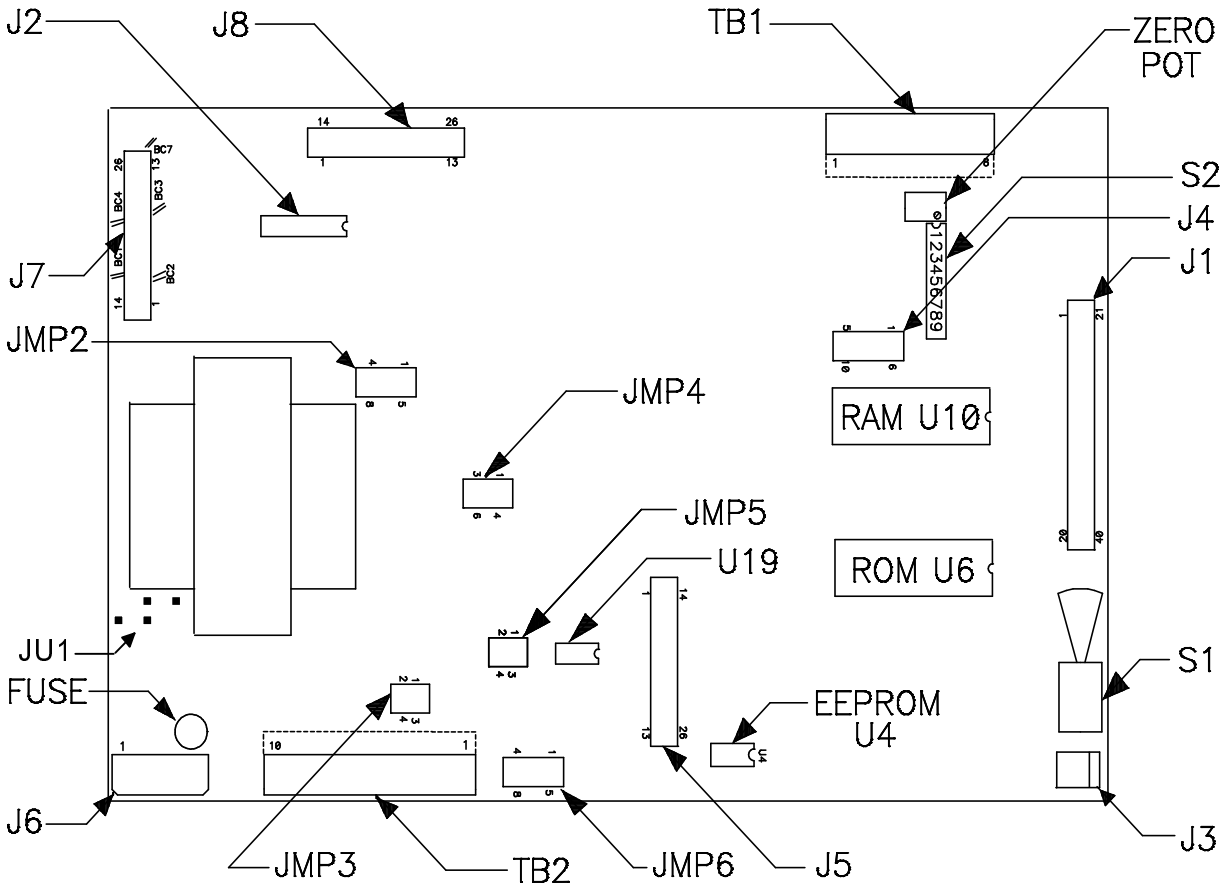


Figure 7. Main Board Layout

SERIAL PORT CONFIGURATION

In order to reconfigure the 8600 communication options, the following jumpers and ICs must be changed on the main board and the connections to TB2 must be as shown.

Default settings are indicated in bold.

PORT 1 (DUPLEX) JUMPERS:

Function	JMP3	JMP4	JMP6	IC Changes
RS232	**1-3 2-4**	**1-4**	**All Open**	**None**
RS485	All Open	2-5	All Open	Insert U19
Passive 20 mA Loop	All Open	3-6	1-2 5-6	Remove U19
Active 20 mA Loop	All Open	3-6	1-5 3-7 4-8	Remove U19

PORT 2 (PRINTER) JUMPERS:

Function	JMP2	JMP5
RS-232	**All Open**	**1-3 2-4**
Passive 20 mA Loop	1-2 5-6	All Open
Active 20 mA Loop	1-5 3-7 4-8	All Open

SERIAL PORT WIRING

In addition to the above configuration changes, the cable connecting TB2 on the main board to the Quick Access board must be wired according to the communication option desired (8600M only). The following figures detail these connections.

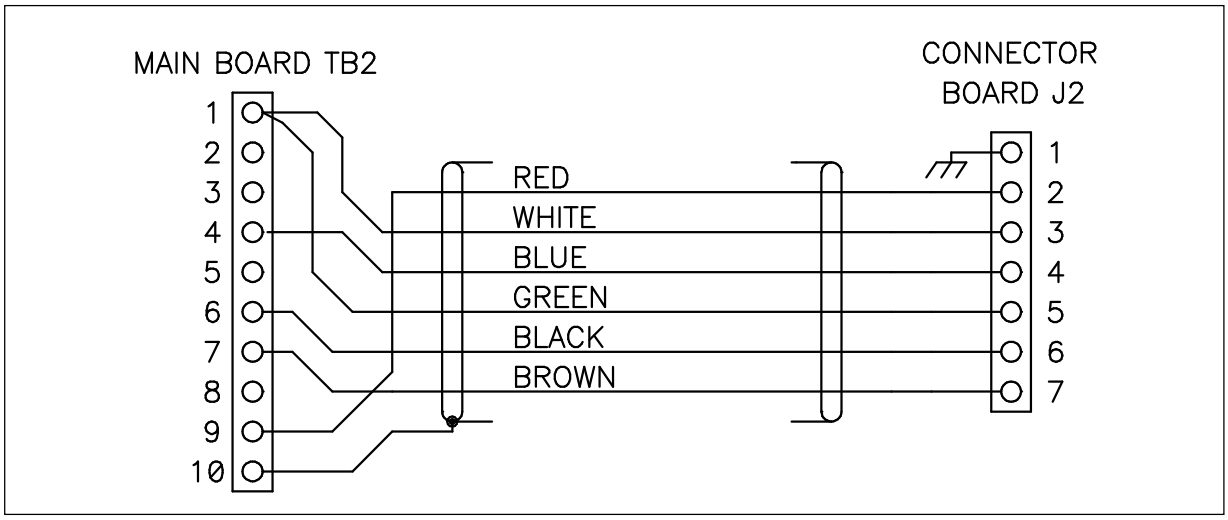


Figure 8 - Port 1 (Duplex): RS232, Port 2 (Printer): RS232 or 20 ma

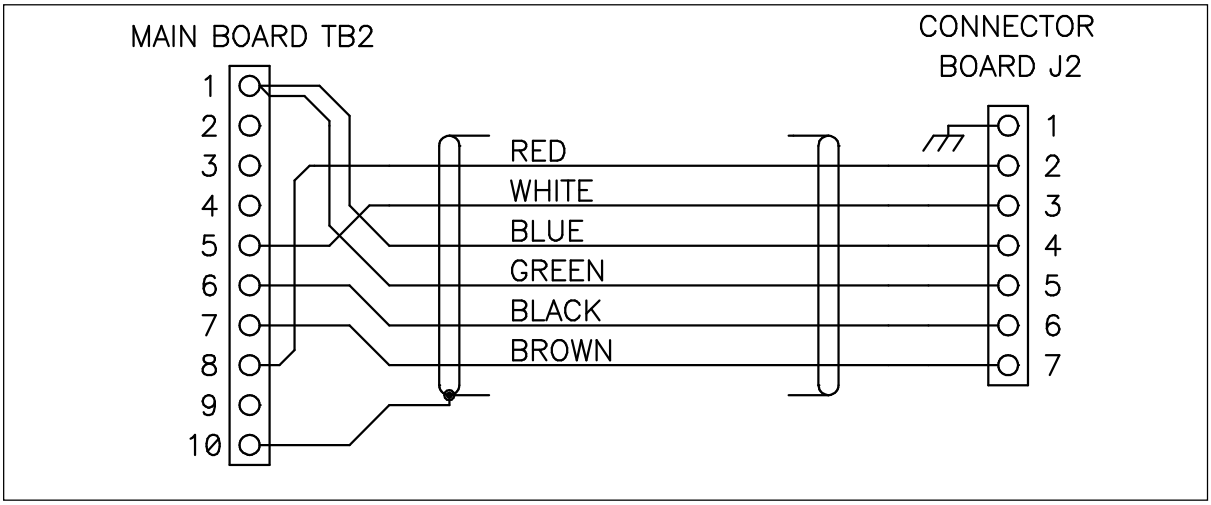


Figure 9 - Port 1 (Duplex): RS485, Port 2 (Printer): RS232

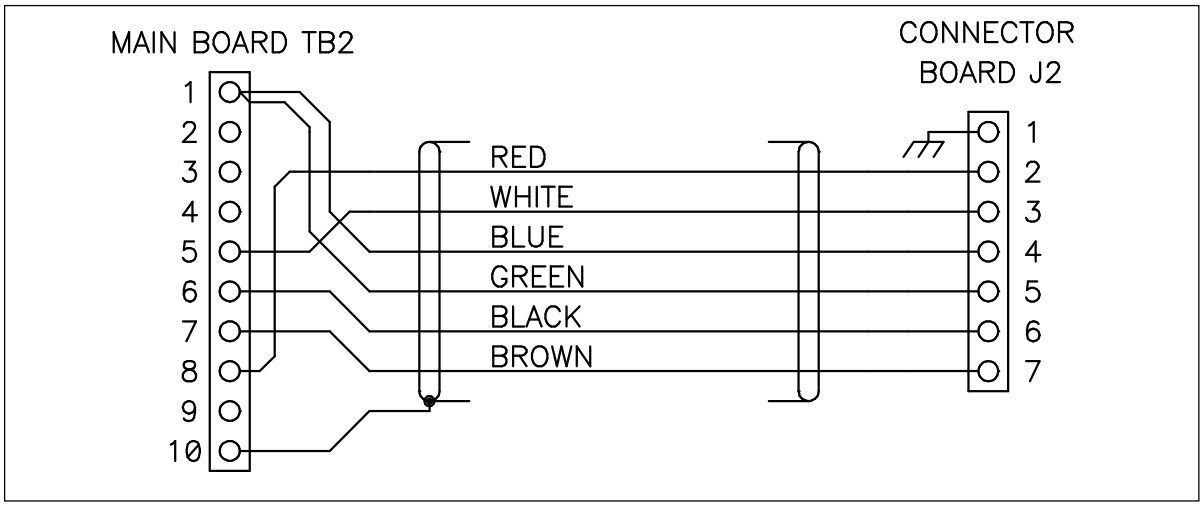


Figure 10 - Port 1 (Duplex): RS485, Port 2 (Printer): 20 ma Loop

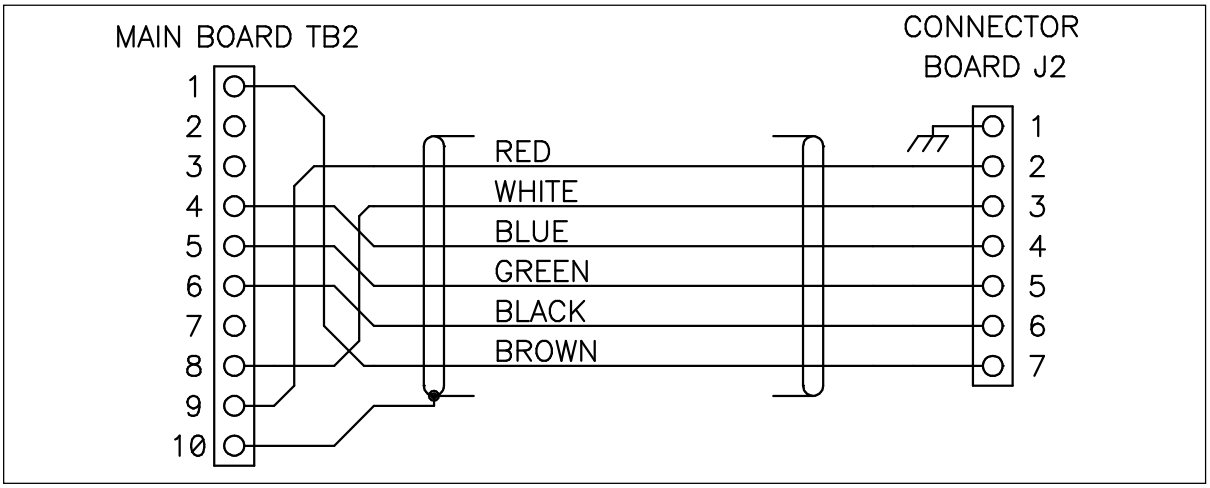


Figure 11 - Port 1 (Duplex): 20 ma Loop, Port 2 (Printer): RS232

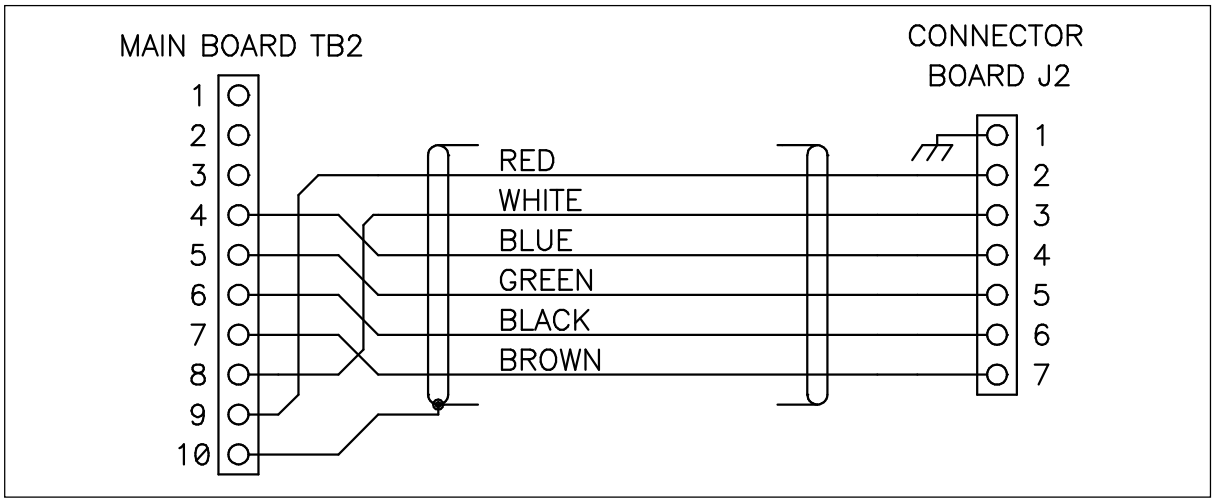


Figure 12 - Port 1 (Duplex): 20 ma Loop, Port 2 (Printer): 20 ma Loop

SERIAL PORT QUICK ACCESS CONNECTIONS (Model 8600M only)

PORT 1	PORT 2	Option Suffix	J2 Pin 1	J2 Pin 2	J2 Pin 3	J2 Pin 4	J2 Pin 5	J2 Pin 6	J2 Pin 7
RS232	**RS232**	**-0**	**SHIELD**	**TXD1**	**GND**	**RXD1**	**GND**	**TXD2**	**CTS**
20ma	RS232	-1	SHIELD	TXD1+	TXD1-	RXD1+	RXD1-	TXD2	GND
RS485	RS232	-2	SHIELD	TX/RX1+	TX/RX1-	GND	GND	TXD2	CTS
RS232	20ma	-3	SHIELD	TXD1	GND	RXD1	GND	TXD2+	TXD2-
20ma	20ma	-4	SHIELD	TXD1+	TXD1-	RXD1+	RXD1-	TXD2+	TXD2-
RS485	20ma	-5	SHIELD	TX/RX1+	TX/RX1-	GND	GND	TXD2+	TXD2-

SERIAL PORT MAIN BOARD CONNECTIONS

Model 8600M: Each function must have a connection from the specified position of TB2 on the main board to the specified position of J2 on the Quick Access board (if the correct option is ordered, all these connections will be made at the factory before shipping). All external connections are then made to J2.

Model 8600RSS: There is no Quick Access board, so make each external connection directly to TB2 on the main board.

PORT 1 - RS232 (DUPLEX)	QUICK ACCESS PORT	MAIN BOARD CONNECTIONS
TXD	J2-2	TB2-9
Signal ground	J2-3	TB2-1
RXD	J2-4	TB2-4
Chassis Ground	J2-1	TB2-10

PORT 1 - RS485 (DUPLEX)	QUICK ACCESS PORT	MAIN BOARD CONNECTIONS
TXD/RXD-(B)	J2-3	TB2-5
TXD/RXD+(A)	J2-2	TB2-8
Chassis Ground	J2-1	TB2-10

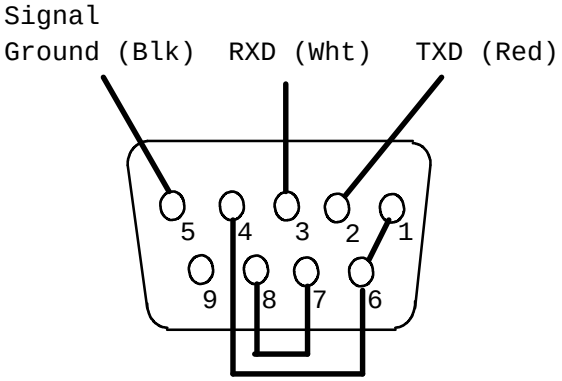
PORT 1 - 20 ma (DUPLEX)	QUICK ACCESS PORT	MAIN BOARD CONNECTIONS
TXD+	J2-2	TB2-9
TXD-	J2-3	TB2-8
RXD+	J2-4	TB2-4
RXD-	J2-5	TB2-5
Chassis Ground	J2-1	TB2-10

PORT 2 - RS232 (PRINTER)	QUICK ACCESS PORT	MAIN BOARD CONNECTIONS
TXD	J2-6	TB2-6
Signal Ground	J2-5	TB2-1
Chassis Ground	J2-1	TB2-10
CTS	J2-7	TB2-7

PORT 2 - 20 ma (PRINTER)	QUICK ACCESS PORT	MAIN BOARD CONNECTIONS
TXD+	J2-6	TB2-6
TXD-	J2-7	TB2-7
Chassis Ground	J2-1	TB2-10

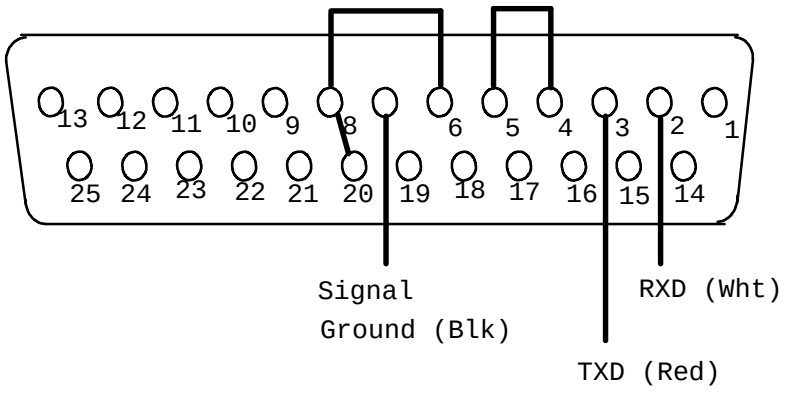
RS232 NULL MODEM CABLE WITH DB9 CONNECTOR

The diagram shown below should be used to wire a DB9 connector to port 1 (duplex) for RS232 operation. The jumpers shown between pins 1,4,6 and 7,8 are necessary in most cases to provide the proper control signals to the computer or other equipment that the DB9 connector will be plugged into. Consult the manual for the equipment you are using for more information on the connections it requires. See Section 9 for more information about port 1.



RS232 NULL MODEM CABLE WITH DB25 CONNECTOR

The diagram shown below should be used to wire a DB25 connector to port 1 (duplex) for RS232 operation. As with the DB9 connector, the jumpers shown are usually necessary for proper operation. Consult the manual for the equipment you are connecting to for more information on the necessary connections. See Section 9 for more information about port 1.



REMOTE ZERO SWITCH (MAIN BOARD)

J3-position	FUNCTION	COMMENTS
J3-1	Ground	
J3-2	Input 10K ohm Pull-up to +5VDC	Requires Molex (.156 centers) type pins and connector. Requires a momentary contact closure.

REMOTE CONFIGURABLE PUSH-BUTTON (MAIN BOARD)

TB2-position	FUNCTION	COMMENTS
TB2-2,3	Remote push-button	A momentary contact closure between positions 2 & 3 will activate. (see Section 5, menu 5.0)

LOAD CELL CONNECTIONS (MAIN BOARD)

Model 8600RSS: Connect your load cell wires directly to TB1 on the main board using the positions shown below.

Model 8600M: The load cell connections are wired from the positions on the main board shown below to the Quick Access board. Use the color code chart below to connect the QA board to the main board. Connect your load cell wires to the Quick Access board as shown on the next page.

TB1-position	FUNCTION If sense is not connected, place jumper between +sense and + excitation, -sense and -excitation.	COLOR CODE Quick Access Board (8600M)	COLOR CODE Doran Platforms (8600RSS)	COLOR CODE Redi-Weigh Floor Bases (8600RSS)
TB1-1	Chassis Ground	Bare	Bare	Braided
TB1-2	+ Signal	Red	Red	White
TB1-3	- Signal	White	White	Red
TB1-4	+ Excitation	Green	Green	Green
TB1-5	- Excitation	Black	Black	Black
TB1-6	+ Sense	Blue	Blue	N/A
TB1-7	- Sense	Brown	Brown	N/A
TB1-8	Chassis Ground			

LOAD CELL CONNECTIONS (QUICK ACCESS BOARD)

Model 8600M: This is the only model that uses the Quick Access board. Connect your external load cell wires to this board.

J1-position	FUNCTION If sense is not connected, place jumper between +sense and + excitation, -sense and -excitation.	COLOR CODE Doran Platforms	COLOR CODE Redi-Weigh Floor Bases
J1-1	Shield	Bare	Braided
J1-2	+ Signal	Red	White
J1-3	- Signal	White	Red
J1-4	+ Sense	Blue	N/A
J1-5	+ Excitation	Green	Green
J1-6	- Excitation	Black	Black
J1-7	- Sense	Brown	N/A

POWER SUPPLY CONNECTIONS (MAIN BOARD)

J6-position	FUNCTION For 220 VAC operation : Cut jumpers between JU1-1and JU1-2, JU1-3 and JU-4, Place jumper between JU1-2 and JU1-3.
J6-1	Not connected
J6-2	Neutral, 115VAC (For 220VAC use proper fuse)
J6-3	Not connected
J6-4	Hot, 115VAC (For 220VAC use proper fuse)

Note: The power cord ground must be connected to the ground stud located directly next to the power cord watertight fitting.

MISCELLANEOUS CONNECTORS, ICs. etc. (MAIN BOARD)

TB or IC	FUNCTION
J1	Display Interface Connector
J2	Solid State Relay Board Interface
J5	Expansion Interface Connector for Optional Cards
U19	RS485 IC Location
U6	EPROM, Program Memory Chip
U10	Static nonvolatile Memory Chip (Time and Date)
S1	Secondary Setup Switch
U12, U20, U21	20 ma Current Loop Interface Chips
U4	EEPROM Memory Chip

Section 11. Messages and Error Codes

DISPLAYED MSG	DESCRIPTION OF ERROR OR MESSAGE
ACC	Displays currently selected accumulator.
ACC_0	Accumulator error, accumulator is 0.
ACCOFL	Accumulator error, accumulator in overrange.
ACCPOL	Accumulator error, negative value.
ACCUFL	Accumulator underflow. Accumulation would result in a negative value.
ALArM	Display alarm message for batching.
b_Err_1	If two boxes pass photoeye 1 without the box 1 entering photoeye 2. (OPER - motion mode only)
b_Err_2	If two boxes on conveyor at the same time (OPER - motion mode only)
b_Err_3	If a box passes photoeye 2 without passing photoeye 1 first. (OPER - motion mode only)
b_Err_4	If a box passes both photoeyes without having a stable reading. or outside the zero band. (OPER - motion mode only)
bAtCOnt	Batching sequence has continued after a pause.
bAtPAUS	Batching sequence has been paused.
bAtStOP	Batching sequence has been stopped.
bAt Str	Batching sequence has been started.
dOnE	Storing operation is complete and accepted.
Ent_0	Enter zero calibration point.
Ent_Id	Prompts to enter the ID.
Ent_SP	Enter span or test weight value.
EntPASS	Prompts to enter the password.
EntSEtP	Enter setpoint value into setpoint register.
EnttAr	Enter tare value into tare register.
Er_ACUn	Accumulator error, tried to accumulate in a different unit than the first accumulation after a clear.
Er_AJ-0	Auto jog error, no previous setpoint found to auto jog.
Er_C0.E	Calibration 0 error, not accepted.
Er_C0.0	Calibration 0 too high, reduce zero offset. Not accepted

Er_C0.U	Calibration 0 too low, increase zero offset. Not accepted
Er_dIV0	Divide by 0 error, CAL values may be cleared.
Er_dn	Calibration failure, negative weight used.
Er_EEP	EEPROM failure, enter setup to correct.
Er_FUn	Calibration and setup data have been set to default.
Er_IdFU	ID error, all ID locations full. Delete to enter new.
Er_LOCK	Keyboard function has been locked out or disabled.
Er_L-O	lb-oz error, lb-oz unit not allowed; enters lbs unit.
Er_nOId	ID error. ID entered for recall not found.
Er_nSt	Value not saved, indicator in motion.
Er_0R0	NTEP, trying to gross zero above of zero range.
Er_RAn	Ram failure, press any button to clear.
Er_SP-	Span calibration negative, not accepted.
Er_SPU	Not enough output from cell for desired graduations.
Er_SPO	Too much output from cell for desired graduations.
Er_SFO	Load factor is too large, decrease gain/span setting.
Er_SFU	Load factor too small, increase gain/span setting.
Er_thr	Threshold error.
Er_Ur0	NTEP, trying to gross zero under zero range.
ErAdCAL	Analog-Digital Converter calibration error. Replace A/D
Ergrdhl	When entering display graduations, value entered >100,000.
Err__t -	Error tare negative, not accepted.
Errn00	Calibration 0 point not accepted or entered.
ErrnOSP	Calibration span or test weight value not accepted.
ErrtArE	Tare entry error, tare value not accepted.
EtrCAL	Enter calibration into memory.
grS-OL	Indicator in gross overload, input too great.
grS-UL	Indicator in gross underload.
LdgnEU	Indicator loading RAM data, power up in setup mode.
LObAtt	Low battery condition for DC/Battery option, recharge.
- - OL - -	Indicator in digital overload. > 103% of capacity
PASSFAI	Entered password failed, incorrect password.
PrtCOnF	Printing configuration list.
rEL_0	Release the ZERO button.

rEL Pb	Release the button that is being held.
rECtAr	Prompts to recall the tare value.
SAVCAL	Save calibration data to EEPROM.
SAVSEtU	Save calibration and setup data, store in EEPROM.
SEt_Pt	Displays currently selected setpoint.
tArE	Displays currently selected tare.
- - UL - -	Indicator in digital underload. < -103% or display err
WAIt	Data is being saved.

Section 12. Troubleshooting Guide

PROBLEM	DESCRIPTION (CAUSE and CORRECTIVE ACTION)
i. Weight reading will not repeat or indicator does not return to zero when weight is removed.	Make sure that there is nothing caught in or around the platform or load cell assembly that could be interfering with the movement of the active or live portion of the assembly.
ii. Indicator overloads early.	Ensure that the overload stops for the platform or loadcell assembly are set correctly and there is no material caught between the stops and the platform or loadcells assembly.
iii. Indicator will not indicate full capacity or enter an overload state.	See description for i. above.
iv. Indicator will not come to zero when ZERO or TARE push-button is pressed	Verify that the indicator is in a stable state ("MOT" annunciator is off) when either push-button is pressed. If the indicator is stable, a problem may exist with the keyboard or the electronics. If ZERO is pressed, verify that the gross weight is not beyond the zero range as set in [1.3 PB0BN]. If it is, reset the indicator or remove weight until the gross weight in with the set limits. If the TARE is pressed, verify that the gross weight is positive and that the tare selection for the TARE is set to PTT. See section 5 [5.2 TARPB].

v. Weight readings don't seem correct.	Check the load calibration for the indicator. See description for i. above. Verify that all connections to the indicator are good. Verify that the setup has been done correctly for the desired application for the indicator (i.e. if a 100 x .05 displayed capacity is desired that the indicator is in fact set up to display the capacity). See section 5 [1. CONF] and [2. DISP].
vi. Indicator drifts off of a zero indication.	Check for air currents around the platform or loadcell assembly. Check for high vibration conditions around the platform or loadcell assembly. If either of the above conditions exist and cannot be eliminated, the digital and/or analog filter can be adjusted to compensate for some or all of the problem. Note however that when modifying the filtering, the weight display update rate may be affected. Also, the AZT can also be adjusted to increase the zero tracking bandwidth. However, check with any regulatory agencies, if applicable, that any adjustments do not void the installation approval of the weighing system. See section 5 [1.2 AZT]
vii. Indicator weight reading is bouncing or seems flighty.	See description for vi. above.
viii. Indicator locks up or displays an error message that will not clear.	Unplug indicator and plug in again to reinitialize. If this doesn't fix the problem, see the solution at the end of this section labeled "IF ALL ELSE FAILS...".

ix. When the PRINT push-button is pressed, serial data is not printed from the printer port.	Check that the proper hardware configuration is selected for the application. For example, that the RS232 selection has been made if an RS232 connection is made to a RS232 printer. Check the setup for the printer simplex port and verify that it matches the requirements for the printer or simplex device (i.e. the baud rate, parity, data bits, etc.). See section 5 [3. SERPRT]. All setup is correct but data will still not come from the printer port. Check that the print push-button operation select is correct. See section 5 [3.4 PRTB]. Check that a print format has been specified for at least the first line in the Print Format Select. See section 5 [3.5 PRTF]. If the print format is set for label buffer, make sure that the proper label buffer is selected. (Do not use label buffer 0).
x. The PRINT indicator comes on for 1-2 seconds, but serial data is still not coming out of the serial printer port.	Check and verify that the simplex printer port has been set up correctly and has been connected correctly to the printer or device. If the print format is set for label buffer, make sure that the proper label buffer is selected. (Do not use label buffer 0).

I ALL ELSE AILS

If the indicator is locked up, displaying an error message that will not clear, or acting erratically, the nonvolatile memory may have been corrupted by conditions such as power surges or voltage spikes caused by industrial equipment. If this is the case, the nonvolatile memory can be cleared as a last resort. Note, however, that if this memory is cleared, all the stored values such as setpoints, accumulators, tares, and batch programs will be cleared, and all setup parameters will be defaulted.

To clear the nonvolatile memory and default the setup parameters, first unplug the indicator and close SW2 #9. Then press and hold the ZERO button while plugging the indicator in to the electrical outlet. The indicator will display 'LDGNEW', then 'ERR_FUN', and finally 'REL 0', after which the ZERO button can be released. The

memory is now cleared and the setup parameters are defaulted. Open SW2 #9 and let the indicator initialize.

After the indicator fully powers up, unplug it and plug it in again. If the 'ERR RAM' message displays at any time, press the ZERO button to clear it. The setup parameters must now be reselected, and any tares, setpoints, etc. reentered.

If this last-resort solution does not solve the problem, call our service department for further assistance.

Section 13. Technical Specs and Options

TECHNICAL SPECIFICATIONS

Functional Specifications :

Approvals	NTEP certified to 10000d CLASS III/IIIL Designed to meet CSA, UL and Canadian W&M	
Load Cell Excitation	10 VDC, short circuit protected	
Load Cell Current	240 mA maximum (8 350 ohm load cells)	
Analog Input Range	0.6 mv/v to 3.0 mv/v	
Analog Sensitivity	0.5 uV/ graduation	
Analog Filter Settings	10Hz to 0.078 Hz	
Update Rate	15 Displayed Updates/Second minimum	
Internal Update Rate	2000 Updates/Second maximum	
A/D Converter Type	Delta Sigma, 20 bit with filter settings	
Displayed Resolution	1:20000 maximum (1:100000 with additional filtering)	
Internal Resolution	1048575 counts maximum	
Power (120 V operation)	120 VAC 50/60 Hz 100 VAC 130 VAC	(typical) (minimum) (maximum)
Power (240 V operation)	240 VAC 50/60 Hz 200 VAC 250 VAC	(typical) (minimum) (maximum)
Power (DC option)	14 VDC 28 VDC	(minimum) (maximum)
Fuse (120 V operation)	0.25 amp, 250 V slo-blow, replaceable, pc mount	
Fuse (240 V operation)	0.125 amp, 250 V slo-blow, replaceable, pc mount	

EMI/RFI Protection	Moderate protection, meets NIST Handbook 44
Operating Temperature	-10 to +40 C (+14 to +104 F)
Storage Temperature	-15 to 85 C (+5 to 185 F)
Inputs	One menu selectable digital input Seven menu selectable digital inputs (optional) Selectable remote switches
Outputs	10 Setpoint outputs, dry contact closure with trip SSR relay option available (AC or DC) 4-20ma / 0-10 VDC option available
Data Communications	One Full Duplex Port, Fully Configurable Supports RS485, RS232, 20 ma current loop 300 to 19.2k baud, 8, 7 data bits, odd ,even, none parity One Simplex Printer Port, Fully Configurable Supports RS232, 20 ma current loop 300 to 19.2 k baud, 8, 7 data bits, odd, even, none parity
Calibration	2 point, digital calibration
Parameter Setup	Fully digital keyboard programmable setup
Memory	64k x 8 Program memory 512 x 8 EEPROM memory for calibration and setup storage 8k x 8 nonvolatile static memory storage of keyboard values
Fault Detection	Microcontroller monitoring system to reduce indicator failure under severe fault conditions

Display Specifications :

Full Scale Capacity	Keyboard selectable to 1,000,000 lbs
Digital Overload	103% of indicator capacity
Display Increments	1, 2, 5

Decimal Point Position	0.00000, 0.0000, 0.000, 0.00, 0.0, 0, 00, 000
Display	7 Digits, 0.8" High, Bright Red LED, 7-Segment with right hand decimal point
Display Units	lb, kg, oz, g, lb-oz, user
Polarity Indication	"-" Sign for all weight values
Under Range Capacity	400 graduations typical, less than -999999
AZT (Auto Zero Tracking)	Selectable Off, 0.5d, 1.0d, 3.0d, 5.0d, 10.0d
Zero Range	100%, 1.9%, 4.0%
Motion Band	Off, 0.5d, 1.0d, 3.0d 5.0d 10.0d
Display Test	All segments and LEDs upon power up
Front Panel Annunciators	Zero, Net, Gross, Motion, lb, kg, oz, g, Setpoints 0-9, Setpoint, Preact, Accumulator, Recall, Print

Keyboard Specifications :

Material	21 Key (1 hidden), polycarbonate with red display filter
ESD	Electrostatic Protection with Metallic Shield and grounding tail
Adhesive	Cross-Linked acrylic, water proof
Capacity Label	Placed in a pocket on the inside of the front panel behind a clear window.

Enclosure Specifications :

Unit Enclosure	Meets NEMA 4X , 304 Stainless Steel
Unit Dimensions	10" W x 7" H x 4" D (8600M) 10" W x 12" H x 6" D (8600RSS)
Unit Approvals	Meets or exceeds USDA

OPTIONS

SOLID STATE RELAYS

The SSR option consists of an internal SSR board and 5 installed solid state relays, with space for a total of 10. These would be used to supply the current for the setpoint outputs. The relays are 250 VAC (for 120V or 240V circuits), 3 Amp, normally open and optically isolated (DC relays are also available). The option includes the SSR board, 5 relays, mounting hardware, and two 12 ft. cables that provide 6 independent circuits. This option is only available with the 8600RSS.

DIGITAL INPUT/OUTPUT INTERFACE

This option provides one configurable remote switch input, seven configurable digital batching inputs, and 10 setpoint outputs. Each of the inputs and outputs is optically isolated and accepts or provides TTL levels. This option is available on either the 8600M or 8600RSS and is necessary if batching inputs are to be used.

EXTERNAL BATTERY OPTION

This option turns either the 8600M or 8600RSS into a battery-operated indicator. The option consists of an external 12V battery, an external battery charger, an internal DC power board, and the necessary cabling and water-tight connections. This allows you to operate the 8600 with one battery while charging another, or to operate the 8600 on battery power throughout the day and charge overnight. The external charger allows you to charge the battery in any convenient location - the scale does not need to be near a power outlet.

INTERNAL BATTERY OPTION

This option allows the 8600 to run on battery power or AC power. The option consists of an internal 12V battery and an internal battery charger board. It is used mainly as a battery backup system that maintains a charge whenever the unit is plugged in and switches to battery power in the event of a power failure. It can also be used to make the 8600 a battery operated scale. However, since the charger and battery are internal, the indicator must be near a power outlet or moved to a power outlet to recharge. If it is undesirable to move the 8600 to charge it, the External Battery Option would probably be a better choice. This option is only available on the 8600RSS.

DC POWER OPTION

The DC Power Option is available for either the 8600M or 8600RSS. A special watertight connector is provided to allow the indicator to be connected to almost

any DC power source. An input range of 14VDC to 28VDC can be accepted. The option also provides additional filtering and reverse polarity protection.

SETPOINT RELAY ENCLOSURE

The Model 8600 provides TTL outputs only. A separate relay enclosure can be ordered that contains 2PDT electromechanical relays. Up to 10 outputs can be supported with the standard enclosure. Terminal blocks are provided for connection of all wiring. The relay enclosure requires its own power supply since the indicator does not supply the power for the electromechanical relays. The enclosure is standard for 115 VAC circuits, but can be ordered with other power requirements. Please contact the Doran Scales sales department for details on other relay enclosure configurations.

ANALOG OUTPUT

The Model 8600 can be ordered with an optional analog output board. This option provides for a 4-20 ma or 0-10 VDC output proportional to the displayed weight to 12 bit resolution. The module is mounted internal to the indicator and provides terminal blocks for connections. When this option is supplied, the TXD portion of the duplex port is used to support the module and therefore is not available for duplex transmissions. Commands can still be sent to the scale via the RXD line of the duplex port, but no information can be sent from the scale via the TXD line. The printer port can still be used to print data. Please contact the Doran Scales sales department for details on the analog output option. When ordered, the Quick Access Port configuration is changed to support connection to the 4-20 / 0-10 VDC analog output. The 20 ma serial data current loop connections are used but the analog output is substituted for the output.

REMOTE PUSH-BUTTONS

The Model 8600 can support a variety of external push-buttons that emulate keyboard operations. A foot-switch or other type of dry-contact closure can be supported. Please contact the Doran Scales sales department for details.

220VAC OPERATION

The 8600 can be ordered as a 220VAC unit. The option consists of a board modification that includes a 1/8 Amp fuse.

OTHER

The Model 8600 is a versatile instrument and can be configured in many different schemes. Please contact the Doran Scales sales department for any questions about special configurations or setup requirements (i.e. enclosures, preconfigured setups, special software, etc.).

SETPOINT, KEYBOARD, POWER OUTPUTS/INPUTS (MAIN BOARD)

J8-position	FUNCTION
J8-1	Signal Ground
J8-2	Scan 3
J8-3	Scan 4
J8-4	Return 7
J8-5	Setpoint 6 output, Open Collector, 10K ohm to 5VDC
J8-6	Setpoint 5 output, Open Collector, 10K ohm to 5VDC
J8-7	Setpoint 4 output, Open Collector, 10K ohm to 5VDC
J8-8	Setpoint 3 output, Open Collector, 10K ohm to 5VDC
J8-9	Setpoint 2 output, Open Collector, 10K ohm to 5VDC
J8-10	Setpoint 1 output, Open Collector, 10K ohm to 5VDC
J8-11	Setpoint 0 output, Open Collector, 10K ohm to 5VDC
J8-12	+5Vdc, 100 ma. max.
J8-13	Return 2
J8-14	Test push-button, Zero also for Turn On for DC version
J8-15	Scan 2
J8-16	Scan 1
J8-17	Return 6
J8-18	Return 5
J8-19	Return 4
J8-20	Return 3
J8-21	Return 1
J8-22	Power supply ground
J8-23	Setpoint 7 output, Open Collector, 10K ohm to 5VDC
J8-24	Setpoint 8 output, Open Collector, 10K ohm to 5VDC
J8-25	Setpoint 9 output, Open Collector, 10K ohm to 5VDC
J8-26	+10Vdc, 500ma. max.

AUXILIARY KEYBOARD CONNECTOR (MAIN BOARD)

J4-position	FUNCTION
J4-1	Return 1, input
J4-2	Return 2, input
J4-3	Return 3, input
J4-4	Return 4, input
J4-5	Return 5, input
J4-6	Return 6, input
J4-7	Scan 1 output, Open Collector, 10K ohm to 5VDC
J4-8	Scan 2 output, Open Collector, 10K ohm to 5VDC
J4-9	Scan 3 output, Open Collector, 10K ohm to 5VDC
J4-10	Scan 4 output, Open Collector, 10K ohm to 5VDC