2200
2200B
2200CW
2200G

INSTRUCTION MANUAL

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Introduction

Thank you for purchasing a Doran Scales Model 2200, 2200B, 2200CW, or 2200G Digital Scale Indicator. This scale uses state of the art technology to provide you with a low cost solution to the most demanding weighing applications. With ease of use and setup in mind, the scale is simple to set up and ready to use.

Please be sure to read the entire manual to ensure you obtain all the benefits that the 2200 series can provide. If any questions arise, please feel free to contact the Doran Scales Technical Support Department at 1-800-262-6844.

The 2200 series offer many features. A few of these features are listed below:

NTEP certification for Class III installations to 10,000d (CoC # 06-101)

- Display Resolution from 250 to 50,000 divisions
- A six digit, 0.56" red LED display for easy reading
- Eight output status LEDs
- Eight on board open collector outputs
- lb, kg, oz, g, lb-oz display units supported
- Two configurable duplex serial ports with RS232 support
- nonvolatile data storage of all calibration and setup information
- Microprocessor monitoring system to prevent scale failure under severe fault conditions
- Support for up to four 350 ohm load cells
- 115 VAC 50/60 Hz operation standard or 230 VAC 50/60 Hz operation (Optional)
- Field selectable digital filtering
- Software configurable remote push-button support
- Password protected, Front Panel Calibration Access Feature
- Battery Operation, internal rechargeable battery provides 60 hours of continuous use with built in charger (Optional)
- 4-20mA analog output (Optional)
- Wired Ethernet (Optional)
- Wireless Ethernet (Optional)
- Modbus/TCP (Optional)
- RS485 (Optional)
- USB (Optional)
- Four Internal Mechanical or Solid State Relay outputs (Optional)
- Eight External Relay outputs for non-battery models (Optional)
- Fiber Optic Communication (Optional)
- For a complete list of options, please contact your local Doran Distributor

Unpacking Your Scale

Before unpacking your Doran scale, please read the instructions in this section. Your new scale is a durable industrial product, but it is also a sensitive weighing instrument. Normal care should be taken when handling and using this product. Improper handling or abuse can damage the scale and result in costly repairs that will not be covered by the warranty. If you notice any shipping damage, notify the shipper immediately. Please observe the following precautions to insure years of trouble free service from your new scale.

- DO NOT drop the scale
- DO NOT immerse the scale
- DO NOT drop objects on the platform
- ONLY pick up the scale base from the bottom of the platform
- CAREFULLY remove the scale from the shipping carton

Electrical Connections

Prior to connecting your scale to power, check the serial number tag on the back of scale for the correct operating voltage. Verify that the power matches the rated voltage.

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 scale has a filtered power supply to reduce the effects of normal line noise, but they cannot limit severe fluctuations. If problems occur, noise producing devices may have to be suppressed to minimize their effect.

Scale Operation

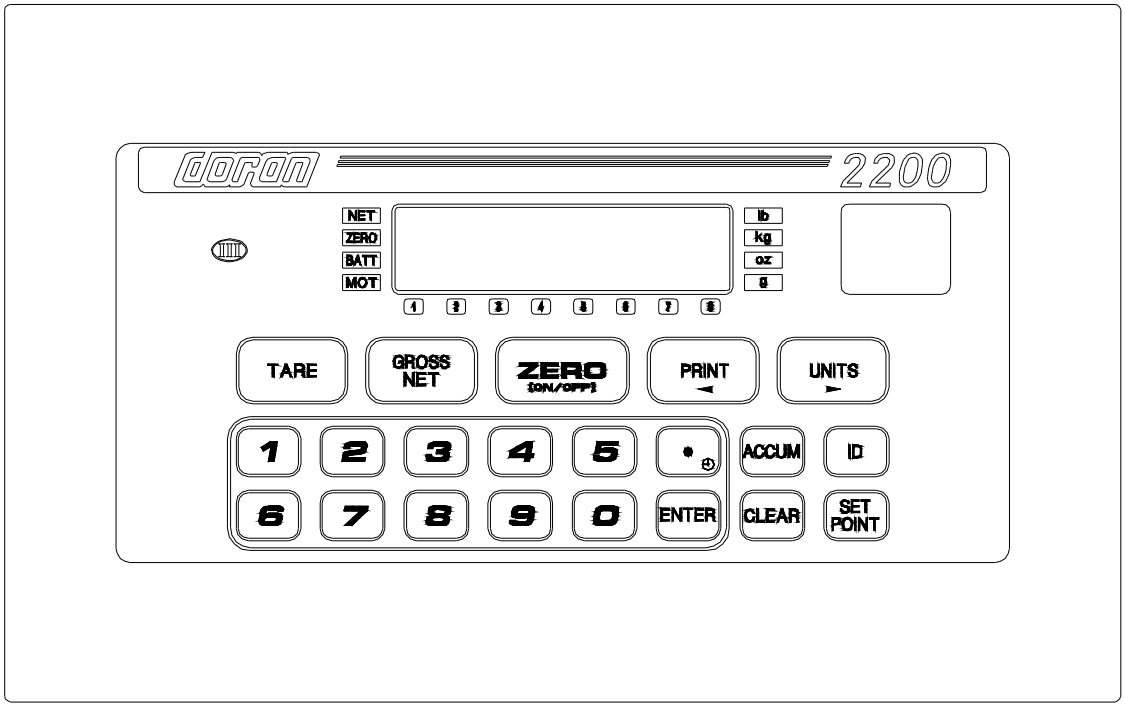


Fig. 1: Model 2200 Front Panel Layout

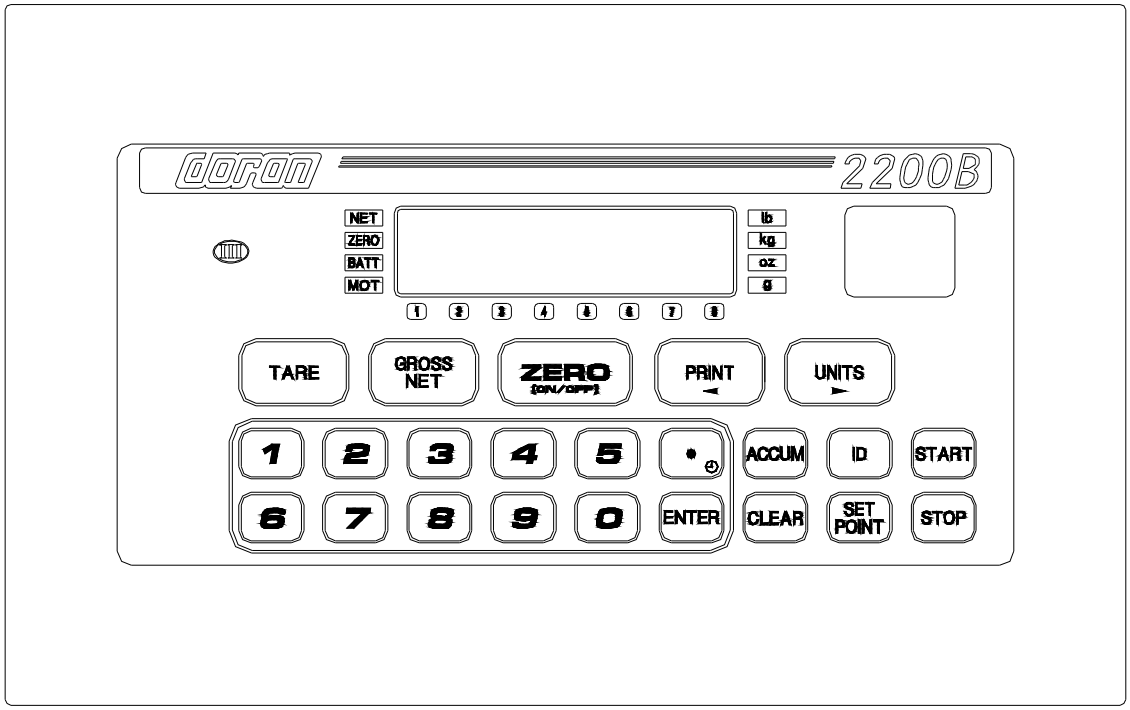


Fig. 2: Model 2200B Front Panel Layout

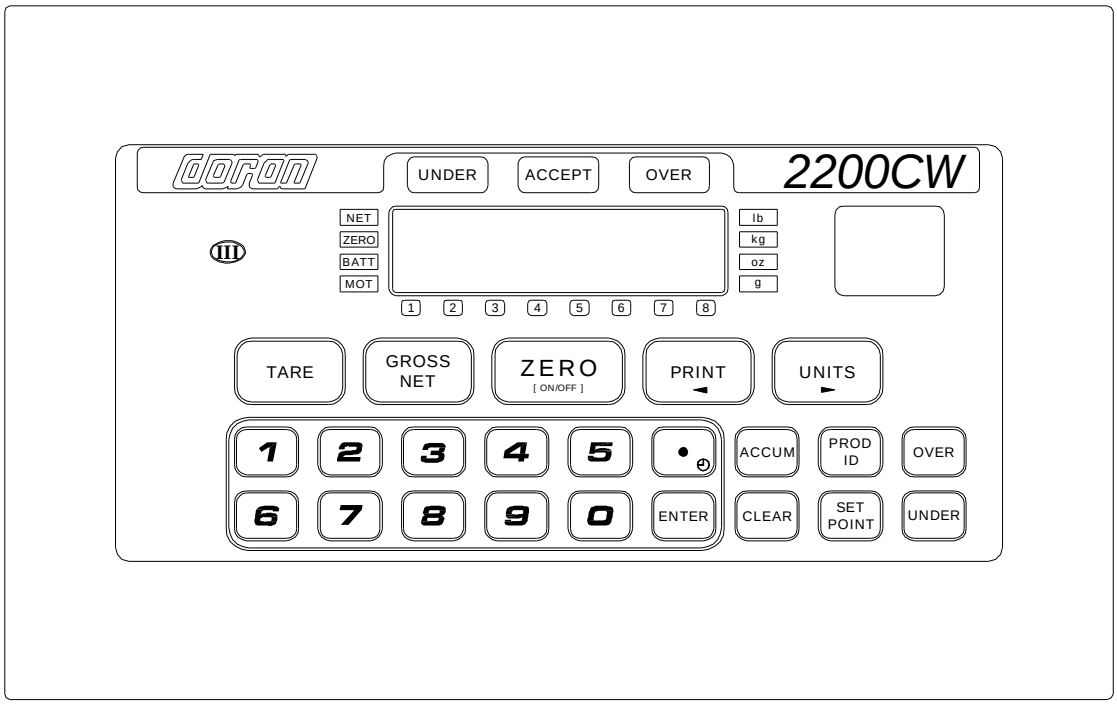


Fig. 3: Model 2200CW Front Panel Layout

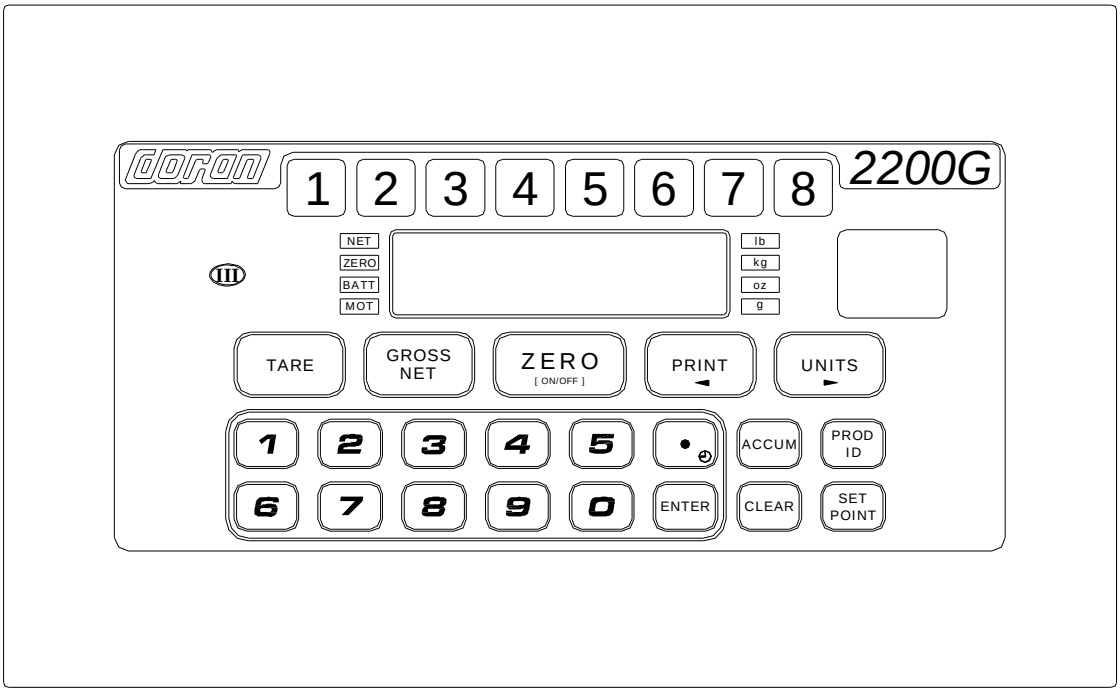
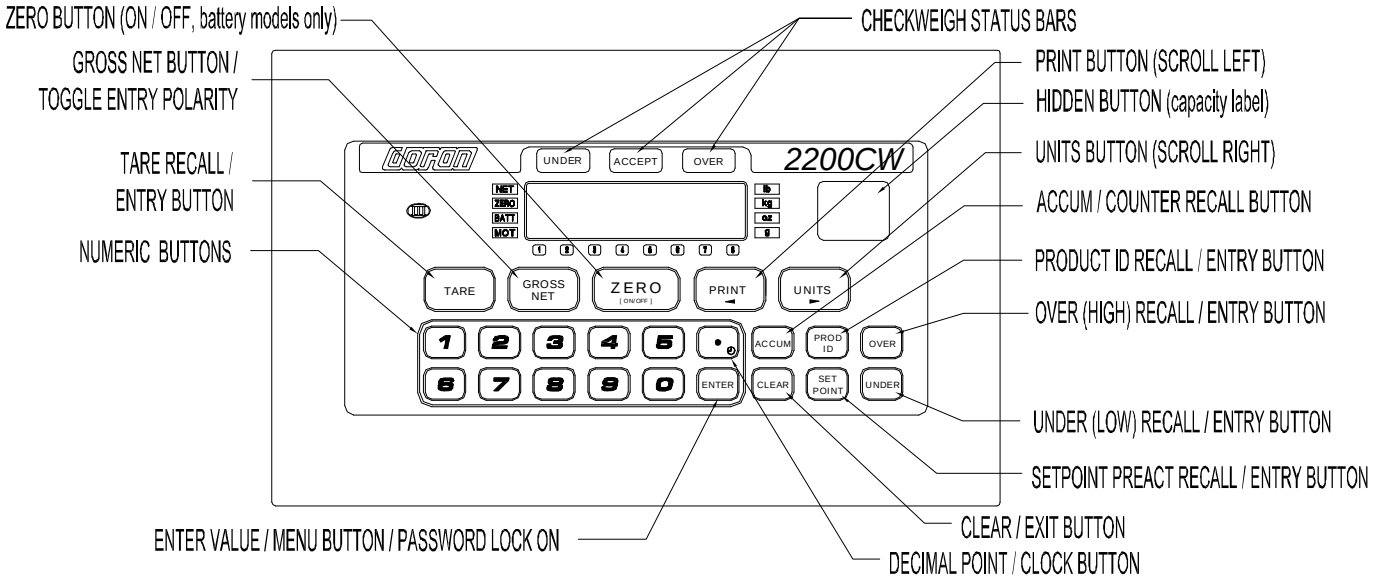


Fig. 4: Model 2200G Front Panel Layout

LED Annunciators

The 2200 series uses a set of sixteen LED annunciators, in addition to the six digit LED weight display, to provide information about the status of the scale.

- Motion is indicated by the MOT annunciator. Motion is an instability in the platform weight. The motion sensitivity can be changed in the parameter setup mode. Some functions like tare, zero and print can only be executed when this annunciator is lit.
- Net mode is indicated by the NET annunciator. When lit, the scale is displaying a net weight. When not lit, the scale is displaying a gross weight.
- Center of zero is indicated by the ZERO annunciator. The ZERO annunciator is lit when the gross weight is within 0.25 divisions of zero gross weight.
- Low battery condition is indicated by the BATT annunciator. Recharge the battery when this annunciator is lit. The scale can charge while in operation.
- Available weight units are displayed by the lb, oz, kg and g annunciators.
- 2200, 2200B, 2200CW only, the 8 red led indicators below main display are used to indicate: setpoint output status during weighing mode or the current setpoint, preact or ID being edited.
- 2200G only, the 8 large yellow led indicators above the main display are used to indicate: setpoint output status during weighing mode or the current setpoint, preact or ID being edited.
- 2200CW only, the OVER, ACCEPT, UNDER indicators above main display are use to indicate checkweight information.



Power Up and Power Down

Connect the indicator to a compatible power source and the indicator will turn on.

For scales with the battery option:

- To turn on the scale, press and release the ZERO button.
- To turn off manually, press and hold the ZERO push button until the display shows "rEL Pb." Then release the ZERO button and the scale will turn off.
- The scale will turn off automatically when the scale is stable for a period of time defined by the Unit On Timer parameter. The default setting is 30 seconds.

Software Part Number and Revision Level

During power up, the scale will display several messages. The first message is a display test with all LED segments on (888888). Next, the scale will show the software part number Su 121 or Su 131 followed by the software revision level rEv 1.5 or higher. When contacting our service department, please have the software part number and the revision level available.

ZERO Displayed Weight

To zero the scale, wait until the scale is stable and press the ZERO button. The scale will not zero if the scale is in motion as indicated by the motion (MOT) annunciator. Center of zero is indicated by the ZERO annunciator, which will be lit when the gross weight is within 0.25 divisions of zero gross weight.

The scale can be zeroed while in the net mode. Press ZERO and the scale will return to the gross mode and will zero out any weight on the scale platform. The stored tare

value will remain in memory.

The indicator is equipped with a Zero on Demand parameter, which saves the ZERO push button command and zeros the scale upon the next stable reading. This option may be activated during the scale setup procedure.

NOTE: On 2200B models configure for Batch Operating mode. The ZERO button is disabled when batch sequence is running.

Push Button Tare

To use Push Button Tare, simply place the tare item on the scale platform and press TARE. The scale will store the tare weight of the item. The net weight is displayed

The TARE weight will remain in memory, even if the indicator is turned off.

NOTE: On 2200B models configure for Batch Operating mode. The push button tare function is disabled when batch sequence is running.

Digital Tare Entry

Enter the tare weight value through the numeric keypad, press TARE to save the tare weight. After the tare weight is stored, the scale will show the net weight.

The tare must be a positive, non-zero weight. If any errors are made while entering the tare weight, press CLEAR and reenter the weight.

The TARE weight will remain in memory, even if the indicator is turned off.

For 2200CW model configure for 250 product memory, the Tare weight is stored with the associated Product ID number.

Tare Recall

To recall the tare weight at any time, press and hold TARE push button for 3 seconds. The display will momentarily show tArE, then flash the tare weight in the currently selected units. To exit this mode press CLEAR.

Clear Stored Tare Value

To clear a tare weight press 0 on the keypad then press TARE. This will remove the tare from memory.

If not cleared, the TARE weight will remain in memory, even if the indicator is turned off.

Barcode Entry of Tare Value

Press and hold TARE push button for 3 seconds to recall tare weight. The display will

momentarily show tArE, then flash the tare weight.

Using Doran's optional barcode scanner, scan the desired barcode. The display will read SAVEd to indicate the scanned tare weight is saved. The display will flash the new tare weight scanned from the barcode. No special serial commands are needed prior to the weight data in barcode value. The barcode value must not exceed the indicator's count by resolution and can not be greater than the capacity. To exit the recall mode, press the TARE button.

Toggle Gross and Net Modes

The GROSS / NET push button is use to switch the display mode between the gross weight and net weight. If a tare value has been entered, then the net value is the gross weight less the tare weight.

The net mode is indicated on the display with the NET annunciator. If a tare is not currently stored, the display remains in gross mode when the GROSS / NET pushbutton is pressed.

NOTE: On 2200B models configure for Batch Operating mode. The GROSS / NET push button is disabled when batch sequence is running.

Toggle Displayed Weight Units

Press the UNITS button to scroll through all available weight units. The corresponding weight units annunciator will be lit.

The UNITS button can be configured to allow the selection of any combination of units listed above, preventing accidental selection of undesired units. See the Units Conversion Setup Parameter for details.

The UNITS button has a parameter located in the Push Button Function Setup, which can disable the UNITS button, and control the startup units selection every time the scale is turned on.

NOTE: On 2200B models configure for Batch Operating mode. The UNITS button is disabled when batch sequence is running.

Data String Output to Printer or Other Device

Wait for the scale to become stable. Press the PRINT button to send data to a printer or other external devices. To confirm data transmission, the left most display digit will momentarily display an r.

The PRINT button transmits data through the standard RS-232 port, as well as the optional RS-485, USB, Ethernet and Wireless Ethernet communication protocols.

The indicator is equipped with a Print on Demand parameter, which saves the PRINT

push button command and transmits data upon the next stable reading. This option may be activated during the scale setup procedure. The indicator also has several automatic print options. See the Data Communication Section for details on Further configuration.

NOTE: On 2200B models configure for Batch Operating mode. The PRINT button is disabled when batch sequence is running.

Recall and Edit Data Output Formats

Press and hold the PRINT button for 3 seconds to access the Data Output Formats for both serial ports. Press UNITS button to toggle between the Data Output Formats for serial Port 1 "For." and serial Port 2 "Fo2.". Use ZERO button to change the output format setting. Press PRINT or ENTER to saved and exit this mode. The display will show SAVEd to indicate changes were made to the Output Format setting.

Password Protected Setpoint, Preact, (Tare and Check Limit 2200CW) Values

All values can be reviewed, but cannot be changed unless the password is deactivated. If the password protection is activated, the display will display pass when the SET POINT, (TARE, UNDER or OVER) values are changed. Enter the password and press ENTER, display show PASS then OFF. Press SET POINT (UNDER or OVER) to change or review weight value or press and hold SET POINT to edit or review preacts.

After entering in the new setpoints or preacts (TARE, UNDER or OVER) Values. Press hold for 2 seconds the ENTER to activate the password protection.

NOTE: If a Password number has been stored. Upon power up, the password protection will be activated.

Display Setpoint Values

Press SET POINT to display the current setpoint values. The last viewed or edited setpoint will be displayed. Press UNITS and PRINT to scroll through the eight available setpoints. The annunciators below the main display indicate the current setpoint. Press SET POINT to exit this mode. The display will read abor t to indicate no changes were made to the setpoint values.

Press ZERO to momentarily display the current parameter settings and output logic for that individual setpoint.

Change Setpoint Values

Press SET POINT to enter the setpoint edit mode. The last viewed or edited setpoint will be displayed. Press UNITS and PRINT to scroll through the eight available setpoints. The annunciators below the main display indicate the current setpoint.

To change the setpoint value, enter the setpoint value using the numeric keypad. Press ENTER to accept the change and return to the weigh mode or press UNITS or PRINT to

save and edit other setpoints. Press SET POINT to exit this mode.

The display will read abor t to indicate no changes were made to the setpoint values or the display will read SaVed to indicate the setpoint value is saved.

NOTE: On 2200B models configure for Batch Operating mode. The SET POINT button is disabled when batch sequence is running.

Barcode Entry of Setpoint Values

Press SET POINT to enter the Setpoint edit mode. The display will momentarily show SEtPt, then flash the current setpoint weight. Press UNITS or PRINT to scroll to the desired setpoint number. The annunciators below the main display indicate which setpoint is currently displayed.

Using Doran's optional barcode scanner, scan the desired barcode. The display will read SAVEd to indicate the scanned setpoint weight is saved. The display will flash the new setpoint weight scanned from the barcode. No special serial commands are needed prior to the weight data in barcode value. The barcode value must not exceed the indicator's count by resolution and can not be greater than the capacity. The barcode value can be read into each of the eight available setpoints. To exit the edit mode press the SET POINT button.

Display Preact Values

Press and hold the SET POINT button for three seconds to display the Preact weight values. The last viewed or edited preact will be displayed. Press UNITS and PRINT to scroll through the eight available setpoints. The annunciators below the main display indicate the current setpoint. Press SET POINT to exit this mode, the display will read abor t to indicate no changes were made to the setpoint values.

Press ZERO to momentarily display the current parameter settings and output logic for that individual preact.

NOTE: On 2200B models configure for Batch Operating mode. The SET POINT button is disabled when batch sequence is running.

Change Preact Values

Press and hold the SET POINT button for three seconds to enter the preact edit mode. The last viewed or edited preact will be displayed. Press UNITS and PRINT to scroll through the eight available preacts. The annunciators below the main display indicate the current preact.

To change the preact value, enter the preact value using the numeric keypad. Press ENTER to accept the change and return to the weigh mode or press UNITS or PRINT to save and edit other preacts. Press SET POINT to exit this mode.

The display will read abort to indicate no changes were made to the preact values or the display will read Saved to indicate the preact value is saved.

Barcode Entry of Preact Values

Press and hold the SET POINT button for three seconds to enter the preact edit mode. The display will momentarily show PrEACt, then flash the current preact weight. Press UNITS and PRINT to scroll through the eight available preacts. The annunciators below the main display indicate the current preact.

Using Doran's optional barcode scanner, scan the desired barcode. The display will read SAVEd to indicate the scanned preact weight is saved. The display will flash the new preact weight scanned from the barcode. No special serial commands are needed prior to the weight data in barcode value. The barcode value must not exceed the indicator's count by resolution and can not be greater than the capacity. The barcode value can be read into each of the eight available preacts. To exit the preact edit mode, press the SET POINT button.

Over, Under and Accept Checkweighing Operation (2200CW)

1. Remove all items from the scale platter.
2. Press ZERO to zero the scale. The weight indication should now be zero.
3. Place an item on scale platter and wait for the motion (MOT) to turn off, indicating a stable weight.
4. If the item is heavier than the over limit, the OVER indicator will light, If the item is lighter than the under limit, the UNDER indicator will light. If the weight is between the limits, the ACCEPT indicator will light.

Five Band Checkweighing Operation (2200CW optional configuration)

1. Remove all items from the scale platter.
2. Press ZERO to zero the scale. The weight display should now be zero.
3. Place an item on scale platter and wait for the motion (MOT) annunciator to turn off, indicating a stable weight.
4. If the item is heavier than the high limit, the OVER indicator will flash. If the item is heavier than the "over" limit but lighter than the "high" limit, the OVER indicator will turn on. If the item is lighter than the low limit, the UNDER indicator will flash. If the item is heavier than the low limit but lighter than the under limit, the UNDER indicator will turn on. If the weight heavier than the under limit but lighter than the over limit, the ACCEPT indicator will light.

NOTE: The Five band checkweighing operating mode ("5BA", "5BS", "5Bt", "5Bb") is available in four different optional configurations in the Check Weighing Operation Mode Menu. See Check Weighing Operation parameter "C.o." for more details.

Display Check Limit Values (2200CW)

Press OVER or UNDER to display the current check limit values. (Or for 5 Band Check weighing operation. Press and hold the OVER for the HIGH limit or UNDER for the LOW limit.) Press UNITS and PRINT to scroll between the available check limits. The top light bars and the main display will indicate which check limit is being displayed (High, over, under, Louu). Press CLEAR to exit this mode. The display will read abort to indicate no changes were made to the check limit values.

Press ZERO to momentarily display the current parameter settings and output logic for that individual check limit.

Change Check Limit Values (2200CW)

Press OVER or UNDER to enter the check limit edit mode. (Or for 5 Band Check weighing operation. Press and hold the OVER for the HIGH limit or UNDER for the LOW limit.) The top light bars and the main display will indicate which check limit is being displayed(High, over, under, Louu).

To change the check limit value, enter the weight value using the numeric keypad. Press ENTER to accept the change and return to the weigh mode or press UNITS or PRINT to save and edit other check limits. Press CLEAR to exit this mode.

The display will read abort to indicate no changes were made to the check limit values or the display will read SaVed to indicate the check limit value is saved.

Barcode Entry of Check Limit Values (2200CW)

Press OVER or UNDER to enter the check limit edit mode. The display will momentarily show over or under, then flash the current limit weight. Press UNITS or PRINT to scroll to the desired check limit. The top light bars and the main display will indicate which check limit is being displayed(High, over, under, Louu). Using Doran's optional barcode scanner, scan the desired barcode. The display will read SAVEd to indicate the scanned weight is saved. The display will flash the new check limit weight scanned from the barcode. No special serial commands are needed prior to the weight data in barcode value. The barcode value must not exceed the indicator's count by resolution and can not be greater than the capacity. The barcode value can be read into each of the available check limits. To exit the edit mode press the ENTER button.

Display Accumulator and Counter Values

Press the ACCUM button to enter the accumulator and counter recall mode. The display will show Accunn followed by the accumulated weight in the units currently selected in the weigh mode. Then Countr will be displayed followed by the counter value.

Press ACCUM to exit the accumulator and counter recall mode without changing their values.

Clear Accumulator and Counter

Press the ACCUM button to enter the accumulator and counter recall mode. The display will show Accunn followed by the accumulated weight in the units currently selected in the weigh mode. Then Countr will be displayed followed by the counter value.

Press CLEAR to clear the accumulator and counter values. The display will show Clr Ac and exit from the recall mode.

Changing the current display units will clear both the accumulator and counter values.

Accumulator and Counter Data String Output to Printer or Other Device

Press ACCUM to enter the accumulator recall mode. Press PRINT to transmit the LB4 custom data string that contains the accumulator and counter values by default. Both the accumulator and counter values are cleared after transmission.

See Output Formats in the parameter section and Custom Data String default settings for more details.

Accumulator and Counter Operation

When a manual or automatic print function is executed, the accumulator has the currently displayed weight added to its' current value and the counter is incremented. To confirm an accumulation and counter operation, the left most display digit will momentarily display an o.

To automatically accumulate, select an auto print function in the parameter setup menu.

To accumulate manually, allow the scale to become stable and press PRINT.

The maximum value that can be shown for the accumulator and counter is 999,999. When the maximum value is reached, the accumulator or counter will rollover to a zero value. The accumulator and counter feature can only be used in a non Legal For Trade application.

For 2200CW model configure for 250 product memory, the Accumulator and Counter values is stored with the associated Product ID number.

Product Size Menu (2200CW)

The 2200CW can be configured for 1 or 250 product operation. Use the Parameter Product Size Menu Prod to toggle between 1 and 250.

Product ID number (2200CW, one product setting)

When the parameter Product Size Menu Prod is configured for one product. There is only one active product field that is used in memory. The Product ID Number becomes a ID value, which is no longer used to recall any stored fields in memory.

Product ID number (2200CW, 250 product setting)

When parameter Prod is set for 250. Up to 250 individual Product ID numbers with their associated fields can be stored in memory.

Product ID Fields (2200CW, 250 product setting)

Product ID Number (6 digits)
Product Description String (20 ascii characters)
Low Limit (6 digits plus decimal point)
Under Limit (6 digits plus decimal point)
Over Limit (6 digits plus decimal point)
High Limit (6 digits plus decimal point)
Tare (6 digits plus decimal point)
Counter (6 digits)
Accumulator (6 digits plus decimal point;
when printed, 8 digits plus decimal point)

Check Way Software (optional)

The Check Way optional software for management of new and existing product ID's. Contact Doran Scales sales department for additional information on this option.

Entering New Product ID number (2200CW, 250 product setting)

Enter a 1 to 6 digit value, then press PROD ID. The display will momentarily show NEUU then Id. Then return to showing weight. All fields (Check Limits, Tare, Accumulator, and Counter) associated with the new Product ID number will be blank.

To enter and save values for all fields associated with the current Product ID, simply enter the values for each field.

NOTE: If the password protection is active, no new Product IDs can be entered. The display will indicate this by momentarily showing a PASS message, then entering in a password entry mode.

Recall Existing Product ID (2200CW, 250 product setting)

Press PROD ID to enter the Product ID recall mode. The display will show Id, followed by the currently active Product ID number. To select another stored ID number, enter the preexisting ID number, then press ENTER. The display will read SaVed to indicate the Check Limits, Tare weight, Product Description String, Accumulator and Counter fields associated with that Product ID number are active.

Another method to select a different Product ID is to press PROD ID, then use the UNITS or PRINT buttons to scroll through the available Product ID numbers. Press ENTER to select the displayed Product ID. The display will read SaVed to indicate the Check Limits, Tare weight, Product Description String, Accumulator and Counter fields associated with that Product ID number are active.

Delete Product ID (2200CW, 250 product setting)

You may wish to remove Product ID's from your 2200CW to prevent accidental use. Deleting a Product ID will make scrolling through the available Product ID's, using UNITS and PRINT a faster process.

Type in the Product ID number to be deleted. Momentarily press PROD ID to recall the Product ID number. The display will show Id, followed by the Product ID number. Press and hold the CLEAR button for more the 2 seconds. The display will show ClrID and then done. All fields associated with that Product ID number will be cleared. The previously used Product ID number will become active.

NOTE: If the password protection is active. Product IDs cannot be deleted. The display will indicate this by momentarily showing a PASS message, then entering in a password entry mode.

Product ID Field Password Protection (2200CW, 250 product setting)

With password protection enabled, the user will be able to recall Product ID's, but not alter any of the associated Product ID fields. The user will also be prohibited from creating or deleting any Product IDs.

To disable password protection, enter the password and press ENTER. The display show PASS then OFF to indicate password protection is off.

NOTE: If a Password number has been stored. Upon power up, the password protection will be activated.

To enable password protection, press hold ENTER for 2 seconds to activate the password protection.

Barcode Entry to recall Product ID Field (2200CW, 250 product setting)

Two ways to recall Product ID Field from the scale's memory. Up to 6 numeric

characters can be read into the 2200CW barcode serial port to request an existing Product ID.

1. Press PROD ID to enter the Product ID recall mode. The display will show Id, followed by the current Product ID number. Use Doran's optional barcode scanner, scan the desired barcode. The display will confirm by showing the barcode value. To exit the ID edit mode press ID.

2. When the scale is in the normal weighing operation. Use the Doran's optional barcode scanner to scan in a barcode value that begins with a numeric character. The barcode value does not require a serial command to recall a saved Product ID field.

Display ID Values (2200 series, one product setting)

Press PROD ID to enter the ID recall mode. The last viewed or edited ID will be displayed. The display will show Id, followed by the current ID's value. Press UNITS and PRINT to scroll through the eight available IDs. The annunciators below the main display indicate the current setpoint. Press ID to exit this mode, the display will read abort to indicate no changes were made to the values.

The ID displayed is the last edited or displayed ID.

Keypad Entry of ID Values (2200 series, one product setting)

Press ID to enter the ID edit mode. The last viewed or edited ID will be displayed. The display will show Id, followed by the current ID's value. Press UNITS or PRINT to scroll to the desired ID. The annunciators below the main display indicate which ID is currently displayed.

Enter up to six digits through the numeric keypad. Press ENTER to accept the change and return to the weigh mode or press UNITS or PRINT to save and edit other IDs. To exit the ID edit mode press ID.

The display will read abort to indicate no changes were made to the preact values or the display will read SaVed to indicate the preact value is saved.

Barcode Entry of ID Values

Two ways to enter ID values into scale. Up to 20 alphanumeric characters can be read into each of the eight available ID's.

3. Press ID to enter the ID edit mode. The last viewed or edited ID will be displayed. The display will show Id, followed by the current ID's value. Press UNITS or PRINT to scroll to the desired ID. The annunciators below the main display indicate which ID is currently displayed.

   Using Doran's optional barcode scanner, scan the desired barcode. The display will

read - - - - - - to represent the barcode value. To exit the ID edit mode press ID.

4. When the scale is in the normal weighing operation. Use the Doran's optional barcode scanner to scan in a bar code value that begins with a numeric character. The bar code value does not require a prefaced command to be saved as a value for ID 1.

Setting Time and Date

Press and hold the decimal point button on the keypad until date is displayed. The current date flashes on the display. To toggle between the current time and date, press the decimal point button. When time is displayed tinne is shown on the display.

To change the date, display the date and enter the date, followed by the time and year. Press UNITS and PRINT to change the current selection. The field that is being edited flashes on the display. Enter a leading zero when entering a single digit year, month or day. Press UNITS until the display reads saved to confirm the date changes are saved.

To change the time, display the current time and enter the time in 24 hour format. Press UNITS and PRINT to change the current selection. The field that is being edited flashes on the display. Enter a leading zero when entering a single digit hour, minute or second. Press UNITS until the display reads saved to confirm the date changes are saved.

NOTE: If the time or date clock funtion has failed. An "ER CLO" error message is momentarily shown after time or date has been entered.

Battery Operation

Indicators with the battery option installed are equipped with an internal rechargeable sealed lead-acid battery and charging circuit. The scale is designed to run continuously for 50 hours (with one 350 ohm load cell) on a fully charged battery. To significantly extend this battery life, be sure the Unit On Timer parameter is enabled, which will power down the scale automatically after a period of non-use. The default setting shuts off the indicator after 30 seconds of non use.

Use of multiple load cells, Fiber Optic, Ethernet, 4-20mA, Wireless Communication, Remote Display, USB, Barcode Scanner, or Relay options will reduce battery life. For multiple load cell applications, battery life is significantly reduced. For example, with a four, 350 Ω load cell configuration, the low battery indication will begin at about 39 hours of continuous use. Load cells with higher input impedance values such as 1000 Ω will display low battery indication after 47 hours.

The charging circuit will fully charge the battery in approximately four to eight hours whether the scale is on or off. To charge the battery, simply plug the line cord into a standard 115V (230V optional) wall outlet. The scale can be used while recharging the battery, in fact, the scale can be used with the AC charger cord plugged in on a continuous basis. **Note:** Indicators installed with multiple load cells, Fiber Optic, Ethernet, 4-20mA, Wireless Communication, Remote Display or Relay options will increase charge time.

If an AC power failure occurs with the charger plugged in, the scale's battery immediately takes over to provide uninterrupted scale operation.

The BATT annunciator indicates that the battery is in need of recharging. The scale will continue to operate accurately for approximately one hour (with one 350 ohm load cell) after the BATT annunciator is lit. When the battery is too low to operate the scale, the scale simply turns off and will not turn on again until the battery is recharged. At this point, when the ZERO (ON/OFF) is pressed, the BATT annunciator will be lit as the scale performs its display test and then the scale will shut down immediately.

The battery should be able to support at least 300 recharges before the end of the battery life is reached. This is an estimate as many factors can affect battery life like, severe temperature changes and charging before the scale displays Low Battery.

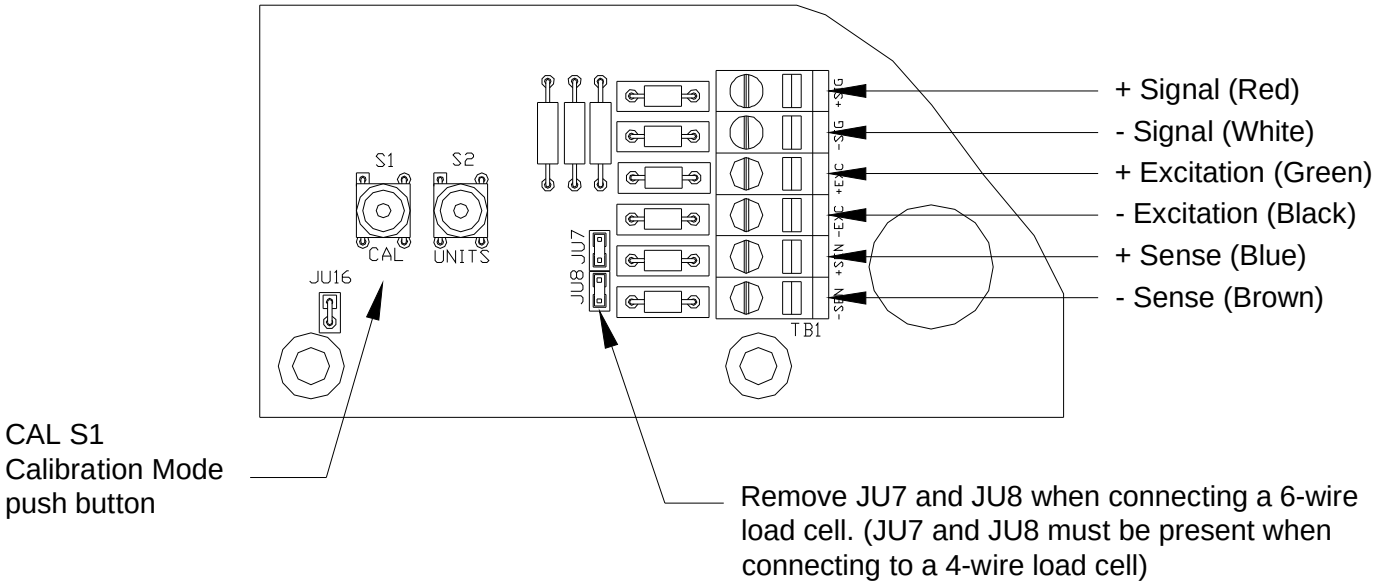


Fig. 6: Load Cell connections

Removing the Rear Panel

Connecting a load cell or configuring jumpers requires the removal of the rear panel. Before you remove the rear panel, remove the AC or battery power supply from the scale. Use a 5/16" nut driver to remove all four screws. Do not loosen any watertights on the back panel that do not require modification.

Replacing the Rear Panel

When replacing the rear panel it is necessary to mount the gasket, all four screws and gasket washers. Tighten all four screws to 20 in-lb to achieve proper sealing. It is normal for the rear panel to dimple slightly when the screws are tightened properly.

Tighten any modified watertight until the cable exiting the watertight can no longer slide through the watertight – this is usually finger tight. With an open-end wrench, apply a quarter turn to the watertight for a tight seal.

Load Cell and Power Connections

Load cell connections are made through terminal block “TB1” located at the bottom center of the main board (see Fig. 6). The power cord connects to terminal block “J1” adjacent to the transformer (see Fig. 7).

These connections are accessible by removing the rear cover. Connect the load cell wires by inserting the tip of a screwdriver into the rectangular hole located on the top of the terminal block TB1. Use the screw drive blade to open the adjacent slot, insert a stripped end of a single load cell wire into the round cage opening. Be sure that the wire insulation is outside of the terminal block cage to ensure a proper connection. Once the wire end has been inserted, remove the screwdriver. The wire will now be captured in terminal slot.

When installing load cell wire connections, be sure to check the JU7 and JU8 jumper configuration. Remove JU7 and JU8 for a six-wire load cell or be sure JU7 and JU8 are in place for a four-wire load cell. Locate the ferrite core kit and follow the included “load cell cable grounding and ferrite assembly” instruction sheet.

RS232 and Remote Switch Connections

The remote switch and serial communications terminal is found on the top of the main board next to the transformer. Remove the rear cover to accesses these connections. Connections are made by inserting each lead of the option cable into P2 terminal block (see Fig. 7).

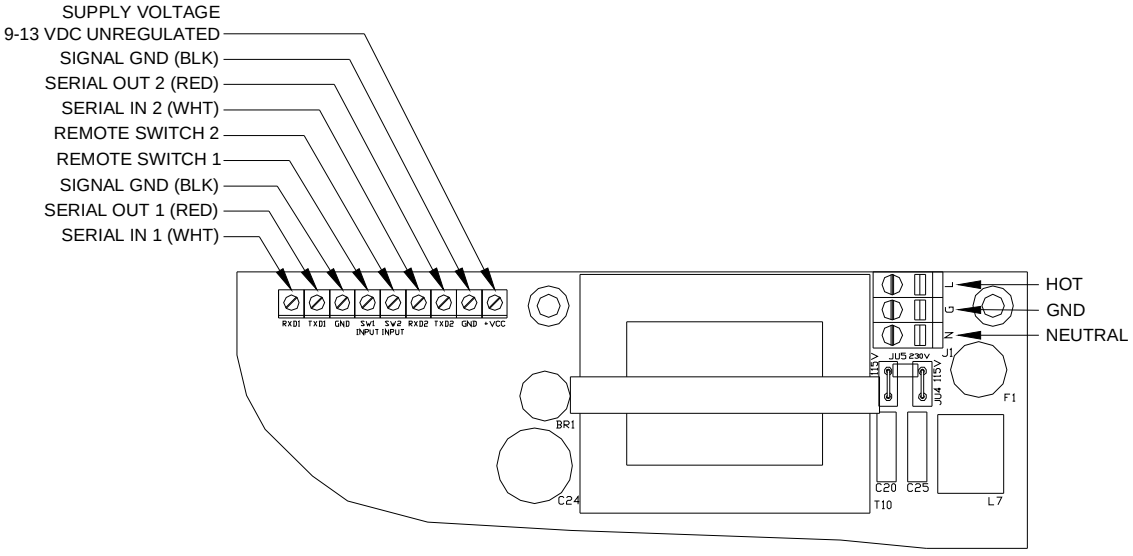


Fig. 7: Serial, Remote Switch and power Connections

Calibration Mode

To calibrate the 2200 series indicators, you must access the setup mode. Any of the three methods below can be utilized.

Power–up Front Panel Setup Mode Access

To enter the calibration mode, power up the indicator while pressing and holding the ZERO and the UNITS buttons. When rEL Pb is displayed, release both buttons. The display will momentarily read Ent Cd, and then go blank. Press the ZERO button five times. The display will indicate the number of times the ZERO button has been pressed. When 5 is displayed, press the UNITS button and wait a few seconds.

Note: If the code is not entered before the timer is finished, the scale will bypass code entry and enter the normal run mode. The front panel access feature during power-up is not available when the Operating Mode (oP) parameter is set to 44S.

Front Panel Setup Mode Access

To enter the calibration mode, press and hold the UNITS and ZERO buttons until the parameter review starts (C and P are displayed). Press the HIDDEN (Capacity Label) button after Cap aj and the capacity is displayed. The display will momentarily read Ent Cd, and then go blank. Press the ZERO button five times. The display will indicate the number of times the ZERO button has been pressed. When 5 is displayed, press the UNITS button and wait a few seconds.

Note: If the code is not entered before the timer is finished, the scale will bypass code entry and enter the normal run mode. The front panel access feature during power-up is not available when the Operating Mode (oP) parameter is set to 44S.

Switch Setup Mode Access

The calibration switch can be accessed by removing the meter's back cover. With the indicator powered on, press the CAL switch (S1), located in the lower left corner of main board (see Fig. 6). Pressing the CAL switch also exits the setup mode and saves any changes.

Warning: do not press CAL switch while powering up scale, this will cause the scale to reset all parameter settings.

Exiting the Setup Mode

To exit the Calibration and Parameter Setup Menu, momentarily press the CAL switch or scroll through the menu options, by pressing the UNITS button, until donE n appears. Press the ZERO button until donE y appears and then press the UNITS button. The indicator will return to the normal weighing mode. If any menu selections were changed, the new values will be saved.

Note: No new setup information is saved until the scale displays SAVEd and returns to the weigh mode. In the event of a power failure while in the setup mode, any changes that have been made will be lost.

Select Scale Capacity

When the setup mode is accessed, the first parameter displayed is the capacity parameter. The capacity parameter toggles the display between CAP Aj and the current capacity. The capacity can be expressed in lb or kg. The units annunciator to the right of the weight display will indicate either lb or kg. The calibration and capacity setup unit is defined by the startup units Units parameter setting.

Enter the capacity through the numeric keypad. If the capacity needs to contain a decimal point, one can be added by pressing the decimal point button to toggle the decimal point on or off to the right of the current digit. If an error is made during entry, press CLEAR to exit without saving changes. Once the desired capacity is displayed, press ENTER.

Once the desired capacity has been selected, place the correct capacity label on the front panel, to the right of the display.

Select Scale Resolution

After the capacity has been entered, the resolution (count-by) will automatically be set for 5000 divisions. To enter in a different resolution, press the UNITS button until the display momentarily shows Cnt by and then displays the current resolution.

The resolution can be a value between 200 and 50,000 divisions of capacity. The units annunciator to the right of the weight display will indicate either lb or kg. Press the ZERO button to increment value through the available range or possible resolutions. Once maximum resolution has been reached, the level will roll over to the minimum value.

Zero and Span Calibration

Press the UNITS button until CAL 0 appears on the display. Remove all weight from the scale platter. To ensure fast and accurate calibration, be sure there are no air currents or vibration present.

Press ZERO and wait for the display to count down to 0. If the calibration zero is accepted, the display will read CAL FS. If the display reads CAL 0, repeat the zero point calibration process.

NOTE: If Er nno appears during the calibration count down, the scale is in motion. All vibrations and air currents must be removed from the scale platform to complete the calibration process.

NOTE: If rg Err appears on the display, the calibration zero is out of range. Press ZERO to clear the error. Refer to the A/D Ranging section for additional information.

To perform the span calibration, place the calibration weight on the platform. Use the numeric keypad to enter in the desired calibration weight and press ENTER. The span point can be calibrated using any weight between 2% and 100% of scale capacity. Wait for the display to count down to 0. If the span calibration is successful, the display will return with donE.

If the display returns to CAL 0, the A/D is auto ranging, and you will need to repeat the zero and span calibration process.

NOTE: If Er dP appears on the display, the calibration span weight value has an incorrect decimal point location.

NOTE: If Er cnt appears on the display, the calibration span weight value has an count by resolution greater than that of the indicator's count by resolution.

NOTE: If Er nEg appears on the display, the calibration span is in a negative range. Check polarity of load cell connection (see Fig. 6) and repeat zero and span calibration.

NOTE: If SPAn E appears on the display, the calibration span is out of range. Press ZERO to clear this error. Refer to the A/D Ranging section for additional information.

WARNING: Calibration at 2% of capacity has been provided as a convenience to customers with high capacity scales in remote or inaccessible locations. Scales calibrated at 2% of capacity may have errors at full capacity than scales calibrated at 25% or 50%. Doran Scales recommends that all scales be calibrated at full capacity whenever possible.

A/D Range Troubleshooting

On scales with factory installed platforms, the zero and span will lie within permissible limits. The allowable load cell signal input range is from 0.283 mV/V to 5 mV/V.

1) Enter the calibration mode.

2) Press PRINT until in the A/D raw counts are displayed.

3) Remove all items from the platform and record the dead load raw counts reading.

4) The dead load raw counts must be between 130,000 and 393,000 counts. If the readings are outside of the limits specified, change the dead load until you meet these requirements.

5) Place full capacity on the platform and record the raw counts. Subtract the dead load counts from the full load counts to calculate the span. Refer to Table 1 and verify that the span falls within the limits specified range. The "Full Load" raw counts (span + dead load) should not exceed 900,000 counts.

6) When using 75%, 50%, 25%, 20% or 10% of full load to calibrate, refer to Table 1 for full load, 75%, 50%, 25%, 20%, 10% span ranges.

Calibration requirements in raw counts		
Platform load	Minimum span	Maximum span
Full	30,000	500,000
75%	22,500	375,000
50%	15,000	250,000
25%	7,500	125,000
20%	6,000	100,000
10%	3,000	50,000

Table 1: Calibration requirements in raw counts

Parameter Setup Mode

The 2200 series provides many parameters that allows you to customize the operation of your 2200 indicator to meet your application's needs. To access these parameters the setup mode must be accessed, which can be entered using any of the three methods below.

Power–up Front Panel Setup Mode Access

To enter the calibration mode, power up the indicator while pressing and holding the ZERO and the UNITS buttons. When rEL Pb is displayed, release both buttons. The display will momentarily read Ent Cd, and then go blank. Press the ZERO button five times. The display will indicate the number of times the ZERO button has been pressed. When 5 is displayed, press the UNITS button and wait a few seconds.

Note: If the code is not entered before the timer is finished, the scale will bypass code entry and enter the normal run mode. The front panel access feature during power-up is not available when the Operating Mode (oP) parameter is set to 44S.

Front Panel Setup Mode Access

To enter the calibration mode, press and hold the UNITS and ZERO buttons until the parameter review starts (C and P are displayed). Press the HIDDEN (Capacity Label) button after Cap aj and the capacity is displayed. The display will momentarily read Ent Cd, and then go blank. Press the ZERO button five times. The display will indicate the number of times the ZERO button has been pressed. When 5 is displayed, press the UNITS button and wait a few seconds.

Note: If the code is not entered before the timer is finished, the scale will bypass code entry and enter the normal run mode. The front panel access feature during power-up is not available when the Operating Mode (oP) parameter is set to 44S.

Switch Setup Mode Access

The calibration switch can be accessed by removing the meter's back cover. With the indicator powered on, press the CAL switch (S1), located in the lower left corner of main board (see Fig. 6). Pressing the CAL switch also exits the setup mode and saves any changes.

Warning: do not press CAL switch while powering up scale, this will cause the scale to reset all parameter settings.

Exiting the Setup Mode

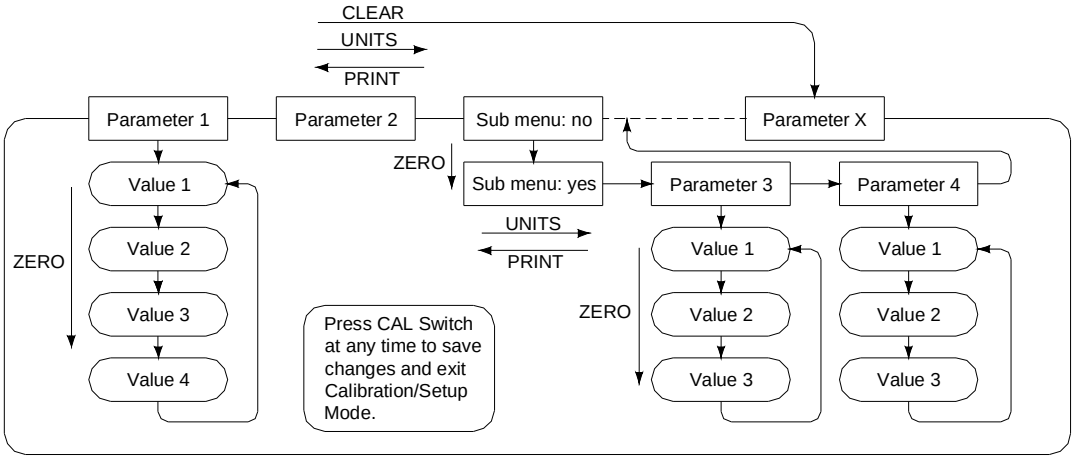
To exit the Calibration and Parameter Setup Menu, momentarily press the CAL switch or scroll through the menu options, by pressing the UNITS button, until donE n appears. Press the ZERO button until donE y appears and then press the UNITS button. The indicator will return to the normal weighing mode. If any menu selections were changed, the new values will be saved.

Note: No new setup information is saved until the scale displays SAVEd and returns to the weigh mode. In the event of a power failure while in the setup mode, any changes that have been made will be lost.

Stepping Through Menu Parameters

Once the Calibration and Parameter Setup Mode has been entered, you may step through the menu by pressing UNITS or PRINT. Press CLEAR button to jump to end of menu section. Some items in the menu contain sub menus, which can be entered by selecting yes by pressing ZERO and then UNITS.

See the Parameter Configuration section on the following pages for details on each setting.



Changing Parameter Settings

After finding the desired parameter, the settings for that parameter may be changed. Press the ZERO button to scroll through the list of settings for that item. The list of choices will repeat after you have scrolled through all available settings for that parameter. When you have found the desired setting, press UNITS or PRINT to go to the next or previous menu item. Press the CLEAR button to jump to the end of parameter menu.

Parameter Review of Calibration and Setup Values

The parameter settings for the indicator may be quickly reviewed without entering the setup mode. With the indicator powered up, press and hold UNITS and ZERO until the indicator begins to scroll through each of the parameters. After all parameters are displayed, the indicator will then enter the weighing mode automatically.

Legal for Trade Restrictions

When the Legal for Trade mode is enabled, it automatically disables some parameter options. This is done to comply with NTEP and CWM requirements. Parameters that are not available when in the Legal for Trade mode are marked by an asterisk.

Calibration and Audit Counters

When entering calibration mode, the parameter audit counter and the calibration audit counter will momentarily be displayed. The parameter audit counter only increments when CAP, Cnt by, A2t, nn.A., SU0, oP values are changed. The calibration audit counter increments when a successful zero calibration and span calibration are performed.

Note: when scale is in Legal For Trade Switch mode (oP = 44S), the audit counters will not be displayed.

Resetting the scale parameters:

If at some point the 2200 Series user wishes to return all parameters to factory default settings, follow these steps.

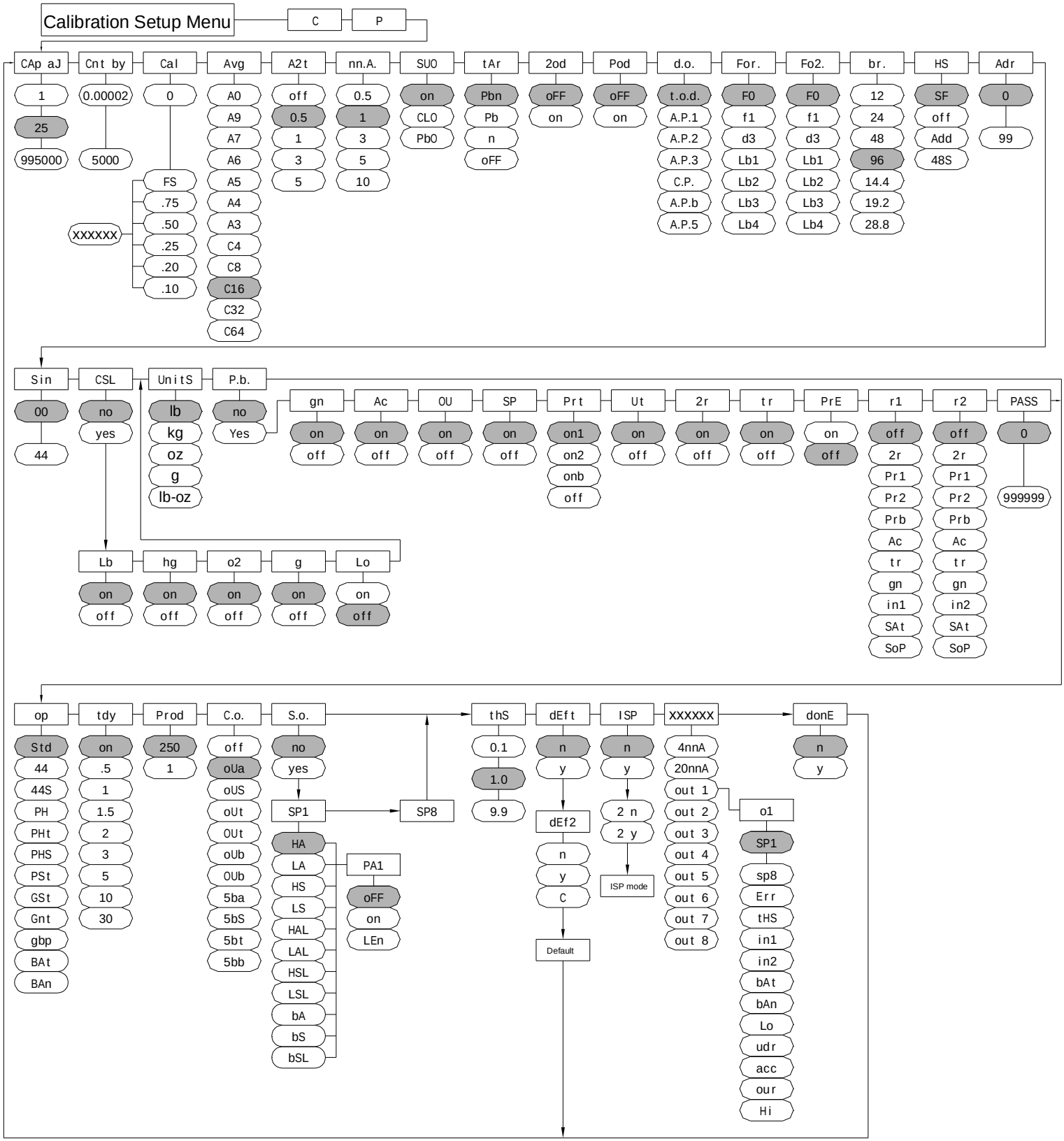
- Enter the Setup mode and press the UNITS button to scroll to menu item "dEFt n".
- Press the ZERO button to select "dEFt y". Press the UNITS button and the display will show "dEF2 n".
- Press the ZERO button to select "dEF2 y" to default all parameter and calibration settings, except for zero & span calibration levels. OR
- Press the ZERO button twice to select "dEF2 C" to default all parameter and calibration settings, including zero & span calibration levels.

WARNING: Using "dEF2 C" selection to default the scale will require a complete recalibration.

- Press the UNITS button to default the scale.
- The scale will then display "InIt" or "InIt C" and "SAVEd". After the "SAVEd" message is displayed the scale will then perform its normal power up routine and enter the Setup mode. All parameters have been reset to their factory default settings.
- If necessary, calibrate the indicator. Refer to Calibration Mode Section for calibration instruction. Or exit the Setup mode to return to the weighing mode.

Note: A second method to default parameter settings only is by holding the CAL push button while powering up scale. The indicator will display "rEL Pb" until the CAL button is released, then show "InIt" and "SAVEd".

Parameter Configuration



Capacity Setup Menu

CAP Aj	**Capacity Adjustment Menu** **Allows the selection of scale capacity.**
1 - 999000	**1 lb / kg to 999,000 lb / kg**

NOTE: Capacities ≥ 60,000 lb, oz units are disabled.
Capacities ≥ 2000 lb, grams units are disabled
Capacities ≥ 1000 lb, lb-oz units are disabled

Count By Setup Menu

Cnt By	**Resolution Setup Menu (Count By)** **Allows the selection of scale division size.**
0.00002 5000	**0.00002 lb / kg to 5000 lb / kg** Selection with be limited by capacity.

Calibration Menu

CAL 0	**Zero Point Calibration**
	See Calibration Mode section for calibration instructions

CAL	**Span Point Calibration** (Appears only after a successful Zero Calibration)
XXXXXX	Use the numeric buttons to enter in weight value.
FS	**Full load calibration.**
.75	3/4 capacity calibration.
.50	Half capacity calibration.
.25	Quarter capacity calibration.
.20	1/5th of capacity calibration.
.10	1/10th of capacity calibration.

Digital Filter Setup Menu

AvG	**Averaging mode Determines the number of samples to average**
A0	Stabil-izer© auto averaging. All readings are averaged. Display updates 10 times a second.
A9	Stabil-izer© auto averaging. All readings are averaged. Display updates 9 times a second.
A7	Stabil-izer© auto averaging. All readings are averaged. Display updates 7 times a second.
A6	Stabil-izer© auto averaging. All readings are averaged. Display updates 6 times a second.
A5	Stabil-izer© auto averaging. All readings are averaged. Display updates 5 times a second.
A4	Stabil-izer© auto averaging. All readings are averaged. Display updates 4 times a second.
A3	Stabil-izer© auto averaging. All readings are averaged. Display updates 3 times a second.
C2	Circular auto averaging, 2 readings are averaged. Display updates 20 times a second.
C4	Circular auto averaging, 4 readings are averaged. Display updates 10 times a second.
C8	Circular auto averaging, 8 readings are averaged. Display updates 5 times a second.
C16	**Circular auto averaging, 16 readings are averaged. Display updates 3 times a second.**
C32	Circular auto averaging, 32 readings are averaged. Display updates 1½ times a second.
C64	Circular auto averaging, 64 readings are averaged. Display updates 1 time every 1.4 seconds.

NOTE: The circular auto averaging filter, when in motion, 4 readings are averaged.

Automatic Zero Tracking Setup Menu

AZt	**Automatic Zero Tracking Range Small weights within the specified number of divisions are automatically zeroed.**
oFF	Zero tracking is off. No automatic zeroing.
0.5	**Zero tracking to within 0.5 division.**
1*	Zero tracking to within 1.0 division.
2*	Zero tracking to within 2.0 division.
3*	Zero tracking to within 3.0 divisions.
5*	Zero tracking to within 5.0 divisions.
10*	Zero tracking to within 10.0 divisions.

*** NOTE**: The Legal for Trade mode disables some parameters and selections. These items are marked with an asterisk.

Motion Aperture Setup Menu

nn.A.*	**Motion aperture *** **Determines how many divisions consecutive readings must change before the scale is considered in motion.**
0.5	0.5 division change must be seen to enter motion.
1	**1 division change must be seen to enter motion.**
2	2 division change must be seen to enter motion.
3	3 division change must be seen to enter motion.
5	5 division change must be seen to enter motion.
10	10 division change must be seen to enter motion.

Start Up Zero Setup Menu

SU0*	**Start Up Zero** **Controls the start up zero function.**
on	**Zeros on the first stable reading on power up.**
CL0	Loads the calibration zero for zero reference
PB0*	Loads the last pushbutton zero. (Disabled in LFT mode)

Tare Entry Menu

tAr	**Tare Entry** **Controls the tare entry mode.**
Pbn	**Push button & digital tare entry.**
pb	Push button tare entry only.
n	Digital tare entry.
off	Tare entry is disabled.

Latching Zero Request Setup Menu

2od	**Zero on Demand** **Enables or disable zero latching.**
on	If ZERO is pressed, it is saved until the scale becomes stable.
oFF	**If the scale is in motion, the zero request is discarded.**

Latching Print Request Setup Menu

Pod	**Print on Demand** **Enables or disables print latching.**
on	If PRINT is pressed, the print request is saved until the scale becomes stable.
oFF	**If the scale is in motion, the print request is discarded.**

Printer Data Output Setup Menu

d.o.	**Data Output Mode** **Determines when serial data will be sent out of serial port 1.**
t.o.d.	**Transmit on demand. The current stable weight is transmitted whenever the PRINT button is pressed, a remote PRINT button is pressed, or a print request is received via communications options.**
A.P.1	Auto Print 1 transmits the first weight reading after the scale becomes stable.
A.P.2	Auto Print 2 transmits the first stable weight reading that is above the threshold level. Once a weight has been transmitted, no further weights will be transmitted until the scale returns to a weight below the threshold level. The default setting for the threshold level is 1% of scale capacity. To adjust the threshold level, see the Threshold Level parameter.
A.P.3	Auto Print 3 transmits the first stable weight reading above the threshold value, while setpoint 6 is active. Once a weight has been transmitted, no further weights will be transmitted until the scale returns to a weight below the threshold level. The default setting for the threshold level is 1% of scale capacity. To adjust the threshold level, see the Threshold Level parameter.
C.P.	In continuous print, data is transmitted each time the scale updates the weight display. Display updates that occur while the scale is in motion are identified by the abbreviation "MOT" following the weight data. The Digital Filter Setup parameter controls the number of data transmissions per second. Note: This option is disabled in RS485 mode.
A.P.b	Auto Print Barcode transmits the first stable scale reading following reception of a string from a barcode scanner. The barcode must begin with a numeric, ascii digit at serial Port 2.
A.P.5	Auto Print 5 transmits the last stable weight that is above the threshold value. On returning to a level below threshold value. Once the weight has been transmitted, no further weights will be transmitted until the scale returns to a stable weight above the threshold level then below the threshold value. The default setting for the threshold level is 1% of scale capacity. To adjust the threshold level, see the Threshold Level parameter.

Output Formats, Port 1

For.	**Data Output Format of Serial Port 1 Defines the serial data transmitted. (see Data output format)**
F0	**Basic output format (8,n,1)**
F1	Enhanced output includes grade status.
d3	Live Scale (Virtual) Display format (set d.o. to C.P.)
nnb	Modbus output format
Lb1	Select Custom Data String 1 (user defined print string)
Lb2	Select Custom Data String 2 (user defined print string)
Lb3	Select Custom Data String 3 (user defined print string)
Lb4	Select Custom Data String 4 (user defined print string) (Used for Accumulator / Counter Print Command)

Output Formats, Port 2

Fo2.	**Data Output Format of Serial Port 2 Defines the serial data transmitted. (see Data output format)**
F0	**Basic output format (8,n,1)**
F1	Enhanced output includes setpoint (grade) status.
Lb1	Select Custom Data String 1 (user defined print string)
Lb2	Select Custom Data String 2 (user defined print string)
Lb3	Select Custom Data String 3 (user defined print string)
Lb4	Select Custom Data String 4 (user defined print string) (Used for Accumulator / Counter Print Command)

Baud Rate Setup Menu

br.	**Baud Rate Setup, Serial Port 1 Determines baud rate for serial data.**
96	**9600 baud (bits per second)**
14.4	14,400 baud (bits per second)
19.2	19,200 baud (bits per second)
28.8	28,800 baud (bits per second)

NOTE: The Serial Port 2 baud rate is fixed at 9600 baud.

Handshaking Setup Menu

HS	**Serial Data Output Handshaking (Port 1 only) Selects the type of serial data handshaking used. (See the Data Communication section for details)**
SF	**Software handshaking. The software handshaking option activates Bi-directional RS232 communications. Refer to the communications section for details.**
oFF	Disables all RXD communications.
Add	Turns on Address mode. (All remote serial commands require a 00-99 address prefix.)
485	Turns on RS485 mode, print buffer & Address mode (Disabled when Data Output is set for Continuous Print) (See RS485 Communications for details.)

Scale Address (Scale ID number)

Adr	**Selects scale (bus) address code at Port 1. In order for the scale to respond at Port 1, RXD1. A two digit ASCII number is added as a prefix to any remote serial input commands. Note: Serial Data Output Handshaking Parameter "HS" must be set to "Add" or "485" setting to activate the address code feature. (See RS485 Communications for additional details)**
0-99	Type in a numeric digit or press zero pb to scroll address from 0 through to 99.

Serial Input Data Strip Prefix and Postfix for Barcode Scanner (Port 2)

Sin	**Strip characters from a barcode serial input on Port 2. (See Communications Section for details)**
00-44	The two digits shown represent the leading and tailing characters that will be stripped from a barcode scanner string. Up to four characters can be stripped from the leading and trialing characters. The left digit represents the number of characters to be stripped from the beginning of the barcode string. The right digit represents the number of trailing characters that will be stripped. The digit value to be changed will flash. Press ZERO to scroll the current digit value from 0 to 4. Press UNITS to select the other digit. Press UNITS to exit this parameter menu.

Units Conversion Setup Menu

CSL	**Convert Select Modes Determines which units selections will be active.**	
no	**Do not enter Convert selection menu.**	
yes	Enter Convert selection menu.	
	lb	**pounds menu**
	on	**lb is active**
	off	lb is non active
	hg	**kilograms menu**
	on	**kg is active**
	off	kg is non active
	o2	**ounces menu**
	on	**oz is active**
	off	oz is non active
	gr	**grams menu**
	on	**g is active**
	off	g is non active
	Lo*	**pound-ounces menu (Disabled in LFT mode)**
	off*	**lb-oz is non active**
	on*	lb-oz is active

Start Up Units Selection Menu

UnitS	**Start Up Units Select Mode Configures selection of start up units.**
lb	Press ZERO to scroll through the units activated in the Units parameter. The selected units will be displayed on the units indicators to the right of the display.

NOTE: If an invalid start up unit is selected for a given capacity, the scale will automatically change the unit setting to the next a valid unit.

Push-button Function Setup Menu

P.b.	Configures push button and remote push buttons.	
no	**Do not enter push button selection menu.**	
yes	Enter push button selection menu.	
	gn	**GROSS NET push button menu**
		on **pb is active**
		off pb is non active
	Ac	**ACCUM push button menu**
		on **pb is active**
		off pb is non active (disables accumulator)
	OU	**OVER & UNDER push button menu (2200CW)**
		on **pb is active**
		off pb is non active
	SP	**SETPOINT push button menu**
		on **pb is active**
		off pb is non active
	Prt	**PRINT push button menu**
		on1 **pb is active on port 1**
		on2 pb is active on port 2
		onb pb is active on port 1 & port 2
		off pb is non active
	Ut	**UNITS push button menu**
		on **pb is active**
		off pb is non active
	2r	**ZERO push button menu**
		on **pb is active**
		off pb is non active
	tr	**TARE push button menu**
		on **pb is active**
		off pb is non active
	PrE	**PREACT push button menu**
		off **pb is non active**
		on pb is active
	r1, r2	**REMOTE SWITCH 1 and 2 push buttons**
		off **Remote pb is non active**
		2r Remote pb = ZERO pb
		Ut Remote pb = UNITS pb
		Pr1 Remote pb = PRINT pb on port 1
		Pr2 Remote pb = PRINT pb on port 2
		Prb Remote pb = PRINT pb on ports 1 & 2
		Ac Remote pb = ACCUM pb
		tr Remote pb = TARE pb
		gn Remote pb = GROSS NET pb
		in1 Remote pb = Input logic 1 (momentary)
		SAt Remote pb = START (2200B only)

		SoP	Remote pb = STOP (2200B only)
	PASS CD	**Pass Code Entry**	
		000000	**Enter a non-zero number to enable the password feature.**

Operating Mode Setup Menu

oP *	**Operating mode Activates the Legal for Trade mode.**
Std	**Standard operation (Audit Trail)**
44	Legal for Trade, Handbook 44 (NIST) (Audit Trail, Audit counters shown)
44S	Legal for Trade Switch mode, Handbook 44 (NIST) and Measurement Canada compliant. (Front Panel Cal Access feature disabled, Cal Switch entry only, Audit counters hidden)
PH	Peak and hold stable or non stable weight.
PHt	Peak and hold for 2 seconds, stable or non stable weight.
PHs	Peak and hold only stable weight.
PSt	Peak and hold for 2 seconds, only stable weight.
GSt	Grade and show weight. The positive or negative weight differences between two stable weights is momentarily shown for 2 seconds. Note: Press Capacity Label button to toggle between Grading and one weighing unit as defined by the startup unit parameter.
Gnt	Grade and show grade number. The grade number (i.e. "000000" to "888888") that was activated from the positive or negative weight differences between two stable weights is momentarily shown for 2 seconds. Note: Press Capacity Label to toggle between Grading and one weighing unit as defined by the startup unit parameter.
GbP	Grade lights only, weight display is blank. Grade is determine by a positive stable weight above the threshold level. Note: Press Capacity Label button to toggle between Grading and one weighing unit as defined by the startup unit parameter.
BAt	Batching Sequence Enabled, no line number displayed. (2200B only)
BAn	Batching Sequence Enabled, line number displayed. (2200B only)

Unit On Timer (Battery option only)

tdy	**Selects the time value that the unit will remain on while the scale is not in use.**
on	Unit will remain on, On timer is off
0.5	**30 second On timer**
1	1 minute On timer
1.5	1.5 minutes On timer
2	2 minutes On timer
3	3 minutes On timer
5	5 minutes On timer
10	10 minutes On timer
30	30 minutes On timer

Product Size Menu (2200CW)

Prod	**Selects between 1 or 250 product memory.**
250	**Up to 250 products are stored under Product ID number in memory.**
1	Limits indicator to one product stored in memory.

Checkweighing Operation Menu (2200CW)

C.o.	**Check Weighing Operation** **Configures the check weighing operating mode.**
off	Check weighing off
oUA	**Over, Accept and Under 3 band check weighing.** **Output Active: All time**
oUS	Over, Accept and Under 3 band check weighing. Output Active: only stable weights (Note: Setpoints 1-3 Output Active: All time)
oUt	Over, Accept and Under 3 band check weighing. Output Active: only weights above Threshold level. (Note: Setpoints 1-3 Output Active: All time)
OUt	Over (Latching), Accept and Under 3 band check weighing. Output Active: only weights above Threshold level. Over output will latch until weight is below the threshold level. (Note: Setpoints 1-3 Output Active: All time)
oUb	Over, Accept and Under 3 band check weighing. Output Active: only stable weights above Threshold level. (Note: Setpoints 1-3 Output Active: All time)
OUb	Over (Latching), Accept and Under 3 band check weighing. Output Active: only stable weights above Threshold level. Over output will latch until weight is below the threshold level. (Note: Setpoints 1-3 Output Active: All time)
5bA	High, Over, Accept, Under & Low 5 band check weighing. Output Active: All time (Note: Setpoints 1-3 Output Active: All time)
5bS	High, Over, Accept, Under & Low 5 band check weighing. Output Active: only stable weights (Note: Setpoints 1-3 Output Active: All time)
5bt	High, Over, Accept, Under & Low 5 band check weighing. Output Active: only weights above Threshold level. (Note: Setpoints 1-3 Output Active: All time)
5bb	High, Over, Accept, Under & Low 5 band check weighing. Output Active: only stable weights above Threshold level. (Note: Setpoints 1-3 Output Active: All time)

Setpoint and Preact Operation Menu

S.o.	**Setpoint Operation Menu** **Configures each of the individual Setpoint operating mode.**
no	**Do not enter Setpoint Operation menu.**
yes	Enter to selected and adjust individual setpoint operational mode.

SP1	**Setpoint 1 mode menu**					
	off	**Setpoint off**				
	HAM	Active High (wt $\geq$ setpt$_x$)				
	LAM	Active Low (wt $\leq$ setpt$_x$)				
	HSM	Active High (wt $\geq$ setpt$_x$): only stable weights.				
	LSM	Active Low (wt $\leq$ setpt$_x$): only stable weights.				
	HAL	Active High (wt $\geq$ setpt$_x$): Latching to Threshold Level.				
	LAL	Output Active Low (wt $\leq$ setpt$_x$): Latching to Threshold Level.				
	HSL	Output Active High (wt $\geq$ setpt$_x$): Latching to Threshold Level and stable weight.				
	LSI	Output Active Low (wt $\leq$ setpt$_x$): Latching to Threshold Level and stable weight.				
	BaM	Band, Active High, only one setpoint activates at a time. (wt $\geq$ setpt$_x$ & wt < setpt$_{x+1}$) (not available on SP8)				
	BSM	Band, Active High, only one setpoint activates at a time. (wt $\geq$ setpt$_x$ & wt < setpt$_{x+1}$): only stable weights. (not available on SP8)				
	BSL	Band, Active High, only one setpoint activates at a time. (wt $\geq$ setpt$_x$ & wt < setpt$_{x+1}$): Latching to Threshold Level and stable weight. (not available on SP8)				
		PA1	**Preact 1 mode menu (Press GROSS NET to enter)**			
			oFF	**Preact off**		
			on	Preact on		
			LEn	Learning Preact mode (2200B, Batch Sequence Command running) **(Press GROSS NET to enter Learn Preact percent menu)**		
				50	Learning Preact 50% step size	
				25	Learning Preact 25% step size	
				12.5	Learning Preact 12.5% step size	
				6.25	Learning Preact 6.25% step size	
				3.12	Learning Preact 3.12% step size	
				1.56	Learning Preact 1.56% step size	
SP2	**Setpoint 2 mode menu**					
	off	**Setpoint off**				
SP3	**Setpoint 3 mode menu**					
	off	**Setpoint off**				
SP4	**Setpoint 4 mode menu**					
	off	**Setpoint off**				
SP5	**Setpoint 5 entry menu**					
	off	**Setpoint off**				
SP6	**Setpoint 6 entry menu**					
	off	**Setpoint off**				

SP7	**Setpoint 7 entry menu**	
	off	**Setpoint off**
SP8	**Setpoint 8 entry menu**	
	off	**Setpoint off**

Threshold Level Menu

tHs	**Threshold Level Entry** **Selects a percent threshold of Capacity when AP2 and latching setpoint operation is active.**
0.1 - 9.9	±0.1% to ±9.9% of capacity. **Default setting is 1%**

Default all Scale Parameter settings

dEFt	**Default Calibration and Parameter settings.**	
n	**Do not default settings.**	
y	1st yes answer, Default all Calibration and Parameter settings.	
	dEF2	**Default Calibration and Parameter settings.**
	n	**Do not default settings.**
	y	Verify 2nd yes answer, Default all Parameter settings.
	C	Verify 2nd yes answer, Default all Calibration and Parameter settings.

ISP Mode

ISP	**In System Programming Mode. (Factory use only)**	
n	**Do not enter ISP mode.**	
y	1st yes answer, to entering in ISP mode	
	ISP2	**In System Programming Mode.**
	n	**Do not enter ISP mode**
	y	Verify 2nd yes answer, Scale enters ISP mode.

Test Mode Menu

XXXXXX	**Displays the raw counts from Analog to Digital converter. Press the Zero button to enter Test mode menu**	
4nnA	Set 4-20mA output to 4mA. Press ZERO to change the output level.	
	4A XX	Press the ZERO and PRINT pushbuttons to adjust 4mA level and UNITS pushbutton to exit. (default value = 97)
20nnA	Set 4-20mA output to 20mA. Press ZERO to change the output level.	
	20A XX	Press ZERO and PRINT pushbutton to adjust 20mA level and UNITS pushbutton to exit. (default value = 3C)
out1	Activate Output 1 at TB4 terminal. Press ZERO to select the type of logic options for Output 1. Use UNITS to scroll to the next Output parameter.	
	o1 oFf	No output logic, Output 1 is turned off.
	o1 SP1	**Setpoint 1 used for output logic. (default)**
	o1 SP2	Setpoint 2 used for output logic.

	o1 SP3	Setpoint 3 used for output logic.
	o1 SP4	Setpoint 4 used for output logic.
	o1 SP5	Setpoint 5 used for output logic.
	o1 SP6	Setpoint 6 used for output logic.
	o1 SP7	Setpoint 7 used for output logic.
	o1 SP8	Setpoint 8 used for output logic.
	o1 Er	Scale Error Message used for output logic.
	o1 THr	Weight below threshold level used for output logic.
	o1 in1	Remote Switch Input Logic 1 used for output logic.
	o1 in2	Remote Switch Input Logic 2 used for output logic.
	o1 bAt	Output controlled by Batching operation. (Model 2200B)
	o1 Lo	Low used for output logic. (Model 2200CW)
	o1 udr	Under used for output logic. (Model 2200CW)
	o1 Acc	Accept used for output logic. (Model 2200CW)
	o1 our	Over used for output logic. (Model 2200CW)
	o1 Hi	High used for output logic. (Model 2200CW)
out 2	Activate Output 2 at TB4. Press Zero pb to select output logic.	
	o1 SP2	**Setpoint 2 used for output logic. (default)**
out 3	Activate Output 3 at TB4. Press Zero pb to select output logic.	
	o1 SP3	**Setpoint 3 used for output logic. (default)**
out 4	Activate Output 4 at TB4. Press Zero pb to select output logic.	
	o1 SP4	**Setpoint 4 used for output logic. (2200, 2200B default)**
	o1 Lo	**Low used for output logic. (2200CW default)**
out 5	Activate Output 5 at TB4. Press Zero pb to select output logic.	
	o1 SP5	**Setpoint 5 used for output logic. (2200, 2200B default)**
	o1 udr	**Under used for output logic. (2200CW default)**
out 6	Activate Output 6 at TB4. Press Zero pb to select output logic.	
	o1 SP6	**Setpoint 6 used for output logic. (2200, 2200B default)**
	o1 Acc	**Accept used for output logic. (2200CW default)**
out 7	Activate Output 7 at TB4. Press Zero pb to select output logic.	
	o1 SP7	**Setpoint 7 used for output logic. (2200, 2200B default)**
	o1 our	**Over used for output logic. (2200CW default)**
out 8	Activate Output 8 at TB4. Press Zero pb to select output logic.	
	o1 SP8	**Setpoint 8 used for output logic. (2200, 2200B default)**
	o1 Hi	**High used for output logic. (2200CW default)**

Calibration and Parameter Menu Exit

donE	**Exit Calibration and Parameter Menu.**
n	**Do not exit menu roll over to the start of the parameter list.**
y	Exit Calibration and Parameter menu. Save all parameter changes. The scale will return to normal weighing when UNITS is pressed.

Batch Commands (2200B)

Command Instruction	Batching command list (2200B model only) Specifies command to be executed at each step up to 100 steps. See Batch Command Explained for a detailed explanation of each command.
NOP	Causes no operation, execution simply passes to the next instruction in the list (useful for allowing insertion of a command in the future).
SET ALL OUTPUTS	All Outputs 1 to 8 are active. NOTE: All the output logic parameters "o1" through "o8" must be set to batch "BAT".
SET OUTPUT 1-8	Output 1 - 8 becomes active. NOTE: The output logic parameter "o1" to "o8" must be set to batch "BAT".
CLR ALL OUTPUTS	All Outputs 1 to 8 are non-active. NOTE: All the output logic parameters "o1" through "o8" must be set to batch "BAT".
CLR OUTPUT 0-8	Output 1- 8 becomes non-active. NOTE: The output logic parameter "o1" to "o8" must be set to batch "BAT".
WAIT 00-99	Causes the batch sequence to wait for a specified amount of time. 00 command waits until START pb to be pressed, 01-99 waits in seconds.
PUSH BUTTON TARE	Causes a push-button TARE, only if the indicator is stable. An "TArE" message will be displayed if tare operation was successful. Press START button to bypass this command.
PUSH BUTTON ZERO	Causes a push-button ZERO, only if the indicator is stable. An "2ERo" message will be displayed, if zero operation was successful. Press START button to bypass this command.
PRINT TO PORT1	Send a print string to Port 1, only if the indicator is stable. Displayed weight is added to Accumulator and the Counter is incremented.
PRINT TO PORT2	Send a print string to Port 2, only if the indicator is stable. The Accumulator and Counter are not effected.
PRINT TO BOTH PORTS	Send a print string to Port 1 and Port 2, only if the indicator is stable. Displayed weight is added to Accumulator and the Counter is incremented.
PRINT USER STRING 1-4 TO PORT 1	Transmits User print string 1-4 out Port 1. The Accumulator and Counter are not effected.
PRINT USER STRING 1-4 TO PORT 2	Transmits User print string 1-4 out Port 2. The Accumulator and Counter are not effected.
NET	Places the indicator in the NET display mode. Only if a tare weight is stored.
GROSS	Places the indicator in the GROSS display mode.
WAIT UNTIL STABLE	Causes the batching sequence to wait until the indicator is stable. Press START button to bypass this command.
GLOBAL REPEAT 00-99	Causes a global repeat back to line 1, for the number of times specified. 00 = loop indefinitely. An "GI Rep" message will be displayed if the operation was successful.
START OF LOCAL REPEAT	Start location of local repeat. Must be place before LOCAL REPEAT command.

LOCAL REPEAT 00-99	Causes a local repeat to a preceding line containing the START OF LOCAL REPEAT command. Loop for the number of times specified. 00 = loop indefinitely. An "IC Rep" message will be displayed if the operation was successful.
WAIT FOR DIN1 TO BE ACTIVE	Waits for DIN 1 input to become momentarily active. Press START button to bypass this command. Note: Remote Switch 1 parameter "r1" must be set for input 1 "in1".
WAIT FOR DIN2 TO BE ACTIVE	Waits for DIN 2 input to become momentarily active. Press START button to bypass this command. Note: Remote Switch 2 parameter "r2" must be set for input 2 "in2".
STABLE AND ABOVE THRESHOLD	Causes the batching sequence to halt until the indicator is above the 0 band threshold and stable. Press START button to bypass this command.
STABLE AND WITHIN/BELOW THRESHOLD	Causes the batching sequence to halt until the indicator is within the 0 band threshold or negative and stable. Press START button to bypass this command.
WAIT FOR CURRENT SETPOINT	Tests a current setpoint and waits for the setpoint to become active, before going on to the next step. Press START button to bypass this command.
WAIT FOR SETPOINT 1-8	Tests a setpoint and waits for the setpoint to become active, before going on to the next step. Press START button to bypass this command.
ACCUMULATOR	When the indicator is stable. The displayed weight is added to the accumulator and the counter is incremented.
CLEAR ACCUMULATOR	Clears the accumulator and counter.
JUMP TO LINE #	Causes the batch sequence to jump to a selected line. An "JUNNP" message will be displayed if the operation was successful.
WAIT FOR CURRENT PRODUCT ID	Waits for Current Product ID entry. Press START button to bypass this command.
WAIT FOR PRODUCT ID 1-8	Waits for Product ID entry. Press START button to bypass this command.
WAIT FOR ENTRY OF CURRENT SETPOINT	Waits for Current Setpoint entry. Press START button to bypass this command.
WAIT FOR ENTRY OF SETPOINT 1-8	Waits for Setpoint entry. Press START button to bypass this command.
WAIT FOR ENTRY OF CURRENT PREACT	Waits for Current Preact entry. Press START button to bypass this command.
WAIT FOR ENTRY OF PREACT 1-8	Waits for Preact entry. Press START button to bypass this command.
WAIT FOR ENTRY OF TARE	Waits for Numeric Tare entry. Press START button to bypass this command.
JUMP TO LINE IF CURRENT SETPOINT ACTIVE	Jump to a selected line, if the current setpoint is active.

JUMP TO LINE IF SETPOINT 1-8 ACTIVE	Jump to a selected line, if setpoint is active.
JUMP TO LINE IF DIN1 ACTIVE	Causes the indicator to jump to a selected line when DIN 1 is active, if not active, will continue to the next instruction in the list. Press START button to bypass this command. Note: Remote Switch 1 parameter "r1" must be set for input 1 "in1".
JUMP TO LINE IF DIN2 ACTIVE	Causes the indicator to jump to a selected line when DIN 2 is active, if not active, will continue to the next instruction in the list. Press START button to bypass this command. Note: Remote Switch 2 parameter "r2" must be set for input 2 "in2".
WAIT FOR CURRENT LEARNING PREACT SAMPLE	If the current Preact mode menu (PA1 - PA8) is set for learn mode (LEn). Batch sequence waits for stable weight sample to calculate current Learning Preact value. Press START button to bypass this command.
WAIT FOR LEARNING PREACT 1-8 SAMPLE	If the Preact 1 - 8 mode menu (PA1 - PA8) is set for learn mode (LEn). Batch sequence waits for stable weight sample to calculate Learning Preact value. Press START button to bypass this command.
CLEAR CURRENT LEARNING PREACT	Sets Current Learning Preact value to zero. An "CLr LPr" message will be displayed if the operation was successful.
CLEAR LEARNING PREACT 1-8	Sets Learning Preact 1-8 value to zero. An "CLr LPr" message will be displayed if the operation was successful.
LOAD CURRENT LEARNING PREACT	Loads Current fixed Preact value into Current Learning Preact. An "Ld LPr" message will be displayed if the operation was successful.
LOAD LEARNING PREACT 1-8	Loads fixed Preact 1-8 value into Learning Preact 1-8. An "Ld LPr" message will be displayed if the operation was successful.
END OF BATCH	End of the batching sequence. Place at last line of Batch sequence.

Default Batch Sequence

Line Number	Command Instruction	Description
00	CLR ALL OUTPUTS	All Outputs are non-active.
01	WAIT UNTIL STABLE	Wait until indicator is stable.
02	PUSH BUTTON ZERO	Push button Zero.
03	SET OUTPUT 1	Output 1 is active.
04	WAIT FOR SETPOINT 1	Wait until setpoint 1 is active.
05	CLR OUTPUT 1	Output 1 is non-active.
06	WAIT UNTIL STABLE	Wait until indicator is stable.
07	PUSH BUTTON TARE	Push button Tare.
08	SET OUTPUT 2	Output 2 is active.
09	WAIT FOR SETPOINT 2	Wait until setpoint 2 is active.
10	CLR OUTPUT 2	Output 2 is non-active.
11	WAIT UNTIL STABLE	Wait until indicator is stable.
12	PUSH BUTTON TARE	Push button Tare.
13	SET OUTPUT 3	Output 3 is active.
14	WAIT FOR SETPOINT 3	Wait until setpoint 3 is active.
15	CLR OUTPUT 3	Output 3 is non-active.
16	WAIT UNTIL STABLE	Wait until indicator is stable.
17	PUSH BUTTON TARE	Push button Tare.
18	SET OUTPUT 4	Output 4 is active.
19	WAIT FOR SETPOINT 4	Wait until setpoint 4 is active.
20	CLR OUTPUT 4	Output 4 is non-active.
21	WAIT UNTIL STABLE	Wait until indicator is stable.
22	GROSS	Indicator is set for gross mode.
23	WAIT 00	Pause until START button is pressed.
24	GLOBAL REPEAT 00	Global repeat back to line 00.
25	END OF BATCH	End of batching sequence.

Batch Configuration

Operation Mode Menu (oP)
Parameter: oP = bAt or bAn

Setpoint Operation Menu (S.o.)
Parameter: SP1 = HA, SP2 = HA, SP3 = HA, SP4 = HA

Test Mode Menu (XXXXXX)
Operation Menu (out 1, out 2, out 3, out 4)
Parameter: oI = BAt (all four outputs)

Learning Preact

The Learning Preact calculations are performed when the batch command "WAIT FOR LEARNING PREACT 1-8 SAMPLE" is processed. The command waits for a stable weight to be used as a sample in calculating a Learning Preact value. The Learn Preact formula is shown below in Fig. 8. Note: The Learning Preact command should follow the "WAIT FOR SETPOINT 1-8" command in the batch sequence.

$$\textbf{New Learning Preact} = \text{Last Learning Preact} + \left(\frac{\text{Displayed Weight - Setpoint value}}{2} \right)$$

Fig. 8: Learning Preact Formula

Learning Preact Batch sequence example

00	CLEAR LEARNING PREACT 1
01	START OF LOCAL REPEAT
02	CLEAR ALL OUTPUTS
03	WAIT UNTIL STABLE
04	SET OUTPUT 1
05	WAIT FOR SETPOINT 1
06	CLEAR OUTPUT 1
07	WAIT 02
08	WAIT LEARNING PREACT 1
09	WAIT 00
10	LOCAL REPEAT 00
11	END OF BATCH

Learning Preact Configuration

Operation Mode Menu (oP)
Parameter: oP = bAt or bAn

Setpoint Operation Menu (S.o.)
Parameter: SP1 = HA
Parameter: PA1 = LEn

Test Mode Menu (XXXXXX)
Operation Menu (out 1)
Parameter: oI = BAt

Data Communications

Standard Print String Formats

The Scale provides eight predefined print strings that are outputted when a manual print, auto print or print function is executed. The exact contents of the predefined print strings and custom data string configuration is shown below.

	Print String	Description
F0	**Standard Output Format, Prints current weight and units.** <STX><p><xxxx.xx><SP><uu><SP> <MOT><CR><LF> Sample Print String ±--10.05-lb Sample Pounds – Ounces String ±27lb-12.2-oz Note: "-" represents a space	**<STX>** Start of Text (02h) **<p>** Weight Polarity Negative weight printed as "-", positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload "-------" is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units "lb", "kg", "oz", "g" **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends "MOT" to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah)

F1	**Format 1, Prints current weight and the highest setpoint number that is active (Grading number).** <STX><p><xxxx.xx><SP><uu><SP> <CWS><MOT><CR><LF> Sample Print String ±--10.05-lb-0 Note: “-” represents a space	**<STX>** Start of Text (02h) **<p>** Weight Polarity Negative weight printed as “-”, positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload “-------” is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units “lb”, “kg”, “oz”, “g” **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends “MOT” to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah) **<CWS>** Setpoint status (highest setpoint only). "0", "1", "2", "3", "4", "5", "6', "7", "8" Or “LOW”, “UNDER”, “ACCEPT”, “OVER” and “HIGH” (2200CW).

d3	**Live Scale (Virtual) Display format, Prints current weight, units, annunciators, checkweigh status, and output status.** <"^"><p><xxxx.xx><ut><an><chk1-4> <chk5-8><out1-4><out5-8><ETX> Sample Print String ±--10.05000000 Note: “-” represents a space	**<"^">** caret (5Eh) **<p>** Weight Polarity Negative weight printed as “-”, positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload “-------” is printed. Leading zeros are printed as spaces (20h). **<ut>** Displayed Units lb = 0(30h), kg = 1(31h), oz = 2(32h), g = 3(33h), lb:oz = 4(34h) **<an>** Annunciators all off = 0(30h), all on = ?(37h) ZERO = bit 0 BATT = bit 1 MOT = bit 2 **<chk1-4>** Setpoint status 1-4. all off = 0(30h), all on = ?(3fh) Setpt 1 = bit 0 Setpt 2 = bit 1 Setpt 3 = bit 2 Setpt 4 = bit 3 **<chk5-8>** Setpoint status 5-8. all off = 0(30h), all on = ?(3fh) Setpt 5 = bit 0 Setpt 6 = bit 1 Setpt 7 = bit 2 Setpt 8 = bit 3 **<out1-4>** Output status 1-4 all off = 0(30h), all on = ?(3fh) out 1 = bit 0 out 2 = bit 1 out 3 = bit 2 out 4 = bit 3 **<out5-8>** Output status 5-8 all off = 0(30h), all on = ?(3fh) out 5 = bit 0 out 6 = bit 1 out 7 = bit 2 out 8 = bit 3 **<ETX>** End of Text (03h)

Lb1	**Custom Data String 1** (\x\w \u \m\r\l) <STX><p><xxxx.xx><SP><uu><SP> <MOT><CR><LF> Sample Print String ±--10.05-lb Note: “-” represents a space	**<STX>** Start of Text (02h) **<p>** Weight Polarity Negative weight printed as “-”, positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload “-------” is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units “lb”, “kg”, “oz”, “g” **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends “MOT” to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah)

Lb2	**Custom Data String 2** (\x\w \u \s\m\r\l) <STX><p><xxxx.xx><SP><uu><SP> <CWS><MOT><CR><LF> Sample Print String ±--10.05-lb-0 Note: “-” represents a space	**<STX>** Start of Text (02h) **<p>** Weight Polarity Negative weight printed as “-”, positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload “-------” is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units “lb”, “kg”, “oz”, “g” **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends “MOT” to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah) **<CWS>** Setpoint status (highest setpoint only). "0", "1", "2", "3", "4", "5", "6', "7", "8" Or “LOW”, “UNDER”, “ACCEPT”, “OVER” and “HIGH” (2200CW).

Lb3	**Custom Data String 3** (\xID:\i \w \u \m\r\l) **Comma-delimited format / CSV** <STX><"ID:"><ADR><p><xxxx.xx><SP><uu><SP><MOT><CR><LF> Sample Print String ±--10.05,lb,00 Note: "-" represents a space	**<p>** Weight Polarity Negative weight printed as "-", positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload "-------" is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units "lb", "kg", "oz", "g" **<ADR>** Scale Address(ASCII 00-99) **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends "MOT" to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah)

Lb4	**Custom Data String 4** (\xACC:\a \u\r\lCNT: \c\r\l\B) **Accumulator print feature.** <STX><"ACC:"><ACC><SP><uu><CR><LF><"CNT:"><CNT><CR><LF> Sample Print String ACC:---0.00-lb CNT:-----0 Note: "-" represents a space	**<STX>** Start of Text (02h) **<p>** Weight Polarity Negative weight printed as "-", positive weight are printed as a space (20h). **<xxxx.xx>** Weight Data fixed field of 6 digits plus decimal. In overload, or underload "-------" is printed. Leading zeros are printed as spaces (20h). **<uu>** Displayed Units "lb", "kg", "oz", "g" **<MOT>** (Available only in Continuous print mode , non-LFT) Motion Status Appends "MOT" to the print string when printing while in motion. **<SP>** Line Space (20h) **<CR>** Carriage Return (0dh) **<LF>** Line Feed (0Ah) **<ACC>** Accumulator weight data (fixed field of 6 digits plus decimal Leading zeros are printed as spaces (20h). **<CNT>** Counter value "000000" to "999999"

Custom Data String Configuration

Programming the custom data strings requires the use of Doran's Dimension Windows program or a terminal program and a data communications option. The custom data strings can be configured from serial port 1, port 2 or any communications option.

To download a custom data string, the string must be prefaced by a command to tell the indicator to expect a custom print string.

ELx<string>↵	Enter (download to indicator) custom data string
RLx↵	Read (upload from indicator) custom data string

x is the custom data string number (1 to 4)
↵ is a Carriage Return (enter key in terminal program)

The custom data string is limited to a 250-character length. A control character counts as two characters. For instance, The following string is 8 characters in length "\w\u\r\l". The custom string is terminated and download by pressing the enter (↵) key. To program this string into the custom data string 1 location, send the following string to the indicator: EL1\w\u\r\l↵

To configure the custom data string with a terminal program, simply type the data string commands into the terminal and press enter. Plain text can be inserted into the custom data string by typing it in. No slash or control character is necessary.

Once programmed, set the Output Format For parameter to Lb1 to active the custom data string.

Note: If the PRINT button is pressed while the accumulator or counter is displayed. custom data string 4 is transmitted instead of the configured serial output string option for the Output Format.

Custom Data String Control Characters

\a	Accumulated Weight (polarity (<sp> or “-”), 8 digits with leading spaces, and decimal point)
\A	Accumulated Weight (polarity ("0" or “-”), 8 digits with leading zeros, and decimal point)
\c	Accumulation Counter (7 digits, leading spaces)
\C	Accumulation Counter (7 digits, leading zeros)
\w	Current Weight (polarity (<sp> or “-”), 6 digits, and decimal point)
\d	Current Weight (no polarity, no decimal point, 6 digits with leading zeros)
\t	Current Tare weight (polarity (<sp> or “-”), 6 digits, and decimal point)
\q	Current Gross weight (polarity (<sp> or “-”), 6 digits, and decimal point)
\n	Current Net weight (polarity (<sp> or “-”), 6 digits, and decimal point)
\p	Gross Weight in pounds (polarity (<sp> or “-”), 6 digits, and decimal point)
\k	Gross Weight in kilograms (polarity (<sp> or “-”), 6 digits, and decimal point
\g	Gross Weight in grams (polarity (<sp> or “-”), 6 digits, and decimal point)
\o	Gross Weight in ounces (polarity (<sp> or “-”), 6 digits, and decimal point)
\z	Gross Weight in lb-oz (polarity (<sp> or “-”), 6 digits, and decimal point)
\P	Net Weight in pounds (polarity (<sp> or “-”), 6 digits, and decimal point)
\K	Net Weight in kilograms (polarity (<sp> or “-”), 6 digits, and decimal point)
\G	Net Weight in grams (polarity (<sp> or “-”), 6 digits, and decimal point)
\O	Net Weight in ounces (polarity (<sp> or “-”), 6 digits, and decimal point)
\L	Net Weight in lb-oz (polarity (<sp> or “-”), 6 digits, and decimal point)
\m	Motion Status – shown in continuous print only ("MOT" or <SP><SP><SP>)
\W	Current weighing mode either "GS" or "NT".
\s	Highest active setpoint number (Grading Status) ("0", "1", "2", "3", "4", "5", "6", "7", or "8") Check weight status (2200CW) ("HIGH ", "OVER ", "ACCEPT", "UNDER ", "LOW ", and " ")
\u	Current Units (“lb”, “kg”, “oz”, “g”)
\i	Serial Scale Address (00-99)
\I0	Current Product ID (6 digits front panel or 20 characters thru serial port) (2200/2200B/2200CW, one product)
\I0	Current Product ID (6 numeric digits) (2200CW, 250 products)
\Ix	Product ID (x = 1-8, ID field location)(6 digits front panel or 20 characters thru serial port or barcode entry) (2200/2200B/2200CW, one product)
\IF0	Current Product ID (fixed 20 characters including leading spaces)
\IFx	Product ID (x = 1-8, ID field location)(fixed 20 characters including leading spaces)(2200/2200B/2200CW, one product)
\D0	Current Product Description (20 characters thru serial port)
\DF	Current Product Description (fixed 20 characters including leading spaces)
\S0	Current Setpoint Weight (polarity (<sp> or “-”), 6 digits, and decimal point)
\Sx	Setpoint Weight where desired setpoint x = 1-8, L = Low, U = Under, O = Over, H = High (polarity (<sp> or “-”), 6 digits, and decimal point)
\E0	Current Preact Weight (polarity (<sp> or “-”), 6 digits, and decimal point)

\Ex	Preact Weight (x = 1-8, Preact field location)(polarity (<sp> or “-”), 6 digits, and decimal point)
\TM	Time (Military) HH:MM (HH = 00-23)(MM = 00-59)
\Tm	Time (Military) HH:MM:SS (HH = 00-23)(MM = 00-59)(SS = 00-59)
\TC	Time (Civilian) HH:MM "AM"/"PM" (HH = 01-12)(MM = 00-59)
\Tc	Time (Civilian) HH:MM:SS "AM"/"PM"(HH = 01-12)(MM = 00-59)(SS = 00-59)
\TP	Time "AM" or "PM"
\M	Month (01-12)
\Y	Year (00-99)
\J	Day (01-31)
\x	Start of Text (02 hex)
\\	Print “\”
\r	Carriage Return (0d hex)
\l	Line Feed (0a hex)
\hxx	Hex command two digits (xx = hex #)
\B	Clears Accumulator & Counter
\Q	Issues a push button print command on other port.
\Z	Zero scale (same as pressing zero pb)

Remote Setpoint / Preact / Limit Entry and Recall

To download a setpoint or preact weight value, the serial string must be prefaced by a command to tell the indicator to expect a setpoint weight value.

ESx<weight>↵	Enter (download to indicator) Setpoint Weight value
RSx↵	Read (upload from indicator) Setpoint Weight value
EPx<weight>↵	Enter (download to indicator) Preact Weight value
RPx↵	Read (upload to indicator) Preact Weight value

x is the setpoint / preact number or limit 2200CW only (1 to 8, or 0 for current number) (2200CW: l = low, u = under, o = over, h = high)
↵ is a Carriage Return (enter key in terminal program)
<weight> contains polarity (negative only), up to 6 digits, and a decimal point

When entering a negative value, do not place a space between the negative sign and the weight value. A positive value is assumed with out the negative polarity sign present. The decimal point location and resolution for the weight being entered, must match the scale's current settings.

To indicate that the setpoint value has been successfully saved, SAVEd will momentarily be displayed. An entry error will be indicated by a “?” character transmitted via the communication option.

For example:
To enter a weight value of 20 lb for setpoint 7, send the following string: ES720.000↵.

To enter a -1 lb value for setpoint 5, send the following string: ES5-1.000↵.

Remote Product ID Entry and Recall:

To download an ID value, the string must be prefaced by a command to tell the indicator to expect an ID value. **Note:** Entering any serial string that begins with an numeric character. Does not require a prefaced command to be saved as a value for ID 1.

EIx<ID>↵	Enter (download to indicator) Product ID value
RIx↵	Read (upload from indicator) Product ID value

x is the ID location number (1 to 8, or 0 for current number)
↵ is a Carriage Return (enter key in terminal program)
<ID> is an alpha numeric string up to 20 characters in length

To indicate that the value has been successfully saved, SAVEd will momentarily be displayed. An entry error will be indicated by a "?" character transmitted via the communication option.

Note: non-numeric characters saved in Product ID memory cannot be viewed(Recall) by way of scale's front display.

For example:
To enter a value of 123456 for the ID 7, send the following string: ES7123456↵.

To enter in a "ABC600" value for ID 3, send the following string: ES3ABC600↵.

Remote Product Description Entry and Recall:

To download an Product Description, the string must be prefaced by a command to tell the indicator to expect the serial string. For the 2200CW with the Prod parameter set for 250. The Product Description string will be stored in the same array field as the current Product ID. For the 2200, 2200B, 2200CW or 2200G with a setting of Prod set to 1. Only one Product Description string can be store.

ED<DATA>↵	Enter (download to indicator) Product Description.
RDx↵	Read (upload from indicator) Product Description.

↵ is a Carriage Return (enter key in terminal program)
<DATA> is an alpha numeric string up to 20 characters in length

To indicate that the Description string has been successfully saved, SAVEd will momentarily be displayed. An entry error will be indicated by a "?" character transmitted via the communication option.

Remote Tare Entry and Recall:

To download a tare weight value, the serial string must be prefaced by a command to

tell the indicator to expect a tare weight value. **Note:** For the model 2200CW set for 250 product memeory. The Tare value will be stored in the same array field as the current Product ID. A total of 250 Tare Values can be stored, one for each Product ID.

ET<tare>↵	Enter (download to indicator) Tare Weight value
RT↵	Read (upload to indicator) Tare Weight value

↵ is a Carriage Return (enter key in terminal program)
<weight> contains up to 6 digits, and a decimal point

The tare weight must be a positive value. The decimal point location and resolution for the weight being entered, must match the scale's current settings.

To indicate that the setpoint value has been successfully saved, SAVEd will momentarily be displayed. An entry error will be indicated by a "?" character transmitted via the communication option.

For example:
To enter a value of 10 lbs. for the tare weight, send the following string: ET10.000↵.

To enter in a 1.5 lbs. for tare weight, send the following string: ET1.500↵.

Command (RXD)	Scale output Response (TXD)	Description
W↵ or w↵	Will respond with current selected data string transmitted from serial port 1. (No transmission will occur if scale is in motion.)	Transmits data out TXD1 (Port1)
Wx↵ or wx↵	Will respond with Custom Data String transmitted from serial port 1.	Transmits Custom Data String number x = 1 to 4 out TXD1 (Port1) Transmits Data Output Format 1 x = 0 out TXD1 (Port1)
P↵ or p↵	Will respond with current selected data string transmitted from serial port 2. (No transmission will occur if scale is in motion.) If this command is sent from serial port 1, a "*" will be sent out of port 1 to acknowledge the command was executed.	Transmits data out TXD2 (Port2)
Px↵ or px↵	Will respond with Custom Data String transmitted from serial port 2. If this command is sent from serial port 1, a "*" will be sent out of port 1 to acknowledge the command was executed.	Transmits Custom Data String number x = 1 to 4 out TXD2 (Port2) Transmits Data Output Format 2 x = 0 out TXD2 (Port2)
U↵ or u↵	* (acknowledgment, port 1 only)	Scale changes current units
Z↵	* (acknowledgment, port 1 only)	Zeros scale
T↵ or t↵	* (acknowledgment, port 1 only)	Tares Scale and enters Net mode
G↵ or g↵	* (acknowledgment, port 1 only)	Scale enters Gross mode
N↵ or n↵	* (acknowledgment, port 1 only)	Scale enters Net mode
D↵ or d↵	Print Buffer data	Dumps serial data that is stored in Print Buffer. Active when Serial Handshaking is set for 485 mode.
ELx↵	* (acknowledgment, port 1 only)	Enter data into Custom Data String number x = 1 to 4 See Custom Data String Configuration
RLx↵	Label buffer string	Read data in Custom Data String number x = 1 to 4 See Custom Data String Configuration
RSx↵	Setpoint or Check limit weight value.	Read weight value in Setpoint number x = 1 to 8, 0 = current Setpoint number 2200CW only; x = L(Low), U(Under), O(Over), H(High). See Remote Setpoint Entry and Recall.
ESx↵	* (acknowledgment, port 1 only) Display will show an "SAVEd" to indication that the Setpoint or Check Limit value has been successfully saved to non-volatile memory	Enter weight value in Setpoint number x = 1 to 8, 0 = current Setpoint number 2200CW only; x = L(Low), U(Under), O(Over), H(High). See Remote Setpoint Entry and Recall.

RPx↵	Preact weight value.	Read weight value in Preact number x = 1 to 8, 0 = current Preact number See Remote Preact Entry and Recall.
EPx↵	* (acknowledgment, port 1 only) Display will show an "SAVEd" to indication that the Preact value has been successfully saved to non-volatile memory.	Enter weight value in Preact number x = 1 to 8, 0 = current Preact number See Remote Preact Entry and Recall.
RIx↵	Product ID.	Read value in Product ID number x = 1 to 8, 0 = current ID number See Remote Product ID Entry and Recall.
RI0↵	Product ID number.	Request the currently active Product ID number. See Remote Product ID Entry and Recall.
EIx↵	* (acknowledgment, port 1 only) Display will show an "SAVEd" to indication that the Product ID has been successfully saved to non-volatile memory .	Enter characters in Product ID number x = 1 to 8., 0 = current Product ID number. Maximum of 20 characters can be enterd. See Remote Product ID Entry and Recall.
RNx↵ (2200CW, 250 product)	* (acknowledgment, port 1 only) Product ID number.	Select an existing Product ID Number for current active product. x = 0 to 999999, ID number. See Remote Product ID Number Entry and Recall.
ENx↵ (2200CW, 250 product)	* (acknowledgment, port 1 only) Product ID number.	Create a new Product ID Number for current active product. x = 0 to 999999, ID number. See Remote Product ID Number Entry and Recall.
RD↵	Product Description.	Read Product Description field. See Remote Product Description Entry and Recall.
ED↵	* (acknowledgment, port 1 only) Display will show an "SAVEd" to indication that the Product Description has been successfully saved to non-volatile memory.	Enter characters in Product Description. Maximum of 20 characters can be enterd. See Remote Product Description Entry and Recall.
RT↵	Tare weight value.	Read Tare weight value. See Remote Tare Entry and Recall.
ET↵	* (acknowledgment, port 1 only) Display will show an "SAVEd" to indication that the Tare value has been successfully saved to non-volatile memory.	Enter Tare weight value. See Remote Tare Entry and Recall.
RA↵	Accumulator weight value.	Read Accumulator weight value.
RC↵	Counter value.	Read Counter value.

CA↵	* (acknowledgment, port 1 only) Display will show an "CLr Ac" to indication that the Accumulator & Counter values has been cleared	Clears Accumulator & Counter values.
BS↵ (2200B only)	* (acknowledgment, port 1 only) Display will show an "StArt" to indication that Batch program has started.	When in the Batch mode, Scale will run the batch program.
BX↵ (2200B only)	* (acknowledgment, port 1 only) Display will show an "StOP" to indication that Batch program has stopped.	When in the Batch mode, Scale will stop the batch program and jump to line 1. All batch relay outputs inactive.
BP↵ (2200B only)	* (acknowledgment, port 1 only) Display will show an "PAUSE" to indication that Batch program has paused.	When in the Batch mode, Scale will pause at current step in the batch program. All batch relay outputs inactive.

Table 2: Doran serial protocol

Specifications and Interconnect Data

Specifications:

Model:	2200/2200G	2200B	2200CW
Resolution:	200d to 50,000d		
Sensitivity:	0.5 uV min.		
Load Cell Capacity:	0.283 mV/V to 5 mV/V		
Power Supply:	115 / 230VAC 50/60Hz		
6V Battery	Optional		
Display:	6 digit LED. 0.56" high		
Displayed units:	lb, kg, oz, g and lb oz		
Capacities:	1 to 999,000 lb		
Printer Interface:	two Bi-directional RS-232		
Calibration	Unit may be calibrated with 2% to 100% of capacity.		
Controls:	Polycarbonate touch panel TARE, GROSS NET, ZERO, PRINT, UNITS, hidden, ACCUM, ID, CLEAR, SET POINT, 0-9 buttons	Polycarbonate touch panel START, STOP, TARE, GROSS NET, ZERO, PRINT, UNITS, hidden, ACCUM, ID, CLEAR, SET POINT, 0-9 buttons	Polycarbonate touch panel OVER, UNDER, TARE, GROSS NET, ZERO, PRINT, UNITS, hidden, ACCUM, PROD ID, CLEAR, SET POINT, 0-9 buttons
Construction:	Rugged Stainless Steel NEMA 4/4X (IP 65) construction.		
Options:	User configurable remote switch, 6 digit LED remote display, USB, 4-20mA output, Ethernet (wired & wireless), Relay outputs, RS485		
Setpoint Delay Time:	250mS TYP. @ C16 Averaging Mode.		

Table 3: Scale Specifications

Interconnect Data:

Pin #	Function	Wire Color
1	+ Load Cell Signal	Red
2	- Load Cell Signal	White
3	+ Load Cell Excitation	Green
4	- Load Cell Excitation	Black
5	+ Sense Signal	Blue
6	- Sense Signal	Brown

Table 4: TB1 Load Cell Connections

NOTE: When connecting the load cell, be sure to install the ESD and EMI protection inductor. Refer to Fig. 11 for details.

P2 Option Connections		
Pin #	Function	Wire Color
1	Port 1 RXD1 (RS232)	White
2	Port 1 TXD1 (RS232)	Red
3	Ground	Black
4	Switch 1 Input	White
5	Switch 1 Input	White
6	Port 2 RXD2 (RS232) Scanner	White
7	Port 2 TXD2 (RS232) Scanner	Red
8	Ground	Black
9	+VCC (unregulated, +12Vdc) Scanner positive supply	

Table 5: P2 Options Connections

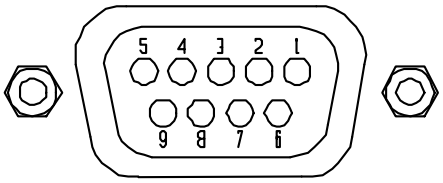


Fig. 10: RS232 Output DB9 Connector (optional)

RS232 Output DB9 Female connector (see Fig. 10)		
Pin #	**Function**	**Wire Color**
1	N/A	
2	TXD	Red
3	RXD/CTS	White
4	N/A	
5	Signal GND	Black
6	N/A	
7	N/A	
8	N/A	
9	N/A	

Table 6: Serial Output pin description

J6 External Supply Connections (optional)	
Pin #	Function
1	8-24 Vdc input
2	Ground

Table 7: J6 External Supply Connections

J1 Power Connections		
PIN #	TITLE	WIRE COLOR CODE
N	Neutral	Blue or White
G	Ground	Green or Green/Yellow
L	Hot	Brown or Black

Table 8: J1 Power Connections

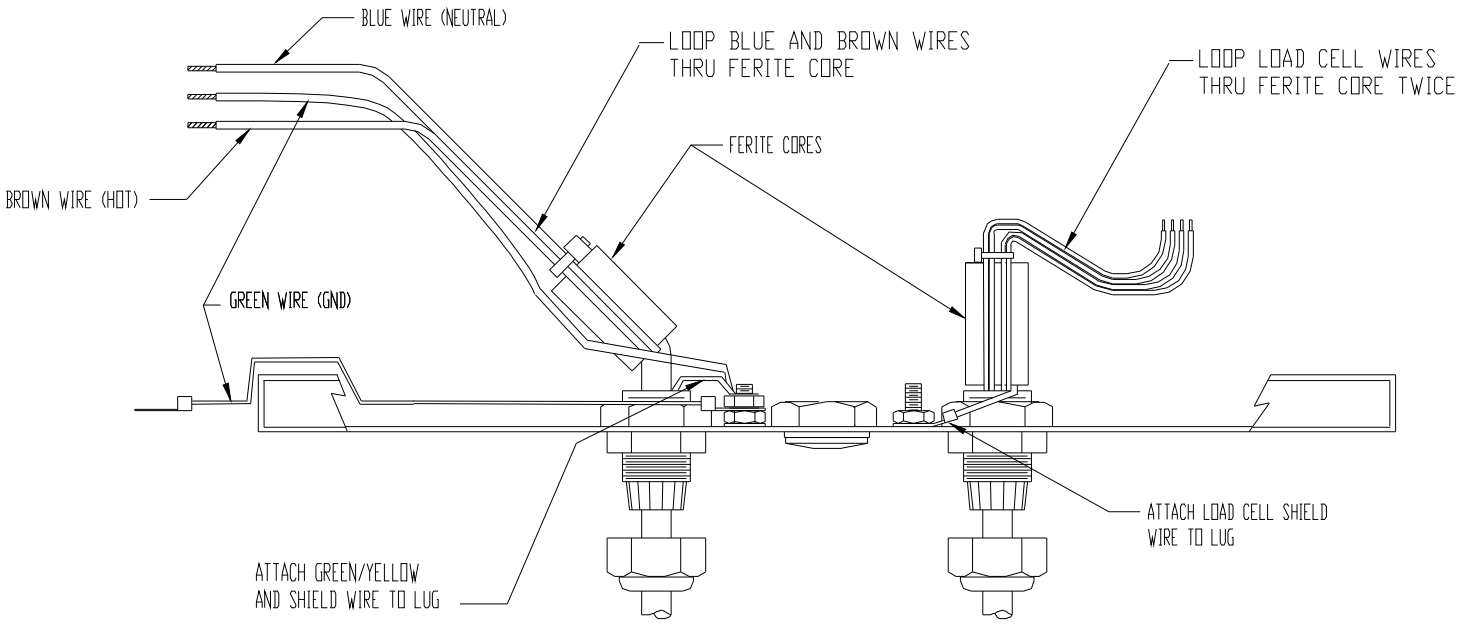


Fig. 11: Installation of EMI / RFI / ESD protection devices.

NOTE: Fig. 11 illustrates a scale connected with a 4-wire load cell. When installing a 6-wire cell, remove shunts at JU7 and JU8.

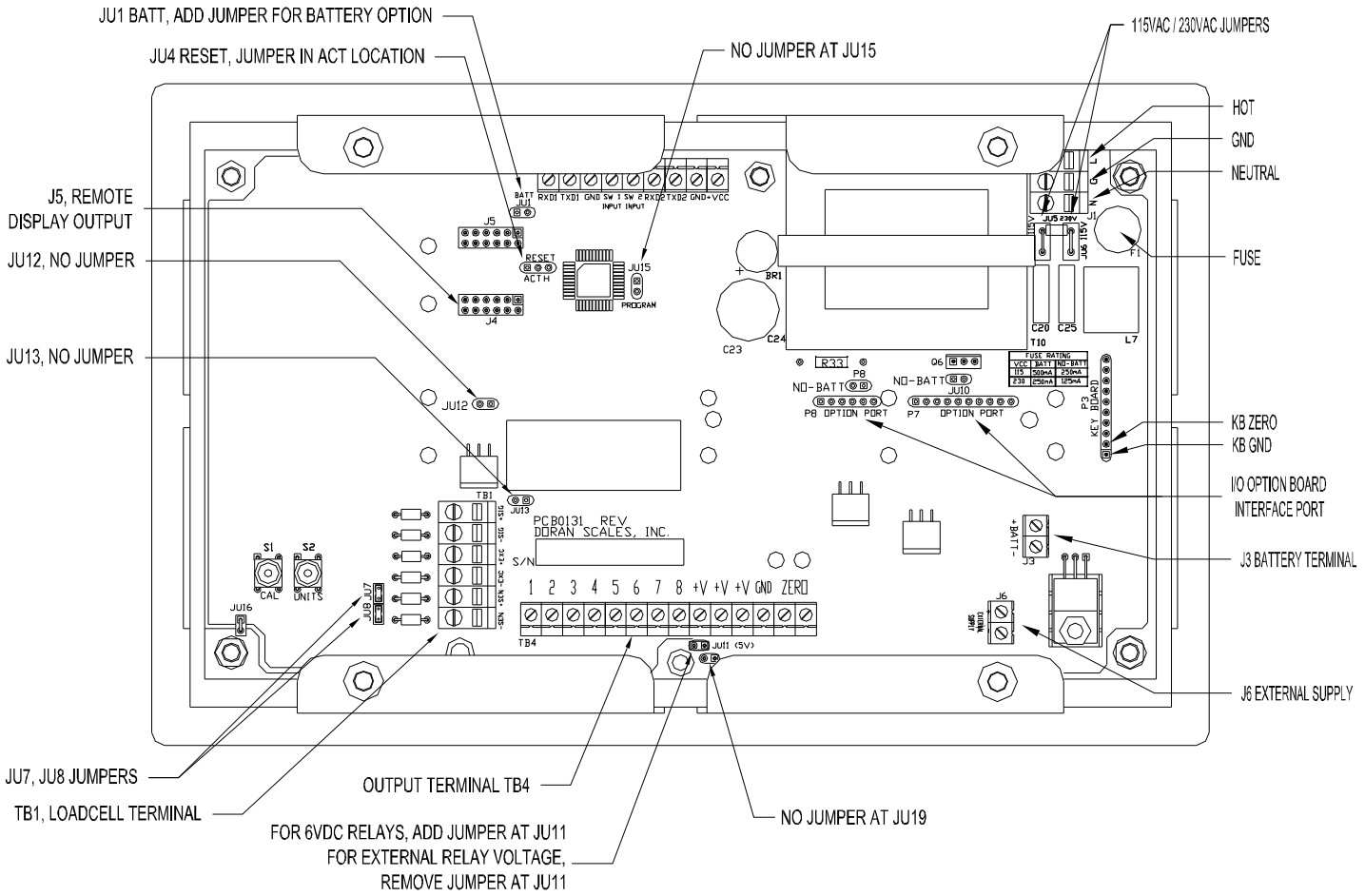


Fig. 12: Jumpers and Connector Locations

Jumper settings per model								
Jumper	**2200**	**2200 (battery)**	**2200B**	**2200B (battery)**	**2200CW**	**2200CW (battery)**	**2200G**	**2200G (battery)**
JU1	OUT	IN	OUT	IN	OUT	IN	IN	IN
JU7	In for 4 wire and Out for 6 wire load cell connections							
JU8	In for 4 wire and Out for 6 wire load cell connections							
JU10	IN	OUT	IN	OUT	IN	OUT	OUT	OUT
JU12	OUT							
JU13	OUT							
JU14	IN							
JU15	IN							
JU17	IN							
JU18	OUT							
JU19	OUT							

Table 9: Board Jumper Settings

Fuse Replacement:

The Scale's line fuse (F1) is located next to the power terminal (J1). Make sure power is off, before replacing the fuse. Remove the fuse cap by unscrewing it counter clockwise, then pull the fuse out of the socket and insert the new fuse in socket (see FIG. 13). Then screw the fuse cap back on the socket and apply power to the scale.

Product option	Line Voltage	Part number	Description
standard	115 VAC	FUS0019	T250mA250V SLO-BLOW
230V non-batt	230 VAC	FUS0021	T125mA250V SLO-BLOW
115V battery	115 VAC	FUS0020	T500mA250V SLO-BLOW
230V battery	230 VAC	FUS0019	T250mA250V SLO-BLOW
115V Digital Output option	115 VAC	FUS0020	T500mA250V SLO-BLOW
230V (Digital Output option)	230 VAC	FUS0019	T250mA250V SLO-BLOW

Table 10: Line Fuse Values

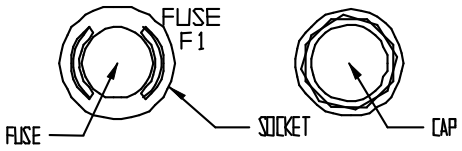


Fig. 13: F1 Fuse Holder

4-20mA Analog Output Option

Introduction

The 4-20mA Analog Output Option is used to provide an analog output that is proportional to the displayed scale weight. Because of the inherent noise immunity present in a current loop, an isolated 4-20mA analog output is ideal for use in noisy environments. The 4-20mA analog output option can be used to send weight data to a process indicator, a simple on/off controller or to a programmable logic controller.

Setup

To setup the 4-20mA Analog Output Option, calibrate the scale if required. The 4-20mA option is automatically calibrated for an output range of 4mA to 20mA. The option will output 4mA when the scale display reads zero weight and 20mA when the scale reads full capacity.

Determine if active (Fig 14.2) or passive mode (Fig 14.3) is required. Active mode provides the 4-20mA loop power, while the passive mode does not provide the loop power. Select the active mode by placing jumpers on pins 3,4 (ACT) on JU1 and JU2. For passive mode, place jumpers on pins 1,2 (PAS) on JU1 and JU2. See Fig 14.1 for jumper locations.

Attach the output cable from the appropriate controller or indicator to the 4-20mA option board. The white lead is connected to the "+" terminal of TB2 and the black lead is connected to the "–" terminal of TB2. Output impedance range is zero to 600 ohms.

Calibrate your process indicator or controller according to the manufacturer's instructions. The 4-20mA output can be forced to 4mA and 20mA in the test mode parameter to aid in calibration without the use of test weights. If, after calibration, the Doran 4-20mA output needs adjustment, see the test mode parameter for adjustment instructions.

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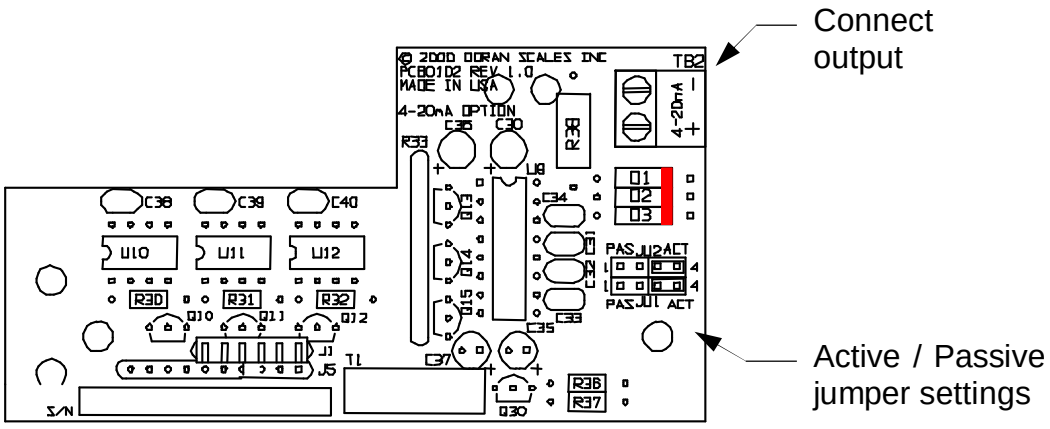


Fig. 14.1: 4-20mA Analog Option Board

Operation and Output Signals

There is no effect on scale operation when the 4-20mA Analog Output Option is installed. The only exception to this is on models with battery option where battery life will be reduced by 50% when the 4-20mA option is set to the active mode. To increase battery life back to normal, set option output for passive mode

The output signals are as follows:

- The 4-20mA output is based upon the current displayed weight
- Overload or Gross Overload Errors – 24mA
- Underload of Gross Underload Errors – 3.5mA
- Negative displayed scale weight – 3.5mA

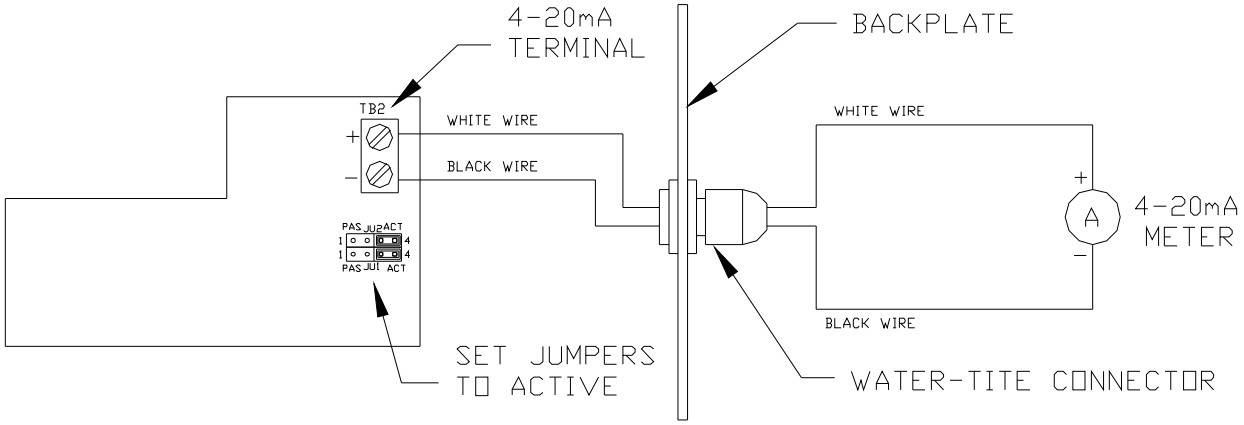


Fig. 14.2: Example of an Active 4-20mA circuit.

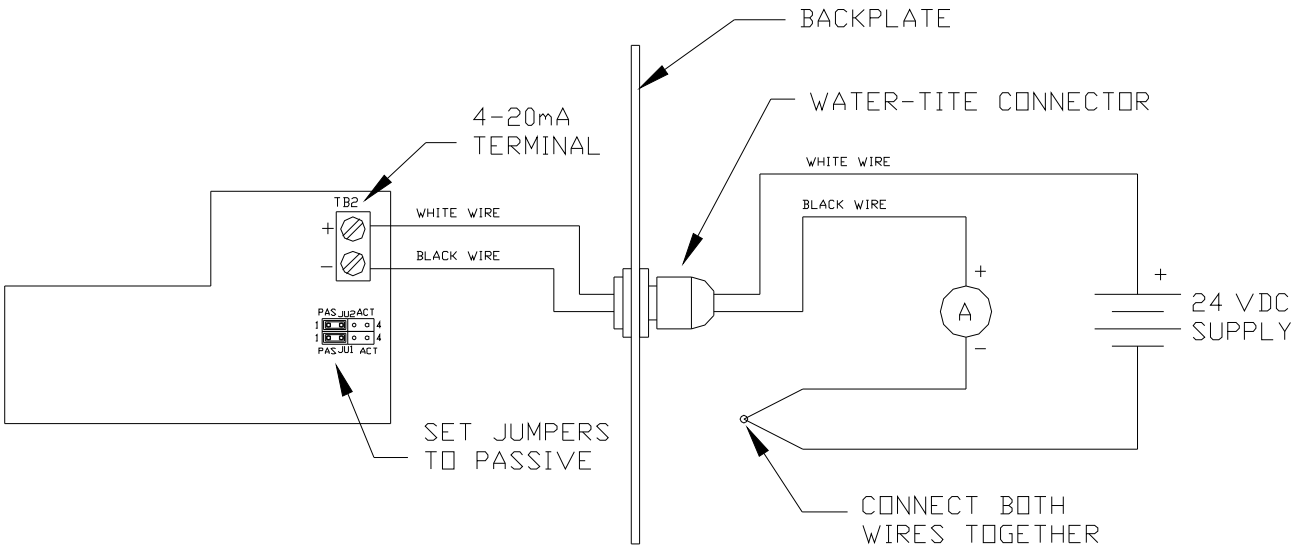


Fig. 14.3: Example of a Passive 4-20mA circuit.

RS485 Communications Option

The scale offers an RS485 data communications option. RS485 communications are similar to RS232 except that RS485 provides better noise immunity, it is suited to longer cable distances, and it will allow multiple scales to be attached to the same data line.

RS485 achieves its performance advantage over RS232 by utilizing a differential input and output. In other words, the RS485 device sends two copies of its data; one in positive logic and in negative logic. The receiving device looks at the two outputs and takes the difference between them. If the difference is positive the bit is a "1' if it is negative, it is a "0."

The ability of RS485 to have multiple devices attached to the same line complicates the serial communication. Because of the multiple device capability, each device must have a unique dedicated address. Also, no device is permitted to communicate unless the master serial bus controller has specifically activated it. Since a scale with RS485 may not communicate unless it is activated by the master serial bus controller, a print buffer is provided to store scale data until it is requested.

When the indicator is setup RS485 communication, all print requests are redirected to the print buffer rather than the printer port. All weight readings are stored in this buffer until a buffer dump command is received from the serial port. Once the dump command is received, the scale takes control of the serial bus and transmits the stored scale readings. When the buffer is empty, the scale releases the bus and will not communicate until the master serial bus controller again activates it.

Warning: if scale data stored in Print Buffer exceeds buffer size, only the latest data that will fit in buffer, will be saved. If the scale is set for the default print string "F0", the buffer will store up to 130 print strings before overflowing the buffer size.

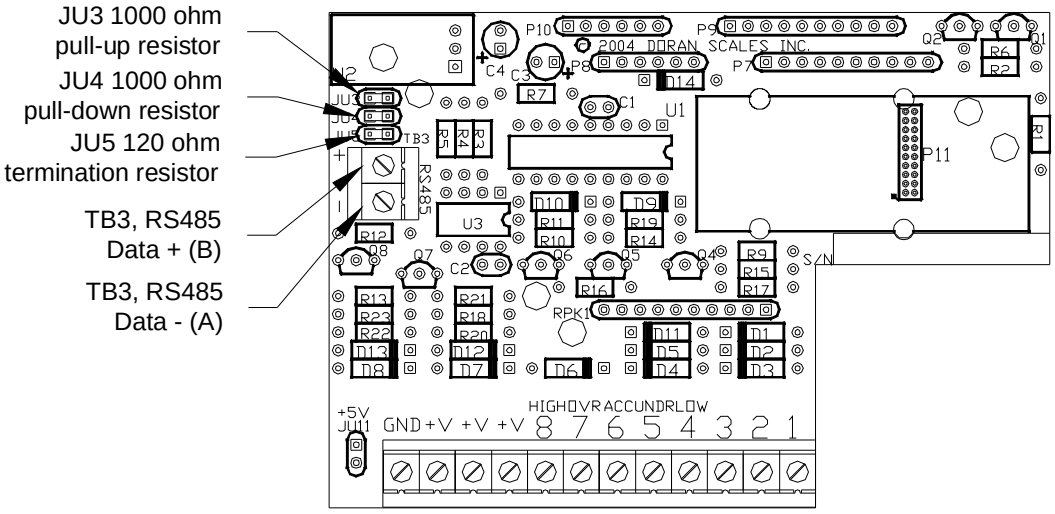


Fig. 15: Digital Output Board with RS485 Option

RS485 SETUP

The following section assumes that you are familiar with the operation of the parameter setup menu. If you are unsure of any step while setting up RS485 operations, please read previous sections in this Instruction Manual before continuing.

Setting up RS485 communications in the system requires that the scale be connected to the RS485 bus. Using a two-wire data cable attached to TB3 on the Digital Output option board makes this connection. See Fig. 15 and Fig. 16 for details on the necessary connections. You will need to know and understand the operation of other RS485 devices in your system.

After setting up the cable, the scale must be configured to work with the RS485 bus. Enter the setup mode and scroll through the setup menu until you come to the Serial Data Output Handshaking and set it for RS485 mode. Next, press "UNITS" to step to Scale (Bus) Address parameter. The scale will ship from the factory set for address "00". Press "ZERO" to scroll up the value for bus address. Be sure to record the address you selected. At this time, the RS485 buffer is activated.

Note: If the Data Output Handshaking is not set to RS485, the scale will behave as if the scale is communicating via RS232. This may be desired for a RS485 bus with one scale on the bus or an application where communication with a single scale over a long distance is required.

Once the scale address is set, select the "Data Output Mode." Doran Scales recommends against using the Continuous Print Mode with RS485 because the buffer will fill up quickly requiring frequent readings of the buffer. If you require an automatic recording of weight data, then the Auto Print mode AP2 is recommended.

RS485 Option Specification	
Maximum Cable length	4,000 ft.
Maximum number of scales per bus	32 nodes
Maximum Number of Print commands that can be stored in Print Buffer (2000 bytes)	130 with Print Output format = "F0"
Bus common mode range	±7 volts
RS485 node load impedance	12K ohms

Table 11: RS485 Option Specification

RS485 Commands

In order to communicate with your scale, your bus controller must send the scale commands in a format it expects. The scale's communications string is constructed as follows:

01 <SC> <CR>

Where; "01" is the scale bus address (01 to 99)
<SC> are the scale commands.
<CR> Carriage Return is a ASCII character (0x0d hex or ^M)

Example: "01W↵" Initiates a print command that will store data to the Print Buffer at address 01.

It is possible to broadcast a command to all scales on the RS485 bus by using scale bus address “00”. All scales will receive this command and will respond. **Warning:** Do not use this command to dump the contents of the scale buffer as all the scales on the bus will attempt to communicate at once and will result in the loss of data.

All scale commands as laid out in the Data Communications section, Table 2 are available for use in RS485 communications. The following are some common commands recognized by the scale:

- W Instructs the scale to print to the print buffer.
- Z Instructs the scale to perform a "ZERO" operation.
- D Instructs the scale to dump (or transmit) the Print Buffer's contents to the bus. The Print Buffer is then cleared of all data.

Bus termination resistors

Since RS485 systems are designed to cover long distances, it is often necessary to terminate the bus at its ends. This termination reduces reflections on the bus and provides a pull up for the bus drivers. The RS485 option board has these termination resistors built in and jumper accessible. Table 12 provides terminator resistor jumper information.

Jumper settings for RS485 line	
Function	**Jumper**
120 ohm line to line Termination Resistor	JU5
1K ohm pull up Bias Resistor	JU3
1K pull down Bias Resistor	JU4

Table 12: RS485 Termination Resistors

In general, JU5 should be inserted at the terminating ends of a long RS-485 bus. Scales (nodes) located between these ends do not need this resistor. JU3 and JU4 are used to provide bias to the bus and at least one pair of pull up / pull down resistors are required somewhere on the bus. Additional sets are probably not required, but every installation will require some judgment by the installer.

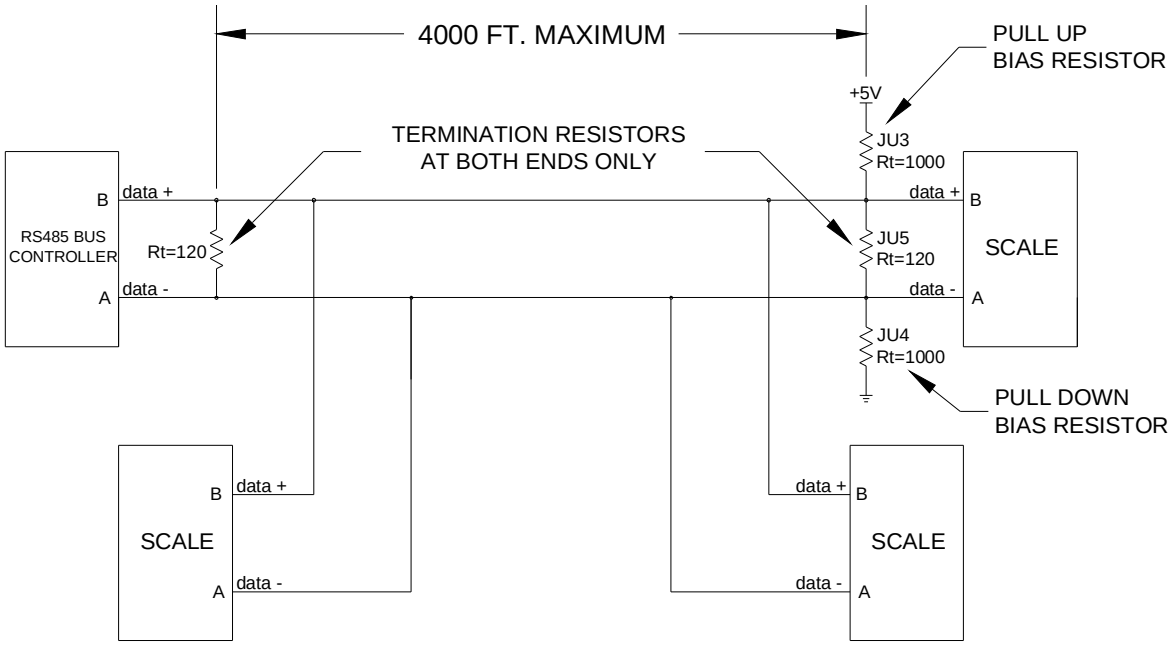


Fig. 16: RS485 two wire system

Internal Relay Option

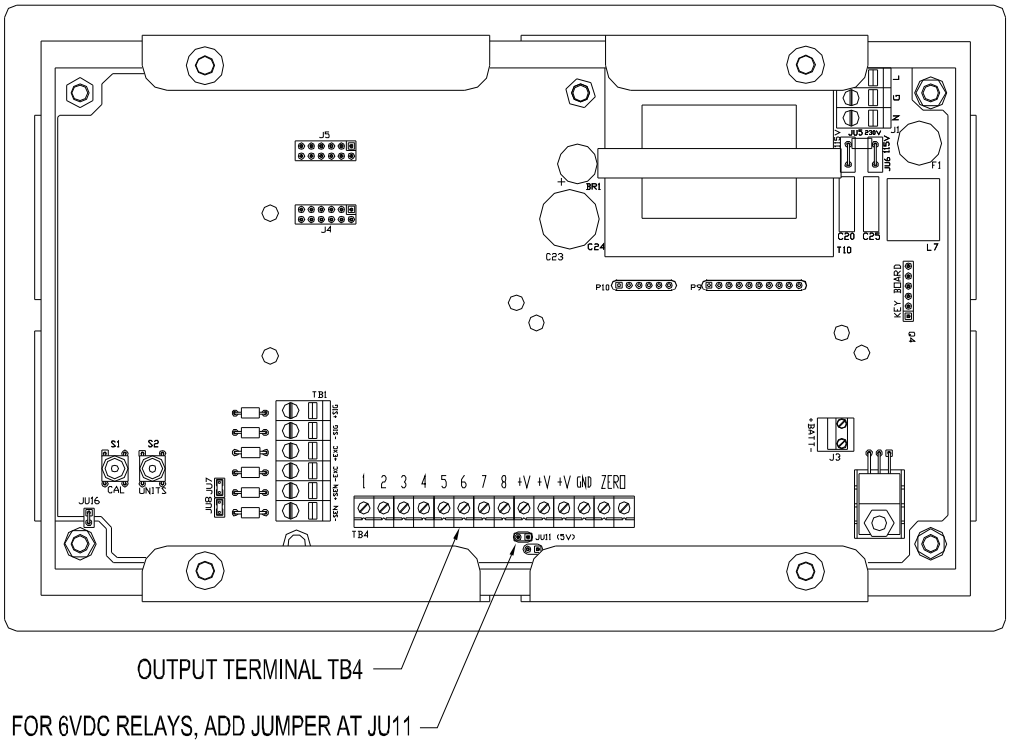


Fig. 17: Digital Output TB4 Terminal

The Internal Relay Option (EXOPT106) allows up to four relays to be mounted inside the scale's enclosure. The relay control is described in Parameter Setup Section. This section discusses the installation and wiring of the relay controls.

Three types of relays are available for use with the Internal Relay Option – 6Vdc Electromechanical and Solid State (AC or DC). Specify style of relay at time of order. Relays are socked so replacements can be installed in the field.

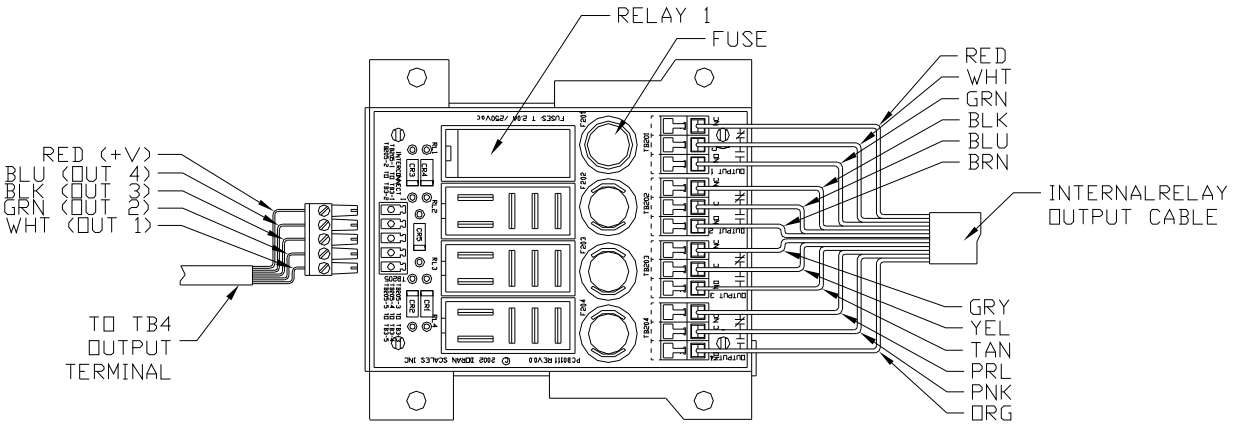


Fig. 18: Internal Relay Board

Internal Relay Setup:

The internal relay option comes with an interface cable between the Digital Output Terminal TB4 on main board and the internal relay board for relay control. A second twelve conductor cable provides the relay output and exits the meter through a watertight. Leave this cable in place when configuring the outputs and refer to the output cable color code table. In the field, this cable will most likely be replaced. Ensure that the replacement cable is rated well above the maximum current required by the electrical device to ensure safe operation and the cable diameter is between 0.16" and 0.31" for proper watertight sealing. The Scale does not provide the AC or DC power to run external devices. Ensure your customer has made provisions to supply the necessary power.

Each relay has a three-position output that provides a Common, Normally Open and Normally Closed terminal. Keep in mind that the Normally Closed terminal is only available for use with a mechanical relay. Solid State relays can operate as Normally Closed through software configuration only. The following table shows the color codes and terminal connections for the included cable.

Relay Specifications:

6VDC Mechanical Relay, 10A 250VAC / 30VDC. Doran part number: EXOPT195
AC Solid State Relay, 2A 100-240VAC. Doran part number: EXOPT109
DC Solid State Relay, 2A 5-48VDC. Doran part number: EXOPT110

Channel	Terminal	Conductor Color
Relay 1 (OUTPUT 1)	TB201 – NC	**Red**
	TB201 – COM	**White**
	TB201 – NO	**Green**
Relay 2 (OUTPUT 2)	TB202 – NC	**Black**
	TB202 – COM	**Blue**
	TB202 – NO	**Brown**
Relay 3 (OUTPUT 3)	TB203 – NC	**Grey**
	TB203 – COM	**Yellow**
	TB203 – NO	**Tan**
Relay 4 (OUTPUT 4)	TB204 – NC	**Purple (Pearl)**
	TB204 – COM	**Pink**
	TB204 – NO	**Orange**

Table 13: Internal Relay Output Cable Color Code

Step-up Relay Circuit:

If the current load to be switched is greater than the maximum current limit of the internal relay, i.e. 10 Amps for mechanical relay or 2 Amps for Solid State Relay. A step-up relay circuit is required in order to switch the higher current loads. See Fig. 19 for an example of a typical step-up relay circuit.

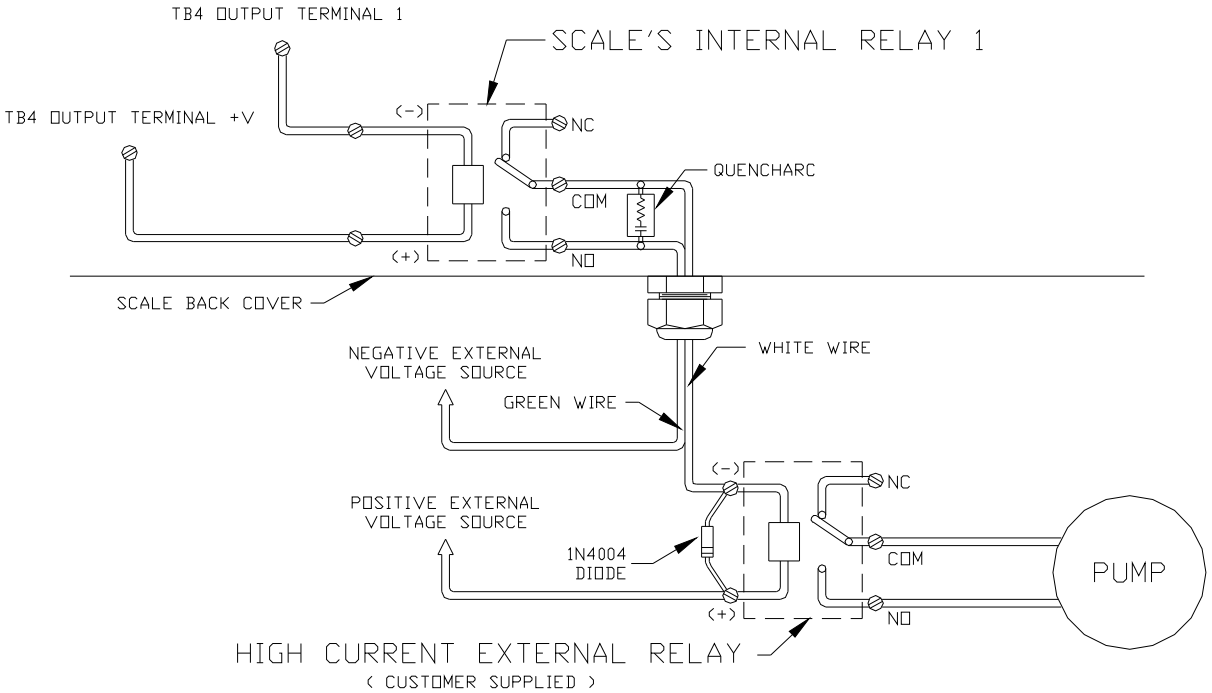


Fig. 19: Example of a Step-up Relay circuit.

External Relay Box Option

The External Relay Box Option (EXOPT107) consist of a +6V Power Supply and up to eight DIN rail mounted relay modules, see Fig 20. The Relay Box is a NEMA4X polystyrene enclosure (10" W x 7" H x 6" D) with a clear cover. The housing has knock-out plugs with sizes of 7/8", 1-1/8", 1-1/2" located on all four sides, see Fig 20. Three types of relays are available for use with the External Relay Box Option – Electromechanical and Solid State (AC or DC). Specify style of relay at time of order. Relays modules are mounted on a DIN rail, so replacements or additional channels can be installed in the field.

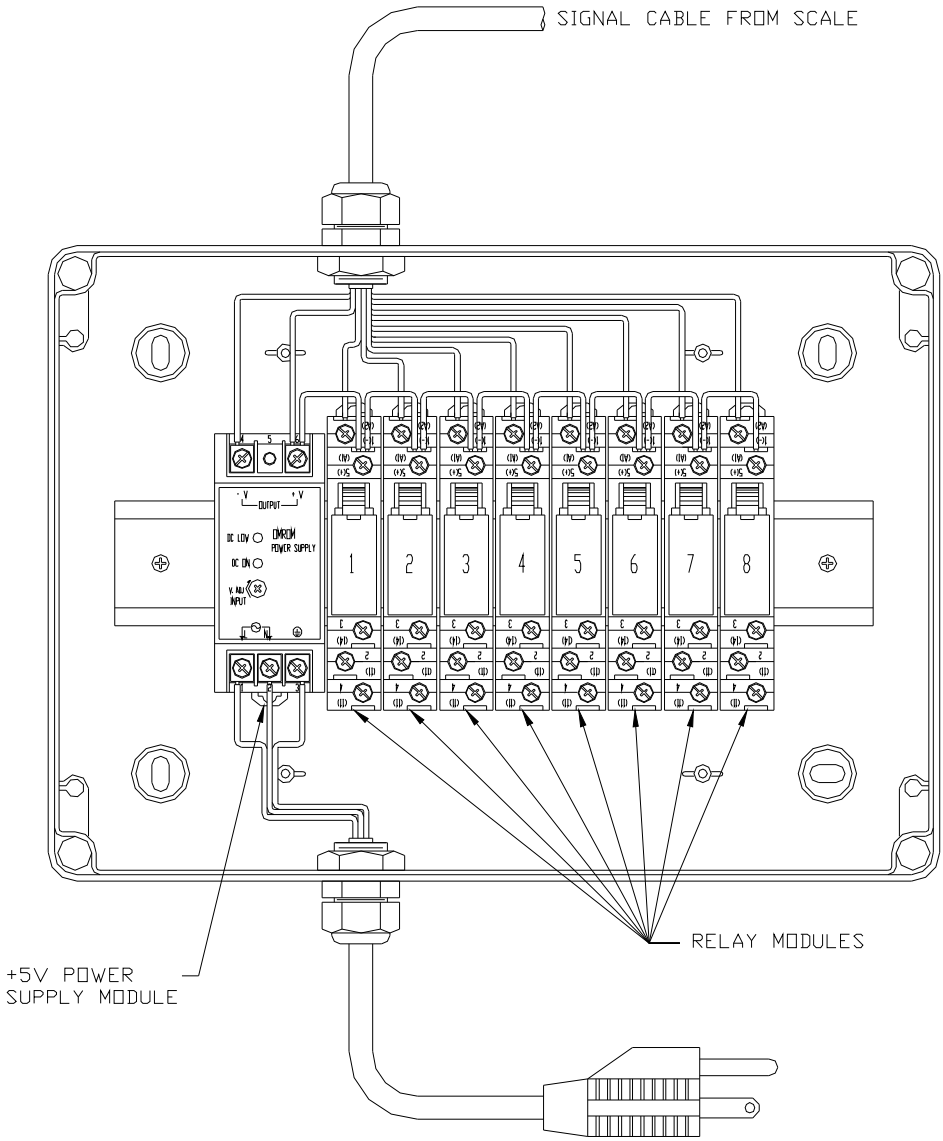


Fig. 20: External Relay Box

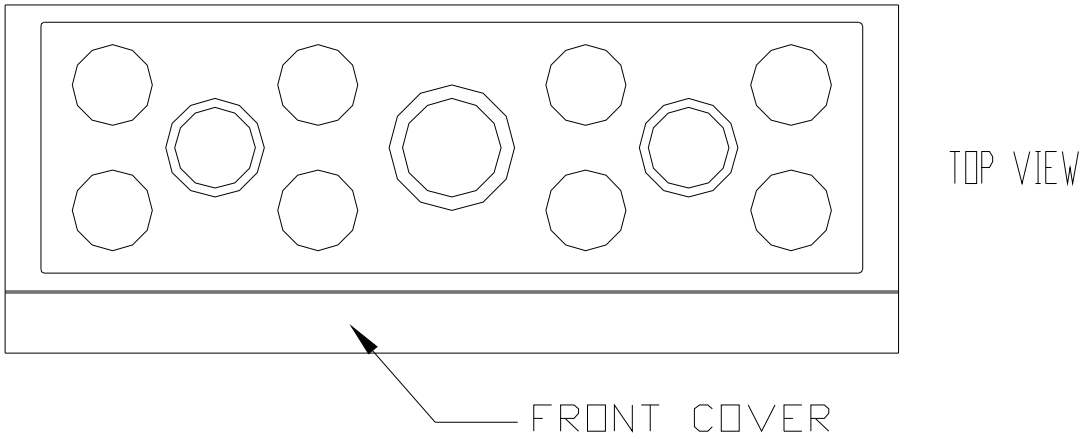


Fig. 21: Knock-out Plugs

External Relay Setup:

The Relay module is offer with three different types of relays, mechanical and solid state (AC or DC). The mechanical relay's output consists of terminal 4 - common (COM), terminal 3 - normally open (NO), and terminal 2 - normally closed (NC) (see FIG 22). The mechanical relay (OMRON G2R-1-SN) is rate for a maximum of 10A @250VAC or 10A @30VDC. Relay drive current for mechanical relay is 70mA @ 5VDC. The solid state relay's output consists of terminal 3 and 4 - normally open (NO). The solid state relay (OMRON G3R-OA202-SZN / G3R-ODX02SN-DC524) is rated for a maximum of 2A @100-240VAC / 2A @5-48VDC. Relay drive current for solid state relay is 11mA @ 5VDC. The relay control is described in Parameter Setup Section. Table 14 lists the scale signal cable wire color control for each relay module.

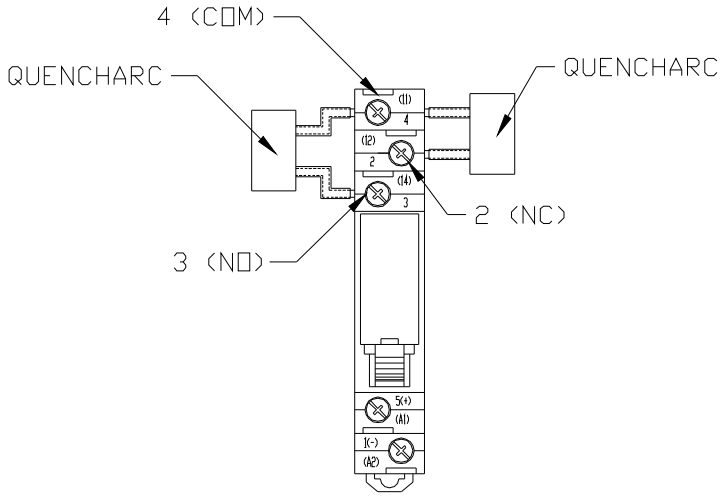


Fig. 22: Mechanical Relay Module

Module	Terminal	Conductor Color
Relay 1	1(-) A2	Brown
Relay 2	1(-) A2	Red
Relay 3	1(-) A2	Orange
Relay 4	1(-) A2	Yellow
Relay 5	1(-) A2	Green
Relay 6	1(-) A2	Blue
Relay 7	1(-) A2	Purple
Relay 8	1(-) A2	Grey
Power Supply	Output +V	White
Power Supply	Output -V	Black

Table 14: Scale Signal Cable Color Code

Digital Output Setup:

Digital Output Terminal TB4 requires the jumper at JU11 and JU19 to be removed in order to be used with the External Relay Box option. Wiring connections for the signal cable to the Digital Output board are shown in Fig 23 below.

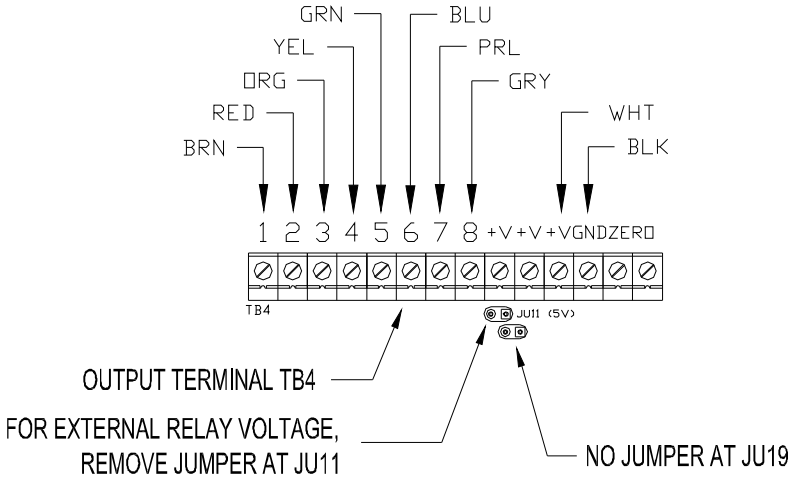


Fig. 23: Digital Output Wire and Jumper locations.

Digital Output Specifications:

Each Digital output consist of an current-sinking npn Darlington pair with an transient-

suppression diode and a 10K ohm pull-up resister connected to +V.

- Maximum current for single output is 200mA.
- Total current available for all outputs using the internal +6V supply is 280mA
- Total current available for all outputs using an external supply is 600mA.
- External power supply voltage range at +V is 5 - 35VDC.
- Maximum power dissipation is 1.5 watts with external power supply.

Note: Jumper at JU11 & JU19 should be removed when using an external power supply, see Fig 23.

Wired Ethernet Option

The Wired Ethernet Option (EXOPT101) connects your Excel Series scale to an Ethernet network. The Digital Output board equipped, with the Ethernet module, installs inside the washdown safe enclosure. The NEMA4X sealed RJ-45 Ethernet connector is bulkhead mounted to the rear panel of the indicator (See Fig 24).

The Wired Ethernet Option auto senses 10/100Base–T networks, so network configuration is simple. The Wired Ethernet Option is fully compliant with the 10/100Base-T Ethernet network standard, transferring data up to 100Mbps. Once the scale is connected you can collect data, remotely configure, or monitor the scale from any computer on the network.

Features and Applications:

- E-mail alerts are user definable based upon scale's setpoint status or fault event.
- Remotely configure your scale parameters.
- Collect and analyze scale process data.
- Monitor the scale status in real time.
- Remotely control the scale in real time.

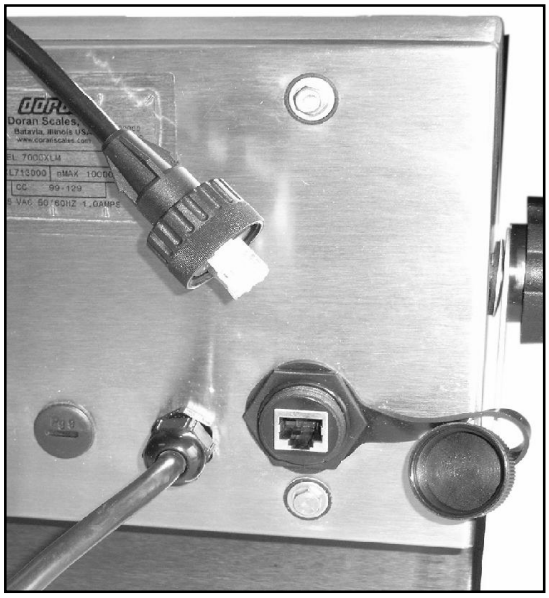


Fig. 24: RJ-45 Ethernet connector

Specifications:

Hardware: Bulkhead mount NEMA4X sealed RJ-45 connector

Network Interface: 10/100Base-T Ethernet protocol, Data rates up to 100Mbps
Universal IP address assignment
Static IP
DHCP
Operating Temp. 14° F to 104° F

Regulatory Approvals: FCC Part 15 Class B, FCC Part 15 Subpart C Sec. 15.247

Options: Washdown Safe RJ-45 Ethernet Connector Field Install Kit (EXOPT150)

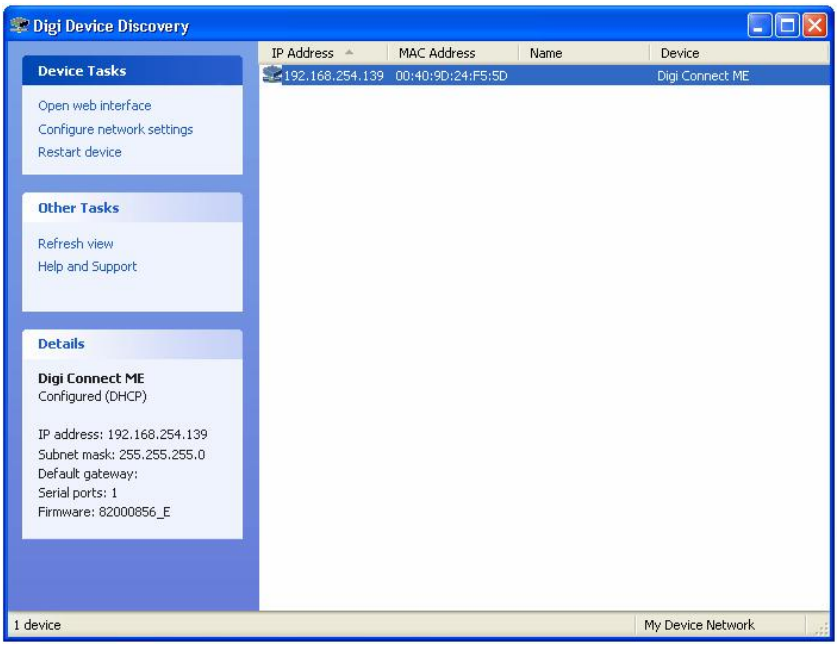
Doran Wired Ethernet Configuration Guide

The Doran Wired Ethernet option comes with a NEMA 4X washdown safe bulkhead mount connector on the rear of the scale. The mating field installable connector is available from Doran (P/N EXOPT150) and can be installed on customer supplied cabling.

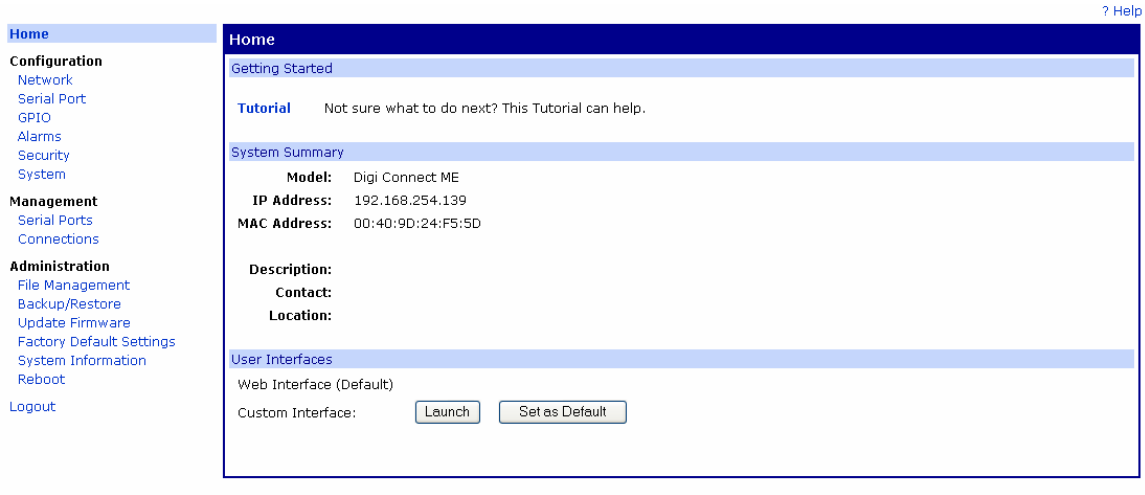
You have two options for Wired Ethernet, Static IP or a Dynamic IP address. Dynamic IP works with a DHCP server and is the default configuration. Each time the scale powers up, the network will assign a new IP address to the scale. If Dynamic IP is desired, simply connect the scale to your network switch and skip to step 6 of the following instructions.

Static IP addresses use the same IP address each time the scale connects to the network. No two devices can share the same IP address. For the Static IP address to always be available on the network, the server must be configured to reserve the Static IP address. To configure a Static IP address, follow the instructions below.

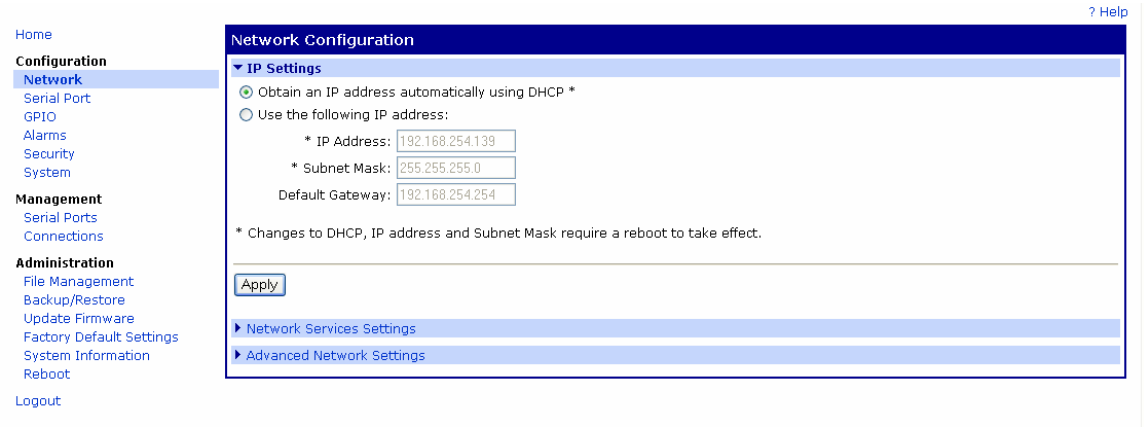
Run the *dgdiscvr.exe* software provided with the Doran Scale on a PC connected to the network and on the same subnet. When this program is executed, all Doran Wired and Wireless Ethernet devices connected to your network will be listed.



Highlight the device you want to configure and click on Open web interface. If you have multiple devices that are new to the network that need to be configured, the scale can be identified by the MAC address. The MAC address can be found just above the Ethernet connector on the rear of the scale.



If you wish to have a Static IP address, click on Network under the Configuration header on the left.



To configure to a Static IP address, click on Use the following IP address radio button and fill in the required network IP address fields. The IP Address field contains the current IP address assigned by the DHCP server. This IP address can remain the same if desired. When configuring the static IP address, be sure that no other device on your network is actively using this IP address. Be sure to reserve this Static IP address in the DHCP server to ensure another device will not be assigned this IP address. Once the IP address is confirmed and available on your network, click Apply to accept the changes.

To implement the changes, click on Reboot to reset the Wired Ethernet option. The webpage will briefly display Reboot In Progress. Once the reboot is complete, the web page will return to the device configuration home page. The web browser can now be closed.

Return to the Digi Device Discovery program from step 1 and click on Refresh View. Check to see if the newly configured device does appear on the list of connected devices with the proper IP settings. Highlight the Ethernet device by clicking on it and

the device settings will be shown in the Details window on the left of the program window. The device will show that it is configured and the IP address status will be shown to be DHCP or Static. Be sure that the device does not have a red explanation mark next to it in the main window. A red explanation mark indicates the device can be configured, but does not have the correct IP address required to communicate with your pc for data collection and scale configuration purposes. If necessary, reconfigure the scale with the proper IP Address, Subnet Mask and Default Gateway. If the network connection icon is displayed as shown in the Digi Device Discovery screen shot above, you can communicate with the scale from your PC.

Module LED Description

The Wired Ethernet module has two types of LEDs.

Amber (Yellow) LED, located top left on module indicates Network link status. Off - No electrical connection to network. On - Electrical connection to network.

Green LED, located top right on module. Normally off, blinks to indicate network activity.

Wireless 802.11b Ethernet Option

The Wireless Ethernet Option (EXOPT102) connects your Excel Series scale to an wireless network. The Digital Output board equipped, with the Wireless Ethernet module, installs inside the washdown safe enclosure. The antenna is bulkhead mounted to the rear panel of the indicator and sealed for harsh environments as well, see Fig 25.

The Wireless Ethernet Option lets you put your scale almost anywhere in the building, without the cost and hassle of running cables. Once the scale is connected, you can collect data, remotely configure, or monitor the scale from any computer on the network.

The Wireless Ethernet Option is fully compliant with the 802.11b wireless network standard, transferring data at up to 11Mbps in the 2.4GHz radio band. Wireless communications is protected by up to a 128-bit security encryption.

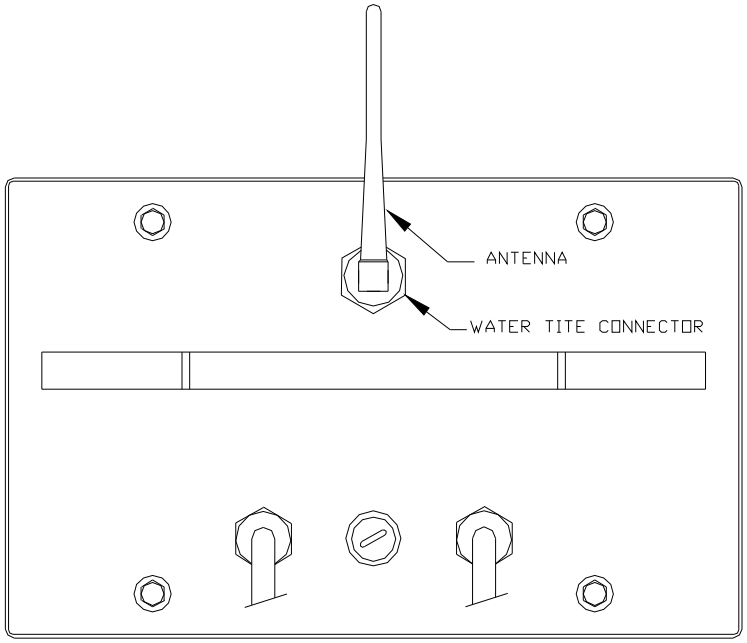


Fig. 25: Wireless Ethernet Antenna

Features and Applications

- E-mail alerts are user definable based upon scale's setpoint status or fault event.
- Remotely configure your scale parameters.
- Collect and analyze scale process data.
- Monitor the scale status in real time.
- Remotely control a the scale in real time.
- No communication cables to connect.

Specifications:

Hardware: Bulkhead mount 2.4 GHz Dipole Antenna

Network Interface: 802.11b Ethernet Protocol
Data rates up to 11Mbps
Universal IP address assignment
Static IP
DHCP
2.4 GHz Frequency
16 dBm Transmitting Power
Receiving Sensitivity
-82 dBm at 11 Mbps
-92 dBm at 1 Mbps
Operating Temp. 14° F to 104° F

Wireless Security: WPA (Wireless Protected Access)
128-bit TKIP Encryption
802.1x EAP Authentication
WEP (Wired Equivalent Privacy)
64/128-bit RCA Encryption

Regulatory Approval: FCC Part 15 Class B
FCC Part 15 Subpart C Sec. 15.247

Doran Wireless Ethernet Configuration Guide

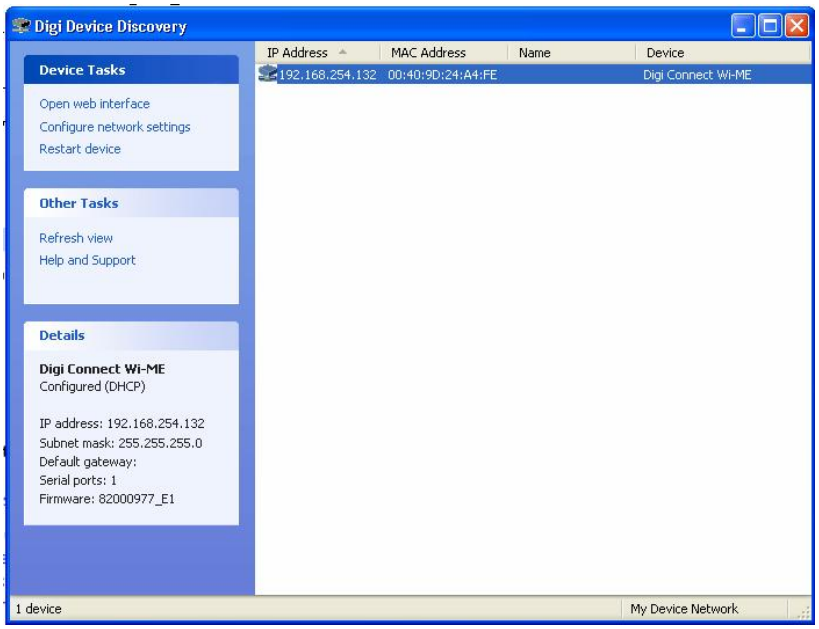
To connect your Doran Wireless Ethernet option to your network, the Wireless Ethernet option will need to be configured to communicate with your Wireless Access Point (WAP). The WAP must be connected to your network and functioning properly. You will need a PC connected to the network – preferably through wired Ethernet, not through the WAP you are reconfiguring. Communications to devices and PCs connected to the WAP you are reconfiguring may lose communication when certain WAP parameters are reconfigured. Refer to the WAP supplied documentation to change WAP parameters.

Configure the customer supplied Wireless Access Point to broadcast the SSID.

Disable any WEP or WPA security in your WAP.

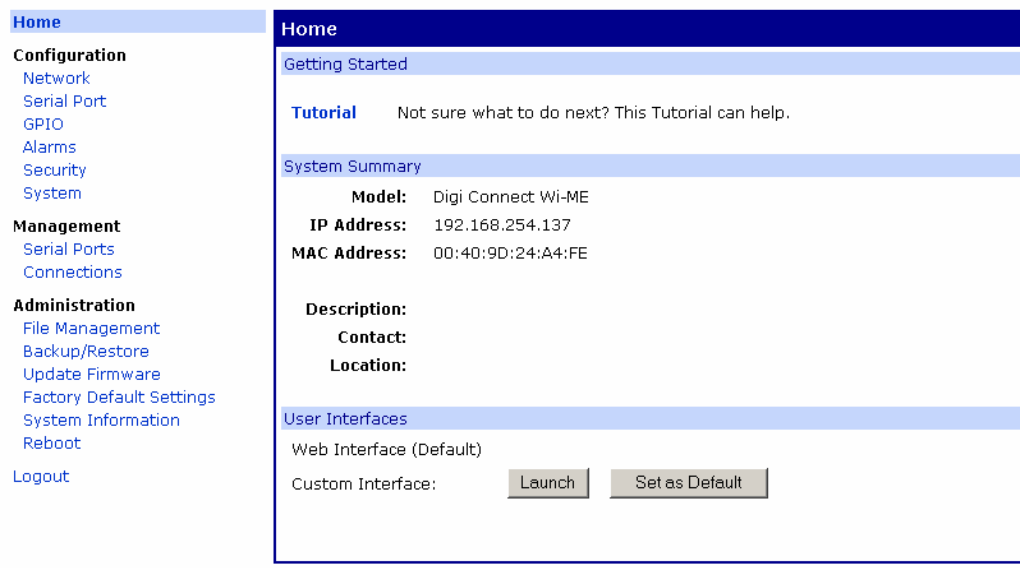
Turn on the Doran Scale with the Wireless Ethernet option installed. Be sure to have the scale near the WAP to prevent any interference with communication while configuring the Wireless Ethernet option. Wait 30 seconds after the scale is powered up to allow the Wireless Ethernet option to begin communications. The Wireless Ethernet option will connect to any WAP broadcasting an SSID without security enabled.

Run the *dgdiscvr.exe* software provided with the Doran Scale on a PC connected to the network. When this program is executed, all Doran Wired and Wireless Ethernet devices connected to your network will be listed.

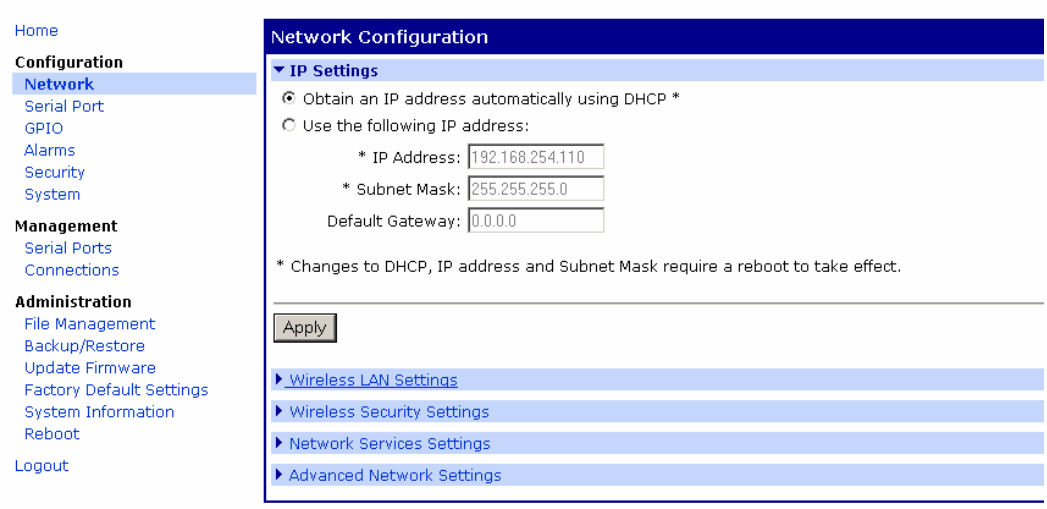


Highlight the device to be modified and click on Open web interface. If you have multiple devices that are new to the network that need to be configured, the scale can be identified by the MAC address. The MAC address can be found just above the antenna on the rear of the scale.
A web browser will be launched that will allow you to reconfigure the selected device as

seen below.

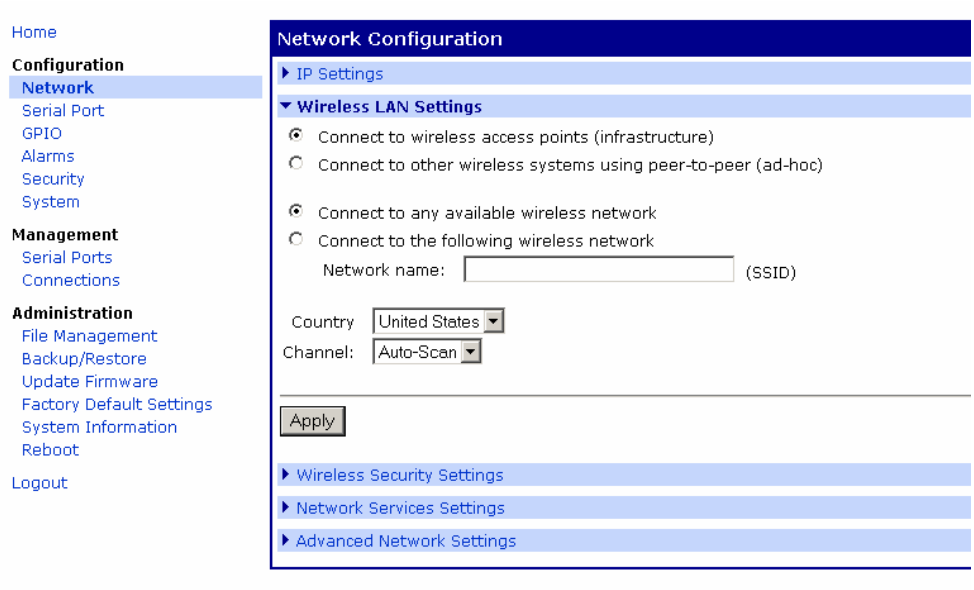


Click on Network under the Configuration header on the left.



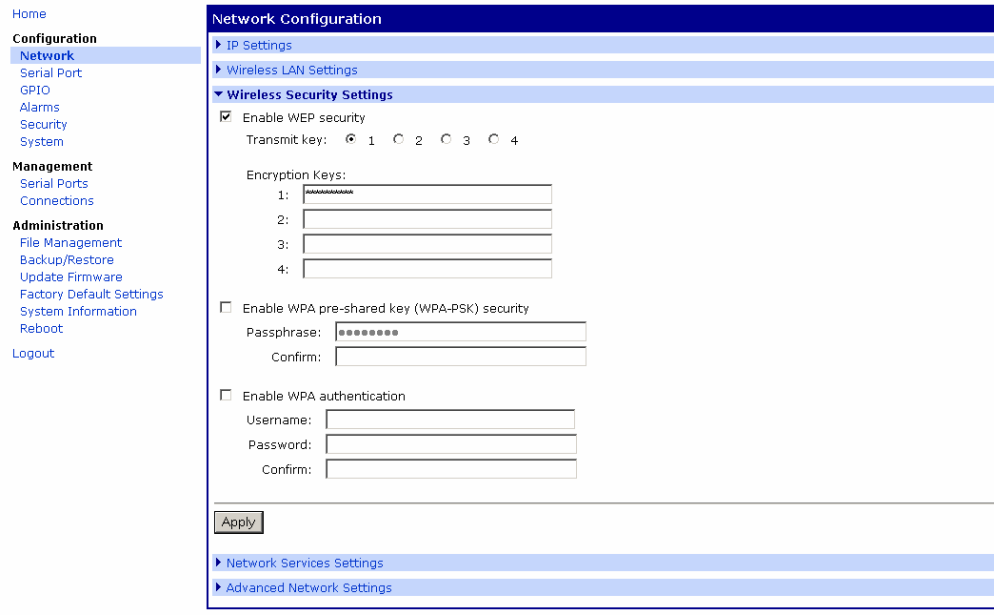
To configure to a Static IP address, click on Use the following IP address radio button and fill in the required network IP address fields. The IP Address field contains the current IP address assigned by the DHCP server. This IP address can remain the same if desired. When configuring the static IP address, be sure that no other device on your network is actively using this IP address. Be sure to reserve this Static IP address in the DHCP server to ensure another device will not be assigned this IP address. Once the IP address is confirmed and available on your network, click Apply to accept the changes.
To implement the changes, click on Reboot to reset the Wireless Ethernet option. The webpage will briefly display Reboot In Progress. Once the reboot is complete, the web page will return to the device configuration home page. The web browser can now be closed.

Click on Network under the Configuration header on the left. Click on Wireless LAN settings to configure security settings.



Select Connect to the following wireless network and enter the SSID (case sensitive) that the WAP is currently broadcasting and click Apply to save the changes.

If you are using WEP or WPA security on your WAP, click on Wireless Security Settings.



Click on the check box to enable any one of the available security settings. The WEP encryption key entry allows for 64 bit encryption (10 hex digits) or 128 bit encryption (26 hex digits). Use the encryption key or sign on that the WPA device will use. Once changes are made, click Apply to save the changes.

WARNING: Make sure to write down and save the security settings for the Doran

Wireless Ethernet option to be sure to be able to access the Wireless Ethernet option once the SSID and security settings are changed. If required, the Wireless Ethernet Option can be reset to factory defaults – see Defaulting Wired an Wireless Ethernet Moduled below.

The changes in security and SSID setting do not take effect until you click on Reboot under the Administration header on the left. Click on Reboot to confirm that a reboot is desired. At this point, you will have to reconfigure your WAP to the security settings to allow the Doran Wireless Ethernet option to communicate with the WAP. You may have to reboot your WAP after the changes are made. If the same SSID and security settings are not implemented, communication will fail.

Return to the Digi Device Discovery program from step 4 and click on Refresh View. Check to see if the newly configured device does appear on the list of connected devices with the proper IP settings. Highlight the Ethernet device by clicking on it and the device settings will be shown in the Details window on the left of the program window. The device will show that it is configured and the IP address status will be shown to be DHCP or Static. Be sure that the device does not have a red explanation mark next to it in the main window. A red explanation mark indicates the device can be configured, but does not have the correct IP address required to communicate with your pc for data collection and scale configuration purposes. If necessary, reconfigure the scale with the proper IP Address, Subnet Mask and Default Gateway. If the network connection icon is displayed as shown in the Digi Device Discovery screen shot above, you can communicate with the scale from your PC.

Module LED Description

The Wireless Ethernet module has two types of LEDs.

Amber (Yellow) LED, located top left on module indicates Network link status. **On** - unit is associated with an access point. **Blinking slowly** - unit is in ADHOC mode. (On 3.5 seconds, off 0.5 seconds, repeat.) **Blinking quickly** - unit is scanning for a network. (On 0.5 seconds, off 0.5 seconds, repeat.) **Blinking 1-5-1 sequence**: Confirming that the module has been defaulted to factory settings.

Green LED, located top right on module. Normally off, blinking to indicate network activity.

Doran Wireless 802.11b Ethernet Option
Factory Configuration Data Sheet

Please fill out this form to provide the customer's wireless access point configuration. Filling out this form will enable Doran to configure your Wireless Ethernet Option at our factory. Configuration at Doran will save you time and effort configuring the Wireless Ethernet Option when it arrives at your facility.

Please note that the Wireless Access Point may need to be configured to communicate with 802.11b devices. Not all Wireless Access Points will support all of the following configurations. Please print clearly when filling out this form.

IP Address Configuration (check one only)

___ Dynamic IP Address (typical)
___ Static IP Address

Static IP Address
Static IP address

_____ . _____ . _____ . _____

Subnet Mask

_____ . _____ . _____ . _____

SSID
The SSID is case sensitive and is less than 32 characters in length.

_____

Encryption Configuration (check one only)

___ WEP 64 bit
___ WEP 128 bit
___ WPA PSK
___ WPA Authentication

WEP Encryption Key Fields
WEP 64 bit encryption consists of 10 hex digits and 128 bit encryption consists of 26 hex digits.

_____ _____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____

WPA – Pre-Shared Key

The passphrase is 8 to 63 characters long.

_____

WPA – Authentication

User Name: _____

Password: _____

Doran Ethernet Option

Factory Configuration Data Sheet

IP Address Configuration (check one only)

___ Dynamic IP Address (typical)
___ Static IP Address

Dynamic IP Address

No further information is required. The server will automatically provide a new IP address each time the scale powers up. This is the typical configuration and is recommended for most applications. Each scale is identified on your network through a unique MAC address.

Static IP Address

Static IP address

_____ . _____ . _____ . _____

Subnet Mask

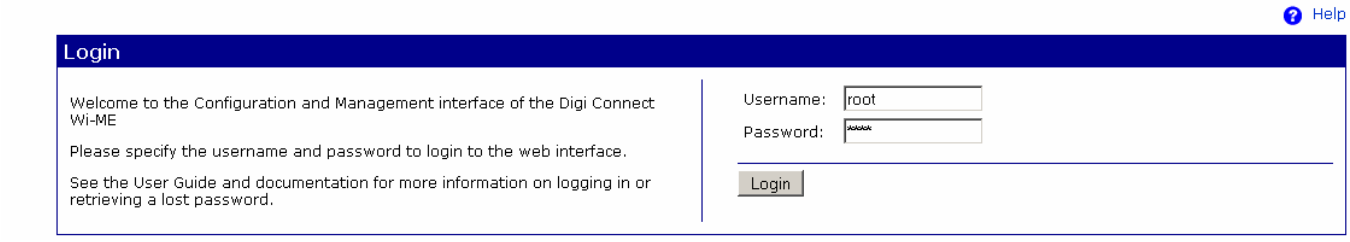
_____ . _____ . _____ . _____

Connecting to a scale through a web page

While connecting to a scale through a web page, the following window may be displayed.

Type the following to login to the scale:

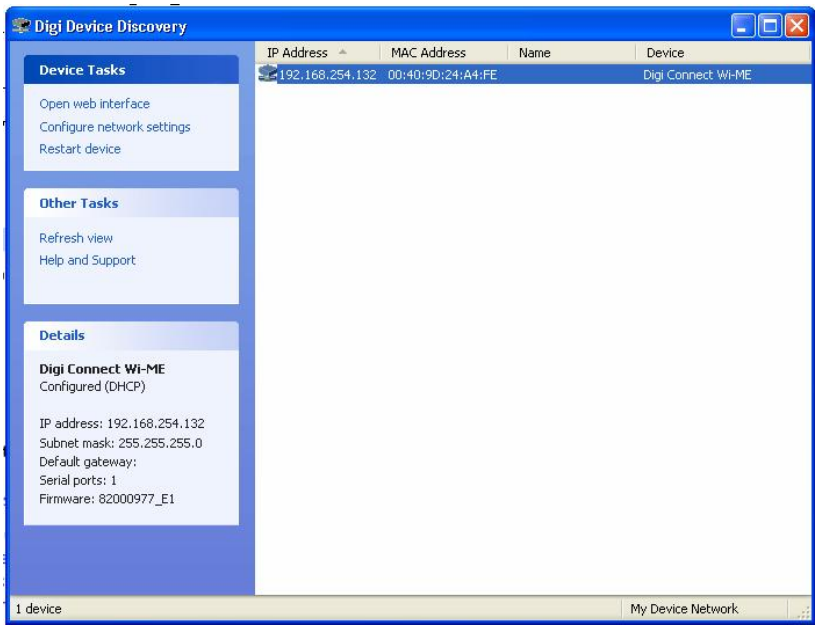
Username: **root**
Password: **dbps**



Defaulting Wired and Wireless Ethernet Modules

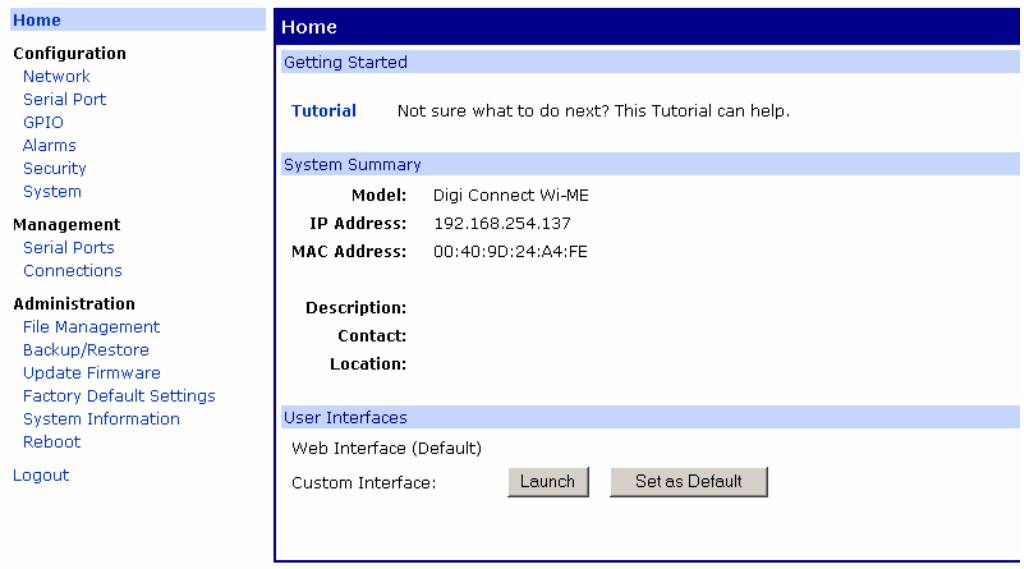
The wireless and wired Ethernet modules can be reset to factory defaults by shorting the two-pin header JU42 with the supplied jumper, while the unit is powered up. Once the amber (wireless) or green (wired) LED begins blinking a 1-5-1 pattern, remove the jumper. The module is now successfully defaulted. After about one minute the module will attempt to make a connection to a WAP without any security enabled. Once defaulted, the module needs to be configured for proper network communications.

Run the *dgdiscvr.exe* software provided with the Doran Scale on a PC connected to the network. When this program is executed, all Doran Wired and Wireless Ethernet devices connected to your network will be listed.

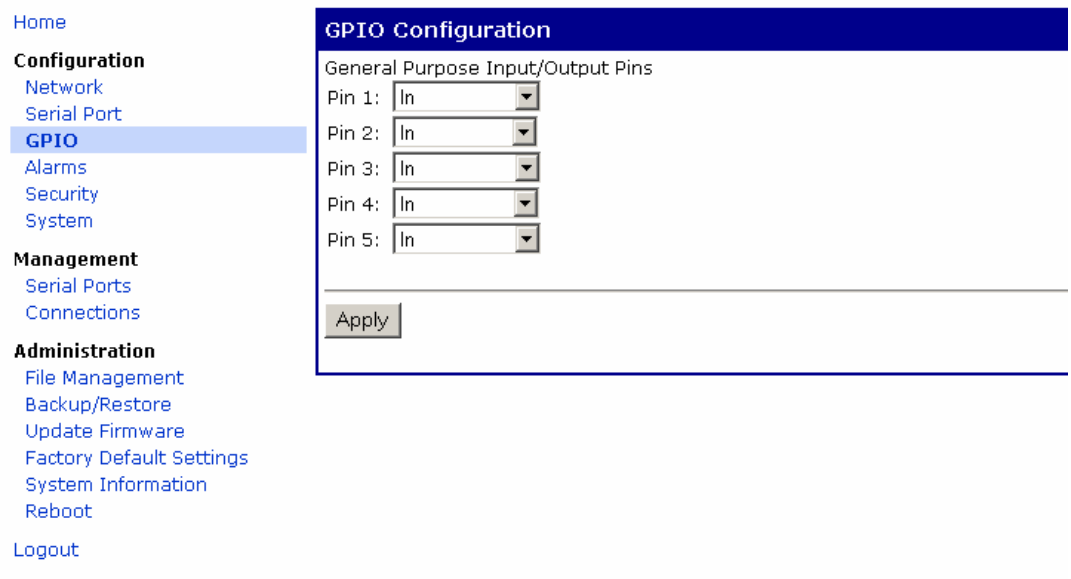


Highlight the device to be modified and click on Open web interface. If you have multiple devices that are new to the network that need to be configured, the scale can be identified by the MAC address. The MAC address can be found just above the antenna on the rear of the scale.

A web browser will be launched that will allow you to reconfigure the selected device as seen below.

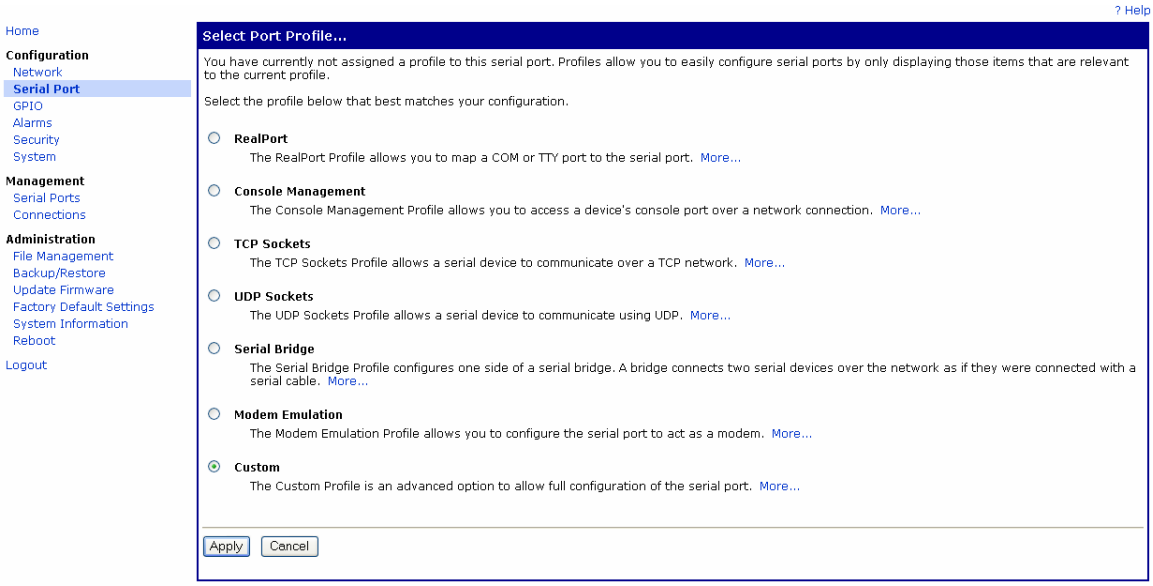


Click on GPIO under the Configuration header on the left



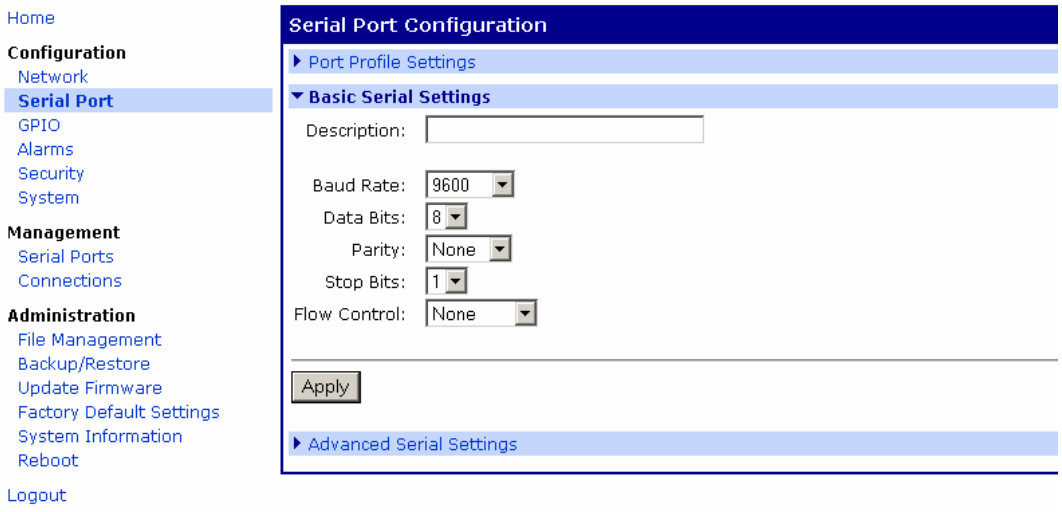
Reconfigure Pin 1 through Pin 5 to In and click apply.

Click on Serial Port under the Configuration header on the left.



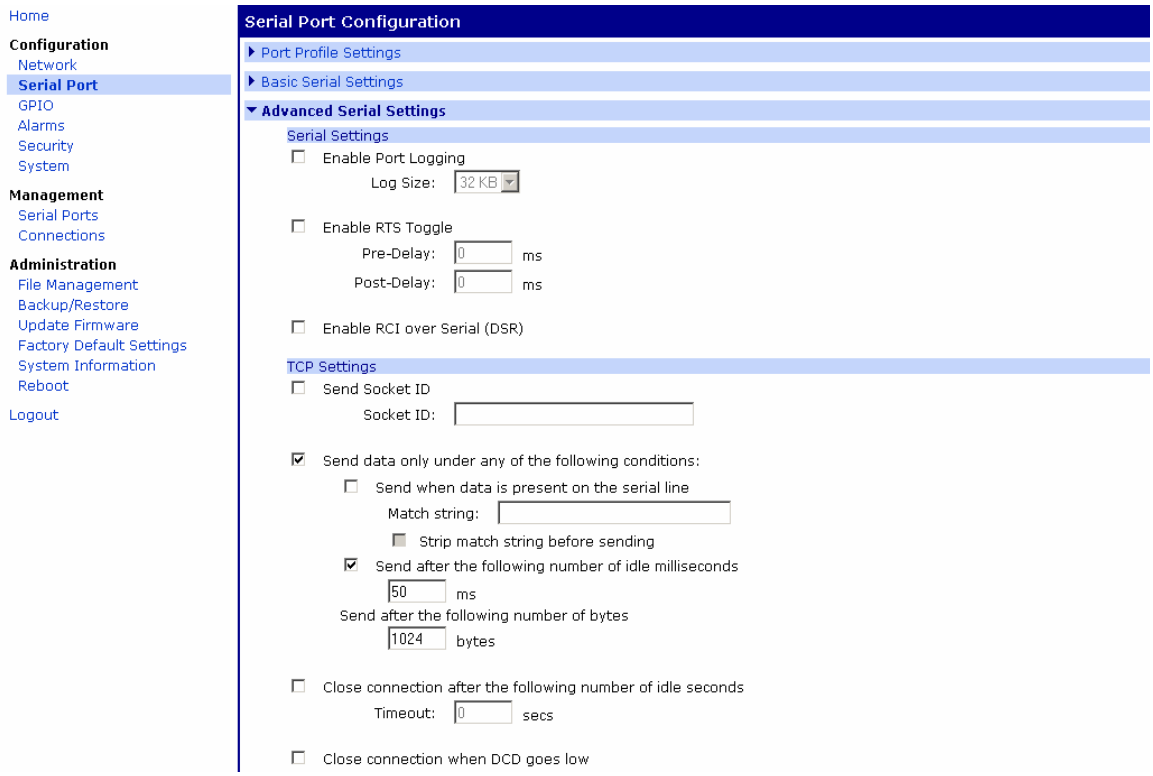
Click on Custom and click Apply.

Click on Basic Serial Settings at the bottom of the display window. You may have to scroll down to see this selection.



Change Flow Control to none and confirm the other settings are as shown above and click apply.

Click on Advanced Serial Settings, located just under the Apply button.



Select ‘Send Data only under any of the following conditions:’ by clicking on the selection check box.

Then select ‘Send after the following number of idle milliseconds’ and set the ms setting to 50.

You can now reconfigure the Wireless and Wired Ethernet Module.

USB Option

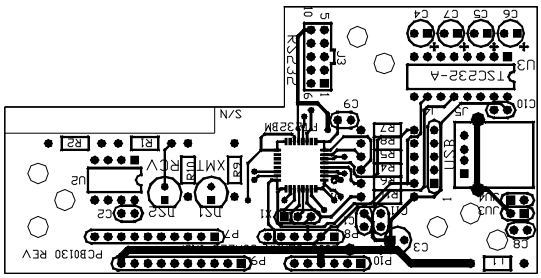


Fig. 26: USB option board

USB Windows Drivers

Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.

Web page link for latest software drivers: http://www.ftdichip.com/Drivers/VCP.htm
Select Driver Version for Device: FT232B.

Installation For Windows XP:

1. It is highly recommended that you disconnect your computer from the Internet prior to connecting your USB scale. This will allow for the latest drivers to be installed on your system. If a connection to the Internet exists, Windows may silently install older or incompatible versions of the USB driver. To disable your connection to the Internet, unplug your Ethernet cable or perform the following procedure:

   a) Click on **Start>Control Panel**
   b) Double-click on **Network Connections**
   c) Right-click on your network connection (usually "**Local Area Connection**")
   d) Click on **Disable**

2. If earlier versions of the driver are already installed on this computer, they will need to be removed. Refer to the section **Removal For Windows XP** section below.

3. Plug in your scale and connect the USB cable between the scale and your computer. This will launch the Windows Found New Hardware Wizard. Select **Install from a list or specific location (Advanced)**. Click the **Next >** button to continue.

4. Select **Search for the best driver in these locations** and enter the path to the driver directory on the installation CD. This should be D:\ USB Drivers, where D is the driver letter of your CD ROM drive. Click the **Next >** button to proceed.

5. If a dialog appears indicating that the driver has not passed Windows Logo testing, click on **Continue Anyway**. A dialog will then appear showing the installation status while the driver is being installed. When finished, the following dialog will appear confirming the installation. Click on **Finish** to complete the installation.

6. This has installed the serial converter. Another "**Found New Hardware Wizard**" window will appear to install the COM port emulation driver. Repeat steps 4 and 5.

7. The scale will now appear as a communications (COM) port and can be accessed by any program capable of interfacing with a COM port. Doran's Dimension and Excelerator programs are good examples, as well as Window's HyperTerminal. To determine the currently active COM ports, perform the following procedure:

   a) Click on **Start>Control Panel**
   b) Double-click on **System**
   c) Click on the **Hardware** tab at the top of the screen
   d) Click on **Device Manager**
   e) Click on the plus sign (**+**) to the left of **Ports (COM & LPT)**
   f) A list of active COM and LPT ports will now be listed. The Doran USB COM port(s) will be listed as **USB Serial Port (COM#)**, where # is the number of the serial port.

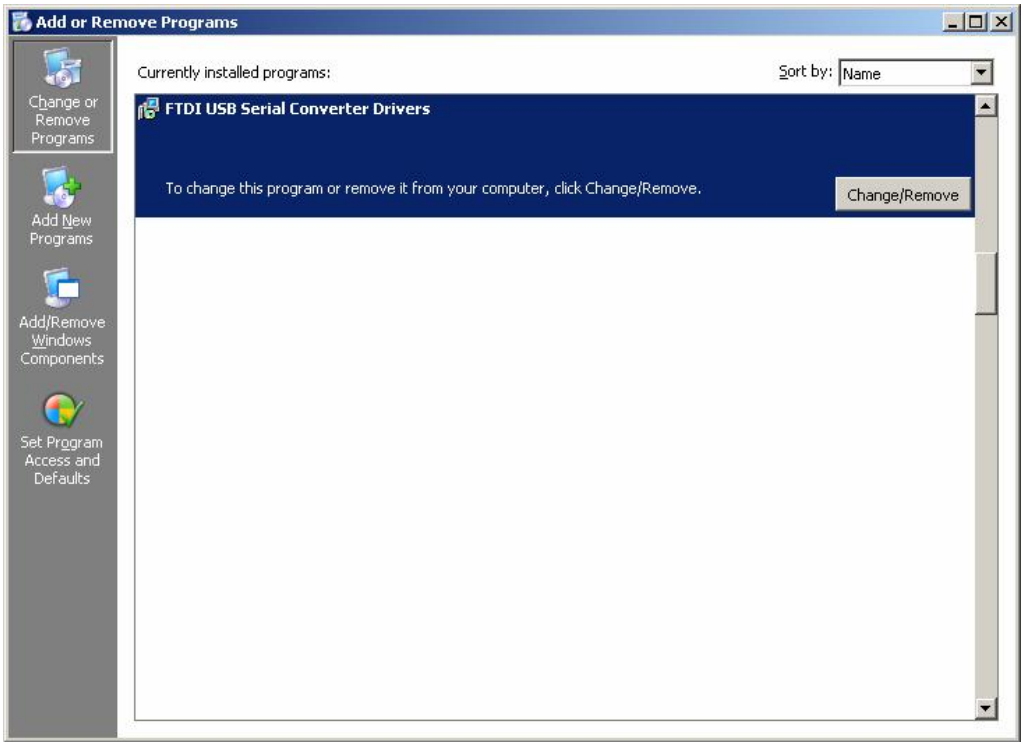
8. If your Ethernet cable was unplugged earlier, plug it back in now. If you disabled your network connection, perform the following procedure:

   a) Click on **Start>Control Panel**
   b) Double-click on **Network Connections**
   c) Right-click on your network connection (usually "**Local Area Connection**")
   d) Click on **Enable**

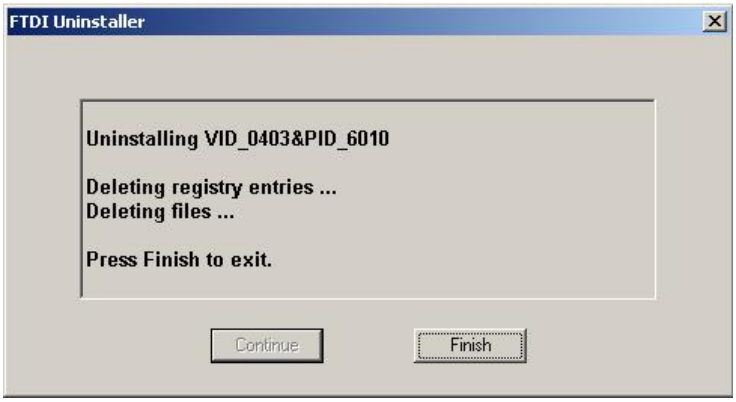
Removal For Windows XP:

Uninstalling drivers should be done through the **Add/Remove Programs** utility. Other methods may leave fragments of the driver that may interfere with future installations.

1. Click on **Start**.
2. Click on **Control Panel**.
3. Double-click **Add or Remove Programs**.
4. Locate the program called **FTDI USB Serial Converter Drivers** and click on **Change/Remove**.



5. The following window will be displayed. Verify all scales are disconnected from the computer and click on **Continue**.



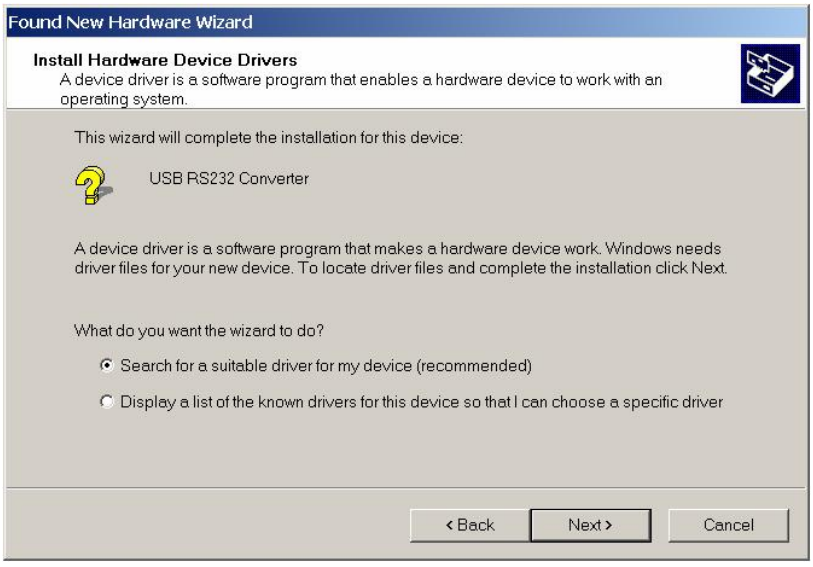
6. The drivers will be removed and the following window will be displayed. Click on **Finish** to exit.

Installation For Windows 2000:

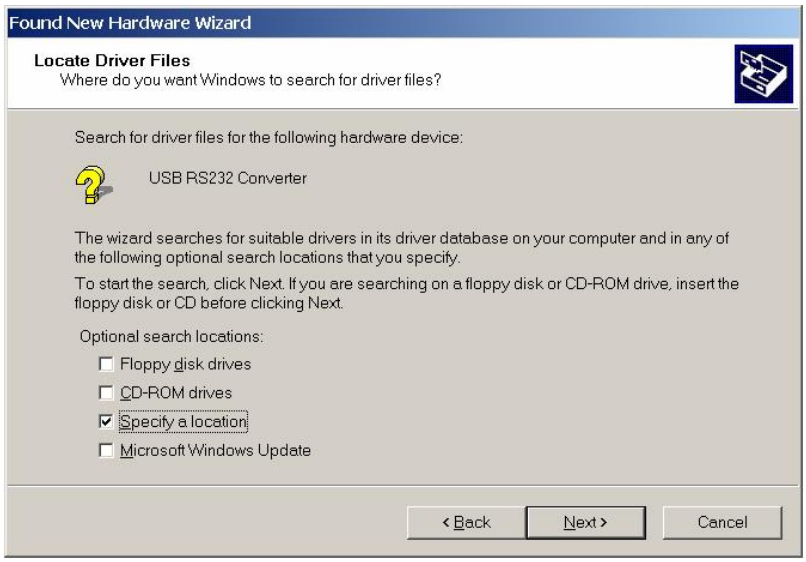
1. If earlier versions of the driver are already installed on this computer, they will need to be removed. Refer to the section **Removal For Windows 2000** section below.

2. Plug in your scale and connect the USB cable between the scale and your computer. This will launch the Windows Found New Hardware Wizard. Click on **Next >** to continue.

3. Select “**Search for a suitable driver for my device (recommended)**” and then click **Next >**.

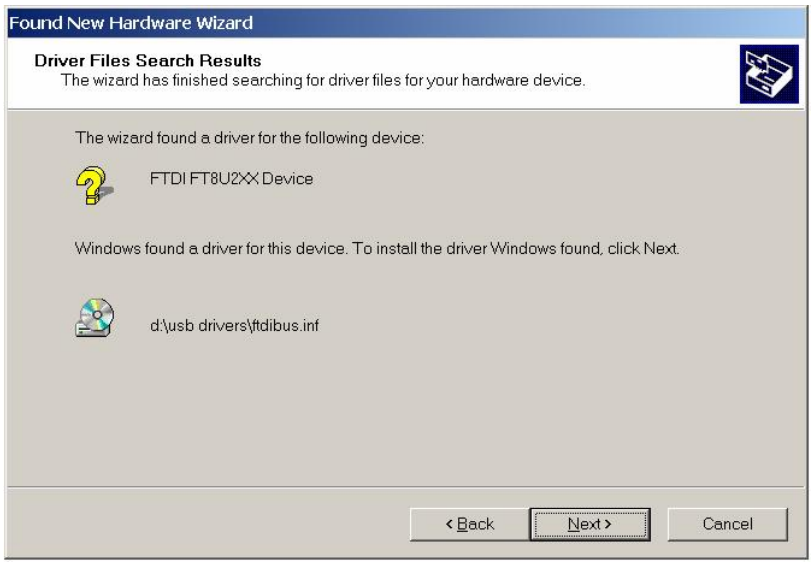


4. Check the box next to “**Specify a location**” and uncheck all other boxes as shown below.



5. Clicking **Next >** displays a window asking for the location of the drivers. Enter “D:\USB Drivers” as shown below, where “D” is the driver letter of your CD ROM drive.

6. The following window will be displayed. Click on **Next >** to continue.



7. Windows will now begin installation. After the drivers have been installed, the following window will be displayed indication a successful installation. Click on **Finish** to exit.

8. This has installed the serial converter. Another "**Found New Hardware Wizard**" window will appear to install the COM port emulation driver. Repeat steps 4 and 5.

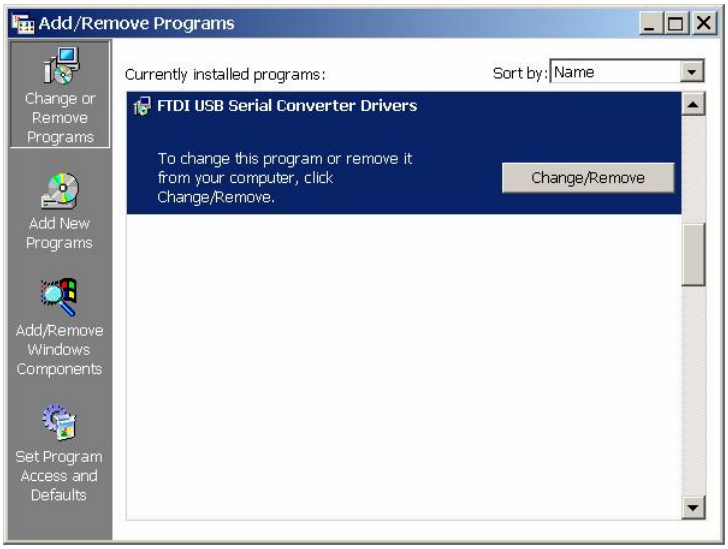
9. The scale will now appear as a communications (COM) port and can be accessed by any program capable of interfacing with a COM port. Doran's Dimension and Excelerator programs are good examples, as well as Window's HyperTerminal. To determine the currently active COM ports, perform the following procedure:

   a) Click on **Start>Control Panel>System**
   b) Click on the **Hardware** tab at the top of the screen
   c) Click on **Device Manager**
   d) Click on the plus sign (**+**) to the left of **Ports (COM & LPT)**
   e) A list of active COM and LPT ports will now be listed. The Doran USB COM port(s) will be listed as **USB Serial Port (COM#)**, where # is the number of the serial port.

Removal For Windows 2000:

Uninstalling drivers should be done through the **Add/Remove Programs** utility. Other methods may leave fragments of the driver that may interfere with future installations.

1. Click on **Start**
2. Click on **Settings**
3. Click on **Control Panel**
4. Click on **Add/Remove Programs**
5. Locate the program called **FTDI USB Serial Converter Drivers** and click on **Change/Remove**.



The following window will be displayed. Verify all scales are disconnected from the computer and click on **Continue**.

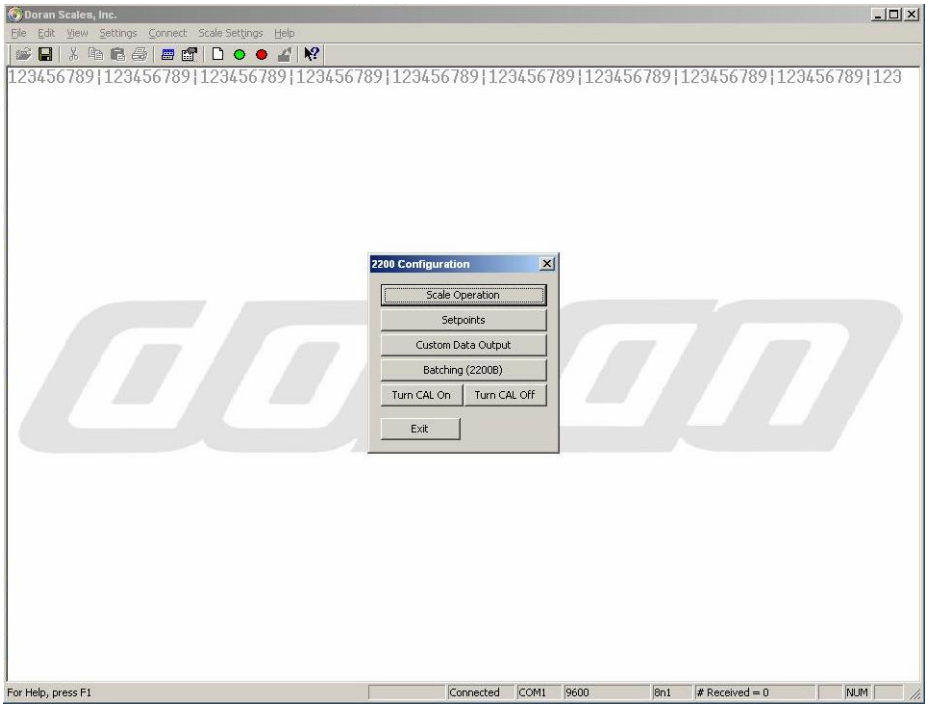
6. The drivers will be removed and the following window will be displayed. Click on

Finish to exit.

Dimension Software

Description:

The Dimension Software allows the users to view a remote scale and change parameters, setpoints, and collect data from any computer connected to the network. **Note:** To enter or modify parameter values in scale's memory, the scale must be in CAL mode first.



Barcode Scanner

Two different types of barcode scanners are offer as a option for the Model 2200 and 2200B. The Model QS2500 (EXOPT178) is a standard duty, non-washdown scanner, see Fig. 27. The Model PS7000 (EXOPT0177) is a heavy duty, washdown (IP65) scanner, see Fig. 30.

Fig. 27: QS2500, EXOPT178

QS2500 Setup Connections

The Model QS2500 scanner is connected to the scale by way of the P2 terminal. See Fig. 28 for scanner wiring connections to P2 terminal on scale's main board.

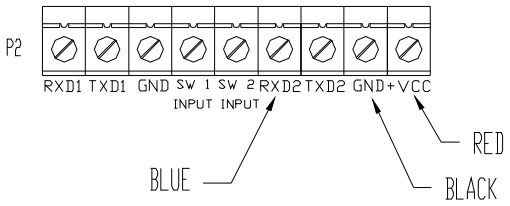


Fig. 28: QS2500 wiring connections

QS2500 Scanner Resetting Defaults

If you are not sure what programming options are in your scanner, or you've changed some options and want the factory settings restored, scan the Default Settings bar code in Fig. 29. This will copy the factory configuration for the currently active interface to the current configuration. Scanner will beep twice and/or flash the green led to acknowledge that programming has been successful.

START

Default Value
Initialization

Fig. 29: QS2500 Default Settings Barcode

QS2500 Scanner Configuration

The QS2500 barcode scanner does not require any additional programming to interface with the scale.

Fig. 30: PS7000, EXOPT177

PS7000 Setup Connections

The Model PS7000 scanner is connected to the scale by way of the P2 terminal. See Fig. 31 for scanner wiring connections to P2 terminal on scale's main board.

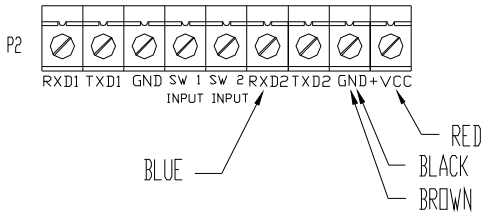


Fig. 31: PS7000 wiring connections

PS7000 Scanner Resetting Defaults

If you are not sure what programming options are in your scanner, or you've changed some options and want the factory settings restored, scan the Default Settings bar code below in Fig. 32. This will copy the factory configuration for the currently active interface to the current configuration. Scanner will beep twice and/or flash the green led to acknowledge that programming has been successful.

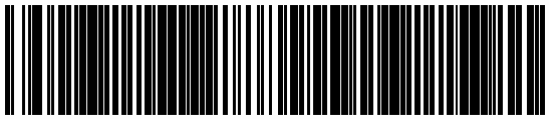


Fig. 32: PS7000 Default Settings Barcode

PS7000 Scanner Configuration

To configure PS7000 barcode scanner to interface properly with the scale. Scan in the following series of barcodes in Fig. 33. Scanner will beep twice and flash the green led to acknowledge that configuration has been successful.

START

Label ID Transmission disabled

END

Fig. 33: Configuration Barcode

Barcode Scanner Test

Enter ID edit mode by pressing ID push button. Press 0 button to clear current ID value. The ID value of "0" will be flashing on the scale's front display. Point the scanner at the barcode shown in Fig. 34 and pull the trigger. The scanner will beep when data has been read successfully. The display will momentarily show "Id" then "SAVEd" followed by the scanned in value of "123456". Press Clear button to exit Id edit mode.

Warning: The current ID value stored in memory will be erased by performing this test.

123456

Fig. 34: 123456 Barcode

1.00	*1.00*
12.500	*12.500*
25	*25*
0.255	*0.255*
3.5	*3.5*
ET5.50	*ET5.50*

Fig. 35: Barcode Examples

Troubleshooting

General problem resolution:

Problem:	What to Do or Check:
Weight reading will not repeat or scale does not return to zero when weight is removed.	Make sure that there is nothing caught in the platform under or around the load cell or spider interfering with its movement.
Scale overloads early.	Make sure all four corner overload stops are properly set, if present. Take the platter off the scale, invert it and place it back on the spider. With 1/2 of the scale's capacity in test weights concentrated over a corner of the platform, there should be approximately 1/32" of clearance between the stop and the bottom of the spider. Check all four corners then recalibrate the scale. If the problem persists, it is possible that the scale is being shock-loaded causing the load cell to be shifted.
Scale will not indicate full capacity or go into overload.	Make sure that there is nothing caught in the scale under or around the load cell or spider, which would interfere with their movement. If not, check the overload stops using the above procedure.
Scale will not come to zero when the ZERO button is pressed.	Make sure that the scale is stable ("MOT" annunciator is off) when ZERO is pressed. If excessive motion is a problem, then it may be necessary to activate the latching print feature (P0d) or lengthen the filter time (Avg C32). If the scale is stable, the scale may be set to the Canadian Legal for Trade (4% zero bandwidth). An attempt is being made to zero more than 4% of capacity (see Parameter Setup section). There may be a problem with the touch-panel or main board.
Weight readings don't seem to be correct.	Check the scale's accuracy with a test weight. Recalibrate if necessary.
Scale drifts off of zero.	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the AZT aperture to a wider setting to compensate (see Parameter Setup section).
Scale drifts off of zero.	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the AZT aperture to a wider setting to compensate (see Parameter Setup section).
Scale reading is bouncing or "flighty".	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the Digital Averaging to a higher setting to stabilize the reading (see Parameter Setup section).

If you are still experiencing a problem with your scale, or if the problem you are having is not covered in the above list, please contact your Doran Scales authorized dealer.

Scale Messages:

Message	Meaning
"donE" Function complete.	The scale has successfully completed the requested action.
"Abort" Aborted function.	The requested action has been canceled prior to completion.
"SAVEd" Parameter value saved.	The scale has successfully store and verified parameter value in nonvolatile memory.
"rEL Pb" Release push button.	The scale has detected that a key has been depressed for more than 3 seconds.
"Ent Cd" Enter code	Enter password code, shown only when using the Front Panel CAL Access Feature.
"Clr Ac" Clear accum/counter	The Accumulator and Counter values are clear out of nonvolatile memory.
"SU nEU" New firmware installed	This message appears when the scale detects that new firmware has been loaded into flash memory.
"CLr tr" Clear Tare weight	This message appears when a zero weight is entered for a tare value. Scale will switch to gross mode.
"SEtUP" Serial Setup Mode	When the scale is connected to a computer running the Scale Setup software.

Error Messages:

Error Message	What to Do or Check:
"ovr Ld" Scale overload	The scale is in overload. The load on the scale exceeds the capacity by more than 103%. Remove excess weight from scale.
"udr Ld" Scale underload	The scale is in underload. The load on the scale is less then the minimum scale capacity by more than -20%. Recalibrate scale or add additional dead load.
"grS oL" Gross overload	The scale is in gross overload. The load exceeds the scale ratings and might result in damage to the scale. Remove excess weight immediately. Ignore this message for the first 5 seconds after power up.
"grS uL" Gross underload	The scale is in gross underload. The load exceeds the minimum scale ratings and might result in damage to the scale. Load cell connections might be wired in reverse. Ignore this message for the first five seconds after power up.
"SU 0 E" Startup zero error	The scale was not stable. This error will only occur in Legal for Trade applications. The scale will zero once it becomes stable.
"Er Ad" A/D failure	The scale has detected a failure in A/D circuit. Have scale serviced by a qualified scale repair technician.
"Er Sr" SRAM error	The setup parameters loaded in nonvolatile memory (SRAM) have become corrupted. The scale requires recalibration by a qualified scale technician.

"Err 1" Program ROM error	The program memory in the scale has become corrupted. Have scale serviced by a qualified scale repair technician.
"Ldg 0" Loading zero.	The scale is attempting to load power up zero. This message will remain until scale is stable.
"SPAn E" Calibration Range Error	Calibration zero is out of range, refer to A/D Ranging section for additional information.
"Er neg" Negative Weight Error	Weight is negative range, Load cell signal wires backwards, refer to A/D Ranging section for additional information.
"Er nno" Motion Error	Weight readings are unstable. Too much vibration occurs during weight entry. Load cell signal wires are not connected.
"rAErr" Calibration Span Error	Calibration Span is out of range, refer to A/D Ranging section for additional information.
"No SAV" Parameter value not saved.	The scale has <u>not</u> successfully store or verified parameter value in nonvolatile memory.
"Er Cnt" Count by Error.	The weight value entered has a smaller count by step then the scale's current count by resolution.
"Er dp" Decimal Point Error.	Too many digits to the right of the decimal point have been entered for capacity.
"CAP rg" Capacity Range Error.	Capacity weight entered, has more than three non-zero digits in a row.
"CAP Lo" Capacity weight is too low.	Capacity weight entered is less than 1 lb or kg.
"CAP 0" Capacity weight equals 0.	A zero weight has been entered for Capacity.
"Er bAt" SRAM low battery	Low battery voltage warning in nonvolatile memory (SRAM). The scale requires recalibration by a qualified scale technician.
"Er CLO" time/date clock error	The time / date has failed. The scale requires recalibration by a qualified scale technician.

Grading Products Application Note

Grade and show product weight (gSt):

The following instructions will configure the scale to display for 2 seconds a product's weight when removed from or added to a container. The product weight is determined from the difference between two stable weights. If the scale becomes unstable and then stable again before the 2 second hold timer has finished, the new weight difference is displayed. All Setpoint functions are only active during the 2 second hold period. (see Setpoint Operation Section). By using the Accumulator and Counter feature, the number of products and total weight can be stored. To activate the Accumulator and Counter feature, set the Printer Data Output "d.o." parameter to Auto Print 2 "A.P.2" (see Accumulator / Counter Operation Section). Another scale feature that can be utilized is the Digital Output Terminal TB4, which can be configured to indicate up to eight grades by way of lights or beepers.

Scale Configuration:

In order to setup the scale to operate in a grade and show product weight application. The Scale's Parameters must be configured to the following settings:

o.P.	= gSt.	Operation mode is set to Grading and show product weight.
Avg	= C8	Averaging mode set to 8 readings
nn.a.	= 0.5	Motion Aperture is set to 0.5 divisions
S.o. / SP	= HA	Setpoint Operation Menu, setpoint mode set to Active High.

Grade and show grade number (gnt):

When a product's weight is removed from or added to a container. The scale will display for 2 seconds, the current grade number (i.e. "111111" to "888888"). The grade number is determined by comparing each setpoint level with the product weight. If the product weight lies between two setpoint levels, the grade number would be the lower numerical setpoint number. For example, the product weight is 10 lbs., setpoint 3 is 9 lbs. and setpoint 4 is 12 lbs. The grade number shown on the display would be 3 or "333333", where SP 3 >= grade < SP 4. The setpoint testing sequence starts with the high to low setpoint number, i.e. weight >= setpoint 8 then weight >= setpoint 7 and so on. The product weight is calculated from the difference between two stable weights. If the scale becomes unstable and then stable again before the 2 second hold timer has finished, a new setpoint number is displayed. Output functions are only active during the 2 second hold period. (see Setpoint Operation Section). By using the Accumulator and Counter feature, the number of products and total weight can be stored. To active the Accumulator and Counter feature, set the Printer Data Output "d.o." parameter to Auto Print 2 "A.P.2" (see Accumulator / Counter Operation Section). Another scale feature that can be utilized is the Digital Output Terminal TB4, which can be configured to indicate up to eight grades by way of lights or beepers.

Scale Configuration:

In order to setup the scale to operate in a grade and show grade number application. The Scale's Parameters must be configured to the following settings:

o.P. = gnt. Operation mode is set to Grade and show setpoint number.
Avg = C8 Averaging mode set to 8 readings
nn.a. = 0.5 Motion Aperture is set to 0.5 divisions
S.o. / SP = HA Setpoint Operation Menu, setpoint mode set to Active High.

Positive Grading with blank weight display (gbP):

The following instructions will configure the scale to indicate grade number by lights only. Scale's weight display is disabled (blank). The product's grade is determined from a positive stable weight above the threshold level. If the scale becomes unstable or weight is below threshold level, grading lights will be blank. All Setpoint functions are only active during the weight is stable above the threshold level. (see Setpoint Operation Section). By using the Accumulator and Counter feature, the number of products and total weight can be stored. To activate the Accumulator and Counter feature, set the Printer Data Output "d.o." parameter to Auto Print 5 "A.P.5" (see Accumulator / Counter Operation Section). Another scale feature that can be utilized is the Digital Output Terminal TB4, which can be configured to indicate up to eight grades by way of lights or beepers.

Scale Configuration:

In order to setup the scale to operate in a grade and show product weight application. The Scale's Parameters must be configured to the following settings:

o.P. = gbP Operation mode is set to Grading lights only, weight display blank.
Avg = C8 Averaging mode set to 8 readings
nn.a. = 0.5 Motion Aperture is set to 0.5 divisions
S.o. / SP = bS Setpoint Operation Menu, setpoint mode set to Band Active High, only one setpoint active, stable weights.