4200 Checkweigher

WITH BARGRAPH

&

4100L Checkweigher

Digital Electronic Indicators

INSTRUCTION MANUAL

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INTRODUCTION

Congratulations! You have chosen the most technologically advanced, highest quality stainless steel checkweighing scale available today. The Doran Scales Model 4200 incorporates state-of-the-art CMOS microprocessor technology, full front panel programmability, and an environmentally sealed load cell to provide you, the user, with the ultimate in scale power, flexibility and reliability. This combination of the 4200's leading edge electronics with its rugged, stainless steel, gasketed construction and high quality, water resistant double-capacity load cell is designed to provide the highest degree of accuracy while maintaining the durability necessary to hold up to hostile industrial environments.

Major features of the 4200 that set it apart from other scales are:

- Fully front panel programmable
- Environmentally protected load cell
- 304 stainless steel construction
- Automatic push-button calibration
- Digital tare & over/under tolerance setability
- Push-button ZERO, GROSS/NET, TARE, UNITS and PRINT
- 20 Product memory for Tare, Over & Under (200 products optional)
- Bright, easy to read LED display
- Read weight in LB, KG, OZ, G, LB & OZ
- OVER-ACCEPT-UNDER Checkweigh Bargraph Indicator
- 1 Bi-directional Serial Data Port (Selectable baud rate, parity)
- 1 Serial Data Printer Port (Selectable baud rate, parity)
- Selectable print formats - includes a fully configurable print buffer
- User programmable features include:
  - -Analog Filter
  - -Digital Filter (display update rate/averaging)
  - -Zero tracking
  - -Push-button enable
  - -Keyboard activation annunciator
  - -Motion aperture
  - -Legal For Trade operation
  - -Data output modes
  - -Capacity and resolution

- Options:
  - -100 Product Memory (includes Time and Date and Setpoint Outputs)
  - -RS485, 20ma serial communications hardware configurations

Please be sure to read this entire manual to assure yourself of getting all the benefits of these and other advanced features of the Doran Scales Model 4200. This scale is backed by a full 2 year factory warranty. Please contact Sales Department for sales for ordering inquiries.

Section 1. Unpacking and Installation

Your Doran Model 4200 or 4100L is ready to unpack, install and put into use. These models (if ordered with a platform) have been carefully calibrated and packed at our factory. If you observe any shipping damage to the carton, immediately notify your shipper - Doran insures all shipments, but all damage claims must be made directly to the shipper.

There are 3 different 4200 types that can be ordered. The internal electronics and the front panels are all the same, but accessing the main board for setup and calibration is different for the 3 types. Whenever a procedure depends upon the enclosure type in this manual, the type is specified in the instructions. The 3 enclosures are pictured below.

In addition to the 4200 models, this manual covers the Model 4100L, which is a "Legal for Trade" version of the Model 4100 Checkweigher. The 4100L is identical to the 4200 electronically, but is different in the display and front panel. See Section 9 for information on the 4100L.
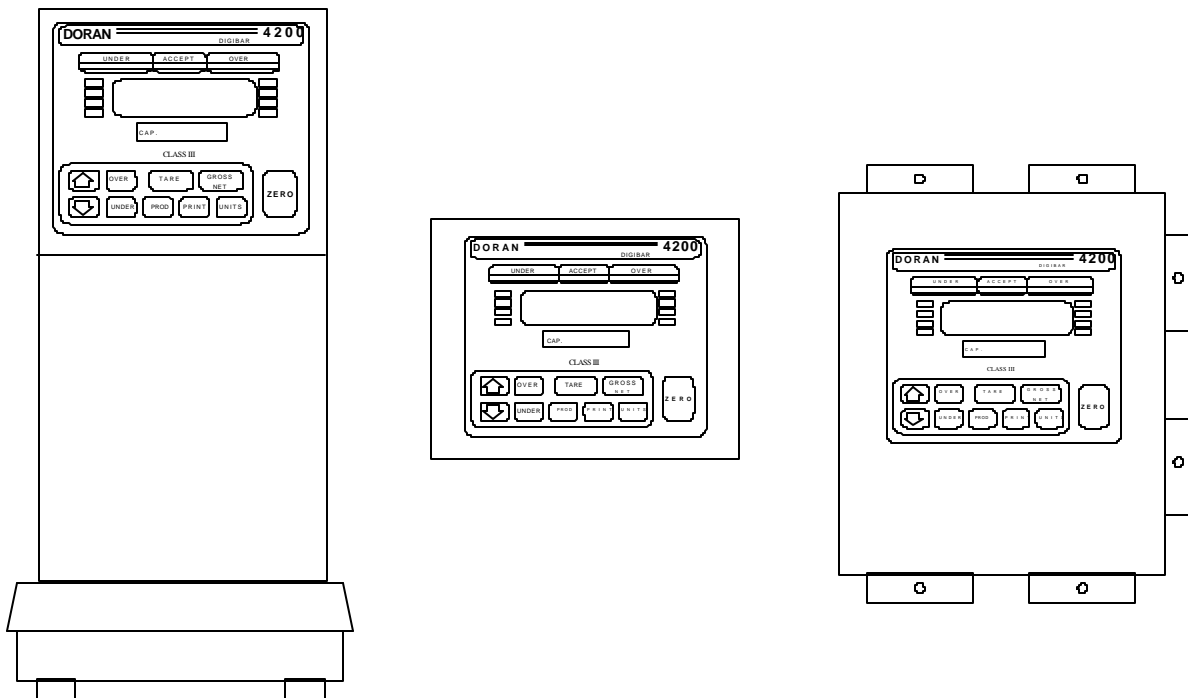
| 4200 Tower | 4200M | 4200RSS |

Figure 1. Model 4200 Enclosure Types

UNPACKING

Before proceeding to unpack your Model 4200, please note that although it is a highly durable industrial scale indicator, it is also a sensitive weighing instrument. Normal care should be taken when handling and using the indicator. Improper handling or abuse could be damaging and result in costly repairs that may not be covered by the warranty. Please observe the following precautions to insure years of trouble-free service from your Model 4200.

     * DO NOT drop the scale indicator or platform.

     * DO NOT immerse the scale indicator or platform.

     * DO NOT drop objects on the platform.

     * DO NOT pick up the scale platform by the "spider".

Carefully remove the Model 4200 from the shipping carton. Be sure to retain the shipping carton and all packaging material in case reshipment is required.

INSTALLATION

4200 Tower: Models with 10" x 10", 12" x 12", and 12" x 16" platforms are shipped in one piece (fully assembled). When unpacking models with 18" x 18", 18" x 24", and 24" x 24" platforms, note that the scale is shipped with the indicator column detached from the weighing platform. To attach the indicator column to the platform, first locate a suitable area at the edge of a table or bench that is taller than the indicator column assembly. Lift the indicator off the platform and set it aside. Note that the indicator and platform are connected by a 5' cable; be careful not to pull on this cable.

Remove the platter from the weighing platform and set it aside. Invert the platform and set it such that the side holding the four indicator column mounting bolts is at the edge of the table. Remove the four mounting bolts from the bottom of the mounting holes. Reinstall and tighten the four mounting bolts. The indicator column mounts to the support plate with 4 1/4"-20 x 1/2" hex head screws. Lift the indicator column and point it down towards the floor with the display facing the platform. Align the 4 mounting holes in the base of the column with the corresponding 4 holes in the support plate. Install and tighten the 4 hex head screws.

Place the scale in the desired position. Level the platform by adjusting the four corner feet until the bubble in the bubble level, located beneath the top platter of the platform is within the center circle. After a level condition is achieved, test for a stable condition by trying to rock the platform backward and forward and side to side. Adjust the feet beneath the indicator column for final levelness and stability.

4200RSS: The indicator box must be mounted to a vertical surface using the mounting flanges on the top and bottom of the case. Access to the internal wiring is accomplished by loosening the front cover latch screws and swinging the front cover open.

4200M: Locate the desired position for the scale indicator. If the indicator is to be permanently mounted to a wall, shelf, or counter, remove the mounting bracket from the indicator. Use the two holes provided in the bracket to affix it to the desired surface. Before mounting the indicator into the bracket, connect the scale platform and any data or communications cables to the indicator. Insert one of the threaded studs into one of the mounting holes on the bracket. Now gently spread the sides of the bracket apart and insert the other stud into the hole on the opposite side. Loosely thread the two knobs back onto the studs. Adjust the indicator to the desired viewing angle and tighten down the knobs.

When choosing a location for the weighing platform, keep in mind that it should be on a sturdy surface that is free from vibration and air currents. Vibration from heavy equipment or appliances and air currents from fans, heating ducts, etc. can cause bounce on the scale display. Using the Model 4200's Digital Averaging feature to minimize these effects is outlined in Section 6 of this manual.

ELECTRICAL CONNECTIONS

The Model 4200 requires 120 VAC, 50/60 Hz power (240 VAC or DC power optional). Be sure the AC power is not excessively noisy - this can occur if large inductive loads, such as solenoids or motors, are on the same power line. The Model 4200 has a filtered power supply to reduce the effects of normal line noise, but it cannot limit severe fluctuations. If problems occur, noise producing devices may have to be suppressed to minimize their effect.

Note - the AC power main disconnect is the power plug. To remove power from the scale, simply pull the power plug.

Section 2. Quick Setup Guide

In most cases, your Model 4200 will be completely configured and calibrated at the factory. If the indicator is ordered without a Doran platform, the indicator will need to be set up using the following guide. If you have any questions about setting up or calibrating the indicator, refer to the more complete sections in this manual for more information.
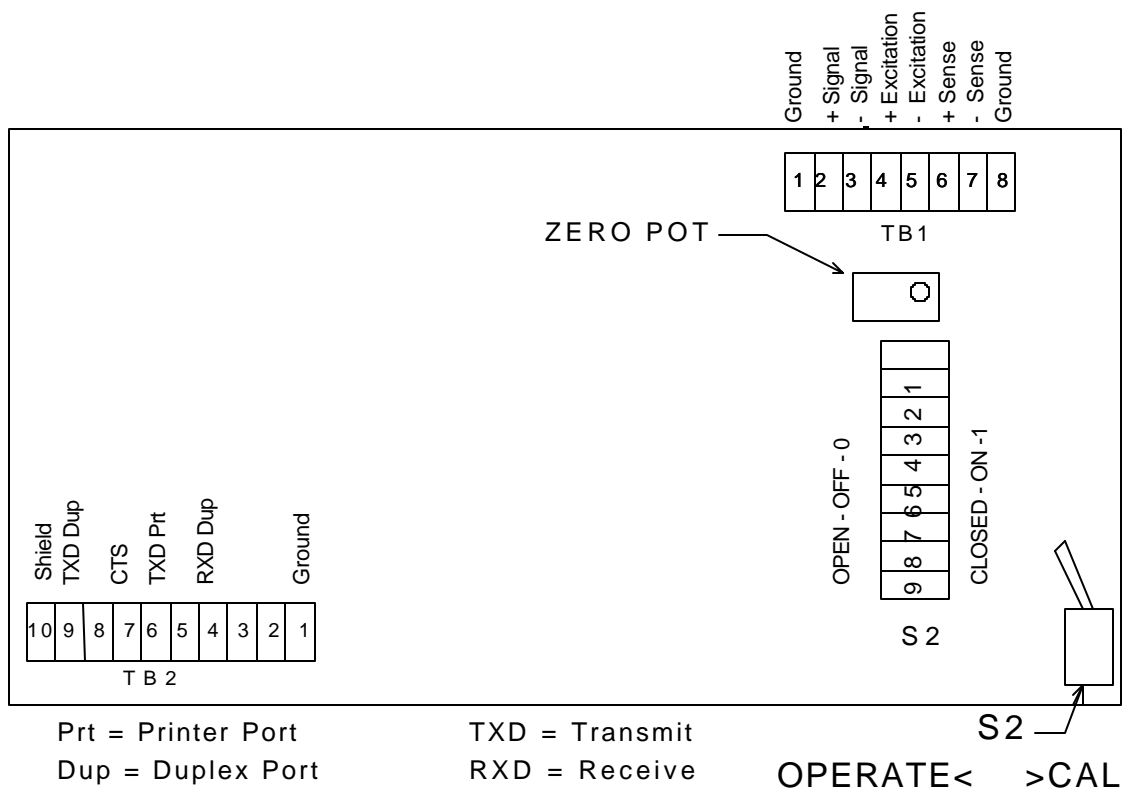
Figure 2. 4200 Main Board Connections and Switches
(components are pictured larger than normal)

There are two communication ports on the Model 4200, a bi-directional (duplex) serial port and an output-only serial printer port.   Both ports are default configured as RS232 and the default connections are shown in figure 2. Other configurations are available and can be ordered as required or configured as stated in Section 12.

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ENTERING THE SETUP MODE

To enter the Setup Mode, it is necessary to gain access to the main board. This is done differently with the different 4200 models (see figure 1). Note: indicator must be powered-up, before switching S2 - position 9 or S1 to the Setup Mode.

Model 4200 Tower: Remove the small rectangular access panel on the rear of the tower by removing the two hex screws holding it in place. Flip S1 located on the PCB just inside the access port (red-handled toggle   switch) to enter the setup mode.

Model 4200M: Remove the rectangular access panel on the rear of the indicator by removing the six hex head screws holding it in place. Locate S2 - position 9 using figure 2. Move this switch to the closed position to enter the setup menu.

Model 4200RSS: Loosen the front cover latches and open the front cover. Locate S1 on the main board using figure 2. Flip S1 to enter the setup mode.

When the switch has been closed, the scale display will respond by showing the message "AUG --". You are now ready to begin programming the 4200.

SELECTING A CAPACITY AND RESOLUTION

After entering the setup mode as explained above, use the DOWN arrow button to advance to the CAP parameter. Use the UP arrow button to advance to the desired capacity. Use the DOWN arrow again to advance to the CtS parameter, and use the UP arrow to choose 3000 or 6000 divisions of displayed resolution (press the PRINT button to choose 10000 divisions).

ANALOG CALIBRATION

A.   If not already in the setup mode, do so now using the procedure outlined above.
B.   Press GROSS/NET to enter the calibration mode.
C.   Remove all weight from the platform.
D.   Press and hold the PRINT button to display the internal or raw counts - this is the RAWLO value. The reading should be between 1000 and 10,000 counts.
E.   Place a test weight on the platform.

F. Press and hold the PRINT button to display the internal counts - this is the RAWHI value. Use the following formula to calculate the SPAN and full capacity output (RAWFC). Note: when the Print button is pressed, the SPAN value will be transmitted to printer port.

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

$$RAWFC = RAWLO + SPAN$$

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

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

RAWFC must be less than 100,000 counts, and SPAN should be at least 40,000 counts.

Typical analog calibration values:

RAWLO: 3,000 to 5,000 counts
RAWHI: 58,000 to 67,000 counts
SPAN: 53,000 to 64,000 counts

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

G. Proceed to DIGITAL CALIBRATION.

DIGITAL CALIBRATION

The Model 4200 must be calibrated with a test weight equal to at least 20% of the scale capacity (5% for capacities over 1000 lb). The greater the test weight, the better the calibration will be throughout the entire active range of the platform or load cell assembly (calibrating at capacity is ideal).   Follow these steps to perform the digital calibration:

A. If not already in the setup mode, do so now using the procedure outlined above.
B. If not in the calibration mode, press GROSS/NET to enter the calibration mode.
C. Remove all weight from the scale platform.
D. Press the ZERO button - the display will show "Ent 0" to signify that the zero point has been successfully calibrated.

E.   Place the test weight on the platform. Adjust the displayed weight to match the test weight using the UP or DOWN arrows.

F.   When the displayed weight is correct, press the UNITS button to save the calibration - the display will show "Ent SP" to signify that the span has been successfully calibrated.

G.   Open SW1 (SW2 #9 for M model) to exit the setup mode and return to normal operation. Reassemble the indicator.

See Section 6 for more information on the setup mode, see Section 7 for a more detailed description of the digital calibration procedure.

If an error message was encountered at any time during the calibration, the calibration was not successful. See section 11 for a list of error codes and their meaning.

Section 3. Display and Keyboard

The front panel of the 4200 contains the digital weight display, the checkweigh bargraph display, the status annunciators, and the push-buttons necessary for controlling the various functions of the indicator. In addition, the capacity label is displayed through a window on the front panel.

Figure 3 Front Panel
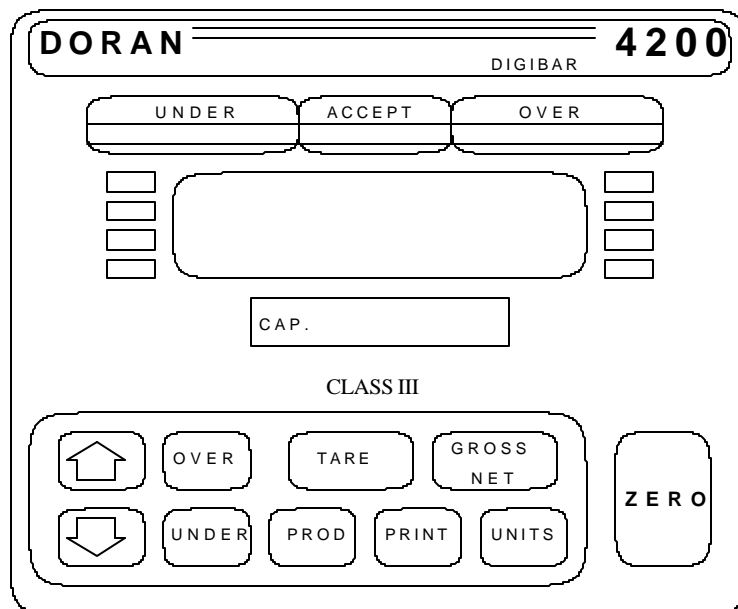
KEYBOARD

The 4200 keyboard consists of 10 push-buttons that control the indicator functions. These are explained briefly below.

ZERO   Zeroes the weight display when pressed. The range of the zero function is menu-programmable for full range, +/- 4.0 % or +/- 1.9 % of scale capacity. The ZERO button is only active in the gross mode. Current parameter settings can be displayed by pressing ZERO button during power-up.

NOTE: The following push-buttons may be active or inactive depending upon the user menu settings.

GROSS/
NET
Switches between the gross and net weight modes. The GROSS and NET annunciators indicate which mode the scale is currently in. The TARE push-button is active in either mode, but the ZERO push-button is available only in the gross mode.

CONV
Each time this push-button is pressed, the digital weight display changes from lb to kg (g) to oz to lb & oz. The user may select 4, 3 or 2 way convert via the menu.

PRINT
Initiates a manual serial data transmission each time pressed. Or selects current label buffer number when depressed for more than 2 seconds.

PROD
Used to recall or change the current product number.

UP/DOWN
ARROWS
Used to increase or decrease the tolerance, tare or product number settings, or to select parameters in the setup mode. Note: When both UP/DOWN arrows are pressed at the same time, scale will reset.

OVER &
UNDER
Used to recall or change the over or under checkweigh tolerance value. In any mode of operation, these push-buttons can be pressed to recall the current setting being used by the 4200.

TARE
Used to set or recall a tare weight values. The ACCEPT indicator flashes when a tare weight is displayed. Only positive values may be entered for a tare. If an attempt is made to enter a negative tare, an error message "Er t-" or "Er tAr" will be displayed as a warning. The TARE button operation depends upon the Tare Entry Mode selected in the parameter setup.

DIGITAL DISPLAY

The 6 digit weight display is a bright easy-to-read, red LED display. It shows the actual weight on the scale in the weighing mode, recalled or new values for over, under or tare values, and error messages as required. The display is also used to display calibration and setup information (parameters and options).

UNIT ANNUNCIATORS

The Model 4200 supports the display of lb, kg, oz, g and lb-oz. When the indicator is in the lb, kg, or oz display modes, their respective annunciators will be enabled. When the indicator is in the lb-oz display mode, both the "lb" and "oz" annunciators will be enabled. If the indicator is set up to start up in the g display mode, then the display will show gram weight, and the "kg" annunciator will be enabled.

STATUS ANNUNCIATORS

The Model 4200 provides 5 additional status annunciators during normal weighing operations.

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

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

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

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

"NEG" Indicates a negative weight when the indicator is in the lb-oz display mode.

CHECKWEIGH INDICATORS

UNDER Indicates that the weight on the scale is below the acceptable weight tolerance.

ACCEPT Weight is within acceptable weight tolerance.

OVER Weight is over acceptable weight tolerance.

Section 4. Scale Operation

The Doran 4200 is a powerful and versatile weighing instrument. It provides the user with the capability of easily changing the scale parameters of the 4200 to fit each application. The 4200 is preset at the factory to the most commonly used settings. Refer to Section 6 Parameter Setup for information about these settings and how to change them. You can use the 4200 "as is" to become familiar with its operation, and then customize it to your particular needs as required.

The Model 4200 is primarily a checkweigher, but can be used for normal weighing and a number of other functions. The bargraph checkweigh display can be configured to meet a variety of needs. The 4200 comes standard with the capability of storing tares and over and under values for 20 products. This capability can be expanded to 200 products with option 42 OPT 27. The 4200 also comes standard with serial output capability for printing, as well as serial bi-directional capability for communicating with a computer or terminal (the bi-directional port can be used to control most of the functions of the indicator).

Keep in mind that the 4200 can be operated very simply by using only the ZERO button, just like our tried and proven Model 4100 Checkweigh Scale. Or, you can utilize more of the 4200's power by using its other features as you require.

POWER UP

To turn on the 4200, simply plug it into a proper wall receptacle. The power plug is the main power disconnect, the only way to remove power from the scale is to pull the power plug. Do not plug a 120VAC model into a 240VAC receptacle as this will cause certain damage. Upon power-up, the display will show the current software number, and then the current revision level (rev x.x) for several seconds. Next, a display test sequence turns on the 8 annunciators, Over, Accept, and Under indicators, and each numeric display digit one-by-one.

After the display test, the 4200 performs an auto-zero function, bringing the weight display to zero. Anything on the scale will be zeroed out, so be sure that the platter is empty upon power-up to avoid possible errors. If "auto-zero upon power-up" is not selected in the parameter setup menu, the 4200 will display the actual gross weight on the scale using either the calibrated zero point or the last push-button zero point as the zero reference point, depending on which parameter is selected in the setup mode. This is useful for batching or filling applications so that a fill cycle can be resumed after a power failure without auto-zeroing the scale.

PRODUCTS

The 4200 has the ability to store information for 20 products (200 products if option 42 OPT 27 is installed). There is a separate tare, over, and under value associated with each product. These values are saved in nonvolatile memory so that they are not lost if power is removed. When a product is selected via the PROD button and the UP and DOWN arrows, the tare, over, and under values associated with that product will become active. This means that any tare operations or checkweighing operations will use the values for that product. The values for the tare, over, and under values for each product must of course be entered before performing any tare or checkweighing operations. These values can be entered in a number of ways - see the explanations for these operations elsewhere in this section.

To select a product to either use that product's values or to enter new values, first momentarily press the PROD button. The indicator will display "Prd XX", where XX is the number of the currently active product. Press the UP or DOWN arrow buttons to change to a different product number. To activate the new product, press PROD again, and the indicator will return to normal weighing. All tare and checkweighing operations will now use the values entered for the product just selected.

ZERO OPERATION

The ZERO push-button is only active in the gross weight mode. When pressed, ZERO causes the display to read zero; it operates on positive or negative weights.

There are 3 operating modes, "OP" for the ZERO function that are menu selectable:

Std   Standard mode which allows full range ZERO operation.
44   Handbook 44 mode which allows only +/- 1.9 % of scale capacity to be zeroed. CAn Canada Weights and Measures mode which allows only +/- 4% of scale capacity   to   be zeroed.

As an example, for a 30 lb. capacity scale, you can zero up to the full 30.00 lb. when in the "Std" mode, up to +/- 0.57 lb. (+/- 1.9 % of 30 lb.) in the "44" mode, and up to
+/- 1.20 lb. (+/- 4.0% of 30 lb.) in the "CAn" mode.

Please note that the startup zero reference point is set upon scale power-up. If any weight is left on the scale upon power-up (or power failure restart) it will be auto-zeroed, setting that weight as the overall gross zero reference point. If you are in the "44" or "CAn" mode, you will not be able to zero any weight greater than +/- 1.9 % or +/- 4.0 % of capacity, based on the gross zero previously set. To avoid potential problems, just be sure that the scale is empty when power-up occurs. This sets the start up zero reference point to the proper value.

The ZERO button also doubles as the start button to turn on the scale when the battery option is installed. Press and release to start, press and hold to reset the power-off timer or to shut the unit off.

TARE OPERATION

The TARE push-button is always active. TARE operates only on positive gross weight, since by definition only a positive weight can be a tare weight. If an attempt is made to enter a negative gross weight as a tare, the 4200 will display an error message   "tar -" to warn you that it cannot be entered.

There are 3 modes of operation for TARE that are menu selectable via the "Tare Entry Mode (tAr)" parameter:

SET MODE

When TARE is pressed in the "SEt" mode, the current tare weight is displayed and the "ACCEPT" indicator flashes to indicate that a tare weight is displayed, rather than an actual scale weight. You can press TARE in this mode to simply recall the current tare value. If you don't want to change the tare value, simply press TARE again to return to the weighing mode - the "ACCEPT" indicator will then stop flashing. Or, you may simply wait 6 seconds and the scale will automatically return to the weigh mode.

If you want to change the current tare value, first recall it by pressing TARE, then adjust the displayed value using the UP and DOWN arrows. Press and hold the arrow keys for rapid update - press the arrow keys repeatedly for slow update. When the correct value is displayed, press TARE again to store it as the new tare value - the 4200 will display "Ent Pr" to indicate that the new value has been accepted. If you don't get this message the old tare value is still in memory! After a new tare is entered, press TARE to recall it as a double check - then press TARE again to go back to the weigh mode.

Any tare value can be recalled or reset in either the GROSS or NET modes. The 4200 has 20 tare memories (200 if option 42 OPT 27 is installed). See the heading marked "PRODUCTS" elsewhere in this section for further information.

PTT MODE

The "P.t.t." (press-to-tare) mode is the auto-tare mode. In this mode, the TARE button when pressed will tare out any positive gross weight on the scale. The scale may be in the gross or net modes to enter a new tare value. A new tare can be entered at any time by placing the container or object to be tared on the scale and pressing TARE momentarily. The tare values for each of the products can be entered this way.

DIS MODE

When set to the "dIS" mode, the TARE button can only be used to recall the current tare value. Press the TARE button to recall the current tare value - it is displayed as long as TARE is pressed. Once released, the scale returns to the weigh mode. The "dIS" mode provides a security feature to prevent the tare values from being changed. After setting the tare values in the "SEt" or "P.t.t." modes, selecting "dIS" mode secures the scale from changes in tare value.

OVER AND UNDER VALUES

The 4200 provides a user-programmable Over and Under checkweigh tolerance feature. The three checkweigh indicators, OVER, UNDER, and ACCEPT, can be used to provide a fast and easily understood indication of an overweight, underweight, or in-tolerance weight condition. Checkweighing is explained in detail in Section 5.

There are 3 modes of operation for the checkweigh indicators that are menu selectable via the "Tolerance (Over/Under) Entry Mode (toL)" parameter:

SET MODE

In the "SEt" mode, when OVER or UNDER is pressed, the current over or under tolerance value is displayed, and the corresponding OVER or UNDER indicator flashes to indicate that a tolerance weight is being displayed, not an actual scale weight. You can press OVER or UNDER in this mode to simply recall the current over or under tolerance setting. If no change is to be made to these settings, simply press OVER or UNDER again to return to the weigh mode - the OVER or UNDER indicator will then stop flashing. Or you may simply wait 6 seconds and the scale will automatically return to the weigh mode.

To change a tolerance value, first recall it by pressing OVER or UNDER, then adjust the displayed value using the UP and DOWN arrows. Press and hold for rapid update - press repeatedly for slow update. When the correct value is displayed, press OVER or UNDER again to store it as the new tolerance value. The 4200 will display "Ent Pr" to indicate that the new value has been accepted. If you don't get this message the old tolerance value is still in memory!   After a new tolerance is entered, press OVER or UNDER to recall it as a double check - then press OVER or UNDER again to go back to the weigh mode.

The 4200 has 20 over and under tolerance memories (200 if option 42 OPT 27 is installed). Refer to the PRODUCT section for further information on this important feature.

PTT MODE

The "P.t.t.", press-to-tolerance mode, is used when the actual tolerance weight is to be used. Simply place the over or under tolerance weight on the scale, recall the current over or under tolerance by pressing OVER or UNDER, then press and hold OVER or UNDER to enter the new value into memory. A verification message, "Ent Pr," will be displayed to indicate that the new   tolerance   value   has   been accepted. Double check that the new value has been entered by recalling the over or under value momentarily.

To recall an over or under value without changing it, press the OVER or UNDER button to display the value, and when done, press the OVER or UNDER button again momentarily to return to the normal weighing mode. If the button is pressed and held, this will cause a new value to be entered, so only press the button momentarily to avoid entering a new value.

DIS MODE

In the disable mode, the over or under tolerance can only be recalled, not altered, as a security feature to prevent tampering.

Recall by pressing OVER or UNDER. The over or under tolerance will be displayed only as long as the button is held down. After release, the scale returns to the weigh mode.

CONVERT

When the Convert function is enabled via the menu item "Push Button Enable (P.b.)" parameter, each time the CONV button is pressed the weight display will change from lb to kg to oz to lb & oz.   You may select 2-way, 3-way or 4-way convert from the menu parameter" Convert Operation Select (CSL)".

All 4 weight display units are available in the "Standard" mode. In either "HB44" or "CAn" legal-for-trade modes, the lb & oz weight display is disabled. This is due to the fact that neither NIST nor Canadian Weights and Measures accept lb & oz as a legal-for-trade display at this time. Convert may be disabled to prevent inadvertent operator error.

PRINT FUNCTION

When the Print function is enabled via the menu parameter "Push Button Enable (P.b.)", each time the PRINT button is pressed, a data transmission is initiated. The weight data is transmitted only when the scale is not in motion and not in overrange. Refer to Section 8 for details on the 4200 Data Interface.

GROSS/NET

The GROSS/NET button switches between the gross and net weight modes each time it is pressed. The scale powers up in the gross mode. The gross and net annunciators indicate the mode that the scale is currently in. The TARE button is active in either mode, but the ZERO button is only active in the GROSS mode. Refer to the ZERO and TARE function sections for details on their operation.

CENTER OF ZERO

The 4200 has an annunciator that illuminates when the scale is within +/- 1/4 division of displayed zero. This is active in either gross or net weight modes. The Center of Zero indication is an NTEP and Canadian Weights and Measures requirement.

MOTION

The 4200 has a "MOT" annunciator that illuminates when the scale is in motion. The motion annunciator turns off when the scale is stable, which means that it is within the menu selected Motion Aperture (MA). You may select 1, 3, or 5 divisions of motion aperture.

SETPOINTS

Over, Under, and Accept outputs are standard on the Model 4200. In addition, 7 setpoints are available with the 42 OPT 27 option. Normally the setpoints are used with solid state relays to drive external devices, so option 42 OPT 05 is usually also needed.

The 4200 can be set up to allow entry of these values using the UP and DOWN arrow buttons, or actual platform weight. In addition, setpoint entry can be disabled in order to prevent tampering or accidental erasure. See the explanations below for information on entering setpoint values.

The value for each setpoint is accessed with the product button. In order to change a setpoint value, the setpoint must first be selected. To do this, first press and hold the PROD button. The display will rotate through "Prd", "SP", and "LbL". When "SP" is displayed, release the PROD button. The right-hand part of the display will show the number of the setpoint last changed. Press the UP or DOWN arrow buttons to display the number of the setpoint that is to be changed.

When the correct setpoint is displayed, press the PROD button once more and the display will show the current value entered for the setpoint selected. If the value is just being recalled, pressing the PROD button again will return the scale to normal weighing with no change to the setpoint value. If the value needs to be changed, refer to the explanations below for information on the various entry modes.

Note - if no buttons are pressed for about 6 seconds, the display will automatically revert back to the normal weighing mode without changing any values.

SET MODE

This is the digital entry mode. Setpoint values are entered using the UP or DOWN arrows to modify the value shown on the display. To change a value, select the desired setpoint and recall its value as outlined above. Next, press the UP or DOWN arrows to increase or decrease the displayed value. Once the proper value has been selected, press the PROD button to enter the value as the new setpoint value. The display will show the message "ENT PR". If the display shows anything else ("ER XX"), the value will not be entered and the old value is retained. The scale will then return to normal weighing automatically.

PTT MODE

This is the platform weight entry mode. Setpoint values are entered using the actual weight on the platform. To enter a new value, select the desired setpoint and recall its value as explained above. Next, place the weight that is to be the new setpoint value on the platform and press and hold the PROD button for about 2 seconds. The scale will verify that the value has been entered with the message "ENT PR."   If any other message is displayed ("ER XX"), the weight on
the platform was not entered as the new setpoint value and the old value is retained and displayed. To exit, press the PROD button again and the scale will return to normal weighing.

DIS MODE

This is the "disable entry" mode. If this mode is chosen, the setpoint values can only be recalled, not changed. This is sometimes necessary to prevent tampering or accidental loss of values. Normally the mode is set to SET or PTT to enter the values, and then changed to DIS to prevent changing them. The values can be recalled by using the procedure above to select and recall setpoints.

STA MODE

In this mode, the seven setpoints indicate the status of various functions of the 4200, e.g. motion, overload, etc. There are therefore no values to change. Listed below are the functions of each setpoint in this mode. In this mode, normal setpoints cannot be used--all setpoints are used to indicate the scale status.

Setpoint	Function	Status (0 = inactive, 1 = active)
0	Center of 0	0 = Out of center-of-zero
		1 = Within center-of-zero
1	Motion	0 = Stable
		1 = In motion
2	Gross/Net	0 = Net mode
		1 = Gross mode
3	Autoprint	0 = Not printed yet
		1 = Done printing
4	Threshold	0 = Below threshold
		1 = Above threshold
5	Overload	0 = Not in overload
		1 = In overload
6	Not Used	

LABEL BUFFER

The print buffer can be used when one of the supplied print formats does not include the specific information or format needed. It can also be used when multiple formats are needed, such as when a label printer is used.

Up to 9 different buffers can be specified, with the total buffer size of 240 bytes being divided evenly between the number of buffers specified. Each buffer is stored in the nonvolatile EEPROM memory to eliminate the possibility of accidental erasure or loss of data.

Also, the buffer format is entered via the duplex port using the commands outlined in Section 8. This means that the indicator must be properly set up for bi-directional serial communications using the proper cabling. A computer or terminal must then be used to send the proper commands to the indicator to set up the buffer(s).

After the buffers are set up as explained in Section 8, the print format parameter must be set to option 13 (see Section 6, parameter 15).

When the buffers are set up and print format 13 selected, the buffers can be used to print as required. If multiple buffers are set up, the PROD button can be used to switch between them. Press and hold the PROD button until "LbL" is displayed on the left part of the display. The number of the current buffer will be shown on the right part of the display. Use the UP or DOWN arrows to scroll through the list of available buffers. When the desired buffer number is displayed, press PROD again, and that buffer will become active. All prints then will use that buffer format.

TIME AND DATE

The time and date function is available as an option 42 OPT 27. If this option is ordered, the time and date can be used in the print formats to provide this information on printouts, labels, etc. In order to be Y2K compatible, the date entry accepts a 4 digit input for the year.

To set the time and date, enter the calibration mode as described in Section 6. The display will show "AVG**". Press the GROSS/NET button once to put the scale into the calibration mode, as signified when the display shows active weight and an upper case 'C' flashes in the far left-hand column. Press the UNITS button again to enter the time setting routine. The current time will be displayed and updated in a 24 hour format only. The UP/DOWN arrow will increment/decrement the column values, and the OVER/UNDER buttons will move the selected column to change right/left respectively. Once the time has been set, press the UNITS button once to enter the new time. The display will show the new updated time.

Press the GROSS/NET button again to put the scale into the date setting mode. The buttons used for setting the time will also function the same way to set the month,day,year. Once the month/day is set, press the UNITS button to enter the new date. Press the GROSS/NET button to put the scale into the year setting mode. Set the 4 digit year the same way as the month/day and time. Press the GROSS/NET button again, to return to the setup menu. The cycle can be repeated as necessary. Exit the "CAL" mode as explained in section 6 to return to normal weighing.

Section 5. Checkweighing

The 4200 provides a user-programmable Over and Under checkweigh tolerance feature. The three checkweigh indicators, OVER, UNDER, and ACCEPT, can be used to provide a fast and easily understood indication of an overweight, underweight, or in-tolerance weight condition.

The three checkweigh indicators can be programmed for zero or net checkweighing (described below), to operate only on gross or net weights, to operate on stable weights only, to operate on weights above 1% of scale capacity, to operate on a combination of the above, or to be disabled totally. See the "Checkweigh Operation (C.O.)" setup parameter for details.

The OVER, UNDER and ACCEPT indicators can be used with or without the digital weight display. Either can be turned off for maximum flexibility of the 4200 scale display. See "Checkweigh Operation (C.O.)" and "Display Operation (doP)" setup parameters.

NET AND ZERO CHECKWEIGHING

The Model 4200 can be used for net or zero checkweighing applications. While both net and zero checkweighing are used for the same purpose, to check for proper package or item weight, the difference is in the weight that is displayed.

In net checkweighing, the scale is zeroed with the platter empty, and the actual item weight is displayed. The over and under values will be set to the actual over and under weights.

In zero checkweighing, a weight that represents the ideal weight for an item is placed on the scale, and then zeroed. Subsequent items being checked for proper weight will display zero if the weight is exactly right, or the over or under weight if the item is not exactly right.

As an example of the two methods, consider a box of produce whose net weight should be exactly 5 lb, but will be considered acceptable if it varies by no more than 0.25 lb above or below 5 lb.

If net checkweighing is used for this example, the under value would be set to 4.75 lb, and the over value would be set to 5.25 lb. The empty box would first be placed on the platform and tared out, and then the filled box would be placed on the platform. The indicator will then display the actual weight of the produce. If it is between 4.75 lb and 5.25 lb, the accept lights will illuminate. If the displayed weight is less than 4.75 lb, the under lights will illuminate. If the weight is greater than 5.25 lb, the over lights will illuminate.

If zero checkweighing is to be used, the under value would be set for -0.25 lb, and the over value would be set for +0.25 lb. The ideal weight is 5 lb, so a 5 lb weight and an empty box would be placed on the platform, and the indicator would then be zeroed or tared. The 5 lb weight and empty box would then be removed, and the filled box of produce placed on the platform. If the produce weighs exactly 5 lb, then the display will show 0 lb. If it is 5.25 lb, the display will show 0.25 lb (the display will show how much the produce is over or under from the ideal weight). If the displayed weight is between -0.25 lb and +0.25 lb, the accept lights will illuminate, otherwise the over or under lights will illuminate.

Both of these examples had exactly the same effect on the checkweigh display, the only difference is in the displayed weight. Net checkweighing will allow you to see the actual weight of the item, while zero checkweighing will allow you to see how much the weight is off from the ideal weight.

TOLERANCE ENTRY AND DISPLAY MODES

Parameter 11 (tOL) allows the user to specify the method that will be used in entering the over and under values, and how they will be used to control the checkweigh display. In each case, the first letter of the option indicates the entry mode, and the following letter(s) or numbers indicate the bargraph display mode.

The 3 entry modes are: SET (UP or DOWN arrows are used to enter value), PTT (platform weight is used to enter value), and DIS (value entry is disabled). Options beginning with an 'S' are SET modes, those beginning with a 'P' are PTT modes, and those beginning with a 'd' are DIS modes. Each of these modes is explained fully in Section 4.

The 4 display modes are: 4200 Standard (S42, P42, and d42), Value Per Bar (Sd, Pd, and dd), Scaled (SS, PS, and dS), and Modified Value Per Bar (SdA, PdA, and ddA). These are each explained fully on next page.

4200 Standard (S42, P42, d42)

In this mode, the whole Over, Under, or Accept display region will illuminate for the given condition. For example, if Over is set for 2.50 lb, and 2.51 lb is placed on the platform, the whole Over region will light up. If 2.50 lb is placed, the entire Accept region will light up. This mode can be used easily for either net or zero checkweighing.

In the following examples, the capacity of the scale is 15 lb, the Under value is 8 lb, and the Over value is 12 lb.

UNDER	ACCEPT	OVER
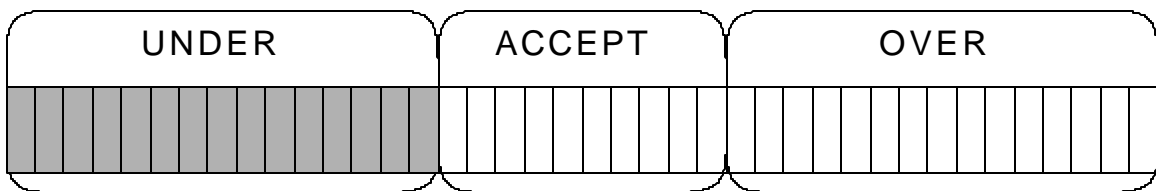
Example 1 - weight on scale = 4 lb.

UNDER	ACCEPT	OVER
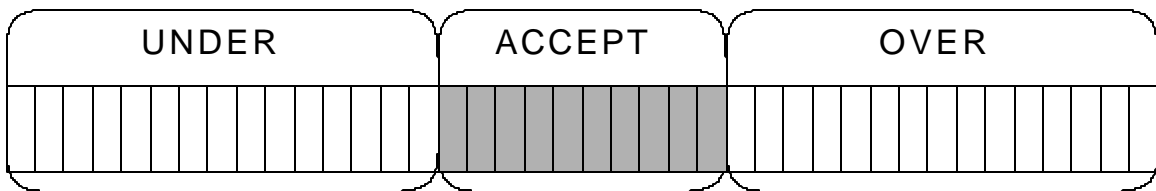
Example 2 - weight on scale = 10 lb.

UNDER	ACCEPT	OVER
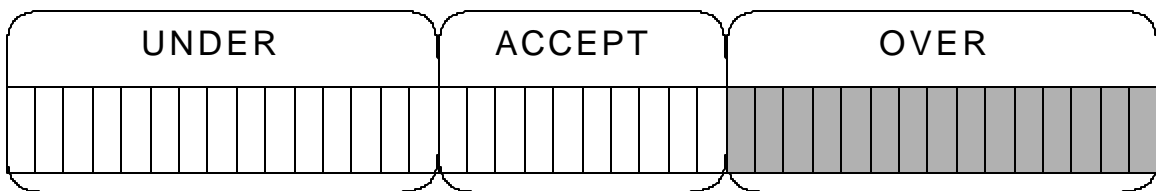
Example 3 - weight on scale = 14 lb.

Value per Bar (Sd, Pd, dd)

This mode is used for zero checkweighing only. The Over and Under values determine the value of each bargraph bar for that part of the display. The Over value specifies the value for each bar to the right of the center of the Accept region. The Under value specifies the value of each bar to the left of the center of the Accept region.

In the following examples, the Over value is 0.2 lb, and the Under value is 0.1 lb.
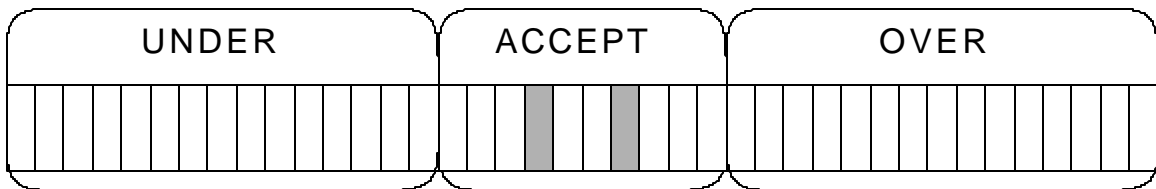
Example 1 - weight on scale is 0 lb. (after zeroing)
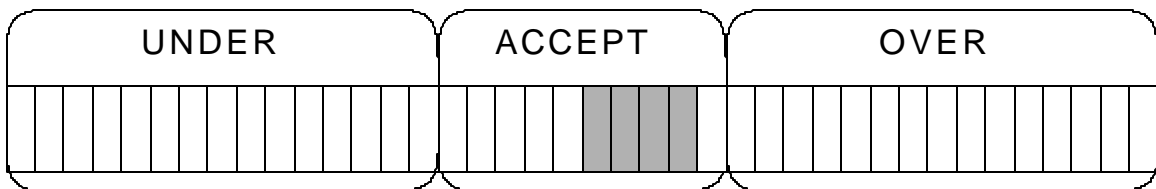
Example 2 - weight on scale is +0.8 lb.
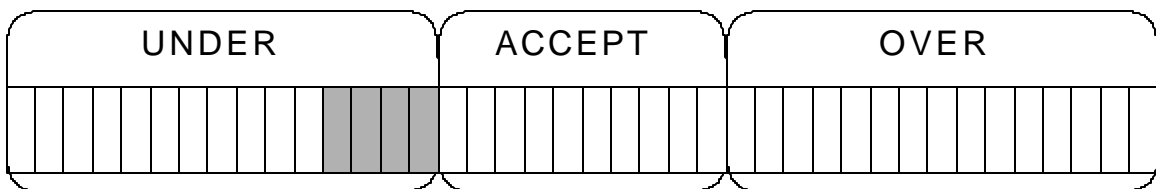
Example 3 - weight on scale is -0.9 lb.

Scaled (SS, PS, dS)

This mode is used strictly in net checkweighing and is similar to the 4200 standard mode. The difference is in the fact that single bars can illuminate, giving an indication of where the weight on the scale is in relation to the capacity of the scale. In the Accept region, a single bar indicates where the weight is in relation to the Over and Under values. The leftmost part of the Under region is zero and the rightmost part is the Under value. The leftmost part of the Over region is the Over value and the rightmost part is the capacity of the scale.

In the following examples, the capacity of the scale is 15 lb, the Under value is 8 lb, and the Over value is 12 lb.

UNDER	ACCEPT	OVER
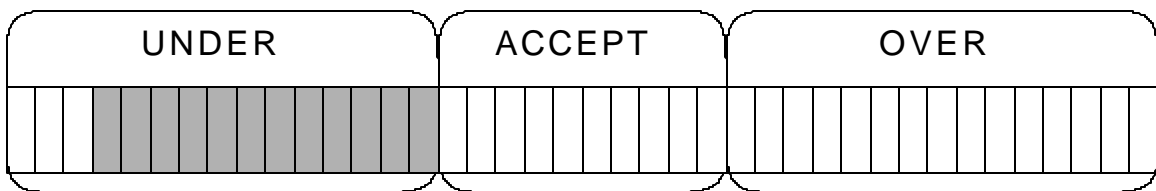
Example 1 - weight on scale = 2 lb

UNDER	ACCEPT	OVER
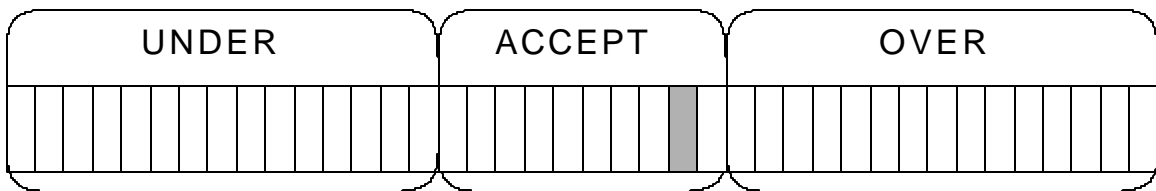
Example 2 - weight on scale = 11.6 lb

UNDER	ACCEPT	OVER
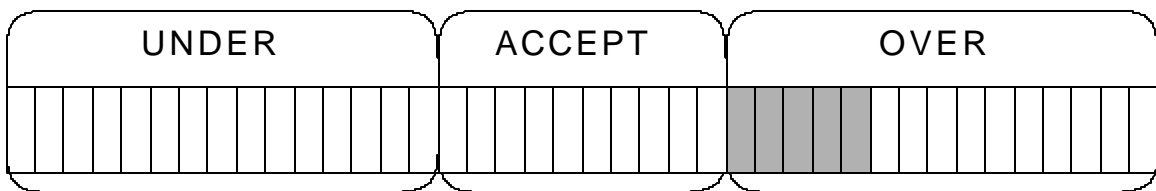
Example 3 - weight on scale = 13 lb

Modified Value per Bar (SdA, PdA, ddA)

This mode can be used for zero or net checkweighing and is similar to the Value per Bar mode. The difference is that the values per bar are calculated instead of specified. The Over value determines the over point, the Under value determines the under point, and the value per bar is found by dividing the difference between the Over and Under values by 10. Note: Value per Bar must be greater than the scale division.

In the following examples, the Over value is set to 0.5 lb, and the Under Value is set to -0.5 lb (value per bar = 0.1 lb).
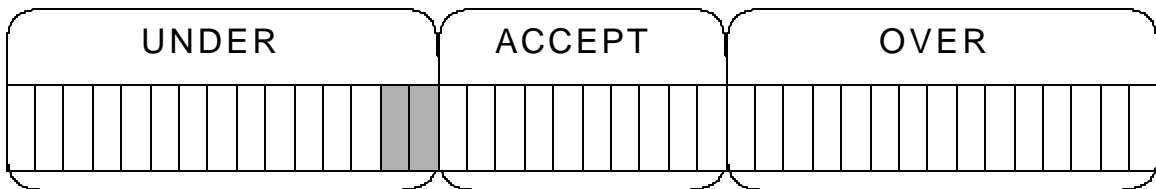
Example 1 - weight on scale = -0.7 lb
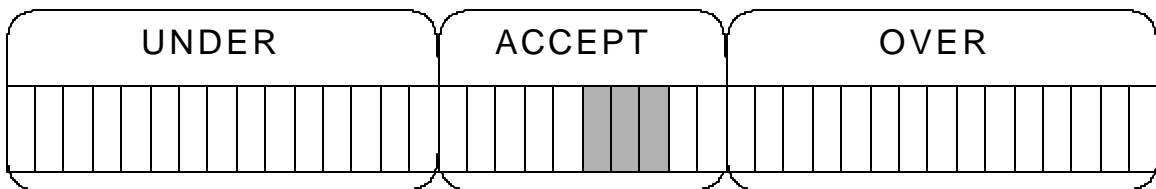
Example 2 - weight on scale = 0.3 lb
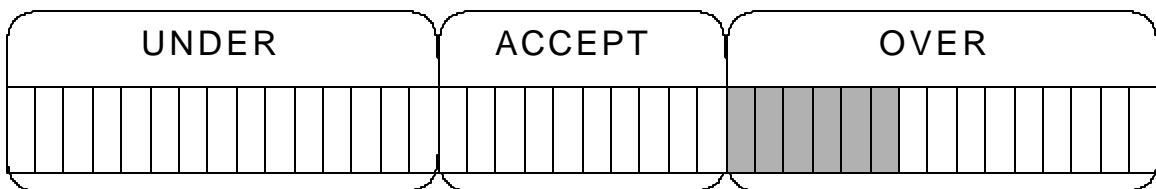
Example 3 - weight on scale = 1.1 lb

Section 6. Parameter Setup

The 4200 has a powerful software "User Setup Menu" that allows you to program up to 25 scale parameters such as update rate, weight display units, scale capacity and resolution, and much more. This allows you to customize the 4200 to your exact needs - and it is easy!

It is a good idea to familiarize yourself with the "User Setup Menu" at first so you can maximize the value of this state-of-the-art scale. Step through the various scale parameters and options as described below. Try different settings to get a feel for their operation. You'll see how easy it is to change the options.

The 4200 is set at the factory to the most commonly used options. These settings are shown in bold type in the following list of parameters and options.

See Section 11 to reset all parameter settings to the factory presets.
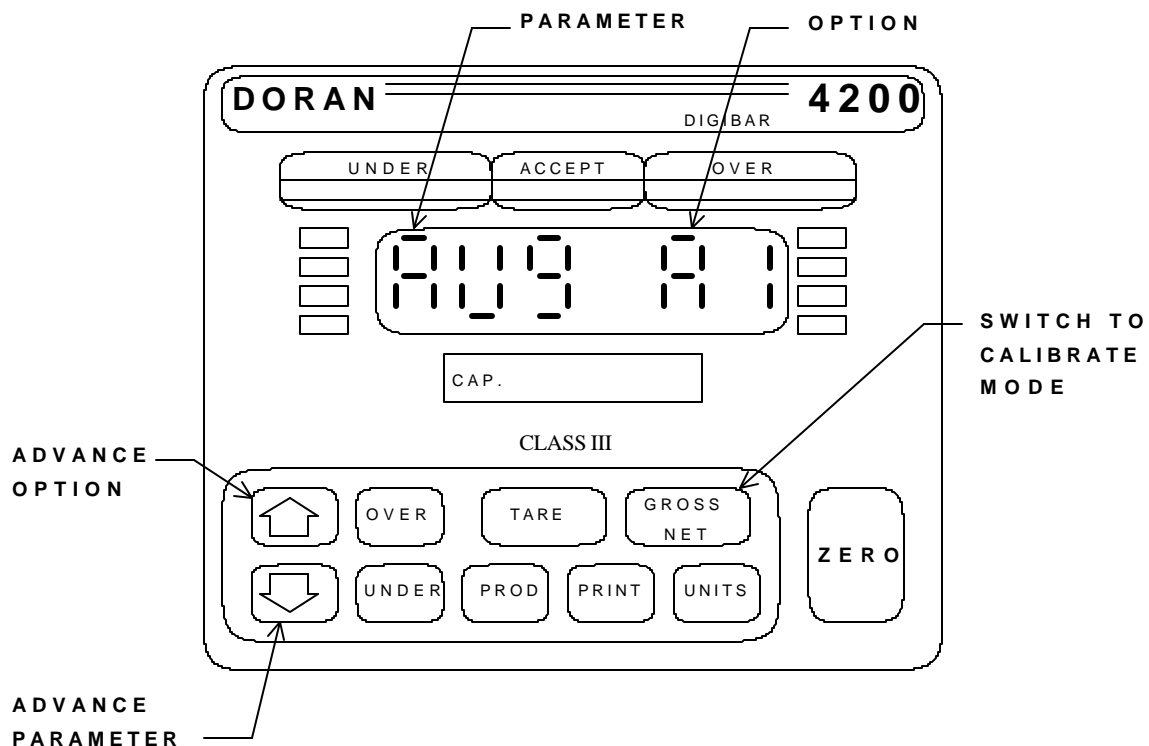
Figure 4 Front Panel Functions - Setup Mode

ENTERING THE SETUP MODE

4200 Tower: Remove the small rectangular access panel on the rear of the scale indicator by removing the two hex screws holding the panel in place. Flip the red handled toggle switch (S1) located on the main board just inside the access port. The scale display will respond by showing the message "AUG --", indicating that the scale is in the setup mode.

4200M: Remove the access panel on the rear of the indicator by removing the six hex screws holding it in place. Locate the 9-position dip switch (S2) within the opening (see figure 2). Move switch #9 to the closed position to enterthe setup mode. The scale display will respond by showing the message "AUG --", indicating that the scale is in the setup mode.

4200RSS: Loosen the front cover latches and open the front cover. Locate S1 on the main board using figure 2. Flip S1 to enter the setup mode. The scale display will respond by showing the message "AUG --", indicating that the scale is in the setup mode.

VIEWING AND CHANGING SETUP PARAMETERS

The actual programming of the various scale parameters on the 4200 is accomplished by pushing the UP and DOWN arrow buttons on the front face of the indicator. Pressing the DOWN arrow causes the parameter shown on left of the display to increment to the next parameter. Pressing the UP arrow causes the option shown on the right of the display to increment to the next option (See Figure 4). Each parameter has several options that affect scale operation.

To change or review parameter option settings, simply step through each parameter by pressing the DOWN arrow and select the desired option for the parameter by pressing the UP arrow. If you wish to go back to make changes or review the setup, simply press the DOWN arrow. The normal programming procedure applies again to change or review this set up. To calibrate the 4200, refer to Section 7 Calibration.

EXITING AND SAVING THE SETUP

To return to normal operation, simply flip S1 (or S2-9 for 4200M) back to its original position. This can be done at any point in the setup menu. It is not necessary to go all the way through the parameters if there is only one specific change that you want to make. Simply select the parameter and the desired option when it comes up in the menu, and flip S1 (or S2) back to the operate position after programming.   At this point all setup parameters are saved in a nonvolatile EEPROM so that they are permanently saved even when the scale is off.

When you are done programming the 4200, be sure to replace the access cover on the back of the unit (4200 Tower, 4200M) or close the front cover (4200RSS) to maintain the water resistant and dust-tight integrity.

SETUP PARAMETERS

The following is a detailed list of the parameters and options in the 4200, as well as a description of how they affect the operation of the scale. Be sure to read these descriptions carefully, and select settings that you feel will best fit your needs.

NOTE: Factory default settings are shown in bold type.

1. Digital Filter (AVg)

Option	Description
A1	**Auto-averaging, averaging disabled when stable, 64 readings per average when in motion (approx. 20 updates/second)**
1	Averaging disabled- approx. 20 updates/second
2	Fixed averaging, 2 readings per average (approx. 17 updates/second)
4	Fixed averaging, 4 readings per average (approx. 15 updates/second)
8	Fixed averaging, 8 readings per average (approx. 10 updates/second)
16	Fixed averaging, 16 readings per average (approx. 5 updates/second)
32	Fixed averaging, 32 readings per average (approx. 3 updates/second)
64	Fixed averaging, 64 readings per average (approx. 2 updates/second)
A2	Auto-averaging, averaging disabled when stable, 128 readings per average when in motion (approx. 20 updates/second)

The Digital Averaging parameter is used to tailor the 4200's display update rate to your application and environment. The circuitry in the 4200 takes several weight readings every second. In some instances because of factors such as wind currents and vibrations that are read as changes by the scale's weight sensor, the maximum update rate is too fast and makes the scale display appear to be "bouncy". In order to filter or "smooth" out the effects of these factors, the 4200 is equipped with an averaging parameter. The averaging parameter simply takes a series of weight readings and averages them together. This smoothes out the small changes caused by outside influences. The more readings taken per average cycle, the more stable the weight reading will appear. However, as this number of readings per average increases, the rate at which the display updates slows down. When selecting a setting for the Digital Averaging parameter, refer to the above chart which shows the relationship between the number of readings per average and the display update rate. Note that the analog filter setting (see next page) also affects the display update rate.

The "A1" and "A2" settings refer to a software utility called "Auto Averaging". In these modes, averaging will be disabled when the scale is in motion in order to achieve a fast update. When the scale stabilizes, averaging is reenabled to achieve the most stable final reading. The difference between "A1" and "A2" is that "A2" has more readings averaged at stability than "A1". This type of averaging may not be desirable in certain filling applications as it has a tendency to be too slow when a product is being "trickled in" or "topped off".

1a. Analog Filter (AnF)

Option	Description
1	Filter setting of 0.08 Hz (slowest response - for unstable environments)
2	Filter setting of 0.15 Hz
3	Filter setting of 0.31 Hz
4	Filter setting of 0.62 Hz
5	Filter setting of 1.25 Hz
6	**Filter setting of 2.50 Hz (fastest response - for stable environments)**

The Analog Filter Selection allows the user to select different filter settings for different environments.   This parameter is accessed by pressing the PRINT button when the Averaging (Avg) parameter is selected. A selection of 1 will take longer to reach a stable weight but provide a large amount of filtering for a very unstable environment. A setting of 6 will respond immediately but provide very little filtering. The analog filter setting also affects the display update rate. A setting of 1 will cause a very low update rate, while a setting of 6 will provide a very high update rate.

2. Automatic Zero Tracking (AZt)

Option	Description
0.5	+/- .5 division from zero will be automatically zeroed
1	**+/- 1 division from zero will be automatically zeroed**
3	+/- 3 divisions from zero will be automatically zeroed
OFF	none

Automatic Zero Tracking is used to compensate for small deviations from zero normally caused by such things as slight air currents or foreign material/product left on the scale platform. Automatic Zero Tracking will measure this deviation every scale update, and if it is within the specified range of scale divisions, it will automatically rezero the scale.

If you are working with minute weights that are near zero, it is advisable to turn Automatic Zero Tracking off, as it may interfere with the proper results. If a "Legal For Trade" mode is selected, the Azt will default to 0.5 divisions or OFF.

3. Motion Aperture (MA)

Option	Description
3	**Select 3 divisions of motion**
1	Select 1 division of motion
5	Select 5 divisions of motion

Motion Aperture is used to select how many displayed divisions of motion must be sensed between updates before the unit will go into a motion state.

4. Serial Data Output (d.o.)

Option	Description
tod	**Transmit on Demand**
Cnt	Continuous Transmission
AP1	Auto Print 1
AP2	Auto Print 2
AP3	Auto Print 3
L.o.d.	Latch on Demand (Transmit when Stable)
tP	Timed Print, prints out data every 10 seconds
Atd	Latch on Demand, acceptable weights only
AP4	Auto Print 4
APUO	Same as AP3 but will only print when scale is in over or under.

For a detailed explanation of the Data Output Modes, see Section 8 on using the data interface.

5. Startup Units (S.U.)

Option	Description
Lb	**Startup in "lb"**
Kg	Startup in "kg"
OZ	Startup in "oz"
L O	Startup in "lb & oz"
g	Startup in "g" (uses kg annunciator)

The Startup Unit is simply the weight display unit that the 4200 reads in when the scale is turned on. Select the unit you will use exclusively or the unit most frequently used as your startup unit.

Note, however, that when the operating mode of the 4200 (see below) is set for "Legal for Trade", the "lb & oz" weight display mode is not a parameter option since it is not recognized by NTEP or CWM as a legal for trade display. If the "lb & oz" option is selected for SU and the operating mode is set for "Legal for Trade", the 4200 will start up in the "lb" weight display mode. In addition, if a capacity of 500 lb or above (see below) is selected, the "lb & oz" display is invalid and will not be a valid option since the graduation size is greater than 2 oz.

Also, the unit can be set to display in grams instead of kilograms for the few capacities and resolutions that have enough display capacity. In this case, the "kg" annunciator will illuminate but the display will be in grams. When printing values, the 1.3 and 6 lb will always print "g", and anything above 200 lb will always print "kg", all others will print the unit selected either g or kg bases on the setting of the Start Up Unit.

Note: NTEP = National Type Evaluation Program
         CWM = Canadian Weights and Measures

5a. Startup Gross/Net (SU)

Option	Description
grS	**Startup in gross mode**
nEt	Startup in net mode

This parameter is accessed by pressing the PRINT button when the Startup Units (S.U.) parameter is selected. Each time PRINT is pressed, the option will toggle between grS and nEt.

This option can be used in conjunction with the Push Button Enable parameter to start up in the net mode when the push-buttons are disabled.

6. Scale Capacity (CAP)

OPTION	GRADS	CAPACITY AND RESOLUTION
1.3	3000 6000 10000	1.3 x .0005 lb / .600 x .0002 kg / 21 x .01 oz 1.3 x .0002 lb / .600 x .0001 kg / 21 x .005 oz 1.0 x .0001 lb / .454 x .00005 kg / 16 x .002 oz
3		3 x .001 lb / 1.3 x .0005 kg / 48 x .02 oz 3 x .0005 lb / 1.3 x .0002 kg / 48 x .01 oz 2 x .0002 lb / .9 x .0001 kg / 32 x .005 oz
6		6 x .002 lb / 2.7 x .001 kg / 96 x .05 oz 6 x .001 lb / 2.7 x .0005 kg / 96 x .02 oz 5 x .0005 lb / 2.3 x .0002 kg / 80 x .01 oz

15		15 x .005 lb / 6.8 x .002 kg / 240 x .1 oz 15 x .002 lb / 6.8 x .001 kg / 240 x .05 oz 10 x .001 lb / 4.5 x .0005 kg / 160 x .02 oz
30		**30 x .01 lb / 13.6 x .005 kg / 480 x .2 oz** **30 x .005 lb / 13.6 x .002 kg / 480 x .1 oz** **20 x .002 lb / 9.1 x .001 kg / 320 x .05 oz**
60		60 x .02 lb / 27 x .01 kg / 960 x .5 oz 60 x .01 lb / 27 x .005 kg / 960 x .2 oz 50 x .005 lb / 23 x .002 kg / 800 x .1 oz
100		100 x .05 lb / 45 x .02 kg / 1600 x 1 oz 100 x .02 lb / 45 x .01 kg / 1600 x .5 oz 100 x .01 lb / 45 x .005 kg / 1600 x .2 oz
120		120 x .05 lb / 54 x .02 kg / 1920 x 1 oz 120 x .02 lb / 54 x .01 kg / 1920 x .5 oz 100 x .01 lb / 45 x .005 kg / 1600 x .2 oz
150		150 x .05 lb / 68 x .02 kg / 2400 x 1 oz 150 x .02 lb / 68 x .01 kg / 2400 x .5 oz 100 x .01 lb / 45 x .005 kg / 1600 x .2 oz
200		200 x .1 lb / 91 x .05 kg / 3200 x 2 oz 200 x .05 lb / 91 x .02 kg / 3200 x 1 oz 200 x .02 lb / 91 x .01 kg / 3200 x .5 oz
300		300 x .1 lb / 136 x .05 kg / 4800 x 2 oz 300 x .05 lb / 136 x .02 kg / 4800 x 1 oz 200 x .02 lb / 91 x .01 kg / 3200 x .5 oz
600		600 x .2 lb / 272 x .1 kg / 9600 x 5 oz 600 x .1 lb / 272 x .05 kg / 9600 x 2 oz 500 x .05 lb / 227 x .02 kg / 8000 x 1 oz
1.0		1105 x .5 lb / 501 x .2 kg / 17680 x 10 oz 1105 x .2 lb / 501 x .1 kg / 17680 x 5 oz 1000 x .1 lb / 454 x .05 kg / 16000 x 2 oz
3.0		3000 x 1 lb / 1360 x .5 kg / 48000 x 20 oz 3000 x .5 lb / 1360 x .2 kg / 48000 x 10 oz 2000 x .2 lb / 907 x .1 kg / 32000 x 5 oz
6.0		6000 x 2 lb / 2720 x 1 kg / 96000 x 50 oz 6000 x 1 lb / 2720 x .5 kg / 96000 x 20 oz 5000 x .5 lb / 2270 x .2 kg / 80000 x 10 oz
15.0		15000 x 5 lb / 6800 x 2 kg 15000 x 2 lb / 6800 x 1 kg 10000 x 1 lb / 4540 x .5 kg
20.0		20000 x 10 lb / 9100 x 5 kg 20000 x 5 lb / 9100 x 2 kg 20000 x 2 lb / 9070 x 1 kg
30.0		30000 x 10 lb / 13600 x 5 kg 30000 x 5 lb / 13600 x 2 kg 20000 x 2 lb / 9070 x 1 kg

60.0		60000 x 20 lb / 27200 x 10 kg 60000 x 10 lb / 27200 x 5 kg 50000 x 5 lb / 22700 x 2 kg
120.		120000 x 50 lb / 54400 x 20 kg 120000 x 20 lb / 54400 x 10 kg 100000 x 10 lb / 45400 x 5 kg

Note: In HB44 or CAN mode (Parameter 8. Operating Mode), the capacities are strictly limited to 3000 divisions. This means that for capacities of 15, 150, and 15000, the metric capacities will scale back to 6, 60, and 6000 kg (from 6.8, 68, and 6800 kg).

To access the 10000d selection, press the PRINT button at the CtS parameter. If 10000d is selected, all the capacities will be restricted to 10000d. This requires that many of the capacities be limited (3 lb is restricted to 2 lb, 6 lb is restricted to 5 lb, etc.)

"Scale Capacity" defines the capacity and resolution that the display will read out. It is used to match the scale indicator to the scale platform. In most cases, the factory has already selected the proper capacity to match the scale platform that is supplied with the indicator.

Should it be necessary to change the capacity of the indicator, make sure that the proper capacity label is applied to the insert card and inserted into the capacity window of the faceplate of the indicator.

Refer to Section 7 on Calibrating the 4200 to make sure that the scale is properly calibrated after changing capacity.

7. Startup Zero (S.U.0)

Option	Description
AU0	**Auto zero upon power up.**
CL0	Restores the calibration zero point as zero reference.
Pb0	Restore last gross push-button zero as zero reference.

The Start Up Zero Mode is used to select whether the scale will auto zero upon the power up of the unit. If the scale is set in a "Legal for Trade" mode, this parameter is ignored and the unit will always zero upon power up. Otherwise, the unit will zero upon power up if the "AU0" option is selected. If the "CL0" option is selected, the scale will use the calibrated zero for power up and display the absolute weight on the platform based on that calibrated zero point. If the "Pb0" option is selected, the scale will use the last push-button zero as the reference point.

8. Operating Mode (oP)

Option	Description
Std	**Standard (not Legal for Trade), full range zero.**
44	HB44 (Legal for Trade) +/- 1.9% gross zero range.
CAn	Canadian Weights and Measures Approval (Legal for Trade) +/- 4.0 % gross zero range.

The Operating Mode defines whether or not the 4200 will operate in a "Legal for Trade" or a "Not Legal for Trade" mode.

In the Legal-for-Trade "44" mode, the 4200's ZERO button and "Auto Zero Tracking" parameter will only zero out up to 1.9% of the scale's capacity in compliance with NIST Handbook 44. The reference point for this 1.9% band is based on the calibration zero point of the scale. If the load on the platform is beyond the 1.9% of capacity, a zero error will result. If this happens, the load must be removed and the indicator restarted. Therefore, care should be taken to make sure that the scale platform is empty when the scale is turned on to insure proper operation of the ZERO button.

In the Legal-for-Trade "CAn" mode, the 4200's ZERO button and "Auto Zero Tracking" parameter will only zero out up to 4.0% of the scale's capacity in compliance with Canadian Weights and Measures. The reference point for this 4.0% band is based on the calibration zero point of the scale. If the load on the platform is beyond the 4.0% of capacity, a zero error will result. If this happens, the load must be removed and the indicator restarted. Therefore, care should be taken to make sure that the scale platform is empty when the scale is turned on to insure proper operation of the ZERO button.

In addition, when either "Legal for Trade" mode is selected, the "lb & oz" weight display mode is disabled, since it is not recognized as a "Legal for Trade" weight display. When the "Std" mode is selected, the ZERO button and "Auto Zero Tracking" parameter will work through the full capacity of the scale. The "lb & oz" weight display will also operate normally, if selected.

9. Push-button Enable (P.b.)

Option	Description
non	Neither "UNITS" nor "PRINT" enabled.
C	**Only "UNITS" enabled.**
P	Only "PRINT" enabled.
C P	Both "UNITS" and "PRINT" enabled.
Z	All push-buttons disabled except ZERO.
ZPr	All push-buttons disabled except ZERO, PROD, and the UP and DOWN arrows.

This parameter allows the user to enable or disable the UNITS and PRINT buttons separately. Additionally, all the push-buttons on the panel, except the ZERO button, can be disabled for cases where operator tampering is to be discouraged by selecting the "Z" option. The "ZPr" option disables all buttons except ZERO, PROD, UP, and DOWN. This allows the operator to choose different products for tare and checkweighing operations without the ability to change any of the values.

9a. Beeper Enable (BEEPON/BEEPOFF)

The Beeper Enable provides a method for enabling or disabling the keyboard push-button beeper. To enable/disable the beeper, press the PRINT button while the parameter menu is in Push Button Select (P.b.). The parameter will alternate between BEEPON and BEEPOFF every time PRINT is pressed.

10. Displayed Resolution (CtS)

Option	Description
3	**1:3000 displayed resolution**
6	1:6000 displayed resolution

The 4200 is provided with the ability to increase its displayed resolution from a nominal 1 part in 3000 to 1 part in 6000. This ability is provided for users who require finer resolution weighing for more precise checkweighing. It should be noted however, that the 4200 is only intended to be certified as "Legal for Trade" up to the 1 part in 3000 displayed resolution. Make sure that your application does not require this certification before selecting the higher resolution.

10a. Extended Resolution (CtS)

1:10000 displayed resolution is also available. To enable this option press the PRINT button when the CtS parameter is selected. This brings up the "10" option for high resolution.

11. Tolerance [Over/Under] Entry Mode (toL)

Option	Description
S42	**4200 Std. emulate (SEt)**
P42	4200 Std. emulate (P.t.t.)
d42	4200 emulate, disable entry (Dis)
S d	Value per bar entered via UP and DOWN arrows.
P d	Value per bar entered by a press of OVER or UNDER button.
d d	Value per bar, disable entry.
S S	Scaled value entered via UP and DOWN arrows.
P S	Scaled value entered by single press of OVER or UNDER button.
d S	Scaled value, disable entry.
SdA	Modified value per bar, Over and Under entered via arrows, value per bar calculated from over and under values.
PdA	Modified value per bar, Over and Under entered by press of OVER or UNDER buttons, value per bar calculated from Over and Under values.
ddA	Modified value per bar, disable entry.

NOTE: When 4200 emulation is selected, the Over and Under areas on the bargraph indicator will all be turned on when the scale senses either Over or Under weights.

The Tolerance Entry Mode parameter allows the user to select how the Over and Under tolerance values on the 4200 are entered, and how the bargraph display operates. The first letter of the option denotes the entry mode. The three entry modes (as explained in Section 5) are SET, PTT, and DIS. The remaining letters or numbers denote the bargraph operation mode. These modes (also explained in Section 5) are 4200 Emulate, Value per Bar, Scaled, and Modified Value per Bar.

The OVER and UNDER buttons can be disabled using the DIS mode if they are not to be used, or if it is desired to preset tolerances and secure them from tampering by the scale operator.

NOTE : It is not recommended that the scaled bargraph settings (SS,PS,dS) be used for "Legal for Trade" applications.

12. Tare Entry Mode (tAr)

Option	Description
SEt	**Tare entered via UP and DOWN arrow buttons.**
P.t.t.	Tare entered by single press of TARE button.
diS	Tare entry disabled.

The Tare Entry Mode parameter allows the user to select how the tare parameter in the 4200 operates. It can be either a standard "Push to Tare" button, causing the weight display to come to zero when pressed, or it can be used in conjunction with the UP and DOWN arrow buttons to preset a tare value from the front panel. In addition, the tare button can be disabled if it is not to be used, or if it is desired to preset a tare to secure it from tampering by the scale operator. See Section 4 for more information.

13. Baud Rate Selection, Port 2 - Printer (b.r.t.)

Option	Description
30	300 baud
120	1200 baud
240	2400 baud
480	4800 baud
960	**9600 baud**
19.2	19200 baud

The Baud Rate parameter is used to select the data output rate for the transmitting of serial data through the simplex (printer) port.

13a. Baud Rate Selection, Port 1 - Duplex (d.b.r.)

Option	Description
30	300 baud
120	1200 baud
240	2400 baud
480	4800 baud
960	**9600 baud**
19.2	19200 baud

To select the baud rate for the duplex port, press the PRINT button to enter the Duplex Port Selection when the parameter menu is in Baud Rate Selection Simplex Port (b.r.t). If the pass-through mode is used, both ports must have the same baud rates.

14. Data Bits and Parity, Port 2 - Printer (d.b.P)

Option	Description
8n	**8 data bits, no parity.**
7 n	7 data bits, no parity.
7 O	7 data bits, odd parity.
7 E	7 data bits, even parity.

The Data Bits and Parity parameter is used to select the number of data bits for each character transmitted through the simplex (printer) port. For error checking, a parity bit can be selected for the device(s) that require it. Select the proper option for the peripheral device(s) being used in the application.

14a. Data Bits and Parity, Port 1 - Duplex (d.b.1)

Option	Description
8n	**8 data bits, no parity.**
7 n	7 data bits, no parity.
7 O	7 data bits, odd parity.
7 E	7 data bits, even parity.

The Data Bits and Parity for the Duplex port provide the same functionality as the Simplex port. To access these options for the duplex port, press the PRINT button when the d.b.P parameter is selected.

15. Print Format (PFt)

Option	Description
1	**Weight, net, and over/accept/under.**
2	Scale i.d., Weight, net, over/accept/under.
3	Scale i.d., Product no., Weight, net, over/accept/under.
4	Product no., Weight, net, over/accept/under.
5	Weight, net, over/accept/under. Tare weight, keyed/not keyed.
6	Scale i.d., Weight, net, over/accept/under. Tare weight, keyed/not keyed.
7	Scale i.d., Product no., Weight, net, over/accept/under. Tare weight, keyed/not keyed.
8	Product no., Weight, net, over/accept/under. Tare weight, keyed/not keyed.
9	Output for a DGH analog output module.
10	Over/Accept/Under.
11	Weight, "grs/net" 8000 output emulation.
12	Output for A&D Printers.
13	Label Buffer output format. See Section 8.
14	Dual Print - same as format 1, plus prints kg weight. See Section 8.
15	Dual Print - same as format 4, plus prints kg weight. See Section 8.

The Print Format parameter allows the 4200 to print a variety of formats for different applications and printer requirements. Select the format that best fits your data and printer requirements.

16. Checkweigh Operation (C.O.)

Option	Description
n A	Net only, all time.
n S	Net only, only stable weights.
n t	Net only, only weights above 1% of scale capacity.
n b	Net only, only stable weights above 1% of scale capacity.
g A	Gross only, all time.
g S	Gross only, only stable weights.
g t	Gross only, only weights above 1% of scale capacity.
g b	Gross only, only stable weights above 1% of scale capacity.
b A	**Gross & Net, all time.**
b S	Gross & Net, only stable weights.
b t	Gross & Net, only weights above 1% of scale capacity.
b b	Gross & Net, only stable weights above 1% of scale capacity.
OFF	Disable tolerance indicators.

The Checkweigh Operation parameter specifies the conditions under which the bargraph indicators are active. If the conditions are not met, the indicators will be off, e.g. if set for bS, and the scale is in motion, the indicators will be off.

This parameter also controls the Over, Under, and Accept outputs of the scale. This is particularly useful when external beepers are used to signal the checkweigh status. In this case, the threshold (1%) parameter is usually used so that the beepers do not activate until a weight is placed on the scale.

17. Convert Operation Select (CSL)

Option	Description
C A	**4-way convert, lb-kg(g)-oz-lb&oz.**
LgO	3-way convert, lb-kg(g)-oz.
Lg	2-way convert, lb-kg(g).
L O	2-way convert, lb-lb&oz.
gO	2-way convert, kg(g)-oz.

The Convert Select parameter is used to select how the UNITS push-button operates when enabled. The push-button can operate in a 4, 3, or 2 way configuration as described above.

18. Display Operation (doP)

Option	Description
On	**Display on all the time.**
OFF	Display off all the time.
S	Display on only when stable.
t	Display on only when above 1% of scale capacity.
S t	Display on only when above 1% of scale capacity and stable.

The Display Operation parameter specifies the conditions under which the weight display operates. If the conditions are not met, the display will be blank.

19. Handshaking (hSh)

Option	Description
non	Handshaking disabled.
Prt	Hardware handshaking enabled for port 2 (printer port) with the CTS (clear to send) control line.
dUP	**Software handshaking enabled for port 1 (duplex port).**
Pd	Handshaking enabled for both ports.

The handshaking modes for both ports are explained fully in Section 8. Serial Communication.

20. Unit Time On (tdy)

Option	Description
on	**Constant on. If battery option is installed, press and hold ZERO to turn off.**
0.5	Time delay, unit on for 0.5 minute.
1.0	Time delay, unit on for 1.0 minute.
1.5	Time delay, unit on for 1.5 minutes.
2.0	Time delay, unit on for 2.0 minutes.
2.5	Time delay, unit on for 2.5 minutes.
3.0	Time delay, unit on for 3.0 minutes.
5.0	Time delay, unit on for 5.0 minutes.
10.0	Time delay, unit on for 10.0 minutes.
20.0	Time delay, unit on for 20.0 minutes.
30.0	Time delay, unit on for 30.0 minutes.
45.0	Time delay, unit on for 45.0 minutes.
1h	Time delay, unit on for 1 hour.
2h	Time delay, unit on for 2 hours.
3h	Time delay, unit on for 3 hours.
4h	Time delay, unit on for 4 hours.
5h	Time delay, unit on for 5 hours.
6h	Time delay, unit on for 6 hours.
7h	Time delay, unit on for 7 hours.
8h	Time delay, unit on for 8 hours.
9h	Time delay, unit on for 9 hours.
10h	Time delay, unit on for 10 hours.

The Unit Time On is the amount of time that the scale will remain on. This is specifically used with the battery option. However, if this is selected on A.C. operated units, the unit will go into a "sleep" mode, causing the display to show "ASLEEP". The unit will awaken when a weight is applied or a push button is pressed.

21. Scale I.D. (Id)

Option	Description
1-30	Scale I.D. = selected number (1-30).

The Scale I.D. is used when a number of scales share the same serial communications cable (network). When more than one scale is connected to a network, each scale must have a unique address, or ID. This ID is used to prefix each command sent to the scale so that only the proper scale will respond. Note that 00 cannot be used as an ID since this is a broadcast ID that causes all scales on the network to respond.

22. Setpoint Entry Mode (S.P.t)

Option	Description
SEt	**Setpoints entered via UP and DOWN arrow buttons.**
P.t.t.	Setpoints entered using platform weight using the PROD button.
dIS	Setpoint entry disabled.
StA	Setpoint status mode.

The Setpoint Entry Mode parameter allows the user to select how the setpoint values are entered in the 4200. Setpoint values can be entered digitally by using the UP or DOWN arrows to enter the value or by placing the actual weight on the platform that corresponds to the desired setpoint value.

If the setpoint entry mode is set for StA, the setpoint operation (see next page) should be set for either hnA or LnA.

The 4 entry modes are explained fully in Section 4.

23. Setpoint Output Operation (S.P.O)

Option	Description
hOF	**Setpoint output disabled, active high all the time.**
hnA	Active high, no latch, all weights.
hnS	Active high, no latch, stable weights.
hLA	Active high, latched, all weights.
hLS	Active high, latched, stable weights.
hPA	Active high, pulsed for 1/16 second, all weights.
hPS	Active high, pulsed for 1/16 second, stable weights.
LnA	Active low, no latch, all weights.
LnS	Active low, no latch, stable weights.
LLA	Active low, latched, all weights.
LLS	Active low, latched, stable weights.
LPA	Active low, pulsed for 1/16 second, all weights.
LPS	Active low, pulsed for 1/16 second, stable weights.
LOF	Setpoint Output Disabled, active low all the time.

This parameter is used to the select how the setpoint outputs operate when the setpoint has been tripped. The setpoints can be set to output active high or low when tripped, to latch the setpoint, to activate on all weights or stable weights, or to pulse the output for about 1/16th of a second.

When set to active high, the output will be at 5 vdc when the setpoint is tripped, and .6vdc when the setpoint is not tripped. When set to active low, the opposite is true. When set to latch, the setpoint output once tripped will remain tripped even if the displayed weight value goes below the setpoint until the scale returns to within 1% of the scale capacity. If set to non-latch, the output will be disabled every time the displayed weight goes below the setpoint value.

When the setpoint is set for stable weights, the setpoint will only be checked if stability is detected. This means that the setpoint status will not change unless the scale is stable. If a setpoint is tripped, and the scale goes into motion, the setpoint will remain tripped until stability is achieved. At that time, the setpoint will be checked and if the weight is below the setpoint, the setpoint will then disable. If the setpoint is set for both stable and latched, once the setpoint is latched, motion is ignored. The setpoint stays latched until the scale returns to within zero (or within 1% of capacity).

The pulse option can be selected to output a pulse for 1/16th of a second once the setpoint is set. If the active high selection is made with the pulse selection, the output will go from .6vdc to 5vdc for about 1/16th of a second, then return to .6vdc. Once the output has been pulsed once, the output will not pulse the output again until the scale returns to within 1% of the capacity of the scale. Selecting the active low will cause the opposite of the above to be output.

24. Time and Date Output Format (t.d.O)

Option	Description
non	**No date or time print out.**
1	Print "MM/DD/YY" only.
2	Print "DD/MM/YY" only.
3	Print "HH:MM:SS AM/PM" only.
4	Print "HH:MM:SS HR" only.
5	Print "MM/DD/YY HH:MM:SS AM/PM."
6	Print "MM/DD/YY HH:MM:SS HR."
7	Print "DD/MM/YY HH:MM:SS AM/PM."
8	Print "DD/MM/YY HH:MM:SS HR."

Option 42 OPT 27 must be installed for the Time and Date feature to function. The Time and Date Output Format is used to enable and select the printout format of the time and/or date. When selected to something other than non, the selected format will be printed after the selected print format (parameter 15) has been printed.

See Section 4 for instructions on setting the time and date.

25. Line Feed and Form Feed (PtF)

Option	Description
non	**Print no line or form feed.**
01L	Print 1 line feed only.
02L	Print 2 line feeds only.
03L	Print 3 line feeds only.
04L	Print 4 line feeds only.
05L	Print 5 line feeds only.
06L	Print 6 line feeds only.
07L	Print 7 line feeds only.
08L	Print 8 line feeds only.
09L	Print 9 line feeds only.
10L	Print 10 line feeds only.
FF	Print form feed only.

The Print Line and Form Feed parameter allows the user to print a selected number of line feeds or a form feed at the end of all other data transmitted. This is useful for label printing where once the data is printed, the user wants to advance to the next label automatically without pressing buttons.

Section 7. Calibration

The 4200 was designed to make calibration as simple and flexible as possible. All that is needed to calibrate the 4200 is one test weight and some simple manipulation of the front panel push-buttons.   Refer to Figure 5 below for push-button functions in the calibrate mode.
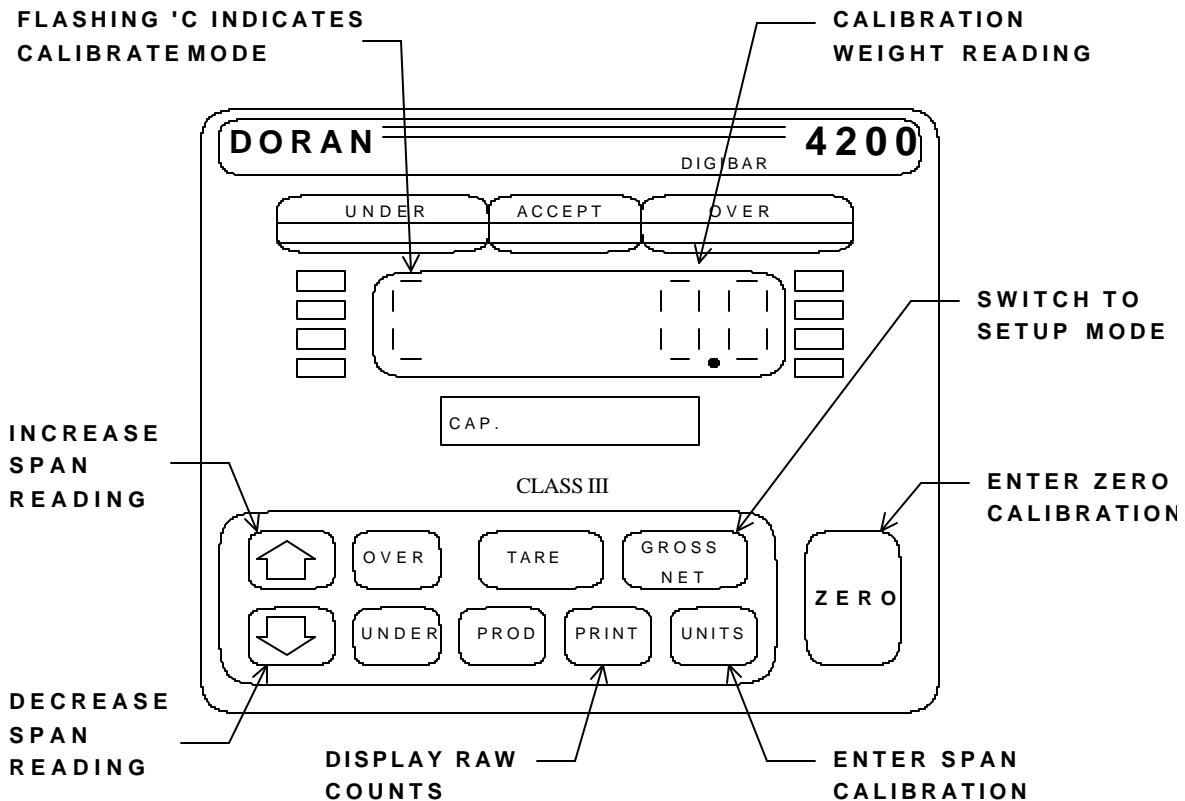
Figure 5 Front Panel Functions - Calibration Mode

ENTERING THE CALIBRATION MODE

To enter the Calibration Mode, it is necessary to gain access to the main board. This is done differently with the 3 enclosure types (see figure 1).

Model 4200 Tower: Remove the small rectangular access panel on the rear of the tower by removing the two hex screws holding it in place. Flip S1 located on the PCB just inside the access port (red-handled toggle switch) to enter the setup mode.

Model 4200M: Remove the rectangular access panel on the rear of the indicator by removing the six hex head screws holding it in place. Locate S2 - position 9 using figure 2. Move this switch to the closed position to enter the setup menu.

Model 4200RSS: Loosen the front cover latches and open the front cover. Locate S1 on the main board using figure 2. Flip S1 to enter the setup mode.

When the switch has been closed, the scale display will respond by showing the message "AUG --". To enter the calibration mode, press the GROSS/NET button. The indicator will flash "C" in the leftmost digit of the display and show the actual gross weight on the platform.

READING RAW A/D PLATFORM DATA

The raw (internal) counts must be displayed in order to perform the analog zero and span calibrations described below.

To display the raw (internal) counts, enter the calibration mode and press and hold the PRINT button. The raw counts will be displayed as long as PRINT is held. The displayed value will always be a positive value and in the range of 0 to 104000. If the value is above or below the limits, then the value will remain at the limits.   Additionally, while the PRINT button is held, serial data representing the raw data will be transmitted from the simplex (printer) port.

ANALOG ZERO CALIBRATION

The analog zero calibration is necessary because a dead load is always present on the load cell due to the weight of the platter and any other weighing apparatus. This dead load is compensated for electronically within the 4200, and switch settings are provided for adjustment.

To check the analog calibration, make sure the weighing platform is properly set up, then enter the calibration mode and display the raw counts as explained above. The reading with no weight on the platter should be between 1000 and 10000. If the reading is outside this range, adjust the zero potentiometer to try to bring it into range. If the zero pot does not provide enough adjustment, change the switch settings using the chart on the following page (zero up settings increase reading, zero down settings decrease reading).

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

*Note : 1 = Closed Switch, 0 = Open Switch.

ANALOG SPAN CALIBRATION

The analog span calibration is the full scale span or gain for the platform being used. The span switch settings should be set so that when 100% of the scale's capacity is applied to the platform, the raw count reading should change approximately 40000 to 60000 counts from the zero reading obtained from the analog zero calibration. If the span is above or below this range, use the chart on the following page to adjust the switch settings so that the span falls into the acceptable range. The raw counts are limited to 104000, so when setting the span, be sure that the absolute raw count reading stays below 104000 counts.

Use the following formulas to determine the SPAN and Full Capacity readings:

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

$$RAWFC = RAWLO + SPAN$$

RAWHI is the reading with the test weight on the platform, RAWLO is the reading with the platform empty. SPAN is the full capacity span, which should be between 40,000 and 60,000 counts, and RAWFC is the full capacity reading, which shouldn't go above 104,000 counts.

After adjusting the span, recheck the zero calibration and adjust again if necessary. Proceed with the digital calibration.

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

DIGITAL CALIBRATION

The digital calibration is necessary to match the raw span value to the actual displayed weight. This is done using an accurate test weight.

In order to perform the digital calibration, you must have an accurate test weight equal to at least 20% of your scale's capacity or 5% for capacities greater that 1000 lbs. The following is a table of scale capacity vs. the minimum recommended amount of test weight that should be used for digital calibration.

Scale Capacity	Minimum Recommended Test Weight for Span Calibration
6 lb	6 lb
15 lb	15 lb
30 lb	30 lb
60 lb	60 lb
100 lb	100 lb
120 lb	120 lb
150 lb	100 lb
200 lb	100 lb
300 lb	150 lb
600 lb	300 lb
1105 lb	500 lb
3000 lb	1500 lb
6000 lb	2000 lb
15000 lb	5000 lb
20000 lb	5000 lb
30000 lb	10000 lb
60000 lb	20000 lb
120000 lb	50000 lb

To perform a digital calibration, first enter the calibration mode as explained on the previous page.   Next, make sure that the scale platform is empty and press the ZERO button.   The 4200 will respond by displaying "Ent 0" for approximately two seconds, signifying that the zero calibration was successful. The display will then go to a zero weight reading with the leftmost digit still flashing "C", indicating that the 4200 is now ready for span calibration.

With the 4200 displaying 0 and still flashing "C" in the leftmost digit, place the known test weight on the scale platform. The display will show the weight of the test load. Use the UP and DOWN arrows to adjust the displayed weight to match the actual weight on the platter. When the displayed weight is correct, press the UNITS button to save the calibration data in the nonvolatile memory. Remember that after you adjust the weight reading, you must press UNITS to save the calibration; failure to do so will result in improper calibration of your 4200. When UNITS is pressed, the 4200 will display "Ent SP" for approximately two seconds indicating that the span calibration was successful.

If an error message appears at any time during the calibration procedure ("Er..." on the display), the calibration was not successful. Refer to Section 10 for causes and remedies.

EXITING THE CALIBRATION MODE

After successfully completing both a zero and span calibration, you may go back to the "User Setup Menu" to review or change the programming of the 4200 by pressing the GROSS/NET button. When calibration and setup are completed, return to normal weighing by reversing the above procedure, and reassemble the indicator.

ZERO AND SPAN SWITCH SETTINGS FOR OLD REVISION BOARDS

The following tables show the switch settings for the older PCB035 revision 2.0 and 2.0A boards and are provided for reference only. These settings should only be used if this manual is being used to support older scales with the PCB035 main board. Scales currently being sold all use the settings on the previous two pages.

Zero Offset switch settings - PCB035 Rev. 2.0 (no zero pot)

Approximate Zero Offset	S2-1	S2-2	S2-3	S2-4	S2-5
40% zero up	1	0	0	0	0
15% zero down	0	1	0	0	0
5% zero down	0	0	1	0	0
2% zero down	0	0	0	1	0
1% zero down	0	0	0	0	1

Span switch settings - PCB035 Rev. 2.0 (no zero pot)

Load Cell Output	S3-1	S3-2	S3-3	S3-4
0.5 mv/v	1	1	1	1
0.75 mv/v	1	1	0	1
1.0 mv/v	1	0	0	1
1.5 mv/v	0	1	1	0
2.0 mv/v	0	0	0	1
2.5 mv/v	0	0	0	0

Zero Offset switch settings - PCB035 Rev. 2.0 (with zero pot)

Zero Offset	S2-1	S2-2
60% zero up or down adjustment	0	0
40% to 160% zero down adjustment	1	0
115% to 235% zero down adjustment	0	1
215% to 335% zero down adjustment	1	1

Span switch settings - PCB035 Rev. 2.0 (with zero pot)

Load Cell Output	S3-1	S3-2	S3-3	S3-4
0.5 mv/v	n/a	1	1	1
1.0 mv/v	n/a	1	1	0
1.5 mv/v	n/a	1	0	1
2.0 mv/v	n/a	0	1	0
2.5 mv/v	n/a	0	0	1
3.0 mv/v	n/a	0	0	0

Section 8. Serial Communications

The Model 4200 is equipped with two serial interface ports. Port 1 is a duplex (bi-directional) port that is usually used to communicate with a computer or terminal, and port 2 is a simplex (printer) port that is usually used to send data to a printer or data logger. The 4200 comes standard with both ports configured for RS232 operation and ready to use. Other configurations are available.

PORT 1 - DUPLEX

Port 1 is a duplex (two-way) port, meaning that it can both transmit and receive data. It is a half-duplex port, so it cannot send and receive simultaneously. Port 1 is usually connected to a computer or terminal to issue commands to the scale, send data to the scale, or request data from the scale. The 4200 command set allows the operator to perform any of the front panel push-button functions, and some others that are not accessible from the front panel. Data that can be sent to, or received from, the scale includes Overs, Unders, Tares, Setpoints, and Labels. Port 1 makes it possible to easily load values for various products or recipe ingredients. It also makes it easy to request data from the scale for purposes of data collection.

Port 1 is available for operation in any of 3 configurations: RS232, RS485, or 20 mA current loop. The 4200 is configured for RS232 operation unless one of the other options is ordered. RS232 is the most commonly used communications standard in the computer industry, so almost all computers come with a standard RS232 port. It is used to transfer data between two pieces of equipment, in this case the 4200 and a computer or terminal. RS232 cable length is limited to approximately 50 ft. (longer if a low capacitance cable is used).

RS485 is necessary when a long cable is to be used, or when more than one scale is to be linked to the same computer. In this case, one end of the cable is connected to the computer, and each scale is connected to a tap or "drop" on the main cable. Each scale must then have a unique scale address so that the scales will not conflict with one another (see Section 6, parameter 21). A special serial card usually needs to be installed in the computer to use RS485 communications.

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

Any of these configurations can be ordered with a data cable and DB9 or DB25 connector (the most common computer serial connectors). The RS232 connector usually needs to wired in the "null modem" configuration, which is shown in Section 12. The main board connections are also shown in Section 12. Note that a shielded cable must be used to avoid interference problems from other equipment.

If a terminal is used to send commands or data, you can hook it up to the scale data cable, usually by way of a DB9 or DB25 connector, set the line parameters, and start using it right away. If a computer is to be used, you must use a communications program in order to communicate with the scale. In either case, you must check the line settings of the scale and computer or terminal to make sure they match. These are the baud rate, data bits, and parity settings. The 4200 comes standard with the most common settings, which are: baud rate = 9600, data bits = 8, parity = n. These can be changed to match the computer or terminal (see Section 6, parameters 13a and 14a), or the computer or terminal settings can be changed to match those of the 4200.

The 4200 also has an option setting to enable or disable handshaking (see Section 6, parameter 19). If handshaking is on, the scale will return an asterisk upon recognition of a valid command and completion of the specified task. If the command is not recognized, the scale will return a question mark. This helps to ensure that a command was recognized and carried out successfully.

PORT 1 (DUPLEX) COMMAND SUMMARY

The Model 4200 has a standard set of commands that enter and return information from the scale via port 1. The commands must always be preceded by the address of the indicator, which is 01 by default. No other addresses need be used, except in the case where multiple indicators are connected in a network, which would require a separate address for each indicator. All indicators will respond to an address of 00, regardless of the indicator's address. This is intended to be used as a broadcast address, allowing a single command to be sent to multiple indicators simultaneously. Send a carriage return (with or without a line feed) after each command to complete the transmission.

General Scale Commands

General commands are mostly one-character commands that accomplish push-button functions. Remember to precede each command with the address of the scale, and follow each command with a carriage return.

G   Selects the gross display mode.

N   Selects the net display mode.

P   Sends one transaction from the scale as specified in Section 6. This will default to transmit from the simplex serial port unless prefixed with the "Q"   command.

V   Causes a unit conversion as set up in Section 6.

Z   Zeros the scale as the ZERO push-button would on the face of the scale.

L   Prints the currently selected label using Print Format 13 (see PRINT BUFFER FORMAT later in this section).

B   Starts data buffering. This means that whenever a print is requested (either by pressing the PRINT button, or by the various automatic print modes), the data that would normally be printed via the printer port is instead sent to a buffer. This data would then be retrieved by a computer or terminal. The buffer is 256 bytes long, and since the length of the print formats vary, the number of transactions that can be buffered is dependent on the print format.

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

D   Sends (dumps) the entire contents of the transaction buffer to the duplex port and clears the buffer.

Q   Prints the next data request using the 'P' command to the duplex port instead of the simplex port. The function resets after the print is completed and must be used for every 'P' command that is used.

^P   A CTRL+P enables the pass through buffer. Once issued, all characters sent to the scale will be passed through to port 2 (printer port). Once all the data is sent, a CTRL+V (^V) is sent without an address to disable the pass-through function. For example, to send "DORAN" to the printer port, first type "00^P", followed by a carriage return, then "DORAN", and finally "^V", followed by a carriage return. The baud rates and parity settings must be the same for both ports to make use of this feature.

H   Remotely sets the time in a "hh:mm:ss" format, e.g. "00H15:20:40" will set the time to 15:20:40 or 3:20:40 pm.

W   Remotely sets the date in a mm/dd/yy format, e.g. "00W10/15/94" will set the date to 10/15/94).

\   Issues a label buffer command. This must be followed by a buffer formatting command (see BUFFER FORMATTING COMMANDS later in this section). When this command is received with a buffer command, data is sent to the simplex port using the format specified by the buffer command (e.g. '\T' will cause the current Tare value to print).

SP   Selects the product number. This accomplishes the same thing as   pressing   the PROD button on the front panel and using the UP and DOWN arrows to select the product. Follow the command with the two digit product number (00 - 99) -- see examples on next page.

SL   Selects the label number. This accomplishes the same thing as pressing the PROD
      button on the front panel and using the UP and DOWN arrows to select the label.
      Follow the command with the two digit label number -- see examples below. Refer
      to the LABEL BUFFER heading later in this section for more information. Note: a
      command of 01SL00 will not print any label out.

EB   Sets up the number of label buffers -- this cannot be done via the front panel. Follow
      the command with the number of label buffers to set up (two digit number) -- see
      examples below. Refer to the LABEL BUFFER information later in this section for
      more information.

Examples :

00G   Selects the gross mode on all scales connected to the network.

05N   Selects the net mode on the scale that has the ID set to 5.

12Z   Zeros the scale that has the ID selected to 12.

01SP12   Selects product 12 on scale 01.

01SL02   Selects label 2 on scale 01.

01EB03   Sets up 3 label buffers on scale 01.

Data Request Commands

Data Request commands are two-character commands that request the scale to return
data from various registers (overs, unders, tares, etc.). Most commands must be followed
by a two digit number that specifies which register data to send. Remember to precede
each command with the address of the scale, and follow each command with a carriage
return.

XO   Requests an Over value. Follow this command with a two digit number that
      specifies which Over value is to be sent.

XU   Requests an Under value. Follow this command with a two digit number that
      specifies which Under value is to be sent.

XT   Requests a Tare value. Follow this command with a two digit number that specifies
      which Tare value is to be sent.

XS   Requests a Setpoint value. Follow this command with a two digit number that
      specifies which Setpoint value is to be sent.

XP   Requests the current product number.   Do not send any numbers after the command.

XPL   Requests all the product values (00-99).   Do not send any numbers after the command.

XZ   Requests the scale status string. Do not send any numbers after the command.

The scale status string is 6 characters long. Each character is as follows:

char 1	G for gross mode, N for net mode.
char 2	T if over 1% or capacity, SP (space) if below.
char 3	L for Pounds, K for Kilograms, O for Ounce, Z for Pound-Ounce, G for Grams.
char 4	M for motion, S for Stable
char 5	SP (space) for valid weight, O for overload condition
char 6	O for over weight, U for under weight, A for acceptable weight, SP (space) for tolerance off.
char 7	B for low battery condition, SP (space) for battery OK.

Examples: N ZS U   Net mode, below 1%, lb-oz units, stable, valid weight (not in overload), under weight.

GTLM A   Gross mode, above 1%, lb units, in motion, valid weight, acceptable weight.

XL   Requests the format string from the specified label buffer. Follow this command with a two digit number that specifies which label string is to be sent. Refer to LABEL BUFFER later in this section for more information.

XB   Requests the number of label buffers currently set up. Do not send any numbers after the command. Refer to LABEL BUFFER later in this section for more information.

Examples:

01XO12   This requests scale 01 to return the Over value of product 12.

01XZ   This requests scale 01 to return the scale status string.

01XP   This requests scale 01 to return the current product number.

01XL03   This requests scale 01 to return the format string in label buffer 3.

01XB   This requests scale 01 to return the number of label buffers that have been set up.

Data Clear Commands

Data Clear commands are two-character commands that clear specified registers (overs, unders, tares, etc.). All commands except CM must be followed by a two digit number that specifies which register to clear. Remember to precede each command with the address of the scale, and follow each command with a carriage return.

CO   Clears the Over value for the specified product.

CU   Clears the Under value for the specified product.

CT   Clears the Tare value for the specified product.

CS   Clears the specified Setpoint value.

CM   Clears the message from the display (see the EM command below).

Examples:

01CO12   Clears the Over value for product 12 on scale 01.

01CM   Clears the message on the display.

Data Entry Commands

Data Entry commands are two-character commands that enter the specified data into the specified registers (overs, unders, tares, etc.). The EO, EU, ET, and ES commands must be followed by the two digit product number (or setpoint number) that is to be updated. This then must be followed by the polarity of the data (+ or -), and then 5 digits of data. A decimal point may be included, but it is ignored.   The decimal point will be placed according to where it is placed on the display. For example, if the display is set to read increments of .01 lb. and the command 01EO12+01100 was sent, then the Over value for product 12 would be 11.00. If instead the display was set to read increments of .1 lb, then the Over value would be set to 110.0. Always send 5 digits of data, using leading zeros to fill in the higher digits if necessary.   Remember to precede each command with the address of the scale, and follow each command with a carriage return. Note: Units entered should match the currently selected units.

EO   Enters the specified value into the specified Over register.

EU   Enters the specified value into the specified Under register.

ET   Enters the specified value into the specified Tare register.

ES   Enters the specified value into the specified Setpoint.

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EM   Displays a momentary message on the front panel. Follow the command with the message, which may be up to 6 characters. The characters must be displayable by a 7-segment display.

EL   Enters the specified format string into the specified label buffer. Refer to LABEL BUFFER FORMAT later in this section for more information.

Examples:

01EO12+00100   Enters the value of 1.00 into the over register for product 12 (if display is set for two decimal places).

01EO12-00100   Enters the value of -1.00 into the over register for product 12.

01ET00+05000   Enters the value of 50.00 into the tare register for product 00.

01EM00ABCDEF   Causes the message "AbCdEF" to display on the front panel.

01EM00QWKXM   Causes nothing to display since none of the characters specified can be displayed by 7-segment LED's.

Consecutive Counter Commands

A consecutive counter can be set up with these commands, and then used in the print buffer to print an increasing or decreasing number on successive labels. The following commands are used to set up the counter or to reset it to the base number. When setting up the counter, specify the base number (the number it starts counting from) and the index (how much the counter increases or decreases each time a label is printed). Also specify whether the counter is to increase or decrease. The form of the counter commands is as follows:

01a+XXXXXX000ZZZZ   Sets up the counter to start at XXXXXX and increase by ZZZZ each time a label is printed (separate the two numbers with 000).

01a-XXXXXX000ZZZZ   Sets up the counter to start at XXXXXX and decrease by ZZZZ each time a label is printed (separate the two numbers with 000).

01aR   Resets the counter to the base XXXXXX specified by either of the two previous commands.

Examples:

01a+0001550000005   Sets the counter to start at 155 and increase by 5 each time a label is printed.

01a-0012340000002   Sets the counter to start at 1234 and decrease by 2 each time a label is printed.

PRINT BUFFER

A 256 byte transaction buffer is included on the 4200 to allow buffering of data for the printer port. To enable the print buffer, send the 'B' command. When this is done, any data that would normally be printed on port 2 will instead be stored in the print buffer. To disable the buffering of data, send the 'U' command. This will re-enable the printer port and data will be printed normally. The data in the buffer will remain intact until a 'D' (dump) command is sent. When this command is sent, all data in the print buffer will be sent to port 1 (duplex port), and the buffer will be reset (cleared). If the dump command is sent before the 'U' command, the contents will be sent and the buffer cleared, but the buffer will still be active, meaning that any future prints will again be buffered.

Note that the number of transactions that can be buffered is dependent upon the Print Format selected. The more data that is printed, the smaller the transaction buffer becomes.

LABEL BUFFER

The Model 4200 provides a 240 character Label Buffer that allows you to customize up to 9 label formats. The programming must be done through the duplex port (port 1) and requires a terminal or computer.

The 240 character label buffer can be divided up into 9 separate buffers for printing 9 different formats. The total 240 characters is divided evenly by the number of buffers that have been specified in the 'EB' command. For example, if two buffers are to be defined for two different formats, then 120 characters will be allocated to each buffer. The selection of which buffer format to use when more than one buffer is defined is done using the PROD button on the scale. See Section 4 for selecting the "LBL XX" prompt to select the buffer format to use.

The protocol uses a series of control codes within the format to instruct what the 4200 is to print at that time in the format. The format can also contain literal characters that can print prompts and/or text before the actual data is printed.

Formatting the Label Buffer

To format the buffer, the number of buffers that are to be set up must be sent to the 4200 first. For example, the string "00EB02" will instruct the 4200 to set up 2 buffers for formatting and will allocate 120 characters to each buffer. Up to 9 buffers may be defined. Sending the string "00XB" will return the maximum number of buffers currently assigned.

Once the maximum number of buffers is defined, each buffer must be formatted. To format the buffer, a series of characters must be sent to the 4200 using the list of control codes listed below. All control codes in the format are prefixed with a '\' character, all other characters are treated as literal characters and will be printed as such.

For example, send the string: "00EL01Net:\b\N\b\u\r\l" to set up buffer number 1. This sequence of controls and literals will result in the printing of:

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

The "Net:" is literally printed, the \b prints a blank, the "\N" instructs the 4200 to print the net weight next, the \b prints another blank, the "\u" prints the current units, "\r" follows with a carriage return and the "\l" instructs the 4200 to print a line feed.

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

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

To select the label buffer to print, use the PROD button to display the "LBL XX" prompt, and use the UP or DOWN arrows to select the label (see Section 4). The label can also be selected by sending the SL command on port 1. For example, 01SL02 will select label buffer 2.

Label Buffer Control Codes

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

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

a   Prints the consecutive counter and then increments or decrements it (depending on how it is set up). (See pg 58)

b   Prints a space (ASCII 32).

r   Sends a carriage return (ASCII 13).

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

f   Sends a form feed (ASCII 12).

G   Prints the gross weight with decimal point.

g   Prints the gross weight without decimal point.

N   Prints the net weight with decimal point.

n   Prints the net weight without decimal point.

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

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

C   Prints the current checkweigh state (Over/Accept/Under).

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

T   Prints the current tare value with decimal point.

t   Prints the current tare value without decimal point.

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

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

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

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

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

y   Prints the year in a "YYYY" (1995-2095) format.

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

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

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

P   Prints the current Product selected (000-199).

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

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

1   Causes the 4200 to print the contents of the receive buffer. This is useful for applications such as bar code readers. The bar code information can be sent to the duplex port from the bar code reader (must be followed by a carriage return), and the label format could be set up to print this information in a specific format (usually used with a special printer, such as the Prodigy printer). A limitation of this feature is that if a string is sent to the 4200 and it recognizes it as a valid command, it will act on it, so only   strings that are non-valid commands should be sent.

PORT 2 - SIMPLEX

Port 2 is a simplex (one-way) port, meaning that it can only send data, not receive. It is normally used as printer port, and can be connected to virtually any printer or other data collection device. The way that a print is initiated is controlled by setup parameter 4 (Serial Data Output), and the format of the printout is controlled by setup parameters 15 (Print Format), 24 (Time and Date Output), and 25 (Line Feed and Form Feed).

As with the duplex port (port 1), port 2 can be ordered with a data cable and DB9 or DB25 connector. If a connector is ordered, the wiring requirements for your printer must be specified since they vary among printer manufacturers. The main board port wiring connections are shown in Section 12. Note that a shielded cable must be used to eliminate interference from other equipment.

Port 1 can be configured for RS232 or 20 mA current loop operation. As explained in the PORT 1 section, RS232 is the most common interface in the computer industry, but the 20 mA current loop allows much longer cables to be used.

The baud rate, data bits, and parity settings of the 4200 must match those of the printer or other equipment that is to be connected to port 2. The 4200 comes standard with the most common settings which are: baud rate = 9600, data bits = 8, parity = n. These can be changed to match the printer (see Section 5, parameters 13a and 14a), or the printer settings can be changed to match those of the 4200.

The 4200 also has an option setting to enable or disable handshaking (see Section 6, parameter 19). This refers to the CTS (Clear to Send) signal that many printers use. If the handshaking is enabled for port 1, the CTS line must be connected from the main board to the printer. This line is supplied if a cable is ordered (see Section 12 for connections).

Data Transmission Modes

Transmission from the 4200 can be initiated in one of 9 ways as follows:

TRANSMIT ON DEMAND (TOD)

When the data output mode is set to Transmit on Demand (tod), transmission of   weight data from the printer port is initiated by pressing the PRINT button. Upon pressing PRINT, weight data will be transmitted provided the scale is stable and not in overload. If either of these two criteria is not met at the time that the PRINT button is pressed, the request will be ignored.   Meeting these two criteria insures that no erroneous weights are transmitted. This output mode is used with a printer when only selective samples need be printed.

LATCH ON DEMAND (LOD)

The Latch on Demand (L.o.d) setting is very similar to the Transmit on Demand setting in that the transmission of weight data from the 4200 is initiated by   pressing the PRINT button. The only difference is in the fact that in the Latch on Demand mode, if the weight reading is in motion or the scale is in overload the print request is "latched" (remembered) and the data will be transmitted upon the first valid stable weight reading.

LATCH ACCEPTABLE WEIGHTS (ATD)

The Latch Acceptable Weights (Atd) setting is the same as the Latch on Demand setting, except that only acceptable weights will be printed. If PRINT is pressed when the scale is in motion and the weight stabilizes in the ACCEPT range, the weight will be printed. If it stabilizes in the OVER or UNDER range, the weight will not print.

AUTO-PRINT 1 (AP1)

When the data output mode is set to "AP1", the scale will transmit each stable weight once and only once each time the scale reading goes into motion. When the scale reading goes into motion, the data output is enabled to transmit as soon as the weight stabilizes again. This output mode can be used with either a printer or computer/ data-logger when a complete sampling of weights is required and a minimum of operator intervention is desired.

AUTO-PRINT 2 (AP2)

When the data output mode is set to "AP2", the scale will transmit stable weights above gross zero once and only once for each transition from "Startup Gross Zero" (This is the initial Zero Reading taken when the scale is turned on), to the stable weight. This means that when an object is placed on the platform, the scale reading will go to the object's weight and stabilize. At this point the data output will transmit the weight data

and remain disabled until the scale returns to "Startup Gross Zero" (object is removed). Once the scale returns to "Startup Gross Zero", the data output is re-enabled to transmit the next stable, nonzero weight.

This differs from the Auto-Print 1 mode in that in "AP1" mode, the scale did not have to return to zero to re-enable the data output; it simply had to go into motion. The Auto-Print 2 mode is useful with printers or computers where there   is a need for a large number of high quality weight samples with a minimum of operator intervention.

AUTO-PRINT 3 (AP3)

This output mode is very similar to Auto-Print 2. The only difference is that the zero reset point for enabling transmission is based upon displayed zero rather than "Startup Gross Zero". This mode is useful to automatically transmit weights when the amount of tare weight on the scale will vary.

AUTO-PRINT4 (AP4)

When this data output mode is selected, the last stable acceptable weight will be printed when the scale returns to zero. This means that when a weight is placed on the platform and it stabilizes in the ACCEPT range, that weight will be remembered so that when the weight is removed and the scale returns to zero, the weight will be printed. If weight is added or removed from the scale and allowed to stabilize, only the last acceptable weight will be remembered and printed. This is useful when a weight needs to be adjusted while on the scale, and only the final result is to be printed. If the last stable weight was not acceptable, no print will take place.

CONTINUOUS MODE

When the data output mode is set to "CNT", the scale will transmit weight data once each scale update. Since there is no qualification of weight data as to stability or overrange, an additional status character is transmitted with the weight data. This status character appears at the end of the message after the last weight unit character and before the carriage return/line feed.

This output mode is used almost exclusively with computers and data loggers where real-time monitoring of the weight is necessary.

TIMED PRINT

When the data output mode is set to "tP" the scale will transmit weight data every 10 seconds. This enables the operator to receive almost constant weight printouts on a lesser scale than the continuous option offers.

Print Formats

PRT FORMAT	LB, KG, OZ, or G	LB - OZ
1	100.55 lb (G/N) (O/A/U)	100 lb 8.8 oz (G/N) (O/A/U)
2	SCALE I.D.: 01 100.55 lb (G/N) (O/A/U)	SCALE I.D.: 01 100 lb 8.8 oz (G/N) (O/A/U)
3	SCALE I.D.: 01 PRODUCT NO.: 12 100.55 lb (G/N) (O/A/U)	SCALE I.D.: 01 PRODUCT NO.: 12 100 lb 8.8 oz (G/N) (O/A/U)
4	PRODUCT NO.: 12 100.55 lb (G/N) (O/A/U)	PRODUCT NO.: 12 100 lb 8.8 oz (G/N) (O/A/U)
5	100.55 lb (G/N) (O/A/U) TARE: 5.00 lb (KEY)	100 lb 8.8 oz (G/N) (O/A/U) TARE: 5.00 lb (KEY)
6	SCALE I.D.: 01 100.55 lb (G/N) (O/A/U) TARE: 5.00 lb (KEY)	SCALE I.D.: 01 100 lb 8.8 oz (G/N) (O/A/U) TARE: 5.00 lb (KEY)
7	SCALE I.D.: 01 PRODUCT NO.: 12 100.55 lb (G/N) (O/A/U) 5.00 lb SP/KEYED	SCALE I.D.: 01 PRODUCT NO.: 12 100 lb 8.8 oz (G/N) (O/A/U) TARE: 5.00 lb (KEY)
8	PRODUCT NO.: 12 100.55 lb (G/N) (O/A/U) TARE: 5.00 lb (KEY)	PRODUCT NO.: 12 100 lb 8.8 oz (G/N) (O/A/U) TARE: 5.00 lb (KEY)
9	1$AO 100.55	1$AO 100.55
10	(O/A/U)	(O/A/U)
11	100.55 lb (G/N)	100 lb 8.8 oz (G/N)
12	This print format matches the format required by A&D printers.	This print format matches the format required by A&D printers.
13	Label buffer format.	Label buffer format.
14	100.55 lb (G/N) (O/A/U) 45.60 kg	100 lb 8.8 oz (G/N) (O/A/U) 45.60 kg
15	PRODUCT NO.: 12 100.55 lb (G/N) (O/A/U) 45.60 kg	PRODUCT NO.: 12 100 lb 8.8 oz (G/N) (O/A/U) 45.60 kg

Notes:

Each line of each of the formats is preceded by a "Start of Text" character (STX - ASCII 02). Print format 1 is the exception, it does not have a STX.

All numeric fields shown in the table (weight data, product numbers, scale IDs, and tare values) are examples. The actual printed values depend on the displayed weight, current product number, etc.

Weight data in lb, kg, oz, or g is six characters long, including decimal point. Leading zeros are transmitted as spaces. In lb-oz format, the pound weight is 1 to 3 characters long depending on the capacity, and the ounce weight is 2 to 5 characters. Product numbers and scale ID's are 2 characters long.

Items in parentheses denote print data that depend on certain scale parameters. The parameters and print formats are as follows:

G/N   Prints "grs" if the scale is in the gross mode, "net" if in the net mode.

O/A/U   Prints "OVER" if the Over indicator is on, "ACCEPT" if the Accept indicator is on, or "UNDER" if the Under indicator is on.

KEY   Prints "KEYED" if the tare value was entered via the UP or DOWN arrows or a space if the value was entered in the PTT mode(see Section 4).

Print format 9 is a special format for a DGH analog output module. Print format 12 is a special format for A&D printers. Print format 13 is used to print the data in the label buffers (see LABEL BUFFER elsewhere in this section).

Print formats 14 and 15 print the same information as formats 1 and 4, respectively, plus an additional kg weight printout. The kg weight will print if the scale is in the lb or lb-oz display mode, or grams if the scale is in the oz display mode.

If the data output mode is set to print continuously, each printout will be followed by one or more of the following scale status characters: M (prints if in motion), R (prints if in digital overload, 103% of scale capacity), G (prints if in gross overload), * (prints always in continuous mode).

CONFIGURATION AND PRODUCT PRINTOUT

The 4200 has the ability to print out the configuration of the unit. If the PRINT push-button is held while the unit is plugged in or the ZERO push-button is pressed (on battery units only), the scale will print a list of parameters and the options selected for those parameters. Release the PRINT push-button once the printing starts. Once printed, the scale will operate as normal. A printout of all products and setpoint values can be obtained by pressing and holding the PROD button as the unit is powered up.

Section 9. Model 4100L

The Model 4100L is a Handbook 44 (NTEP) certified version of the Model 4100 Checkweigher. The scale has limited options but is as versatile as the Model 4200. The electronics used in the Model 4100L are the same as the electronics used in the Model 4200. A special display board with accessible push-buttons is used since a touch panel is not used for the scale.
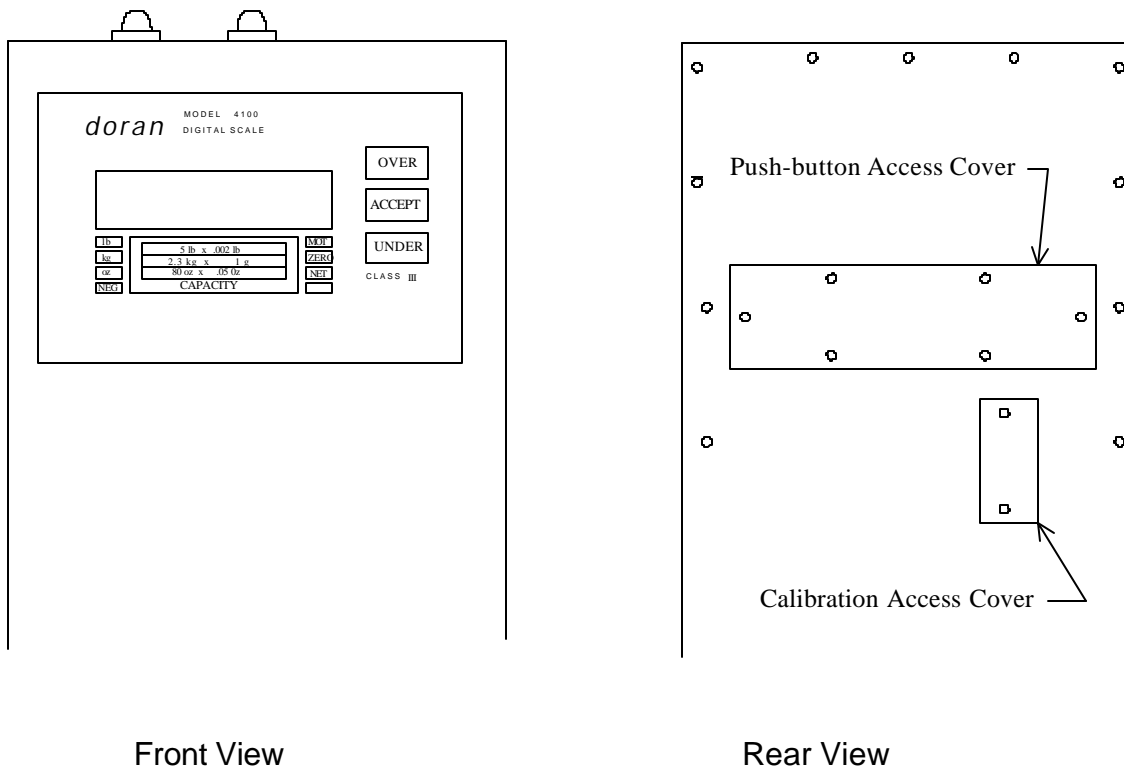
Front View   Rear View

Figure 7 - Model 4100L

DISPLAY AND PUSH-BUTTONS

The 4100L uses the same display as the 4100, but the main board electronics are the same as the 4200. There is a single zero push-button on top of the scale, and optional convert, print, tare or gross/net push-buttons are available.   In addition to the external ZERO button, the 4100L has all the push-buttons of the 4200, accessible by removing the push-button access cover on the rear cover (see figure 7). These push-buttons can be used to perform any of the functions supported by the 4200. They will probably be used mostly for entering over and under values for checkweighing. Refer to figure 8 and the appropriate sections in this manual for explanations of the functions of each of the push-buttons.

OVER   UNDER   TARE   PROD   GROSS   PRINT   CONV   ZERO

NET
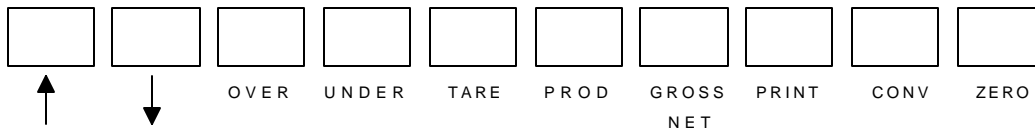
Figure 7. 4100L Internal Push-buttons

SCALE OPERATION

All of the information in Section 4 of this manual is valid for the Model 4100L, although typically not as many features are utilized. The 4100L typically has only an external ZERO push-button and possibly an optional CONVERT or PRINT push-button.   The internal push-buttons can be used to perform any of the functions explained in Section 4, but the most common is the entry of over and under value for checkweighing. In order to access the internal push-buttons, the push-button access cover must be removed. See Section 4 for more information.

CHECKWEIGHING

Checkweighing is performed as outlined in Section 5 of this manual.   Only zero checkweighing can be performed, and only in the S42 tolerance mode (parameter 11) since the 4100L does not have a bargraph display.

PARAMETER SETUP

The parameter setup mode operates the same as the 4200 - see Section 6. To enter the setup mode and review or change the settings, the push-button access panel and the calibration access cover must be removed to expose the internal push-buttons and the setup switch. Follow the instructions in Section 6 to enter the setup mode and review or change settings.   Following Section 6 in the Model 4200 manual, these are the suggested settings for the Model 4100L for most applications.

	Parameter		Option
1.	Averaging (AVg)		A1
1a.	Analog Filter		5
2.	Zero Tracking (AZt)		0.5
3.	Motion Aperture (MA)		1
4.	Serial Output (d.o.)		T.O.D.
5.	Startup Unit (S.U.)		LB
6.	Scale Capacity (CAP)		Variable
7.	Startup Zero (S.U.O)	AU0	
8.	Operating Mode (oP)		Std
9.	Push Button Enable (P.b.)		non
9a.	Beep On		
10.	Displayed Resolution (CtS)	3	
11.	Tolerance Entry (toL)		S42
12.	Tare Entry (tAr)		Set
13.	Simplex Baud Rate (b.r.t)		120
13a.	Duplex Baud rate (d.b.r)		120
14.	Data Bits and Parity (d.b.P)	8 N	
14a.	Duplex (d.b.1)		8 N
15.	Print Format (PFt)		1
16.	Checkweigh Operation (C.o.)		b A
17.	Convert Operation Sel. (CSL)		LGO
18.	Display Operation (doP)		on
19.	Handshaking (hSh)		non
20.	Unit On Time (tdY)		on
21.	Scale I.D. (i.d.)		01
22.	Setpoint Entry Mode (S.P.t)	SET	
23.	Setpoint Output Operation (S.P.o)	HoF	
24.	Time and Date Format (t.d.O)		non
25.	Print Line/Form Feed Select		non

Notes:

i.   Parameter 2 should be set to off or 0.5 divisions to comply with the approval.

ii.   Parameter 8 should be set up to STD to allow full range zero. Otherwise the zero range will be limited.

iii. Parameter 10 should always be set to 3 since the scale is only certified to 3000 divisions.

iv.   Parameter 16 should always be set to operate in both the Gross and Net modes since the scale will normally be in the Gross mode only.

v.   Parameter 17 should always be set to 3 way or 2 way convert since the lb-oz mode
        is not an recognized unit within Handbook 44.

vi.   Any deviation from the suggested settings may void the approval capabilities of the
        scale.

CALIBRATION

Calibration is performed as outlined in Section 7 of this manual. In order to access the
necessary internal push-buttons and the calibration switch, the push-button access cover
and calibration access cover must be removed. After removing the rear cover, follow the
instructions in Section 7 to calibrate the 4100L. If analog calibration is necessary, the rear
cover must be removed to gain access to the zero and span dip switches.

Section 10. Error Codes

Error Code: **"Er nSt"**   Scale not stable

Cause: Vibration/air currents affecting platform or possible trouble with load cell or main board.

Remedy: Isolate platform from the source of vibration and/or air currents or replace defective load cell or main board.

Error Code: **"Er C0.u"**   Load cell output too low for Cal 0.

Cause: Negative zero shift of load cell, trouble on main board, or incorrect analog calibration.

Remedy: Press the PRINT button to read what the actual zero offset is. This number should be between 1000 and 10000. See Section 7 for information on the analog calibration. If this problem happens after the scale has been in service for a period of time, check the load cell for damage, or the main board.

Error Code: **"Er C0.o"**   Load cell output too high for Cal 0.

Cause: Positive zero shift of load cell, trouble on main board, or incorrect analog calibration.

Remedy: Make sure platform is empty. If this is the case then press the PRINT button to read the actual zero offset. This number should be between 1000 and 10000. See Section 7 for information on the analog calibration. If this problem happens after the scale has been in service for a period of time, check the load cell for damage, or the main board.

Error Code: **"Er C0.E"**   Calibration Zero Error - cannot calibrate span.

Cause: Load cell output too high or low.

Remedy: See error codes "Er C0.o" and "Er C0.u".

Error Code: **"Er EEP"**   EEPROM fault

Cause: The EEPROM is defective or the stored data is corrupted.

Remedy: Switch S1 up. "Ldg new" will display. Switch S1 to its original position. This will load defaulted settings to the EEPROM. The scale should return to normal weight display. If the scale returns to the weighing mode, but the weight reading is incorrect, recalibrate the scale. If the scale will not return to the weighing mode, the main board may need to be replaced. After the scale loads the default settings, go to the setup mode and set any parameters that have been changed (see Section 6). If problem persists, the main board may need to be replaced.

Error Code: **"Er RAM"**   SRAM fault

Cause: Error in the static RAM memory.

Remedy: Push ZERO. Software version and revision will display then the scale will return to weigh mode. Reenter any values (Over, Under, Tare, etc.) that have been lost.

Error Code: **"Er SF.o"**   Load cell output swing too large.

Cause: Load cell is too small for selected scale capacity, load cell defective, incorrect analog calibration, or bad main board.

Remedy: Make sure load cell is the right size for the selected scale capacity. Check the analog calibration as outlined in Section 7. If the load cell capacity is proper and the calibration is set correctly, the load cell or main board may need to be replaced.

Error Code: **"Er SF.u"**   Load cell output swing too small

Cause: Load cell too large for selected capacity, defective load cell, incorrect analog calibration, or trouble on main board.

Remedy: Make sure that the load cell capacity is correct for the selected scale capacity. Check the analog calibration as outlined in Section 7. If the load cell capacity is proper and the calibration is set correctly, the load cell or main board may need to be replaced.

Error code: **"Er SP.o"**   Selected span calibration value (displayed weight) is over full scale capacity.

Cause: Improper setting of calibration span value or test load too heavy.

Remedy: Recheck test weight value and reset span.

Error Code: **"Er SP.u"**   Selected span calibration value (displayed weight) is less than 20% of full scale capacity.

Cause: Improper setting of calibration span value or test load too light.

Remedy: Recheck test weight value and reset span.

Error Code: **"Er dn"**   Attempting to adjust calibration span value down with less than 20% of full scale capacity on the platform.

Cause: Test load too light.

Remedy: Use heavier test weight.

Error Code: **"Er SP.-"**   Span setting negative.

Cause: Improper calibration span setting.

Remedy: Reset span to positive.

Error Code: **"Er or.0"**   Zero Over Error - Legal For Trade scales.

Cause: Attempting to zero too large of a weight (1.9% or 4.0% of scale capacity), lost calibration, or load cell zero shift (load cell may be damaged).

Remedy: Remove the load from the platform and reset the scale, or recalibrate, or replace load cell.

Error Code: **"Er ur.0"**   Zero Under Error - Legal For Trade scales.

Cause: Lost calibration, or load cell zero shift (load cell may be damaged).

Remedy: Recalibrate scale, or replace load cell.

Error Code: **"Er Fun"**   Function Error

Cause: This is a normal message that displays when the parameters are being defaulted by the user - see Section 11.

Error Code: **"Er t-"**   Negative Tare Error (SET mode)

Cause: Attempting to enter a negative tare in the SET mode.

Remedy: Enter only positive tares.

Error Code: **"Er tAr"**   Negative Tare Error (PTT mode)

Cause: Attempting to enter a negative platform weight as a tare.

Remedy: Enter only positive platform weights as tares.

Error Code: **"--OL--"**   Overload

Cause: Weight on scale is over 103% of capacity.

Remedy: Remove excess weight.

Error Code: **"--UL--"**   Underload

Cause: Weight on scale is less than -3% of capacity (platter may be removed).

Remedy: Replace weighing platter.

Error Code: **"grS-OL"**   Gross Overload

Cause: Weight on platter has greatly exceeded the capacity of the scale, incorrect connections or calibration, or defective load cell or main board.

Remedy: Remove excess weight, check connections and calibration, replace defective load cell or main board.

Error Code: **"grS-UL"**   Gross Underload

Cause: Weighing platter is removed, incorrect connections or calibration, or defective load cell or main board.

Remedy: Replace platter, check connections and calibration, replace defective load cell or main board.

Error Code: **"LObAtt"**   Low Battery

Cause: Battery voltage is low (models with battery option only).

Remedy: Recharge battery. If error still displays, the charger board or battery
may need to be replaced.

Section 11. Troubleshooting

Problem:	**What to Do or Check:**
Weight reading will not repeat scale does not return to zero when weight is removed.	Make sure that there is nothing caught in the platform or under or around the load cell or spider interfering with its movement.
Scale overloads early.	Make sure all four overload stops are properly set. Take the platter off the platform, 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's zero to be shifted. Review the cautions in section 1.
Scale will not indicate full capacity or go into overload.	Make sure that there is nothing caught in the platform under or around the load cell or spider interfering with its movement. If not, check the overload stops using the above procedure.
Scale will not come to zero when the ZERO or TARE button is pressed.	Make sure that the scale is stable ("MOT" annunciator is off) when either button is pressed. If the scale is stable, there may be a problem with the touch-panel or main board, or the scale may be set to HB44 mode (1.9% zero bandwidth) and an attempt is being made to zero more than 1.9% of capacity (4.0% for Canadian mode). If TARE does not operate, verify that the Tare parameter is set to "P.t.t.".
Weight readings don't seem to be correct.	Check the scale's accuracy with a test weight. Re-calibrate 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 Section 6).
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 Section 6).

If you are still experiencing a problem with your 4200, or if the problem you are having is not covered in the above list, please contact your Doran Scales authorized dealer.

CONFIGURATION AND PRODUCT PRINTOUT

The 4200 has the ability to print out the configuration of the unit. If the print push-button is held while the unit is plugged in or the ZERO push-button is pressed (on battery units only), the scale will print a list of parameters and the options selected for those parameters. Release the PRINT push-button once the printing starts. Once printed, the scale will operate as normal. To get a printout of all 20 products (100 if option 4227 is installed) and setpoint values, press and hold the PROD button as the unit is plugged in.

RESETTING PARAMETERS

If at some point the user may wish to reset all the parameters in the Model 4200 to the default settings, this can be done by putting the scale into the calibration mode and holding the ZERO push button in upon power up. The indicator will display "LdgnEw", then "Er Fun", and finally "rEL 0", at which point the ZERO button may be released. After ZERO is released, the scale will go into the setup mode. See Section 6 for setting up the scale. Once finished, return the switch to the normal weighing position and the scale will go into the normal weighing mode.

RESETTING SCALE

In the event that a power problem has disabled the scale, in most cases, pressing and holding the UP and DOWN arrow buttons simultaneously will reset the scale. If not, remove power from the scale and restart it. Also, the hardware should be tested to verify that no other damage has occurred.

RETURNING SCALE FOR SERVICE

To return a product for repair, first contact the Doran Scales, Inc. Service Department at 1-800-262-6844 for a return authorization number. An RMA (Return Material Authorization) is required for any returned product. A delay in the repair may occur if a product is returned without proper documentation, including the RMA number.

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

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

Section 12. Connections

PORT 1 (DUPLEX) HARDWARE CONFIGURATION

FUNCTION	Jmp 3	Jmp 4	Jmp 6	IC Changes
RS232	**1-3 2-4**	**1-4**	**All Open**	**None**
RS485	All Open	2-5	All Open	Insert U19
20ma (Passive)	All Open	3-6	1-2 5-6	Remove U19
20ma (Active)	All Open	3-6	1-5 3-7 4-8	Remove U19

PORT 2 (PRINTER) HARDWARE CONFIGURATION

FUNCTION	Jmp2	Jmp5
RS232	**All Open**	**1-3 2-4**
20ma (Passive)	1-2 5-6	All Open
20ma (Active)	1-5 3-7 4-8	All Open

SERIAL DATA CONNECTIONS - PORT 1 (DUPLEX)

Port 1	RS232		Port 1	RS485		Port 1	20 ma
TB2-9	TXD		TB2-5	TXD/RXD- (B)		TB2-9	TXD+
TB2-1	Signal Ground		TB2-8	TXD/RXD+ (A)		TB2-8	TXD-
TB2-4	RXD		TB2-10	Chassis Ground		TB2-4	RXD+
TB2-10	Chassis Ground					TB2-5	RXD-
						TB2-10	Chassis Ground

SERIAL DATA CONNECTIONS - PORT 2 (PRINTER)

Port 2	RS232		Port 2	20 ma
TB2-6	TXD		TB2-6	TXD+
TB2-1	Signal Ground		TB2-7	TXD-
TB2-7	CTS		TB2-10	Chassis Ground
TB2-10	Chassis Ground			

RS232 NULL MODEM CABLE WITH DB9 CONNECTOR

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

```
Signal
Ground (Blk)   RXD (Wht)   TXD (Red)

         5    4    3    2    1

            9   8   7   6
```
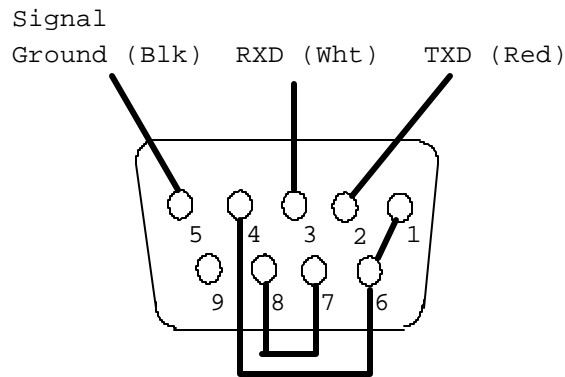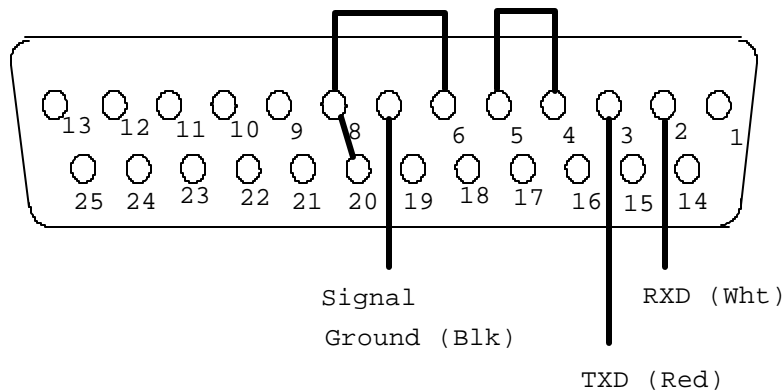
RS232 NULL MODEM CABLE WITH DB25 CONNECTOR

The diagram shown below should be used to wire a DB25 connector to port 1 (duplex) for RS232 operation. As with the DB9 connector, the jumpers shown are usually necessary for proper operation. Consult the manual for the equipment to which you are connecting for more information on the necessary connections. See Section 8 for more information about port 1.

```
  13  12  11  10  9   8     6   5   4   3   2   1

  25  24  23  22  21  20  19  18  17  16  15  14
```

Signal
Ground (Blk)

RXD (Wht)

TXD (Red)

REMOTE ZERO SWITCH

J3-Position	
J3-1	Requires Molex type pins and connector
J3-2	Requires a Normally open switch closure

LOAD CELL CONNECTIONS

TB1-Position	FUNCTION	COLOR CODE Doran Platforms	COLOR CODE Redi-Weigh Floor Bases
TB1-1	Chassis Ground	Bare	Braided
TB1-2	+ Signal	Red	White
TB1-3	- Signal	White	Red
TB1-4	+ Excitation	Green	Green
TB1-5	- Excitation	Black	Black
TB1-6	+ Sense	Blue	N/A
TB1-7	- Sense	Brown	N/A
TB1-8	Chassis Ground		

To enable sense capability, cut traces BC4 and BC5. Make sure that if these traces are cut, that either the sense leads are connected to the load cell or a jumper is placed between +excitation and +sense then a jumper between - excitation and - sense.

POWER SUPPLY CONNECTIONS

J6-Position	Function
J6-1	Not Connected
J6-2	Neutral, 115VAC (230VAC)
J6-3	Not Connected
J6-4	Hot, 115VAC (230VAC)

Note: The ground wire from the power cord should be connected to the ground stud which is located directly next to the power cord watertight fitting.

For 230VAC Setup:
1. Cut traces "CUT1" and "CUT2"
2. Place a jumper at "JU1"
3. Replace fuse, F1, with proper fuse

MISCELLANEOUS CONNECTORS, SWITCHES AND IC's

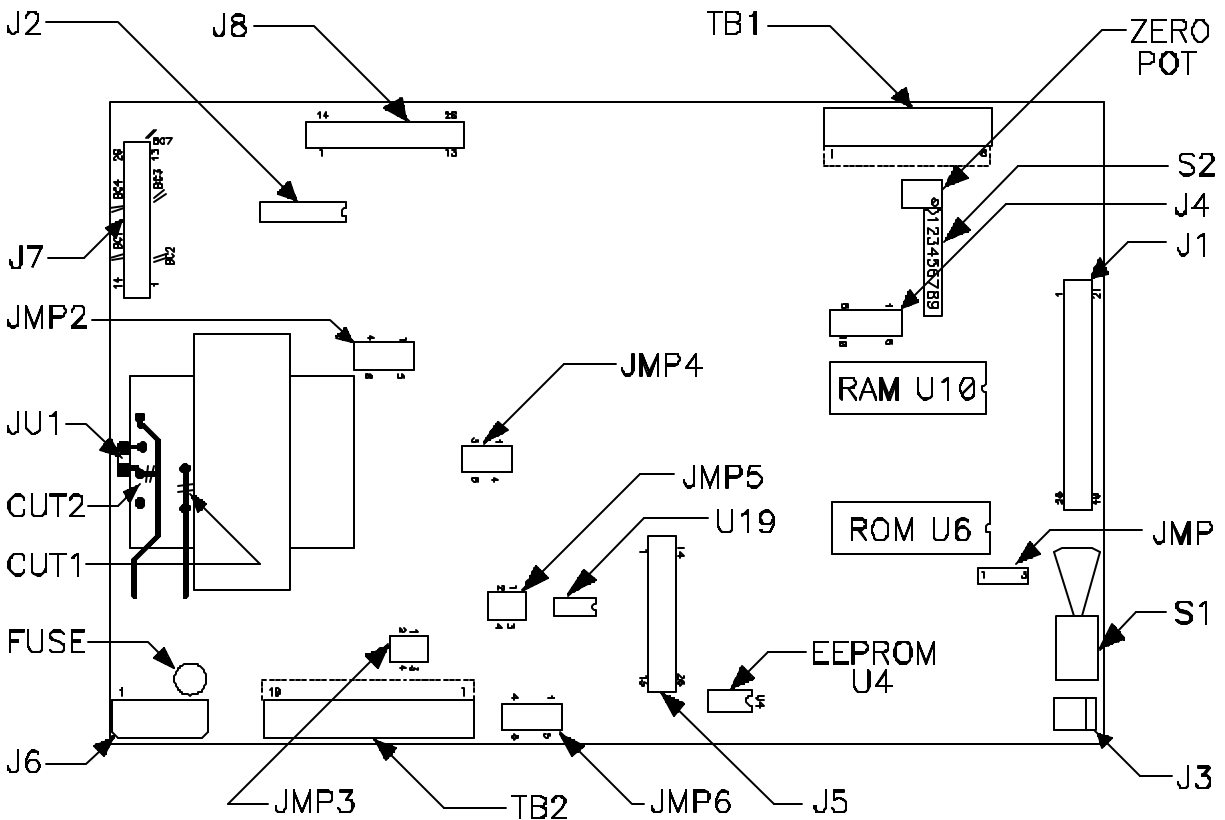| J, U, or S	FUNCTION
J1	Display Interface Connector
J2	Solid State Relay Board Interface
J5	Expansion Interface Connector (Optional Cards)
J7	DC/DC Converter/Charger Card Connector
U19	RS485 IC Location
U6	EPROM, Program Memory Chip
U10	Static RAM Memory Chip (optional battery backup)
S1	Calibration Switch
U12, U20, U21	20ma Current Loop Interface Chips

Figure 6 Main Board Connections and Components

Section 13. Technical Specs and Options

OPTIONS

200 PRODUCTS, SETPOINTS, TIME & DATE (TYPE 42 OPT 27)

Option 42 OPT 27 upgrades the number of products to 200 from the standard of 20, and adds time and date capability. Option 42 OPT 27 also supports setpoint outputs. The standard 4200 does not support setpoint outputs, so this option must be ordered if setpoints are going to be used.

REMOTE PUSH-BUTTON

The Model 4200 can support remote push-buttons to emulate the function keys of the touch panel. These include ZERO, TARE, PRINT, UNITS, and GROSS/NET. The connector for the push button is on an I/O card that is ordered separately. You will need 2-position Molex type housings and 2 Molex pins for each remote push-button needed. Contact Doran Scales, Inc. for proper parts.

INTERNAL BATTERY OPTION

The Internal Battery Option enables the scale to operate on battery power. The battery charges whenever the AC power cord is plugged in, making it easy to use this option as a battery back-up. The option can also be used to operate the scale throughout the day on battery power and recharge the battery overnight by simply plugging in the AC power cord.

A low battery is indicated by flashing a "LOBATT" message on the display periodically. With the battery option, pressing and holding the ZERO button will turn off the scale at any time. When holding ZERO, "Rel Pb" will be displayed. Upon release of the zero button, the scale will turn off.

4200Tower   The option includes a 12 VDC, 3.4 Ah lead acid battery, a DC/DC Converter/Charger card, a special back plate, and hardware. The rated life of the battery is 20 hours with a single load cell, less with multiple load cells. The battery requires an 8 hour recharging period (for a fully drained battery).

4200RSS   The option includes a 12 VDC, 6.5 Ah lead acid battery, a DC/DC Converter/Charger card, and hardware. The rated life of the battery is 40 hours with a single load cell, less with multiple load cells. The battery requires a 16 hour recharging period (for a fully drained battery).

4200M   This option is not available for the 4200M - see the External Battery Option below.

EXTERNAL BATTERY OPTION

The External Battery Option is available for all enclosure types. It consists of an external 12 VDC, 6.5 Ah battery in a special enclosure and a separate battery charger. A popular implementation of this option is to use one battery to power the indicator while a second battery is charging. When the first battery needs charging, the two batteries can be swapped without any interruption in service.

The rated life of the external battery is 40 hours and requires a 10 hour charge time (for a fully drained battery).

INTERFACE OPTIONS

The Model 4200 can support RS232 (duplex and simplex), RS485 (duplex port) and 20ma current loops (duplex and simplex).

The scale has a default setting for RS232 for both ports. The RS485 requires a different terminal connection and an additional integrated circuit chip. Jumper settings may also have to be adjusted. Please contact the factory for upgrade information.

The scale can also support 20ma current loops for both ports. However, this requires different terminal connections and an additional integrated circuit chip. Jumper settings may also have to be changed. Please contact the factory for upgrade information.

SOLID STATE RELAY OPTION

The Solid State Relay Option enables the OVER, UNDER, and ACCEPT indicators to control external loads (lights, etc.). Additionally, the setpoint outputs can be connected to the SSR card to provide up to 7 outputs. This requires an S.S.R. card, mounting hardware, and a ribbon interconnect cable. The 4200 Tower also requires a special backplate. See Figure 6 in Section 12 for installation. Note - if the SSR option is to be used for setpoints, option 42 OPT 27 must also be ordered.

AUDIBLE ALARM OPTION

The Audible Alarm Option is available for applications that require an audible indication when a weight is over tolerance, under tolerance, or acceptable.

TECHNICAL SPECIFICATIONS

Display:	6-digit red LED, 0.43" high
	8 red LED bar type annunciators 0.2"x0.4"
	3 bargraph areas for OVER, ACCEPT, UNDER 0.35"x0.75"
Front Panel:	Flat membrane touch panel; 0.010" polycarbonate laminated over electrical grade polyester. Deposited silver ink contacts on switches; cross linked acrylic adhesive.

Load Cell Excitation:10 VDC Fixed, 240 ma max. (8 x 350 ohm load cells)
    (+EXC = +5vdc, -EXC = -5vdc)

Analog Input Range: 1 mV/V nominal

Analog Sensitivity: 0.6 uV/grad minimum

Internal Update Rate: 512 updates/second typical

Displayed Update Rate: Up to 20 updates/second

Resolution: 1:104,000 internal

    1:3000 displayed   (standard)
    1:6000 displayed   (precision)
    1:10000 displayed   (super precision)

Power (120 V operation): 120 VAC, 50/60 Hz, 0.1 A (typical)
    100 VAC   (minimum)
    130 VAC   (maximum)

Power (240 V operation): 240 VAC, 50/60 Hz, 0.05 A (typical)
    200 VAC   (minimum)
    250 VAC   (maximum)

Fuse (120 V operation):   0.250 amp, 250 V time-delay

Fuse (240 V operation):   0.125 amp, 250 V time-delay

    Fuse is soldered into PCB and is not field replaceable without tools.

Data Communications: Simplex (printer port) - RS232 standard hardware, 20ma current loop available, CTS handshaking supported.

       Duplex port - RS232 standard hardware, RS485 or 20ma current available, Software handshaking supported.

Digital Input: Can accept TTL input or standard Normally Open switch contact closures. (300 ms minimum contact closure time)

Operating Temp. Range: 14 to 104 Deg. F
       -10 to 40 Deg. C

Warranty Statement

Model 4200

LIMITED WARRANTY
STATEMENT

DORAN SCALES, INC. warrants its products to be free from defects in material and workmanship for a period of two (2) years from date of shipment. Any product found to be defective within this time period may be returned to DORAN's factory, freight prepaid, with prior return authorization for repair or replacement at no charge.

DORAN's liability under this warranty is limited to the repair or replacement of the defective product and in no event shall DORAN be liable for consequential or indirect damages to equipment or personnel. Nor shall DORAN be liable for damages to equipment or for personal injury caused by misuse, overload, accidental damage, alteration, improper installation, or unauthorized opening of the equipment. Under no circumstances will DORAN be responsible for any indirect or consequential damages due to errors in weighing or failure of a DORAN product to perform properly.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. THIS WARRANTY CONSTITUTES DORAN'S EXCLUSIVE WARRANTY. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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