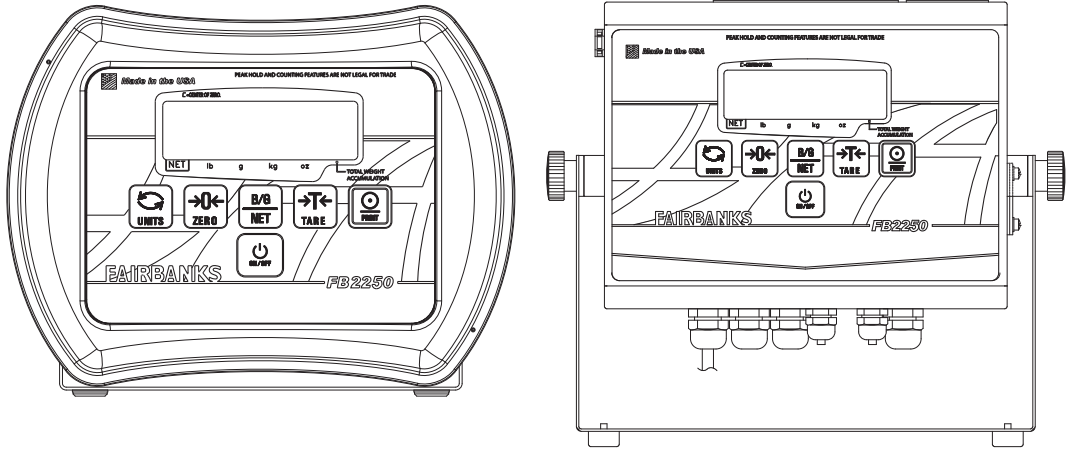




Operating Manual



FB 2250 Series Instrument

Amendment Record

FB 2250

Document 51214

Manufactured by Fairbanks Scales Inc.

821 Locust

Kansas City, Missouri 64106

| | | |
|------------|---------|--|
| Created | 3/2009 | |
| Revision 1 | 03/2009 | Released Manual |
| Revision 2 | 05/2009 | Added CC and ETL Approvals |
| Revision 3 | 06/2009 | Added MC Approval, IP69K, and Panel Mount Models |
| Revision 4 | 07/2009 | Added power on/off instruction |
| Revision 5 | 03/2010 | Updated for Rev 2 Software |

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Section 1: General Information

The FB 2250 is a general purpose weighing instrument that can be used with a wide variety of platforms and load receivers, and is available in nine (9) different configurations.

| | |
|---|-----------|
| Model: FB 2250 Series ABS, AC Power – | P/N 29250 |
| Model: FB 2250 Series ABS, AC/Batt Power – | P/N 29561 |
| Model: FB 2250 Series SS, AC Power – | P/N 29251 |
| Model: FB 2250 Series SS, AC/Batt Power – | P/N 29562 |
| Model: FB 2250 Series SS, AC Power, No Bracket – | P/N 29563 |
| Model: FB 2250 Series SS, AC/Batt Power, No Bracket – | P/N 29564 |
| Model: FB 2250 Series SS, AC Power, No Bracket, IP69K | P/N 29013 |
| Model: FB 2250 Series SS, AC Power, IP69K | P/N 28990 |
| Model: FB 2250 Series, AC Power, Panel Mount | P/N 29803 |

Major features of the Instrument include push-button programming and calibration. Program data is stored in battery supported ram and backed up in flash memory. The battery should be replaced every 12 months.

The FB 2250 series instrument features a large one inch high green backlit LCD weight display, which can be tilted up or down to accommodate different lighting conditions. Microprocessor controlled design allows the instrument to be rapidly programmed at installation to meet the specific requirements of the application.

The obtainable accuracy meets Handbook 44 requirements, and the instrument is approved for commercial application up to 10,000 divisions. A maximum of 100,000 displayed divisions can be programmed for non-commercial applications.

The instrument provides two (2) serial communication ports to provide communication to various types of peripheral devices for RS232, RS485, and 20mA data outputs.

Optional accessories include a 4-20 mA analog output, Bluetooth® serial adapter, and three different fieldbus devices; Profibus®, DeviceNet™, and Ethernet/IP.



Specifications

Instrument Approvals: CC: 09-023
 MC: AM-5720
 ETL: ETL Listed.
 Conforms to ANSI/UL STD 60950-1
 Certified to CAN/CSA C22.2 STD NO. 60950-1-03

Power Requirements:

117 volts AC +/- 10 %
 220 volts AC +/- 10 %

Power Consumption: 1.5 watts maximum;
 The FB 2250 is designed to operate from 80 to 260 volts AC, 50 to 60 Hertz.
DC Models: five (5) Size "D" Alkaline batteries @ 1.5 Volts DC each.
Battery Life: up to 40 Hours or greater with a maximum load of 4, 350 load cells and backlighting enabled. Battery Usage time can be adversely affected by battery storage, battery capacity and battery brand.

Enclosure ABS, Black NEMA 1, Stainless Steel NEMA 4X
 Desk and Wall Mount

Display 6 digits, 1 inch LCD, Green Backlight
Front Panel Keys On/Off, Units, Zero, B/G, Net, Tare and Print

Units lbs, oz, kg, g and lbs/oz, or custom

Graduation Size 0.0001 to 50

AD Conversion 66 per second

Load Cell Excitation 5 Volts DC

Sensitivity: 1µv/d (microvolt/division)

Load Cells Eight (8) 350 ohm or Sixteen (16) 1000 ohm

Displayed Divisions 10,000d Commercial and 100,000d Non-Commercial

Capacities: Programmable to 999999

Units: lb, g, kg, oz, lb/oz or custom

Out of Range warnings

HiCAP Scale input is over Capacity

----- Displayed weight exceeds 6 digits

Sleep Mode Settings include OFF, 1, 2, 5, 10, 20, and 30 minutes.

Time and Date Battery Maintained



External Printers

Citizens IDP 3550 Tape Printer
Okidata 184 & 186 Serial Form Printer
Okidata 420 Serial Form Printer
Epson Model TM-U295 & TM-U590 Ticket Printers

Zero Range:

Settings include 2 % or 100%.

Auto Zero Tracking:

Settings include OFF, 0.5, 1 or 3 divisions.

Balance:

Settings include OFF, 0.5, 1 or 3 divisions.

Filter:

Settings include Slo, Cattle, Standard, and Fast.

Display Update Rate:

Settings include 0.2, 0.4, and 0.8 seconds.

Weight Accumulator:

A Capacity of 999,999 Weight Units. The accumulated weight data can be printed or viewed at the FB 2250 display.

Outputs

Port 1: Bidirectional serial port: Settings include OFF, RS 232, and RS 485. RS 232 has 30+ updates a second

Port 2 is used to interface to the PC2250 program, OR to provide 20 mA passive, RS 232, or RS 485.

Battery should be replaced every 12 months.

Battery type: Panasonic CR 1220 3V or equivalent.

Environment:

Temp -10°C to + 40°C (+14°F to + 104°F)

Storage: Temp -40°C to + 60°C (-40°F to + 140°F)

Accessories

Optional accessories include a 4-20 mA analog output, Bluetooth® serial adapter, and three different fieldbus devices; Profibus®, DeviceNet™, and Ethernet/IP.

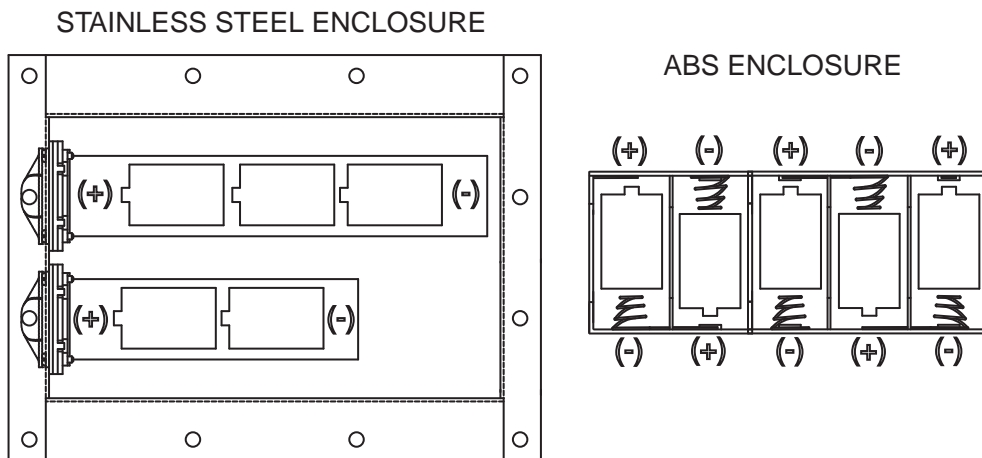
4-20 mA analog current loop output

16 bit Resolution and Monotonicity
 0.01% Non-Linearity
 Isolated 4mA to 20mA.
 Front Panel Programmable

Bluetooth® technology Interface

Utilizes either Channel 1 or Channel 2 Serial Output. RS232 serial Interface to Bluetooth Interface. Range 100 meters (328 feet).
 The Bluetooth option will operate either as a Client or Server depending on which device the FB 2250 is connected. i.e. if connected to a printer the FB 2250 be a *Server* and a Client if connected to a PC.

Battery Installation



Stainless Steel Instrument: Unscrew the black plastic end caps and insert 5 alkaline "D" cells as shown above.

ABS Instrument: Unscrew the two large knurled screws on the back of the Instrument and remove the battery cover. Insert 5 alkaline "D" cells as shown above.

Industrial 'D' Size battery Energizer EN95 or equivalent is recommended for maximum operating time.

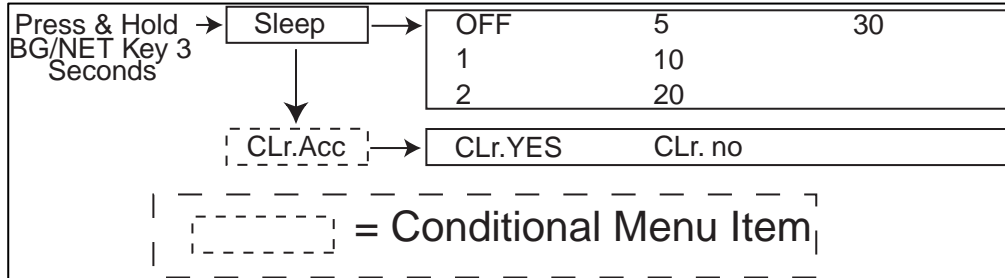
Powering up the FB 2250

Press the ON / OFF Key for 1 to 2 seconds. The Instrument will display “888888” followed by a “1234567890” character display moving from right to left, followed by the revision of software. Upon completing the warm-up, the FB 2250 will display the actual weight on the scale.

To turn the FB 2250 off, press the ON / OFF key for 1 to 2 seconds.

Flow Charts

Dashed line boxes used in the flowchart indicate that the menu item availability is dependant upon programming performed elsewhere. For example, “clearing the accumulator” will not be available if accumulation has not been enabled.

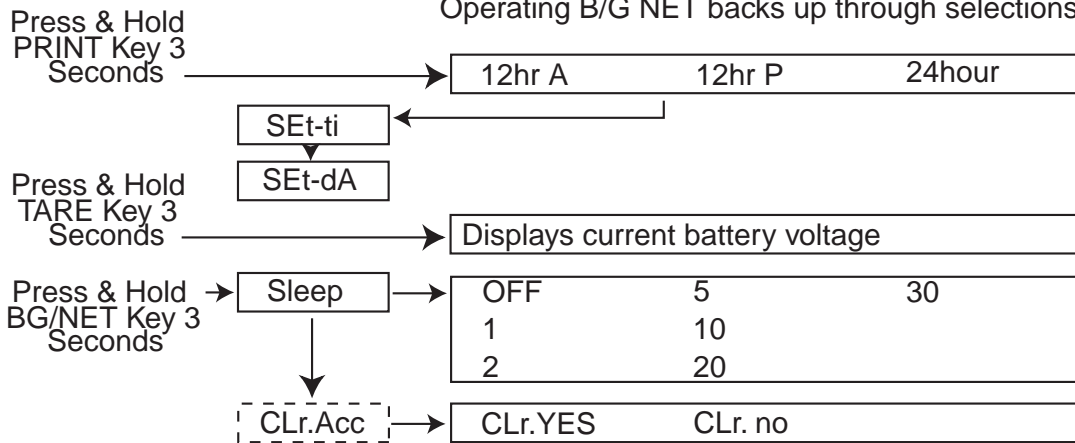


Section 2: Front Panel Programming

Front Panel Programming Parameters

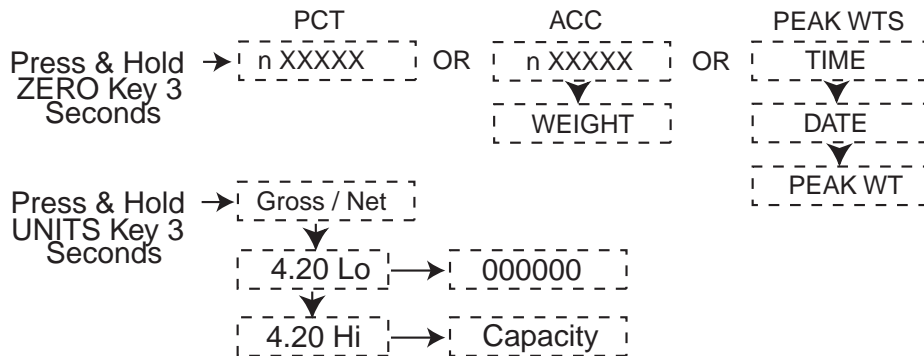
Front Panel Programming

Operating ZERO enters the change Mode
 Operating UNITS scrolls through the selections
 Operating ZERO saves the change
 Operating B/G NET backs up through selections



NOTE Press Zero key will Clear the Accumulator/Total Register/ Peak Weight parameters and set the Instrument to the Net/Gross Mode

NOTE Press Units key will not Clear the Accumulator/Total Register/ Peak Weight parameters and set the Instrument to the Net/Gross Mode





Press the Print key for 3 seconds.

Programming Time Format: Press the ZERO key. Pressing the UNITS key will toggle through the available selections. Press the ZERO key to enter the selection. Available selections are:

- 12hr A: 12 hour clock, currently AM.
- 12hr P: 12 hour clock, currently PM.
- 24 hour: Military time, (1:00 PM = 1300 hours)

Set-ti: Programming the Time: Time is set as HHMMSS. The display will indicate **Set-ti** and then display the current time. Press the ZERO key, the first two digits will blink. Press the UNITS key to increment to the desired minute setting and press the ZERO key. The second set of digits will blink. Press the UNITS key to increment to the desired seconds setting, and press the ZERO key. The third set of digits will blink. Press the UNITS key to increment to the desired seconds setting, and press the ZERO key to enter the time settings.

Set-dA: Programming the date: The display will indicate **Set-dA** and then display the current date setting. Date is entered in the MM-DD-YY format. Press the ZERO key and the first two digits will blink. Press the UNITS key to increment to the desired month then press the ZERO key. The second set of digits will blink, press the UNITS key to increment to the desired day and press the ZERO key. The third set of digits will blink. Press the UNITS key to increment to the desired year setting, then press the ZERO key to enter the date settings.

Press the TARE key for 3 seconds.

The current battery / power supply voltage is displayed (8.3 volts DC nominal).

Press the BG/Net key for 3 seconds

Sleep: Programming the Sleep Function: The display will indicate **Sleep** and then display the current setting. This function serves to prolong battery life by turning off the Instrument. Sleep mode will commence in the time programmed provided there is no activity detected for the duration of the programmed sleep time setting. Activity is defined as weight applied to the scale exceeding the balance setting, the pressing of a key, and the receiving of a polling request on a communication port. Press the ZERO key, then the UNITS key to scroll through available settings. Press the ZERO key to enter the selection. Available selections are:

- OFF 1 2 5 10 20 30 (selections indicate minutes)



CLr.ACC: Clearing the Accumulator:

Conditional upon programming the operating mode to accumulation, peak hold, piece count, or piece count & total. The display will indicate CLr.ACC. Press the ZERO key, then the UNITS key to toggle the available settings. Press the ZERO key to enter the selection. Available selections are:

Clr.YES (Clear the Accumulator) CLr.NO (Do NOT Clear the Accumulator)

NOTE:

Pressing ZERO will clear the Accumulator and return to the Net/Gross mode.

Pressing UNITS will NOT clear the Accumulator and return to the Net/Gross mode.

Press the Zero key for 3 seconds

Conditional upon programming the operating mode to accumulation.

The FB 2250 will display total number of pieces and weight, then time out (30 sec).

Conditional upon programming the operating mode to piece count, or piece count & total. The FB 2250 will display total number of pieces, then time out (30 sec).

Conditional upon programming the operating mode to peak hold stable or peak hold unstable. The FB 2250 will display time, date, peak weight, and time out (30 sec).

Note: Pressing the UNITS key will skip time out and immediately exit to the weigh mode.

Press the Units key for 3 seconds

Conditional upon enabling 4-20 mA.

Gross / Net: Programming the weigh mode the output will track: Select Gross or Net.

The 4-20 mA analog output will track the selection. It will continue to track the selection regardless of the currently selected weigh mode of the FB 2250.

Press the ZERO key, then the UNITS key to toggle the available settings. Press the ZERO key to enter the selection. Available selections are Gross or Net.

4.20 Lo: Programming the weight value associated with 4 mA: The display will indicate 4.20 Lo: Press the ZERO key. The display will indicate the zero weight "XXXXXX". Press the UNITS key to increment the blinking digit, press the ZERO key to advance to the next digit, repeat until entry is complete. After entering the least significant digit, press the ZERO key. This weight entry will result in a 4 mA output.

4.20 Hi: Programming the weight value associated with 20 mA: The display will indicate 4.20 Hi: Press the ZERO key. The display will indicate the maximum weight "XXXXXX". Press the UNITS key to increment the blinking digit, press the ZERO key to advance to the next digit, repeat until entry is complete. After entering the least significant digit, press the ZERO key. This weight entry will result in a 20 mA output.

Section 3: Operation

Front Panel Key Functions

| | |
|------------------|--|
| ON/OFF | Turns the Instrument on or off. |
| UNITS | Switches between pre-programmed selectable weight units. |
| ZERO | Sets the display to zero, programmable: 2% or 100% of capacity. |
| B/G – NET | Toggles between Gross and Net weights (only if a tare value has been entered greater than zero) |
| TARE | automatically tares off displayed weight when key is pressed. |

Depending on programmed selection, Tare weight will either:

- A. Be retained for reuse until changed or power is removed, or
- B. Automatically clear when Gross weight returns to Zero.

| | |
|--------------|--|
| PRINT | Simple RS232 output when key is pressed. |
|--------------|--|

Operating Procedures

Press the ON / OFF Key. The Instrument will display “888888” followed by a “1234567890” character display moving from right to left, followed by the revision of software. Upon completing the warm-up, the FB 2250 will either display zero, or it will display the actual weight on the scale.

The Zero function, Tare function, and AZT require the displayed weight to be stable before these functions will operate. The weight reading is stable if the variation in weight is less than the programmed bAL range.



Instrument Weighing Functions

The industry uses three terms to describe the apportionment of an object's weight. These terms are GROSS WEIGHT, TARE WEIGHT, and NET WEIGHT.

Example: A can of house paint is an object to be weighed. The empty can is the 'TARE' weight, the paint is the 'NET' weight, and together they equal the 'GROSS' weight.

$$\text{GROSS} = \text{NET} + \text{TARE}$$

$$\text{GROSS} - \text{NET} = \text{TARE}$$

$$\text{GROSS} - \text{TARE} = \text{NET}$$

Basic Weighing

Ensure platform is empty, turn the scale ON, press the ZERO key and the display indicates "0" and is ready for use.

Gross Weighing

1. Press the GROSS/NET key, if required, to set the display to GR (gross).
2. Press the ZERO key, if required, to set scale to "0".
3. Place container/object on scale platform.
4. Read the gross weight on the display.

Net Weighing

1. Press the GROSS/NET key, if required, to set display to GR (gross).
2. Press the ZERO key, if required, to set scale to "0".
3. Place container/object on scale (Tare weight).
4. Press the TARE key.
5. Place material in container or add objects (Net weight).
6. Read the net weight on the display.

Gross/Tare/Net Weighing

1. Press the GROSS/NET key, if required, to set display to GR (gross).
2. Press the ZERO key, if required, to set scale to "0".
3. Place container/object on scale (Tare weight).
4. Press the TARE key.
5. Place material in container or add objects (Net weight).
6. Read the net weight on the display.
7. Press the GROSS/NET key to switch to Gross and view Gross weight.



Weight Accumulation

1. Place a weight on the Scale Platform
2. After the weight has settled. Press the B/G NET key until the display alternates between the number of Accumulations "n" and the Accumulated weight.
3. Press the UNITS key to return to the Gross/Net Mode and add the Weight to the Accumulator.

The display will momentarily indicate ACCEPt then return to the Weigh Mode.

Press the B/G NET key to skip adding the Weight to the Accumulator and return to the Weigh Mode.

The scale must return to "0" Gross mode before another accumulation can occur.

4. To continue, add the next load, press the B/G NET key until the display alternates between the number of Accumulations "n" and the Accumulated weight.
5. Press the UNITS key to return to the Gross/Net Mode and add the Weight to the Accumulator. The display will momentarily indicate ACCEPt then return to the Weigh Mode.

Clearing the Accumulators

Press the BG/Net key for 3 seconds

The display will indicate "Sleep" and then display the current setting. Press the UNITS key, and the display will indicate CLr.ACC. Press the ZERO key, then the UNITS key to toggle the available settings. Press the ZERO key to enter the selection. Available selections are:

Clr.YES (Clear the Accumulator) CLr. NO (Do NOT Clear the Accumulator)

NOTE:

Pressing the ZERO key will clear the Accumulator and return to the Net/Gross mode.

Pressing the UNITS key will NOT clear the Accumulator and return to the Net/Gross mode.

Clears Peak Weight data and Piece Count Data if selected .



Parts Counting and Accumulation

1. Place the Container on the Scale Platform.
2. Press the TARE key to Tare off the container weight and set the scale in the Net Mode. The Display should indicate 0 Net Weight.
3. Press the B/G NET key. The Display prompts to "Add" a number of sample parts to the Container. Pressing the B/G NET key repeatedly will Prompt to; "Add 1", "Add 5", "Add 10", "Add 25", Add 50", or "Add 100" parts.
4. Add the required sample to the container, then press the UNITS key. The Display will alternate between indicating the weight and the Number of pieces.
5. Add the remaining parts to the Container.
6. The Display will update and continue to alternate between the Weight and Number of Pieces including the original sample.
7. Press the B/G NET key. The Display will alternate between the "Total" legend and the Total number of pieces accumulated.

Print Example:

| |
|-------------------------|
| 09:52AM |
| 03-11-09 |
| 7.395 lb GR |
| 1.000 lb TA |
| 6.395 lb NT |
| 457 Pieces |
| 457 Total Pieces |

Press the B/G NET key to skip adding the Current Piece to the Total Register and return to the Weigh Mode

Press the UNITS key to complete the Accumulation

Notes:

If the prompts do not occur, clear the accumulator and start over.

The operating mode must be set to Piece Count & total to function.



Peak Weight

Either the Maximum Unstable or Maximum Stable Peak Weights, are stored along with the time and date that the condition occurred. This data can be printed or viewed at the FB 2250.

To view, press the ZERO key for 3 seconds to alternately display the peak weight, time, and date. This will time out 30 seconds and return to the weigh mode, otherwise press the UNITS key to end.

Press the Zero key for 3 seconds

Conditional upon programming the operating mode to accumulation, piece count, or piece count & total.

The FB 2250 will display total number of pieces, weight, and time out (30 sec).

Conditional upon programming the operating mode to peak hold stable or peak hold unstable.

The FB 2250 will display time, date, peak weight, and time out (30 sec).

Appendix I: Data Output Formats

General Notes:

<CR> = means carriage return character.

<LF> = line feed character.

<SP> = space character.

<EOT> = end of transmission character.

<> = used to indicate individual characters for clarity only (not present in data stream).

Fairbanks/ Toledo Continuous Output

<STX><A><C><WWWWWW><TTTTTT><CR>

A = Status Word A

B = Status Word B

C = Status Word C

W = Displayed Weight

T = Tare Weight

Leading zeros are not suppressed. The Continuous Computer Output is an uninitiated, unrequested output that is transmitted at a fixed time interval.

| <u>Character String</u> | <u>Description</u> |
|-------------------------|---|
| STX | Start of Text character : (02 Hex) |
| A | Status Word A |
| B | Status Word B |
| C | Status Word C |
| xxxxxx | Displayed Weight : x = Weight (6 characters if grad size does not have a decimal point.) (5 characters if the grad size does have a decimal point.) The decimal point is not sent as part of the character string. |
| xxxxxx | Tare Value : x = Tare (6 characters if the grad size does not have a decimal point.) (5 characters if the grad size does have a decimal point.) The decimal point is not sent as part of the character string |
| CR | Carriage Return Character : (0D hex) |
| CS | Checksum Character : If enabled, this character consists of the last eight bits of the binary sum of all characters transmitted up to this checksum character. |

Status Word A

| Bit # | Decimal Point or Zero Location | | | | | | | |
|-------|--------------------------------|----|---|----------------|------|-------|------------|---------|
| | x00 | x0 | x | x.x | x.xx | x.xxx | x.xxxx | x.xxxxx |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | | | Increment Size | | | | |
| | Count by 1 | | | Count by 2 | | | Count by 5 | |
| 3 | 1 | | | 0 | | | 1 | |
| 4 | 0 | | | 1 | | | 1 | |
| 5 | | | | Always Logic 1 | | | | |
| 6 | | | | Always Logic 0 | | | | |
| 7 | | | | Parity Bit | | | | |



Status Word B

| Bit # | Description |
|-------|----------------|
| 0 | Gross = 0 |
| 1 | Positive = 0 |
| 2 | In Range = 0 |
| 3 | No Motion = 0 |
| 4 | lb = 0 |
| 5 | Always Logic 1 |
| 6 | Normal = 0 |
| 7 | Parity Bit |

Status Word C

| Bit # | Description |
|-------|----------------|
| 0 | Always Logic 0 |
| 1 | Always Logic 0 |
| 2 | Always Logic 0 |
| 3 | Normal = 0 |
| 4 | Always Logic 0 |
| 5 | Always Logic 1 |
| 6 | Normal = 0 |
| 7 | Parity Bit |

Cardinal 738 Continuous Scoreboard Output

<CR><P><WWWWWW><m><SP><U><SP><g><SPSP><ETX>

- W = Displayed weight
- P = Polarity
 - + = Positive weight
 - = Negative weight
- U = Units
 - lb = pounds
 - kg = kilograms
- m = Motion or o = Overload
- g = Gross; n = Net
- SP = Space

Leading zeros are not suppressed

Weightronics WI-120 Continuous Output

<G><P><WWWWWW><SP><U><CR><LF>

- G = Gross; N = Net
- P = Polarity
 - + = positive weight
 - = negative weight
- U = Units
 - lb = pounds
 - kg = kilograms
- SP = Space

Leading zeros are not suppressed



Condec Continuous Output

<STX><P><WWWWWWW><U><G><M><CR>

P = Polarity space = positive weight

 - = negative weight

W = Displayed weight

U = Units

 L = pounds

 K = kilograms

G = Gross; N = Net

M = Motion

Leading zeros are suppressed

Demand: Activated by the receipt of a <CR>.

Gross Weight – No Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <G> <R> <SP>
<SP> <CR> <LF> <EOT>

Gross Weight – Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <g> <r> <SP>
<SP> <CR> <LF> <EOT>

Net Weight – No Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <N> <T> <SP>
<SP> <CR> <LF> <EOT>

Net Weight – Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <n> <t> <SP>
<SP> <CR> <LF> <EOT>

Continuous: Outputs once every display update rate cycle.

Continuous Output formatted output. Same for Poll and Auto

Gross Weight – No Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <G> <R> <SP>
<SP> <CR> <LF> <EOT>



Gross Weight – Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <g> <r> <SP>
<SP> <CR> <LF> <EOT>

Net Weight – No Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <N> <T> <SP>
<SP> <CR> <LF> <EOT>

Net Weight – Motion – decimal points included

<SP> <W> <W> <W> <W> <W> <W> <SP> <l> <SP> <SP> <n> <t> <SP>
<SP> <CR> <LF> <EOT>

Plc

Instrument Setup Protocol: 19,200 Baud, 8 Character bits, 1 Stop bit, and no parity. This is a continuous output that transmits data on every other A/D update (approximately 32 transmissions per second).

The output string is 12 characters, seen as "wwwwwwuumm<eot>" where,
<wwwwwww> = Weight including decimal point and negative sign.
Negative sign precedes most significant digit and may be preceded by space characters.
<uu> = units "lb", "kg", "oz", or "g". "oz" may indicate ounces, or lb/ounces.
<mm> = mode "GR" or "NT" for stable weight, or "gr" or "nt" for motion.
<eot> = end of text.

- Example 1: Gross - lbs - Weight Stable
<WWWWWWW> <l> <G> <R> <EOT>
- Example 2: Gross - lbs - Weight in Motion
<WWWWWWW> <l> <g> <r><EOT>
- Example 3: Net - kgs - Weight Stable
<WWWWWWW> <k> <g> <N> <T> <EOT>
- Example 4: Net - kgs - Weight in Motion
<WWWWWWW> <k> <g> <n> <t> <EOT>

Note: Once PLC option is selected and protocol has been programmed, the installing technician's setup is complete. Confirmation of output can be performed by monitoring the COM port with a terminal program such as Windows Hyper Terminal.

Note: Interface of the HMS Communications device, power supply to same device, and programming of the PLC is strictly the responsibility of the customer.



UPS

Serial Data Output Format for UPS Worldship Software.

The instrument will transmit the following string of data.

Character Number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

String 1

Gross Weight: X X X X . X X SP l/k b/g SP G/g R/r SP SP CR LF EOT

NOTES

1. Characters denoted by “X” are characters 0-9. Leading zeroes are replaced with spaces (SP). Character 5 is a decimal point (HEX 2E).
2. Lower case “l” and “b” for Avoirdupois Units or “k” and “g” for Metrics Units.
3. The first weight character will be a minus (-), HEX 2D, If weight is negative.
4. Characters separated with an / denoted one of the characters will be transmitted.
5. Lower case gr in characters 12 &13 indicates scale motion. Upper case indicates stable weight.
6. EOT, HEX 04 is transmitted in “HiCAP” condition.
7. Transmission will occur when a CR (Hex 0D) carriage return is received.



P Ship

Serial Data Output Format for P Ship, used to interface to FedEx Shipping Programs.

All computer commands and scale responses are ASCII character strings, where:

<CR> is an ASCII carriage return (hexadecimal 0D)

<LF> is an ASCII line feed (hexadecimal 0A)

<ETX> is an ASCII End-Of-Text (hexadecimal 03)

(STATUS) is a two ASCII number representation of the scale status (in the form of hexadecimal 3x3x, where the bit pattern of the low nibbles, indicated by an "x", determine the actual status conditions)

| COMPUTER RESPONSE | SCALE RESPONSE | COMMAND RESULT |
|-------------------|-----------------------------------|---|
| W<CR> | <LF><SP>XXX.XXUU<CR>(STATUS)<ETX> | Returns the weight and scale status in two ASCII digits. |
| S<CR> | <LF>S(STATUS)<CR><ETX> | Returns the scale Status in two ASCII digits (defined in the following section) |
| Z<CR> | No response | Zeros the scale |
| All Else | <LF>?<CR> | Unrecognizable command |

Notes: In the scale response to "W<CR>":

1. XXX.XX = A five digit number with two digits to the right of the decimal point which is the displayed scale weight.
2. SP = An ASCII space (hexadecimal 20). In the event of a negative weight, an ASCII, "-" (hexadecimal 2D) is returned in this location.
3. UU = A two character weight identifier. If the scale is configured to weigh kilograms, a "KG" (uppercase letters) will be returned, if configured for pounds, "LB" (uppercase letters) will be returned.
4. The decimal point is returned by the scale as part of the ASCII string.



5. Interpretation of scale status digits

The high order nibble of each status byte has a value of 3 (0011 B). The low order nibble of the first and second bytes are defined as follows:

1st Byte: Bit 0 - High = scale is in motion
Low = scale is stable

Bit 1 - High = scale at zero
Low = scale not at zero

Bit 2 - Low = not used

Bit 3 - Low = not used

2nd Byte: Bit 0 - High = scale is below zero
Low = scale is not below zero

Bit 1 - High = scale is over capacity
Low = scale is not over capacity

Bit 2 - High = scale ROM program failure
Low = scale ROM okay

Bit 3 - High = faulty calibration data*
Low = scale calibration okay

*This is the result of an incorrect checksum

An example of the scale response to an "S" command would be:

<LF>S20<CR><ETX>

The following status conditions are in effect for this response:

- scale at zero
- scale is not below zero
- scale is not over capacity
- scale ROM okay
- scale calibration okay

Appendix II: ASCII Chart

| Char | Dec | Hex |
|------|-----|-----|
| NUL | 0 | 0 |
| SOH | 1 | 1 |
| STX | 2 | 2 |
| ETX | 3 | 3 |
| EOT | 4 | 4 |
| ENQ | 5 | 5 |
| ACK | 6 | 6 |
| BEL | 7 | 7 |
| BS | 8 | 8 |
| HT | 9 | 9 |
| LF | 10 | a |
| VT | 11 | b |
| FF | 12 | c |
| CR | 13 | d |
| SO | 14 | e |
| SI | 15 | f |
| DLE | 16 | 10 |
| DC1 | 17 | 11 |
| DC2 | 18 | 12 |
| DC3 | 19 | 13 |
| DC4 | 20 | 14 |
| NAK | 21 | 15 |
| SYN | 22 | 16 |
| ETB | 23 | 17 |
| CAN | 24 | 17 |
| EM | 25 | 19 |
| SUB | 26 | 1a |
| ESC | 27 | 1b |
| FS | 28 | 1c |
| GS | 29 | 1d |
| RS | 30 | 1e |
| US | 31 | 1f |
| SP | 32 | 20 |

| Char | Dec | Hex |
|------|-----|-----|
| ! | 33 | 21 |
| " | 34 | 22 |
| # | 35 | 23 |
| \$ | 36 | 24 |
| % | 37 | 25 |
| & | 38 | 26 |
| ` | 39 | 27 |
| (| 40 | 28 |
|) | 41 | 29 |
| * | 42 | 2a |
| + | 43 | 2b |
| , | 44 | 2c |
| - | 45 | 2d |
| . | 46 | 2e |
| / | 47 | 2f |
| 0 | 48 | 30 |
| 1 | 49 | 31 |
| 2 | 50 | 32 |
| 3 | 51 | 33 |
| 4 | 52 | 34 |
| 5 | 53 | 35 |
| 6 | 54 | 36 |
| 7 | 55 | 37 |
| 8 | 56 | 38 |
| 9 | 57 | 39 |
| : | 58 | 3a |
| ; | 59 | 3b |
| < | 60 | 3c |
| = | 61 | 3d |
| | 62 | 3e |
| ? | 63 | 3f |
| @ | 64 | 40 |
| A | 65 | 41 |

| Char | Dec | Hex |
|------|-----|-----|
| >B | 66 | 42 |
| C | 67 | 43 |
| D | 68 | 44 |
| E | 69 | 45 |
| F | 70 | 46 |
| G | 71 | 47 |
| H | 72 | 48 |
| I | 73 | 49 |
| J | 74 | 4a |
| K | 75 | 4b |
| L | 76 | 4c |
| M | 77 | 4d |
| N | 78 | 4e |
| O | 79 | 4f |
| P | 80 | 50 |
| Q | 81 | 51 |
| R | 82 | 52 |
| S | 83 | 53 |
| T | 84 | 54 |
| U | 85 | 55 |
| V | 86 | 56 |
| W | 87 | 57 |
| X | 88 | 58 |
| Y | 89 | 59 |
| Z | 90 | 5a |
| [| 91 | 5b |
| \ | 92 | 5c |
|] | 93 | 5d |
| ^ | 94 | 5e |
| _ | 95 | 5f |
| ` | 96 | 60 |
| a | 97 | 61 |
| b | 98 | 62 |

| Char | Dec | Hex |
|------|-----|-----|
| c | 99 | 63 |
| d | 100 | 64 |
| e | 101 | 65 |
| f | 102 | 66 |
| g | 103 | 67 |
| h | 104 | 68 |
| i | 105 | 69 |
| j | 106 | 6a |
| k | 107 | 6b |
| l | 108 | 6c |
| m | 109 | 6d |
| n | 110 | 6e |
| o | 111 | 6f |
| p | 112 | 70 |
| q | 113 | 71 |
| r | 114 | 72 |
| s | 115 | 73 |
| t | 116 | 74 |
| u | 117 | 75 |
| v | 118 | 76 |
| w | 119 | 77 |
| x | 120 | 78 |
| y | 121 | 79 |
| z | 122 | 7a |
| { | 123 | 7b |
| | 124 | 7c |
| } | 125 | 7d |
| ~ | 126 | 7e |
| DEL | 127 | 7f |



Manufactured by Fairbanks Scale, Inc.
821 Locust Street
Kansas City, MO 64106

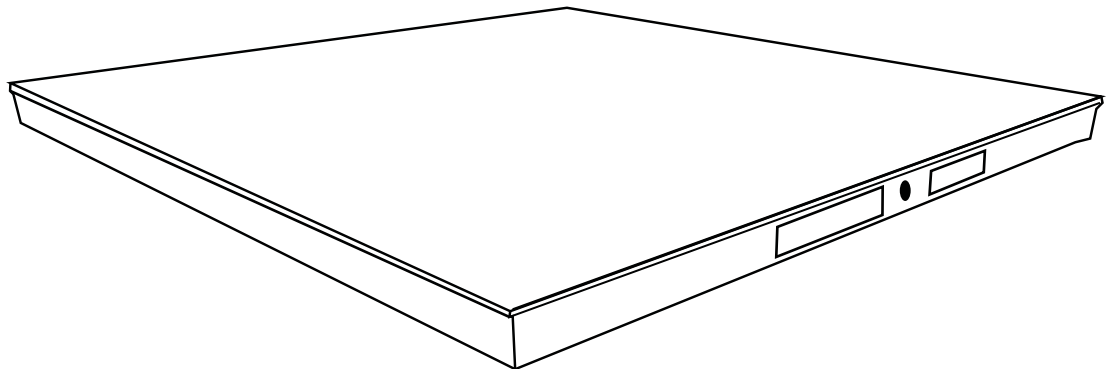
www.fairbanks.com

FB 2250 Series Instrument

Document 51214



3500 Series Yellow Jacket Mild Steel Floor Scale



Amendment Record

3500 SERIES MILD STEEL FLOOR SCALE

Document 51233

Manufactured by Fairbanks Scales, Inc.

821 Locust

Kansas City, Missouri 64106

| | | |
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Disclaimer

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Section 1: General Information

INTRODUCTION

The **3500 Series Floor Scale** uses a summing junction box for interfacing to all analog weight instruments.

NOTE: *It is the owner's responsibility to document, notify, and follow-up regarding shipping damage with the carrier.*

DESCRIPTION

- The scale platform is shipped in a crate, fully assembled and wired.
- The floor scale size is **4' x 4'** (both smooth and safety tread).
- The floor scale capacities range from **2.5k to 5k (lbs)**.
- Both scale types are equipped with a **30 foot** interface cable.
- All models have threaded holes in the deck for attaching eyebolts to facilitate installation and cleaning.

NOTE: *Specifications and sizes are shown in **Appendix II**.*

Section 2: Company Service Information

GENERAL SERVICE POLICY

Prior to installation, ***always*** verify that the equipment satisfies the customer's requirements as supplied, and as described in this manual.



If the equipment cannot satisfy the application and the application cannot be modified to meet the design parameters of the equipment, **the installation should NOT be attempted.**

It is **the customer/operator's responsibility** to ensure the equipment provided by Fairbanks is operated within the parameters of the equipment's specifications and protected from accidental or malicious damage.

W A R N I N G

Absolutely NO physical, electrical, or program modifications other than selection of standard options and accessories can be made to this equipment by customers.

Repairs performed by Fairbanks Scales service technicians and authorized distributor personnel ONLY!

Failure to comply with this policy voids all implied and/or written warranties.

OVERVIEW

Physical Installation Notes

- Check all devices for proper operation. If any error messages occur, refer to Troubleshooting or the proper manual of that device.
- ***Only those charges which are incurred as a result of the equipment's inability to be adjusted to performance specifications may be charged to warranty.***
- No physical alterations (mounting holes, etc.) are allowed during installation.

The installing technician is responsible that all personnel are fully trained and familiar with the equipment's capabilities and limitations before the installation is considered complete.

- All electrical assemblies must be replaced as assemblies or units.
 - Replacement of individual components is not allowed.
 - These components must be returned intact for replacement credit per normal procedures.
- All electronic and mechanical adjustments are considered to be part of the installation, and are included in the installation charge(s).
 - Included is any required computer programming or upgrades.
 - Included are any accuracy and/or operational specification changes.
- The AC receptacle / outlet shall be located near the Instrument and easily accessible.
- Electrical connections other than those specified may not be performed.

Conferring with Our Client

- The technician must be prepared to recommend the arrangement of components which provide the most efficient layout, utilizing the equipment to the best possible advantage.
- The warranty policy must be explained and reviewed with the customer.

Pre-Installation Checklist

The following points should be checked and discussed with the **Area Sales Manager and/or customer**, if necessary, before the technician goes to the site and installs the equipment.

- ✓ Check the customer's application to make certain it is within the capabilities and design parameters of the equipment.
- ✓ If the installation process might disrupt normal business operations, tell the customer and ask that they make ample arrangements.
- ✓ Be sure that the equipment operator(s) are available for training.
- ✓ The service technician reviews the recommended setup with the Area Sales Manager or Area Service Manager, and together they identify all necessary variations to satisfy the customer's particular application.



Unpacking

Follow these guidelines when unpacking all equipment:

- ✓ Check in all components and accessories according to the customer's order.
- ✓ Remove all components from their packing material, checking against the invoice that they are accounted for and not damaged.
 - *Advise the shipper immediately, if damage has occurred.*
 - *Order any parts necessary to replace those which have been damaged.*
 - *Keep the shipping container and packing material for future use.*
 - *Check the packing list.*
- ✓ Collect all necessary installation manuals for the equipment and accessories.
- ✓ Open the equipment and perform an inspection, making certain that all hardware, electrical connections and printed circuit assemblies are secure.
- ✓ Do not reinstall the cover if the final installation is to be performed after the pre-installation checkout.



Equipment Checkout

Position the equipment with these points in mind:

- ✓ Intense direct sunlight can harm the display.
- ✓ Do not locate near magnetic material or equipment/Instruments which use magnets in their design.
- ✓ Avoid areas which have extreme variations in room temperatures. Temperatures outside the Instrument's specifications will affect the weighing accuracy of this product.
- ✓ Do not load the platform if there is any evidence of damage to the platform or supporting structure.



Users' Responsibility

- ✓ All electronic and mechanical calibrations and/or adjustments required for making this equipment perform to accuracy and operational specifications are considered to be part of the installation.
 - They are included in the installation charge.
 - Only those charges which are incurred as a result of the equipment's inability to be adjusted or calibrated to performance specifications may be charged to warranty.
- ✓ Absolutely no physical, electrical or program modifications other than selection of standard options and accessories are to be made to this equipment.
- ✓ The equipment consists of printed circuit assemblies which must be handled using ESD handling procedures, and must be replaced as units.
 - Replacement of individual components is not allowed.
 - The assemblies must be properly packaged in ESD protective material and returned intact for replacement credit per normal procedures.



Section 3: Scale Installation

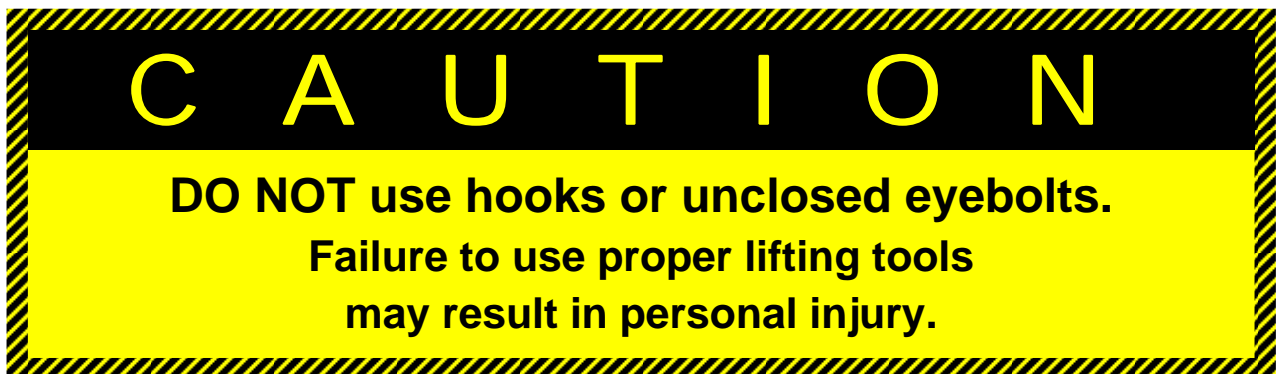
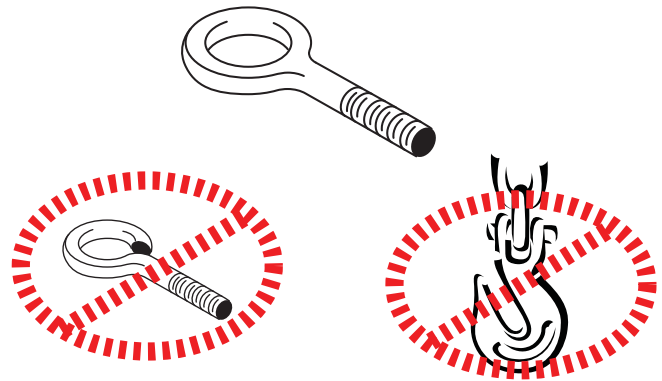
Installing the Scale

2. Select a location that is flat, solid, level, and one that fully supports the weight of the platform plus a full capacity load.
3. Remove the top of the crate and all packing material.
4. Screw **two (2) eyebolts** into the threaded adapters in the platform top.
5. Use a forklift or other lifting means, along with chains, cables, or nylon straps to remove the scale from the crate bottom.

TWO TYPES of EYE BOLTS

✓ **Closed Gap Eyebolts**

- Open Gap Eyebolts (**NOT USED**)
- Lifting Hooks (**NOT USED**)



6. Set the scale so that the interface cable exits in a direction where it can be protected.
 - If possible, use a cable protector to reduce 'trip' hazards and to protect the interface cable from being damaged.
7. Level the scale using a screwdriver to turn the threaded 'leg' of the foot assembly.

INSTALLATION, CONTINUED

8. Wire the scale cable to the proper type instrument, as shown in the chart below.
9. Once the scale platform is completely wired to the instrument, calibrate the unit.
 - Follow the appropriate instrument service manual to ensure a good calibration.

Platform Interface Cable Wiring

| WIRE COLOR | FUNCTION |
|------------|----------------|
| Black | (-) Excitation |
| Red | (+) Excitation |
| Yellow | Shield |
| Green | (+) Signal |
| White | (-)Signal |

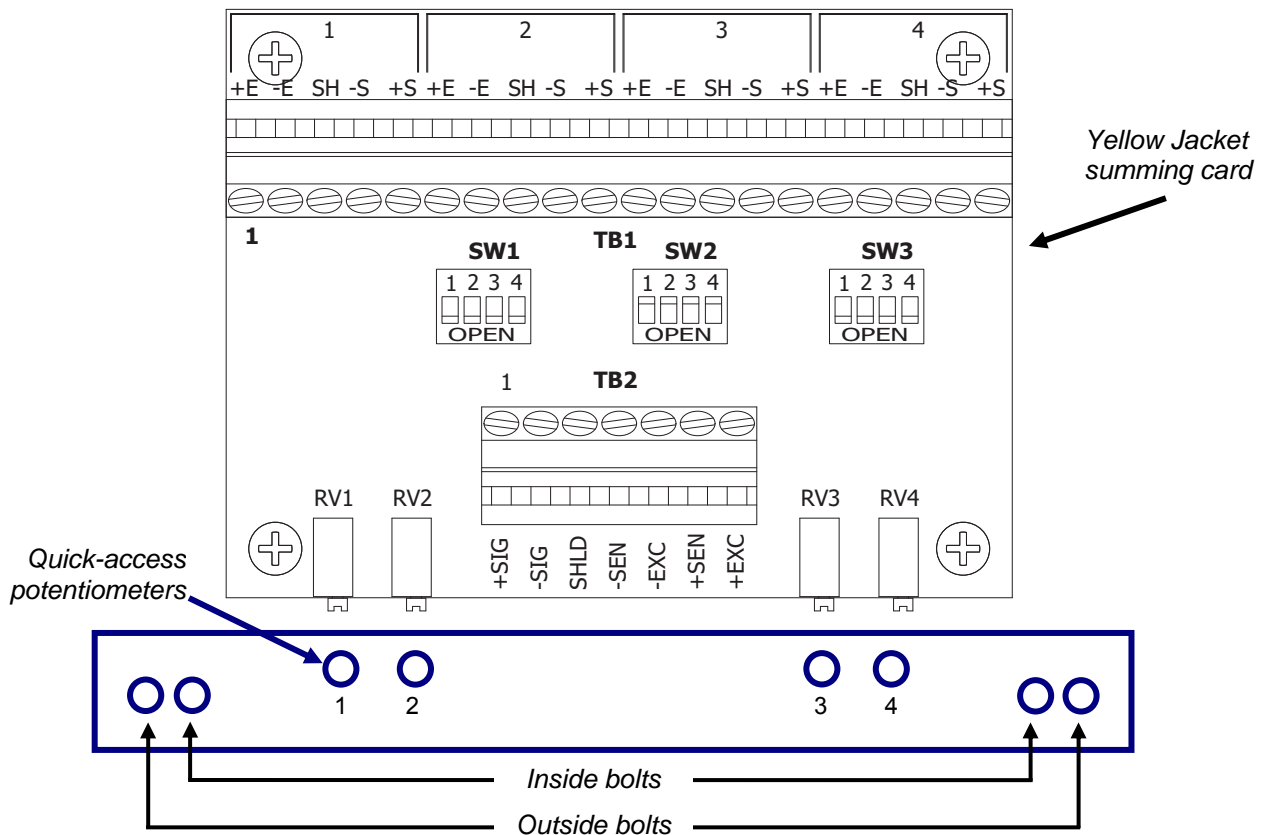
Calibration Steps

Adjust the analog interface instrument to the platform.

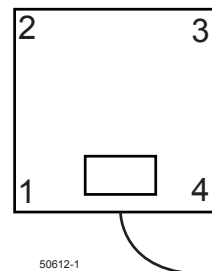
- Adjust all the corners to within **one (1) division of each other at 25% of rated capacity.**
- Follow the appropriate instrument service manual to ensure a proper calibration.

STEPS

1. Remove the two inside bolts on the side of the scale and remove access panel, exposing the quick-access potentiometers.
 - Total number of turns is **twenty.**



2. Identify the platform corner numbers.
3. Place a concentrated weight (**25%** of platform capacity) on corner #1, then move it to #2, #3 and #4, noting the displayed reading on each corner.





If corners **do** require adjustment, complete the following steps:

1. Remove the outside bolts on the quick access plate. This removes the J-box cover.
2. Safely lift scale on its end with forklift or heavy pry bar.
3. In order to adjust the potentiometers, the **DIP switches** are set as follows:
SW1 = OPEN SW2 = CLOSED SW3 = OPEN
The factory default settings have these switches set to bypass the potentiometers.
4. Center the four **Junction Box Potentiometers** by turning the adjustment screw **counter-clock-wise position** until a clicking sound is heard, then turning each of them back **clock-wise ten (10) turns**.
5. Identify the lowest reading, and then place the concentrated weight on this corner.
6. Place the concentrated weight on the corner displaying the lowest weight.
7. Turn the adjustment on the potentiometer clockwise (CW) to the displayed weight so it reads the same as the highest reading.
8. Repeat this procedure while rechecking all corners until they are equal.

Important Note: *When moving the weight(s) from corner to corner, **DO NOT** zero the scale. The purpose is to adjust the corners to be the same, and not to perform a correct calibration.*

9. Perform a zero reference check with an unloaded platform.
10. Repeat the corner test to ensure all readings are the same before proceeding.
11. Replace J-box cover with outside bolts, replace quick-access cover with inside bolts, and perform final calibration using the appropriate instrument's service manual.

If corners **do not** require adjustment, complete the following steps:

1. Remove all weights.
2. Zero the instrument.
3. Perform a final calibration with test weights.
4. Follow the appropriate instrument service manual to ensure a proper calibration.

Section 4: Installing Accessories

Installing Bolt-Down Plates

Bolt down plates are used to keep the scale from sliding or moving when loads are applied. The plates are bolted using anchors at each of the scales feet.

STEPS

1. Place the platform into the correct position.
2. Place the bolt-down plate under the foot. The plate edge extends out from under the scale.
3. Drill **two (2) 7/16"** attachment holes using a hammer drill.
4. Insert anchors with the ***nut and washer already on them.***
5. Tap the anchor into the hole, then tighten the nuts securely.
6. Repeat this process for each plate.

Note: *If ramps are **not** installed and bolt-down plates are needed, then a full set of four bolt-down plates is required.*



Installing Ramps

Each mild steel ramp accessory comes with two integral bolt-down plates and four anchors.

STEPS

1. Place the ramp in position, then lift and set the platform feet into the bolt-down plate holes.
2. Drill the **two (2) 7/16” holes** using a hammer drill. Insert the anchors with the nut and washer already on.
3. Tap the anchor into the hole, then tighten the nuts securely.

IMPORTANT TIPS

- If two ramps are installed, then no other bolt-down plates are needed.
- If only one ramp is installed, then a set of two bolt-down plates is necessary.
- Only two ramps (total) may be installed on opposite sides of a scale platform.

Installing Bumper Guards

Bumper Guards help protect the platform from direct hits from forklift traffic. The guards are slightly higher than the scale and help deflect the forks.

STEPS

1. Place the bumper guard into a position so it protects the platform from non-scale traffic.
 - Place the bumper guard so it does not touch or interfere with the platform’s movement.
2. Drill the 7/16” fastening holes using a hammer drill.
3. Insert the anchors with the nut and washer already on it.
4. Tap the anchor into the hole.
5. Tighten the nuts securely.

Section 5: Parts Replacement

Load Cell Replacement Steps

1. Cycle-down the power to the instrument, and then unplug the unit.
2. Remove potentiometer cover.
3. Lift the platform end with a forklift or heavy pry bar, using wood blocks for safety.
4. Remove J-box cover.
5. Disconnect the failed load cell cable(s) at the junction box.
6. Loosen the gland bushing, and tie a string or wire to the end of the cable to act as a pull wire.
7. Place wire markers on the cable ends.
 - Masking tape is an effective alternative
8. Disconnect the faulty load cells wires from the terminal block.
9. Remove the load cell mounting bolts with a **3/4" socket**.
10. Remove the load cell, pulling the cable through the scale while leaving the pull string/wire in the scale.
11. Remove the foot assembly from the old cell, then install it onto the new load cell.
 - Use anti-seize on the threads.
12. Disconnect the pull string/wire from the old cell's cable, then attach to the new cell's cable end.
13. Pull the cable from the new cell through to the junction box.
14. Mount the cell to the scale platform.
 - Torque it to **90 ft/lbs**, using anti-seize on the mounting bolts.
15. Connect the load cell wires into the junction box, then tighten the box gland bushing(s).
16. Lower the scale to the surface removing the safety blocks.
17. Distribute the scale's weight evenly by all four (4) feet.
18. Recalibrate the unit as necessary.

Load Cell Replacement Steps, Continued

IMPORTANT NOTE: See **Appendix I** for specific load cell color code and wiring information.

Load Cell Specifications

| DESCRIPTION | SPECIFICATION |
|----------------------------------|----------------------|
| Material | Mild Steel |
| Rated Output | 3mV/V |
| Impedance | 350 ohm |
| Safe Overload | 150% |
| Compensated Temperature Range | -10° C to 40° C |
| Safe Operating Temperature Range | -10° C to 40° C |

Junction Box Replacement Steps

1. Remove power to the instrument.
2. Open the platform access cover, then the junction box cover.
3. Loosen all gland bushing nuts.
4. Place wire markers on all the load cell cable ends.
5. Disconnect the load cells' wires from the terminal blocks.
6. Disconnect the homerun wires.
7. Remove the PCB, clean the junction box, then install the new PCB.
8. Reconnect all load cell and home-run wires to the new PCB.
9. Tighten all gland bushing nuts.
10. Replace the junction box cover, and torque all screws to **18-20 in/lbs.**
11. Recalibrate the unit as necessary, including corner adjustments.
12. Replace the platform access cover.

Foot Assembly Replacement Steps

1. Lift the platform end with a forklift or heavy pry bar using wood blocks for safety.
2. Using a standard screwdriver, unscrew the foot assembly.
3. Replace the Foot Assembly, using anti-seize on the screws attaching to the load cell.
4. Lower the scale to the surface removing the safety blocks.
5. Distribute the scale's weight evenly by all four (4) feet.

Section 6: Parts

Parts List

| ITEM | PART NO. | DESCRIPTION | SCALE CAPACITIES |
|------|-----------------|--------------------------------------|------------------|
| 1 | See Appendix II | Platform weldment | See Appendix II |
| 2 | See Appendix I | Load cell LC1 LC4 | See Appendix I |
| 3 | 54502 | Screw, cap, hex hd .50-20 x 1.75 | ALL |
| 4 | 63913 | Foot | ALL |
| 5 | 66754 | Spacer plate, load cell SST | ALL |
| 6 | 30139 | Box, junction | ALL |
| 7 | 30249 | Plate, cover | ALL |
| 8 | 11039 | Bullseye level | ALL |
| 9 | 15389 | Adhesive | ALL |
| 10 | 30063 | PCB assy, summing network | ALL |
| 11 | 17814 | Tie, wire | ALL |
| 12 | 12838 | Cable assy (30 ft. long) | ALL |
| 13 | 11020 | Bushing, strain relief | ALL |
| 14 | -- | | ALL |
| 15 | 14828 | Screw, sealing SST 10-32 x .75 | |
| 16 | 11119 | Washer, plain, flat SST No. 10 | ALL |
| 17 | 11103 | Nut, hex SST | |
| 18 | 11146 | Screw, Mach, PH, Phil SST 6-32 x .38 | ALL |
| 19 | 11191 | Washer, lock, Ext. tooth SST No. 6 | |
| 20 | -- | | ALL |
| 21 | 30251 | Plate, nameplate | |
| 22 | 10106 | Nut, hex 10-32 | ALL |
| 23 | 10311 | Washer, plain flat No. 10 | |
| 24 | 11926 | Adhesive (permanent type) | ALL |
| 25 | See tab | Nameplate | |
| 28 | 12189 | Seal wire | ALL |
| 29 | 28498 | Screwdriver | |
| 30 | 51233 | Manual CD (26461) | ALL |

*See [Appendix I](#) for Load Cell wiring information.

Appendix I: Load Cells

| ITEM | PART NO. | DESCRIPTION | SCALE CAPACITY |
|------|----------|--|----------------|
| 2 | 30328 | 1K lb Capacity Load Cell 350 Ohm, 3 mV/V, Plated Tool Steel | 2.5k |
| 2 | 30329 | 2.5K lb Capacity Load Cell 350 Ohm, 3 mV/V, Plated Tool Steel | 5k |

| WIRE COLOR | FUNCTION |
|------------|----------------|
| Black | (-) Excitation |
| Red | (+) Excitation |
| Yellow | Shield |
| Green | (+) Signal |
| White | (-)Signal |

Appendix II: Specifications

| PRODUCT NO. | SIZE | CAPACITY | PLATFORM WELDMENT | DECK |
|-------------|---------|-----------|-------------------|---------|
| 30325 | 4' x 4' | 2,500 lbs | 30133 | Diamond |
| 30326 | 4' x 4' | 2,500 lbs | 30134 | Smooth |
| 30327 | 4' x 4' | 5,000 lbs | 30133 | Diamond |
| 30328 | 4' x 4' | 5,000 lbs | 30134 | Smooth |

| Device | Approvals |
|-----------|---------------------------------|
| Platform | NTEP CC# 10-008 |
| Load Cell | NTEP CC# 06-079, Factory Mutual |

Appendix III: Accessories

Ramps and Bumper Guards

| SIZE | CAPACITY | RAMP | BUMPER GUARD |
|----------|-----------|--------------------|--------------|
| 4' x 30" | 2,500 lbs | 30256 safety tread | 72194 |
| 4' x 30" | 2,500 lbs | 30257 smooth tread | 72194 |
| 4' x 30" | 5,000 lbs | 30256 safety tread | 72194 |
| 4' x 30" | 5,000 lbs | 30257 smooth tread | 72194 |

Bolt-down Plates, Eyebolts and Hole Plugs

| SIZE | CAPACITY | BOLT-DOWN PLATES | EYEBOLTS | EYEBOLT PLUG |
|------|----------|------------------|-----------|--------------|
| ALL | ALL | 63777 (Set of 4) | 70895 (2) | 70896 (2) |
| | | 63779 (Set of 2) | | |



Manufactured by Fairbanks Scales, Inc.
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Kansas City, MO 64106

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3500 Series Floor Scale

INSTALLATION MANUAL
DOCUMENT 51233