IQ plus® 800/810

Digital Weight Indicator

Installation/Operation Manual

ENABLED BY ALLEN-BRADLEY TECHNOLOGY

RICE LAKE WEIGHING SYSTEMS
Industrial Solutions on a Global Scale®

ISO 9001 REGISTERED

30262

Contents

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1. Introduction

ABOUT THE MANUAL

The IQ plus 800 and 810 indicators are both very flexible, offering a variety of standard features and optional features. This manual is organized so that you can learn about the basic installation and standard operations first, then find more detailed information about specific optional features in later sections (see Table 1-1 for optional features).

The configuration menu charts include parameter choices for both the standard features and all possible options. When configuring your IQ plus 800 or 810, you can ignore the settings for parameters dealing with options not installed on your indicator. Settings chosen for non-installed options are ignored.

OVERVIEW

For basic weighing applications, the IQ plus 800 or 810 has more useful standard features than any other digital indicator currently available. For more complex weighing applications, the IQ plus® 800/810 series indicators are expandable, programmable, process controllers with an impressive array of options (see Table 1-2 for standard features and Table 1-3 for optional features).

The economical IQ plus® 800 indicator is available in a compact stainless steel enclosure. It carries all the features of the standard IQ plus® 800/810 indicators, but its compact enclosure size will not accept all the expansion options of the larger 810 enclosures. See the Applications Chart (Table 1-1) on the following page for a complete listing of options which will fit into the various models.

The IQ plus® 810 is available in desktop (DT), stainless steel batching (SS), and hostile environment batching (HE) models. The 800 and all 810 models are NTEP-certified for Class III and Class IIIL at 10,000 divisions.

The 800 stainless steel, 810 SS and HE models are certified for NEMA 4X washdown applications. See page 9-1 for a complete list of specifications.

Table 1-1.

Applications Chart					
Optional Features	**IQ plus 800**	**IQ plus 810 DT**	**IQ plus 810 SS**	**IQ plus 810 HE**	**Notes**
Rate of Change Function	✔	✔	✔	✔	A
Peak Hold Function	✔	✔	✔	✔	A
Bar Graph	✔	✔	✔	✔	A
Passwords	✔	✔	✔	✔	A
Dual-Channel Load Cell Input Module	✔	✔	✔	✔	B
Setpoint Output Expander Module	✔	✔	✔	✔	B
Analog Output Module 1	✔	✔	✔	✔	B
2-Channel Relay Rack	✔	✔	✔	✔	
4-Channel Relay Rack	✔	✔	✔	✔	B
16-Channel Relay Rack	NA[D, E]	NA[D, E]	✔[E]	✔[E]	B
Duplex 20 mA CL for EDP Port	✔	✔	✔	✔	B
RS-485 Communication for EDP Port	✔	✔	✔	✔	B
Expansion Board	NA	✔[2]	✔[2]	✔[2]	B
2nd Dual-Channel Load Cell Input Module	NA	✔	✔	✔	C
RS-485 Communication for Auxiliary Port	NA	✔	✔	✔	C
Analog Output Module 2	NA	✔	✔	✔	C
Supervisor Setup Switch	✔	✔	✔	✔	B
Start/Stop/Run Batching Switch	✔[3]	✔[3]	✔	✔	
Panel Mount Kit	✔	✔	NA	NA	
Wall Mount Kit	Standard	✔	Standard	Standard	
Jetpak™ 100 HZ High-Speed Option	✔	✔	✔	✔	
Allen-Bradley Remote I/O Network Interface	✔	✔	✔	✔	D

Notes:

A - SOFTWARE INSTALLED.
B - MAIN BOARD. Hardware option which mounts on main CPU board.
C - EXPANSION BOARD. Hardware option which mounts on expansion board.
1 - Will only fit in Desktop model if expansion board has not been installed.
2 - Includes Remote Keyboard Input, and Auxiliary Serial Communication Port. This option will not fit in the Desktop model if the 4-channel relay rack has been installed.
3 - Includes separate NEMA 4-switch enclosure and 5-ft cable for external remote mounting.
NA - NOT APPLICABLE
D - Will not fit in enclosure. However, hardware is available for external mounting.
E - Setpoint Output Expander Module necessary when using more than four setpoint outputs.

Standard features

Table 1-2.

All standard models feature...
• 110 or 220 VAC operation
• 10-key numerical keyboard
• LED indicators
• Single-scale load cell input (expandable to four scales)
• Load cell excitation voltage to support 32 (700-Ω) or 16 (350-Ω) load cells
• Front panel configuration or downloadable setup from personal computer or ASCII terminal
• Front panel calibration with internal memory to store calibration constants
• Field-replacement of complete units or components without recalibrating
• Three digital inputs (TTL or switch closure) configurable to duplicate keyboard functions or facilitate batching operations
• 20 fully programmable setpoints (continuous or batch steps)
• Four digital setpoint outputs (16 with setpoint output expander module)
• One Electronic Data Processing (EDP) serial port configurable as duplex RS-232 or 20mA current loop with optional RS-485
• One serial printer port configurable for simplex RS-232 and/or simultaneous 20mA current loop
• Accumulate function
• Formattable custom printing, including time, date, and custom headers
• Both analog filtering and exclusive digital RattleTrap® vibration filtering
• Truck In/Out program with 200 ID's and choice of 6 operating modes

NOTE:
Many setup parameters relate to optional features which may not be installed. Changing the parameters for an uninstalled option has no effect.

Optional features

Table 1-3.

Optional features include...
• Bar graph display
• Rate of change function
• Peak hold function
• High speed update function (100/sec)
• 2nd load cell input channel
• 3rd and 4th load cell input channels (810 only)
• Digital outputs (5 – 16) for setpoints
• 3rd auxiliary serial port (810 only)
• Single and dual channel analog output options (dual on 810 only)
• Expansion board option (810 only)
• 2-, 4- and 16-channel relay modules (16-channel on 810 only)
• RS-485 communication option
• Remote keyed switch for accessing supervisor mode
• Panel mounting kit, or Wall mounting kit (standard on 800)
• NEMA 4X reinforced fiberglass or stainless steel batching enclosure
• Start/Run/Stop batching switch
• Allen-Bradley Remote I/O Network Interface

Refer to Section 8 for complete details on options listed in Table 1-3.

NOTE:
Application specialists at Rice Lake Weighing Systems are available to help with unique situations not covered in this manual.

LEARNING THE KEYBOARD AND DISPLAYS

Take some time to familiarize yourself with the IQ plus® 800/810 front panel (Figures 1-1 and 1-2). Although the keys function similarly, the layout varies, depending on the model.

Figure 1-1. IQ plus 810 HE front panel

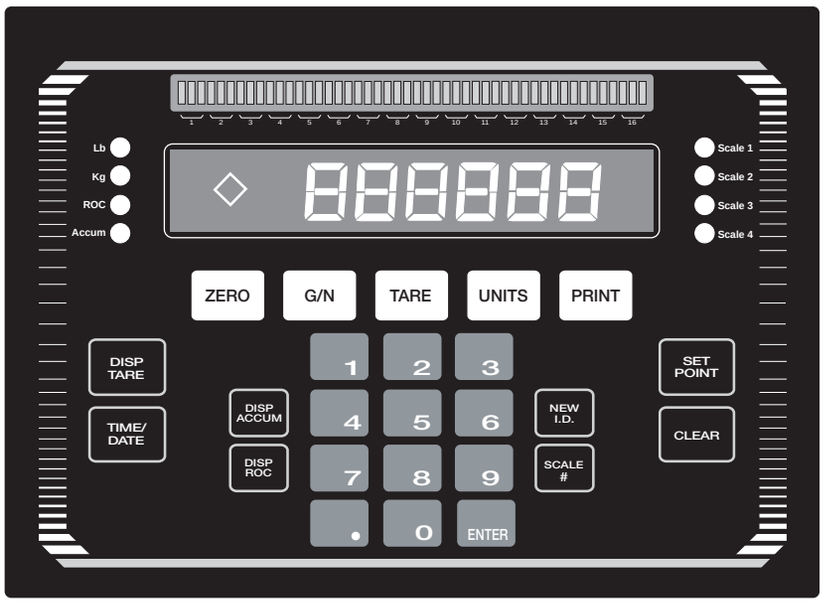
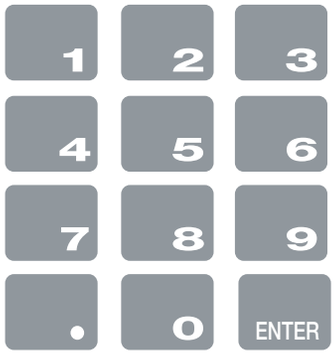


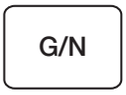
Figure 1-2. IQ plus 810 DT and SS, and IQ plus 800 front panel

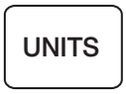
Keyboard functions and displays

The items in Table 1-4 describe various keys and display functions.

Table 1-4.







Numeric keypad
These keys let you enter numerical data. Normally, you key a number, and then press **ENTER** and/or a function key. Each digit appears on the display screen as entered. If you key a number and don't press **ENTER** and/or a function key within several seconds, the display reverts to the previous mode and the number is ignored. If you make a mistake entering a number, press **CLEAR** to erase a single digit. Continue pressing **CLEAR** to erase the remaining digits as necessary. If you key a number and press **G/N** before pressing **ENTER**, the number is erased and the display reverts to the previous mode.
Zero
Eliminates weight from the display (when in Gross mode). This key will not function when the scale is in motion, displaying Net weight, or beyond the selected zero range.
G/N
Toggles between Gross and Net display modes. In Net mode, the display shows net weight and the "N" annunciator lights. In Gross mode, the display shows gross weight and the "G" annunciator lights. Also, you can use **G/N** to revert to normal weighing mode if in another mode.
Tare
Zeroes the displayed weight and places it into the tare register. The scale must not be in motion, as indicated by: ◺◿ If you press **TARE** in Gross mode, the indicator automatically changes to Net mode and tares the current gross weight. If you type in a value using the keypad, then press **TARE**, the indicator tares that value. The T and rhombus appear on the display when a tare is in the system. The TE and rhombus indicate a manually entered tare.
Units
Toggles the display between the primary and secondary units. Although the standard label shows pounds and kilograms, other units can be defined in the configuration menus.
Print
Prints a ticket when pressed in Normal Weighing Mode. You can configure PRINT to operate in one of three modes: as a simple print button (normal weighing mode), as a revolving-terminal data entry key (Truck In/Out Mode 1), or as a fixed-terminal data entry key (Truck In/Out Mode 2). In all cases, PRINT only functions when the scale is at standstill ◺◿. Also, you can customize the ticket format (see *Custom Print Formatting Procedure* in Section 9, *Appendix*). *continued...*

Table 1-4. (continued)

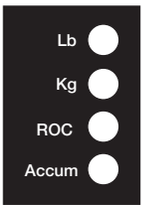
DISP TARE	**Disp Tare** In the normal weighing mode, **DISP TARE** displays the current weight in the tare register (if any) and lights the "T" annunciator. In the Truck In/Out mode, key in a truck ID number and press **DISP TARE**. If the ID is not found, "NO ID" appears on the display. If the ID is found, press **ENTER** to display the stored weight value. If you press **CLEAR**, the display prompts "CLR ID?." If you press **CLEAR** a second time, the indicator clears the stored truck ID. Also, in the Truck In/Out mode, you can press **DISP TARE** repeatedly to scroll through the stored IDs.
TIME/ DATE	**Time/Date** Press once to display the date. Press it a second time to display the time. You can enter new values for the date and time while they appear in the display. Simply type in a new value and press **ENTER**. Use the 24-hour format to enter time values.
DISP ACCUM	**Disp Accum** Displays the current weight from the accumulator register and sequentially lights the accumulator annunciators. Press repeatedly to access all five accumulators, or enter number (0 – 4) and press **DISP ACCUM**. If you press **CLEAR**, the display prompts "CLR AC?." If you press **CLEAR** a second time, the indicator clears the accumulate register.
DISP ROC	**Disp ROC** Displays the rate of change for weight data on the current load cell channel. This is expressed as the change in weight during a specific period of time, such as lbs/min, gals/hour, etc. The "ROC" annunciator lights when this mode is active. This key only works if the optional rate of change feature is installed.
NEW I.D.	**New ID** In the Truck In/Out mode, **NEW ID** lets you enter a new truck ID number. Key in a number with the numeric keys and press **NEW ID** to save. When a truck is on the scale, you can use **NEW ID** to enter the new ID number, save the tare, and print a weigh-in ticket, all in one step. Also, you can use **NEW ID** to enter an ID number not associated with the truck program or weight storage (see Section 5, *Operating Modes*, for more information).
SCALE #	**Scale # (or BASE # for HE)** Selects an analog input channel or total of all channels to display. The annunciator light indicates which input source or sources are selected. If sources are totaled, more than one annunciator light is illuminated. Note: This key only works if more than one input channel is enabled and selected.

Table 1-4. (continued)

Set Point
Press to access the current setpoint values. When you first press this key, the display shows “SP 1” for two seconds, then switches to show the setpoint value. Each time you press **SET POINT**, the next setpoint (SP 2, SP 3, etc.) appears. You can change the setpoint value by keying in a number and pressing **ENTER**. To turn off a setpoint, press **CLEAR**. The message “OFF” appears on the display for disabled setpoints. Note: If you turn off a setpoint while in the setup mode, you cannot reactivate it from the front panel. You must return to the setup mode to reactivate it. If you make an error when keying in a value, press **CLEAR** to erase individual digits. To return to the normal weighing mode, press **G/N** or wait for the display to switch back. You can use the **SET POINT** key to view or change PREACT values from the front panel during the normal operating mode (see Section 7, *Setpoints and Batch Processing*, for more information). If you wish to customize the prompts given while using **SET POINT**, you can define up to 10 unique names. See Section 7, *Setpoints and Batch Processing*, *Setpoint Mnemonics*, for more information.
Clear
Erases digits entered from the keyboard or clears special function values. In the SETPOINT function, **CLEAR** disables setpoints or erases individual digits. In the DISP ACCUM function, **CLEAR** erases the value in the accumulator. In the DISP TARE function (normal weighing mode) with the current tare value displayed, pressing **CLEAR** causes the following prompt to appear: “CLR TR?” Pressing **CLEAR** a second time clears the tare register. In the DISP TARE function (Truck In/Out mode), **CLEAR** erases truck IDs, as well as tare values.

Annunciator lights

The annunciator lights provide status information about the indicator.



These annunciator lights are on the left side of the display. See UNITS, DISP ROC, and DISP ACCUM in Table 1-4 for more information.

These annunciator lights are on the right side of the display. See SCALE # (or BASE #) in Table 1-4 for more information.

2. Installation

Caution

To avoid damaging the indicator, properly configure the power supply / display board before connecting to the 3-wire power supply line.

MAKING POWER CONNECTIONS

The IQ plus® 800/810 can operate from either a 110VAC or 220VAC 3-wire power supply line at 50 or 60 Hz. It is further recommended that the 800/810 be connected to an AC power supply that is on a separate branch or feeder from other AC equipment that causes step-load changes and/or other AC line disturbances.

The transformer on the power supply / display board is pre-wired at the factory for 110VAC operation. If the installation requires 220VAC operation, move the transformer connector from J5 to J9 on the power supply / display board. Also, be sure to install the correct fuse. See Section 9 for a complete list of Specifications.

CONNECTING THE BOARDS

The main CPU board connects to the power supply / display board with two ribbon cables (see Figure 2-1). The power ribbon cable connects between J1 on both boards; and the data ribbon cable connects between J2 on both boards.

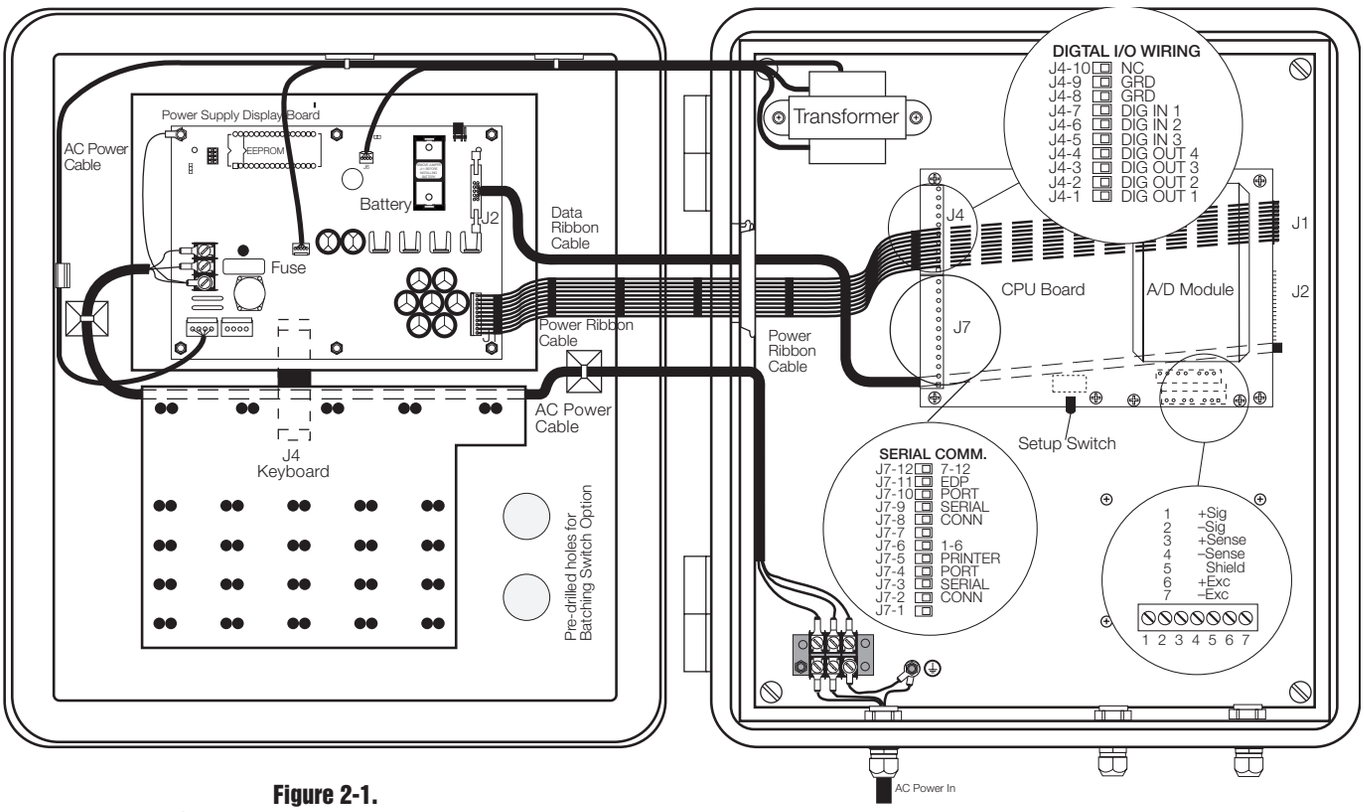


Figure 2-1.
IQ plus 810 HE wiring

WIRING THE ANALOG INPUTS (LOAD CELLS)

Wire the analog input cable from the load cell or junction box to the removable connector and plug into the CPU board at J10 near the A/D module. If your indicator was purchased after June 1, 1996, the A/D module will be surface mounted to the CPU board. See Figure 2-2 below for J10 pin assignments #1-#7 for these indicators.

Note that earlier indicators (with A/D modules mounted on standoffs) have J10 pin assignments in reversed order from Figure 2-2.

Leave jumpers JP1 and JP2 in place for 4-wire load cell installations. Remove them for 6-wire sense lead installations.

For a single-channel A/D module, use the upper plug-in connector for the load cell. If a dual-channel A/D module is being used, plug the second load cell cable into the lower connector at J10.

If using 4-wire load cell cable, leave on jumpers JP1 and JP2 that connect pins 3 – 6 and pins 4 – 7 at terminal J10. For a 6-wire installation using sense leads, remove the jumpers.

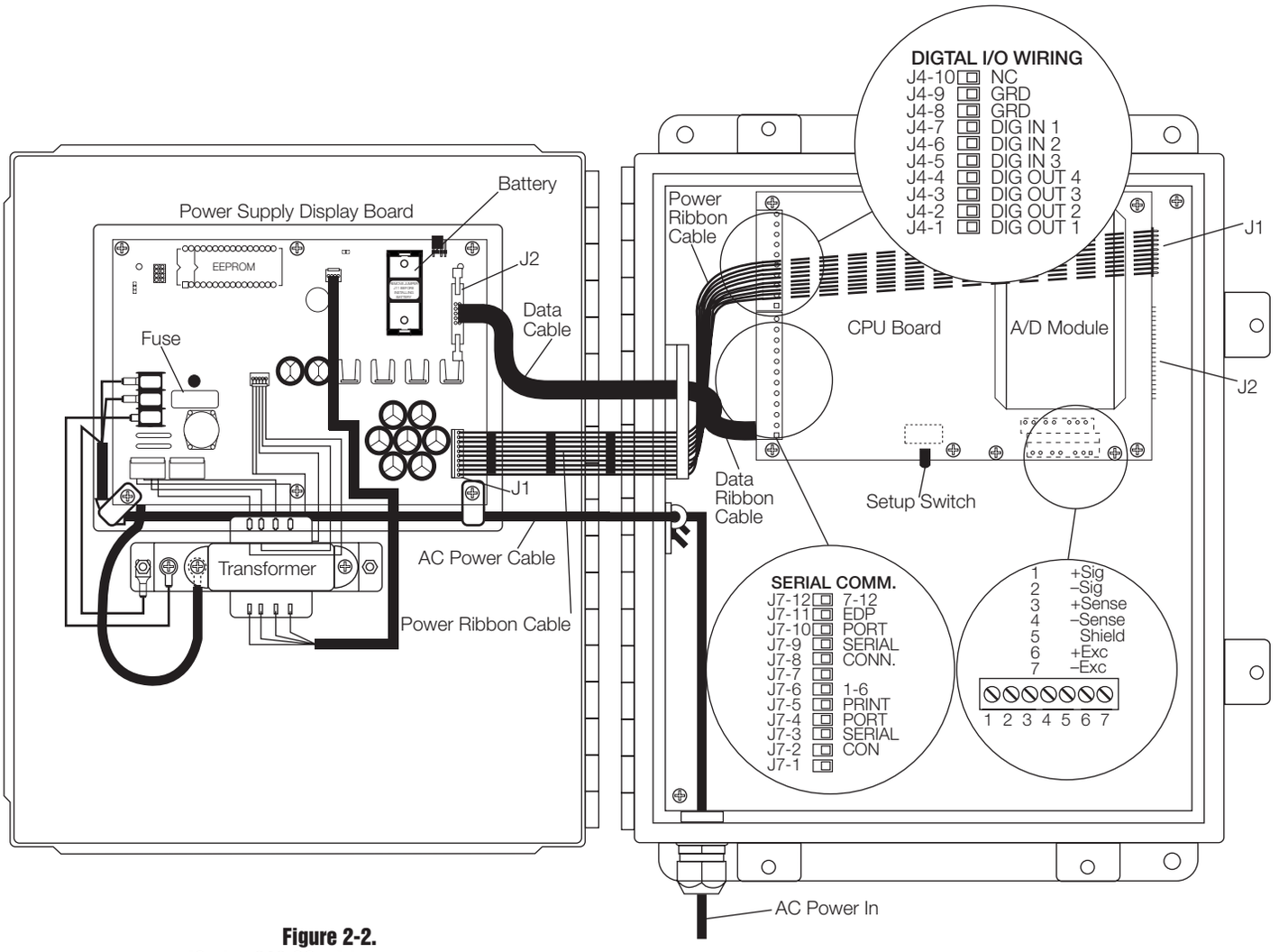


Figure 2-2.
IQ plus 810 SS wiring

Figure 2-3.
IQ plus 810 DT wiring: side view

NOTE:

The IQ plus 800 board locations are the same for wiring purposes

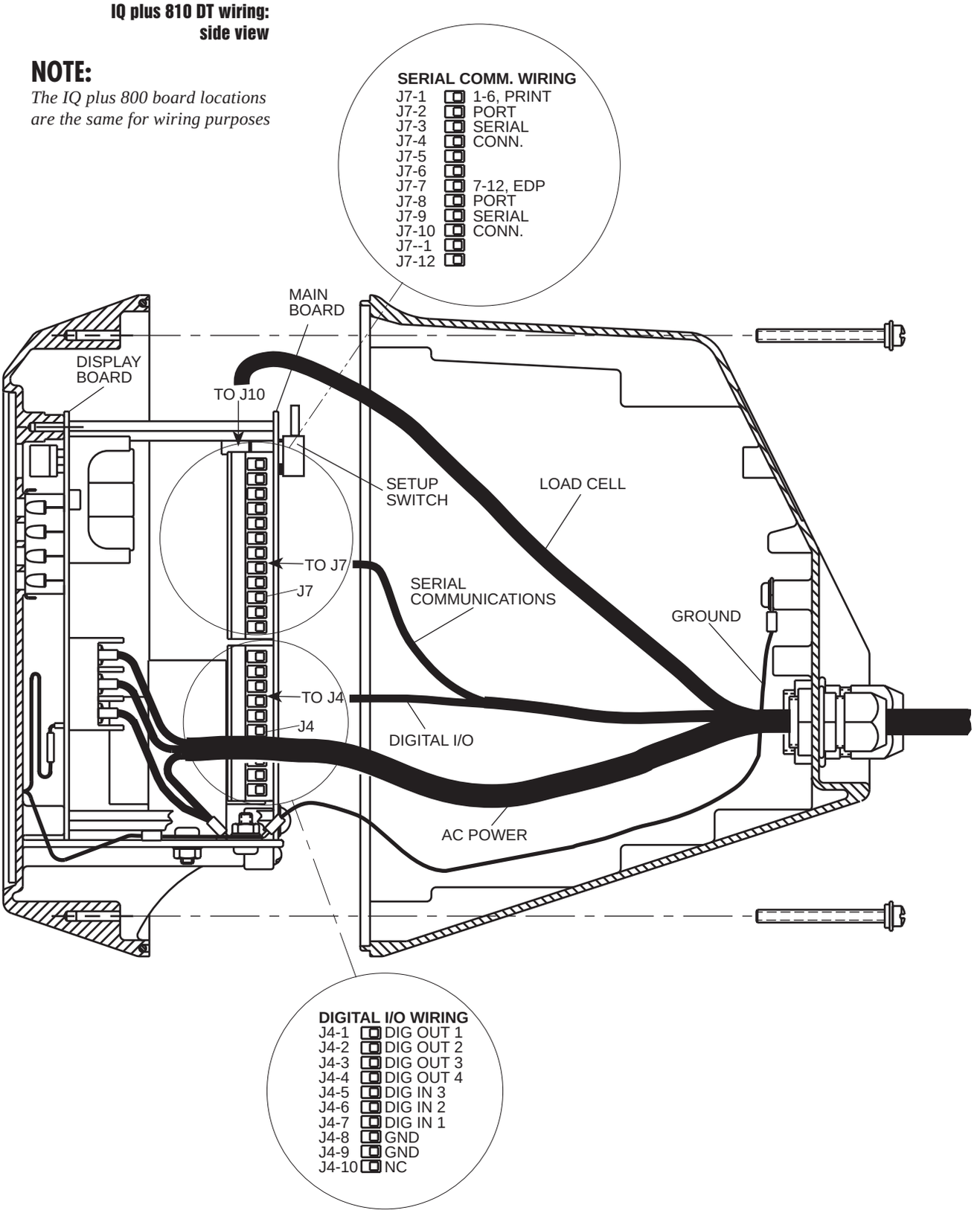


Figure 2-4.
IQ plus 810 DT wiring: top view

The IQ plus 800 board locations are the same for wiring purposes

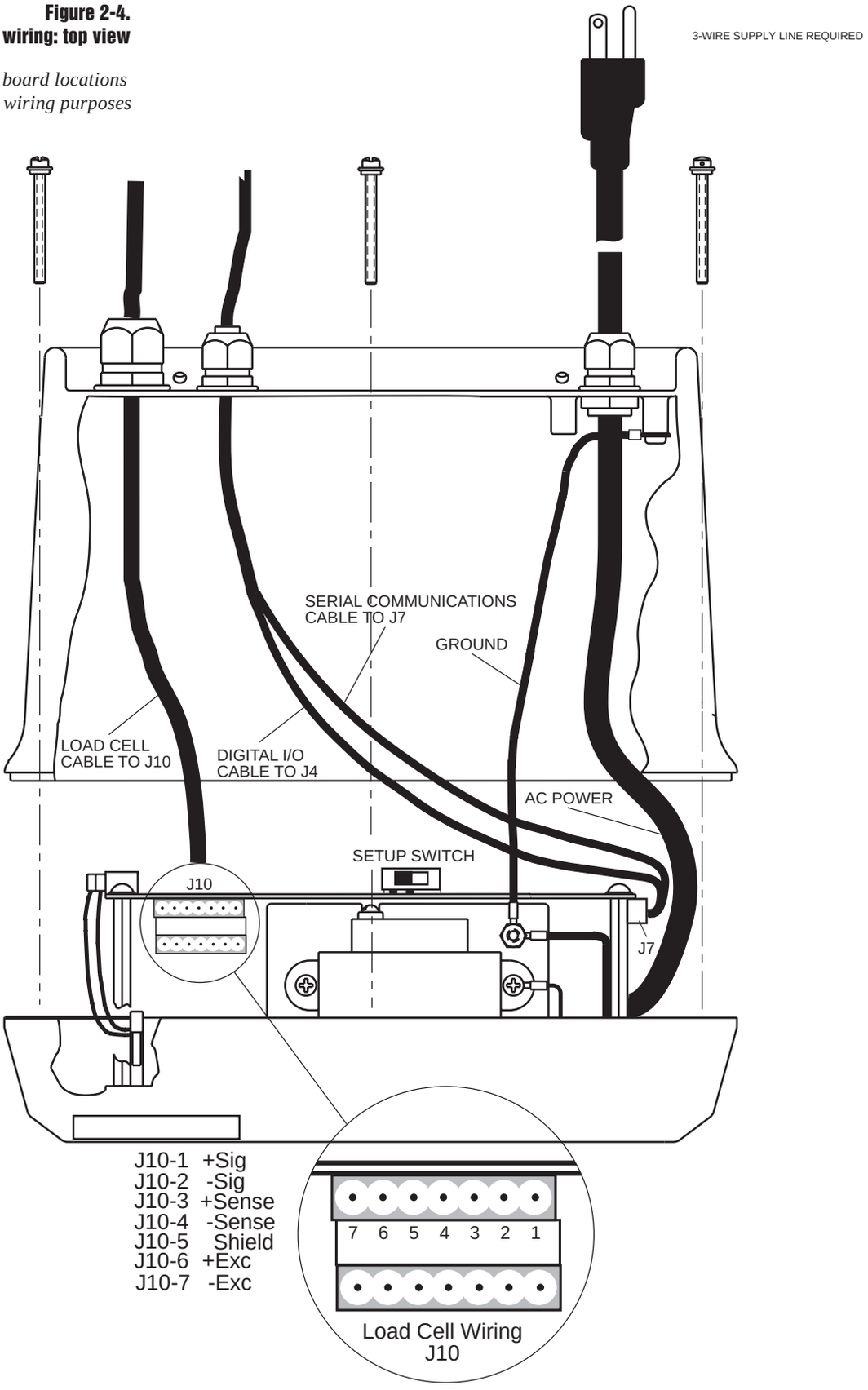
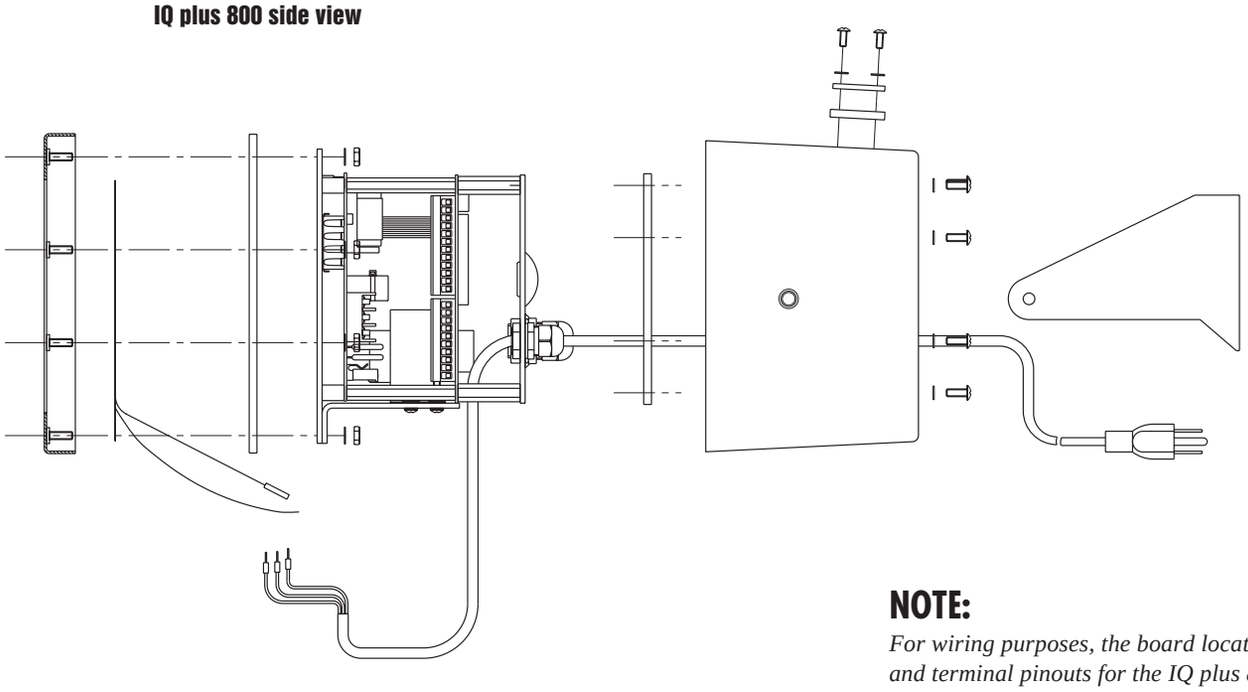


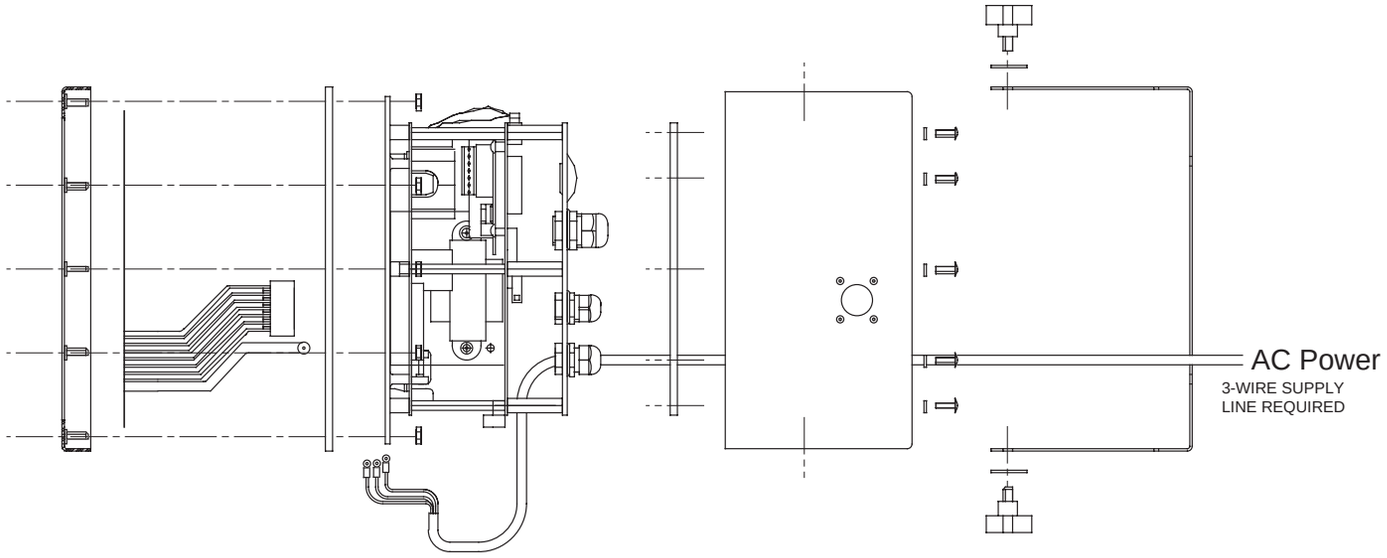
Figure 2-5a.
IQ plus 800 side view



NOTE:

For wiring purposes, the board locations and terminal pinouts for the IQ plus 800 are identical to the IQ plus 810 Desktop model shown on pages 2-3 and 2-4.

Figure 2-5b.
IQ plus 800 top view



For dual-channel A/D modules, there are jumper pins on the board near J10. The sense jumpers are labeled JP1–JP2 for channel one, and JP3–JP4 for channel two. Leave the jumpers installed for a 4-wire cable, and remove them for a 6-wire installation. See Table 2-1 for J10 analog input connections.

Table 2-1.

J10 – analog input connections	
Pin	**Signal**
1	CH1 SIG+
2	CH1 SIG–
3	CH1 SENSE+
4	CH1 SENSE–
5	SHIELD
6	CH1 EXC+
7	CH1 EXC–
8	CH2 SIG+
9	CH2 SIG–
10	CH2 SENSE+
11	CH2 SENSE–
12	SHIELD
13	CH2 EXC+
14	CH2 EXC–

WIRING THE SERIAL COMMUNICATIONS PORTS

Terminal block J7 on the CPU board connects both the EDP (Electronic Data Processing) port and the printer port. You must configure these ports for your specific application (see Section 3, *Configuration*, for more information). The EDP port handles full-duplex RS-232 or simplex 20 mA current loop communication, with half-duplex RS-485 and full-duplex 20 mA current loop as optional features. The printer port handles simplex RS-232 and 20 mA transmissions. Also, you can add another full-duplex serial port to the system by installing the optional expansion board and auxiliary serial port (see Section 8, *Optional Features*, for more information).

NOTE:

RS-485 requires a U24 chip. Bidirectional 20 mA CL requires a U22 chip.

Table 2-2.

J7 – serial communications ports

Pin	EDP (RS-232)	EDP (20 mA CL)	Printer (RS-232)	Printer (20 mA CL)	EDP (RS-485)	EDP (20 mA CL)
1	—	—	—	—	—	—
2	—	—	—	—	—	—
3	—	—	—	—	—	—
4	—	—	—	I– OUT	—	—
5	—	—	TXD	—	—	—
6	—	—	GND	I+ OUT	—	—
7	—	—	—	—	485-A	I+ IN
8	—	—	—	—	485-B	I– IN
9	RXD	—	—	—	—	—
10	—	I– OUT	—	—	—	I– OUT
11	TXD	—	—	—	—	—
12	GND	I+ OUT	—	—	—	I+ OUT

The following communications parameters (Table 2-3) apply to both the EDP port and the printer port.

Table 2-3.

Serial communications parameters

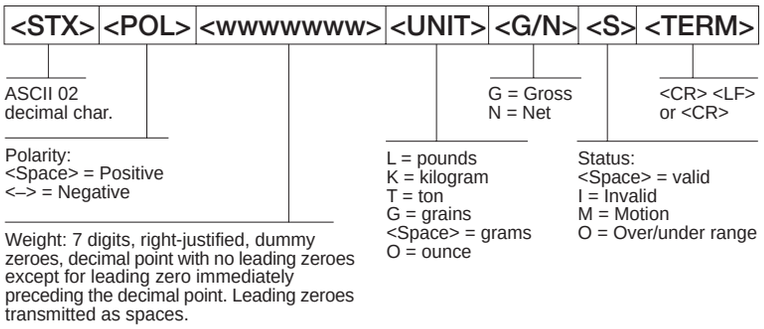
- Continuous or Demand outputs
- 300, 600, 1200, 2400, 4800, 9600, or 19200 baud rate
- 7 data bits (with parity) or 8 data bits (no parity); 1 start bit and 1 stop bit
- None, odd, or even parity
- Line termination: <CR LF> or <CR>
- End of line delay up to 2550 milliseconds (2.55 seconds)

NOTE:

If your application requires a customized format, consult your supplier for further details.

Continuous output serial data format

When you select continuous transmission in the setup menus (SERIAL ➥ STREAM ➥ EDP, PRN, or AUX), the IQ plus® 800/810 uses the Consolidated Controls serial data format as shown below:



Demand output serial data format

When you select demand mode transmission in the setup menus (SERIAL ➥ PRNDEST ➥ EDP, PRN, or AUX), the IQ plus® 800/810 uses a data string formatted for a basic ticket printout. However, you can use the EDP port or keypad to fully customize the ticket (see Section 9, *Appendix*, for more information on custom printing formats). This allows the IQ plus® 800/810 to work with a wide variety of printers, scoreboard displays, and other remote equipment.

RS-485 communications (optional)

You can configure multiple IQ plus® 800/810 indicators to operate on a 2-wire, multidrop RS-485 serial communications line. The expanded serial communication option must be installed. To enable RS-485 communications, an optional chip, U24, must be installed on the CPU board (see Section 8, *Optional Features*, for more information on expanded serial communications).

When planning an RS-485 installation, consider the following:

Table 2-4.

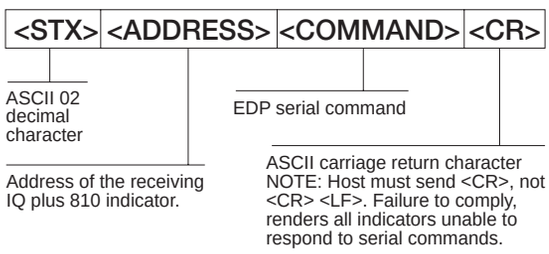
RS-485 hardware
• Every piece of equipment must have a unique address. • Every piece of equipment must remain quiet while waiting for a command. • All interface wiring and RS-485 transceivers must be correctly installed. Note that there are both 2-wire and 4-wire RS-485 implementations. Although the IQ plus® 800/810 uses 2-wire, you can incorporate other 4-wire equipment in the system by tying the two transmit (A) pins together and the two receive (B) pins together.

Table 2-5.

RS-485 software
• The controller software must be compatible with the IQ plus 800/810's protocol. Some equipment may have its own, proprietary RS-485 protocol. • All equipment in the RS-485 network must follow the rules of half duplex communications: "Be quiet unless spoken to;" and "Never echo back what you are receiving." • The controller must turn on its transmitter, send the commands, wait for the transmission, and finally, turn off its transmitter. • The controller software must be able to handle the echo from its own transmission, since the transmit and receive lines are the same.

The IQ plus 800/810 has a built-in RS-485 software protocol, which you enable by assigning an address to the EDP port on the CPU board. From the setup menus, the progression is: SERIAL ➥ EDP ➥ ADDRESS, where the address is an ASCII decimal value other than zero. We recommend addresses of 65 or higher.

Since the RS-485 protocol requires that each device has a unique address, all remote commands are initiated as shown below:

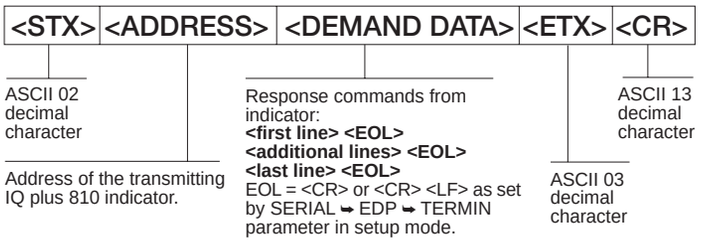


If the initiating address matches the port address of an IQ plus® 800/810 listening on the RS-485 network, that indicator responds.

NOTE:

The EDP port supports bidirectional serial communications.

For example, with demand outputs, or in response to a KPRINT command, the protocol is:



For example, suppose you wish to send the remote print command, KPRINT, from an ASCII terminal to an indicator on the RS-485 network. Assume the indicator's address is ASCII decimal character 65. After consulting an ASCII chart, you determine that the keyboard equivalent for the STX character (02) is CONTROL-B. The address (65) corresponds to the capital letter "A" and the CR character is ENTER. Therefore, from the terminal you press: CONTROL-B, A, K, P, R, I, N, T, ENTER.

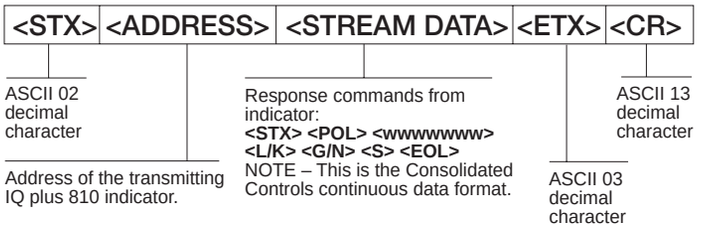
The indicator responds with:

<STX> A SCALE #1 **<EOL>**
GROSS 1699 LB **<EOL>**
04/20/94 10:05 AM **<EOL>**
<ETX> <CR>

If the indicator is configured for continuous outputs, the protocol is:

NOTE:

Continuous outputs are not recommended for half-duplex, master/slave RS-485 network configurations.



WIRING THE DIGITAL INPUTS AND OUTPUTS

The standard unit allows 3 digital inputs and 4 digital outputs. Wire any active digital inputs and outputs to connector J4 on the CPU board. See Table 2-6 for J4 digital I/O connections.

Typically, digital outputs control relays which operate other equipment. Each output is a normally-open collector circuit, capable of sinking 250 mA when "on" and withstanding +40 VDC when "off." All logic levels are active (on) when a low voltage signal (-5 VDC) is present. The output circuits also include 5V pull-up resistors to send a 5V TTL or 5V CMOS logic signal when the outputs are closed (on). Use the SETPNTS menu to configure the digital outputs.

You can wire as many as three external switches to the digital inputs. These inputs can be set to duplicate keyboard functions. When used with our #19369 Batching Start/Stop Switch, the inputs can be set up to start, run, pause, and stop batch sequences. As with the outputs, the inputs are active (on) with low voltage (-5 VDC) and can be driven by TTL or 5V logic without additional hardware. Use the DIG IN menu to configure the digital inputs.

To provide the most clean and noise-free 5VDC power supply to terminal J4, pin 10 for digital outputs, use an external power supply, such as RLWS # 16418. This is especially important when digital outputs are heavily utilized.

This only applies to units manufactured before September 1, 1966. CPU boards manufactured after that date automatically provide clean 5 VDC power to J4, pin 10 through the board circuitry.

Table 2-6.

J4 – digital I/O connections	
Pin	**Signal**
1	DIG OUT 1
2	DIG OUT 2
3	DIG OUT 3
4	DIG OUT 4
5	DIG IN 3
6	DIG IN 2
7	DIG IN 1
8	GND
9	GND
10	5 VDC (see note at right)

NOTE:

Indicators manufactured prior to September 1, 1996 do not provide a 5 VDC power supply at J4, pin 10. Two methods may be used to provide 5 VDC power to this pin:

- Solder an insulated red jumper wire from J1, pin 4 to J4, pin 10.
- Use an external power supply to energize J4, pin 10. Part # 16418 is recommended for this use.

Indicators made after that date have 5 VDC built into J4, pin 10.

TIME AND DATE SETTING

To set the time and date on the indicator:

Press TIME/DATE key once to display date. Press again to display time.

You can enter new values for the date and time while they appear in the display. Simply key in a new value and press **ENTER**. Use the 24-hour format to enter time values.

The display and printing format for both time and date can be altered in the configuration mode under the Format menu.

NOTE:

You may lose important configuration parameters if you remove the battery when power is not applied to the indicator. To avoid this, connect the indicator to the AC power before removing the battery. Always be very careful when working inside a live unit!

REPLACING THE BATTERY

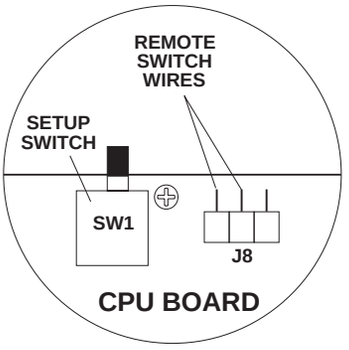
A 3.0V Lithium battery on the power supply / display board maintains the real-time clock and protects the system RAM when the IQ plus® 800/810 is not connected to the AC power line. Under normal circumstances, the battery lasts about three years. We recommend replacement every two years, or anytime the situation warrants it.

INSTALLING A REMOTE SUPERVISOR SWITCH

The optional supervisor switch allows you to access the SETPNT configuration menu without opening the case. To install a remote switch, remove the jumper block from J8 on the CPU board. Connect the remote switch wires to J8 at the two terminals closest to the setup switch, SW1. The supervisor mode switch operates independently from SW1.

⚠ Caution

You must have an earth ground provided with power. Failure to do so may result in unstable weight readings or damage to battery backup system.



Wiring the remote supervisor switch

WALL MOUNTING SS AND HE MODELS

If you are permanently mounting an SS or HE model to the wall, Underwriter's Laboratory (UL) requires that you run the AC power cord in conduit and connect it to the case with a conduit hub according to standard construction practices. For portable units, the standard power cord is sufficient.

Figure 2-6 shows a typical method for mounting the indicator which maintains its portability. Use the installation screws to secure four #10 wall anchors. Then, remove the installation screws and attach the indicator with four threaded eye bolts.

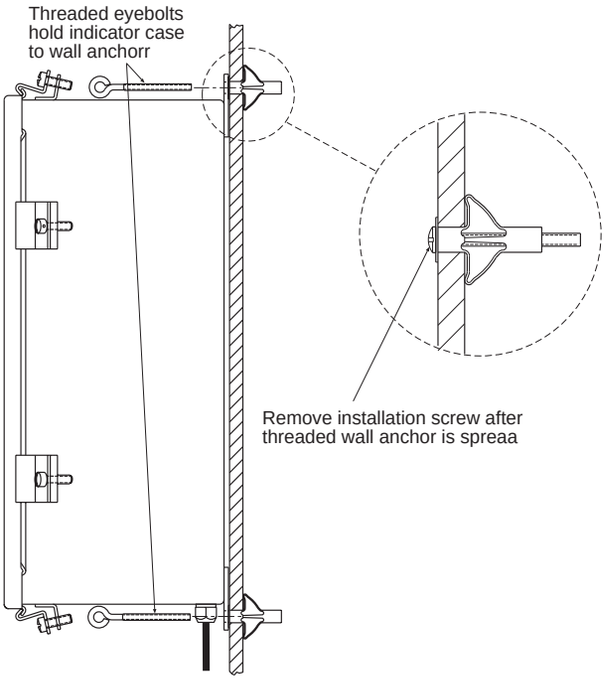


Figure 2-6. Mounting the indicator for portability

BOARD DIAGRAMS

Use the following board diagrams to locate major components on the IQ plus® 800/810 circuit boards.

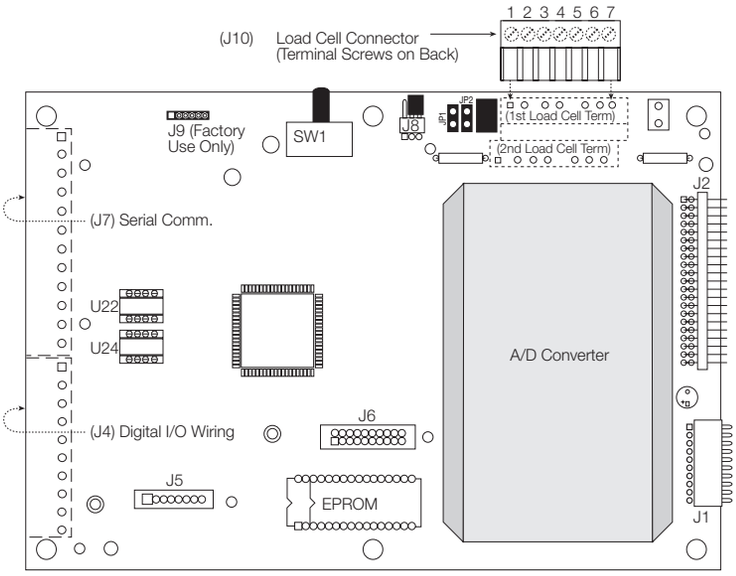


Figure 2-7.
CPU Board — component side

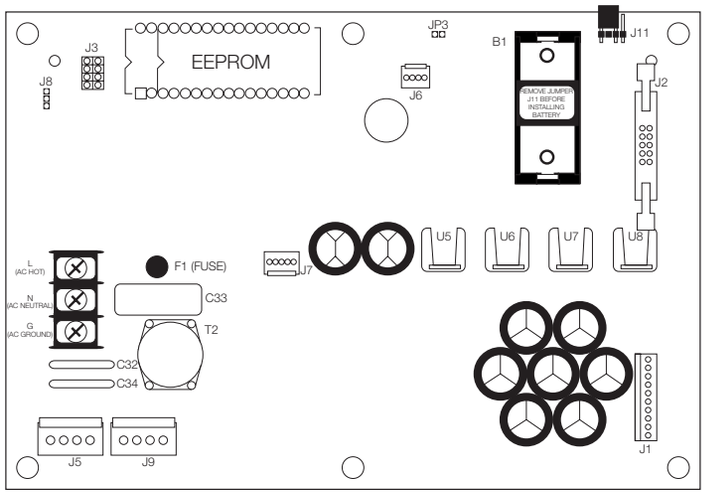


Figure 2-8.
Power Supply / Display Board — component side

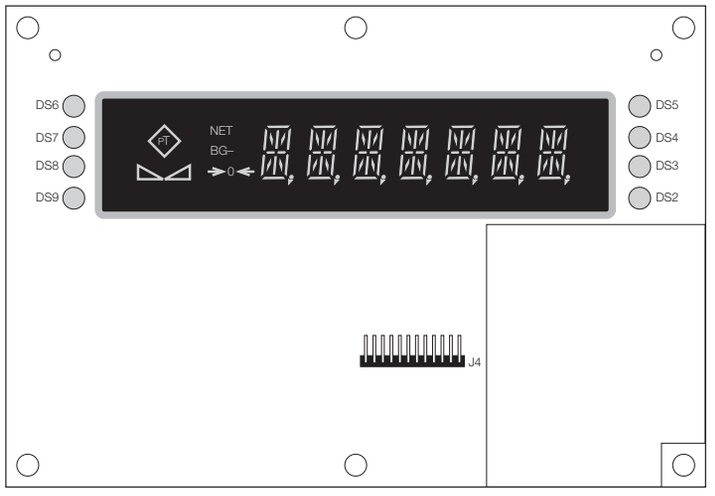


Figure 2-9.
Power Supply / Display Board — back side

3. Configuration

NOTE:
HOTLINE® is a PC program that uses serial communication to configure IQ plus 800/810 indicators running standard indicator software.

See your distributor for more information.

Warning

Established digital outputs may still be activated when configuring, calibrating, or changing setpoint parameters. De-energize any external equipment controlled by the indicator's digital outputs while configuration, calibration, or setpoint changes are being made.

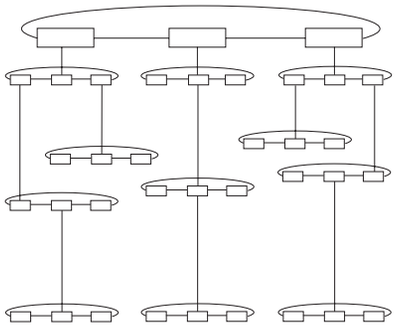
Caution

When exploring the various menus, be careful not to accidentally change the parameter settings. Remember, the display shows the default setting when you first move to a particular level; so make sure the same setting appears on the display before you press DISP TARE to exit.

To access the setup mode, open the case and move switch SW1 on the CPU board (see Figure 2-3 in Section 2, *Installation*, for location). This 2-position switch is near the middle of the board, at the edge. When you move it to the setup position, "CONFIG" appears on the display. "CONFIG" is one of eleven main menu items, each with its own set of configurable parameters.

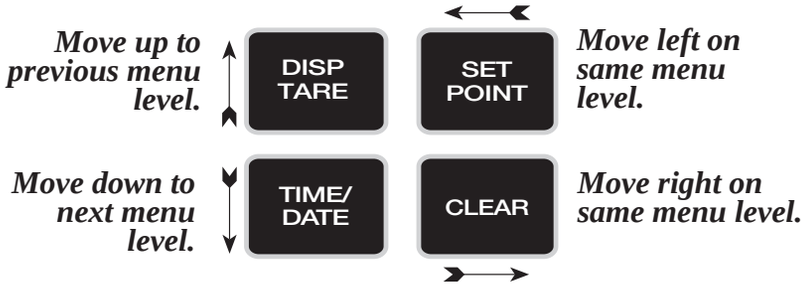
MOVING AROUND IN THE MENUS

The parameter menus (shown below) are arranged under eleven main group headings, with various levels under each heading. See Figures 3-1 through 3-10 for menu charts of each parameter selection.



To set up the unit, you navigate through the configuration menus with four front-panel keys (shown below) that become directional keys in the setup mode. Press **SET POINT** and **CLEAR** to scroll left and right (horizontally) on the same level. Press **DISP TARE** and **TIME/DATE** to move up and down (vertically) to different menu levels.

To select a parameter, press **SET POIN**T or **CLEAR** until the desired main menu group appears on the display. Then, press **TIME/DATE** to move down to the desired level. When moving down through the menus, the default setting appears first on the display. To change a default, scroll left or right through the various options for that level. When the desired option appears on the display, press **DISP TARE** to lock in your selection and move back up one level. For parameters requiring a numerical entry, key in the number, press **ENTER**, and scroll up to lock in the number.



MENU CHARTS

This section provides a graphic representation of the IQ plus® 800/810 menu structure (Figure 3 through 3-11). *In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns.* ***The factory default setting appears at the top of each column. Settings shown surrounded by a dotted-line box only appear under the special circumstances explained under each box.***

Figure 3-1.
Configuration menu

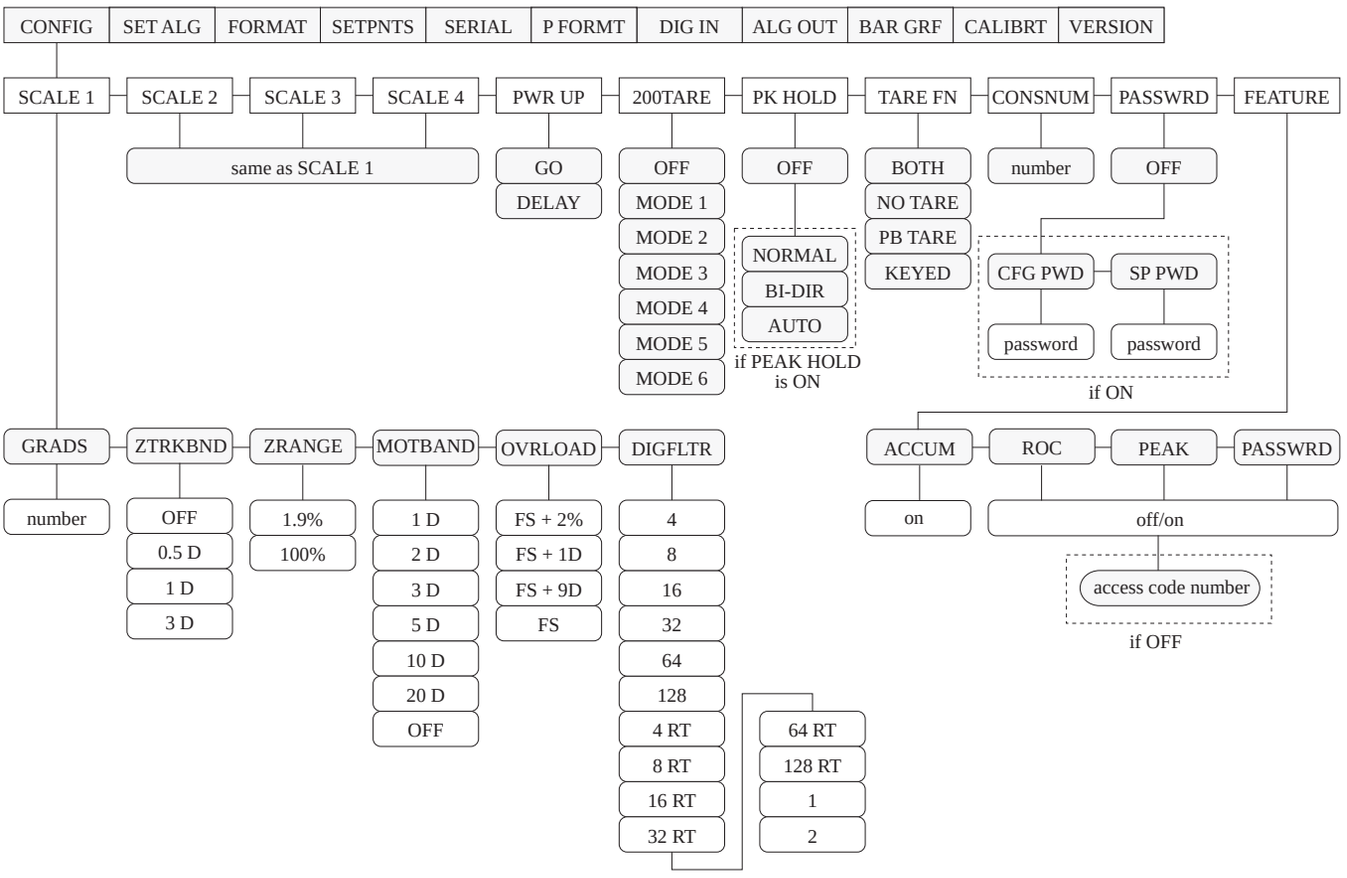
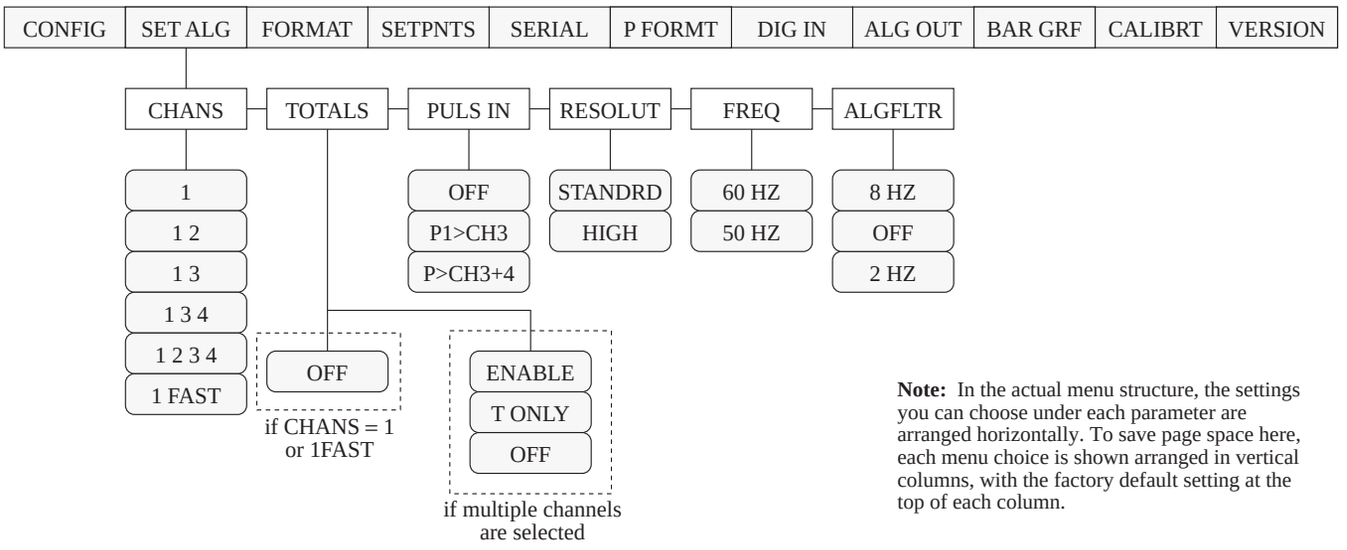
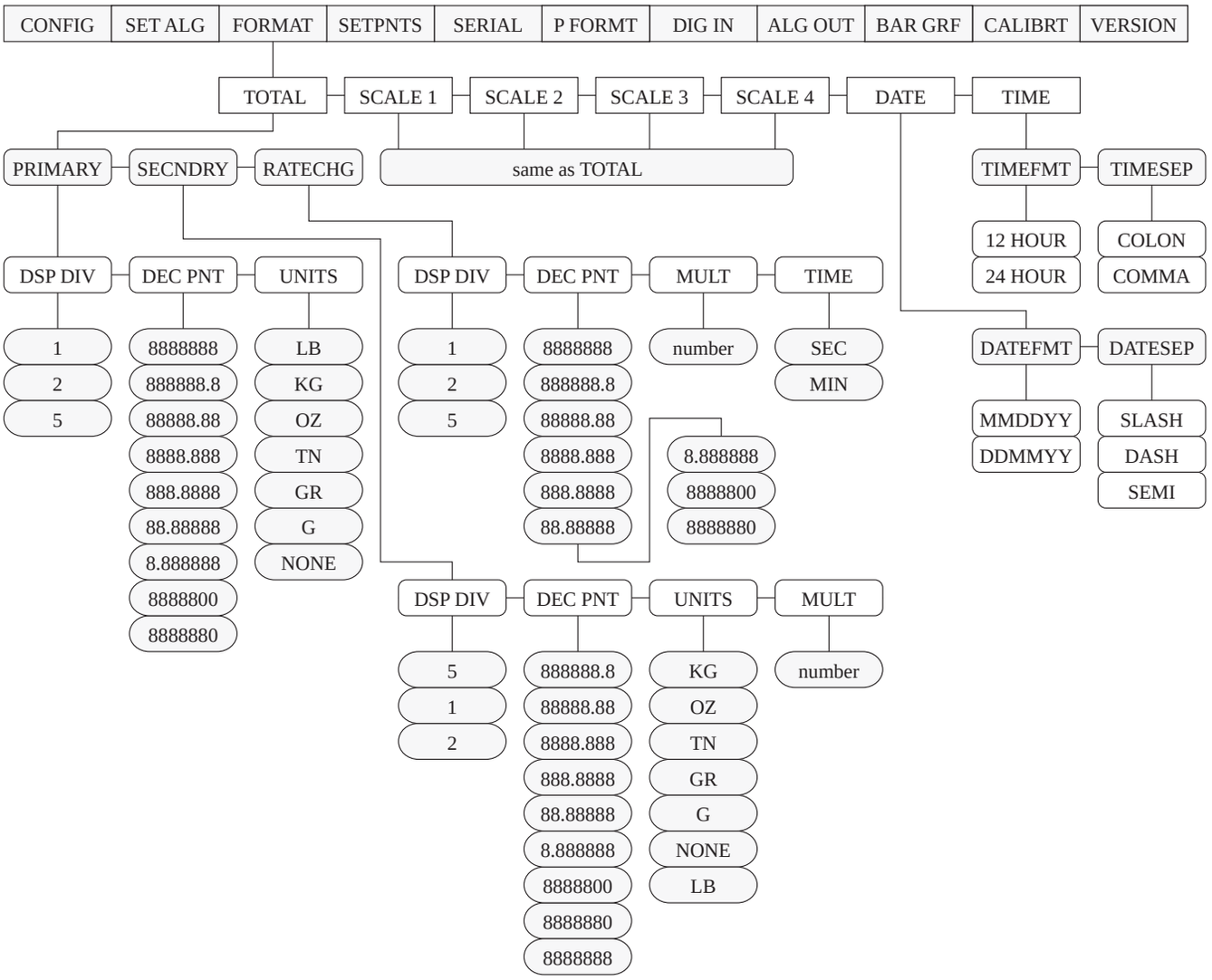


Figure 3-2.
Set Analog menu



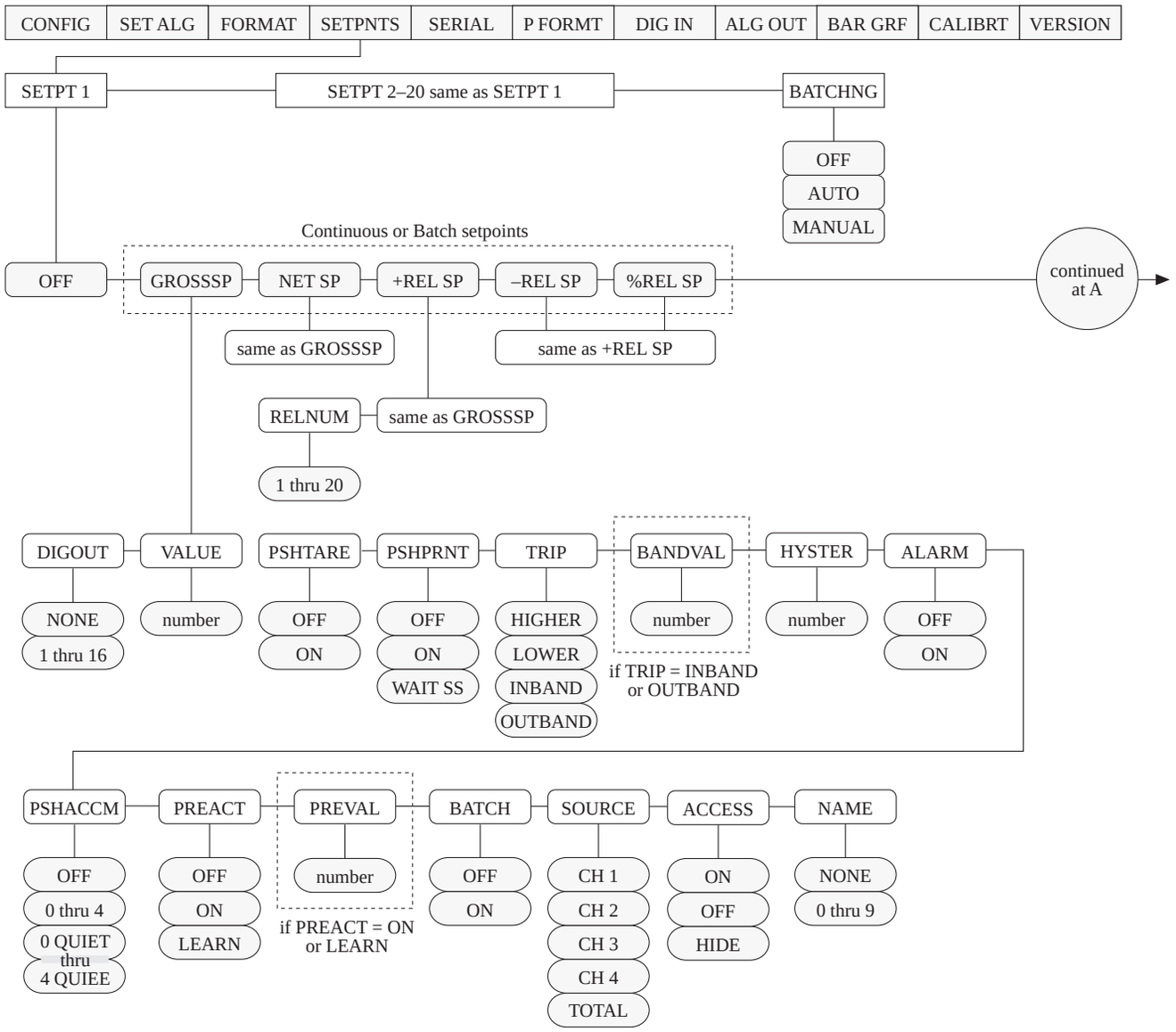
Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-3.
Format menu



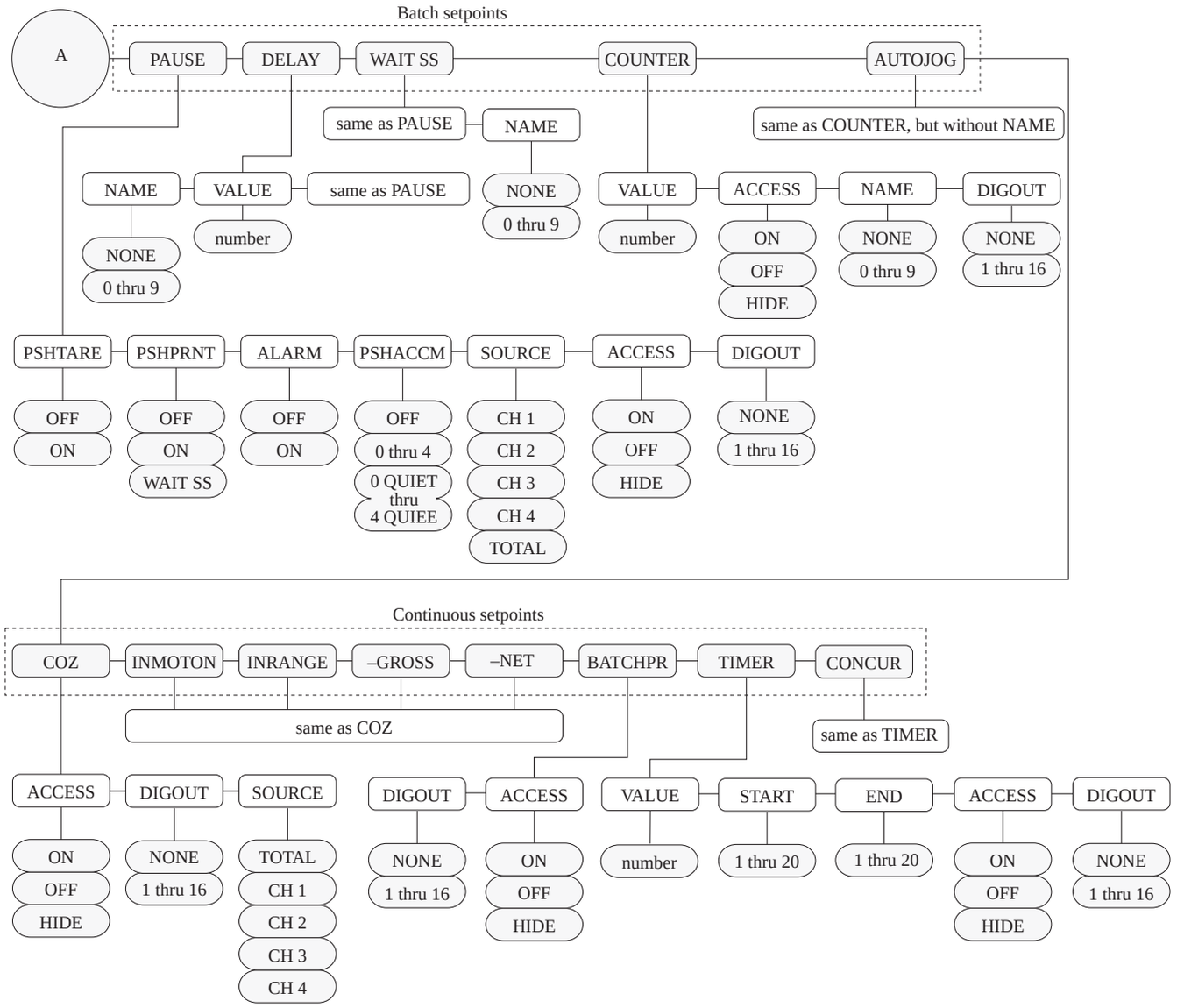
Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-4.
Setpoints menu



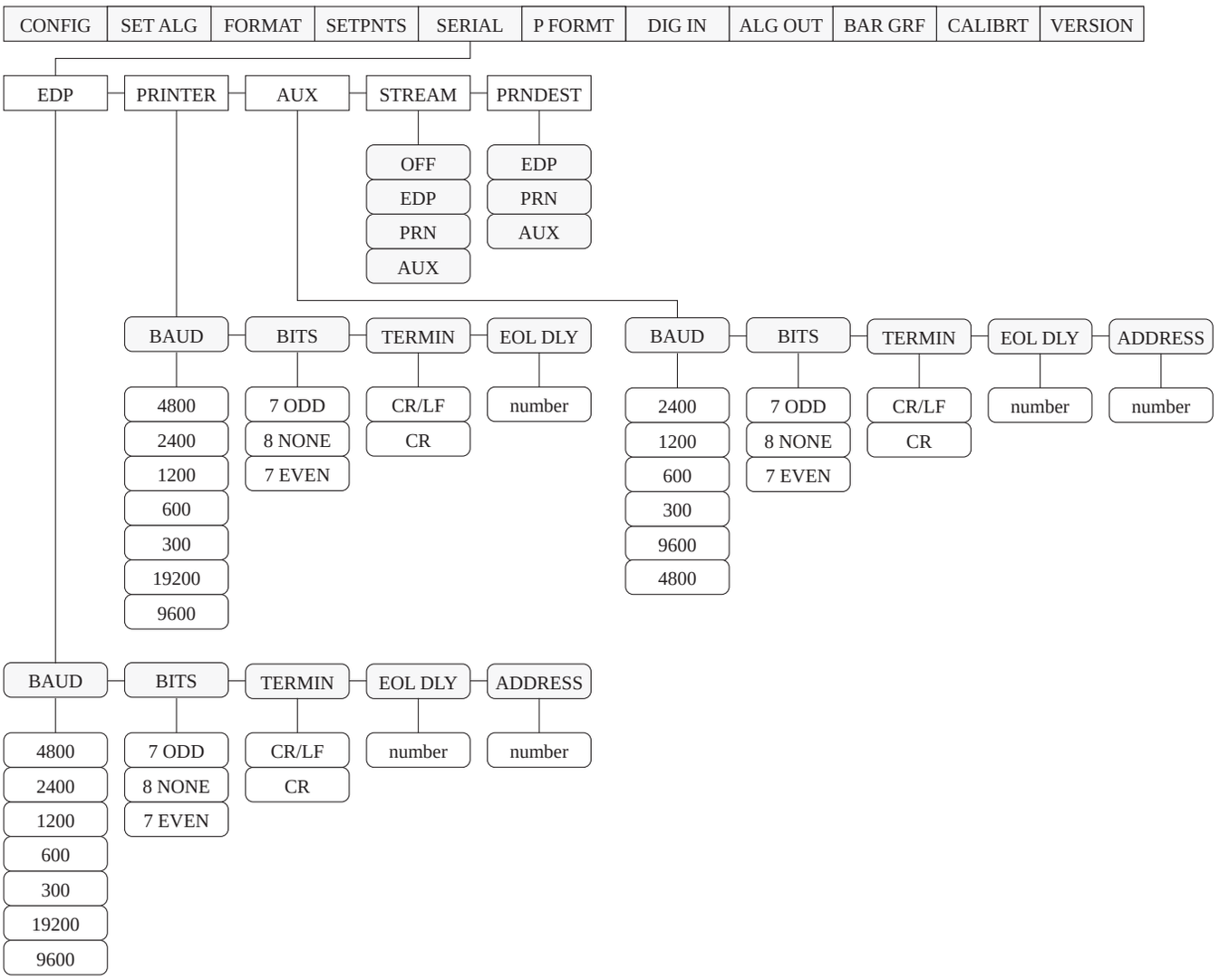
Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-4 (continued)
Setpoints menu



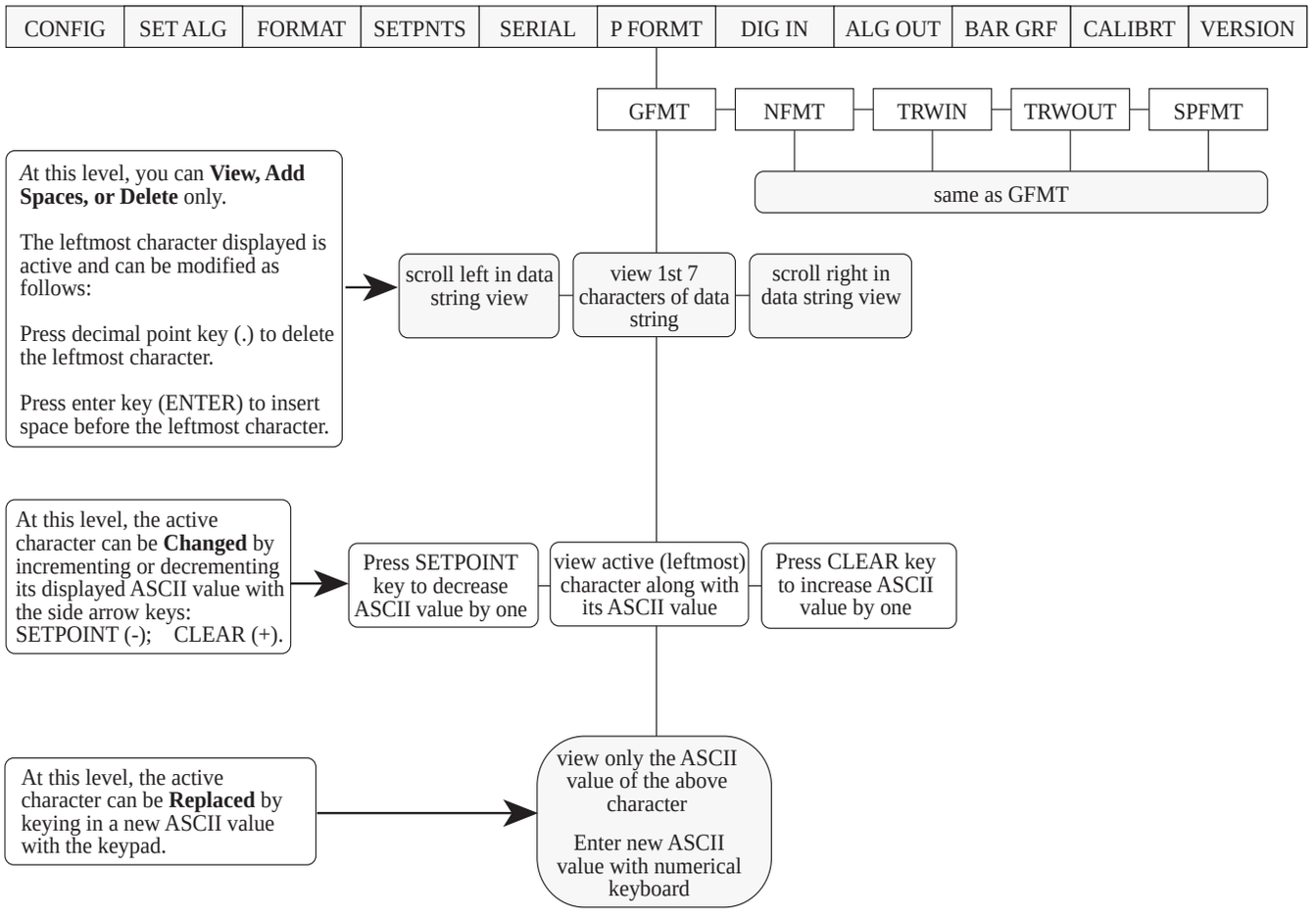
Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-5.
Serial menu



Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-6.
Printer Format menu



Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-7.
Digital Input menu

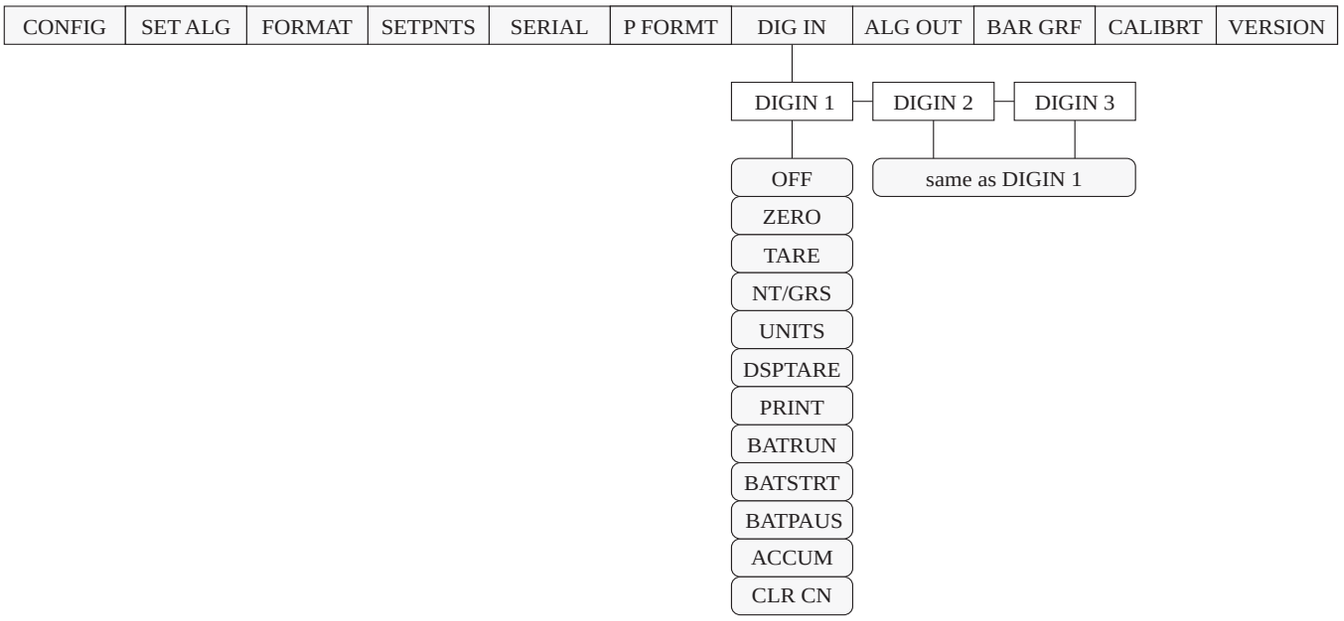
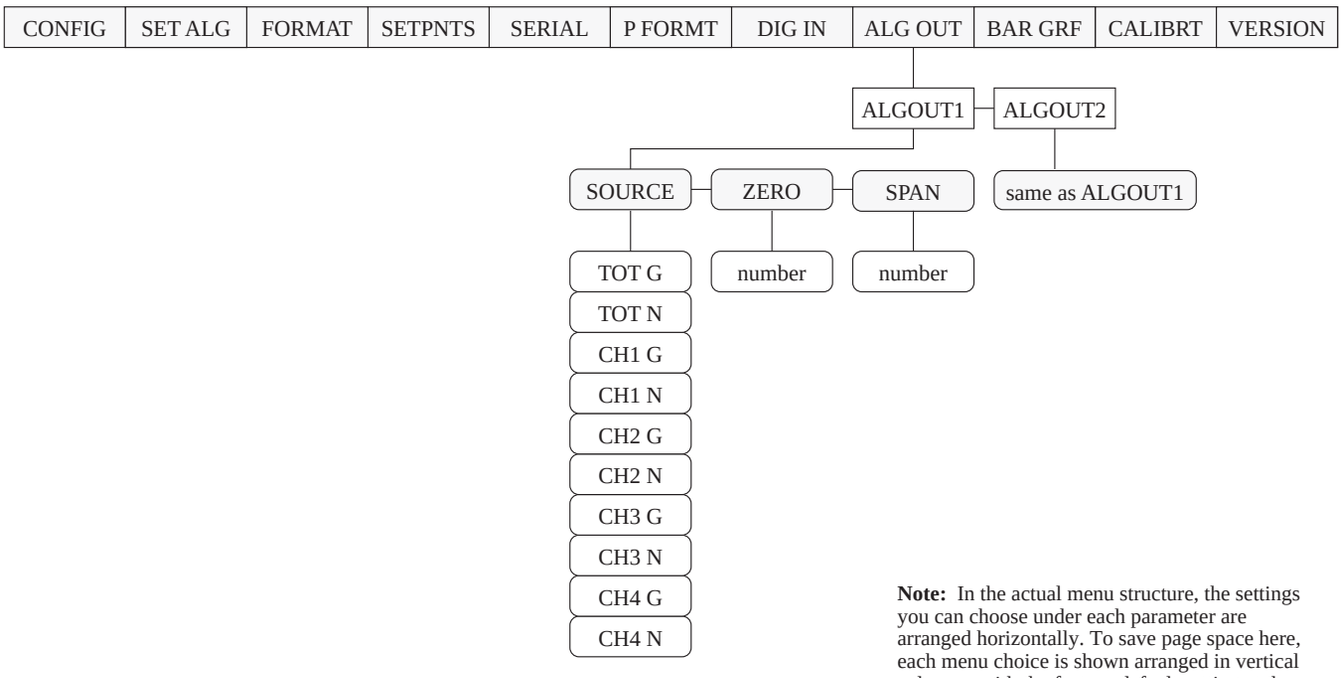


Figure 3-8.
Analog Outputs menu



Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

Figure 3-9.
Bar Graph menu

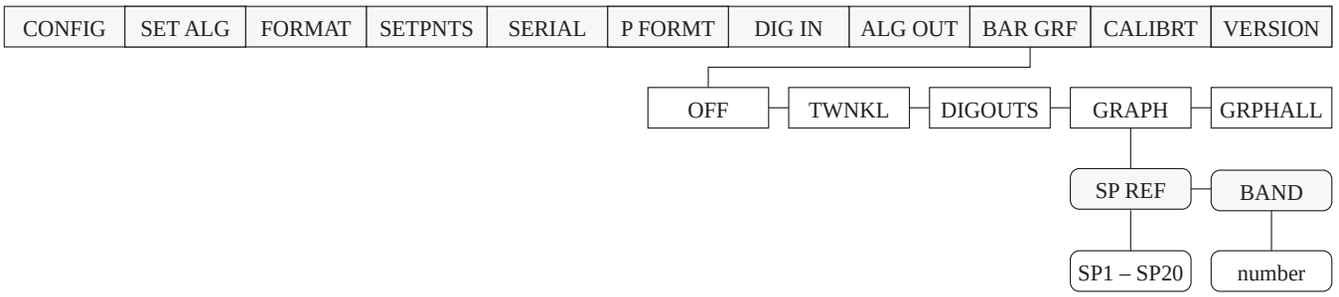
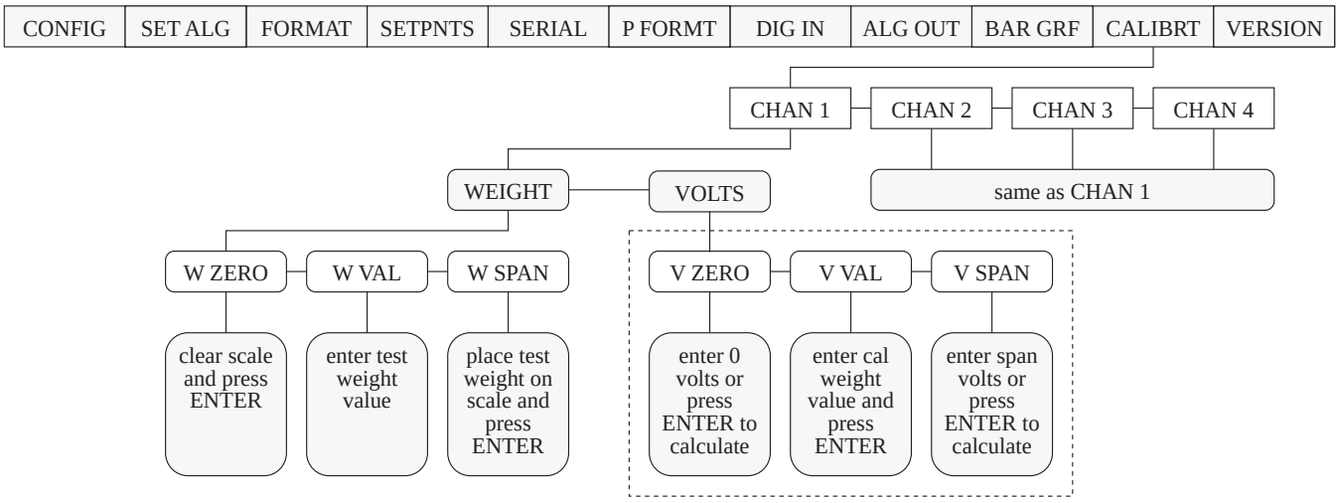
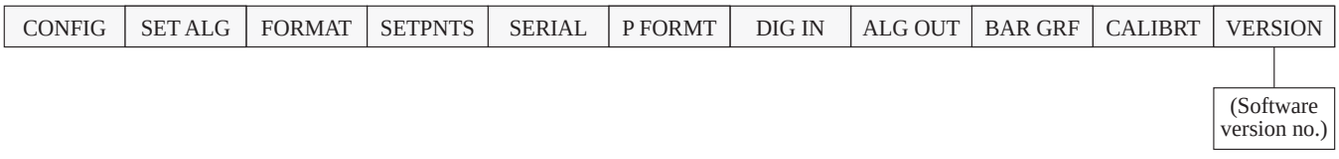


Figure 3-10.
Calibrate menu



CAUTION! DO NOT CHANGE FACTORY VOLTS VALUES.

Figure 3-11.
Version menu



Note: In the actual menu structure, the settings you can choose under each parameter are arranged horizontally. To save page space here, each menu choice is shown arranged in vertical columns, with the factory default setting at the top of each column.

MENU DESCRIPTIONS

Tables 3-1 through 3-11 provide complete information about each of the main menu options. Each table describes all parameters associated with that menu option, the choices available for each parameter, and a general description of each parameter and related choices. ***The system defaults are indicated by a check mark (√).***

Table 3-1.

CONFIG menu		
Parameter	**Choices**	**Description**
Level 2 submenus...		
SCALE 1 - 4	GRADS ZTRKBND ZRANGE MOTBAND OVRLOAD DIGFLTR	Selects an analog input channel to configure for each of any four individual channels. See the SCALE 1 through SCALE 4 level 3 submenus in Figure 3-1 for configuration choices.
PWR UP	**GO** √ DELAY	Power Up Mode. In the GO mode, the scale goes into operation immediately after a brief power up display test. In the DELAY mode, the scale does a power up display test, then must warm up (WARM UP and the standstill symbol are displayed) with no motion detected for 30 seconds before going into operation. If motion is detected within that period, the 30-second sequence restarts. The delay is used where local regulations require a warm-up period.
200TARE	**OFF** √ MODE 1 MODE 2 MODE 3 MODE 4 MODE 5 MODE 6	200 ID/Tare Truck In/Out Mode. If enabled by selecting one of the six Truck In/Out modes, the indicator shifts from the Normal Weighing Mode into the truck mode selected. Note that the Accumulate function cannot be used in the 200 ID/Tare Truck In/Out Mode. MODE 1: Auto Clear ID, Keyed Tares, Value Swapping MODE 2: Auto Clear ID, No Keyed Tares, Value Swapping MODE 3: Stored ID, Keyed Tares, Value Swapping MODE 4: Stored ID, No Keyed Tares, Value Swapping MODE 5: Stored ID, Keyed Tares, No Value Swapping MODE 6: Stored ID, No Keyed Tares, No Value Swapping
PK HOLD	**OFF** √ NORMAL BI-DIR AUTO	Peak Hold Function. This optional feature holds the display on the highest net weight achieved during a weighing cycle. If the Peak Hold function is enabled, PKHOLD is set globally for all channels. The peak value for a channel is only being calculated while the channel is being displayed. The TOTAL channel peak value is independent of the individual channels and the TOTAL value does not reflect the sum of the peak values. See the Section 8, Optional Features, for more information on the Peak Hold function.
TAR FN	**Both** √ NO TARE PB TARE KEYED	Tare Function. Allows or disallows push-button and keyed tares. Selections are as follows: BOTH: Both push-button and keyed tares are allowed. NO TARE: No tare is allowed (gross mode only). PB TARE: Push-button tares are allowed, keyed tares are disallowed. KEYED: Push-button tares are disallowed, keyed tares are allowed.
CONSNUM	Number	Consecutive Numbering. Allows you to implement consecutive or sequential numbers to count batch sequences, or to serialize ticket numbers, by entering a starting value for the consecutive number. The default value is zero. The consecutive number can be printed on any print ticket you choose and it will be incremented only after it is printed. If the consecutive number is not printed, it is effectively disabled. A serial command (CONSECNUM) allows you to view or change consecutive numbers.

Table 3-1 (continued).

CONFIG menu (continued)		
Parameter	**Choices**	**Description**
Level 2 submenus (continued)...		
PASSWRD	**OFF** √ CFG PWD SP PWD	Password. Available as an optional feature. This feature supports two passwords: one for the entire configuration menus in the setup mode, and one for the setpoint configuration from the supervisor switch and SET POINT key. (See Section 8, Optional Features, for more information on using the supervisor switch and SET POINT key.) Passwords can be entered if the feature is turned ON. The indicator reads PASSWRD. Move down in the menu to allow the indicator to read CFG PWD for the CONFIG password. Then move down again to enter up to seven digits for each password. This the only place where the password can be entered or changed. See Section 8, Optional Features, for more information on the Password feature.
FEATURE	ACCUM ROC PEAK PASSWRD	Allows you to verify current status of features or, with factory assistance, turn on an optional feature. ACCUM is a standard feature; ROC, PEAK, and PASSWRD are options available at extra cost. Moving down from an option, you can determine if the feature is ON or OFF. If the optional feature is OFF and has not been activated, an access code number will appear as you scroll sideways. Optional features (ROC, PEAK, PASSWRD) can be activated in the field using this access code number. Call your supplier for information on using the number to activate these features in the field.
Level 3 submenus...		
GRADS	Number	Graduations. This parameter specifies the number of full scale graduations. The value entered should be consistent with legal requirements and environmental limits on the useful system resolution. Enter a value with the numerical keyboard; then exit upward to lock in the new value. Following are examples of some common scale set ups. **Capacity Display Divisions** 120,000 x 20 lb 200,000 x 50 lb 500 x .05 lb 100 x 01 lb To calculate GRADS, use the following formula: GRADS = Capacity / Display Divisions
ZTRKBAND	**OFF** √ 0.5 D 1 D 3 D	Zero Track Band. Automatically zeroes the scale when it is within the range of selected values, as long as the input is within the ZRANGE, and the scale is in standstill. Selections are ± dd. Maximum legal value varies depending on local regulations.

Table 3-1 (continued).

CONFIG menu (continued)		
Parameter	**Choices**	**Description**
Level 3 submenus. (continued)..		
ZRANGE	**1.9%** √ 100%	Zero Range. Selects the range within which the scale may be zeroed. The 1.9% selection is ± 1.9% around the calibrated zero point. for a total range of 3.8%. Indicator must be in standstill and in Gross Weight Display Mode to zero the scale. Use 1.9% for Legal-for-trade applications. When the ZERO key is pressed while displaying the total channel, the amount on each individual channel is zeroed off if possible. If the ZERO is not possible on all channels, then the ZERO is denied.
MOTBAND	**1D** √ 2 D 3 D 5 D 10 D 20 D OFF	Motion Band. Sets the level at which scale motion is detected by comparing the present display update with the previous update. If motion is not detected for 1 second or more, the standstill symbol lights and the scale can process a PRINT command. Maximum legal value varies depending on local regulations. When all the individual channels are out of motion, the total channel is out of motion. When OFF is selected, ZTRKBAND must also be set to OFF.
OVRLOAD	**FS + 2%** √ FS + 1D FS + 9D FS	Overload. Determines the point at which the display blanks and an error message is displayed, indicating an out-of-range condition. Maximum legal value varies depending on local regulations. When any individual channel is above the OVERLOAD of below the OVERLOAD, the total channel display is also blanked.
DIGFLT	**4** √ 8 16 32 64 128 4 RT 8 RT 16 RT 32 RT 64 RT 128 RT 1 2	Digital Filtering. Selects the Digital Filtering rate for eliminating the effects of mechanical vibration from the immediate area of the indicator. The choices indicate the number of A/D conversions per update that are averaged to obtain the displayed reading. A higher number gives a more accurate display by minimizing the effect of a few “noisy” readings, but slows down the settling rate of the indicator to stabilize the new weight. Rattletrap™ selections (with “RT” after the number) are the most effective at filtering out repeating vibrations caused by mechanical noise from nearby machines. These increase the settling times over standard digital filter selections. The RT selections should be used where necessary to eliminate mechanical vibration. See Section 9, Appendix, for more information on digital filtering.
ACCUM ROC PEAK PASSWRD	OFF/ON **(OFF √)**	In the submenu under FEATURE, you can determine if these features are ON or OFF. Consult your supplier for information on adding these features. See Section 8, Optional Features, for a complete description.

Table 3-2.

SET ALG menu		
Parameter	**Choices**	**Description**
Level 2 submenus...		
CHANS	**1** √ 1 2 1 3 1 3 4 1 2 3 4 1 FAST	Channels. Selects the channels for analog input to the indicator. The standard unit has one channel. Up to four input channels are optional, as are various combinations of the channels with the optional expansion board. If the Jetpak® option has been installed. Channel 1 can be selected as a high-speed update channel (1 FAST), with an update rate of 100/second.
TOTALS	**OFF** ENABLE T ONLY	Allows you to configure the total channel. Selections are as follows: OFF: Disables the total channel; it cannot be viewed on the selection indicator. This the only setting available if CHANS = 1 or 1 FAST. ENABLE: Allows the channel to be enabled; the channel can be viewed on the indicator. This is the default if CHANS < > 1 or 1 FAST. TONLY: Only the total channel can be viewed on the indicator. See page 5-5 for more information on individual scale setup.
PULS IN	**OFF** √ P1>CH3 P>CH3+4	Pulse Input. This option is currently not available.
RESOLUT	**STANDRD** √ HIGH	Resolution. Selects between Standard (360,000 grads at 120 V, 60 Hz, 20 updates/second) and High Resolution (740,000 grads at 120 V, 60 Hz, 10 updates/second). Internal resolution in grads is increased by 20% if using 50 Hz AC power supply.
FREQ	**60 HZ** √ 50 HZ	Frequency. Sets the A/D to the frequency of the incoming AC power source.
ALGFLTR	**8 HZ** √ OFF 2 HZ	Analog Filter. Selects the Analog Filtering range for filtering electrical interference and mechanical noise in selected frequencies from the nearby environment. OFF has the least filtering effect, 8 Hz has a medium filtering effect; 2 Hz has the highest filtering effect. Normally, choose the lowest filtering which gives a stable display, but if digital filtering will also be needed, select either 8 Hz or 2 Hz for the analog filter. See Appendix for more information on analog filtering.

Table 3-3.

FORMAT menu		
Parameter	**Choices**	**Description**
Level 2 submenus...		
TOTAL SCALE 1 - 4	PRIMARY SECNDRY RATECHG	Selects the format for an analog input channel. See Level 3 and 4 submenus below or Figure 3-3 for format choices.
DATE	DATEFMT DATESEP	Selects date format as month-day-year or day-month-year. Selects slash (/) dash (—) or semicolon (;) as the separating character.
TIME	TIMEFMT TIMESEP	Selects 12-hour or 24-hour time formatSelects colon (:) or comma (,) as the separating character.
Level 3 submenus...		
PRIMARY	DSP DIV DEC PNT UNITS	Allows selection of Display Divisions, Decimal Point Location, and Units for the primary units.
SECNDRY	DEC PNT UNITS MULT DSP DIV	Allows selection of Decimal Point Location, Units, Multiplier, and Display Divisions for secondary units.
RATECHG	DSP DIV DEC PNT MULT TIME	Allows selection of Display Divisions, Decimal Point Location, Multiplier, or Time for the Rate of Change (ROC) function.
DATEFMT	**MMDDYY** √ DDMMYY	Date Format. This specifies the format in which the date will be printed and displayed, either month/day/year, or day/month/year.
DATESEP	**SLASH/** √ DASH— SEMI:	Date Separator. This specifies the separation character between the day, month, and year when the date is printed. The display, however, will always show a period (.) separating these elements.
TIMEFMT	**12 HOUR** √ 24 HOUR	Time Format. This specifies the format in which the time will be displayed and printed, either in 12-hour or 24-hour format. The actual setting of time is done through the front panel TIME/DATE key, and is always entered in 24-hour format.
TIMESEP	**COLON:** √ COMMA,	Time Separator. This specifies the separation character between the minutes and hours when the time is printed. The display, however, will always show a period (.) separating these elements.

Table 3-3 (continued).

FORMAT menu (continued)		
Parameter	**Choices**	**Description**
(PRIMARY)		**(SETTINGS FOR PRIMARY UNITS)**
DSP DIV	**1** √ 2 5	Display Divisions. Selects the value of minimum division size of the displayed weight for the Primary Units.
DEC PNT	**8888888** √ 888888.8 88888.88 8888.888 888.8888 88.88888 8.888888 8888800 8888880	Decimal Point Location. Determines the location of the decimal point or dummy zeros in the Primary Unit display. Value should be consistent with local legal requirements.
UNITS	**LB** √ KG OZ TN GR G NONE	Specifies the units for displayed and printed weight. Abbreviations are as follows: LB is Pound KG is Kilogram OZ is Ounce TN is Ton GR is Gram G is Grain
(SECONDAY)		**(SETTINGS FOR SECONDARY UNITS)**
DEC PNT	**888888.8** √ 88888.88 8888.888 888.8888 88.88888 8.888888 8888880 8888888	Decimal Point Location. Determines the location of the decimal point or dummy zeros in the display.
UNITS	**KG** √ OZ TN GR G LB NONE	Specifies the units for displayed and printed weight. Abbreviations are as follows: KG is Kilogram OZ is Ounce TN is Ton GR is Gram G is Grain LB is Pound
MULT	**0.453592** √ Enter other choices via keyboard	Multiplier. This is the conversion factor by which the primary units are multiplied by to obtain the secondary units. The default is 0.453592, which is the conversion factor to change pounds to kilograms. To toggle between Primary and Secondary units, press the UNITS key. See the chart, *Conversion Factors for Secondary Units*, in the Appendix for a list of multipliers.
DSP DIV	**5** √ 1 2	Display Divisions. Selects the value of minimum division size of the displayed weight.

Table 3-3 (continued).

FORMAT menu (continued)		
Parameter	**Choices**	**Description**
(ROC)		**(SETTINGS FOR RATE-OF-CHANGE UNITS)**
DSP DIV	**1** √ 2 5	Display Divisions. Selects the value of minimum division size of the displayed weight.
DEC PNT	**8888888** √ 888888.8 88888.88 8888.888 888.8888 88.88888 8.888888 8888800 8888880	Decimal Point Location. Determines the location of the decimal point or dummy zeros in the display. Value should be consistent with legal local requirements.
MULT	**1.0000** √ Enter other choices via keyboard	Multiplier. This is the conversion factor by which the primary units are multiplied by to obtain the Rate-of-Change units. The default is 1.0000.
TIME	**SEC** √ MIN	This sets the time units for the Rate-of-Change function.

Table 3-4.

SETPNTS menu		
Parameter	**Choices**	**Description**
Level 2		
SETPNT 1 –20	**OFF** √ GROSSSP NET SP +REL SP -REL SP % REL SP	This group of choices for SETPNT 1 – 20 may be either Continuous or Batch setpoints.
	PAUSE DELAY WAIT SS COUNTER AUTOJOG	This group of choices for SETPNT 1 – 20 can only be Batch setpoints.
	COZ INMOTION INRANGE -GROSS -NET BATCHPR TIMER CONCUR	This group of choices for SETPNT 1 – 20 can only be Continuous setpoints.
BATCHNG	**OFF** √ AUTO MANUAL	Batching Enable. If MANUAL or AUTO is selected, this allows a batching sequence to be run. This parameter serves as a software safety lockout for establishing a batch sequence. If this parameter is OFF, no individual setpoints can be assigned as batch steps.
Level 3		**May be either Continuous or Batch Setpoints**
GROSSSP	VALUE PSHTARE PSHPRNT TRIP HYSTER ALARM PSHACCM PREACT BATCH SOURCE ACCESS NAME DIGOUT	Gross Setpoint. The setpoint value will be a GROSS weight.
NET SP	VALUE... DIOUT	Net Setpoint. The setpoint value will be a NET weight.
+REL SP	VALUE... DIGOUT RELNUM	Positive Relative Setpoint (selects another setpoint to which this one relates). The setpoint value will be added to a specified setpoint to arrive at this value.
-REL SP	VALUE... DIGOUT RELNUM	Negative Relative Setpoint (selects another setpoint to which this one relates). The setpoint value will be subtracted from a specified setpoint to arrive at this value.
%REL SP	VALUE... DIGOUT RELNUM	Percentile Relative Setpoint (selects another setpoint to which this one relates). The setpoint value will be a percentage of a previous specified setpoint.

Table 3-4 (continued).

SETPNTS menu (continued)		
Parameter	**Choices**	**Description**
Level 3 (continued)...		**These are Batch setpoints only**
PAUSE	PSHTARE PSHPRNT PSHACCM SOURCE ACCESS DIGOUT	Pauses the batching sequence. The indicator will flash "PAUSE" until the batch process is restarted. A START input is required to continue the operation. Note: Do not use PAUSE as the first step in a batch routine.
DELAY	NAME VALUE PSHTARE PSHPRNT ALARM PSHACCM SOURCE ACCESS DIGOUT	Delays the batching sequence for a specified time in 1/10 second increments. This choice automatically makes the setpoint a batch step in a batching sequence if one has been established. For example: Setting a delay value of 20 programs a 2.0 second delay time.
WAIT SS	NAME PSHTARE PSHPRNT ALARM PSHACCM SOURCE ACCESS DIGOUT	Wait Until Standstill. When active, the batch sequence will stop until standstill is achieved. Note: Do not use WAIT SS as the first step in a batch routine.
COUNTER	VALUE ACCESS NAME DIGOUT	Establishes the number of identical batch sequences to be run. When the specified number of sequences has been run, all processing stops.
AUTOJOG	VALUE (.1 sec. units) ACCESS DIGOUT	Automatically jogs the previous filling operation. This check weighs the prior NET SP, GROSS SP, or REL SP setpoint operation to be certain its value is still true in the standstill condition. If the prior setpoint value is not still true in standstill, the prior operation will jog ON for a selected time value period (units in 0.1 second), or until the prior setpoint value is achieved. This sequence repeats until the prior setpoint is achieved in standstill. Note: the AUTOJOG digout should never have the same value as the filling setpoint digout.
Level 3 (continued)...		**These are Continuous setpoints only**
COZ	ACCESS DIGOUT SOURCE	Center of Zero. No value need be set for this setpoint. Anytime the scale is in the center of the zero range, this selection will turn on the digital output associated with this setpoint.
INMOTION	ACCESS DIGOUT SOURCE	In Motion. No value need be set for this setpoint. Anytime the scale is not in the standstill condition, this selection will turn on the digital output associated with this setpoint.
-GROSS	ACCESS DIGOUT SOURCE	Negative Gross Weight Reading. No value need be set for this setpoint. Anytime the scale is registering a gross weight less than zero, this selection will turn ON the digital output associated with this setpoint.

Table 3-4 (continued).

SETPNTS menu (continued)		
Parameter	**Choices**	**Description**
-NET	ACCESS DIGOUT SOURCE	Same as -GROSS, but for net weights.
BATCHPR	ACCESS DIGOUT	Batch Processing Signal. No value need be set for this setpoint. Anytime a batch sequence is in progress, this selection will turn ON the digital output associated with this setpoint.
TIMER	VALUE START END ACCESS DIGOUT	Can be used as an alarm to alert you that the batch is not progressing in an appropriate time period. The TIMER setpoint tracks the progress of the batch sequence. If a specified portion of the sequence is not complete within a given amount of time, a designated digital output will become active. This is called a “no-flow alarm”. Selections are defined as follows: VALUE: Amount of time in tenths of seconds allowable for batch sequence to progress from starting to ending batch step without turning on the output. START: Batch setpoint at which to start timer. END: Batch setpoint the sequence must reach before the timer expires. DIGOUT: Digital output The timer starts when the START setpoint becomes the current batch step. The timer is set to the VALUE amount of units of 0.10 seconds. If the timer runs out before the END setpoint is reached, the digital output will be brought to an active-low. Selections START and END can be set to 1 – 20 setpoint numbers. Note: A maximum of 5 TIMER and/or CONCUR (type 2) setpoints are allowed. If more than 5 are defined, the additional ones are ignored.
CONCUR	VALUE START END ACCESS DIGOUT	Allows you to keep a digital output active over particular portion of the batch sequence. For example, you may want to use a digital output to keep a mixer running during bulk and trim fill cycles. Selections are as follows: VALUE: Amount of time in tenths of seconds to hold the digital output active. START: Batch setpoint at which to start the digital output is at an active-lo state. END: Batch setpoint at which to end the digital output active state and return to an inactive-high state. Must end with a batch setpoint; cannot end with any type of free-running setpoint. DIGOUT: Digital output The CONCUR setpoint can be configured to work in one of two ways: TYPE 1: The CONCUR digital output becomes active when the START batch setpoint becomes the current batch step and remains active until the END batch setpoint becomes the active batch step. TYPE 2: The CONCUR digital output becomes active when the START batch setpoint becomes the current batch step and remains active until the VALUE in 10ths of a second has elapsed. If the VALUE parameter is greater than 0, TYPE 2 is implemented. If VALUE is equal to 0, then TYPE 1 is implemented. Selections START and END can be set to 1 – 20 setpoint numbers. Note: A maximum of 5 TIMER and/or CONCUR (type 2) setpoints are allowed. If more than 5 are defined, the additional ones are ignored. Note: Serial commands are available for START and END

Table 3-4 (continued).

SETPNTS menu (continued)		
Parameter	**Choices**	**Description**
DIGOUT	NONE 1 – 16	Digital Output. This selection specifies the digital output to which this setpoint will be assigned. The default setting is NONE.
VALUE	Number	This is the numerical value to be compared against in setpoint types GROSS SP, NET SP, +REL SP, -REL SP, and %REL SP. If the value is a time unit (AUTOJOG, DELAY), units are in 0.1 second. In the COUNTER setpoint, value is the number of consecutive batches to be run.
PSHTARE	**OFF** √ ON	Push Tare. Press the TARE key when value is reached. This selection automatically enters the registered weight as a tare, and shifts the indicator into net mode .
PSHPRINT	**OFF** √ ON WAIT SS	Push Print initiates the transmission of the setpoint SPFMT print sequence when the setpoint has been satisfied. If PSHPRINT is set to WAITSS (and the setpoint is satisfied) the print will not be done until standstill is achieved. Since the PSHACCUM, and PSHTARE are done after the PSHPRINT, these functions will also wait for standstill. By using this setting, you will eliminate the need for an additional setpoint to wait for standstill. Note: The WAITSS setting only works for batch steps.
TRIP	**HIGHER** √ LOWER INBAND OUTBAND	Trips the setpoint when the weight is higher than the setpoint value, lower than the value, within a band established around the value, or outside of that band. With a continuous or free-running setpoint, LOWER means the output is active until you reach weight. If trip is HIGHER, the output is active when the setpoint is met or exceeded. If trip is HIGHER in a batch routine, output is active until you reach or exceed setpoint value. If trip is LOWER in a batch routine, output is active until weight goes below setpoint.
BANDVAL	Number (if TRIP = INBAND or OUTBAND)	Bandwidth Value. Usually hidden, if the TRIP parameter is set to either INBAND or OUTBAND, this parameter will appear and offer a way to set the value of the band. A band selected will fall equally ± on both sides of the setpoint value.
HYSTER	Number	Hysteresis. This value sets a ± band around the setpoint value that must be exceeded before a continuous setpoint will trip ON again once it has shut OFF. This parameter must be used with a free-running setpoint.
ALARM	**OFF** √ ON	Flashes an ALARM message on the display screen when the setpoint value is reached. ALARM is best utilized when the setpoint is a continuous setpoint.
PSHACCM	**OFF**√ 0-4 0 QUIET- 4 QUIET	Push Accumulate. When the setpoint value is reached, this selection enters that value to the total in the chosen accumulator register. To view the register, push DISP ACCM. After updating the appropriate accumulator, the new value is printed. If set to a QUIET setting, the accumulator updates, but does not print.
PREACT	**OFF** √ ON LEARN	Preact. This allows the setpoint to cut off before the original setpoint value to allow for free fall material to settle onto the scale. The ON setting adjusts the setpoint value to that original value plus or minus (depending on the TRIP parameter setting) the PREACT VALUE. The LEARN setting adjusts the value the same way initially, but then adjusts the preact value in the next batch by correcting the amount of error by 50% (based upon the accuracy of the current preact operation) so as to automatically correct for overfill or underfill. LEARN only functions in the batching mode.

Table 3-4 (continued).

SETPNTS menu (continued)		
Parameter	**Choices**	**Description**
Level 4 submenus (continued...)		
PREVAL	Number (if PREACT = ON or LEARN)	Preact Value. This parameter only appears if PREACT is set to ON or LEARN. The value selected adjusts the trip values of the setpoint configured with the PREACT parameter.
BATCH	**OFF** √ ON	Batch Step Enable. When ON, this setpoint is part of any batch sequence established. If OFF, the setpoint remains a continuously running setpoint. This option is available only for the setpoint types which can be either continuous or batch setpoints (GROSS SP, NET SP, +REL SP, -REL SP, %REL SP).
SOURCE	**TOTAL** √ CH 1 CH 2 CH 3 CH 4	Source Channel. This selects which input channel (1 – 4, or TOTAL) from which the indicator should obtain the weight reading. Selections for the IQplus 800 are 1-2, or TOTAL.
ACCESS	**ON** √ OFF HIDE	Front Panel Access. Allows you to view or change setpoint values from the front panel using the SET POINT key. Selections are: ON: You can view and change the setpoint value in operating mode. OFF: You can view but cannot change the setpoint value in operating mode. HIDE: You cannot view or change the setpoint value in operating mode. **Note: Software Versions 3.0 and higher allow a batch setpoint or preact value to be changed only when ACCESS is ON *and* a batch is not currently running.**
NAME	NONE 0 thru 9	Setpoint name. This parameter can be set to the SPNAME number 0 – 9. The NAME parameter defaults to “NONE”, which means no name is assigned to the setpoint. You can change the setting in the SETUP menu, or use the serial command NAME via the EDP port. See Section 7, Setpoints and batch processing, for more information. **Note: The 10 names must be defined through the EDP port using serial commands.**

Table 3-5.

SERIAL menu		
Parameter	**Choices**	**Description**
Level 2		
EDP	BAUD BITS TERMIN EOL DLY ADDRESS	The EDP parameter allows you to select EDP port settings for the baud rate, bits, termination characters, end-of-line delay, and port address.
PRINTER	BAUD BITS TERMIN EOL DLY	The Printer parameter allows you to select the printer port settings for the baud rate, data bits and parity, line termination characters, and end-of-line delay.
AUX	BAUD BITS TERMIN EOL DLY ADDRESS	Auxiliary. Allows you to select the settings for the auxiliary port baud rate, data bits and parity, line termination characters, end-of-line delay, and port address.
STREAM	**OFF** √ EDP PRN AUX	Selects the serial port that will be used for Continuous transmission. Choices are EDP, printer, and auxiliary.
PRNDEST	**EDP** √ PRN AUX	Print Destination. Selects the serial port for data transmission when the PRINT key is pressed, or the KPRINT serial command is sent. Normally, a demand or "dumb" printer is connected to this port. Choices are EDP, printer, and auxiliary.
Level 3 **(EDP)**		
BAUD	**4800** √ 2400 1200 600 300 19200 9600	EDP Port Baud Rate. Selects the transmission speed for the Electronic Data Processing port.
BITS	**7 ODD** √ 8 NONE 7 EVEN	EDP Port Data Bits and Parity. Selects number of data bits and parity of data transmitted through the Electronic Data Processing port.
TERMIN	**CR/LF** √ CR	EDP Port Terminal Characters. Selects how a line of data sent out of the Electronic Data Processing port will end.
EOL DLY	Number	EDP Port End-of-Line Delay. Sets the delay period from when a formatted line is terminated to the beginning of the next formatted serial output. Values are in units of 0.01 second (100 = 1 second).
ADDRESS	Number	EDP Port Address. The number entered will be the designation by which this indicator will be known in an interconnected system using RS-485 communication. Any number between 01 and 255 may be selected for the address. A selection of 0 turns off the RS 485 mode. We recommend an EDP port address of 65 or higher to avoid problems with ASCII control characters.

Table 3-5 (continued).

SERIAL menu (continued)		
Parameter	**Choices**	**Description**
Level 3 **(PRINTER)**		
BAUD	**4800** √ 2400 1200 600 300 19200 9600	Printer Port Baud Rate. Selects the transmission speed for the Printer serial port.
BITS	**7 ODD** √ 8 NONE 7 EVEN	Printer Port Data Bits and Parity. Selects number of data bits and parity of data transmitted through the Printer port.
TERMIN	**CR/LF** √ CR	Printer Port Terminal Characters. Selects how a line of data transmitted out through the Printer port will end.
EOL DLY	Number	Printer Port End-of-Line Delay. Sets the delay period from when a formatted line is terminated to the beginning of the next formatted serial output. Values are in units of 0.01 second (100 = 1 second).
(AUX)		
BAUD	2400 √ 1200 600 300 9600 4800	Auxiliary Port Baud Rate. Selects the transmission speed for the Auxiliary serial port.
BITS	**7 ODD** √ 8 NONE 7 EVEN	Auxiliary Port Data Bits and Parity. Selects number of data bits and parity of data transmitted through the Auxiliary port.
TERMIN	**CR/LF** √ CR	Auxiliary Port Terminal Characters. Selects how a line of data transmitted out through the Auxiliary port will end.
EOL DLY	Number	Auxiliary Port End-of-Line Delay. Sets the delay period from when a formatted line is terminated to the beginning of the next formatted serial output. Values are in units of 0.01 second (100 = 1 second).
ADDRESS	Number	Auxiliary Port Address. The number entered will be the designation by which this indicator will be known in an interconnected system using RS-485 communication. Any number between 01 and 255 may be selected for the address. A selection of 0 turns off the RS 485 mode.

Table 3-6.

P FORMT menu (Note: For complete information, see page 9-6.)		
Parameter	**Choices**	**Description**
Level 2		
GFMT	View and edit	GROSS Demand Print Format String. See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
NFMT	View and edit	NET Demand Print Format String. See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
TRWIN	View and edit	Truck Weigh-In Print Format String. See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
TRWOUT	View and edit	Truck Weigh-Out Print Format String. See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
SPFMT	View and edit	See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
Level 3 selections...		
	User can **view**, **add spaces**, or **delete** only.	See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
Level 4 selections...		
	Active characters can be **changed**.	See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*
Level 5 selections...		
	Active characters can be **replaced**.	See Appendix, *CUSTOM PRINT FORMATTING PROCEDURE*

Table 3-7.

DIG IN menu		
Parameter	**Choices**	**Description**
DIGIN 1 DIGIN 2 DIGIN 3	ZERO TARE NT/GRS UNITS DSPTARE PRINT	Duplicates the function of the corresponding front panel key. Activates on a momentary contact closure (logic low).
	BATRUN	When maintained at a logic low (on), allows a batch routine to be started and run. When at a logic high (off), allows a batch to be aborted.
	BATSTRT	While BATRUN input is held low (on), a momentary contact closure will start a batch routine. If the BATRUN input is high (off), a momentary contact closure on this input will abort a batch routine.
	BATPAUS	When maintained at a logic low (on), this input pauses a batch.
	ACCUM	A momentary contact closure updates the accumulator.
	CLR CN	A momentary contact closure resets the consecutive number to zero.

Table 3-8.

ALG OUT menu		
Parameter	**Choices**	**Description**
Level 2 submenus...		
ALGOUT1 ALGOUT2	SOURCE ZERO SPAN	Allows you to access three analog settings for either Analog Output 1 or Output 2.
Level 3 submenus...		
SOURCE	**TOT G** √ TOT N CH1 G CH1 N CH2 G CH2 N CH3 G CH3 N CH4 G CH4 N	This specifies the channels which will be used as a source for the analog output. The Gross or Net value of the source channels can also be specified.
ZERO	Number	Zero Calibration Value. Enter the zero value via the keyboard. Note: For complete instructions on analog calibration, see the Analog Output instruction sheet available when this option is ordered.
SPAN	Number	Span Value. Enter span value via the keyboard. Note: For complete instructions on analog calibration, see the Analog Output instruction sheet available when this option is ordered.

Table 3-9.

BAR GRF menu		
Parameter	**Choices**	**Description**
Level 2		
OFF	NA	The bar graph is turned OFF and disabled.
TWINKL	NA	The TWINKL mode allows active setpoints to light up bar graph segments, allowing you to visually monitor the currently active setpoints. The 48 bar graph segments are divided into 16 equal 3-segment sections, and each section is assigned to one of the first 16 setpoints (batch steps) only. SP1 is assigned the 3 segments on the far left of the graph, SP2 lights the next three segments, and so on until SP16 lights the three segments on the far right. Both continuous and batch type setpoints light the bar graph sections, but in different ways. You can employ 20 setpoints, however, setpoints over 16 cannot be viewed. Continuous type setpoints are constantly scanned by the indicator. Thus graph sections for these setpoints are constantly illuminated in the TWINKL mode. Batch type setpoints are scanned only while active and until tripping; they are OFF for the remainder of the batch sequence. Therefore, batch setpoints only light up their 3-segment graph sections when the batch setpoints are in progress, or “active”. Once the batch setpoint is tripped, the light section goes OFF, and the next section lights while that setpoint is “active”.
DIGOUTS	NA	Digouts Mode. Displays the logic state of all digital outputs. The corresponding segments will be lit for active digital outputs and unlit for inactive digital outptus.
GRAPH	SP REF BAND	The GRAPH mode allows you to monitor increasing or decreasing weight value of a selected setpoint as, for example, during a filling operation. A band is established (see the BAND menu description on the following page) around the setpoint value. Each of the 48 bar graph segments is approximately equal to 2% of the band value. The graph lights when the weight is within this band. When the band width is established around the value for the setpoint, the graph will begin to light from the left at the bottom of the band as weight increases. At the selected setpoint value, the graph will be totally lit. As the setpoint value is exceeded, graph segments go OFF from the left until all segments are OFF at the top of the band.
GRPHALL	BAND Number	Graph All Mode. Similar to the GRAPH mode, except it graphs every batch step as it occurs. The bar graph segments are used to show the progress of each of the batch setpoints of type GROSSSP, NETSP, %RELSP, +RELSP, or -RELSP. Setpoints can be graphed from the current GROSS or NET value on the source channel.
SP REF	**SP1** √ - SP20	Setpoint Reference Mode. When set in the GRAPH mode, this selects the setpoint number whose value the bar graph will monitor.
BAND	Number	This establishes one-half of the band width around the setpoint value. All of the total band value selected will fall below the setpoint value, and all will fall above the value. For example: if a setpoint value is established at 1000 lb gross weight, and the BAND is set at 100, then the graph will begin to light (left to right) at 900. It will be totally lit at 1000. Increasing weight beyond 1000 will cause graph segments to go OFF (left to right) until all segments are off at 1100.

Table 3-10.

CALIBRT menu		
Parameter	**Choices**	**Description**
Level 2		
CHAN 1 CHAN 2 CHAN 3 CHAN 4	WEIGHT VOLTS	Select any of four channels (1 – 4) for calibration of Weight and Volts.
Level 3		
WEIGHT	W ZERO W VAL W SPAN	...Clear scale and press ENTER key ....Enter test weight value ....Place test weight on scale and press ENTER key.
VOLTS	V ZERO V VAL V SPAN	**WARNING: DO NOT CHANGE FACTORY VOLT VALUES. DOING SO MAY RENDER THE INDICATOR USELESS.**

Table 3-11.

VERSION menu		
Parameter	**Choices**	**Description**
VERSION	Current version number	

4. Calibration

OVERVIEW

The IQ plus 800/810 stores calibration values in nonvolatile memory on the CPU board. You access these values through the CALIBRT setup menu.

If the IQ plus 800/810 has multiple scale inputs, you must do a weight calibration for each channel.

NOTE:
Record all weight calibration values for future reference. These values allow you to swap indicators in the field without using test weights to recalibrate the replacement indicator.

WEIGHT CALIBRATION PROCEDURE

1. Power up the unit for approximately 15 minutes before beginning calibration. Place the indicator in setup mode by sliding the setup switch on the CPU board so the display reads CONFIG. Press **LEFT ARROW** until the display reads CALIBRT.
2. Press **DOWN ARROW** to display CHAN 1. Press **DOWN ARROW** again to display WEIGHT. Press again to display W ZERO. If W VAL or W SPAN appears, press left or right arrows until display reads W ZERO. Remove all load and allow time for the scale to settle.
3. Press **DOWN ARROW** again to display current default value. Press **ENTER** and wait until a value reappears on the display. Enter this value as “W ZERO” for channel 1 in the chart below. Repeat a few times to verify that the results are similar each time, but not necessarily identical. This is a numerical constant, not a weight value.
4. Press **UP ARROW** to display W ZERO. Press **RIGHT ARROW** to display W VAL. Press **DOWN ARROW** to display current default value. Key in the test weight value and press **ENTER**. Enter this value as “W VAL” in the chart for channel 1.

⚠ Caution

Before beginning weight calibration with test weights, turn off AC power to all equipment controlled by setpoints or their associated digital outputs. Continuous setpoints (with weight values equal to or lower than the test weights) may be tripped when test weights are loaded and unloaded onto the scale during the calibration procedure.

Record WEIGHT calibration values here ►

WEIGHT	W ZERO	W VAL	W SPAN
CHANNEL 1			
CHANNEL 2			
CHANNEL 3			
CHANNEL 4			

5. Press **UP ARROW** to display W VAL. Press **RIGHT ARROW** to display W SPAN. Press **DOWN ARROW** to display current default value. Place test weight on scale and allow to settle. Repeat a second time to verify that the results are similar but not identical. Press **ENTER** and wait until a value reappears on the display. Enter this value as "W SPAN" in the chart for channel 1. This is a calibration number, *not* a weight value. Remove the test weight.
6. Repeat the above steps for channels 2 - 4 if necessary.
7. Slide the setup switch on the CPU board back to the previous position to exit setup mode.

⚠ Caution

Do NOT change any VOLTS calibration values while calibrating the indicator. Do not press ENTER while viewing values.

FOR UNITS MANUFACTURED PRIOR TO JULY, 1996

IQ plus 800/810 CPU boards manufactured prior to July, 1996 had separate A/D converters bolted to standoffs on their CPU boards. These replaceable A/D converters were matched to their CPU boards by a set of voltage calibration numbers. These voltage calibration values appeared under a separate VOLTS submenu in the CALIBRT menu.

When replacing an A/D converter on one of these older units, it is necessary to go into the VOLTS submenu and replace the existing voltage calibration numbers with the new ones found on the replacement converter. This step will match the new A/D converter to the existing board.

Current CPU boards are built with integral, non-replaceable A/D converters. With these models, there is no need to enter the VOLTS submenu during calibration except as noted at left.

NOTE:

If the complete configuration from another IQ plus 800/810 is ever downloaded to this indicator, the voltage calibration values from the other indicator will replace the original values. It will then be necessary to re-enter the original voltage calibration values (from the chart at right). This is done in setup mode by scrolling to the appropriate parameter displays under the CALIBRT submenu. The original values can be keyed in with the keypad, and saved by pressing the ENTER key.

Record VOLTS calibration values here ►

VOLTS	V ZERO	V VAL	V SPAN
CHANNEL 1			
CHANNEL 2			
CHANNEL 3			
CHANNEL 4			

5. Operating modes

SETUP MODE

The Setup Mode lets you access the configuration and calibration parameters (as described in Section 3, *Configuration*). To enable this mode, open the case and move switch SW1 on the CPU board. See Figure 2-3 in Section 2, *Installation*, for location of the setup switch.

This 2-position switch is near the middle of the board, at the edge. When you move it to the setup position, CONFIG appears on the display and normal weighing functions are disabled.

When a legal-for-trade scale is configured, calibrated, and inspected, the case is closed with a legal seal. Therefore, only normal and truck in/out mode functions are available without breaking the seal. However, an optional remote supervisor switch lets you change the SETPNT configuration menu without breaking the seal. Usually, this is a keyed switch and the supervisor carries the key to prevent unauthorized access. See Section 2, *Installation*, for details on installing a remote supervisor switch.

NORMAL MODE

In the normal mode, the indicator displays gross weight. You can toggle between gross and net weight displays by pressing **G/N**. "G" appears on the display for gross weight. "N" appears for net weight. You can enter tare weights by two methods:

NOTE:

*When the display is showing gross weight, you can press **ZERO** to remove small weight variations from the display at zero. However, pressing **ZERO** does not tare the weight.*

Push-button tares

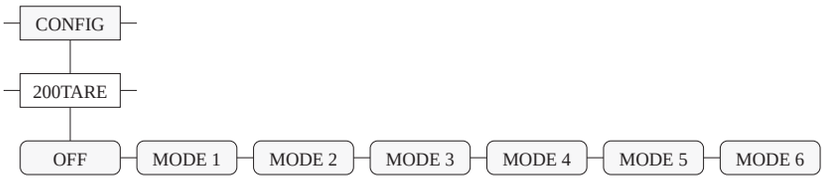
When you press **TARE**, the indicator tares the current weight on the scale and automatically displays the net weight (initially zero). As you load the scale, the indicator continues to show net weight. You can toggle back to the gross weight display at any time by pressing **G/N**. "T" appears on the display when a push-button tare weight is in memory.

Keyed tares

You can use the numeric keys to enter a tare weight. While the indicator is displaying gross weight, key in a numeric value for the tare weight and press **TARE**. The indicator automatically changes to display the net weight. "TE" appears on the display when a keyed tare weight is in memory.

When you press **PRINT**, the indicator sends a "gross-tare-net" ticket to the printer. If you press **PRINT** when a tare is not in memory, the gross weight prints on a single line.

TRUCK IN/OUT MODES



The truck in/out modes handle multiple truck ID numbers and tare weights. There are six modes which allow you to combine features in various ways (see Table 5-1).

Table 5-1.

Truck mode features

	Stored IDs	Keyed tares	Value swapping
MODE 1	no	yes	yes
MODE 2	no	no	yes
MODE 3	yes	yes	yes
MODE 4	yes	no	yes
MODE 5	yes	yes	no
MODE 6	yes	no	no
OFF	—	—	—

Stored IDs let you keep a database of truck IDs and tare weights in the indicator's memory. The indicator can automatically store up to 200 truck IDs and tares; or it can clear the information after printing a weigh-out ticket. For example, if the same truck seldom crosses the scale, it may not be practical to save its ID number and tare weight. However, if that same truck crosses the scale many times each day, it's much more convenient to store the information in the indicator's memory, so you can simply recall it when needed. Stored IDs and tare weights are available in Modes 3, 4, 5, and 6.

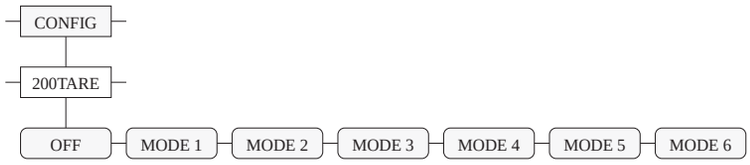
Keyed tares allow you to manually enter the tare weight from the keyboard. Keyed tares are available in Modes 1, 3, and 5.

Value swapping ensures that the lowest of two weight values associated with a particular ID number is entered as the tare weight. For example, if a truck crosses the scale fully loaded at weigh-in, then unloads and crosses the scale empty at weigh-out, the indicator automatically assigns the lesser (empty truck) weight as the tare. Value swapping is available in Modes 1, 2, 3, and 4.

Selecting a mode

To select a truck in/out mode (as in diagram below), move setup switch SW1 to the CONFIG position (see *Setup Mode* on page 5-1). Then, press **TIME/DATE** once to drop to the next level. Press **CLEAR** several times until the display reads 200TARE. Then, press **TIME/DATE** again and use **CLEAR** to scroll to the desired mode. Finally, press **DISP TARE** to lock in your selection move the setup switch back to its normal position.

NOTE:
Some local regulations require the tare weight to be read from the scale. If so, don't use the keyed tares feature.



Using the truck in/out modes

All the truck in/out modes let you quickly search the memory for a specific ID number. To do this, key in the ID number and press **DISP TARE**. If the number is in memory, it remains on the display. Otherwise, the indicator displays NO ID or another number. Use **ENTER** to toggle between the ID number and tare weight. To delete the displayed ID number, press **CLEAR** twice.

NOTE:
Select OFF to disable the truck in/out modes.

To scroll through all the stored ID numbers, key in any number and press **DISP TARE**. Then, each time you press **DISP TARE**, the next number appears on the display.

To print all the stored ID numbers and their associated tare weights, press **PRINT** when an ID number is on the screen.

Modes 1 and 2

In these two modes, the indicator erases truck ID numbers and tare weights from memory after the transaction.

1. The truck moves onto the scale for weigh-in.
2. If keyed tares are enabled (Mode 1), key in the desired tare weight and press **TARE**.
3. Key in an ID number (up to 7 digits) and press **NEW ID**. This information remains in memory until the weigh-out ticket is printed.
4. The indicator prints the following weigh-in ticket for the driver:

   ID. NO. 304812
   GROSS 15000. LB STORED
   5/4/1994 10:24 AM

5. The loaded truck moves onto the scale for weigh-out.

NOTE:
If you key in an ID number that is already in memory, the display reads "BAD ID" and aborts the operation.

6. Key in the ID number (from the weigh-in ticket) and press **PRINT**. The indicator prints the following weigh-out ticket and automatically clears the information from memory:

```
ID. NO. 304812
GROSS      100000. LB
TARE        15000. LB RECALLED
NET         85000. LB
5/4/1994 10:55 AM
```

   If it was a keyed tare, "KEYED" prints after "RECALLED" on the tare line.

Modes 3, 4, 5, and 6

In these modes, the indicator stores the tare weights and ID numbers in memory until you manually erase them.

NOTE:
If keyed tares are enabled, the tare weight need not be keyed in, but can be obtained in the normal manner from the weight on the scale.

1. The truck moves onto the scale for weigh-in.
2. Press **TARE** to store the scale weight. If keyed tares are enabled (Modes 3, 5), you may instead key in the desired tare weight, then press **TARE**.
3. Key in an ID number (up to 7 digits) and press **NEW ID**. This information remains in memory until manually deleted. Truck leaves.
4. The loaded truck moves back onto the scale for weigh-out.
5. Key in the ID number and press **PRINT**. The indicator prints the weigh-out ticket. If value swapping is enabled (Modes 3, 4), the lower weight will always be printed as the tare weight.

Multiple scales

If you use more than one scale with the truck in/out modes, the indicator can print tickets indicating either an individual scale's total or a combined total for all scales.

For an individual scale total, press **SCALE #** to select the scale before printing a ticket. If more than one scale exists, the scale number also appears on the ticket.

For a combined total of all scales, press **SCALE #** to select all active scales before printing a ticket. "SCALE TOTAL" prints on the ticket after the ID number.

```
ID. NO. 304812     SCALE TOTAL
GROSS      100000. LB
TARE        15000. LB RECALLED
NET         85000. LB
5/4/1994 10:55 AM
```

If you are using only a single scale setup on channel 1, either no scale number, or SCALE # 1 will appear on the ticket.

INDIVIDUAL SCALE SET-UP

The IQ plus 810 offers up to four scale inputs with the flexibility to define different graduation sizes for all the individual scales. Many of the parameters defining the functionality of the channel can be defined individually for each channel.

Under the CONFIG submenu (in setup), the following parameters are available to allow independent settings for each scale: GRADS, ZERO BAND, ZERO RANGE, MOTION BAND, OVERLOAD and DIGITAL FILTER. In the FORMAT submenu DISPLAY DIVISIONS, DECIMAL POINT, and UNITS can be defined for each separate channel for both PRIMARY and SECONDARY units. Under the FORMAT submenu, the total channel has its own DISPLAY DIVISION, DECIMAL POINT, and UNITS settings for both primary and secondary units. By setting these parameters independently, you can configure different graduation sizes for each channel and the total.

> Note: If you intend to use different grad sizes for the individual channels, the total channel could be meaningless. For example, if scale #1 counts by 50 lb and scale #2 counts by 1/10 lb, you probably will not want to view the total. A parameter called TOTALS (under the submenu SET ANALOG in setup) allows you to disable the total channel. The selections for TOTAL are shown in the following table.

TOTAL selections

Selection...	Description...
OFF	The total channel is disabled and cannot be viewed on the indicator. This is the only setting available if CHANS=1 or 1 FAST.
ENABLE	The total channel is enabled and can be viewed on the indicator. This is the default if CHANS=1 or 1 FAST.
TONLY	The total channel is the only channel that can be viewed on the indicator.

The TONLY setting are useful for customers who are only interested in the sum of several scales, a truck scale for example. The OFF setting is for the user who does not want to view the TOTAL.

Suppose you want to set up the individual channels with different grad sizes and the total channel has been enabled. The total channel is calculated by rounding the individual channels using the total channel grad size and summing the results. In this instance the total channel will *not* equal the sum of the individual channels as they are displayed. The number of grads on the total channel is equal to the sum of the full capacities of the individual scales divided by the graduation size on the total channel. See the *example* on page 5-6.

NOTE:
The number of grads for the total channel is not user-selectable.

Example:

If the scales have the following settings:

SCALE#1: GRADS=2000 DEC PNT=8888880
DSP DIV=5 ==> COUNT BY 50

SCALE#2: GRADS=100000 DEC PNT=888888.8
DSP DIV=1 ==> COUNT BY .1

TOTAL: GRADS=110000 DEC PNT=8888888
DSP DIV=5 ==> COUNT BY 1

The number of grads for the total channel is calculated as follows:

((GRADS#1 x COUNTBY#1) + (GRADS#2 x COUNTBY#2)/COUNTBY_TOTAL

Which is:

((2000 x 50) + (100000 x .1))/1 = 110000

NOTE: The number of grads for the total channel is not user-selectable.

Suppose the user has the following actual data:

SCALE#1 2527.6 (2550 displayed)

SCALE#2 1658.1 (1658.1 displayed)

The total channel display would be calculated by rounding scale #1's *actual* data to the nearest pound (2528), rounding scale #2's *actual* data to the nearest pound (1658), and summing the two.

2528 + 1658 = 4186

TOTAL = 4186

The grad size differs for the individual channels and the total channel. Therefore, the total grad size functions like a "master unit" and is used for all the channels in calculating the total display weight.

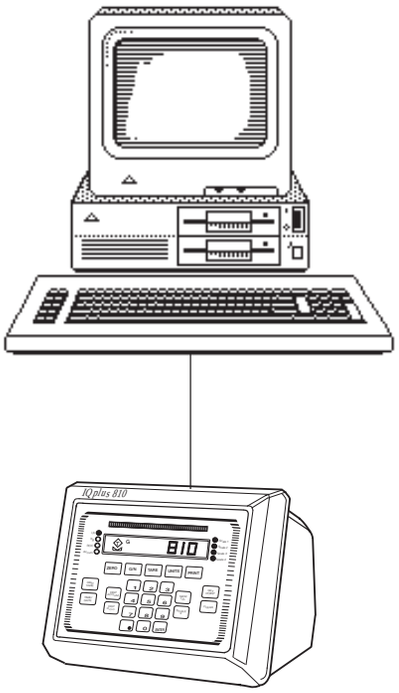
The Rate of Change (ROC) feature is configurable for each individual channel and for the total channel. With rate of change enabled, you can press the **DISP ROC** key repeatedly to view the ROC for the different active channels, based on how ROC is defined for each channel.

Other total channel settings are as follows:

- **MOTION BAND** - When all the individual channels are out of motion the total channel is out of motion.
- **ZERO BAND** - Zero tracking is done for the individual channels even when displaying the total channel. No specific zero track band exists for the total but the total reflects the zero tracking done on the individual channels.
- **ZERO RANGE** - If ZERO is possible on all channels, when the ZERO key is pressed while displaying the total channel, the amount on each individual channel is zeroed OFF. If the ZERO is *not* possible on all channels, then the ZERO is denied.

- **OVERLOAD** - When any individual channel is above OVERLOAD or below UNDERLOAD, the total channel display is also blanked.
- **PKHOLD** - If the peak hold feature is enabled, PKHOLD is set globally for all channels. The peak value for a channel is only being calculated while the channel is being displayed. The TOTAL channel peak value is independent of the individual channels and the TOTAL value does not reflect the sum of the peak values.

6. Using the EDP port



The EDP (electronic data processing) port lets you control the IQ plus 800/810 from a remote keyboard or personal computer. You can transfer configuration data directly between two IQ plus 800/810 indicators. By using special commands from the keyboard, you can simulate front panel key press functions, call up current settings for setup parameters, and perform reporting functions. Also, you can use special commands to transmit weight data directly from the EDP port on demand.

An optional computer software program, called Hotline™, makes it easy to save, change, and transfer configuration data, including setpoints for batch processing. (See *Using Hotline*™ on page 6-13 for more information.)

When you send a command via the EDP port, the command must be in the specific format as shown on the following pages. Generally, you type the command on the remote keyboard and press **ENTER** or **RETURN** to send it. However, if you use a communications program such as Hotline™, you can set up multiple commands, then send (download) them all at once.

EDP serial commands can be divided into five different categories: key press commands, reporting commands, special function commands, parameter setting commands, and transmit weight data commands.

KEY PRESS COMMANDS

Key press serial commands (Table 6-1) simulate pressing the keys on the front panel of the indicator. They can be used in both the *Setup* Mode and the *Operating* Mode. Several of the commands simulate “pseudo” keys, meaning that they provide a function that is *not* represented by a key on the front panel.

Table 6-1

Key press commands	
Command	**Function**
KZERO	Press the ZERO key.
KGROSSNET	Press the G/N key.
KGROSS	Go to Gross mode (pseudo key).
KNET	Go to Net mode (pseudo key).
KTARE	Press the TARE key.
KUNITS	Press the UNITS key.
KPRIM	Go to primary units (pseudo key).
KSEC	Go to secondary units (pseudo key).
KPRINT	Press the PRINT key.
KCLR	Press the CLEAR key.

(continued)

Table 6-1 (continued).

Key press commands (continued)	
Command	**Function**
KNEWID	Press the NEW ID key.
KSETPOINT	Press the SETPOINT key.
KBASE	Press the SCALE # key.
KTOTAL	Display the TOTAL channel (pseudo key).
KDISPTARE	Press the DISP TARE key.
KDISPACCUM	Press the DISP ACCUM key.
KDISPROC	Press the DISP ROC key.
KTIMEDATE	Press the TIME/DATE key.
KDATE	Display the DATE (pseudo key).
KTIME	Display the TIME (pseudo key).
KLEFTARROW	In SETUP mode move left in menu. In weighing mode, SET POINT key.
KRIGHTARROW	In SETUP mode move right in menu. In weighing mode, CLEAR key.
KUPARROW	In SETUP mode move up in menu. In weighing mode, DISP TARE key.
KDOWNARROW	In SETUP mode move down in menu. In weighing mode, TIME/DATE key.
K0	Press number 0.
K1	Press number 1.
K2	Press number 2.
K3	Press number 3.
K4	Press number 4.
K5	Press number 5.
K6	Press number 6.
K7	Press number 7.
K8	Press number 8.
K9	Press number 9.
KDOT	Press the '.' key.
KENTER	Press the ENTER key.

After the indicator receives a key press command, it responds with the message "OK". The "OK" response verifies that the command was received. However, this response does not indicate that a requested action was completed. For example, the indicator will respond with "OK"even after it disallows a ZERO function.

An example of using the EDP commands is as follows: To enter a 15-pound tare weight using EDP commands —

1. Type K1 and press **ENTER** (or **RETURN**).
2. Type K5 and press **ENTER**.
3. Type KTARE and press **ENTER**.
4. The indicator displays “TE” (for tare entered at keyboard) and shifts the net weight.

REPORTING COMMANDS

Reporting serial commands (Table 6-2) cause the indicator to respond by writing specific information from the EDP port. These commands are accessible from both the *setup* mode and *operating* mode.

Table 6-2.

Reporting commands	
Command	**Function**
DUMPALL	Write a list of all current parameter settings.
SPDUMP	Write a list of current setpoint parameter settings.
VERSION	Write current IQplus® 800/810 software version.
P	Write whatever is currently displayed on indicator.
S	Write 1 frame of the STREAM format.
OPT	Write list of currently active optional software features.

SPECIAL FUNCTION COMMANDS

There are four special function serial commands available (Table 6-3). The commands, RESETCONFIGURATION and CLEARALLFEATURES, are accessible from the *setup* mode only.

Table 6-3.

Special function commands	
Command	**Function**
?	Print a list of all the parameter setting commands.
D	Toggle the DEBUG mode. *
RESETCONFIGURATION	Return all parameter settings to defaults. Calibration settings will be lost. Special software features that are turned on will be saved.
CLEARALLFEATURES	Turn off all special software features.

* When the debug mode is "ON", more information is printed as a batch sequence is running. The user will be informed when a batch reset occurs and when the current batch step and batch sequence is complete.

NOTE:
The indicator must be in Setup Mode to reset configuration or clear all features.

PARAMETER SETTING COMMANDS

NOTE:
There are no spaces before or after the equal (=) sign. If you type an incorrect command, the display reads "?Unknown Command." Changes to the parameters do not take effect until you exit the setup mode.

Parameter setting commands allow you to report a current setting for a particular setup parameter (Tables 6-4 through 6-13). Also, they allow you to change the setting of a setup parameter.

Current setup parameter settings can be reported from either the *setup* mode or *operating* mode:

command <RETURN>

Numerical parameter values can be changed from the *setup* mode only (see adjacent NOTE):

command=value <RETURN>

NOTE:
The SETPOINT submenu commands, the STREAM command, and the BARGRF commands are accessible from both the setup mode and operating mode.

where *value* is either a number or a specific submenu parameter.

For example, to set the motion band parameter to 5, type MOTBAND=5 and press **ENTER** (or **RETURN**). You can view the choices available for any command by substituting a question mark (?) in place of the value. For example, to see which choices are available for the peak hold parameter, type PKHOLD=? and press **ENTER** (or **RETURN**).

Table 6-4.

CONFIG commands (Note: Indicator must be in Setup Mode to change.)		
Command	**Description**	**Choices**
GRADS#x *	Graduations.	Number
ZTRKBND#x *	Zero Track Band.	OFF, 0.5 D, 1 D, 3 D
ZRANGE#x *	Zero Range.	1.9%, 100%
MOTBAND#x *	Motion Band.	1 D, 2 D, 3 D, 5 D, 10 D, 20 D, OFF
OVRLOAD#x *	Overload.	FS + 2%, FS + 1D, FS + 9D, FS
DIGFLTR#x *	Digital Filtering.	4, 8, 16, 32, 64, 128, 4 RT, 8 RT, 16 RT, 32 RT, 64 RT, 128 RT, 1, 2
PWRUPMD	Power Up Mode.	GO, DELAY
TARE200	200 ID/Tare Truck In/Out Mode.	OFF, MODE 1, MODE 2, MODE 3, MODE 4, MODE 5, MODE 6
PKHOLD	Peak Hold Function.	OFF, NORMAL, BI-DIR, AUTO
TAREFN	Tare Function.	Both, NO TARE, PB TARE, KEYED
CONSECNUM ***	Consecutive Number.	Number

Table 6-5.

SET ALG commands (Note: Indicator must be in Setup Mode to change.)		
Command	**Description**	**Choices**
CHANS	Selects the channels for analog input.	1, 1 2, 1 3, 1 3 4, 1 2 3 4, 1FAST
TOTALS ***	Total channel enable/disable.	
PULSEIN	Pulse input feature.	OFF, P1>CH3, P>CH3+4
RESOLUT	Resolution: Standard or High.	STANDRD, HIGH
FREQ	Frequency of incoming AC power source.	60 HZ, 50 HZ
ALGFLTR	Analog Filtering.	8 HZ, OFF, 2 HZ

* Where “x” is the channel number 1, 2, 3, or 4. By omitting “#x”, you can access the setting for the current display channel.

*** Version 3.0 and later software.

Table 6-6.

FORMAT commands (Note: Indicator must be in Setup Mode to change.)		
Command	**Description**	**Choices**
PRI.DSPDIV#x **	Primary Display Divisions.	1, 2, 5
PRI.DECPNT#x **	Primary Decimal Point Location.	8888888, 888888.8, 88888.88, 8888.888, 888.8888, 88.88888, 8.888888, 8888800, 8888880
PRI.UNITS#x **	Primary Units.	LB, KG, OZ, TN, GR, G, NONE
SEC.DSPDIV#x **	Secondary Display Divisions.	5, 2, 1
SEC.DECPNT#x**	Secondary Decimal Point Location.	888888.8, 88888.88, 8888.888, 888.8888, 88.88888, 8.888888, 8888800, 8888880, 8888888
SEC.UNITS#x **	Secondary Units.	KG, OZ, TN, GR, G, NONE, LB
SEC.MULT#x **	Secondary Multiplier.	Number
ROC.DSPDIV#x **	Rate of Change Display Division.	1, 2, 5
ROC.DECPNT#x **	Rate of Change Decimal Point.	8888888, 888888.8, 88888.88, 8888.888, 888.8888, 88.88888, 8.888888, 8888800, 8888880
ROC.TIME#x **	Rate of Change Time.	SEC, MIN
ROC.MULT#x **	Rate of Change Multiplier.	Number
DATEFMT	Date Format.	MMDDYY, DDMMYY
DATESEP	Date Separator.	SLASH, DASH, SEMI
TIMEFMT	Time Format.	12 HOUR, 24 HOUR
TIMESEP	Time Separator.	COLON, COMMA

** Where “x” is the channel number 1, 2, 3, or 4, or 0 for the total channel. By omitting “#x”, you can access the setting for the current display channel.

Table 6-7.

SETPNTS commands

Command	Description	Choices
SETPOINT	Setpoint Number.	Setpoints 1 – 20
KIND	Type of Setpoint.	OFF, GROSSSP, NETSP, +RELSP, -RELSP, %RELSP, PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, -GROSS, -NET, BATCHPR, TIMER, CONCUR
VALUE	Value.	Number
BANDVAL	Bandwidth Value.	Number
HYSTER	Hysteresis.	Number
PREACT	Preact.	OFF, ON, LEARN
PREVAL	Preact Value.	Number
SOURCE	Source Channel.	CH1, CH2, CH3, CH4, TOTAL
DIGOUT	Digital Output.	NONE, 1 – 16
RELNUM	Relative Value.	1 – 20
PSHTARE	Push Tare.	OFF, ON
PSHPRINT	Push Print.	OFF, ON, WAITSS
ALARM	Alarm.	OFF, ON
PSHACCM	Push Accumulator.	OFF, 0 – 4, 0 QUIET through 4 QUIET
TRIP	Trip Condition.	HIGHER, LOWER, INBAND, OUTBAND
ACCESS ***	Front Panel Access.	ON, OFF, HIDE
START ***	Start Batchstep, Timer.	1 – 20
END ***	End Batchstep.	1 – 20
NAME ***	Setpoint Name.	NONE, 0 – 9

*** Version 3.0 and later software.

Table 6-8.

SERIAL commands

Command	Description	Choices
EDP.BAUD	EDP Port Baud Rate.	4800, 2400, 1200, 600, 300, 19200, 9600
EDP.BITS	EDP Port Data Bits and Parity.	7 ODD, 8 NONE, 7 EVEN
EDP.TERMIN	EDP Port Line Termination Characters.	CR/LF, CR
EDP.EOLDLY	EDP Port End of Line Delay.	Number
EDP.ADDRESS	EDP Port Address.	Number
PRN.BAUD	Printer Port Baud Rate.	4800, 2400, 1200, 600, 300, 19200, 9600
PRN.BITS	Printer Port Data Bits and Parity.	7 ODD, 8 NONE, 7 EVEN
PRN.TERMIN	Printer Port Line Termination Characters.	CR/LF, CR
PRN.EOLDLY	Printer Port End of Line Delay.	Number
AUX.BAUD	Auxiliary Port Baud Rate.	2400, 1200, 600, 300, 9600, 4800
AUX.BITS	Auxiliary Port Data Bits and Parity.	7 ODD, 8 NONE, 7 EVEN
AUX.TERMIN	Auxiliary Port Line Termination Characters.	CR/LF, CR
AUX.EOLDLY	Auxiliary Port End of Line Delay.	Number
AUX.ADDRESS	Auxiliary Port Address.	Number
PRNDEST	Print Destination.	EDP, PRN, AUX
STREAM	Continuous Stream Serial Port.	OFF, EDP, PRN, AUX

Table 6-9.

P FORMT commands

Command	Description	Choices
GFMT	GROSS Demand Print Format String.	Third level:View, add spaces, or delete only. Fourth level:Active characters can be changed by incrementing or decrementing its displayed ASCII value. Fifth level:View the ASCII value of the above character.Enter new ASCII value with numerical kyboard.
NFMT	NET Demand Print Format String.	Same as GFMT above.
SPFMT ***	SETPOINT PRINT Format String.	Same as GFMT above.
TRWIN ***	TRUCK WEIGH-IN Print Format String.	Same as GFMT above.
TRWOUT ***	TRUCK WEIGH-OUT Print Format String.	Same as GFMT above.

*** Version 3.0 and later software.

Table 6-10.

DIG IN commands

Command	Description	Choices
DIGIN1	Digital Input 1 Function.	OFF, ZERO, TARE, NT/GRS, UNITS, DSPTARE, PRINT, BATRUN, BATSTRT, BATPAUS, ACCUM, CLR CN
DIGIN2	Digital Input 2 Function.	OFF, ZERO, TARE, NT/GRS, UNITS, DSPTARE, PRINT, BATRUN, BATSTRT, BATPAUS, ACCUM, CLR CN
DIGIN3	Digital Input 3 Function.	OFF, ZERO, TARE, NT/GRS, UNITS, DSPTARE, PRINT, BATRUN, BATSTRT, BATPAUS, ACCUM, CLR CN

Table 6-11.

ALG OUT commands		
Command	**Description**	**Choices**
SOURCE1	Source for Analog Output 1.	TOT G, TOT N, CH1 G, CH1 N, CH2 G, CH2 N, CH3 G, CH3 N, CH4 G, CH4 N
ZERO1	Zero Calibration Value for Analog Output 1.	Number
SPAN1	Span Value for Analog Output 1.	Number
SOURCE2	Source for Analog Output 2.	TOT G, TOT N, CH1 G, CH1 N, CH2 G, CH2 N, CH3 G, CH3 N, CH4 G, CH4 N
ZERO2	Zero Calibration Value for Analog Output 2.	Number
SPAN2	Span Value for Analog Output 2.	Number

Table 6-12.

BAR GRF commands		
Command	**Description**	**Choices**
BARGRF	Bar Graph Mode.	OFF, TWINKL, DIGOUTS, GRAPH, GRPHALL
BARREF	Graph Mode Setpoint Reference.	Setpoints 1 – 20
BARBAND	Graph Mode Band Value.	Number

Table 6-13.

CALIBRT commands		
Command	**Description**	**Choices**
VZERO#x *	Zero Volts Calibration.	Enter 0 Volts or press ENTER key to calculate.
VSPAN#x *	Span Volts Calibration.	Enter span Volts or press ENTER key to calculate.
VVAL#x *	Volts Value Calibration.	Enter calculated weight value and press ENTER key.
WZERO#x *	Zero Weight Calibration.	Clear scale and press ENTER.
WSPAN#x *	Span Weight Calibration.	Place test weight on scale and press ENTER key.
WVAL#x *	Weight Value Calibration.	Enter test weight value.

* Where “x” is the channel number 1, 2, 3, or 4. By omitting “#x”, you can access the setting for the current display channel.

TRANSMIT WEIGHT DATA COMMANDS

The serial transmit weight data commands (Table 6-14) transmit data out the EDP port on demand. They allow you to request weight data from any of the active channels via the EDP port. These commands are accessible while in the *operating* mode.

Table 6-14.

Transmit data commands	
Command	**Function**
XG#x	Transmit the GROSS weight for channel x.
XN#x	Transmit the NET weight for the channel x.
XT#x	Transmit the TARE weight for channel x.
XA#x	Transmit the ACCUMULATOR for channel x.
XPEAK#x	Transmit the PEAK weight for display channel x.
XROC#x	Transmit the RATE OF CHANGE for channel x.

NOTE:

The XA command is only enabled when the Accumulator feature is ON. The XROC command is only enabled when the Rate of Change feature is ON. The XPEAK command is only enabled when the Peak Hold option is ON.

Where "x" is an active channel 0, 1, 2, 3, or 4 (where 0 is the total channel). If the "#x" is omitted, the data from the current display channel is transmitted. If the data requested is not displayable, the indicator will respond with "??". See adjacent NOTE.

SAVING AND TRANSFERRING DATA

The EDP port gives you many options for saving and transferring configuration data:

Save and transfer options...

- Print all configuration data
- Print setpoints only
- Save all configuration data to floppy disk
- Save setpoints to disk
- Transfer configuration data directly between two indicators
- Transfer configuration data from floppy disk to indicator

Printing all configuration data

1. Make sure a compatible printer is properly configured and installed on the EDP port.
2. Place the indicator in setup mode and press **PRINT**.
3. The indicator sends all configuration parameters, including calibration values, to the printer in ASCII-formatted text.

Printing setpoints

1. Make sure a compatible printer is properly configured and installed on the EDP port.
2. Place the indicator in supervisor mode and press **PRINT** (see Section 2, *Installation*, for more information on installing a remote supervisor switch).
3. The indicator sends all setpoint values to the printer in ASCII-formatted text.

Saving all configuration data to floppy disk

1. Make sure the EDP port is properly configured and connected to a standard, duplex RS-232 communications port on an IBM-compatible computer.
2. Make sure the computer is running a standard communications program, such as PROCOMM PLUS® or CROSSTALK®. The baud rate, parity, and stop bit settings must be identical for both the computer and indicator.
3. Set the program to capture incoming data to a file before you press **PRINT**. Refer to your program manual for details.
4. Place the indicator in setup mode and press **PRINT** (or type DUMPALL from the computer keyboard and press **RETURN**).
5. The indicator sends all configuration parameters, including calibration values, to the computer in ASCII-formatted text.
6. At the computer, save the text as a file on a floppy disk. (This process varies, depending upon the software and computer.)

Saving setpoints to a floppy disk

1. Make sure the EDP port is properly configured and connected to a standard, duplex RS-232 communications port on an IBM-compatible computer.
2. Make sure the computer is running a standard communications program, such as PROCOMM PLUS® or CROSSTALK®. The baud rate, parity, and stop bit settings must be identical for both the computer and indicator.
3. Place the indicator in supervisor mode and press **PRINT** (see Section 2, *Installation*, for more information on installing a remote supervisor switch).
4. The indicator sends all setpoint values to the computer in ASCII-formatted text.
5. At the computer, save the text as a file on a floppy disk. (This process varies, depending upon the software and computer.)

Caution

To avoid losing important information, always write down the voltage calibration values for the receiving indicator before *transferring any data (see Section 4, Calibration). Those original voltage calibration values will have to be replaced into the receiving indicator after another indicator's configuration has been transferred to it.*

Transferring configuration data directly between two indicators

1. Make sure the EDP ports are properly configured and connected between both IQ plus® 800/810 indicators.
   (J7-9) RXD <----- TXD (J7-11)
   (J7-11) TXD -----> RXD (J7-9)
   (J7-12) GND <-----> GND (J7-12)
   The baud rate, parity, and stop bit settings must be identical for both indicators.
2. Place the both indicators in setup mode and press **PRINT** from the transmitting indicator.
3. The transmitting indicator sends all configuration parameters, including calibration values, to the receiving indicator.

   CAUTION!
   You must reenter the correct voltage calibration values on the receiving indicator (see Section 4, *Calibration*).

Transferring configuration data from floppy disk to indicator

1. Make sure the EDP port is properly configured and connected to a standard, duplex RS-232 communications port on an IBM-compatible computer.
2. Make sure the computer is running a standard communications program, such as PROCOMM PLUS® or CROSSTALK®. The baud rate, parity, and stop bit settings must be identical for both the computer and indicator.
3. Place the indicator in setup mode.
4. At the computer, send the configuration files to the indicator. (This process varies, depending upon the software and computer.)

   CAUTION!
   You must reenter the correct voltage calibration values on the receiving indicator (see Section 4, *Calibration*).

USING HOTLINE™

Hotline™ is an optional computer software program which makes it easy to establish, save, change, and transfer configuration data—including setpoints for batch processing. It is available from Rice Lake Weighing Systems.

Following are some common questions and answers about Hotline:

Do I have to be a computer expert and have a powerful computer for Hotline?

Hotline is designed specifically for technicians with very little computer training. Minimum hardware required is an IBM-compatible computer with a 286 processor, DOS 3.3, an EGA monitor, and 3 megabytes of disk space. A standard 3-wire cable connects the computer's serial port and the indicator's EDP port. Hotline automatically determines and matches the correct baud rate, stop bit, and parity settings.

USING HOTLINE™ (continued)

How long does it take to learn Hotline?

You can use it immediately and learn as you work. Hotline presents a series of user-friendly screens to guide you through the process of changing, saving, and transferring IQ plus 800/810 configuration parameters. Pop-up windows offer multiple choice selections.

What can I do with the Hotline program?

You can completely set up all parameters on the computer screen. You see each submenu, along with all the possible choices, rather than just a single line on the indicator's display. In addition, on-screen help in choosing parameters is available at the touch of a key.

For this initial step, you don't even have to be connected to the indicator. You can plan the configuration at your office or anywhere a computer is located.

Hotline saves the configuration settings you've established as a file, which it can copy to any IQ plus 800/810 indicator. You can save the file for future use, or modify it to create additional configuration files.

With a portable computer and Hotline, you have both a powerful diagnostic tool and a link to expert assistance. You can plug into any IQ plus 800/810 indicator and instantly view its configuration data on the computer screen – all without opening the case (or breaking the seal) to operate the setup switch.

With a modem, you can use the telephone line to send configuration data to an IQ plus 800/810 at another location.

You can use the computer's hard drive to save many different "recipe" variations for a batch process controlled by the IQ plus 800/810. Hotline can quickly send and receive complete setpoint configurations for the indicator, even when it is not in setup mode.

You can use Hotline as a backup system for saving configuration parameters from a particular indicator and scale. If an accident damages the original indicator, you can quickly configure the replacement by using Hotline to download the original parameters.

You can use Hotline to change the format of printed tickets. The program can add company names or other custom text.

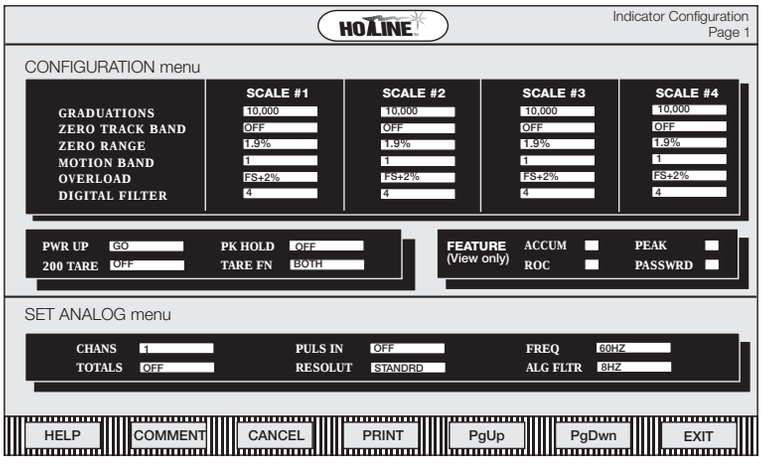


Figure 6-1.
Configuration Submenu Screen from Hotline Program

7. Setpoints and batch processing

OVERVIEW

NOTE:
It is possible to configure setpoints without using the front panel keys. See Section 6, Using the EDP Port, for more information.

The IQ plus 800/810 indicators have 20 programmable setpoints, each with 20 unique parameter selections. These parameters determine exactly how a setpoint functions. To configure the setpoints, you must enter the setup mode (see Section 3, *Configuration*). Once established, you can change setpoint and preact values from the normal operating mode.

The setpoint parameters are summarized below. See the main menu charts and descriptions in Section 3, *Configuration*, for details on each parameter.

Table 7-1.

Main setpoint parameters

Name...	Type...	Action...
OFF	n/a	disables the setpoint
GROSSSP	continuous / batch	trips when its value matches the current gross weight
NET SP	continuous / batch	trips when its value matches the current net weight
+REL SP	continuous / batch	trips at a specific value above the referenced setpoint
–REL SP	continuous / batch	trips at a specific value below the referenced setpoint
%REL SP	continuous / batch	trips at a specific percentage value ¡relative to previous setpoint
PAUSE	batch	pauses batch sequence until manually restarted
DELAY	batch	delays batch sequence for a specific time period
WAIT SS	batch	pauses batch sequence until scale is at standstill
COUNTER	batch	specifies number of consecutive batch sequences to perform
AUTOJOG	batch	enables automatic jogging feature
COZ	continuous	indicates within center of zero range
INMOTION	continuous	indicates when scale is in motion
INRANGE	continuous	indicates when within capacity range
–GROSS	continuous	indicates when gross weight is negative
–NET	continuous	trips when net weight is negative
BATCHPR	continuous	indicates when a batch sequence is running
TIMER	continuous	trips if batch process is not progressing within allotted time
CONCUR	continuous	keeps digital output active between specified setpoints

Warning

Established digital outputs may still be activated when configuring, calibrating, or changing setpoint parameters. Turn off or disconnect any external equipment controlled by the indicator's digital outputs while configuration, calibration, or setpoint changes are being made.

Setpoint menu chart

Figure 7-1 is a graphic overview of the setpoint menu structure. See Section 3, *Configuration*, for more information.

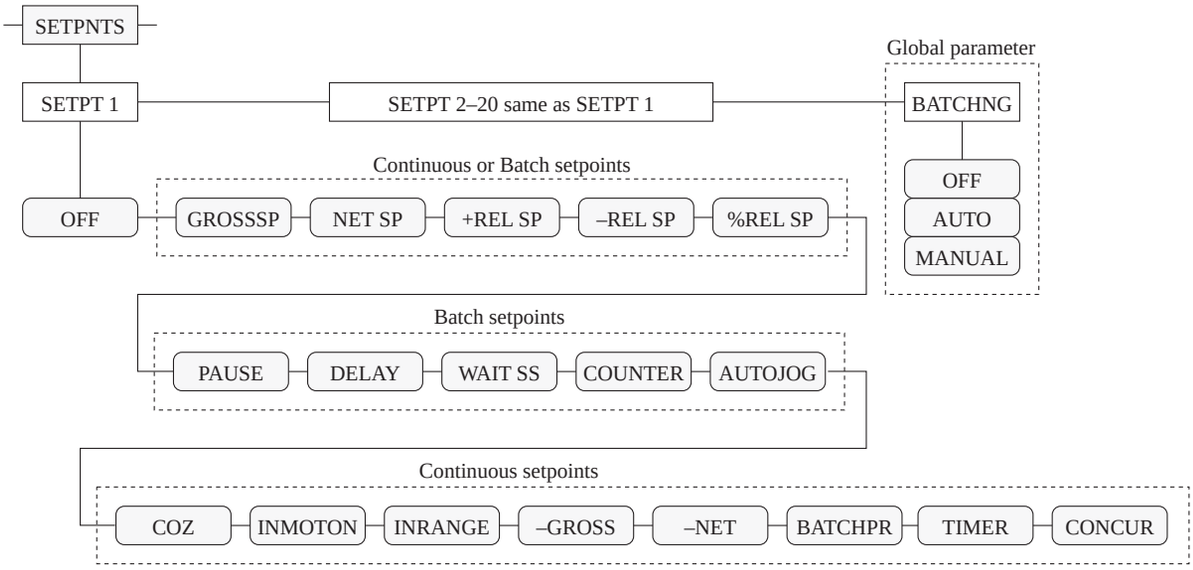


Figure 7-1.
Setpoint menu structure

Beyond the main setpoint categories, there are additional parameters (Table 7-2) which apply (dependent upon the requirements of a particular setpoint). See Table 3-4 for expanded definitions of the following setpoint parameters.

Table 7-2.

Additional setpoint parameters	
Name...	**Action...**
DIGOUT	defines which digital output to activate
VALUE	defines numerical setpoint value
PSHTARE	presses TARE key when setpoint trips
PSHPRNT	presses PRINT key when setpoint trips
TRIP	defines condition necessary for setpoint to trip
BANDVAL	defines the BAND value for inband and outband trips
HYSTER	defines a dead zone for continuous setpoint reaction
ALARM	displays “ALARM” briefly when setpoint trips
PSHACCM	accumulates weight values when setpoint trips
PREACT	enables preact feature (see *Front Panel PREACT Value Access* on page 7-5)
PREVAL	adjusts the trip values of the configured setpoint
BATCH	defines the setpoint as a batch step when set to ON
SOURCE	defines which input channel to use
ACCESS	allows viewing, changing, or hiding setpoints from front panel access
NAME	defines a name for a specific setpoint number, 0 – 9 (see *Assigning the Names to Setpoints* on page 7-6)

USING CONTINUOUS SETPOINTS

Continuous setpoints are free-running—the indicator is constantly checking the input channel for the setpoint value at each A/D update. If the input channel weight reading matches the setpoint value, the indicator acts upon the corresponding digital output (logic = active-low).

Some continuous setpoints do not require a numerical value. The setpoints COZ, INMOTION, INRANGE, –GROSS, –NET, and BATCHPR all detect a particular condition, rather than a specific value. For example, suppose you want to turn on a warning light whenever the scale is in motion:

1. Enter Setup Mode and use right (CLEAR) or left (SETPOINT) arrow keys to scroll to the SETPNT menu. Then press the down (TIME/DATE) arrow.

   In this example, setpoint 1 turns on a light wired to digital output 1. Scale input source is channel 1.
2. Scroll to SP 1 and press the down arrow.
3. Scroll to INMOTION and press the down arrow.
4. Scroll to DIGOUT and press the down arrow.
5. Scroll to 1 and press the up (DISP TARE) arrow.
6. Scroll to SOURCE and press the down arrow.
7. Scroll to CH 1 and press the up arrow.
8. Exit Setup Mode.
9. Now, Setpoint 1 turns on the light at output 1 whenever the scale on channel 1 is in motion.

Other continuous setpoints, such as GROSSSP, NET SP, +REL SP, –REL SP, %REL SP, TIMER, and CONCUR require that you enter a numerical value to determine the trip point. For example, to enable an output whenever the gross weight is at least 125 pounds on input channel 2:

1. Enter Setup Mode and scroll right or left to the SETPNT menu. Press the down arrow.

   In this example, setpoint 2 turns on digital output 2. Scale input source is channel 2.
2. Scroll to SETPNT 2 and press the down arrow.
3. Scroll to GROSSSP and press the down arrow.
4. Scroll to VALUE and press the down arrow.
5. Use the numeric keys to type 125. Press **ENTER**, then press the up arrow.
6. Scroll to SOURCE and press the down arrow.
7. Scroll to CH 2 and press the up arrow.
8. Exit Setup Mode.
9. Now, setpoint 2 activates digital output 2 whenever the scale on channel 2 reaches 125 pounds.

NOTE:

Update time depends on the number of channels active.

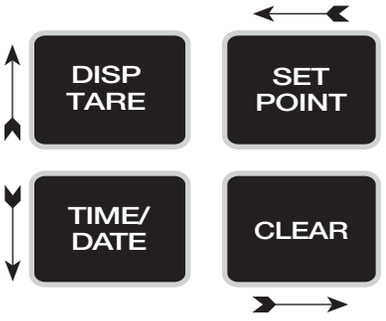
1 channel = 20 updates/sec
1 & 3 channels = 10 updates/sec
1 & 2 channels = 5 updates/sec

Whenever a dual A/D is used, update rate is 5 per second.

NOTE:

You can assign more than one setpoint to a digital output, producing a logical OR condition where the output can be activated by any one of the setpoints.

Also, note that setpoints operate independently from the display. For example, the display may be reading from the scale on channel 1 while the setpoint is reading from channel 2.

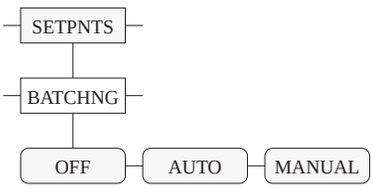


The setpoints GROSSSP, NET SP, +REL SP, –REL SP, and %REL SP have other parameters which give you even more control over continuous setpoints. See Section 3, *Configuration*, for more information on each parameter.

USING BATCHED SETPOINTS

Batched setpoints are active one at a time, in an ordered sequence. Since there are 20 setpoints, the IQ plus 800/810 can control up to 20 separate batch processing steps or operations. When a batch setpoint is active, the corresponding digital output turns ON for the duration of the setpoint (batch step). When the next setpoint in the sequence is active, it turns ON and the previous one turns OFF.

To configure and use batched setpoints, you must activate a global parameter, called BATCHNG. This parameter defines whether a batch sequence is automatic or manual. AUTO sequences repeat continuously, while MANUAL sequences require a digital input signal (BATSTRT) before restarting.

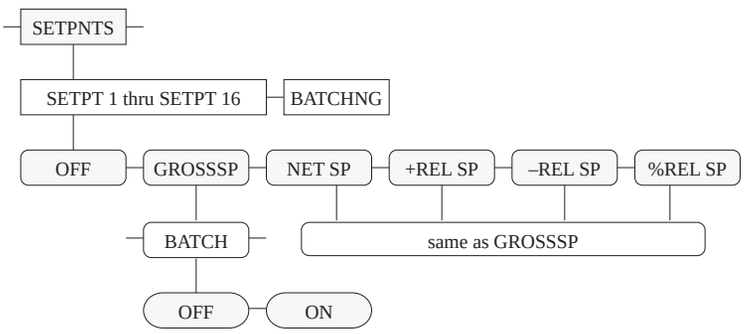


NOTE:
PAUSE, DELAY, WAIT SS, COUNTER, and AUTOJOG do not have the additional BATCH parameter, since they are always dedicated batch types. On the other hand, the continuous setpoint types COZ, INMOTION, INRANGE, –GROSS, –NET, BATCHPR, TIMER, and CONCUR cannot be used as batch steps.

Also, note that setpoints operate independently from the display. For example, the display may be reading from the scale on channel 1, while the setpoint is reading from channel 2.

Also, you must connect two batching switches to two digital inputs. (See Section 8, *Optional Features*, for information about the batching switches.) These switches control two signals, called BATRUN and BATSTRT, which allow a batch to run and start the batch. BATRUN is a normally-closed switch while BATSTRT is a momentary normally-open switch.

When working with batched setpoints, remember that GROSSSP, NET SP, +REL SP, –REL SP, and %REL SP can be either continuous or batched setpoints. In addition to the global BATCHNG parameter, there is a separate parameter for each batched setpoint, called BATCH, which you must turn ON for batch processing. Otherwise, if BATCH is OFF and the setpoint is enabled, it operates as a continuous setpoint (even during batch sequences).



FRONT PANEL PREACT VALUE ACCESS

NOTE:
A PREACT setting of "LEARN" functions only when the setpoint is a batch step.

Values for the setpoint parameter PREACT can be viewed on the front panel, while in the normal operating mode if the PREACT parameter has been turned ON . The **SET POINT** key function allows you to access the PREACT value if the ACCESS parameter is set to ON and PREACT is *not* OFF.

After pressing **SET POINT**, you will see the "SP x" prompt where "x" is the setpoint number. The display then shows the setpoint target value. While viewing the "SP x" prompt or the target value, you can press the **SET POINT** key again to view the preact value. The display will read "P xxxxxx", where "xxxxxx" is the PREACT value.

The PREACT value can be up to 6 digits long and the preact value decimal places will be truncated to fit on the indicator display.

While viewing the PREACT value you can change the value if the ACCESS parameter is set to ON. When viewing the value, you can enter a new value from the keypad and press the **ENTER** key. To clear the PREACT value, press the 0 key and **the ENTER** key.

SETPOINT MNEMONICS

NOTE:
Customized setpoint names can be up to seven characters in length. Capital letters are preferred.

The setpoint mnemonics feature allows you to customize the prompts given to the operator when the **SET POINT** key is used. The default prompt is "SP x", where "x" is the setpoint number. You can define up to 10 unique names, with up to 7 characters each. A setpoint can be assigned one of the defined names that will appear as the display prompt when the **SET POINT** key is used to access the setpoint. This assigned name can be printed on a setpoint print ticket initiated by this setpoint.

Defining setpoint names

NOTE:
Setpoint names must be established using commands entered through the EDP port.

There are 10 user-definable names, with up to 7 characters each. You define the names via the EDP port using the following command:

SPNAME#x=AAAAAAA

where x is the name number 0, 1, 2, 3, ... or 9 and AAAAAAA is the assigned name. Uppercase letters are recommended for the setpoint names because many of the lowercase letters are not legible on the 14-segment display. Table 7-2 shows default command names for numbers 0 – 9.

Table 7-3.

Setpoint name defaults	
Name...	**Default...**
SPNAME#0	INGRED1
SPNAME#1	INGRED2
SPNAME#2	INGRED3
SPNAME#3	INGRED4
SPNAME#4	INGRED5
SPNAME#5	INGRED6
SPNAME#6	INGRED7
SPNAME#7	INGRED8
SPNAME#8	INGRED9
SPNAME#9	INGRD10

Assigning the names to setpoints

The setpoint parameter NAME allows you to assign names to setpoints. NAME can be set to the SPNAME number 0,1,2,...9, as shown above. The NAME parameter defaults to “NONE”, meaning that no name is assigned to the setpoint.

The setting can be changed in the SETUP menu, or you can use the NAME serial command via the EDP port. An example of assigning names to setpoints is given as follows:

Suppose you define the following names —

SPNAME#0=CORN

SPNAME#1=PEAS

SPNAME#2=CARROTS

SPNAME#3=BEANS

Then, you assign these names to setpoints —

SETPOINT=1

NAME=1

SETPOINT=2

NAME=3

When you press the **SET POINT** key to access setpoint #1, the indicator will read “PEAS”. When you press the **SET POINT** key to access setpoint #3, the indicator will read “BEANS”.

NOTE:
The defined name can be printed on the setpoint print ticket by including the <NA> command in the SPFMT print format string.

8. Optional and advanced standard features

APPLICATIONS CHART

Table 8-1 is a list of all the IQ plus 800/810 optional and advanced standard features discussed in this section.

Table 8-1.

Applications Chart

Optional and Advanced Features	IQ plus 800	IQ plus 810 DT	IQ plus 810 SS	IQ plus 810 HE	Page
Rate of Change Function	✔	✔	✔	✔	8-2
Accumulate	STD	STD	STD	STD	8-3
Peak Hold Function	✔	✔	✔	✔	8-5
Bar Graph	✔	✔	✔	✔	8-6
Passwords	✔	✔	✔	✔	8-8
Expansion Board	NA	✔	✔	✔	8-9
Auxiliary Serial Port	NA	✔	✔	✔	8-10
Remote Keyboard	✔	✔	✔	✔	8-12
Multiple Scale Inputs	NA	✔	✔	✔	8-13
2- and 4-Channel 800 Relay Boards	✔	NA	NA	NA	8-15
4- and 16-Channel 810 Relay Rack	NA	✔[1]	✔[1]	✔[1]	8-16
Analog Output Modules	✔	✔	✔	✔	8-19
Setpoint Output Expander Module	✔	✔	✔	✔	8-22
Expanded Serial Communication	✔	✔	✔	✔	8-23
RS-485 Communication for Auxiliary Port	NA	✔	✔	✔	8-24
Supervisor Setup Switch	✔	✔	✔	✔	8-25
Start/Stop/Run Batching Switch	✔[2]	✔[2]	✔	✔	8-26
IQ plus 800 Panel Mount Kit	✔	NA	NA	NA	8-28
IQ plus 810 Panel Mount Kit	NA	✔	NA	NMA	8-29
IQ plus 810 Wall Mount Kit	NA	✔	STD	STD	8-30
Jetpak™ 100 HZ High-Speed Option	✔	✔	✔	✔	8-31
Allen-Bradley Remote I/O Interface	✔[2]	✔[2]	✔[2]	✔[2]	8-32
Recipe Storage Option	✔	✔	✔	✔	8-33

✔ - OPTIONAL
STD - Standard
NA - NOT APPLICABLE

1 - Using more than four relays requires the optional Setpoint Expander Output Module
2 - Includes separate NEMA 4 enclosure and cable for external remote mounting.

RATE OF CHANGE FUNCTION (OPTIONAL)

NOTE:
An access number is provided when this option is purchased. The option is enabled by entering the access number under the FEATURE submenu. See the Configuration section for more information.

The IQ plus 800/810 — with the Rate of Change (ROC) function activated and in the normal weighing mode — will display a change in weight over a preset period of time. The rate of change function is represented by the RATECHG submenu, under the FORMAT menu.

Parameter settings for rate of change are found under the RATECHG submenu, in the first level FORMAT menu. See Figure 8-1 for layout.

The setup for the ROC function is similar in many respects to the set up for the secondary units that are converted and displayed on the indicator when the **UNITS** key is pressed. In this function, though, the units are established in the setup mode, and the display is accessed in the operating mode by pressing the **DISP ROC** key. If the ROC units will be the same as the primary units, display divisions and decimal point location will be the same under RATECHG as those settings under primary units. If, however, the ROC units differ from the primary units, then display divisions, decimal point location, and multiplier will be altered to reflect the new units. For instance, if you were in the pound (lb) base as the primary unit, and wanted to view the ROC of gallons of gasoline, then you would have to know that one gallon of gasoline weighs 6 lbs (for a wide range of conversions, see Section 9-14 in the Appendix for information on conversion factors). With DSP DIV and DEC PNT set the same as PRIMARY, the MULT setting should be entered as “6”. This will cause the ROC units to change by one increment every time the scale changes weight by six pounds.

In the normal operating mode, you can press the **DISP ROC** key to select a Rate of Change display. When selected, the ROC will be active for 7 – 8 seconds, then time out.

The last parameter is used to set the time increments. You can choose between seconds or minutes. The display will show “MIN” for minutes and “SEC” for seconds. In the normal operating mode, you can press the **DISP ROC** key to select a rate of change display. When selected, the ROC annunciator light will be lit.

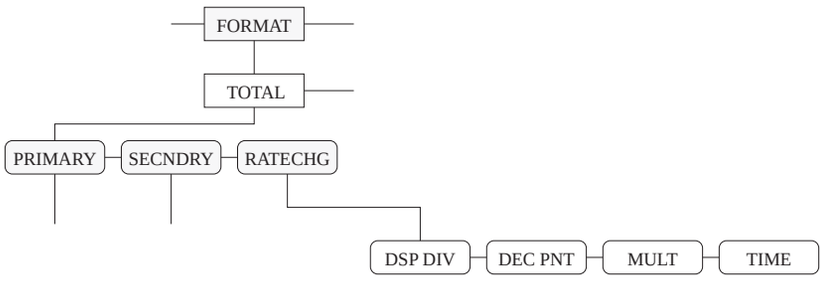


Figure 8-1. Rate of Change submenu layout

NOTE:
Do not turn on ROC for Legal-For-Trade applications before checking with your local Weights and Measures officials. There may be Handbook 44 regulations which affect this function in your jurisdiction.

ACCUMULATE FUNCTION (STANDARD FEATURE)

*To verify that the accumulate function is installed, press the **DISP ACCUM** key. If present, the ACCUM annunciator on the left side of the display will light.*

The Accumulate function (represented by the PSHACCUM submenu, under the SETPNTS menu) is used to add weight data to a register for later access by the user. The accumulator can keep a running total of weights entered either *automatically* by the setpoints, or *manually* by a user pressing the **PRINT** key when the accumulate function is active.

With either the automatic or the manual entry method, the register will accumulate gross weight values only if no tare has been entered into the system. If a tare has been entered (indicated by the T or TE annunciator being lit), the accumulator will automatically always add net weight to the register.

To verify that the accumulate function is ON, press the **DISP ACCUM** key. If ON, the ACCUM annunciator on the left side of the display will light.

In the normal operating mode with accumulate active and a weight value on the display, press the **PRINT** key to store that value in the accumulate register. Subsequent pressing of the **PRINT** key will add whatever value is on the display to the register. To view the accumulated weight currently in the register, press the **DISP/ACCUM** key. The ACCUM annunciator will light, and a value will appear on the display. That value is the total currently in the accumulator register. With that number displayed, pressing the **PRINT** key again prints the accumulated weight through any serial port configured in the “Demand” mode.

NOTE:
*Five accumulators are available with the accumulator software feature. One accumulator is provided for each channel including the total channel. When you press the **PRINT** key, the accumulator corresponding to the current display channel will be updated. To allow maximum flexibility, you can access all five of the accumulators regardless of which channel is being displayed, or how many channels are active.*

When **PRINT** is used as above to print out the displayed register, that value is not accumulated in the register — in other words, the register does not accumulate itself when printed. The display will return to normal weight display after five seconds without a key stroke, or by pressing the **N/G** key. The total accumulated weight can be cleared from the register by pressing the **DISP/ACCUM** key until the total accumulated weight is displayed and then pressing the **CLEAR** key. The display will then prompt the operator with “CLEAR ACC?”. You must then press the **CLEAR** key again to clear the register. If you do not want to clear the accumulate register, you can press the **N/G** key to exit the accumulator function; or, you can wait five seconds without making a key stroke to automatically go back to the normal weighing mode.

NOTE:
None of the accumulators can be used while using the truck program.

Five accumulators are available with the accumulator software feature. One accumulator is provided for each channel including the total channel. When the **PRINT** key is pressed, the accumulator corresponding to the current display channel will be updated. To allow maximum flexibility, you can access all five of the accumulators regardless of which channel is being displayed, or how many channels are active.

The automatic accumulator can be tied to the setpoints for automatic operation. The automatic accumulate function can be tripped immediately when the setpoint value is reached, or after the value is reached AND when the scale achieves standstill.

Parameter settings for the setpoint-activated accumulate functions are found under the PSHACCUM submenu, in the first level SETPNTS menu. See Section 3, *Configuration*, for layout.

Front panel access

You can add to any accumulator from the front panel by pressing the accumulator number, followed by the **PRINT** key. For example, if you are displaying channel 1 and press "3 **PRINT**", accumulator 3 will be updated. To add to the total accumulator, you can enter "0" and press **PRINT**. If you are displaying channel 1 and press PRINT only, accumulator 1 will be updated.

To view the accumulators, press the **DISP ACCUM** key. A prompt will inform you which accumulator is being displayed. By entering an accumulator number on the front panel and then pressing the **DISP ACCUM** key, you can view the accumulator of his choice. The total accumulator can be viewed by pressing "0" and **DISP ACCUM**. By pressing **DISP ACCUM** repeatedly, you can cycle through and view all of the accumulators. If an invalid number is entered before the **PRINT** key is pressed, no accumulator will be updated and no ticket will be printed.

The total accumulator will be handled the same as the other accumulators. If the total channel is the current display channel and the **PRINT** key is pressed or "0" **PRINT** is entered, the total accumulator will be updated. The total accumulator is not meant to reflect the total of the other accumulators.

To clear an accumulator, you display the accumulator value and press the **CLEAR** key. The indicator will prompt "CLR AC1, CLR AC2, CLR AC3, CLR AC4 or CLR AC0". You then press **CLEAR** again to clear the accumulator. Each of the accumulators is cleared independently.

To print an accumulator you display the accumulator value and press the **PRINT** key. The following ticket will be sent out the print destination port:

ACCUM #x aaaaaaa LB

01/01/94 02:56 AM

where x is the accumulator number and aaaaaaa is the current accumulated value. This is *not* a formattable ticket.

Setpoint access

To access the accumulators from the setpoints, the PSHACCUM parameter can be set to 1, 2, 3, 4, and 0. When the PSHACCUM is set, the appropriate accumulator will be updated and the new value will be printed as follows:

ACCUM #x aaaaaaa LB

01/01/94 09:20

where x is the accumulator number and aaaaaaa is the updated accumulator value.

The ticket produced by the setpoint PSHACCM is *not* formattable. Some customers do not want this information printed so the following parameter settings for PSHACCUM have been added: 1 QUIET, 2 QUIET, 3 QUIET, 4 QUIET, and 0 QUIET. By setting the PSHACCM setpoint parameter to one of these settings, the corresponding accumulator will be updated but the accumulator print ticket will be suppressed.

PEAK HOLD FUNCTION (OPTIONAL)

NOTE:
An access number is provided when this option is purchased. The option is enabled by entering the access number under the FEATURE submenu. See the Configuration section for more information.

The Peak Hold function (represented by the PK HOLD submenu, under the CONFIG menu) is used to determine, display, and print the greatest net weight data achieved during a weighing cycle. See Figure 8-2 for layout.

A weighing cycle ends when the print command is given, or when the peak net weight is manually cleared by the **CLEAR** key. Peak hold tracks only net weight, and operates independently of the display. For example, if the indicator is displaying gross weight, but AUTO peak hold is active, the display will remain in gross, but the net peak weight will be automatically printed when standstill is achieved at zero.

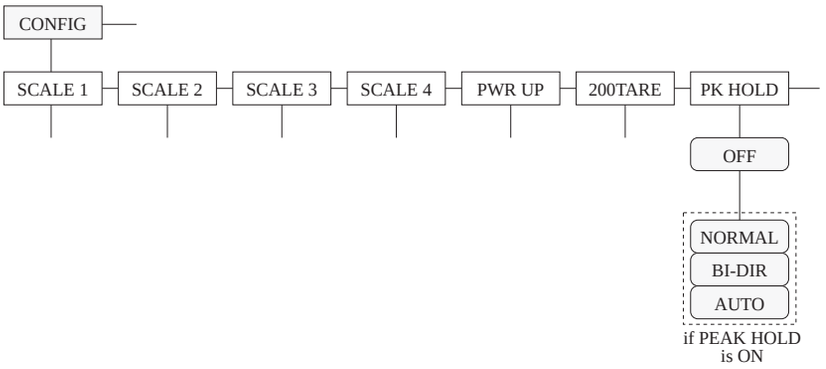


Figure 8-2. Peak Hold submenu layout

Peak hold function is enabled in the Setup Mode. Parameter settings are found under the PK HOLD submenu, in first level CONFIG menu:

1. NORMAL (Positive Peak, Manual Reset). This is the basic peak hold function in which a weight is applied to a scale and the greatest net weight value is held in memory until the weight is removed from the scale, and the **CLEAR** key is pressed. If the display is in gross mode, the peak net weight can be displayed by toggling to the net mode with the **N/G** key.
2. BI-DIR (Bi-Directional Peak, Manual Reset). This is the same as NORMAL above except that the peak can either be a positive or negative number, determined by the absolute weight value. This means that if a positive peak is displayed, a negative weight value of greater absolute value can update the peak information in the same cycle. As above, the peak cycle is reset by pressing the **CLEAR** key after the weight has been removed.
3. AUTO (Positive Peak, Auto Print, Auto Reset). This is the same as

NORMAL, except that an automatic print command occurs after the scale achieves standstill, and when the scale load is reduced to 0 ±10 display divisions. Following the print command, the peak value is cleared and reset automatically. As in the above two modes, the peak hold value can also be cleared by the **CLEAR** key, or by a manual press of the **PRINT** key.

The peak hold function will only track the primary analog input of the indicator. The digital display can be set to display other analog inputs or gross weight information data using the **N/G** mode key during peak hold function cycles.

BAR GRAPH (OPTIONAL)

The Bar Graph feature (represented by the BAR GRF menu) has 48 LED segments that can be scaled to represent weight, speed, or batch step progress. It can be used to monitor the progress of batch steps in a batching sequence, with assigned segments lighting when a particular batch step is active. The bar graph can also be used as a visual graph to monitor individual setpoint operations like a filling operation, with segments progressively lighting as the fill weight increases until all 48 are lit when the setpoint weight is achieved.

The bar graph can also be set up around a band, rather than a single setpoint value. In this case, the segments begin to light at the bottom of the band value and are entirely lit at the middle of the band. Then they progressively extinguish until all are off at the top end of the band.

The bar graph function is enabled in the Setup Mode. Parameter settings are found under the first level BAR GRF menu. See Figure 8-3 for layout.

During a batching operation where the setpoints are configured as steps in a batching sequence, the bar graph can be programmed to illuminate the appropriate three segments in the sequence while a particular setpoint (batch step) is active. This is the “TWNKL” selection mode shown in Figure 8-3. TWNKL provides a visual indication of which setpoint (of setpoints 1 — 16) is “hot” during a batch process. Continuous setpoints that are not part of the batch process are shown as continuously on by the bar graph.

Another use of the bar graph is to monitor the active weight value of a setpoint during a filling operation. This gives the operator a visual indication of the level of completion of a particular setpoint. This is the “GRAPH” selection mode. If the band width (“BAND”) is set to equal the setpoint value, each of the 48 segments is equal to approximately 2 percent of the total set point value. When the ingredient begins to fill, all of the bar graph segments will be OFF. The segments will begin to light from left to right as the weight value increases to meet the setpoint value.

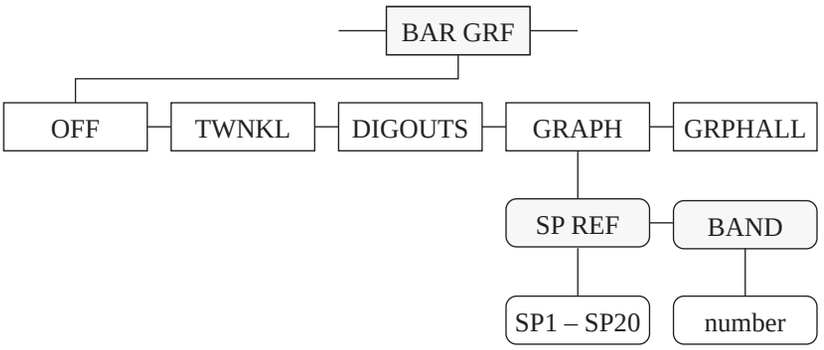


Figure 8-3. Bar Graph submenu layout

NOTE:

The Bar Graph is an optional hardware feature that is recommended for all setpoint applications. Any of the IQ plus 800/810 models can be fitted with the Bar Graph. It mounts on the front side of the display board as shown in Figure 8-4.

Another popular use for the bar graph in "GRAPH" mode is as an "over/under" indicator. In this application the *low* level is set at one end of a band width and the *high* level is set at the other end. The difference between the low and high points becomes the "accept" band. When the weight on the scale is below the accept band, all segments of the bar graph (except the last segment on the left) are dark. When the weight reaches the low level point, the bar graph segments begin to light from left to right. When the weight is halfway between the high and low points, all of the bar graph segments will be lit. As the weight increases from this point the segments will begin to turn OFF from left to right. When the weight exceeds the high point of the band, all of the segments will be turned OFF, except the last one on the right. This segment remains ON to show that the upper range of the band has been exceeded.

The bar graph can also be configured to display a particular load cell channel. For example, the weight value of scale 1 can be displayed digitally, while the weight value of scale 2 can be displayed graphically on the bar graph.

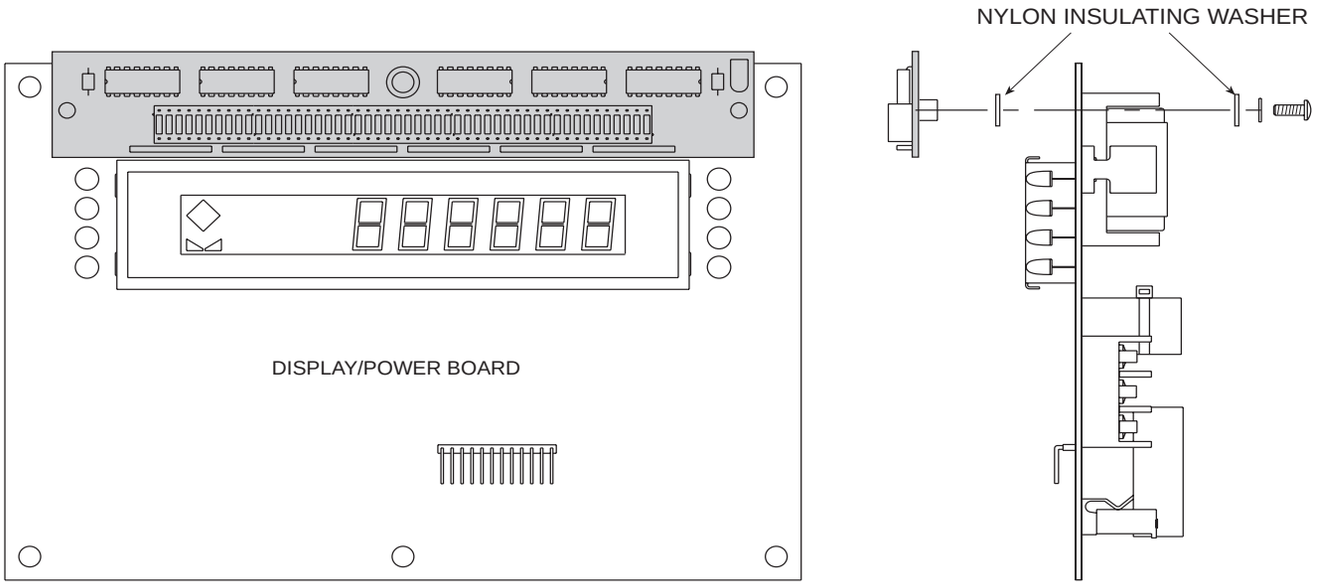


Figure 8-4. Bar Graph hardware mounted on display board

PASSWORDS (OPTIONAL)

NOTE:
An access number is provided when this option is purchased. The option is enabled by entering the access number under the FEATURE submenu. See the Configuration section for more information.

The password feature supports two passwords: one for the entire configuration menu in setup mode and one for setpoint configuration from the supervisor switch and from the **SET POINT** key.

Entering passwords

The passwords can be entered as parameters under the first level menu CONFIG (from the submenu PASSWORD) if the password feature is turned ON. The indicator reads PASSWORD. Move down in the menu and the indicator will read CFG PWD for the CONFIG password and SP PWD for the setpoint password. Move down again and enter up to seven digits for each password. This is the only place either password can be entered/changed.

CONFIG password: When you are in normal operating mode and switch the CONFIG switch, the indicator will prompt CONF ID. You can then enter the numeric password. As each digit is entered a "*" will appear from left to right on the indicator. You must then press the **ENTER** key. If the password is incorrect, the indicator will display REJECT and return to the CONF ID prompt. There is no penalty for entering an incorrect password. You can attempt to enter the password as many times as you wish. Once a correct password is entered, the indicator displays ACCEPT and then moves into the CONFIG menu.

SETPOINT password: The setpoint password works the same as the CONFIG password. When you press the **SET POINT** key or enter supervisor mode, the indicator will prompt STPT ID. You then enter the numeric setpoint password and press **ENTER**. If incorrect REJECT will appear and then STPT ID again. If correct, you can continue to view alter the setpoint parameters. The setpoint password can*not* be changed from the setpoint submenu.

NOTE:
*The setpoint password can*not *be changed from the setpoint submenu.*

Disabling Passwords

Either or both of the CONFIG or SETPOINT passwords can be disabled by entering a 0 (zero) for the password in the CONFIG menu. Because passwords are saved on the EEPROM, the loss of battery backup will *not* disable the passwords.

Backdoor password

If you forget the CONFIG password and have no way to enter the CONFIG menu, call Rice Lake Weighing Systems. We can help you find a unique "back-door" password to enter the CONFIG menu.

EXPANSION BOARD (OPTIONAL)

The IQ plus 810 Expansion Board (Figures 8-5 through 8-7) is a separate hardware board which provides the additional room for adding other options to the system. The expansion board mounts directly in back of the main board on furnished standoffs. Ribbon cables are used to connect the main board to the expansion board. Several options are included as part of the expansion board; others are purchased separately and mounted onto the expansion board.

NOTE:
The Expansion Board will not fit into the more compact IQ plus 800 case.

Expansion board standard features...

- Auxiliary, EDP-type serial port
- Alternate remote keyboard input

Additional options which mount on expansion board...

- Single or dual load cell input module
- Analog output module
- RS-485 serial communication chip (U7) for the auxiliary EDP serial port.

NOTE:
If the expansion board is mounted in the IQ plus 810 Desktop model, the unit will accommodate neither the 4-channel nor the 16-channel relay rack. SS and HE models will accommodate both the expansion board and any of the optional relay racks.

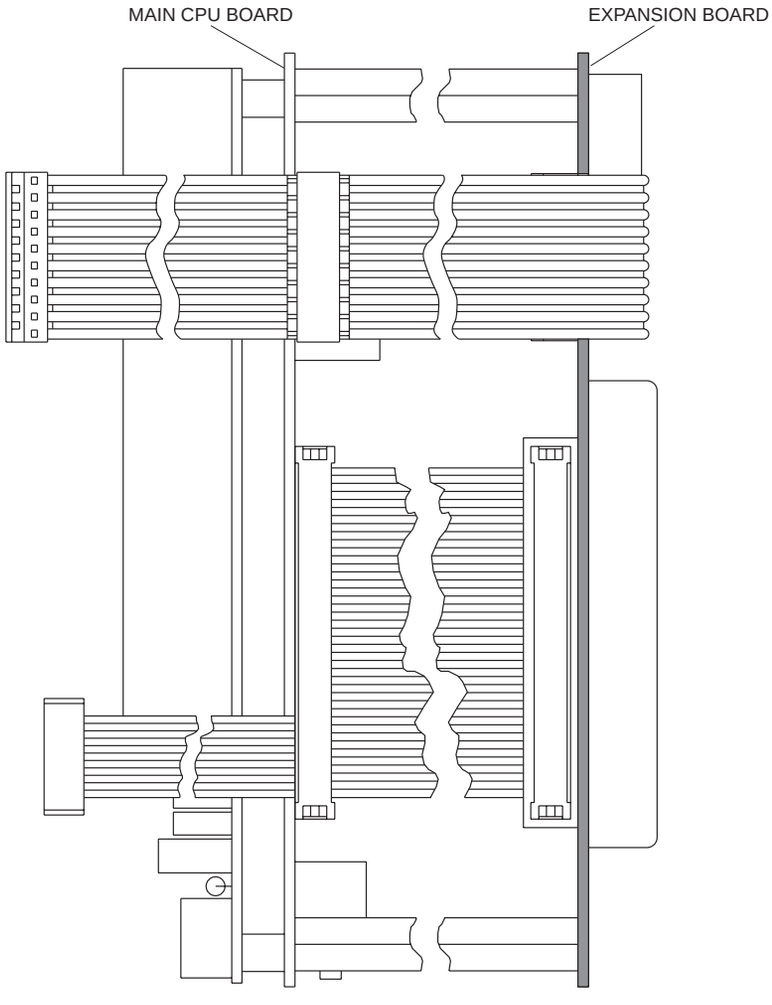


Figure 8-5. Expansion board (side view)

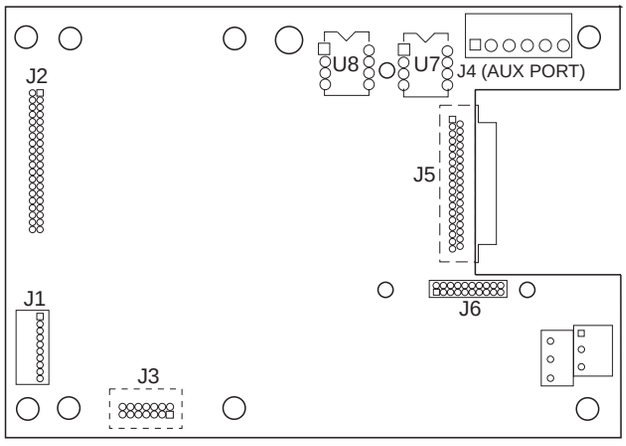


Figure 8-6. Expansion board (component side)

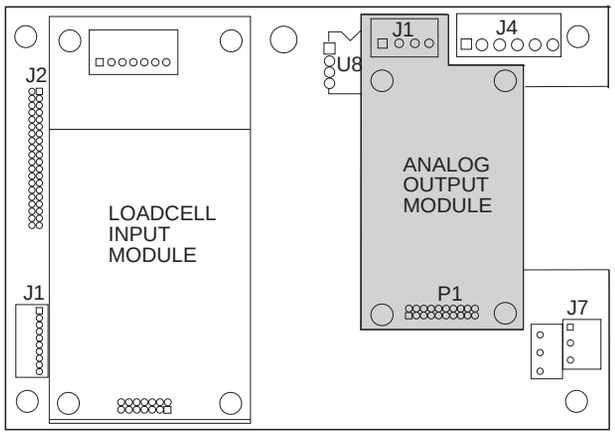


Figure 8-7. Expansion board with modules installed (component side)

AUXILIARY SERIAL PORT

An electronic data processing *serial* port is available on the expansion board. This auxiliary third serial communications port is represented by the AUX submenu, in the first level SERIAL menu (see Figure 8-8 for layout). The port address is a selectable parameter, under the AUX submenu.

The auxiliary serial port can be used as an RS-232 transmitter, 20 mA current loop transmitter, or RS-485 transmitter (by adding a U7 integrated chip). The AUX port can be configured for continuous stream or demand print communications. The other menu selections are similar to the EDP port selections, with the exception that the AUX port has a maximum baud rate of 9600, rather than 19200, and is simplex output only.

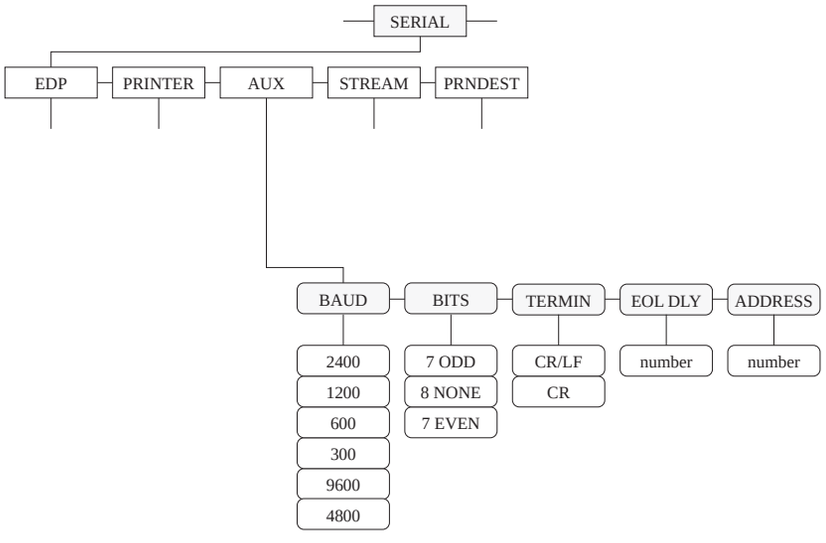


Figure 8-8. Auxiliary serial port parameter layout

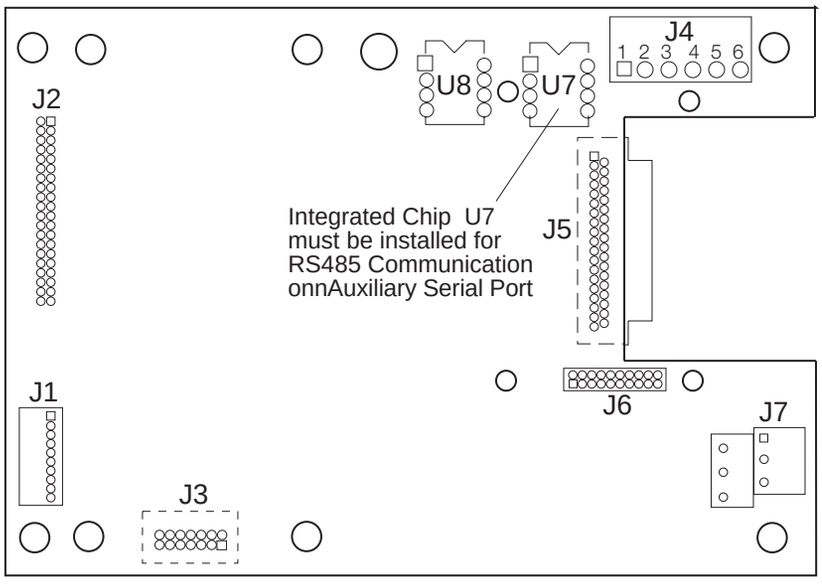
When configured for RS-232 applications through the AUX port, neither of the integrated chips U7 nor U8 (Figure 8-9) is installed in their respective sockets on the expansion board. J4-5 (OUT) and J4-6 (GND) terminal connections are used for output-only RS-232 communication. Output-only 20 mA Current Loop transmission is also available simultaneously on J4-4 (20 mA CL-) and J4-6 (20 mA CL+). See Table 8-2 below for terminal connections.

Table 8.2.

Auxiliary serial port connection points on expansion board			
AUX	**RS-232**	**RS-485**	**20 mA**
J4-1		485-A	
J4-2		485-B	
J4-3			
J4-4			20 mA CL-
J4-5	RS-232 OUT		
J4-6	RS-232 GND		20 mA CL+

When used for RS-485 applications, the AUX port can be configured to operate as a transmitter-only on a multi-drop twisted-pair line. U7 must be installed in the proper socket on the expansion board to configure the AUX port as an RS-485 transmitter. Before installing U7, make certain that U8 is ***not*** installed. J4-1 (RS-485-A) and J4-2 (RS-485-B) terminal connections are used for RS-485 applications.

Figure 8-9. Auxiliary serial port and expansion board



REMOTE KEYBOARD

The alternate keyboard connector provides a means for connecting a remote keyboard to the IQ plus 810 system. All inputs are active-low with pullups to +5 V. Any of the front panel keyboard functions can be activated by shorting the appropriate alternate keyboard input to ground with hard-contact switches, or by achieving TTL logic-low levels. When a remote keyboard is being used, the built-in keyboard is still functional and available for use. Terminal connections (J5 on the expansion board) for a remote keyboard are listed in Table 8-3.

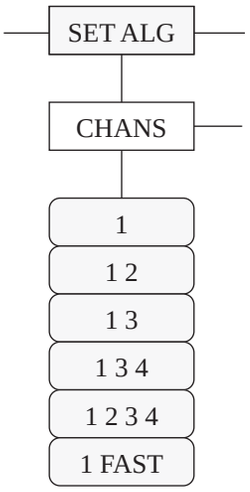
Table 8-3.

Terminal connection (J5 on the expansion board) for the remote keyboard	
J5-1 GROUND	J5-20 GROUND
J5-2 (spare)	J5-21 (spare)
J5-3 (spare)	J5-22 CLEAR (Right)
J5-4 PRINT	J5-23 NEW ID
J5-5 SETPOINT (Left)	J5-24 SCALE #
J5-6 ZERO	J5-25 GROSS/NET
J5-7 TARE	J5-26 UNITS
J5-8 DISP TARE (Up)	J5-27 1
J5-9 GROUND	J5-28 GROUND
J5-10 GROUND	J5-29 2
J5-11 3	J5-30 DISP ACCUM
J5-12 4	J5-31 5
J5-13 6	J5-32 DISP RO
J5-14 7	J5-33 8
J5-15 9	J5-34 TIME/DATE (Down)
J5-16 .(Decimal Point)	J5-35 0
J5-17 ENTER	J5-36 GROUND
J5-18 GROUND	J5-37 nc
J5-19 nc	

MULTIPLE SCALE INPUTS (OPTIONAL)

The standard IQ plus 800/810 has a single analog input channel. The 800 can be expanded to 2 channels, and the 810 to 2, 3, or 4. This feature is represented by the CHANS submenu, under the SET ANALOG menu. The parameter settings (or channel selections enabling multiple channel inputs) are accessible from the CHANS submenu. See Figure 8-10 for layout.

Figure 8-10. Multiple scale inputs (CHANS submenu) layout



*The channels can be selected and processed individually or as a total by toggling with the **SCALE #** key. The red annunciators for the appropriate scales will light to indicate the active source channel(s).*

The channels can be selected and processed individually or as a total by toggling with the **SCALE #** key. The red annunciators for the appropriate scales will light to indicate the active source channels. A separate option allows channel 1 to be selected as a high-speed channel, weighing at 100 updates per second. The indicator's power supply will support up to 32-700 Ω load cells or 16-350 Ω load cells, all on one channel or split up amongst multiple channels.

Notice that *only* the channels specified are operational with the various multichannel setups. For example, channel 2 is not operational with the 1, 3 channel or the 1, 3, 4 channel setup.

The most common use of multiple channel weight indicators is in axle weighing truck scales. In this application two, three, or four truck scales are placed end to end. In a three-scale system, the front scale weighs the front axle of the truck. The second scale weighs the drive axles of the truck, and the third weighs the trailer axles. The IQ plus 810 indicator could display each axle weight individually or display the sum of all scales.

It is also possible to do multiple "loss in weight" steps or filling applications using one indicator. There are 20 setpoints available on the IQ plus 800/810. Each set point step can be assigned to any one of the load cell input channels. The only restrictions are that the application not require high-speed display updates and that the weights in each tank not be simultaneously displayed. It is possible, however, to monitor two tanks at once — one channel can be watched on the bar graph, while monitoring the other channel on the digital display.

NOTE:
If the indicator is displaying the TOTAL of all channels, and any active scale on any channel goes into an underrange or overrange condition, the display will blank out.

It is important to note that channels are processing information, whether or not those channels are displayed to the operator. Setpoint functions in Net mode on channel 2, for instance, can be automatically running even though the display may be showing Gross weight on channel 1.

Each channel has its own individual setup parameter for graduations, display divisions, decimal point location, and units.

The hardware choices necessary to add multiple channels allow several possible combinations of multiple channels. Either a single or a dual-channel input module can be mounted on the main board and a dual-channel module on the expansion board. Both modules plug into female connectors already installed on the boards. The only external difference between the single-channel and dual-channel module is the activation of the second J-10 terminal strip for wiring the second scale (see Figure 8-11). The second-channel sense jumpers (JP3, JP4) only appear on the dual-channel modules.

The software choices under the SET ALG main menu allow the following combinations:

NOTE:
When installing dual-channel modules, be sure to enter the VZERO, VVAL, and VSPAN values listed on Volts Calibration label (on module). Go to the Calibrate-Volts submenu on the IQ plus 800/810 to enter these values. (Refer to Section 4, Calibration*, for more information).*

- Single-channel module on main board (CHANS = 1)
- Dual-channel module on main board (CHANS = 1, 2)
- Single-channel module on main board and single-channel module on expansion board (CHANS = 1, 3) NOTE: Single-channel modules on expansion board will not be available after August, 1996.
- Single-channel module on main board, and dual-channel module on expansion board (CHANS = 1, 3, 4) NOTE:Channel 2 is not operational with this setup.
- Dual-channel on both main and expansion boards (CHANS = 1, 2, 3, 4)

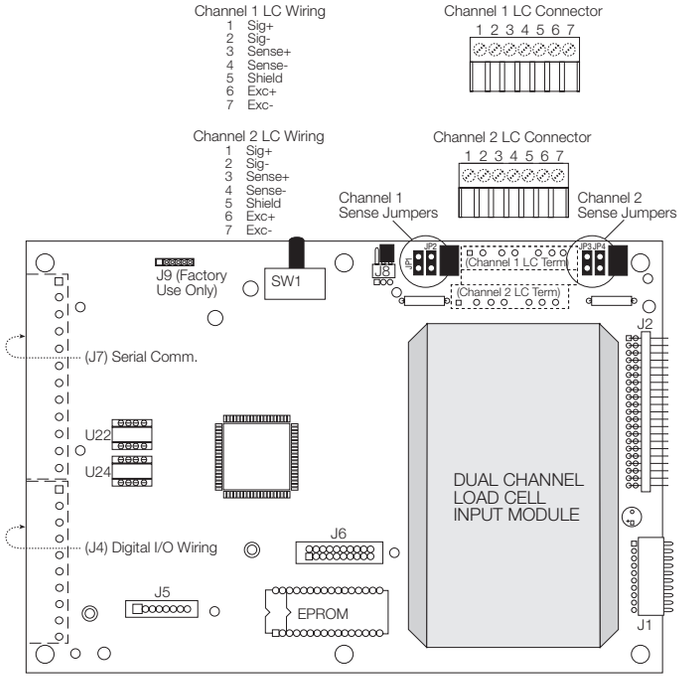


Figure 8-11. Dual-channel module on main board

2- AND 4-CHANNEL RELAY BOARDS (IQ PLUS 800)

A 2-channel or a 4-channel relay board is available for mounting inside the IQ plus 800 case.

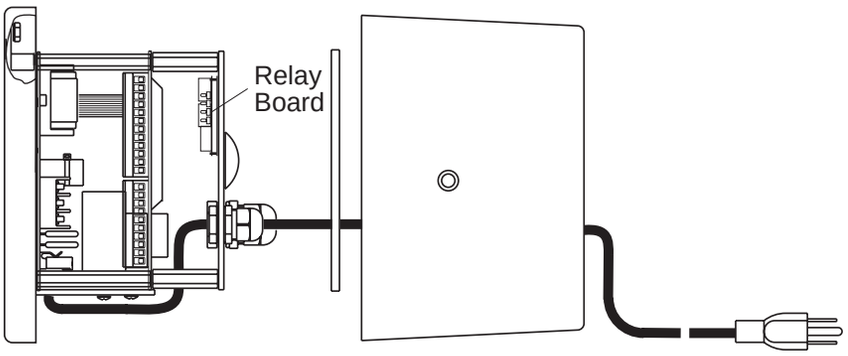


Figure 8-12. Mounting relay boards on IQ plus 800 back panel

2-Channel Relay Board

This compact (2.5" x 3.0") output board allows two digital outputs to control 115 VAC or DC services that operate other equipment. Both outputs can be wired for normally-open (N.O.) or normally-closed (N.C.) operation. Relays activate on a logic low state. Relay outputs are rated at 3 amps at 115 VAC and .5 amps at 50 VDC.

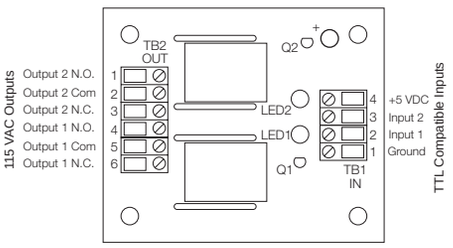


Figure 8-13. IQ plus 800 2-Channel Relay Board

4-Channel Relay Board

This 3.0" x 4.0" input/output board allows up to four digital outputs to operate 115 VAC or DC service. Two of the channels have a normally-open contact output. The remaining two output channels are selectable for either normally-open or normally-closed. Relay outputs are rated at 3 amps at 115 VAC and .5 amps at 50 VDC. The output contact is fused with a 4 amp fuse. Up to three AC inputs from equipment in the field can also be wired to the board to feed into the indicator's TTL-level digital inputs. Inputs are normally-open in a +5 VDC logic-high OFF condition. When AC voltage is present , the outputs go to an ON logic-low state.

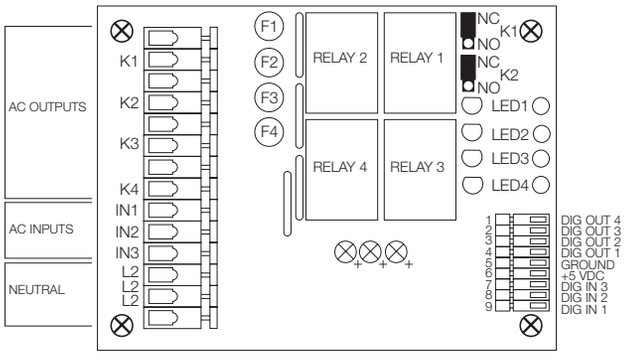


Figure 8-14. IQ plus 800 4-Channel Relay Board

NOTE:
Relay outputs K1 and K2 can be selected as normally-open or normally-closed by placing their jumpers to the NO or NC position.

4-CHANNEL AND 16-CHANNEL RELAY RACKS (IQ PLUS 810)

Relay racks may be mounted on standoffs or bolted to the main mounting panel on IQ plus 810 models to allow the 5 VDC indicator signals to operate AC or DC working voltages. This allows the indicator to control (or receive input from) peripheral equipment operating at various voltages. Individually-fused input and output relays are designed to plug into either the 4-channel rack or the 16-channel rack. The AC output relays are rated at 3 A working voltage, with a 4A fuse. Both input and output relays are available in either AC or DC voltage configuration. Each rack has a fuse tester for troubleshooting, and one spare fuse.

A single 4-channel rack can be mounted in any of the IQ plus 810 models. On the SS and HE models, the board is mounted in predrilled holes in the panel holding the main CPU board. See Figure 8-15. On the Desktop model, standoffs are furnished for mounting a relay rack off the main CPU board.

If more relays than will fit on a single 4-channel rack are desired, the use of the optional 12 TTL Setpoint Output Expander Board is required. See page 8-22 for information on this option.

For an 8-channel system, two 4-channel racks can be mounted side by side in either the SS or HE models as shown below.

The 16-channel rack mounts in same outer holes as those used for the 4-channel racks in the SS and HE models. The Desktop model will *not* accommodate the 16-channel rack.

Wiring connections will vary according to particular combination of individual input and output relays chosen for the application. Sample wiring diagrams in Figures 8-14 through 8-16 show the general principles.

NOTE:
Boards manufactured prior to August, 1996 may not have a built-in 5 VDC power supply to power digital outputs. To provide clean 5 VDC power for digital output operation, use the optional external power supply board (part # 16418).

Boards manufactured after that date (rev. 2.0 and higher) have a 5 VDC power supply available on the main board at J4, pin 10.

NOTE:
For greater noise immunity, we recommend that a separate 5 VDC power supply be used to operate relays.

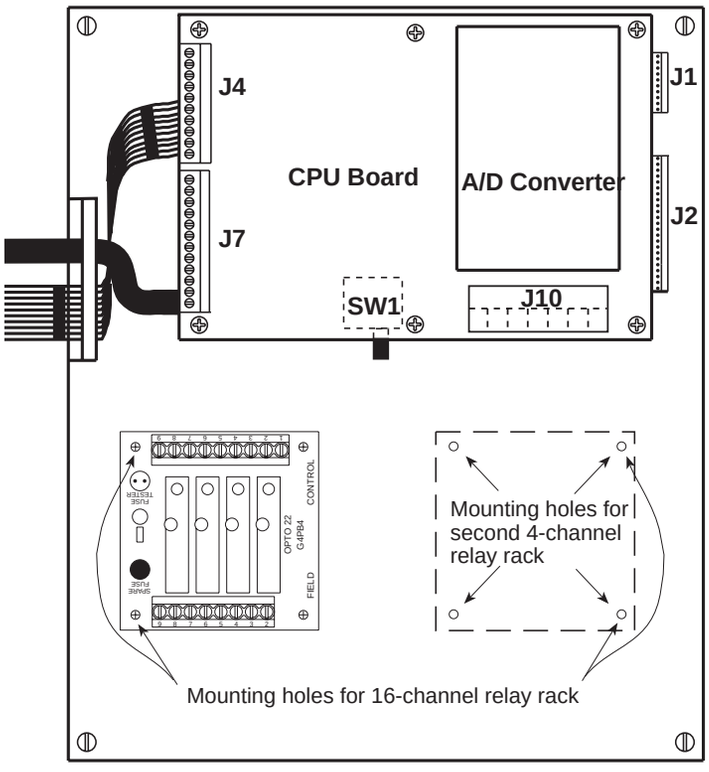
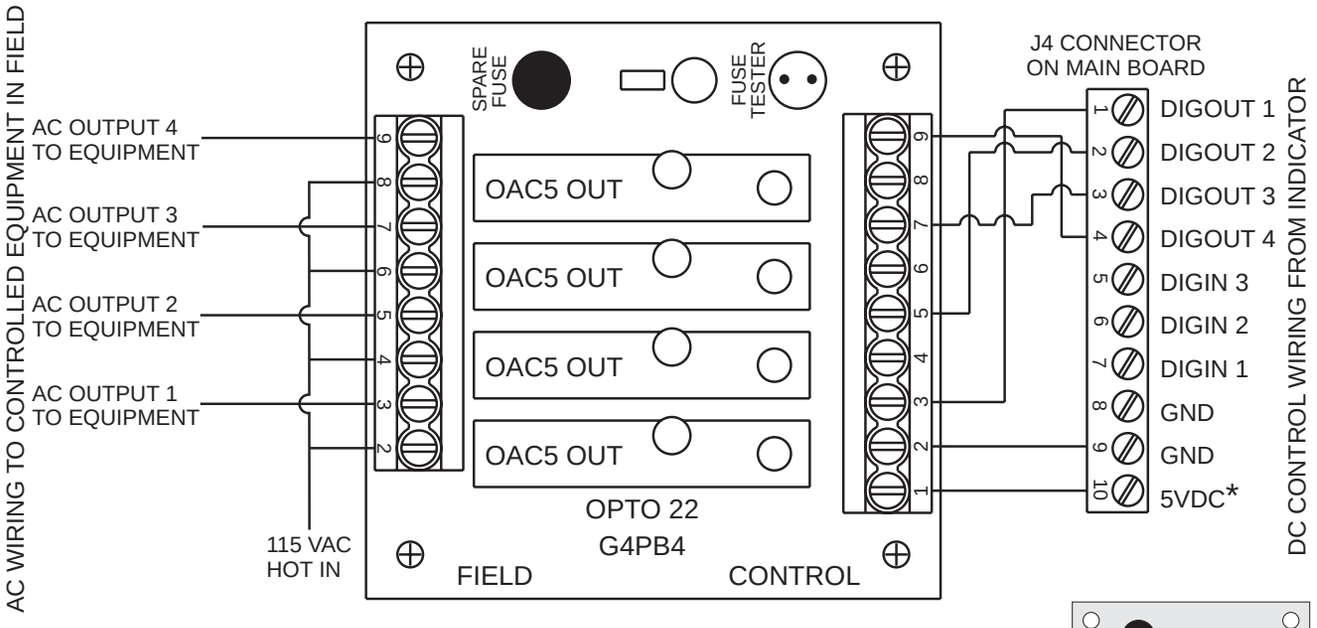


Figure 8-15. Mounting of 4-channel relay racks on SS or HE panel



*NOTE: Boards manufactured prior to August, 1996 may not have 5 VDC power supplied to J4, pin 10. To provide 5 VDC power for digital output operation with those boards, use external power supply board (part # 16418) as shown at right.

Boards manufactured after that date have a 5 VDC supply at J4, pin 10 which can be used to power digital outputs on relay boards.

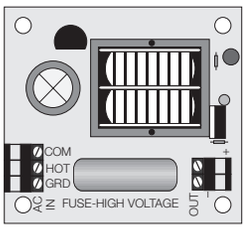
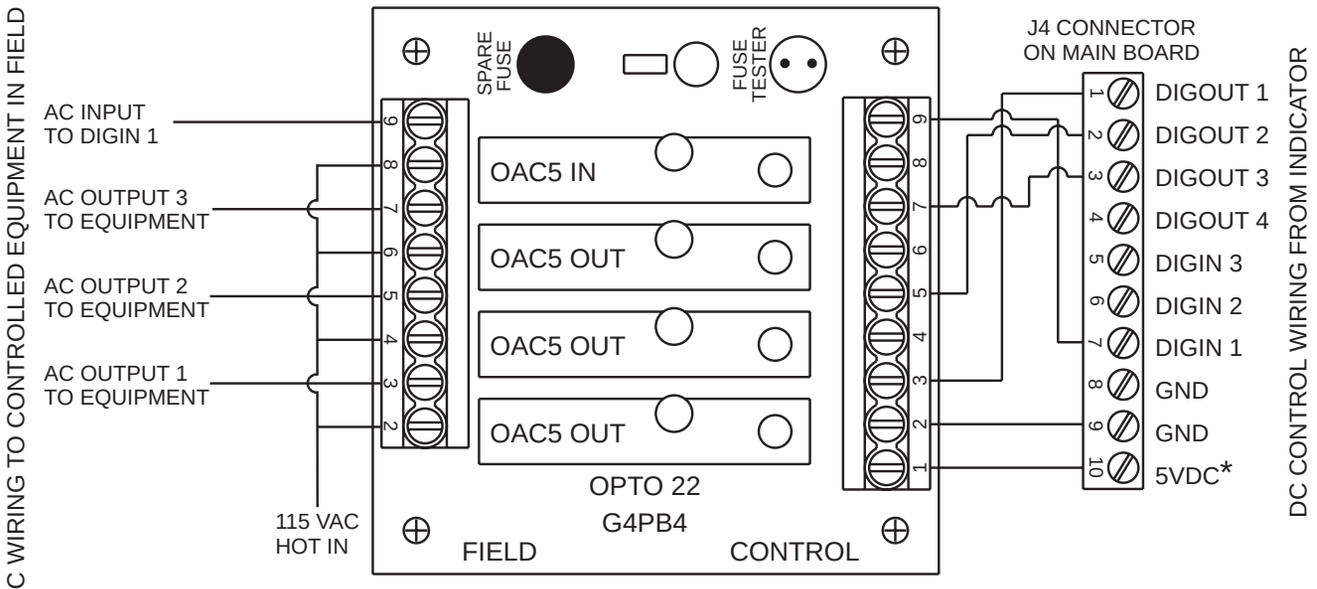
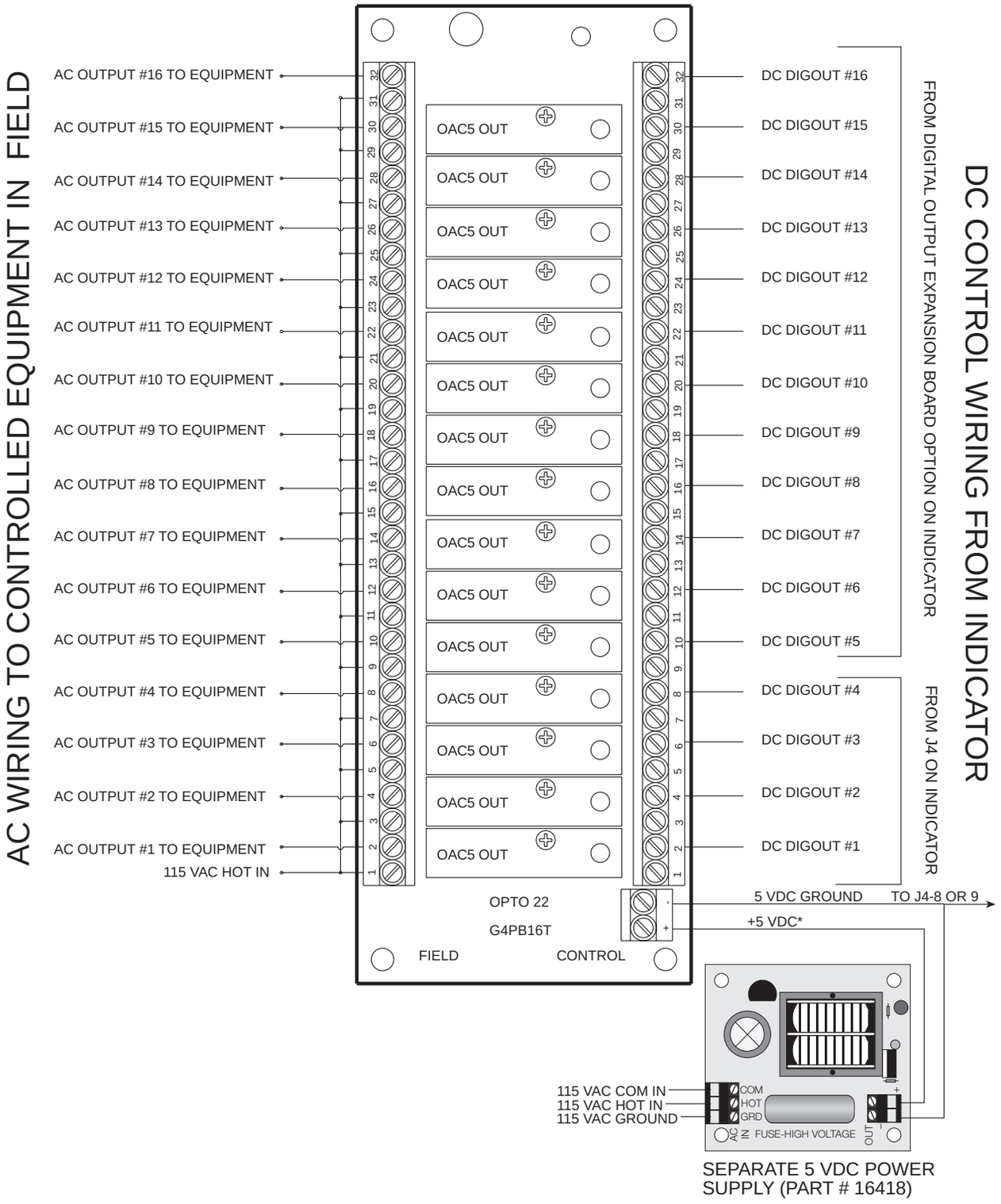


Figure 8-16. Typical wiring for 4 AC outputs to control equipment in the field



*NOTE: Boards manufactured after August, 1996 (rev. 2 or higher) have a 5 VDC supply at J4, pin 10 which can be used to power digital outputs on relay boards.

Figure 8-17. Typical wiring for 3 AC outputs to control equipment, 1 AC input back to indicator



*When using a main CPU board manufactured after August, 1996 (rev. 2 or higher), +5VDC power can be provided to the relay board from J4-10 on the main board. Boards manufactured prior to that date must use the separate 5 VDC power supply to energize the relay board. In either case, run a 5 VDC ground wire to J4-8 or J4-9.

Figure 8-18. 16-channel relay rack with external 5 VDC power supply

ANALOG OUTPUT (OPTIONAL)

The IQ plus 800 may have one analog output module installed. The IQ plus 810 will accept two analog output modules with the expansion board assembly. Either output may be setup for 0 to 10V, or for 4 to 20-mA analog output. With this arrangement on a dual-output 810, you may use one output for 0 to 10V operation and the other output for 4 to 20-mA output, or you may make both of them the same type of output. Each of these modules has separate calibration parameters in the configuration menu under the first level menu ALG OUT (Analog Out), but each is installed and calibrated in the same manner.

Analog output module #1 is located on the back side of the main board immediately behind the configuration switch.

Analog output module #2 is located on the back side of the expander board.

To connect an analog output, locate the J1 connector on the Analog Output module. This is a 4-position pluggable connector located at one end of the analog output board. The pinout below lists functions for the pins of this connector. *Pin#1 of this connector is located closest to the outer edge of the PC board. Pin #1 is designated on the board by a square, rather than a round, pin designation.*

Analog output module pinout

Pin #	Function
1	+ Current Out
2	- Current Out
3	+ Voltage Out
4	- Voltage Out

Before the analog output can be configured and calibrated, the IQ plus 800/810 must be configured and calibrated to the scale. See Sections 3 and 4, *Configuration* and *Calibration*, for more information on how to do the configuration and calibration on the IQ plus 800/810 to the scale.

Analog output calibration

After the IQ plus 800/810 is configured and calibrated to the scale, you may configure and calibrate the analog output. This is done by entering CONFIGURATION (as you did for the Setup) and moving horizontally to the selection labeled “ALG OUT”.

The analog output layout is shown in the following figure. Move down one step and you will get a display of “ALGOUT1” for analog output 1 or “ALGOUT2” for analog output 2. Move horizontally to the output which you wish to calibrate at this time and down one level to get to the configuration and calibration level for that analog output.

NOTE:

Although each of these analog outputs is hooked up and calibrated in the same manner, please note that each module has separate calibration parameters in the configuration menu under Analog Out.

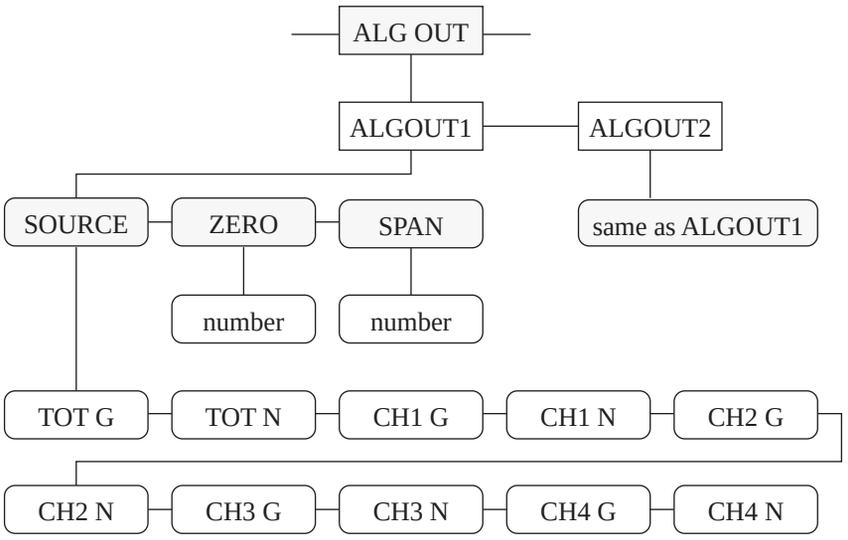


Figure 8-20. Analog output submenu layout

First, choose the source that the analog output will track. Scroll to the selection labeled “SOURCE”. Move down to get to the selectable choices. They are Gross or Net of Channel 1, 2, 3, 4 or TOTAL. For the purposes of calibration, it is best to set the source to the GROSS of a channel so that you can calibrate without having to work with a Tare. After the calibration is completed, you may then change it to a NET if you wish. After making your selection, move up one level and horizontally to the right to the selection labeled “ZERO”.

Entering coarse zero and span values

The next step is to enter the “Coarse” Zero and Span values. These values give the indicator a starting point from which to work and must be entered before final calibration can be completed. Without these values entered, you may see a zero or span shift of the analog output while doing your final calibration of the analog output.

The coarse zero is entered by moving down from the “ZERO” prompt. At this level, enter a 7.5 for the coarse zero if you will be hooking up and using the 0 to 10V output, or enter 3100 if you will be using the 4 to 20 mA output. After entering the proper coarse zero value, push the **ENTER** key. Move up to the “ZERO” prompt and horizontally to the right to the “SPAN” prompt.

The next step we need to perform is entering the coarse span value. This is done by first making a simple calculation based an the type of output that you will use and the weight value that you wish to equal the full span output. The values that you will use for the coarse span values are:

15300 For 0 to 10 Volt Output

12400 For 4 to 20 milli-amp Output

You simply divide the proper number from above by the full span weight value.

As an example of this, we will calculate the coarse span value for a 0 to 10V output at 5000 lb. In this case, we will use the value of 15300 for the 0 to 10V output and divide it by the full scale output of 5000.

15300/5000 = 3.06

This calculation gives us a coarse span value of 3.06. With this information, we may now go and enter it into the indicator. At the "SPAN" prompt, move down 1 level and you are ready to enter the calculated value. Key in the calculated value in from the key board and press the **ENTER** key. Move up 1 level to the "SPAN" prompt and horizontally to the left back to the "ZERO" prompt.

NOTE:
Set the scale back to the normal weigh mode to insure that the scale is reading zero with no weight, and the correct span value with the test weight.

Final zero and span calibration of the analog output

We are now ready to perform final calibration of the zero and span for the analog output. The receiving device must be hooked up to the indicator and in operation.

For the following final calibration steps, shift back into the Setup Mode and remain in that mode during the final calibration process.

With the scale cleared of weight, check to see what the receiving device is seeing at zero. If the receiving device is showing zero, you may continue to the final span calibration. If the receiving device is showing slightly behind zero, move down into the zero cal setting where you keyed in the COARSE Zero value and enter a slightly larger number. You may have to make several entries until you walk the receiving device into zero. If you find the receiving device is seeing a slightly above zero reading, enter a slightly smaller number and check the receiving device again. Continue adjusting until the receiving device reads zero. When completed, move back up to the "ZERO" prompt and move horizontally to the right to the "SPAN" prompt.

NOTE:
You may prefer to use a digital multimeter for this step rather than reading the controller the indicator is being used with. →

You are now ready to perform the final span calibration. Enter the test weight that you used to calibrate the scale back on the scale. You will use this weight to calibrate the analog output as well. Remember that if the test weight is only 50 percent of the full span value, the analog output should be adjusted to only 50 percent of its span value. With the test weight on the scale, check the receiving device for its received value.

As with the zero adjustment, if the value is not what it should be, move down into the span value and enter a slightly smaller or larger value as is needed; "walk" the output in until the receiving device is indicating the correct value for the amount of test weight on the scale.

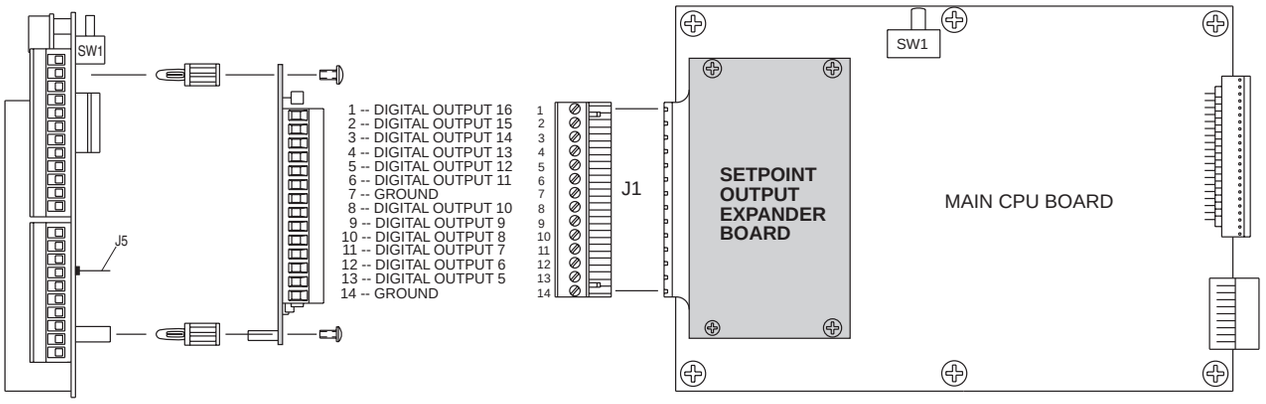
When you have completed the final span procedure, run the weight up and down on the scale to test zero and span output. When completed, return the indicator back to the normal weighing mode.

SETPOINT DIGITAL OUTPUT EXPANDER (OPTIONAL)

There are four standard digital outputs on the main board designed primarily to be switch-closure outputs for controlling relays. The setpoint expander board adds 12 additional digital output terminals, bringing the total to 16. Like the original digital outputs, each of these is an open-collector circuit capable of sinking 250 mA when ON and withstanding +40 VDC when OFF. In addition, resistor pull-ups to +5 V are provided, making the outputs capable of driving TTL or 5-V CMOS logic directly, without the need for any additional circuitry. The logic levels are active-low. For example, a TTL low level indicates the output is ON, and a high level indicates the output is OFF.

The setpoint digital output expander board mounts on standoffs on the component side of the main board (Figure 8-21). An 8-pin male terminal (J5 on the main board), plugs into a socket on the setpoint expander board as it is being mounted on the standoffs. For reference purposes, the J5 connector pinouts are shown in Table 8-4. With the HE or SS models, it will be necessary to temporarily remove the main board from its mounted position to gain enough clearance to install the setpoint expander board. The main board can then be reattached in its original position. With the Desktop model, the setpoint digital output expander can be mounted with the main board in place.

Figure 8-21. Setpoint expander board mounted on component side of main board



NOTE:
When assigning the setpoints to the digital out terminals, remember that digital outputs 1 – 4 remain on the J4 terminal of the main board, and 5 – 16 are on the J1 terminal of the setpoint expander board.

Table 8-4.

Connector pinout, J5 (main board) to setpoint digital output expander board	
J5-1	+5D
J5-2	DOUTSTB
J5-3	RESET
J5-4	DOUTCLK
J5-5	SDOUT
J5-6	GND
J5-7	HGND
J5-8	HGND

EXPANDED SERIAL COMMUNICATION (OPTIONAL)

The expanded serial communications option includes:

- Adding duplex 20 mA current loop to EDP serial port
- Adding RS-485 to EDP serial port

Adding duplex 20 mA current loop to EDP serial port

In standard form, the EDP port has duplex RS-232 serial and simultaneous output-only 20 mA current loop (CL) communication. To change the simplex 20 mA CL to duplex, integrated chip U22 must be installed in the proper connection on the main board (Figure 8-22). Integrated Chip U24 must not be installed with this application. When used for duplex 20 mA CL communication, main board connections on the J7 terminal are: J7-7 (CL+ IN), J7-8 (CL- IN), J7-10 (CL- OUT), AND J7-12 (CL+ OUT). See the connector pinout table below.

Wiring RS-232 and 20 mA

EDP Port :	RS-232	EDP Port: 20 mA (U22)*
J7-7		CL+ IN
J7-8		CL - IN
J7-9	RS-232 IN	
J7-10		CL- OUT
J7-11	RS-232 OUT	
J7-12	GND	CL+ OUT

*Integrated chip U22 must be installed; U24 must *not* be installed**.**

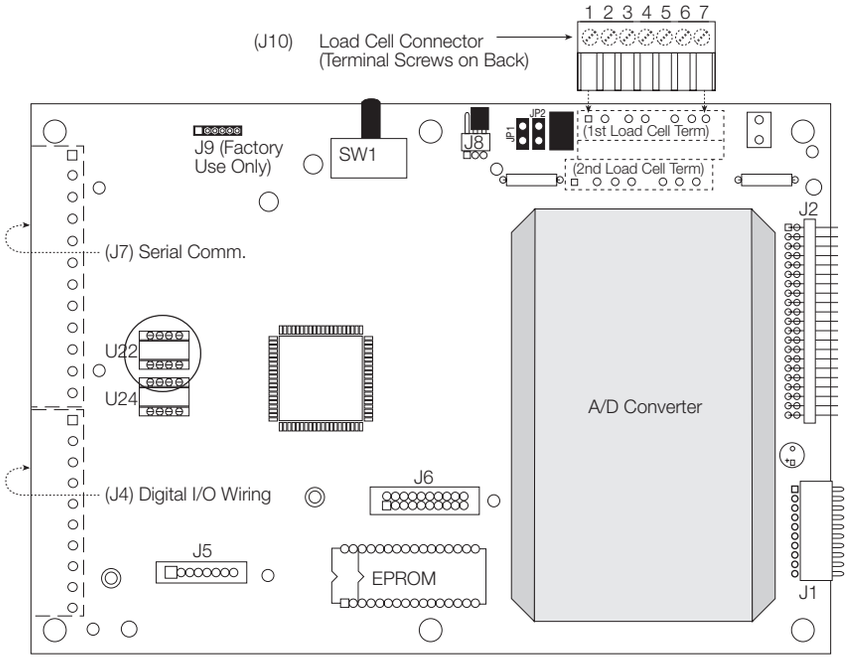


Figure 8-22. Location of duplex 20 mA CL chip, U22, on main board

Adding RS-485 to EDP serial port

When used for RS-485 applications, the EDP port can be configured to operate as a transceiver on a multi-drop twisted-pair line. Optional integrated chip U24 must be installed in the proper socket on the main board to configure the EDP port for RS-485 format (Figure 8-23). Before installing U24, make certain that U22 is *not* installed. J7-7 (RS-485-A) and J7-8 (RS-485-B) are used for RS-485 applications. See the connector pinout table below.

RS-485 wiring

EDP Port	RS-485 (U24)*
J7-7	485-A
J7-8	485-B
J7-9	
J7-10	
J7-11	
J7-12	

*Integrated Chip U24 must be installed; U22 must *not* be installed.

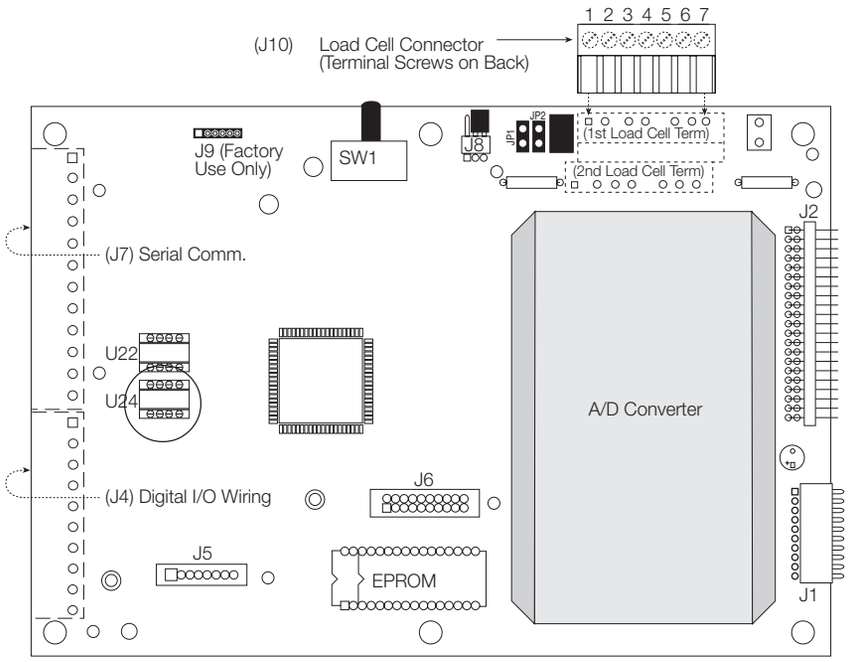


Figure 8-23. Location of RS-485 chip, U-24, on main board

RS-485 COMMUNICATION FOR AUXILIARY PORT

The auxiliary serial port on the expansion board can be configured to operate in RS-485 format . Integrated chip U7 must be installed in the proper socket on the expansion board to configure the AUX port as a 485 transceiver (Figure 8-24). Before installing U7, make certain that U8 is *not* installed. Terminal J4 on the expansion board is used for the AUX serial port connections. J4-1 (RS-485-A) and J4-2 (RS-485-B) are used for RS-485 applications. See the connector pinout table following.

AUX port RS-485 wiring

AUX Port	RS-485 (U7)*
J4-1	485-A
J4-2	485-B
J4-3	
J4-4	
J4-5	
J4-6	

*Integrated Chip U7 must be installed; U8 must NOT be installed.

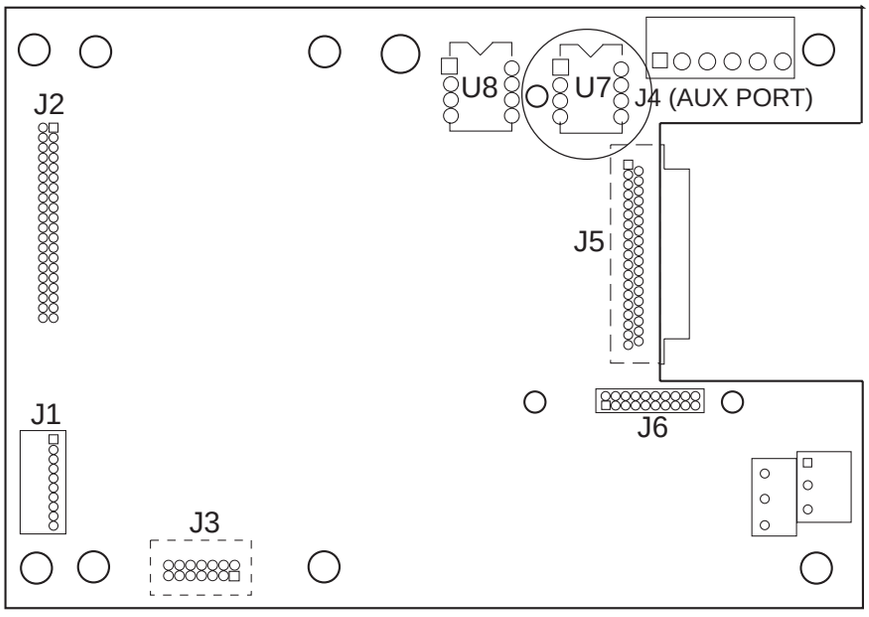


Figure 8-24. Location of RS-485 chip, U-7, on component side of expansion board

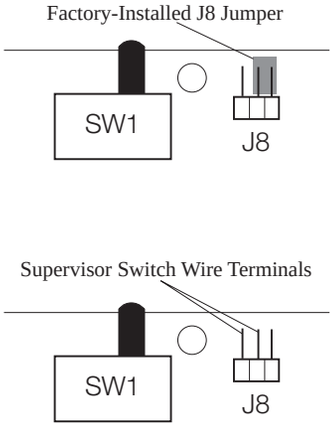


Figure 8-25. Supervisor Switch Wiring

SUPERVISOR SETUP SWITCH (OPTIONAL)

With the supervisor setup switch, a modified Setup mode can be accessed without entering the case or breaking the legal weights and measures seal. This mode allows access to all setup parameters, except those which are involved in legal-for-trade transactions (Grads, Display Divisions, etc.). The supervisor setup switch must be unlocked with a key—normally carried by a supervisor—which prevents tampering with important parameters by unauthorized operators.

The wiring for the switch is connected to the two terminals on J8 (main board) closest to the SW1 switch. The two terminals farthest from SW1 will be jumpered at the factory as shown at left. Remove that existing jumper. Connect the supervisor switch wires to the two terminals closest to SW1 using appropriate connectors. The supervisor switch body can be mounted in a hole drilled in the enclosure for that purpose, or can be mounted remotely.

START/STOP/RUN BATCHING SWITCH (OPTIONAL)

The Batching Switch option comes as a complete unit with legend plate, locking stop button, and run/start/abort 3-way switch (Figure 8-26). With the SS and HE models, the unit can be mounted directly on the face of the case by drilling 7/8-inch holes for the two switches. The 810 DT and 800 models have insufficient room for switches on the case, and a special FRP case is available for mounting the switch unit remotely. The remote mounting kit includes case, 5 feet of cable, and O-ring and cord grip for sealing. Either mounting method is waterproof, and maintains a NEMA 4X rating.

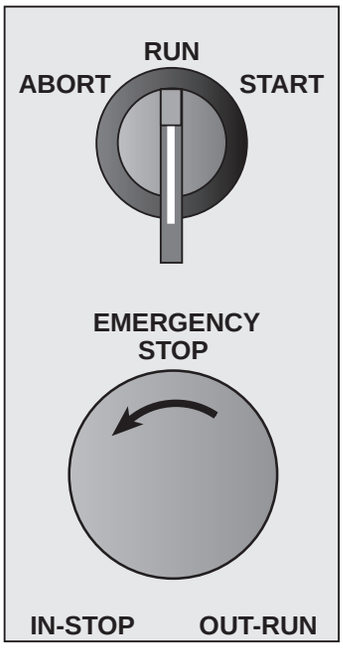


Figure 8-26. Start/stop/run batching switch

Both switches are wired into the indicator's digital input connection terminal according to the wiring in Figure 8-27 on the following page. Each switch requires a separate digital input, leaving one of the IQ plus 800/810's original three digital inputs available for other use. The 5-VDC digital ground required to operate the switches is available on the indicator's digital input terminal at J4-8 or J4-9.

After the switches are mounted and wired, the IQ plus 800/810's software must be configured for the correct digital input functions. (Detailed configuration instructions are found on the following page.)

The batching switch is designed for safety and ease of operation, yet is flexible enough to allow choices when restarting a halted batch. Three general principles govern the operation of the switches:

1. The red STOP button must be in the OUT position to allow the batch process to run. This enables BATRUN with a TTL-low (ON) condition.

   To begin a batch process, the 3-way switch must momentarily be turned to START. If the STOP button is pushed during the batch process, the process halts and the button locks in the IN position. Turning the 3-way switch to START while the STOP button is locked IN will *not* resume the batch process. The STOP button must be turned counterclockwise to unlock it, and release it into the OUT position.

2. When the STOP button is used to halt a batching operation, the operation will continue *where it left off* by following these steps:

   a. Unlock the STOP button to OUT.

   b. Turn the 3-way switch to START.

3. When the STOP button is used to halt a batching operation, the operation will *abort and return to the beginning step* by following these steps:

   a. Before unlocking the STOP button, turn the 3-way switch to ABORT.

   b. Unlock the STOP button to OUT.

   c. Turn the 3-way switch to START.

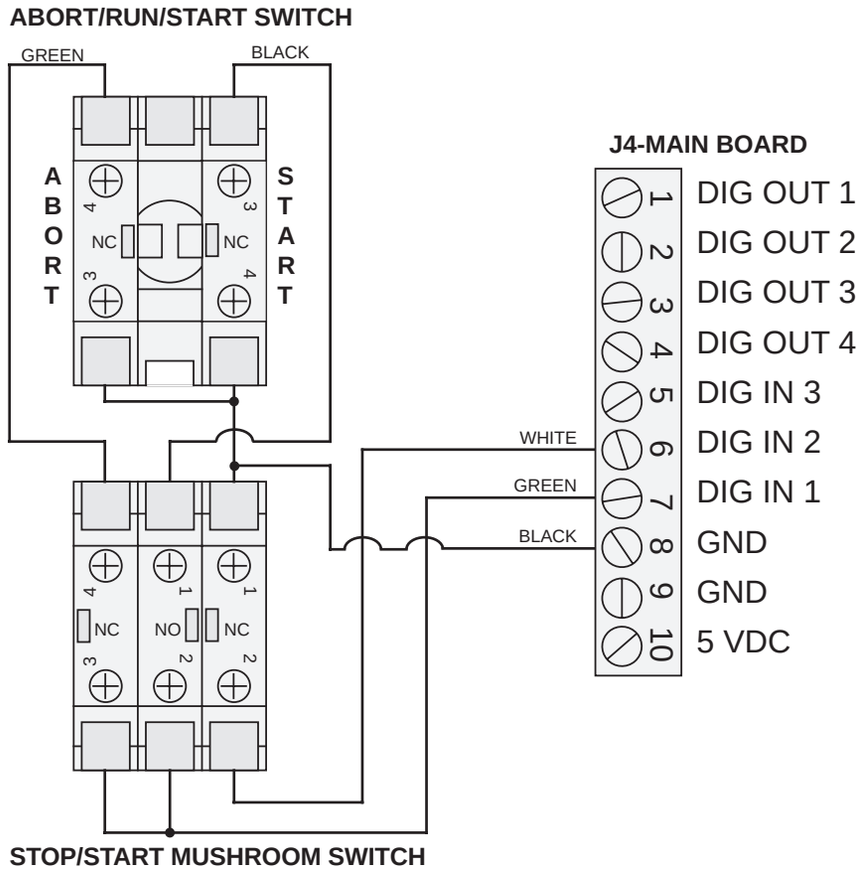


Figure 8-27. Wiring diagram for start/stop/run batching switch

Configuring the batching switch option

When the hardware switches and wires are completed, place the indicator in the Setup Mode using SW1 on the main CPU Board. Use the first level menu DIG IN to configure the batch switch option. Move down to the submenu DIG IN 1 and choose BATSTRT as the digital input 1 selection. Then, move to the submenu DIG IN 2 and choose BATRUN as the digital input 2 selection. Return to normal weighing mode when the digital input configuration above is completed. See below for layout of batch switch option in the DIG IN menu.

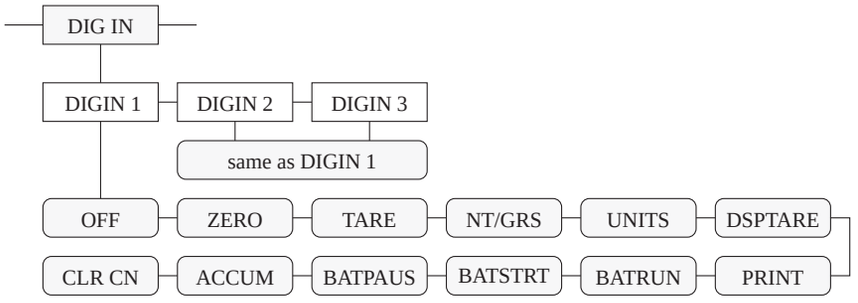


Figure 8-28. Batch switch option menu layout

IQ PLUS 800 PANEL MOUNT KIT (OPTIONAL)

The IQ plus 800 Panel Mount Kit contains two brackets, six stainless steel screws, and a 4' length of gasket.

1. Unplug the AC power cord before beginning.
2. Using a template with a cutout 9-7/8" W by 7-7/16" H, transfer the cutout outline to the panel. Cut out the panel.
3. Attach the gasket to the edge of the cutout on the front of the panel.
4. If the tilt stand has been attached, remove it from the indicator and discard the large thumbscrews which held the tilt stand to the indicator. Insert the IQ plus 800 completely into the panel cutout until the front lip of the indicator contacts the gasket.
5. Attach the angle brackets to the threaded holes on the sides of the indicator case using the 1/4-20 X 3/8" screws provided.

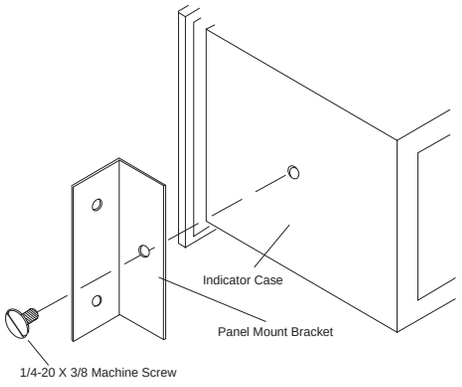


Figure 8-29. Attaching Panel Mount Brackets to IQ plus 800

6. Use the four 10-32 X 1 3/4" stainless steel screws to hold the indicator's front lip snugly against the gasket so a good seal is achieved.

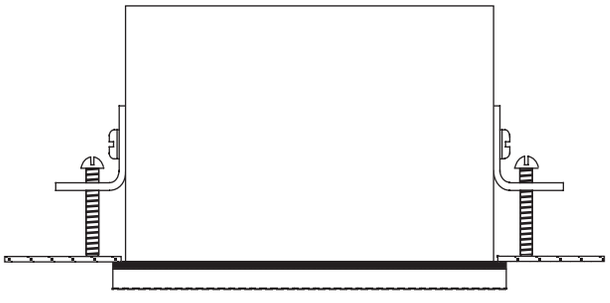


Figure 8-30. Installing IQ plus 800 into Panel Mount

7. Reattach cables to indicator and power the unit up.

IQ PLUS 810 PANEL MOUNT KIT (OPTIONAL)

The panel mounting kit for the IQ plus 810 Desktop model contains five screws with washers which replace the original screws holding the body to the faceplate. A template constructed from the drawing below may be used to mark the hole cutout in the panel. See Figures 8-31 and 8-32.

1. Unplug the AC power cord before beginning.
2. Remove the back of the indicator by unscrewing the six machine bolts holding the back to the faceplate.
3. Temporarily remove any cable connections from the indicator terminals. Remove the ground cable from the cast lug on the rear of the indicator case.
4. Using a template made from the drawing, transfer the cutout to the panel. Cut out the panel and drill the holes to size.

Figure 8-31`. Panel mounting layout (front view)

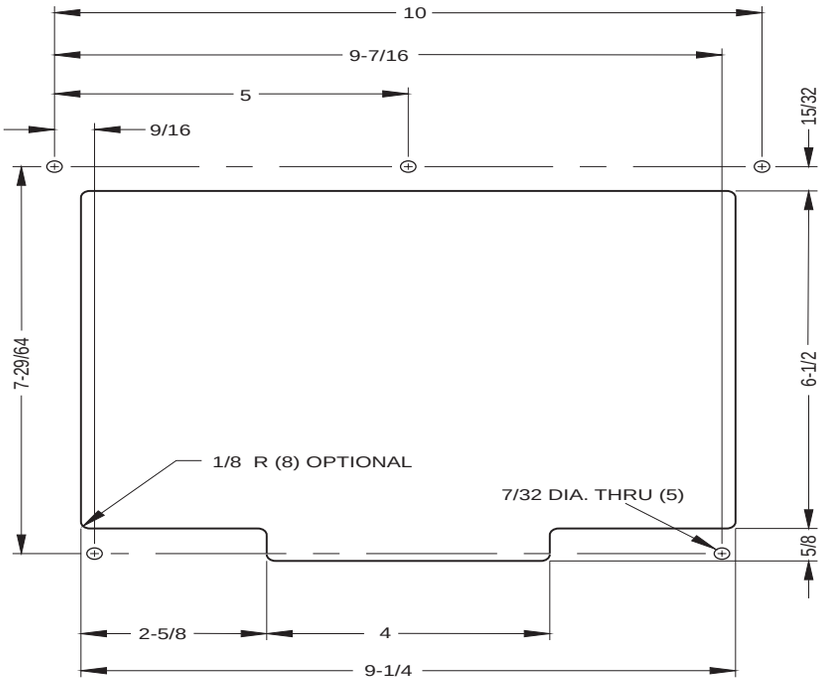
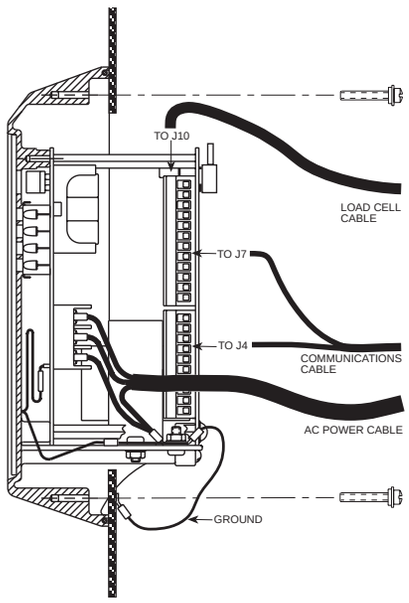


Figure 8-32. Panel mounting wiring (side view)



5. Hold the faceplate against the panel as shown and secure with the five machine screws and washers provided.
6. Attach the ground wire that was connected to the lug on the indicator body to one of the five screws.
7. Reattach cables to indicator terminals. Power up and test the indicator.

WALL MOUNT KIT (OPTIONAL)

A wall mount kit is available for mounting the IQ plus 810 DT model against vertical surfaces. The indicator mounting plate both swivels and tilts for adjusting the viewing angle. The indicator case is secured to the mounting plate with two machine screws turned into threaded holes in the bottom of the indicator body. Overall dimensions are shown in Figures 8-33 and 8-34.

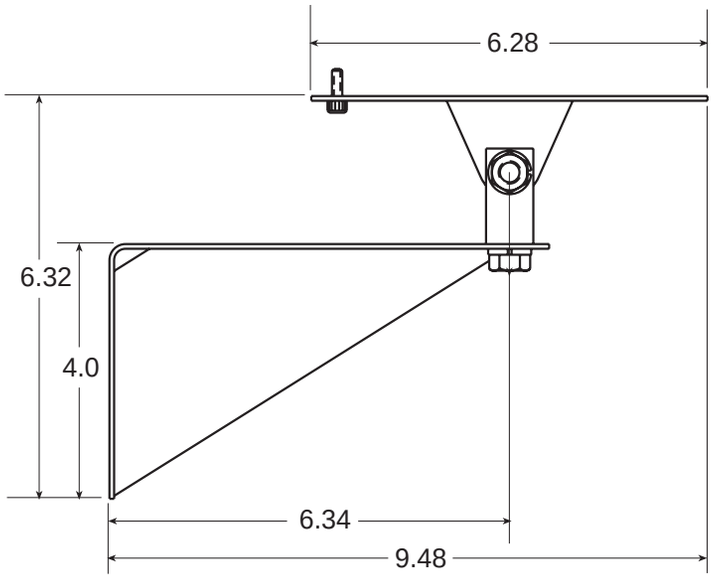


Figure 8-33. Wall/tilt stand (side view)

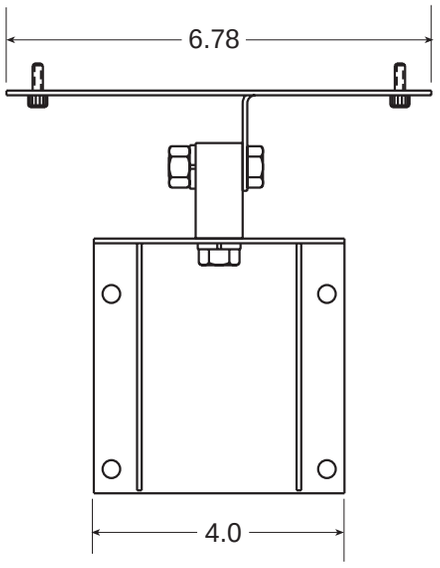


Figure 8-34. Wall/tilt stand (front view)

100-HZ HIGH SPEED OPTION (OPTIONAL)

The Jetpak™ version of the IQ plus 800/810 features an update rate of 100 updates per second. This option can be added after purchase to modify an existing unit, but it is best that it be initially ordered as a high-speed unit. The necessary hardware—a dedicated, single-channel 100 Hz A/D converter—should be installed at the factory. High-speed Jetpak™ units are identified by a special label on the A/D converter, and the letter "X" in the model number tag.

Software indicators also designate the unit as a high-speed version. Upon startup, the unit will run through a lamp test, then display the word FAST for two seconds. After setup has been completed and the unit is exiting the SETUP mode, the word FAST will again flash onto the display momentarily.

The Jetpak™ version of the IQ plus 800/810 is a dedicated single-channel, high-speed indicator. As such, the high-speed A/D precludes the use of multiple input channels. When setting up the unit, use the first level menu SET ALG (Set Analog), then move down to the submenu CHANS. The only selection available under the CHANS parameter is 1 FAST. Any other menu selections involving multiple channel choices will be either disabled or limited to single-channel choices. All other features of the standard IQ plus 800/810 system are compatible with the Jetpak™ option.

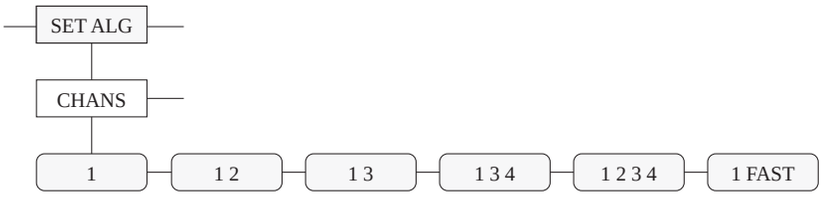


Figure 8-35. 100 Hz High-Speed Option Menu Layout

MAXIMIZING OPERATING SPEED

NOTE:
Note that the complete weighing system must be streamlined to take full advantage of the high-speed weighing capabilities of the Jetpak™ unit.

- Operating more than two continuously-running setpoints requires intensive work from the microprocessor and will generally slow the actual update rate to less than 100 per second. Batch step setpoints, however, do not affect the update rate and can run at 100 per second.
- Operations which depend heavily on serial communications will not affect the A/D converter rate, but will slow down the capabilities of the overall system. The practical limit for serial transmission is approximately only 50 readings per second, even though the A/D is updating at 100 per second. Continuous Streaming format, End-of-Line delays, and extensive EDP serial port commands all act to slow down the overall system performance. Slow baud rate selections will further reduce the capabilities of the system. A special high-speed data streaming version is available. However, several standard options such as setpoints are not available when high-speed data streaming is used. Consult the factory for specifications and limitations.
- Inappropriate settings, like filtering selections which require long settling times, will also slow down the overall speed of the weighing system.

ALLEN-BRADLEY® REMOTE I/O INTERFACE (OPTIONAL)

The Remote I/O Interface allows IQ plus 800/810 indicators to communicate with PLC® and SLC™ controllers using the Allen-Bradley® Remote I/O network.

The Remote I/O Interface returns weight and status information streamed from the indicator to the PLC controller and provides full control of indicator function to the PLC programmer.

Figure 8-36 shows an example of the Remote I/O Interface used to connect an IQ plus 810 indicator to an SLC controller on an Allen-Bradley network.

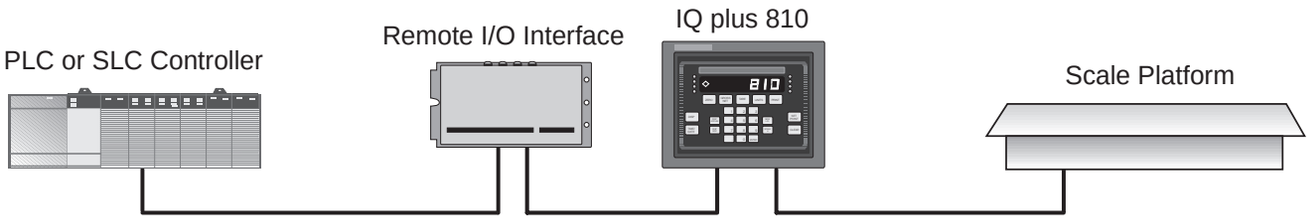


Figure 8-36. AB Remote I/O Interface Sample Application

The Remote I/O Interface is housed in a NEMA 4X stainless steel enclosure to permit use in washdown environments. RS-232 communications between the Remote I/O Interface and the indicator is standard; a 20mA current loop interface option is also available.

Instructions for connecting and configuring the IQ plus 800/810 indicators to communicate with the Remote I/O Interface are included in the *Remote I/O Interface Installation and Programming Manual*.

Contact Rice Lake Weighing Systems for latest technical updates to the Remote I/O Interface.

RECIPE STORAGE OPTION

This option provides nine “stored” recipes and one “working” recipe. Each recipe has 16 setpoints. You can configure all nine working recipies from the “SETPNTS” configuration submenu or by using EDP commands. Also, you can copy a stored recipe into the currently running “working” recipe from the front panel or with EDP commands. Then, you can use the **SETPOINT** key to modify the working recipe without affecting the stored recipe. Also, by using an EDP command, you can save the working recipe as a stored recipe.

To copy a stored recipe into the working recipe location:

Enter a number corresponding to one of the stored recipes and press **NEW ID**. The indicator prompts “NEW REC” and copies the recipe into the working recipe. Return to the normal operating mode by pressing **GROSS/NET**, or waiting until the display switches back.

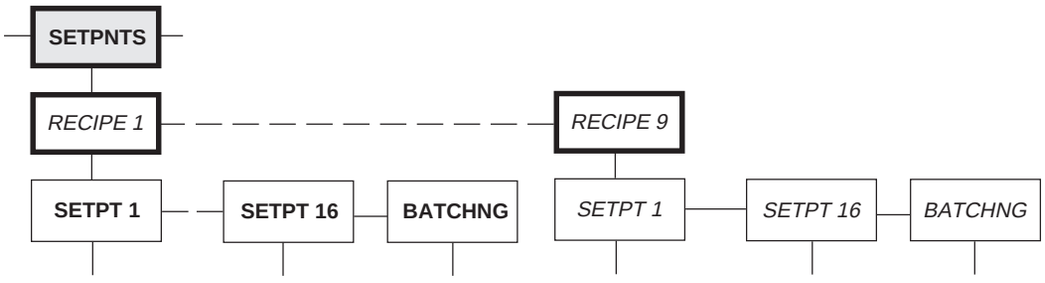
While in normal operating mode, you can press **NEW ID** to verify which recipe was last copied to the working recipe location. The indicator responds with “RECIP x” (where x = the recipe number). Once again, return to the normal operating mode by pressing **GROSS/NET**, or waiting until the display switches back.

To change the working recipe:

You can change the working recipe from the front panel by using the **SETPOINT** key. Changes to the working recipe do not affect the stored recipes. To undo changes to the working recipe, copy the original stored recipe over the working recipe.

Accessing the recipes in setup mode:

In the setup mode, you access the recipes from the “SETPNTS” submenu. There are 16 configurable setpoints for each of the nine recipes.



Using EDP commands to modify recipes:

You can modify the working recipe by using the EDP commands listed in the following chart. You can use these EDP commands in both the normal operating and setup modes. You must use upper case letters for the commands.

EDP COMMANDS FOR MOVING RECIPES:	
RECIPE	Corresponds to the recipe number affected by RECIPESAVE and RECIPERECALL commands
RECIPESAVE	Copies the working recipe into the recipe previously selected with the RECIPE command
RECIPERECALL	Copies the recipe designated by RECIPE command into the working recipe
RECIPEDUMP	Sends all setpoint parameter settings for the current working recipe to the EDP port. (Similar to DUMPALL, but dumps only the setpoint parameters)

CONCUR setpoint use in recipe storage option:

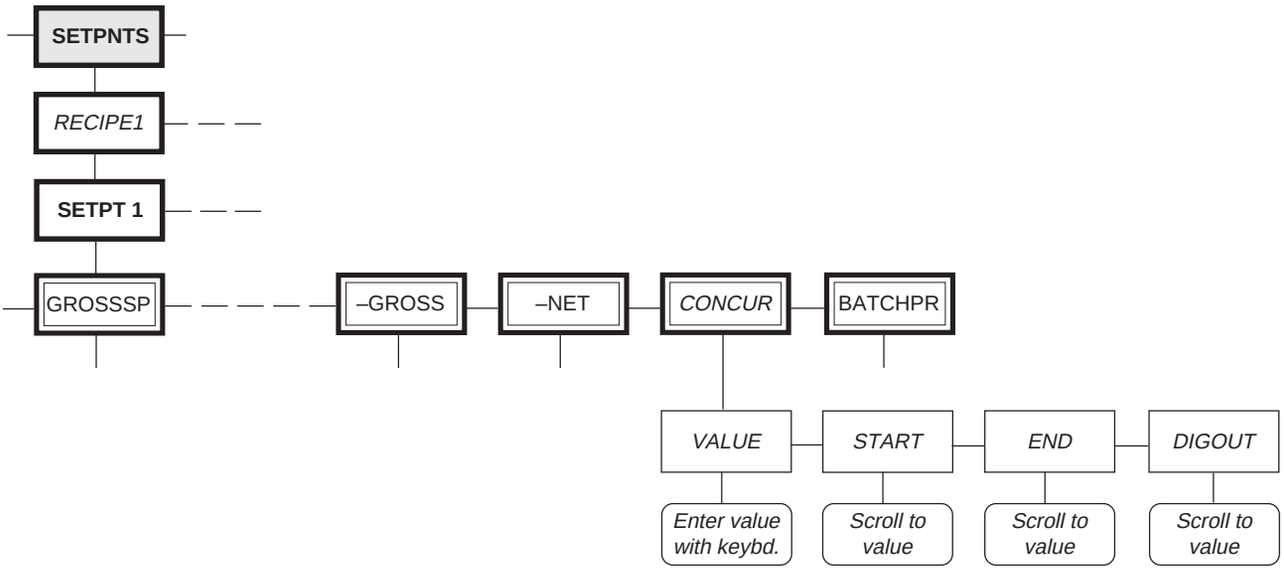
The recipe storage option uses a setpoint, called CONCUR, which can keep a digital output active over the duration of several setpoints. The following parameters apply to concurrent setpoints: VALUE, START, END, and DIGOUT.

NOTE:

Two EDP commands, START and END, change the START and END concurrent setpoints, respectively.

CONCURRENT SETPOINT TYPES:	
Type 1:	The digital output becomes active at the beginning of the START setpoint and returns to an inactive state at the beginning of the END setpoint.
Type 2:	The digital output becomes active at the beginning of the START setpoint and returns to an inactive state after VALUE (in 10ths of seconds).

If the VALUE parameter is greater than 0, then the Type 2 concurrent setpoint is implemented. Otherwise, Type 1 is implemented. The maximum number of Type 2 concurrent setpoints is five.



9. Appendix

SPECIFICATIONS

Analog Specifications	
Full Scale Input Signal	5 to 39 mV including deadload (initial load)
Analog Signal Input Range	0.6 mV/V - 3.9 mV/V
Analog Signal Sensitivity	0.3 microvolts/graduation minimum, 1.0 microvolt/grad recommended
Input Impedance	> 10 MΩ
Noise (Referred to Input)	0.3 µV p-p with 2 Hz analog filter, digital filter 4
Internal Resolution	Selectable: 300,000 - 740,000 counts
Display Resolution	>100,000 dd, limited only by internal resolution and system noise
Measurement Rate	20 Meas/sec, nominal
Input Sensitivity	Normally 130 nV per internal count, < 60 nV with expanded resolution or digital filtering
System Linearity	Within 0.01% of FS
Zero Stability	140 nV/°C, maximum; 10 nV/°C typical
Span Stability	3.5 ppm/°C, maximum
Recommended Recalibration	3 years
Calibration Method	By software through front panel, with storage of voltage and weight constants in EEROM
Common Mode Voltage	± 4 V, referred to earth
Common Mode Rejection	140 dB, minimum @ 50 or 60 Hz with 2 Hz or 8 Hz analog filter, digital filter 4
Normal Mode Rejection	90 dB, minimum @ 50 or 60 Hz with 2 Hz analog filter 80 dB, minimum @ 50 or 60 Hz with 8 Hz analog filter
Input Overload	± 12 V continuous, static discharge protected
Excitation Voltage	10 ± 0.5 V DC, 16 x 350 Ω load cells
Analog Filter	Software selectable: Off, 2 , 8 Hz typical / 3 pole
Digital Filter	Software selectable: Off, 1, 2, 4, 8, 16, 32, 64, 128 typical / 3 pole. Enhanced vibration capability available through Rattletrap® hybrid digital filtering.
Sense Amplifier	Differential amplifier with 6-wire sensing
RFI Protection	Signal, excitation, and sense lines protected by capacitor bypass
Analog Output	Optional: fully isolated 0 – 10 V DC or 4 – 20 mA, 14-bit resolution

Digital Specifications	
Microcomputer	NEC µPD75216A display processor, Hitachi 64180 main processor Program memory:128K x 8 RAM: 32K x 8 EEROM: 128 x 16, 93C66
Digital Inputs:	3 inputs, TTL or switch closure, active-low, special-purpose setpoint supervisor input
Digital Outputs	4 outputs, open collector with TTL pullup, 250 mA sink, 40 V withstand
Expansion Digital Outputs	Optional: 12 additional 250 mA sink, 40 V DC withstand
Serial Communication	
EDP Port	19200, 9600, 4800, 2400, 1200, 600, 300 baud. Full duplex RS-232, simplex 20 mA Current Loop. Duplex 20 mA, RS-485 optional
Printer Port	19200, 9600, 4800, 2400, 1200, 600, 300 Baud. Simplex RS-232, or simplex 20 mA Current Loop
Both Ports	Selectable:RS-232 or 20 mA current loop standard 8 data bits, no parity 7 data bits, even parity 7 data bits, odd parity
Operator Interface	
Display	14 mm (0.55 inch), 14-segment vacuum fluorescent, 7 full digit display. Decimal point available at each digit. Eight red LED annunciators
Additional Symbols	Tare, Entered Tare, Tare In System, Standstill, Net, Gross, Center of Zero, Minus Sign, lb, kg, Entry Mode
Color	Blue-green main display, red annunciators
Keyboard	25-key flat membrane panel. Tactile feel is provided by stainless steel domes
Bar Graph (optional)	48-segment red display tracks net or gross weight functions, or setpoint functions
Power	
Line Voltages	120 or 240 VAC +10% / –15%
Frequency	50 or 60 Hz
Power Consumption	12 VA with minimum configuration, 30 VA with all options
Fusing	120 VAC operation: 0.25 A Slo-Blo radial lead subminiature fuse (RLWS part #35993) 240 VAC operation: 0.125 A Slo-Blo radial lead subminiature fuse (RLWS part #35994)

Environmental	
Operating Temperature	–10 to +40°C (legal operating range) –10 to +50°C (industrial operating range)
Storage Temperature	–25 to +70°C, limited by battery life
Electric Field Rejection	Per SMA requirements
Emissions	FCC Part 15 Class A, UL 466, UL 508 and CISPR 22 Class A
Electrical Safety	According to IEC 950, UL 1950, CSA 220
Mechanical	
Overall Dimensions	11" W, 8.5" H, 8.5" D (DT) 16" W, 17.5" H, 8" D (HE) 12.6" W, 15.5" H, 6.3" D (SS) 10.0" W, 7.75" H, 6.0" D (800)
Weight	15.0 lb (DT) 17.3 lb (HE) 24.0 lb (SS) 14.0 lb (800)
Enclosure Classification	NEMA 4 (DT) NEMA 4X (HE) NEMA 4X (SS) NEMA 4X (800)
Enclosure Materials	Die-cast Zinc (Desktop) Fiberglass Reinforced Polyester (HE) Stainless Steel (SS and 800)
NTEP Certification	
CoC Number	92-013
Class	Certified for 10,000 Divisions, Class III and IIIL

FILTER SELECTIONS

Finding the right filter settings takes both patience and experimentation. The following subsections will help you understand how filtering works.

Analog filtering

Analog filtering uses electrical components (usually special capacitors and other “voltage smoothing” elements) to make the DC voltage from the load cell to the A/D converter as free of surges and fluctuations as possible. These capacitors have a tendency toward smoothing out the major, high-frequency voltage bumps, while easily tracking the smaller, low-frequency changes. Analog filtering is generally more effective than digital filtering in preventing voltage fluctuations caused by electrical or radio frequency interference. Voltage fluctuation caused by such electrical interference usually shows as a regular rolling up and down of the display.

In Table 9-1, notice that settings for increased filtering effect that screen out more electrical noise, also tend to increase settling time, therefore slowing down the display in achieving Standstill. Generally, use the lowest filtering effect which yields a quiet or stable display.

It is generally the best practice to attempt to clear interference first with just the analog filter so the signal will be clear entering the A/D converter. When testing the effect of the analog filter in this manner, set the digital filter at its lowest setting, 1. If the highest rate of analog filtering does not stabilize the display, leave the analog filter on at 8 Hz or 2 Hz, and begin increasing the digital filter settings.

Table 9-1.

Analog filter selections

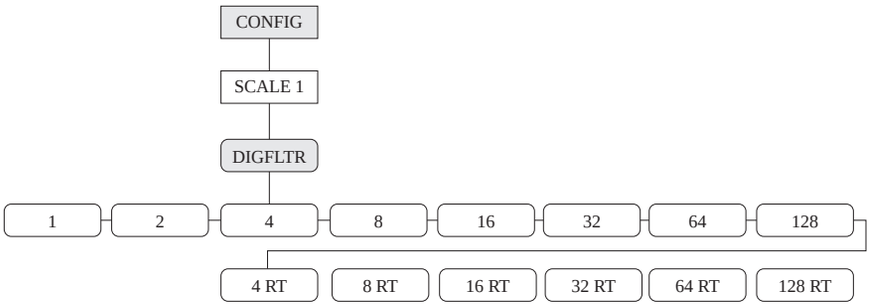
ALGFLTR setting...	Filtering effect...	Approximate settling time*...
None	Low (>25 Hz)	64 ms
8 Hz	Medium (>8 Hz)	200 ms
2 Hz	High (>2 Hz)	800 ms

*Settling times are relative and dependent on interference level.

Digital filtering

Standard digital filtering is basically a software function. It uses mathematical averaging to try to eliminate the variant digital readings that the A/D converter sends periodically because of external vibration. Digital filtering does not effect the indicator's measurement rate, but does affect the settling time. The selections from 1 to 128 reflect the number of readings averaged per update period. When a reading is encountered that is outside a predetermined band, the averaging is overridden, and the display “jumps” directly to the new value.

Advanced Rattletrap™ digital filtering (selections with RT after the number) indicate a mode that can be viewed as a hybrid combination of the best features of analog and digital filtering. RATTLETRAP™ uses a vibration-dampening algorithm developed in actual industrial applications with extreme vibration present. This filtering mode evaluates the frequency of a repeating vibration, then derives a composite displayed weight equal to the actual weight on the scale less the vibration-induced flaws. It is particularly effective for eliminating repeating vibration or mechanical interference from nearby machinery. RT selections will eliminate much more mechanical vibration than standard digital filtering, but usually also increase settling time over standard digital filtering.



Digital filtering is most effective in eliminating effects of mechanical noise and vibrations when combined with analog filtering. Such mechanical noise usually shows on the display as a random changing of the least-significant digit. The trade off with using a high number of averages (and therefore a very accurate reading) is that the settling time increases as the number of averages chosen increases. So even though the higher-numbered selections give a more accurate reading, if speed of display is important use the lowest selection which gives a stable display.

When using digital filtering, analog filtering is usually set to High (2 Hz). When testing the effect of the analog filter, set the digital filter to 1.

CUSTOM PRINT FORMATTING PROCEDURE

The IQ plus 800/810 has a formattable print function available as a standard feature. This feature allows the user to customize the **Demand Print** serial output to meet the needs of the user.

With this feature, the IQ plus 800/810 can be setup to print special information such as company name and address, scale identification information, etc. This feature also allows the user to customize the format of the printed weight ticket and to have trailing information as well.

Additionally, the user can customize the format of the following print tickets: gross/net demand, truck-in, truck out, and setpoint push print.

For each of these print tickets, the user will define a custom format string which will define the format of the ticket. The following is a list of user-definable print tickets and the name of the corresponding format string:

1. Gross Format Demand ticket (GFMT)
2. Net Format Demand Ticket (NFMT)
3. Truck Weigh-In Format Ticket (TRWIN)
4. Truck Weigh-Out Format Ticket (TRWOUT)
5. Setpoint Push Print Ticket (SPFMT)

NOTE:
Accumulator print tickets generated from the front panel or the setpoint push print (PSHPRNT) are not formattable.

The format strings GFMT, NFMT, TRWIN, TRWOUT, and SPFMT can include text and special commands. Commands are used to place the weight information on the ticket. Each of the format strings can be up to 300 characters long. In order to make the format strings more readable the commands must be enclosed between '<' and '>' brackets. Any characters outside of the brackets will be printed as text on the ticket.

In short, you may enter any character on the ASCII code chart (see Table 9-6). Also, the Gross and Net printouts have separate 300 character buffers which allows the installer to setup different printouts for the Gross weight and the Net weight printouts.

This subsection discusses in detail each user-definable print format. It begins by explaining how print format can be set using a terminal with a keyboard connected to the bidirectional EDP port. Then it discusses how you can manipulate format strings from the front panel of the IQ plus 800/810.

EDP interface information

The formattable print option can modified through the EDP serial port. This requires the installer to use a terminal or PC to enter the new print format into the IQ plus 800/810. The print format that can be entered may include numbers, upper and lower case letters, punctuation marks, and special control characters.

The current printout configuration may be checked or changed after establishing bidirectional communications with the IQ plus 800/810. This may be accomplished with the use of a terminal or PC running a terminal software program. When setting up to communicate with the IQ plus 800/810, you must match the baud rate, data bits and parity of both devices so that they can understand each other.

To view the current setting of a format string, you enter the name of the string, GFMT, NFMT, TRWIN, TRWOUT, or SPFMT, and press **ENTER** (or **RETURN**). The current string will be displayed.

For example, to check the current configuration of the Gross Demand printout, you can enter:

"GFMT" then press **ENTER** or **RETURN**

The IQ plus 800/810 will then respond by sending the current configuration for the Demand Gross Printout which will look something like this:

GFMT=SCALE#<S><NL2>GROSS<G><NL2><TD><NL>

The actual printout will have a format like this:

SCALE #1

GROSS 5021 LB

01/14/92 12:37 PM

NOTE:
For a complete list of print formatting commands (<S>, <NL2>,<TD>, etc.), see Table 9.2 on page 9-9.

To change the string—for example to add the ID number to the printout—reenter the string as in the following example:

GFMT =SCALE#<S><NL2>GROSS<G><NL>ID # <ID><NL2> <TD><NL>

Similarly, to check the Net Demand Printout you can enter:

"NFMT" then press **ENTER** or **RETURN**

The IQ plus 800/810 will then respond by sending the current configuration for the Demand Net Printout which will look something like this:

NFMT=SCALE#<S><NL2>GROSS<G><NL>TARE<T><NL>NET<N><NL2><TD><NL>

The actual printout will have a format like this:

SCALE #1

GROSS 5021 LB
TARE 500 LB
NET 4521 LB

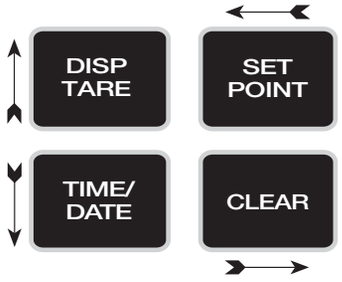
01/14/92 12:38 PM

NOTE:
You can change print format strings from the front panel of the IQ plus 800/810. This feature is necessary for users with no access to equipment used to communicate through the EDP port or at sites where such equipment cannot be used.

Manipulating format strings through the front panel keypad

You can access each of the ticket formats in the first level menu PFORMT. Under PFORMT are the submenu selections for each of the ticket formats: GFMT, NFMT, TRWIN, TRWOUT, and SPFMT.

By moving down (**TIME/DATE** key) from the print ticket name, the indicator will display the first 7 characters of the string. RIGHT



(**CLEAR** key) and LEFT (**SET POINT** key) will move one character to the right or left. Pressing **ENTER** inserts a space in the leftmost position and "." (DOT) will delete the leftmost position. By moving DOWN, the user can edit the leftmost character. The character will be displayed along with the decimal ASCII value for the character.

You can press RIGHT to *increment* or LEFT to *decrement* the ASCII value in order to change the character. By moving DOWN again, you can also enter a new ASCII value. The ASCII values 1 through 255 will be available. After making a change, can move back up in the menu and view or change. See Table 9-1 for an example of a gross format demand ticket. See Table 9-6 for ASCII character set.

Table 9-1.

Sample GFMT formatting

Indicator Display	Description	Action
P FORMT	Setup submenu prompt.	Press TIME/DATE.
GFMT	Name of gross mode demand ticket format string.	Press CLEAR repeatedly to view all format ticket names. Press TIME/DATE to edit/view string.
SCALE <	The first 7 characters of the GFMT string.	Press the CLEAR key to shift the 7 character view one character to the right until the end of the 300 character string is reached. Press the SETPOINT key to shift the view one character to the left until the beginning of the string is reached. Press the CLEAR key to change the leftmost character in the 7 digit display.
S = 83	The left most character from the previous 7 character view and its ASCII code.	Press the SETPOINT and CLEAR keys to increment and decrement the ASCII code by one.
83	The ASCII code of the character in the leftmost position of the 7 character view.	From this point the user can enter a new ASCII code from the front panel and press ENTER to change the code. When moving back up (SETPOINT key), the user will see the character with the new ASCII code entered.

NOTE:
Even though the printout for this example would take upwards of 300 characters to print, we only used 39 characters of our 300 character buffer to format this output string.

NOTE:
For more information on changing print format from the front panel of the IQ plus 800/ 810, see page 3-7.

Gross/Net demand ticket

Table 9-2 is a list of commands you can use to format Gross/Net demand tickets. Remember to enclose these commands in brackets < >.

Table 9-2.

Commands for demand tickets

Command	Description
G	Gross weight / active channel
G1	Gross weight / scale #1
G2	Gross weight / scale #2
G3	Gross weight / scale #3
G4	Gross weight / scale #4
G0	Gross weight / total
N	Net weight / active channel
N1	Net weight / scale #1
N2	Net weight / scale #2
N3	Net weight / scale #3
N4	Net weight / scale #4
N0	Net weight / total
T	Tare weight / active channel
T1	Tare weight / scale #1
T2	Tare weight / scale #2
T3	Tare weight / scale #3
T4	Tare weight / scale #4
T0	Tare weight / total
A	Accum for current channel
A1	Accum for scale #1
A2	Accum for scale #2
A3	Accum for scale #3
A4	Accum for scale #4
A0	Total accum
TI	Time only
DA	Date only
TD	Time and date
S	Scale number
ID	ID number
CN	Consecutive number
NLx	x number of terminating sequences (<CR> or <CR/LF)*
SPx	x number of spaces*
SU	Toggle weight data normal format and no format**

* If the number (x) is missing 1 is assumed.

** After receiving this command the IQ plus 800/810 will send all succeeding weight data unformatted. Unformatted means no leading spaces, no decimal place, and no trailing characters. The next SU command will toggle back to normal weight data format with leading spaces and the decimal point.

ID Numbers is a feature that supports an ID number *not* associated with the truck program or weight storage. To enter an ID the user enters a number up to seven digits long and presses the NEW ID key. The number is saved and can be printed on any formattable print ticket. The ID entered will remain unchanged until the user enters a new ID number. **This ID number c*annot* be disabled**, but if it is not formatted on any of the print tickets it will be ignored. See the example below.

Example:

The user enters “1234567” and presses the **NEW ID** key and then the **PRINT** key. The print ticket can look like this:

SCALE #1

ID # 1234567

GROSS 3780 LB

9/1/93 8:30 PM

You can print weight data from any active channel. Time and date will be printed independently or together. ID number and consecutive number can be added to the ticket (see Section 3, *Configuration*, for more information on ID numbers and consecutive numbering). All of the accumulators can be printed on the ticket. See the example below.

Example:

GFMT=SCALE#<S><NL><G>GROSS<NL>ID#<ID><NL2><TD><NL>

This string will produce the following ticket:

SCALE# 1

xxxxxxxx LB GROSS

ID# aaaaaaa

11:11 01/01/94

where xxxxxxxx is the current gross weight and aaaaaaa is the current ID number.

Truck weigh-in and weight-out tickets

You can use the TRWIN and TRWOUT format strings to customize the truck weigh-in and weight-out tickets. The strings are handled the same way the GFMT/NFMT strings are handled, except the list of commands includes different data. Table 9-3 is a list of the commands you can use to configure truck print tickets.

Table 9-3.

Commands for truck tickets

Command	Description
TR1	Gross weight for current ticket*
TR2	Tare weight for current ticket*
TR3	Net weight for current ticket
TI	Time only
DA	Date only
TD	Time and date
S	Scale number
ID	ID number
CN	Consecutive number
NLx	x number of terminating sequences (<CR> or <CR/LF>)**
SPx	x number of spaces**

* Weight data includes key words *stored* or *keyed* when applicable.

** If the number (x) is missing, 1 is assumed.

All the commands listed for GFMT/NFMT will also be accepted on the truck tickets even though other pieces of data are not appropriate. The user is responsible for setting up a legal for trade format. See the example below for default format and related ticket formats.

The default format is:

TRWIN=<NL>ID <ID> SCALE
<S><NL2>GROSS<TR1><NL2><DA><TI><NL>

TRWOUT=<NL6>ID <ID> SCALE
<S><NL2>GROSS<TR1><NL>TARE <TR2><NL>NET
<TR3><NL2><DA><TI><NL>

These strings produce the following tickets:

ID 1 SCALE TOTAL

GROSS 5254 LB STORED

12/01/93 01:46 PM

(6 blank lines)

ID 1 SCALE TOTAL

GROSS 5578 LB

TARE 5254 LB RECALLED

NET 324 LB

12/01/93 01:46 PM

Setpoint push print ticket

When a setpoint push print is set (PSHRPNT in the first level menu SETPNTS), the gross and tare values from the source channel of the setpoint achieved will be saved and used on the setpoint ticket. The ticket is scheduled to be printed immediately, but the ticket is actually printed a fraction of time later than the setpoint is satisfied. All data items (other than the source channel's gross and tare weights) will retain their current values at the time of print (*not* frozen values at the time the setpoint was achieved). The printing of time and date is not supported for the setpoint ticket. Table 9-4 is a list of commands you can use to configure setpoint tickets.

Table 9-4.

Commands for push print tickets

Command	Description
SV1	Weight value when setpoint was achieved
SV2	Label for SV1 weight value
BN	Current setpoint number
TV	Current setpoint target value*
PV	Current setpoint preact value
NA	Print setpoint name in SPFMT format
NLx	x number of terminating sequences (<CR> or <CR/LF>)**
SPx	x number of spaces**
SU	Toggle weight data normal format and no format***

* In the case of relative setpoints, *relative value* is printed.

** If the number (x) is missing assume 1.

*** After receiving this command, the IQ plus 800/810 will send all succeeding weight data unformatted. "Unformatted" means no leading spaces, no decimal place, and no trailing characters. The next SU command will toggle back to normal weight data format with leading spaces and the decimal point.

CONVERSION FACTORS FOR SECONDARY UNITS

The IQ plus 800/810 has the capability to mathematically convert a weight into many different types of units and instantly display those results with a press of the **UNITS** key.

In the 1st level menu, FORMAT, the primary units display can be converted with a multiplier into many possible forms for display as secondary units. The **UNITS** key is used to toggle between primary units display and secondary units display. The default setting is pounds (lb) for primary, and kilograms (kg) for secondary, and the annunciator lights are labelled accordingly. Four other standard annunciator labels are available for ounces, tons, grams, and grains.

However, the range of possibilities for the secondary units display is not limited to the six units listed. If a correct conversion multiplier is entered under the secondary units parameter in the FORMAT menu, conversion possibilities are nearly unlimited. The annunciator for the secondary scale may still read kg as a label, but the multiplier entered may be actually allowing the display to show gallons or cubic feet of a liquid, lineal feet of wire, newtons, dynes, psi, etc.

The Conversion Factors beginning on the following page (Table 9-5) list multipliers for converting a wide range of possible units. Not all units are applicable for weighing applications.

Table 9-5. Conversion Factors

To Convert	Into	Multiply By	Conversely x By
Acres	Square feet	4.356×10^{4}	2.296×10^{-5}
Acres	Square meters	4047	2.471×10^{-4}
Acres	Square miles	1.5625×10^{-3}	640
Ampere-hours	Coulombs	3600	2.778×10^{-4}
Ampere-turns	Gilberts	1.257	0.7958
Ampere-turns per cm.	Ampere-turns per inch	2.54	0.3937
Angstrom units	Inches	3.937×10^{-9}	2.54×10^{8}
Angstrom units	Meters	10^{10}	10^{10}
Ares	Square meters	10^{2}	10^{2}
Atmospheres	Feet of water	33.90	0.02950
Atmospheres	Inch of mercury at 0°C	29.92	3.342×10^{-2}
Atmospheres	Kg per square meter	1.033×10^{4}	9.678×10^{-5}
Atmospheres	mm of mercury at 0°C	760	1.316×10^{-3}
Atmospheres	Pascals	1.0133×10^{5}	0.9869×10^{-5}
Atmospheres	Pounds per square inch	14.70	0.06804
Barns	Square centimeters	10^{24}	10^{24}
Bars	Atmospheres	.9869	1.0133
Bars	Dynes per square cm	10^{6}	10^{6}
Bars	Pascals	10^{5}	10^{5}
Bars	Pounds per square inch	14.504	6.8947×10^{-2}
Board feet	Cubic meters	2.3597×10^{-3}	4.238×10^{2}
Btu	Ergs	1.0548×10^{10}	9.486×10^{-11}
Btu	Foot-pounds	778.3	1.285×10^{-3}
Btu	Joules	1054.8	9.480×10^{-4}
Btu	Kilogram-calories	0.252	3.969
Btu per hour	Horsepower-hours	3.929×10^{-4}	2545
Bushels	Cubic feet	1.2445	0.8036
Bushels	Cubic meters	3.5239×10^{-2}	28.38
Calories, gram	Joules	4.185	0.2389
Carats (metric)	Grams	0.2	5
Celsius	Fahrenheit	(°C x 9/5) + 32 = °F	(°F - 32) x 5/9 = °C
Celsius	Kelvin	°C + 273.1 = K	K - 273.1 = °C
Chains (surveyor's)	Feet	66	1.515×10^{-2}
Circular mils	Square centimeters	5.067×10^{-6}	1.973×10^{5}
Circular mils	Square mils	0.7854	1.273
Cords	Cubic meters	3.625	0.2758
Cubic feet	Cords	7.8125×10^{-3}	128
Cubic feet	Gallons (liq U.S.)	7.481	0.1337
Cubic feet	Liters	28.32	3.531×10^{-2}
Cubic inches	Cubic centimeters	16.39	6.102×10^{-2}
Cubic inches	Cubic feet	5.787×10^{-4}	1728
Cubic inches	Cubic meters	1.639×10^{-5}	6.102×10^{4}
Cubic inches	Gallons (liq U.S.)	4.329×10^{-3}	231
Cubic meters	Cubic feet	35.31	2.832×10^{-2}
Cubic meters	Cubic yards	1.308	0.7646
Cups	Cubic centimeter	2.366×10^{2}	4.227
Curies	Becquerels	3.7×10^{10}	2.7×10^{-11}
Cycles per second	Hertz	1	1
Degrees (angle)	Mils	17.45	5.73×10^{-2}
Degrees (angle)	Radians	1.745×10^{-2}	57.3
Dynes	Pounds	2.248×10^{-6}	4.448×10^{5}
Electron volts	Joules	1.602×10^{-19}	0.624×10^{19}
Ergs	Foot-pounds	7.376×10^{-8}	1.356×10^{7}
Ergs	Joules	10^{7}	10^{7}
Ergs per second	Watts	10^{7}	10^{7}
Ergs per square cm	Watts per square cm	10^{9}	10^{9}
Fahrenheit	Kelvin	(°F + 459.67) / 1.8	1.8K - 459.67
Fahrenheit	Rankine	°F + 459.67 = °R	°R - 459.67 = °F
Faradays	Ampere-hours	26.8	3.731×10^{-2}
Fathoms	Feet	6	0.16667
Fathoms	Meters	1.8288	0.5467
Feet	Centimeters	30.48	3.281×10^{-2}
Feet	Meters	0.3048	3.281
Feet	Mils	1.2×10^{4}	8.333×10^{-5}
Feet of water at 4°C	Inches of mercury at 0°C	0.8826	1.133
Feet of water at 4°C	Kg per square meter	304.8	3.281×10^{-3}
Feet of water at 4°C	Pascals	2.989×10^{3}	3.346×10^{-4}
Fermis	Meters	10^{15}	10^{15}

Table 9-5. Conversion Factors (continued)

To Convert	Into	Multiply By	Conversely x By
Foot candles	Lux	10.764	0.0929
Foot lamberts	Candelas per sq meter	3.4263	0.2918
Foot-pounds	Gram-centimeters	1.383×10^{4}	1.235×10^{-5}
Foot-pounds	Horsepower-hours	5.05×10^{-7}	1.98×10^{6}
Foot-pounds	Kilogram-meters	0.1383	7.233
Foot-pounds	Kilowatt-hours	3.766×10^{-7}	2.655×10^{6}
Foot-pounds	Ounce-inches	192	5.208×10^{-3}
Gals	Meters per second	9.807	0.102
Gallons (liq U.S.)	Cubic meters	3.785×10^{-3}	264.2
Gallons (liq U.S.)	Gallons (liq Br. lmp.)	0.8327	1.201
Gammas	Teslas	10^{9}	10^{9}
Gausses	Lines per square cm	1.0	1.0
Gausses	Lines per square in	6.452	0.155
Gausses	Teslas	10^{4}	10^{4}
Gausses	Webers per square in	6.452×10^{-8}	1.55×10^{7}
Gilberts	Amperes	0.7958	1.257
Grads	Radians	1.571×10^{-2}	63.65
Grams	Dynes	980.7	1.02×10^{-3}
Grams	Grains	15.43	6.481×10^{-2}
Grams	Ounces (avdp)	3.527×10^{-2}	28.35
Grams	Poundals	7.093×10^{-2}	14.1
Grams per cm	Pounds per in	5.6×10^{-3}	178.6
Grams per cu cm	Pounds per cu in	3.613×10^{-2}	27.68
Grams per square cm	Pounds per square ft	2.0481	0.4883
Hectares	Acres	2.471	0.4047
Horsepower	Btu per minute	42.418	2.357×10^{-2}
Horsepower	Foot-lbs per minute	3.3×10^{4}	3.03×10^{-5}
Horsepower	Foot-lbs per second	550	1.182×10^{-3}
Horsepower	Horsepower (metric)	1.014	0.9863
Horsepower	Kilowatts	0.746	1.341
Horsepower (metric)	Btu per minute	41.83	2.390×10^{-2}
Horsepower (metric)	Kg-calories per minute	10.54	9.485×10^{-2}
Horsepower (metric)	Watts	7.355×10^{2}	745.7
Inches	Centimeters	2.54	0.3937
Inches	Feet	8.333×10^{-2}	12
Inches	Meters	2.54×10^{-2}	39.37
Inches	Miles	1.578×10^{-5}	6.336×10^{4}
Inches	Mils	10^{3}	10^{3}
Inches	Yards	2.778×10^{-2}	36
Inches of mercury at 0°C	Pascals	3.386×10^{3}	2.953×10^{-4}
Inches of mercury at 0°C	Pounds per square inch	0.4912	2.036
Inches of water at 4°C	Inches of mercury	7.355×10^{-2}	13.60
Inches of water at 4°C	Kg per square meter	25.40	3.937×10^{-2}
Inches of water at 15.6°C	Pascals	2.488×10^{2}	4.02×10^{-3}
Joules	Foot-pounds	0.7376	1.356
Joules	Watt-hours	2.778×10^{-4}	3600
Kilogram-calories	Kilogram-meters	426.9	2.343×10^{3}
Kilograms	Tons	10^{3}	10^{3}
Kilograms	Tons (long)	9.842×10^{-4}	1016
Kilograms	Tons (short)	1.102×10^{-3}	907.2
Kilograms	Pounds (avdp)	2.205	0.4536
Kilograms per sq meter	Pounds per square feet	0.2048	4.882
Kilometers	Feet	3281	3.408×10^{-4}
Kilometers	Inches	3.937×10^{4}	2.54×10^{-5}
Kilometers	Light years	1.0567×10^{-13}	9.4637×10^{12}
Kilometers per hour	Feet per minute	54.68	1.829×10^{-2}
Kilometers per hour	Knots	0.5396	1.8532
Kilowatt-hours	Btu	3413	2.93×10^{-4}
Kilowatt-hours	Foot-pounds	2.655×10^{6}	3.766×10^{-7}
Kilowatt-hours	Horsepower-hours	1.341	0.7457
Kilowatt-hours	Joules	3.6×10^{6}	2.778×10^{-7}
Kilowatt-hours	Kilogram-calories	860	1.163×10^{-3}
Kilowatt-hours	Kilogram-meters	3.671×10^{5}	2.724×10^{-6}
Kilowatt-hours	Pounds of water evap. at 212°F	3.53	0.284
Kilowatt-hours	Watt-hours	10^{3}	10^{3}
Knots	Feet per second	1.688	0.5925
Knots	Meters per minute	30.87	0.0324
Knots	Miles per hour	1.1508	0.869

Table 9-5. Conversion Factors (continued)

To Convert	Into	Multiply By	Conversely x By
Lamberts	Candelas per square cm	0.3183	3.142
Lamberts	Candelas per square in	2.054	0.4869
Leagues	Miles	3	0.33
Links	Chains	0.01	100
Links (surveyor's)	Inches	7.92	0.1263
Liters	Bushels (dry U.S.)	2.838×10^{-2}	35.24
Liters	Cubic centimeters	10^{3}	10^{3}
Liters	Cubic inches	61.02	1.639×10^{-2}
Liters	Cubic meters	10^{3}	10^{3}
Liters	Gallons (liq U.S.)	0.2642	3.785
Liters	Pints (liq U.S.)	2.113	0.4732
$Log_e N$	$Log_{10} N$	0.4343	2.303
Lumens per sq foot	Foot-candles	1	1
Lumens per sq meter	Foot-candles	0.0929	10.764
Lux	Foot-candles	0.0929	10.764
Maxwells	Kilolines	10^{3}	10^{3}
Maxwells	Megalines	10^{6}	10^{6}
Maxwells	Webers	10^{8}	10^{8}
Meters	Feet	3.28	30.48×10^{-2}
Meters	Inches	39.37	2.54×10^{-2}
Meters	Miles	6.214×10^{-4}	1609.35
Meters	Yards	1.094	0.9144
Meters per minute	Feet per minute	3.281	0.3048
Meters per minute	Kilometers per hour	0.06	16.67
Mhos	Siemens	1	1
Miles (nautical)	Feet	6076.1	1.646×10^{-4}
Miles (nautical)	Meters	1852	5.4×10^{-4}
Miles (statute)	Feet	5280	1.894×10^{-4}
Miles (statute)	Kilometers	1.609	0.6214
Miles (statute)	Light years	1.691×10^{-13}	5.88×10^{12}
Miles (statute)	Miles (nautical)	0.869	1.1508
Miles (statute)	Yards	1760	5.6818×10^{-4}
Miles per hour	Feet per minute	88	1.136×10^{-2}
Miles per hour	Feet per second	1.467	0.6818
Miles per hour	Kilometers per hour	1.609	0.6214
Miles per hour	Kilometers per minute	2.682×10^{-2}	37.28
Miles per hour	Knots	0.869	1.1508
Millimeters	Inches	3.937×10^{-2}	25.4
Millimeters	Microns	10^{3}	10^{3}
Mils	Meters	2.54×10^{-5}	3.94×10^{4}
Mils	Minutes	3.438	0.2909
Minutes (angle)	Degrees	1.666×10^{-2}	60
Minutes (angle)	Radians	2.909×10^{-4}	3484
Nepers	Decibels	8.686	0.1151
Newtons	Dynes	10^{5}	10^{6}
Newtons	Kilograms	0.1020	9.807
Newtons per square meter	Pascals	1	1
Newtons	Pounds (avdp)	0.2248	4.448
Oersteds	Amperes per meter	7.9577 x 10	1.257×10^{-2}
Ohms	Ohms (International)	0.99948	1.00052
Ohms circular-mil per ft	Ohms per sq mm per meter	1.66×10^{-3}	6.024×10^{2}
Ohms per foot	Ohms per meter	0.3048	3.281
Ounces (fluid)	Quarts	3.125×10^{-2}	32
Ounces (avdp)	Pounds	6.25×10^{-2}	16
Pints	Quarts (liq U.S.)	0.50	2
Pounds	Grams	453.6	2.205×10^{-3}
Pounds (force)	Newtons	4.4482	0.2288
Pounds carbon oxidized	Btu	14,544	6.88×10^{-5}
Pounds carbon oxidized	Horsepower-hours	5.705	0.175
Pounds carbon oxidized	Kilowatt-hours	4.254	0.235
Pounds of water (dist)	Cubic feet	1.603×10^{-2}	62.38
Pounds of water (dist)	Gallons	0.1198	8.347
Pounds per foot	Kg per meter	1.488	0.6720
Pounds per square in	Dynes per square cm	6.8946×10^{4}	1.450×10^{-5}
Pounds per square in	Pascals	6.895×10^{3}	1.45×10^{-4}
Poundals	Dynes	1.383×10^{4}	7.233×10^{-5}
Poundals	Pounds (avdp)	3.108×10^{-2}	32.17

Table 9-5. Conversion Factors (continued)

To Convert	Into	Multiply By	Conversely x By
Quadrants	Degrees	90	11.111×10^{-2}
Quadrants	Radians	1.5708	0.637
Quarts (U.S. dry)	Cubic cms	1101.4	9.9079×10^{-4}
Quarts (U.S. liquid)	Cubic cms	946.4	1.057×10^{-3}
Radians	Mils	10^{3}	10^{3}
Radians	Minutes	3.438×10^{3}	2.909×10^{-4}
Radians	Seconds	2.06265×10^{5}	4.848×10^{-6}
Rods	Feet	16.5	6.061×10^{-2}
Rods	Miles	3.125×10^{-3}	320
Rods	Yards	5.5	0.1818
Roentgens	Coulombs per kilogram	2.58×10^{-4}	3.876×10^{3}
Rpm	Degrees per second	6.0	0.1667
Rpm	Radians per second	0.1047	9.549
Rpm	Rps	1.667×10^{-2}	60
Slugs	Kilograms	1.459	0.6854
Slugs	Pounds (avdp)	32.174	3.108×10^{-2}
Square feet	Square centimeters	929.034	1.076×10^{-3}
Square feet	Square inches	144	6.944×10^{-3}
Square feet	Square meters	9.29×10^{-2}	10.764
Square feet	Square miles	3.587×10^{-8}	27.88×10^{6}
Square feet	Square yards	11.11×10^{-2}	9
Square inches	Circular mils	1.273×10^{6}	7.854×10^{-7}
Square inches	Square centimeters	6.452	0.155
Square inches	Square mils	10^{6}	10^{6}
Square inches	Square millimeters	645.2	1.55×10^{-3}
Square kilometers	Square miles	0.3861	2.59
Square meters	Square yards	1.196	0.8361
Square miles	Acres	640	1.562×10^{-3}
Square miles	Square yards	3.098×10^{6}	3.228×10^{-7}
Square millimeters	Circular mils	1973	5.067×10^{-4}
Square mils	Circular mils	1.273	0.7854
Steres	Cubic meters	1	1
Stokes	Square meter per second	10^{4}	10^{4}
Tablespoons	Cubic cms	14.79	6.761×10^{-2}
Teaspoons	Cubic cms	4.929	0.203
Tonnes	Kilograms	10^{3}	10^{3}
Tonnes	Pounds	2204.63	4.536×10^{-4}
Tons (long)	Pounds (avdp)	2240	4.464×10^{-4}
Tons (metric)	Kilograms	10^{3}	10^{3}
Tons (short)	Pounds	2000	5×10^{-4}
Torrs	Newtons per square meter	133.32	7.5×10^{-3}
Varas	Feet	2.7777	0.36
Watts	Btu per hour	3.413	0.293
Watts	Btu per minute	5.689×10^{-2}	17.58
Watts	Foot-lbs per minute	44.26	2.26×10^{-2}
Watts	Foot-lbs per second	0.7378	1.356
Watts	Horsepower	1.341×10^{-3}	746
Watts	Kilogram-calories per minute	1.433×10^{-2}	69.77
Watt-seconds	Gram-calories (mean)	0.2389	4.186
Watt-seconds	Joules	1	1
Webers	Maxwells	10^{8}	10^{8}
Webers per square meter	Gausses	10^{4}	10^{4}
Yards	Feet	3	.3333
Yards	Varas	1.08	0.9259

ASCII CHARACTER CHART

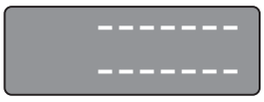
Table 9-6. ASCII characters with decimal and HEX equivalents

	ASCII	DEC	HEX	ASCII	DECIMAL	HEX	ASCII	DECIMAL	HEX	ASCII	DECIMAL	HEX
Ctrl @	NUL	0	00	@	64	40	Ç	128	80		192	C0
Ctrl A	SOH	1	01	A	65	41	ü	129	81		193	C1
Ctrl B	STX	2	02	B	66	42	é	130	82		194	C2
Ctrl C	ETX	3	03	C	67	43	â	131	83		195	C3
Ctrl D	EOT	4	04	D	68	44	ä	132	84		196	C4
Ctrl E	ENQ	5	05	E	69	45	«a	133	85		197	C5
Ctrl F	ACK	6	06	F	70	46	å	134	86	ã	198	C6
Ctrl G	BEL	7	07	G	71	47	ç	135	87	A	199	C7
Ctrl H	BS	8	08	H	72	48	ê	136	88		200	C8
Ctrl I	HT	9	09	I	73	49	ë	137	89		201	C9
Ctrl J	LF	10	0A	J	74	4A	«e	138	8A		202	CA
Ctrl K	VT	11	0B	K	75	4B	ï	139	8B		203	CB
Ctrl L	FF	12	0C	L	76	4C	î	140	8C		204	CC
Ctrl M	CR	13	0D	M	77	4D	«i	141	8D		205	CD
Ctrl N	SO	14	0E	N	78	4E	a	142	8E		206	CE
Ctrl O	SI	15	0F	O	79	4F	A	143	8F		207	CF
Ctrl P	DLE	16	10	P	80	50	´E	144	90	õ	208	D0
Ctrl Q	DC1	17	11	Q	81	51	æ	145	91	D	209	D1
Ctrl R	DC2	18	12	R	82	52	Æ	146	92	E	210	D2
Ctrl S	DC3	19	13	S	83	53	ô	147	93	Ë	211	D3
Ctrl T	DC4	20	14	T	84	54	ö	148	94	E	212	D4
Ctrl U	NAK	21	15	U	85	55	«o	149	95		213	D5
Ctrl V	SYN	22	16	V	86	56	û	150	96	í	214	D6
Ctrl W	ETB	23	17	W	87	57	«u	151	97	î	215	D7
Ctrl X	CAN	24	18	X	88	58	y	152	98	ï	216	D8
Ctrl Y	EM	25	19	Y	89	59	Ö	153	99		217	D9
Ctrl Z	SUB	26	1A	Z	90	5A	u	154	9A		218	DA
Ctrl [	ESC	27	1B	[	91	5B	ø	155	9B		219	DB
Ctrl \	FS	28	1C	\	92	5C	£	156	9C		220	DC
Ctrl]	GS	29	1D	]	93	5D	Ø	157	9D		221	DD
Ctrl ^	RS	30	1E	^	94	5E	x	158	9E	«i	222	DE
Ctrl _	US	31	1F	_	95	5F	ƒ	159	9F		223	DF
	space	32	20	`	96	60	á	160	A0	O	224	E0
	!	33	21	a	97	61	í	161	A1	ß	225	E1
	“	34	22	b	98	62	ó	162	A2	O	226	E2
	#	35	23	c	99	63	ú	163	A3	O	227	E3
	$	36	24	d	100	64	ñ	164	A4	O	228	E4
	%	37	25	e	101	65	Ñ	165	A5	O	229	E5
	&	38	26	f	102	66	?	166	A6	µ	230	E6
	'	39	27	g	103	67	°	167	A7	p	231	E7
	(	40	28	h	104	68	¿	168	A8	p	232	E8
	)	41	29	i	105	69	®	169	A9	U	233	E9
	*	42	2A	j	106	6A		170	AA	U	234	EA
	+	43	2B	k	107	6B	½	171	AB	U	235	EB
	,	44	2C	l	108	6C	¼	172	AC	ÿ	236	EC
	-	45	2D	m	109	6D	¡	173	AD	ˆy	237	ED
	.	46	2E	n	110	6E		174	AE		238	EE
	/	47	2F	o	111	6F	-	175	AF		239	EF
	0	48	30	p	112	70		176	B0		240	F0
	1	49	31	q	113	71		177	B1	±	241	F1
	2	50	32	r	114	72	²	178	B2		242	F2
	3	51	33	s	115	73	³	179	B3	3/4	243	F3
	4	52	34	t	116	74	´	180	B4		244	F4
	5	53	35	u	117	75	«A	181	B5		245	F5
	6	54	36	v	118	76	ˆÅ	182	B6	+	246	F6
	7	55	37	w	119	77	A	183	B7	,	247	F7
	8	56	38	x	120	78	©	184	B8	⁰	248	F8
	9	57	39	y	121	79	¹	185	B9	"	249	F9
	:	58	3A	z	122	7A		186	BA	.	250	FA
	;	59	3B	{	123	7B	«	187	BB		251	FB
	<	60	3C	|	124	7C		188	BC		252	FC
	=	61	3D	}	125	7D	¢	189	BD		253	FD
	>	62	3E	~	126	7E	¥	190	BE		254	FE
	?	63	3F	DEL	127	7F		191	BF		255	FF

ERROR MESSAGES

OVER CAPACITY

GROSS WEIGHT < 0



A/D CONVERTER
OUT OF RANGE

If an error code appears on the display:

- ✓ Check for improper wiring. Make sure there are no cut or broken wires.
- ✓ Verify that sense jumper blocks or jumper wires are properly installed.
- ✓ Check for proper excitation voltages.
- ✓ Make sure the indicator is properly configured. Check number of grads, channel selection, display divisions, formats, etc.
- ✓ Make sure W ZERO and W SPAN values are correct.
- ✓ Make sure volts calibration values are correct.
- ✓ Check the software revision. In older versions with multiple scale applications, the display blanks when any scale goes over or under range.
- ✓ Call Rice Lake Weighing Systems for assistance.

SOFTWARE REVISION HISTORY

Version 1.0

This version was the original release.

Version 1.1 - 1.4

No new features were added; these revisions provided minor operating refinements to the original release.

Version 2.0

Accumulators retain their totals when leaving the SETUP mode, rather then automatically zeroing.

The 100 update per second function (1 FAST) is enabled in the CHANS parameter of the SET ALG menu.

When batching, the net or gross display mode reflects the type (Gross / Net) of the present batch step, and the scale number illuminators reflect the source scale selected for that batch step.

A tare value of zero can be entered.

Setpoint values can be changed, or setpoints can be turned on or off with front panel keystrokes while in the normal operating mode.

Version 2.1

Auto jog now references the first preceding weight setpoint (net, gross, or relative) rather than just the first preceding setpoint. This allows conditional setpoints like WAITSS, DELAY, PAUSE, etc. to be inserted directly before the Autojog setpoint.

Continuous setpoints reflecting a scale condition, such as COZ, INMOTION, INRANGE, -GROSS, -NET, and BATCHPR can now have a source scale associated with them, rather than be forced to use the source currently on the display.

Version 2.2

Unreleased.

Version 2.3

When using RS-485 mode, a carriage return has been added after the last character (ETX) in the response to purge the receive buffers of all IQ plus 800/810's on the bus.

When using multiple scales, and in the TOTAL display mode, the unit will not blank when one scale goes below GROSS ZERO, but will display the positive total of all scales. The unit will blank, however, if one scale goes into an underrange condition.

The following parameters can be changed "on the fly" by keying in the correct EDP commands without the need to enter the SETUP mode: BARGRF, BARBAND.

(continued)

The Truck In/Out Program was altered to allow printed tickets to reflect only the scale being displayed, rather than the total of all scales.

Each scale now has to be within its zero band to zero out, rather than having all scales zero by the TOTAL CHANS function.

Version 3.0

Individual scale setup will allow the user the flexibility to define different graduation sizes for all the individual scales.

Five accumulators are available with the accumulator software feature.

Password has been implemented as an optional special feature which the installer can enable or disable, just like the accumulator and rate of change features.

Software options can now be enabled at the site from a submenu in the IQ plus 800/810 setup.

An ID number not associated with the truck program or weight storage is provided.

A consecutive or sequential number can be used to count batch sequences, or print tickets.

Custom printing formats allows the user to customize the format of the print tickets.

New EDP commands have been added for the new setup parameters, syntax has changed for commands referencing one of the 4 channels on the indicator, and a new set of weight data transmitting commands have been added.

Two new digital input selections have been added.

The number of definable setpoints has been expanded from 16 to 20. There is still a maximum of 16 digital outputs but the user can define up to 20 steps.

The optional Rate of Change feature now has a much more stable reading. The rate of change is now calculated from an average of weight data over a longer fraction of time.

Two new BARGRAPH modes have been added: DIGOUTS mode and GRPHALL mode.

New motion band settings of 2, 20, and OFF have been added.

New Tare Function — In past versions the IQ plus 800/810 has had a parameter called GONLY which would allow or disallow Tares to be entered. The GONLY parameter has now been replaced with the TAREFN (Tare Function) parameter.

IQ plus 800/810 LIMITED WARRANTY

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one (1) year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

1. Upon discovery by Buyer of such non-conformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.

2. Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, "Protecting Your Components From Static Damage in Shipment," available from RLWS Equipment Return Department.

3. Examination of such equipment by RLWS confirms that the non-conformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.

4. Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.

5. RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.

6. In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.

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VOLUME 14, JULY 1997

TECHtalk

A TECHNICAL PRODUCT PUBLICATION

NEW!

Version 3.11 Software

for IQ plus® 800/810 Indicators

CONTENTS

This Tech Talk provides a summary of the changes included in Version 3.11 of the IQ plus® 800/810 indicator software. Release 3.11 will begin shipping in September 1997.

Read This First!

Warning

If you are upgrading to Release 3.11 or are familiar with prior releases of the IQ plus® 800/810 software, please note the following changes before using the software.

The digital output of continuous setpoints using the TRIP parameter with InBand or OutBand specified is reversed in this release. Existing setpoints using these values must be redefined for use with Release 3.11. See pages 4 and 5 for more information about this and other setpoint processing changes.

When the indicator is placed in setup mode:

- Analog outputs are set off (0 VDC or 4 mA)
- Batching stops automatically

When the indicator is returned to operating mode, the interrupted batch must be manually restarted.

The BATSTRT digital input no longer requires an active BATRUN digital input to start and run a batch sequence. If no digital input is assigned to BATRUN, batching proceeds as if BATRUN were always on. See page 5 for more information.

COMING SOON!

New Stainless Steel Enclosure

for IQ plus® 800 Indicators

The IQ plus 800 stainless steel enclosure has been redesigned to provide easier access to internal components: Boards are now mounted to a backplate, rather than to the front of the enclosure. For desktop models, this mounting allows removal of boards while the enclosure remains attached to the mounting bracket.

Dimensions for panel mounting remain the same as for the old enclosure, so existing units can be replaced without changing cutouts.

The setup switch is now accessed by removing a single screw on the backplate. Switch position can be changed using the same screwdriver used to remove the screw. A guard plate surrounding the switch prevents accidental contact with internal components.

Perhaps best of all, the new enclosure is almost 30% lighter than its predecessor, making the trip from the truck to the installation site that much easier.

Watch for the new IQ plus 800 enclosures to start shipping in August 1997. See *Tech Talk Volume 15* for more information about the new enclosure.

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Front Panel Keys and LEDs

Lb/Kg LEDs

In software versions prior to Release 3.11, the Lb and Kg LEDs were used as primary/secondary units indicators. The function of these LEDs has been changed in Release 3.11 to better reflect the actual units being displayed:

- If the displayed weight is in pounds, the Lb LED is lit; if kilograms, the Kg LED is lit.
- If the primary unit of weight is pounds, the Kg LED is lit for secondary units—or, if the primary unit is kilograms, the Lb LED is lit for secondary units—unless the secondary unit of weight is the same as the primary.
- If neither primary nor secondary units are pounds or kilograms, the Lb LED is used as a primary units indicator and the Kg LED is used as the secondary units indicator.

If stickers or other labels have been used to change the LED labeling on the indicator front panel, these may need to be removed for Release 3.11.

Setpoint Key

In Release 3.11, pressing the **SETPOINT** key now displays only defined setpoints: setpoints of KIND = OFF are not shown.

Setpoints that have been set off at the front panel using the **SETPOINT** and **CLEAR** keys can now be set back on. Press the **SETPOINT** key to display the "OFF" status of the setpoint, then press **ENTER** to turn the setpoint back on.

Tare Key

A keyed tare of zero now puts the indicator in gross display mode and clears the tare. See the description of the LGLMODE parameter for more information.

NOTE: In Release 3.11, if the gross weight is not positive when the **TARE** key is pressed, the tare is cleared and the indicator set to gross display mode. In prior releases, the **TARE** key was ignored if the gross weight was not greater than zero.

Alphanumeric Character Entry

The procedure for entering alphanumeric characters is changed in this release. See the description of the P FORMT menu on page 8 for more information.

Configuration Menus

Several of the configuration menus are changed in Release 3.11, including the CONFIG, SET ALG, FORMAT, SERIAL, P FORMT, and DIGIN menus. Changes to these menus are summarized in the following pages.

NOTES:

- In Release 3.11, analog outputs are set off (0 VDC or 4 mA) when the indicator is placed in setup mode.
- New parameters added for Release 3.11 (LGLMODE on the CONFIG menu, UNITS and SPNAME on the FORMAT menu) cannot be set using the Hotline™ Version 3.0+ configuration utility.

CONFIG Menu

Several new parameters and values have been changed or added to the CONFIG menu for Release 3.11:

- PWRUP parameter name changed to PWRUPMD.
- 200TARE parameter name changed to TARE200.
- New LGLMODE parameter added between TARE FN and CONSNUM parameter. See detailed description below.
- New A/B value added under FEATURE parameter allows the Allen-Bradley® Remote I/O feature to be turned on with a valid access code.

  NOTE: The Hotline™ configuration utility cannot be used when the A-B feature is enabled.

Figure 1 on page 3 shows the CONFIG menu for Release 3.11.

LGLMODE Parameter

The LGLMODE parameter on the CONFIG menu (see Figure 1 on page 3) sets the display characteristics of the indicator when a tare of zero is entered in gross mode.

- If LEGAL (the default) is specified for the LGLMODE parameter, the display returns to gross mode when a zero tare is entered.
- If INDUST is specified, the display switches to net mode when a zero tare is entered.

SET ALG Menu

The default value for the TOTALS parameter is now OFF, regardless of the number of channels configured. See Figure 2 on page 3.

FORMAT Menu

Several parameters have been changed or added to the FORMAT menu for Release 3.11:

- TOTAL parameter is moved between SCALE4 and DATE. SCALE1 is now the first second-level parameter under FORMAT.
- New UNITS parameter added after the TIME parameter to allow customizing of the units designators.
- New SPNAME parameter added after UNITS. SPNAME allows modification of setpoint names at the front panel, similar to function of SPNAME#x EDP command.

Figure 3 on page 3 shows the changed parameters on the FORMAT menu for Release 3.11. UNITS and SPNAME parameters are described on page 4.

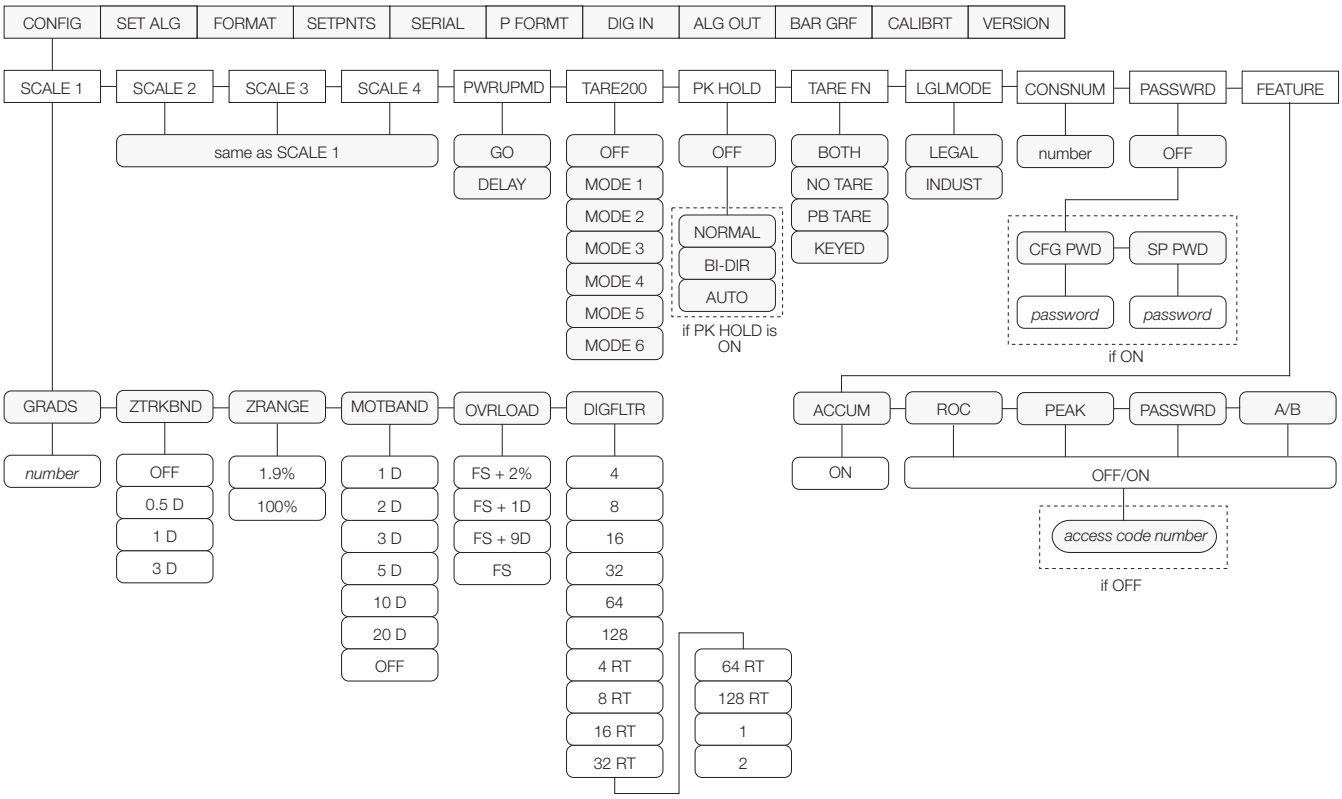

Figure 1. CONFIG Menu

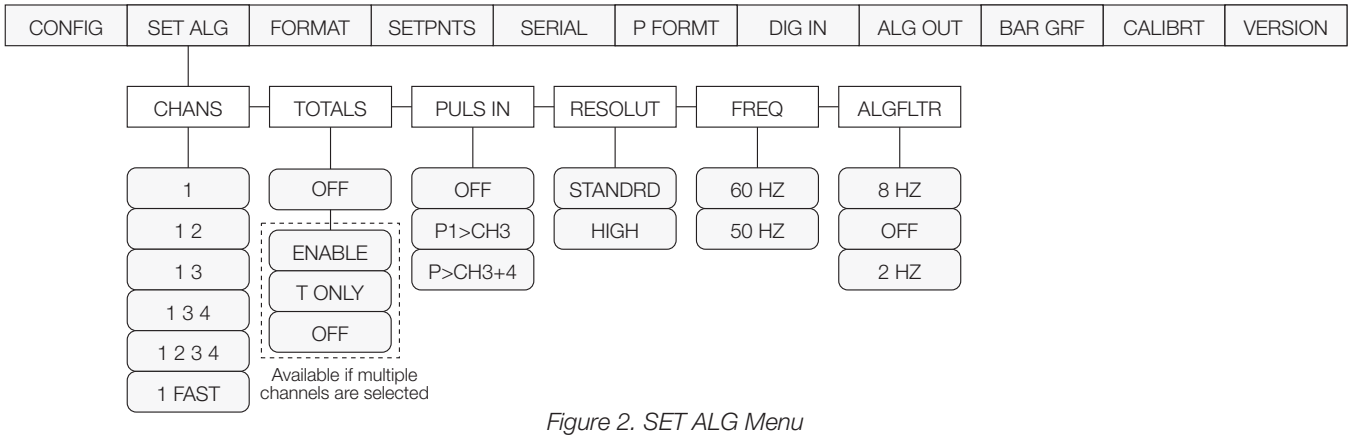

Figure 2. SET ALG Menu

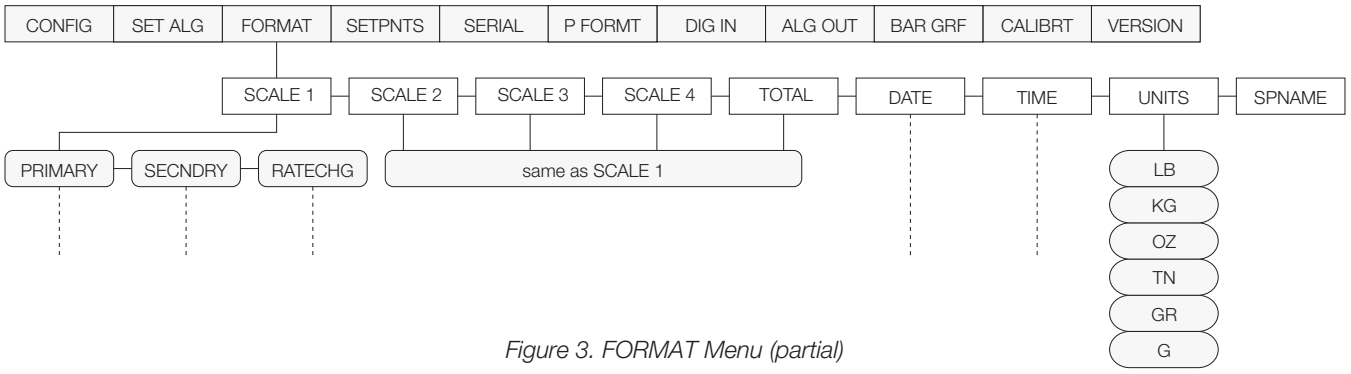

Figure 3. FORMAT Menu (partial)

UNITS Parameter

The UNITS parameter allows units identifiers to be customized. Default identifiers (LB-KG-OZ-TN-GR-G) can be changed using the procedure described under the P FORMT menu. Once changed, the custom units identifiers appear as selections for the UNITS subparameters on the FORMAT menu, PRIMARY and SECNDRY parameters.

Modified units identifiers can be from one to seven characters long and use both upper and lower case letters. The maximum length allowed for the entire identifier string (including all units identifiers and the dashes used as separator characters) is 30 characters.

NOTE: Displayed unit identifiers are shown in upper-case only; printed unit identifiers show both upper and lower case letters.

SPNAME Parameter

The SPNAME parameter allows setpoint names to be modified at the front panel. The function of this parameter is identical to the SPNAME#x EDP command. Use the procedure described under the P FORMT menu to edit setpoint names.

SERIAL Menu

An optional parameter, ABSTRM, is added between the STREAM and PRNDEST parameters to allow selection of the port used for streaming to the Remote I/O Interface (see Figure 4, below). ABSTRM is only shown if the A/B option is enabled (FEATURE parameter on the CONFIG menu).

P FORMT Menu

The P FORMT menu is changed to allow character editing at the first level (see Figure 9 on page 8). The procedure shown in Figure 9 is used for all parameters that allow editing of alphanumeric character strings.

DIGIN Menu

The default values for DIGIN 1 and DIGIN 2 are changed for Release 3.11 as shown in Figure 5, below.

Also, the BATSTRT digital input no longer requires an active BATRUN digital input to start and run a batch sequence (see *BATSTRT DIGIN Dependency on BATRUN Removed* on page 5). For applications that do not require the capability to stop or reset the batch, batching can be started using a single digital input.

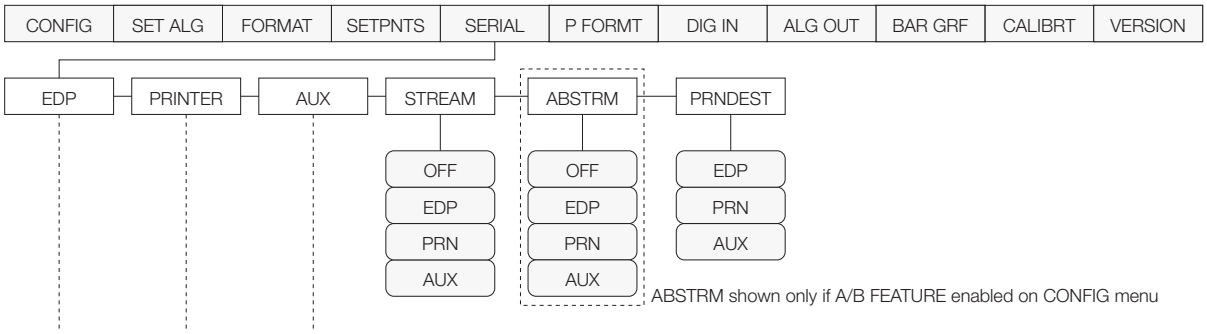

Figure 4. SERIAL Menu (partial)

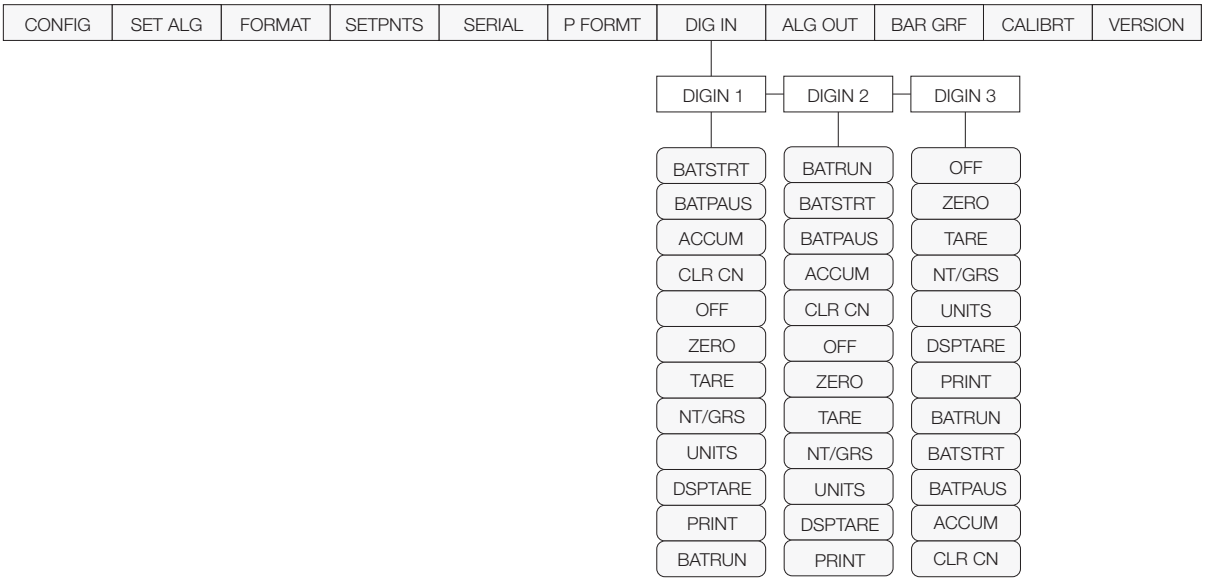

Figure 5. DIGIN Menu

Setpoint Processing

Automatic Reset for COUNTER Setpoints

The counter setpoint is changed in Release 3.11 to automatically reset to its initial value when a batch is restarted. Prior to this release, the counter value had to be manually re-entered.

No Limit to Number of TIMER and CONCUR Setpoints

The limitation of no more than five timer and/or concur setpoints is removed in Release 3.11.

Front Panel Entry of Setpoint Names

Setpoint names can be changed using the SPNAME parameter on the FORMAT menu.

Changing Setpoint KIND Resets All Setpoint Values

For Release 3.11, if a setpoint is changed from one kind to another (in SETUP mode or using the KIND EDP command), all parameters for that setpoint are reset to their default values.

DIGOUTs Changed for Continuous Setpoints Using TRIP Parameter with InBand/OutBand

Digital outputs for continuous setpoints using TRIP=INBAND and TRIP=OUTBAND are changed in Release 3.11 to function as follows:

- For TRIP = INBAND, the digital output is active when the weight value is inside the band set by the BANDVAL parameter.
- For TRIP = OUTBAND, the digital output is active when the weight value is outside the band set by the BANDVAL parameter.

Warning **This change reverses the digital output states for setpoints using InBand/OutBand. Existing setpoints using these values must be redefined.**

BATSTRT DIGIN Dependency on BATRUN Removed

The BATSTRT digital input no longer requires an active BATRUN digital input to run. If no digital input is assigned to BATRUN, batching proceeds as if BATRUN were always on.

In prior releases, the BATSTRT digital input would not go active unless a second digital input, assigned to BATRUN, was active. Release 3.11 removes this requirement for a second digital input.

Warning **If your application requires the indicator to provide a means of stopping or resetting the batch, a digital input must be assigned to BATRUN.**

ALARM Parameter for Batch Setpoints

The ALARM parameter is redefined for batch setpoints in Release 3.11 to hold the alarm message active until the setpoint is satisfied. The alarm message *does not* flash when waiting for standstill as in prior releases.

HYSTER Parameter for Batch Setpoints

The HYSTER parameter is redefined for batch setpoints in Release 3.11 to allow an assigned digital output to control an automatic refill/discharge cycle, based on the scale weight relationship to the setpoint VALUE and TRIP setting.

Using this capability, a batch setpoint can be configured to check that a scale vessel contains a minimum amount of material and, if the weight is less than the setpoint VALUE, refill the vessel to the weight specified by VALUE + HYSTER before continuing to the next setpoint.

For example,a setpoint configured with the following values will check whether the vessel contains more than 200 lb of material.

```
GROSSSP … VALUE = 200
TRIP = HIGHER
HYSTER = 1800
BATCH = ON
```

If the weight is greater than 200 lb (TRIP = HIGHER), the setpoint trips (digital output goes inactive) and the batch routine continues to the next setpoint. If the weight is 200 lb or less, the digital output stays active until the hopper is refilled to 2000 lb (200 + 1800 HYSTER parameter value).

Enhanced Batch Status Messages

Figure 6 (below) shows the status messages used for interrupted batches in Release 3.11.

Batch sequence stopped by…	Status message	Batch sequence restarted by…
BATPAUS DIGIN set low	HELD	BATPAUS DIGIN set high
PAUSE setpoint	PAUSED	BATSTRT DIGIN or BATSTART EDP command
Emergency stop switch	STOPPED	
BATPAUSE EDP command		
COUNTER setpoint		
Indicator in setup mode*		
* Indicator flashes STOPPED status message when returned to operating mode.		

Figure 6. Batch Status Messages

Additional Batch Setpoint Processing Changes

Note the following changes to batch setpoint processing for Release 3.11:

- Batching is automatically stopped when the indicator is placed in setup mode.
- When a batch setpoint trips, subsequent setpoints are evaluated immediately. In prior releases, evaluation was deferred to the next A/D cycle.

(continued on next page)

- Digital outputs set in two consecutive batch setpoints no longer toggle off and back on between setpoints.
- The default values for DIGIN 1 and DIGIN 2 are changed for Release 3.11. See page 4 for more information.

Truck Modes

Accumulator Function for Truck Program

The accumulator now accumulates net values while in truck mode.

Single-Transaction Tare Weights and IDs Supported in Stored-ID Truck Modes

Release 3.11 supports temporary tare weights for indicators configured to use stored IDs (TARE200 MODEs 3–6). This function allows one-time weighing of trucks without adding the Truck ID and tare weight to the indicator database.

To use this function, enter a Truck ID containing a decimal point, then press **NEW ID**.

Tare weights and Truck IDs entered using decimal Truck IDs are erased when the transaction is complete.

Print Formatting

NOTE: The P FORMT menu is changed to allow character editing at the first level as shown in Figure 8 on page 7. This procedure is used for all parameters that allow editing of alphanumeric character strings.

Extended Print Format Commands for Printing Using Display, Alternate, Primary, and Secondary Units

Release 3.11 allows specification of the units identifier used to print the demand, truck, and push print tickets listed in the Figure 7 (below). Units are specified by adding a slash and the units identifier after the command.

Print Format Command		Default Units	Optional Units
G	Gross	/D	/D = Display /A = Alternate (*not* displayed) /P = Primary /S = Secondary
T	Tare		
N	Net		
A	Accumulator		
TR1	Truck 1/Gross		
TR2	Truck 2/Tare		
TR3	Truck 3/Net		
SV1	Setpoint Value	/P	

Figure 7. Extended Print Format Command Syntax

For example, the following command is used to print a gross weight ticket using secondary units: **<G/S>**

Resetting ID, Consecutive Number, and Accumulator Values for Print Commands

ID, consecutive number, and accumulator values can be reset by specifying the value directly on the print format string. The format for these commands is:

<ID=n> **<CN=n>** **<A=n>**

where **n** is the number that the ID, consecutive number, or accumulator is reset to. The values are reset immediately.

NOTE: The consecutive number is now updated only once per print. In prior releases, the consecutive number was incremented every time it was printed.

EDP Commands

The following EDP commands are new for release 3.11:

LOCKON/LOCKOFF Commands

The LOCKON/LOCKOFF EDP commands provide the capability to lock and unlock the indicator front panel keys. The LOCKON command locks the front panel in operating mode only; all keys are functional in configuration mode.

DON/DOFF Commands

The DON/DOFF commands allow individual digital outputs to be set on or off. Once a digital output is set on, it remains on until set off or until the indicator is powered off.

Command format is as follows:

DON#nn or **DOFF#nn**

where **nn** is the number of the digital output, 01–16, being set on or off. The command **DOFF#0** can be used to turn off all digital outputs.

Batching Control Commands

Four new commands have been added to allow batching control through the EDP port:

BATSTART
If the BATRUN digital input is on, or if no digital input is assigned to BATRUN, the BATSTART command can be used to start the batch program.

BATRESET
Resets the batch program to the first batch step and stops the program.

BATPAUSE
Stops the batch program at the current step. All batch digital outputs set on by the current step are set off. The BATSTART command can be used to restart the batch program at the current step.

BATSTATUS

The BATSTATUS command is used to check the current status of various setpoint and batching conditions. BATSTATUS returns 14 bytes of status data as described in Figure 8 (below).

Status information returned in bytes 3–12 is coded as ASCII characters @ (hex 40) through O (hex 4F); only the low order bits of these characters are significant. The first table shows the low order bit assignments for bytes 3–12. Use the table at the bottom of the page (*Translating ASCII Status Data*) to interpret the status of the low order bits for a given ASCII character.

Batch Status Data	Byte	Values
Batch Status	0	"S" = stopped
		"R" = running
		"P" = paused
Current Batch Step	1 – 2	00 – 20

		Low Order Bit Assignments for Bytes 3 – 12				ASCII Values
Continuous Setpoint Status *Low order bits of bytes 3–7 are set on to indicate continuous setpoints for which conditions are being met. Bits are assigned to setpoint numbers as shown at right.*	3 – 7	Bit 3	Bit 2	Bit 1	Bit 0	@@@@@ – OOOOO
	3	SP 1	SP 2	SP 3	SP 4	
	4	SP 5	SP 6	SP 7	SP 8	
	5	SP 9	SP 10	SP 11	SP 12	
	6	SP 13	SP 14	SP 15	SP 16	
	7	SP 17	SP 18	SP 19	SP 20	
Digital Output Status *Low order bits of bytes 8–11 are set on to indicate active digital outputs. Bits are assigned to digital outputs as shown at right.*	8 – 11	Bit 3	Bit 2	Bit 1	Bit 0	@@@@ – OOOO
	8	DIGOUT 1	DIGOUT 2	DIGOUT 3	DIGOUT 4	
	9	DIGOUT 5	DIGOUT 6	DIGOUT 7	DIGOUT 8	
	10	DIGOUT 9	DIGOUT 10	DIGOUT 11	DIGOUT 12	
	11	DIGOUT 13	DIGOUT 14	DIGOUT 15	DIGOUT 16	
Digital Input / Alarm Status *Low order bits of byte 12 are set on to indicate active digital inputs and setpoint alarm status. Bits are assigned as shown at right.*	12	DIGIN 1	DIGIN 2	DIGIN 3	Alarm	@ – O
Carriage Return	13	N/A				(CR)

Translating ASCII Status Data

Use the table at right to evaluate the ASCII character output for bytes 3 – 12 and determine which of the low order bits are set on.

For example, if the Digital Output Status returned in bytes 8 – 11 is H@@N, the table at right can be used with the bit assignments described above to determine that digital outputs 1, 13, 14, and 15 are active:

• H (byte 8) indicates that bit 3 is on (DIGOUT 1);

• @ in bytes 9 and 10 indicates that DIGOUTs 5 through12 are all off;

• N (byte 11) indicates that bits 3, 2, and 1 are on. These bits represent DIGOUTs 13–15.

ASCII Value	Bit 3	Bit 2	Bit 1	Bit 0
@	0	0	0	0
A	0	0	0	1
B	0	0	1	0
C	0	0	1	1
D	0	1	0	0
E	0	1	0	1
F	0	1	1	0
G	0	1	1	1
H	1	0	0	0
I	1	0	0	1
J	1	0	1	0
K	1	0	1	1
L	1	1	0	0
M	1	1	0	1
N	1	1	1	0
O	1	1	1	1

Figure 8. BATSTATUS Command Structure and ASCII Translation Table

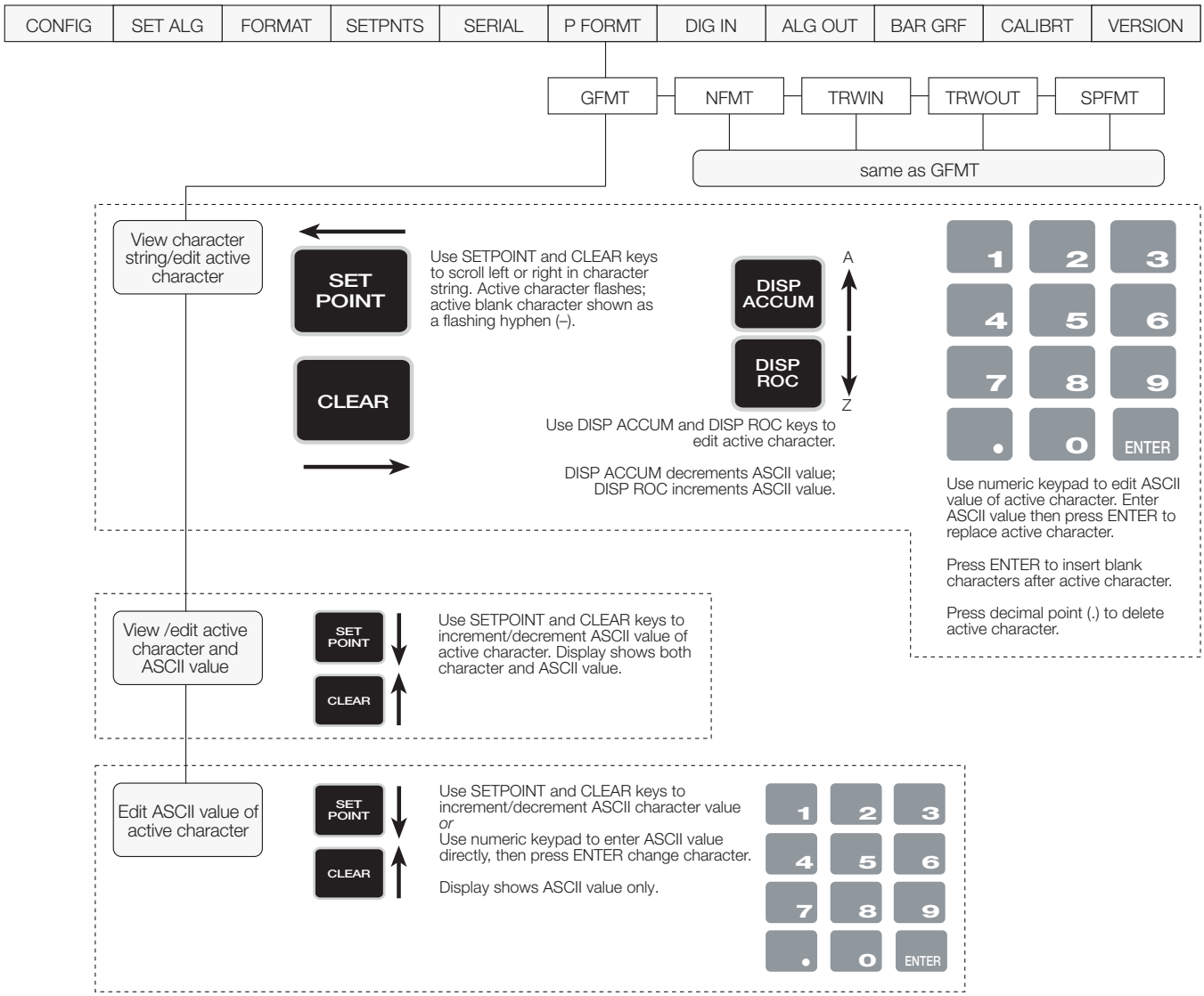

Figure 9. P FORMT Menu, Showing Alphanumeric Character Entry Procedure
The procedure shown above is used in Release 3.11 for all parameters that allow editing of alphanumeric characters.

Pass this Tech Talk along to share this technical information with your associates.

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