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IQ plus® 800/810

Digital Weight Indicators
Version 3.1

Installation Manual





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About this Manual

This manual is intended for use by service technicians responsible for installing and servicing the IQ plus® 800/810 digital weight indicators. This manual applies to Version 3.1 software for the IQ plus 800/810 indicators. See Section 10.6 on page 90 for a summary of software changes included in Version 3.1.

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.

The configuration menu charts include parameter choices for both the standard and optional features. When configuring the 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.

Warning *Most procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.*

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.rlws.com.

Warning *If you are upgrading to Version 3.1 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 Version 3.1.
- When the indicator is placed in setup mode:
  - Analog outputs are set off (0 VDC or 0 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 Section 3.2.7 on page 34 for more information.

1.0 Introduction

For basic weighing applications, the IQ plus 800 and IQ plus 810 have 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.

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.

The IQ plus 810 is available in desktop, 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.

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1.1 Optional Features

Table 1-1 lists some of the optional features available for the IQ plus 800/810 indicators, including references to pages in this manual for more information. See page 10 for information about wall- and panel-mounting options.

Option	Option PN	Model	See Page
Rate of Change Function	19359	All	65
Peak Hold Function	19360	All	66
Passwords	30547	All	67
Supervisor Setup Switch	19375	All	67
Batching Switch	19369	All	68
Bar Graph	19363	All	69
Duplex 20 mA Current Loop	19374	All	71
RS-485 Communications	19372	All	71
Dual Channel Load Cell Expansion Board for 800/810 desktop model	40386	800/810	71
Dual-Channel Load Cell Expansion Board for wall mount models)	67595	810 HE/SS	71
Remote Keyboard Input Expansion Board	40385	800/810	73
Analog Output	19357	All	73
2-Channel Relay Rack (Internal)	30549	800	77
4-Channel Relay Rack (Internal)	36080	800	77
Setpoint Digital Output Expansion Board	19362	All	78
4-Channel Relay Rack (External)	19365	All	79
16-Channel Relay Rack (External)	19373	All	79
Jetpak™ High Speed Option	various	All	82
Allen Bradley Remote I/O Interface (External)	35888	All	83
Profibus Interface (External)	49974	All	83
Dual Range Option	61138	All	83

Table 1-1. IQ plus 800/810 Optional Features

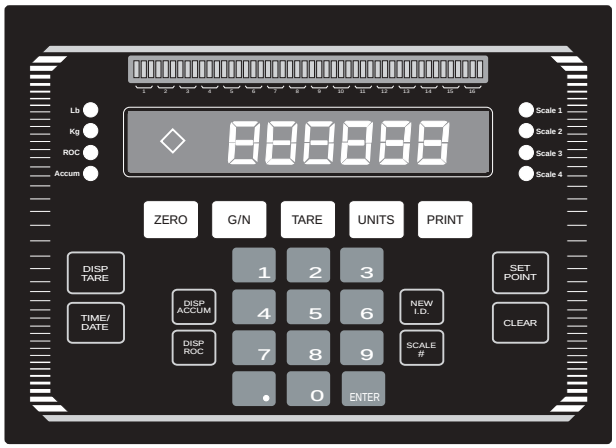


Figure 1-1. IQ plus 800/810 Front Panel

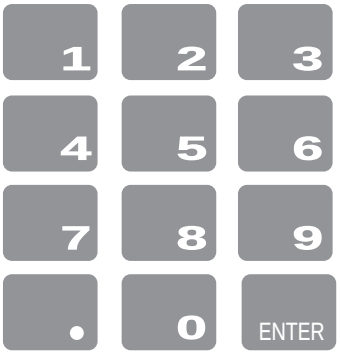


Figure 1-2. IQ plus 810 HE Front Panel

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1.2 Front Panel Keys and Annunciators

The following section describes the front panel keys, annunciators, and display functions of the IQ plus 800/810 indicators.



Numeric keypad

The numeric keypad is used to enter numeric values, such as tare weights and ID numbers. 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 returns to normal mode.

ZERO

ZERO

Resets the scale gross weight to zero. The ZERO key cannot be used when the scale is in motion or when the displayed weight value is outside of the configured zero range.

G/N

G/N

Toggles between Gross and Net display modes. In Net mode, the display shows net weight and the *NET* 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

TARE

Captures the current gross weight as a tare value and switches to net mode. The gross weight must be positive and the scale at standstill to perform a tare operation.

Tare values can also be entered using the numeric keypad, then pressing TARE, or by sending commands to the EDP port

The *T* and rhombus appear on the display when a tare is in the system. The *pT* and rhombus indicates a manually entered (keyed) tare.

UNITS

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. See the description of the LED annunciators on page 5 for more information.

PRINT

PRINT

In normal mode and with the scale at standstill, pressing the PRINT key sends data to the serial port. See Section 7.0 on page 54 for information about creating custom print formats.

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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?*; press CLEAR again to clear the stored truck ID.

In the Truck In/Out mode, press DISP TARE repeatedly to scroll through the stored IDs.



TIME/DATE

Press once to display the date, press again to display the time.

You can enter new values for the date and time while they appear in the display by typing the new value and pressing ENTER. Use the 24-hour format to enter time values.



DISP ACCUM

Displays the current weight from the accumulator register and sequentially lights the accumulator annunciators. Press repeatedly to scroll through all five accumulators or enter an accumulator number (0–4) and press DISP ACCUM.

If you press CLEAR, the display prompts *CLR AC?.* Press CLEAR again to clear the accumulate register.



DISP ROC

Displays the rate of change for weight data on the current scale channel. The ROC value is expressed as the change in weight during a specific period of time, such as lb/min or Kg/hour. The DISP ROC key functions only if the rate of change feature is installed; the ROC annunciator lights when the rate of change feature is active.



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 5.3 on page 41 for information about using the truck modes.



SCALE

Selects an individual scale channel or total channel for display.

The scale number LED annunciator lights to show which scale weight is displayed. If sources are totaled, more than one LED is lit. The SCALE # key functions only if more than one input channel is enabled and selected.

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SETPOINT

Press to show defined 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 SETPOINT, the next defined setpoint is shown.

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: In Version 3.1, you can reactivate setpoints that have been turned off at the front panel. Press the SETPOINT key to show the *OFF* status for the setpoint, then press ENTER to turn the setpoint back on.

If you make an error when keying in a value, press CLEAR to erase individual digits. To return to normal mode, press G/N or wait for the display to switch back.

You can use the SETPOINT key to view or change preact values from the front panel during the normal mode. See Section 8.3 on page 62 for more information using the SETPOINT key to access preact values.

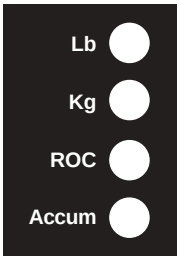
See Section 8.4 on page 62 for more information about naming setpoints.



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, with the current accumulator value displayed, press CLEAR to display the prompt *CLR ACn* (where *n* is the accumulator number, 0–4). Press CLEAR a second time to clear the accumulator.
- In the DISP TARE function with the current tare value displayed, press CLEAR to display the prompt *CLR TR?*. Press CLEAR a second time to clear the tare register.
- In the DISP TARE function (truck in/out mode), CLEAR erases truck IDs, as well as tare values.



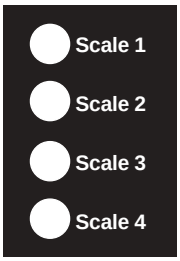
LED Annunciators

The LED annunciators provide status information about the indicator.

The LEDs on the left side of the display indicate the display units and whether the value displayed is a rate of change or accumulator value. The Lb and Kg (Units) LEDs function as follows:

- 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 unit.
- If neither primary nor secondary units are pounds or kilograms, the Lb LED is used as a primary units annunciator and the Kg LED is used as the secondary units annunciator.

See the descriptions of the UNITS, DISP ROC, and DISP ACCUM keys for more information.



The scale channel LEDs on the right side of the display indicate which scale weight is displayed. See the description of the SCALE # key for more information.

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2.0 Installation

2.1 Power Connections

The IQ plus 800/810 can operate from either a 115 VAC or 230 VAC 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 115 VAC operation. If the installation requires 230 VAC 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 10.7 on page 91 for specifications

2.2 Board Connections

The main CPU board is connected to the power supply/display board by two ribbon cables. The power ribbon cable connects between J1 on both boards; the data ribbon cable connects between J2 on both boards.

Figures 2-1 through 2-3 show board locations and cabling for the IQ plus 810, HE, and SS models. Board locations and cabling for the IQ plus 800 are essentially the same as for the IQ plus 810.

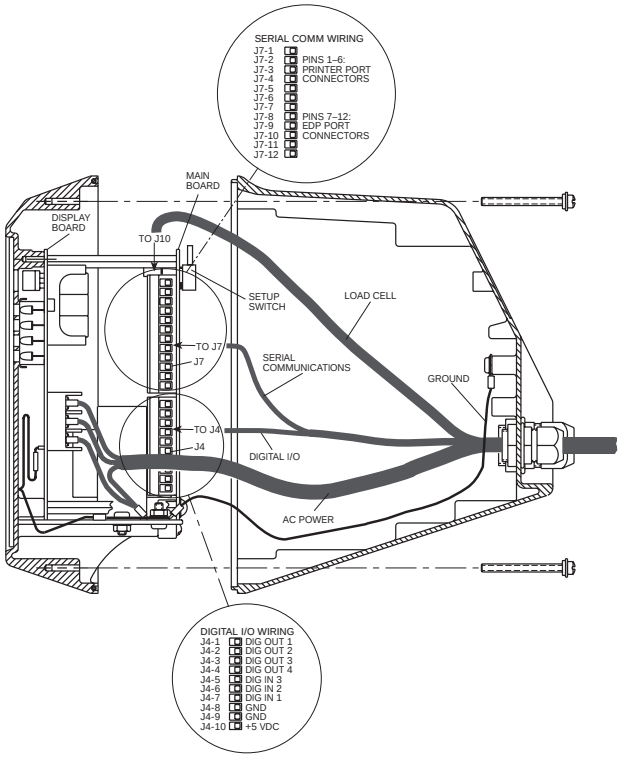


Figure 2-1. IQ plus 810 Wiring, Side View

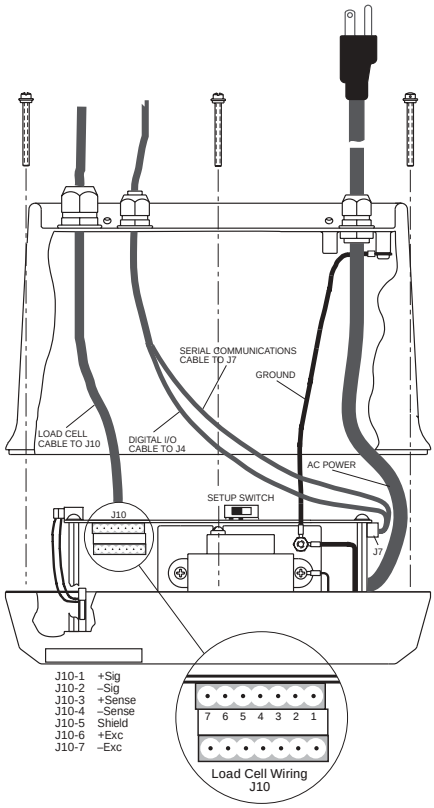


Figure 2-2. IQ plus 810 Wiring, Top View

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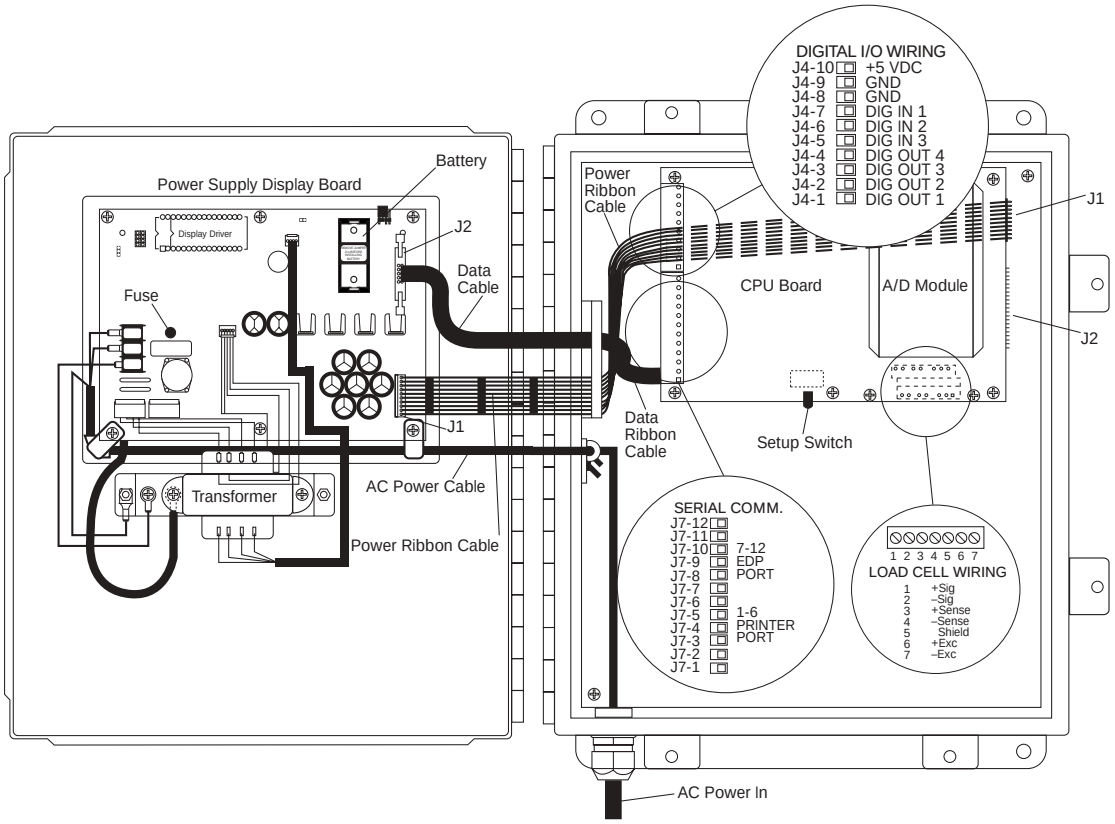


Figure 2-3. IQ plus 810 SS Wiring

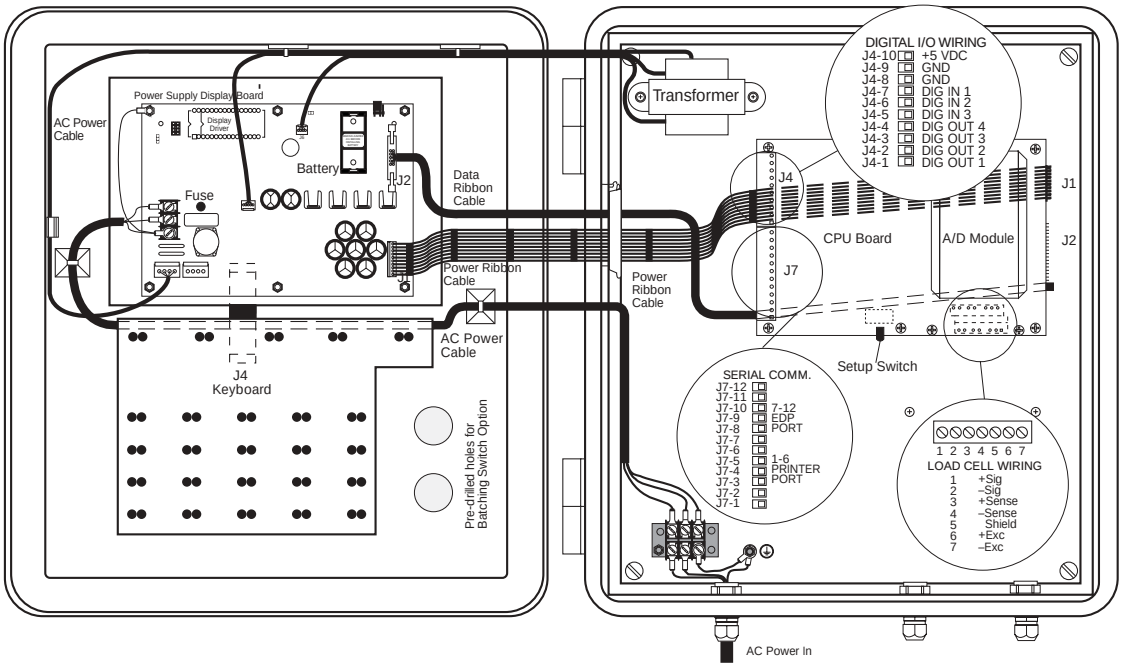


Figure 2-4. IQ plus 810 HE Wiring

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2.3 Board Diagrams

Figures 2-5 through 2-7 show major component locations on the IQ plus 800/810 circuit boards.

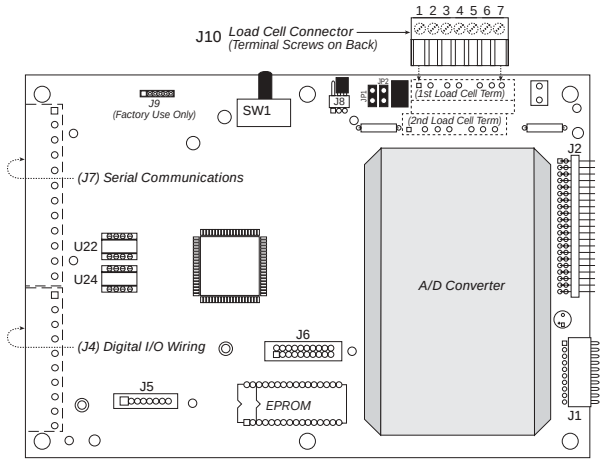


Figure 2-5. CPU Board, Component Side

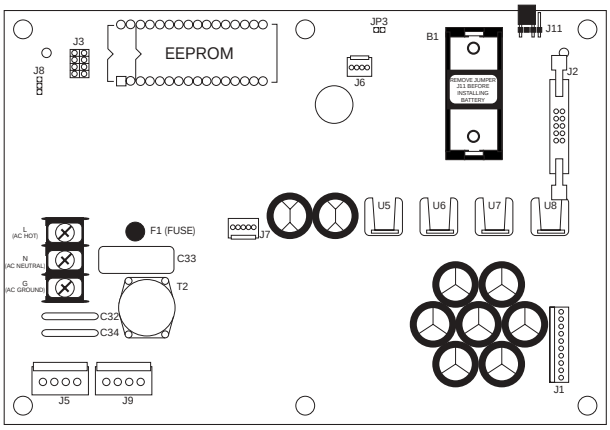


Figure 2-6. Power Supply/Display Board, Component Side

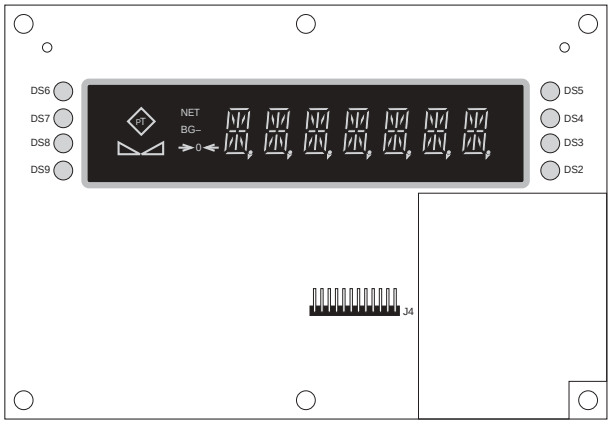


Figure 2-7. Power Supply/Display Board, Display Side

2.4 Load Cell Wiring

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 is surface mounted to the CPU board.

Note that earlier indicators (with A/D modules mounted on standoffs) have J10 pin assignments in reversed order from those shown in Table 2-1.

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 jumpers JP1 and JP2 on (these jumpers connect pins 3 and 6, 4 and 7, at terminal J10). For a 6-wire installation using sense leads, remove the jumpers.

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, remove them for a 6-wire installation.

Table 2-1 shows the J10 pin assignments for load cell connections.

Channel	J10 Pin	Signal
1	1	+SIGNAL
	2	–SIGNAL
	3	+SENSE
	4	–SENSE
	5	SHIELD
	6	+EXCITATION
	7	–EXCITATION
2	1	+SIGNAL
	2	–SIGNAL
	3	+SENSE
	4	–SENSE
	5	SHIELD
	6	+EXCITATION
	7	–EXCITATION

Table 2-1. J10 Pin Assignments (Load Cells)

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2.5 Serial Communications Wiring

Terminal block J7 on the CPU board connects both the EDP (Electronic Data Processing) port and the printer port. See Section 3.2.5 on page 30 for information about configuring the serial ports.

The EDP port supports 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 can support full duplex RS-232 and simplex 20 mA transmissions. (Pin 3 is used as an RS-232 receive in some custom software versions only.) See Section 9.8 on page 71 for information about serial communications options.

Table 2-2 shows the J7 pin assignments for serial communications connections.

Port	J7 Pin	RS-232	20mA Current Loop	RS-485
Printer	1			*R38/GND*
	2			*R39/+5V*
	3	RxD		
	4		–20mA OUT	
	5	TxD		
	6	GND	+20mA OUT	
EDP	7		+20mA IN	485-A
	8		–20mA IN	485-B
	9	RxD		
	10		–20mA OUT	
	11	TxD		
	12	GND	+20mA OUT	

Table 2-2. J7 Pin Assignments (Serial Communications)

RS-485 Wiring

Biasing resistors R38 and R39 can be used to assure that the RS-485 loop remains in a MARK state when idle. If the indicator is installed at the end of the RS-485 cable, install a 100Ω termination resistor across the inputs.

The IQ plus 800/810 RS-485 option requires installation of a single chip (U24) to provide 2-wire, half-duplex communications. RS-485 MARK and SPACE states are generated or detected when the following conditions exist:

- MARK state if 485-A (pin J7-7) is > 200 mV lower than 485-B (J7-8)
- SPACE state if 485-A (pin J7-7) is > 200 mV higher than 485-B (J7-8)

Equipment using the 4-wire RS-485 implementation can be incorporated into a network of IQ plus 800/810 indicators by tying the transmit (A) and receive (A) pins together, and tying the transmit (B) and receive (B) pins together.

2.6 Digital I/O Wiring

The standard unit allows three digital inputs and four digital outputs. Wire any active digital inputs and outputs to connector J4 on the CPU board. Table 2-3 shows the digital I/O assignments for the J4 connector.

J4 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

Table 2-3. J4 Pin Assignments (Digital I/O)

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 (0 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 the batching switch, PN 19369, 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 (0 VDC) and can be driven by TTL or 5V logic without additional hardware. Use the DIG IN menu to configure the digital inputs (see Section 3.2.7 on page 34).

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 jumper wire from J1, pin 4 to J4, pin 10.
- Use an external power supply to energize J4, pin 10. PN 16418 is recommended.

Indicators made after September 1, 1996 have 5 VDC built into J4, pin 10.

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2.7 Wall- and Panel-Mounting

The following sections describe wall- and panel-mounting procedures for the IQ plus 800/810 indicators.

2.7.1 IQ plus 810 Panel Mount Kit

The panel mounting kit for the IQ plus 810 desktop model contains five screws with washers to replace the original screws holding the body to the faceplate.

1. Create a template using the drawing in Figure 2-8 to mark the hole cutout in the panel.

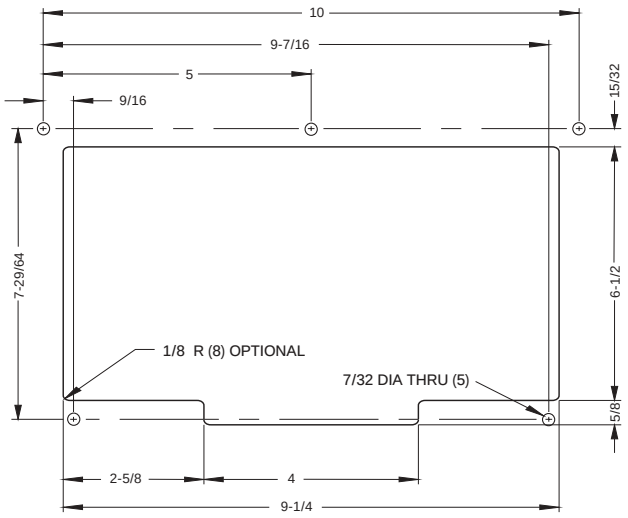


Figure 2-8. IQ plus 810 Panel Cutout

2. Disconnect power to the indicator.
3. Remove the back of the indicator by unscrewing the six machine bolts holding the back to the faceplate.
4. Temporarily remove any cable connections from the indicator terminals. Remove the ground cable from the cast lug on the rear of the indicator case.
5. Using a template made from the drawing shown in Figure 2-8, transfer the cutout to the panel. Cut out the panel and drill the holes to size. Hold the faceplate against the panel 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 (see Figure 2-9).
7. Reattach cables to indicator terminals. Power up and test the indicator.

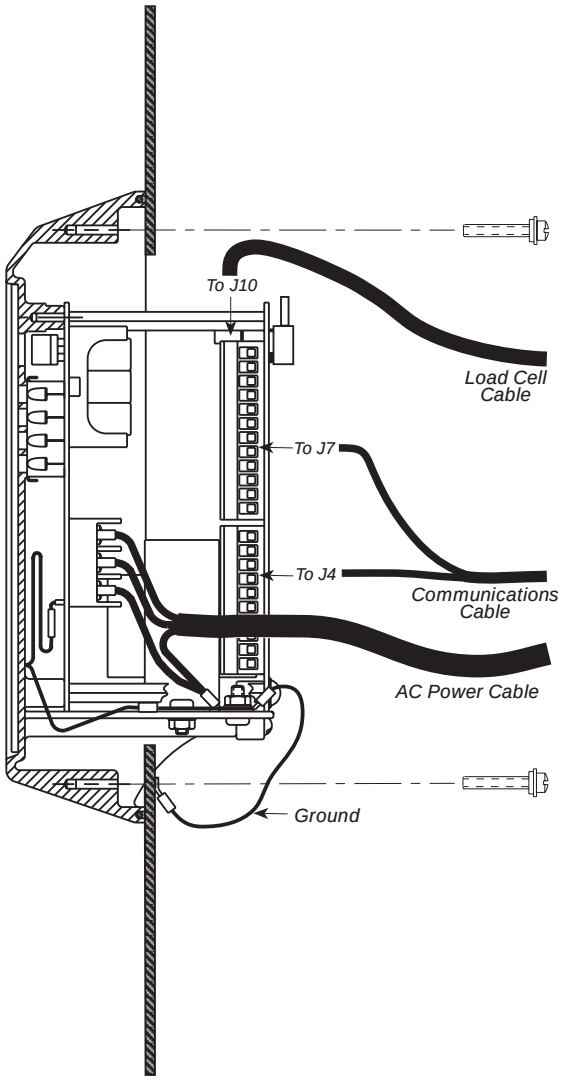


Figure 2-9. IQ plus 810 Panel Mount Wiring

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2.7.2 IQ plus 810 Wall Mount Kit

A wall mount kit is available for mounting the IQ plus 810 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 2-10 and 2-11.

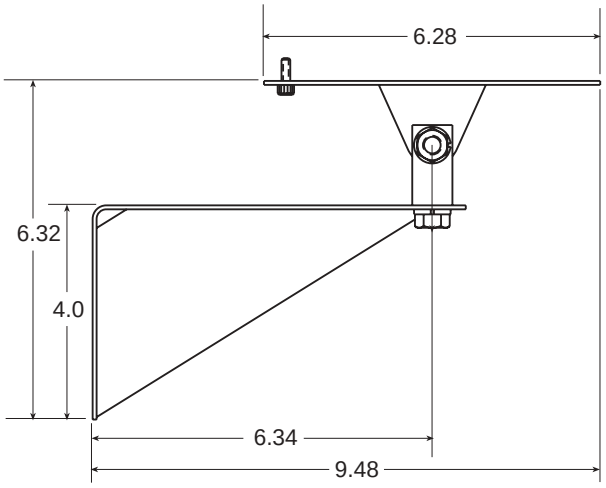


Figure 2-10. IQ plus 810 Wall Mount (Side View)

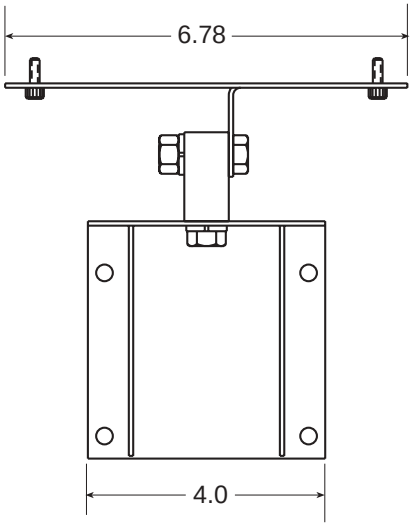


Figure 2-11. IQ plus 810 Wall Mount (Front View)

2.7.3 IQ plus 810 SS and HE Model Wall Mounting

If you are permanently mounting an SS or HE model to a wall, Underwriters Laboratories (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 2-12 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.

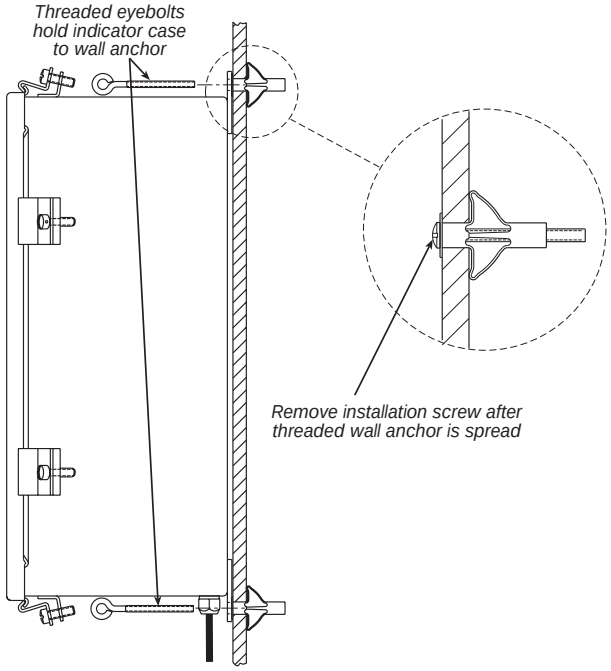


Figure 2-12. Wall Mounting for HE and SS Models

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2.7.4 IQ plus 800 Panel Mount Kit

Use the following procedure when panel mounting IQ plus 800 indicators manufactured after September 1997. These indicators use the same cutout dimensions as that for the older IQ plus 800 models; the panel mount kit includes a larger bezel and gasket for secure mounting.

1. Make a 9 13/16 W x 7 5/16 H inch cutout in the panel.
2. Remove the tilt stand from the indicator enclosure.
3. Remove the 14 screws and washers that hold the backplate to the enclosure body. Note the location of the larger fillister head screw above the setup switch access screw.
4. Slowly pull the backplate away from the enclosure. Disconnect the ribbon cable extension from the front panel membrane overlay tail before attempting to completely remove the backplate and boards from the enclosure.
5. Remove the 10 nuts and washers that secure the bezel to the front of the enclosure (see Figure 2-13).

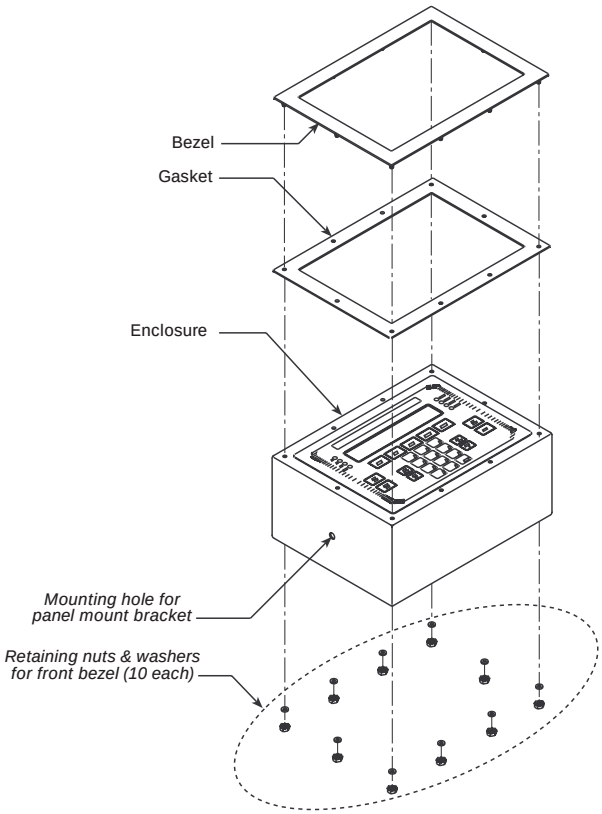


Figure 2-13. IQ plus 800 Bezel and Gasket Replacement (for indicators manufactured after September 1997)

6. Remove the standard bezel and gasket from the front of the indicator and replace with the larger bezel and gasket from the panel mount kit. Replace the washers and nuts to secure the new front bezel.
7. Feed the power, load cell, and communications cables through the cord grips on the backplate. Make cable connections as required.
8. Reassemble the indicator enclosure to the backplate and boards. Move the indicator halves together until the ribbon cable extension can be reconnected to the front panel membrane overlay tail. Reconnect the ribbon cable extension then slide the backplate and boards fully into the enclosure.
9. Place the indicator face-down on the antistatic mat. Align the holes in the backplate with those in the enclosure, then reassemble the washers and screws removed in step 3. Use an alternating pattern when tightening the screws to prevent distorting the backplate gasket.
10. Feed indicator cables through the panel cutout from front to rear. Insert the indicator into the panel from the front and hold in place.
11. From the rear of the panel, use the 1/4-20 x 3/8 pan-head screws and lock washers provided to attach the panel mount brackets to the sides of the indicator as shown in Figure 1.
12. Thread the four 10-32 x 1 3/4-inch round-head machine screws into the panel mount brackets and tighten until the indicator is held securely against the panel.

2.8 Battery Replacement

The 3.0V lithium battery on the power supply/display board maintains the real-time clock and protects data stored in the system RAM when the indicator is not connected to AC power.

System RAM data includes time and date, print formats, truck ID storage, and setpoint configuration. This information is lost if the battery loses power and the indicator is disconnected from AC power. To prevent loss of data, do the following:

- Periodically check the battery voltage and replace when the voltage drops. The battery should last a minimum of one year.
- Use the Revolution™ configuration utility or EDP commands (see Section 6.2 on page 52) to store a copy of the indicator configuration on a PC before attempting battery replacement. If any data is lost, the indicator configuration can be restored from the PC.

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3.0 Configuration

To configure the IQ plus 800/810 indicators, the indicator must be placed in setup mode. The setup switch is located on the top edge of the vertically-mounted CPU board, near the middle of the board. Moving the two-position setup switch toggles between setup or normal mode. Access to the setup switch depends on the type of indicator.

NOTE: *Entering setup mode erases any pushbutton zero values.*

IQ plus 800

The setup switch is accessed by removing a screw on the enclosure backplate. Switch position is changed by inserting the screwdriver into the access hole and moving the switch left (CONFIGURE) or right (RUN), as indicated by the label immediately below the access hole. Figure 3-1 shows a cutaway view of the setup switch access screw and the setup switch.

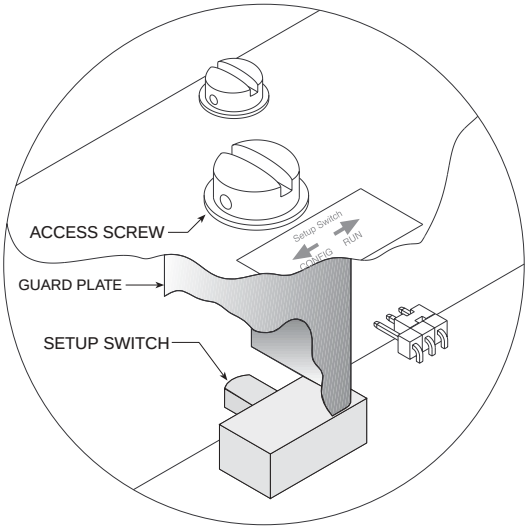


Figure 3-1. IQ plus 800 Setup Switch Access

NOTE: *For IQ plus 800 enclosures manufactured prior to September 1997, the setup switch is accessed by removing four screws that secure the setup switch cover to the top of the enclosure.*

IQ plus 810

The setup switch (SW1) is accessed by separating the enclosure halves. See Figure 2-5 on page 8 for switch location.

When the indicator is placed in setup mode, the word *CONFIG* is shown on the display. The CONFIG menu is the first of the main menus used to configure the indicator. Detailed descriptions of these menus are given in Section 3.2. When configuration is complete, move the setup switch to the run position and replace the setup switch access screw or reassemble the enclosure, as required.

3.1 Configuration Methods

The IQ plus 800/810 indicators can be configured by using the front panel keys to navigate through a series of configuration menus or by sending commands or configuration data to the EDP port. Configuration using the menus is described in Section 3.1.3.

Configuration using the EDP port can be accomplished using either the EDP command set described in Section 6.0 or the Revolution™ configuration utility.

3.1.1 Revolution Configuration

The Revolution configuration utility provides the preferred method for configuring the IQ plus 800/810 indicators. Revolution runs on a personal computer to set configuration parameters for the indicator. When Revolution configuration is complete, configuration data is downloaded to the indicator.

Revolution supports both uploading and downloading of indicator configuration data. This capability allows configuration data to be retrieved from one indicator, edited, then downloaded to another.

To use Revolution, do the following:

1. Install Revolution on an IBM-compatible personal computer running Windows® 3.11 or Windows 95. Minimum system requirements are 4MB of extended memory and at least 5MB of available hard disk space.
2. With both indicator and PC powered off, connect the PC serial port to the RS-232 pins on the indicator EDP port.
3. Power up the PC and the indicator. Use the setup switch to place the indicator in setup mode.
4. Start the Revolution program.

Figure 3-2 on page 14 shows an example of one of the Revolution configuration displays.

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Figure 3-2. Sample Revolution Configuration Display

Revolution provides online help for each of its configuration displays. Parameter descriptions provided in this manual for front panel configuration can also be used when configuring the indicator using Revolution: the interface is different, but the parameters set are the same.

3.1.2 EDP Command Configuration

The EDP command set can be used to configure the IQ plus 800/810 indicators using either a personal computer, terminal, or remote keyboard. Like Revolution, EDP command configuration sends commands to the indicator EDP port; unlike Revolution, EDP commands can be sent using any external device capable of sending ASCII characters over a serial connection.

EDP commands duplicate the functions available using the indicator front panel and provide some functions not otherwise available. EDP commands can be used to simulate pressing front panel keys, to configure the indicator, or to dump lists of parameter settings. See Section 6.0 for more information about using the EDP command set.

3.1.3 Front Panel Configuration

The IQ plus 800/810 indicators can be configured using a series of menus accessed through the indicator front panel when the indicator is in setup mode. Table 3-1 provides a summary of the configuration functions provided by each of these menus.

Menu		Menu Function
CONFIG	Configuration	Configure input channels and select general indicator functions. CONFIG menu is used to set grads, zero tracking, zero range, motion band, overload, and digital filtering for each scale channel, select truck modes and power-up mode, set consecutive number initial value, set tare function, define passwords, and enable optional features.
SET ALG	Set Analog	Select input channels, TOTALS channel configuration, resolution, and analog filtering.
FORMAT	Format	Set display format (units, decimal point position, display divisions) for primary, secondary, and rate-of-change weight displays, time and date information, and define setpoint names.
SETPNTS	Setpoints	Configure setpoints. See Section 8.0 for more information about setpoint configuration.
SERIAL	Serial	Configure EDP, printer, and auxiliary communications ports.
P FORMT	Print Format	Set print format used for demand, truck, and setpoint push-print tickets. See Section 7.0 for more information about print formatting.
DIG IN	Digital Input	Assign digital input functions.
ALG OUT	Analog Output	Configure analog output modules. Used only if analog output option is installed.
BAR GRF	Bar Graph	Configure bar graph function. Used only if bar graph option is installed.
CALIBRT	Calibrate	Calibrate input channels. See Section 4.0 for calibration information.
VERSION	Version	Displays installed software version number.

Table 3-1. IQ plus 800/810 Menu Summary

Four front panel keys are used as directional keys to navigate through the menus in setup mode (see Figure 3-3). The SETPOINT and CLEAR keys scroll left and right (horizontally) on the same level; DISP TARE and TIME/DATE move up and down (vertically) to different menu levels.

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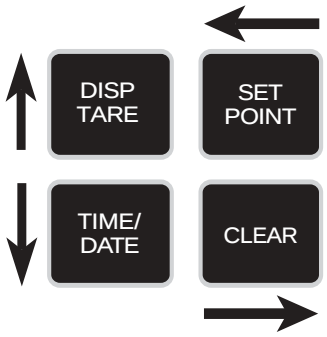


Figure 3-3. Menu Navigation Keys

To select a parameter, press SETPOINT or CLEAR until the desired 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.

3.2 Menu Structures and Parameter Descriptions

The following sections provide graphic representations of the IQ plus 800/810 menu structures (Figures 3-4 through 3-15). In the actual menu structure, the settings you choose under each parameter are arranged horizontally. To save page space, menu choices are shown 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.

Most menu diagrams are accompanied by one or more tables that describe all parameters and parameter values associated with that menu option. Default parameter values are shown in bold type.

3.2.1 Configuration Menu

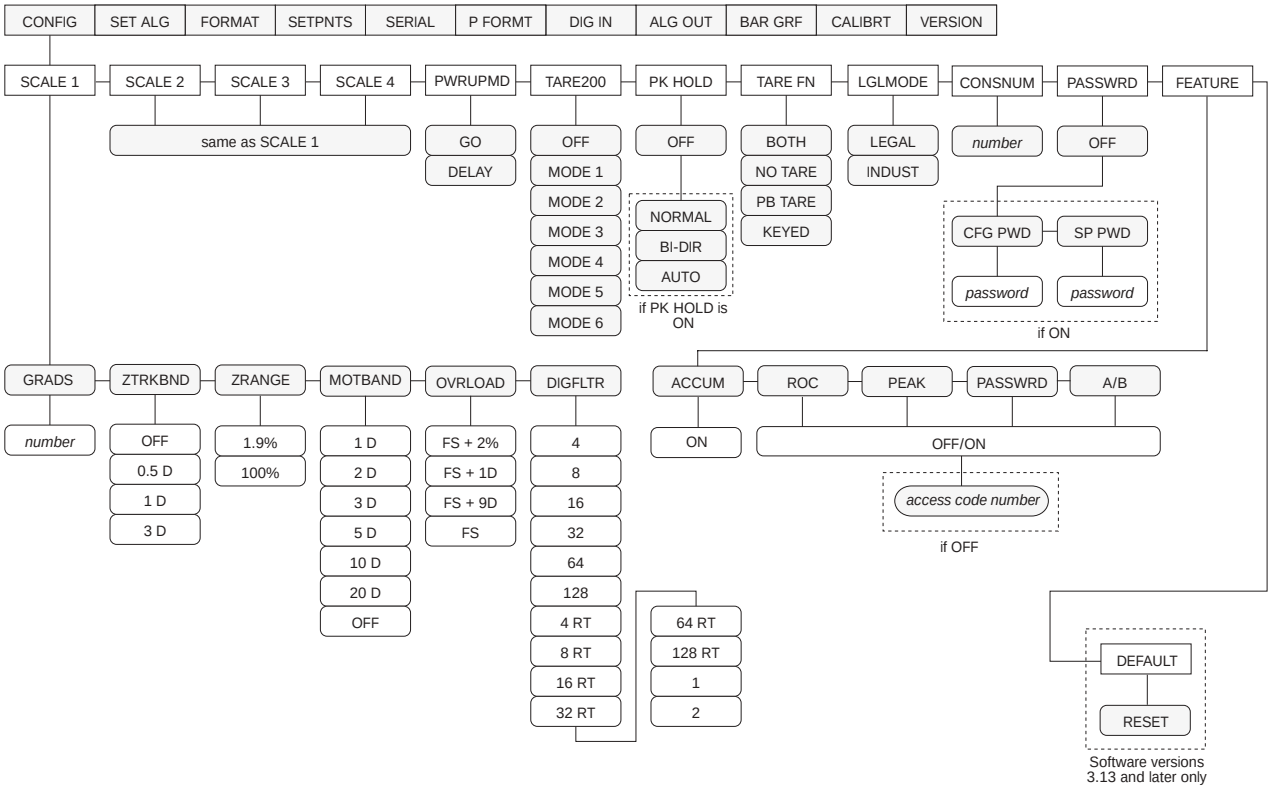


Figure 3-4. Configuration Menu

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CONFIG Menu		
Parameter	Choices	Description
Level 2 submenus		
SCALE 1–4	GRADS ZTRKBND ZRANGE MOTBAND OVRLOAD DIGFLTR	Specifies the analog input channel being configured. See level 3 submenus for configuration choices.
PWRUPMD	GO DELAY	Power up mode. In GO mode, the scale goes into operation immediately after a brief power up display test. In DELAY mode, the scale performs a power up display test, then warms up (WARM UP and standstill symbol displayed). Indicator becomes operational when no motion is detected for 30 seconds. DELAY mode is used where local regulations require a warm-up period.
TARE200	OFF MODE 1 MODE 2 MODE 3 MODE 4 MODE 5 MODE 6	200 ID/Tare Truck In/Truck Out mode. Specifies one of six truck modes. If selected, the indicator shifts from normal weighing mode to the selected truck mode. See Section 5.3 on page 41 for more information about truck modes. 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. Optional feature used to hold display of the highest net weight achieved during a weighing cycle. If the peak hold function is enabled, PK HOLD is set on for all channels. The TOTAL channel peak value is independent of the individual channels; it does not represent the sum of the channel peak values. See Section 10 for more information about the peak hold function.
TARE FN	BOTH NO TARE PB TARE KEYED	Tare function. Enables or disables push-button and keyed tares. Possible values are: BOTH: Both push-button and keyed tares are enabled NO TARE: No tare allowed (gross mode only) PB TARE: Push-button tares enabled KEYED: Keyed tares enabled
LGLMODE	LEGAL INDUST	Legal/industrial mode. Controls whether scale switches to gross or net display when a tare of zero is entered in gross mode. If LEGAL is selected, scale returns to gross mode; if INDUST is selected, scale switches to net display.
CONSNUM	0 *number*	Consecutive numbering. Specifies starting value for sequential numbering used to count batch sequences or serialize ticket numbers. The consecutive number can be printed on any print ticket; value is incremented after it is printed. If consecutive number is not printed, it is effectively disabled. The CONSECNUM EDP command allows you to view or change consecutive numbers.
PASSWRD	OFF CFG PWD SP PWD	Password. Optional feature supports two passwords: one for configuration menus in setup mode (CFG PWD), one for setpoint configuration using supervisor switch and SETPOINT key (SP PWD). Passwords can be entered only if feature is enabled (see FEATURE parameter). Enter up to seven digits for each password. See Section 9.4 on page 67 for more information.

Table 3-2. Configuration Menu Parameters

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CONFIG Menu		
Parameter	Choices	Description
FEATURE	ACCUM ROC PEAK PASSWRD A/B	Allows you to verify current feature status or to activate a feature. See the Level 3 parameter descriptions on page 18 for information about activating these features.
DEFAULT	RESET	Press the down (TIME/DATE) key to reset configuration parameters to default values. This parameter is available only with software versions 3.13 and later. NOTE: *Indicator must be reconfigured and load cells recalibrated after performing this function.*
Level 3 submenus		
GRADS	*number*	Graduations. Specifies the number of full scale graduations. The value entered should be consistent with legal requirements and environmental limits on system resolution. Enter a value with the numeric keypad; exit upward to save the new value. To calculate GRADS, use the formula, GRADS = Capacity / Display Divisions. Display divisions for primary and secondary units are specified on the FORMAT menu.
ZTRKBND	OFF 0.5 D 1 D 3 D	Zero track band. Automatically zeroes the scale when within the range specified, as long as the input is within the ZRANGE and scale is at standstill. Selections are ± display divisions. Maximum legal value varies depending on local regulations.
ZRANGE	1.9% 100%	Zero range. Selects the range within which the scale can 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, in display divisions, at which scale motion is detected by comparing the current display with the previous display. If motion is not detected for 1 second or more, the standstill symbol lights, enabling the scale to process a PRINT command. Maximum legal value varies depending on local regulations. If OFF is selected, ZTRKBAND must also be set to OFF. TOTAL channel is considered at standstill when all individual channels are out of motion.
OVRLOAD	FS + 2% FS + 1D FS + 9D FS	Overload. Determines the point at which the display blanks and an out-of-range error message is displayed. Maximum legal value varies depending on local regulations. When any individual channel is overloaded, the total channel display is also blanked.

Table 3-2. Configuration Menu Parameters (Continued)

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CONFIG Menu		
Parameter	Choices	Description
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 used to reduce the effects of mechanical vibration from the immediate area of the indicator. 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. RATTLETRAP® selections (shown with "RT" after the number) are most effective at filtering repeating vibrations caused by mechanical noise from nearby machines but may increase settling times over standard digital filter selections. See Section 10.5 on page 89 for more information on digital filtering.
ACCUM ROC PEAK PASSWRD A/B	OFF ON	ACCUM is a standard feature and can simply be turned ON or OFF. Use the following procedure to activate the ROC, PEAK, PASSWRD, and A/B features: 1. From the selected feature (ROC, PEAK, PASSWRD, or A/B), press TIME/DATE to move down and show the feature status. If OFF, press TIME/DATE again to display a unique number generated by the indicator. This number is used to calculate the access code for the feature. 2. Record the generated number, then use the number in the following equation to calculate the feature access code: (*generated_number* x 5) + *feature_type* where *feature_type* is: 14 for ROC 21 for PEAK 28 for PASSWRD 35 for A/B For example, if the number generated for the ROC feature is 5000, the access code would be: (5000 x 5) + 14 = 25000 + 14 = 25014 3. Use the numeric keypad to enter the calculated access code, then press ENTER. The display should return to show the changed feature status value (ON). The CLEARALLFEATURES EDP command can be used to turn off all active features. See Section 9.0 for more information about using these features.

Table 3-2. Configuration Menu Parameters (Continued)

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3.2.2 Set Analog Menu

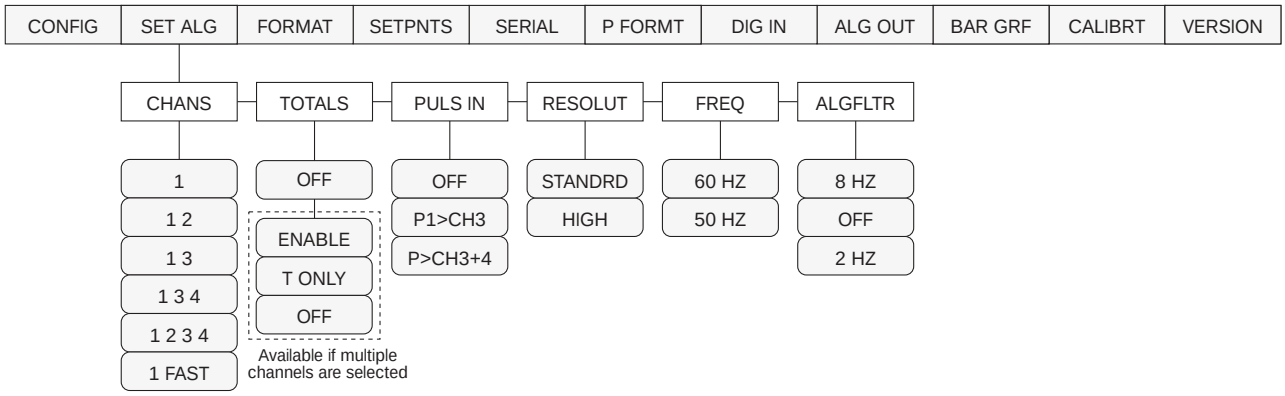


Figure 3-5. Set Analog Menu

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 used for analog input to the indicator. The standard unit has one channel; up to four channels can be specified. If the Jetpak option is installed, channel 1 can be selected as a high-speed channel (1 FAST) with an update rate of 100/second.
TOTALS	OFF ENABLE T ONLY	TOTALS channel configuration. Possible values are: OFF: TOTALS channel disabled. This is the default value for all channel configurations. ENABLE: TOTALS channel enabled. Indicator displays TOTALS with other configured channels. T ONLY: Indicator displays only the TOTALS channel
PULS IN	OFF P1>CH3 P>CH3+4	Pulse input. This option is not available at this time.
RESOLUT	STANDRD HIGH	Resolution. Selects between standard (360 000 grads a t 120V, 60 Hz, 20 updates/sec) and high resolution (740 000 grads at 120V, 60 Hz, 10 updates/sec). Internal resolution is increased by 20% with 50 Hz AC power supply.
FREQ	60 HZ 50 HZ	Frequency. Sets the A/D converter to match AC power supply.
ALGFLTR	8 HZ OFF 2 HZ	Analog filter. Selects the range used for filtering mechanical and electrical noise. 8 Hz value has a medium filtering effect; 2 Hz has the greatest effect. Normally, the minimum filter value that allows a stable display should be selected. If digital filtering is also used, select either 2 Hz or 8 Hz for this parameter. See Section 10.5 on page 89 for more information about analog filtering.

Table 3-3. Set Analog Menu Parameters

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3.2.3 Format Menu

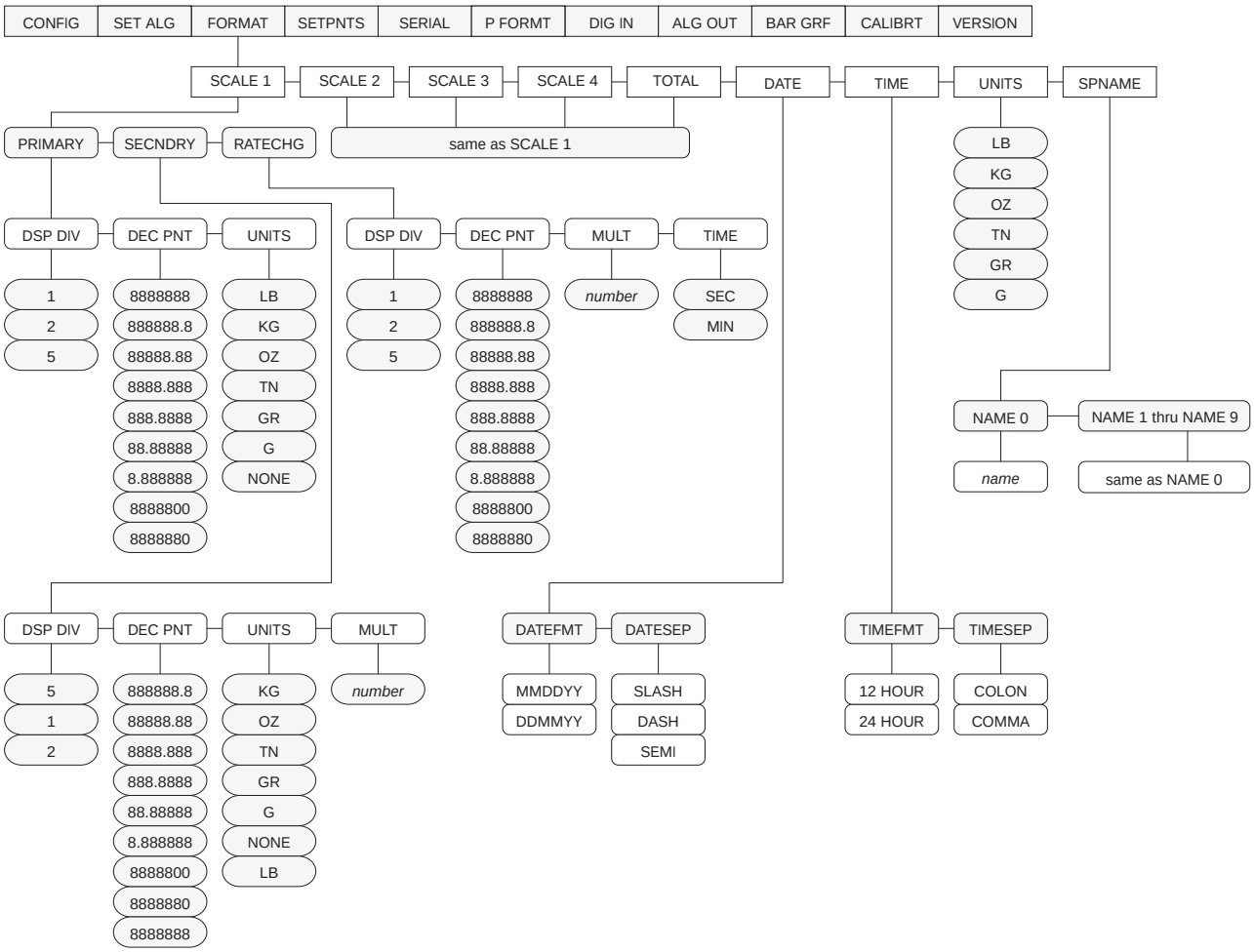


Figure 3-6. Format Menu

FORMAT Menu		
Parameter	Choices	Description
Level 2 submenus		
SCALE 1 SCALE 2 SCALE 3 SCALE 4 TOTAL	PRIMARY SECNDRY RATECHG	Selects the format for an analog input channel., including primary, secondary, and rate of change units used to display weight data for each channel.
DATE	DATEFMT DATESEP	Allows selection of date format and separator character.
TIME	TIMEFMT TIMESEP	Allows selection of time format and separator character.

Table 3-4. Format Menu Parameters

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FORMAT Menu		
Parameter	Choices	Description
UNITS	*unit ID*	Allows customization of default units identifiers for displayed and printed weights. Default values (LB=pound; KG=kilogram; OZ=ounce; TN=ton; GR=gram; G=grain) can be modified using the procedure described for the P FORMT menu. Customized identifiers are listed in the UNITS subparameter values for primary, secondary, and ROC parameters.
SPNAME	*SPNAME0 – SPNAME9*	Allows specification of setpoint names. Use the procedure described under the P FORMT menu to assign names for SPNAME0 through SPNAME9. Names specified on this parameter are assigned to setpoints using the NAME parameter on the SETPNTS menu.
Level 3 submenus		
PRIMARY	DSP DIV DEC PNT UNITS	Allows selection of display divisions, decimal point location, and units for the primary units.
SECNDRY	DSP DIV DEC PNT UNITS MULT	Allows selection of display divisions, decimal point location, units, and multiplier for secondary units.
RATECHG	DSP DIV DEC PNT MULT TIME	Allows selection of display divisions, decimal point location, multiplier, and time for the rate of change (ROC) function. See Section 9.2 on page 65 for more information about the ROC function.
DATEFMT	MMDDYY DDMMYY	Date format. Specifies the format in which the date is printed and displayed, either month/day/year, or day/month/year.
DATESEP	SLASH DASH SEMI	Date separator. Specifies the separator character between the day, month, and year when the date is printed. The display always uses a period (.) as the date separator.
TIMEFMT	12 HOUR 24 HOUR	Time format. Specifies the format in which the time is 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. Specifies the separator character between the minutes and hours when the time is printed. The display always uses a period (.) as the time separator.
Level 4 submenus		
Primary Units		
DSP DIV	1 2 5	Display divisions. Selects the minimum division size for the primary units displayed weight.
DEC PNT	8888888 888888.8 88888.88 8888.888 888.8888 88.88888 8.888888 8888800 8888880	Decimal point location. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.

Table 3-4. Format Menu Parameters (Continued)

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FORMAT Menu		
Parameter	Choices	Description
UNITS	LB KG OZ TN GR G NONE	Specifies primary units for displayed and printed weight. Values are: LB=pound; KG=kilogram; OZ=ounce; TN=ton; GR=gram; G=grain.
Secondary Units		
DSP DIV	5 1 2	Display divisions. Selects the value of minimum division size of the displayed weight.
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 secondary units for displayed and printed weight. Values are: KG=kilogram; OZ=ounce; TN=ton; GR=gram; G=grain; LB=pound.
MULT	0.453592 *Enter other choices via keyboard*	Multiplier. Specifies 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 for changing pounds to kilograms. Section 10.4 on page 88 for a list of multipliers. To toggle between primary and secondary units, press the UNITS key.
Rate of Change Units		
DSP DIV	1 2 5	Display divisions. Selects the minimum division size for the rate of change units displayed weight.
DEC PNT	8888888 888888.8 88888.88 8888.888 888.8888 88.88888 8.888888 8888800 8888880	Decimal point location. Specifies the location of the decimal point or dummy zeroes in the primary unit display. Value should be consistent with local legal requirements.
MULT	1.0000 *Enter other choices via keyboard*	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the rate of change units. The default is 1.0000. See Section 10.4 on page 88 for a list of multipliers.
TIME	SEC MIN	Specifies time units for the rate of change function.

Table 3-4. Format Menu Parameters (Continued)

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3.2.4 Setpoints Menu

See Section 8.0 on page 59 for more information about configuring and using setpoints.

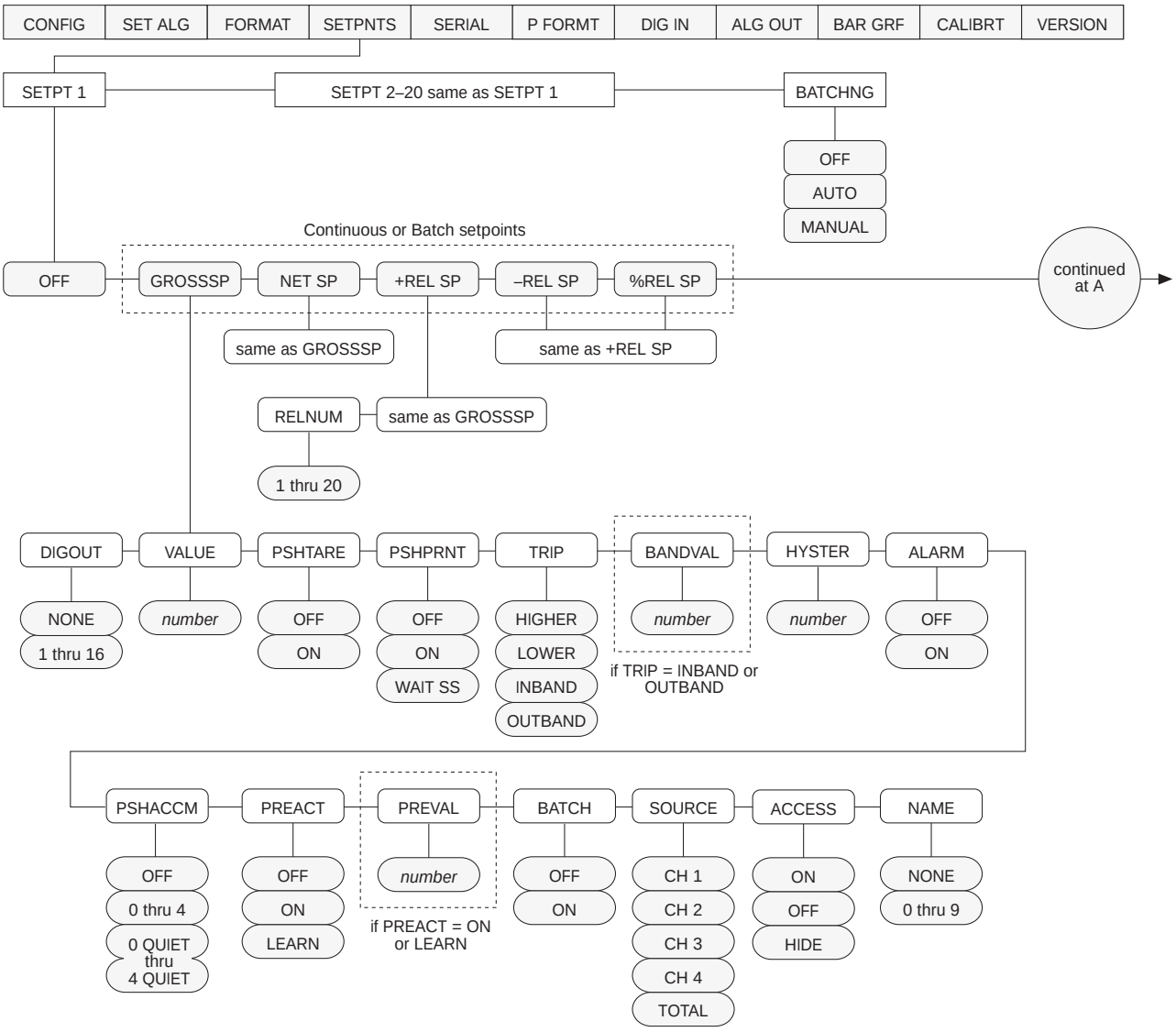


Figure 3-7. Setpoints Menu (Part 1)

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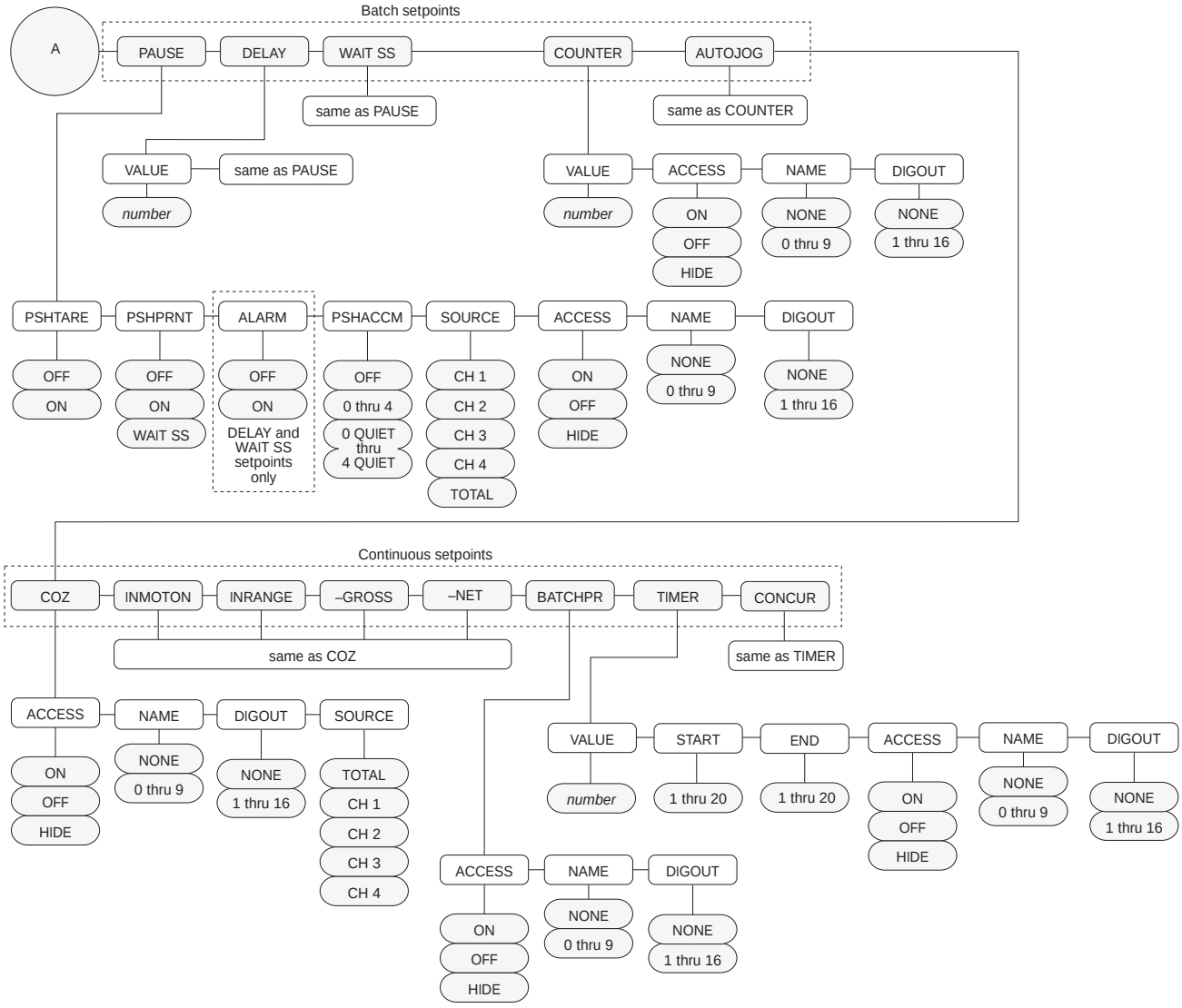


Figure 3-8. Setpoints Menu (Part 2)

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SETPNTS Menu		
Parameter	Choices	Description
Level 2 submenus		
SETPNT *1–20*	OFF GROSSSP NET SP +REL SP –REL SP % REL SP PAUSE DELAY WAIT SS COUNTER AUTOJOG COZ INMOTON INRANGE –GROSS –NET BATCHPR TIMER CONCUR	Specifies setpoint kind. Some setpoint kinds can be batch or continuous setpoints only. (Delay can also be called Timer Setpoint) (Timer can also be called a Watchdog Timer)
BATCHNG	OFF AUTO MANUAL	Batching enable. If MANUAL or AUTO is selected, 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 submenus		Continuous or Batch Setpoints
GROSSSP	VALUE PSHTARE PSHPRNT TRIP BANDVAL HYSTER ALARM PSHACCM PREACT PREVAL BATCH SOURCE ACCESS NAME DIGOUT	Gross setpoint. Setpoint value is a gross weight. To enter a negative setpoint value, press the NEW ID key before entering the number.
NET SP	*same as GROSSSP*	Net setpoint. Setpoint value is a net weight. To enter a negative setpoint value, press the NEW ID key before entering the number.

Table 3-5. Setpoints Menu Parameters

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SETPNTS Menu		
Parameter	Choices	Description
+REL SP	VALUE PSHTARE PSHPRNT TRIP BANDVAL HYSTER ALARM PSHACCM PREACT PREVAL BATCH SOURCE ACCESS NAME DIGOUT RELNUM	Positive relative setpoint. Trips at a specific value above the referenced setpoint (RELNUM).
–REL SP	*same as +REL SP*	Negative relative setpoint. Trips at a specific value below the referenced setpoint (RELNUM).
%REL SP	*same as +REL SP*	Percent relative setpoint. Trips at a specific percentage value of the referenced setpoint (RELNUM).
Level 3 submenus		Batch setpoints only
PAUSE	PSHTARE PSHPRNT PSHACCM SOURCE ACCESS NAME DIGOUT	Pauses the batching sequence. The indicator flashes *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	VALUE PSHTARE PSHPRNT ALARM PSHACCM SOURCE ACCESS NAME DIGOUT	Delays the batching sequence for a specified time in 0.1-second increments. For example, a VALUE of 20 results in a 2.0 second delay time.
WAIT SS	PSHTARE PSHPRNT ALARM PSHACCM SOURCE ACCESS NAME DIGOUT	Wait until standstill. When active, the batch sequence stops until standstill is achieved. NOTE: Do not use WAIT SS as the first step in a batch routine.
COUNTER	VALUE ACCESS NAME DIGOUT	Sets the number of identical batch sequences to run. When the specified number of sequences has been run, all processing stops.

Table 3-5. Setpoints Menu Parameters (Continued)

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SETPNTS Menu		
Parameter	Choices	Description
AUTOJOG	VALUE ACCESS NAME 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 digital output should never have the same value as the filling setpoint digital output.
Level 3 submenus		Continuous setpoints only
COZ	ACCESS NAME DIGOUT SOURCE	Center of zero. No value need be set for this setpoint. Any time the scale is in the center of the zero range, the digital output associated with this setpoint is active.
INMOTON	*Same as COZ*	In motion. No value need be set for this setpoint. Any time the scale is not in the standstill condition, the digital output associated with this setpoint is active.
INRANGE	*Same as COZ*	In range. No value need be set for this setpoint. Any time the displayed weight is valid (not over- or underrange), the digital output associated with this setpoint is active.
–GROSS	*Same as COZ*	Negative gross weight. No value need be set for this setpoint. Any time the scale registers a gross weight less than zero, the digital output associated with this setpoint is active.
–NET	*Same as COZ*	Same as –GROSS, but for net weights.
BATCHPR	ACCESS NAME DIGOUT	Batch processing signal. No value need be set for this setpoint. Any time a batch sequence is in progress, the digital output associated with this setpoint is active.
TIMER	VALUE START END ACCESS NAME DIGOUT	The TIMER setpoint tracks the progress of the batch sequence and can be used as an alarm to alert you that the batch is not progressing in an appropriate time period. If a specified portion of the sequence is not complete within a given amount of time, a designated digital output becomes active. This is called a “no-flow alarm”. Selections are defined as follows: VALUE: Amount of time allowed, in 0.1-second intervals, for the batch sequence to progress from starting to ending batch step without turning on the digital output. START: Batch setpoint at which to start timer. END: Batch setpoint the sequence must reach before the timer expires. The timer starts when the START setpoint becomes the current batch step. If the timer runs out before the END setpoint is reached, the digital output will be brought to an active-low.
CONCUR	*Same as TIMER*	Allows a digital output to remain 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.
Level 4 submenus		
DIGOUT	NONE *1 – 16*	Digital output. This selection specifies the digital output assigned to this setpoint. The default setting is NONE.
VALUE	*number*	Specifies the numeric value compared in setpoint types GROSS SP, NET SP, +REL SP, –REL SP, and %REL SP. If the value is a time unit (AUTOJOG, DELAY, TIMER, and CONCUR setpoints), units are in 0.1-second intervals. For COUNTER setpoints, value is the number of consecutive batches to be run. To enter a negative value, press NEW ID before entering the numeric value.
PSHTARE	OFF ON	Push tare. Presses the TARE key when VALUE is reached. This selection automatically enters the registered weight as a tare and shifts the indicator into net mode.

Table 3-5. Setpoints Menu Parameters (Continued)

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SETPNTS Menu		
Parameter	Choices	Description
PSHPRINT	OFF ON WAIT SS	Sends the SPFMT print sequence when the setpoint has been satisfied. If PSHPRINT is set to WAITSS and the setpoint is satisfied, the print is done only when standstill is achieved. Since the PSHACCUM, and PSHTARE are done after the PSHPRINT, these functions also wait for standstill. Use of this setting eliminates the need for an additional setpoint to wait for standstill. NOTE: The WAITSS setting is valid only 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. 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*	Bandwidth value. If the TRIP parameter is set to either INBAND or OUTBAND, this parameter is used to set the bandwidth value. The BANDVAL specified falls equally on both sides of the setpoint value: VALUE ± BANDVAL.
HYSTER	*number*	Hysteresis. Sets a band around the setpoint value that must be exceeded before a setpoint will trip on again once it has shut off. To enter a negative value, press NEW ID before entering the numeric value.
ALARM	OFF ON	Flashes an alarm message on the display screen. For batch setpoints, the display flashes *until* the setpoint is reached; for continuous setpoints, the display flashes *when* the setpoint value is reached. ALARM is best used with continuous setpoints.
PSHACCM	OFF *0 – 4* *0 QUIET – 4 QUIET*	Push accumulate. When the setpoint value is reached, this selection adds the actual net value to the total in the chosen accumulator. To view the register, press the DISP ACCUM key. The new value is printed after updating the accumulator. If set to a QUIET setting, the accumulator updates, but does not print.
PREACT	OFF ON LEARN	Preact. Allows a digital output 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 the 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) to automatically correct for overfill or underfill. LEARN functions only in batching mode.
PREVAL	*number*	Preact value. Appears only if PREACT is set to ON or LEARN. The value selected adjusts the trip values of the setpoint configured with the PREACT parameter. To enter a negative value, press NEW ID before entering the numeric value.
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 (GROSSSP, NET SP, +REL SP, –REL SP, %REL SP).
SOURCE	TOTAL CH 1 CH 2 CH 3 CH 4	Source channel. Selects the input channel (1 – 4, or TOTAL) from which the indicator obtains the weight reading. Selections for the IQ plus 800 are 1, 2, or TOTAL.

Table 3-5. Setpoints Menu Parameters (Continued)

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SETPNTS Menu		
Parameter	Choices	Description
ACCESS	ON OFF HIDE	Front panel access. Allows setpoint values to be viewed or changed from the front panel using the SETPOINT key. Selections are: ON: Setpoint values can be viewed or changed in operating mode. OFF: Setpoint value can be viewed in operating mode. HIDE: Setpoint value can be neither viewed nor changed 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.
START	*1–20*	For TIMER and CONCUR setpoint types, specifies the starting setpoint number. The TIMER or CONCUR setpoint begins monitoring when the starting setpoint begins. *Do not* specify the number of the TIMER or CONCUR setpoint itself.
END	*1–20*	For TIMER and CONCUR setpoint types, specifies the ending setpoint number. The TIMER or CONCUR setpoint stops monitoring when the ending setpoint begins. *Do not* specify the number of the TIMER or CONCUR setpoint itself.
NAME	NONE *0–9*	Setpoint name. Selects a setpoint name from those assigned as SPNAME numbers 0–9. The NAME parameter defaults to NONE, which means no name is assigned to the setpoint. You can assign names using the SPNAME parameter on the CONFIG menu or the SPNAME#*x* EDP command, then use this parameter to select the name used for this setpoint. See Section 8.0 for more information about setpoints.

Table 3-5. Setpoints Menu Parameters (Continued)

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3.2.5 Serial Menu

See Section 10.3 on page 87 for information about serial data formats supported by the IQ plus 800/810 indicators.

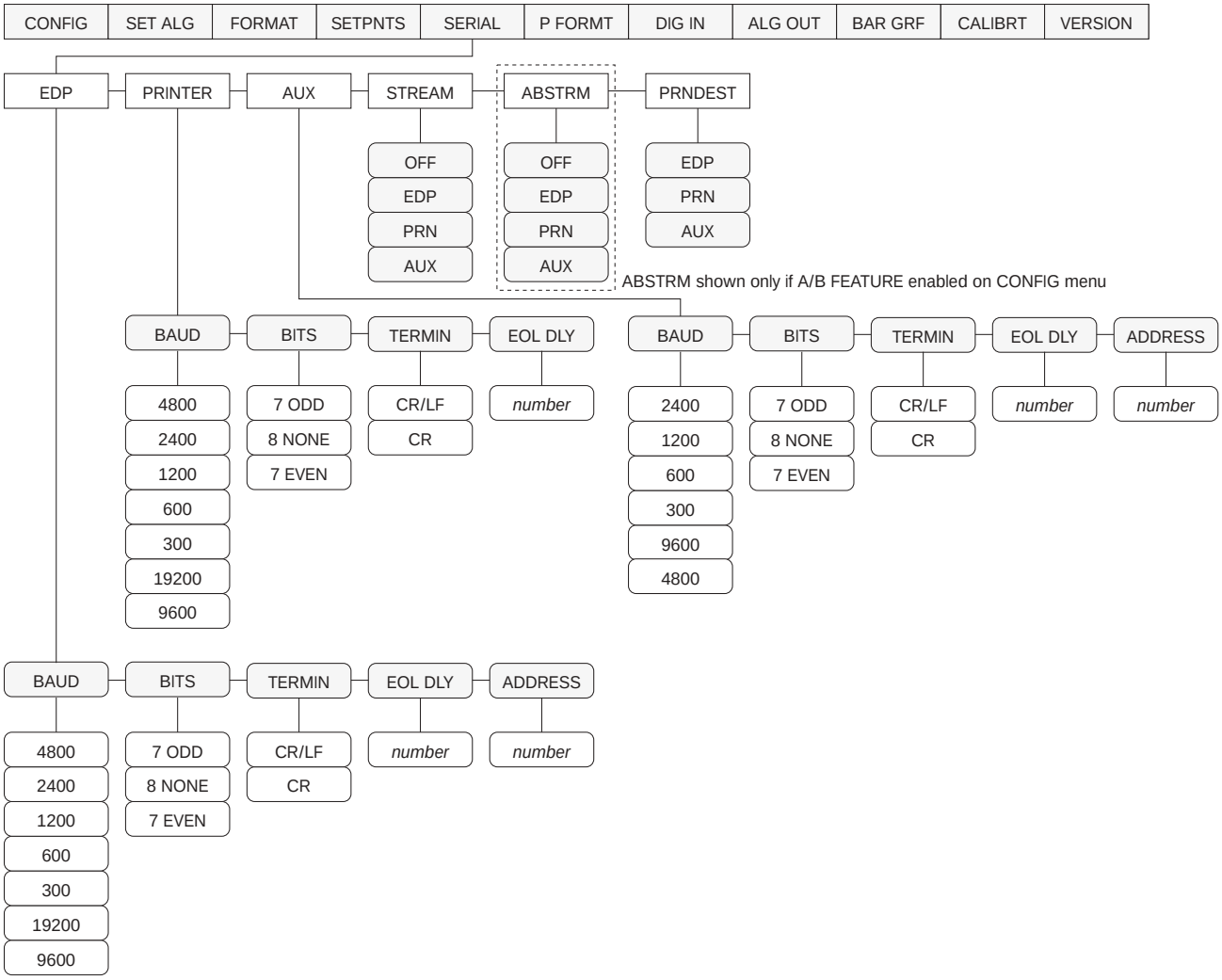


Figure 3-9. Serial Menu

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SERIAL Menu		
Parameter	Choices	Description
Level 2 submenus		
EDP	BAUD BITS TERMIN EOL DLY ADDRESS	Specifies settings for baud rate, data bits, termination characters, end-of-line delay, and port address used by the EDP port.
PRINTER	BAUD BITS TERMIN EOL DLY	Specifies settings for baud rate, data bits, termination characters, and end-of-line delay used by the printer port.
AUX	BAUD BITS TERMIN EOL DLY ADDRESS	Specifies settings for baud rate, data bits, termination characters, end-of-line delay, and port address used by the auxiliary port. *This parameter is valid only for units with expansion board PN 19629 installed.*
STREAM	OFF EDP PRN AUX	Selects the serial port used for continuous transmission. *The value AUX is valid only for units with expansion board PN 19629 installed.*
ABSTRM	OFF EDP PRN AUX	Specifies which port uses the Allen-Bradley Remote I/O data stream. This parameter is valid only if the Remote I/O option is installed.
PRNDEST	EDP PRN AUX	Print destination. Selects the port for data transmission when the PRINT key is pressed or the KPRINT EDP command is sent. *The value AUX is valid only for units with expansion board PN 19629 installed.*
Level 3 Submenus		EDP Port
BAUD	4800 2400 1200 600 300 19200 9600	EDP port baud rate. Selects the transmission speed for the EDP port.
BITS	7 ODD 8 NONE 7 EVEN	Selects number of data bits and parity of data transmitted from the EDP port.
TERMIN	CR/LF CR	EDP port termination character. Selects termination character for data sent from the EDP port
EOL DLY	*number*	EDP port end-of-line delay. Sets the delay period, in 0.01-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output.
ADDRESS	*number*	EDP port address. Specifies the address used for RS-485 communications. Valid addresses are 01 through 255. An address of 0 turns off the RS-485 mode.

Table 3-6. Serial Menu Parameters

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SERIAL Menu		
Parameter	Choices	Description
Level 3 Submenus		Printer Port
BAUD	4800 2400 1200 600 300 19200 9600	Printer port baud rate. Selects the transmission speed for the printer port.
BITS	7 ODD 8 NONE 7 EVEN	Selects number of data bits and parity of data transmitted from the printer port.
TERMIN	CR/LF CR	Printer port termination character. Selects termination character for data sent from the printer port
EOL DLY	*number*	Printer port end-of-line delay. Sets the delay period, in 0.01-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output.
Level 3 Submenus		Auxiliary Port *(Valid only for units with expansion board PN 19629 installed)*
BAUD	4800 2400 1200 600 300 19200 9600	Auxiliary port baud rate. Selects the transmission speed for the auxiliary port.
BITS	7 ODD 8 NONE 7 EVEN	Selects number of data bits and parity of data transmitted from the auxiliary port.
TERMIN	CR/LF CR	Auxiliary port termination character. Selects termination character for data sent from the auxiliary port
EOL DLY	*number*	Auxiliary port end-of-line delay. Sets the delay period, in 0.01-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output.
ADDRESS	*number*	Auxiliary port address. Specifies the address used for RS-485 communications. Valid addresses are 01 through 255. An address of 0 turns off the RS-485 mode.

Table 3-6. Serial Menu Parameters (Continued)

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3.2.6 Print Format Menu

See Section 7.0 on page 54 for information about custom print formatting.

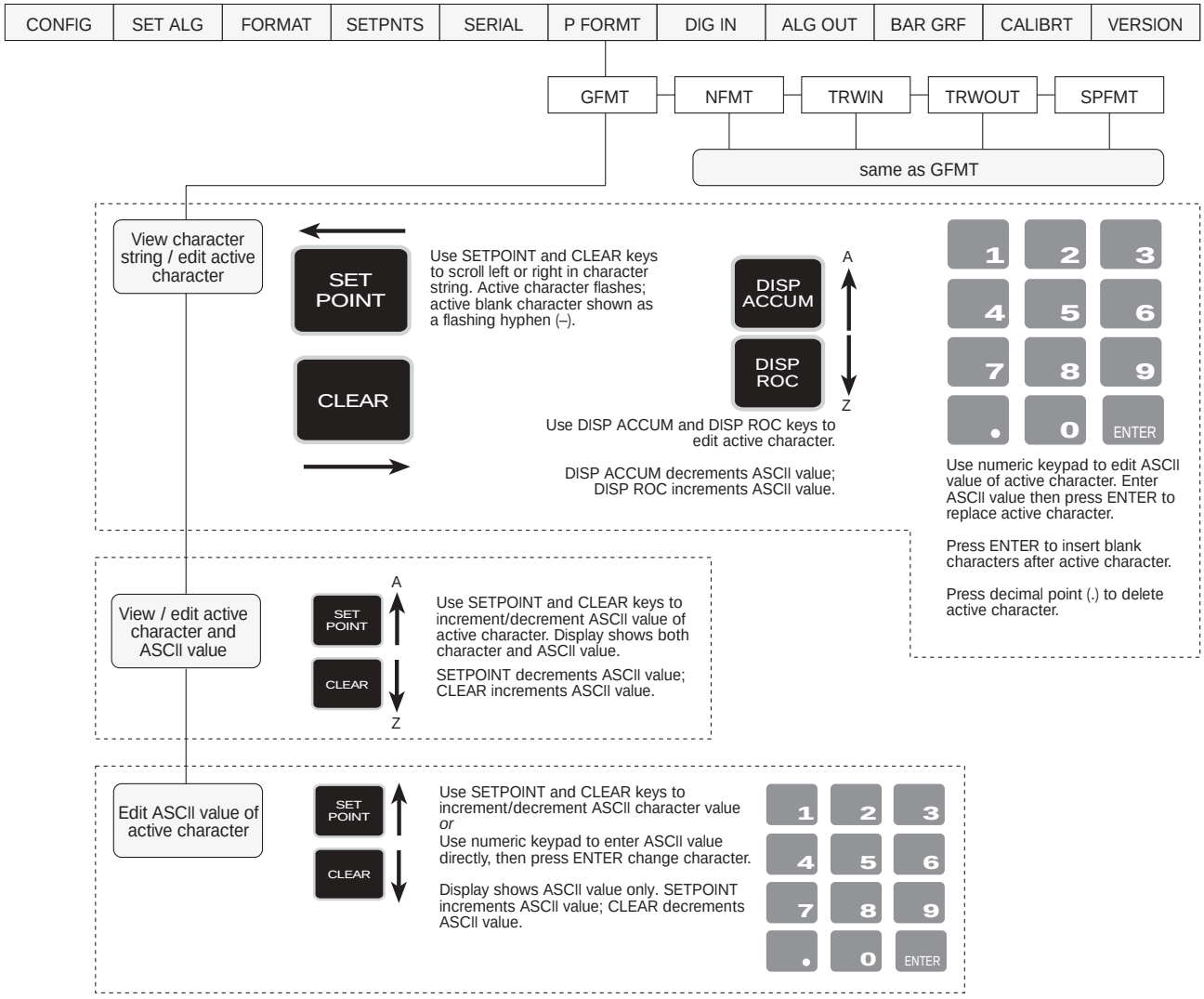


Figure 3-10. Print Format Menu

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3.2.7 Digital Input Menu

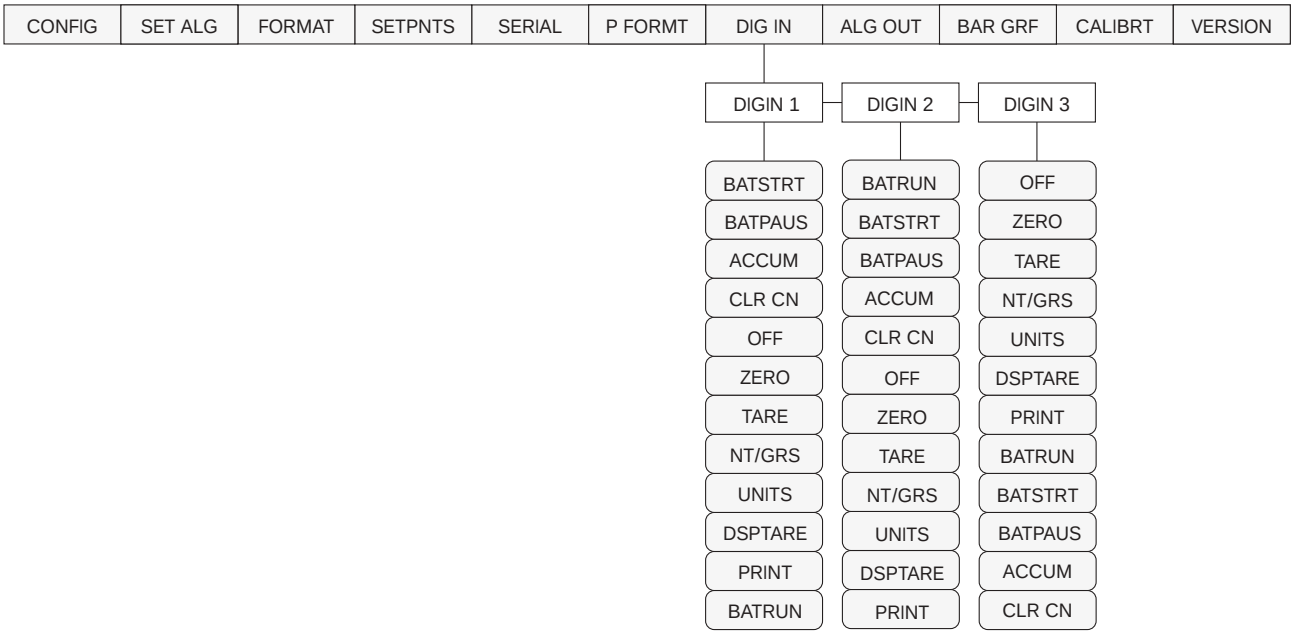


Figure 3-11. Digital Input Menu

DIG IN Menu		
Parameter	Choices	Description
Level 2 submenus		
DIGIN 1 DIGIN 2 DIGIN 3	BATSTRT BATPAUS ACCUM CLR CN OFF ZERO TARE NT/GRS UNITS DSPTARE PRINT BATRUN	Digital inputs are activated by a momentary contact closure (logic low). Default values for DIGINs 1, 2, and 3 are as follows: DIGIN1: BATSTRT DIGIN2: BATRUN DIGIN3: OFF • BATSTRT starts a batch routine. If a digital input is also assigned to BATRUN, the BATRUN input can be used to enable or disable BATSTRT. If the BATRUN input is low (on), a momentary contact closure on BATSTRT starts the batch routine; if the BATRUN input is high (off), a momentary contact closure on BATSTRT aborts the batch. • BATPAUS pauses a batch routine. • ACCUM updates the accumulator. • CLR CN resets the consecutive number to zero. • OFF sets the digital input off. • ZERO, TARE, NT/GRS (net/gross mode toggle), UNITS. DSPTARE, and PRINT provide the same functions as the front panel keys. • BATRUN allows a batch routine to be started and run when held at a logical low (on). When held high (off), BATRUN allows a batch to be aborted. See BATSTRT value description.

Table 3-7. Digital Input Menu Parameters

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3.2.8 Analog Output Menu

See Section 9.11 on page 73 for information about installing, configuring, and calibrating the analog output option.

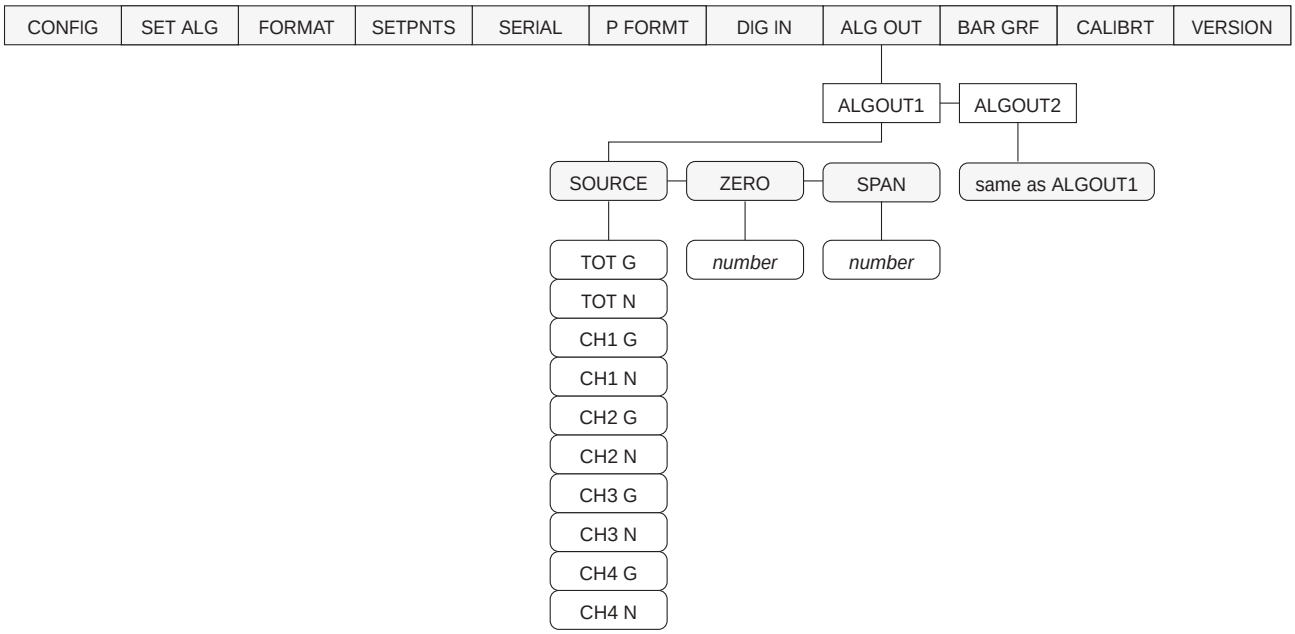


Figure 3-12. Analog Output Menu

ALG OUT Menu		
Parameter	Choices	Description
Level 2 submenus		
ALGOUT1 ALGOUT2	SOURCE ZERO SPAN	Specifies the level 3 parameter being set for Analog Output 1 or 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	Specifies the source channel tracked by the analog output. Either gross or net values can be selected.
ZERO	*number*	Zero calibration value. Use keypad to enter zero value. See page 75 for calibration instructions.
SPAN	*number*	Span calibration value. Use keypad to enter span value. See page 75 for calibration instructions.

Table 3-8. Analog Output Menu Parameters

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3.2.9 Bar Graph Menu

See Section 9.7 on page 69 for information about installing and configuring the bar graph option.

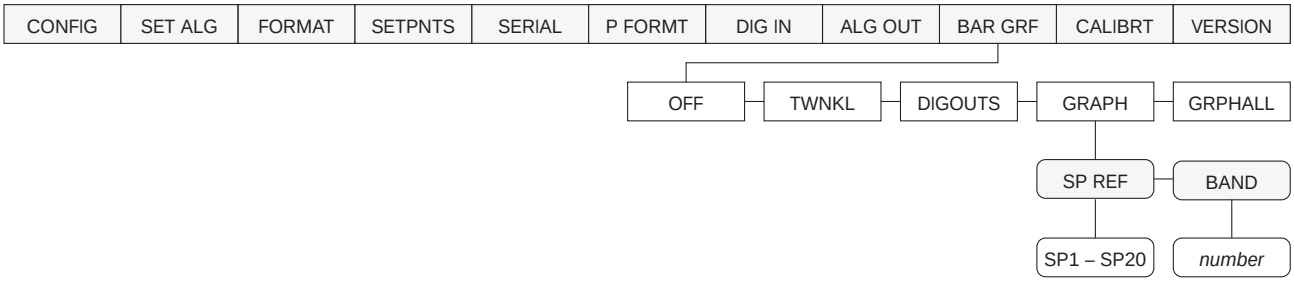


Figure 3-13. Bar Graph Menu

BAR GRF Menu		
Parameter	Choices	Description
Level 2 submenus		
OFF	—	The bar graph is turned off and disabled.
TWINKL	—	The TWINKL mode allows visual monitoring of active setpoints by lighting up bar graph segments for up to 16 setpoints. The 48 bar graph segments are divided into 16 3-segment sections, with each section assigned to one of the first 16 setpoints (batch steps). 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. Continuous setpoints are constantly scanned by the indicator. Bar graph sections for continuous setpoints are always illuminated in the TWINKL mode. Batch setpoints are scanned only while active and until tripped; bar graph segments representing batch setpoints are lit only while the setpoint is active. Once the batch setpoint is tripped, the bar graph section goes off, and the section representing the next batch setpoint lights.
DIGOUTS	—	Digital output mode. Displays the logic state of all digital outputs. The corresponding segments are lit for active digital outputs, off for inactive digital outputs.
GRAPH	—	Graph mode monitors increasing or decreasing weight value for a selected setpoint. Setpoint is selected on the SP REF parameter (see below). The bar graph monitors weight change in a band established around the setpoint value (see BAND parameter description) with each of the 48 bar graph segments representing approximately 2% of the band value. The graph lights when the weight is within the band The bar graph lights from the left as weight increases from the bottom of the band. When the weight reaches the setpoint value, the graph is 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	—	Graph All mode. Similar to the GRAPH mode, GRAPHALL graphs every batch step as it occurs. Bar graph segments show the progress of each of the batch setpoints of type GROSSSP, NETSP, %RELSP, +RELSP, or –RELSP. Setpoints are graphed from the current GROSS or NET value on the source channel.
SP REF	SP1 – SP20	Setpoint reference. Specifies the setpoint monitored by the bar graph.
BAND	*number*	Specifies one-half of the band width around the setpoint value. Total band width is the value of the setpoint specified on the SP REF parameter ± the BAND value. For example, if a setpoint value is 1000 and BAND is set to 100, the graph begins to light (left to right) at 900. It is totally lit at 1000 (setpoint value). Increasing weight beyond 1000 causes graph segments to go off (left to right) until all segments are off at 1100.

Table 3-9. Bar Graph Menu Parameters

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3.2.10 Calibration Menu

See Section 4.0 on page 38 for calibration procedures.

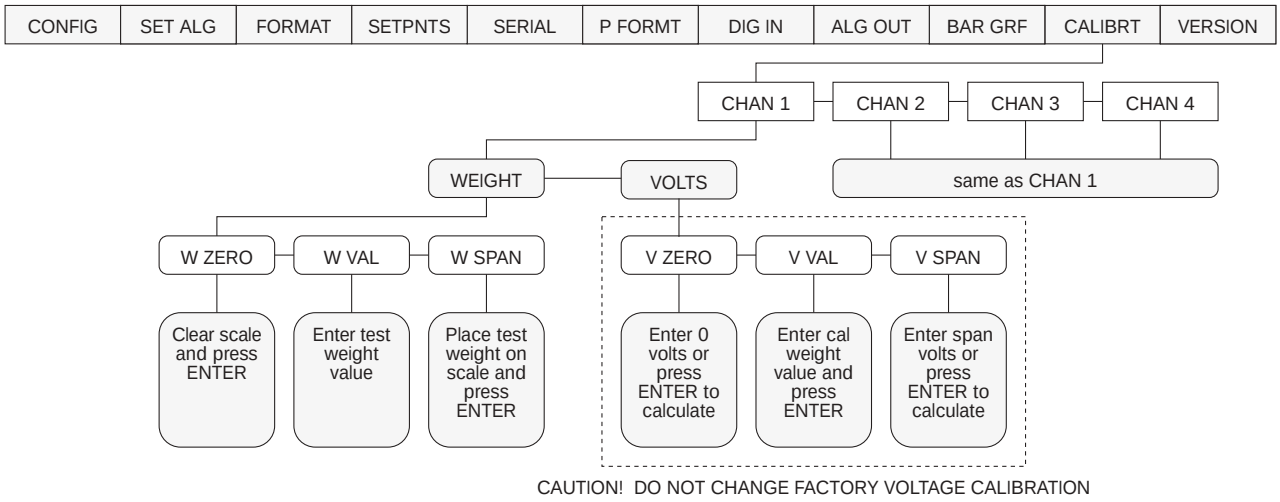


Figure 3-14. Calibration Menu

CALIBRT Menu		
Parameter	Choices	Description
Level 2 submenus		
CHAN 1 CHAN 2 CHAN 3 CHAN 4	WEIGHT VOLTS	Specifies channel (1–4) for weight or volts calibration.
Level 3 submenus		
WEIGHT	W ZERO W VAL W SPAN	See weight calibration procedure on page 38.
VOLTS	V ZERO V VAL V SPAN	DO NOT CHANGE FACTORY VOLTAGE CALIBRATION VALUES! Voltage calibration should be done only when replacing A/D converters on indicators manufactured before July 1996. See Section 4.0 for more information.

Table 3-10. Calibration Menu Parameters

3.2.11 Version Menu

The Version menu is used to check the software version installed in the indicator. There are no parameters associated with the Version menu: when selected, the indicator displays the installed software version number.

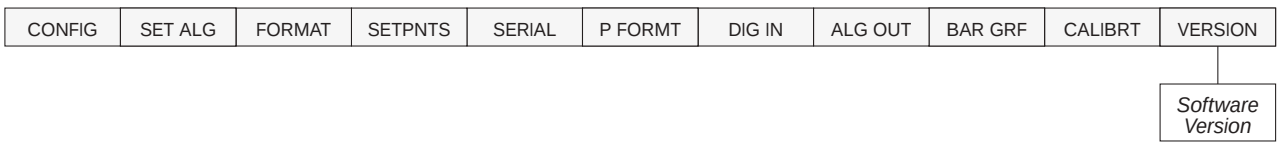


Figure 3-15. Version Menu

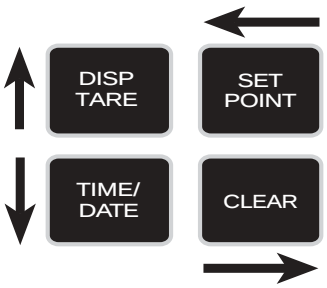
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4.0 Calibration

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.*

The IQ plus 800/810 stores calibration values in nonvolatile memory on the CPU board. You access these values through the CALIBRT menu. If the IQ plus 800/810 has multiple scale inputs, you must calibrate each channel.

The procedures described in this section use the front panel keys shown below to navigate through the Calibration menu, shown in Figure 4-1.



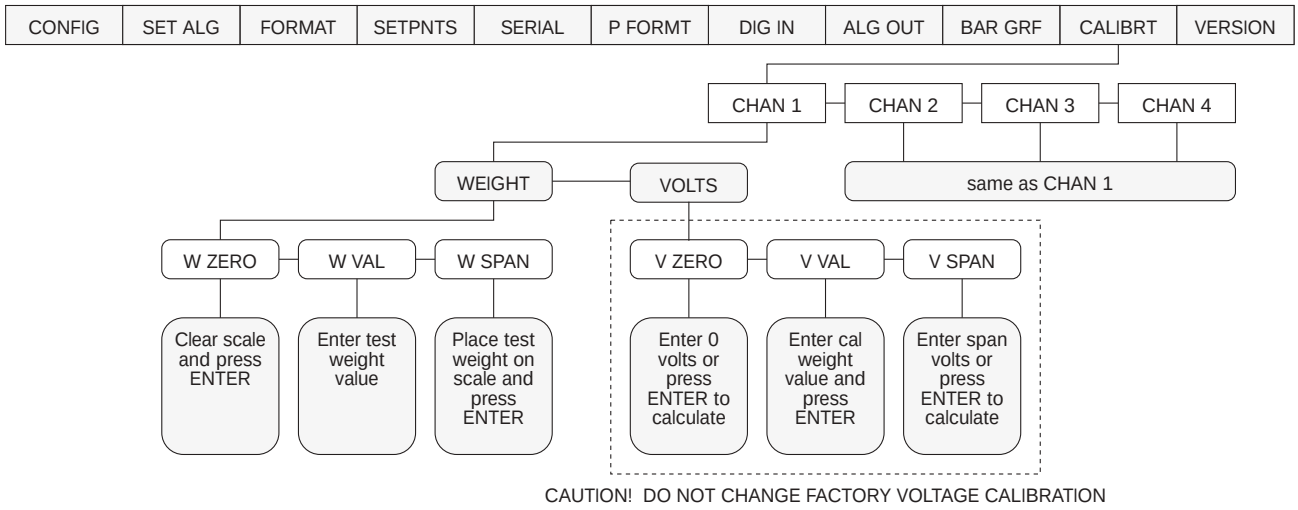


Figure 4-1. Calibration Menu

4.1 Front Panel Calibration

Use the following procedure to calibrate the IQ plus 800/810 indicator. Use Table 4-1 on page 39 to record calibration values.

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 SETPOINT until the display reads *CALIBRT*.
2. Press TIME/DATE to show *CHAN 1*. Press TIME/DATE again to show *WEIGHT*. Press again to show *W ZERO*. If *W VAL* or *W SPAN* appears, press the SETPOINT or CLEAR key until the display reads *W ZERO*. Remove all load and allow time for the scale to settle.
3. Press TIME/DATE again to display current default value. Press ENTER and wait until a value reappears on the display. Record this value as the W ZERO value for channel 1 in Table 4-1 on page 39. Repeat a few times to verify that the results are similar each time. This is a numerical constant, not a weight value.
4. Press DISP TARE to show *W ZERO*. Press CLEAR to display *W VAL*. Press TIME/DATE to display current default value. Enter the test weight value and press the ENTER key. Record this value as the W VAL value for channel 1.
5. Press DISP TARE to show *W VAL*, then press CLEAR to show *W SPAN*. Press TIME/DATE to display the current default value. Place test weight on scale and allow time for the scale to settle. Press ENTER and wait until a value

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reappears on the display. Repeat to verify that the results are similar. Record this value as W SPAN for channel 1 in Table 4-1. This is a calibration number, not a weight value. Remove the test weight.

6. Press DISP TARE to return to the channel selection level of the calibration menu. Repeat the above steps for additional scale channels, if necessary, or press DISP TARE a second time to exit calibration and return to the first-level menus.
7. Press DISP TARE to lock in calibration settings.
8. Slide the setup switch on the CPU board back to the previous position to exit setup mode.

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

Table 4-1. Weight Calibration Values. Use this table to record weight calibration values for your indicator. All weight calibration values should be recorded for future reference. These values allow you to swap indicators in the field without using test weights to recalibrate the replacement indicator.

Voltage Calibration (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: *Do not change any VOLTS calibration values while calibrating the indicator. Do not press ENTER while viewing values.*

VOLTAGE Calibration	V ZERO	V VAL	V SPAN
CHANNEL 1			
CHANNEL 2			
CHANNEL 3			
CHANNEL 4			

Table 4-2. Voltage Calibration Values. Use this table to record voltage calibration values for indicators manufactured prior to July 1996. These values allow you to swap indicators in the field without using test weights to recalibrate the replacement indicator.

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4.2 EDP Command Calibration

To calibrate the indicator using EDP commands, the indicator EDP port must be connected to a terminal or personal computer. See Section 2.5 on page 9 for EDP port pin assignments; see Section 6.0 on page 45 for more information about using EDP commands.

Once the indicator is connected to the sending device, use the KDOWNARROW, KLEFTARROW, and KRIGHTARROW, and KENTER EDP commands to navigate through the calibration menu shown in Figure 4-1 on page 38. When calibration is complete, use the KUPARROW command to exit the calibration menu, then slide the setup switch to the run (normal mode) position.

4.3 Revolution™ Calibration

To calibrate the indicator using the Revolution configuration utility, the indicator EDP port must be connected to a PC running the Revolution configuration utility.

Use the following procedure to calibrate the indicator:

1. Select *Calibrate Indicator* from the Revolution main menu.
2. On the Indicator Calibration display, select the indicator model (*IQ+800/810*) and communications port then click *OK*.

Revolution uploads calibration data from the indicator then presents the information in a display like that shown in Figure 4-2.



Figure 4-2. Revolution Calibration Display

3. Enter the *Value of Test Weight* to be used for span calibration on the Indicator Weight Calibration display then click *OK*.
4. The Zero Calibration dialog box prompts you to remove all weight from the scale. Clear the scale and click *OK* to begin zero calibration.



Figure 4-3. Indicator Weight Calibration Display

5. When zero calibration is complete, the Span Calibration dialog box prompts you to place test weights on the scale for span calibration. Place tests weights on the scale then click *OK*.
6. When calibration is complete, the *New Settings* fields of the Indicator Calibration display are filled in (see Figure 4-3). Click *Exit* to save the new values and return to the Revolution main menu; to restore the previous calibration values, click *Restore Settings*.

4.4 Adjusting Final Calibration

Calibration may be affected by environmental factors including wind, vibration, and angular loading. For example, if the scale is calibrated with 1000 lb, a strain test may determine that at 2000 lb the calibration is 3 lb high. In this case, final calibration can be adjusted by tweaking W VAL to 998.5 lb. This adjustment provides a linear correction of 1.5 lb per 1000 lb.

To adjust the final calibration, return to the *W VAL* prompt and press TIME/DATE to show the test weight value. Enter the desired value, then press ENTER to save the value. Use the DISP TARE key to return to the CALIBRT menu.

NOTE: *Entering setup mode erases any pushbutton zero values.*

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5.0 Operating Modes

5.1 Setup Mode

Setup mode lets you access the configuration and calibration parameters described in Sections 3.0 and 4.0.

The setup 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. See also Section 9.5 on page 67 for details on installing a remote supervisor switch.

5.2 Normal Mode

In 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. *NET* appears for net weight. You can enter tare weights by two methods:

5.2.1 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* is shown on the display when a pushbutton tare weight is in memory.

5.2.2 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. *pT* is shown 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.

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.

5.3 Truck 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:

Mode	Stored IDs	Keyed Tares	Value Swapping
MODE1	NO	YES	YES
MODE2	NO	NO	YES
MODE3	YES	YES	YES
MODE4	YES	NO	YES
MODE5	YES	YES	NO
MODE6	YES	NO	NO
OFF			

Table 5-1. Truck Mode Features

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

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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.

To select a truck in/out mode, move the setup switch to the CONFIG position. Press TIME/DATE once to drop to the next level, then press CLEAR several times until the display reads TARE200. 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. Figure 5-1 shows the structure of the TARE200 submenu.

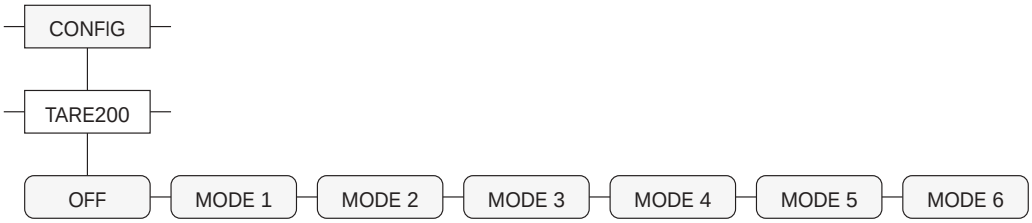


Figure 5-1. TARE200 Truck Mode Selections

5.3.1 Using the Truck 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*. Use ENTER to toggle between the ID number and tare weight. To delete the displayed ID number, press CLEAR twice.

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 modes 1 and 2, 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 weigh-in ticket shown below for the driver:

   ```
   ID. NO. 304812
   GROSS 15000. LB STORED
   5/4/98 10:24 AM
   ```

5. The loaded truck moves onto the scale for weigh-out.
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: If it was a keyed tare, *KEYED* prints after *RECALLED* on the tare line.

   ```
   ID. NO. 304812
   GROSS 100000. LB
   TARE   15000. LB RECALLED
   NET    85000. LB
   5/4/98 10:55 AM
   ```

Modes 3, 4, 5, and 6

In modes 3–6, the indicator stores the tare weights and ID numbers in memory until you manually erase them.

1. The truck moves onto the scale for weigh-in.
2. If keyed tares are enabled (Modes 3, 5), you may key in the desired tare weight, then press TARE.

   If a tare is not keyed in, the truck weight is stored as an inbound weight when the ID is entered. When weighing out, this stored weight is used as the tare weight unless value swapping is enabled and the outbound weight is lighter.
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 and 4), the

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lower weight is always printed as the tare weight.

5.3.2 Single-Transaction Tare Weights and IDs

Version 3.1 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, follow the procedure described above for modes 3–6, but insert a decimal point in the ID number. When the transaction is complete, the truck ID and tare weight are erased from the indicator database.

5.3.3 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.

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

5.4 Individual Scale Setup

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 menu, the following parameters are available to allow independent settings for each scale: grads, zero band, zero range, motion band, overload, and digital filter. Under the FORMAT menu, display divisions, decimal point location, and units can be defined for each separate channel 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. The TOTAL parameter on the SET ALG menu allows you to disable the total channel.

5.5 Using the TOTAL Channel

The TOTAL parameter allows the indicator to use, or not use, the summing capability for multiple-channel setups.

OFF The total channel is disabled and cannot be viewed on the indicator. This is the default value, regardless of the number of channels available.

ENABLE The total channel is enabled and can be viewed on the indicator.

TONLY The total channel is the only channel that can be viewed on the indicator.

The TONLY setting is 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.

If the scales have the following settings:

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

SCALE#2:
- GRADS=10000
- DEC PNT=888888.8
- DSP DIV=1
- COUNT BY .1

TOTAL:
- GRADS=11000
- 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) + (10000 x .1))/1 = 11000

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

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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 is 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.

See Section 9.0 for more information about configuring the ROC and peak hold features.

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6.0 EDP Commands

The IQ plus 800/810 indicators can be controlled by a personal computer or remote keyboard connected to the indicator EDP port. Control is provided by a set of EDP commands that can simulate front panel key press functions, display and change setup parameters, and perform reporting functions. The EDP port provides the capability to print setpoint and configuration data, to save that data to an attached personal computer, or to transfer configuration data from one indicator to another. This section describes the EDP command set and procedures for printing, saving, and transferring data using the EDP port.

6.1 The EDP Command Set

The EDP command set can be divided into five groups: key press commands, reporting commands, special function commands, parameter setting commands, and transmit weight data commands. The following sections list the commands and command syntax used for each of these groups.

6.1.1 Key Press Commands

Key press EDP commands (see Table 6-1) simulate pressing the keys on the front panel of the indicator. They can be used in both setup and operating mode. Several of the commands serve as “pseudo” keys, providing functions that are not represented by a key on the front panel.

After the indicator receives a key press command, it responds with the message *OK*. The OK response verifies that the command was received. Note that this response does not confirm 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 shows the *pT* (keyboard tare) symbol and switches to net mode.

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)

Table 6-1. EDP Key Press Commands

Command	Function
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
KNEWID	Press the NEWID 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 DSIP 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 right in the menu; in weighing mode, press the SETPOINT key
KRIGHTARROW	In setup mode, move left in the menu; in weighing mode, press the CLEAR key
KUPARROW	In setup mode, move up in the menu; in weighing mode, press the DISP TARE key
KDOWNARROW	In setup mode, move down in the menu; in weighing mode, press the TIME/DATE key
K0	Press number 0 (zero)
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 decimal point (.)
KENTER	Press the ENTER key

Table 6-1. EDP Key Press Commands (Continued)

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6.1.2 Reporting Commands

Reporting commands (see Table 6-2) cause the indicator to send specific information to the EDP port. These commands are accessible in both setup mode and normal operating mode.

Command	Function
DUMPALL	List all parameter values
SPDUMP	List setpoint parameter values
VERSION	Write IQ plus 800/810 software version
P	Write whatever is currently displayed
S	Write one frame of stream format
OPT	List active optional software features

Table 6-2. EDP Reporting Commands

6.1.3 Special Function Commands

Table 6-3 lists the special function commands:

Command	Function
?	Print list of all parameter setting commands
D	Toggle debug mode
RESETCONFIGURATION	Reset all parameters to default values. Active software features are saved, but calibration settings are erased.
CLEARALLFEATURES	Turn off all special software features

Table 6-3. EDP Special Function Commands

NOTES:

- The indicator must be in setup mode to use the RESETCONFIGURATION and CLEARALLFEATURES commands. RESETCONFIGURATION clears all calibration values and provides no OK response.
- When the debug mode is on, more information is printed as a batch sequence is running. The user is informed when a batch reset occurs and when the current batch step and batch sequence is complete.

6.1.4 Parameter Setting Commands

Parameter setting commands allow you to display or change the current value for a particular setup parameter (Tables 6-4 through 6-14).

Current setup parameter settings can be displayed in either setup mode or operating mode using the following syntax:

command <RETURN>

Most parameter values can be changed in setup mode only; the **NOTES** on page 50 list exceptions. Use the following command syntax when changing parameter values:

command=value <RETURN>

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

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.

Command	Description	Values
GRADS#x	Graduations	*number*
ZTRKBND#*x*	Zero track band	OFF, 0.5, 1, 3
ZRANGE#*x*	Zero range	1.9%, 100%
MOTBAND#*x*	Motion band	1, 2, 3, 5, 10, 20, OFF
OVRLOAD#*x*	Overload	FS+2%, FS+1D, FS+9D, FS
DIGFLTR#*x*	Digital filtering	1, 2, 4, 8, 16, 32, 64, 128, 4RT, 8RT, 16RT, 32RT, 64RT, 128RT
PWRUPMD	Power up mode	GO, DELAY
TARE200	200 ID/tare truck In/Out mode	OFF, MODE1, MODE2, MODE3, MODE4, MODE5, MODE6
PKHOLD	Peak hold function	OFF, NORMAL, BI-DIR, AUTO
TAREFN	Tare function	BOTH, NOTARE, PBTARE, KEYED
CONSECNUM	Consecutive number	*number*

Table 6-4. EDP CONFIG Commands

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Command	Description	Values
LOCKON	Lock indicator front panel in operating mode	—
LOCKOFF	Unlock indicator front panel in operating mode	—
For commands ending with “#x”, x is the channel number (1–4). Omitting the “#x” channel identifier causes the command to run against the current display channel.		

Table 6-4. EDP CONFIG Commands (Continued)

Command	Description	Values
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	8888888, 888888.8, 88888.88, 8888.888, 888.8888, 88.88888, 8.888888, 8888800, 8888880
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 divisions	1, 2, 5
ROC.DECPNT#*x*	Rate of change decimal point location	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	12HOUR, 24HOUR
TIMESEP	Time separator	COLON, COMMA
SPNAME#*x*	Setpoint name	*name* (1–7 characters)
For the SPNAME#*x* command, *x* is the number of the name assigned to the setpoint on the NAME command (see SETPNTS EDP Commands). For all other commands ending with “#*x*”, *x* is the channel number (1–4, or 0 for total channel). Omitting the “#*x*” channel identifier causes the command to run against the current display channel.		

Table 6-5. EDP FORMAT Commands

Command	Description	Values
CHANS	Selects channels for analog input	1, 12, 13, 134, 1234, 1FAST
TOTALS	Total channel enable/disable	OFF, ENABLE, TONLY
PULSEIN	Pulse input feature	OFF, P1>CH3, P>CH3+4
RESOLUT	Resolution	STANDRD, HIGH
FREQ	Frequency of AC power source	60HZ, 50HZ
ALGFLTR	Analog filtering	OFF, 2HZ, 8HZ

Table 6-6. EDP SET ALG Commands

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Command	Description	Values
BATCHNG	Batching	OFF, AUTO MANUAL
SETPOINT	Setpoint number	*number* (1–20)
KIND	Setpoint type	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*
BATCH	Batch step enable	OFF, ON
SOURCE	Source channel	CH1, CH2, CH3, CH4, TOTAL
DIGOUT	Digital output	NONE, *number* (1–16)
RELNUM	Relative value	*number* (1–20)
PSHTARE	Push tare	OFF, ON
PSHPRINT	Push print	OFF, ON, WAITSS
ALARM	Alarm	OFF, ON
PSHACCM	Push accumulator	OFF, 0–4, 0QUIET–4QUIET
TRIP	Trip condition	HIGHER, LOWER, INBAND, OUTBAND
ACCESS	Front panel access	ON, OFF, HIDE
START	Start batch step, timer	*number* (1–20)
END	End batch step	*number* (1–20)
NAME	Setpoint name	NONE, *number* (0–9)

Table 6-7. EDP SETPNTS Commands

Command	Description
DON#*nn*	Set digital output *nn* on
DOFF#*nn*	Set digital output *nn* off
DOFF#0	Set all digital outputs off
For commands ending with "#*nn*", *nn* is the digital output (01–16) being set on or off.	

Table 6-8. EDP DIG OUT Commands

Command	Description	Values
GFMT	Gross demand print format string	See Section 7.1.1 on page 54 for detailed description
NFMT	Net demand print format string	
SPFMT	Setpoint print format string	
TRWIN	Truck weigh-in print format string	
TRWOUT	Truck weigh-out print format string	

Table 6-9. EDP P FORMT Commands

Command	Description	Values
EDP.BAUD	EDP port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200
EDP.BITS	EDP port data and parity bits	7ODD, 8NONE, 7EVEN

Table 6-10. EDP SERIAL Commands

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Command	Description	Values
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	300, 600, 1200, 2400, 4800, 9600, 19200
PRN.BITS	Printer port data and parity bits	7ODD, 8NONE, 7EVEN
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	300, 600, 1200, 2400, 4800, 9600
AUX.BITS	Auxiliary port data and parity bits	7ODD, 8NONE, 7EVEN
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 port	EDP, PRN, AUX
STREAM	Continuous stream serial port	OFF, EDP, PRN, AUX

Table 6-10. EDP SERIAL Commands

Command	Description	Values
DIGIN1	Digital input 1 function	OFF, ZERO, TARE, NT/GRS, UNITS, DSPTARE, PRINT, BATRUN, BATSTRT, BATPAUS, ACCUM, CLRCN
DIGIN2	Digital input 2 function	
DIGIN3	Digital input 3 function	

Table 6-11. EDP DIG IN Commands

Command	Description	Values
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. EDP ALG OUT Commands

Command	Description	Values
BARGRF	Bar graph mode	OFF, TWNKL, DIGOUTS, GRAPH, GRPHALL
BARREF	Graph mode setpoint reference	*setpoint number* (1–20)
BARBAND	Graph mode band value	*number*

Table 6-13. EDP BAR GRF Commands

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Command	Description	Values
WZERO#*x*	Zero weight calibration	*actual value*
WSPAN#*x*	Span weight calibration	*actual value*
WVAL#*x*	Weight value calibration	*actual value*
VZERO#*x*	Zero volts calibration (see NOTE)	*number*
VSPAN#*x*	Span volts calibration (see NOTE)	*number*
VVAL#*x*	Volts value calibration (see NOTE)	2, 3 (mV/V)
For commands ending with "#*x*", *x* is the channel number (1–4). Omitting the "#*x*" channel identifier causes the command to run against the current display channel. **NOTE**: Voltage calibration applies only to indicators with replaceable A/D converters manufactured prior to July 1996. Do not attempt voltage calibration on later indicators! See Section 4 for more information.		

Table 6-14. EDP CALIBRT Commands

NOTES:

- SETPNTS and BAR GRF EDP commands can be run in either setup mode or operating mode.
- The STREAM command on the SERIAL submenu can be run in either setup mode or operating mode.

6.1.5 Transmit Weight Data Commands

The serial transmit weight data commands transmit data to the EDP port on demand. These commands are used to request weight data from any of the active channels. The transmit weight data commands are valid only in normal operating mode.

Command	Description
XG#*x*	Transmit gross weight for channel
XN#*x*	Transmit net weight for channel
XT#*x*	Transmit tare weight for channel
XA#*x*	Transmit accumulator for channel
XPEAK#*x*	Transmit peak value for channel
XROC#*x*	Transmit rate of change data for channel
For commands ending with "#*x*", *x* is the channel number (1–4, or 0 for total channel). Omitting the "#*x*" channel identifier causes the command to run against the current display channel. If requested data cannot be displayed, indicator responds with "??". XA, XROC, and XPEAK commands are valid only if the feature associated with the command (Accumulator, Rate of Change, or Peak Hold) is enabled.	

Table 6-15. EDP Transmit Weight Data Commands

6.1.6 Batching Control Commands

The commands listed in Table 6-16 provide batching control through the EDP port. See next page for a detailed description of the BATSTATUS command.

Command	Description
BATSTART	Start batch program BATRUN digital input must be on or not assigned.
BATRESET	Reset batch program BATRESET stops the program and resets the program to first batch step.
BATPAUSE	Pause batch program BATPAUSE stops the program at the current batch step; all digital outputs set on by the current step are set off. BATSTART can be used to restart the batch at the current step.
BATSTATUS	Batch status Provides status data including batch status, current batch step, continuous setpoint status, digital input and output status.

Table 6-16. EDP Batching Control Commands

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BATSTATUS Command

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 Table 6-17. BATSTATUS is principally used to provide status information to a controlling batch program when using the Remote I/O Interface option.

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. Table 6-17 shows the low order bit assignments for bytes 3–12. Use Table 6-18 on page 52 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)

Table 6-17. BATSTATUS Command Structure

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Translating ASCII Status Data	ASCII Value	Bit 3	Bit 2	Bit 1	Bit 0
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.	@	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

Table 6-18. ASCII Translation Table for BATSTATUS Data

6.2 Saving and Transferring Data

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

- Print configuration and setpoint data
- Save configuration and setpoint data to a personal computer
- Download configuration data from PC to indicator
- Transfer configuration data from one indicator to another

The following sections describe the procedures for these save and transfer operations.

6.2.1 Printing Configuration and Setpoint Data

Configuration and setpoint data can be printed directly to a printer connected to the EDP port. See Section 2.5 on page 9 for information about serial communications wiring and EDP port pin assignments.

When configuring the indicator, ensure that the values set for the BAUD and BITS parameters on the SERIAL menu match the baud rate, bits, and parity settings configured for the printer. Set the PRNDEST parameter to EDP.

To print all configuration data, place the indicator in setup mode and press PRINT. The indicator sends all configuration parameters, including calibration values, to the printer as ASCII-formatted text. This procedure is equivalent to using the DUMPALL EDP command.

If a supervisor switch is installed, place the indicator in supervisor mode and press the PRINT key to print all setpoint data. This procedure is equivalent to using the SPDUMP EDP command.

See Section 9.5 on page 67 for information about the supervisor switch.

6.2.2 Saving Indicator Data to a Personal Computer

Configuration and setpoint data can be saved to a personal computer connected to the EDP port. The PC must be running a communications program such as PROCOMMPLUS®. See Section 2.5 on page 9 for information about serial communications wiring and EDP port pin assignments.

When configuring the indicator, ensure that the values set for the BAUD and BITS parameters on the SERIAL menu match the baud rate, bits, and parity settings configured for the serial port on the personal computer. Set the PRNDEST parameter to EDP.

To save all configuration data, place the indicator in setup mode and press PRINT. The indicator sends all configuration parameters, including calibration values, to the PC as ASCII-formatted text.

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If a supervisor switch is installed, place the indicator in supervisor mode and press the PRINT key to save all setpoint data.

See Section 9.5 on page 67 for information about the supervisor switch.

6.2.3 Downloading Configuration Data from PC to Indicator

Configuration data saved on a PC or floppy disk (see Section 6.2.2 on page 52) can be downloaded from the PC to an indicator. This procedure is useful when a number of indicators with similar configurations are set up.

NOTE: *Always record the calibration values for the receiving indicator before transferring configuration data. Calibration data for the receiving indicator is overwritten during transfer and must be re-entered before using the indicator.*

To download configuration data, connect the PC to the EDP port as described in Section 6.2.2. Place the indicator in setup mode and use the PC communications software to send the saved configuration data to the indicator. When transfer is complete, re-enter the calibration values for the receiving indicator.

NOTES:

- *When using a PC with a Pentium® processor, specify a short end-of-line delay value to avoid overflowing the indicator buffer.*
- *When downloading configurations that include changed serial communications settings, edit the data file to place the serial communications changes at the end of the file. Communication between the PC and indicator will be lost once the indicator receives settings for baud rate (BAUD parameter) or data bits and parity (BITS parameter) that do not match those configured for the PC.*

6.2.4 Transferring Configuration Data from One Indicator to Another

Configuration data can be transferred from one indicator to another. Like downloading from a PC, this procedure is useful when a number of indicators with similar configurations are set up.

NOTE: *Always record the calibration values for the receiving indicator before transferring configuration data. Calibration data for the receiving indicator is overwritten during transfer and must be re-entered before using the indicator.*

To transfer configuration data, connect the EDP ports of the indicators as shown below:

Sending Indicator		Receiving Indicator	
Function	J7 Pin	J7 Pin	Function
RS-232 TxD	11	9	RS-232 RxD
RS-232 GND	12	12	RS-232 GND
RS-232 RxD	9	11	RS-232 TxD

Table 6-19. Pin Connections for Transferring Data

Place both indicators in setup mode, then press PRINT on the sending indicator. When transfer is complete, re-enter calibration values for the receiving indicator.

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7.0 Print Formatting

The IQ plus 800/810 has a formattable print function available as a standard feature. This feature allows the demand print serial output to be customized to meet the needs of the user.

With this feature, the IQ plus 800/810 can be configured 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.

The following is a list of user-definable print tickets and the name of the corresponding format string:

- Gross demand format (GFMT)
- Net demand format (NFMT)
- Truck weigh-in format (TRWIN)
- Truck weigh-out format (TRWOUT)
- Setpoint push print format (SPFMT)

NOTE: Accumulator print tickets generated from the front panel or the setpoint push accumulator (PSHACCM) function cannot be formatted.

The GFMT, NFMT, TRWIN, TRWOUT, and SPFMT format strings 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. The GFMT and NFMT formats have separate 300 character buffers to allow the installer to set up different printouts for the gross weight and the net weight printouts.

7.1 Customizing Print Formats

The following sections describe procedures for customizing print formats using the EDP port, the front panel (P FORMT menu), and the Revolution configuration utility.

7.1.1 Using the EDP Port

The formattable print option can modified through the EDP port. This requires the installer to use a terminal or PC to enter the new print format into the indicator.

Print formats can include numbers, upper and lower case letters, punctuation marks, and special control characters. Commands must be enclosed between < and > delimiters. Any characters outside of the delimiters are printed as text on the ticket.

The current printout configuration can be checked or changed after establishing bidirectional communications with the IQ plus 800/810. This can be accomplished with the use of a terminal or PC running a terminal emulation 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, enter the name of the string (GFMT, NFMT, TRWIN, TRWOUT, or SPFMT) and press ENTER (or RETURN). The current string is 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 responds 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 is formatted as shown below:

```
SCALE #1
GROSS      5021 LB
09/14/97 12:37 PM
```

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 demand net print format you can enter NFMT then press ENTER.

The IQ plus 800/810 responds 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 is formatted as shown below:

```
SCALE #1

GROSS          5021 LB
TARE           500 LB
NET            4521 LB

09/14/97     12:38 PM
```


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7.1.2 Using the Front Panel

If you have no access to equipment used to communicate through the EDP port or are working at a site where such equipment cannot be used, you can change print format strings from the front panel of the indicator.

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. Figure 7-1 shows the P FORMT menu, including instructions on how to use the front panel keys to edit characters or ASCII values. See page 85 for an example of a 256-character ASCII character set.

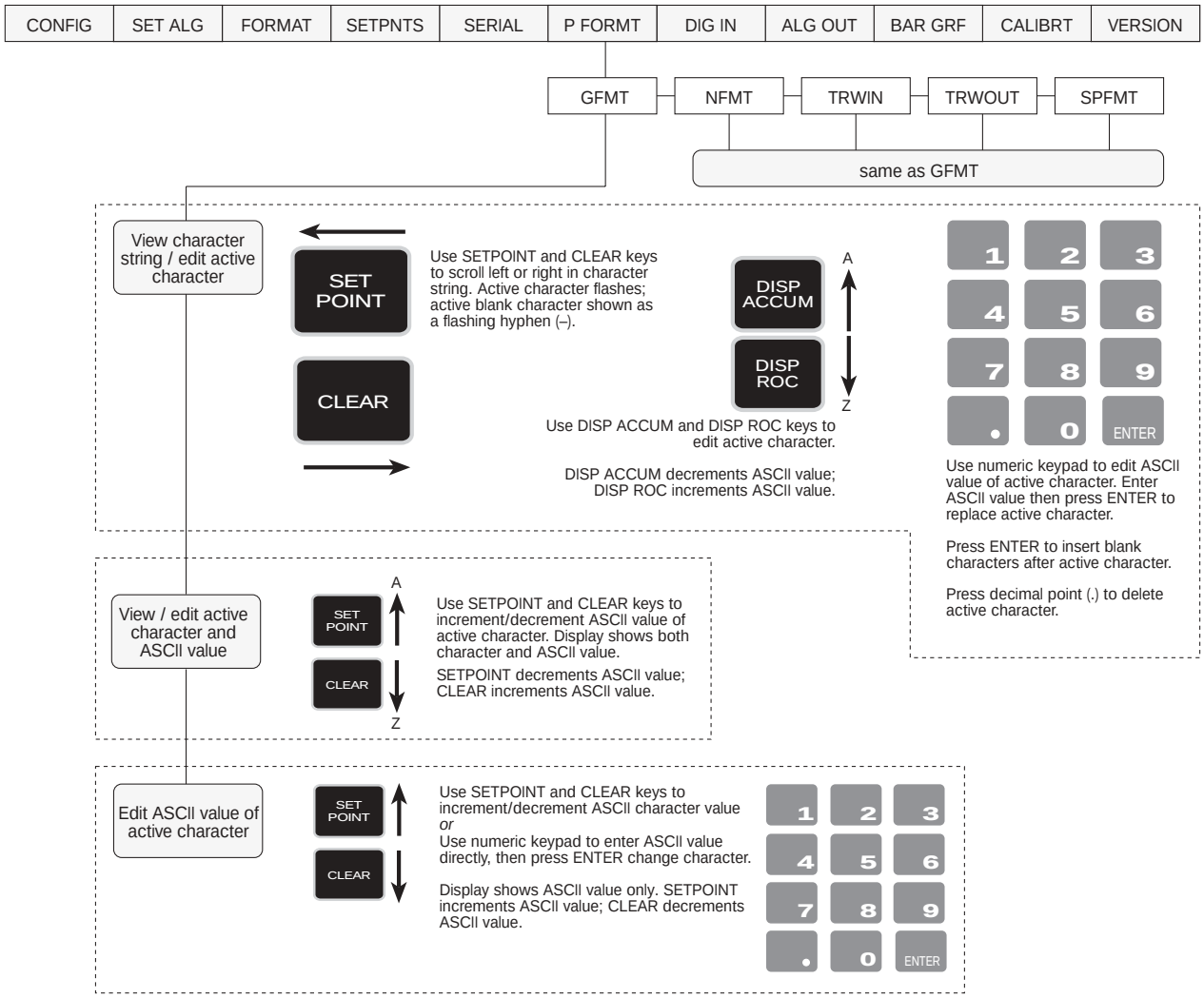


Figure 7-1. P FORMT Menu, Showing Alphanumeric Character Entry Procedure

7.1.3 Using Revolution

The Revolution configuration utility provides a print formatting grid with a tool bar. The grid allows you to construct the print format without the formatting commands (<NL> and <SP>) required by the front panel or EDP command methods. Using Revolution, you can type text directly into the grid, the select fields (including weight, scale number, time, and date) from the tool bar and place them where you want them to appear on the printed ticket.

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Figure 7-2 shows an example of the Revolution print formatting grid.

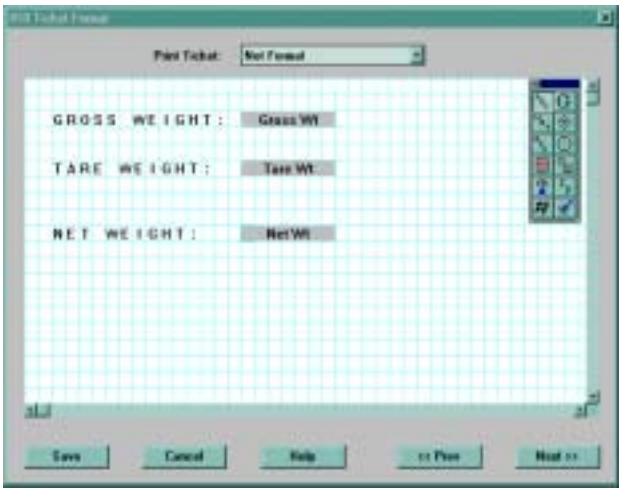


Figure 7-2. Revolution Print Format Grid

7.2 Ticket Formats

The following sections describe the ticket formats available through the P FORMT menu.

7.2.1 Gross/Net Demand Ticket Format

Table 7-1 lists commands used to format Gross/Net demand tickets (GFMT/NFMT parameters on the P FORMT menu). All print formatting commands must be enclosed in delimiters (< >).

Command	Description
<G>	Gross weight for active channel
<G*x*>	Gross weight / *x* = channel number (1–4, or 0 for total)
<N>	Net weight for active channel
<N*x*>	Net weight / *x* = channel number (1–4, or 0 for total)
<T>	Tare weight for active channel
<T*x*>	Tare weight / *x* = channel number (1–4, or 0 for total)
<A>	Accumulator for active channel
<A*x*>	Accumulator / *x* = channel number (1–4, or 0 for total)
<TD> *or* <TD4>	Time and date (TD4 prints four-digit year)
<TI>	Time only
<DA> *or* <DA4>	Date only (DA4 prints four-digit year)
<S>	Scale number
<ID>	ID number
<CN>	Consecutive number

Table 7-1. Demand Ticket Print Format Commands

Command	Description
<NL*n*>	*n* = number of termination characters (<CR> or <CR/LF>)*
<SP*n*>	*n* = number of spaces*
<SU>	Toggle weight data format (formatted/ unformatted)**
* If *n* is not specified, 1 is assumed. **After receiving an SU command, the indicator will send unformatted data until the next SU command is received. Unformatted data omits decimal points, leading and trailing characters.	

Table 7-1. Demand Ticket Print Format Commands

The ID Number feature 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 remains unchanged until the user enters a new ID number. This ID number cannot be disabled, but if it is not formatted on any of the print tickets it is ignored.

For example: If you enter 1234567, press NEW ID, then the PRINT key. The print ticket might look like this:

```
SCALE #1
ID # 1234567
GROSS  3780 LB
5/1/98    8:30   PM
```

You can print weight data from any active channel. Time and date can be printed separately or together. Accumulator values, ID and consecutive numbers can be added to the ticket. See Section 7.3 on page 58 for more information.

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 02/01/98
```

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

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7.2.2 Truck Weigh-in and Weigh-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 7-2 lists the commands you can use to configure truck print tickets.

Command	Description
<TR1>	Gross weight for current ticket*
<TR2>	Tare weight for current ticket*
<TR3>	Net weight for current ticket*
<TD> *or* <TD4>	Time and date (TD4 prints four-digit year)
<TI>	Time only
<DA> *or* <DA4>	Date only (DA4 prints four-digit year)
<S>	Scale number
<ID>	ID number
<CN>	Consecutive number
<NL*n*>	*n* = number of termination characters (<CR> or <CR/LF>)**
<SP*n*>	*n* = number of spaces**
* Weight data includes key words (STORED, KEYED, RECALLED) as applicable. ** If *n* is not specified, 1 is assumed.	

Table 7-2. Truck Ticket Print Format Commands

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.

The default ticket format is as follows:

```
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
12/01/97 01:46 PM
```

(6 blank lines)

```
ID 1   SCALE TOTAL
GROSS     5578 LB
TARE      5254 LB RECALLED
NET        324 LB
12/01/97 01:46 PM
```

7.2.3 Setpoint Push Print Ticket

When a setpoint push print is set (PSHRPNT parameter on the level SETPNTS menu), 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 gross and tare weights retain their current values at the time of print (values are not frozen at the time the setpoint is achieved).

Table 7-3 lists commands you can use to configure setpoint tickets.

Command	Description
<SV1>	Weight value when setpoint tripped
<SV2>	Label for SV1 weight value
<TD> *or* <TD4>	Time and date (TD4 prints four-digit year)
<TI>	Time only
<DA> *or* <DA4>	Date only (DA4 prints four-digit year)
<BN>	Current setpoint number
<TV>	Current setpoint target value (relative value for REL setpoints)
<PV>	Current setpoint preact value
<NA>	Setpoint name in SPFMT format
<NL*n*>	*n* = number of termination characters (<CR> or <CR/LF>)*
<SP*n*>	*n* = number of spaces*
<SU>	Toggle weight data format (formatted/ unformatted)**
* If n is not specified, 1 is assumed. ** After receiving an SU command, the indicator will send unformatted data until the next SU command is received. Unformatted data omits decimal points, leading and trailing characters.	

Table 7-3. Setpoint PSHPRNT Print Format Commands

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7.3 Extended Print Format Commands

You can specify the units identifier used to print demand, truck, and push print tickets as shown in Table 7-4. 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	

Table 7-4. Extended Print Format Command Syntax

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

7.4 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 incremented only when the <CN> command is included in the print format used for the print operation. In releases prior to 3.1, the consecutive number was incremented with every print operation.

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8.0 Setpoints and Batch Processing

The IQ plus 800/810 indicators provide 20 programmable setpoints, each with 20 unique parameter selections. These parameters determine exactly how a setpoint functions. To configure setpoints, you must enter the setup mode. Once setpoints are configured, you can change setpoint and preact values from normal operating mode.

See the menu charts and descriptions in Section 3.0 for details on each parameter. See Section 6.0 for information about configuring setpoints through commands sent to the EDP port.

Figure 8-1 shows the setpoint menu structure. Each setpoint is defined as a particular setpoint kind. Table 8-1 lists the setpoint kinds.

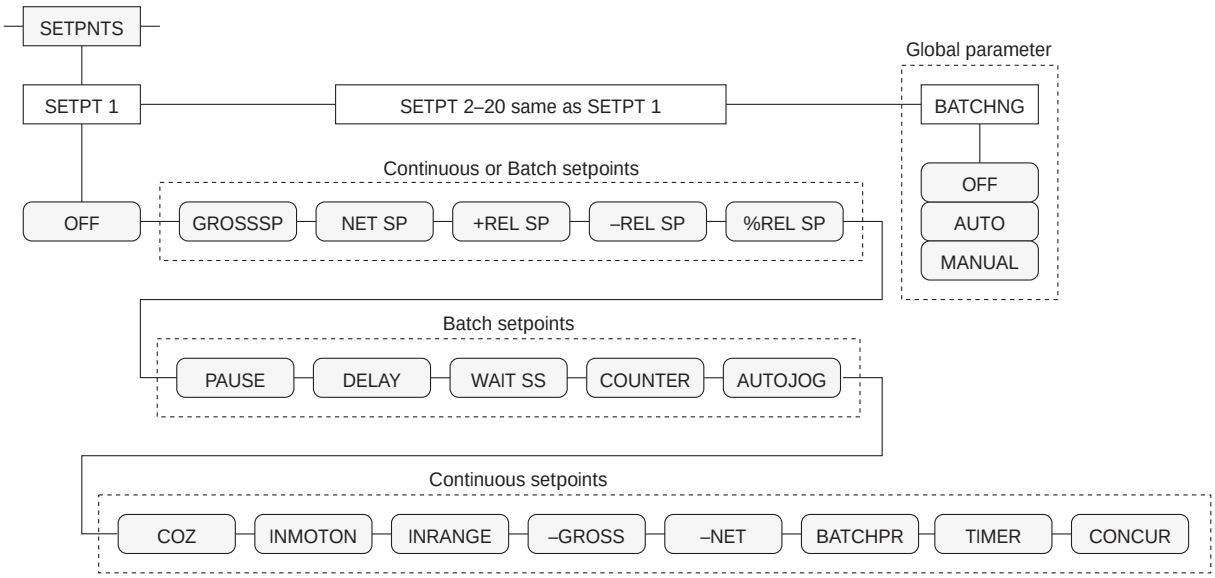


Figure 8-1. Setpoint Menu Structure

Kind	Description
OFF	Setpoint turned off/ignored.
GROSSSP	Gross setpoint. Trips when the current gross weight matches this value.
NETSP	Net setpoint. Trips when the current net weight matches this value.
+RELSP	Positive relative setpoint. Trips at a specific value above the referenced setpoint.
–RELSP	Negative relative setpoint. Trips at a specific value below the referenced setpoint.
%RELSP	Percent relative setpoint. Trips at a specific percentage value of the referenced setpoint.
PAUSE	Pauses the batch sequence indefinitely. Operator must activate the START digital input to continue processing.
DELAY	Delays the batch sequence for a specified time. The length of the delay (in tenths of a second) is specified on the Value parameter.
WAITSS	Wait for standstill. Pauses the batch sequence until the scale is at standstill.
COUNTER	Specifies the number of consecutive batch sequences to perform.
AUTOJOG	Automatically jogs the previous filling operation.
COZ	Center of zero. The digital output associated with this setpoint is activated when the scale is at center of zero. No value is required for this setpoint.
INMOTON	In motion. The digital output associated with this setpoint is activated when the scale is not at standstill. No value is required for this setpoint.

Table 8-1. Setpoint Kinds

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Kind	Description
INRANGE	In range. The digital output associated with this setpoint is activated when the scale is within capacity range. No value is required for this setpoint.
–GROSS	Negative gross weight. The digital output associated with this setpoint is activated when the gross weight reading is less than zero. No value is required for this setpoint.
–NET	Negative net weight. The digital output associated with this setpoint is activated when the net weight reading is less than zero. No value is required for this setpoint.
BATCHPR	Batch processing signal. The digital output associated with this setpoint is activated whenever a batch sequence is in progress. No value is required for this setpoint.
TIMER	Tracks the progress of a batch sequence based on a timer. The timer value, specified in tenths of a second on the Value parameter, determines the length of time allowed between start and end setpoints. The indicator Start and End parameters are used to specify the start and end setpoints. If the End setpoint is not reached before the timer expires, the digital output associated with this setpoint is activated.
CONCUR	Allows a digital output to remain active over a specified portion of the batch sequence. Two types of Concur setpoints can be configured: Type 1: The digital output associated with this setpoint becomes active when the Start setpoint becomes the current batch step and remains active until the End setpoint becomes the current batch step. Type 2: The digital output associated with this setpoint becomes active when the Start setpoint becomes the current batch step and remains active until a timer expires. The indicator Start and End parameters are used to specify start and end setpoints. The timer value is specified in tenths of a second on the Value parameter.

Table 8-1. Setpoint Kinds (Continued)

NOTE: If the setpoint KIND is changed, using either the SETPNTS menu or the KIND EDP command, all other parameters for that setpoint are reset to their default values.

Table 8-2 shows additional setpoint parameters. Some of the listed parameters apply only to certain setpoint kinds. See Section 3.2.4 on page 23 for detailed descriptions of these parameters.

Parameter	Description
DIGOUT	Specifies which digital output is activated
VALUE	Specifies numerical setpoint value
PSHTARE	Presses TARE key when setpoint trips
PSHPRNT	Presses PRINT key when setpoint trips
TRIP	Defines condition necessary to trip setpoint
BANDVAL	Specifies 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 Section 8.3 on page 62)
PREVAL	Adjusts the trip values of the configured setpoint
BATCH	Defines the setpoint as a batch step when set to ON
SOURCE	Specifies 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 Section 8.4.2 on page 63)

Table 8-2. Additional Setpoint Parameters

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8.1 Using Continuous Setpoints

Continuous setpoints are free-running: the indicator constantly checks the input channel for the setpoint value. If the input channel weight reading matches the setpoint value, the indicator sets the corresponding digital output on.

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 the right (CLEAR) or left (SETPOINT) arrow keys to scroll to the SETPNT menu. Then press time/date (TIME/DATE key). 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 TIME/DATE.
3. Scroll to *INMOTON* and press TIME/DATE.
4. Scroll to *DIGOUT* and press TIME/DATE.
5. Scroll to *1* and press the DISP TARE key.
6. Scroll to *SOURCE* and press TIME/DATE.
7. Scroll to *CH 1* and press DISP TARE.
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, then press TIME/DATE**.** In this example, setpoint 2 turns on digital output 2. Scale input source is channel 2.
2. Scroll to *SETPNT 2* and press TIME/DATE.
3. Scroll to *GROSSSP* and press TIME/DATE.
4. Scroll to *VALUE* and press TIME/DATE.
5. Use the numeric keys to type 125. Press ENTER, then press DISP TARE.
6. Scroll to *SOURCE* and press TIME/DATE.
7. Scroll to *CH 2* and press DISP TARE.
8. Exit setup mode.
9. Now, setpoint 2 activates digital output 2 whenever the scale on channel 2 reaches 125 pounds.

The GROSSSP, NET SP, +REL SP, –REL SP, and %REL SP setpoint kinds have other parameters that give you even more control over continuous setpoints. See Section 3.2.4 on page 23 for more information on setpoint parameters.

8.2 Using Batch Setpoints

Batch setpoints are active one at a time, in an ordered sequence. 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 batch setpoints, you must activate the BATCHNG global parameter on the SETPNTS menu. 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.

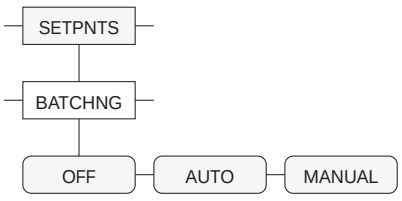


Figure 8-2. Setpoint BATCHNG Parameter

When working with batch setpoints, remember that GROSSSP, NET SP, +REL SP, –REL SP, and %REL SP can be either continuous or batch setpoints.

In addition to the BATCHNG parameter, each setpoint has a BATCH parameter (see Figure 8-3) which must be set on for batch processing. If the setpoint is defined but BATCH is off, the setpoint operates as a continuous setpoint, even during batch sequences.

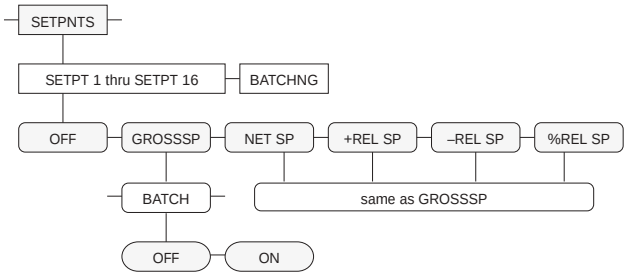


Figure 8-3. Setpoint BATCH Parameter

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Batch Status Messages

Table 8-3 shows the status messages used to indicate interrupted batches.

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

Table 8-3. Batch Status Messages

8.3 Front Panel Preact Value Access

Values for the PREACT setpoint parameter can be viewed on the front panel in the normal operating mode if the PREACT parameter is turned on. The SETPOINT key function allows you to access the PREACT value if the ACCESS parameter is set to on and PREACT is not off.

After pressing SETPOINT, the display shows 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 SETPOINT key again to view the preact value. The display reads *P xxxxxx*, where *xxxxxx* is the PREACT value.

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

You can change the PREACT value if the ACCESS parameter is set to on. With the PREACT value displayed, enter a new value from the keypad and press the ENTER key. To clear the PREACT value, press 0, then press ENTER.

8.4 Setpoint Names

You can customize the prompts given to the operator when the SETPOINT key is used by defining setpoint names. The default prompt is *SP x*, where *x* is the setpoint number.

To use setpoint names, two steps are required:

1. Define the setpoint names

   Use either the SPNAME#*x* EDP command or the SPNAME parameter on the FORMAT menu to define up to ten setpoint names of up to seven characters each.

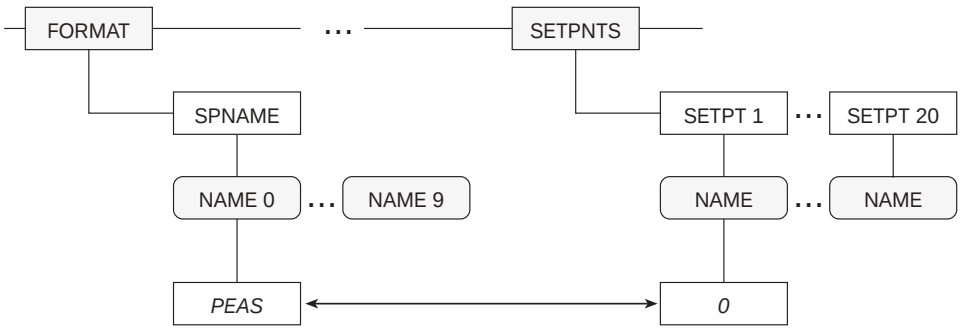
2. Assign one of the defined names to the setpoint

   Use either the NAME EDP command or the NAME parameter on the SETPNTS menu to assign one of the defined names to the setpoint being configured.

The assigned name can be included on a setpoint push print ticket by including the <NA> print format command.

Figure 8-4 on page 63 shows the configuration menu parameters used to define setpoint names and to assign the names to particular setpoints.

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- Specify up to ten ingredient names on the FORMAT menu SPNAME parameter
- Use the setpoint NAME parameter to select the NAME *x* value used for the setpoint
- In the example above, NAME=0 means that the ingredient name for SETPT 1 is defined under NAME 0

Figure 8-4. Setpoint Naming Parameters on FORMAT on SETPNTS Menus

8.4.1 Defining Setpoint Names

You can define up to ten names, with up to 7 characters each. You can define setpoint names using either the FORMAT menu (see Figure 8-4, above) or by using the following EDP 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 8-4 shows the default names for setpoint names 0 – 9.

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

Table 8-4. Default Setpoint Names

8.4.2 Assigning Names to Setpoints

Each setpoint includes a NAME parameter used to associate the setpoint with one of the defined SPNAME values. NAME is set to a value, 0–9, representing the SPNAME parameter containing the name to be used for the setpoint. The NAME parameter defaults to NONE, meaning that no name is assigned to the setpoint.

You can assign names to setpoints using either the SETPNTS menu (see Figure 8-4, above) or by using the NAME EDP command.

For example, with the following setpoint names defined:

SPNAME#0=CORN
SPNAME#1=PEAS
SPNAME#2=CARROTS
SPNAME#3=BEANS

Use the SETPOINT and NAME EDP commands to assign names to setpoints 1 and 2:

SETPOINT=1
NAME=1
SETPOINT=2
NAME=3

When you press the SETPOINT key to access setpoint 1, the indicator reads *PEAS*. When you press the SETPOINT key to access setpoint 3, the indicator reads *BEANS*.

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9.0 Optional and Advanced Features

9.1 Accumulate Function

The accumulate function 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 using setpoints, or manually pressing the PRINT key when the accumulate function is active.



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 is lit.

With either the automatic or the manual entry method, if no tare is entered into the system, the register accumulates gross weight values. If a tare has been entered (indicated by the *T* or *pT* annunciator being lit), the accumulator adds net weight to the register.

In normal operating mode with accumulate active and a weight value displayed, you can do the following:

- Press the PRINT key to add the displayed value to the accumulator and print the accumulated weight. (NOTE: If PSHACCM is set to 0QUIET–4QUIET, the accumulator is updated but is not printed.)
- Press the DISP ACCUM key to display the accumulated weight. The ACCUM annunciator lights and the accumulator value is displayed. With the accumulator displayed, press the PRINT key to print the accumulated weight to the serial port configured for demand mode.

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 returns to the current weight reading automatically after five seconds, or you can press the G/N key to return to the current weight display immediately.

To clear the accumulator, press the DISP ACCUM key to display the accumulated weight, then press the CLEAR key. The display will then prompt the operator with *CLR ACn* (where *n* is the accumulator number, 0–4). Press the CLEAR key again to clear the register. To cancel the clear operation, press the G/N key. If no key is pressed, the display returns to the current weight reading after five seconds.

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 is 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 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 the scale is at standstill.

Parameters used to configure the setpoint-activated accumulate functions are found on the SETPNTS menu, PSHACCM parameter (see Section 3.2.4 on page 23).

9.1.1 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, then 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 informs you which accumulator is being displayed. To view a different accumulator, enter the accumulator number on the front panel then press the DISP ACCUM key. To view the total accumulator, press 0 and DISP ACCUM. Press DISP ACCUM repeatedly to cycle through and view all of the accumulators. If an invalid number is entered before the PRINT key is pressed, no accumulator is updated and no ticket is printed.

The total accumulator is 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 is 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.

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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
01/01/98 92:16 AM

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

9.1.2 Setpoint Access

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

ACCUM #*x aaaaaaa* LB
01/01/98 09:20 AM

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 PSHACCM 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.

9.2 Rate of Change Function

The Rate of Change (ROC) function displays change in weight over a set period of time. The rate of change function is configured using the RATECHG submenu, under the FORMAT menu. Figure 9-1 shows the RATECHG submenu.

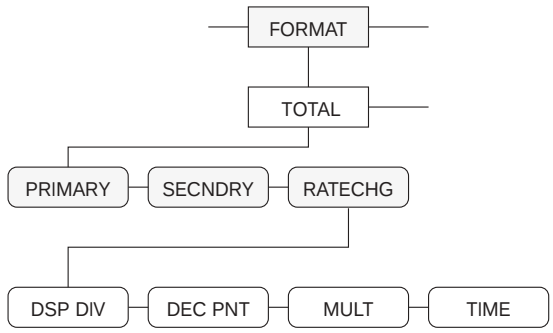


Figure 9-1. Rate of Change Submenu



ROC configuration is similar to secondary units configuration. ROC units are defined under the FORMAT menu and the display is accessed in operating mode by pressing the DISP ROC key.

If the ROC units are the same as the primary units, display divisions and decimal point location are the same under RATECHG as those settings under primary units. If the ROC units differ from the primary units, display divisions, decimal point location, and multiplier are changed to reflect the new units.

For example, if pounds (lb) are the primary unit and want to view the ROC of gallons of gasoline, you must know that one gallon of gasoline weighs 6 lbs See Section 10.4 on page 88 for information about conversion factors. With DSP DIV and DEC PNT set the same as PRIMARY, the MULT setting should be entered as 6. This causes the ROC units to increment every time the scale changes weight by six pounds.

The TIME parameter is used to set the time increments. You can choose between seconds or minutes. The display shows 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 is active for 7–8 seconds, then times out.

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9.3 Peak Hold Function

The peak hold function is used to determine, display, and print the greatest net weight read during a weighing cycle. Peak hold tracks only net weight and operates independently of the display. Other analog inputs or gross weight can be shown during peak hold function cycles; the peak hold value is displayed only in net mode. The weighing cycle ends when a print command is issued, or when the peak value is manually cleared by pressing the CLEAR key.

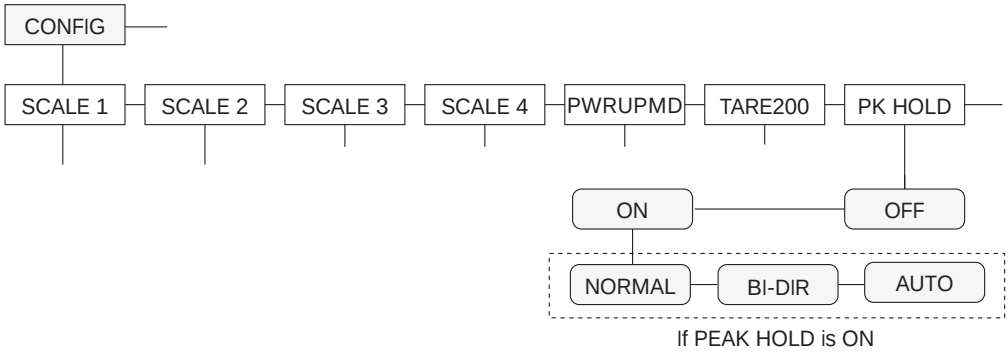


Figure 9-2. Peak Hold Submenu

For example, if the indicator is displaying gross weight, but AUTO peak hold is active, the display remains in gross mode but the net peak weight is automatically printed when standstill is achieved at zero.

The peak hold function is enabled by setting the following parameters on the CONFIG menu:

- Set the PK HOLD parameter on and choose the peak hold mode (NORMAL BI-DIR, or AUTO). See Figure 9-2.
- Set the PEAK parameter (under the FEATURE submenu) on.

NORMAL (Positive Peak, Manual Reset)
In NORMAL peak hold mode, the greatest net weight applied to the scale 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, press the G/N key to display the peak value.

BI-DIR (Bi-Directional Peak, Manual Reset)
Same as NORMAL except that the peak value can be positive or negative (representing the absolute value of the weight reading). If a positive peak is displayed, a negative weight value of greater absolute value can update the peak information in the same cycle.

AUTO (Positive Peak, Auto Print, Auto Reset)
Same as NORMAL except that an automatic print command is sent when the scale achieves standstill and the scale load is reduced to 0 ±10 display divisions. Following the print command, the peak value is cleared and reset automatically. The current peak hold value can also be cleared by pressing the CLEAR or PRINT key.

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9.4 Passwords

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 SETPOINT 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.

Configuration Password

When you are in normal operating mode and switch the CONFIG switch, the indicator prompts *CONF ID*. You can then enter the numeric password. As each digit is entered a "*" appears from left to right on the indicator. You must then press the ENTER key. If the password is incorrect, the indicator displays *REJECT* and returns 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 configuration password. When you press the SETPOINT key or enter supervisor mode, the indicator prompts *STPT ID*. You then enter the numeric setpoint password and press ENTER. If incorrect, *REJECT* appears, then *STPT ID* again. If correct, you can continue to view or change the setpoint parameters. The setpoint password cannot 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 does not disable the passwords.

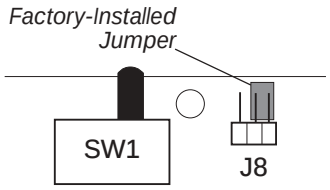
Backdoor Password

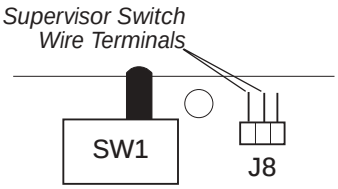
If you forget the CONFIG password and have no way to enter the CONFIG menu, call Rice Lake Weighing Systems. We can help you find a unique "back-door" password to enter the CONFIG menu.

9.5 Supervisor Setup Switch

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 setpoint parameters. The supervisor setup switch must be unlocked with a key—normally carried by a supervisor—which prevents tampering with setpoint 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 is jumpered at the factory as shown at below. 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.

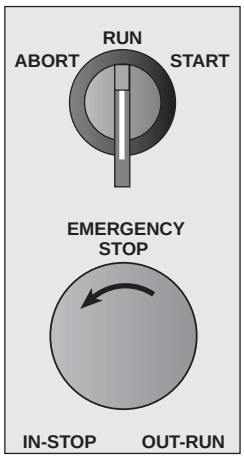




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9.6 Batching Switch

The batching switch option comes as a complete unit with legend plate, locking stop button, and run/start/abort 3-way switch.



For SS and HE models, the unit can be mounted directly on the face of the case by drilling 7/8" holes for the two switches. Desktop models have insufficient room for switches on the case; a special FRP case is available for mounting the switch unit remotely. The remote mounting kit includes case, 5 feet of cable, O-ring, and cord grip for sealing the cable connection to the indicator. Either mounting method is waterproof and maintains a NEMA 4X rating.

Both switches are wired into the indicator's digital I/O terminal strip as shown in the wiring diagram below. Each switch uses a separate digital input, leaving the third digital input available for other use.

After the switches are mounted and wired, the indicator must be configured for the correct digital input functions. Configuration instructions are listed on the following page.

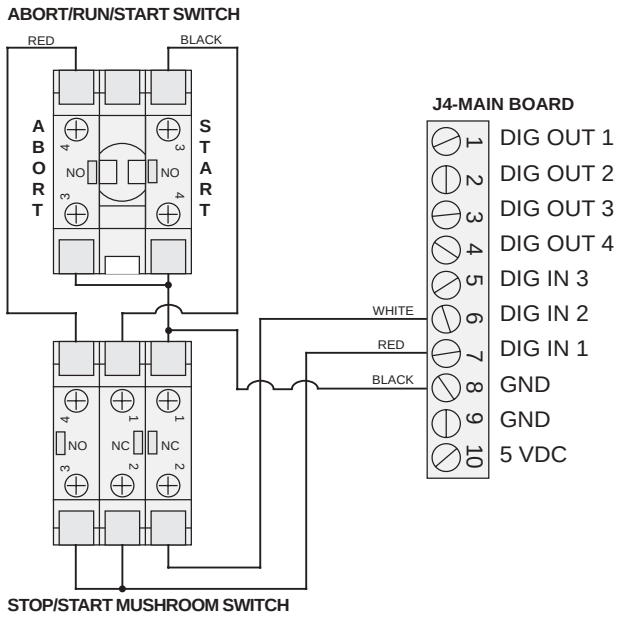


Figure 9-3. Batching Switch Wiring Diagram

The following items describe the operation of the batching switch for indicators running Release 3.0 and Release 3.1 software:

When correctly configured (see the **WARNING** below) the red STOP button must be in the OUT position to allow the batch process to run. To begin a batch process, the 3-way switch is momentarily turned to START. If the STOP button is pushed during the batch process, the process halts and the button locks in the IN position. The 3-way switch is ignored while the STOP button is locked in the IN position: The STOP button must be turned counterclockwise to unlock it, then released into the OUT position to enable the 3-way switch.

To restart an interrupted batch from the step where it left off, do the following:

1. Unlock STOP button (OUT position)
2. Turn 3-way switch to START

Caution *For indicators using Release 3.0 software, if a power failure occurs during a batch sequence, the sequence must be reset and restarted from the first batch step using the procedure below. You cannot resume the batch from the point of the power failure.*

To restart an interrupted batch from the first batch step, do the following:

1. Turn 3-way switch to ABORT
2. Unlock STOP button (OUT position)
3. Turn 3-way switch to START

NOTE: Anytime setpoint configuration is changed, the batch sequence must be reset as described above to initialize the new batch routine.

Configuring the Batching Switch Option

Once cables and switches have been connected to the indicator, use the setup switch to place the indicator in setup mode.

- For indicators using Release 3.0 software, go to the DIG IN menu, move to DIGIN 1 and select BATSTRT as digital input 1. Then move to DIGIN 2 and select BATRUN as digital input 2. See Figure 9-4 on page 69.
- For indicators using Release 3.1 software, the default values for DIGIN 1 and DIGIN 2 are BATSTRT and BATRUN, respectively. Use the procedure described above to verify the digital input assignments.

Warning *In Release 3.1, if no digital input is assigned to BATRUN, batching proceeds as if BATRUN were always on: If DIGIN 2 is not assigned to BATRUN, the batch will start when the 3-way switch is turned to RUN, but the STOP mushroom button will not function.*

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NOTE: In Release 3.0, the default value for DIGINs 1 and 2 is OFF; in Release 3.1, the default values are BATSTRT (DIGIN 1) and BATRUN (DIGIN 2). Always verify the digital input assignments before using the batching switch.

When configuration is complete, use the setup switch to place the indicator back in weighing mode. Initialize the batch by turning the 3-way switch to ABORT, then unlock the STOP button. The batching switch is now ready to use.

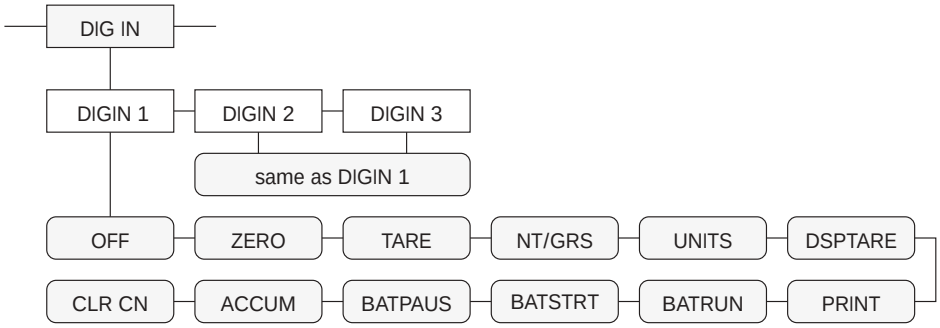


Figure 9-4. Digital Input Menu

9.7 Bar Graph

The Bar Graph is an optional hardware feature that is recommended for all setpoint applications. The Bar Graph feature can be mounted on the front side of the display board in any of the IQ plus 800/810 models as shown in Figure 9-5.

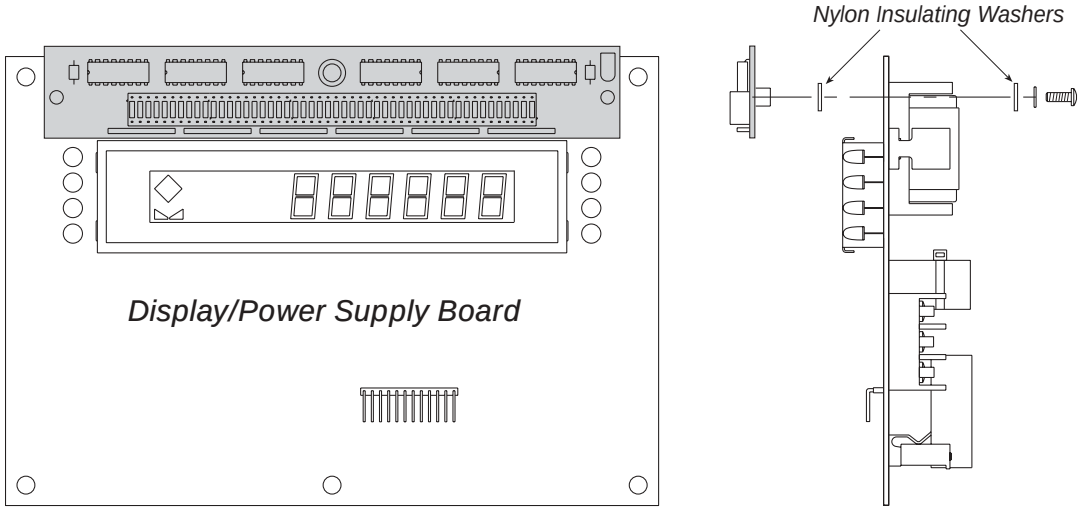


Figure 9-5. Bar Graph Option Installed on Display Board

The bar graph feature hardware uses 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.

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Figure 9-6 shows the BAR GRF menu used to configure the bar graph feature. See Section 3.2.9 on page 36 for more information about configuring this feature.

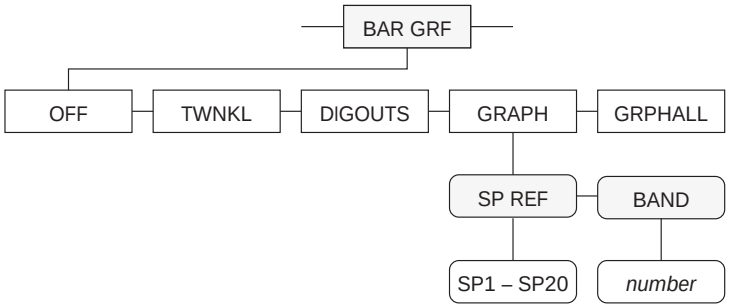


Figure 9-6. Bar Graph Submenu

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 9-6. TWNKL provides a visual indication of which setpoint is active 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 are off. The segments begin lighting from left to right as the weight value increases to meet the setpoint value.

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.

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9.8 Expanded Serial Communications

The expanded serial communications options provide duplex 20 mA current loop or RS-485 communications for the IQ plus 800/810.

To install either option, disconnect power to the indicator and open the enclosure. Follow the instructions below for installation on the main or expansion board. Once the chip is installed and the cabling complete, reassemble the enclosure, connect power, and place the indicator in setup mode. Use the SERIAL menu to configure the EDP port as described in Section 3.2.5 on page 30.

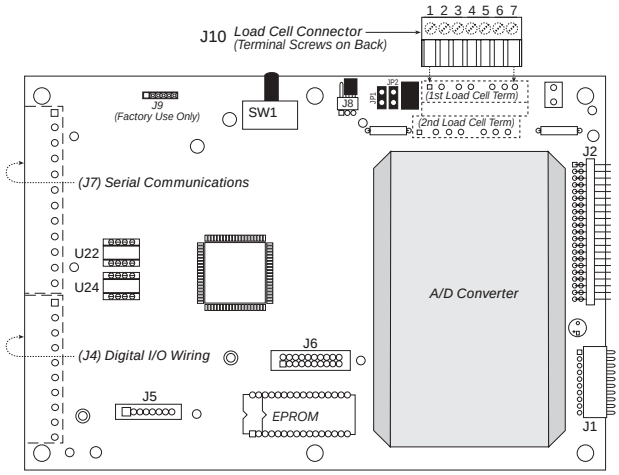


Figure 9-7. Location of Chips U22 and U24 on CPU Board

9.8.1 Duplex 20 mA Current Loop

The standard EDP port supports duplex RS-232 serial and simultaneous output-only (simplex) 20 mA current loop communications. To upgrade to 20 mA duplex operation, verify that socket U24 is empty (no RS-485 chip) and install the 20 mA chip in socket U22 (see Figure 9-7). Connect communications cable as described for 20 mA current loop in Table 9-1.

9.8.2 RS-485 Communications

The EDP port can be configured to operate as an RS-485 transceiver on a multi-drop, twisted-pair line. To enable RS-485 operation, verify that socket U22 is empty (no 20 mA chip) and install the RS-485 chip in socket U24 (see Figure 9-7). Connect communications cable as described for RS-485 in Table 9-1.

J7 Pin	RS-232	20 mA Current Loop	RS-485
7		+20 mA IN	485-A
8		–20 mA IN	485-B
9	RxD		
10		–20 mA OUT	
11	TxD		
12	GND	+20 mA OUT	

Table 9-1. EDP Port/J7 Pin Assignments

9.9 IQ plus 810 Expansion Board

The IQ plus 810 expansion board is a separate hardware board that supports the addition of other options to the system. The expansion board mounts on standoffs directly in back of the main board; ribbon cables connect the expansion board to the main and display boards. See Figures 9-8 and 9-9 on page 72.

Expansion board PN 35765 provides load cell connections and A/D conversion for two additional scale channels (channels 3 and 4). Expansion board PN 35767 provides a connector for attaching a remote keyboard to the indicator. Both expansion boards support an optional analog output module.

NOTE: If the expansion board is mounted in the IQ plus 810 Desktop model, the unit cannot accommodate any relay rack options. SS and HE models will accommodate either one or two 4-channel racks, or one 16-channel rack, in addition to the expansion board.

To install the expansion board, disconnect power to the indicator and open the enclosure. If adding an analog output module, assemble the analog output to the expansion board before mounting the expansion board on the standoffs.

Once the expansion board is installed and cabling complete, reassemble the enclosure, connect power, and place the indicator in setup mode. Use the menus to configure additional channels and analog output, as required.

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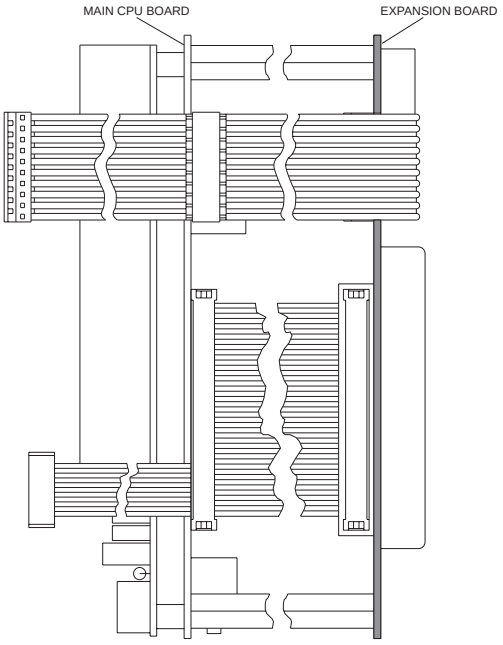


Figure 9-8. Installed Expansion Board, Side View

Table 9-2 shows the pin assignments for load cell connections on the expansion boards.

Channel	J10 Pin	Signal
3	1	–EXCITATION
	2	+EXCITATION
	3	SHIELD
	4	–SENSE
	5	+SENSE
	6	–SIGNAL
	7	+SIGNAL
4	1	–EXCITATION
	2	+EXCITATION
	3	SHIELD
	4	–SENSE
	5	+SENSE
	6	–SIGNAL
	7	+SIGNAL

Table 9-2. Channel 3 & 4 Load Cell Pin Assignments

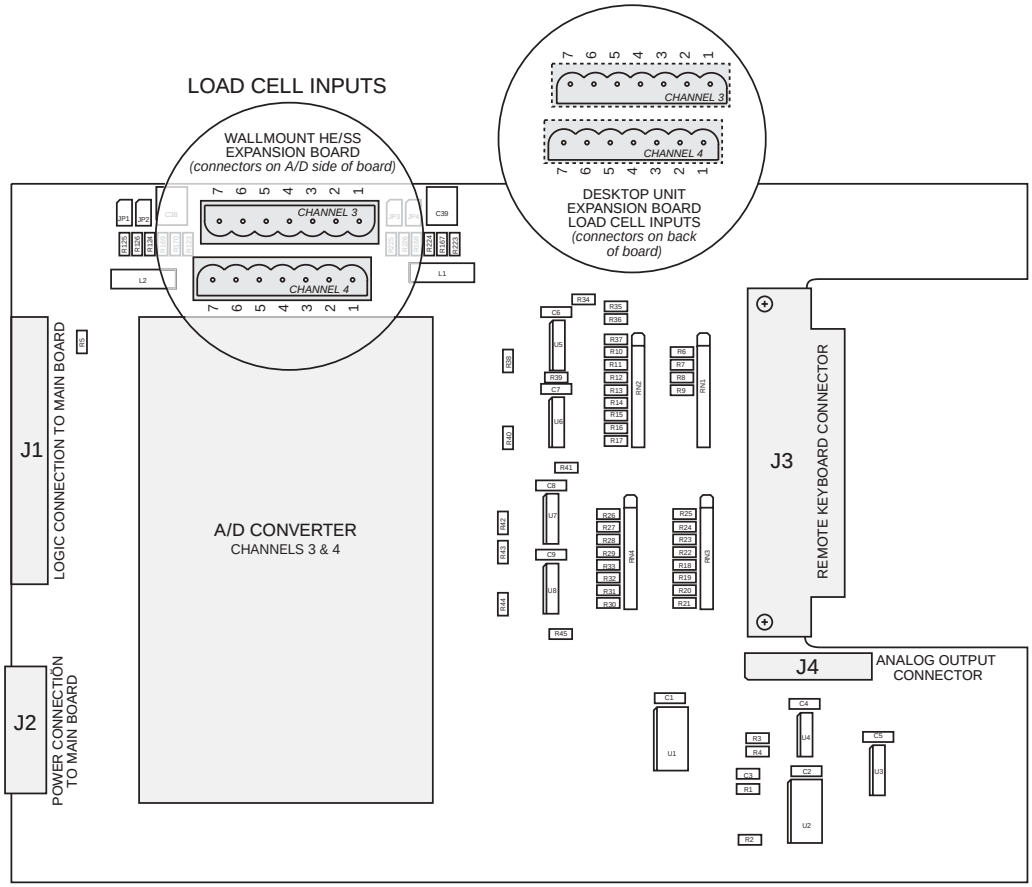


Figure 9-9. IQ plus 810 Expansion Board

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9.10 Remote Keyboard

The remote keyboard connector provides a means of connecting a remote keyboard to the IQ plus 810 indicator. The front panel keyboard on the indicator remains active with the remote keyboard attached.

All inputs to the remote keyboard connector are active low with pullups to +5V. Front panel keyboard functions are activated by shorting the appropriate remote keyboard input to ground with hard-contact switches, or by setting TTL logic-low levels. Table 9-3 lists the inputs for the remote keyboard connector, J3.

J3 Pin	Description	J3 Pin	Description
1	GND	20	GND
2	(spare)	21	(spare)
3	(spare)	22	CLEAR (Right)
4	PRINT	23	NEW ID

Table 9-3. Remote Keyboard J5 Pin Assignments

J3 Pin	Description	J3 Pin	Description
5	SETPOINT (Left)	24	SCALE #
6	ZERO	25	GROSS/NET
7	TARE	26	UNITS
8	DISP TARE (Up)	27	1
9	GND	28	GND
10	GND	29	2
11	3	30	DISP ACCUM
12	4	31	5
13	6	32	DISP ROC
14	7	33	8
15	9	34	TIME/DATE (Down)
16	. (decimal point)	35	0
17	ENTER	36	GND
18	GND	37	NC
19	NC		

Table 9-3. Remote Keyboard J5 Pin Assignments

9.11 Analog Output

The IQ plus 800 supports one analog output module installed on its main board. The IQ plus 810 can accommodate two analog output modules—one on the main board, the second on the optional expansion board. Outputs can be set up for 0–10 volt or 4–20 mA analog output. IQ plus 810 models with two analog output modules installed can configure each module for either 10V or 20 mA operation. Each module has separate calibration parameters in the ALG OUT configuration menu.

A single analog output module is installed on the back of the main board, immediately behind the setup switch. A second module (IQ plus 810 models only) can be installed on the back of the expansion board.

The J1 connector on the analog output module is used to connect the analog output to the receiving device.

Analog Output Module Installation

To install or replace the analog output module, ensure power to the indicator is disconnected, then place the indicator face-down on an antistatic work mat and open the enclosure. Loosen all in-use cord grips before separating the enclosure halves.

Caution *Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.*

CPU Board Installation

Mount the analog output module on its standoffs in the location shown in Figure 9-10 and plug the module input into connector J6 on the CPU board.

Expansion Board Installation

Mount the analog output module on its standoffs in the location shown in Figure 9-11 and plug the module input into connector J4 on the expansion board.

NOTE: *Ensure jumpers JP1 and JP2 are installed in position 2 (POS2, pins 2 and 3) as shown in Figures 9-10 and 9-11.*

Route the output cable through a cord grip on the indicator backplate, then connect the output cable to the analog output module as shown in Table 9-4. For the IQ plus 800, see *"Installing the IQ plus 800 Replacement Setup Switch"* on page 74. For the IQ plus 810, reassemble the enclosure, then configure and calibrate the indicator and analog output as described on page 75.

Pin	Signal
1	+ Current Out
2	– Current Out
3	+ Voltage Out
4	– Voltage Out

Table 9-4. Analog Output Module Pin Assignments

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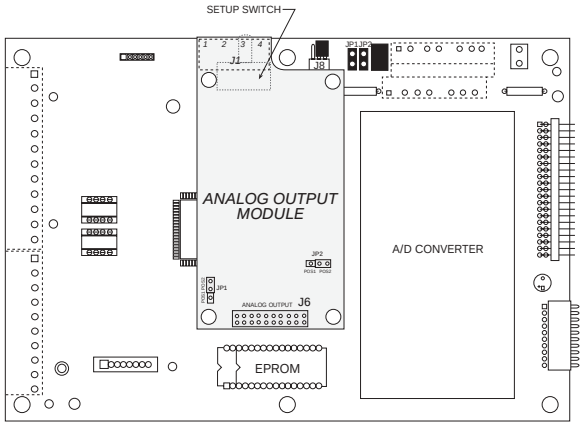


Figure 9-10. Analog Output Installed on CPU Board

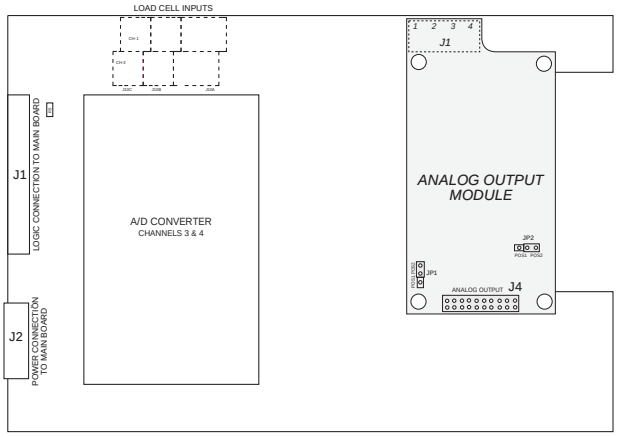


Figure 9-11. Analog Output Installed on Expansion Board

Installing the IQ plus 800 Replacement Setup Switch

The analog output option includes a replacement setup switch for the IQ plus 800. The replacement toggle switch mounts on the backplate U-bracket to allow access to setup mode without opening the enclosure when the analog output option is installed.

To install the replacement switch, follow the procedure shown in Figure 9-12. When done, reassemble the enclosure, and follow the configuration and calibration instructions on page 75.

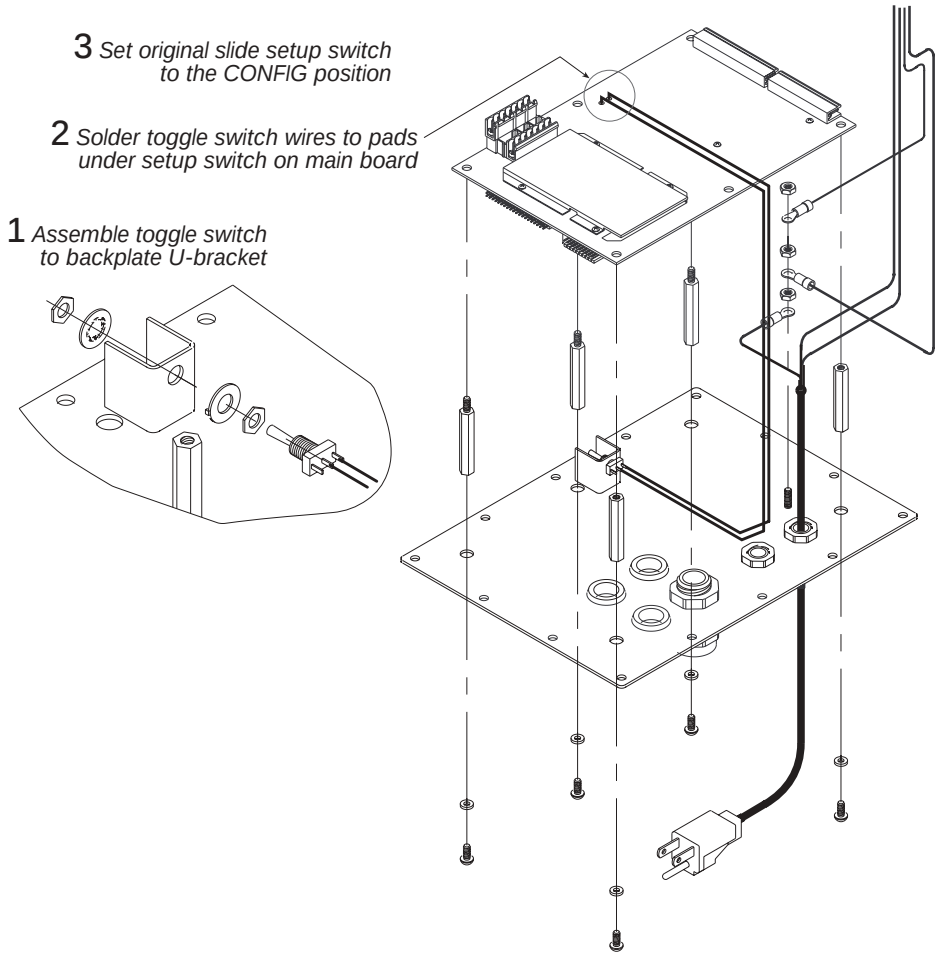


Figure 9-12. IQ plus 800 Replacement Setup Switch Installation

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Analog Output Calibration

The following calibration procedure requires a multimeter to measure voltage or current output from the analog output module.

After the IQ plus 800/810 is configured and calibrated to the scale, calibrate the analog output. Enter setup mode and go to the analog output (ALG OUT) menu (see Figure 9-13). Move down to the ALGOUT1 prompt to calibrate a single analog output module. If calibrating a second analog output, go to ALGOUT2.

NOTE: *The analog output must be calibrated **after** the indicator itself has been configured and calibrated.*

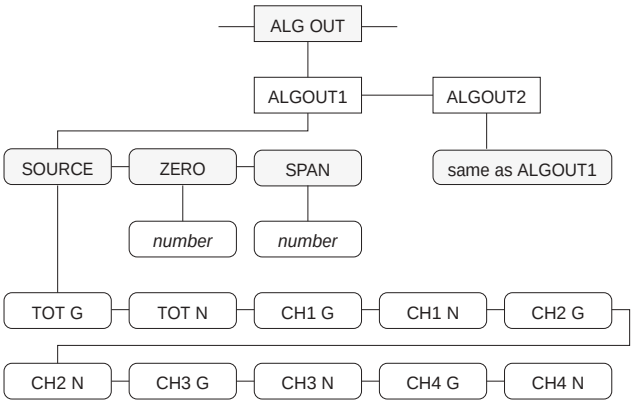


Figure 9-13. Analog Output Menu

Next, choose the source that the analog output will track. The SOURCE parameter allows selection of gross or net input from channel 1, 2, 3, 4, or the total channel. For calibration, set the SOURCE input to a channel gross input to avoid working with tare values. You can reconfigure the SOURCE input to track a net value when calibration is complete. After making your selection, move up one level, then move horizontally to the ZERO parameter to begin entering coarse zero and span values.

Entering Coarse Zero and Span Values

The coarse zero and span values give the indicator a starting point from which to begin calibration. These values must be entered before final calibration.

Coarse Zero Value: To enter the coarse zero value, move down from the ZERO prompt. If you are using 0–10 V output, enter 7.5 for the coarse zero value; if you are using 4–20 mA output, enter 3100. After entering the appropriate value, press ENTER.

Coarse Span Value: Next, the coarse span value is calculated. The calculation is based on the type of output and the weight value of the full span output.

The following values are used as constants, depending on the type of output:

- 15300 For 0–10 V output
- 12400 For 4–20 mA output

To calculate the coarse span value, divide the appropriate constant value from above by the full span weight value. For example, to calculate the coarse span value for a 0–10 V output at 5000 lb, divide 15300 (0–10 volt output constant) by the full scale output of 5000:

15300/5000 = 3.06

This calculation results in a coarse span value of 3.06. Enter this value under the SPAN prompt, then press ENTER.

Final Zero and Span Calibration

To perform final zero and span calibration, the receiving device must be connected to the indicator. Use the setup switch to return to normal weighing mode. Verify that the scale reads zero with no weight applied and shows the correct span value with the test weight. When the indicator reads correctly, use the setup switch to return to setup mode. Remain in setup mode for the following steps.

NOTE: *You may prefer to use a digital multimeter for the following steps.*

Final Zero Calibration: With the scale cleared of weight, check that the value on the receiving device reads zero. If the receiving device is showing zero, continue to the final span calibration. If the receiving device reads slightly less than zero, enter a slightly larger coarse zero value for the ZERO parameter. You may need to make several adjustments before the receiving device reads zero. If the receiving device reads slightly above zero, enter a slightly smaller number for the ZERO parameter, then check the receiving device again. Continue adjusting the coarse zero value until the receiving device reads zero.

Final Span Calibration: Put the calibration test weight back on the scale, then check the value returned to the receiving device. Remember that if the test weight is only 50% of the full span value, the analog output should be adjusted to only 50% of its span value. If the value is not correct, adjust the SPAN parameter by entering a slightly smaller or larger value as described for final zero calibration.

When final span calibration is complete, verify the zero and span output readings at the receiving device. When done, return the indicator to normal weighing mode. Calibration is now complete.

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9.12 Multiple Scale Inputs

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 ALG menu. The parameter settings (or channel selections enabling multiple channel inputs) are accessible from the CHANS submenu (see Figure 9-22 on page 82).

The channels can be selected and processed individually or as a total by pressing the SCALE # key. The red annunciators for the appropriate scales 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 power supply will support up to 32 700Ω load cells or 16 350Ω load cells, all on one channel or split between multiple channels.

Notice that only the specified channels 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 setpoint 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.

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 example, can run automatically 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 terminal strip for wiring the second scale). The second-channel sense jumpers (JP3, JP4) only appear on the dual-channel modules.

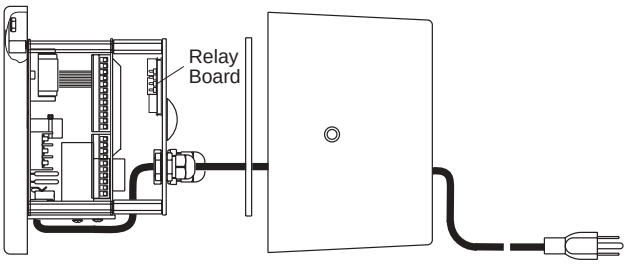
NOTE: *Consult factory when upgrading to 3- or 4-channel capability. An alternative load cell connector is required to install the expansion board in the 810SS enclosure, and may be desirable in the other IQ plus 810 models.*

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

- 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 the expansion board are no longer available.
- 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)

9.13 2- and 4-Channel Relay Boards (IQ plus 800)

2-channel and 4-channel relay boards are available for mounting inside the IQ plus 800 enclosure. The drawing below shows an installed IQ plus 800 relay board.



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9.13.1 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 0.5 amps at 50 VDC.

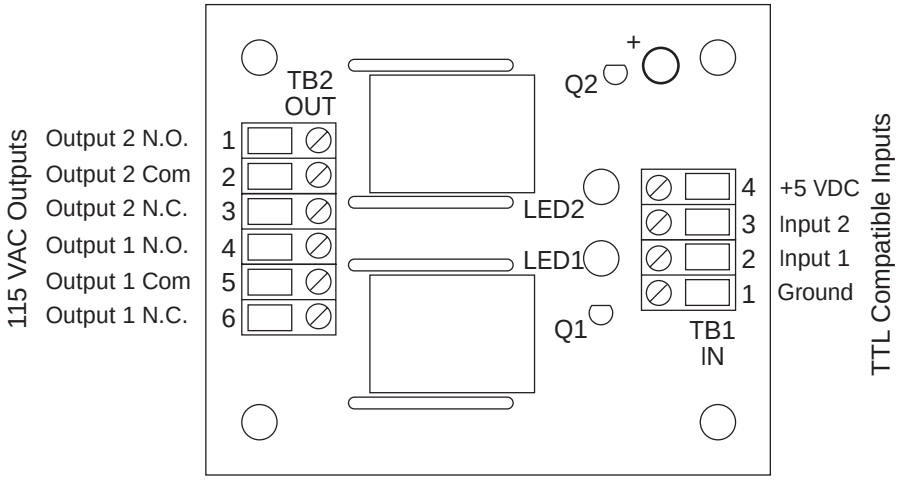


Figure 9-14. IQ plus 800 2-Channel Relay Board, PN 30549

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

Relay outputs are rated at 3 amps at 115 VAC and 0.5 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.

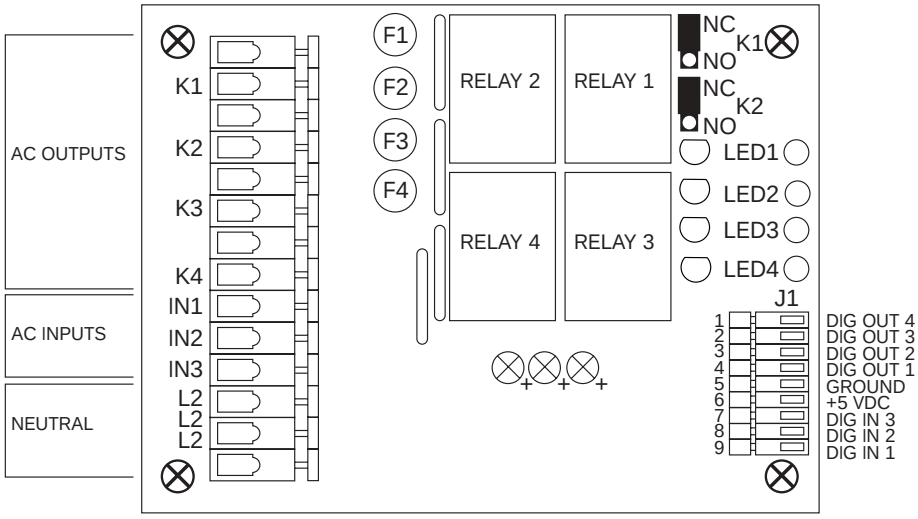


Figure 9-15. IQ plus 800 4-Channel Relay Board, PN 36080

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9.14 Setpoint Digital Output Expander

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 +5V are provided, making the outputs capable of driving TTL or 5V 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 (see Figure 9-16). 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. With the HE or SS models, it is 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.

NOTE: When assigning setpoints to the digital output 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.

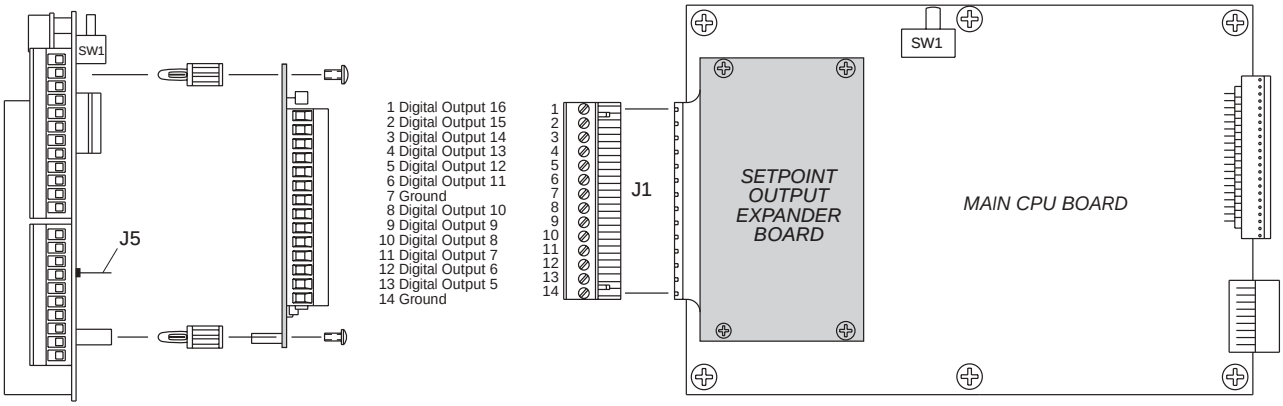


Figure 9-16. Setpoint Digital Output Expansion Board

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9.15 IQ plus 810 4- and 16-Channel Relay Racks

Relay racks can be mounted on standoffs or bolted to the main mounting panel on IQ plus 810 models to allow 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 relay board is mounted in pre-drilled holes in the panel holding the main CPU board (see Figure 9-17). For an 8-channel system, two 4-channel racks can be mounted side by side in the SS or HE models as shown in Figure 9-17.

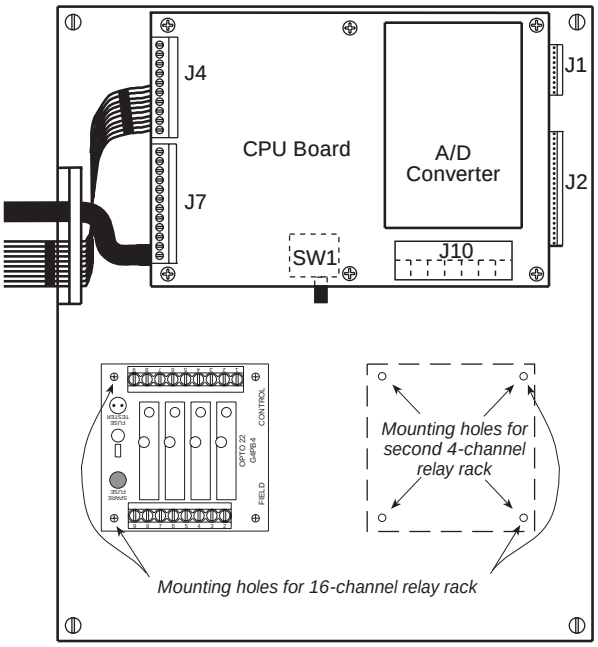


Figure 9-17. SS/HE Panel-Mounted 4-Channel Relay Rack

- On the desktop models, the relay rack is mounted on a pre-drilled plate which is installed behind the CPU board using the supplied standoffs (see Figure 9-18).

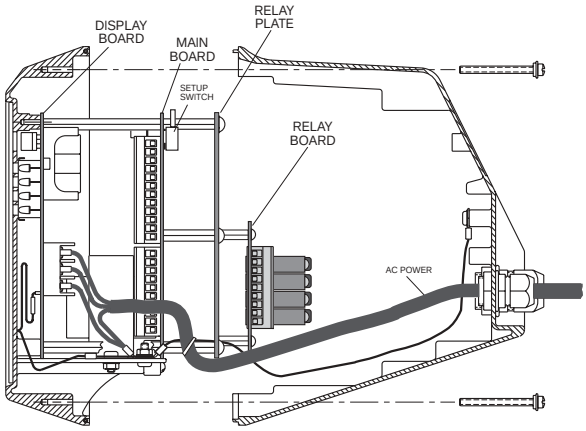


Figure 9-18. Installed 810 4-Channel Relay Board

If more relays are needed, use the optional 12 TTL Setpoint Output Expander Board, PN 19362.

The 16-channel rack mounts in same outer holes as those used for the 4-channel racks in the IQ plus 810 SS and HE models. The desktop model will not accommodate the 16-channel rack.

Wiring connections vary according to particular combinations of input and output relays chosen for the application. Sample wiring diagrams in Figures 9-19 through 9-21 on the following pages show the general wiring principles.

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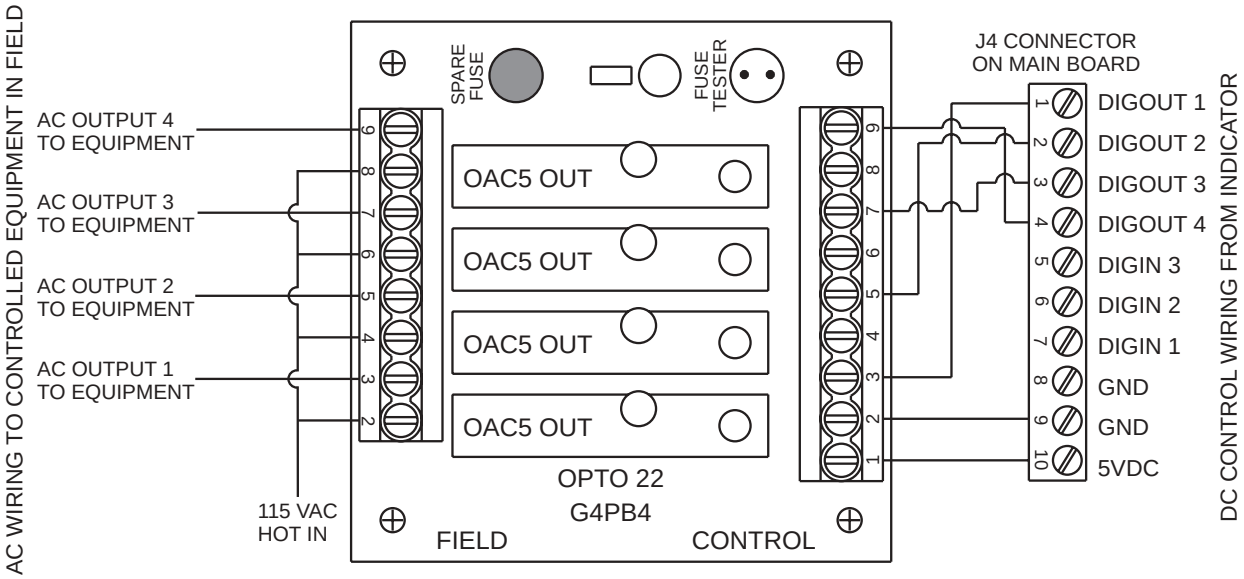


Figure 9-19. Relay Wiring for 4 AC Outputs

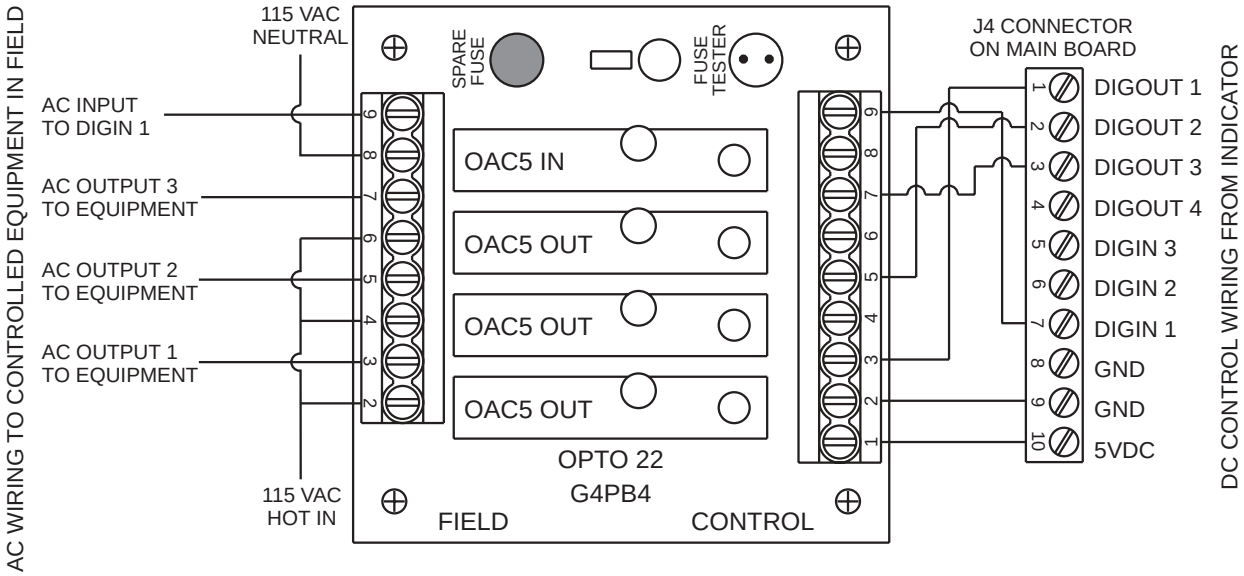


Figure 9-20. Relay Wiring for Three AC Outputs, One Input

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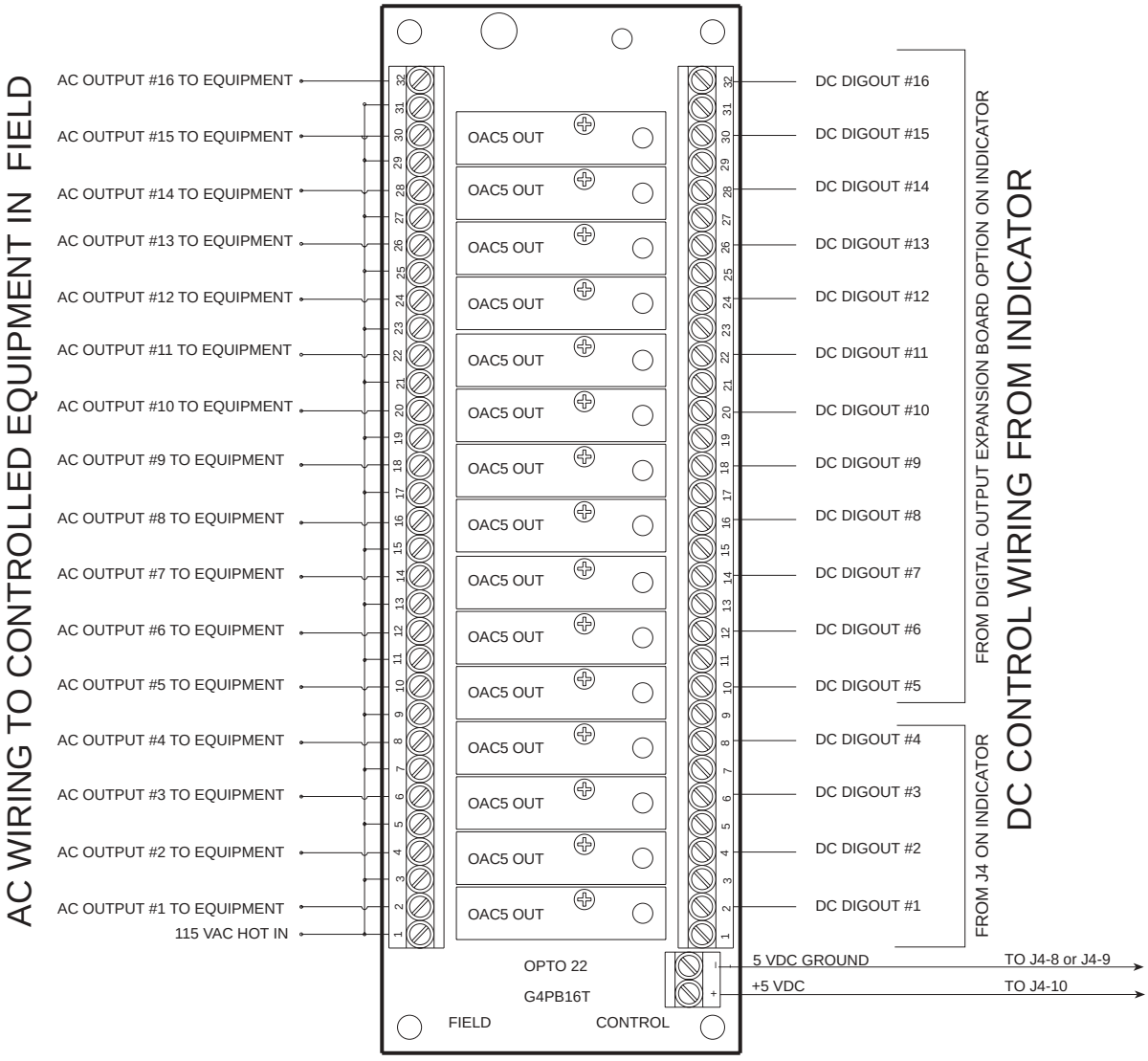


Figure 9-21. 16-Channel Relay Rack

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9.16 Jetpak™ High Speed Option

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. At startup, the unit runs through a lamp test, then displays the word *FAST* for two seconds. When setup is completed and the unit exits setup mode, the word *FAST* again flashes on the display.

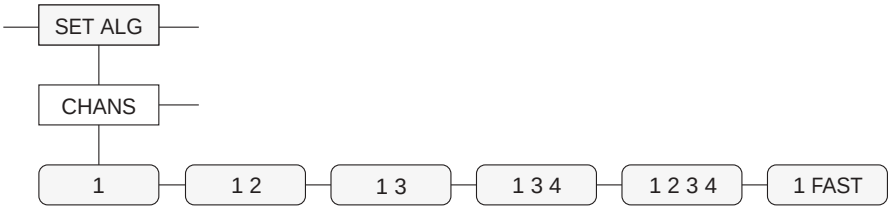


Figure 9-22. Channels Submenu: Select 1 FAST for JetPak Option

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 SET ALG menu, 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.

Maximizing Operating Speed

Operating more than two continuously-running setpoints requires intensive work from the microprocessor and typically slows the actual update rate to less than 100 per second. Batch setpoints, however, do not affect the update rate and can run at 100 updates per second.

Operations that 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, such as filtering selections that require long settling times, will also slow down the overall speed of the weighing system.

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9.17 Allen-Bradley Remote I/O Interface

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 9-23 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.

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*, PN 36254.

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

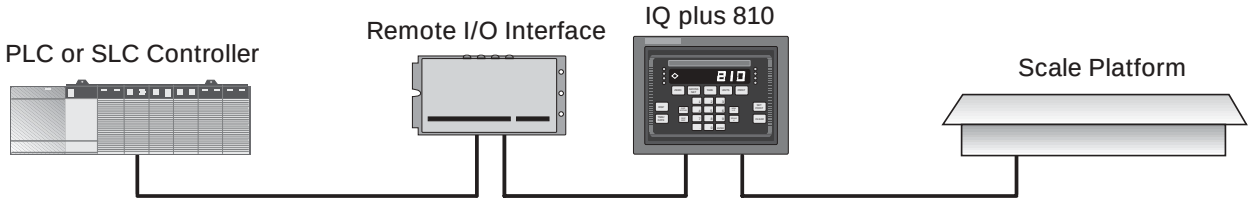


Figure 9-23. Allen-Bradley Remote I/O Interface Sample Application

9.18 Profibus Indicator Interface

The Profibus Indicator Interface allows IQ plus® 800/810 indicators to communicate with a Profibus master device using the Profibus-DP communications standard.

The Profibus Indicator Interface provides full control of indicator functions to the PLC programmer and allows indicator weight and status data to be returned to the Profibus DP network. A diskette containing the GSD file used to configure the master device is supplied with the Profibus Indicator Interface.

The Profibus Indicator Interface is housed inside the NEMA 4X stainless steel indicator 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 Profibus Indicator Interface are included in the *Profibus® DP Indicator Interface Installation and Programming Manual*, PN 50955.

Contact Rice Lake Weighing Systems for the latest technical updates to the Profibus Indicator Interface.

9.19 Dual Range Option

The IQ plus 800/810 dual range option software allows separate configuration of display divisions and decimal point location for low and high weight ranges.

The low and high ranges are established by configuring a split point. When the gross weight exceeds the specified split point value, the indicator automatically switches from the low range display division and decimal point location values to the high range values. The indicator switches back to the low range settings when the gross weight returns to center of zero.

Configuration menus, EDP commands, and operating instructions for the dual range option are provided in the *Dual Range Option* addendum, PN 53709.

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10.0 Appendix

10.1 Error Messages

If an error code appears on the display, use the information in Table 10-1 as a troubleshooting guide. If you cannot clear the error, call RLWS Service for assistance.

Be sure to check the software version (VERSION menu). In older versions with multiple scale applications, the display blanks when any scale goes over or under range.

Error Display	Description	Solution
	Over range	• Check load cell wiring, including sense jumpers. • Check configuration, including number of grads, channel selection, display divisions. • Check calibration, including W ZERO and W SPAN values. • Check for scale binding or damage. • Check for proper excitation voltage. • Call RLWS Service for assistance.
	Under range	
	A/D out of range	
	Indicator reset	In Version 3.13 and later, the indicator displays the message *RESET* at power-up when EEROM values are reset to their default values.The indicator must be reconfigured and recalibrated when these values are reset. To clear the *RESET* message, turn the indicator power off then back on, or press the CLEAR key.
	EEROM Check	Changed configuration parameters are written to the EEROM only when the indicator exits setup mode. If the indicator is powered off before exiting setup mode, changed parameters and all setpoint definitions are lost. In Version 3.13 and later, the indicator tests the latest configuration parameters against a stored checksum value to ensure that the values stored in EEROM are current. If the checksum test fails, the indicator displays the message *EEROMCK*. If the EEROMCK message is displayed, do one of the following: • To write the latest parameter values to EEROM, move the setup switch to setup mode (CONFIGURE), then back to normal mode (RUN). • To reinitialize configuration parameters and setpoint definitions, leave the indicator in normal mode and power it off, then back on.

Table 10-1. IQ plus 800/810 Error Messages

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10.2 ASCII Character Chart

Use the decimal values for ASCII characters listed in Tables 10-2 and 10-3 when specifying print format strings on the P FORMT menu. The actual character printed depends on the character mapping used by the output device.

The IQ plus 800/810 can send or receive any ASCII character value (decimal 0–255), but the characters that can be shown on the indicator are limited by the 14-segment display. Text strings formatted for display on the indicator should be limited to upper-case, unaccented characters to ensure legibility.

Control	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ctrl-@	NUL	00	00	space	32	20	@	64	40	`	96	60
Ctrl-A	SOH	01	01	!	33	21	A	65	41	a	97	61
Ctrl-B	STX	02	02	“	34	22	B	66	42	b	98	62
Ctrl-C	ETX	03	03	#	35	23	C	67	43	c	99	63
Ctrl-D	EOT	04	04	$	36	24	D	68	44	d	100	64
Ctrl-E	ENQ	05	05	%	37	25	E	69	45	e	101	65
Ctrl-F	ACK	06	06	&	38	26	F	70	46	f	102	66
Ctrl-G	BEL	07	07	’	39	27	G	71	47	g	103	67
Ctrl-H	BS	08	08	(	40	28	H	72	48	h	104	68
Ctrl-I	HT	09	09	)	41	29	I	73	49	i	105	69
Ctrl-J	LF	10	0A	*	42	2A	J	74	4A	j	106	6A
Ctrl-K	VT	11	0B	+	43	2B	K	75	4B	k	107	6B
Ctrl-L	FF	12	0C	,	44	2C	L	76	4C	l	108	6C
Ctrl-M	CR	13	0D	-	45	2D	M	77	4D	m	109	6D
Ctrl-N	SO	14	0E	.	46	2E	N	78	4E	n	110	6E
Ctrl-O	SI	15	0F	/	47	2F	O	79	4F	o	111	6F
Ctrl-P	DLE	16	10	0	48	30	P	80	50	p	112	70
Ctrl-Q	DC1	17	11	1	49	31	Q	81	51	q	113	71
Ctrl-R	DC2	18	12	2	50	32	R	82	52	r	114	72
Ctrl-S	DC3	19	13	3	51	33	S	83	53	s	115	73
Ctrl-T	DC4	20	14	4	52	34	T	84	54	t	116	74
Ctrl-U	NAK	21	15	5	53	35	U	85	55	u	117	75
Ctrl-V	SYN	22	16	6	54	36	V	86	56	v	118	76
Ctrl-W	ETB	23	17	7	55	37	W	87	57	w	119	77
Ctrl-X	CAN	24	18	8	56	38	X	88	58	x	120	78
Ctrl-Y	EM	25	19	9	57	39	Y	89	59	y	121	79
Ctrl-Z	SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
Ctrl-[	ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
Ctrl-\	FS	28	1C	<	60	3C	\	92	5C	|	124	7C
Ctrl-]	GS	29	1D	=	61	3D	]	93	5D	}	125	7D
Ctrl-^	RS	30	1E	>	62	3E	^	94	5E	~	126	7E
Ctrl-_	US	31	1F	?	63	3F	_	95	5F	DEL	127	7F

Table 10-2. ASCII Character Chart (Part 1)

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ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ç	128	80	á	160	A0		192	C0	α	224	E0
ü	129	81	í	161	A1		193	C1	β	225	E1
é	130	82	ó	162	A2		194	C2	Γ	226	E2
â	131	83	ú	163	A3		195	C3	π	227	E3
ä	132	84	ñ	164	A4		196	C4	Σ	228	E4
à	133	85	Ñ	165	A5		197	C5	σ	229	E5
å	134	86	ª	166	A6		198	C6	µ	230	E6
ç	135	87	º	167	A7		199	C7	τ	231	E7
ê	136	88	¿	168	A8		200	C8	Φ	232	E8
ë	137	89		169	A9		201	C9	Θ	233	E9
è	138	8A	¬	170	AA		202	CA	Ω	234	EA
ï	139	8B	1/2	171	AB		203	CB	δ	235	EB
î	140	8C	1/4	172	AC		204	CC	∞	236	EC
ì	141	8D	¡	173	AD		205	CD	ϕ	237	ED
Ä	142	8E	«	174	AE		206	CE	∈	238	EE
Å	143	8F	»	175	AF		207	CF	∩	239	EF
É	144	90		176	B0		208	D0	≡	240	F0
æ	145	91		177	B1		209	D1	±	241	F1
Æ	146	92		178	B2		210	D2	≥	242	F2
ô	147	93		179	B3		211	D3	≤	243	F3
ö	148	94		180	B4		212	D4	⌠	244	F4
ò	149	95		181	B5		213	D5	⌡	245	F5
û	150	96		182	B6		214	D6	÷	246	F6
ù	151	97		183	B7		215	D7	≈	247	F7
ÿ	152	98		184	B8		216	D8	°	248	F8
Ö	153	99		185	B9		217	D9	•	249	F9
Ü	154	9A		186	BA		218	DA		250	FA
¢	155	9B		187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
¥	157	9D		189	BD		221	DD	2	253	FD
Pts	158	9E		190	BE		222	DE		254	FE
f	159	9F		191	BF		223	DF		255	FF

Table 10-3. ASCII Character Chart (Part 2)

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10.3 Data Formats

10.3.1 Continuous Output Serial Data Format

If continuous transmission is configured for the EDP or printer port (STREAM parameter on the SERIAL menu), the IQ plus 800/810 sends data using the Consolidated Controls serial data format shown in Figure 10-1:

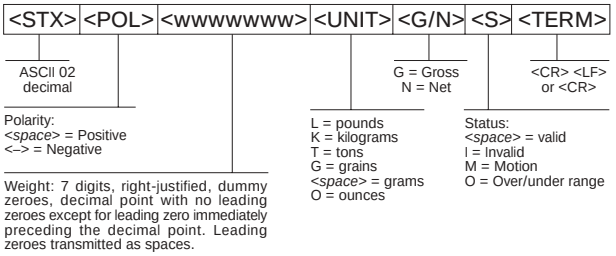


Figure 10-1. Continuous Output Serial Data Format

10.3.2 Demand Output Serial Data Format

When demand mode is configured for the EDP or printer port in the setup menus (PRNDEST on the SERIAL menu), the IQ plus 800/810 uses a data string formatted for a basic ticket printout. The particular ticket format printed depends on the indicator configuration.

You can use the EDP port or keypad to fully customize the ticket to work with a wide variety of printers, scoreboard displays, and other remote equipment. See Section 7.0 on page 54 for more information on custom print formats.

10.3.3 RS-485 Data Formats

The IQ plus 800/810 has a built-in RS-485 software protocol which is enabled when you assign an address to the indicator. The address is specified on the ADDRESS parameter on the SERIAL menu. The address is a non-zero ASCII decimal value; we recommend addresses of 65 or higher.

All remote commands are initiated using the data format shown in Figure 2-9:

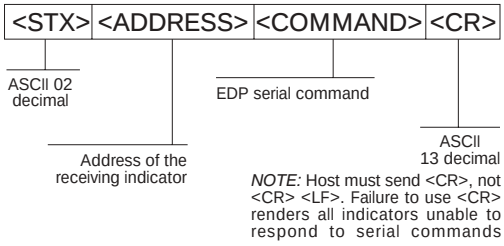


Figure 10-2. RS-485 Send Data Format

If the initiating device address matches the port address of an IQ plus 800/810 listening on the RS-485 network, that indicator responds. For example, with demand outputs, or in response to a KPRINT command, the responding indicator uses the format shown in Figure 2-10:

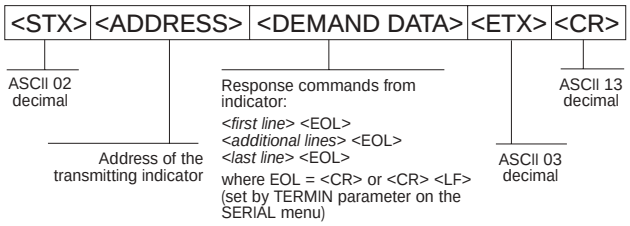


Figure 10-3. RS-485 Respond Data Format

For example, to send the remote print command, KPRINT, from an ASCII terminal to an indicator at address 65 on the RS-485 network. After consulting an ASCII chart, you determine that the keyboard equivalent for the start-of-text (STX) character is CONTROL-B. The address (65) corresponds to the capital letter “A” and the CR character is ENTER. Therefore, from the terminal you type: CONTROL-B, A, K, P, R, I, N, T, ENTER.

The indicator responds with:

```
<STX>  A    SCALE #1     <EOL>
            GROSS  1699 LB<EOL>
            04/20/87 10:05 AM<EOL>
<ETX> <CR>
```

If continuous transmission is configured for the EDP port (STREAM parameter on the SERIAL menu), the IQ plus 800/810 sends data using the data format shown in Figure 10-4:

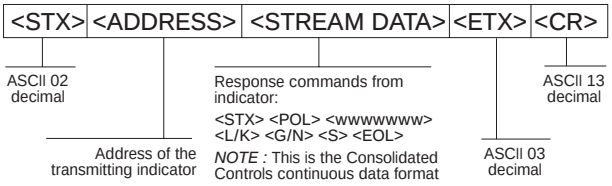


Figure 10-4. RS-485 Continuous Data Format

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10.4 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.

Secondary units can be specified on the FORMAT menu using the SECNDRY parameter, or by using EDP commands.

- To configure secondary units using the front panel menus, use Table 10-4 to find the conversion multiplier for the MULT parameter. For example, if the primary unit is pounds and the secondary unit is short tons, set the MULT parameter to 0.000500.
- To configure secondary units using EDP commands, use Table 10-4 to find the conversion multiplier for the SEC.MULT#*x* command. For example, if the primary unit for the current channel is pounds and the secondary unit is short tons, send the EDP command SEC.MULT=0.0005<CR> to set the multiplier for the secondary units.
- Long tons and metric tons units listed in Table 10-4 cannot be directly specified as primary or secondary units on the IQ plus 800/810 indicators. For these or other unlisted units of weight, specify NONE on the UNITS parameter.

NOTE: Ensure that the secondary decimal point position is set appropriately for the scale capacity in the secondary units. If the converted value requires more digits than are available, the indicator will display an overflow message. For example, if the primary units are short tons, secondary units are pounds, and the secondary decimal point is set to 8888.888, the indicator will overflow if 5 tons or more are applied to the scale. With 5 tons applied, and a conversion factor of 2000, the secondary units display needs five digits to the left of the decimal point to display the 10000 lb secondary units value.

Primary Unit	*x Multiplier*	Secondary Unit
grains	0.064799	grams
	0.002286	ounces
	0.000143	pounds
	0.000065	kilograms
ounces	437.500	grains
	28.3495	grams
	0.06250	pounds
	0.02835	kilograms
pounds	7000.00	grains
	453.592	grams
	16.0000	ounces
	0.453592	kilograms
	0.000500	short tons
	0.000446	long tons
	0.000453	metric tons
short tons	2000.00	pounds
	907.185	kilograms
	0.892857	long tons
	0.907185	metric tons
grams	15.4324	grains
	0.035274	ounces
	0.002205	pounds
	0.001000	kilograms
kilograms	15432.4	grains
	35.2740	ounces
	1000.00	grams
	2.20462	pounds
	0.001102	short tons
	0.000984	long tons
	0.001000	metric tons
metric tons	2204.62	pounds
	1000.00	kilograms
	1.10231	short tons
	0.984207	long tons
long tons	2240.00	pounds
	1016.05	kilograms
	1.12000	short tons
	1.01605	metric tons

Table 10-4. Conversion Factors

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10.5 Filtering

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

10.5.1 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 10-5, 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.

ALGFLTR Value	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

Table 10-5. Analog Filter Values

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.

10.5.2 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 shown with RT after the number in Figure 10-5) 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 eliminate much more mechanical vibration than standard digital filtering, but usually also increase settling time over standard digital filtering.

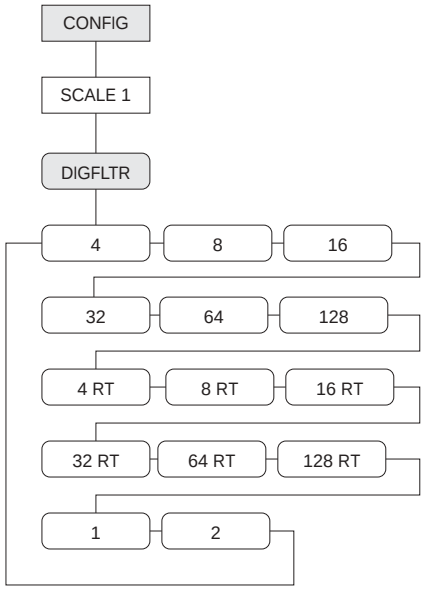


Figure 10-5. Digital Filtering Submenu

Digital filtering is most effective in eliminating effects of mechanical noise and vibrations when combined with analog filtering. 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 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.

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10.6 Software Revision History

Version 3.1 software for the IQ plus 800/810 is based on Version 3.0, which is documented in the previous version of this manual, PN 30262.

The following list summarizes software changes made for Version 3.1.

Front Panel Keys and LEDs

The following changes were made to the front panel key and LED functions for Version 3.1:

- Lb/Kg LED functions changed to better reflect actual units displayed.
- SETPOINT key now displays only defined setpoints. Setpoints set off at the front panel using the SETPOINT and CLEAR keys can now be set on using the ENTER key.
- TARE key function changed to put the indicator in gross mode and clear the tare when a keyed tare of zero is entered.
- Alphanumeric character entry changed to simplify character editing. See the description of the P FORMT menu on for more information.

Configuration Menus

The following changes were made to the configuration menus for Version 3.1:

CONFIG Menu

- PWRUP parameter name changed to PWRUPMD
- 200TARE parameter name changed to TARE200
- LGLMODE parameter added
- A/B value added under FEATURE parameter
- DEFAULT parameter added (Revision 3.13)

SET ALG Menu

Default for TOTALS parameter changed to OFF, regardless of number of channels configured.

FORMAT Menu

- TOTAL parameter moved between SCALE4 and DATE. SCALE1 now the first second-level parameter under FORMAT
- UNITS and SPNAME parameters added

SERIAL Menu

- ABSTRM optional parameter added for Remote I/O data streaming

P FORMT Menu

Changed to allow character editing at the first level.

DIGIN Menu

Default values for DIGIN 1 and DIGIN 2 changed to BATSTRT and BATRUN, respectively.

Setpoint Processing

- Automatic reset for COUNTER setpoints
- No limit to number of TIMER and CONCUR setpoints
- Front panel entry of setpoint names supported on SPNAME parameter
- Changing setpoint KIND resets all setpoint values
- DIGOUTS changed for continuous setpoints using TRIP parameter with INBAND/OUTBAND specified
- BATSTRT DIGIN dependency on BATRUN removed
- ALARM and HYSTER parameters for batch setpoints
- Enhanced batch status messages
- Batching automatically stopped when indicator placed in setup mode
- When batch setpoint trips, subsequent setpoints are evaluated immediately

Truck Modes

- Accumulator function for truck program
- Single-transaction tare weights and IDs supported in stored-ID truck modes

Print Formatting

New P FORMT menu structure allows editing of print formats on the first menu level. Extended print format commands added for print formats using displayed, alternate, primary, and secondary units.

Consecutive number handling changed to increment value only when print format includes <CN> format command.

DA4 and TD4 print formatting commands added to support printing of four-digit year (Revision 3.13).

EDP Commands

Several new EDP commands were added for Version 3.1 for EDP port control of keyboard lockout, digital outputs, and batching.

- LOCKON/LOCKOFF commands added
- DON/DOFF commands added
- BATSTART, BATRESET, BATPAUSE, and BATSTATUS batching control commands added

Error Messages

Two new display messages were added to Version 3.13, *EEROMCK* and *RESET*. These messages are described in Section 10.1 on page 84.

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10.7 Specifications

Power

Line Voltages	115 or 230 VAC (+10%/–15%)
Frequency	50 or 60 Hz
Power Consumption	12 VA with minimum configuration, 30 VA with all options
Fusing	115 VAC operation: 0.25 A Slo-Blo radial lead subminiature fuse (PN 35993) 230 VAC operation: 0.125 A Slo-Blo radial lead subminiature fuse (PN 35994)

Analog Specifications

Full Scale Input Signal	5 – 39 mV including deadload
Analog Signal Input	0.6 mV/V – 3.9 mV/V
Analog Signal Sensitivity	0.3 μV/graduation minimum, 1.0 μV/grad recommended
Input Impedance	> 10 MΩ
Noise (ref 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
Calibration Method	Software through front panel, voltage and weight constants stored in EEPROM
Common Mode Voltage	± 4 V, referred to earth
Common Mode Rejection1	40 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
Digital Filter	Software selectable: Off, 1, 2, 4, 8, 16, 32, 64, 128 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, voltage or current output,14-bit resolution. Voltage output: 0 –10 VDC Load resistance:1kΩ minimum Current output: 4–20 mA External loop resistance: 500Ω maximum

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
Digital Output Expander	Optional: 12 additional 250 mA sink, 40 VDC withstand

Serial Communications

EDP Port	19200, 9600, 4800, 2400, 1200, 600, 300 bps. Full duplex RS-232, simplex 20 mA current loop. Optional duplex 20 mA, RS-485
Printer Port	19200, 9600, 4800, 2400, 1200, 600, 300 bps. Simplex RS-232, or simplex 20 mA current loop
Both Ports	RS-232 or 20 mA current loop standard; 7 or 8 data bits; even, odd, or no parity

Operator Interface

Display	14 mm (0.55 inch), 14-segment vacuum fluorescent, 7 full digit display. Decimal point available at each digit. 8 LED annunciators
Additional Symbols	Tare, entered tare, tare in system, standstill, net, gross, center of zero, minus sign, lb, kg, entry mode
Keyboard	25-key flat membrane panel
Bar Graph	Optional: 48-segment display tracks setpoint, net or gross weight

Environmental

Operating Temperature	–10 to +40°C (legal range) –10 to +50°C (industrial range)
Storage Temperature	–25 to +70°C, limited by battery life

Mechanical

Overall Dimensions:

800	10.0" W, 7.75" H, 6.0" D
810	11" W, 8.5" H, 8.5" D
810 HE	16" W, 17.5" H, 8" D
810 SS	12.6" W, 15.5" H, 6.3" D

Weight:

800	12.0 lb
810	15.0 lb
810 HE	17.3 lb
810 SS	24.0 lb

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Enclosure Classification:

800	NEMA 4X
810	NEMA 4
810 HE/SS	NEMA 4X

Enclosure Materials:

800	Stainless steel
810	Die-cast zinc
810 HE	Fiberglass Reinforced Polyester (FRP)
810 SS	Stainless steel

Certifications and Approvals

NTEP

CoC Number: 92-013

Accuracy Class: III/III L

n_{max} : 10 000

Measurement Canada

Approval: AM-4840

Accuracy Class:

III n_{max} : 10 000

IIIHD n_{max} : 20 000

UL

File Number: E207758

Requires control panel approval

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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:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- 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.
- Examination of such equipment by RLWS confirms that the nonconformity 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.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- 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.

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