IQ plus® 710

Digital Weight Indicator

Version 2.1

Installation Manual

REVOLUTION® SCALE SOFTWARE

ROCKWELL AUTOMATION ENCOMPASS™ THE AMERICAS

RICE LAKE® WEIGHING SYSTEMS

To be the best by every measure®

64505

Contents

About This Manual

This manual is intended for use by service technicians responsible for installing and servicing IQ plus® 710 digital weight indicators.

This manual applies to indicators using Version 2.1 of the IQ plus 710 software. See Section 10.9 on page 73 for a summary of software changes included in this release.

Configuration and calibration of the indicator can be accomplished using the indicator front panel keys, the EDP command set, or Version 3.0 or later of the Revolution™ configuration utility (Revolution III). See Section 3.1 on page 14 for information about configuration methods.

Caution *Some 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.ricelake.com*.

The *Operator Card* included with this manual provides basic operating instructions for users of the IQ plus 710. Please leave the *Operator Card* with the indicator when installation and configuration are complete.

1.0 Introduction

The IQ plus 710 is a single-channel digital weight indicator housed in a NEMA 4X/IP66-rated stainless steel enclosure. The indicator front panel consists of a 29-button keypad with a large, seven-digit, 14-segment, vacuum fluorescent display, two-character dot-matrix annunciator field, and a sixteen-character dot-matrix prompt field. Features include:

- Drives up to eight 350Ω or sixteen 700Ω load cells
- Supports 4- and 6-wire load cell connections
- Eight configurable digital inputs
- Eight digital outputs
- Electronic data processing (EDP) port for full duplex RS-232 or RS-485 communications at up to 19200 bps
- Printer port for full duplex RS-232 and output-only 20 mA current loop communications at up to 19200 bps
- Optional analog output module provides 0–10 VDC or 4–20 mA tracking of gross or net weight values
- Optional Remote I/O Interface for communication with PLC® and SLC™ controllers using the Allen-Bradley® Remote I/O networks[1]
- Optional interface for Profibus® DP network communications[2]
- Available in 115 VAC and 230 VAC versions

The IQ plus 710 is NTEP-certified for Classes III and III L at 10,000 divisions. See Section 10.10 on page 74 for more information about NTEP and OIML certifications and Measurement Canada approval.

1.1 Operating Modes

The IQ plus 710 has three modes of operation:

Normal mode

Normal mode is the weighing mode of the indicator. The indicator displays gross, net, or tare weights as required, using the secondary display to indicate scale status and the type of weight value displayed. Once configuration is complete and a legal seal is affixed to the back of the indicator, this is the only mode in which the IQ plus 710 can operate.

Setup mode

Most of the procedures described in this manual require the indicator to be in setup mode, including configuration and calibration.

To enter setup mode, remove the large fillister head screw from the enclosure backplate. Insert a screwdriver or a similar tool into the access hole and press the setup switch once. The indicator display changes to show the word *CONFIG*.

Test mode

Test mode provides a number of diagnostic functions for the IQ plus 710 indicator. Like setup mode, test mode is entered using the setup switch. See Section 10.8 on page 72 for more information about entering and using test mode.

1. Allen-Bradley®, PLC®, and SLC™ are trademarks of Allen-Bradley Company, Inc., a Rockwell International company.
2. Profibus® is a registered trademark of Profibus International.

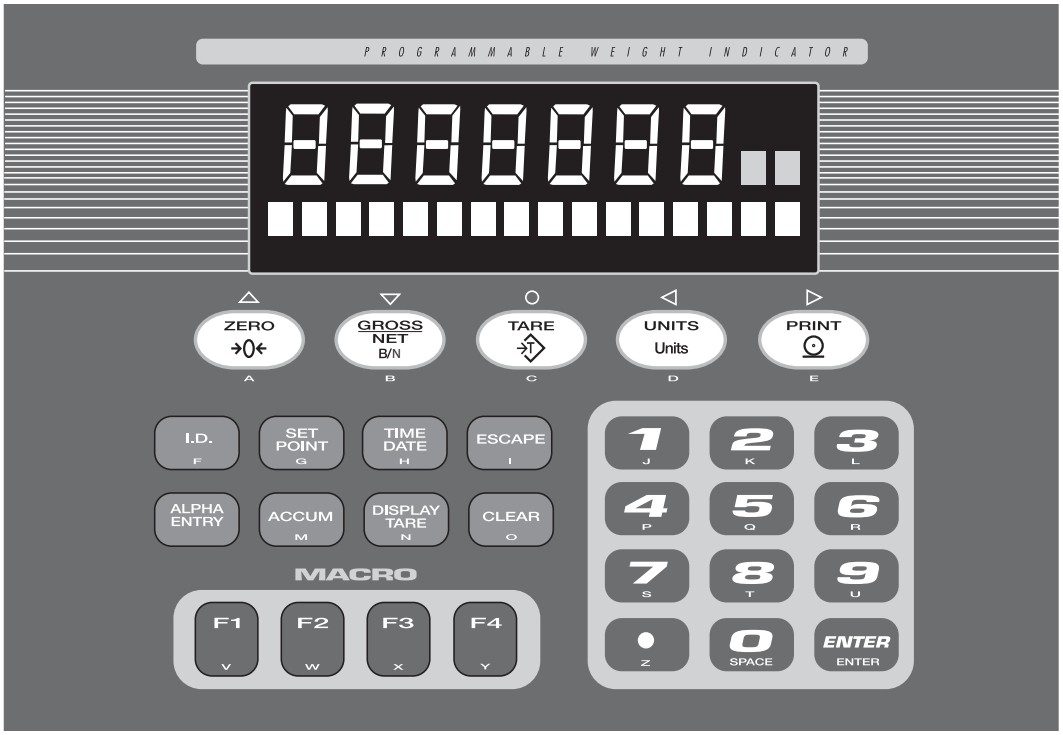

Figure 1-1. IQ plus 710 Front Panel

1.2 Front Panel Display

Figure 1-1 shows the IQ plus 710 front panel keys and the key functions assigned in normal mode.

The IQ plus 710 display is divided into three areas (see Figure 1-2):

- The primary display consists of seven large, 14-segment digits used to display weight data.
- A two-digit annunciator shows the units associated with the displayed value: lb=pounds, kg=kilograms, oz=ounces, T=short tons, t=metric tons, LT=long tons, g=grams, GN=grains. When the units configured are troy pounds or troy ounces, the word **troy** is shown in the secondary display area in addition to the **lb** or **oz** annunciator. The units can also be set to NONE (no units information displayed).
- The two-digit annunciator also displays whether the indicator is in numeric entry (NE) or alpha entry (AE) mode for some operations.

The 16-digit secondary display is used to display the weighing mode (Gross/Brutto or Net) and status indicators, including standstill (◣◢) and center of zero (→0←).

The symbols shown over the keys in Figure 1-1 (representing up, down, enter, left, right) describe the key functions assigned in setup mode. In setup mode, the keys are used to navigate through menus, select digits within numeric values, and increment/decrement values. See Section 3.1.3 on page 15 for information about using the front panel keys in keys in setup mode.

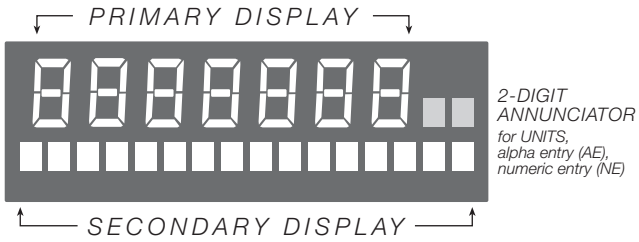

Figure 1-2. IQ Plus 710 Front Panel Display Areas

1.3 Indicator Operations

Basic IQ plus 710 operations are summarized below:

1.3.1 Toggle Gross/Net Mode

Press the GROSS/NET key to switch the display mode from gross to net, or from net to gross. If a tare value has been entered or acquired, the net value is the gross weight minus the tare. If no tare has been entered or acquired, the display remains in gross mode.

Gross mode is indicated by the word **Gross** (or **Brutto** in OIML mode) on the secondary display; net mode is indicated by the word **Net**.

1.3.2 Toggle Units

Press the UNITS key to switch between primary and secondary units. The units identifier is shown to the right of the primary display. Troy ounces and troy pounds are indicated by the word **troy** on the secondary display.

1.3.3 Zero Scale

1. In gross mode, remove all weight from the scale and wait for the standstill annunciator (◣◢).
2. Press the ZERO key. The center of zero (→0←) annunciator lights to indicate the scale is zeroed.

1.3.4 Acquire Tare

1. Place container on scale and wait for the standstill annunciator (◣◢).
2. Press the TARE key to acquire the tare weight of the container.
3. Display shifts to net weight and shows the word **Net** on the secondary display.

To display the current tare value, press the DISPLAY TARE key.

1.3.5 Remove Stored Tare Value

1. Remove all weight from the scale and wait for the standstill annunciator (◣◢).
2. Press the TARE key (or, in OIML mode, the ZERO key). Display shifts to gross weight and shows the word **Gross** on the secondary display.

1.3.6 Print Ticket

1. Wait for the standstill annunciator (◣◢).
2. Press the PRINT key to send data to the serial port.

1.3.7 Display or Change Time and Date

To display the date, press the TIME/DATE key once; press TIME/DATE a second time to display the time.

To set the date, press the TIME/DATE key once. Use the numeric keypad to enter the date, then press the ENTER key. The date must be entered in the date format configured for the indicator: *MMDDYY*, *DDMMYY*, or *YYMMDD*.

To set the time, press the TIME/DATE key twice. Use the numeric keypad to enter the time in 24-hour format, then press the ENTER key.

1.3.8 Display or Change Setpoint Value

To display a setpoint value, use the numeric keypad to enter the setpoint number, then press the SETPOINT key. Or, you can display a setpoint value by pressing the SETPOINT key a number of times equal to the setpoint number. For example, to display the value of setpoint 4, press the SETPOINT key four times.

To change the setpoint value, display the current value, then use the numeric keypad to enter the new value and press the ENTER key.

NOTE: *Some indicator configurations may not allow setpoint values to be changed through the front panel or may require a password to display or change the setpoint value.*

1.3.9 Turn Setpoint On or Off

To turn a setpoint off at the front panel, use the numeric keypad to enter the setpoint number, then press the SETPOINT key (or, press the SETPOINT key a number of times equal to the setpoint number). With the correct setpoint displayed, press CLEAR to turn the setpoint off.

To re-enable a setpoint on that has been turned off at the front panel, press the SETPOINT key until the correct setpoint is displayed, then press ENTER to turn the setpoint back on.

NOTE: Some indicator configurations may not allow setpoints to be turned off through the front panel or may require a password to turn the setpoint on and off.

1.3.10 Display or Clear Accumulator

If the accumulator function is enabled, the current net weight is added to the accumulator each time the indicator performs a print operation.

- To display the current accumulator value, press the ACCUM key.
- To clear the accumulator, press ACCUM to show the current value, then press the CLEAR key twice to reset the accumulator.

2.0 Installation

This section describes procedures for connecting load cells, digital I/O, and serial communications cables to the IQ plus 710 indicator. Instructions for field installation of the analog output option and replacement of the CPU board are included, along with assembly drawings and parts lists for the service technician.

Caution

- *Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.*
- *This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicator must be performed by qualified service personnel only.*
- *The supply cord serves as the power disconnect for the IQ plus 710. The power outlet supplying the indicator must be installed near the unit and be easily accessible.*

2.1 Unpacking and Assembly

Immediately after unpacking, visually inspect the IQ plus 710 to ensure all components are included and undamaged. The shipping carton should contain the indicator with attached tilt stand, this manual, and a parts kit. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

The parts kit contains the items listed below:

- Capacity and identification labels.
- Two 8-32NC x 7/16 fillister head screws (PN 30623). These screws occupy the holes above and on either side of the setup screw on the indicator backplate (see Figure 2-5 on page 8).
- Ten 8-32NC x 3/8 machine screws (PN 14862) for the indicator backplate (see #29 in Figure 2-9 on page 13).
- Twelve bonded sealing washers (PN 45042) for backplate screws included in the parts kit.
- Four cord grip reducing glands (PN 15664).
- Four rubber bumpers (“feet”) for the tilt stand, PN 42149.
- 6-position screw terminal (PN 70599) for connector J1; two 7-position screw terminals (PN 70600) for connectors J4 and J12; two 10-position screw terminals (PN 70601) for connectors J7 and J8.
- One kep nut (PN 14676) for grounding cable shield wires against the backplate.

2.2 Enclosure Disassembly

The indicator enclosure must be opened to connect cables for load cells, communications, digital inputs, digital outputs, and analog output.

Warning *The IQ plus 710 has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.*

Ensure power to the indicator is disconnected, then place the indicator face-down on an antistatic work mat. Remove the screws that hold the backplate to the enclosure body, then lift the backplate away from the enclosure and set it aside.

NOTE: With the backplate removed, check the battery to ensure it has not been jarred loose from the battery holder (B1) in shipping.

2.3 Cable Connections

The IQ plus 710 provides five cord grips for cabling into the indicator: one for the power cord, three to accommodate communications, digital I/O, and analog output cables, and one metal cord grip for the load cell cable. The three nylon cord grips come with a plug installed to prevent moisture from entering the enclosure. Depending on your application, remove the plug from any cord grip that will be used and install cables as required.

Except for the power cord and load cell cables, all cables routed through the cord grips should be grounded to the ground stud on the indicator backplate.

2.3.1 Load Cells

To attach cable from a load cell or junction box, use the following procedure to cable through the metal cord grip:

1. Disconnect indicator from power source.
2. Place indicator face-down on an antistatic work mat. Remove screws that hold the backplate to the enclosure body.
3. Loosen cord grips, then route cables through the stainless steel cord grip. Determine cable length required to reach connector J1. Mark the cable at the inside edge of the cord grip (see Figure 2-1 on page 5).

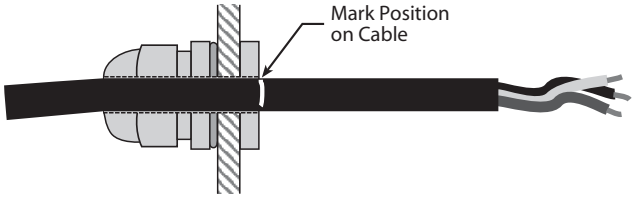

Figure 2-1. Mark Length of Cable at Inside of Cord Grip

4. Remove cable from cord grip. Strip insulation from the marked position to the end of the cable.
5. For cables with braided shielding, cut the shield at the same location as the insulation, then strip an additional 15 mm of insulation from the cable to allow the shield to contact the inside of the metal cord grip (see Figure 2-2).

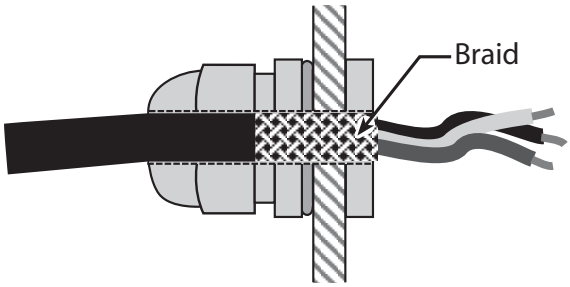

Figure 2-2. Braided Shield Cabling

For cables with foil-type shielding, strip an additional 15 mm of insulation from the cable. Cut the foil shield at a location about 15 mm *inside* the enclosure, then fold the foil shield back on the cable (see Figure 2-3). Ensure silver (conductive) side of foil is turned outward for contact with the metal cord grip.

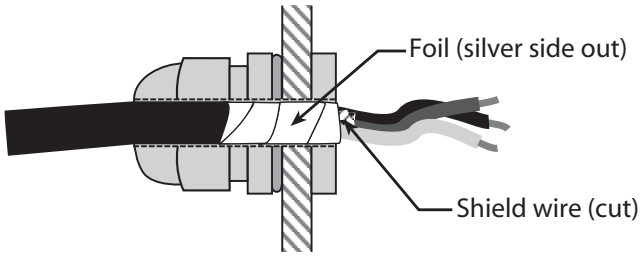

Figure 2-3. Foil Shielded Cabling

6. Cut the shield wire just inside the enclosure (see Figure 2-3). Shield wire function is provided by contact with the metal cord grip.
7. Route cables through cord grip so cable shield contacts cord grip fitting as shown in Figures 2-2 and 2-3. Tighten cord grip.
8. Next, remove connector J1 from the board. The connector plugs into a header on the board (see Figure 2-4). Wire the load cell cable from the load cell or junction box to connector J1 as shown in Table 2-1.

J1 Pin	Function
1	+SIG
2	–SIG
3	+SENSE
4	–SENSE
5	+EXC
6	–EXC
For 6-wire load cell connections, remove jumpers JP1 and JP2.	

Table 2-1. J1 Pin Assignments

9. If using 6-wire load cell cable (with sense wires), remove jumpers JP1 and JP2 before reinstalling connector J1. For 4-wire installation, leave jumpers JP1 and JP2 on.
10. Finish installation using cable mounts and ties to secure cables inside of indicator enclosure.

When connections are complete, reinstall connector J1 onto the header so that it snaps securely into place. Use two cable ties to secure the load cell cable to the inside of the enclosure.

Setting the Load Cell Compensation Jumper

The load cell compensation jumper JP5 (near the transformer on the CPU board; see Figure 2-4) must be set ON for load cells with unbalanced bridges. The compensation jumper has the effect of lowering the positive excitation voltage. Uncompensated unbalanced load cells can cause instability or calibration errors.

For RL1040 and RL1042 load cells, set the compensation jumper as follows:

- RL1040 load cells: jumper OFF
- RL1042 load cells: jumper ON

For other load cell types, use the following procedure to determine the correct jumper position;

1. Disconnect load cell from indicator and use an ohmmeter to measure the following:
   - +EXC to +SIG, +EXC to –SIG
   - –EXC to +SIG, –EXC to –SIG

   Measured values between the excitation line and each of the signal lines should be within 2–3Ω.
2. If the +EXC measurements are Š 5% larger than the –EXC measurements, set the compensation jumper in the ON position. If the +EXC measurements are < 5% greater (or are less) than the –EXC measurements, set the jumper in the OFF position.

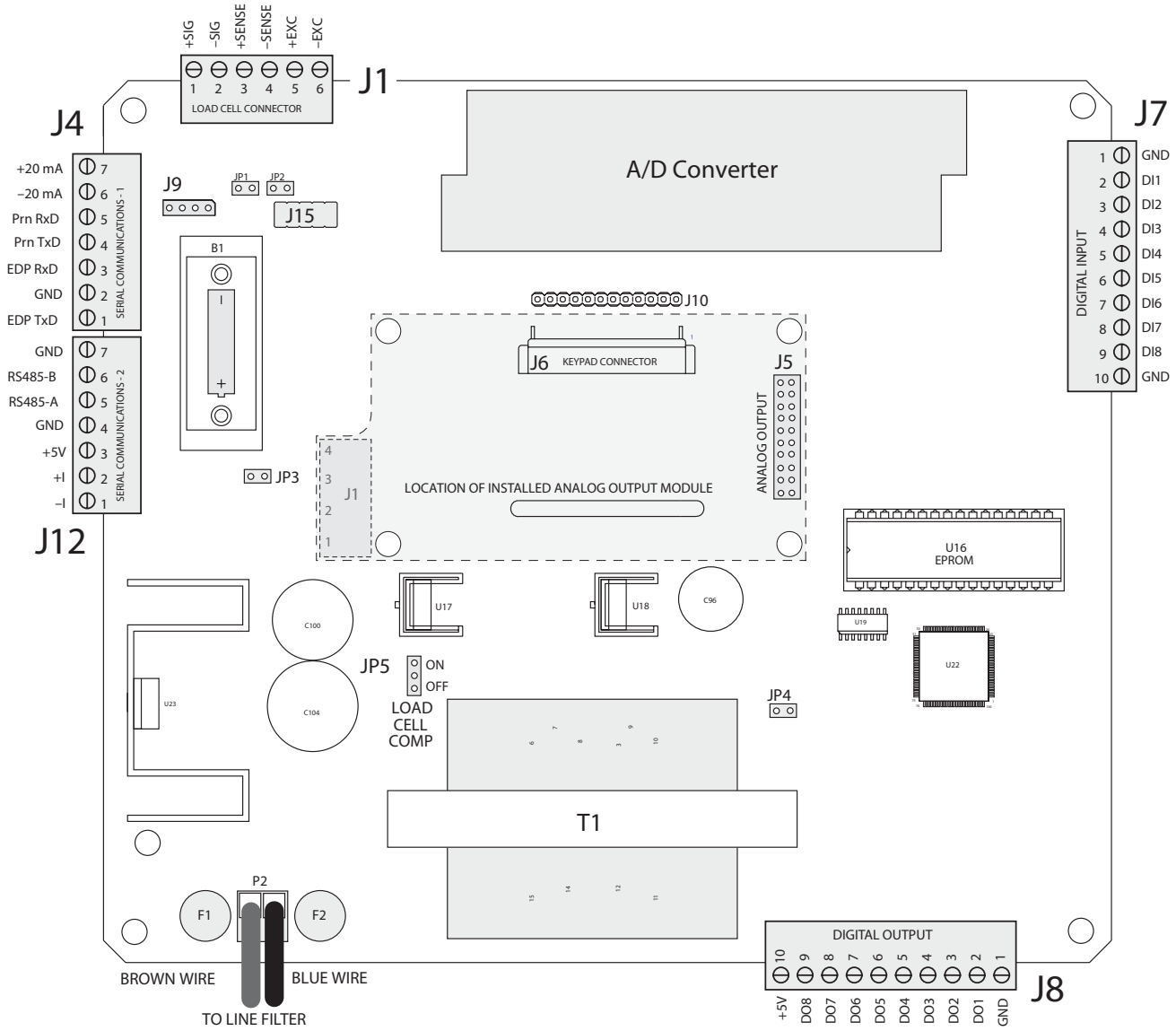

Figure 2-4. IQ plus 710 CPU and Power Supply Board, Version 2.1

2.3.2 Serial Communications

To attach serial communications cables, remove connector J4 or J12 from the board. Connector J4 provides connections for the EDP (Electronic Data Processing) port, printer port, and 20 mA current loop transmit signals; connector J12 provides RS-485 signals. Table 2-2 shows the pin assignments for connectors J12 and J4.

Once cables are attached, reconnect J12 or J4 to the header on the board. Use cable ties to secure serial cables to the inside of the enclosure.

The EDP port supports RS-232 or RS-485 communications; the printer port provides active 20 mA output and full-duplex RS-232 communications. Both ports are configured using the SERIAL menu. See Section 3.0 on page 14 for configuration information.

Connector	Pin	Signal
J4	1	EDP TxD
	2	GND
	3	EDP RxD
	4	Printer TxD
	5	Printer RxD
	6	Printer –20 mA TxD
	7	Printer +20 mA TxD
J12	1	*Reserved*
	2	*Reserved*
	3	+5V
	4	GND
	5	RS485-A
	6	RS485-B
	7	GND

Table 2-2. J4 and J12 Pin Assignments

2.3.3 Digital I/O

Digital inputs can be set to provide many indicator functions, including all keypad functions. Digital inputs are active (on) with low voltage (0 VDC), inactive (off) at 5 VDC. Use the DIG IN menu to configure the digital inputs.

Digital outputs are typically used to control relays that drive other equipment. Outputs are designed to sink, rather than source, switching current. Each output is a normally open collector circuit, capable of sinking 250 mA when active. Digital outputs are wired to switch relays when the digital output is active (low, 0 VDC) with reference to a 5 VDC supply.

Up to eight relays can be mounted inside the flat front enclosure; up to four relays can be mounted inside the sloped front enclosure. Use the SETPTS menu to configure digital outputs.

Table 2-3 shows the pin assignments for connectors J7 and J8.

Pin	J7 Signal	J8 Signal
1	GND	GND
2	DI1	DO1
3	DI2	DO2
4	DI3	DO3
5	DI4	DO4
6	DI5	DO5
7	DI6	DO6
8	DI7	DO7
9	DI8	DO8
10	GND	+5V

Table 2-3. J7 and J8 Pin Assignments (Digital I/O)

2.3.4 Analog Output

If the optional analog output module is installed, attach the output cable to connector J1 on the analog output board. Table 2-4 lists the analog output pin assignments.

Use the ALGOUT menu to configure and calibrate the analog output module when cabling is complete. See Section 2.4 for information about installing the analog output module.

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

Table 2-4. Analog Output Module Pin Assignments

2.4 Analog Output Module Installation

To install or replace the analog output module, follow the steps listed in Section 2.2 on page 4 for opening the IQ plus 710 enclosure.

Mount the analog output module on its standoffs in the location shown in Figure 2-4 on page 6 and plug the module input into connector J5 on the IQ plus 710 board. Connect the output cable to the analog output module as shown in Table 2-4, then reassemble the enclosure (Section 2.5).

See Section 10.7 on page 71 for analog output calibration procedures.

2.5 Enclosure Reassembly

Once cabling is complete, position the backplate over the enclosure and reinstall the backplate screws. Use the torque pattern shown in Figure 2-5 to prevent distorting the backplate gasket. Torque screws to 10 in-lb (1.13 N-m).

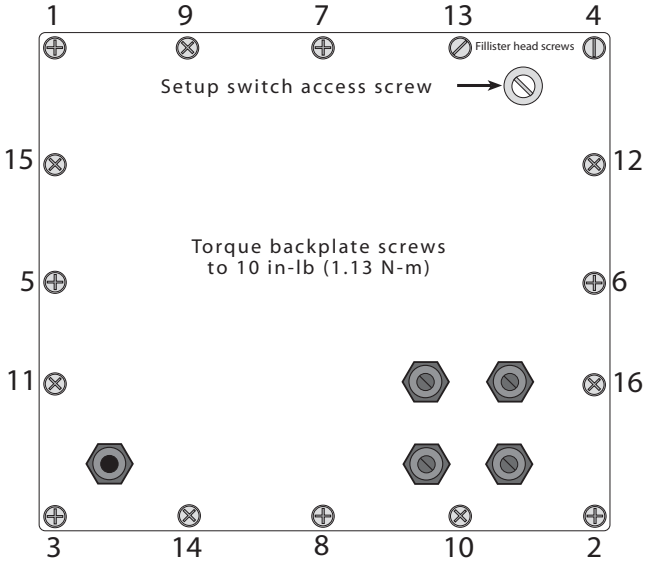

Figure 2-5. IQ plus 710 Enclosure Backplate

2.6 Board Removal

If you must remove the IQ plus 710 CPU board, use the following procedure:

1. Disconnect power to the indicator. Loosen cord grips and remove backplate as described in Section 2.2 on page 4.
2. Unplug connectors J1 (load cell cable), J4 and J12 (serial communications), J7 and J8 (digital I/O), J6 (keypad ribbon cable), and JP4 (setup switch). If an analog output board is installed, disconnect the analog output cable. See Figure 2-4 on page 6 for connector locations.
3. Remove the standoff and three nuts from the corners of the CPU board.
4. Cut the cable tie that holds the line filter load wires to the enclosure.
5. Lift the board off of its spacers just far enough to access the setscrews that secure the line filter load wires at connector P2. Use a small screwdriver to loosen the setscrews and disconnect power to the board.
6. Remove the CPU board from the enclosure.

To replace the CPU board, reverse the above procedure. Be sure to reinstall cable ties to secure all cables inside the indicator enclosure.

2.7 Battery Replacement

The lithium battery on the CPU 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 prompts, truck ID storage, and keyboard locks. 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 below 3.1 VDC. The battery should last a minimum of one year. Therefore, in critical applications, replace the battery every twelve months.
- Use the Revolution™ configuration utility or EDP commands (see Section 5.2 on page 48) 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.

Caution *Risk of explosion if battery is replaced with incorrect type. Dispose of batteries per manufacturer instruction.*

2.8 Replacement Parts

Table 2-5 lists replacement parts for the IQ plus 710, including all parts referenced in Figures 2-6 through 2-10.

Ref Number	PN	Description (Quantity)	Figure
1	41397	Enclosure, sloped front (1)	Figure 2-9 on page 13
	41401	Enclosure, flat front (1)	
2	41398	Enclosure backplate (1)	Figure 2-6 on page 10
3	14626	Kep nuts, 8-32NC hex (13)	Figure 2-9 on page 13
4	30375	Nylon seal rings for cable grips (3)	Figure 2-6 on page 10
5	14621	Kep nuts, 6-32NC hex (4–flat enclosure; 6–sloped)	Figure 2-8 on page 12
6	15626	Cable grips, PG9 (3)	Figure 2-6 on page 10
7	15627	Locknuts, PCN9 (3)	
8	15650*	Cable tie mounts (8)	Figure 2-7 on page 11
10	19538	Cable grip plugs (3)	Figure 2-6 on page 10
11	44676	Sealing washer for setup switch access screw (1)	
12	42640	Setup switch access screw, 1/4 x 28NF x 1/4 (1)	
13	41965	Power cord assembly, 115VAC (1)	
	45254	Power cord assembly, 230VAC (1)	
15	16892	Ground/Earth label (1)	Figure 2-7 on page 11
16	45402	Bezel, sloped front (1)	Figure 2-9 on page 13
	41399	Bezel, flat front (1)	
17	41386	Switch panel membrane (1)	Figure 2-9 on page 13
18	41400	Backplate gasket (1)	Figure 2-6 on page 10
19	45043	Ground wire, 4 in w/ No. 8 eye connector (1)	Figure 2-7 on page 11
21	46027	Setup switch mounting bracket (1)	Figure 2-8 on page 12
24	44844	Setup switch assembly (1)	
25	68403	Wing knobs for tilt stand (2)	Figure 2-10 on page 13
26	29635	Tilt stand (1)	
27	15144	Nylon washers for tilt stand, 1/4 x 1 x 1/16 (2)	
28	45891	Line filter assembly (1)	Figure 2-7 on page 11
29	14862*	Screws, 8-32NC x 3/8 (4)	Figure 2-10 on page 13
30	16903	Model/serial number label (1)	—
31	46252	Bezel gasket, sloped front (1)	Figure 2-9 on page 13
	45076	Bezel gasket, flat front (1)	
36	45401	CPU board mounting tab, sloped front models (1)	Figure 2-8 on page 12
37	15134	Lock washers, No. 8 (4)	Figure 2-7 on page 11
38	48027	Nylon spacers for board mounting (3)	Figure 2-8 on page 12
39	45042*	Sealing washers (4)	Figure 2-10 on page 13
40	15369	Standoffs, fem 6-32NC x 3/4 (3)	Figure 2-7 on page 11
41	64956	Display and CPU board assembly, 115 VAC (1)	Figure 2-8 on page 12
	64960	Display and CPU board assembly, 230 VAC (1)	
—	40698	VFD display (1)	
42	19644	3V cylindrical lithium battery	

Table 2-5. Replacement Parts

Ref Number	PN	Description (Quantity)	Figure
45	65981	Brass spacer (1)	Figure 2-8 on page 12
46	15130	Internal lock washers (2)	
49	50959	Metal cord grip, PG9 (1)	Figure 2-6 on page 10
50	50962	Metal cord grip nut, PG9 (1)	
51	73769	Grounding clips (4)	
—	70600	7-position connectors for J4, and J12 (2)	Figure 2-4 on page 6
—	70599	6-position connector for J1 (1)	
—	70601	10-position connectors for J7 and J8 (2)	
—	45484	160 mA TR5 subminiature fuses (2), 115 VAC	F1 and F2 in Figure 2-4 on page 6
	45107	80 mA TR5 subminiature fuses (2), 230 VAC	

* Additional parts included in parts kit.

Caution *To protect against the risk of fire, replace fuses only with same type and rating fuse.* See Section 10.10 on page 74 for complete fuse specifications.

Table 2-5. Replacement Parts (Continued)

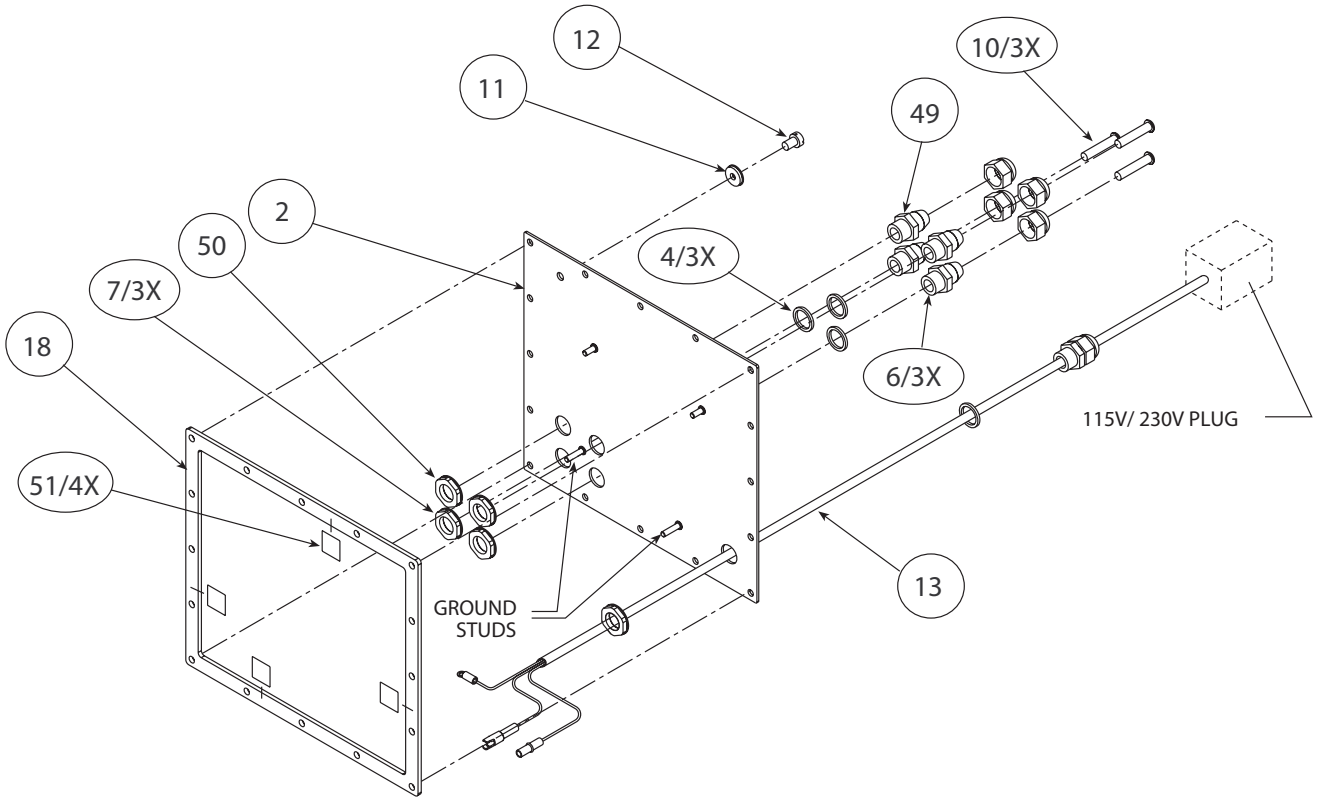

Figure 2-6. Backplate Assembly

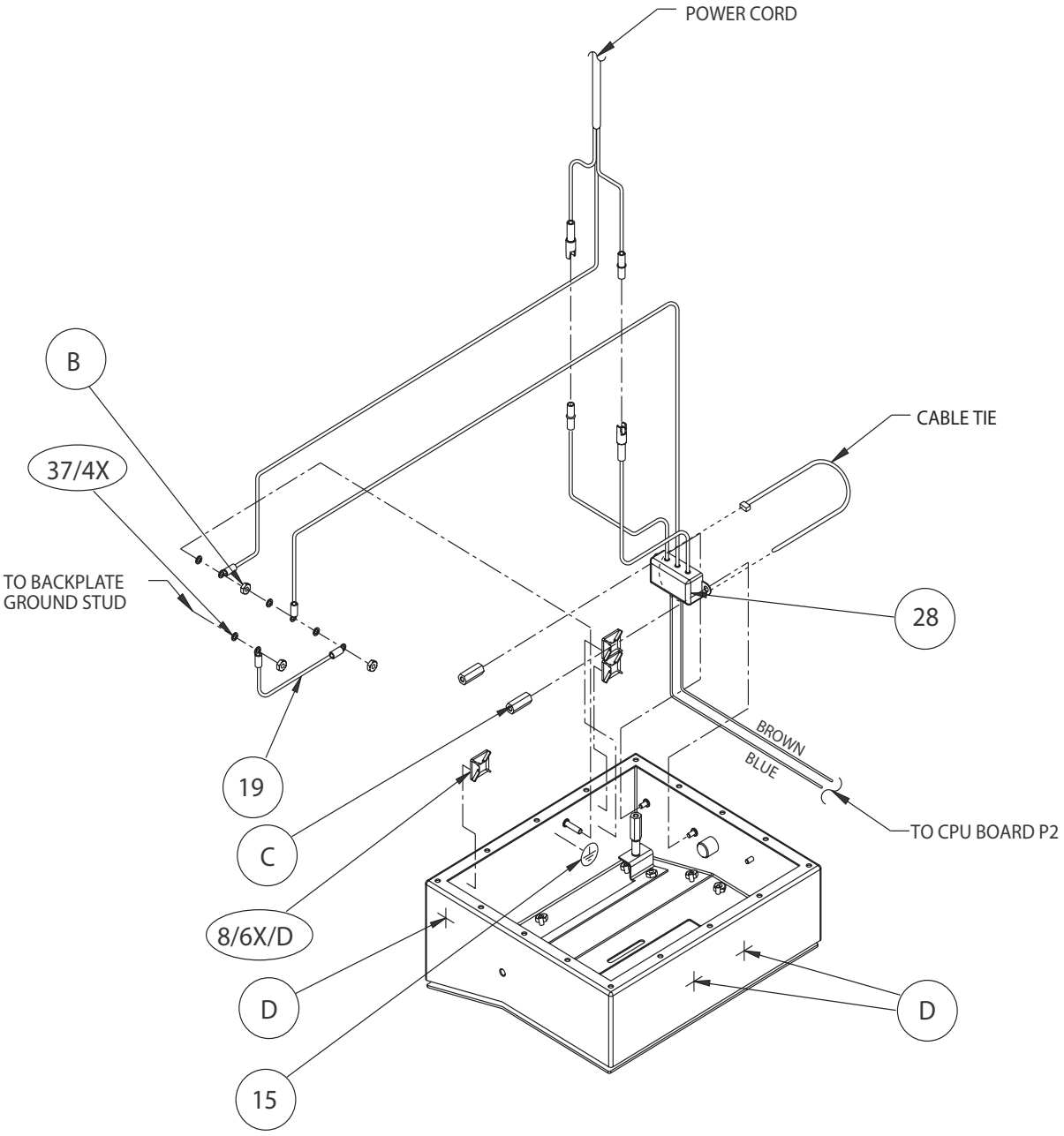

Figure 2-7. Enclosure and Line Filter Assembly

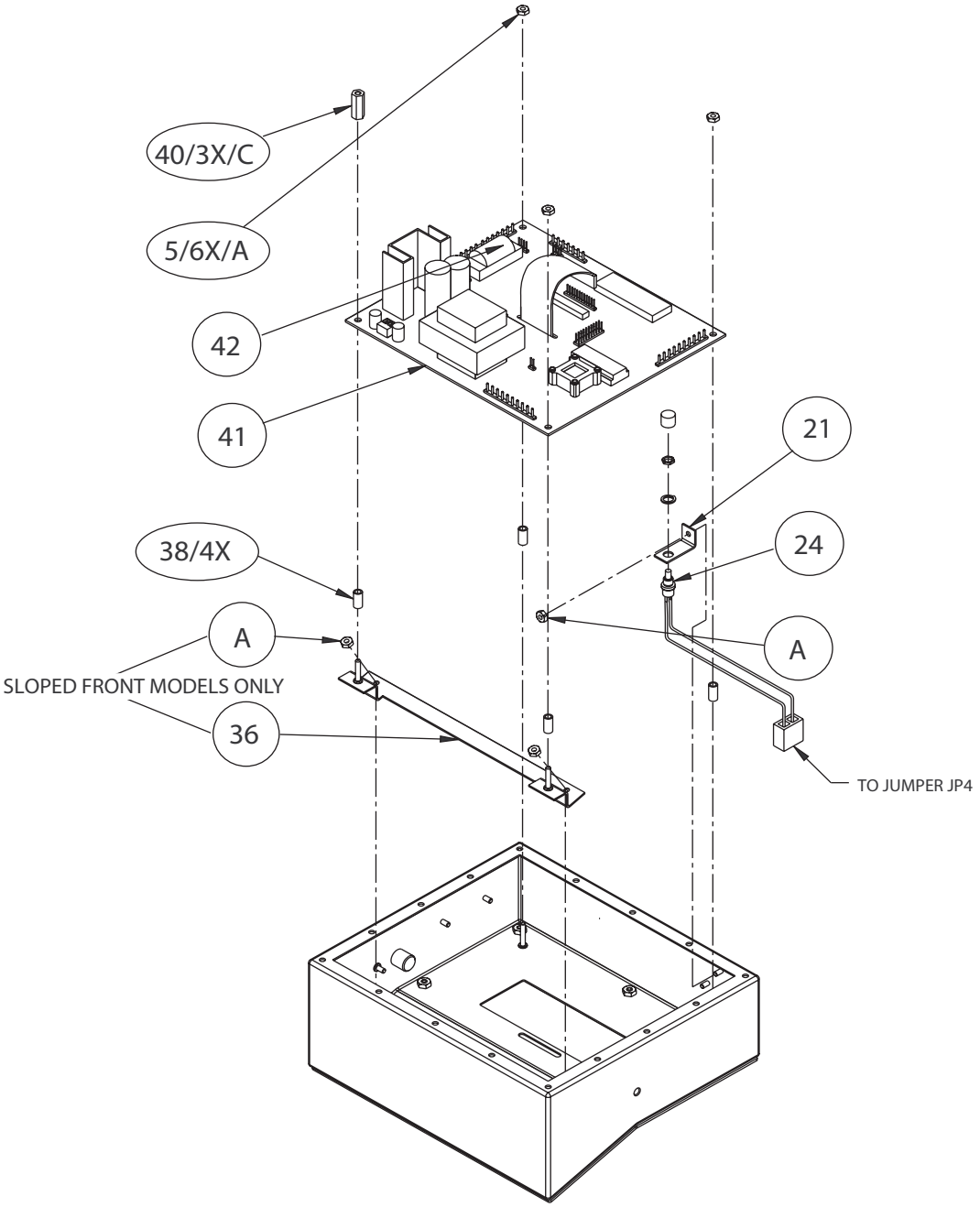

Figure 2-8. Enclosure and CPU Board Assembly

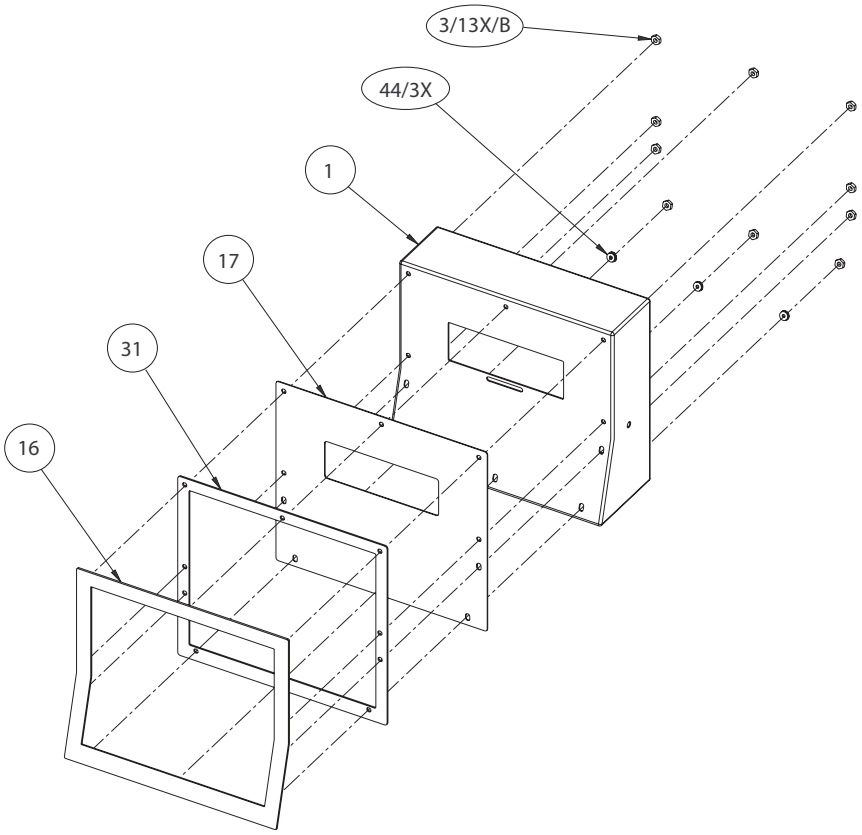

Figure 2-9. Bezel Assembly

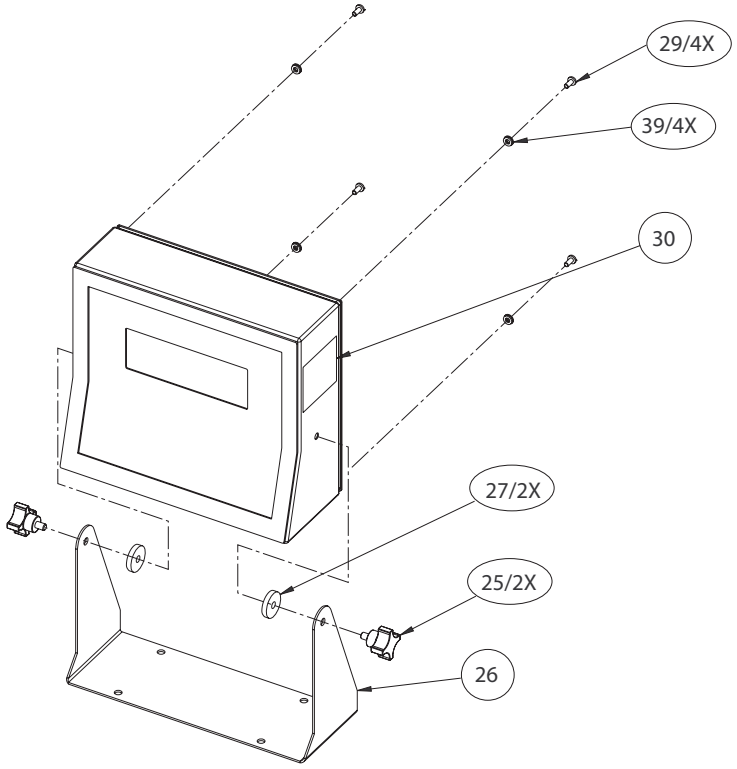

Figure 2-10. Tilt Stand Assembly

3.0 Configuration

To configure the IQ plus 710 indicator, the indicator must be placed in setup mode. The setup switch is accessed by removing the large fillister head screw on the enclosure backplate. Switch position is changed by inserting a screwdriver into the access hole and pressing the switch.

When the indicator is placed in setup mode, the word *CONFIG* is shown on the display. The CONFIG menu is the first of ten main menus used to configure the indicator. Detailed descriptions of these menus are given in Section 3.2. When configuration is complete, return to the CONFIG menu and press the △ (**ZERO**) key to exit setup mode, then replace the setup switch access screw.

3.1 Configuration Methods

The IQ plus 710 indicator 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 5.0 or Version 2.5 or later of the Revolution™ configuration utility.

3.1.1 Revolution Configuration

The Revolution configuration utility provides the preferred method for configuring the IQ plus 710 indicator. 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.

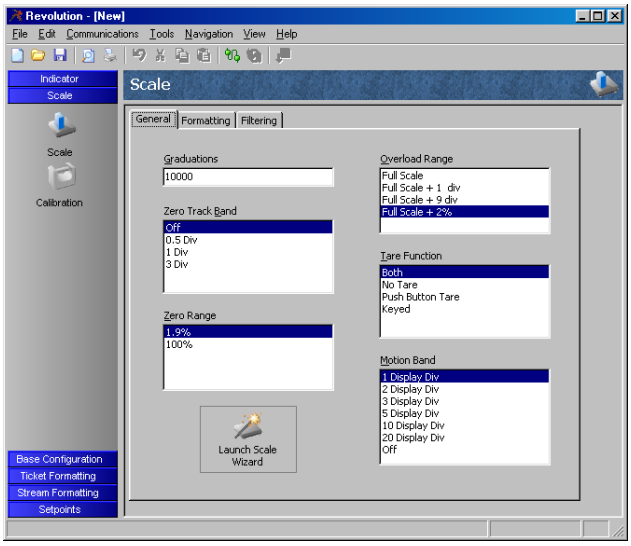

Figure 3-1. Sample Revolution Configuration Display

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 (Version 3.0 later) on an IBM-compatible personal computer running Windows® 98 or later.

   Minimum system requirements include a processor speed of at least 133MHz, 32MB of memory (64MB recommended), and at least 20MB of available hard disk space for installation.
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 3-1 shows an example of one of the Revolution configuration displays.

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 710 indicator 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 5.0 on page 41 for more information about using the EDP command set.

3.1.3 Front Panel Configuration

The IQ plus 710 indicator can be configured using a series of menus accessed through the indicator front panel when the indicator is in setup mode. Table 3-1 summarizes the functions of each of the main menus.

Menu		Menu Function
CONFIG	Configuration	Configure grads, zero tracking, zero range, motion band, overload, A/D sample rate, tare function, power-up mode, analog and digital filtering parameters.
FORMAT	Format	Set format of primary and secondary units, decimal format, and display rate.
CALIBR	Calibration	Calibrate indicator. See Section 4.0 for calibration procedures.
SERIAL	Serial	Configure EDP and printer serial ports.
PROGRM	Program	Set date and time formats, truck mode, passwords, keyboard locks, regulatory mode, and initial consecutive number value; enable accumulator; define setpoint and macro prompts, and program macros.
PFORMT	Print Format	Set print format used for header, gross, net, truck in/out, setpoint, and EDP format tickets. See Section 6.0 for more information.
SETPTS	Setpoints	Configure setpoints and batching mode.
DIG IN	Digital Input	Assign digital input functions.
ALGOUT	Analog Output	Configure analog output module. Used only if analog output option is installed.
VERSION	Version	Display installed software version number.

Table 3-1. IQ plus 710 Menu Summary

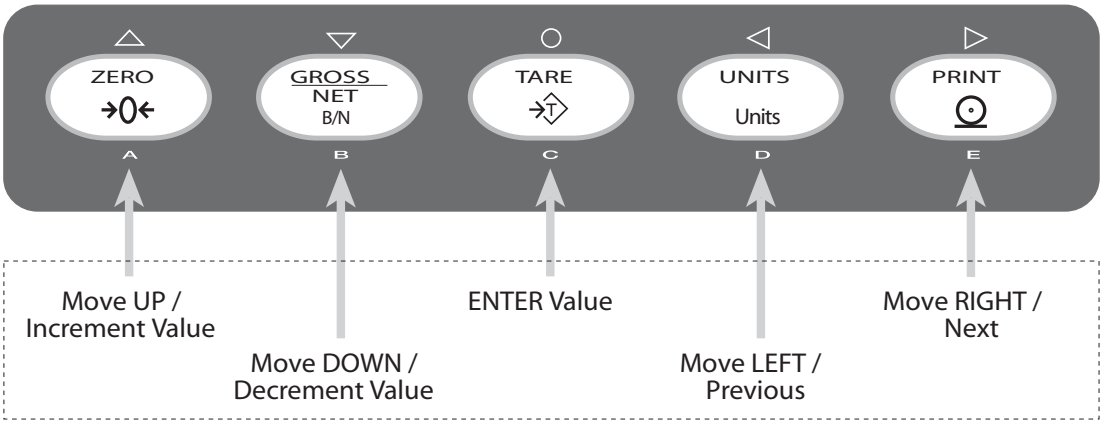

Figure 3-2. Five-Key Keypad Functions in Setup Mode

Four front panel keys are used as directional keys to navigate through the menus in setup mode (see Figure 3-2). The **UNITS** (◁) and **PRINT** (▷) keys scroll left and right (horizontally) on the same menu level; **ZERO** (△) and **GROSS/NET** (▽) move up and down (vertically) to different menu levels. The ***TARE*** key (○) serves as an Enter key for selecting parameter values within the menus. A label over each of these keys identifies the direction provided by the key when navigating through the setup menus.

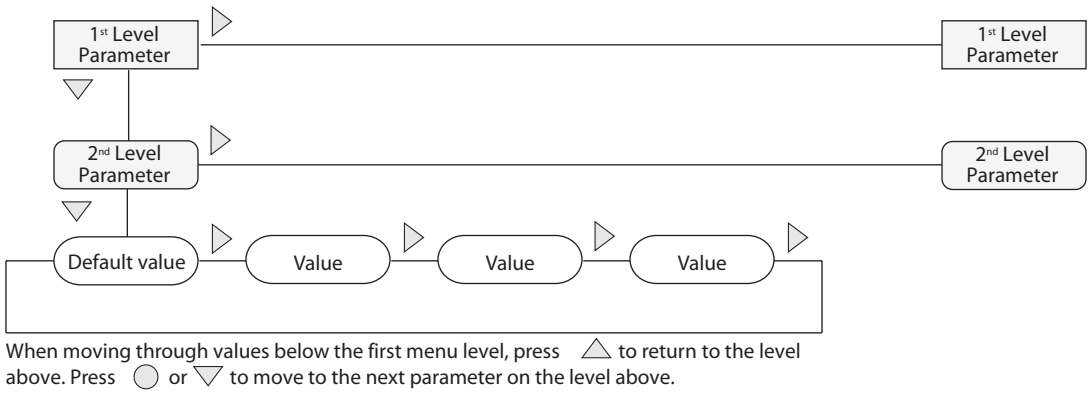

Figure 3-3. Setup Mode Menu Navigation

To select a parameter, press ◁ or ▷ to scroll left or right until the desired menu group appears on the display, then press ▽ to move down to the submenu or parameter you want. When moving through the menu parameters, the default or previously selected value appears first on the display.

To change a parameter value, scroll left or right to view the values for that parameter. When the desired value appears on the display, press ○ to select the value and move back up one level. To edit numerical values, use the numeric keypad on the indicator front panel.

3.2 Menu Structures and Parameter Descriptions

The following sections provide graphic representations of the IQ plus 710 menu structures. 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. Parameters 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

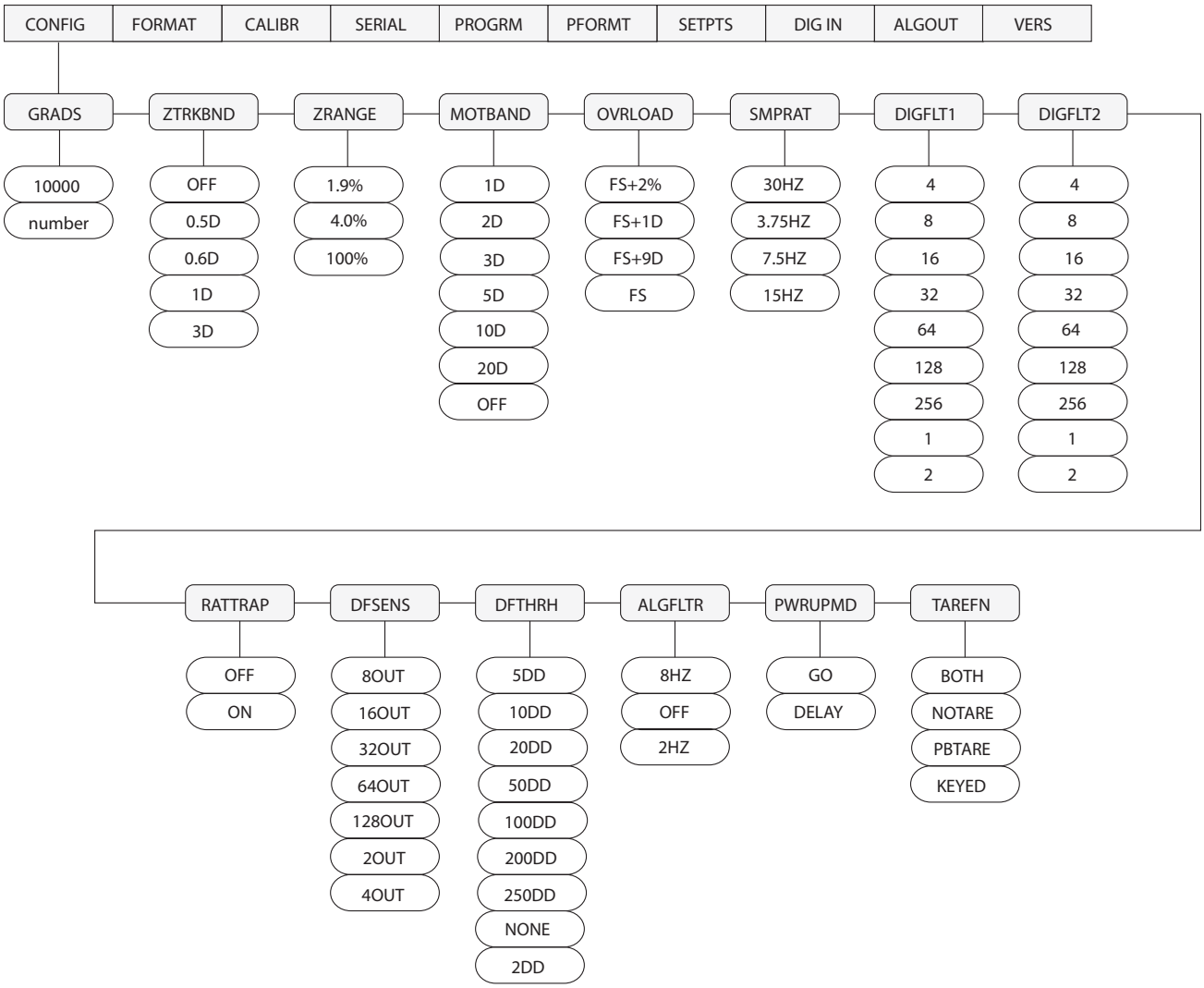

Figure 3-4. Configuration Menu

CONFIG Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
GRADS	**10000** *number*	Specifies the number of full scale graduations. The value entered must be in the range 1–9 999 999 and should be consistent with legal requirements and environmental limits on system resolution. To calculate GRADS, use the formula, GRADS = *Capacity* / *Display Divisions*. Display divisions for primary and secondary units are specified on the FORMAT menu.

Table 3-2. Configuration Menu Parameters

CONFIG Menu		
Parameter	**Choices**	**Description**
ZTRKBND	**OFF** 0.5D 0.6D 1D 3D	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%** 4.0% 100%	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 at standstill to zero the scale. Use 1.9% for legal-for-trade applications.
MOTBAND	**1D** 2D 3D 5D 10D 20D OFF	Sets the level, in display divisions, at which scale motion is detected. If motion is not detected for 1 second or more, the standstill symbol lights. Some operations, including print, tare, and zero, require the scale to be at standstill. Maximum legal value varies depending on local regulations. If this parameter is set to OFF, the standstill annunciator will not light; operations normally requiring standstill (zero, tare, print) are performed regardless of scale motion. If OFF is selected, ZTRKBND must also be set to OFF.
OVRLOAD	**FS+2%** FS+1D FS+9D FS	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.
SMPRAT	**30HZ** 3.75HZ 7.5HZ 15HZ	Sample rate. Selects measurement rate, in samples per second, of the analog-to-digital converter. Lower sample rate values provide greater signal noise immunity.
DIGFLT1 DIGFLT2	**4** 8 16 32 64 128 256 1 2	Selects the digital filtering rate used to reduce the effects of mechanical vibration from the immediate area of the scale. 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.
RATTRAP	**OFF** ON	Enables RATTLETRAP® digital filtering. RATTLETRAP is most effective at filtering repeating vibrations caused by mechanical noise from nearby machines but may increase settling times over standard digital filter selections.
DFSENS	**8OUT** 16OUT 32OUT 64OUT 128OUT 2OUT 4OUT	Digital filter cutout sensitivity. Specifies the number of consecutive readings that must fall outside the filter threshold (DFTHRH parameter) before digital filtering is suspended.
DFTHRH	**5DD** 10DD 20DD 50DD 100DD 200DD 250DD NONE 2DD	Digital filter cutout threshold. Specifies the filter threshold, in display divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside of this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled.

Table 3-2. Configuration Menu Parameters (Continued)

CONFIG Menu		
Parameter	**Choices**	**Description**
ALGFLTR	**8HZ** OFF 2HZ	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.
PWRUPMD	**GO** DELAY	Power up mode. In GO mode, the indicator goes into operation immediately after a brief power up display test. In DELAY mode, the indicator performs a power up display test, then enters a 30-second warm up period. If no motion is detected during the warm up period, the indicator becomes operational when the warm up period ends; if motion is detected, the delay timer is reset and the warm up period repeated.
TAREFN	**BOTH** NOTARE PBTARE KEYED	Enables or disables push-button and keyed tares. Possible values are: BOTH: Both push-button and keyed tares are enabled NOTARE: No tare allowed (gross mode only) PBTARE: Push-button tares enabled KEYED: Keyed tare enabled

Table 3-2. Configuration Menu Parameters (Continued)

3.2.2 Format Menu

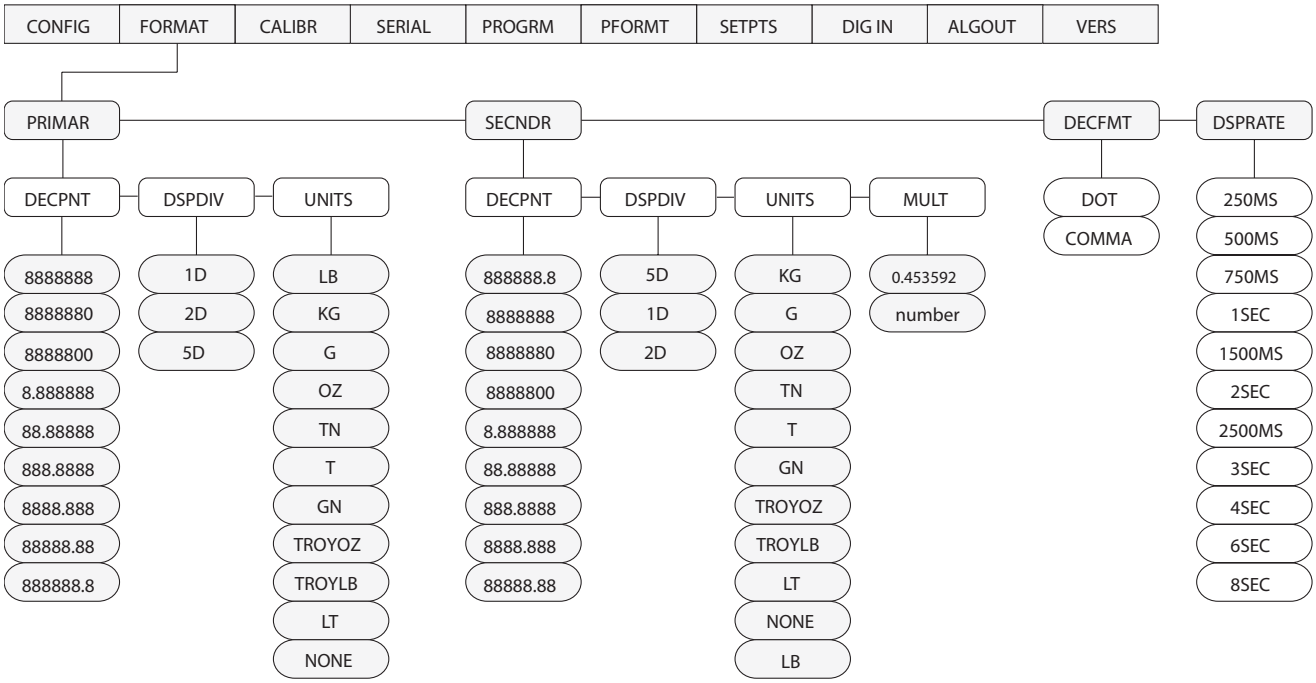

Figure 3-5. Format Menu

FORMAT Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
PRIMAR	DECPNT DSPDIV UNITS	Specifies the decimal position, display divisions, and units used for the primary units. See Level 3 submenu parameter descriptions.
SECNDR	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the secondary units. See Level 3 submenu parameter descriptions.
DECFMT	**DOT** COMMA	Specifies whether decimal numbers are displayed using a period (DOT) or comma as the decimal symbol.
DSPRATE	**250MS** 500MS 750MS 1SEC 1500MS 2SEC 2500MS 3SEC 4SEC 6SEC 8SEC	Display rate. Sets the update rate for displayed values. Values are in milliseconds (MS) or seconds (SEC). **NOTE:** Indicators programmed to run macros should set the display rate to 2SEC or faster.
Level 3 submenus		
Primary Units (PRIMAR Parameter)		
DECPNT	**8888888** 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	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.
DSPDIV	**1D** 2D 5D	Display divisions. Selects the minimum division size for the primary units displayed weight.
UNITS	**LB** KG G OZ TN T GN TROYOZ TROYLB LT NONE	Specifies primary units for displayed and printed weight. Values are: LB=pound; kg=kilogram; g=gram; OZ=ounce; TN=short ton; T=metric ton; GN=grain; TROYOZ=troy ounce; TROYLB=troy pound; LT=long ton. **NOTE:** 230 VAC indicators are configured with KG for both primary and secondary units.

Table 3-3. Format Menu Parameters

FORMAT Menu		
Parameter	**Choices**	**Description**
Secondary Units (SECNDR Parameter)		
DECPNT	**888888.8** 8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88	Decimal point location. Determines the location of the decimal point or dummy zeros in the display.
DSPDIV	**5D** 1D 2D	Display divisions. Selects the value of minimum division size of the displayed weight.
UNITS	**KG** G OZ TN T GN TROYOZ TROYLB LT NONE LB	Specifies primary units for displayed and printed weight. Values are: LB=pound; KG=kilogram; G=gram; OZ=ounce; TN=short ton; T=metric ton; GN=grain; TROYOZ=troy ounce; TROYLB=troy pound; LT=long ton.
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. See Section 10.6 on page 70 for a list of multipliers. To toggle between primary and secondary units, press the UNITS key.

Table 3-3. Format Menu Parameters (Continued)

3.2.3 Calibration Menu

See Section 4.0 on page 37 for calibration procedures.

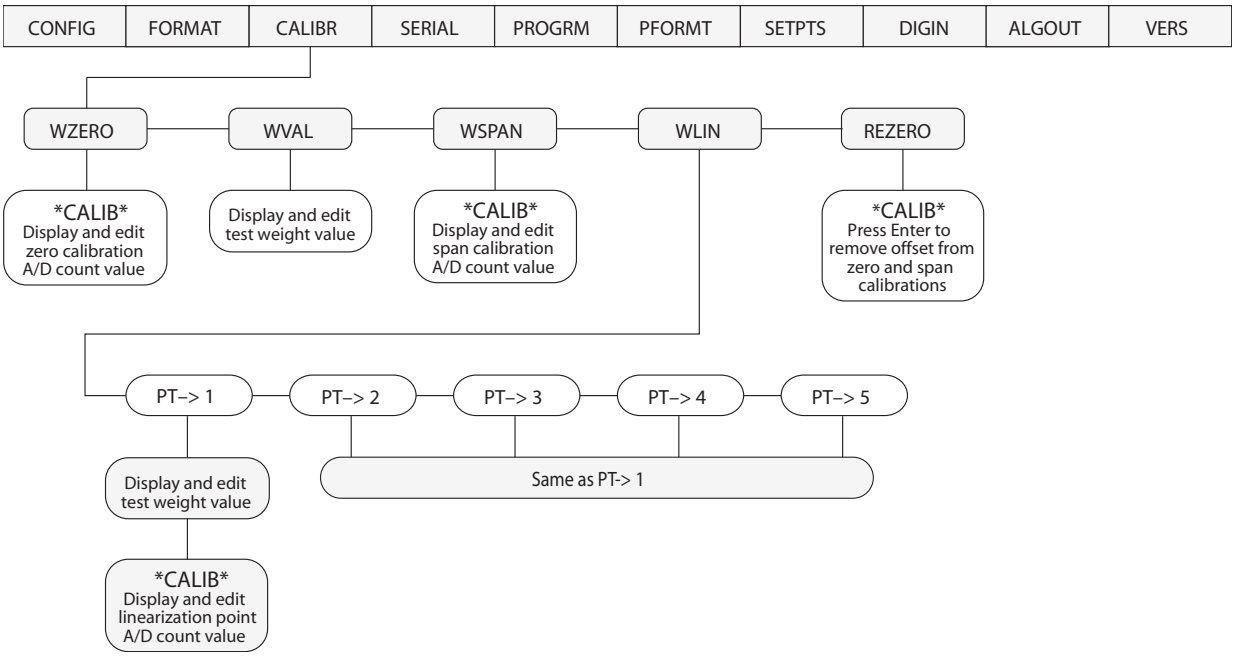

Figure 3-6. Calibration Menu

CALIBR Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
WZERO	—	Press ENTER to display and edit the zero calibration A/D count value.
WVAL	—	Press ENTER to display and edit the test weight value.
WSPAN	—	Press ENTER to display and edit the span calibration A/D count value.
WLIN	PT->1 — PT->5	Press ENTER to display and edit test weight and calibration values for up to five linearization points. Perform linear calibration only after WZERO and WSPAN have been set.
REZERO	—	Press Enter to remove an offset value from the zero and span calibrations. Use this parameter only after WZERO and WSPAN have been set. See Section 4.1 on page 37 for more information about using this parameter.

Table 3-4. Calibration Menu Parameters

3.2.4 Serial Menu

See Section 10.4 on page 68 for information about IQ plus 710 serial data formats.

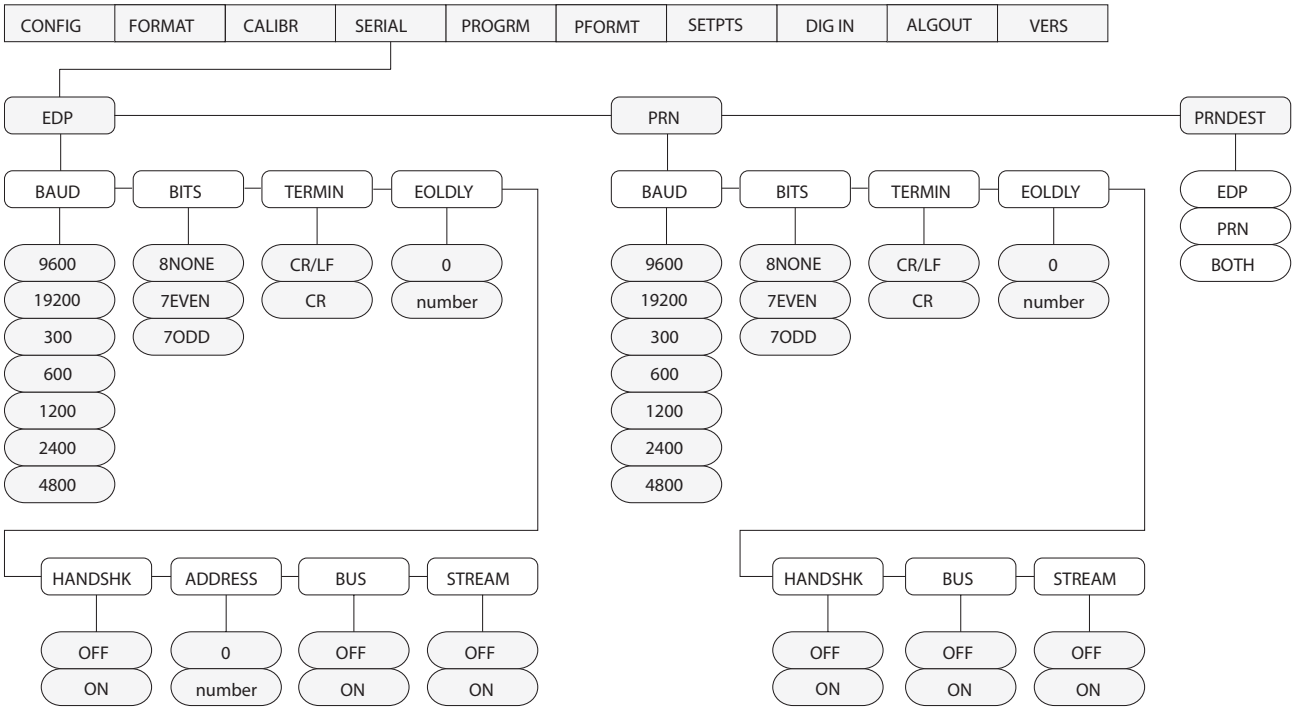

Figure 3-7. Serial Menu

SERIAL Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
EDP	BAUD BITS TERMIN EOLDLY HANDSHK ADDRESS BUS STREAM	Configure the EDP port. See Level 3 submenu parameter descriptions.
PRN	BAUD BITS TERMIN EOLDLY HANDSHK BUS STREAM	Configure the printer port. See Level 3 submenu parameter descriptions.
PRNDEST	**EDP** PRN BOTH	Print destination. Selects the port for data transmission when the PRINT key is pressed or the KPRINT EDP command is sent.

Table 3-5. Serial Menu Parameters

SERIAL Menu		
Parameter	**Choices**	**Description**
Level 3 Submenus		EDP Port
BAUD	**9600** 19200 300 600 1200 2400 4800	Baud rate. Selects the transmission speed for the EDP port.
BITS	**8NONE** 7EVEN 7ODD	Selects number of data bits and parity of data transmitted from the EDP port.
TERMIN	**CR/LF** CR	Termination character. Selects termination character for data sent from the EDP port.
EOLDLY	**0** *number*	End-of-line delay. Sets the delay period, in 0.1-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output. Value specified must be in the range 0-255, in tenths of a second (10 = 1 second).
HANDSHK	**OFF** ON	Specifies whether XON/XOFF flow control characters are used.
ADDRESS	**0** *address*	Specifies the decimal indicator address for RS-485 connections. RS-232 communications is disabled if an address other than zero is specified for this parameter. RS-485 addresses must be in the range 01–255.
BUS	**OFF** ON	Specifies whether the EDP port sends the data stream to a network bus. Specify ON only if the Remote I/O or Profibus option is installed.
STREAM	**OFF** ON	Specifies whether data is streamed from the EDP port.
Level 3 Submenus		Printer Port
BAUD	**9600** 19200 300 600 1200 2400 4800	Baud rate. Selects the transmission speed for the printer port.
BITS	**8NONE** 7EVEN 7ODD	Selects number of data bits and parity of data transmitted from the printer port.
TERMIN	**CR/LF** CR	Termination character. Selects termination character for data sent from the printer port.
EOLDLY	**0** *number*	End-of-line delay. Sets the delay period, in 0.1-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output. Value specified must be in the range 0-255, in tenths of a second (10 = 1 second).
HANDSHK	**OFF** ON	Specifies whether XON/XOFF flow control characters are used.
BUS	**OFF** ON	Specifies whether the printer port sends the data stream to a network bus. Specify ON only if the Remote I/O or Profibus option is installed.
STREAM	**OFF** ON	Specifies whether data is streamed from the printer port.

Table 3-5. Serial Menu Parameters (Continued)

3.2.5 Program Menu

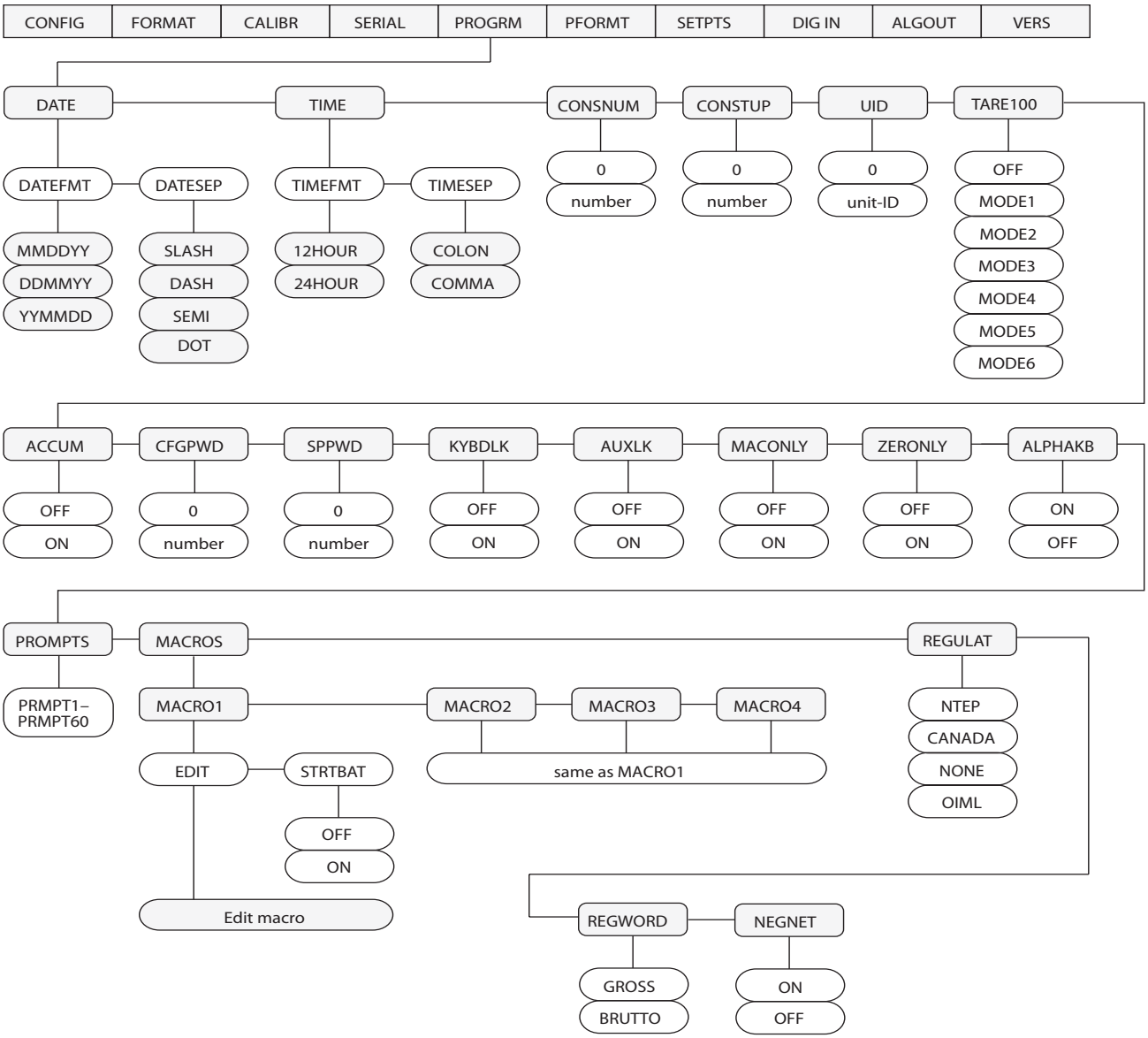

Figure 3-8. Program Menu

PROGRM Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
DATE	**DATEFMT** DATESEP	Allows selection of date format and date separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE key or the SD EDP command to set the date. See Section 5.0 on page 41 for information about using the EDP commands.
TIME	**TIMEFMT** TIMESEP	Allows selection of time format and separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE key or the ST EDP command to set the time. See Section 5.0 on page 41 for information about using the EDP commands.
CONSNUM	**0** *number*	Consecutive numbering. Allows sequential numbering for print operations. The consecutive number value is incremented following each print operation that includes <CN> in the ticket format. When the consecutive number is reset, it is reset to the value specified on the CONSTUP parameter.
CONSTUP	**0** *number*	Specifies the consecutive number start-up value used when the consecutive number is reset by sending the KCLRCN EDP command or a CLRCN digital input. Value specified must be in the range 0–9 999 999.
UID	**0** *unit-ID*	Specifies the unit identification number. Value specified can be any alphanumeric value, up to seven characters.
TARE100	**OFF** MODE1 MODE2 MODE3 MODE4 MODE5 MODE6	Specifies the truck mode used. If selected, the indicator switches from normal mode to the selected truck mode. See Section 7.0 on page 53 for more information about using the truck modes. MODE1: Auto clear ID, keyed tares, value swapping MODE2: Auto clear ID, no keyed tares, value swapping MODE3: Stored ID, keyed tares, value swapping MODE4: Stored ID, no keyed tares, value swapping MODE5: Stored ID, keyed tares, no value swapping MODE6: Stored ID, no keyed tares, no value swapping
ACCUM	**OFF** ON	Accumulator. Specifies whether the accumulator is enabled.
CFGPWD	**0** *1–9999999*	Configuration password. Specify a non-zero value to restrict access to all configuration menus.
SPPWD	**0** *1–9999999*	Setpoint password. Specify a non-zero value to restrict access to the setpoint menu.
KYBDLK	**OFF** ON	Keyboard lock. Specify ON to disable the keypad in normal mode.
NOTE: No more than one of the AUXLK, MACONLY, and ZERONLY parameters can be specified as ON. Individual keys can be locked or unlocked using the KLOCK and KUNLOCK EDP commands (see Table 5-1 on page 41 for more information).		
AUXLK	**OFF** ON	Auxiliary keypad lock. Specify ON to disable all keys except ZERO, GROSS/NET, TARE, UNITS, and PRINT in normal mode. See NOTE above.
MACONLY	**OFF** ON	Macro keys only. Specify ON to disable all except the four macro keys (F1–F4) in normal mode. See NOTE above
ZERONLY	**OFF** ON	Zero key only. Specify ON to disable all front panel keys except ZERO in normal mode. See NOTE above
ALPHAKB	**ON** OFF	Alpha keyboard. Specify ON to enable alpha entry for the indicator keypad. If OFF is specified, the ALPHA ENTRY key is disabled.

Table 3-6. Program Menu Parameters

PROGRM Menu		
Parameter	**Choices**	**Description**
PROMPTS	*PROMPT1–PROMPT60*	Specify prompts for use in macros and setpoint names. Prompts are referenced by the NAME parameter under the MACRO and SETPTS submenus; prompts appear in the secondary display area during macro and setpoint execution.
MACRO1 MACRO2 MACRO3 MACRO4	STRTBAT EDIT	Specify MACROs 1–4. The STRBAT parameter can be set on to start a batch sequence on completion of the macro; the EDIT parameter contains up to 30 macro steps, including simulated keystrokes and pause/release conditions. See Section 9.0 on page 60 for more information about configuring macros.
REGULAT	**NTEP** OIML NONE CANADA	Regulatory mode. Specifies the regulatory agency having jurisdiction over the scale site. • OIML, NTEP, and CANADA modes allow a tare to be acquired at any weight greater than zero. NONE allows tares to be acquired at any weight value. • OIML, NTEP, and CANADA modes allow a tare to be cleared only if the gross weight is at no load. NONE allows tares to be cleared at any weight value. • Streamed output in OIML, NTEP, and CANADA modes follows the display update rate. In NONE mode, streamed output follows the A/D update rate. • NTEP and OIML modes allow a new tare to be acquired even if a tare is already present. In CANADA mode, the previous tare must be cleared before a new tare can be acquired. • NONE, NTEP and CANADA modes allow the scale to be zeroed in either gross or net mode as long as the current weight is within the specified ZRANGE. In OIML mode, the scale must be in gross mode before it can be zeroed; pressing the ZERO key in net mode clears the tare. • OIML mode replaces the *Gross* annunciator with *Brutto*. The value specified for this parameter affects the function of the front panel TARE and ZERO keys. See Section 10.3 on page 67 for a complete description of TARE and ZERO key functions for each of the regulatory modes.
REGWORD	**GROSS** BRUTTO	Selects the word to display for Gross Mode in NTEP or OIML
NEGNET	**ON** OFF	Allows the user to turn off the negative sign in loss-in-weight systems.
Level 3 submenus		
DATEFMT	**MMDDYY** DDMMYY YYMMDD	Specifies the format used to display or print the date.
DATESEP	**SLASH** DASH SEMI DOT	Specifies the date separator character.
TIMEFMT	**12HOUR** 24HOUR	Specifies the format used to display or print the time.
TIMESEP	**COLON** COMMA	Specifies the time separator character.

Table 3-6. Program Menu Parameters (Continued)

3.2.6 Print Format Menu

See Section 6.0 on page 49 for information about custom print formatting.

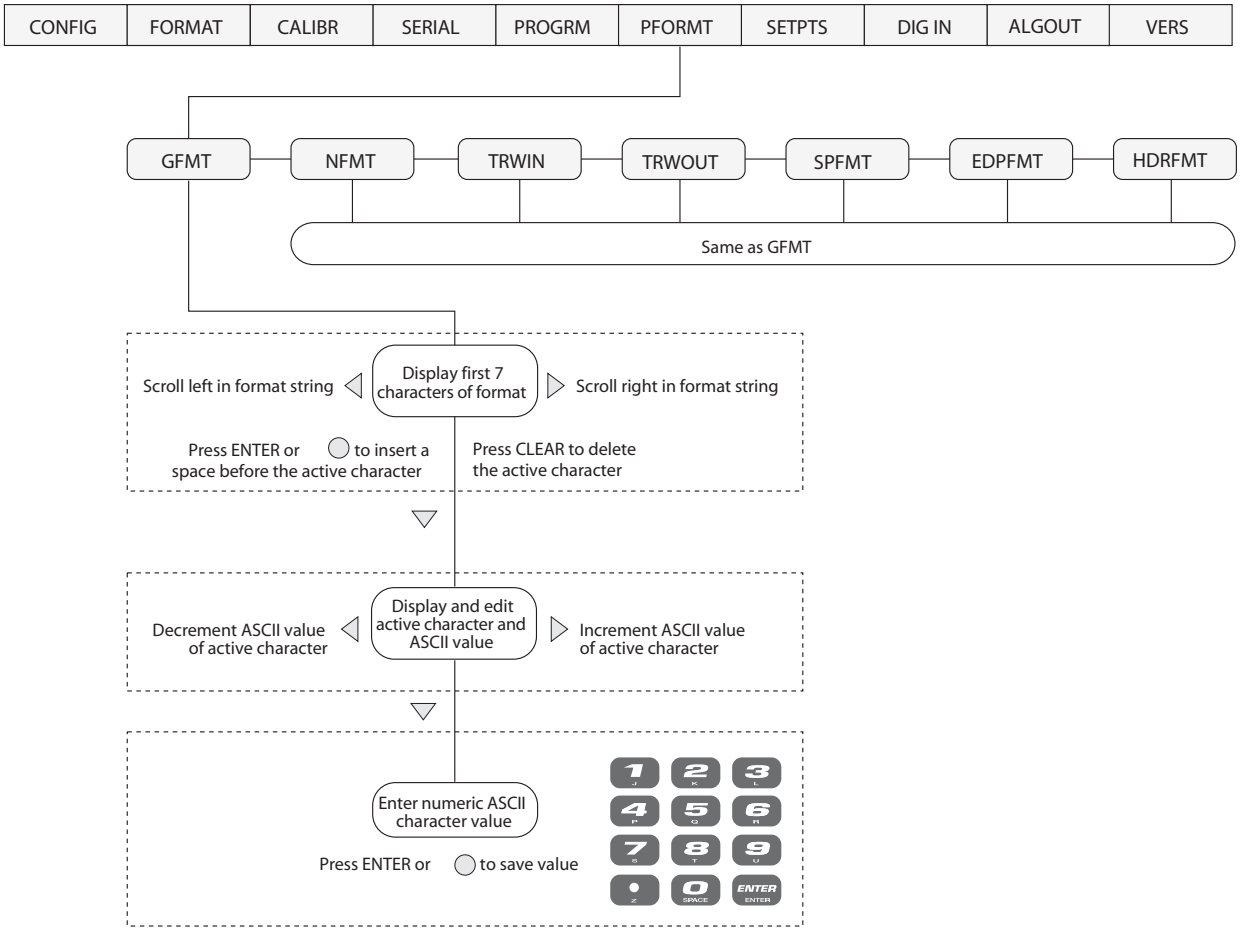

Figure 3-9. Print Format Menu

3.2.7 Setpoints Menu

See Section 8.0 on page 55 for more information about configuring and using setpoints.

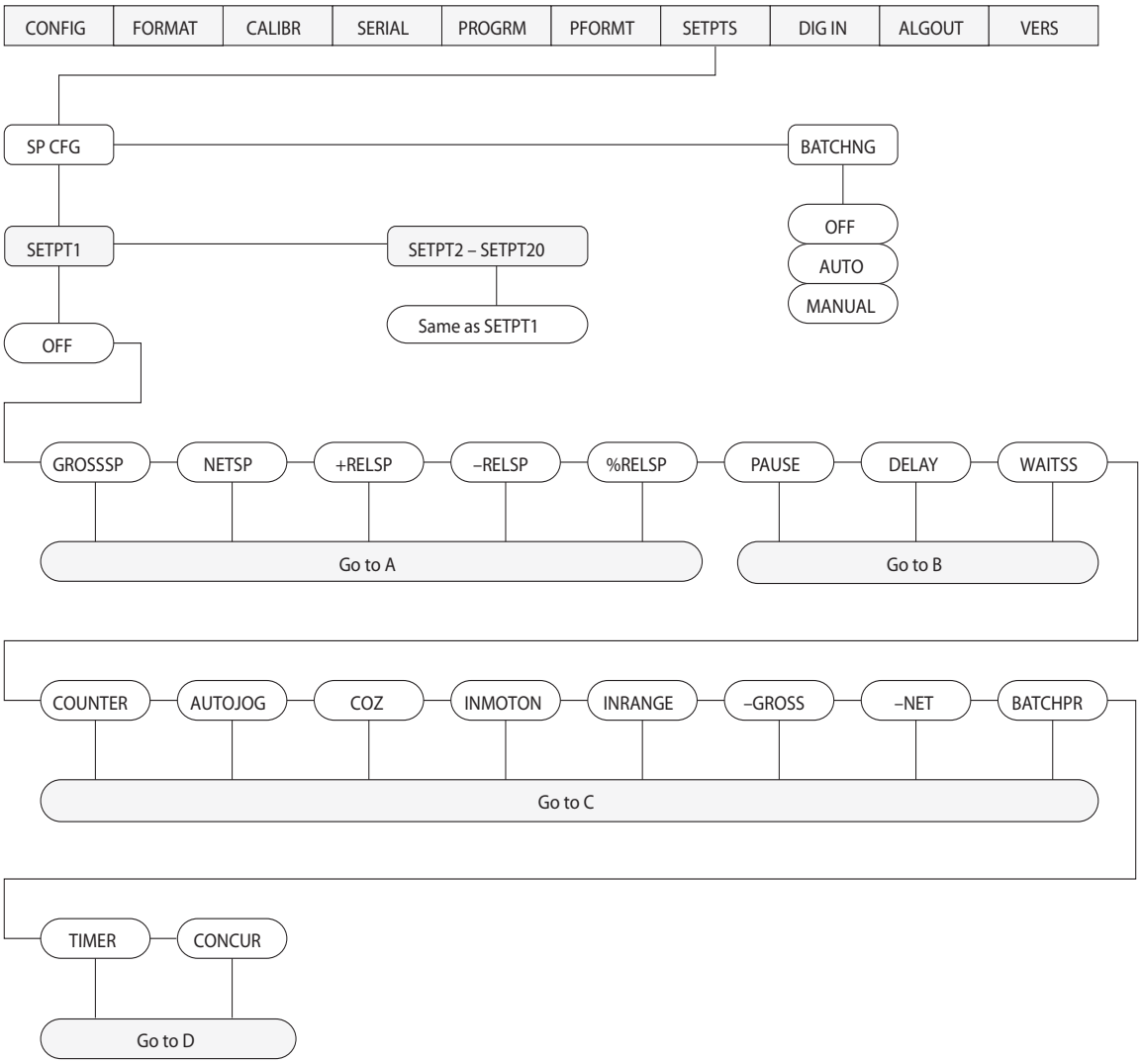

Figure 3-10. Setpoints Menu

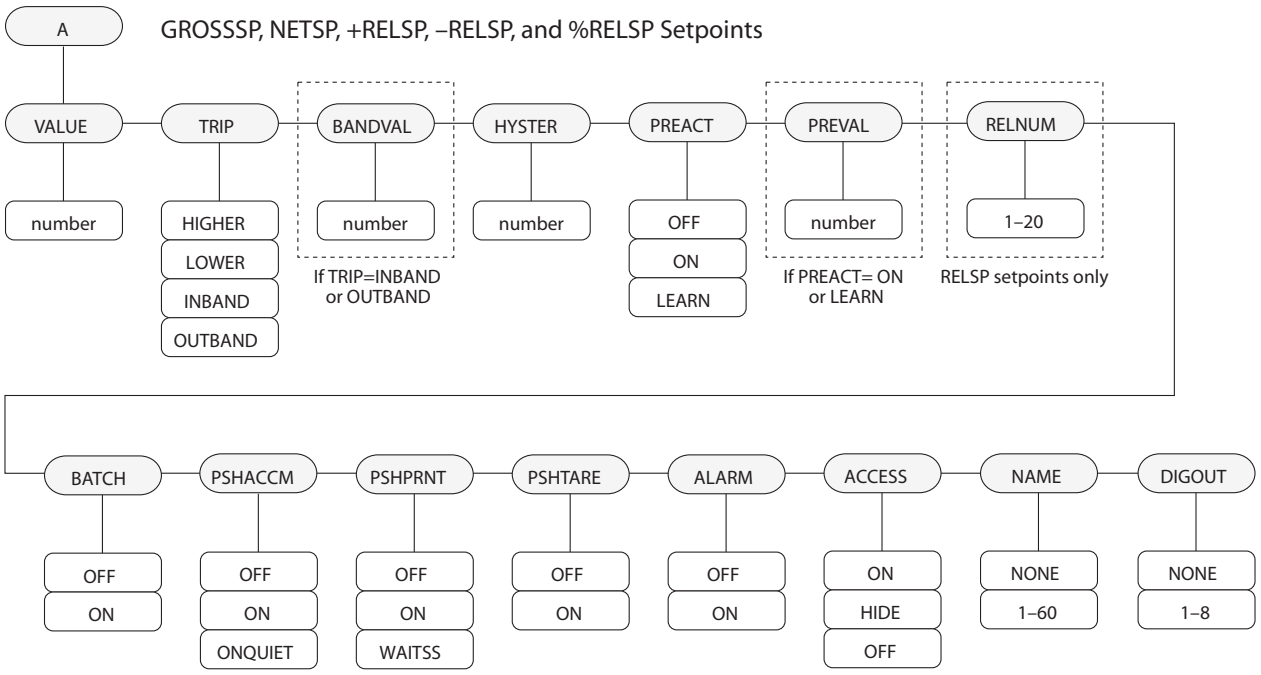

Figure 3-11. Submenu for GROSSSP, NETSP, and RELSP Setpoints

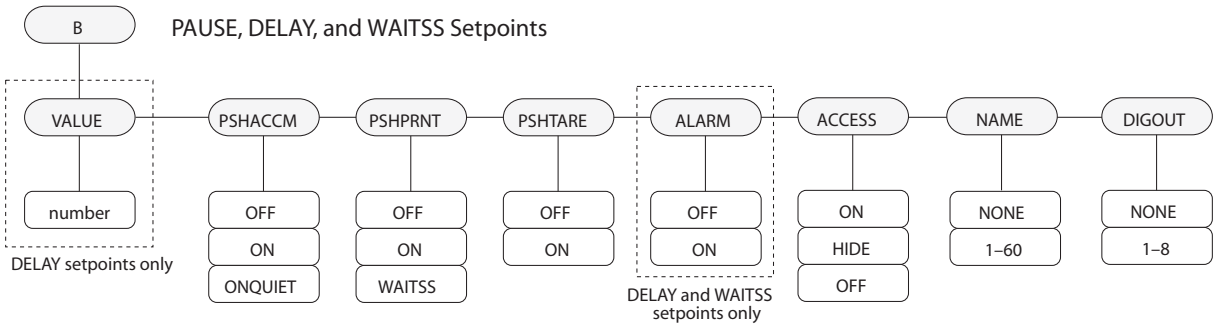

Figure 3-12. Submenu for PAUSE, DELAY, and WAITSS Setpoints

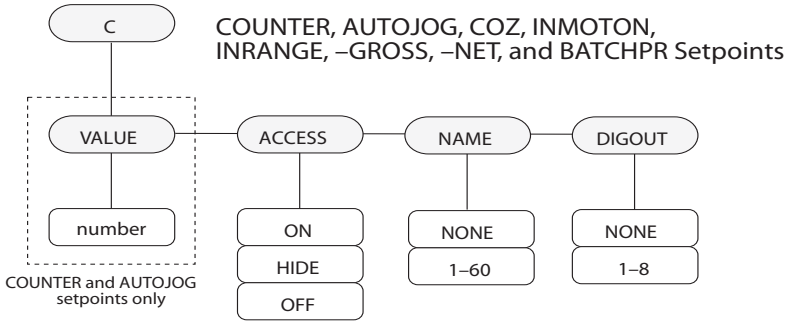

Figure 3-13. Submenu for COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, –GROSS, –NET, and BATCHPR Setpoints

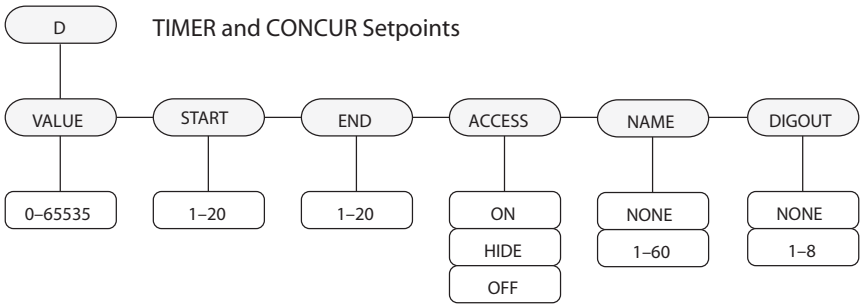

Figure 3-14. Submenu for TIMER and CONCUR Setpoints

SETPTS Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
SETPT1–SETPT8	**OFF** GROSSSP NETSP +RELSP –RELSP %RELSP PAUSE DELAY WAITSS COUNTER AUTOJOG COZ INMOTON INRANGE –GROSS –NET BATCHPR TIMER CONCUR	Specifies the setpoint kind. GROSSSP, NETSP, +RELSP, –RELSP, and %RELSP setpoint kinds can be used as either batch or continuous setpoints. PAUSE, DELAY, WAITSS, COUNTER, and AUTOJOG setpoint kinds can only be used in batch sequences. COZ, INMOTON, INRANGE, –GROSS, –NET, BATCHPR, TIMER, and CONCUR setpoint kinds can only be used as continuous setpoints. See Table 8-1 on page 56 for more information about setpoint kinds.
BATCHNG	**OFF** AUTO MANUAL	Batching enable. Set to AUTO or MANUAL to allow a batch sequence to run. MANUAL requires a BATSTRT digital input, BATSTART EDP command, or STRTBAT macro configuration before the batch sequence can run. AUTO allows batch sequences to repeat continuously.

SETPTS Menu		
Parameter	**Choices**	**Description**
Level 3 submenus		
GROSSSP NETSP +RELSP –RELSP %RELSP	VALUE TRIP BANDVAL HYSTER PREACT PREVAL RELNUM BATCH PSHACCM PSHTARE PSHPRNT ALARM ACCESS NAME DIGOUT	Configure GROSSSP, NETSP, and RELSP setpoints. See Figure 3-11 on page 30 and Level 4 parameter descriptions.
PAUSE DELAY WAITSS	PSHTARE PSHPRNT PSHACCM ACCESS DIGOUT NAME VALUE	Configure PAUSE, DELAY, and WAITSS setpoints. See Figure 3-12 on page 30 and Level 4 parameter descriptions.
COUNTER AUTOJOG COZ INMOTON INRANGE –GROSS –NET BATCHPR	VALUE ACCESS NAME DIGOUT	Configure COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, –GROSS, –NET, AND BATCHPR setpoints. See Figure 3-13 on page 30 and Level 4 parameter descriptions.
TIMER CONCUR	VALUE START END ACCESS NAME DIGOUT	Configure TIMER and CONCUR setpoints. See Figure 3-14 on page 31 and Level 4 parameter descriptions.
Level 4 submenus		
VALUE	*number*	GROSSSP, NETSP, RELSP setpoint types: Specifies the target weight value. DELAY, AUTOJOG, TIMER, and CONCUR setpoint types: Specifies, in 0.1-second intervals, a time value in the range 0–65535. COUNTER setpoint types: Specifies the number of consecutive batches to be run.
TRIP	**HIGHER** LOWER INBAND OUTBAND	GROSSSP, NETSP, and RELSP setpoint types: Specifies whether the setpoint is tripped when the weight is higher or lower than the setpoint value, within a band established around the value, or outside of that band. In a batch sequence with TRIP=HIGHER, the associated digital output is active until the setpoint value is reached or exceeded; with TRIP=LOWER, the output is active until the weight goes below the setpoint value.
BANDVAL	*number*	GROSSSP, NETSP, and RELSP setpoint types with TRIP=INBAND or OUTBAND: Specifies a weight equal to half the band width. The band established around the setpoint value is VALUE ±BANDVAL.
HYSTER	*number*	GROSSSP, NETSP, and RELSP setpoint types: Specifies a band around the setpoint value that must be exceeded before the setpoint, once off, can trip on again.

SETPTS Menu		
Parameter	**Choices**	**Description**
PREACT	**OFF** ON LEARN	GROSSSP, NETSP, and RELSP setpoint types: Allows the digital output associated with a setpoint to shut off before the setpoint is satisfied to allow for material in suspension. The ON value adjusts the setpoint trip value up or down (depending on the TRIP parameter setting) from the setpoint value. The LEARN value can be used to automatically adjust the preact value after each batch. LEARN compares the actual weight at standstill to the target setpoint value, then adjusts the preact by half of the difference after each batch.
PREVAL	*number*	GROSSSP, NETSP, and RELSP setpoint types: Specifies the preact value for setpoints with PREACT set to ON or LEARN. Depending on the TRIP setting specified for the setpoint, the setpoint trip value is adjusted up or down by the preact value.
RELNUM	*1–20*	RELSP setpoints: Specifies the number of the relative setpoint. The target weight for this setpoint is: • For +RELSP, the value of the relative setpoint plus the value (VALUE parameter) of this setpoint • For –RELSP, the value of the relative setpoint minus the value of this setpoint • For %RELSP, the percentage (specified on the VALUE parameter for this setpoint) of the relative setpoint
BATCH	**OFF** ON	GROSSSP, NETSP, and RELSP setpoint types: Specifies whether the setpoint is used as a batch (ON) or continuous (OFF) setpoint.
PSHACCM	**OFF** ON ONQUIET	GROSSSP, NETSP, RELSP, PAUSE, DELAY, and WAITSS setpoint types: Specify ON to update the accumulator and perform a print operation when the setpoint is satisfied. Specify ONQUIET to update the accumulator without printing. Gross weight must return to zero before another accumulation can occur.
PSHPRNT	**OFF** ON WAITSS	GROSSSP, NETSP, RELSP, PAUSE, DELAY, and WAITSS setpoint types: Specify ON to perform a print operation when the setpoint is satisfied; specify WAITSS to wait for standstill after setpoint is satisfied before printing.
PSHTARE	**OFF** ON	GROSSSP, NETSP, RELSP, PAUSE, DELAY, and WAITSS setpoint types: Specify ON to perform an acquire tare operation when the setpoint is satisfied. **NOTE:** PSHTARE acquires the tare regardless of the value specified for the REGULAT parameter on the PROGRM menu.
ALARM	**OFF** ON	GROSSSP, NETSP, RELSP, DELAY, and WAITSS setpoint types: Specify ON to display the word *ALARM* on the primary display while the setpoint is active (batch setpoints) or while the setpoint is not tripped (continuous setpoints).
START	*1–20*	TIMER and CONCUR setpoint types: Specifies the starting setpoint number. *Do not* specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint begins when the starting setpoint begins.
END	*1–20*	TIMER and CONCUR setpoint types: Specifies the ending setpoint number. *Do not* specify the number of the TIMER or CONCUR setpoint itself. The TIMER or CONCUR setpoint stops when the ending setpoint begins.
ACCESS	**ON** HIDE OFF	All setpoint types: Specifies whether the SETPOINT key can be used to change the setpoint value in normal mode, including macro simulations of pressing the SETPOINT key. ON: Value can be displayed and changed HIDE: Value cannot be displayed or changed OFF: Value can be displayed but not changed Setpoints with ACCESS=ON can be turned on or off when a batch is not running: • To turn the setpoint off, display the setpoint, then press CLEAR • To turn the setpoint on, display the setpoint, then press ENTER

SETPTS Menu		
Parameter	**Choices**	**Description**
NAME	**NONE**, *1–60*	All setpoint types: Specify the number of an assigned prompt. Up to 60 prompt names can be specified on the PROMPTS submenu of the PROGRM menu.
DIGOUT	**NONE**, *1–8*	All setpoint types: Specifies a digital output associated with the setpoint. For continuous setpoints, the digital output becomes active (low) when the condition is met; for batch setpoints, the digital output is active *until* the setpoint condition is met.

3.2.8 Digital Input Menu

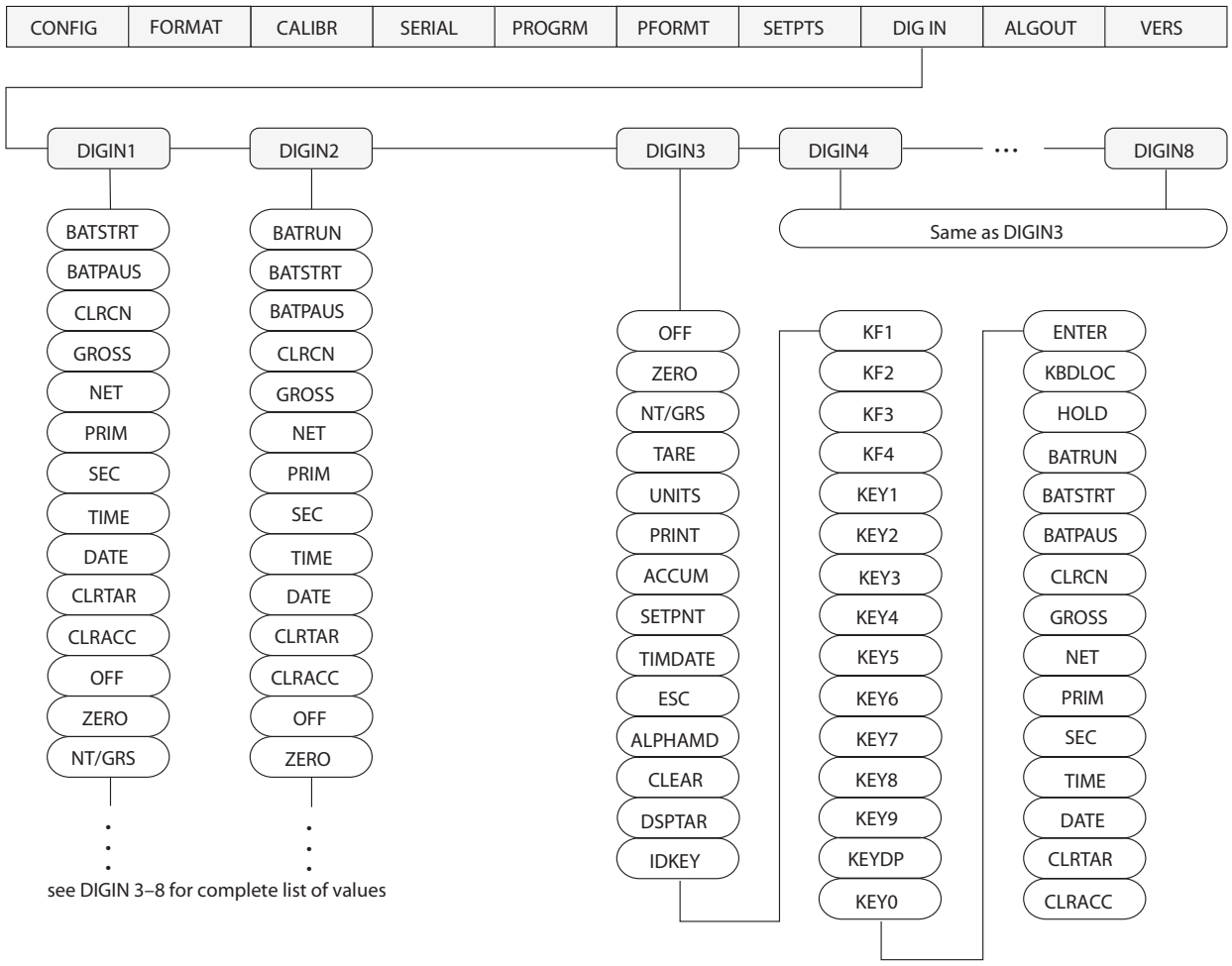

Figure 3-15. Digital Input Menu

DIG IN Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
DIGIN1 DIGIN2 DIGIN3 DIGIN4 DIGIN5 DIGIN6 DIGIN7 DIGIN8	**OFF** ZERO NT/GRS TARE UNITS PRINT ACCUM SETPNT TIMDATE ESC ALPHAMD CLEAR DSPTAR IDKEY KF1—KF4 KEY0—KEY9 KEYDP ENTER BATRUN BATSTRT BATPAUS KBDLOC HOLD CLRCN GROSS NET PRIM SEC TIME DATE CLRTAR CLRACC	Specifies the function activated by digital inputs 1–8. Default values are: DIGIN1=BATSTRT; DIGIN2=BATRUN; DIGIN3–DIGIN8=OFF. • ZERO, NT/GRS (net/gross mode toggle), TARE, UNITS, and PRINT provide the same functions as the five major front panel keys. • ACCUM, SETPNT, TIMDATE, ESC, ALPHAMD, CLEAR, DSPTAR, and IDKEY provide the same functions as the front panel keys. • KF1—KF4 are equivalent to pressing the macro keys, F1—F4. • KEY0—KEY9 and KEYDP (decimal point) are simulate pressing keys on the numeric keypad. • ENTER simulates pressing the front panel ENTER key. • BATRUN allows a batch routine to be started and run. With BATRUN active (low), the BATSTRT input starts the batch; if BATRUN is inactive (high), BATSTRT cancels the batch. • BATSTRT starts or ends a batch routine, depending on the state of the BATRUN input. • BATPAUS pauses a batch routine when held low. • KBDLOC locks the keyboard (indicator front panel) when held low. • HOLD holds the current display. Releasing this input clears the running average filter. • CLRCN resets the consecutive number to the value specified on the CONSTUP parameter (PROGRM menu). • GROSS, NET, PRIM, and SEC select gross, net, primary units, or secondary units display modes. • TIME and DATE inputs show TIME or DATE entry displays. DATE simulates pressing the TIME/DATE key once; TIME simulates pressing the key twice. • CLRTAR clears the current tare. • CLRACC clears the accumulator.

Table 3-7. Digital Input Menu Parameters

3.2.9 Analog Output Menu

The ALGOUT menu is used only if the analog output option is installed. If the analog output option is installed, configure all other indicator functions and calibrate the indicator before configuring the analog output. See Section 10.7 on page 71 for analog output calibration procedures.

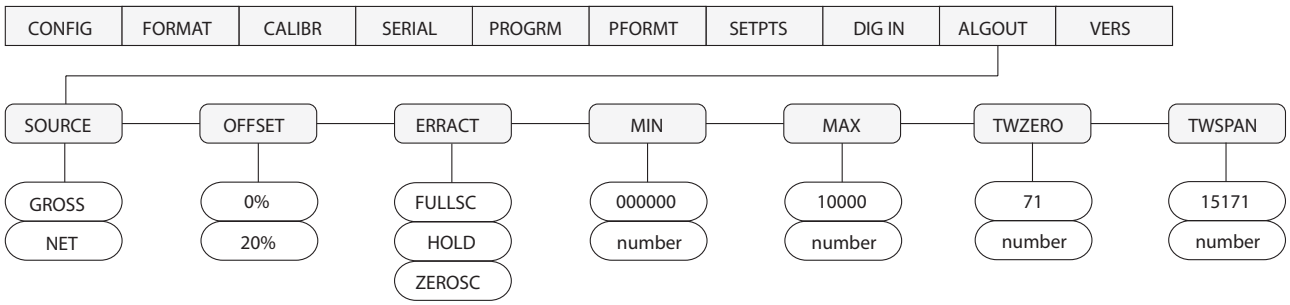

Figure 3-16. Analog Output Menu

ALG OUT Menu		
Parameter	**Choices**	**Description**
Level 2 submenus		
SOURCE1	GROSS NET	Specifies the source tracked by the analog output.
OFFSET	0% 20%	Zero offset. Selects whether the analog output supplies voltage (0–10 V) or current (4–20 mA) output. Select 0% for 0–10 V output; select 20% for 4–20 mA output.
ERRACT	FULLSC HOLD ZEROSC	Error action. Specifies how the analog output responds to system error conditions. Possible values are: FULLSC: Set to full value (10 V or 20 mA) HOLD: Hold current value ZEROSC: Set to zero value (0 V or 4 mA)
MIN	000000 *number*	Specifies the minimum weight value tracked by the analog output. Specify a value in the range 0–9999999.
MAX	010000 *number*	Specifies the maximum weight value tracked by the analog output. Specify a value in the range 0–9999999
TWZERO	71 *number*	Tweak zero. Adjust the analog output zero calibration. Use a multimeter to monitor the analog output value. Press and hold △ or ▽ to adjust the output.
TWSPAN	15171 *number*	Tweak span. Adjust the analog output span calibration. Use a multimeter to monitor the analog output value. Press and hold △ or ▽ to adjust the output.

Table 3-8. Analog Output Menu Parameters

3.2.10 Version Menu

The VERS 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.

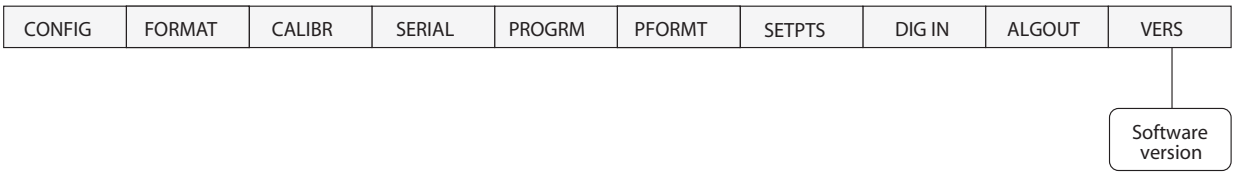

Figure 3-17. Version Menu

4.0 Calibration

The IQ plus 710 can be calibrated using the front panel, EDP commands, or the Revolution™ configuration utility. Each method consists of the following steps:

- Zero calibration
- Entering the test weight value
- Span calibration
- Optional five-point linearization
- Optional rezero calibration for test weights using hooks or chains.

The following sections describe the calibration procedure for each of the calibration methods.

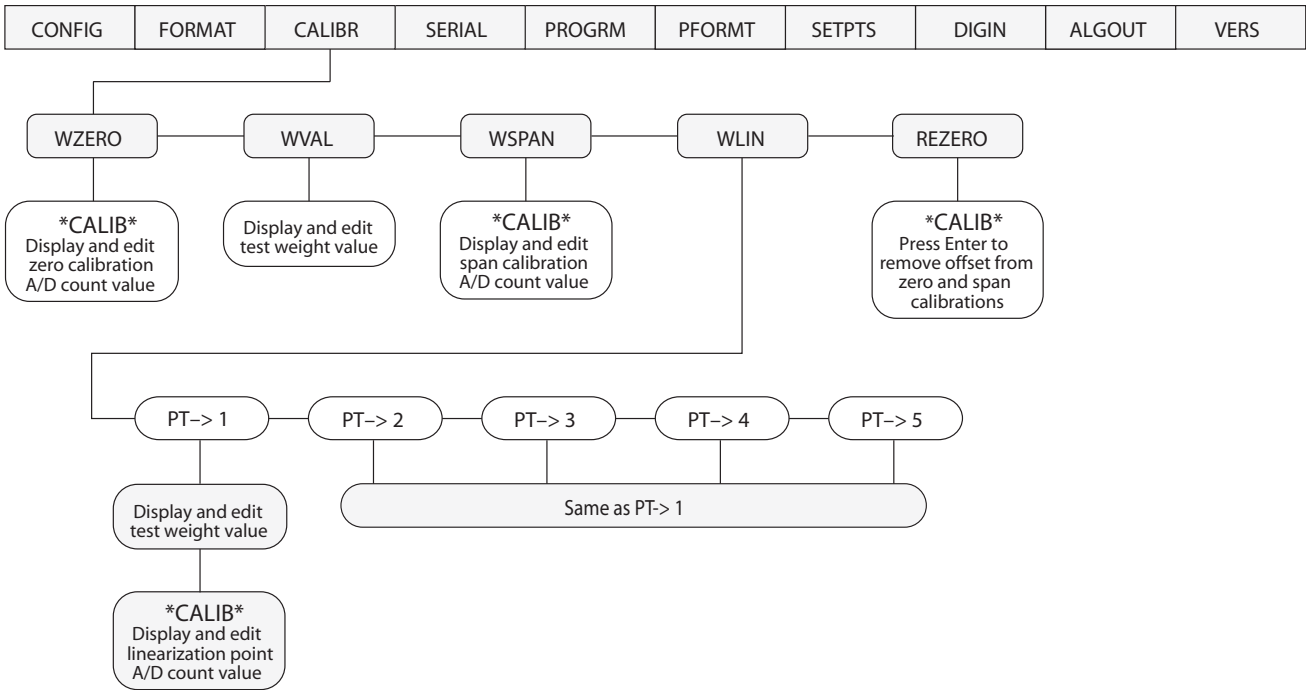

Figure 4-1. Calibration (CALIBR) Menu

4.1 Front Panel Calibration

To calibrate the indicator using the front panel, do the following:

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Press ▷ until the display reads *CALIBR* (see Figure 4-1). Press ▽ to go to zero calibration (*WZERO*).
3. With *WZERO* displayed, press ○ to calibrate zero. The indicator displays **CAL** while calibration is in progress. When complete, the A/D count for the zero calibration is displayed. Press ○ again to save the zero calibration value and go to the next prompt (*WVAL*).
4. With *WVAL* displayed, place test weights on the scale and press ○ to show the test weight value. Use the numeric keypad to enter the actual test weight, then press **ENTER** to save the value and go to span calibration (*WSPAN*).
5. With *WSPAN* displayed, press ○ to calibrate span. The indicator displays **CAL** while calibration is in progress. When complete, the A/D count for the span calibration is displayed. Press ○ again to save the span calibration value and go to the next prompt (*WLIN*).
6. Five-point linearization (using the WLIN parameter) provides increased scale accuracy by calibrating the indicator at up to five additional points between the zero and span calibrations.

Linearization is optional: if you choose not to perform linearization, skip the WLIN parameter; if linearization values have previously been entered, these values are reset to zero during calibration. To perform linearization, follow the procedure below:

With *WLIN* displayed, Press ▽ to go to the first linearization point (*PT-> 1*). Place test weights on the scale and press ○ or **ENTER**. Use the numeric keypad to enter the actual test weight value, then press **ENTER** to calibrate. The indicator displays **CAL** while calibration is in progress. When complete, the A/D count for the linear calibration is displayed. Press **ENTER** again to save the calibration value and go to the next prompt (*PT-> 2*).

Repeat for up to five linearization points. To exit the linearization parameters, press △ to return to WLIN.

7. The optional rezero function is used to remove a calibration offset when hooks or chains are used to hang the test weights.
   - If no other apparatus was used to hang the test weights during calibration, remove the test weights and press △ to return to the CALIBR menu.
   - If hooks or chains were used during calibration, remove these and the test weights from the scale. With all weight removed, press **ENTER** to rezero the scale. This function adjusts the zero and span calibration values. The indicator displays **CAL** while the zero and span calibrations are adjusted. When complete, the adjusted A/D count for the zero calibration is displayed. Press **ENTER** to save the value, then press △ to return to the CALIBR menu.
8. Press ◁ until the display reads *CONFIG*, then press △ to exit setup mode.

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 2.3.2 on page 7 for EDP port pin assignments; see Section 5.0 on page 41 for more information about using EDP commands.

Once the indicator is connected to the sending device, do the following:

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Send the WZERO EDP command to calibrate zero. The indicator displays **CAL** while calibration is in progress.
3. Place test weights on the scale and use the WVAL command to enter the test weight value in the following format:

   WVAL=*nnnnnn*<CR>
4. Send the WSPAN EDP command to calibrate span. The indicator displays **CAL** while calibration is in progress.
5. Up to five linearization points can be calibrated between the zero and span calibration values. Use the following commands to set and calibrate a single linearization point:

   WLIN.V1=*nnnnn*<CR>
   WLIN.C1<CR>

   The WLIN.V1 command sets the test weight value (*nnnnn*) for linearization point 1. The WLIN.C1 command calibrates the point. Repeat using the WLIN.V*x* and WLIN.C*x* commands as required for additional linearization points.
6. To remove an offset value, clear all weight from the scale, including hooks or chains used to hang test weights, then send the REZERO EDP command. The indicator displays **CAL** while the zero and span calibrations are adjusted.
7. Send the KUPARROW or KEXIT EDP command to exit setup mode.

4.3 Revolution™ Calibration

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

Use the following procedure to calibrate the indicator:

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform.
2. Select *Calibrate Indicator* from the Revolution main menu.
3. On the Indicator Calibration display, select the indicator model (*IQ+710*) and communications port then click *OK*.
4. Revolution uploads calibration data from the indicator then presents the information in a display like that shown in Figure 4-2.

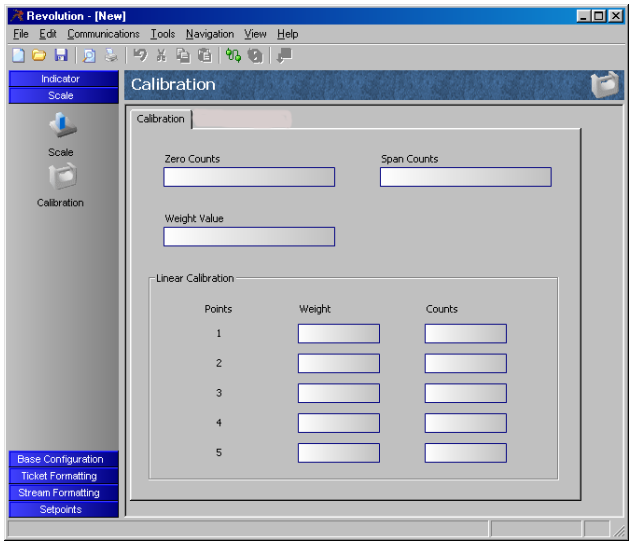

Figure 4-2. Revolution Calibration Display

5. Enter the *Value of Test Weight* to be used for span calibration then click *START*.
6. A dialog box asks whether hooks or chains are used to hang calibration test weights. Click *Yes* or *No* to continue.
7. The Zero Calibration dialog box prompts you to remove all weight from the scale. Clear the scale and click *OK* to begin zero calibration. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
8. When zero calibration is complete, the Span Calibration dialog box prompts you to place test weights on the scale for span calibration. Place test weights on the scale then click *OK*.
9. When span calibration is complete, a dialog box asks whether you wish to perform linear calibration. Click *Yes* to perform linear calibration for up to five linearization points, or click *No* to continue calibration with step 11.
10. On the Linear Calibration display, select the point (1–5) to calibrate, then click *Calibrate*. Place test weights on scale then click *OK*. When prompted, enter the test weight value then press Enter. Repeat for additional linearization points, then click *Exit* to return to the Indicator Calibration display.
11. If hooks or chains were used to hang test weights, the Rezero dialog box prompts you to remove weights from the scale. Remove the weights then click *OK*.

    If hooks or chains were not used in the calibration procedure, Revolution goes directly to step 12. Calibration is complete.
12. When calibration is complete, the *New Settings* fields of the Indicator Calibration display are filled in. Click *Exit* to save the new values and return to the Revolution main menu; to restore the previous calibration values (including linear calibration values), click *Restore Settings*.

4.4 More About Calibration

The following topics provide additional information about compensating for environmental factors (Section 4.4.1) and diagnostic information for determining expected zero and span coefficients.

4.4.1 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 WVAL 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 *WVAL* prompt and press ○ to show the test weight value. Press △ or ▽ to adjust calibration up or down. Press ○ to save the value, then press △ to return to the CALIBR menu.

4.4.2 Zero Deadload A/D Counts

Table 4-1 lists the ideal A/D counts that result from input signals of 0–45 mV with zero deadload. Actual values will typically be higher than the values shown in Table 4-1.

Input Signal (mV)	Raw A/D Count
0	105 000
1	126 000
2	147 000
3	168 000
4	189 000
5	210 000
6	231 000
7	252 000
8	273 000
9	294 000
10	315 000
15	420 000
20	525 000
30	735 000
45	1 050 000

Table 4-1. Ideal A/D Raw Counts

4.4.3 Calculating the Span Coefficient

The span coefficient value displayed by the WSPAN parameter can be calculated using the following formula:

(21000 * mV_signal_input) + zero_coefficient

where mV_signal_input is the change in the signal input when the test weight is applied and the zero_coefficient is the WZERO value. Actual values typically vary from the calculated value.

5.0 EDP Commands

The IQ plus 710 indicator 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 configuration data or to save that data to an attached personal computer. This section describes the EDP command set and procedures for saving and transferring data using the EDP port.

NOTE: *The full duplex RS-232 printer port provided with Version 2.0 and later hardware can also be used to process EDP commands.*

5.1 The EDP Command Set

The EDP command set can be divided into five groups: key press commands, reporting commands, the RESETCONFIGURATION special function command, parameter setting commands, and transmit weight data commands.

When the indicator processes an EDP command, it responds with the message *OK*. The *OK* response verifies that the command was received and has been executed. If the command is unrecognized or cannot be executed, the indicator responds with *??*.

The following sections list the commands and command syntax used for each of these groups.

5.1.1 Key Press Commands

Key press EDP commands (see Table 5-1) simulate pressing the keys on the front panel of the indicator. These commands can be used in both setup and weighing mode. Several of the commands serve as "pseudo" keys, providing functions that are not represented by a key on the front panel.

For example, 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.

Command	Function
KZERO	In weighing mode, press the ZERO key
KGROSSNET	In weighing mode, press the GROSS/NET key
KGROSS	Go to gross mode (pseudo key)
KNET	Go to net mode (pseudo key)

Table 5-1. EDP Key Press Commands

Command	Function
KTARE	Press the TARE key
KUNITS	In weighing mode, press the UNITS key
KPRIM	Go to primary units (pseudo key)
KSEC	Go to secondary units (pseudo key)
KPRINT	In weighing mode, press the PRINT key
KID	Press the ID key
KSETPOINT	Press the SETPOINT key
KTIMEDATE	Press the TIME/DATE key
KTIME	Display time (pseudo key)
KDATE	Display date (pseudo key)
KESCAPE	Press the ESCAPE key
KALPHA	Press the ALPHA ENTRY key
KDISPACCUM	Press the ACCUM key
KDISPTARE	Press the DISPLAY TARE key
KCLR	Press the CLEAR key
KCLRCN	Reset consecutive number (pseudo key)
KCLRTAR	Clear tare from system (pseudo key)
KLEFTARROW	In setup mode, move left in the menu
KRIGHTARROW	In setup mode, move right in the menu
KUPARROW	In setup mode, move up in the menu
KDOWNARROW	In setup mode, move down in the menu
KEXIT	In setup mode, exits to normal mode
KCLRNV	Clear non-volatile RAM
K0–K9	Press number 0 (zero) through 9
KDOT	Press the decimal point (.)
KENTER	Press the ENTER key
KF1	Play MACRO1
KF2	Play MACRO2
KF3	Play MACRO3
KF4	Play MACRO4
KLOCK	Lock specified front panel key. For example, to lock the SETPOINT key, enter KLOCK=KSETPOINT.
KUNLOCK	Unlock specified front panel key. For example, to unlock the TIME/DATE key, enter KUNLOCK=KTIMEDATE.

Table 5-1. EDP Key Press Commands (Continued)

5.1.2 Reporting Commands

Reporting commands (see Table 5-2) send specific information to the EDP port. These commands can be used in both setup mode and normal mode.

Command	Function
DUMPALL	List all parameter values
SPDUMP	Print setpoint configuration
VERSION	Write IQ plus 710 software version
P	Write current displayed weight with units identifier. See Section 10.2 on page 66 for more information.
S	Write one frame of stream format

Table 5-2. EDP Reporting Commands

5.1.3 The RESETCONFIGURATION Command

The RESETCONFIGURATION command can be used in setup mode to restore all configuration parameters to their default values.

This command is equivalent to using the DEFAULT function in TEST mode. See Section 10.8 on page 72 for more information about test mode.

NOTE: All load cell calibration settings are lost when the RESETCONFIGURATION command is run.

5.1.4 Parameter Setting Commands

Parameter setting commands allow you to display or change the current value for a particular configuration parameter (Tables 5-3 through 5-12).

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

command<ENTER>

Most parameter values can be changed in setup mode only; setpoint parameters listed in Table 5-8 on page 45 can be changed when in normal weighing mode.

Use the following command syntax when changing parameter values:

command=value<ENTER>

where *value* is either a number or a parameter value. Use no spaces before or after the equal (=) sign. If you type an incorrect command, the display reads *??*.

For example, to set the motion band parameter to 5, type the following:

MOTBAND=5D<ENTER>

For parameters with selectable values, enter the command and equal sign followed by a question mark:

command=?<ENTER>

to see a list of those values. The indicator must be in setup mode to use this function.

Command	Description	Values
GRADS	Graduations	*1–9999999*
ZTRKBND	Zero track band	OFF, 0.5D, 1D, 3D
ZRANGE	Zero range	1.9%, 100%
MOTBAND	Motion band	1D, 2D, 3D, 5D, 10D, 20D, OFF
OVRLOAD	Overload	FS+2%, FS+1D, FS+9D, FS
SMPRAT	Sample rate	30HZ, 3.75HZ, 7.5HZ, 15HZ
DIGFLTR1 DIGFLTR2	Digital filtering	1, 2, 4, 8, 16, 32, 64, 128, 256
RATLTRAP	Rattletrap filtering	OFF, ON
DFSENS	Digital filter cutout sensitivity	2OUT, 4OUT, 8OT, 16OUT, 32OUT, 64OUT, 128OUT
DFTHRH	Digital filter cutout threshold	NONE, 2DD, 5DD, 10DD, 20DD, 50DD, 100DD, 200DD, 250DD
ALGFLTR	Analog filter	OFF, 2HZ, 8HZ
PWRUPMD	Power up mode	GO, DELAY
TAREFN	Tare function	BOTH, NOTARE, PBTARE, KEYED

Table 5-3. CONFIG EDP Commands

Command	Description	Values
PRI.DECPNT	Primary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
PRI.DSPDIV	Primary units display divisions	1D, 2D, 5D
PRI.UNITS	Primary units	LB, KG, G, OZ, TN, T, GN, TROYOZ, TROYLB, LT, NONE
SEC.DECPNT	Secondary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SEC.DSPDIV	Secondary units display divisions	1D, 2D, 5D
SEC.UNITS	Secondary units	LB, KG, G, OZ, TN, T, GN, TROYOZ, TROYLB, LT, NONE
SEC.MULT	Secondary units multiplier	*0.00000–99999.99*
DECFMT	Decimal format	DOT, COMMA
DSPRATE	Display rate	250MS, 500MS, 750MS, 1SEC, 1500MS, 2SEC, 2500MS, 3SEC, 4SEC, 6SEC, 8SEC

Table 5-4. FORMAT EDP Commands

Command	Description	Values
WZERO	Zero calibration	—
WVAL	Test weight value	*test_weight_value*
WSPAN	Span calibration	—
WLIN.F1–WLIN.F5	Actual raw count value for linearization points 1–5	—
WLIN.V1–WLIN.V5	Test weight value for linearization points 1–5	*test_weight_value*
WLIN.C1–WLIN.C5	Calibrate linearization points 1–5	—
REZERO	Rezero	—
LC.CD	Set deadload coefficient	*value*
LC.CW	Set span coefficient	*value*

Table 5-5. CALIBR EDP Commands

Command	Description	Values
EDP.BAUD	EDP port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200
EDP.BITS	EDP port data bits/parity	8NONE, 7EVEN, 7ODD
EDP.TERMIN	EDP port termination character	CR/LF, CR
EDP.EOLDLY	EDP port end-of-line delay	*0–255* (0.1-second intervals)
EDP.HANDSHK	EDP port handshaking	OFF, ON
EDP.ADDRESS	EDP port RS-485 address	*0, 01–255*
EDP.BUS	EDP port bus network enable	OFF, ON
EDP.STREAM	EDP port streaming	OFF, ON
PRN.BAUD	Printer port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200
PRN.BITS	Printer port data bits/parity	8NONE, 7EVEN, 7ODD
PRN.TERMIN	Printer port termination character	CR/LF, CR
PRN.EOLDLY	Printer port end-of-line delay	*0–255* (0.1-second intervals)
PRN.HANDSHK	Printer port handshaking	OFF, ON

Table 5-6. SERIAL EDP Commands

Command	Description	Values
PRN.BUS	Printer port bus network enable	OFF, ON
PRN.STREAM	Printer port streaming	OFF, ON
PRNDEST	Print destination	EDP, PRN, BOTH

Table 5-6. SERIAL EDP Commands (Continued)

Command	Description	Values
SD	Set date	*MMDDYY*, *DDMMYY, YYMMDD* (enter using DATEFMT specified)
ST	Set time	*hhmm* (enter using 24-hour format)
DATEFMT	Date format	MMDDYY, DDMMYY, YYMMDD
DATESEP	Date separator	SLASH, DASH, SEMI
TIMEFMT	Time format	12HOUR, 24HOUR
TIMESEP	Time separator	COLON, COMMA
CONSNUM	Consecutive numbering	*0–9 999 999*
CONSTUP	Consecutive number start-up value	*0–9 999 999*
UID	Unit identifier	*nnnnnn*
TARE100	Truck in/out mode	OFF, MODE1, MODE2, MODE3, MODE4, MODE5, MODE6
ACCUM	Accumulator	OFF, ON
CFGPWD	Configuration password	*0, 1–9999999*
SPPWD	Setpoint password	*0, 1–9999999*
KYBDLK	Keyboard lock (disable keypad)	OFF, ON
LOCKON	Lock indicator front panel in operating mode	Same function as KYBDLK command
LOCKOFF	Unlock indicator front panel in operating mode	
AUXLK	Disable auxiliary keyboard	OFF, ON
MACONLY	Disable all except macro keys	OFF, ON
ZERONLY	Disable all keys except ZERO	OFF, ON
ALPHAKB	Enable ALPHA ENTRY key	OFF, ON
REGULAT	Regulatory compliance	NONE, OIML, NTEP, CANADA
REGWORD	Regulatory word	GROSS, BRUTTO
PROMPT#1– PROMPT#60	Macro prompts/setpoint names	See Section 9.0 on page 60 for information about macro programming
MACRO1.K01– MACRO1.K30	Set MACRO1 keystroke	
MACRO2.K01– MACRO2.K30	Set MACRO2 keystroke	
MACRO3.K01– MACRO3.K30	Set MACRO3 keystroke	
MACRO4.K01– MACRO4.K30	Set MACRO4 keystroke	
MACRO1.STRTBAT MACRO2.STRTBAT MACRO3.STRTBAT MACRO4.STRTBAT	Start batch	OFF, ON

Table 5-7. PROGRM EDP Commands

Command	Description	Values
SETPOINT	Setpoint number	*1–20*
KIND	Setpoint kind	OFF, GROSSSP, NETSP, +RELSP, –RELSP, %RELSP, PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, –GROSS, –NET, BATCHPR, TIMER, CONCUR
VALUE	Setpoint value	*number*
PSHTARE	Push tare	OFF, ON
PSHPRINT	Push print	OFF, ON, WAITSS
PSHACCM	Push accumulate	OFF, ON, ONQUIET
TRIP	Trip	HIGHER, LOWER, INBAND, OUTBAND
BANDVAL	Band value	*number*
HYSTER	Hysteresis	*number*
ALARM	Alarm	OFF, ON
PREACT	Preact	OFF, ON, LEARN
PREVAL	Preact value	*number*
BATCH	Batch step enable	OFF, ON
NAME	Setpoint name number	NONE, *1–60*
ACCESS	Setpoint access	OFF, ON, HIDE
DIGOUT	Digital output	NONE, *1–8*
RELNUM	Relative setpoint numer	*1–20*
START	Starting setpoint	*1–20*
END	Ending setpoint	*1–20*
BATCHNG	Batching mode	OFF, AUTO, MANUAL

Table 5-8. SETPNTS EDP Commands

Command	Description	Values
GFMT	Gross demand print format string	See Section 6.0 on page 49 for detailed information
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	
EDPFMT	EDP demand print format string	
HDRFMT	Ticket header format string	

Table 5-9. PFORMT EDP Commands

Command	Description
DON#*nn*	Set digital output *nn* on (active)
DON#0	Set all digital outputs on (active)
DOFF#*nn*	Set digital output *nn* off (inactive)
DOFF#0	Set all digital outputs off (inactive)
For commands ending with "#*nn*", *nn* is the digital output (01–8) being set on or off.	

Table 5-10. DIG OUT EDP Commands

Command	Description	Values
DIGIN1 DIGIN2 DIGIN3 DIGIN4 DIGIN5 DIGIN6 DIGIN7 DIGIN8	Digital input function	OFF, ZERO, NT/GRS, TARE, UNITS, PRINT, ACCUM, SETPNT, TIMDATE, ESC, ALPHAMD, CLEAR, DSPTAR, IDKEY, KF1–KF4, KEY0–KEY9, KEYDP, ENTER, BATRUN, BATSTRT, BATPAUS, KBDLOC, HOLD, CLRCN, GROSS, NET, PRIM, SEC, TIME, DATE, CLRTAR, CLRACC

Table 5-11. DIG IN EDP Commands

Command	Description	Values
SOURCE1	Analog output source	GROSS, NET
OFFSET	Zero offset	0%, 20%
ERRACT	Error action	FULLSC, HOLD, ZEROSC
MIN	Minimum value tracked	*0–9 999 999*
MAX	Maximum value tracked	*0–9 999 999*
ZERO1	Zero calibration	*0–16 383*
SPAN1	Span calibration	*0–16 383*

Table 5-12. ALGOUT EDP Commands

5.1.5 Normal Mode Commands

The normal mode commands (see Table 5-13) transmit data to the EDP port on demand. The SX command is valid only in normal operating mode; all other commands are valid in either setup or normal mode.

Command	Description	Response Format
CONSNUM	Set consecutive number	*0–9 999 999*
UID	Set unit ID	*nnnnnnn*
SD	Set date	*MMDDYY*, *DDMMYY, YYMMDD* (enter using DATEFMT specified)
ST	Set time	*hhmm* (enter using 24-hour format)
SX	Start EDP streaming	OK *or* ??
EX	Stop EDP streaming	OK *or* ??
DX	Start streaming raw A/D counts	OK *or* ??
RS	Reset system	—
XA	Transmit accumulator value	*nnnnnn UU* where *nnnnnn* is the weight value, *UU* is the units.
XG	Transmit gross weight in displayed units	
XN	Transmit net weight in displayed units	
XT	Transmit tare weight in displayed units	
XG2	Transmit gross weight in non-displayed units	
XN2	Transmit net weight in non-displayed units	
XT2	Transmit tare weight in non-displayed units	
XE	Query system error conditions	*nnnnn* See Section 10.1 on page 65 for detailed information about the XE command response format.

Table 5-13. Normal Mode EDP Commands

5.1.6 Batching Control Commands

The commands listed below provide batching control through the EDP port.

BATSTART

If the BATRUN digital input is active (low) or not assigned, the BATSTART command can be used to start the batch program.

BATRESET

Stops the program and resets the batch program to the first batch step. Run the BATRESET command after making changes to the batch configuration.

BATPAUSE

Stops the batch program at the current step. All digital outputs set on by the current step are set off. The BATSTRT DIGIN, BATSTART EDP command, or a macro configured with STRTBAT=ON can be used to restart the batch program at the current step.

BATSTATUS

The BATSTATUS command is used to check the current status of various setpoint and batching conditions. BATSTATUS returns 14 bytes of status data as described in Table 5-14. 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 5-14 shows the low order bit assignments for bytes 3–12. Use Table 5-15 on page 48 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 3–4 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 8–9 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	N/A				
	11					
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 5-14. BATSTATUS Command Structure

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 AC@@, the table at right can be used with the bit assignments described above to determine that digital outputs 4, 7, and 8 are active: • A (byte 8) indicates that DIGOUT 4 (bit 0) is on • C (byte 9) indicates that DIGOUTs 7 and 8 (bits 1 and 0) are on • @@ indicates that bytes 10 and 11 are not used	@	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 5-15. ASCII Translation Table for BATSTATUS Data

5.2 Saving and Transferring Data

Connecting a personal computer to the IQ plus 710 EDP port allows you to save indicator configuration data to the PC or to download configuration data from the PC to an indicator. The following sections describe the procedures for these save and transfer operations.

5.2.1 Saving and Printing Indicator Data

Configuration 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 2.3.2 on page 7 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 PC.

To save all configuration data, send the DUMPALL EDP command to the indicator. The IQ plus 710 responds by sending all configuration parameters to the PC as ASCII-formatted text.

Configuration data can also be sent to the printer port: To print configuration data, place the indicator in setup mode, then press the ID key.

5.2.2 Downloading Configuration Data from PC to Indicator

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

To download configuration data, connect the PC to the EDP port as described in Section 5.2.1. 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, calibrate the indicator as described in Section 4.0 on page 37.

NOTE: *Calibration settings are included in the configuration data downloaded to the indicator. For non-legal-for-trade applications, if the receiving indicator is a direct replacement for another IQ plus 710 and the attached scale is not changed, recalibration is not required.*

6.0 Print Formatting

The IQ plus 710 provides seven print formats that determine the format of the printed output when the **PRINT** key is pressed or when a KPRINT EDP command is received. Supported print formats are: GFMT, NFMT, EDPFMT, TRWIN, TRWOUT, and SPFMT. A header format, HDRFMT, allows specification of up to 300 characters of ticket header information. The contents of the HDRFMT format can be inserted into any other ticket format using the <AE> formatting command.

The particular ticket format used for a given print operation depends on the indicator configuration (see Table 6-2 on page 50).

Each print format can be customized to include up to 300 characters of information, such as company name and address, on printed tickets. You can use the indicator front panel (PFORMT menu), EDP commands, or the Revolution™ configuration utility to customize the print formats.

6.1 Print Formatting Commands

Table 6-1 lists commands you can use to format the IQ plus 710 print formats. Commands included in the format strings must be enclosed between < and > delimiters. Any characters outside of the delimiters are printed as text on the ticket. Text characters can include any ASCII character that can be printed by the output device.

Command	Description	Ticket Format		
		GFMT/NFMT/ EDPFMT	TRWIN/TRWOUT	SPFMT
<G>	Gross weight in displayed units	√	√	
<G2>	Gross weight in non-displayed units	√	√	
<N>	Net weight in displayed units	√	√	
<N2>	Net weight in non-displayed units	√	√	
<T>	Tare weight in displayed units	√	√	
<T2>	Tare weight in non-displayed units	√	√	
<A>	Accumulated weight in displayed units	√		
<AC>	Number of accumulator event (5-digit counter)	√		
<AT>	Time of last accumulator event	√		
<AD>	Date of last accumulator event	√		
<TR1>	Gross weight for current ticket in displayed units		√	
<TR2>	Tare weight for current ticket in displayed units		√	
<TR3>	Net weight for current ticket in displayed units		√	
<SV1>	Setpoint value when tripped in displayed units			√
<SV2>	Label for SV1 value			√
<BN>	Current setpoint number			√
<NA>	Current setpoint name			√
<TI>	Time	√	√	√
<DA>	Date	√	√	√
<TD>	Time and date	√	√	√
<ID>	ID number	√	√	√
<CN>	Consecutive number	√	√	√
<AE>	Ticket header (HDRFMT)	√	√	√
<NL*nn*>	New line (*nn* = number of termination (<CR/LF> or <CR>) characters)*	√	√	√

Table 6-1. Print Format Commands

Command	Description	Ticket Format		
		GFMT/NFMT/ EDPFMT	TRWIN/TRWOUT	SPFMT
<SP*nn*>	Space (*nn* = number of spaces)*	√	√	√
<SU>	Toggle weight data format (formatted/unformatted)**	√	√	√

NOTES:
Gross, net, and tare weights, SV1 setpoint weight are 9 digits in length, including sign (10 digits with decimal point), followed by a space and a two-digit units identifier. Total field length with units identifier is 12 (or 13) characters.

TR1, TR2, and TR3 truck ticket weight data includes keywords INBOUND, KEYED, RECALLED, as necessary.

ID and consecutive number (CN) fields are 1–7 characters in length, as required.

ID numbers included in the print format string (<ID> command) must be set using the UID EDP command.

Ticket header (AE) inserts information specified for the HDRFMT header format.

* If *nn* is not specified, 1 is assumed. Value must be in the range 1–99.

** After receiving an SU command, the indicator sends unformatted data until the next SU command is received. Unformatted data omits decimal points, leading and trailing characters.

Table 6-1. Print Format Commands (Continued)

NOTE: The <G2>, <N2>, and <T2> commands listed in Table 6-1 print the gross, net, and tare weights in non-displayed units—that is, in the units *not* currently displayed on the indicator.

6.2 Default Ticket Formats

Table 6-2 shows the default print formats for the IQ plus 710 and lists the conditions under which each print format is used. The HDRFMT format is used to specify header information that can be used by the other ticket formats. The contents of the HDRFMT format can be inserted into any other ticket format using the <AE> formatting command.

Format	Default Format String	Used When
GFMT	GROSS<G><NL2><TD><NL>	Normal mode, no tare in system
NFMT	GROSS<G><NL>TARE<SP><T><NL>NET<SP2><N> <NL2><ID><NL>	Normal mode, tare in system
EDPFMT	GROSS<G><NL2><TD><NL>	Normal mode, PRNDEST=BOTH (SERIAL menu). GFMT (or NFMT) print format is sent to printer port simultaneously.
TRWIN	<NL>ID<SP><ID><NL2>GROSS<TR1> <NL2><DA><SP><TI><NL>	Truck mode (TARE100 ¦ OFF), when truck ID is entered and NEWID key is pressed. See Note 2.
TRWOUT	<NL6>ID<SP><ID><NL2>GROSS<TR1><NL>TARE<SP><TR2> <NL>NET<SP2><TR3><NL2><DA><SP><TI><NL>	Truck mode (TARE100 ¦ OFF), when truck ID is entered and PRINT key is pressed. See Note 2.
SPFMT	<SV1><SP><SV2><NL>	Setpoint push print operation (PSHPRNT=ON)
HDRFMT	COMPANY NAME<NL>STREET ADDRESS<NL> CITY, ST ZIP<NL2>	N/A

NOTES:
1. In OIML and CANADA modes, the letters *PT* (preset tare) are automatically inserted after the printed tare weight.
2. For most applications, when using a printer attached to the EDP port, set PRNDEST (on the SERIAL menu) to EDP. If PRNDEST=BOTH, only the EDP format is sent to the printer.

Table 6-2. Default Print Formats

6.3 Customizing Print Formats

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

6.3.1 Using the EDP Port

With a personal computer, terminal, or remote keyboard attached to the IQ plus 710 EDP port, you can use the EDP command set to customize the print format strings.

To view the current setting of a format string, type the name of the print format and press **ENTER**. For example, to check the current configuration of the GFMT format, type GFMT and press **ENTER**. The indicator responds by sending the current configuration for the gross format:

GFMT=<G> GROSS<NL>

To change the format, use the GFMT or NFMT EDP command followed by an equals sign (=) and the modified print format string. For example, to add the name and address of a company to the gross format, you could send the following EDP command:

GFMT=MOE'S DUMP<NL>2356 EAST HIGHWAY ROAD<NL>SMALLTOWN<NL2><G> GROSS<NL>

A ticket printed using this format might look like the following:

MOE'S DUMP
2356 EAST HIGHWAY ROAD
SMALLTOWN

1345 LB GROSS

The ticket above could also be formatted by specifying the company address information in the HDRFMT ticket format, then substituting the <AE> command for the address in the GFMT ticket format:

HDRFMT=MOE'S DUMP<NL>2356 EAST HIGHWAY ROAD<NL>SMALLTOWN<NL2>

GFMT=<AE><G> GROSS<NL>

6.3.2 Using the Front Panel

If you have no access to equipment for communication through the EDP port or are working at a site where such equipment cannot be used, you can use the PFORMT menu (see Figure 6-2 on page 52) to customize the print formats.

Using the PFORMT menu, you can edit the print format strings by changing the decimal values of the ASCII characters in the format string.

NOTES:

- *Lower-case letters and some special characters cannot be displayed on the IQ plus 710 front panel and are shown as blanks. The IQ plus 710 can send or receive any ASCII character; the character printed depends on the particular ASCII character set implemented for the receiving device.*
- *Because commas and periods are shown as part of the digit on the front panel, display and displayed position of commas entered into a print format may not reflect the actual printed output.*

6.3.3 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, then select weight value fields from the tool bar and place them where you want them to appear on the printed ticket.

Figure 6-1 shows an example of the Revolution print formatting grid.

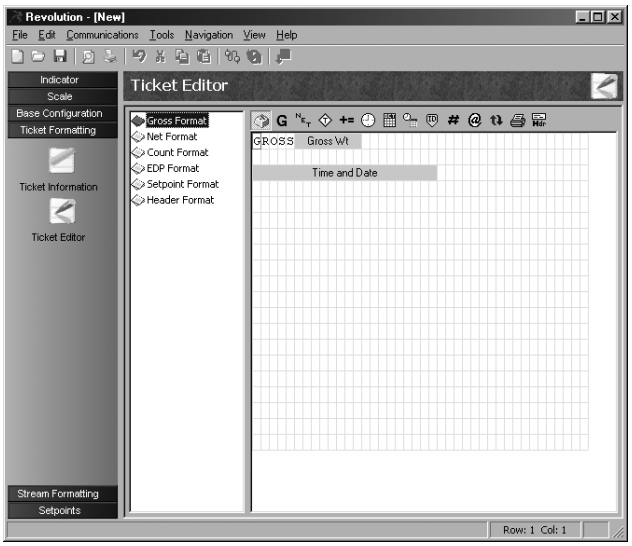

Figure 6-1. Revolution Print Format Grid

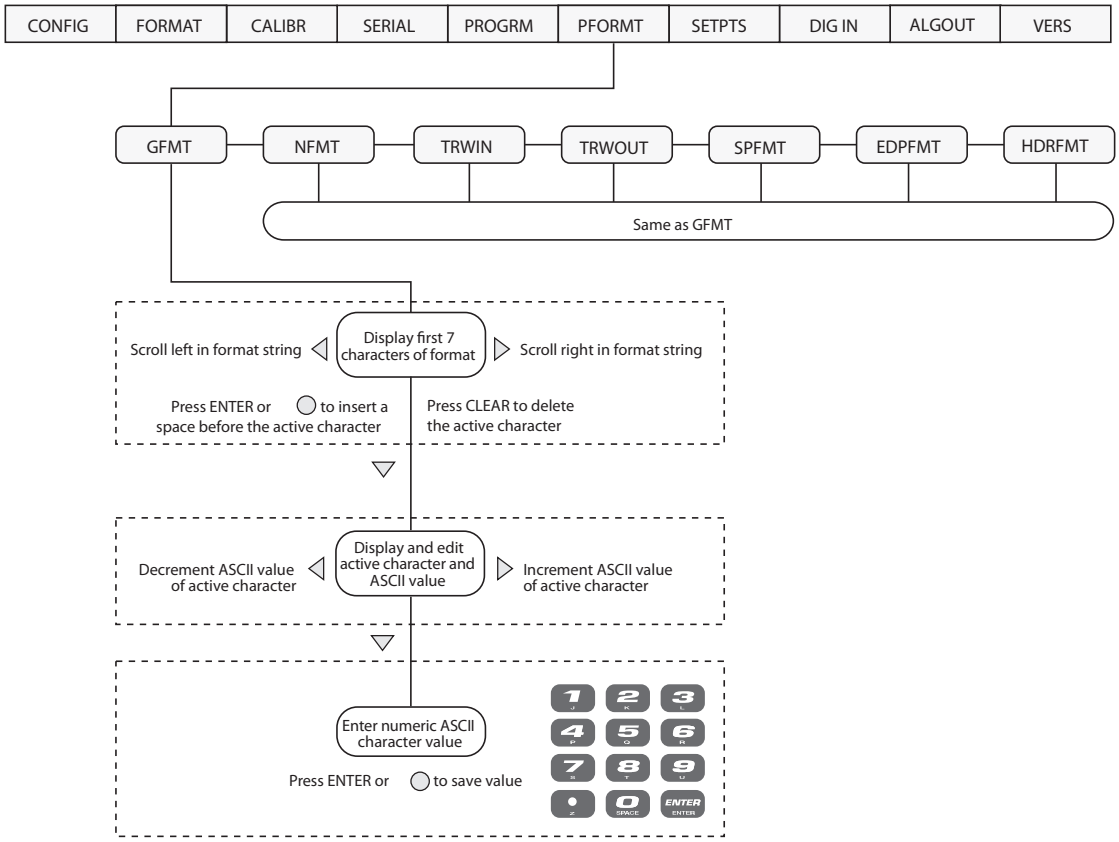

Figure 6-2. PFORMT Menu, Showing Alphanumeric Character Entry Procedure

7.0 Truck Modes

The truck in/out modes are used to handle multiple truck ID numbers and tare weights. Six truck modes combine stored ID, keyed tare, and value swapping 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 7-1. 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 300 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 memory and 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 using the numeric keypad and the **TARE** key. 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.*

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, press the setup switch to enter setup mode. Use the navigation keys to go to the PROGRM menu, then to the TARE100 submenu. Figure 7-1 shows the structure of the TARE100 submenu.

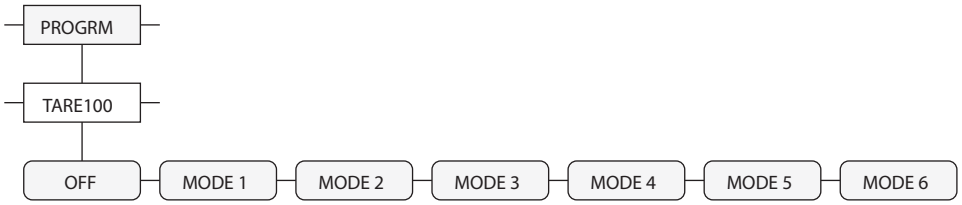

Figure 7-1. TARE100 Truck Mode Selections

7.1 Using the Truck Modes

All the truck in/out modes let you search the memory for a specific ID number. Information can be displayed, cleared, or printed.

- To display a particular ID, key in the ID number and press **DISPLAY TARE**. If the number is in memory, it is displayed. If not, the indicator displays *NO ID*. **ENTER** toggles between the ID number and tare weight.
- If the ID number is not known, press **ID** to display the first available ID in the register, then press **DISPLAY TARE** to display the next ID. Each time you press **DISPLAY TARE**, the next number appears on the display.
- To display all stored IDs, key in any ID number and press **DISPLAY TARE**. Each time you press **DISPLAY TARE**, the next number appears on the display.
- To clear one or more truck IDs, display an ID you want to delete, then press **CLEAR**. The indicator responds by prompting *CLR REG??*. To clear only the displayed ID, press **CLEAR** again. To clear all truck IDs, press **ENTER**, then press **CLEAR** when the *CLR ALL??* prompt is shown.
- To print all stored ID numbers and their associated tare weights, press **PRINT** when an ID number is on the screen.

7.1.1 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 **ID**. This information remains in memory until the weigh-out ticket is printed.
4. The indicator prints the weigh-in ticket (TRWIN format) shown below:

   ```
   ID. NO. 304812
   GROSS 15000. LB INBOUND
   08/04/1998 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 a weigh-out ticket (TRWOUT format) and automatically clears the information from memory: If the tare weight is a keyed tare, the word *KEYED* is printed after *RECALLED* on the tare line.

7.1.2 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), key in the desired tare weight, then press **TARE**.
3. Key in an ID number (up to 7 digits) and press **I.D.** This information remains in memory until manually deleted.
4. The indicator prints the weigh-in ticket (TRWIN format). Truck leaves.
5. The loaded truck moves back onto the scale for weigh-out.
6. Key in the ID number and press **PRINT**. The indicator prints the weigh-out ticket (TRWOUT format). If value swapping is enabled (modes 3 and 4), the lower weight is always printed as the tare weight.

   ```
   ID. NO. 304812
   GROSS 100000. LB
   TARE   15000. LB RECALLED
   NET    85000. LB
   08/04/1998 10:55 AM
   ```

7.1.3 Single-Transaction Tare Weights and IDs

Temporary tare weights are supported in all modes that can be configured to use stored IDs (TARE100 modes 3–6). This function allows one-time weighing of trucks without adding the truck ID and tare weight to the indicator database.

To use this function, enter a truck ID containing a decimal point, then press **ID.** Tare weights and Truck IDs entered using decimal truck IDs are erased from the indicator database when the transaction is complete.

8.0 Setpoints

The IQ Plus 710 indicator provides twenty programmable setpoints for control of both indicator and external equipment functions. Setpoints are configured to trip based on specified conditions; tripping the setpoint can be used to request indicator functions (print, tare, accumulate) or to change the state of a digital output controlling external equipment. **NOTE:** *Weight-based setpoints are tripped by values specified in primary units only.*

Figure 8-1 shows the general structure of the SETPTS menu. See Section 3.2.7 on page 29 for a detailed description of the SETPTS menu. The eighteen setpoint kinds are described in Table 8-1 on page 56.

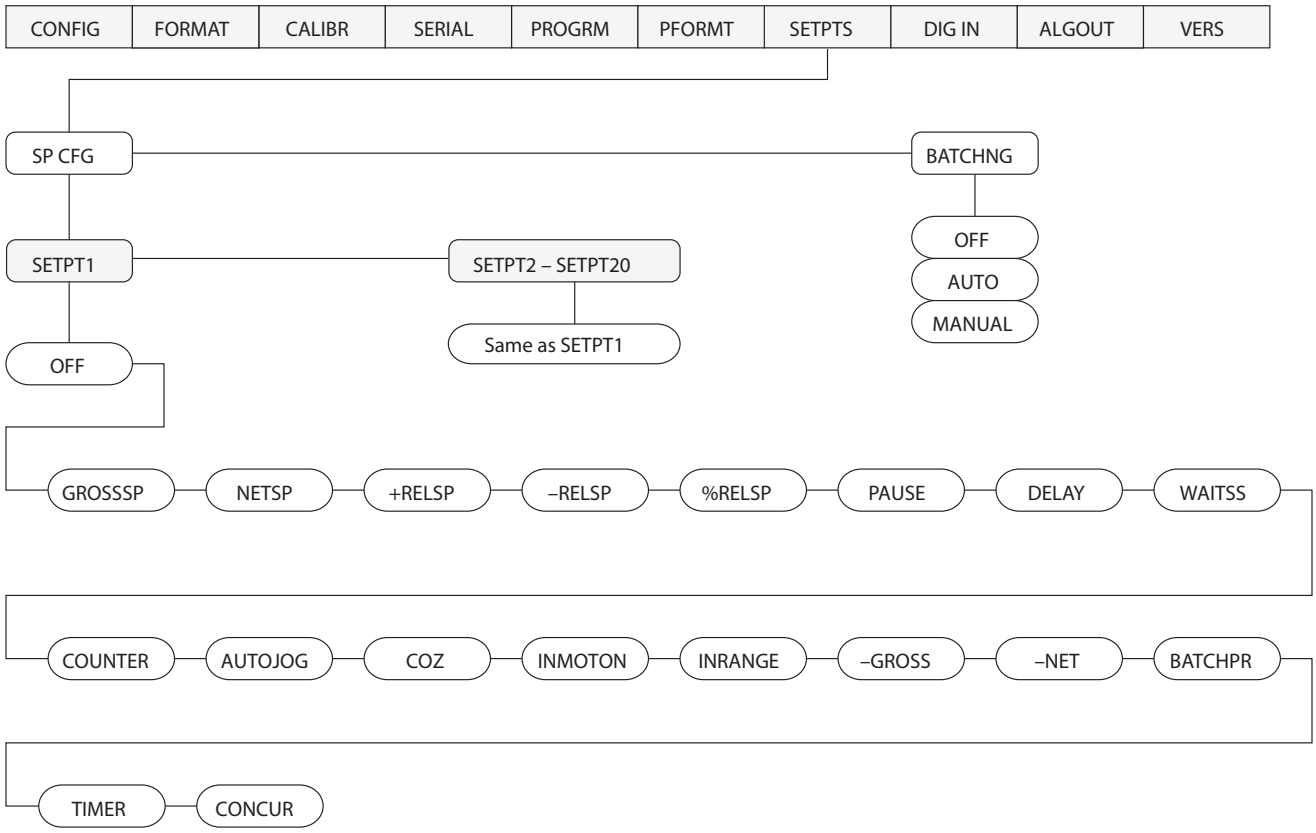

Figure 8-1. SETPTS Menu

8.1 Batch and Continuous Setpoints

IQ Plus 710 setpoints can be either continuous or batch setpoints.

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

Batch setpoints are active one at a time, in an ordered sequence. The *920i* can use batch setpoints to control up to twenty separate batch processing steps. A digital output associated with a batch setpoint is on until the setpoint condition is met, then latched for the remainder of the batch sequence.

To use batch setpoints, you must activate the BATCHNG parameter on the SETPTS menu. This parameter defines whether a batch sequence is automatic or manual. AUTO sequences repeat continuously, while MANUAL sequences require a BATSTRT digital input, BATSTART EDP command, or STRTBAT macro command before restarting. As shown in Table 8-1 on page 56, GROSSSP, NETSP, and RELSP setpoint kinds can be configured as either batch or continuous setpoints.

The BATCH parameter must also be set on for each batch setpoint. If the setpoint is defined but the BATCH parameter is off, the setpoint operates as a continuous setpoint, even during batch sequences.

Kind	Description	Batch	Continuous
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 BATSTRT 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.		√
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 (VALUE=0):** 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 (VALUE > 0):** If a non-zero value is specified for the VALUE parameter, that value represents the timer, in tenths of a second, for this setpoint. The digital output associated with this setpoint becomes active when the START setpoint becomes the current batch step and remains active until the timer expires. **NOTE:** If more than one concurrent setpoint is configured, each must be assigned to a different digital output.		√

Table 8-1. Setpoint Kinds

8.2 Batching Examples

8.2.1 Example 1

The following example uses seven setpoints to dispense material from a hopper in 100 LB batches and to automatically refill the hopper when its weight drops below 300 LB.

Digital inputs 1 and 2 are assigned to batch start and batch run functions: BATRUN must be on (low) before the BATSTRT input starts the batch.

```
DIGIN1=BATSTRT
DIGIN2=BATRUN
BATCHNG=MANUAL
```

Setpoint 1 ensures that the hopper has enough material to start the batch. If the hopper weight is 300 LB or higher, setpoint 1 is tripped.

```
SETPOINT=1
KIND=GROSSSP
VALUE=300
TRIP=HIGHER
BATCH=ON
ALARM=ON
```

Setpoint 2 waits for standstill, then performs a tare to put the indicator into net mode.

```
SETPOINT=2
KIND=WAITSS
PSHTARE=ON
```

Setpoint 3 is used as a reference (relative setpoint) for setpoint 4.

```
SETPOINT=3
KIND=NETSP
VALUE=0
TRIP=HIGHER
BATCH=OFF
```

Setpoint 4 is used to dispense material from the hopper. When the hopper weight falls to 100 LB less than its weight at the relative setpoint (setpoint 3), digital output 1 is set off.

```
SETPOINT=4
KIND=–RELSP
VALUE=100
TRIP=LOW
BATCH=ON
DIGOUT=1
RELNUM=3
```

Setpoint 5 is used to evaluate the gross amount of material in the hopper after dispensing, and to maintain a minimum material level in the hopper. When the hopper weight falls below 300 LB, digital output 2 becomes active and the hopper is refilled to 1000 LB.

```
SETPOINT=5
KIND=GROSSSP
VALUE=300
TRIP=HIGHER
HYSTER=700
BATCH=ON
DIGOUT=2
```

Setpoint 6 is used to ensure that the operation performed in setpoint 4 is completed within 10 seconds. The START and END parameters identify the setpoints monitored by the timer. If the timer expires before setpoint 5 starts, digital output 4 is turned on as an alarm to signal a process fault.

```
SETPOINT=6
KIND=TIMER
VALUE=100
START=4
END=5
DIGOUT=4
```

Using the ACCESS Parameter

The ACCESS parameter should be set ON when creating and testing batch routines. Once the batching routine is complete and ready for production, ACCESS can be set to OFF to prevent changes to the configured setpoint value, or to HIDE to prevent changing or viewing the value.

Setpoints with ACCESS=ON can be turned on or off when a batch is not running by doing the following:

- To turn the setpoint off, use the **SETPOINT** key to display the setpoint, then press **CLEAR**
- To turn the setpoint on, use the **SETPOINT** key to display the setpoint, then press **ENTER**

8.2.2 Example 2

The following example uses seven setpoints to control a two-speed fill operation where both fast and slow feeds are on simultaneously.

Digital inputs 1 and 2 are assigned to batch start and batch run functions: BATRUN must be on (low) before the BATSTRT input starts the batch.

```
DIGIN1=BATSTRT
DIGIN2=BATRUN
BATCHNG=MANUAL
```

Setpoint 1 ensures that the scale is empty (0±2 LB).

```
SETPOINT=1
KIND=GROSSSP
VALUE=0
TRIP=INBAND
BANDVAL=2
BATCH=ON
```

Setpoint 2 checks for the weight of a container (Š 5 LB) placed on the scale.

```
SETPOINT=2
KIND=GROSSSP
VALUE=5
TRIP=HIGHER
BATCH=ON
```

Setpoint 3 waits for standstill, then tares the container weight, placing the indicator in net mode.

```
SETPOINT=3
KIND=WAITSS
PSHTARE=ON
```

Setpoint 4 starts the fast fill operation. When the net weight reaches 175 LB, the setpoint trips and digital output 1 is set off.

```
SETPOINT=4
KIND=NETSP
VALUE=175
TRIP=HIGHER
BATCH=ON
DIGOUT=1
```

Setpoint 5 controls the slow fill operation. When the net weight reaches 200 LB, the slow fill is stopped (see Setpoint 7), the indicator waits for standstill and performs a push print operation using the SPFMT ticket format.

```
SETPOINT=5
KIND=NETSP
VALUE=200
PSHPRINT=WAITSS
TRIP=HIGHER
BATCH=ON
DIGOUT=2
```

Setpoint 6 is a continuous setpoint, used to allow the slow feed output to be on at the same time as the fast fill. The slow fill output (digital output 2) is turned on when setpoint 4 (fast fill) starts and remains on until setpoint 5 begins.

```
SETPOINT=6
KIND=CONCUR
VALUE=0
START=4
END=5
DIGOUT=2
```

8.3 Batching Switch

The batching switch option, PN 19369, comes as a complete unit in an FRP enclosure, with legend plate, locking stop switch (mushroom button), and a run/start/abort 3-way switch.

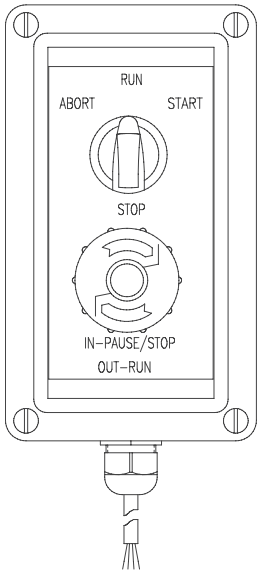

Figure 8-2. Batching Switch

Both switches are wired into the indicator's digital I/O terminal strip as shown in Figure 8-3. Each switch uses a separate digital input.

Once cables and switches have been connected to the indicator, use the setup switch to place the indicator in setup mode. Use the DIGIN menu (see Section 3.2.8 on page 34) to configure digital input functions. The default values for DIGIN1 and DIGIN2 are BATSTRT and BATRUN, respectively.

When configuration is complete, exit setup mode. Initialize the batch by turning the 3-way switch to *ABORT*, then unlock the STOP button (the STOP button must be in the OUT position to allow the batch process to run). The batching switch is now ready to use.

Warning *If no digital input is assigned to BATRUN, batching proceeds as if BATRUN were always on: If DIGIN2 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.*

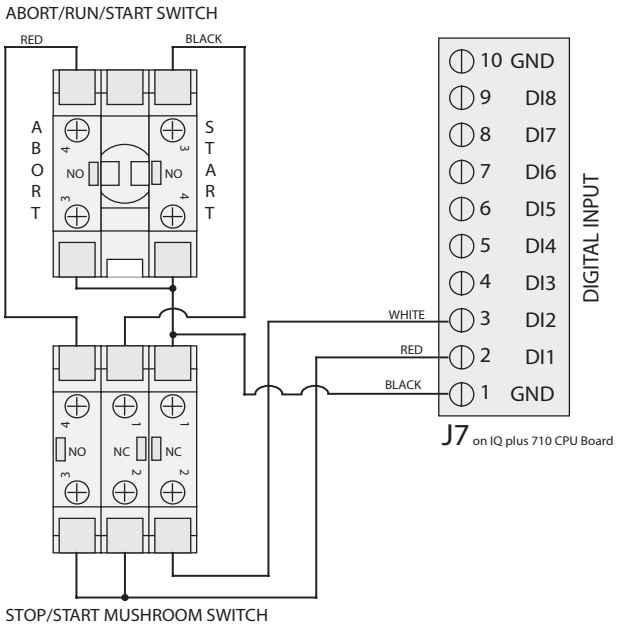

Figure 8-3. Batching Switch Wiring Diagram

To begin a batch process, turn the 3-way switch to *START* momentarily. If the STOP button is pushed during the batch process, the process halts and the button locks in the IN position.

The *START* 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*

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: *Use this procedure (or the BATRESET EDP command) to initialize the new batch routine following any change to the setpoint configuration.*

9.0 Macro Programming

Up to four macro sequences can be programmed for the IQ Plus 710 indicator. Each macro provides a simulation of up to 30 front panel key presses and can be used to provide single-key, automated operation of a number of processes, including operator identification, prompts, setpoint editing, and batch control.

NOTES:

- *Macro steps are performed at the display update rate. Configure the update rate (DSPRATE parameter on the FORMAT menu) to 2 seconds (2SEC) or faster.*
- *To stop a running macro, press the ESCAPE key.*

9.1 Using the Macro Submenu

Macros can be programmed using the front panel, EDP commands, or the Revolution configuration utility. Figure 9-1 shows the structure of the MACRO submenu under the PROGRM menu; Table 9-1 on page 61 describes each of the MACRO submenu parameters.

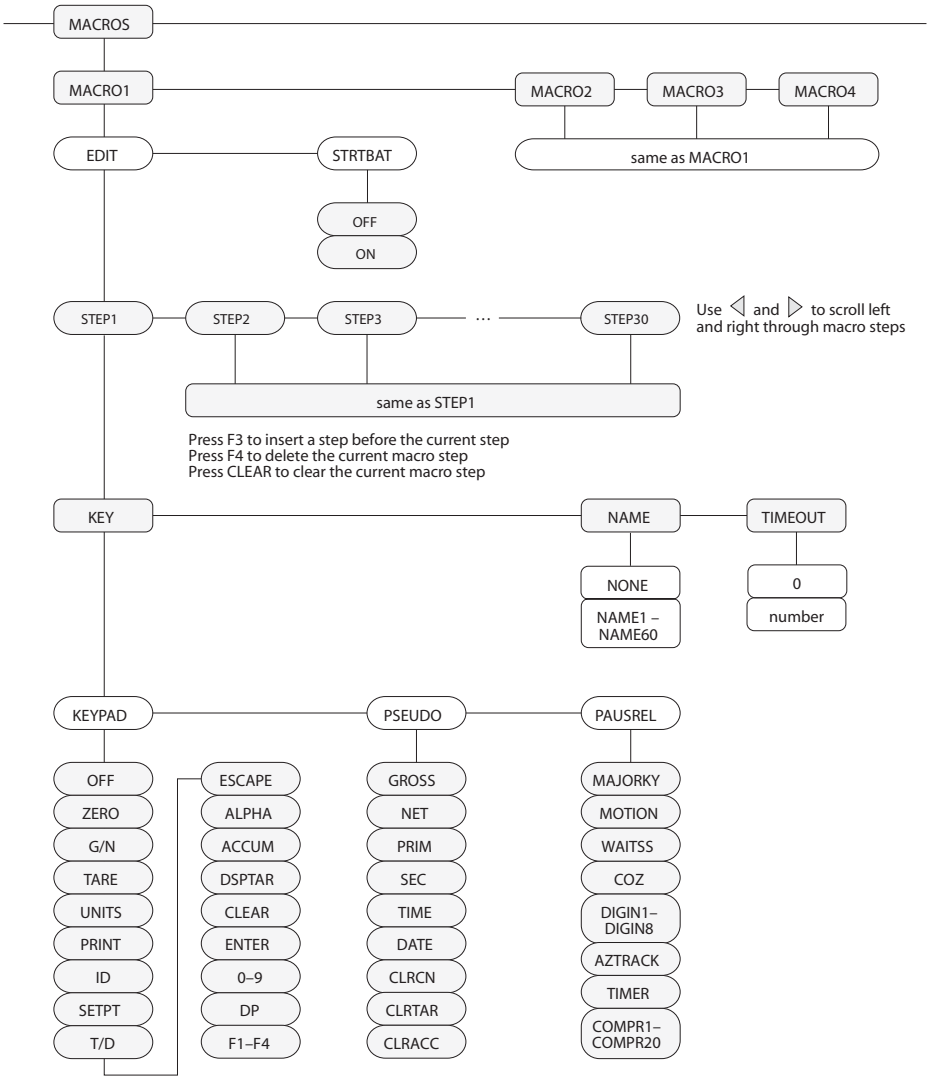

Figure 9-1. Macro Submenu under PROGRM Menu

PROGRM Menu		
Parameter	**Choices**	**Description**
Level 2 MACRO submenu		
MACRO1 MACRO2 MACRO3 MACRO4	EDIT STRTBAT	Configure macros
Level 3 MACRO submenu		
EDIT	*macro sequence*	Create or display a macro sequence
STRTBAT	**OFF** ON	Specifies whether a batch sequence is automatically started when the macro sequence ends. STRTBAT=ON is functionally equivalent to the BATSTART EDP command or the BATSTRT digital input.
Level 4 MACRO submenu		
STEP1 – STEP30	KEY NAME TIMEOUT	Select macro step
Level 5 MACRO submenu		
KEY	KEYPAD PSEUDO PAUSREL	Specifies whether the keystroke simulated by the macro is an actual keypad key, a pseudo key, or a pause release.
NAME	**NONE** *NAME1 – NAME60*	Specifies the text, if any, shown on the secondary display during macro execution. NAME1 through NAME60 are specified on the PROMPTS parameter.
TIMEOUT	*number*	If TIMER is specified for the PAUSREL parameter, specify a timer value in the range 0–65535, in 0.1-second intervals. For example, specify TIMER=150 to insert a 15-second pause.
Level 6 MACRO submenu		
KEYPAD	**OFF** ZERO G/N TARE UNITS PRINT ID SETPT T/D ESCAPE ALPHA ACCUM DSPTAR CLEAR ENTER *0–9* DP *F1-F4*	Select front panel key simulated by this macro step.

Table 9-1. MACRO Submenu Parameters (PROGRM Menu)

PROGRM Menu		
Parameter	**Choices**	**Description**
PSEUDO	GROSS NET PRIM SEC TIME DATE CLRCN CLRTAR CLRACC	The PSEUDO parameter allows simulation of a pseudo key for the macro step. Pseudo keys are keypad functions not represented by an actual front panel key. For example, the PRIM pseudo key displays the primary units configured for the indicator, but there is no actual primary units key on the front panel. The PRIM and SEC pseudo keys are used to explicitly request primary or secondary units display; the UNITS front panel key toggles between primary and secondary units, depending on which is displayed at the time the key is pressed.
PAUSREL	MAJORKY MOTION WAITSS COZ *DIGIN1 – DIGIN8* AZTRACK TIMER *COMPR1 – COMPR20*	The PAUSEREL parameter inserts a pause in the macro sequence that is released when the specified condition is met. The value specified for this parameter determines when the pause is released: MAJORKY: When any of the five major keys is pressed MOTION: When motion is detected WAITSS: When scale is stable within the specified motion band COZ: When scale reaches center of zero DIGIN1–DIGIN8: When DIGIN*x* goes active AZTRACK: When scale is within the zero track band TIMER: When timer expires (timer value is specified on TIMEOUT parameter) COMPR1 – COMPR20: When the setpoint *x* (1–20) changes state

Table 9-1. MACRO Submenu Parameters (PROGRM Menu)

9.2 Macro Programming Examples

Warning *To prevent injury and equipment damage, always test macros and batching routines thoroughly before connecting the indicator to a live system.*

9.2.1 Example 1

The following example uses a macro to provide operator prompts for a simple container filling procedure. The single setpoint is used to check for a full container; when tripped, the setpoint releases the pause in step 5 of the macro.

With the indicator in setup mode, the following EDP commands are sent to program the setpoint and assign prompts used by the macro.

```
SETPOINT=1
KIND=GROSSSP
VALUE=5
TRIP=HIGHER
BATCH=OFF
DIGOUT=NONE

SETPOINT=2
KIND=NETSP
VALUE=200
TRIP=HIGHER
BATCH=OFF
DIGOUT=NONE

PROMPT#1=ADD BOX
PROMPT#2=ADD MATERIAL
PROMPT#3=REMOVE BOX
```

NOTE: *Prompts are assigned using the PROMPT#n EDP command or the PROMPTS parameter on the PROGRM menu. Prompts are recalled for display during macro execution using the NAME.n EDP parameter or the NAME parameter under the macro submenu.*

The macro shown below is started when the operator presses the F1 macro key:

MACRO 1

```
MACRO1.K01=PAUSREL.COMPR1
MACRO1.K01=NAME.1
MACRO1.K02=PAUSREL.WAITSS
MACRO1.K02=NAME.1
MACRO1.K03=KTARE
MACRO1.K04=PAUSREL.COMPR2
MACRO1.K04=NAME.2
MACRO1.K05=PAUSREL.WAITSS
MACRO1.K06=KPRINT
MACRO1.K07=KGROSS
MACRO1.K08=PAUSREL.AZTRACK
MACRO1.K08=NAME.3
```

1. The first macro step waits for an empty box to be placed on the scale. The prompt *ADD BOX* is shown on the secondary display until setpoint 1 changes state.
2. The second macro step continues to display the prompt *ADD BOX* on the secondary display while waiting for the scale to settle out of motion. When scale motion stops, the pause is released and the macro continues.
3. The macro performs a tare operation in step 3, taring the box weight and placing the indicator in net mode at 0 LB.
4. In step 4, the secondary display prompts the operator to *ADD MATERIAL*. The prompt is held on the display until setpoint 2 changes state (COMPR2). When the setpoint trips, the pause is released.
5. In step 5, the macro again waits for the scale to settle out of motion.
6. In step 6, the macro performs a print operation using the NFMT ticket format.
7. Step 7 places the macro in gross mode, displaying the weight of both the box and the material.
8. The secondary display prompts the operator to *REMOVE BOX* in step 8. The prompt is held on the display until the gross weight on the scale comes within the specified zero tracking band. The ZTRKBND parameter on the CONFIG menu, or the ZTRKBND EDP command, must be set to a value other than OFF.

9.2.2 Example 2

The following example uses a combination of macros and batch routines to control a two-speed filling operation. The operation includes a batch filling operation followed by two macro-controlled hand-add operations and a mixing operation.

With the indicator in setup mode, the following EDP commands are sent to program the setpoints and assign prompts used by the macros.

```
SETPOINT=1
KIND=GROSSSP
VALUE=0.6
TRIP=INBAND
BANDVAL=0.2
BATCH=ON
DIGOUT=NONE
NAME=1

SETPOINT=2
KIND=WAITSS
PSHTARE=ON
DIGOUT=NONE

SETPOINT=3
KIND=NETSP
VALUE=6.5
TRIP=HIGHER
BATCH=ON
DIGOUT=1
NAME=2

SETPOINT=4
KIND=NETSP
VALUE=7
TRIP=HIGHER
BATCH=ON
DIGOUT=2
NAME=3

SETPOINT=5
KIND=WAITSS
PSHTARE=ON
DIGOUT=NONE

SETPOINT=6
KIND=DELAY
VALUE=1
DIGOUT=3

SETPOINT=7
KIND=NETSP
VALUE=0.4
TRIP=HIGHER
BATCH=OFF
DIGOUT=NONE
NAME=NONE

SETPOINT=8
KIND=NETSP
VALUE=1
TRIP=HIGHER
BATCH=OFF
DIGOUT=NONE
NAME=NONE

SETPOINT=9
KIND=GROSSSP
VALUE=1
TRIP=LOWER
BATCH=OFF
DIGOUT=NONE
NAME=NONE
```

```
BATCHNG=MANUAL
PROMPT#1=ADD BUCKET
PROMPT#2=FAST FILL
PROMPT#3=SLOW FILL
PROMPT#4=ADD BLUE DYE
PROMPT#5=ADD GREEN DYE
PROMPT#6=TURN MIXER ON
PROMPT#7=MIXING
PROMPT#8=MIXER: 1 MINUTE
PROMPT#9=TURN MIXER OFF
PROMPT#10=FINISHED
```

Digital inputs 1 and 2 are connected to a batching switch and configured for BATSTRT and BATRUN inputs (see Section 8.3 on page 59). The batching switch must be on to enable the STRTBAT (batch start) commands in the macros.

Digital input 3 is wired to digital output 3. When the setpoints associated with the digital outputs are tripped, the output activates the digital input to start the next macro.

```
DIGIN1=BATSTRT
DIGIN2=BATRUN
DIGIN3=KF1
```

The macro shown below is started when the digital output from setpoint 6 goes active (DO3 wired to DI3):

```
MACRO1.K01=PAUSREL.COMPR7
MACRO1.K01=NAME.4
MACRO1.K02=PAUSREL.WAITSS
MACRO1.K03=KTARE
MACRO1.K04=PAUSREL.COMPR8
MACRO1.K04=NAME.5
MACRO1.K05=PAUSREL.WAITSS
MACRO1.K06=PAUSREL.MOTION
MACRO1.K06=NAME.6
MACRO1.K07=PAUSREL.TIMER
MACRO1.K07=NAME.7
MACRO1.K07=TIMEOUT.600
MACRO1.K08=PAUSREL.TIMER
MACRO1.K08=NAME.8
MACRO1.K08=TIMEOUT.600
MACRO1.K09=PAUSREL.WAITSS
MACRO1.K09=NAME.9
MACRO1.K10=PAUSREL.COMPR9
MACRO1.K10=NAME.10
```

1. Step 1 of the macro displays the prompt *ADD BLUE DYE* on the secondary display until 0.4 LB is detected on the scale (setpoint 7).
2. Step 2 waits for scale standstill. Step 3 tares the weight on the scale, placing the indicator in net mode.
3. Step 4 displays the prompt *ADD GREEN DYE* on the secondary display until 1.0 LB is detected on the scale (setpoint 8).
4. Step 5 waits for scale standstill. Step 6 prompts the operator to *TURN MIXER ON* until motion, caused by running the mixer, is detected.
5. Steps 7 and 8 provide 60-second timers and prompts for the mixing operation.
6. Step 9 displays the prompt *TURN MIXER OFF*, then waits for standstill.
7. Step 10 displays the prompt *FINISHED* until the gross weight on the scale drops below 1.0 LB.

10.0 Appendix

10.1 Error Messages

The IQ plus 710 indicator provides a number of error messages. When an error occurs, the message is shown on the indicator display. Error conditions can also be checked remotely by using the XE EDP command as described in Section 10.1.2.

10.1.1 Displayed Error Messages

The IQ plus 710 provides a number of front panel error messages to assist in problem diagnosis. Table 10-1 lists these messages and their meanings.

Error Message	Description	Solution
E EEROM	EEPROM physical error	Call RLWS Service.
E VIREE	Virgin EEPROM	Use TEST menu to perform DEFLT (restore defaults) procedure, then recalibrate load cells.
E PCKSM	Parameter checksum error	
E LCKSM	Load cell calibration checksum error	Recalibrate load cells.
E ACKSM	A/D calibration checksum error	A/D converter requires recalibration. Call RLWS Service.
E FCKSM	Print format checksum error	Use TEST menu to perform DEFLT (restore defaults) procedure.
E IDATA	Internal RAM data error	Call RLWS Service.
E XDATA	External RAM data error	
E A/D	A/D physical error	
E REF	A/D reference error	A/D converter requires recalibration. Call RLWS Service.
REG ERR	Non-volatile RAM (NVRAM) register error	Press CLEAR to clear non-volatile storage. If battery is weak or not installed, replace battery (see Section 2.7 on page 8) then use TEST menu to perform CLR NV (clear non-volatile storage) procedure. The REG ERR error indicates that the NV RAM is corrupted; it must be cleared to restore indicator function. Clearing the NV RAM erases all stored tares, truck IDs, and prompts.
TAR ERR	Tare register checksum error	Acquire tare, acquire zero, or reset configuration.
ACC ERR	Accumulator overflow error	Press ACCUM to display accumulator value, then press CLEAR twice to clear the accumulator.
PWRFAIL	Power failure	Input voltage too low.
OVERFL	Overflow error	Weight value too large to be displayed.
------	Gross > overload limit	Gross value exceeds overload limit. Check configuration.
_____	A/D underrange	A/D reading < –4 mV. Check scale for binding or damage.

Table 10-1. IQ plus 710 Error Messages

10.1.2 Using the XE EDP Command

The XE EDP command can be used to remotely query the IQ plus 710 for the error conditions shown on the front panel. The XE command returns a decimal number representing any existing error conditions.

If more than one error condition exists, the number returned is the sum of the values representing the error conditions (see Table 10-2). For example, if the XE command returns the number 1040, this value represents the sum of an A/D reference error (1024) and an A/D calibration checksum error (16).

Error Code	Description	Binary Value
0	No error	0000 0000 0000 0000
1	EEPROM physical error	0000 0000 0000 0001
2	Virgin EEPROM	0000 0000 0000 0010
4	Parameter checksum error	0000 0000 0000 0100
8	Load cell calibration checksum error	0000 0000 0000 1000
16	A/D calibration checksum error	0000 0000 0001 0000
32	Print format checksum error	0000 0000 0010 0000
64	Internal RAM data error	0000 0000 0100 0000
128	External RAM data error	0000 0000 1000 0000
256	NV register checksum error	0000 0001 0000 0000
512	A/D physical error	0000 0010 0000 0000
1024	A/D reference error	0000 0100 0000 0000
2048	Tare register error	0000 1000 0000 0000
4096	Accumulator overflow error	0001 0000 0000 0000
8192	A/D underrange	0010 0000 0000 0000
16384	Power failure	0100 0000 0000 0000
32768	Gross > overload limit	1000 0000 0000 0000

Table 10-2. Error Codes Returned on XE Command

10.2 Status Messages

Two EDP commands, P and ZZ, can be used to provide status about the indicator.

- The P EDP command returns whatever is currently shown in the indicator's primary display area.
- The ZZ EDP command returns whatever is currently shown in both the primary and secondary displays. Depending on the type of device used to receive data from the indicator, the standstill and center of zero symbols may be shown as spaces or as special characters. The ZZ command returns information in the following format:

PPPPPPP uu sssssssssssssss

where:

- *PPPPPPP* is the information shown on the primary display
- *uu* is the 2-digit units annunciator
- *sssssssssssssss* is the contents of the secondary display

If the indicator is in an underrange or overload condition, the weight value is replaced with &&&&&& (overload) or :::::: (underrange).

10.3 TARE and ZERO Key Functions

The function of the front panel TARE and ZERO keys depends on the value specified for the REGULAT parameter on the PROGRM menu. Table 10-3 describes the function of these keys for each of the regulatory modes.

REGULAT Parameter Value	Weight on Scale	Tare in System	Front Panel Key Function	
			TARE	ZERO
NTEP	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	TARE	
CANADA	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	*no action*	
OIML	zero or negative	no	*no action*	ZERO
		yes	CLEAR TARE	ZERO *and* CLEAR TARE
	positive	no	TARE	ZERO
		yes	TARE	*no action*
NONE	zero or negative	no	TARE	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	CLEAR TARE	

Table 10-3. TARE and ZERO Key Functions for REGULAT Parameter Settings

10.4 Data Formats

10.4.1 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 710 sends data using the Consolidated Controls serial data format shown in Figure 10-1:

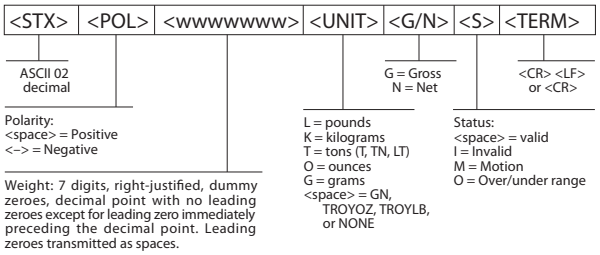

Figure 10-1. Continuous Output Serial Data Format

10.4.2 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 710 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 6.0 on page 49 for more information on custom print formats.

10.4.3 RS-485 Data Formats

The IQ plus 710 has a built-in RS-485 software protocol which is enabled when you assign a non-zero address to the indicator. Valid RS-485 addresses must be in the range 1–255; the address is specified on the ADDRESS parameter on the SERIAL menu.

All remote commands are initiated using the data format shown in Figure 10-2:

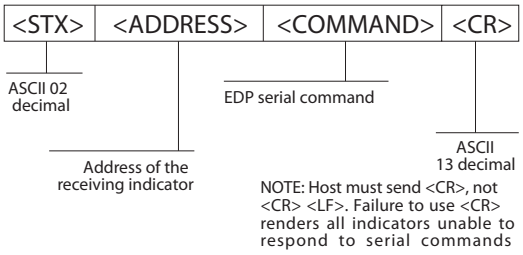

Figure 10-2. RS-485 Send Data Format

If the initiating device address matches the port address of an IQ plus 710 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 10-3:

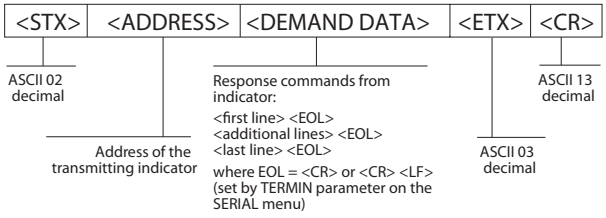

Figure 10-3. RS-485 Respond Data Format

Example: To send the KPRINT command from an ASCII terminal to an indicator at address 65 (decimal) on the RS-485 network, use the format shown in Figure 10-2.

- The keyboard equivalent for the start-of-text (STX) character is CONTROL-B (see Table 10-3 on page 67).
- The indicator address (65) is represented by an upper case “A”.
- The carriage return (CR) character is generated by pressing the ENTER key.

Therefore, to send the KPRINT command to the indicator at address 65, enter the following at the terminal: CONTROL-B, A, K, P, R, I, N, T, ENTER.

The indicator responds with the format shown in Figure 10-3:

<STX> A SCALE #1 <EOL>
GROSS 1699 LB<EOL>
08/20/1998 10:05 AM<EOL>
<ETX> <CR>

If continuous transmission is configured for the EDP port (STREAM parameter on the SERIAL menu), the IQ plus 710 sends data using the data format shown in Figure 10-4:

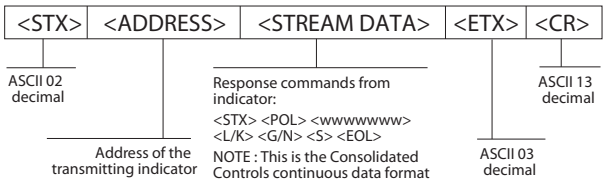

Figure 10-4. RS-485 Continuous Data Format

10.5 Digital Filtering

Standard digital filtering uses mathematical averaging to eliminate the variant digital readings that the A/D converter sends periodically because of external vibration. Digital filtering does not affect the indicator measurement rate, but does affect the settling time. The selections from 1 to 256 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.

DIGFLx Parameters

The first two digital filtering parameters, DIGFLT1, and DIGFLT2, are configurable filter stages that control the effect of a single A/D reading on the displayed weight. The value assigned to each parameter sets the number of readings received from the preceding filter stage before averaging.

The overall filtering effect can be expressed by adding the values assigned to the two filter stages:

DIGFLT1 + DIGFLT2

For example, if the filters are configured as DIGFLT1=16, DIGFLT2=8, the overall filtering effect is 24 (16 + 8). With this configuration, each A/D reading has a 1-in-24 effect on the displayed weight value. Setting the filters to 1 effectively disables digital filtering.

RATTLETRAP® Filtering

RATTLETRAP digital filtering (RATTRAP parameter set ON) uses a vibration-dampening algorithm to provide a combination of the best features of analog and digital filtering. The RATTLETRAP algorithm 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 vibration effects or mechanical interference from nearby machinery. Using RATTLETRAP filtering can eliminate much more mechanical vibration than standard digital filtering, but will usually increase settling time over standard digital filtering.

DFSENS and DFTHRH Parameters

The digital filter can be used by itself to eliminate vibration effects, but heavy filtering also increases settling time. The DFSENS (digital filter sensitivity) and DFTHRH (digital filter threshold) parameters can be used to temporarily override filter averaging and improve settling time:

- DFSENS specifies the number of consecutive scale readings that must fall outside the filter threshold (DFTHRH) before digital filtering is suspended.
- DFTHRH sets a threshold value, in display divisions. When a specified number of consecutive scale readings (DFSENS) fall outside of this threshold, digital filtering is suspended. Set DFTHRH to NONE to turn off the filter override.

Setting the Digital Filter Parameters

Fine-tuning the digital filter parameters greatly improves indicator performance in heavy-vibration environments. Use the following procedure to determine vibration effects on the scale and optimize the digital filtering configuration.

1. In setup mode, set the digital filter parameters (DIGFLT1 and DIGFLT2) to 1. Set DFTHRH to NONE. Return indicator to normal mode.
2. Remove all weight from the scale, then watch the indicator display to determine the magnitude of vibration effects on the scale. Record the weight below which all but a few readings fall. This value is used to calculate the DFTHRH parameter value in Step 4.

   For example, if a heavy-capacity scale produces vibration-related readings of up to 50 lb, with occasional spikes to 75 lb, record 50 lb as the threshold weight value.
3. Place the indicator in setup mode and set the DIGFLT*x* parameters to eliminate the vibration effects on the scale. (Leave DFTHRH set to NONE.) Find the lowest effective value for the DIGFLT*x* parameters.
4. Calculate the DFTHRH parameter value by converting the weight value recorded in Step 2 to display divisions:

   threshold_weight_value / DSPDIV

   In the example in Step 2, with a threshold weight value of 50 lb and a display division value of 5D: *50 / 5D = 10.* DFTHRH should be set to 10DD for this example.
5. Finally, set the DFSENS parameter high enough to ignore transient peaks. Longer transients (typically caused by lower vibration frequencies) will cause more consecutive out-of-band readings, so DFSENS should be set higher to counter low frequency transients.

   Reconfigure as necessary to find the lowest effective value for the DFSENS parameter.

10.6 Conversion Factors for Secondary Units

The IQ plus 710 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 SECNDR parameter, or by using EDP commands.

- To configure secondary units using the front panel menus, use the 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 the Table 10-4 to find the conversion multiplier for the SEC.MULT command. For example, if the primary unit 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.

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 (OVERFL).*

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
	0.002083	troy ounces
	0.000174	troy pounds
ounces	437.500	grains
	28.3495	grams
	0.06250	pounds
	0.02835	kilograms
	0.911458	troy ounces
	0.075955	troy pounds

Table 10-4. Conversion Factors

Primary Unit	*x Multiplier*	Secondary Unit
pounds	7000.00	grains
	453.592	grams
	16.0000	ounces
	0.453592	kilograms
	14.58333	troy ounces
	1.215278	troy pounds
	0.000500	short tons
	0.000446	long tons
	0.000453	metric tons
grams	15.4324	grains
	0.035274	ounces
	0.002205	pounds
	0.001000	kilograms
	0.032151	troy ounces
	0.002679	troy pounds
kilograms	15432.4	grains
	35.2740	ounces
	1000.00	grams
	2.20462	pounds
	32.15075	troy ounces
	2.679229	troy pounds
	0.001102	short tons
	0.000984	long tons
	0.001000	metric tons
short tons	2000.00	pounds
	907.185	kilograms
	0.892857	long tons
	0.907185	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 (Continued)

Primary Unit	*x Multiplier*	Secondary Unit
troy ounces	480	grains
	31.10348	grams
	0.031103	kilograms
	1.09714	ounces
	0.068571	pounds
	0.083333	troy pounds

Table 10-4. Conversion Factors (Continued)

Primary Unit	*x Multiplier*	Secondary Unit
troy pounds	5760	grains
	373.2417	grams
	0.373242	kilograms
	13.16571	ounces
	0.822857	pounds
	12	troy ounces

Table 10-4. Conversion Factors (Continued)

10.7 Analog Output Calibration

The following calibration procedure requires a multimeter to measure voltage or current output from the analog output module. If the option is not already installed, see Section 2.4 on page 7.

NOTE: *The analog output must be calibrated after the indicator itself has been configured (Section 3.0) and calibrated (Section 4.0).*

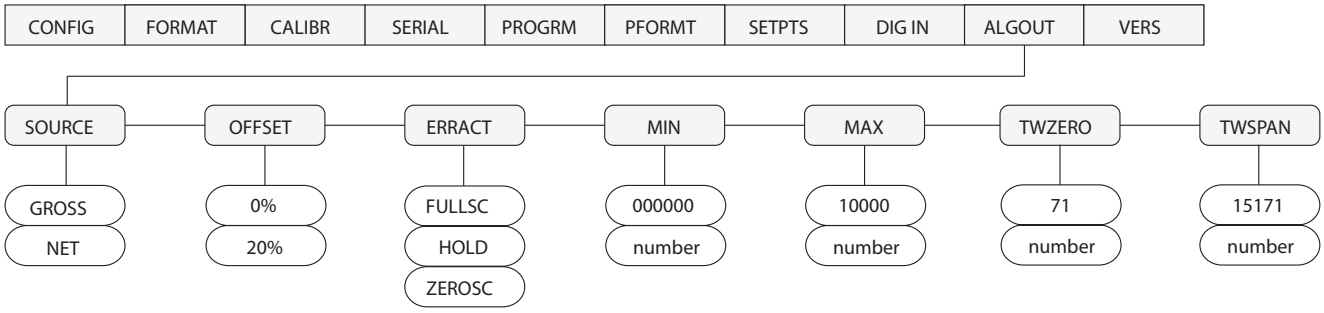

Figure 10-5. Analog Output Menu

1. Enter setup mode and go to the ALGOUT menu (see Figure 10-5):
   - Set OFFSET to 0% for 0–10 V output, 20% for 4–20 mA output
   - Set MIN to lowest weight value to be tracked by the analog output
   - Set MAX to highest weight value to be tracked by the analog output
2. Connect multimeter to connector J1 on the analog output board:
   - For voltage output, connect voltmeter leads to pins 3 and 4
   - For current output, connect ammeter leads to pins 1 and 2
3. Adjust zero calibration: Scroll to the TWZERO parameter. Press ▽ to view zero value, then check voltage or current reading on multimeter. Press and hold △ or ▽ to adjust the zero value up or down.
4. Adjust span calibration: Scroll to the TWSPAN parameter. Press ▽ to view span value, then check voltage or current reading on multimeter. Press and hold △ or ▽ to adjust the span value up or down.
5. Final zero calibration: Return to the TWZERO parameter and verify that the zero calibration has not drifted. Press and hold △ or ▽ to re-adjust the zero value as required.
6. Return to normal mode. Analog output function can be verified using test weights.

10.8 Test Mode

In addition to normal and setup modes, test mode provides a number of diagnostic functions for the IQ plus 710, including:

- Display raw A/D count
- Set digital outputs on and display digital input states
- Reset configuration parameters to default values
- Clear non-volatile (battery backed) storage
- Clear EEPROM
- Set analog output state to zero or full scale
- Set A/D offset and gain calibration

To enter test mode, press and hold the setup switch until the front panel display shows the word *TEST*. In test mode, the front panel keys are mapped to the test mode functions as shown in Figure 10-6 and Table 10-5.

Caution *A/D calibration functions, ADOFFS and ADGAIN, must be used only by qualified service personnel, and only after replacing A/D converter components. Improper A/D calibration may render the indicator unusable.*

The CLEAR EEPROM function erases both A/D and load cell calibration data. The A/D converter and the scale must be recalibrated after using this function.

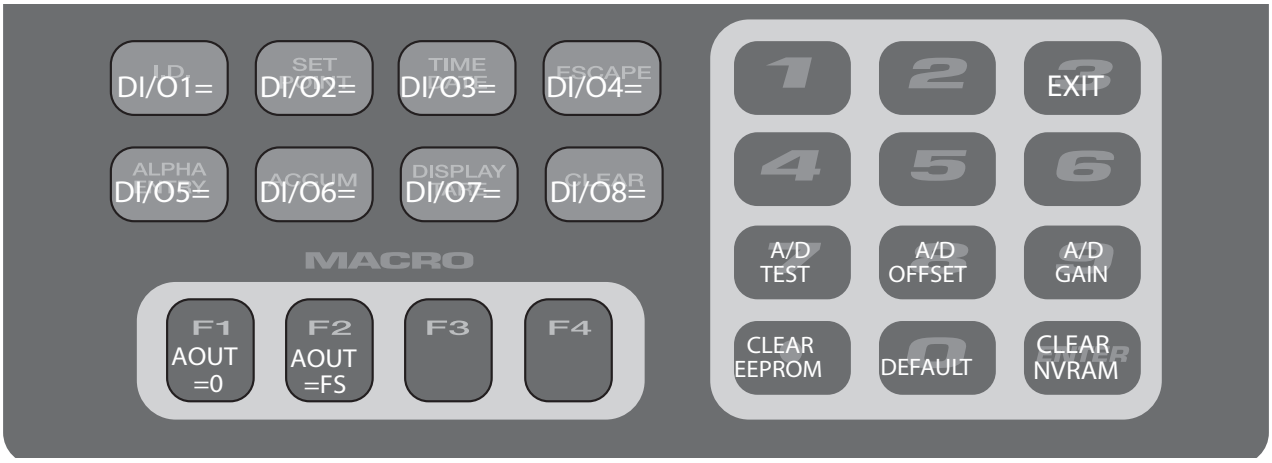

Figure 10-6. Front Panel Key Functions in Test Mode

TEST Menu	
Function	Description
DI/O1 —DI/O8	Set digital output *x* high and display status of digital input *x* Press and hold **DI/Ox=** key (see Figure 10-6) to show status of DIGIN*x* (DI*x*=HI or DI*x*=LO).
AOUT=0	Set analog output to zero Press and hold the **F1** key to set analog output to its zero value.
AOUT=FS	Set analog output to full scale Press and hold the **F2** key to set analog output to its full scale value.
A/D TEST	Display A/D test Press and hold the **7** key to display raw count from A/D converter.
CLEAR NVRAM	Clear non-volatile storage Press and hold the setup switch, then press the **ENTER** key to clear values stored in battery-backed SRAM, including truck mode data, time, and date.
DEFAULT	Default parameters Press and hold the setup switch, then press the **0** key to reset configuration and calibration parameters to factory default values. Load cells must be recalibrated before using the indicator (see Section 4.0 on page 37).

Table 10-5. Test Menu Functions

TEST Menu	
Function	Description
CLEAR EEPROM	Clear EEPROM ***Read Caution! statement on page 72 before using this function.*** Press and hold the setup switch, then press the **.** (decimal_point) key to clear EEPROM.
A/D OFFSET	A/D offset calibration (–0.5 mv/V) ***Read Caution! statement on page 72 before using this function.*** Press and hold the setup switch, then press the 8 key to perform offset calibration.
A/D GAIN	A/D gain calibration (+4.5 mv/V) ***Read Caution! statement on page 72 before using this function.*** Press and hold the setup switch, then press the **9** key to perform gain calibration.
EXIT	Press the **3** key to exit test mode.

Table 10-5. Test Menu Functions (Continued)

10.9 Software Revision Information

Version 2.1 of the IQ plus 710 software provides the following additional support:

- New SMPRAT parameter on the CONFIG menu provides selectable A/D conversion rate ranging from 3.75–30 Hz.
- New YYMMDD value on the DATEFMT parameter (PROGRM menu).

10.10 Specifications

Power

Line Voltages	115 or 230 VAC
Frequency	50 or 60 Hz
Power Consumption	100 mA @ 115 VAC (11.5 W) 50 mA @ 230 VAC (11.5 W)

Fusing

115 VAC	2 x 160 mA TR5 subminiature fuses Wickmann Time-Lag 19374 Series UL Listed, CSA Certified and Approved
230 VAC	2 x 80 mA TR5 subminiature fuses Wickmann Time-Lag 19372 Series UL Recognized, Semko and VDE Approved

Analog Specifications

Full Scale Input Signal	Up to 45 mV
Excitation Voltage	10 ± 0.5 VDC, 8 x 350¾ or 16 x 700W load cells
Sense Amplifier	Differential amplifier with 4- and 6-wire sensing
Analog Signal Input Range	–0.6 mV/V – 4.5 mV/V
Analog Signal Sensitivity	0.3 mV/graduation minimum, 1.5 mV/grad recommended
A/D Sample Rate:	3.75–30Hz, software configurable
Input Impedance	200 M¾, typical
Noise (ref to input)	0.3 mV p-p with digital filter at 4
Internal Resolution	1 000 000 counts, approximate
Display Resolution	100 000 dd
Input Sensitivity	50 nV per internal count
System Linearity	Within 0.01% of full scale
Zero Stability	150 nV/°C, maximum
Span Stability	3.5 ppm/°C, maximum
Calibration Method	Software, constants stored in EEPROM
Common Mode Voltage	–0.15 to +0.95 V, referred to earth
Common Mode Rejection	130 dB minimum @ 50 or 60 Hz
Input Overload	± 12 V continuous, static discharge protected
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:1kW minimum Current output: 4–20 mA External loop resistance: 500W maximum

Digital Specifications

Microcomputer	Hitachi H8/3002 main processor @ 9.8304 MHz
Digital Inputs	8 inputs, TTL or switch closure, active-low
Digital Outputs	8 outputs, open collector with TTL pullup, 250 mA sink, 40V withstand
Digital Filter	Software selectable: 1–256, enhanced Rattletrap® hybrid digital filtering

Serial Communications

EDP Port	Full duplex RS-232 or RS-485
Printer Port	Full duplex RS-232 or active 20 mA current loop output
Both Ports	19 200, 9600, 4800, 2400, 1200, 600, 300 bps; 7 or 8 data bits; even, odd, or no parity; two stop bits on transmit, one stop bit on receive

Operator Interface

Display	Vacuum fluorescent display: 7-digit, 14-segment primary weight display; Two 5x7 dot matrix digits for units, alpha/numeric entry mode designators; 16-digit dot matrix display for additional symbols, user prompts.
Keyboard	29-key membrane panel

Environmental

Operating Temperature	–10 to +40°C (legal); –10 to +50°C (industrial)
Storage Temperature	–25 to +70°C
Humidity	0–95% relative humidity

Enclosure

Enclosure Dimensions (without tilt stand)

Sloped Enclosure:	9.5 in x 8.38 in x 4.95 in 241 mm x 213 mm x 126 mm
Flat Enclosure:	9.5 in x 8.38 in x 5.25 in 241 mm x 213 mm x 133 mm

Weight

Sloped Enclosure:	7.4 lb (3.3 Kg)
Flat Enclosure:	7.8 lb (3.5 Kg)
Rating/Material	NEMA 4X/IP66, stainless steel

Certifications and Approvals

NTEP

CoC Number	98-081	
Accuracy Class	III/III L	n_{max}: 10 000

Measurement Canada

Approval	AM-5253	
Accuracy Class	III	n_{max}: 10 000
	III HD	n_{max}: 20 000

OIML

R76-2 Test Certificate	TC5678	
Accuracy Class	III	n_{max}: 10 000

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IQ plus 710 Limited Warranty

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

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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