920i™

Programmable Indicator

Installation Manual

RICE LAKE WEIGHING SYSTEMS
Industrial Solutions on a Global Scale®

ISO 9001 REGISTERED

67887

Contents

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Version 1.05, June 2003

About This Manual

This manual is intended for use by service technicians responsible for installing and servicing *920i*™ digital weight indicators. This manual applies to Version 1.05 of the *920i* indicator software.

Configuration and calibration of the indicator can be accomplished using the *iRev*™ configuration utility, serial commands, or the indicator front panel keys. See Section 3.1 on page 20 for information about configuration methods.

Warning *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.rlws.com.

The *Operator Card* included with this manual provides basic operating instructions for users of the *920i*. Please leave the *Operator Card* with the indicator when installation and configuration are complete.

1.0 Introduction

The *920i* is a programmable, multi-channel digital weight indicator/controller. The configuration can be performed using the front panel, with an attached PS/2®[1]-type keyboard, or using the *iRev* utility.

Custom event-driven programs can be written with the *iRite* language up to 128K in program size. These programs are compiled with an *iRev* compiler utility, which can only be downloaded into the indicator. The RLWS Web Update utility can be used to download *920i* firmware upgrades to a PC from the RLWS web site; *iRev* provides functions for installing the new software into the *920i*.

Onboard Features

Features of the basic *920i* include:

- Support for A/D scale or serial scale inputs. The *920i* must be configured for at least one scale input—either from A/D cards or serial input from an external digital indicator. The maximum number of scale inputs is 28; these can be combined to represent up to 32 scale configurations.
- Four digital I/O channels on main board, each configurable as either input or output.
- Four serial ports on main board (Ports 1–4) support duplex RS-232 up to 115200 bps. Port 2 supports hardware handshaking and remote keyboard input; Ports 3 and 4 support 20mA output; Port 4 supports 2-wire RS-485 communications.
- External DB-9 and DIN-8 connectors for serial connection to a PC and attachment of PS/2-type remote keyboard.
- Available in 115 VAC and 230 VAC North American and European versions.

Other features include:

- 64K of non-volatile RAM can be allocated to databases using *iRev* database editor.
- Configurable print formats can be defined for up to 1000 characters each. These formats are used to print gross or net weights, truck in/out weights, setpoint weights, accumulator weights, and header information. Additional print formats can be created with *iRite*.
- Six truck modes to store and recall weights for gross, tare, and net printing. The truck register contains fields for ID number, weight, and the transaction time and date. Weights can be stored permanently or erased at the end of the transaction.
- The setpoint engine supports 30 configurable setpoint kinds. Setpoints can be arranged in a sequential batch routine of up to 100 steps. If setpoints are configured as free running setpoints, they can be tied to program control. This allows for simultaneous batching operations to be written with the *iRite* language. A scale must be configured to enable the setpoint engine.

The *920i* is NTEP-certified for Classes III and III L at 10,000 divisions. See Section 10.13 on page 107 for more information about additional certifications and approvals.

1. PS/2® is a registered trademark of IBM Corporation.

Option Cards

The CPU board provides two slots for installing A/D or other option cards. Additional option cards can be added using either two-card or six-card expansion boards connected to the CPU board via the expansion bus. Available option cards include:

- Single- and dual-channel A/D cards to drive up to sixteen 350Ω load cells per A/D card. A/D cards support both 4- and 6-wire load cell connections.

  A/D cards are matched to allow interchangeability without having to recalibrate the scale. Calibration includes support for latitude and elevation compensation, millivolt calibration, and five-point linearization.
- Analog output card for 0–10 VDC or 0–20 mA tracking of gross or net weight values.
- Dual-channel serial expansion card provides one additional RS-485 port or two ports for either RS-232 or 20mA communications at up to 19200 bps.
- 24-channel digital I/O expansion card.
- 1MB memory expansion card for expanded database capability.
- Pulse input card for use with pulse count and pulse rate setpoints.
- Bus interface cards for DeviceNet™[1], Allen-Bradley Remote I/O[2], and Profibus® DP networks[3].

See Section 2.5 on page 10 for detailed information about expansion board configurations. Part numbers of available option cards and expansion boards are listed in Section 1.4 on page 4.

Front Panel

The *920i* front panel, shown in Figure 1-1, consists of a 27-button keypad with a large backlit LCD display. The keys are grouped as five configurable softkeys, five primary scale function keys, four navigation keys, and numeric entry keys. The display can be graphically configured using *iRev* software.

Weight information is displayed with a graphical scale in six font sizes up to 1.2 inches. Up to four scale widgets can be displayed in legal-for-trade, multiple-scale applications. Status areas on the display are used for operator prompts and entering data. The remainder of the display can be graphically configured for representation of a specific application.

Display contrast can be adjusted with the LCD contrast potentiometer.

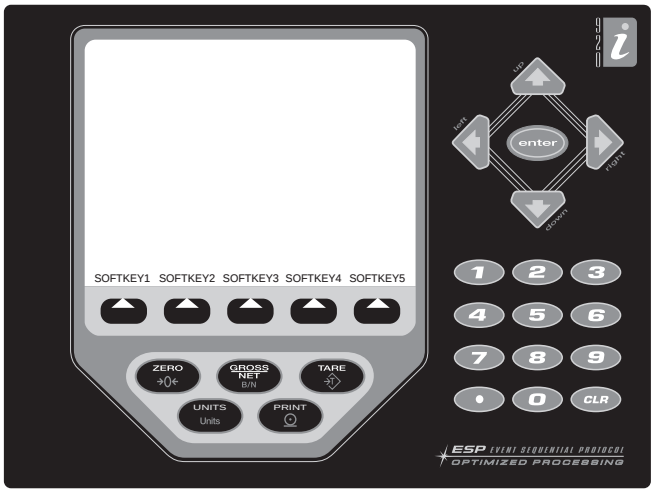


Figure 1-1. 920i Front Panel

Enclosures

The *920i* is available in four enclosures: universal (tilt-stand), desktop, panel mount, and wall mount. Stainless steel enclosures are rated for NEMA 4X/IP66. This manual provides assembly drawings and replacement parts lists for the universal and desktop models; supplemental documentation provides information specific to the panel mount and wall mount models (Section 1.4 on page 4).

1.1 Operating Modes

The *920i* has two 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 large fillister-head screw on the indicator enclosure, this is the only mode in which the *920i* 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. Insert a screwdriver or a similar tool into the access hole and press the setup switch once. The indicator display changes to show scale configuration menus.

1. DeviceNet™ is a trademark of the Open DeviceNet Vendor Association.

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

3. Profibus® is a registered trademark of Profibus International.

1.2 Indicator Operations

Basic *920i* operations are summarized below:

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); net mode is indicated by the word Net.

Toggle Units

Press the UNITS key to switch between primary, secondary, and tertiary units.

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.

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 display.

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.

Print Ticket

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

Accumulator Functions

The accumulator must be enabled before use in either normal mode or setpoint operations. Once enabled, weight (net weight if a tare is in the system) is accumulated whenever a print operation is performed using the PRINT key, digital input, or serial command. The scale must return to zero (net zero if a tare is in the system) before the next accumulation.

The Display Accum softkey can be configured to display the current accumulator value. Printing while the accumulator is displayed, or when the setpoint PSHACCUM function is active, uses the ACCFMT print format (see Section 6.0 on page 47).

Press the CLEAR key twice to clear the accumulator.

1.3 Softkey Operations

Softkeys can be defined to provide additional operator functions for specific applications. Softkey assignments are listed on the tabs shown at the bottom of the LCD display; softkey functions are activated by pressing the arrow keys below the softkey tabs (Figure 1-1 on page 2).

The particular set of softkeys shown on the display is determined by the indicator configuration and program.

Softkey	Description
Time/Date	Displays current time and date; allows time and date change.
Display Tare	Displays tare value for the current scale
Display Accum	Displays accumulator value, if enabled, for the current scale.
Display ROC	Displays rate-of-change value, if enabled, for the current scale.
Setpoint	Displays a menu of configured setpoints; allows display and change of some setpoint parameters.
Batch Start	Starts a configured batch.
Batch Stop	Stops a running batch and turns off all associated digital outputs. Requires a batch start to resume processing.
Batch Pause	Pauses a running batch. (Same as stop, but digital outputs, if on, are not turned off.)
Batch Reset	Stops a batch and resets it to the first batch step.
Weigh In	Allows truck ID entry; generates weigh-in ticket for truck weighing applications.
Weigh Out	Allows truck ID entry; generates weigh-out ticket for truck weighing applications.
Truck Regs	Displays truck register; allows deletion of individual or all entries. Truck register can be printed by pressing the PRINT key while the truck register is displayed.
Unit ID	Allows display or change of Unit ID.
Select Scale	For multi-scale applications, provides a prompt to enter the scale number to be displayed.
F1–F10	User-programmable keys; defined by application.
More…	For applications with more than five defined softkeys, the More… key is automatically assigned to the fifth softkey position. Press More… to toggle between groups of softkeys.

Table 1-1. Configurable Softkeys

1.4 System Configurations and Options

Table 1-2 lists the *920i* system models and part numbers. All models include CPU board with two option card slots, PS/2 and DB-9 communications ports. Each model comes equipped with a single- or dual-channel A/D card installed in Slot 1 (see Table 1-3).

Feature	Desktop	Universal	Panel Mount	Wall Mount
CPU board with two option card slots	√	√	√	√
Single- or dual-channel A/D card in slot 1	√	√	√	√
DIN-8 and DB-9 communications ports	√	√	√	√
25W internal power supply	√	√		
65W internal power supply			√	√
Supports internal 2-card expansion board			√	√
Supports internal 6-card expansion board				√
Supports internal relay rack				√

Table 1-2. 920i Model Features

System Model	Model PNs	
	Single-Channel A/D	Dual-Channel A/D
Desktop model, 115 VAC	67528	69768
Desktop model, 230 VAC, North American, NEMA 15-5 power cord	67616	69773
Desktop model, 230 VAC, European, CEE 7/7 power cord	69523	69775
Universal (tilt stand) model, 115 VAC	67527	69767
Universal (tilt stand) model, 230 VAC, North American, NEMA 15-5 power cord	67615	69772
Universal (tilt stand) model, 230 VAC, European, CEE 7/7 power cord	69522	69774
Panel mount model, 115 VAC	69764	69771
Panel mount model, 230 VAC, North American, NEMA 15-5 power cord	69766	69777
Panel mount model, 230 VAC, European, CEE 7/7 power cord	72137	72138
Wall mount model, 115 VAC	69763	69770
Wall mount model, 230 VAC, North American, NEMA 15-5 power cord	69765	69776
Wall mount model, 230 VAC, European, CEE 7/7 power cord	72133	72134

Table 1-3. Part Numbers for 920i Models

Option Cards

Table 1-4 lists the available *920i* option cards. Any of the listed option cards can be installed in Slot 2 of the CPU board or in any available slot of an attached expansion board.

Option Card	PN
Single-channel A/D card	68532
Dual-channel A/D card	68533
Analog output card	67602
Dual serial port expansion card	67604
24-channel digital I/O expansion card	67601
1MB NV RAM memory expansion card	67600
Pulse input card	67603
Ethernet communications card	71986
DeviceNet interface card	68541
Allen-Bradley Remote I/O interface card	68539
Profibus DP interface card	68540

Table 1-4. Part Numbers for 920i Option Cards

Expansion Boards

Table 1-5 lists the expansion boards available for the panel mount and wall mount enclosures. The panel mount enclosure can accommodate a single 2-card expansion board; the wall mount enclosure supports either a 2-card or a 6-card expansion board. Any of the available option cards can be installed in any available expansion board slot.

A second two- or six-card expansion board can also be connected to the *920i*, providing up to 14 option card slots. Consult factory for details. See Section 2.5 on page 10 for detailed information about slot and serial port assignments for expanded system configurations.

Expansion Board	PN
Two-card expansion board for panel mount enclosure, slots 3–4. Includes 2-inch, 34-pin ribbon cable and power supply cable.	71743
Two-card expansion board for wall mount enclosure, slots 3–4. Includes 24-inch, 34-pin ribbon cable and power supply cable.	69782
Six-card expansion board for wall mount enclosure, slots 3–8. Includes 16-inch, 34-pin ribbon cable and power supply cable.	69783

Table 1-5. Part Numbers for 920i Expansion Boards

Relay Options

8-, 16-, and 24-channel relay racks are available for all *920i* systems. Relays can be installed internally in the wall mount enclosure; all other models require an external enclosure for the relays. Consult factory for details.

2.0 Installation

This section describes procedures for connecting load cell, digital I/O, and serial communications cables to the *920i* indicator. Assembly drawings and replacement parts lists for the desktop and universal models are included for the service technician. See Section 10.11 on page 102 for dimension drawings of the all models.

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 920i. 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 *920i* to ensure all components are included and undamaged. The shipping carton should contain the indicator, this manual, and a parts kit. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

See Section 2.10 on page 12 for parts kit contents.

2.2 Enclosure Disassembly

The indicator enclosure must be opened to install option cards and to connect cables for installed option cards.

Warning *The 920i 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.

2.3 Cable Connections

Desktop and universal models of the *920i* provide six cord grips for cabling into the indicator: one for the power cord, five to accommodate cabling for option cards. Install plugs in all unused cord grips to prevent moisture from entering the enclosure.

2.3.1 Cable Grounding

Except for the power cord, all cables routed through the cord grips should be grounded against the indicator enclosure. Do the following to ground shielded cables:

- Use the lockwashers, clamps, and kep nuts provided in the parts kit to install grounding clamps on the enclosure studs adjacent to cord grips. Install grounding clamps only for cord grips that will be used; do not tighten nuts.
- Route cables through cord grips and grounding clamps to determine cable lengths required to reach cable connectors. Mark cables to remove insulation and shield as described below:
  - For cables with foil shielding, strip insulation and foil from the cable half an inch (15 mm) past the grounding clamp (see Figure 2-1). Fold the foil shield back on the cable where the cable passes through the clamp. Ensure silver (conductive) side of foil is turned outward for contact with the grounding clamp.
  - For cables with braided shielding, strip cable insulation and braided shield from a point just past the grounding clamp. Strip another half inch (15 mm) of insulation *only* to expose the braid where the cable passes through the clamp (see Figure 2-1).

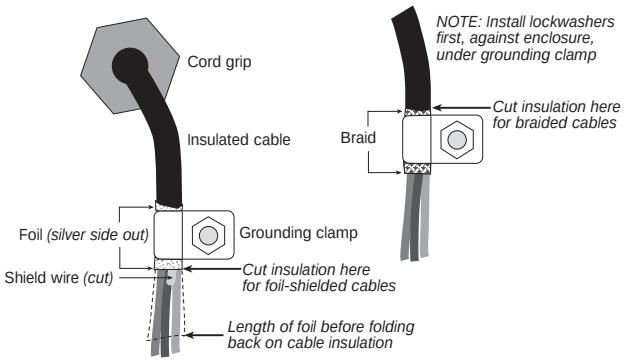


Figure 2-1. Grounding Clamp Attachment for Foil-Shielded and Braided Cabling

- For load cell cables, cut the shield wire just past the grounding clamp. Shield wire function is provided by contact between the cable shield and the grounding clamp.
- Route stripped cables through cord grips and clamps. Ensure shields contact grounding clamps as shown in Figure 2-1. Tighten grounding clamp nuts.
- Finish installation using cable ties to secure cables inside of indicator enclosure.

2.3.2 Load Cells

To attach cable from a load cell or junction box to an installed A/D card, route the cable through the cord grip and ground the shield wire as described in Section 2.3.1 on page 6.

Next, remove connector J1 from the A/D card. The connector plugs into a header on the A/D card (see Figure 2-2). Wire the load cell cable from the load cell or junction box to connector J1 as shown in Table 2-1.

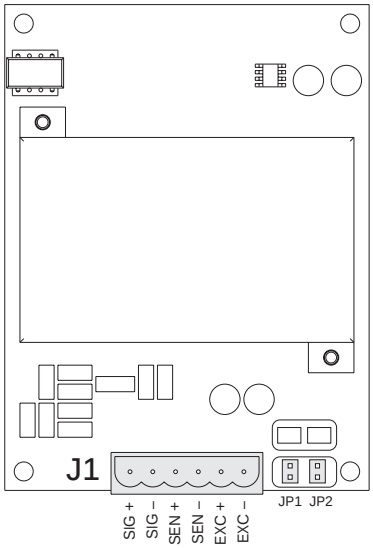


Figure 2-2. Single-Channel A/D Card

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. For 6-wire load cell connections on dual-channel A/D cards, remove jumpers JP3 and JP4 for connections to J2.

When connections are complete, reinstall load cell connector on the A/D card and use two cable ties to secure the load cell cable to the inside of the enclosure.

A/D Card Connector Pin	Function
1	+SIG
2	–SIG
3	+SENSE
4	–SENSE
5	+EXC
6	–EXC
• For 6-wire load cell connections to connector J1, remove jumpers JP1 and JP2. • For 6-wire load cell connections to connector J2 (dual A/D cards), remove jumpers JP3 and JP4. 2.	

Table 2-1. A/D Card Pin Assignments

2.3.3 Serial Communications

The four communications ports on the *920i* CPU board support full duplex RS-232, 20 mA output, or RS-485 communications at up to 115200 bps.

To attach serial communications cables, route the cable through the cord grip and ground the shield wire as described in Section 2.3.1 on page 6. Remove the serial connector from the CPU board and wire to the connector. Once cables are attached, plug the connector into the header on the board. Use cable ties to secure serial cables to the inside of the enclosure.

Table 2-2 shows the pin assignments for Ports 1, 3, and 4. Port 2 provides DIN-8 and DB-9 connectors for remote keyboard attachment of PS/2-type personal computer keyboards (see Figure 2-3 on page 8). The DB-9 connector pin assignments for Port 2 are shown in Table 2-3 on page 8; see Section 10.3 on page 91 for information about the PS/2 keyboard interface.

Connector	Pin	Signal	Port
J11	1	GND	1
	2	RS-232 RxD	
	3	RS-232 TxD	
J9	1	GND / –20mA OUT	3
	2	RS-232 RxD	
	3	RS-232 TxD	
	4	+20mA OUT	
J10	1	GND / –20mA OUT	4
	2	RS-232 RxD	
	3	RS-232 TxD	
	4	+20mA OUT	
	5	RS-485 A	
	6	RS-485 B	

Table 2-2. Serial Port Pin Assignments

Serial ports are configured using the SERIAL menu. See Section 3.2.2 on page 30 for configuration information.

An optional dual-channel serial communications expansion card, PN 67604, is also available. Each serial expansion card provides two additional serial ports, including one port that supports RS-485 communications. Both ports on the expansion card can support RS-232 or 20mA connections.

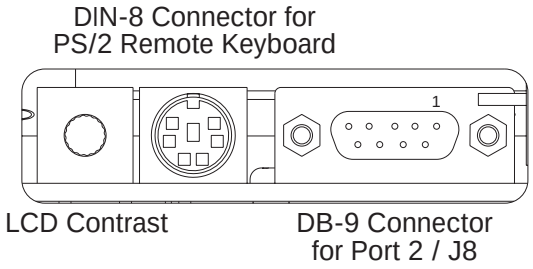


Figure 2-3. Interface Board Connections

DB-9 Pin	Signal
2	TxD
3	RxD
5	GND
7	CTS
8	RTS

Table 2-3. DB-9 Connector Pin Assignments

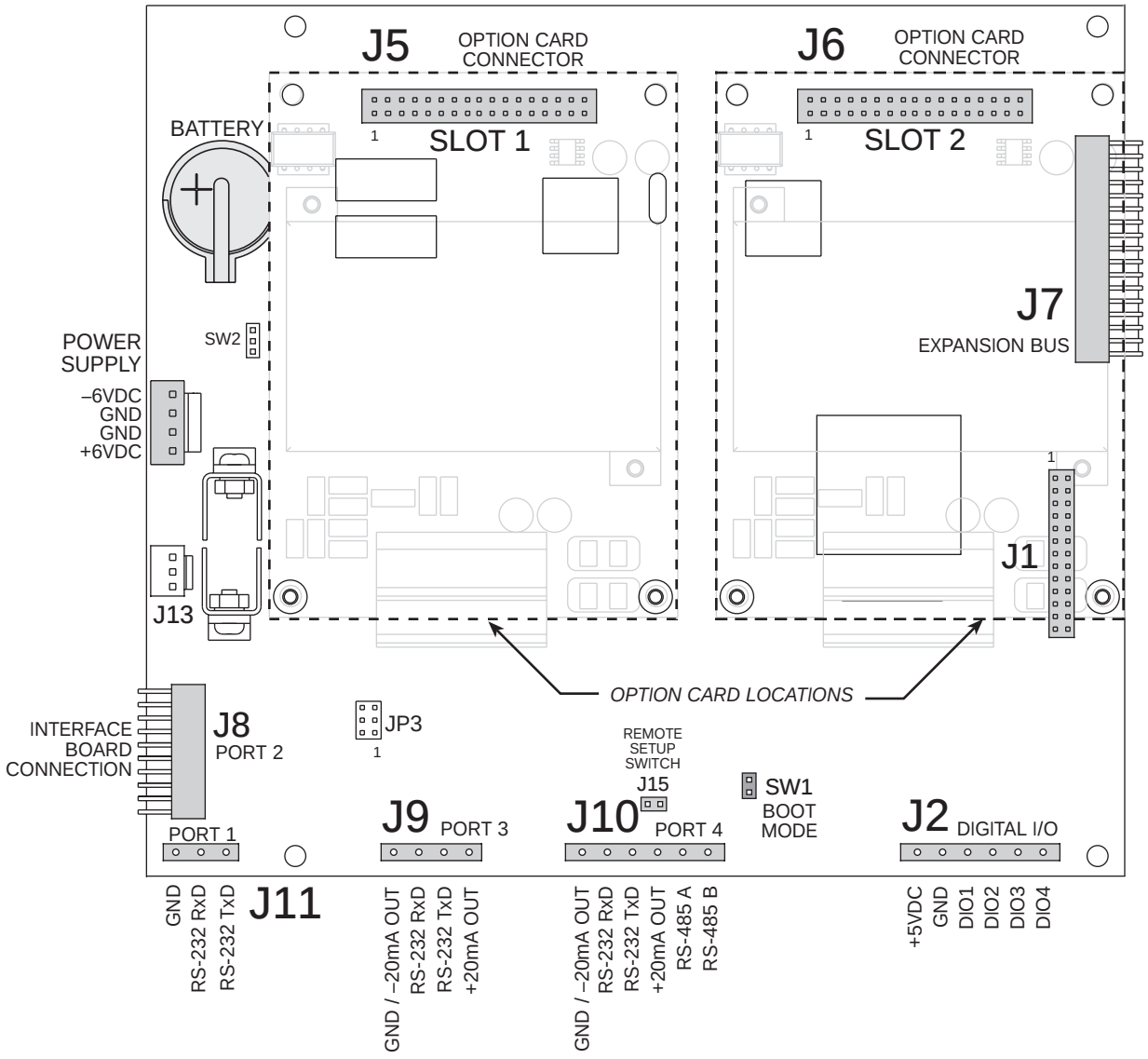


Figure 2-4. 920i CPU Board, Showing Option Card Locations

2.3.4 Digital I/O

Digital inputs can be set to provide many indicator functions, including all keypad functions. Digital inputs are active low (0 VDC), inactive high (5 VDC).

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 24 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.

Table 2-4 shows the pin assignments for connector J2.

J2 Pin	J2 Signal
1	+5 VDC
2	GND
3	DIO 1
4	DIO 2
5	DIO 3
6	DIO 4

Table 2-4. J2 Pin Assignments (Digital I/O)

Digital inputs and outputs are configured using the DIG I/O menu. See Section 3.2.6 on page 37 for configuration information.

An optional 24-channel digital I/O expansion card, PN 67601, is available for applications requiring more digital I/O channels.

2.4 Installing Option Cards

Each option card is shipped with installation instructions specific to that card. The general procedure for all option cards is as follows:

⚠ Caution *Option cards are not hot-pluggable. Disconnect power to the 920i before installing option cards.*

1. Disconnect power to the indicator. Remove backplate as described in Section 2.2 on page 6.
2. Carefully align the large option card connector with connector J5 or J6 on the CPU board (see Figure 2-5). Press down to seat the option card in the CPU board connector.
3. Use the screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board (see Figure 2-5).
4. Make connections to the option card as required. Use cable ties to secure loose cables inside the enclosure as shown in Figure 2-6. When installation is complete, reassemble the enclosure as described in Section 2.6 on page 11.

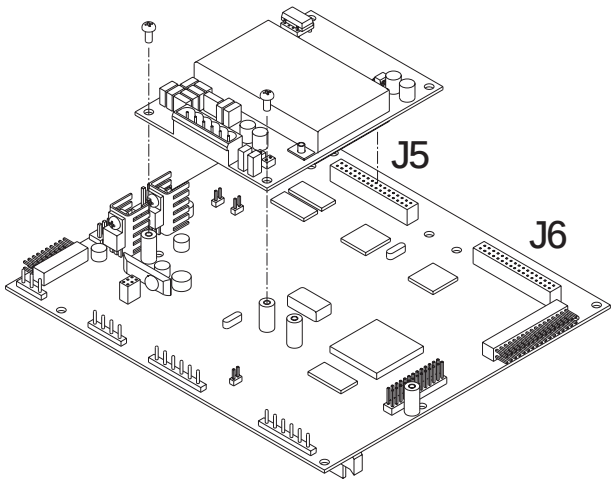


Figure 2-5. Installing Option Card Onto CPU Board

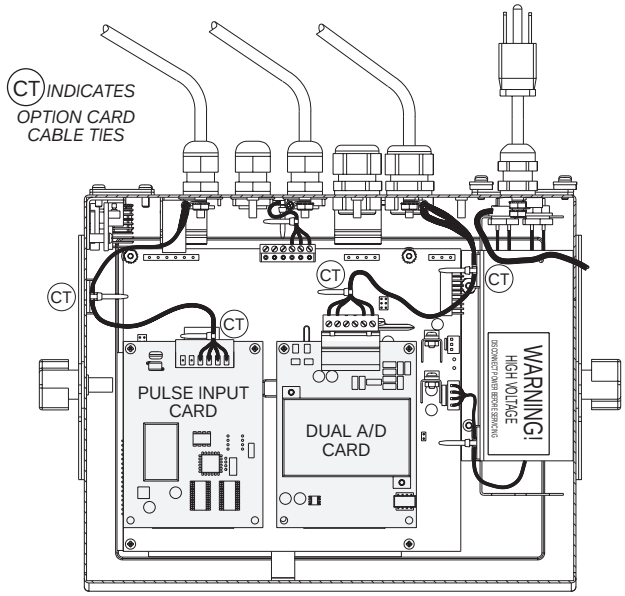


Figure 2-6. Installed Option Cards, Showing Secured Cables

The *920i* automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify the newly-installed card to the system.

2.5 Expansion Board Configurations

Two- and six-card expansion boards allow up to fourteen option cards to be attached to the *920i*. Figures 2-7 through 2-9 show the slot numbers assigned for various combinations of two- and six-card expansion boards. A single six-card expansion board is assigned slots 3–8.

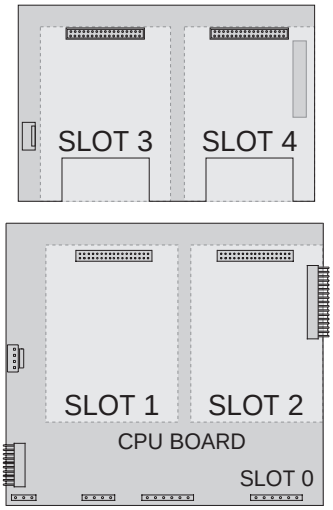


Figure 2-7. CPU Board with Two-Card Expansion Board

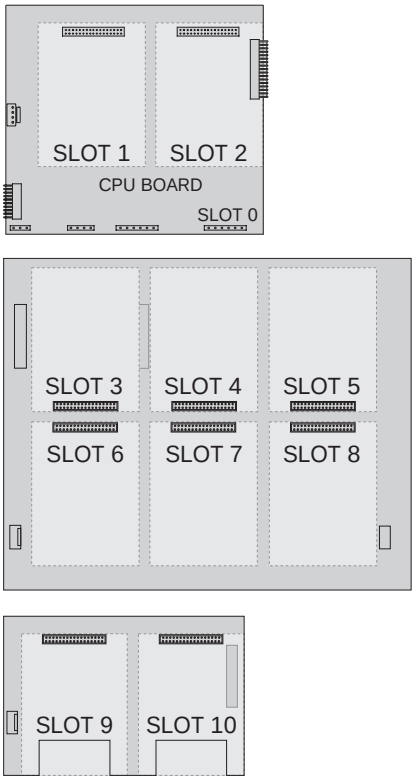


Figure 2-8. CPU Board with Two- and Six-Card Expansion Boards

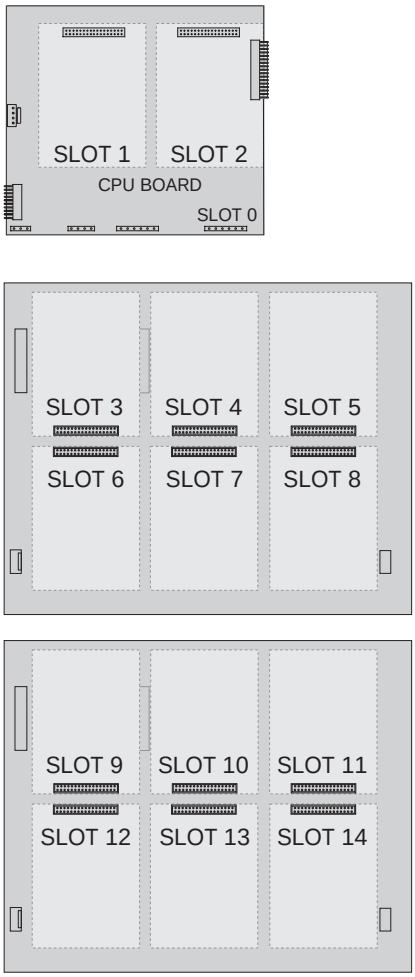


Figure 2-9. CPU Board with Two Six-Card Expansion Boards

NOTES:

- The maximum number of option board slots is fourteen: two onboard slots, plus two six-card expansion boards.
- The two-card expansion board is always placed at the end of the expansion bus. No more than one two-card expansion board can be used in any system configuration.
- The panel mount enclosure can accommodate a single two-card expansion board.
- The wall mount enclosure can accommodate a two-card or a six-card expansion board.
- Systems using two expansion boards are housed in a custom enclosure.

Expansion Board Serial Port Assignments

Serial port numbers are reserved for each option card slot, regardless of the type of cards actually installed. Two port numbers are reserved for each slot that could contain a dual-channel serial expansion card. Table 2-5 shows the port numbers assigned to each slot.

Slot Number	Serial Port Assignments
CPU board	1–4
1	5–6
2	7–8
3	9–10
4	11–12
5	13–14
6	15–16
7	17–18
8	19–20
9	21–22
10	23–24
11	25–26
12	27–28
13	29–30
14	31–32

Table 2-5. Expansion Board Serial Port Assignments

For example, in a system with a two-card expansion board, port assignments are reserved as shown in Figure 2-10. If the only serial card installed in this system is in SLOT 4 of the expansion board, the system consists of serial ports 1–4 (on the CPU board) and ports 11–12.

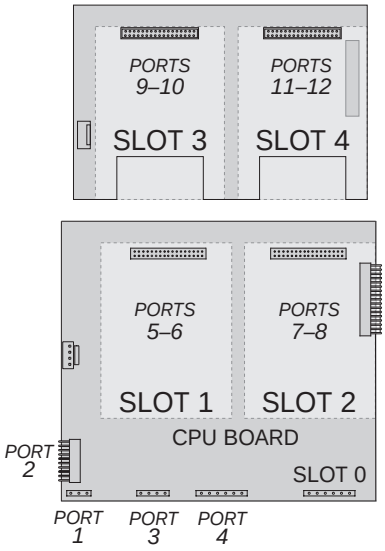


Figure 2-10. Serial Port Assignments, Two-Card Expansion Board

2.6 Enclosure Reassembly

Once cabling is complete, position the backplate over the enclosure and reinstall the backplate screws. Use the torque pattern shown in Figure 2-11 to prevent distorting the backplate gasket. Torque screws to 15 in-lb (1.7 N-m).

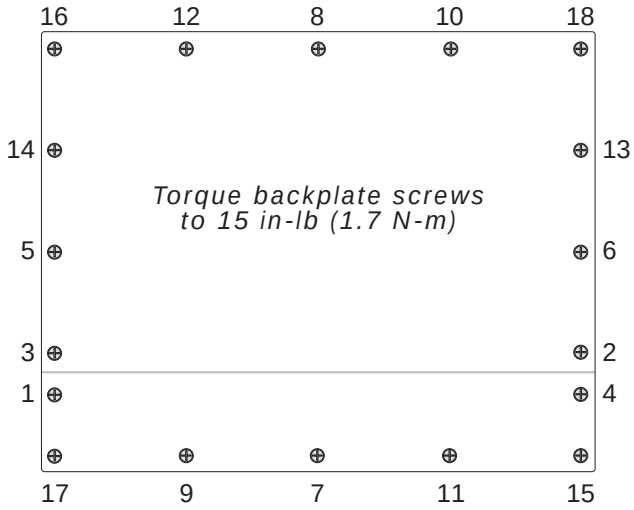


Figure 2-11. 920i Enclosure Backplate

2.7 CPU Board Removal

If you must remove the *920i* CPU board, use the following procedure:

1. Disconnect power to the indicator. Remove backplate as described in Section 2.2 on page 6.
2. Unplug connectors J9, J10, and J11 (serial communications), J2 (digital I/O), P1 (power supply), and connectors to any installed option cards.
3. Remove any installed option cards.
4. Remove the five phillips head screws and two kep nuts from the CPU board.
5. Gently lift up the CPU board, then disconnect connectors J12 (power to display), J4 (ribbon cable, J3 (keypad connector), then the cable J8 (Port 2 serial port).
6. Remove CPU board from the enclosure. If necessary, cut cable ties to shift cables out of the way.

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

2.8 Fuse Replacement

Fuses for the desktop and universal models of the *920i* are located under a cover plate on the outside of the enclosure. Remove the cover plate, replace the fuses, and reinstall the cover plate (see Figures 2-12 and 2-13).

Caution *To protect against the risk of fire, replace fuses only with same type and rating fuse.*

See Section 10.13 on page 107 for complete fuse specifications for the desktop and universal units.

Caution *Interface board and fuse access cover plates must be in place for use in NEMA 4X/IP66 applications.*

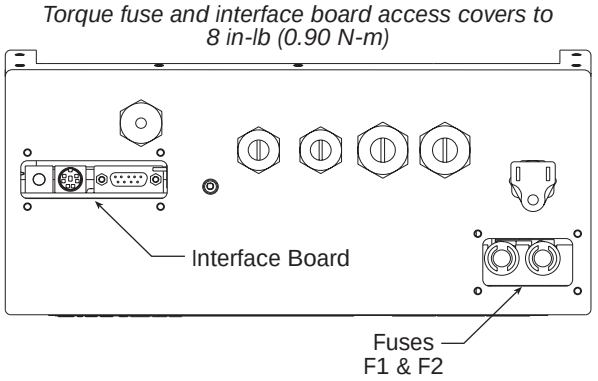


Figure 2-12. Interface Board and Fuse Locations, Desktop Model

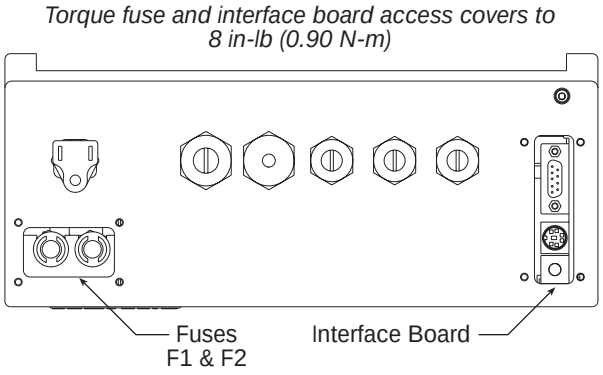


Figure 2-13. Interface Board and Fuse Locations, Universal Model

2.9 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.

Data protected by the CPU board battery includes time and date, truck and tare memory, onboard database information, and setpoint configuration.

Use *iRev* 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.

NOTE*: Memory option card data is also protected by a lithium battery. All database information stored on a memory card is lost if the memory card battery fails.*

Watch for the low battery warning on the LCD display and periodically check the battery voltage on both the CPU board and on any installed memory option cards. Batteries should be replaced when the indicator low battery warning comes on, or when battery voltage falls to 2.2 VDC. Life expectancy of the battery is ten years.

See Figure 2-4 on page 8 for CPU board battery location and orientation (positive side up).

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

2.10 Parts Kit Contents

Table 2-6 lists the parts kit contents for the desktop and universal models of the *920i*.

PN	Description
14626	Kep nuts, 8-32NC (4)
14862	Machine screws, 8-32NC x 3/8 (12)
75068	Sealing washers (14)
15133	Lock washers, No. 8, Type A (4)
30623	Machine screws, 8-32NC x 7/16 (2)
15631	Cable ties (4–single A/D, 6–dual A/D)
15665	Reducing glands for 1/2 NPT cord grips (2)
15887	6-position screw terminal for load cell connection (1–single A/D, 2–dual A/D)
19538	Cord grip plugs (4–single A/D, 3–dual A/D)
42350	Capacity label (1–single A/D, 2–dual A/D)
53075	Cable shield ground clamps (4)
70599	6-position screw terminals for J2 and J10 (2)
71126	4-position screw terminal for J9 (1)
71125	3-position screw terminal for J11 (1)
19433	Adhesive-backed feet (4, desktop model only)
42149	Rubber feet for tilt stand (4, universal model only)
15144	Nylon washers for tilt stand, 1/4 x 1 x 1/16 (2, universal model only)
68403	Wing knobs for tilt stand (2, universal model only)

Table 2-6. Parts Kit Contents

2.11 Replacement Parts and Assembly Drawings

Table 2-7 lists replacement parts for the *920i* desktop and universal models, including all parts referenced in Figures 2-14 through 2-19. For assembly drawings and replacement parts information for the panel mount and wall mount enclosures, see the *920i Panel Mount Installation Instructions*, PN 69989 and the *920i Wall Mount Installation Instructions*, PN 69988.

Ref Number	PN	Description (Quantity)	See Figure	
			Desktop	Universal
1	67534	Enclosure, desktop (1)	2-14	—
	67529	Enclosure, universal (1)	—	2-18
2	68598	Protective lens (1)	2-14	
3	67614	LCD display (1)		
4	68425	Fuse access coverplate (1)		
5	68621	Fuse access coverplate gasket (1)		
6	67886	Standoffs, short (4)		
7	68661	Standoffs, long (2)		
8	70912	CPU board (1)		
9	14618	Kep nuts, 4-40NC (2)		
10	67613	Power supply, ±6VDC, 25W (1)	2-16	
11	67536	Power supply bracket (1)	2-15	
12	16861	High voltage warning label (1)	2-16	
13	14624	Lock nuts, 6-32NC, nylon (2)	2-15	
14	14822	Machine screws, 4-40NC x 1/4 (11)	2-14	
15	67530	Interface board connector plate (1)		
16	67535	Interface board gasket (1)		
17	14862	Machine screws, 8-32NC x 3/8 (4)*		
18	75068	Sealing washers (12)*		
19	32365	Setup switch access screw, 1/4 x 20NC x 1/4 (1)		
20	44676	Sealing washer for setup switch access screw (1)		
21	15626	Cord grips, PG9 (3)		
22	15627	Lock nuts, PCN9 (3)		
23	30375	Nylon seal rings for PG9 cord grips (3)		
25	15134	Lock washers, No. 8, Type A (3)	2-15	2-19
26	14626	Kep nuts, 8-32NC (3)*		
27	45043	Ground wire, 4 in w/ No. 8 eye connector (1)		
28	67533	Enclosure backplate, desktop (1)	2-14	—
	68424	Enclosure backplate, universal (1)	—	2-18
29	68622	Backplate gasket, desktop (1)	2-14	—
	67532	Backplate gasket, universal (1)	—	2-18
30	15631	Cable tie, 3-in nylon (1)*	2-17	2-20
31	67795	Power cord assembly, 115 VAC and 230 VAC North American units (1)	2-14	2-18
	69998	Power cord assembly, 230 VAC European units (1)	—	—
32	67796	Power supply cable assembly, to CPU board (1)	2-14	2-19

Table 2-7. Replacement Parts

Ref Number	PN	Description (Quantity)	See Figure	
			Desktop	Universal
33	68536	Ribbon cable to interface board, desktop (1)	2-16	—
	68662	Ribbon cable to interface board, universal (1)	—	2-19
34	16892	Ground/Earth label (1)	2-16	2-19
35	15650	Cable tie mounts, 3/4 in. (4)	2-15	
40	53308	Model/serial number label (1)	2-14	
41	68532	Single-channel A/D card (1, can be single- or dual-channel A/D)	2-17	—
	68533	Dual-channel A/D card (1, can be single- or dual-channel A/D)	—	2-19
43	71027	Fuses (115 VAC models), 2 A Time-Lag TR5 (2)	2-14	2-18
	71026	Fuses (230 VAC models), 2 A Time-Lag TR5 (2)		
44	46192	Ribbon cable clamp (2–desktop only)	2-17	—
45	67869	Interface board (1)	2-15	2-19
46	14832	Machine screws, 4-40NC x 3/8 (2)		
47	22086	Machine screws, 6-32NC x 1/4 (8)	2-14	2-18
50	15628	Cord grips, 1/2 NPT (2)		
52	30376	Nylon seal rings for 1/2 NPT cord grips (2)		
53	15630	Lock nuts for 1/2 NPT cord grips (2)		
54	70069	3V Lithium coin battery	—	2-20
55	69898	Nylon spacers (4)	2-14	2-18
—	66502	Switch panel membrane (1)		

* 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 10.13 on page 107 for complete fuse specifications.

Table 2-7. Replacement Parts (Continued)

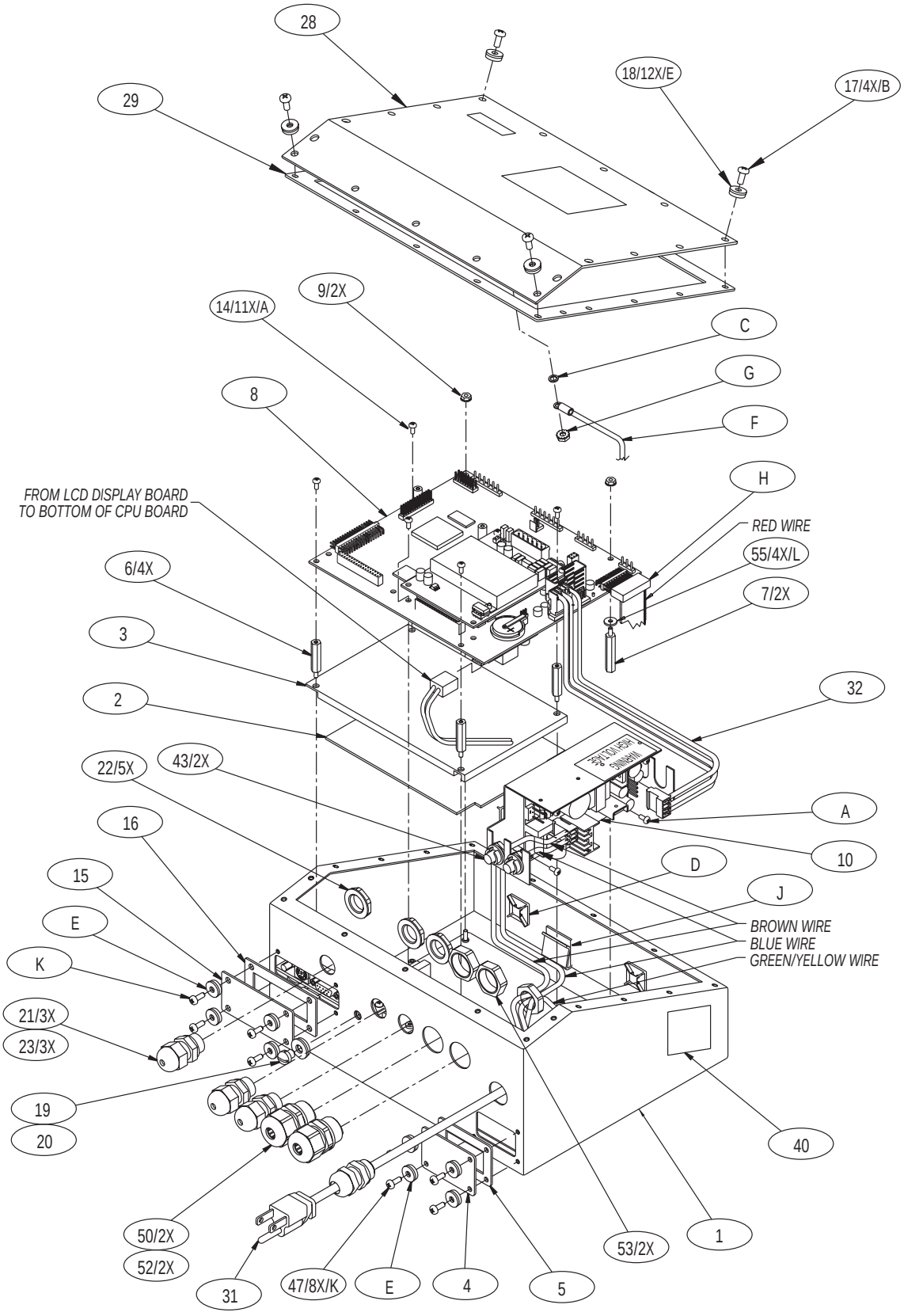


Figure 2-14. 920i Desktop Model Assembly

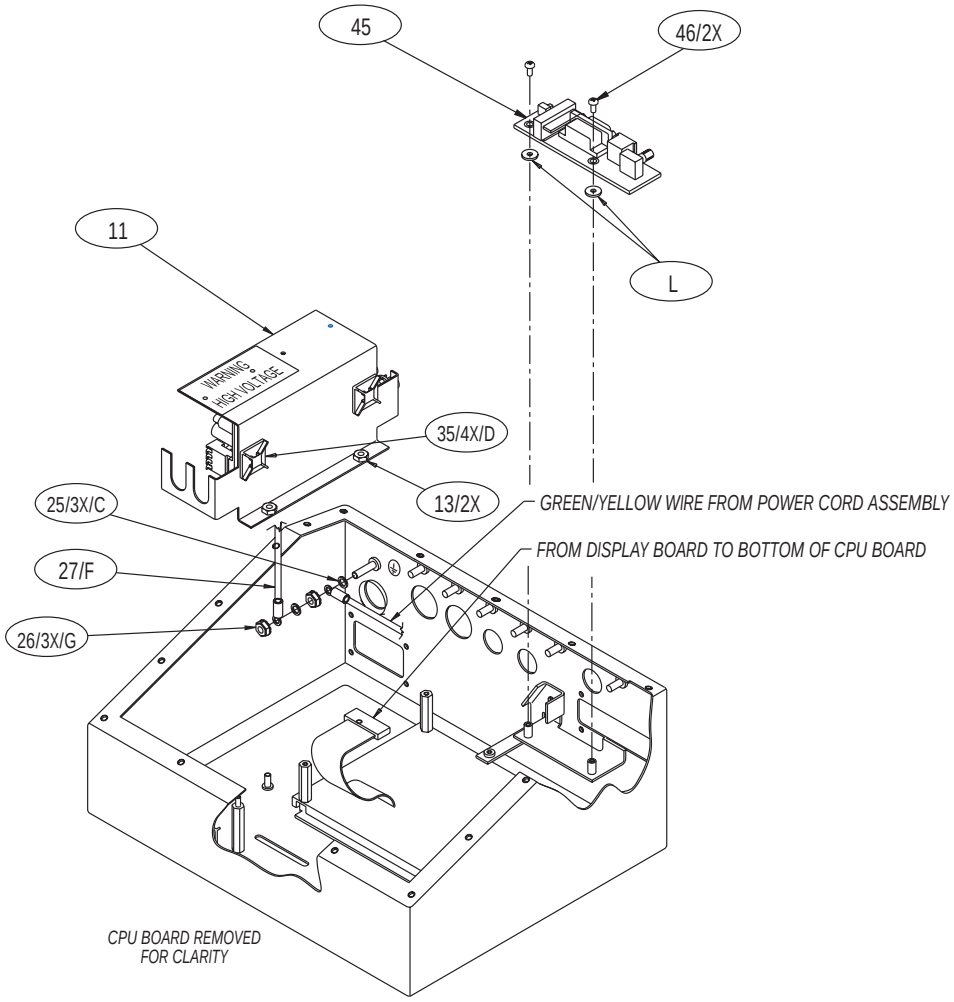


Figure 2-15. 920i Desktop Model Power Supply and Interface Board Components

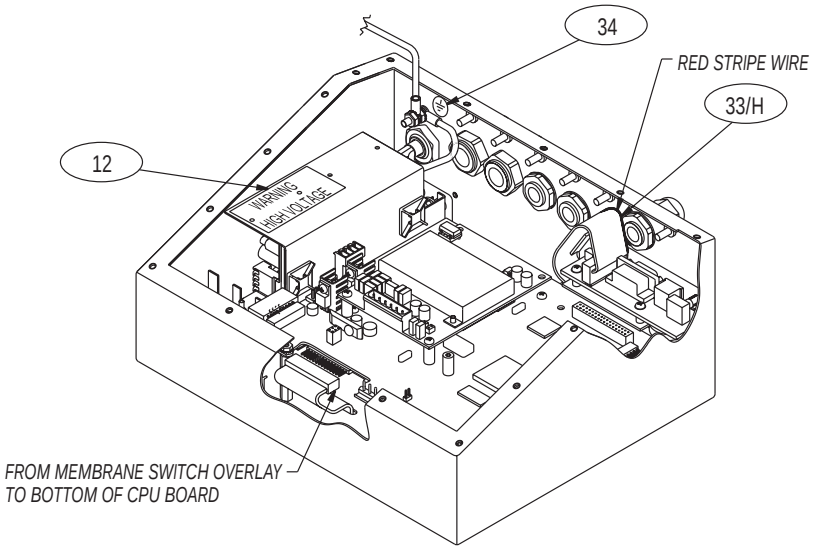


Figure 2-16. 920i Desktop Model, Interior View

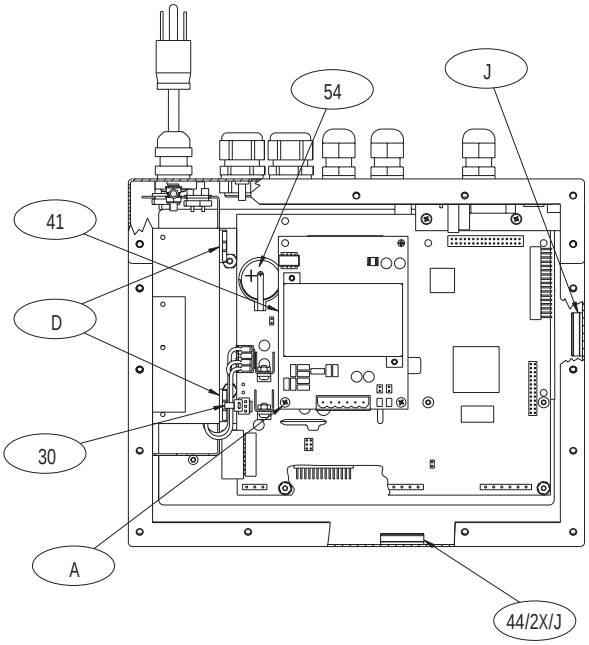


Figure 2-17. 920i Desktop Model, Top View with Backplate Removed

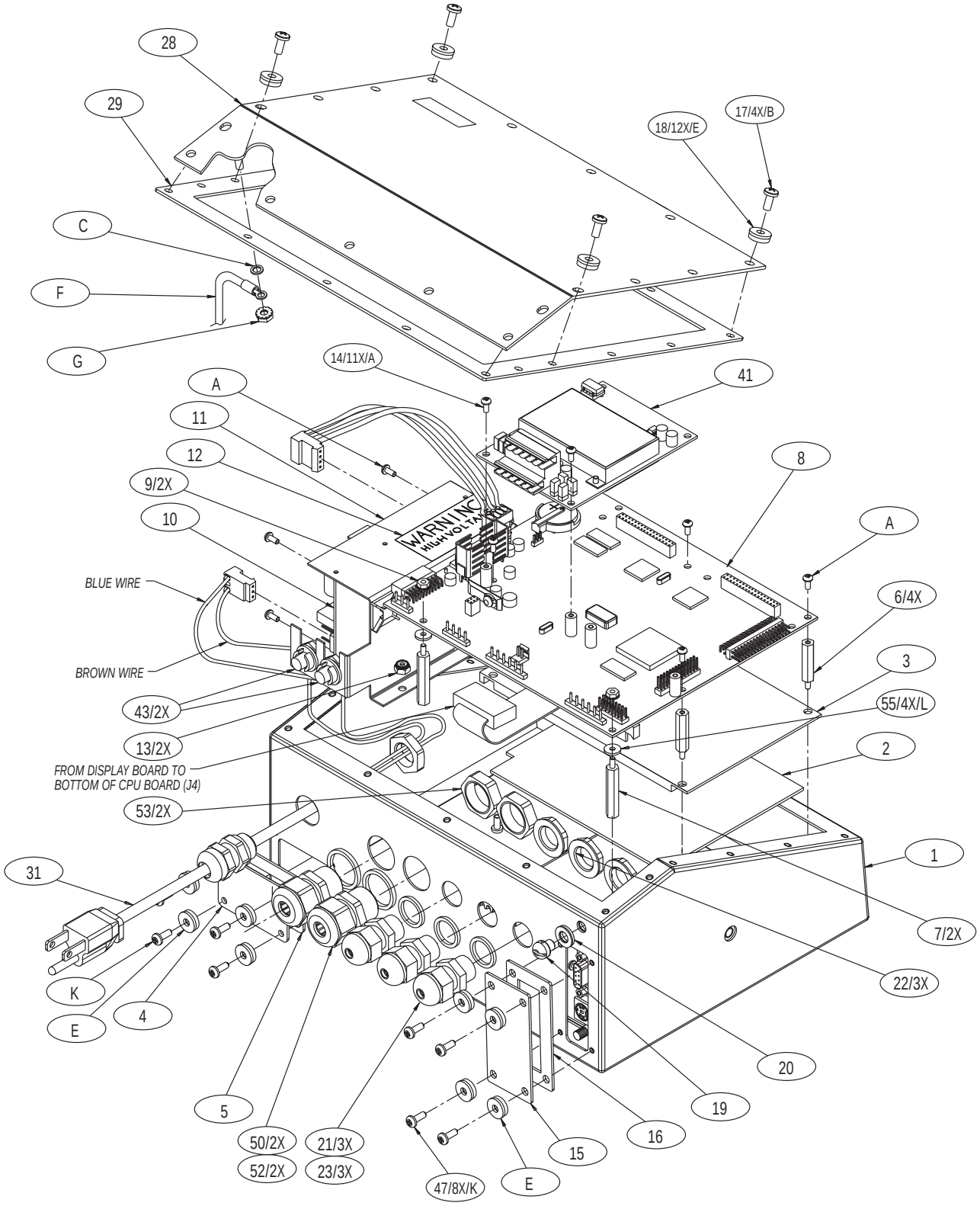


Figure 2-18. 920i Universal Model Assembly

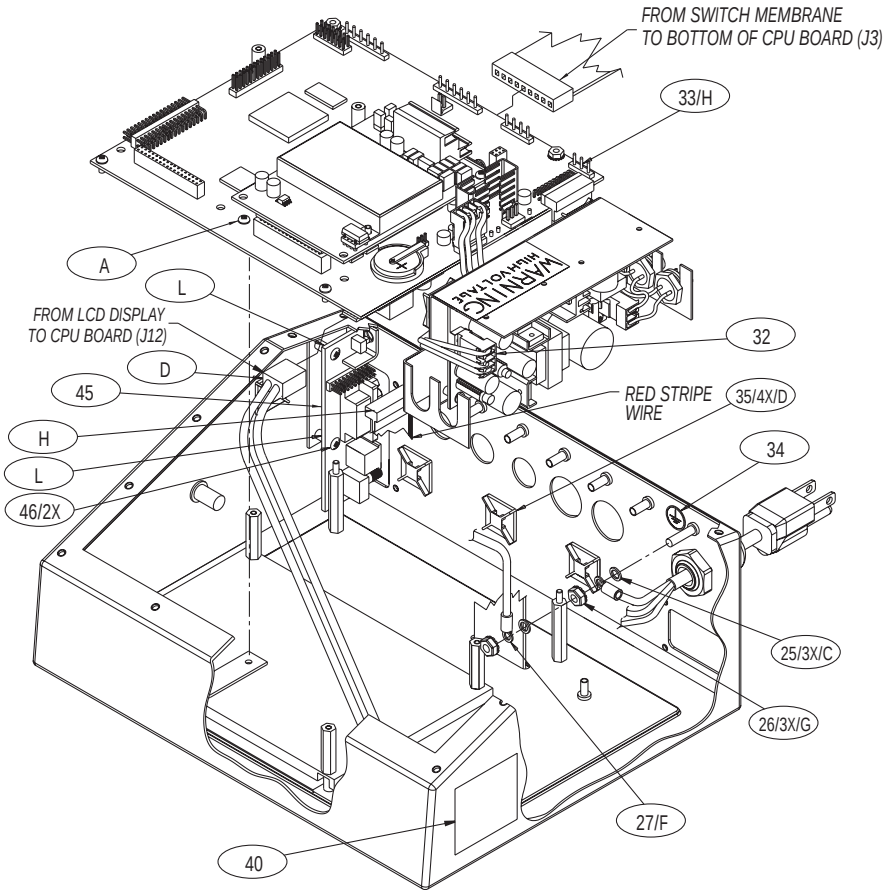


Figure 2-19. 920i Universal Model Power Supply Components

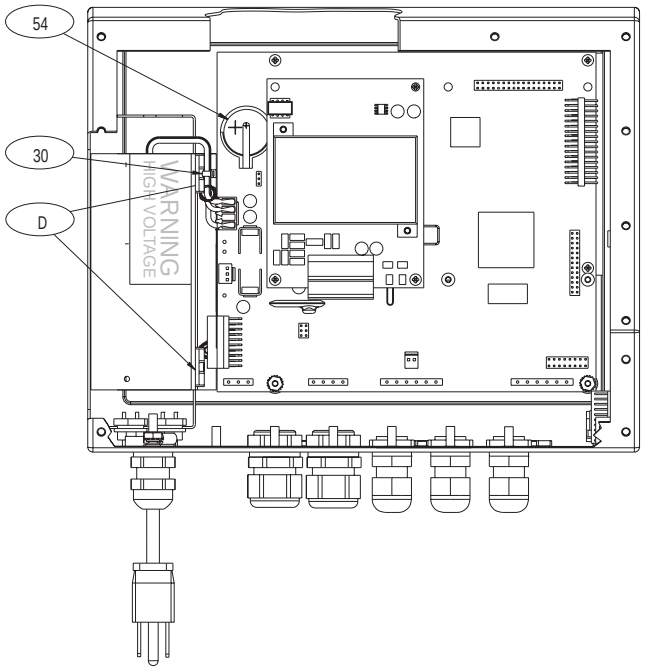


Figure 2-20. 920i Universal Model, Back View with Backplate Removed

3.0 Configuration

To configure the *920i* indicator, the indicator must be placed in setup mode. The setup switch is accessed by removing the large fillister head screw on the desktop and universal enclosures. Switch position is changed by inserting a screwdriver into the access hole and pressing the switch.

When the indicator is placed in setup mode, a series of menus is shown across the top of the display, along with the words *Scale Configuration*. The SCALES menu is highlighted as the first used to configure the indicator. Detailed descriptions of these menus are provided in Section 3.2.

When configuration is complete, press the Exit or Save and Exit softkey to exit setup mode, then replace the setup switch access screw.

- The Exit softkey exits setup mode without saving parameter changes to NV RAM. Changes made to the configuration remain in the system until indicator power is cycled.
- Save and Exit writes all parameter changes to NV RAM before returning to normal mode.

3.1 Configuration Methods

The *920i* 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 an indicator serial port. Configuration using the menus is described in Section 3.1.3.

Configuration using the serial port can be accomplished using either the serial command set described in Section 9.0 or the *iRev* configuration utility.

NOTE: Some configuration parameters, such as those used to configure the *920i* display and widgets, cannot be accessed through the configuration menus. *iRev* provides the most complete and efficient configuration interface for the *920i*.

3.1.1 iRev Configuration

The *iRev* configuration utility provides the preferred method for configuring the *920i* indicator. *iRev* runs on a personal computer to set configuration parameters for the indicator. When *iRev* configuration is complete, configuration data is downloaded to the indicator.

iRev 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 indicator with an identical hardware configuration.

Figure 3-1. iRev Hardware Configuration Display

To use *iRev*, do the following:

1. Install *iRev* on an IBM-compatible personal computer. See Section 5.0 on page 44 for detailed hardware and software requirements.
2. With both indicator and PC powered off, connect the PC serial port to the RS-232 pins on the indicator serial port.
3. Power up the PC and the indicator. Use the setup switch to place the indicator in setup mode.
4. Start the *iRev* program.

iRev 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 *iRev*: The interface is different, but the parameters set are the same.

See Section 5.0 on page 44 for more information about using *iRev* to configure the *920i*.

3.1.2 Serial Command Configuration

The serial command set can be used to configure the *920i* indicator using either a personal computer, terminal, or remote keyboard. Like *iRev*, serial command configuration sends commands to the indicator serial port; unlike *iRev*, serial commands can be sent using any external device capable of sending ASCII characters over a serial connection.

Serial commands duplicate the functions available using the indicator front panel and provide some functions not otherwise available. Serial commands can be used to simulate pressing front panel keys, to configure the indicator, or to dump lists of parameter settings. See Section 9.0 on page 72 for more information about using the serial command set.

3.1.3 Front Panel Configuration

Use the CONFIG submenu under the SCALES menu to configure A/D scales. For example, in an indicator with a single-channel A/D card installed in Slot 1, the Scale Configuration display will show the A/D listed (*Slot 1 Channel 1*) under the *AVAILABLE A/D's* column. Use the left navigation key to select the A/D, then press the center softkey, Add. The A/D is then moved to the Associated A/D's column. If no other A/D's are listed in the *AVAILABLE A/D's* column, the center softkey changes to Done, as shown in Figure 3-2. Press Done to exit the Scale Configuration display.

See Section 10.4 on page 91 for information about configuring serial scales.

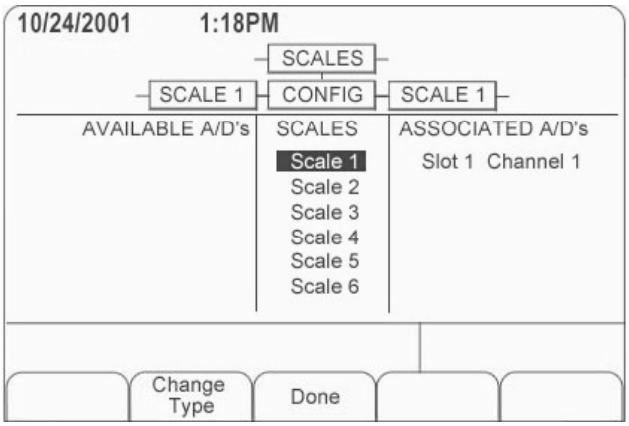


Figure 3-2. Scale Configuration Display

The *920i* 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
SCALES	Configuration	Configure and calibrate scales.
SERIAL	Serial	Configure communications ports.
FEATURE	Feature	Set date and time formats, truck mode, passwords, keyboard locks, regulatory mode, and initial consecutive number value, define softkeys and setpoint prompts.
PFORMT	Print Format	Set print format used for header, gross, net, truck in/out, setpoint, and auxiliary ticket formats. See Section 6.0 on page 47 for more information.
SETPTS	Setpoints	Configure setpoints and batching mode.
DIG I/O	Digital I/O	Assign digital input/output functions.
ALGOUT	Analog Output	Configure analog output module. Used only if analog output option is installed.
VERSION	Version	Display installed software version number. The Reset Config softkey on the Version menu can be used to restore all configuration parameters to their default values.

Table 3-1. 920i Menu Summary

3.2 Menu Structures and Parameter Descriptions

The following sections provide graphic representations of the *920i* menu structures and tables describing the menu parameters. Default values are shown in **bold** type; numeric ranges and string values are shown in *italic* type. Parameters shown surrounded by a dotted-line box only appear under the special circumstances explained under each box.

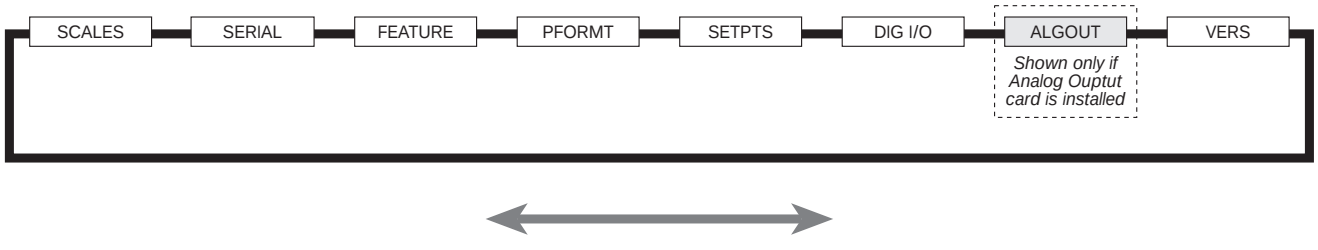


Figure 3-3. Configuration Menu Flow

3.2.1 SCALES Menu

The SCALES menu is shown in Figure 3-4. The FORMAT submenu is shown in Figure 3-5 on page 25; the CALIBR submenu is shown in Figure 3-6 on page 29. Parameters shown in each diagram are described in the table following that diagram.

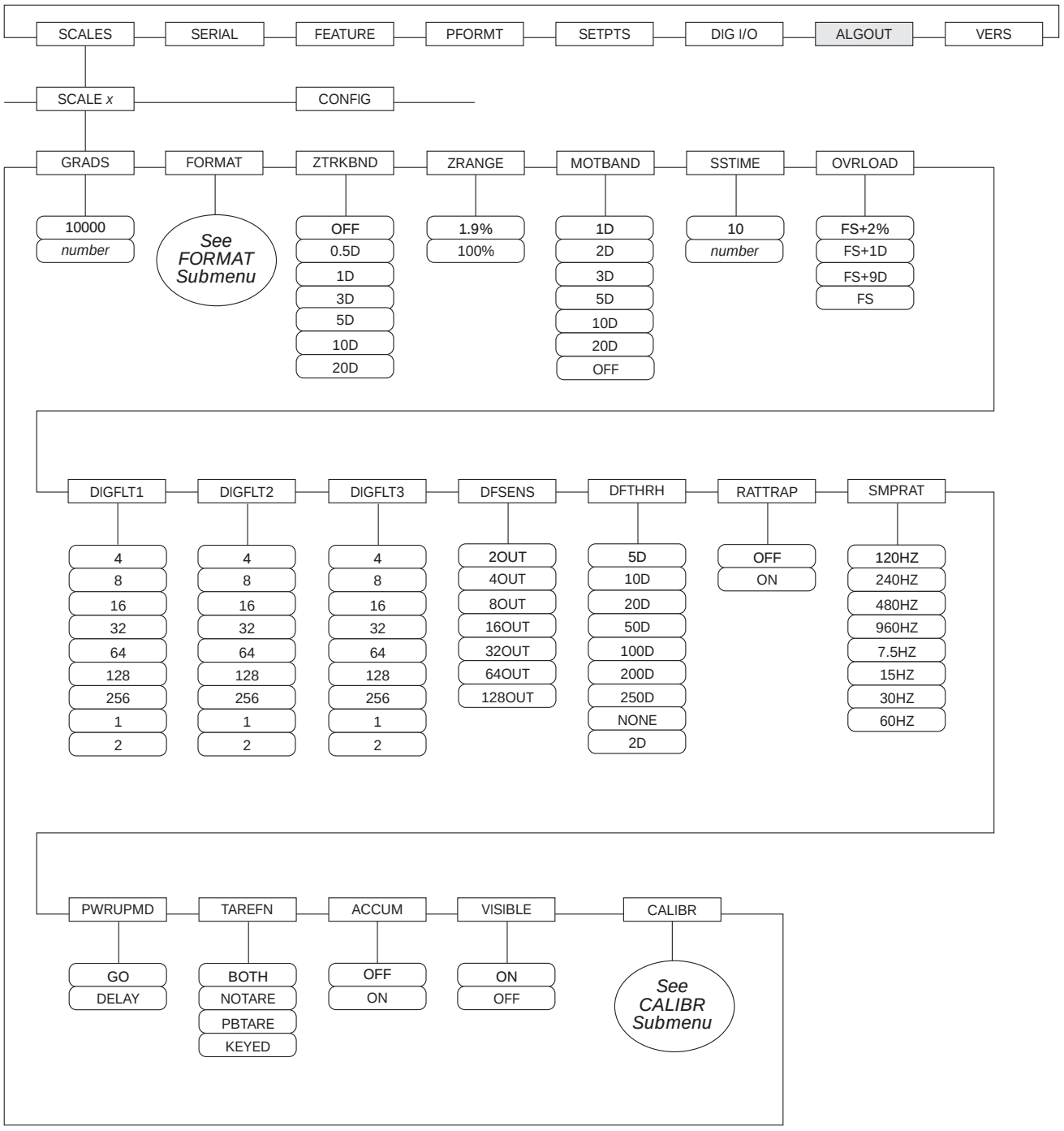


Figure 3-4. SCALES Menu

SCALES Menu		
Parameter	Choices	Description
Level 2 submenus		
SCALE*x*		Allows configuration and calibration of each scale
CONFIG		Lists available and associated A/Ds
Level 3 submenus		
GRADS	10000 *1–9999999*	Specifies the number of full scale graduations. The value entered must be in the range 1–9999999 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 under the FORMAT submenu.
FORMAT	PRIMAR SECNDR TERTIA ROC	See Level 4 submenu descriptions in Table 3-3 on page 26.
ZTRKBND	OFF 0.5D 1D 3D 5D 10D 20D	Automatically zeroes the scale when within the range specified, as long as the input is within the ZRANGE and scale is at standstill. Selections are ± display divisions. Maximum legal value varies depending on local regulations.
ZRANGE	1.9% 100%	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 does 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.
SSTIME	10 *number*	Specifies the length of time the scale must be out of motion, in 0.1-second intervals, before the scale is considered to be at standstill. Values entered must be in the range 1–65535.
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.
DIGFLT1 DIGFLT2 DIGFLT3	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.

Table 3-2. SCALES Menu Parameters

SCALES Menu		
Parameter	Choices	Description
DFSENS	2OUT 4OUT 8OUT 16OUT 32OUT 64OUT 128OUT	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	5D 10D 20D 50D 100D 200D 250D NONE 2D	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.
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.
SMPRAT	120HZ 240HZ 480HZ 960HZ 7.5HZ 15HZ 30HZ 60HZ	Sample rate. Selects measurement rate, in samples per second, of the analog-to-digital converter. Lower sample rate values provide greater signal noise immunity: the default 120 Hz value may be too fast to provide the desired stability in some static weighing applications. NOTE: The maximum total sample rate for all configured A/D channels—the sum of the sample rates for all scales—is 1200 Hz. For example, up to ten scales can be configured with 120 Hz sample rates, or up to twenty scales with 60 Hz sample rates.
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
ACCUM	OFF ON	Accumulator. Specifies whether the scale accumulator is enabled. If enabled, accumulation occurs whenever a print operation is performed.
VISIBL	ON OFF	Scale visibility. Specifies whether scale data is displayed.
CALIBR	WZERO WVAL WSPAN WLIN REZERO	See Level 4 submenu descriptions in Table 3-6 on page 29.

Table 3-2. SCALES Menu Parameters (Continued)

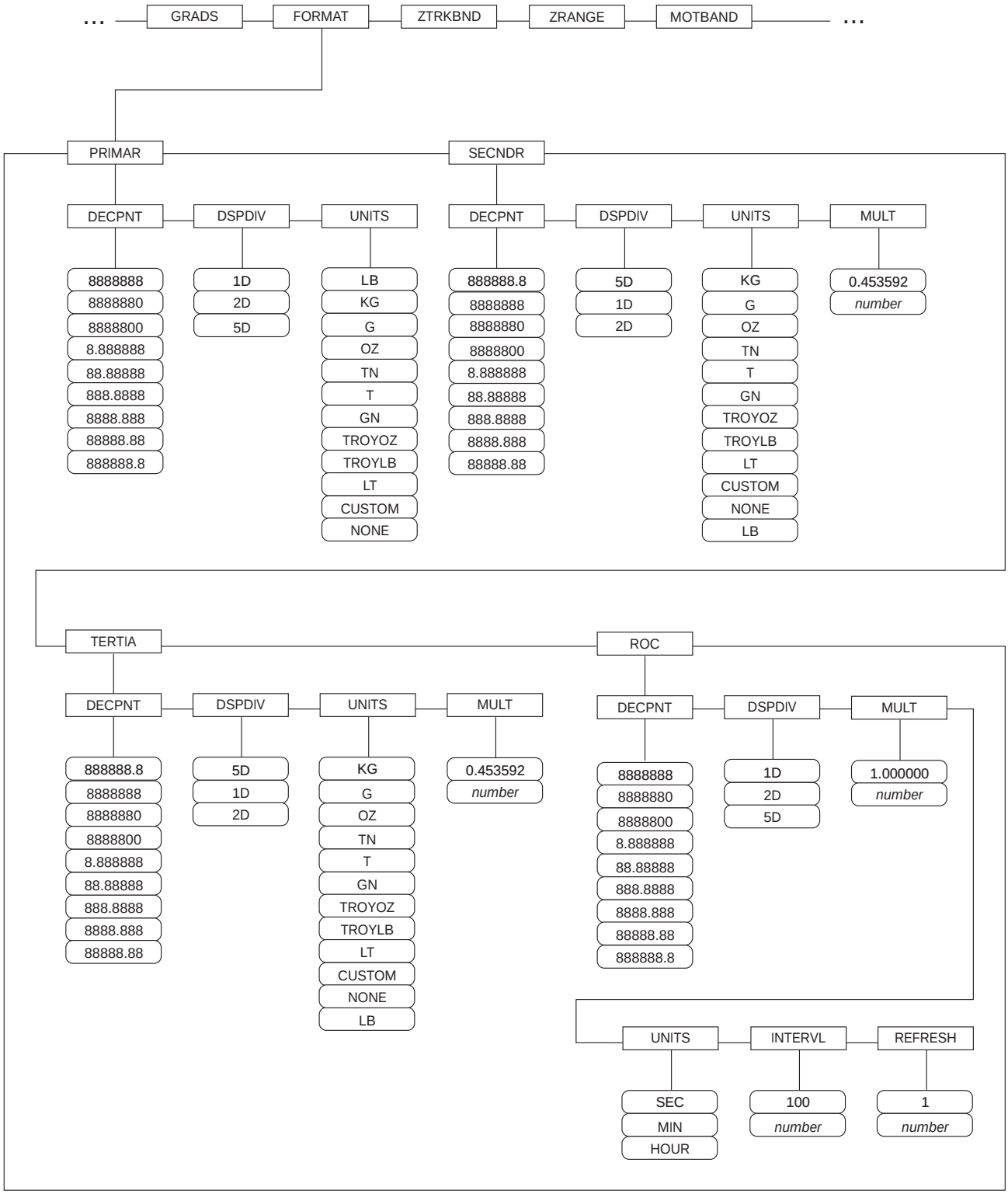


Figure 3-5. SCALES Menu, FORMAT Submenu

SCALES Menu, FORMAT Submenu		
Parameter	Choices	Description
Level 4, FORMAT submenu		
PRIMAR	DECPNT DSPDIV UNITS	Specifies the decimal position, display divisions, and units used for the primary units. See Level 5 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 5 submenu parameter descriptions.
TERTIA	DECPNT DSPDIV UNITS MULT	Specifies the decimal position, display divisions, units, and conversion multiplier used for the tertiary units. See Level 5 submenu parameter descriptions.
ROC	DECPNT DSPDIV MULT UNITS INTERVL REFRESH	Specifies the decimal position, display divisions, conversion multiplier, units, update interval, and refresh interval used for the rate of change units. See Level 5 submenu parameter descriptions.
Level 5 submenus		
Primary Units (PRIMAR) Parameters		
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 CUSTOM 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.

Table 3-3. SCALES Menu, FORMAT Submenu Parameters

SCALES Menu, FORMAT Submenu		
Parameter	Choices	Description
Secondary Units (SECNDR) and Tertiary Units (TERTIA) Parameters		
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 secondary or tertiary units display.
DSPDIV	5D 1D 2D	Display divisions. Selects the value of minimum division size of the displayed weight for secondary or tertiary units display.
UNITS	KG G OZ TN T GN TROYOZ TROYLB LT CUSTOM NONE LB	Specifies secondary or tertiary 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 *0.000001–9999999*	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the secondary or tertiary units. The default is 0.453592, which is the conversion factor for changing pounds to kilograms. See Section 10.10 on page 101 for a list of multipliers. To shift between primary, secondary, and tertiary units, press the UNITS key.
Rate of Change (ROC) Units Parameters		
DECPNT	8888888 8888880 8888800 8.888888 88.88888 888.8888 8888.888 88888.88 888888.8	Decimal point location. Determines the location of the decimal point or dummy zeros in the display.
DSPDIV	1D 2D 5D	Display divisions. Selects the minimum division size for the ROC units displayed weight.

Table 3-3. SCALES Menu, FORMAT Submenu Parameters (Continued)

SCALES Menu, FORMAT Submenu		
Parameter	Choices	Description
MULT	1.0 *0.000001–9999999*	Multiplier. Specifies the conversion factor by which the primary units are multiplied by to obtain the displayed rate of change units. To calculate the MULT value, use the following equation: MULT = (SMPRAT / INTERVL) * *(seconds_per_ROC_unit)* * *(ROC/PRIMAR_precision_adjustment)* Where: • SMPRAT is the value specified for the A/D sample rate on the SCALES menu • INTERVL is the specified ROC interval • *seconds_per_ROC_unit* is an adjustment for the ROC UNITS parameter. If ROC UNITS is set to SEC, use 1; use 60 for UNITS=MIN, use 3600 for UNITS=HOUR. • *ROC/PRIMAR_precision_adjustment* compensates for any difference in the DECPNT and DSPDIV parameters specified for primary units and ROC units. For example, if the ROC DECPNT parameter is set to 8888888 (no decimal) and with DSPDIV=1, ROC precision is 1. If PRIMAR DECPNT is set to 8888880 (null units position) and DSPDIV=2, PRIMAR precision is 20. (That is, weights will be displayed in increments of 20.) In this example, the precision adjustment would be 1 / 20, or 0.05. *Example:* If SMPRAT=120HZ, INTERVL=240, ROC UNITS=MIN, and the precision is compensated as described above, MULT would be calculated as follows: MULT = (120 / 240) * 60 * 0.05 = 1.5 To calculate a ROC MULT value based on secondary or tertiary units, multiply the calculated primary units MULT value by the conversion factor for the alternate units. For example, if a MULT value of 1.5 is calculated for pounds as the primary unit, calculate the MULT value for kilogram secondary units by multiplying the original MULT value by 0.453592: MULT*(kg)* = 1.5 * 0.453592 = 0.680388 See Section 10.10 on page 101 for information about conversion factors.
UNITS	SEC MIN HOUR	Rate-of-change units.
INTERVL	100 *1–65535*	Update interval. Specifies the number of A/D updates over which the rate-of-change is calculated.
REFRESH	1 *1–65535*	Refresh interval. Specifies the number of A/D updates between rate-of-change samples. The value specified for this parameter should be an integer not less than 1% and not more than 50% of the update interval (INTERVL parameter) specified. For example, if the INTERVL parameter value is 120, the REFRESH specified should be in the range of 2–60.

Table 3-3. SCALES Menu, FORMAT Submenu Parameters (Continued)

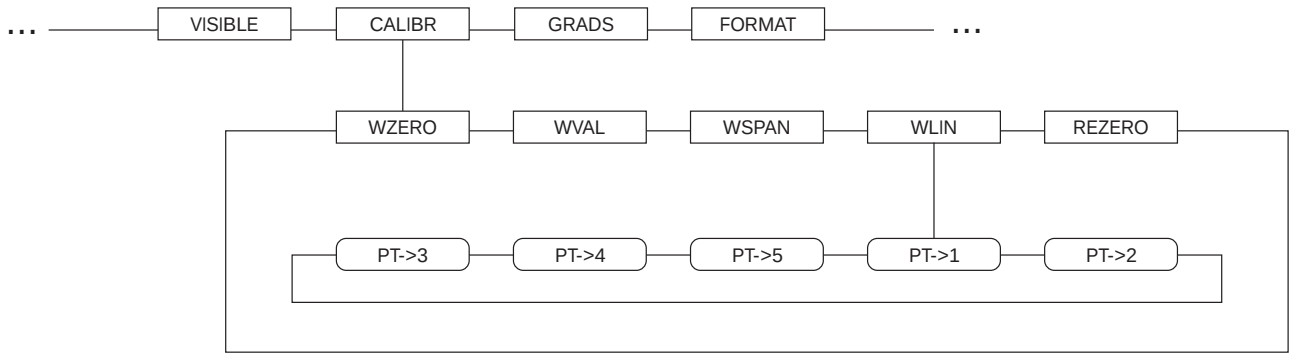


Figure 3-6. SCALES Menu, CALIBR Submenu

SCALES Menu, CALIBR Submenu		
Parameter	Choices	Description
Level 4, CALIBR submenu		
WZERO	—	Press ENTER to display and edit the zero calibration A/D count or millivolts 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 or millivolts 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. **NOTE:** *Use this parameter only after WZERO and WSPAN have been set. See Section 4.2 on page 40 for more information about using this parameter.*

Table 3-4. SCALES Menu, CALIBR Submenu Parameters

3.2.2 SERIAL Menu

See Section on page 92 for information about *920i* serial data formats.

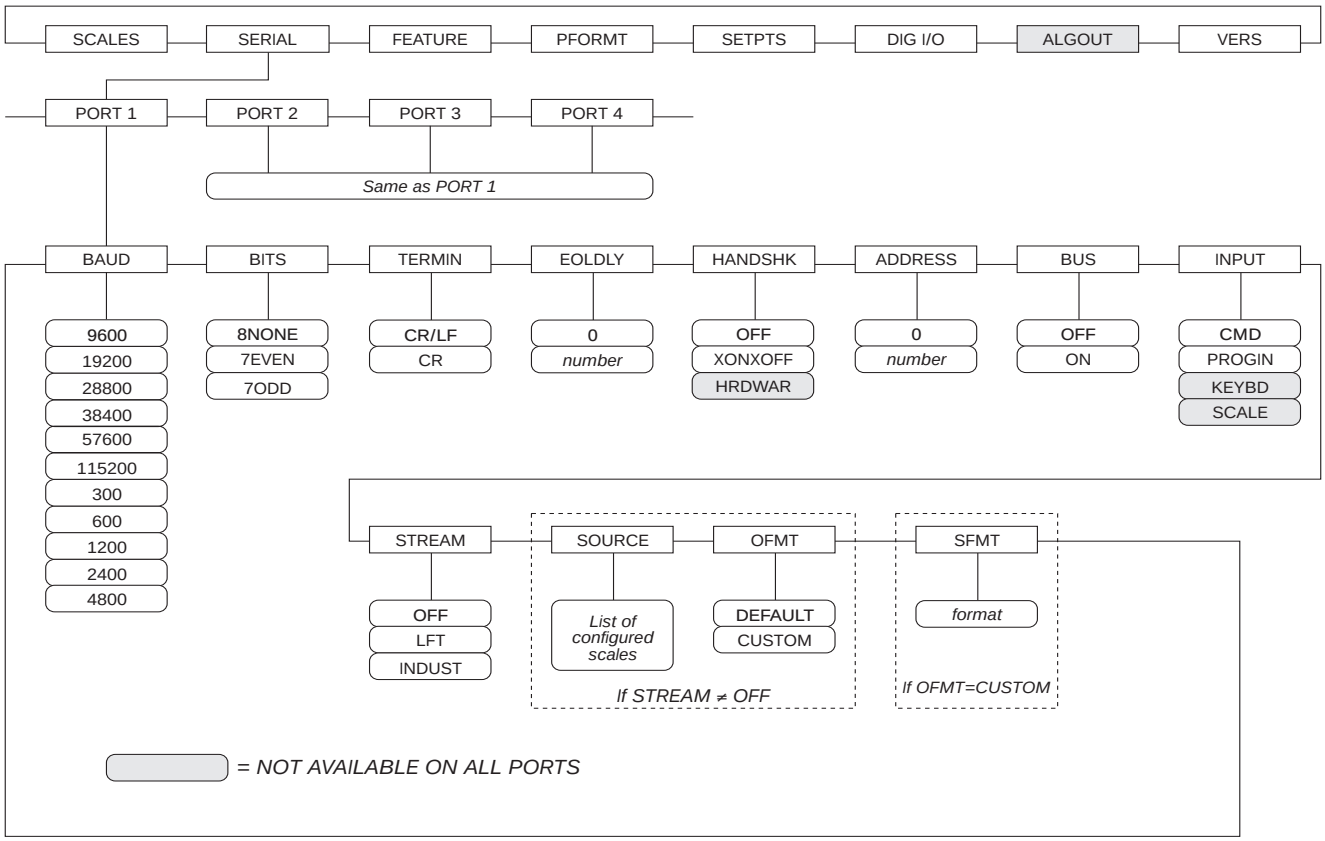


Figure 3-7. SERIAL Menu

SERIAL Menu		
Parameter	Choices	Description
Level 2 submenus		
PORT 1 PORT 2 PORT 3 PORT 4 … PORT *x*	BAUD BITS TERMIN EOLDLY HANDSHK ADDRESS BUS INPUT STREAM	Configure communication ports. See Level 3 submenu parameter descriptions.

Table 3-5. Serial Menu Parameters

SERIAL Menu		
Parameter	Choices	Description
Level 3 Submenus		Port 1–Port 4
BAUD	9600 19200 28800 38400 57600 115200 300 600 1200 2400 4800	Baud rate. Selects the transmission speed for the port. NOTE: The maximum baud rate for ports on serial expansion cards (port number greater than 4) is 19200.
BITS	8NONE 7EVEN 7ODD	Selects number of data bits and parity of data transmitted or received by the port.
TERMIN	CR/LF CR	Termination character. Selects termination character for data sent from the port.
EOLDLY	0 *0–255*	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 XONOFF HRDWAR	Specifies whether XON/XOFF flow control characters or hardware handshaking is used. Hardware handshaking is available only on Port 2.
ADDRESS	0 *0–25*	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 port sends the data stream to a network bus. Specify ON only when using serially-connected bus options.
INPUT	CMD PROGIN KEYBD SCALE	Specifies whether the port receives remote command input, programmable input, remote keyboard input, or scale input. KEYBD is available only on Port 2; SCALE is available only on Ports 3 and 4. **NOTE:** *The keyboard interface is not hot-pluggable. Power-off the 920i before plugging the keyboard cable into the Port 2 connector*
STREAM	OFF LFT INDUST	Specifies whether data is streamed from the port.
SOURCE	*source_scale*	If STREAM is set to a value other than OFF, SOURCE specifies the source scale for data streamed from the port.
OFMT	DEFAULT CUSTOM	Specifies whether streamed data uses the default or a custom stream format.
SFMT	*format*	Specifies the custom stream format used for the streamed data. See Section 10.5 on page 91 for information about custom stream formatting.

Table 3-5. Serial Menu Parameters (Continued)

3.2.3 FEATURE Menu

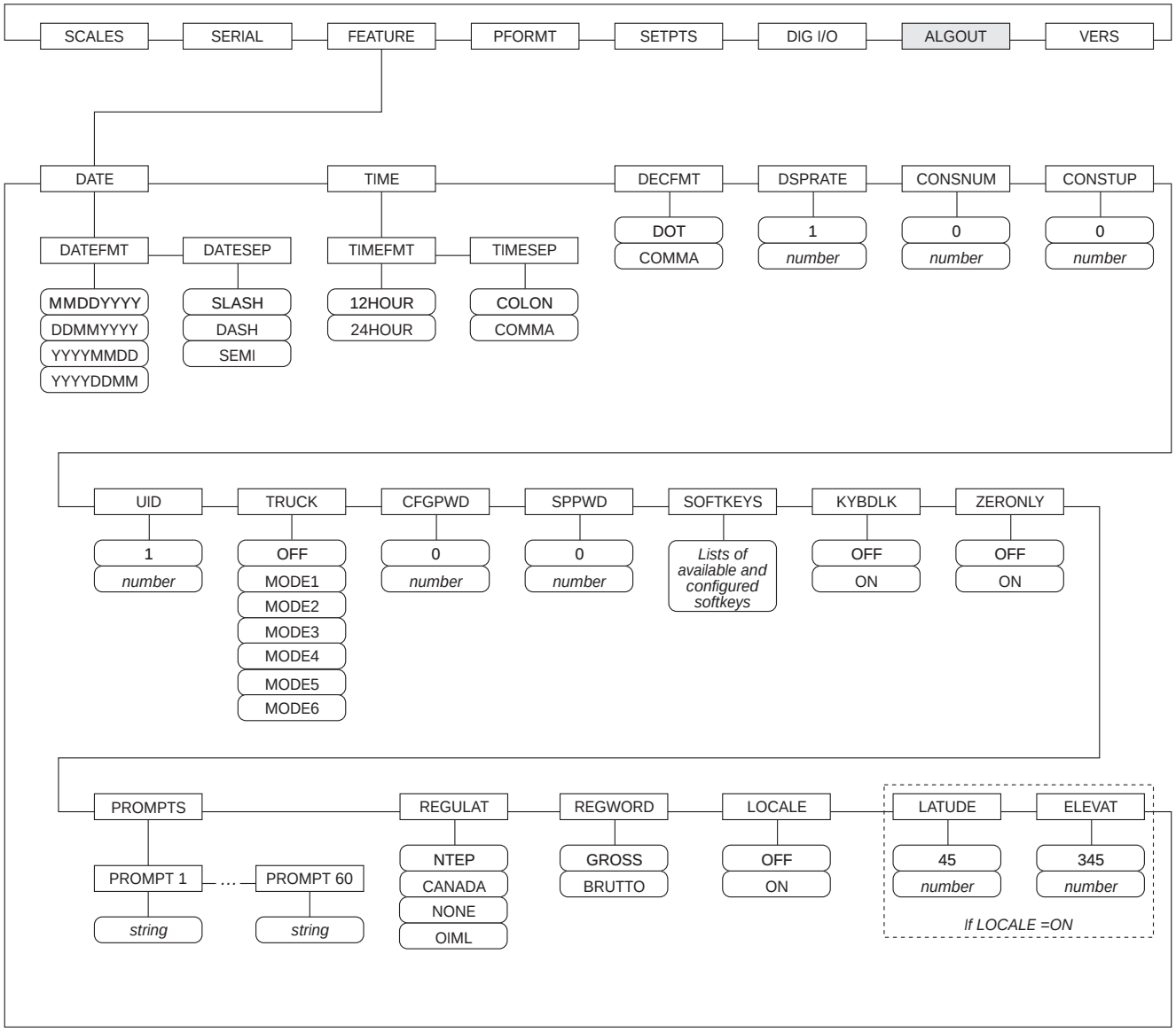


Figure 3-8. FEATURE Menu

FEATURE 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 softkey or the SD serial command to set the date. See Section 9.0 on page 72 for information about using the serial commands.

Table 3-6. FEATURE Menu Parameters

FEATURE Menu		
Parameter	Choices	Description
TIME	TIMEFMT TIMESEP	Allows selection of time format and separator character. See Level 3 submenu parameter descriptions. Use the TIME/DATE softkey or the ST serial command to set the time. See Section 9.0 on page 72 for information about using the serial commands.
DECFMT	DOT COMMA	Specifies whether decimal numbers are displayed using a period (DOT) or comma as the decimal symbol.
DSPRATE	1 *1–80*	Display update rate. Specifies the display update rate, in the number of 100-millisecond intervals between updates. The default value, 1, provides about 10 updates per second. The maximum value updates the display every 8 seconds.
CONSNUM	0 *0–9999999*	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 *0–9999999*	Specifies the consecutive number start-up value used when the consecutive number is reset by sending the KCLRCN serial command or a CLRCN digital input. Value specified must be in the range 0–9 999 999.
UID	1 *unit-ID*	Specifies the unit identification number. Value specified can be any alphanumeric value, up to eight characters.
TRUCK	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 52 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
CFGPWD	0 *0–9999999*	Configuration password. Specify a non-zero value to restrict access to all configuration menus.
SPPWD	0 *0–9999999*	Setpoint password. Specify a non-zero value to restrict access to the setpoint menu. The SPPWD is also shared by, and can be used to protect, the truck register. If a non-zero setpoint password is specified, the password must be entered before deleting any entries from the truck register.
SOFTKEYS	<blank> Time/Date Display Tare Display Accum Display ROC Setpoint Batch Start Batch Stop Batch Pause Batch Reset Weigh In Weigh Out Truck Regs Unit ID Select Scale *F1–F10*	Use the Add and Remove softkeys to select softkeys to be displayed in weighing mode.

Table 3-6. FEATURE Menu Parameters (Continued)

FEATURE Menu		
Parameter	Choices	Description
KYBDLK	OFF ON	Keyboard lock. Specify ON to disable the keypad in normal mode.
ZERONLY	OFF ON	Zero key only. Specify ON to disable all front panel keys except ZERO in normal mode.
PROMPTS	*PROMPT1–PROMPT60*	Specify prompts for use in setpoint names. Prompts are referenced by the NAME parameter under the SETPTS submenus; prompts are shown on the display during setpoint execution.
REGULAT	NTEP CANADA NONE OIML	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. • 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. The value specified for this parameter affects the function of the front panel TARE and ZERO keys. See Section 10.2 on page 90 for a complete description of TARE and ZERO key functions for each of the regulatory modes.
REGWORD	GROSS BRUTTO	Sets the term displayed when weighing in gross mode. Selecting BRUTTO replaces the *Gross* annunciator with *Brutto*.
LOCALE	OFF ON	Locale. Set this parameter ON to enable the LATUDE and ELEVAT parameters. Specifying latitude and elevation of the scale site provides compensation for gravitational effects. Attached scales must be recalibrated after changing this parameter from OFF to ON.
LATUDE	45 *0–90*	Latitude. Specify the latitude of the scale site in degrees. This parameter is shown only if LOCALE=ON.
ELEVAT	345 *±0–9999*	Elevation. Specify the elevation of the scale site in meters. Valid values are –9999 through 9999. This parameter is shown only if LOCALE=ON.
Level 3 submenus		
DATEFMT	MMDDYYYY DDMMYYYY YYYYMMDD YYYYDDMM	Specifies the format used to display or print the date.
DATESEP	SLASH DASH SEMI	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. FEATURE Menu Parameters (Continued)

3.2.4 PFORMT Menu

See Section 6.0 on page 47 for information about custom print formatting.

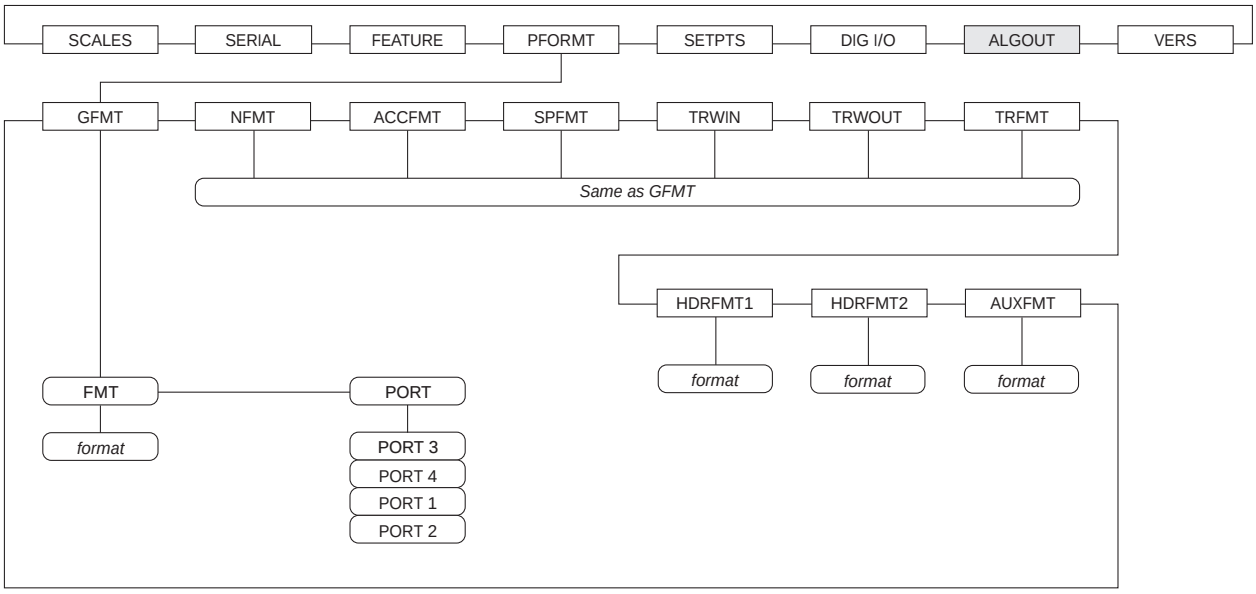


Figure 3-9. PFORMT Menu

3.2.5 SETPTS Menu

See Section 8.0 on page 54 for more information about configuring and using setpoints. Submenus for the various setpoint kinds (shown as *Go to X* in Figure 3-10) are described in Figures 8-2 through 8-8, beginning on page 58.

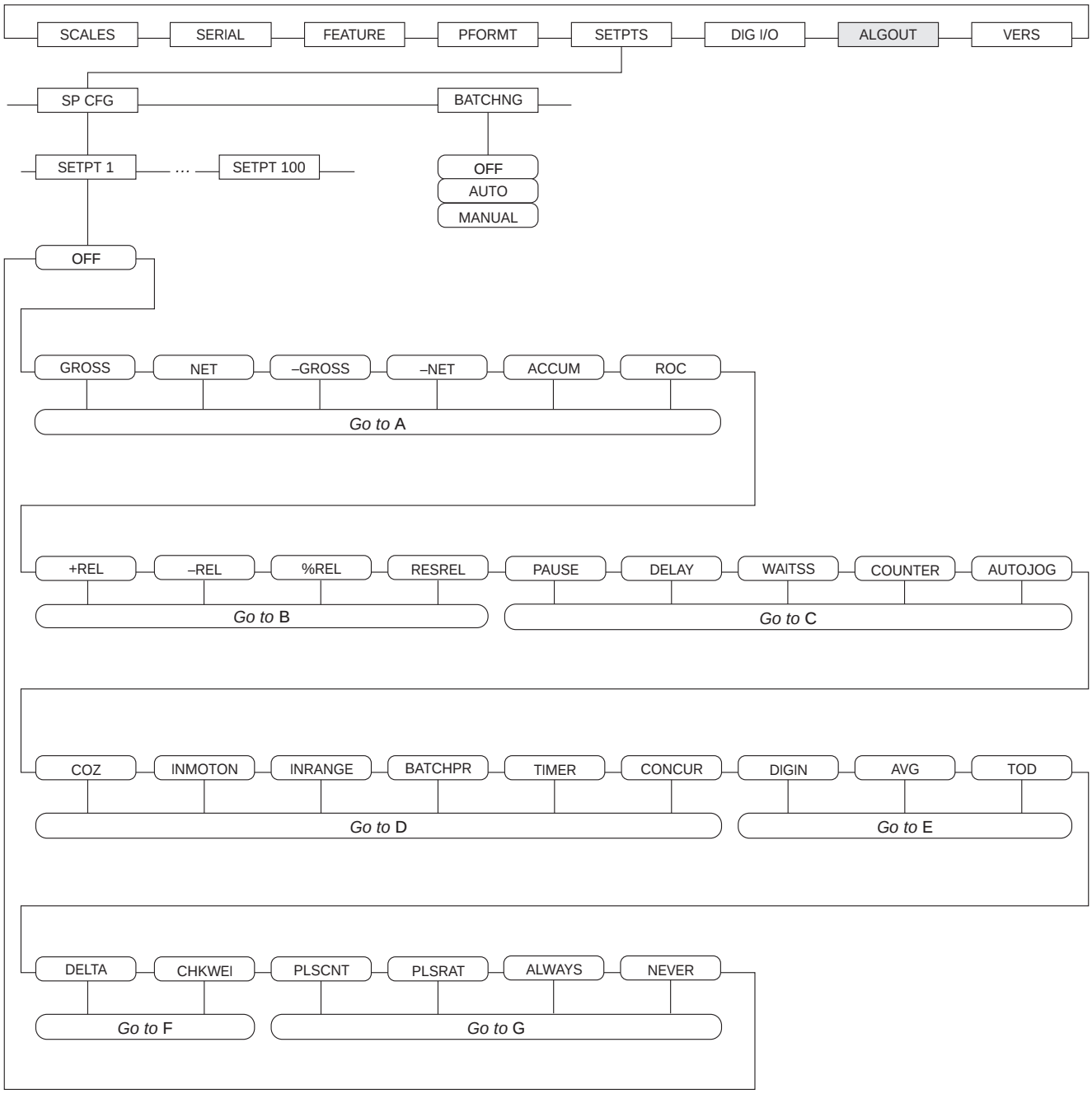


Figure 3-10. SETPTS Menu

3.2.6 DIG I/O Menu

The DIG I/O menu shown in Figure 3-11 is used to assign functions to digital inputs and outputs. SLOT 0 represents the four I/O bits available on the CPU board (connector J2); additional slots, each with 24 I/O bits, are shown only if one or more digital I/O expansion cards are installed.

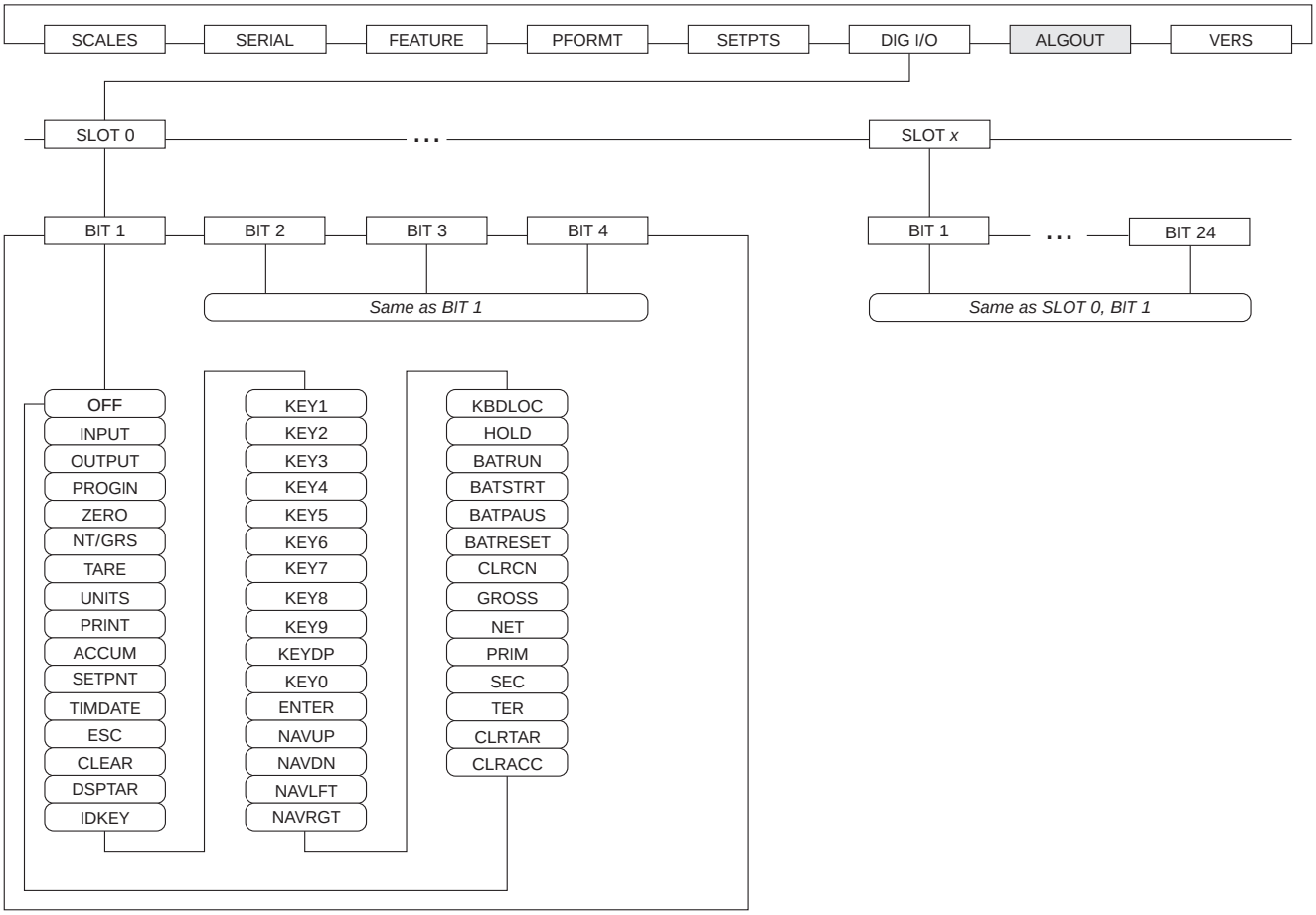


Figure 3-11. DIG I/O Menu

DIG I/O Menu		
Parameter	Choices	Description
Level 2 submenus		
SLOT*x*	BIT *y*	Lists available digital I/O slots.
Level 3 submenus		
BIT *y*	OFF INPUT OUTPUT PROGIN ZERO NT/GRS TARE UNITS PRINT ACCUM SETPNT TIMDATE ESC CLEAR DSPTAR IDKEY KEY0—KEY9 KEYDP ENTER NAVUP NAVDN NAVLFT NAVRGT KBDLOC HOLD BATRUN BATSTRT BATPAUS BATRESET CLRCN GROSS NET PRIM SEC TER CLRTAR CLRACC	Specifies the function of the digital I/O bit. • OFF indicates that the bit is not configured. • INPUT assigns the bit as a digital input used for DIGIN setpoints. • OUTPUT assigns the bit as a digital output for setpoint or program use. • PROGIN assigns the bit as a digital input used to generate a program event. • ZERO, NT/GRS (net/gross mode toggle), TARE, UNITS, and PRINT provide the same functions as the five major front panel keys. • ACCUM adds the current scale weight to the accumulator, if the scale accumulator is enabled. • SETPNT, and TIMDATE provide the same functions as the Setpoint and Time/Date softkeys. • ESC provides a function equivalent to the Cancel softkey. • CLEAR simulates pressing the front panel CLR key. • DSPTAR displays the current tare; equivalent to pressing the Display Tare softkey. • IDKEY displays a prompt to enter a new unit ID; equivalent to pressing the Unit ID softkey. • KEY0—KEY9 and KEYDP (decimal point) simulate pressing keys on the numeric keypad. • ENTER simulates pressing the front panel ENTER key. • NAVUP, NAVDN, NAVLFT, and NAVRGT simulate pressing the navigation keys. • KBDLOC locks the keyboard (indicator front panel) when held low. • HOLD holds the current display. Releasing this input clears the running average filter. • 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. • BATRESET resets the batch sequence. • CLRCN resets the consecutive number to the value specified on the CONSTUP parameter (FEATURE menu). • GROSS, NET, PRIM, SEC, and TER select gross or net weight display, and primary, secondary, or tertiary units display modes. • CLRTAR clears the current tare. • CLRACC clears the active accumulator.

Table 3-7. DIG I/O Menu Parameters

3.2.7 Analog Output Menu

The ALGOUT menu is shown only if the analog output option is installed. If the analog output option is installed, configure all other indicator functions and calibrate the indicator itself before configuring the analog output. See the *Analog Output Card Installation Instructions*, PN 69089, for more information.

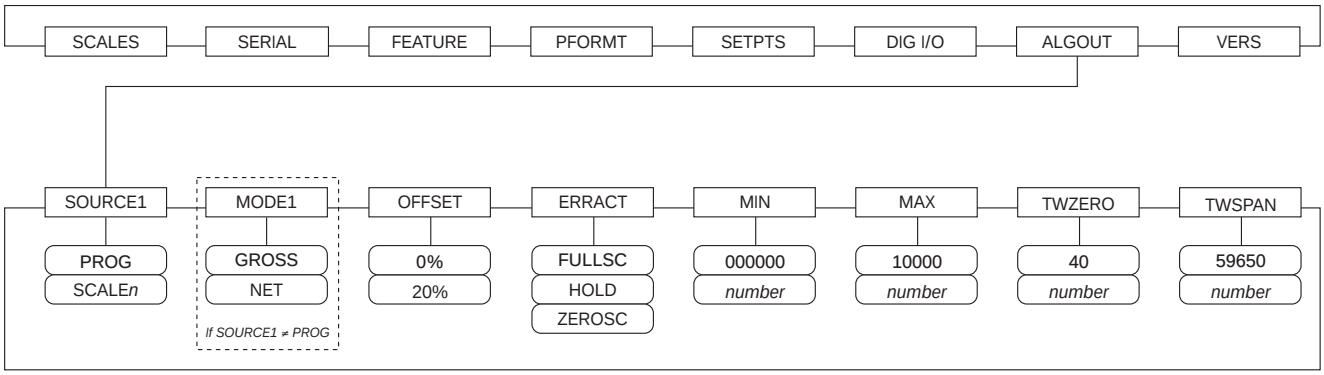


Figure 3-12. Analog Output Menu

ALG OUT Menu		
Parameter	Choices	Description
Level 2 submenus		
SOURCE1	PROG SCALE*n*	Specifies the scale tracked by the analog output. PROG indicates that the analog output is under program control.
MODE1	GROSS NET	Specifies the weight data, gross or net, tracked by the analog output.
OFFSET	0% 20%	Zero offset. Select 0% for 0–10 V or 0–20 mA output; select 20% for 4–20 mA output. This parameter must be set before calibrating the analog 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 *0–9999999*	Specifies the minimum weight value tracked by the analog output. Specify a value in the range 0–9999999.
MAX	10000 *0–9999999*	Specifies the maximum weight value tracked by the analog output. Specify a value in the range 0–9999999
TWZERO	40 *0–65535*	Tweak zero. Enter tweak value to adjust the analog output zero calibration. Use a multimeter to monitor the analog output value.
TWSPAN	59650 *0-65535*	Tweak span. Enter tweak value to adjust the analog output span calibration. Use a multimeter to monitor the analog output value.

Table 3-8. Analog Output Menu Parameters

3.2.8 Version Menu

The VERS menu can be used to check the installed software version or, by using the Reset Config softkey, to restore all configuration parameters to their factory default values. There are no parameters associated with the Version menu: when selected, the indicator displays the installed software version number.

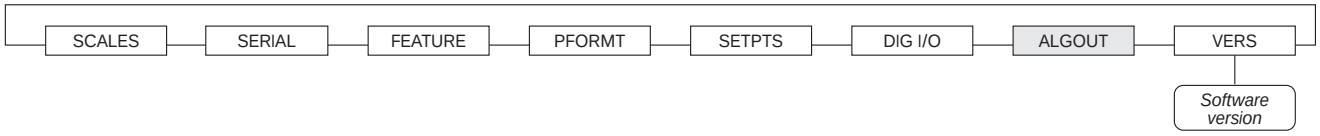


Figure 3-13. Version Menu

4.0 Calibration

The *920i* can be calibrated using the front panel, serial commands, or *iRev*. 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.

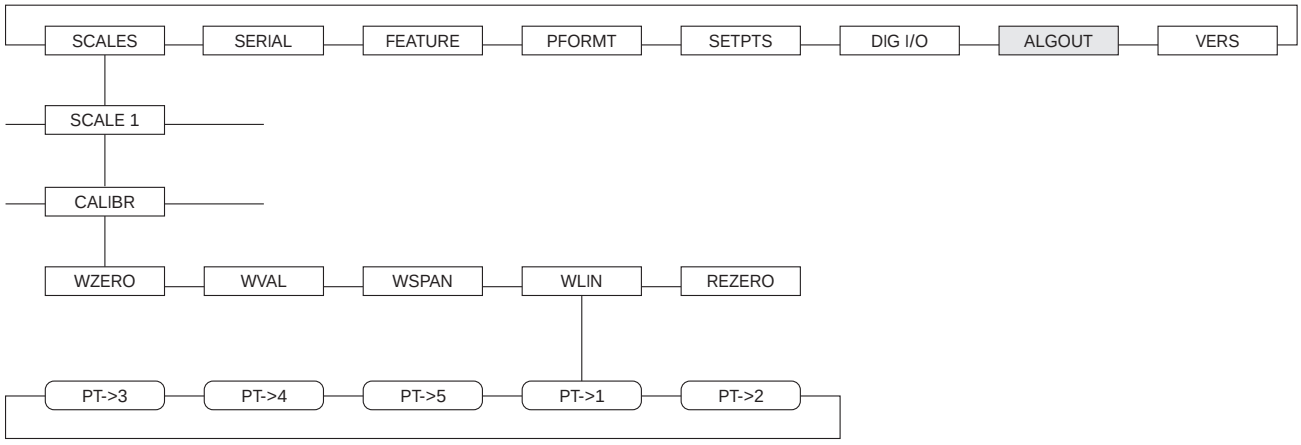


Figure 4-1. Calibration (CALIBR) Submenu

4.1 Gravity Compensation

Gravity compensation for latitude and elevation is available for the *920i*. To calibrate with gravity compensation, the LOCALE parameter under the FEATURE menu must be set ON, and the LATUDE (latitude) and ELEVAT (elevation, in meters) parameters set before calibrating the indicator (see Figure 3-8 on page 32).

If the indicator is later installed at a different location, gravity compensation can be applied to a pre-calibrated indicator by adjusting the LATUDE and ELEVAT parameters.

4.2 Front Panel Calibration

The CALIBR submenu (under the SCALES menu, see Figure 4-2) is used to calibrate the *920i*. The zero, span, and linear calibration point displays provide a set of softkeys used specifically for calibration procedures:

Default	Restores the value to its default
+/–	Toggles to allow entry of negative or positive values
Calibrate	Performs calibration for the selected point
Millivolts (or Counts)	Toggles between display of captured A/D counts and captured millivolts values; allows entry of calibration values in mV or counts
Restore	Restores the value to the previously saved value

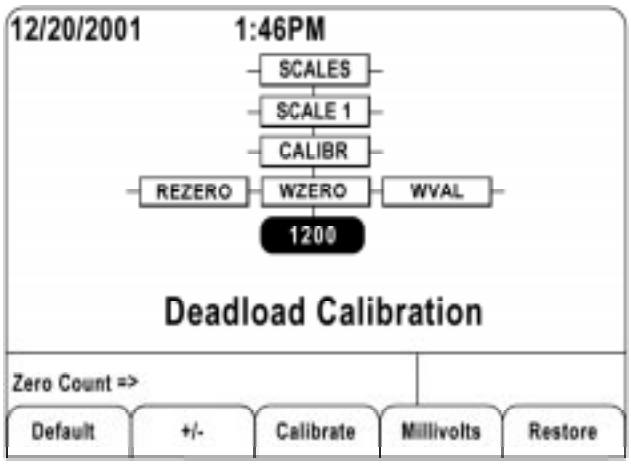


Figure 4-2. WZERO Calibration Display

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

1. Place the indicator in setup mode (display reads *Scale Configuration*) 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. With the *SCALES* menu highlighted, press the down key, then select the scale to be calibrated. Press down again (*GRADS* parameter highlighted), then press left to highlight the *CALIBR* submenu (see Figure 4-1). Press down to go to zero calibration (*WZERO*). See Figure 4-2 on page 40.
3. Ensure scale is empty, then press down again to show the current WZERO value, then press the Calibrate softkey to calibrate zero. When complete, the new A/D count for the zero calibration is displayed. Press enter 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 down 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. Press down again to show the current WSPAN value, then press the Calibrate softkey to calibrate span. When complete, the new A/D count for the span calibration is displayed. Press enter 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 down to go to the first linearization point (*POINT 1*). Press down again to show the weight value prompt (*WGT 1*), then down once more to show the weight value. Place test weights on the scale, then use the numeric keypad to enter the actual test weight value. Press enter to save the value and move to the calibration (*CAL 1*) prompt. Press down to show the current calibration value, then press the Calibrate softkey to calibrate the linearization point. 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 (*POINT 2*).

   Repeat for up to five linearization points. To exit the linearization parameters, press the up key 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.

   NOTE: *The rezero function cannot be used with five-point linear calibration.*

   - If no other apparatus was used to hang the test weights during calibration, remove the test weights and press up to return to the CALIBR submenu.
   - If hooks or chains were used during calibration, remove these and the test weights from the scale. With all weight removed, go to the REZERO parameter, then press down to show the current zero value. Press the Calibrate softkey to adjust the zero and span calibration values. Press enter or up to return to the CALIBR submenu.
8. Press up to return to the SCALES menu, or press the Save and Exit softkey to exit setup mode.

4.3 Serial Command Calibration

To calibrate the indicator using serial commands, the indicator serial port must be connected to a terminal or personal computer. See Section 2.3.3 on page 7 for serial port pin assignments; see Section 9.0 on page 72 for more information about using serial 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 SC.WZERO#*n* serial command (where *n* is the number of the scale) to calibrate zero.
3. Place test weights on the scale and use the SC.WVAL command to enter the test weight value in the following format:

   SC.WVAL#*n*=*vvvvv*<CR>
4. Send the SC.WSPAN#*n* serial command to calibrate span.
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:

SC.WLIN#*n*.V1=*vvvvv*<CR>
SC.WLIN#*n*.C1<CR>

The SC.WLIN#*n*.V1 command sets the test weight value (*vvvvv*) for linearization point 1. The SC.WLIN#*n*.C1 command calibrates the point. Repeat using the SC.WLIN#*n*.V*x* and SC.WLIN#*n*.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 SC.REZERO#*n* serial command.
7. Send the KSAVE serial command to save the calibration changes; send KEXIT to exit setup mode.

4.4 iRev Calibration

The *iRev* Calibration Wizard provides step-by-step scale calibration. With the *920i* connected to the PC, select the Calibration Wizard from the Tools menu on the *iRev* Scales display, then follow the steps listed below to calibrate the scale. See Section 5.0 on page 44 for a general overview of the *iRev* utility.

1. On the first Calibration Wizard display (see Figure 4-3), select whether you are performing a standard (zero and span) calibration or a multi-point linear calibration. Click the *Next* button to continue.

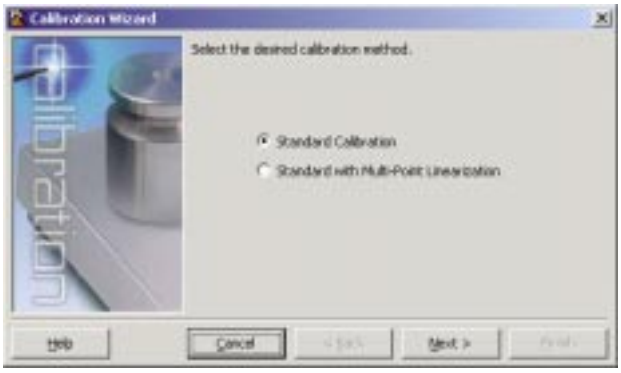


Figure 4-3. iRev Calibration Wizard

2. Next (see Figure 4-4), select the scale you wish to calibrate.

Figure 4-4. iRev Scale Selection Display

3. Enter the test weight used to calibrate the scale (see Figure 4-5). If chains or hooks are used to hold the weights, check the box below the test weight value entry. This adds a rezero step to the calibration sequence.

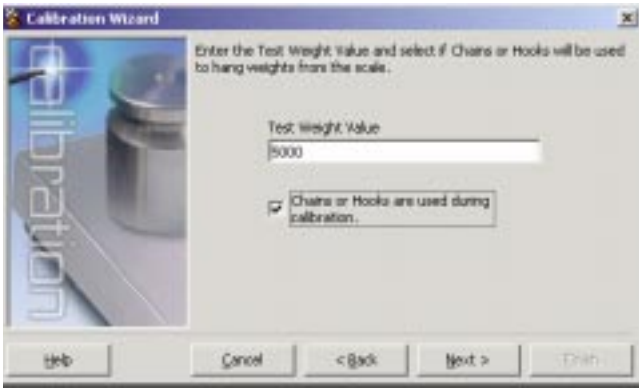


Figure 4-5. iRev Test Weight Value Display

4. Remove all weights from the scale. If chains or hooks are used, place them on the scale. Press the *Calibrate Zero* button to perform the zero calibration (see Figure 4-6). A message box appears when the process is complete.

Figure 4-6. iRev Zero Calibration Display

5. Apply the test weights to the scale. Press the *Calibrate Span* button to perform the span calibration (see Figure 4-7). A message box appears when the process is complete.

Figure 4-7. iRev Span Calibration Display

6. If the option for chains or hooks was selected in step 3, the Rezero display is shown (see Figure 4-8). Remove all weights from the scale, including chains or hooks. Press the *Re-Zero* button to calibrate the zero offset.

Figure 4-8. iRev Rezero Display

7. If performing a multi-point linear calibration, up to five other calibration weight values can be entered on the display shown in Figure 4-9. The weights must be in ascending order and must not include zero or the span weight. Enter the weight values and click the *Go* button to calibrate each point.

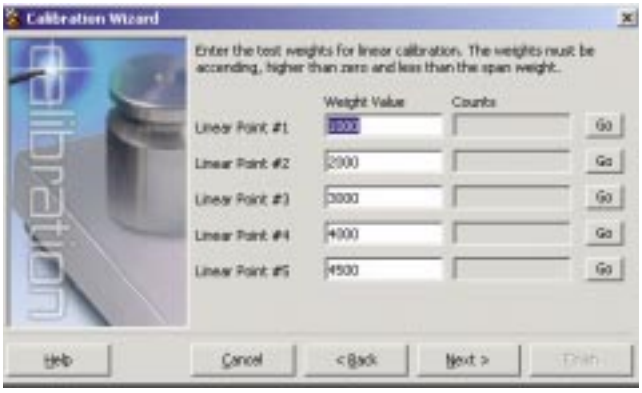


Figure 4-9. iRev Linear Calibration Display

8. Review the new calibration values then click *Finish* to close the Calibration Wizard. To restore the current calibration values, click *Cancel*.

Figure 4-10. iRev Calibration Values Display

5.0 Using iRev

The *iRev* utility provides a suite of functions used to support configuration, calibration, customization, and backup of the *920i* software. Hardware and software configuration, *920i* display setup for up to ten screen designs, stream and ticket formatting, setpoint configuration, database management, and *iRite* program editing are all supported by *iRev*.

Calibration values, scale, setpoint, and display configuration, database tables, and user programs, can be both saved and restored to the *920i* using *iRev*. (See Section 4.4 on page 42 for *iRev* calibration procedures.)

Other supporting applications provided with *iRev* include:

- The *iRev* Editor provides a basic editor and a compiler for writing *iRite* applications.
- The Rice Lake Web Update utility uses your internet connection to check for and download updates to the *iRev* and *920i* software.
- The iLaunch utility can be installed to display a set of icons used for convenient startup of *iRev* and its supporting applications, including the Help system.

Hardware and Software Requirements

Minimum system requirements: 166 MHz, *x*86-compatible, with 32MB RAM (64MB for NT4/2000), 40MB disk space. Recommended system: 233 MHz, *x*86-compatible or greater, with 64MB RAM, 40 MB disk space.

iRev runs on most Windows® operating systems, including Windows 95 (original release), Windows 95 OSR2, Windows 98, Windows 98 SE, Windows ME, Windows NT 4.0 (SP4 or greater), Windows 2000, and Windows XP (Home or Professional).

When used with the original release of Windows 95, *iRev* requires an updated version of TAPI. The TAPI update is included on the *iRev* installation CD and is available from the RLWS web site at www.rlws.com.

Internet Explorer® (IE) 4.0 or greater is required to use the *iRev* help system. Explorer is included on the *iRev* installation CD or is available from Microsoft Corporation.

5.1 Installing and Starting the Program

iRev is installed using a standard Windows installation procedure. *iRev* applications and support files are installed in a directory named iRev; icons for the *iRev* application, the *iRev* Editor, Uninstall and the Rice Lake Web Update utility are placed in the Windows Start menu.

5.2 Hardware Configuration

When *iRev* is started, the Hardware Configuration display is shown (Figure 5-1). This display is used to create a virtual hardware configuration for your indicator by dragging and dropping icons for the supported option cards into the empty slots on the display. The slots shown on the Hardware Configuration display represent the two option card slots on the *920i* CPU board (above) and up to twelve slots on attached expansion boards (slots 3–8 at left, 9–14 at right).

Figure 5-1. iRev Hardware Configuration Display

5.3 Configuring Scales

Once the hardware configuration has been set, scales can be configured by selecting the parameter subsets listed at the left side of the Hardware Configuration display. For most applications, the Scales icon, under *System Parameters*, should be configured first, by associating each scale with an A/D channel or serial scale source. To assign the scale source, double-click on the scale number listed in the Scales menu (see Figure 5-2), then select the scale source type in the Config Scale dialog box.

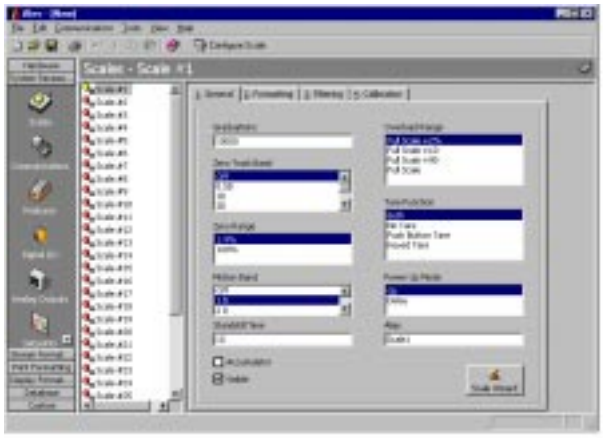


Figure 5-2. iRev Scales Menu

5.3.1 Configuring Other Parameters

Once the scale source is set, you can continue configuring the scale using the other icons listed under the *System Parameters*, or you can use the Scale Wizard (shown as a button on the Scales menu; also available under the Tools menu) to create a basic configuration based on your application type, units, capacity, and filtering requirements.

Other subsets of configuration parameters, including stream, print, and display formatting, can be accessed by selecting them from the list shown at the left side of the *iRev* displays.

5.3.2 Setpoints

The Setpoints menu, available by clicking the Setpoints icon under *System Parameters*, provides access to all configuration parameters for up to 100 setpoints. Configured setpoints can be displayed individually or in groups of 5, 10, or 100; setpoint parameters can be changed only when shown individually. Click on the setpoint view icons in the toolbar to change the view.

When the setpoint view is set to a value greater than one, swap and move icons are added to the toolbar, allowing single or multiple setpoints to be reordered (see Figure 5-3).

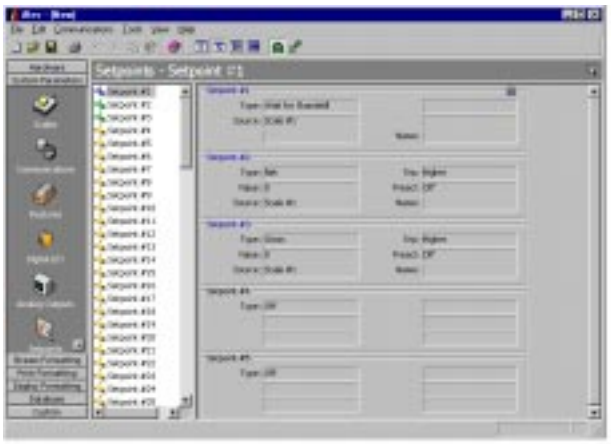


Figure 5-3. iRev Setpoints Display

The Batching Wizard, available under the Tools menu when viewing or changing setpoints, can be used to set up a basic batch sequence, based on the batch type, number of ingredients, and several batch options.

5.4 Configuring the Display

The *iRev* display editor allows the *920i* display to be customized by dragging and dropping widgets onto a virtual display, then setting parameters specific to each widget type. (See Section 9.2 on page 82 for detailed information about widget programming.) Up to ten display configurations can be saved for each indicator file. Display configurations can be switched within applications using custom programs to drive the *920i*.

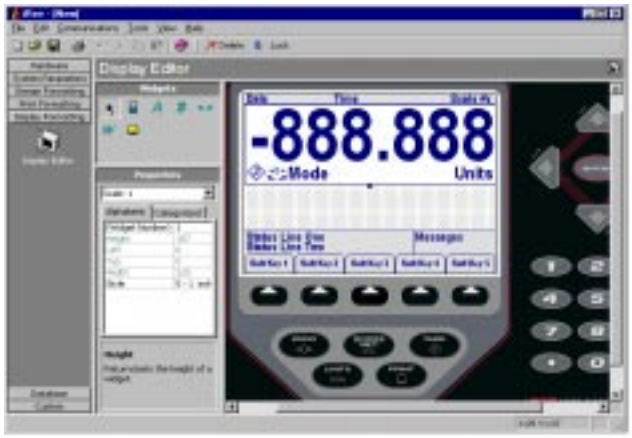


Figure 5-4. iRev Display Editor

5.5 Connecting to the Indicator

Connect the PC serial port to port 2 of the *920i*. Return to the Hardware Configuration display, then click on the *Connect* icon in the toolbar. *iRev* attempts to establish communications to the indicator.

Once communications is established, *iRev* queries the indicator configuration to determine whether the indicator hardware matches the virtual hardware configured in the current *iRev* file. If the hardware matches, the Hardware Configuration section of *iRev* is disabled, preventing further changes.

If the hardware does not match, you are given the option of either canceling the connect operation or overwriting the *iRev* hardware configuration with the actual indicator hardware configuration.

5.5.1 Downloading to the Indicator

The *Download Configuration* function on the *iRev* Communications menu allows an *iRev* configuration file (with or without scale calibration data), setpoint data, widgets, database tables, or an *iRite* program file to be downloaded to a connected indicator in setup mode.

The *Download Current Display* function on the Communications menu allows you to download only the currently displayed object, such as the parameter set for one scale of a multi-scale configuration.

Because less data is transferred using *Download Current Display*, it is typically faster than a full configuration download, but there is an increased possibility that the download may fail due to dependencies on other objects. If the download fails, try performing a complete download using the *Download Configuration* function.

5.5.2 Uploading Configuration to iRev

The *Upload Configuration* function on the *iRev* Communications menu allows the existing configuration of a connected indicator to be saved to a file on the PC. Once saved, the configuration file provides a backup that can be quickly restored to the indicator if needed. Or, the file can be edited within *iRev*, then downloaded back to the indicator.

NOTE: *The indicator must be in setup mode before uploading or downloading data.*

5.6 Installing Software Upgrades

New releases of the *920i* system software can be downloaded and installed using an internet connection and the Rice Lake Web Update application.

NOTE: Before upgrading to a new version of *920i* system software, ensure that a copy of the current indicator configuration has been saved using *iRev*. Reloading the system software requires a RESETCONFIGURATION function and resets all configuration and calibration values to their factory defaults.

Figure 5-5. Rice Lake Web Update Display

Click on the *Check for Updates* button in the Rice Lake Web Update application to check if a new version of the *920i* software is available. To download a new software version, select the new software version and click on Get Selection. Once the new software is downloaded to the PC, do the following:

1. Disconnect power to the *920i*.
2. Connect the PC serial port to port 2 of the *920i*. Connection must be made at 38400 bps.
3. Open the indicator enclosure and place a jumper across the SW1 boot mode pins (see Figure 2-4 on page 8).
4. Power up the *920i*. The indicator will stall at the diagnostic monitor.
5. Click on the Update Indicator button to downloaded the new software. When the download begins, the following messages are shown:

   Loading…
   System Diagnostic Monitor v1.0
   $KNIX
   $SYSLOAD
6. When the download is complete, the indicator display shows the following messages:

   $DONE
   $BOOT
   Loading…
7. The indicator resets and goes to weigh mode.
8. Disconnect power to the indicator. Remove the jumper from across the SW1 boot mode pins and place it on a single pin.
9. Power up the indicator and reload *iRev* and *iRite* files as necessary.

6.0 Print Formatting

The *920i* provides seven print formats that determine the format of the printed output when the PRINT key is pressed, a KPRINT serial command is received, or when setpoint push-print or truck weigh-in or weigh-out operations are performed. Supported print formats are: GFMT, NFMT, ACCFMT, SPFMT, TRWIN, TRWOUT, and AUXFMT. Additionally, two header formats, HDRFMT1 and HDRFMT2, can be inserted into any of the other ticket formats using the <H1> and <H2>formatting commands. The particular ticket format used for a given print operation depends on the indicator configuration (see Table 6-2 on page 49) and the particular operation performed.

Each print format can be customized to include up to 1000 characters of information, such as company name and address, on printed tickets. You can use the *iRev*™ configuration utility, serial commands, or the indicator front panel (PFORMT menu) to customize the print formats.

6.1 Print Formatting Commands

Table 6-1 lists commands you can use to format the *920i* 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/ AUXFMT	TRWIN/TRWOUT	SPFMT
General Weight Data Commands				
<G>	Gross weight, current scale	√	√	
<G#*n*>	Gross weight, scale *n*	√	√	
<N>	Net weight, current scale	√	√	
<N#*n*>	Net weight, scale *n*	√	√	
<T>	Tare weight, current scale	√	√	
<T#*n*>	Tare weight, scale *n*	√	√	
<S>	Current scale number	√	√	
Accumulator Commands				
<A>	Accumulated weight, current scale	√		
<A#*n*>	Accumulated weight, scale *n*	√		
<AA>	Average accumulation, current scale	√		
<AA#*n*>	Average accumulation, scale *n*	√		
<AC>	Number of accumulations, current scale	√		
<AC#*n*>	Number of accumulations, scale *n*	√		
<AT>	Time of last accumulation, current scale	√		
<AT#*n*>	Time of last accumulation, scale *n*	√		
<AD>	Date of last accumulation, current scale	√		
<AD#n>	Date of last accumulation, scale *n*	√		
Truck Mode Commands				
<TID>	Truck ID number		√	
<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		√	

Table 6-1. Print Format Commands

Command	Description	Ticket Format		
		GFMT/NFMT/ AUXFMT	TRWIN/TRWOUT	SPFMT
Setpoint Commands				
<SCV>	Setpoint captured value			√
<SN>	Setpoint number			√
<SNA>	Setpoint name			√
<SPM>	Setpoint mode (gross or net label)			√
<SPV>	Setpoint preact value			√
<STV>	Setpoint target value			√
Formatting and General-Purpose Commands				
<*nnn*>	ASCII character (*nnn* = decimal value of ASCII character). Used for inserting control characters (STX, for example) in the print stream.	√	√	√
<TI>	Time	√	√	√
<DA>	Date	√	√	√
<TD>	Time and date	√	√	√
<UID>	Unit ID number	√	√	√
<CN>	Consecutive number	√	√	√
<H1>	Insert header format 1 (HDRFMT1); see Table 6-2 on page 49	√	√	√
<H2>	Insert header format 2 (HDRFMT2); see Table 6-2 on page 49	√	√	√
<CR>	Carriage return character	√	√	√
<LF>	Line feed character	√	√	√
<NL*nn*>	New line (*nn* = number of termination (<CR/LF> or <CR>) characters)*	√	√	√
<SP*nn*>	Space (*nn* = number of spaces)*	√	√	√
<SU>	Toggle weight data format (formatted/unformatted)	√	√	√

NOTES:

Gross, net, tare, accumulator, truck, and setpoint weights can be printed in any configured weight units by adding the following modifiers to the gross, net, and tare weight commands: /P (primary units), /D (displayed units), /S (secondary units), /T (tertiary units). If not specified, the current displayed units (/D) is assumed. *Example:* To format a ticket to show net weight for Scale #3 in secondary units, use the following command: N#3/S

Formatted weight strings contain a 10-digit weight field (including sign and decimal point, with leading zeroes suppressed), 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 1–8 alphanumeric characters in length, as required.

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

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

Table 6-1. Print Format Commands (Continued)

6.2 Default Print Formats

Table 6-2 shows the default print formats for the *920i* and lists the conditions under which each print format is used. The HDRFMT1 and HDRFMT2 formats are used to specify header information that can be used by the other ticket formats. The contents of the HDRFMT*x* format can be inserted into any other ticket format using the <H1> and <H2> formatting commands.

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><TD><NL>	Normal mode, tare in system
ACCFMT	ACCUM<A><NL><DA><TI><NL>	Accumulator enabled and displayed, or setpoint print operation with PSHACCM=ON
SPFMT	<SCV><SP><SPM><NL>	Setpoint print operation with PSHPRNT=ON
TRWIN	<NL>ID<SP><TID><NL2>GROSS<TR1> <NL2><DA><SP><TI><NL>	Press the Weigh In softkey, enter truck ID number, and press enter.
TRWOUT	<NL6>ID<SP><TID><NL2>GROSS<TR1><NL>TARE<SP><TR2><NL>NET<SP2><TR3><NL2><DA><SP><TI><NL>	Press the Weigh Out softkey, enter truck ID number, and press enter.
TRFMT	REG ID: <TID>: <TR2> SCALE<S> <TD><NL>	Truck register currently displayed
HDRFMT1 HDRFMT2	COMPANY NAME<NL>STREET ADDRESS<NL> CITY, ST ZIP<NL2>	Must be inserted into other print format
AUXFMT	GROSS<G><NL2><TD><NL>	Access only through *iRite* programming
NOTE: In OIML and CANADA modes, the letters *PT* (preset tare) are automatically inserted after the printed tare weight.		

Table 6-2. Default Print Formats

6.3 Customizing Print Formats

The following sections describe procedures for customizing print formats using the *iRev* configuration utility, serial commands, or the front panel (PFORMT menu. See Section 10.5 on page 91 for information about custom stream formatting.

6.3.1 Using iRev

The *iRev* configuration utility provides a ticket formatting grid with a tool bar. The grid allows you to construct the ticket format without using the formatting commands (<NL> and <SP>) required by the front panel or serial command methods. Using *iRev*, 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 *iRev* print formatting display.

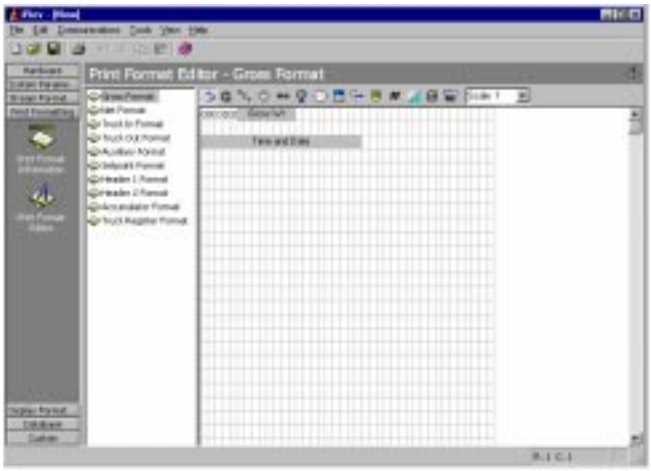


Figure 6-1. iRev Print Formatting Display

6.3.2 Using the Front Panel

If you have no access to equipment for communication through a serial 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 50) to customize the print formats.

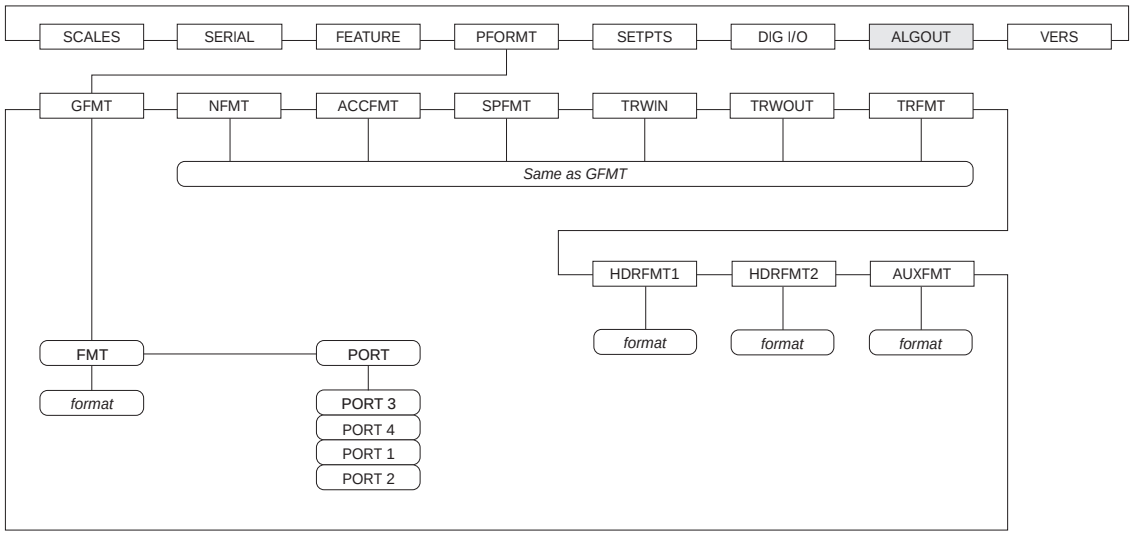


Figure 6-2. PFORMT Menu

Each print format can be edited from the front panel using a character selection like that shown in Figure 6-3. Use the navigation keys (up, down, left, right) to move around and between the format command line and the character selection list.

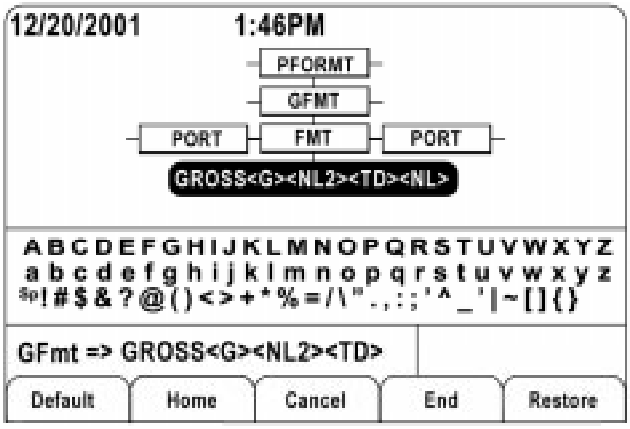


Figure 6-3. Print Formatting Character Selection Display

- To add a character: position the cursor in the format where you want to add the character. Use the up key to return to the character selection list, use the navigation keys to highlight the character to add, then press enter. The new character is added to the left of the current cursor location in the format string.
- To add a blank space to a string, position the cursor to the right of where the space is to be inserted in the format string, highlight the *SP* character in the selection list, and press enter.
- To delete a character, position the cursor to the right of the character to be deleted from the format string, then press the CLR key.
- To add a special character, insert the < and > delimiter characters from the selection list. Use the numeric keypad to insert the decimal ASCII value (1–255) of the character between the delimiters. For example, insert <2> to add the STX character to the print format.

To save the edited format string, position the cursor in the format string and press enter. Softkeys shown on the character selection display provide additional functions:

Default	Restores the string to its default value.
Home	Positions cursor at the beginning of the format string.
Cancel	Exits without saving changes to the format string.
End	Positions cursor at the end of the format string.
Restore	Restores the string to its previously saved value.

A Print Test softkey is shown under the *FMT* parameter after exiting the character selection display. If a printer is attached, this key can be used to verify the edited string format before exiting setup mode.

NOTE: *The* Print Test *softkey is not available for the HDRFMTx formats. These formats can be output only when inserted into one of the printable ticket formats by using the <H1> or <H2> print format commands.*

6.3.3 Using Serial Commands

With a personal computer, terminal, or remote keyboard attached to one of the *920i* serial ports, you can use the serial command set described in Table 6-1 on page 47 to customize the print format strings.

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

```
GFMT.FMT=<G> GROSS<NL>
```

To change the format, use the GFMT.FMT or NFMT.FMT serial 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 serial command:

```
GFMT.FMT=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 HDRFMT1 ticket format, then substituting the <H1> command for the address in the GFMT ticket format:

```
HDRFMT1=MOE'S DUMP<NL>2356 EAST HIGHWAY ROAD<NL>SMALLTOWN<NL2>

GFMT.FMT=<H1><G> GROSS<NL>
```

7.0 Truck Modes

The truck in/out modes are used to handle multiple truck ID numbers and 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 weigh-in weights in the indicator's memory. The indicator can automatically store up to 1000 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 weigh-in weight. However, if that same truck crosses the scale many times each day, it's more convenient to store the information in the indicator memory and recall it when needed. Stored IDs and 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. To use keyed tares, an incoming truck must be empty at weigh-in, full at weigh-out.

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.

7.1 Using the Truck Modes

To select a truck in/out mode, press the setup switch to enter setup mode. Use the navigation keys to go to the FEATURE menu, then to the TRUCK submenu to select the mode.

Next, go right to the SOFTKEYS submenu and configure the Weigh In, Weigh Out, and Truck Regs softkeys. These keys are required when using the truck modes.

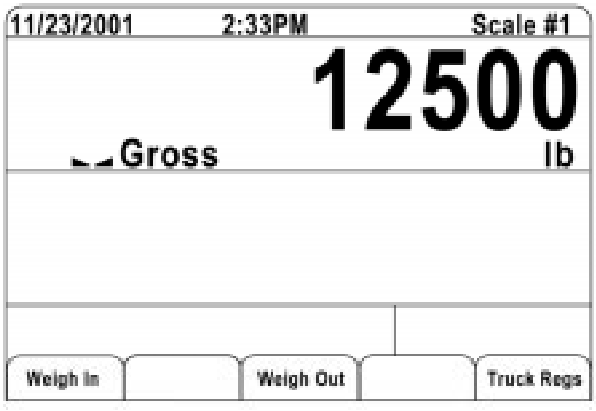


Figure 7-1. 920i Display, showing Truck Mode Softkeys

7.2 Using the Truck Regs Display

The Truck Regs display is shown by pressing the Truck Regs softkey in weighing mode. The display contains an alphabetical list of stored truck IDs, weigh-in weights (in primary units), and the time and date of the weigh-in transaction (see Figure 7-2).

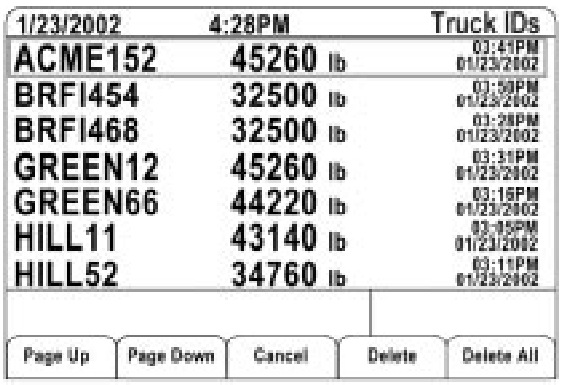


Figure 7-2. Truck Register Display

Softkeys shown at the bottom of the Truck Regs display are described below.

Page Up	Shows previous page of the truck register.
Page Down	Shows next page of the truck register.
Cancel	Exits to weighing mode.
Delete	Deletes the highlighted truck ID from the truck register.
Delete All	Deletes all truck IDs from the truck register.

The truck register can be printed to an attached printer by pressing the PRINT key while the Truck Regs display is shown. The printed register uses the TRFMT print format (see Section 6.2 on page 49).

NOTE: *If a non-zero setpoint password is configured (SPPWD parameter on the FEATURE menu), you must enter the password before any truck register entries can be deleted.*

7.3 Weigh-In Procedure

In modes 1 and 2, the indicator erases truck ID numbers and tare weights from memory after the transaction. In modes 3–6,the truck ID and weigh-in weight values are saved after the weigh-out ticket has been processed.

The general weigh-in procedure is as follows:

1. The empty truck moves onto the scale for weigh-in.
2. Press the Weigh In softkey.
3. A prompt is shown to enter the truck ID (up to eight alphanumeric characters). Enter the ID, then press the enter key.
4. Indicator generates the weigh-in ticket:

   ```
   ID 304812
   GROSS 15000. LB INBOUND
   01/14/2002 10:24 AM
   ```

5. Truck leaves the scale.

7.4 Weigh-Out Procedure

The general weigh-out procedure is as follows:

1. The loaded truck moves onto the scale for weigh-out.
2. If truck ID is known, press the Weigh Out softkey, enter the ID, and press the enter key.

   If ID is not known, press the Truck Regs softkey to view list of stored IDs (see Figure 7-2 on page 52). Scroll to the correct truck ID, note the ID number, then press the Cancel softkey to return to the weight display. From the weight display, press Weigh Out, key in the ID, then press the enter key.
3. Indicator generates the weigh-out ticket. In modes 1 and 2, the ID is deleted once the weigh-out ticket is processed.

7.5 Single-Transaction Tare Weights and IDs

One-time transactions are supported in all modes that can be configured to use stored IDs (modes 3–6). This function allows one-time weighing of trucks without adding the truck ID and weigh-in weight to the permanent truck register.

To use this function, enter a truck ID containing a decimal point, then press the Weigh In softkey. IDs entered with a decimal point as part of the ID are erased from the truck register when the transaction is complete.

8.0 Setpoints

The *920i* indicator provides 100 configurable setpoints for control of both indicator and external equipment functions. Setpoints can be configured to perform actions or functions based on specified parameter conditions. Parameters associated with various setpoint kinds can, for example, be configured to perform functions (print, tare, accumulate), to change the state of a digital output controlling indicator or external equipment functions, or to make conditional decisions.

8.1 Batch and Continuous Setpoints

920i setpoints can be either continuous or batch setpoints.

Continuous setpoints are free-running: the indicator constantly monitors the condition of free-running setpoints at each A/D update. The specified setpoint action or function is performed when the designated setpoint parameter conditions are met. A digital output or function assigned to a free-running setpoint continuously changes state, becoming active or inactive, as defined by the setpoint parameters.

Batch setpoints are active one at a time, in an ordered sequence. The *920i* can use setpoints to control up to 100 separate batch processing steps.

A digital output associated with a batch setpoint is active 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 signal. The BATSTRT signal can be initiated by a digital input, serial command, Batch Start softkey, or the StartBatch function in an *iRite* program.

For setpoint kinds that can be used as either continuous or batch setpoints, the BATCH parameter must also be set ON. (Setpoint kinds that can only be used as batch setpoints do not require the BATCH parameter.) If the setpoint is defined but the BATCH parameter is off, the setpoint operates as a continuous setpoint, even during batch sequences.

NOTE: In applications that contain both batch setpoint routines and continuous setpoints, continuous setpoints should be kept separate from the batch sequence. This is especially true when using CONCUR or TIMER setpoints to perform actions or functions based on the batch sequence. CONCUR and TIMER setpoints should not be included in the referenced START and END setpoint sequence.

Kind	Description	Batch	Continuous
OFF	Setpoint turned off/ignored.		
GROSS	Gross setpoint. Performs functions based on the gross weight. The target weight entered is considered a positive gross weight.	√	√
NET	Net setpoint. Performs functions based on the net weight. The target weight entered is considered a positive net weight value.	√	√
–GROSS	Negative gross weight. Performs functions based on the gross weight. The target weight entered is considered a negative gross weight.	√	√
–NET	Negative net weight. Performs functions based on the net weight. The target weight entered is considered a negative net weight value.	√	√
ACCUM	Accumulate setpoint. Compares the value of the setpoint to the source scale accumulator. The accumulator setpoint is satisfied when the value of the source scale accumulator meets the value and conditions of the accumulator setpoint.	√	√
ROC	Rate-of-change setpoint. Performs functions based on the rate-of-change (ROC) value.	√	√
+REL	Positive relative setpoint. Performs functions based on a specified value above a referenced setpoint, using the same weight mode as the referenced setpoint.	√	√

Table 8-1. Setpoint Kinds

Kind	Description	Batch	Continuous
–REL	Negative relative setpoint. Performs functions based on a specified value below a referenced setpoint, using the same weight mode as the referenced setpoint.	√	√
%REL	Percent relative setpoint. Performs functions based on a specified percentage of the target value of a referenced setpoint, using the same weight mode as the referenced setpoint. The actual target value of the %REL setpoint is calculated as a percentage of the target value of the referenced setpoint.	√	√
RESREL	Relative to a result setpoint. Performs functions based on a specified percentage of the captured value of a referenced setpoint, using the same weight mode as the referenced setpoint. The actual target value of the RESREL setpoint is calculated as a percentage of the captured value of the referenced setpoint, rather than the target value.	√	√
PAUSE	Pauses the batch sequence indefinitely. A BATSTRT signal must be initiated to continue the batch process.	√	
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. Suspends the batch sequence until the scale is at standstill.	√	
COUNTER	Specifies the number of consecutive batch sequences to perform. Counter setpoints should be placed at the beginning of a batch routine.	√	
AUTOJOG	Automatically checks the previous weight-based setpoint to verify the setpoint weight value is satisfied in a standstill condition. If the previous setpoint is not satisfied when at standstill, the AUTOJOG setpoint activates the digital output of the previous weight-based setpoint for a period of time, specified on the VALUE parameter. The autojog process repeats until the previous weight-based setpoint is satisfied when the scale is at standstill. NOTE: The AUTOJOG digital output is typically used to signify that an autojog operation is being performed. AUTOJOG should not be assigned to the same digital output as the related weight-based setpoint.	√	
COZ	Center of zero. Monitors for a gross zero condition. The digital output associated with this setpoint kind is activated when the referenced scale is a center of zero. No value is required for this setpoint.		√
INMOTON	In motion. Monitors for an in-motion condition. 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. Monitors for an in-range condition. The digital output associated with this setpoint is activated when the scale is within capacity range. 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.		√

Table 8-1. Setpoint Kinds (Continued)

Kind	Description	Batch	Continuous
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.		√
DIGIN	Digital input setpoint. Requires a specific group of digital inputs to be in low (0 VDC) state to satisfy the setpoint. The digital output associated with this setpoint is held in a low (0 VDC) state until the inputs selected for the digital input mask are all in a low state.	√	√
AVG	Average setpoint. Performs functions based on the calculated average weight over a specified number of A/D samples. Note that this setpoint is based on the *raw* A/D weight value, rather than the rounded value shown on the indicator display. For example, if the display shows 50.0 but the actual raw A/D value is 49.99, the setpoint will not be satisfied.	√	√
TOD	Time of day setpoint. Performs functions when the internal clock time of the indicator matches the specified setpoint time.	√	√
DELTA	Delta weight setpoint. Satisfied when the change in weight on the scale is equal to or exceeds the absolute value specified for the setpoint.	√	
CHKWEI	Checkweigher setpoint. Allows specification of over- and under-weight values. Up to three digital outputs can be configured to represent overweight, underweight, and accept conditions.		√
PLSCNT	Pulse counter setpoint. Performs functions based on pulse counts received by a pulse input card.	√	
PLSRAT	Pulse rate setpoint. Performs functions based on the pulse rate received by a pulse input card.		√
ALWAYS	Always setpoint. This setpoint is always satisfied. It is typically used to provide an endpoint for true/false branching batch routines.	√	
NEVER	Never setpoint. This setpoint is never satisfied. It is used to branch to a designated setpoint in true/false branching batch routines in which the batch will not continue through the normal sequence of batch setpoints.	√	

Table 8-1. Setpoint Kinds (Continued)

8.2 Setpoint Menu Parameters

Figure 8-1 shows the general structure of the SETPTS menu. Submenus (indicated by *Go to X* in Figure 8-1) for various groups of setpoint kinds are shown on the following pages (Figures 8-3 through 8-8); parameter descriptions for the submenus are provided in Table 8-2 on page 65.

See Table 8-1 on page 54 for descriptions of each of the setpoint kinds.

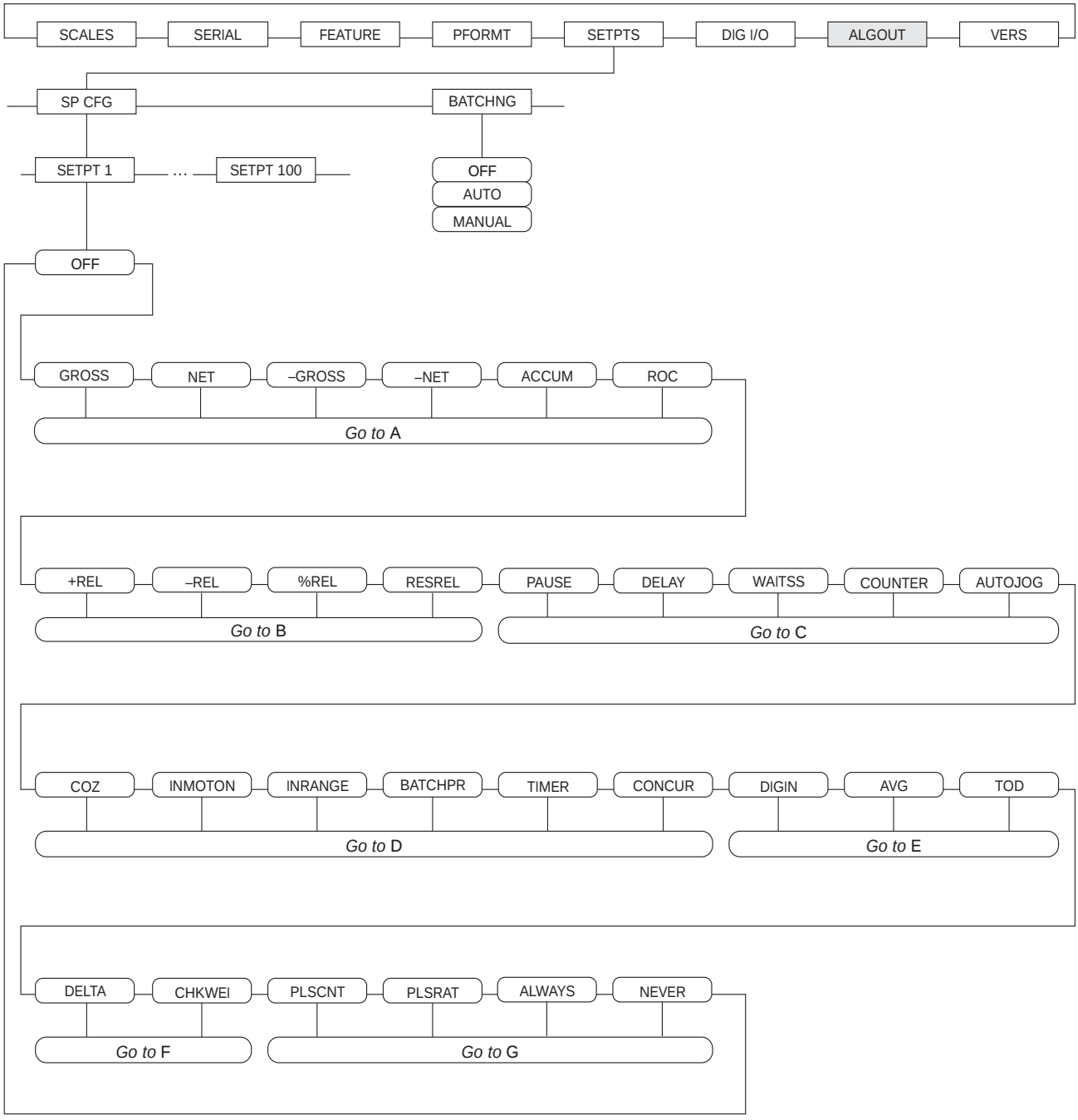


Figure 8-1. SETPTS Menu

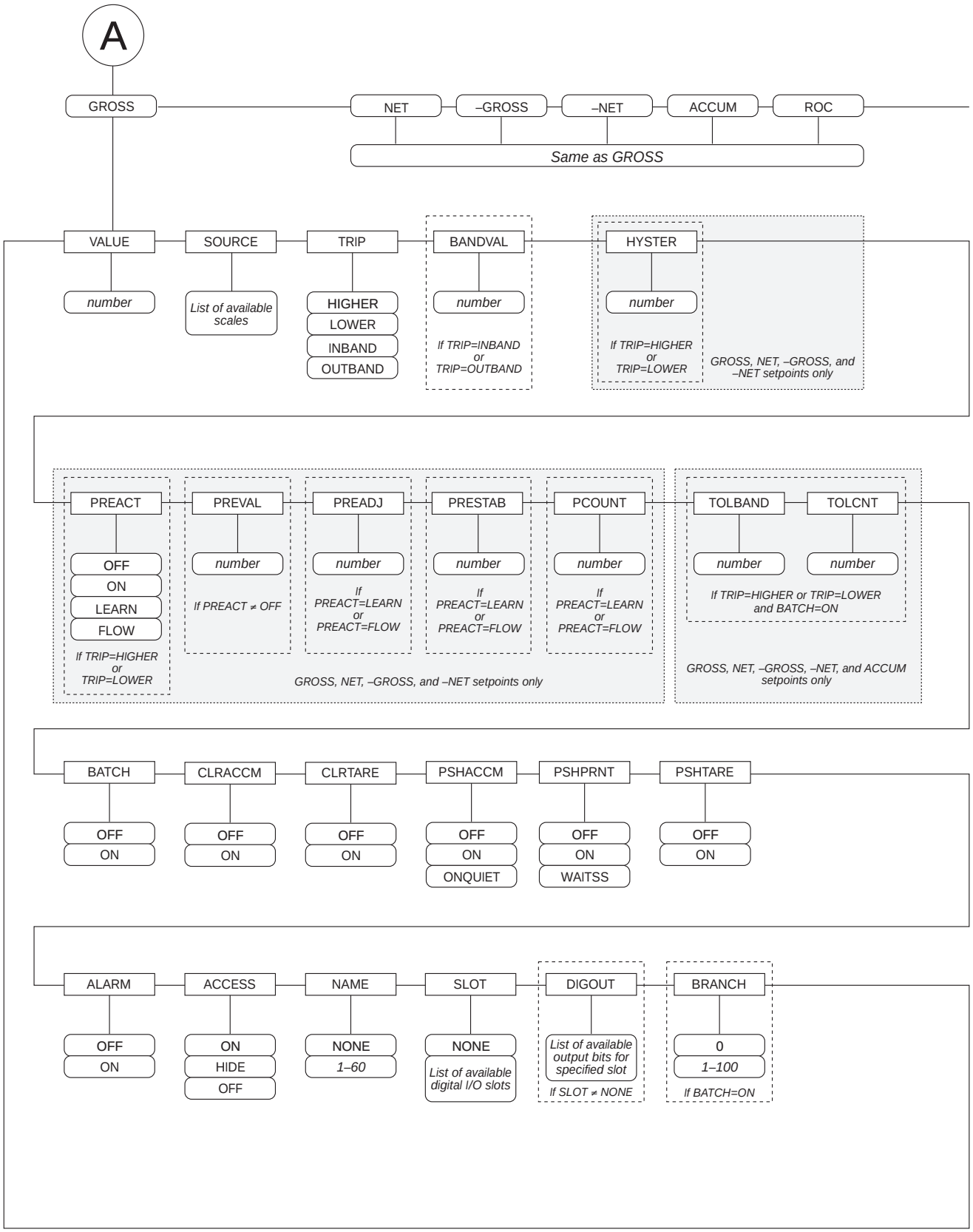


Figure 8-2. GROSS, NET, –GROSS, –NET, ACCUM, and ROC Setpoint Parameters

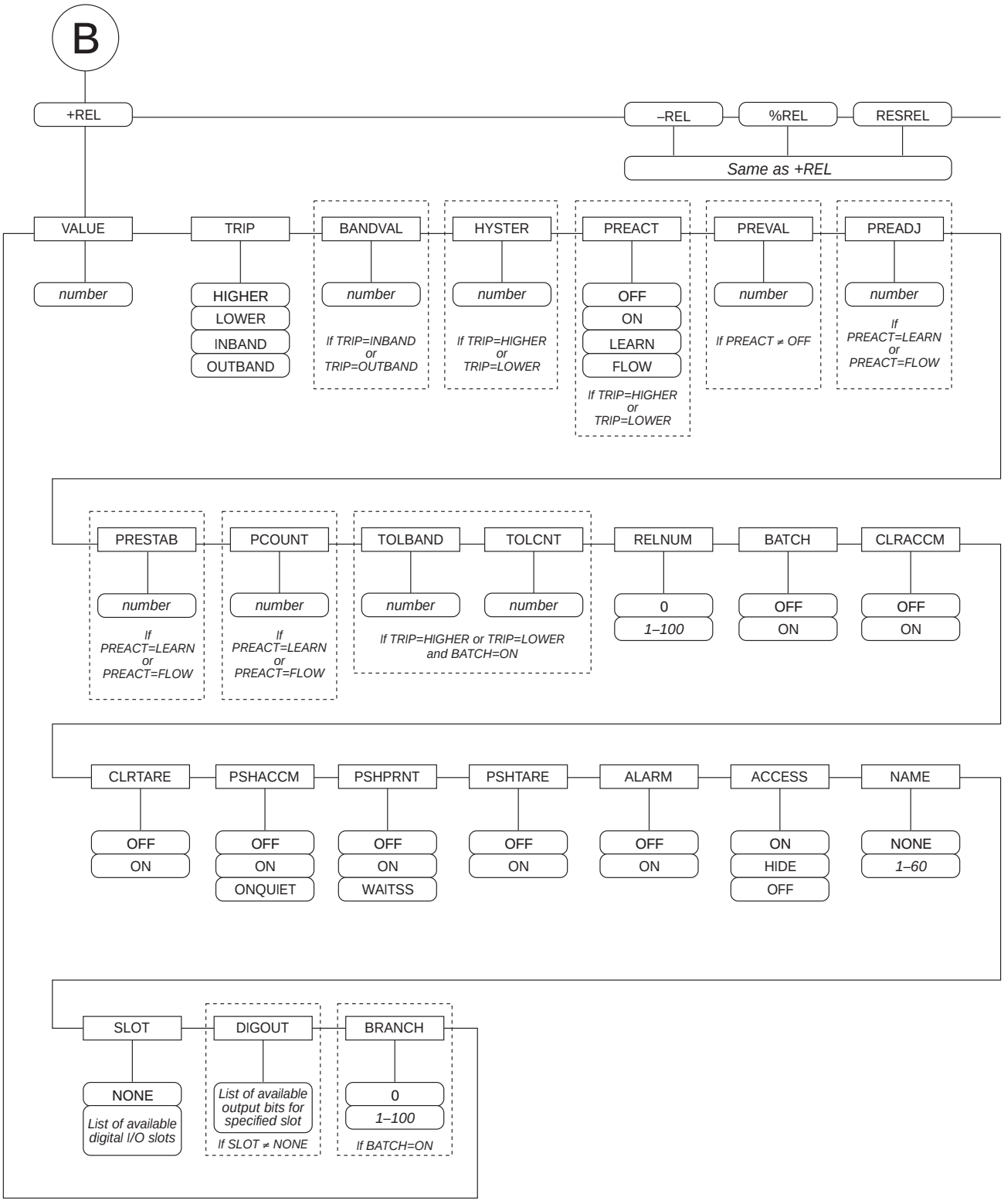


Figure 8-3. +REL, –REL, %RELS and RESREL Setpoint Parameters

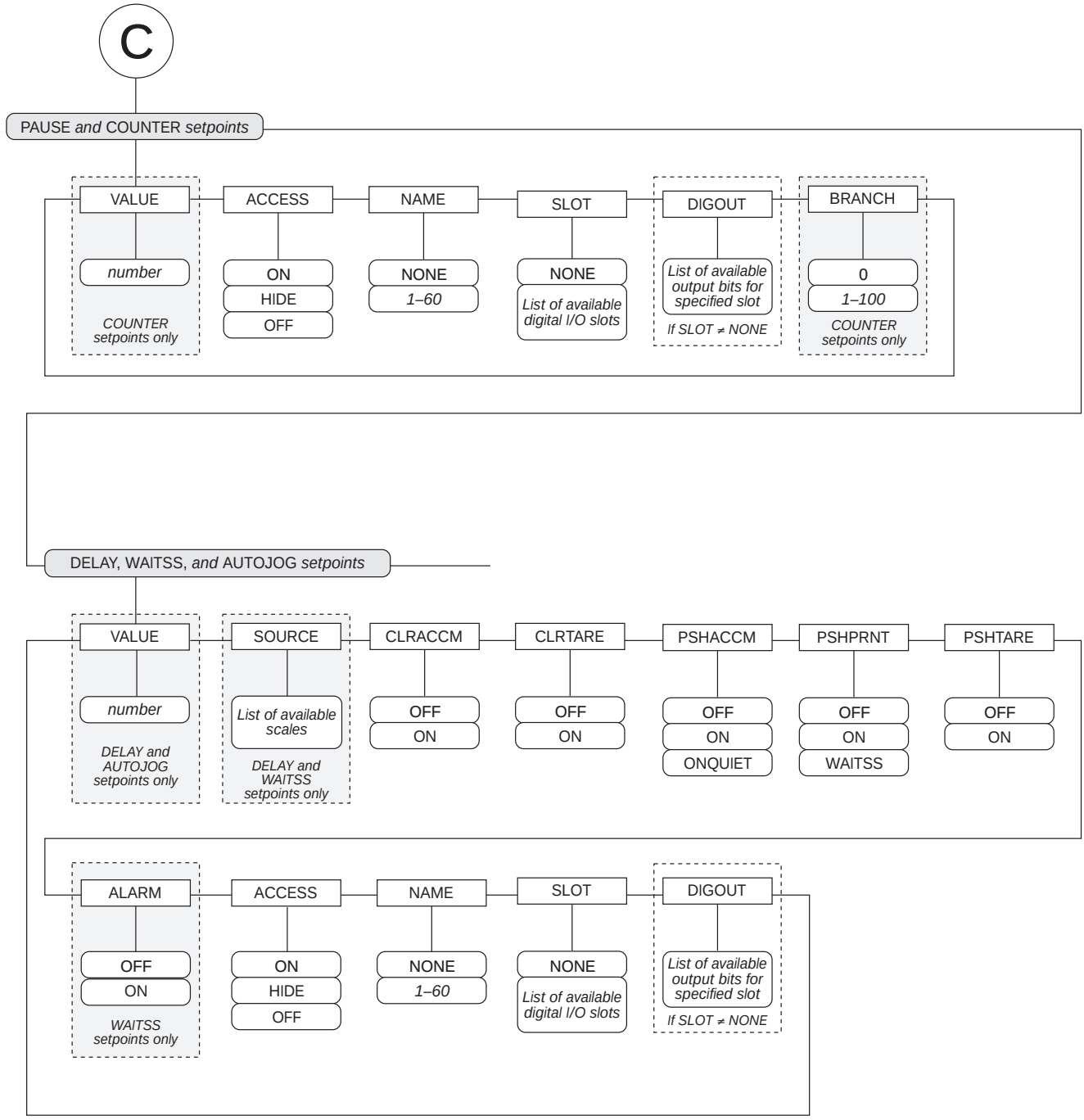


Figure 8-4. PAUSE, COUNTER, DELAY, WAITSS, and AUTOJOG Setpoint Parameters

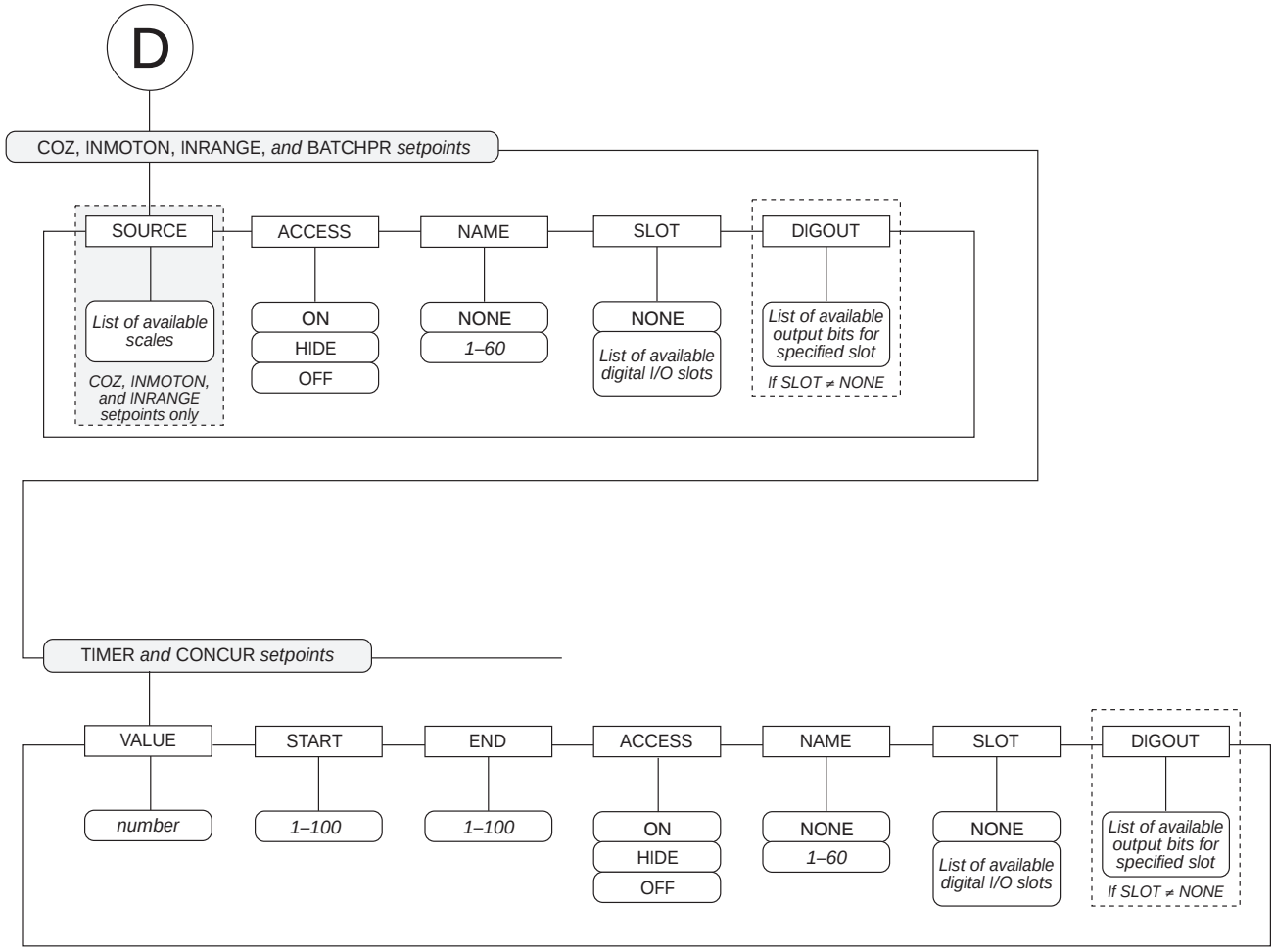


Figure 8-5. COZ, INMOTON, INRANGE, and BATCHPR Setpoint Parameters

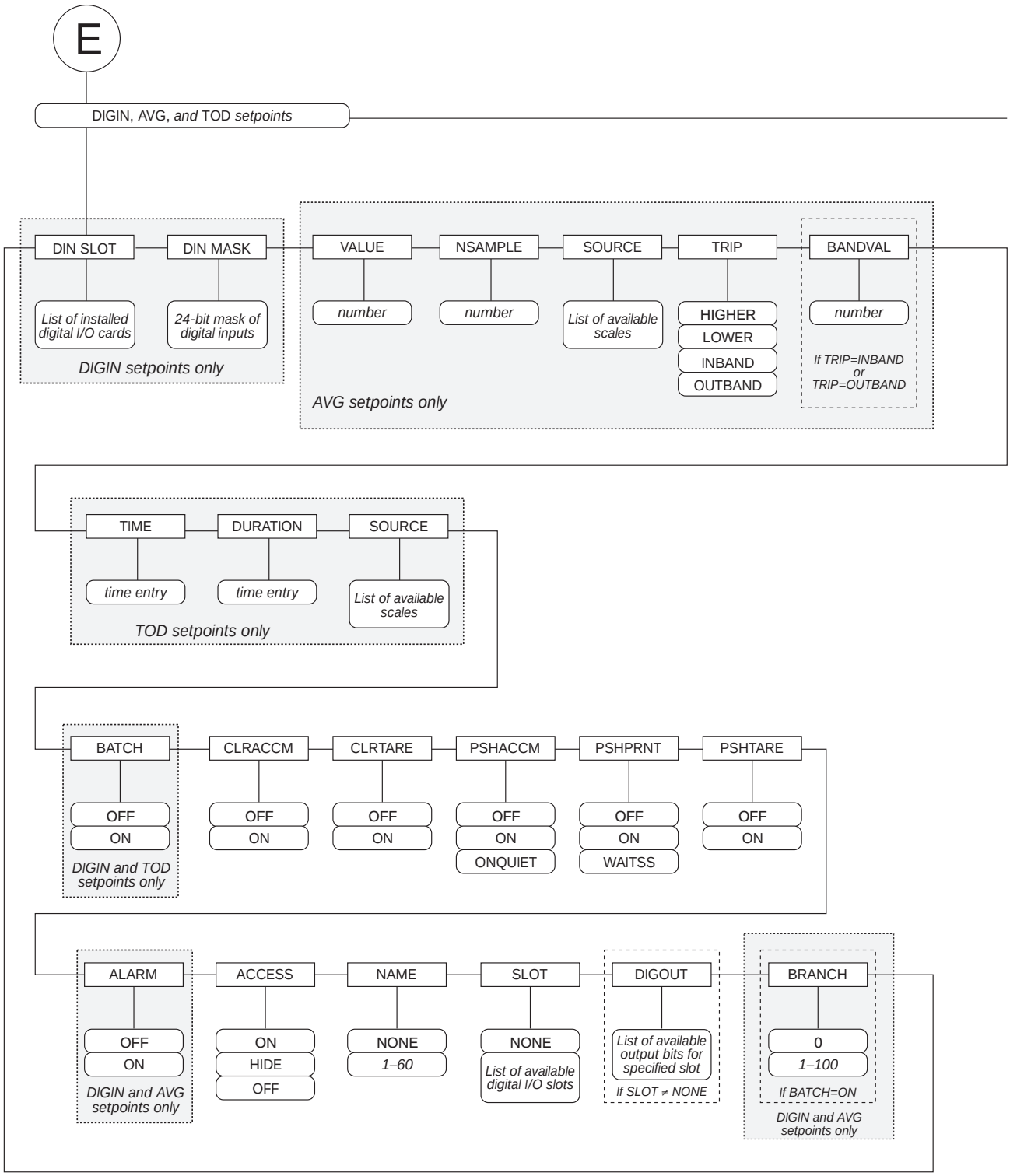


Figure 8-6. DIGIN, AVG, and TOD Setpoint Parameters

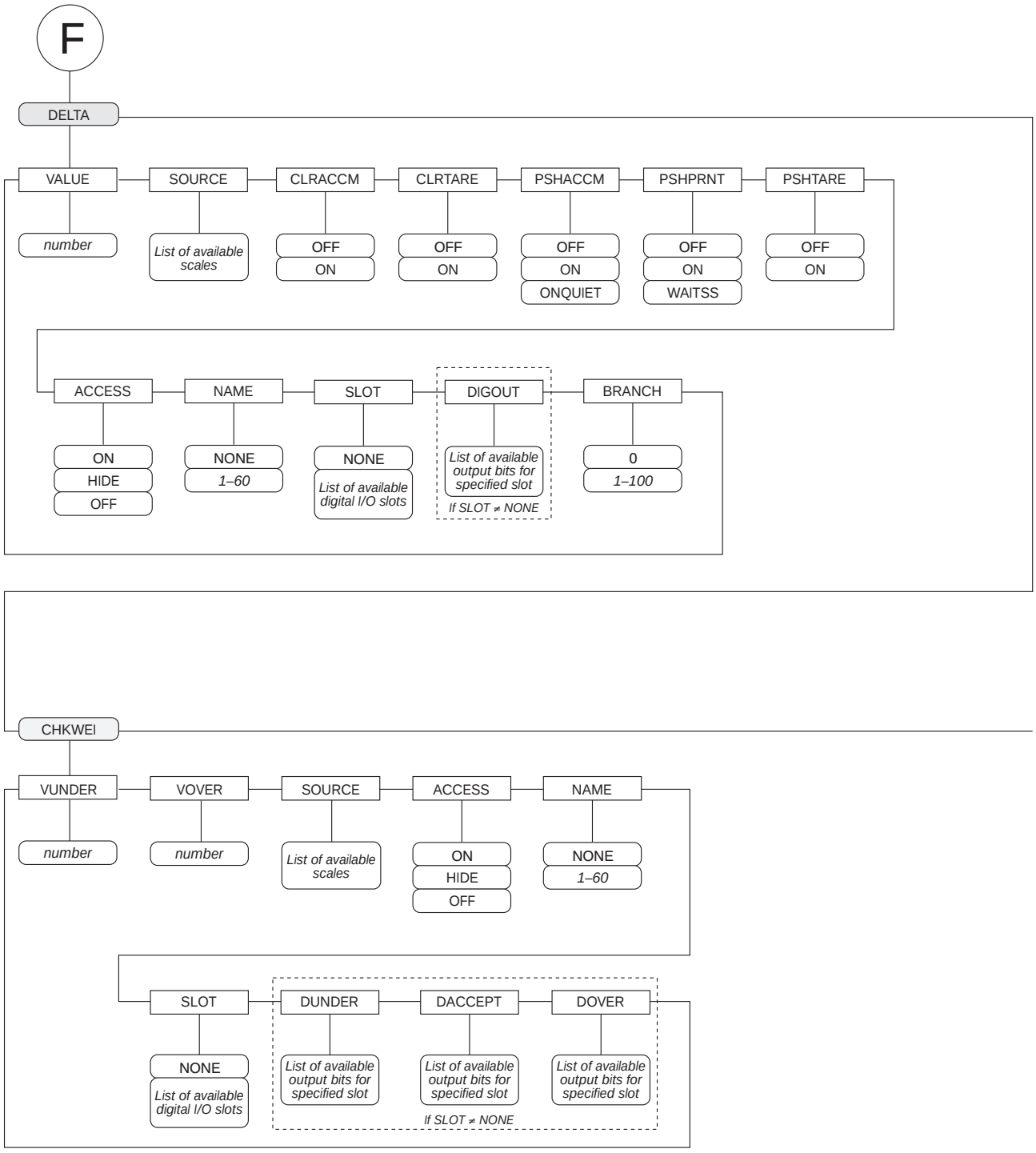


Figure 8-7. DELTA and CHKWEI Setpoint Parameters

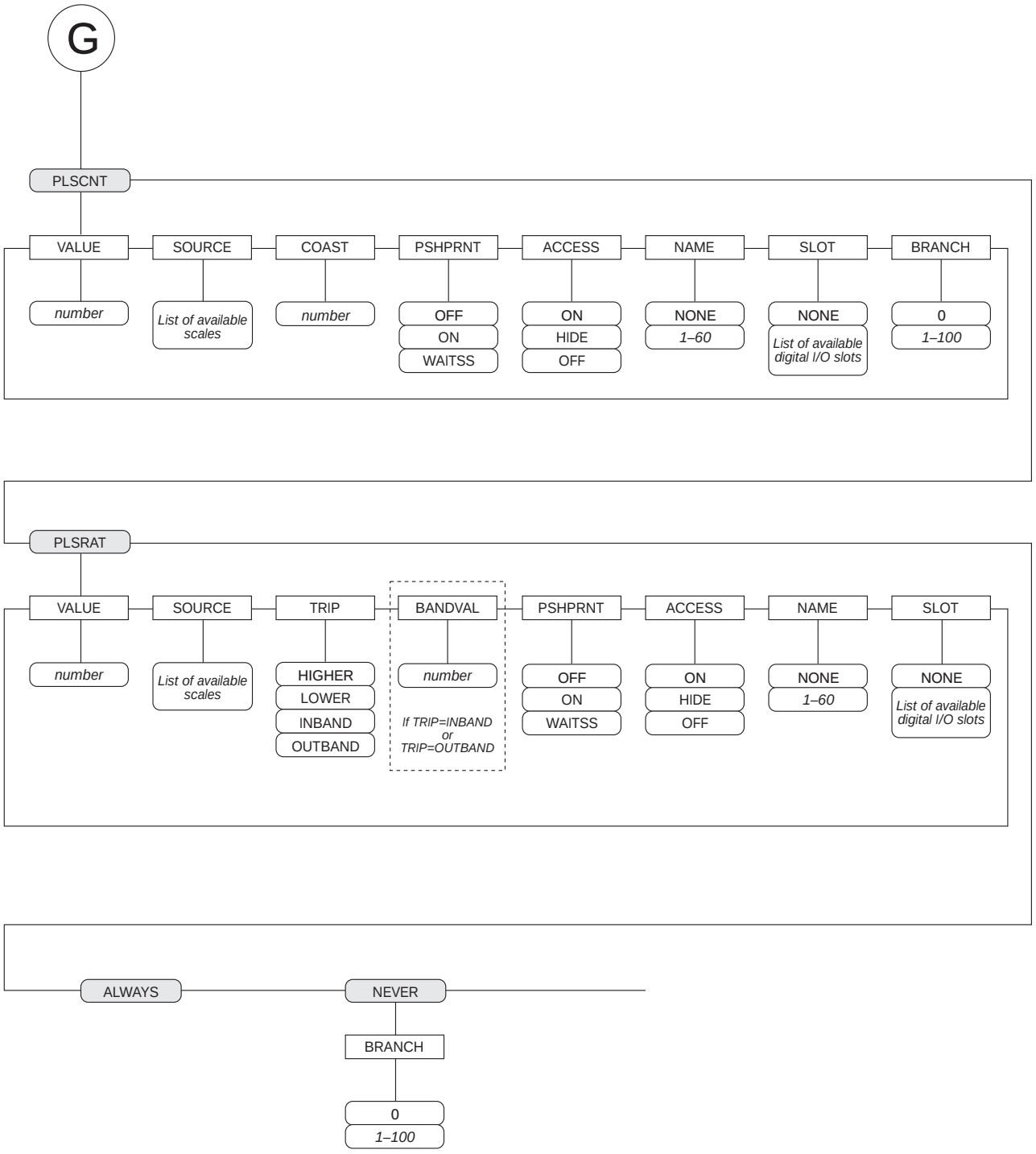


Figure 8-8. PLSCNT, PLSRAT, ALWAYS, and NEVER Setpoint Parameters

SETPTS Menu		
Parameter	Choices	Description
Level 2 submenus		
SETPT 1– SETPT 100	OFF GROSS NET –GROSS –NET ACCUM ROC +REL –REL %REL RESREL PAUSE DELAY WAITSS COUNTER AUTOJOG COZ INMOTON INRANGE BATCHPR TIMER CONCUR DGIN AVG TOD DELTA CHKWEI PLSCNT PLSRAT ALWAYS NEVER	Specifies the setpoint kind. GROSS, NET, –GROSS, –NET, ACCUM, ROC, +REL, –REL, %REL, RESREL. DIGIN, AVG, and TOD setpoint kinds can be used as either batch or continuous setpoints. PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, DELTA, PLSCNT, ALWAYS, and NEVER setpoint kinds can only be used in batch sequences. COZ, INMOTON, INRANGE, BATCHPR, TIMER, CONCUR, PLSRAT, and CHKWEI setpoint kinds can only be used as continuous setpoints. See Table 8-1 on page 54 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 serial command, Batch Start softkey, or the StartBatch function in an *iRite* program before the batch sequence can run. AUTO allows batch sequences to repeat continuously.

Table 8-2. Setpoint Menu Parameters

SETPTS Menu		
Parameter	Choices	Description
Level 4 submenus		
VALUE	*number*	Setpoint value. • For weight-based setpoints: Specifies the target weight value, 0–9999999. • For time-based setpoints: Specifies, in 0.1-second intervals, a time value in the range 0–65535. • For COUNTER setpoints: Specifies the number of consecutive batches to be run, 0–65535. • For PLSCNT setpoints, specifies a number of pulses, 0-65535, received by a pulse input card. • For PLSRAT setpoints, specifies a pulse rate in Hz, 0-65535, received by a pulse input card.
TRIP	HIGHER LOWER INBAND OUTBAND	Specifies whether the setpoint is satisfied 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	*0–9999999*	For setpoints 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	*0–9999999*	Specifies a band around the setpoint value that must be exceeded before the setpoint, once off, can trip on again.
PREACT	OFF ON LEARN FLOW	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. FLOW preact provides compensation for material flow rate in determining when to shut off the digital output. Rather than waiting for the specified weight to be reached, FLOW preact uses the change in weight over time to anticipate when the preact weight value will be reached.
PREVAL	*0–9999999*	Specifies the preact value for setpoints with PREACT set to ON, LEARN, or FLOW. Depending on the TRIP setting specified for the setpoint, the setpoint trip value is adjusted up or down by the preact value.
PREADJ	0.500000 *0–9999999*	Preact adjustment factor. For setpoints with PREACT set to LEARN or FLOW, specifies a decimal representation of the percentage of error correction applied (0.5 = 50%, 1.0 = 100%) each time a preact adjustment is made.
PRESTAB	0 *0–65535*	Time-out for preact learn. For setpoints with PREACT set to LEARN or FLOW, specifies the time, in 0.1-second intervals, to wait for standstill before adjusting the preact value. Setting this parameter to a value greater than zero disables the learn process if standstill is not achieved in the specified interval.
PCOUNT	1 *0–65535*	Preact learn interval. For setpoints with PREACT set to LEARN or FLOW, specifies the number of batches after which the preact value is recalculated. The default value, 1, recalculates the preact value after every batch cycle.
TOLBAND	0 *0–9999999*	Tolerance band. For setpoints with TRIP set to HIGHER or LOWER, specifies a tolerance band around the target weight. If the captured weight is not within the specified tolerance band, the preact learn function is not applied and the batch is paused (based on the value of the TOLCNT parameter, below) until restarted or reset.

Table 8-2. Setpoint Menu Parameters (Continued)

SETPTS Menu		
Parameter	Choices	Description
TOLCNT	1 *0–65535*	Tolerance count. For setpoints with TRIP set to HIGHER or LOWER, specifies the number of consecutive batch cycles in which the tolerance band (TOLBAND parameter) must be exceeded before the batch process is paused. When the specified value is met, the batch is paused and an error message is displayed. The batch must be restarted or reset to clear the error message. The special value of zero means that the batch is never paused for an out-of-tolerance condition.
RELNUM	*1–100*	For relative setpoints, specifies the number of the relative setpoint. The target weight for this setpoint is determined as follows: • For +REL setpoints, the value of the relative setpoint plus the value (VALUE parameter) of the +REL setpoint • For –REL setpoints, the value of the relative setpoint minus the value of the –REL setpoint • For %REL setpoints, the percentage (specified on the VALUE parameter of the %REL setpoint) of the target value of the relative setpoint • For RESREL setpoints, the percentage (specified on the VALUE parameter of the RESREL setpoint) of the *captured* value of the relative setpoint
BATCH	OFF ON	Specifies whether the setpoint is used as a batch (ON) or continuous (OFF) setpoint.
CLRACCM	OFF ON	Specify ON to clear the accumulator when the setpoint is satisfied
CLRTARE	OFF ON	Specify ON to clear the tare when the setpoint is satisfied
PSHACCM	OFF ON ONQUIET	Specify ON to update the accumulator and perform a print operation when the setpoint is satisfied. Specify ONQUIET to update the accumulator without printing.
PSHPRNT	OFF ON WAITSS	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	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 FEATURE menu.
ALARM	OFF ON	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	*1–100*	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	*1–100*	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	Specifies the access allowed to setpoint parameters shown by pressing the Setpoint softkey in normal mode. ON: Values can be displayed and changed HIDE: Values cannot be displayed or changed OFF: Values can be displayed but not changed
NAME	NONE, *1–60*	Specify the number of an assigned prompt. Up to 60 prompt names can be specified on the PROMPTS submenu of the FEATURE menu.
SLOT	*slot_number*	Lists all available digital I/O slots. This parameter specifies the slot number of the digital I/O card referenced by the DIGOUT parameter.

Table 8-2. Setpoint Menu Parameters (Continued)

SETPTS Menu		
Parameter	Choices	Description
DIGOUT	*bit_number*	Lists all digital output bits available for the specified SLOT. This parameter is used to specify the digital output bit associated with this 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.
BRANCH	0 *1-100*	Specifies the setpoint number to which the batch sequence is to branch if the current setpoint is not satisfied upon initial evaluation. The special value zero indicates that no branch is taken.
TIME	*time*	For TOD setpoints, specifies the time at which the setpoint becomes active. The format used to enter the time (12-hour or 24-hour) is based on the value specified for the TIMEFMT parameter on the FEATURE menu.
DURATION	*hh:mm:ss*	For TOD setpoints, specifies the length of time that the digital output associated with this setpoint changes state. The value is entered in hours, minutes, and seconds (*hh:mm:ss*). All other operations associated with this setpoint (print, tare, or accumulate) are performed at the end of the specified duration.
NSAMPLE	*1–65535*	For AVG setpoints, specify the number of A/D samples used to calculate the average weight.
SOURCE	*source_scale*	Specify the scale number used as the source for the setpoint.
DIN SLOT	*slot_number*	For DIGIN setpoints, specify the slot number from which digital inputs will be read.
DIN MASK	*digital_input_mask*	For DIGIN setpoints, specify the bits used as inputs to the setpoint. Use the Select softkey to select bits.
VUNDER	*0–9999999*	For CHKWEI setpoints, specifies the lower weight limit.
VOVER	*0–9999999*	For CHKWEI setpoints, specifies the upper weight limit.
DUNDER	*digital_output*	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight is less than the VUNDER value specified.
DACCEPT	*digital_output*	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight between the VUNDER and VOVER values specified.
DOVER	*digital_output*	For CHKWEI setpoints, specifies the bit number of digital output activated when the scale weight is greater than the VOVER value specified.
COAST	*0–65535*	For PLSCNT setpoints, specifies the time delay (in 0.1-second intervals) inserted between reaching the setpoint target value and capture of the actual pulse count.

Table 8-2. Setpoint Menu Parameters (Continued)

8.3 Batch Operations

Softkeys can be configured to allow operator control of batch operations from the *920i* front panel (see Figure 8-9), Softkeys can be configured using *iRev*, serial commands, or the FEATURE menu (see Section 3.2.3 on page 32).

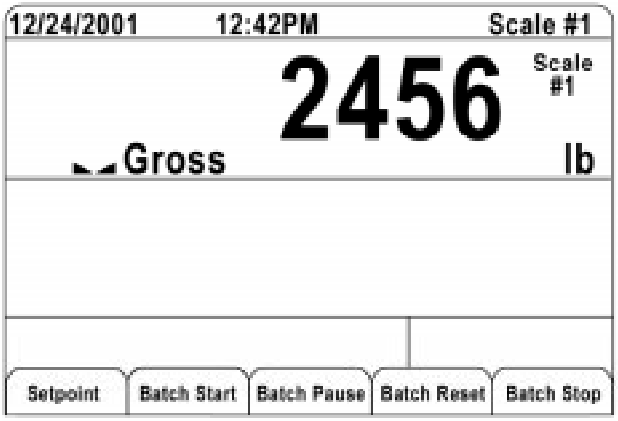


Figure 8-9. Batching Softkeys

Setpoint	Display or change assigned setpoints.
Batch Start	Starts batch process.
Batch Pause	Pauses an active batch. Processing is suspended until Batch Start is pressed again.
Batch Reset	Stops and resets an active batch to the beginning of the process.
Batch Stop	Stops an active batch and turns off all associated digital outputs.

Warning *To prevent personal injury and equipment damage, software-based interrupts must always be supplemented by emergency stop switches and other safety devices necessary for the application.*

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.

Both switches are wired into the indicator's digital I/O terminal strip as shown in Figure 8-11. 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 DIG I/O menu (see Section 3.2.6 on page 37) to configure digital input and output functions.

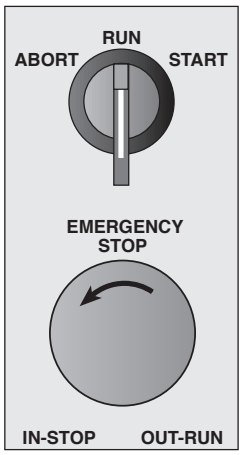


Figure 8-10. Batching Switch

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: the batch will start when the 3-way switch is turned to RUN, but the STOP mushroom button will not function.*

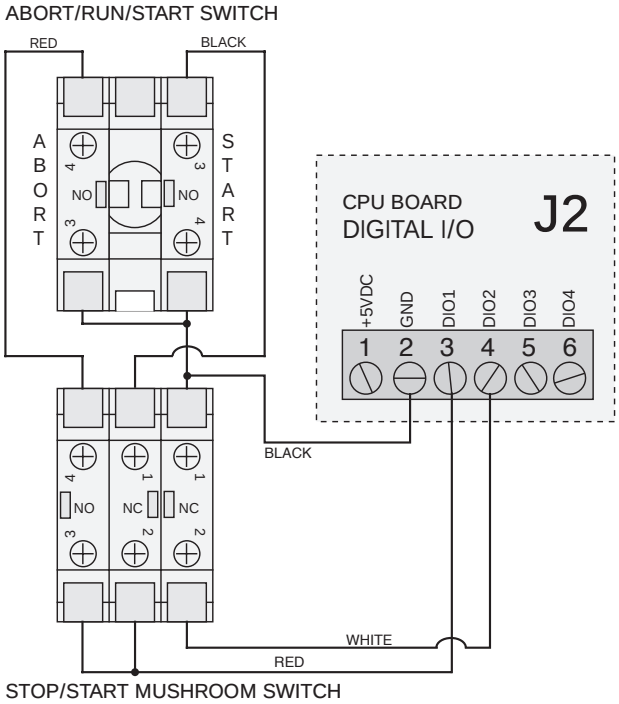


Figure 8-11. Batching Switch Wiring Diagram Example

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 serial command) to initialize the new batch routine following any change to the setpoint configuration.

8.4 Batching Examples

Example 1

The following example is used to dispense 100-LB drafts, automatically refilling a hopper to 1000 LB gross weight once the gross weight has dropped below 300 LB.

Setpoint 1 ensures that the hopper has enough material to start the batch. If the hopper weight is 100 LB or higher, setpoint 1 is tripped.

```
SETPOINT=1
KIND=GROSS
VALUE=100
TRIP=HIGHER
BATCH=ON
ALARM=ON
```

Setpoint 2 waits for standstill, performs a tare, and puts 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=NET
VALUE=0
TRIP=HIGHER
BATCH=OFF
```

Setpoint 4 is used to dispense material from the hopper. When the hopper weight goes below 100 LB net the setpoint is tripped.

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

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

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

Setpoint 6 is used as a “no flow alarm”. If the process in setpoint 4 is not completed in 10 seconds, digital output 4 becomes active to signify a problem.

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

Example 2

The following example uses a CONCUR setpoint to provide a two-speed simultaneous fill of a hopper to a net weight of 1000 LB.

Setpoint 1 ensures that the gross weight is within 50 LB of gross zero.

```
SETPOINT=1
KIND=GROSS
VALUE=0
TRIP=INBAND
BANDVAL=50
BATCH=ON
```

Setpoint 2 performs a tare once the scale is at standstill.

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

Setpoint 3 uses DIGOUT 1 to fill a hopper to a net weight of 800 LB.

```
SETPOINT=3
KIND=NET
VALUE=800
TRIP=HIGHER
BATCH=ON
DIGOUT=1
```

Setpoint 4 uses DIGOUT 2 to fill the hopper to a net weight of 1000 LB.

```
SETPOINT=4
KIND=NET
VALUE=1000
TRIP=HIGHER
BATCH=ON
DIGOUT=2
```

Setpoint 5 operates DIGOUT 2 while Setpoint 3 is active, providing simultaneous two-speed filling.

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

9.0 Serial Commands

The *920i* indicator can be controlled by a personal computer or remote keyboard connected to an indicator serial port. Control is provided by a set of serial commands that can simulate front panel key press functions, display and change setup parameters, and perform reporting functions. The serial commands provide the capability to print configuration data or to save that data to an attached personal computer. This section describes the serial command set and procedures for saving and transferring data using the serial ports.

9.1 The Serial Command Set

The serial 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 a serial 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.

9.1.1 Key Press Commands

Key press serial commands (see Table 9-1) simulate pressing the keys on the front panel of the indicator. These commands can be used in both setup and normal (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 serial commands:

1. Type K1 and press ENTER (or RETURN).
2. Type K5 and press ENTER.
3. Type KTARE and press ENTER.

Command	Function
KBASE	Select current scale (Example: KBASE, K2, KENTER to select Scale #2)
KZERO	In normal mode, press the ZERO key
KGROSSNET	In normal mode, press the GROSS/NET key
KGROSS	Go to gross mode (pseudo key)
KNET	Go to net mode (pseudo key)
KTARE	Press the TARE key
KUNITS	In weighing mode, press the UNITS key

Table 9-1. Serial Key Press Commands

Command	Function
KPRIM	Go to primary units (pseudo key)
KSEC	Go to secondary units (pseudo key)
KTER	Go to tertiary units (pseudo key)
KPRINT	In normal mode, press the PRINT key
KDISPACCUM	Press the ACCUM key
KDISPTARE	Display tare (pseudo key)
KCLR	Press the CLEAR key
KCLRCN	Reset consecutive number (pseudo key)
KCLRTAR	Clear tare from system (pseudo key)
KLEFT	In setup mode, move left in the menu
KRIGHT	In setup mode, move right in the menu
KUP	In setup mode, move up in the menu; in normal mode, scroll up to previous configured scale.
KDOWN	In setup mode, move down in the menu; in normal mode, scroll down to the next configured scale.
KEXIT	In setup mode, exits to normal mode
KSAVE	In setup mode, saves previously entered data
KCLRNV	Clear non-volatile RAM
K0–K9	Press number 0 (zero) through 9
KDOT	Press the decimal point (.)
KENTER	Press the ENTER key
KLOCK	Lock specified front panel key. For example, to lock the ZERO key, enter KLOCK=KZERO.
KUNLOCK	Unlock specified front panel key. For example, to unlock the PRINT key, enter KUNLOCK=KPRINT.
KID	Display Unit ID entry screen
KTREG	Display truck register
KWIN	Process truck weigh-in transaction Example: KWIN, K2, K3, KENTER to select ID #23)
KWOUT	Process truck weigh-out transaction
KDEL	While truck register is displayed, delete truck register
KSETPOINT	Display setpoint configuration (pseudo key)
KDATE	Display date (pseudo key)
KTIME	Display time (pseudo key)
KTIMEDATE	Display time and date (pseudo key)

Table 9-1. Serial Key Press Commands (Continued)

9.1.2 Reporting Commands

Reporting commands send specific information to the serial port. The commands listed in Table 9-2 can be used in either setup mode and normal mode.

Command	Function
DUMPALL	List all parameter values
SPDUMP	Print setpoint configuration
VERSION	Write *920i* software version
S#*n*	Write one frame of stream format to scale channel *n*
HARDWARE	Lists option cards installed in slots 1–14. See Section 10.1.2 on page 88 for more information about using the HARDWARE command.
XE	Returns a10-digit code representing any error conditions currently shown on the front panel. See Section 10.1.4 on page 89 for more information.

Table 9-2. Reporting Commands

9.1.3 Clear and Reset Commands

The following commands can be used to clear and reset the *920i*:

PCLR: Program clear. Erases the loaded user program (setup mode only).

RS: Reset system. Resets the indicator without resetting the configuration.

RESETCONFIGURATION: Restores all configuration parameters to their default values (setup mode only). The RESETCONFIGURATION function can also be initiated by pressing the Reset Config softkey under the VERSION menu. **NOTE:** *All load cell calibration settings are lost when the RESETCONFIGURATION command is run.*

9.1.4 Parameter Setting Commands

Parameter setting commands allow you to display or change the current value for a particular configuration parameter (Tables 9-3 through 9-11).

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 9-6 on page 76 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 on Scale #1 to 5 divisions, type the following:

SC.MOTBAND#1=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.

NOTE: *Some parameters are valid only if other parameters or parameter values are specified. See the configuration menus in Section 3.2 on page 21 for information about parameter dependencies. Restrictions for front-panel configuration also apply to serial command configuration.*

Command	Description	Values
SC.GRADS#*n*	Graduations	*1–9999999*
SC.ZTRKBND#*n*	Zero track band	OFF, 0.5D, 1D, 3D
SC.ZRANGE#*n*	Zero range	1.9%, 100%
SC.MOTBAND#*n*	Motion band	1D, 2D, 3D, 5D, 10D, 20D, OFF
SC.SSTIME#*n*	Standstill time	*1-65535*
SC.OVRLOAD#*n*	Overload	FS+2%, FS+1D, FS+9D, FS
SC.DIGFLTR1#*n* SC.DIGFLTR2#*n* SC.DIGFLTR3#*n*	Digital filtering	1, 2, 4, 8, 16, 32, 64, 128, 256
SC.DFSENS#*n*	Digital filter cutout sensitivity	2OUT, 4OUT, 8OT, 16OUT, 32OUT, 64OUT, 128OUT
SC.DFTHRH#*n*	Digital filter cutout threshold	NONE, 2D, 5D, 10D, 20D, 50D, 100D, 200D, 250D
SC.RATLTRAP#*n*	Rattletrap filtering	OFF, ON

Table 9-3. SCALES Serial Commands

Command	Description	Values
SC.SMPRAT#*n*	Sample rate	30, 60, 120, 240, 480, 960
SC.PWRUPMD#*n*	Power up mode	GO, DELAY
SC.TAREFN#*n*	Tare function	BOTH, NOTARE, PBTARE, KEYED
SC.PRI.DECPNT#*n*	Primary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.PRI.DSPDIV#*n*	Primary units display divisions	1D, 2D, 5D
SC.PRI.UNITS#*n*	Primary units	LB, KG, G, OZ, TN, T, GN, TROYOZ, TROYLB, LT, CUSTOM, NONE
SC.SEC.DECPNT#*n*	Secondary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.SEC.DSPDIV#*n*	Secondary units display divisions	1D, 2D, 5D
SC.SEC.UNITS#*n*	Secondary units	LB, KG, G, OZ, TN, T, GN, TROYOZ, TROYLB, LT, CUSTOM, NONE
SC.SEC.MULT#*n*	Secondary units multiplier	*0.00000–9999999*
SC.TER.DECPNT#*n*	Tertiary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.TER.DSPDIV#*n*	Tertiary units display divisions	1D, 2D, 5D
SC.TER.UNITS#*n*	Tertiary units	LB, KG, G, OZ, TN, T, GN, TROYOZ, TROYLB, LT, CUSTOM, NONE
SC.TER.MULT#*n*	Tertiary units multiplier	*0.000001–9999999*
SC.ROC.DECPNT#*n*	Tertiary units decimal position	8.888888, 88.88888, 888.8888, 8888.888, 88888.88, 888888.8, 8888888, 8888880, 8888800
SC.ROC.DSPDIV#*n*	Rate-of-change units display divisions	1D, 2D, 5D
SC.ROC.MULT#*n*	Rate-of-change units multiplier	*0.000001–9999999*
SC.ROC.UNITS#*n*	Rate-of-change units	SEC, MIN, HOUR
SC.ROC.INTERVL#*n*	Rate-of-change interval	*1–65535*
SC.ROC.REFRESH#*n*	Rate-of-change refresh interval	*1–65535*
SC.ACCUM#*n*	Accumulator enable	ON, OFF
SC.VISIBLE#*n*	Scale visibility	ON, OFF
SC.WZERO#*n*	Zero calibration	—
SC.WVAL#*n*	Test weight value	*test_weight_value*
SC.WSPAN#*n*	Span calibration	—
SC.WLIN.F1#*n*–SC.WLIN.F5#*n*	Actual raw count value for linearization points 1–5	*0–16777215*
SC.WLIN.V1#*n*–SC.WLIN.V5#*n*	Test weight value for linearization points 1–5	*0.000001–9999999*
SC.WLIN.C1#*n*–SC.WLIN.C5#*n*	Calibrate linearization points 1–5	—
SC.LC.CD#*n*	Set deadload coefficient	—
SC.LC.CW#*n*	Set span coefficient	—
REZERO#*n*	Rezero	—
For commands ending with “#*n*”, *n* is the scale number.		

Table 9-3. SCALES Serial Commands (Continued)

Command	Description	Values
EDP.BAUD#*p*	Port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 115200
EDP.BITS#*p*	Port data bits/parity	8NONE, 7EVEN, 7ODD
EDP.TERMIN#*p*	Port termination character	CR/LF, CR
EDP.EOLDLY#*p*	Port end-of-line delay	*0–255* (0.1-second intervals)
EDP.HANDSHK#*p*	Port handshaking	OFF, ON, HRDWAR
EDP.ADDRESS#*p*	Port RS-485 address	*0, 1–255*
EDP.BUS#*p*	Port bus network enable	OFF, ON
EDP.INPUT#*p*	Port serial input function	CMD, NONE, KEYBD, SCALE
EDP.STREAM#*p*	Port streaming	OFF, LFT, INDUST
EDP.SOURCE#*p*	Port source scale for output	*scale_number*
EDP.OFMT#*p*	Port output stream select	DEFAULT, CUSTOM
EDP.SFMT#*p*	Port custom stream format	*0-50 characters*
STR.POS#*p*	Custom stream identifiers	*Specify replacement text for token* Example: STR.PRI#1=L See Section 10.5 on page 91 for information more about custom stream formatting.
STR.NEG#*p*		
STR.PRI#*p*		
STR.SEC#*p*		
STR.TER#*p*		
STR.GROSS#*p*		
STR.NET#*p*		
STR.TARE#*p*		
STR.POS#*p*		
STR.NEG#*p*		
STR.MOTION#*p*		
STR.RANGE#*p*		
STR.OK#*p*		
STR.INVALID#*p*		
For commands including “#*p*”, *p* is the serial port number.		

Table 9-4. SERIAL Port Serial Commands

Command	Description	Values
SD	Set date	*MMDDYY*, *DDMMYY, YYMMDD,* or *YYDDMM.* Enter six-digit date using the year-month-day order specified for the DATEFMT parameter, using only the last two digits of the year.
ST	Set time	*hhmm* (enter using 24-hour format)
DATEFMT	Date format	MMDDYYYY, DDMMYYYY, YYYYMMDD, YYYYDDMM
DATESEP	Date separator	SLASH, DASH, SEMI
TIMEFMT	Time format	12HOUR, 24HOUR
TIMESEP	Time separator	COLON, COMMA
DECFMT	Decimal format	DOT, COMMA
DSPRATE	Display rate	*1–80,* in100-ms intervals

Table 9-5. FEATURE Serial Commands

Command	Description	Values
CONSNUM	Consecutive numbering	*0–9999999*
CONSTUP	Consecutive number start-up value	*0–9999999*
UID	Unit identifier	*aaaaaaaa* (up to 8 alphanumeric characters)
TRUCK	Truck in/out mode	OFF, MODE1, MODE2, MODE3, MODE4, MODE5, MODE6
CFGPWD	Configuration password	*0, 1–9999999*
SPPWD	Setpoint password	*0, 1–9999999*
SK#1–SK#10	Softkey assignment	Blank, TimeDate, DspTar, DspAcc, DspROC, SetPt, BatStrt, BatStop, BatPause, BatRst, WeighIn, WeighOut, TrkReg, UID, SclSel, *SKUD1–SKUD10*
SKT#1–SKT#10	User-defined softkey text	—
KYBDLK	Keyboard lock (disable keypad)	OFF, ON
ZERONLY	Disable all keys except ZERO	OFF, ON
PROMPT#1–PROMPT#60	Prompts/setpoint names	—
REGULAT	Regulatory compliance	NONE, OIML, NTEP, CANADA
REGWORD	Regulatory word	GROSS, BRUTTO
GRAVADJ	Gravitational adjustment	OFF, ON
LAT.LOC	Latitude	*0–90* (to nearest degree of latitude)
ELEV.LOC	Elevation	±*0–9999* (in meters)

Table 9-5. FEATURE Serial Commands (Continued)

Command	Description	Values
SP.KIND#*n*	Setpoint kind	OFF, GROSS, NET, –GROSS, –NET, ACCUM, ROC, +REL, –REL, %REL, RESREL, PAUSE, DELAY, WAITSS, COUNTER, AUTOJOG, COZ, INMOTON, INRANGE, BATCHPR, TIMER, CONCUR, DIGIN, AVG, TOD, DELTA, CHWEI, PLSCNT, PLSRAT, ALWAYS, NEVER
SP.VALUE#*n*	Setpoint value	*number*
SP.SOURCE#*n*	Source scale	SCALE1, SCALE2, SCALE3…SCALEx
SP.TRIP#*n*	Trip	HIGHER, LOWER, INBAND, OUTBAND
SP.BANDVAL#*n*	Band value	*number*
SP.HYSTER#*n*	Hysteresis	*number*
SP.PREACT#*n*	Preact type	OFF, ON, LEARN, FLOW
SP.PREVAL#*n*	Preact value	*number*
SP.PREADJ#*n*	Preact adjustment percentage	*number*
SP.PRESTAB#*n*	Preact learn stability	*number*
SP.PCOUNT#*n*	Preact learn interval	*number*
SP.TOLBAND#*n*	Target tolerance	*number*
SP.TOLCNT#*n*	Tolerance count	*number*
SP.BATCH#*n*	Batch step enable	OFF, ON
SP.CLRACCM#*n*	Clear accumulator enable	OFF, ON
SP.CLRTARE#*n*	Clear tare enable	OFF, ON
SP.PSHACCM#*n*	Push accumulate	OFF, ON, ONQUIET

Table 9-6. SETPNTS Serial Commands

Command	Description	Values
SP.PSHPRINT#*n*	Push print	OFF, ON, WAITSS
SP.PSHTARE#*n*	Push tare	OFF, ON
SP.ALARM#*n*	Alarm enable	OFF, ON
SP.NAME#*n*	Setpoint name number	NONE, *1–60*
SP.ACCESS#*n*	Setpoint access	OFF, ON, HIDE
SP.SLOT#*n*	Digital output slot	*number*
SP.DIGOUT#*n*	Digital output	*number*
SP.BRANCH#*n*	Branch destination	0, *1-100*
SP.RELNUM#*n*	Relative setpoint numer	*1–100*
SP.START#*n*	Starting setpoint	*1–100*
SP.END#*n*	Ending setpoint	*1–100*
SP.DSLOT#*n*	Digital input slot	*number*
SP.MASK#*n*	Digital input mask	*number*
SP.NSAMPLE#*n*	Number of samples	*number*
SP.TIME#*n*	Trip time	*hhmm*
SP.DURATION#*n*	Trip duration	*hhmmss*
SP.VUNDER#*n*	Underrange value	*number*
SP.VOVER#*n*	Overrange value	*number*
BATCHNG	Batching mode	OFF, AUTO, MANUAL
For setpoint commands ending with "#*n*", *n* is the setpoint number.		

Table 9-6. SETPNTS Serial Commands (Continued)

Command	Description	Values
GFMT.FMT GFMT.PORT	Gross demand print format string	For .PORT commands, specify the port number as PORT*xx* (no leading zero). For example: GFMT.PORT=PORT3. See Section 6.0 on page 47 for information about demand print format strings.
NFMT.FMT NFMT.PORT	Net demand print format string	
ACC.FMT ACC.PORT	Accumulator print format string	
SPFMT.FMT SPFMT.PORT	Setpoint print format string	
TRWIN.FMT TRWIN.PORT	Truck weigh-in print format string	
TRWOUT.FMT TRWOUT.PORT	Truck weigh-out print format string	
TR.FMT TR.PORT	Truck register print format string	
HDRFMT1 HDRFMT2	Ticket header format strings	
AUXFMT.FMT AUXFMT.PORT	Auxiliary ticket format	
WDGT#*n*	Display widget	*widget_number* See Section 9.2 on page 82 for widget programming information.
WDGT.CLR	Clear widgets	—

Table 9-7. PFORMT Serial Commands

Command	Description
DON.*b*#*s*	Set digital output on (active) at bit *b*, slot *n.*
DOFF.*b*#*s*	Set digital output off (inactive) at bit *b*, slot *n.*

Table 9-8. DIG I/O Serial Commands

Command	Description	Values
DIO.*b*#*s*	Digital input function	OFF, INPUT, OUTPUT, ZERO, NT/GRS, TARE, UNITS, PRINT, ACCUM, SETPNT, TIMDATE, ESC, CLEAR, DSPTAR, IDKEY, KEY0–KEY9, KEYDP, ENTER, KBDLOC, HOLD, BATRUN, BATSTRT, BATPAUS, BATRESET, CLRCN, GROSS, NET, PRIM, SEC, CLRTAR, CLRACC
Digital inputs are specified by bit number (*b*) and slot number (*s*)		

Table 9-9. DIG IN Serial Commands

Command	Description	Values
ALG.ALIAS#*s*	Analog output alias	*name*
ALG.SOURCE#*s*	Analog output source	USER, SCALE*n*
ALG.MODE#*s*	Mode	GROSS, NET
ALG.OFFSET#*s*	Zero offset	0%, 20%
ALG.ERRACT#*s*	Error action	FULLSC, HOLD, ZEROSC
ALG.MIN#*s*	Minimum value tracked	*0–9999999*
ALG.MAX#*s*	Maximum value tracked	*0–9999999*
ALG.ZERO#*s*	Zero calibration	*0–65535*
ALG.SPAN#*s*	Span calibration	*0–65535*
For commands ending with “#*s*”, *s* is the slot number.		

Table 9-10. ALGOUT Serial Commands (Valid Only If Analog Output Card Is Installed)

9.1.5 Normal Mode Commands

The normal mode print commands (see Table 9-11) transmit data to the serial port on demand in either setup or normal mode.

Command	Description	Values
CONSNUM	Set consecutive number	*0–9 999 999*
UID	Set unit ID	*nnnnnn*
SD	Set date	*MMDDYY*, *DDMMYY, YYMMDD,* or *YYDDMM.* Enter six-digit date using the year-month-day order specified for the DATEFMT parameter, using only the last two digits of the year.
ST	Set time	*hhmm* (enter using 24-hour format)
SX#*n*	Start serial port streaming	OK *or* ?? The port streaming parameter (EDP.STREAM#*p*) for the streaming port must be set to LFT or INDUST before using these commands. An EX command sent while in setup mode does not take effect until the indicator is returned to normal mode.
EX#*n*	Stop serial port streaming	

Table 9-11. Normal Mode Serial Commands

Command	Description	Values
RS	Reset system	Soft reset. Used to reset the indicator without resetting the configuration to the factory defaults.
XA#*n*	Transmit accumulator value in displayed units	*nnnnnn UU*
XAP#*n*	Transmit accumulator value in primary units	
XAS#*n*	Transmit accumulator value in secondary units	
XAT#*n*	Transmit accumulator value in tertiary units	
XG#*n*	Transmit gross weight in displayed units	*nnnnnn UU*
XGP#*n*	Transmit gross weight in primary units	
XGS#*n*	Transmit gross weight in secondary units	
XGT#*n*	Transmit gross weight in tertiary units	
XN#*n*	Transmit net weight in displayed units	*nnnnnn UU*
XNP#*n*	Transmit net weight in primary units	
XNS#*n*	Transmit net weight in secondary units	
XNT#*n*	Transmit net weight in tertiary units	
XT#*n*	Transmit tare weight in displayed units	*nnnnnn UU*
XTP#*n*	Transmit tare weight in primary units	
XTS#*n*	Transmit tare weight in secondary units	
XTT#*n*	Transmit tare weight in tertiary units	
XE	Query system error conditions	*nnnnn* See Section 10.1.4 on page 89 for detailed information about the XE command response format.

Table 9-11. Normal Mode Serial Commands

9.1.6 Batching Control Commands

The commands listed below provide batching control through the serial 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 serial command, Batch Start softkey, or the StartBatch function in an *iRite* program can be used to restart the batch program at the current step.

9.1.7 Database Commands

The commands listed in Table 9-12 can be used to create and maintain databases in the *920i*. Except for the DB.DELALL command, all of the database commands require an extension to identify the number of the database within the memory card and the slot number of the memory card.

Command	Description
DB.ALIAS.*n#x*	Get or set database name
DB.CLEAR.*n#x*	Clear database contents
DB.DATA.*n#x*	Get or set database contents
DB.SCHEMA.*n#x*	Get or set database structure
DB.DELALL	Delete all databases and database contents
n represents the database number within the memory card; *x* is the slot number of the memory card. Each command must be terminated with a carriage return character (<CR>, ASCII 13).	

Table 9-12. Database Commands

DB.ALIAS

The DB.ALIAS command is used to get or set the alias used by *iRite* programs to reference the specified database. Each database alias must be unique among all databases and adhere to the following rules: 8 character maximum; must begin with an alpha character or an underscore; can only contain A–Z, a–z, 0–9, or an underscore (_).

Example. The following command assigns an alias of TRUCKS_2 to the first database on the memory card installed in slot 2:

DB.ALIAS.1#2=TRUCKS_2<CR>

Sending the DB.ALIAS command alone, without assigned data, returns the current database alias.

DB.CLEAR

To clear the contents of a database, send the following command:

DB.CLEAR.*n*#*x*<CR>

Where:

n is the database number within the memory card

x is the slot number of the memory card (0 is the onboard memory)

The *920i* responds with OK<CR> if the command is successful, ??<CR> if unsuccessful.

DB.DATA

The DB.DATA command can be used to send data to or retrieve data from the *920i*.

Data can be sent to the indicator using the following command:

DB.DATA.*n*#*x* = *data*{ | }<CR>

Where:

n is the database number within the memory card

x is the slot number of the memory card (0 is the onboard memory)

data represents a single cell of a row of data

{ | } is a pipe character (ASCII 124), used to delimit cell data. If the data being sent is not the last cell of the row, append the pipe character to the data to indicate that more data is coming for that particular row. If the data being sent is the last cell of the row, do not append the pipe character.

If the command is accepted, the *920i* responds with OK<CR>; if not, it responds with ??<CR>.

Example. The following commands place the data shown in Table 9-13 into the first database in the onboard memory:

DB.DATA.1#0=this|<CR>
DB.DATA.1#0=is|<CR>
DB.DATA.1#0=a|<CR>
DB.DATA.1#0=test<CR>
DB.DATA.1#0=aaa|<CR>
DB.DATA.1#0=bbb|<CR>
DB.DATA.1#0=ccc|<CR>
DB.DATA.1#0=ddd<CR>

	Cell			
Record	1	2	3	4
first	this	is	a	test
second	aaa	bbb	ccc	ddd

Table 9-13. Sample Database Contents

Sending the DB.DATA command alone, without assigned data, returns the database contents:

DB.DATA.*n*#*x*<CR>

The *920i* responds with the entire contents of the database. Returned data is cell-delimited with the pipe character (ASCII 124) and row-delimited with carriage returns (ASCII 13).

For example, the following command could be used to return the contents of database 1 in the onboard memory:

DB.DATA.1#0<CR>

If the database contents are the records shown in Table 9-13, the indicator responds with the following data, using pipe characters and carriage returns to delimit the database cells and rows, respectively:

this|is|a|test<CR>aaa|bbb|ccc|ddd<CR>

NOTE: *There is no* end of database *notification at the end of the* DB.DATA *command transmission. Use a receive time-out to determine command completion. This time-out should vary based on baud rate.*

You should determine the number of records currently in the database both prior to and after sending the DB.DATA command to verify that the correct number of records are received. The number of records can be determined with the DB.SCHEMA command.

DB.SCHEMA

The DB.SCHEMA command is used to get or set the structure of a database.

DB.SCHEMA.*n*#*x*<CR>

The *920i* responds to the command above by returning the following:

<Max Records>,<Current Record Count>,
<Column Name>,<Data Type>,<Data Size>,...<CR>

The *<Column Name>*, *<Data Type>*, and *<Data Size>* elements repeat for each column in the database.

The <*Column Name*> follows the rules for alias names: 8 character maximum; must begin with an alpha character or an underscore; can only contain A–Z, a–z, 0–9, or an underscore (_).

The <*Data Type*> is represented by a numeric field:

Value	Type
1	Byte
2	Short (16-bit integer)
3	Long (32-bit integer)
4	Single (32-bit floating point)
5	Double (64-bit floating point)
6	Fixed string
7	Variable string
8	Date and time

Table 9-14. Data Type Field Codes

The <*Data Size*> value must match the data type. A range of data size values is allowed only for the string data types:

Size	Value
Byte	1
Short	2
Long	4
Single	4
Double	8
Fixed string	*1–255*
Variable string	*1–255*
Date and time	8

Table 9-15. Data Size Field Codes

The DB.SCHEMA command can also be used to modify the schema, but only when the indicator is in setup mode and only if the database does not contain any data.

9.2 Widget Programming

The type and location of elements shown on the *920i* display are easily specified using the drag and drop features of the *iRev* utility. However, display widgets can also be programmed using serial commands while the *920i* is in setup mode, or through *iRite* programming. Up to ten different screens can be configured.

Serial command widget programming is accomplished in setup mode, using the WDGT serial command. The first parameter specified is the widget type, listed in Table 9-16. The following sections describe each of the widget types and the parameters and values specific to that type.

In setup mode, the WDGT.CLR serial command can be used to clear all specified widgets from the display.

Type	Description
1	Scale Widget
2	Bitmap Widget
3	Bargraph Widget
4	Label Widget
5	Numeric Widget
6	Symbol Widget

Table 9-16. Widget Types

Some widget types require that the location or size of the widget be specified, in pixels. Figure 9-16 shows the pixel counts (80 pixels per inch) used to specify the pixel location on the display.

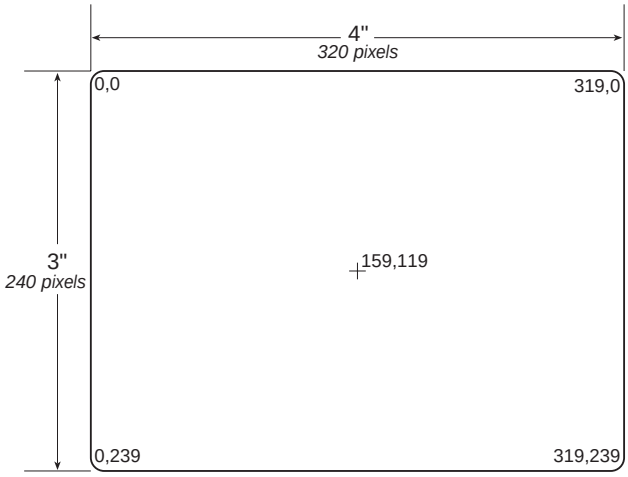


Figure 9-1. Screen Location Pixel Values

Setting the *data_source* of bargraph, label, numeric, and symbol widgets to 2 (program) allows these widget types to be directly controlled by an *iRite* program rather than by indicator data. The user program must provide the code necessary for widget manipulation.

9.2.1 Scale Widgets

Scale widgets are used to present basic scale data from one or more configured scales. For multiple scale applications, up to four scale widgets can be configured to be shown on the display at any one time. Fewer displayed widgets allow each widget to be larger. Scale data from additional configured scales can be shown by scrolling up or down through all configured scales, including a total scale widget, if configured.

WDGT#*n*=1, *scale_widget_size, scales_displayed, screen_number*

where:

n=widget number
1= scale widget type
scale_widget_size = 1–6 (size refers to numeral height)
1: 1/4"
2: 1/2"
3: 3/4"
4: 7/8"
5: 1"
6: 1 5/32"
scales_displayed = 1–4
screen_number = 1–10

Example:

WDGT#1=1,2,1,2<CR>

creates a single 1/2" scale widget for screen number 2.

9.2.2 Bitmap Widgets

Bitmap widgets provide a representation of vertical or horizontal tanks or a hopper. The location, size, and border style of the widget are specified on the WDGT command.

WDGT#*n*=2, *left, top, width, height,border_style, bitmap_widget_style, name/alias, visible, screen_number*

where:

n=widget number
2= bitmap widget type
left = left edge location, in pixels
top = top edge location, in pixels
width = width, in pixels
height = height, in pixels
border_style = 1 (none)
bitmap_widget_style = 1 (vertical tank), 2 (horizontal tank), 3 (hopper)
name/alias = text name or alias
visible = 1 (on) or 2 (off)
screen_number = 1–10

Example:

WDGT#2=2,30,30,120,120,1,3,Hopper1,1,2<CR>

creates a visible, 1.5" x 1.5" (120 x 120 pixel) hopper widget for screen 2, named *Hopper1*, with no border, with the upper left-hand corner of the bitmap at pixel location 30,30 (near upper left corner of display).

9.2.3 Bargraph Widgets

Bargraph widgets allow display of vertical or horizontal graphs, either a normal bargraph style or a needle gauge, with or without graduations. The graph can be used to represent scale weight or progress toward a setpoint target value.

WDGT#*n*=3, *left, top, width, height, border_style, bargraph_widget_style, graduations, orientation, name/alias, data_source, data_field, data_subfield, visible, screen_number*

where:

n=widget number
3= bargraph widget type
left = left edge location, in pixels
top = top edge location, in pixels
width = width, in pixels
height = height, in pixels
border_style = 1 (none) or 2 (fixed single)
bargraph_widget_style = 1 (basic), 2 (meter)
graduations = 1 (on), 2 (off)
orientation = 1 (horizontal), 2 (vertical)
name/alias = text name or alias
data_source = 1 (scale), 2 (program), 3 (setpoint)
data_field
If *data_source* = 1, *data_field* is the scale channel number
If *data_source* = 3, *data_field* is the setpoint number, 1–100, or 0 (current setpoint)
data_subfield
If *data_source* = 1, *data_subfield* is 1 (gross), 2 (net), 3 (displayed value)
If *data_source* = 3 and *bargraph_widget_style* is 2, *data_subfield* is the current value of the setpoint.
visible = 1 (on) or 2 (off)
screen_number = *1–10*

Example:

WDGT#2=3,30,30,30,100,2,1,1,2,,Graph1,1,1,1,1,2<CR>

creates a visible, 30 x 100 pixel bargraph widget for screen 2, named *Graph1*, with a single border, with the upper left-hand corner of the bargraph at pixel location 30,30 (near upper left corner of display). The bargraph is of the basic style (1), with graduations turned on (1) and is oriented vertically (2). Bargraph source is the gross weight from scale channel 1.

9.2.4 Label Widgets

Label widgets are used to insert a text label in the display.

WDGT#*n*=4, *left, top, width, caption, border_style, justification, font_size, name/alias, data_source, data_field, data_subfield, visible, screen_number*

where:

n=widget number
4= label widget type
left = left edge location, in pixels
top = top edge location, in pixels
width = width, in pixels
caption = text caption
border_style = 1 (none) or 2 (fixed single)
justification = 1 (left), 2 (right), 3 (center)
font_size = 1 (9 pt), 2 (12 pt), 3 (18 pt)
name/alias = text name or alias
data_source = 1 (scale), 2 (program), 3 (setpoint), 4 (*caption* text)
data_field
If *data_source* = 1, *data_field* is the scale channel number
If *data_source* = 3, *data_field* is the setpoint number, 1–100, or 0 (current setpoint)
data_subfield
If *data_source* = 1, *data_subfield* is the scale alias (text
If *data_source* = 3, *data_subfield* is the setpoint name
visible = 1 (on) or 2 (off)
screen_number = *1–10*

Example:

WDGT#2=4,60,60,120,Caption, 2,1,1,Label1,4,0,0,1,2<CR>

creates a visible, 30 x 100 pixel label widget for screen 2, named *Label1*, with a single border, with the upper left-hand corner of the label at pixel location 60,60. The label is left-justified (1), with text in a 9-pt font (1). Label source is the text specified for the caption (4)—the word “Caption”.

9.2.5 Numeric Widgets

Numeric widgets are used to provide numeric information in the display.

WDGT#*n*=5, *left, top, width, border_style, justification, font_size, name/alias, data_source, data_field, data_subfield, visible, screen_number*

where:

n=widget number
5= numeric widget type
left = left edge location, in pixels
top = top edge location, in pixels
width = width, in pixels
border_style = 1 (none) or 2 (fixed single)
justification = 1 (left), 2 (right), 3 (center)
font_size = 1 (9 pt), 2 (12 pt), 3 (18 pt)
name/alias = text name or alias
data_source = 1 (scale), 2 (program), 3 (setpoint)
data_field
If *data_source* = 1, *data_field* is the scale channel number
If *data_source* = 3, *data_field* is the setpoint number, 1–100, or 0 (current setpoint)

data_subfield
If *data_source* = 1, *data_subfield* can be:
1 (gross, primary units)
2 (gross, secondary units)
3 (gross, tertiary units)
4 (net, primary units)
5 (net, secondary units)
6 (net, tertiary units)
7 (displayed value)
8 (rate of change value);
If *data_source* = 3, *data_subfield* can be:
1 (setpoint value)
2 (preact value)
3 (tolerance band value)

visible = 1 (on) or 2 (off)
screen_number = 1–10

Example:

WDGT#2=5,60,60,120, 2,1,1,Numeric1,1,1,7,1,2<CR>

creates a visible, 120-pixel wide, numeric widget for screen 2, named *Numeric1*, with the upper left-hand corner of the label at pixel location 60,60. The label is left-justified (1), with text in a 9-pt font (1). The widget shows the displayed weight (data_subfield = 7) from scale channel 1 (data_source = 1, data field = 1).

9.2.6 Symbol Widgets

Symbol widgets provide icons to indicate a variety of alarms, conditions, or device states.

WDGT#*n*=6, *left, top, symbol_style, name/alias, data_source, data_field, data_subfield, visible, screen_number*

where:

n=widget number
6= symbol widget type
left = left edge location, in pixels
top = top edge location, in pixels
symbol_style = *1–41* (see Table 9-17 on page 84)
name/alias = text name or alias
data_source = 1 (scale), 2 (program), 3 (setpoint), 4 (*digital I/O point)*

data_field
If *data_source* = 1, *data_field* is the scale channel number
If *data_source* = 3, *data_field* is the setpoint number, 1–100, or 0 (current setpoint)
If *data_source* = 4, *data_field* is 0 (onboard I/O, bits 1–4) or the I/O expansion card number, 1–14

data_subfield
If *data_source* = 1, *data_subfield* can be:
1 (tare)
2 (motion)
3 (center of zero)
4 (overload)
5 (underload)
If *data_source* = 3, *data_subfield* can be:
1 (setpoint state)
2 (tolerance check)
If *data_source* = 4, *data_subfield* specifies the bit number of the onboard or expansion card digital I/O channel: 1–4 (for onboard I/O, *data_field*=0) or 1–24 (for expansion card I/O)

visible = 1 (on) or 2 (off)
screen_number = 1–10

Example:

WDGT#2=6,120,120,6,Alarm, 4,12,1,1,2<CR>

creates a visible symbol widget for screen 2, named *Alarm*, using the bell symbol (symbol widget number 6 in Table 9-17), with the upper left-hand corner of the label at pixel location 120,120. The symbol toggles on or off depending on the state of bit 1 on digital I/O expansion card 12.

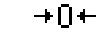
Symbol Style (x)	Description	Widget State (y)					
		y=1		y=2		y=3	
1	Tare	Tare		Off	[Blank]	P. Tare	
2	Standstill	On		Off	[Blank]		
3	COZ	On		Off	[Blank]		
4	Round	Empty		Full			
5	Square	Empty		Full			

Table 9-17. Symbol Widgets

Symbol Style (x)	Description	Widget State (y)					
		y=1		y=2		y=3	
6	Bell	On		Off	[Blank]		
7	Exclamation Mark	On		Off	[Blank]		
8	Light Bulb	On		On/Bright		Off	[Blank]
9	Reject	On		Off	[Blank]		
10	Over/Under	=		–		+	
11	Stop Light	Green		Red		Yellow	
12	Left	On		Off	[Blank]		
13	Right	On		Off	[Blank]		
14	Up	On		Off	[Blank]		
15	Down	On		Off	[Blank]		
16	Speaker	Quiet		Loud		Off	[Blank]
17	Serial	Connect		Disconnect		Off	[Blank]
18	Truck 1	On		Off	[Blank]		
19	Truck 2	On		Off	[Blank]		
20	Weight	On		Off	[Blank]		
21	Overload	On		Off	[Blank]		
22	Underload	On		Off	[Blank]		
23	Stop	On/Dark		Off	[Blank]	On/Light	
24	Yield	On		Off	[Blank]		
25	Skull & Crossbones	On		Off	[Blank]		
26	Unbalance	On		Off	[Blank]		
27	Runner	Slow		Fast		Off	[Blank]

Table 9-17. Symbol Widgets (Continued)

Symbol Style (x)	Description	Widget State (y)					
		y=1		y=2		y=3	
28	Walker	Left leg		Right leg		Off	[Blank]
29	Printer	On		Off	[Blank]		
30	Hourglass	On		Off	[Blank]		
31	Gas Pump	On		Off	[Blank]		
32	Conveyor	Empty		Full		Off	[Blank]
33	Batch	Automatic		Manual		Off	[Blank]
34	Valve	Closed		Open		Off	[Blank]
35	Motor	Stop		Run		Off	[Blank]
36	Checkmark	On		Off	[Blank]		
37	Faucet	Closed		Open		Off	[Blank]
38	Padlock	Locked		Open		Off	[Blank]
39	Key	On		Off	[Blank]		
40	Pipe	Empty		Full		Off	[Blank]
41	Not	On		Off	[Blank]		

Table 9-17. Symbol Widgets (Continued)

10.0 Appendix

10.1 Troubleshooting

Table 10-1 lists general troubleshooting tips for various hardware and software error conditions. See the following pages for additional information about specific diagnostic tools.

The distributor site for the *920i* at www.rlws.com includes a section of Frequently Asked Questions. RLWS will post answers to questions presented to the technical support group. Check the site often for new postings.

Symptom	Cause/Remedy
Indicator does not power up	Possible blown fuse or bad power supply. Check fuses (see Section 2.8 on page 12) and replace if necessary. Fuse specifications are listed on page 107; fuse replacement part numbers are listed in Table 2-7 on page page 14. If fuses are good, check all voltages on CPU board. Power supply should output both +6V and –6V levels to the CPU board (see Figure 2-4 on page 8). If power supply appears bad, check the small glass fuse (2.5A, 5x20mm) on the power supply board.
Front panel power indicator blinking ( )	Power supply overloaded. Check for shorts in A/D card regulators or in the DC-to-DC converter of any installed analog output or pulse input cards.
"Blue screen"	Check LCD contrast pot (under interface board access cover; see Figure 2-3 on page 8). Possible corrupt core software; reset or reload software.
Hangs in "888" display	Corrupt core software. Reset or reload software.
Tare and truck data pointers are corrupt, *Tare storage is corrupt* error messages at startup	Possible dead battery. Perform configuration reset then check for low battery warning on display. If battery is low, replace battery, perform another configuration reset, then reload files.
Divide by zero error message at startup	User program error. See Section 10.1.3 on page 88
ERROR message in weight display	Excitation voltage too low or off. Excitation voltage is provided by the A/D card.
Dashes in weight display	Overrange or underrange scale condition. Check scale. For out-of -range conditions in total scale display, check all scale inputs for positive weight values.
Display reads *0.000000*	Scale not updating. Check for bad option card hanging the bus.
Cannot enter setup mode	Possible bad switch. Test switch; replace interface board if necessary.
Serial port not responding	Possible configuration error. For command input, ensure port INPUT parameter is set to CMD.
A/D scale out of range	Check source scale for proper mechanical operation. Check load cell and cable connection. Possible bad load cell: check indicator operation with load cell simulator.
Locked — Scale in use	Scale is assigned as an input to a total scale or is the source for a serial scale, analog output, or setpoint. If not correct, deconfigure this scale assignment and reconfigure as required.
Serial scale out of range	Check source scale for proper mechanical operation. Check cable connection. Possible format mismatch between serial scale and *920i*: Check SFMT specification under SERIAL menu.
Option card failure	Possible defective card or slot. Disconnect power, install card in different slot, then apply power again.
Option card hardware diagnostic error	Required option card not found. See Section 10.1.1 on page 88.
Expansion board does not power up	Check expansion board power supply.

Table 10-1. Basic Troubleshooting

NOTE: *Always save copies of the indicator configuration, calibration, iRev and iRite files on a local PC so that these are available when a software reload or upgrade is required.*

10.1.1 Option Card Diagnostic Errors

Option cards are detected by the *920i* at power-up. If the current indicator configuration requires an option card but that card is not detected at power-up, an error similar to the following is displayed:

```
HARDWARE CRITICAL TO PROPER OPERATION
WITH CURRENT CONFIGURATION
CANNOT BE FOUND

A/D SLOT 4 CHANNEL 1

INSTALL HARDWARE OR RECONFIGURE
```

To recover from this error you can do the following:

- If the option is required, ensure that the card is properly seated in its slot and cycle the power. If the card is still not recognized, replace the card or try installing the card in a different slot.
- Enter setup mode and reconfigure to eliminate the requirement for the option.
- Go to the VERSION menu and use the Reset Config softkey (or RESETCONFIGURATION command) to perform a configuration reset. Configuration reset returns all configuration values to their factory defaults.

See Section 10.1.2 below, for information about using the HARDWARE serial command to verify that installed cards are recognized.

10.1.2 Using the HARDWARE Command

The HARDWARE serial command can be issued to verify that all installed cards are recognized by the system. The HARDWARE command returns a string of card type codes, representing cards installed in slots 1–14:

```
HARDWARE=3,3,2,4,5,0,0,0,0,0,0,0,0,0
```

Table 10-2 lists the card codes returned by the HARDWARE command.

Code	Card Type
0	*No card installed*
1	Dual-Channel Serial Expansion Card
2	Dual-Channel A/D Card
3	Single-Channel A/D Card
4	Analog Output Card
5	24-Channel Digital I/O Expansion Card
6	Pulse Input Card
7	1 MB Memory Expansion Card
9	DeviceNet Card
10	Profibus Card
12	Remote I/O Card

Table 10-2. HARDWARE Command Option Card Codes

If an installed card is not recognized (HARDWARE command returns a code of *0* for that slot), ensure that the card is seated properly. Reinstall the card, if necessary, then cycle the indicator power to read the configuration again. If the card is still not recognized, try installing it in another slot.

NOTE: *The internal Ethernet card does not return a card type code. Any slot containing an Ethernet card will show a value of 0 on the HARDWARE command.*

10.1.3 User Program Diagnostic Errors

Faulty user programs can cause critical errors that are detected by the *920i* at power-up. The following error message is caused by a user program attempting to divide by zero:

```
A CRITICAL USER PROGRAM ERROR
HAS BEEN DETECTED

DIVIDE BY ZERO

SYSTEM RESET IS REQUIRED
```

To recover from this error you can do the following:

- Cycle the indicator power to reset the user program.
- Correct the *iRite* program to eliminate the divide by zero operation. Recompile the program, then download the corrected program to the indicator.

If technical assistance is required, contact RLWS technical support.

Diagnostic Boot Procedure

If a user program causes an error in the start-up handler, the only way to fix the error is to perform the following diagnostic boot procedure.

1. Disconnect power to the *920i*.
2. Connect the serial port of a PC with *iRev* installed to port 2 of the *920i*. Connection must be made at 38400 bps.
3. Open the indicator enclosure and place a jumper across the SW1 boot mode pins (see Figure 2-4 on page 8).
4. Power up the *920i*. The indicator will stall at the diagnostic monitor.
5. Start *iRev* and enter monitor mode, then type BOOT.
6. Use the indicator setup switch to enter setup mode.
7. Remove the jumper from SW1.
8. From monitor mode, enter the RESETCONFIGURATION command.

Determine the cause of the startup handler error, make program corrections, then reload the corrected user program and test.

10.1.4 Using the XE Serial Command

The XE serial command can be used to remotely query the *920i* for the error conditions shown on the front panel. The XE command returns a decimal number representing any existing error conditions. For multi-scale applications, the value returned by the XE command represents all error conditions, if any, present on all configured scales.

If more than one error condition exists, the number returned is the sum of the values representing the error conditions (see Table 10-3 on page 89). For example, if both a tare error (TAREERR, 65536) and a truck database checksum error (ETRUCKERR, 8192) have occurred, the XE command returns the value 73728, representing the sum of those two error conditions.

Error Code	Value	Description
VIRGERR	1	Virgin error
PARMCHKERR	2	Configuration checksum error
LOADCHKERR	4	Calibration checksum error
PRINTCHKERR	8	Print format checksum error
ENVRAMERR	16	General NVRAM error
ENVCRC1ERR	32	Setpoint NVRAM data error
ENVCRC2ERR	64	
ENVCRC3ERR	128	
ENVCRC4ERR	256	
ENVCRC5ERR	512	
ENVCRC6ERR	1024	
ENVCRC7ERR	2056	
ENVCRC8ERR	4096	
ETRUCKERR	8192	Truck database checksum error
GRAVERR	16384	Gravity calibration error
ADPHYSICALERR	32768	A/D physical error
TAREERR	65536	Tare checksum error
STRINGERR	262144	String program error
POWER_FAIL	524288	Power failure
RTCERR	1048576	Real time clock error

Table 10-3. Error Codes Returned on XE Command

10.2 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 FEATURE menu. Table 10-4 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	ZERO *and* CLEAR TARE
NONE	zero or negative	no	TARE	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	CLEAR TARE	

Table 10-4. TARE and ZERO Key Functions for REGULAT Parameter Settings

10.3 PS/2 Keyboard Interface

Serial port 2 on the *920i* CPU board provides a PS/2-type keyboard interface for use with a remote keyboard. To use the keyboard interface, set the INPUT parameter for Port 2 (under the SERIAL menu) to *KEYBD*.

Table 10-5 summarizes the *920i*-specific functions provided by the keyboard interface; most other alphanumeric and navigational keys provide functions equivalent to those typical for PC operation.

NOTE: *The keyboard interface is not hot-pluggable. Disconnect power to the 920i before plugging the keyboard cable into the Port 2 connector.*

Key	Function
F1	ZERO key
F2	GROSS/NET key
F3	TARE key
F4	UNITS key
F5	PRINT key
F6	Softkey 1
F7	Softkey 2
F8	Softkey 3
F9	Softkey 4
F10	Softkey 5
F11	*Not used*
F12	
Print Screen	Same as PRINT key, in both normal and setup modes

Table 10-5. PS/2 Keyboard Functions

10.4 Serial Scale Interface

Serial ports 3 through 32 can be configured for serial scale input. The serial scale function allows other scale indicators to send gross, net, or tare weight data to the *920i*. Once a serial port has been configured to accept scale data, the data format can be customized to match the data stream sent by that indicator.

To configure a serial scale, do the following:

1. Under the SERIAL menu, set the INPUT parameter for the selected port to SCALE.
2. Return to the SCALES menu. Under CONFIG, drop down and select the serial port. If the serial scale is not shown, press the Change Type softkey to select available serial scales, then use the navigational keys to select the serial scale. Press Add to move the scale to the righthand column, the press Done.
3. Under the SERIAL menu, return to the selected port and set the format under the SFMT parameter to match the format sent by the serial scale.

The default serial scale format is:

<2><P><W7.><U><M><S><CR><LF>

where:

<2>	STX character
<P>	Polarity
<W7.>	Seven bits of net data with decimal point
<M>	Mode
<U>	Units
<S>	Status
<CR>	Carriage return
<LF>	Line feed

See Section 10.5 for information about stream formatting and format identifiers.

iRev provides several preset scale formats within its Stream Formatting function. Figure 10-1 shows one of the *iRev* stream formatting displays.

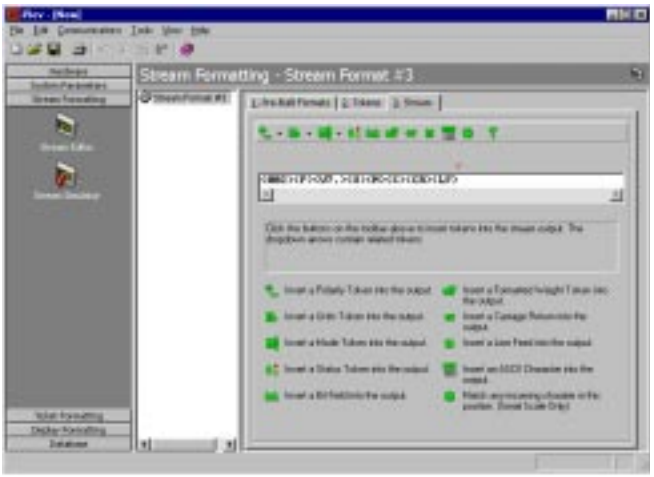


Figure 10-1. iRev Stream Formatting Display

10.5 Custom Stream Formatting

Each port can be independently configured to stream a default frame format or can be customized to stream a user-defined format. Custom formatting is very similar to the standard print formatting described in Section 6.0.

Table 10-6 on page 92 lists the format identifiers used to configure a custom stream format. See Section 10.6 on page 94 for examples of custom stream formats.

Format Identifier	Defined By	Description
<P[G | N | T]>	STR.POS#*n* STR.NEG#*n*	Polarity. Specifies positive or negative polarity for the current or specified (Gross/Net/Tare) weight on the source scale. Possible values are SPACE, NONE, + (for STR.POS#*n*), or – (for STR.NEG#*n)*
<U[P | S | T]>	STR.PRI#*n* STR.SEC#*n* STR.TER#*n*	Units. Specifies primary, secondary, or tertiary units for the current or specified weight on the source scale.
<M[G | N | T]>	STR.GROSS#*n* STR.NET#*n* STR.TARE#*n*	Mode. Specifies gross, net, or tare weight for the current or specified weight on the source scale.
<S>	STR.MOTION#*n* STR.RANGE#*n* STR.OK#*n* STR.INVALID#*n*	Status for the source scale. Default values and meanings for each status: STR.MOTION#*n* M In motion STR.RANGE#*n* O Out of range STR.OK#*n* <*space*> OK STR.INVALID#*n* I Invalid
<B [–]n,…]	*See descriptions below*	Bit fields. Comma-separated sequence of bit field specifiers. Must not exceed 8 bits. Minus sign ([–]) reverses the bit order.
B0	—	Always 0
B1	—	Always 1
B2	Configuration	=1 if even parity
B3	Dynamic	=1 if MODE=NET
B4	Dynamic	=1 if COZ
B5	Dynamic	=1 if standstill
B6	Dynamic	=1 if gross negative
B7	Dynamic	=1 if out of range
B8	Dynamic	=1 if secondary/tertiary
B9	Dynamic	=1 if tare in system
B10	Dynamic	=1 if tare is keyed
B11	Dynamic	=00 if MODE=GROSS =01 if MODE=NET =10 if MODE=TARE =11 (*not used*)
B12	Dynamic	=00 if UNITS=PRIMARY =01 if UNITS=SECONDARY =10 if UNITS=TERTIARY =11 (*not used*)
B13	Configuration	=00 (*not used*) =01 if current DSPDIV=1 =10 if current DSPDIV=2 =11 if current DSPDIV=5
B14	Configuration	=00 (*not used*) =01 if primary DSPDIV=1 =10 if primary DSPDIV=2 =11 if primary DSPDIV=5
B15	Configuration	=00 (*not used*) =01 if secondary DSPDIV=1 =10 if secondary DSPDIV=2 =11 if secondary DSPDIV=5

Table 10-6. Custom Stream Format Identifiers

Format Identifier	Defined By	Description
B16	Configuration	=00 (*not used*) =01 if tertiary DSPDIV=1 =10 if tertiary DSPDIV=2 =11 if tertiary DSPDIV=5
B17	Configuration	=000 if current DECPNT=8888800 =001 if current DECPNT=8888880 =010 if current DECPNT=8888888 =011 if current DECPNT=888888.8 =100 if current DECPNT=88888.88 =101 if current DECPNT=8888.888 =110 if current DECPNT=888.8888 =111 if current DECPNT=88.88888
B18	Configuration	=000 if primary DECPNT=8888800 =001 if primary DECPNT=8888880 =010 if primary DECPNT=8888888 =011 if primary DECPNT=888888.8 =100 if primary DECPNT=88888.88 =101 if primary DECPNT=8888.888 =110 if primary DECPNT=888.8888 =111 if primary DECPNT=88.88888
B19	Configuration	=000 if secondary DECPNT=8888800 =001 if secondary DECPNT=8888880 =010 if secondary DECPNT=8888888 =011 if secondary DECPNT=888888.8 =100 if secondary DECPNT=88888.88 =101 if secondary DECPNT=8888.888 =110 if secondary DECPNT=888.8888 =111 if secondary DECPNT=88.88888
B20	Configuration	=000 if tertiary DECPNT=8888800 =001 if tertiary DECPNT=8888880 =010 if tertiary DECPNT=8888888 =011 if tertiary DECPNT=888888.8 =100 if tertiary DECPNT=88888.88 =101 if tertiary DECPNT=8888.888 =110 if tertiary DECPNT=888.8888 =111 if tertiary DECPNT=88.88888
<*wspec* [–] [0] *digit*[[.]*digit*]>	Scale weight	Weight for the source scale. *wspec* is defined as follows: *wspec* Indicates whether the weight is the current displayed weight (W, w), gross (G, g), net (N, n), or tare (T, t) weight. Upper-case letters specify right-justified weights; lower-case are left-justified. Optional /P, /S, or /T suffixes can be added before the ending delimiter (>) to specify weight display in primary (/P), secondary (/S), or tertiary (/T) units. [–] Enter a minus sign (–) to include sign for negative values. [0] Enter a zero (0) to display leading zeroes. *digit*[[.][.]*digit*] The first digit indicates the field width in characters. Decimal point only indicates floating decimal; decimal point with following digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals send the decimal point even if it falls at the end of the transmitted weight field.
<CR>	—	Carriage return
<LF>	—	Line feed

Table 10-6. Custom Stream Format Identifiers

10.6 Stream Formatting Examples

10.6.1 Toledo 8142 Indicator

Sample string for Toledo 8142 indicator (with no checksum):

<STX><*Status Word A*><*Status Word B*><*Status Word C*><*wwwwww*><*tttttt*><EOL>

String recognized by the *920i*:

<02><B2, B0, B1, B13, B17><B2, B0, B1, B8, B5, B7, B6, B3><B2, B0, B1, B0, B0, B0, B0, B0><W06><T06><CR>

Identifier	*920i* Stream Format
<STX>	The STX character is entered into the string using the <02> hex value.
<*Status Word A*>	Toledo status words are made up of various bit fields which are replaced by the *920i* format identifiers listed in Table 10-6 on page 92. **NOTE:** *Identifiers must be entered beginning with the high-order bit (bit 7–bit0) of the Toledo status word.* *Status Word A* contains the following fields. Equivalent *920i* format identifiers are shown in parentheses. Bit 7: parity (*920i* bit field B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bits 3–4: display divisions (B13) Bits 0–2: decimal format (B17)
<*Status Word B*>	*Status Word B* contains the following fields. Equivalent *920i* format identifiers are shown in parentheses. Bit 7: parity (*920i* bit field B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bit 4: lb/kg units (B8) Bit 3: stable/motion (B5) Bit 2: in/out-of-range (B7) Bit 1: pos/neg (B6) Bit 0: gross/net (B3)
<*Status Word C*>	*Status Word C* contains the following fields. Equivalent *920i* format identifiers are shown in parentheses. Bit 7: parity (*920i* bit field B2) Bit 6: always 0 (B0) Bit 5: always 1 (B1) Bits 0–4: always 0 (B0)
<*wwwwww*>	The <W06> and <T06> indicate six digits of indicated weight and tare weight with leading zeroes. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G–gross weight, N–net weight, T–tare weight. /P, /S, and /T can be used to specify primary, secondary, or tertiary units. Minus (–) indicates sign inclusion; (0) indicates leading zeros. First digit indicates field width in characters; a decimal point (.) indicates floating decimal point. A decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<*tttttt*>	Tare weight. See description above.
<EOL>	<CR> is entered at the end of the string as the end of line character in this example.

Table 10-7. Toledo Sample String Identifiers

10.6.2 Cardinal 738 Indicator

Sample string for the Cardinal 738 indicator:

<CR><POL><*wwwwww*><S><SP><*units*><SP><G/N><SP><SP><EOL>

String recognized by the *920i*:

<CR><P><W06..><S><SP><U><SP><M><SP2><03>

Identifier	*920i* Stream Format
<CR>	Carriage Return
<POL>	Cardinal uses + for positive and – for negative, so the stream polarity tokens need to reflect this. The serial commands for the *920i* are STR.POS#p=+ and STR.NEG#p=–.
<*wwwwww*>	The <W06..> identifier that the *920i* recognizes indicates six digits of weight with a decimal and leading zeroes, with the decimal sent at the end of the weight. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G–gross weight, N–net weight, T–tare weight. /P, /S, and /T can be used to specify primary, secondary, or tertiary units. Minus (–) indicates sign inclusion; (0) indicates leading zeros. First digit indicates field width in characters; a decimal point (.) indicates floating decimal point. A decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<S>	There are four possible tokens for status bits that can be used: motion, out-of-range, valid, and invalid. In the Cardinal, m indicates motion, o indicates out-of-range; a space is used for valid or invalid weights. The commands to set these tokens in the *920i* are STR.MOTION#*p*=m, STR.RANGE#*p*=o, STR.OK#*p*= , STR.INVALID#*p*= . NOTE: A space must be entered following the equals sign on the OK and INVALID serial commands.
<SP>	Space
<*units*>	The Cardinal uses two-character, lower-case units identifiers. The commands to set these tokens in the *920i* include: STR.PRI#*p*=lb (options: kg, g, tn, t, gr, oz, or sp), STR.SEC#*p*=kg and STR.TER#*p*=kg (options: lb, g, tn, t, gr, oz, or sp).
<SP>	Space
<*g/n*>	The mode used for Cardinal is *g* for gross and *n* for net. These tokens are set using the STR.GROSS#*p*=g and STR.NET#*p*=n tokens.
<SP>	Space
<SP>	Space
<EOL>	The end of line character is an ETX in this example, so the hex value of <03> is entered in the string.

Table 10-8. Cardinal Sample String Identifiers

10.6.3 Weightronix WI -120 Indicator

Sample string for the Weightronix WI-120 indicator:

<SP><G/N><POL><*wwwwww*><SP><*units*><EOL>

String recognized by the *920i*:

<SP><M><P><W06.><SP><U><CR><LF>

Identifier	*920i* Stream Format
<SP>	Space
<G/N>	The mode used for Weightronix is *G* for gross and *N* for net. These tokens are set using the STR.GROSS#*p*=G and STR.NET#*p*=N tokens.
<POL>	Since the Weightronix uses + for positive and – for negative, the polarity tokens need to reflect this. The serial commands for the *920i* are STR.POS#*p*=+ and STR.NEG#*p*= –.
<*wwwwww*>	The <W06.> that the *920i* recognizes indicates six digits of weight with a decimal and leading zeroes. Valid characters are W, w, G, g, T, t, N, or n (lower case indicates left justified). W indicates current weight, G–gross weight, N–net weight, T–tare weight. /P, /S, and /T can be used to specify primary, secondary, or tertiary units. Minus (–) indicates sign inclusion; (0) indicates leading zeros. First digit indicates field width in characters; a decimal point (.) indicates floating decimal point. A decimal with subsequent digit indicates fixed decimal with *n* digits to the right of the decimal. Two consecutive decimals (for example, <W06..>) send the decimal point even if it falls at the end of the transmitted weight field.
<SP>	Space
<*units*>	The Weightronix uses two-character, lower-case units identifiers. The commands to set these tokens in the *920i* include: STR.PRI#*p*=lb (options: kg, g, tn, t, gr, oz, or sp), STR.SEC#*p*=kg (options: lb, g, tn, t, gr, oz, or sp).
<EOL>	<CR> or <CR> and <LF>

Table 10-9. Weightronix Sample String Identifiers

10.7 Data Formats

Continuous Output Serial Data Format

If continuous transmission is configured for a serial port (STREAM parameter set to LFT or INDUST on the SERIAL menu), the *920i* sends data using the Consolidated Controls serial data format shown in Figure 10-2:

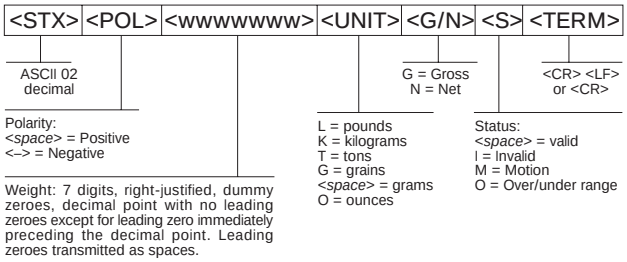


Figure 10-2. Continuous Output Serial Data Format

NOTE: *If the scale capacity is exceeded, the weight data field is replaced with >>>>>>> characters. If the display capability of the indicator is exceeded, the weight field is replaced with* VERFLOW *("overflow"). Both errors set the <S> status data field to "I".*

Demand Output Serial Data Format

When demand mode is configured for the serial port (STREAM parameter set to OFF), the *920i* uses a data string formatted for a basic ticket printout. The particular ticket format printed depends on the indicator configuration.

You can customize the ticket to work with a wide variety of printers, scoreboard displays, and other remote equipment. See Section 6.0 on page 47 for more information on custom print formats.

RS-485 Data Formats

Two-wire RS-485 communications is available on port 3 of the CPU board; four-wire RS-485 communications is supported on the "A" ports of any installed serial expansion cards.

The *920i* 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 10-3:

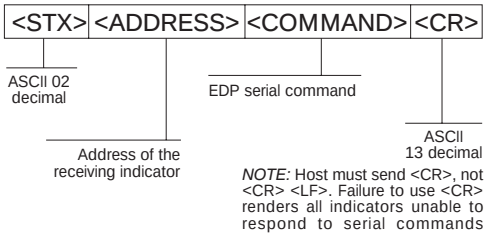


Figure 10-3. RS-485 Send Data Format

If the initiating device address matches the port address of an *920i* 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 10-4:

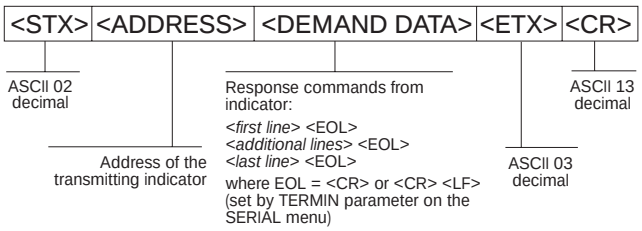


Figure 10-4. RS-485 Respond Data Format

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 10-3.

- The keyboard equivalent for the start-of-text (STX) character is CONTROL-B.
- 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 10-4:

```
<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 serial port, the *920i* sends data using the data format shown in Figure 10-5:

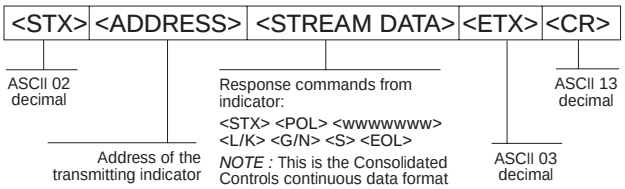


Figure 10-5. RS-485 Continuous Data Format

10.8 ASCII Character Chart

Use the decimal values for ASCII characters listed in Tables 10-10 and 10-11 when specifying print format strings under the *920i* PFORMT menu. The actual character printed depends on the character mapping used by the output device.

The *920i* can send or receive any ASCII character value (decimal 0–255). Due to limitations of the indicator display, some characters cannot be shown.

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

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

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

Table 10-11. ASCII Character Chart (Part 2)

10.9 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.

DIGFL*x* Parameters

The first three digital filtering parameters, DIGFLT1, DIGFLT2, and DIGFLT3, 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 filter stages:

DIGFLT1 + DIGFLT2 + DIGFLT3

For example, if the filters are configured as DIGFLT1=16, DIGFLT2=4, and DIGFLT3=4, the overall filtering effect is 24 (16 + 4 + 4). 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–DIGFLT3) 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 (10000 x 5 lb) 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 / display_divisions

   In the example in Step 2, with a threshold weight value of 50 lb and a display divisions value of 5 lb: *50 / 5 = 10.* DFTHRH should be set to 10D 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.

10.10 Conversion Factors for Secondary Units

The *920i* 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 and tertiary units can be specified on the FORMAT menu using the SECNDR and TERTIA parameters, or by using serial commands.

- To configure secondary or tertiary units using the front panel menus, use the Table 10-12 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 or tertiary units using serial commands, use the Table 10-12 to find the conversion multiplier for the SC.SEC.MULT or SC.TER.MULT command. For example, if the primary unit is pounds and the secondary unit is short tons, send the serial command SC.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 displays 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/ Tertiary 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
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

Table 10-12. Conversion Factors

Primary Unit	*x Multiplier*	Secondary/ Tertiary Unit
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

Table 10-12. Conversion Factors (Continued)

Primary Unit	*x Multiplier*	Secondary/ Tertiary Unit
long tons	2240.00	pounds
	1016.05	kilograms
	1.12000	short tons
	1.01605	metric tons
troy ounces	480	grains
	31.10348	grams
	0.031103	kilograms
	1.09714	ounces
	0.068571	pounds
	0.083333	troy pounds
troy pounds	5760	grains
	373.2417	grams
	0.373242	kilograms
	13.16571	ounces
	0.822857	pounds
	12	troy ounces

Table 10-12. Conversion Factors (Continued)

10.11 Dimension Drawings

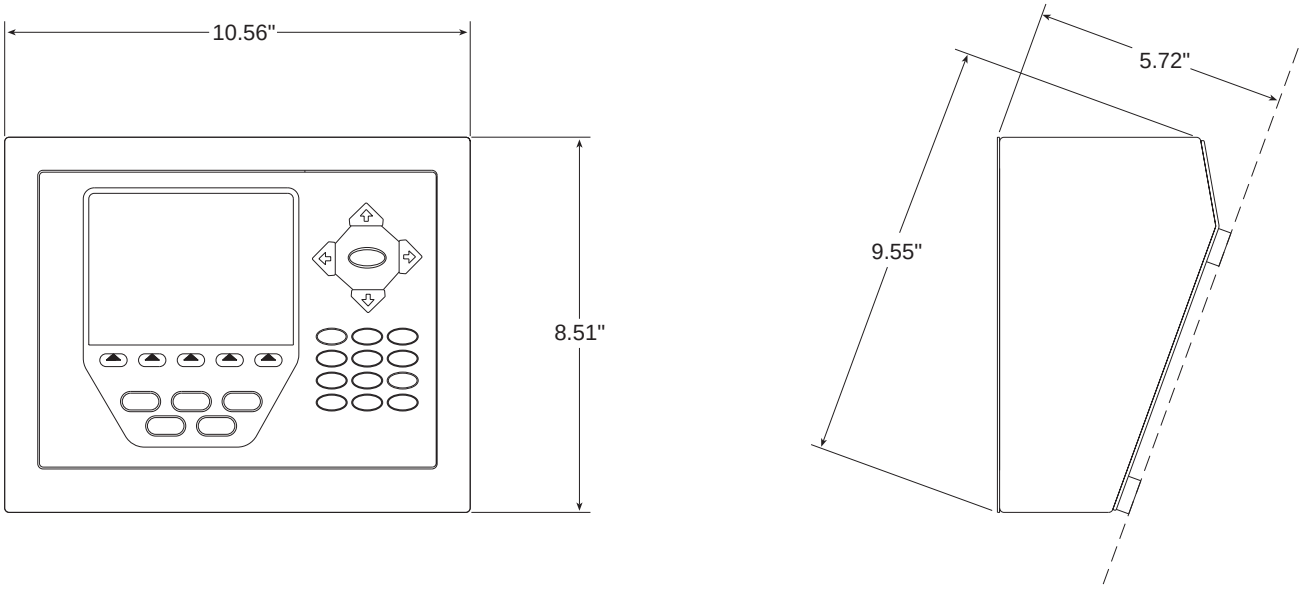


Figure 10-6. Desktop Model Dimensions

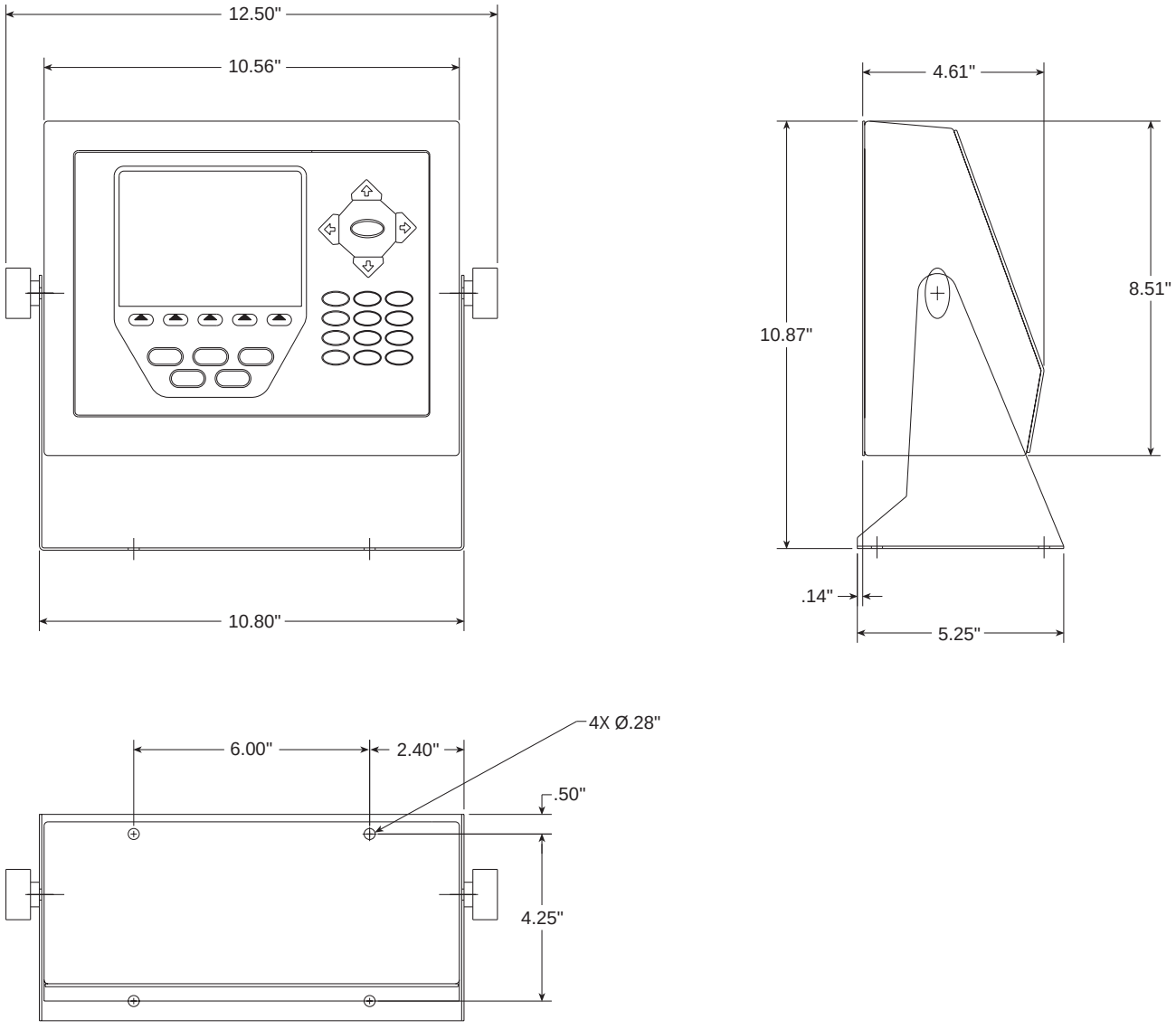


Figure 10-7. Universal Model Dimensions

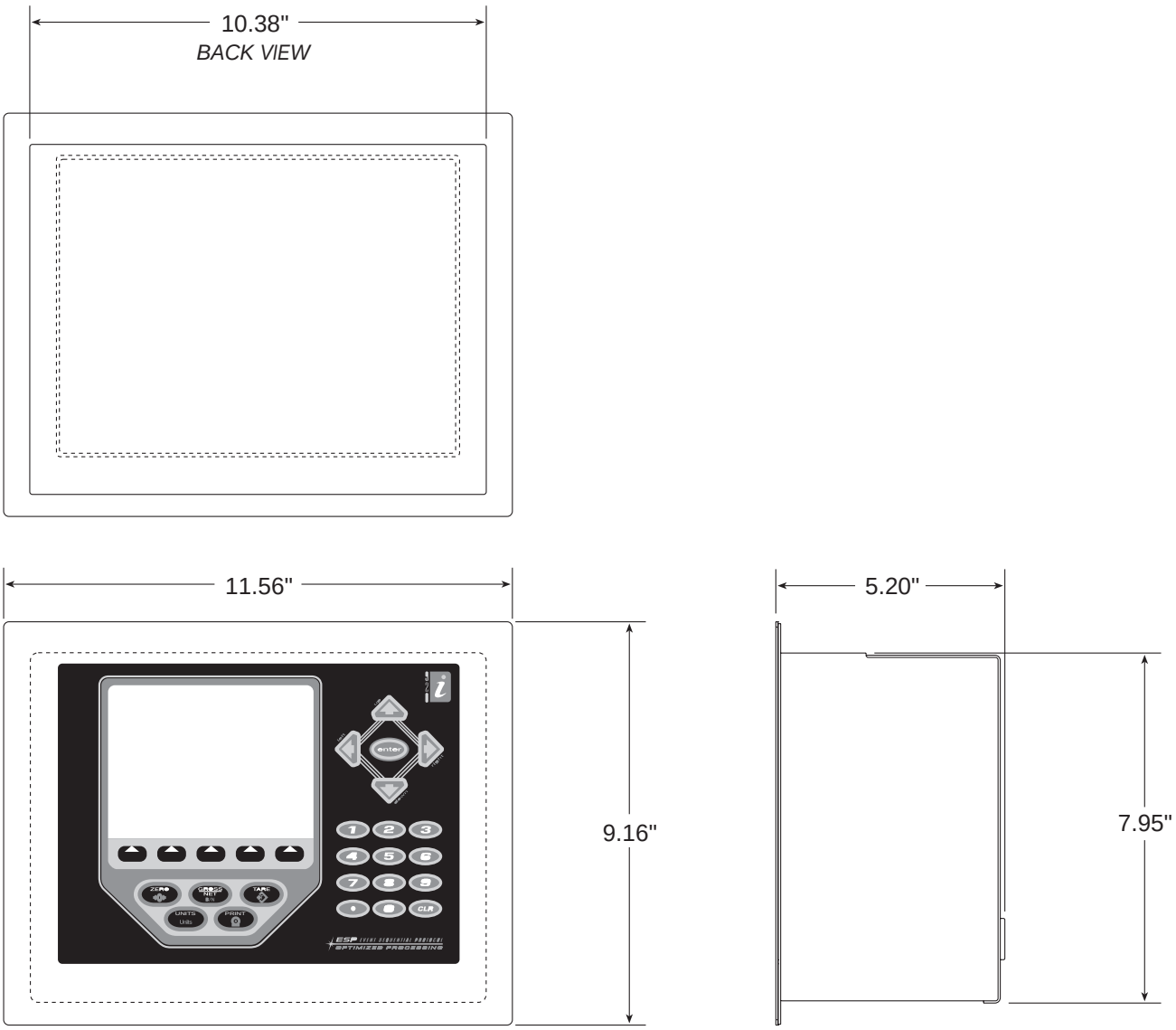


Figure 10-8. Panel Mount Model Dimensions

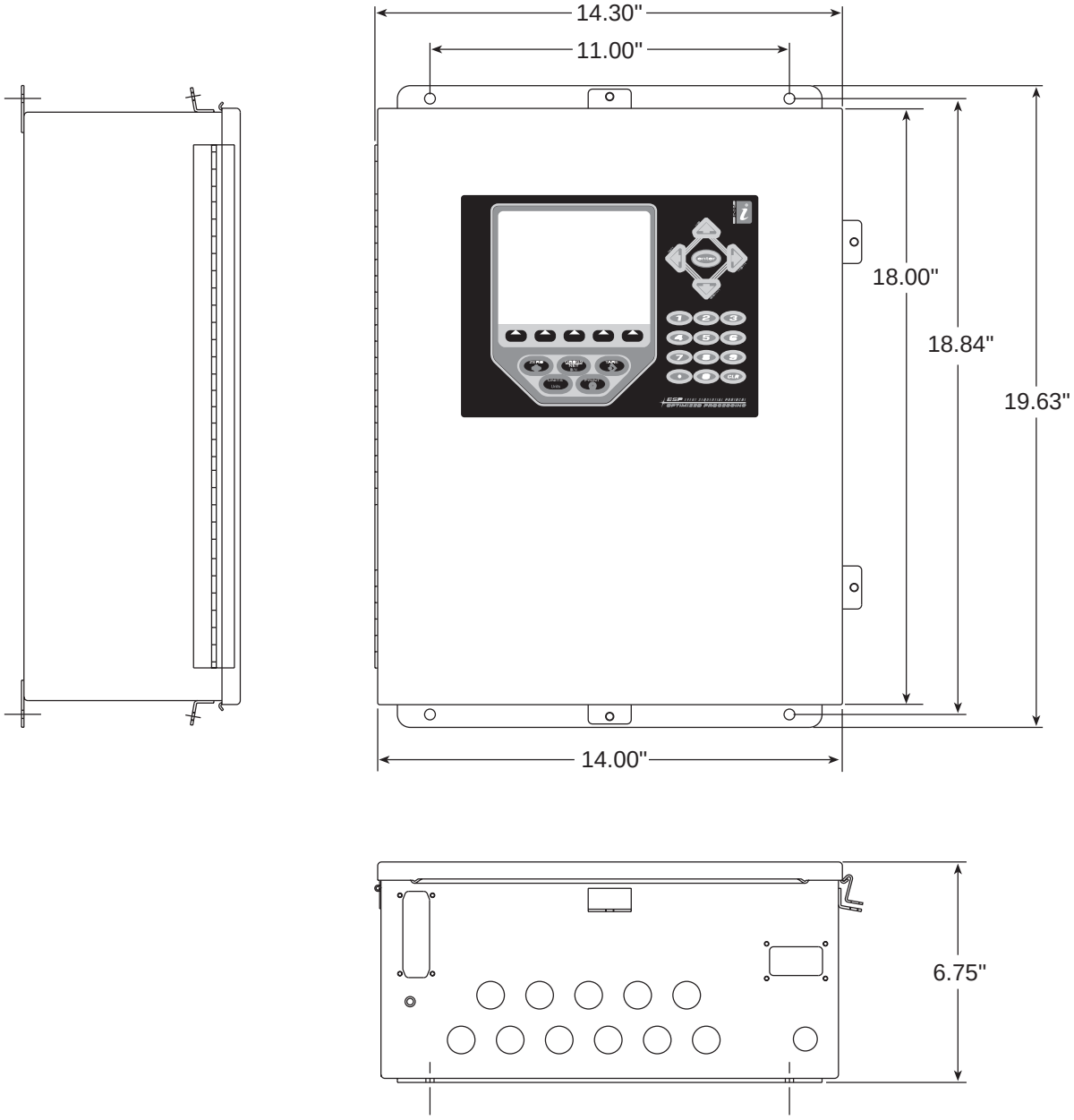


Figure 10-9. Wall Mount Model Dimensions

10.12 Printed Information

System Manuals

- *920i Installation Manual*, PN 67887
- *iRite™ Programming Reference*, PN 67888

Enclosures

- *920i Panel Mount Installation Instructions*, PN 69989
- *920i Wall Mount Installation Instructions*, PN 69988

Expansion Boards

- *Two-Card Expansion Board Installation Instructions*, PN 71284
- *Six-Card Expansion Board Installation Instructions*, PN 71285

Option Cards

- *920i Analog Output Card Installation Instructions*, PN 69089
- *920i Single-Channel A/D Card Installation Instructions*, PN 69092
- *920i Dual-Channel A/D Card Installation Instructions*, PN 69090
- *920i 24-Channel Digital I/O Expansion Card Installation Instructions*, PN 69087
- *920i Dual-Channel Serial Expansion Card Installation Instructions*, PN 69088
- *920i Pulse Input Card Installation Instructions*, PN 69086
- *920i Memory Expansion Card Installation Instructions*, PN 69085

Communications Options (*520/920i*)

- *DeviceNet™ Interface Installation and Programming Manual*, PN 69949
- *Profibus® DP Interface Installation and Programming Manual*, PN 69948
- A*llen-Bradley® Remote I/O Interface Installation and Programming Manual*, PN 69950
- *Ethernet Communications Card Installation Instructions*, PN 72117

10.13 Specifications

Power

Line Voltages	115 or 230 VAC
Frequency	50 or 60 Hz
Power Consumption (desktop and universal models, 32 x 350Ω load cells)	
115 VAC	400 mA (46 W)
230 VAC	250 mA (58 W)
Fusing	
115 VAC	2 x 2A TR5 subminiature fuses Wickmann Time-Lag 19374 Series UL Listed, CSA Certified and Approved
230 VAC	2 x 2A TR5 subminiature fuses Wickmann Time-Lag 19374 Series UL Recognized, Semko and VDE Approved

A/D Specifications

Excitation Voltage	10 ± 0.5 VDC, 16 x 350Ω or 32 x 700Ω load cells per A/D card
Sense Amplifier	Differential amplifier with 4- and 6-wire sensing
Analog Signal Input Range	–10 mV to +70 mV
Analog Signal Sensitivity	0.3 μV/grad minimum @ 7.5 Hz 1.0 μV/grad typical @ 120 Hz 4.0 μV/grad typical @ 960 Hz
A/D Sample Rate	7.5–960 Hz, software selectable
Input Impedance	>35 MΩ typical
Internal Resolution	8 000 000 counts
Wt Display Resolution	9,999,999
Input Sensitivity	10 nV per internal count
System Linearity	±0.01% of full scale
Zero Stability	±150 nV/°C, maximum
Span Stability	± 3.5 ppm/°C, maximum
Input Voltage Differential	±800 mV referenced to earth ground
Input Overload	Load cell signal lines ±10 V continuous, ESD protected
RFI/EMI Protection	Communications, signal, excitation, and sense lines protected

Digital Specifications

Microcomputer	Motorola ColdFire® MCF5307 main processor @ 90 MHz
Digital I/O	4 I/O channels on CPU board; optional 24-channel I/O expansion cards available
Digital Filter	Software selectable: 1–256, enhanced Rattletrap® hybrid digital filtering

Serial Communications

Serial Ports	4 ports on CPU board support up to 115200 bps; optional dual-channel serial expansion cards available
Port 1	Full duplex RS-232
Port 2	RS-232 with CTS/RTS; PS/2 keyboard interface via DB-9 connector
Port 3	Full duplex RS-232, 20 mA output
Port 4	Full duplex RS-232, 2-wire RS-485, 20 mA output

Operator Interface

Display	320x240 pixel VGA LCD display module with adjustable contrast, 75Hz scan rate 26000 cd/m^2 brightness
Keyboard	27-key membrane panel, PS/2 port for external keyboard connection

Environmental

Operating Temperature	
Legal	–10 to +40°C (14 to 104°F)
Industrial	–10 to +40°C (14 to 104°F)
Storage Temperature	–10 to +70°C (14 to 158°F)
Humidity	0–95% relative humidity

Enclosure

Enclosure Dimensions	
Desktop enclosure	10.5 in x 4.5 in x 8.5 in 267 mm x 114 mm x 216 mm
Universal enclosure (with tilt stand)	10.5 in x 11.5 in x 4.5 in 267 mm x 292 mm x 114 mm
Panel mount enclosure	11.5 in x 9.1 in x 5 in 292 mm x 231 mm x 127 mm
Wall mount enclosure	14 in x 18 in x 6.75 in 356 mm x 457 mm x 171 mm
Weight	
Desktop enclosure	7.8 lb (3.5 Kg)
Universal enclosure	9.5 lb (4.3 Kg)
Panel mount enclosure	8.5 lb (3.9 Kg)
Wall mount enclosure	23 lb (10.4 Kg)
Rating/Material	NEMA 4X/IP66, stainless steel

Certifications and Approvals

NTEP

CoC Number	01-088	
Accuracy Class	III/IIIL	n_{max} : 10 000

Measurement Canada

Approval	AM-5426	
Accuracy Class	III	n_{max} : 10 000

UL

Desktop and universal models
File Number: E151461

Panel mount model
File Number: E151461, Vol 2

Wall mount model
UL 508A control panel approved
File Number: E207758

OIML

GB-1140	n_{max} : 6 000
GB-1135	n_{max} : 10 000

CE

920i 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.

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

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

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

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF RLWS AND THE BUYER.

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