

SURVIVOR® 390HE

Digital Weight Indicator

Version 1.0

Installation Manual



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About This Manual

This manual is intended for use by service technicians responsible for installing and servicing 390HE digital weight indicators.

Configuration and calibration of the indicator can be accomplished using the indicator front panel keys, the EDP command set, or the Revolution™ configuration utility. See Section 3.1 on page 8 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.

1.0 Introduction

The 390HE is a single-channel digital weight indicator housed in a NEMA 4X fiberglass reinforced polyester (FRP) enclosure. The indicator front panel consists of a 1-inch (25 mm), six-digit, liquid crystal (LCD) display and a five-button keypad. Features include:

- Drives up to four 350Ω or eight 700Ω load cells
- Supports 4- and 6-wire load cell connections
- Electronic data processing (EDP) port for full duplex, RS-232 communications at up to 19200 bps
- Piece count mode for basic parts counting functions.

The 390HE is NTEP-certified for Classes III and III L at 10,000 divisions.

1.1 Operating Modes

The 390HE has several modes of operation:

Normal (weighing) mode

Normal mode is the “production” mode of the indicator. The indicator displays gross or net weights as required, using the LCD annunciators described in Section 1.3 on page 2 to indicate scale status and the type of weight value displayed. Once configuration is complete and a legal seal is affixed to the back of the indicator, the 390HE can operate only in normal mode.



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

The *Operator Card* included with this manual provides basic operating instructions for users of the 390HE. Please leave the *Operator Card* with the indicator when installation and configuration are complete.

Piece count mode

In piece count mode, the indicator display shows the number of parts on the scale rather than the weight of those parts. Piece count mode has two submodes:

- Count display mode displays the current parts count and allows ticket printing using the CFMT print format.
- Sample acquisition mode is used to calibrate the indicator for parts counting.

Operator access to piece count mode is disabled when the indicator is shipped from the factory. See Section 6.0 on page 26 for detailed information about counting operations.

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, open the enclosure and press the setup switch mounted on the end of the pushbutton switch board. The indicator display changes to show the word *CONFIG*.

Test mode

Test mode provides a number of diagnostic functions for the 390HE indicator. Like setup mode, test mode is entered using the setup switch. See Section 8.7 on page 36 for more information about entering and using test mode.

1.2 Front Panel Keypad

Figure 1-1 shows the 390HE front panel keys and the key functions assigned in normal mode.

The symbols shown above the keys in Figure 1-1 (representing up, down, enter, left, right) describe the key functions assigned in setup mode. In setup mode, the keys are used to navigate through menus, select digits within numeric values, and increment/decrement values. See Section 3.1.3 on page 9 for information about using the front panel keys in setup mode.

Labels under the keys in Figure 1-1 describe the key functions used in piece count mode. See Section 6.0 on page 26 for more information about counting operations.

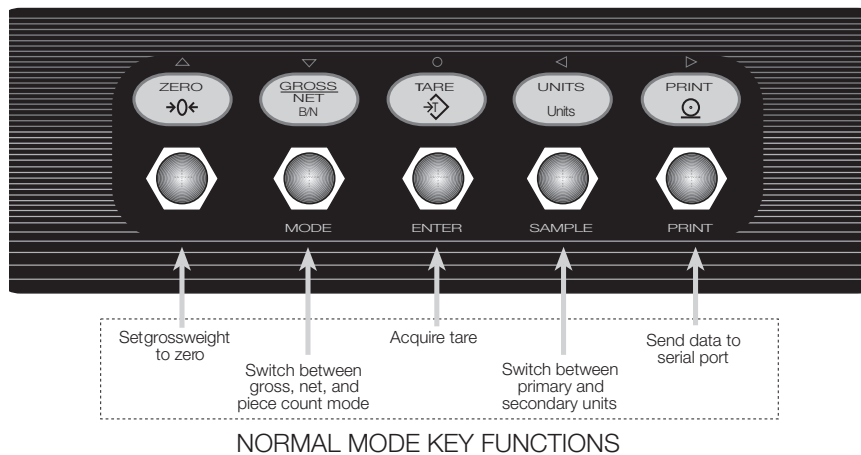


Figure 1-1. Front Panel Key Functions in Normal Mode

1.3 Display Annunciators

The 390HE display uses a set of LCD annunciators to provide additional information about the value being displayed. Figure 1-2 on page 3 shows these annunciators and their meanings.

G The displayed weight is a gross weight.

N The displayed weight is a net weight.



Scale is at standstill or within the specified motion band. Some operations, including zero, tare, and printing functions, can only be done when the standstill symbol is shown.



Center of zero. Gross weight is within 0.25 graduations of zero. This annunciator lights when the scale is zeroed.



Indicates that a tare has been entered. The tare value can be entered by pressing the **TARE** key on the keypad or by sending the **KTARE** EDP command. See Section 5.0 on page 22 for information about the EDP command set.

lb, kg, PC

Three arrow annunciators on the right side of the LCD display indicate the units associated with the displayed value. The bottom arrow annunciator (PC) is lit when the indicator is in piece count mode. The top and middle arrows, labeled lb and kg, show primary and secondary units, as described below:

- If the displayed weight is in pounds, the top arrow (lb) is lit; if kilograms, the middle arrow (kg) is lit.
- If the primary unit of weight is pounds, the middle (kg) arrow is lit for secondary units—or, if the primary unit is kilograms, the top (lb) arrow is lit for secondary units, unless the secondary unit of weight is the same as the primary unit.
- If neither primary nor secondary units are pounds or kilograms, the top arrow is used as a primary units annunciator and the middle arrow is used as the secondary units annunciator. A set of replacement overlay decals is included in the parts kit for units other than pounds and kilograms.

See Section 3.2.2 on page 13 for information about configuring primary and secondary display units.

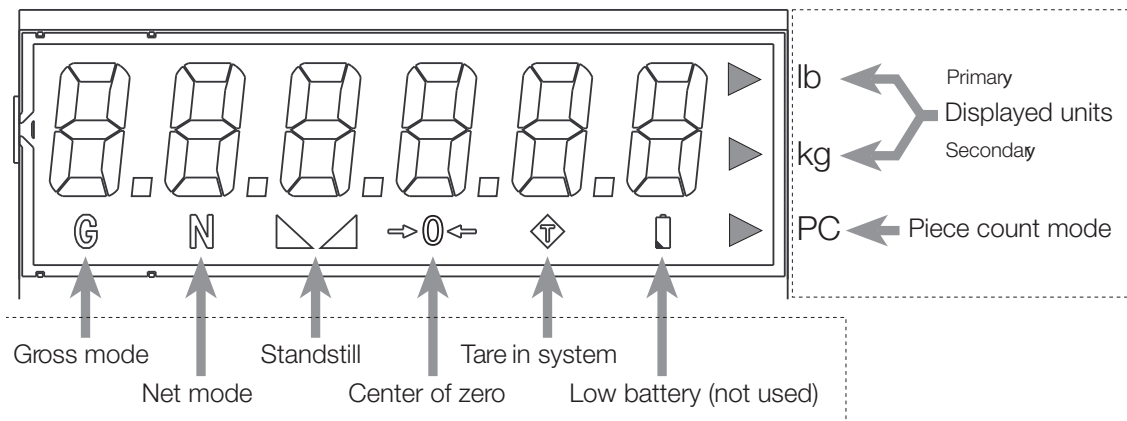


Figure 1-2. 390HE Display Annunciators

1.4 Indicator Operations

Basic 390HE operations are summarized below:

1.4.1 Toggle Gross/Net/Piece Count Mode

Press the **GROSS/NET** key to switch the display mode between gross, net, and piece count modes. If a tare value has been entered or acquired, the net value is the gross weight minus the tare. If access to piece count mode is disabled, pressing the **GROSS/NET** key switches between gross and net modes only.

Gross mode is shown by the **G** annunciator; net mode is shown by the **N** annunciator. Piece count mode is shown by the LCD annunciator adjacent to the **PC** at the right edge of the display.

1.4.2 Toggle Units

Press the **UNITS** key to switch between primary and secondary units. The units annunciator arrow on the right side of the LCD display points to the units identifier.

1.4.3 Zero Scale

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

1.4.4 Acquire Tare

1. Place container on scale and wait for the standstill annunciator (▲▲).
2. Press the **TARE** key to acquire the tare weight of the container.
3. Net weight is displayed and the **T** annunciator lit to show the tare value was acquired.

1.4.5 Remove Stored Tare Value

1. Remove all weight from the scale and wait for the standstill annunciator (▲▲).
2. Press the **ZERO** key. The **T** annunciator goes off, indicating the tare value has been removed.

1.4.6 Print Ticket

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

1.4.7 Acquire Parts Sample

1. Place empty parts container on scale. Wait for the standstill annunciator (▲▲), then press **TARE** to acquire the tare weight of the container.
2. Press **MODE** to enter piece count mode.
3. Press the **SAMPLE (UNITS)** key to enter sample acquisition mode.
4. The indicator display shows the message *Addnnn*, where *nnn* is the sample quantity to be placed on the scale. Add the number of parts shown or choose a different sample size by pressing the **SAMPLE** key to scroll through the selectable sample quantities (5, 10, 20, 50, 100).
5. Once the sample quantity is on the scale, press **ENTER** to calibrate the indicator for counting the new parts. The indicator display shows the message *-CNT-* as it acquires the sample weight, then switches to count display mode and shows the part quantity.

2.0 Installation

This section describes procedures for connecting load cell and serial communications cables to the 390HE indicator. Assembly drawings and parts lists are included for the service technician.

Caution

- Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.
- This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicator must be performed by qualified service personnel only.
- The supply cord serves as the power disconnect for the 390HE. 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 390HE 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.

The parts kit contains the items listed below:

- Identification label.
- Capacity and identification labels. Identification label (PN 49958) includes replacement overlay decals for indicators using units other than pounds and kilograms.
- 3-position (PN 15888) and 7-position (PN 23165) pluggable terminal blocks for load cell and serial communications connectors.

2.2 Enclosure Disassembly

The indicator enclosure must be opened to connect load cell and communications cables. Power-off the indicator and remove the screws that secure the enclosure cover. Open the cover; the CPU/display board is mounted to the enclosure cover.

2.3 Cable Connections

The 390HE provides three cord grips for cabling into the indicator: one each for the load cell cable, serial communications, and the AC power cord.

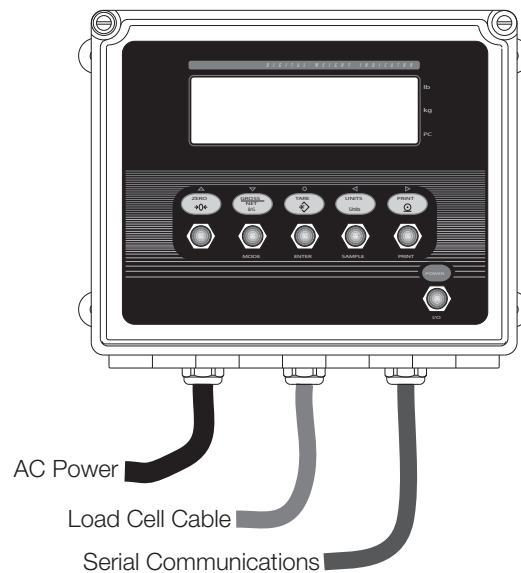


Figure 2-1. 390HE Cord Grip Assignments

2.3.1 Load Cells

To attach cable from a load cell or junction box, remove connector J1 from the board. The connector plugs into a header on the board. Connect cable from the load cell or junction box through the load cell cable cord grip to connector J1 as shown in Table 2-1. If using 6-wire load cell cable (with sense wires), remove jumpers JP1 and JP2 before reinstalling connector J1 (see Figure 2-2). For 4-wire installation, leave jumpers JP1 and JP2 on.

When connections are complete, reinstall connector J1 on the board.

| J1 Pin | Function |
|--------|--------------------------|
| 1 | +SIG |
| 2 | -SIG |
| 3 | +SENSE |
| 4 | -SENSE |
| 5 | SHIELD (nsee NOTE below) |
| 6 | +EXC |
| 7 | -EXC |

NOTES:

- J1 SHIELD wire connection not used. Use ring terminal to attach shield wire to grounded CPU board mounting screw next to the J1 connector.
- For 6-wire connections, remove jumpers JP1 and JP2.

Table 2-1. J1 Pin Assignments

2.3.2 Serial Communications

To attach serial communications cables, remove connector J2 from the board (see Figure 2-2). Connect communications cable through cord grip to connector J2 as shown in Table 2-2.

Once cables are attached, reconnect J2 to the header on the board.

The 390HE serial port supports full duplex RS-232 communications for connections to printers, PCs, and other attached devices. See Section 3.0 on page 8 for general configuration information; see Section 3.2.4 on page 16 for serial port configuration.

| J2 Pin | Function |
|--------|---------------|
| 1 | RS-232 TxD |
| 2 | RS-232 Ground |
| 3 | RS-232 RxD |

Table 2-2. J2 Pin Assignments

2.4 CPU Board Replacement

If you must remove the 390HE CPU board, use the following procedure:

1. Disconnect power to the indicator. Loosen cord grips and open enclosure.
2. Unplug all connections to the CPU board. See Figure 2-2 on page 5 for connector locations.
3. Remove the four nuts from the corners of the CPU board.
4. Remove the CPU board from the enclosure.

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

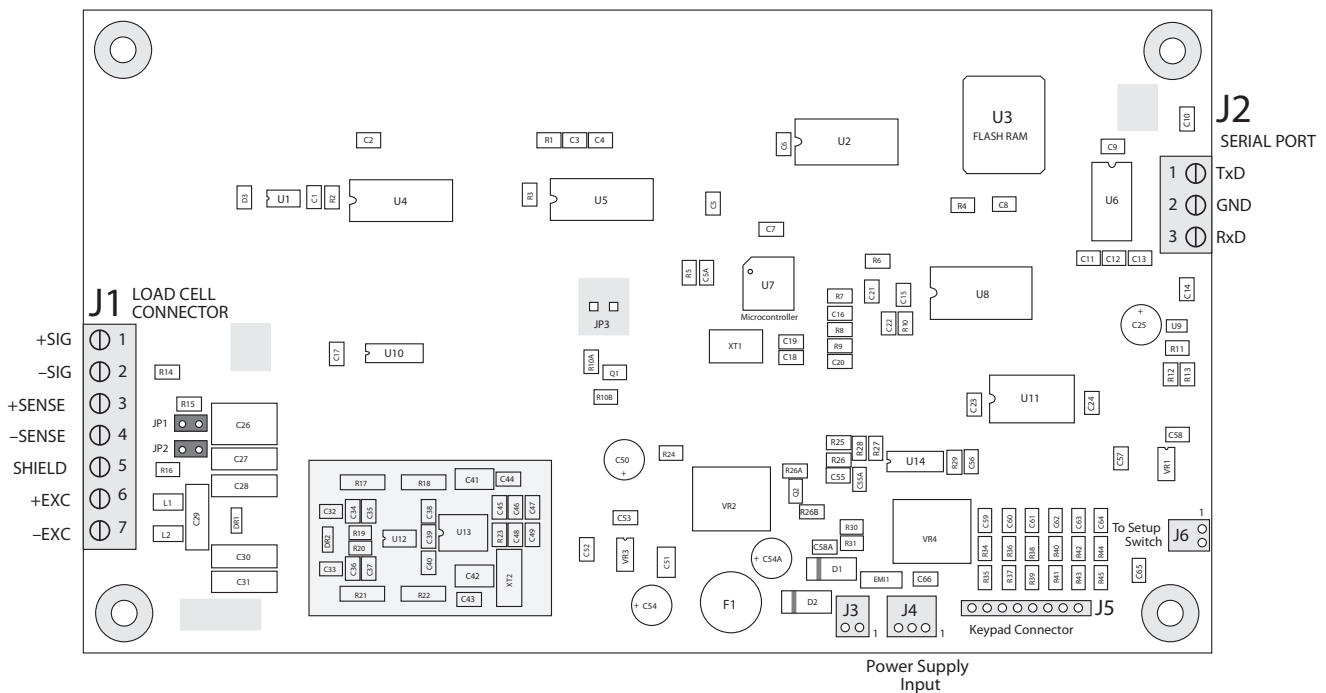


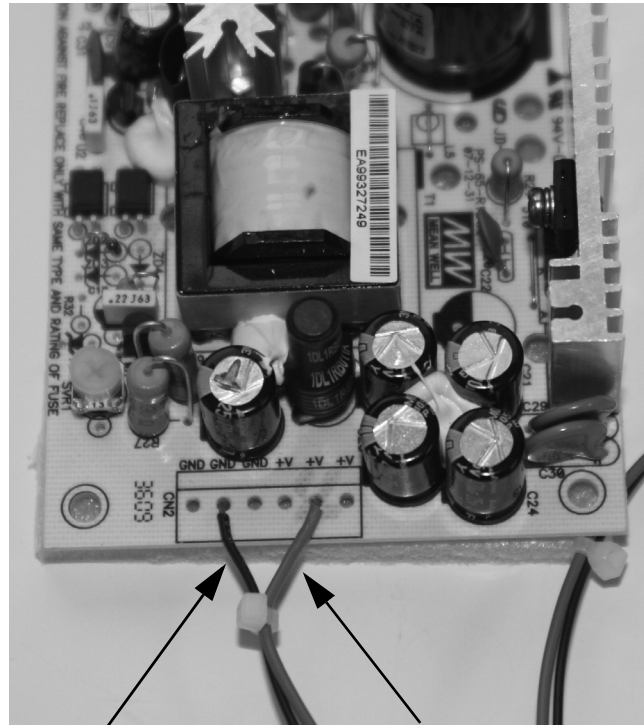
Figure 2-2. 390HE CPU Board

2.5 Replacement Parts

Table 2-3 lists replacement parts for the 390HE, including all parts referenced in Figure 2-4 on page 7.

| Ref Number | PN | Description (Quantity) |
|------------|--------|------------------------------------|
| 1 | 76272 | Display and CPU board assembly (1) |
| 2 | 14845 | Screws, 6-32NC x 3/8 (6) |
| 3 | 53539 | Pushbutton switch assembly (1) |
| 4 | 49910 | Setup switch assembly (1) |
| 5 | 14621 | Keyp nuts, 6-32NC hex (2) |
| 6 | 53835 | Setup switch bracket (1) |
| 7 | 100066 | Back panel (1) |
| 8 | 100065 | Power supply (1) |
| 9 | 53541 | Enclosure (1) |
| 10 | 15630 | Locknuts, 1/2 in, NPT (2) |
| 11 | 15895 | Pushbutton covers (5) |
| 12 | 53542 | Overlay (1) |
| 13 | 30376 | Nylon seal rings, 1/2 in, NPT (2) |
| 14 | 15626 | Cable grips, 1/2 in, NPT (3) |
| 15 | 78950 | Power cord (1) |
| 16 | 15602 | Ground wire (1) |
| 17 | 53844 | Keypad ribbon cable assembly (1) |
| 18 | 14626 | Number 8 Keyp nut (2) |
| 19 | 15134 | Number 8 lock washer (2) |
| 20 | 15374 | Standoffs for power supply (4) |
| 21 | 15650 | Cable tie mounts (5) |
| — | 15631 | Cable ties (5) |
| 22 | 19538 | Cable grip plug (1) |

Table 2-3. Replacement Parts



Black

Red

Figure 2-3. 390HE Power Supply

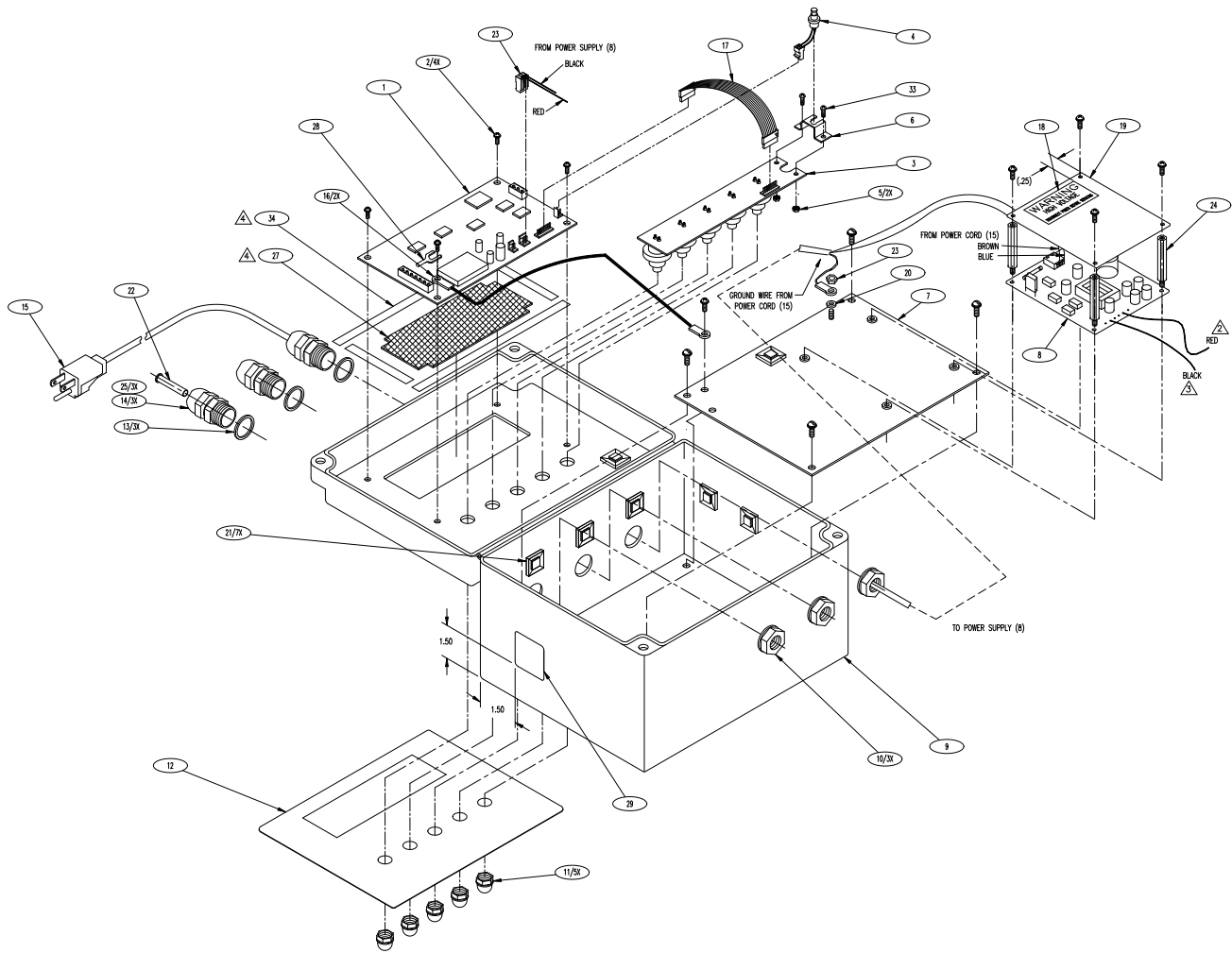


Figure 2-4. 390HE Assembly

3.0 Configuration

To configure the 390HE indicator, the indicator must be placed in setup mode. The setup switch is accessed by opening the enclosure cover and pressing the setup switch mounted on the end of the pushbutton switch board, next to the **ZERO** button. Press the switch once to enter setup mode, then close the cover and tighten the cover screws.

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

3.1 Configuration Methods

The 390HE indicator can be configured by using the front panel keys to navigate through a series of configuration menus or by sending commands or configuration data to the EDP port. Configuration using the menus is described in Section 3.1.3.

Configuration using the EDP port can be accomplished using either the EDP command set described in Section 5.0 on page 22 or the Revolution™ configuration utility.

3.1.1 Revolution Configuration

The Revolution configuration utility provides the preferred method for configuring the 390HE indicator. Revolution runs on a personal computer to set configuration parameters for the indicator. When Revolution configuration is complete, configuration data is downloaded to the indicator.

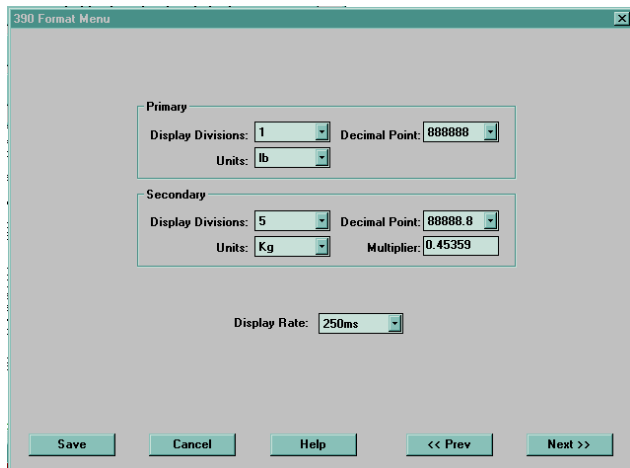


Figure 3-1. Sample Revolution Format Display

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

To use Revolution, do the following:

1. Install Revolution on an IBM-compatible personal computer running Windows® 3.11 or Windows 95. Minimum system requirements are 8MB of extended memory and at least 5MB of available hard disk space.
2. With both indicator and PC powered off, connect the PC serial port to the RS-232 pins on the indicator EDP port.
3. Power up the PC and the indicator. Use the setup switch to place the indicator in setup mode.
4. Start the Revolution program.

Figure 3-1 shows an example of one of the Revolution configuration displays.

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

3.1.2 EDP Command Configuration

The EDP command set can be used to configure the 390HE indicator using a personal computer, terminal, or remote keyboard. Like Revolution, EDP command configuration sends commands to the indicator EDP port; unlike Revolution, EDP commands can be sent using any external device capable of sending ASCII characters over a serial connection.

EDP commands duplicate the functions available using the indicator front panel and provide some functions not otherwise available. EDP commands can be used to simulate pressing front panel keys, to configure the indicator, or to dump lists of parameter settings. See Section 5.0 on page 22 for more information about using the EDP command set.

3.1.3 Front Panel Configuration

The 390HE indicator can be configured using a series of menus accessed through the indicator front panel when the indicator is in setup mode. Table 3-1 summarizes the functions of each of the main menus.

| Menu | | Menu Function |
|---------|---------------|---------------------------------------------------------------------------------------------------------------------|
| CONFIG | Configuration | Configure grads, zero tracking, zero range, motion band, overload, tare function, and digital filtering parameters. |
| FORMAT | Format | Set format of primary and secondary units, display rate. |
| CALIBR | Calibration | Calibrate indicator. See Section 4.0 on page 20 for calibration procedures. |
| SERIAL | Serial | Configure serial port. |
| PROGRM | Program | Set power-up and standby modes, counting scale functions, regulatory mode, unit ID and consecutive number values. |
| P FORMT | Print Format | Set print format used for gross, net, and counting scale tickets. See Section 7.0 on page 27 for more information. |
| VERSION | Version | Display installed software version number. |

Table 3-1. 390HE Menu Summary

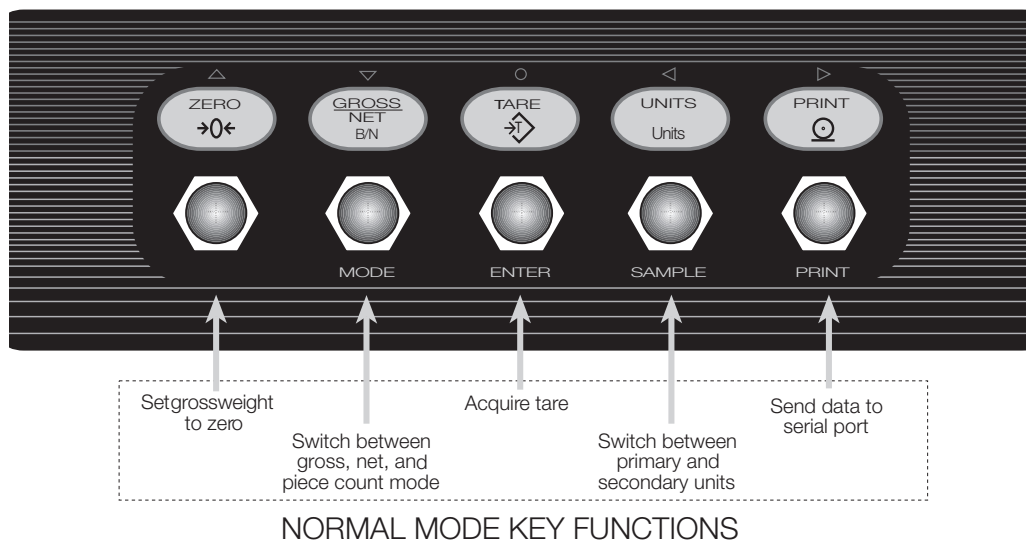


Figure 3-2. Front Panel Key Functions in Setup Mode

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

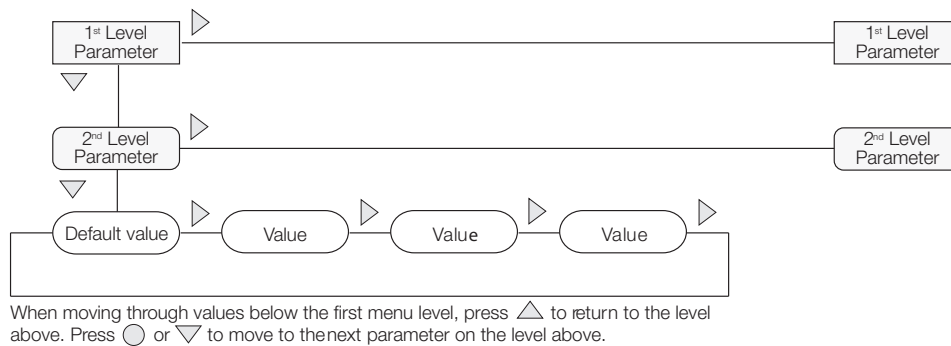


Figure 3-3. Setup Mode Menu Navigation

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

To change a parameter value, scroll left or right to view the values for that parameter. When the desired value appears on the display, press \circ to select the value and move back up one level.

To edit numeric values, use the navigation keys to select the digit and to increment or decrement the value. Press \circ to enter the numeric value, then use the \blacktriangleleft or \blacktriangleright key to adjust the decimal point position, if necessary. Press \circ again to save the value and exit the parameter (see Figure 3-4).



When editing numeric values, press \blacktriangleleft or \blacktriangleright to change the digit selected. Press \blacktriangle or \blacktriangledown to increment or decrement the value of the selected digit. Press \circ to save the value.



After entering the value, press \blacktriangleleft or \blacktriangleright to change the decimal point location. Press \circ again to save the value and exit the parameter.

Figure 3-4. Editing Procedure for Numeric Values

3.2 Menu Structures and Parameter Descriptions

The following sections provide graphic representations of the 390HE menu structures. In the actual menu structure, the settings you choose under each parameter are arranged horizontally. To save page space, menu choices are shown in vertical columns. The factory default setting appears at the top of each column.

Most menu diagrams are accompanied by a table that describes all parameters and parameter values associated with that menu. Default parameter values are shown in bold type.

NOTE: Some characters cannot be accurately represented on the 7-segment front panel LCD display. Section 8.4 on page 33 lists the 7-segment character set and the alphanumeric characters they represent.

3.2.1 Configuration Menu

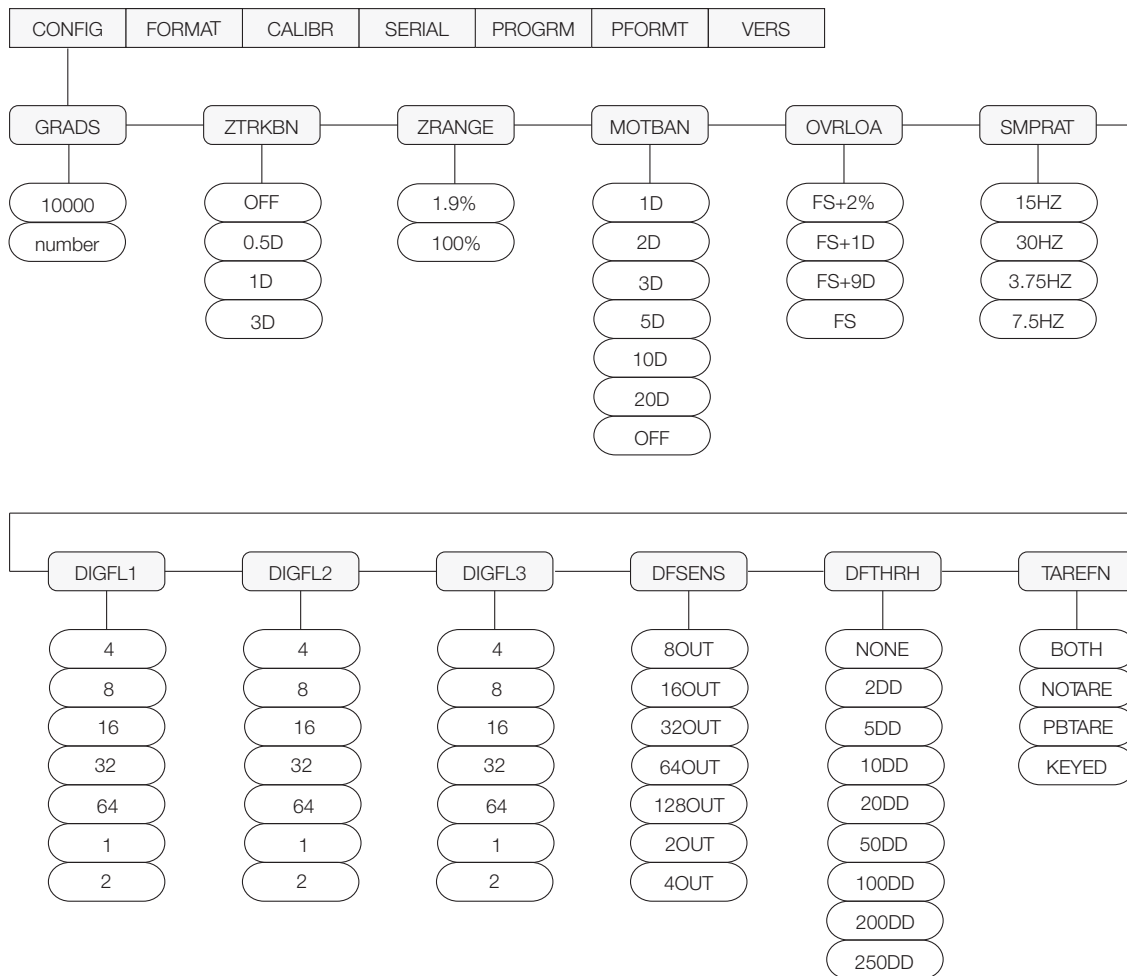


Figure 3-5. Configuration Menu

| CONFIG Menu | | |
|-------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| <i>Level 2 submenus</i> | | |
| GRADS | 10000 <i>number</i> | Graduations. Specifies the number of full scale graduations. The value entered must be in the range 1–999 999 and should be consistent with legal requirements and environmental limits on system resolution. To calculate GRADS, use the formula, $GRADS = Capacity / Display Divisions$. Display divisions for primary and secondary units are specified on the FORMAT menu. |
| ZTRKBN | OFF 0.5D 1D 3D | Zero track band. Automatically zeroes the scale when within the range specified, as long as the input is within the ZRANGE and scale is at standstill. Selections are \pm display divisions. Maximum legal value varies depending on local regulations. |
| ZRANGE | 1.9% 100% | Zero range. Selects the range within which the scale can be zeroed. The 1.9% selection is \pm 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. |

Table 3-2. Configuration Menu Parameters

| <i>CONFIG Menu</i> | | |
|----------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| MOTBAN | 1D 2D 3D 5D 10D 20D OFF | Motion band. 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 OFF is selected, ZTRKBN is disabled. |
| OVRL0A | FS+2% FS+1D FS+9D FS | Overload. Determines the point at which the display blanks and an out-of-range error message is displayed. Maximum legal value varies depending on local regulations. |
| DIGFL1 DIGFL2 DIGFL3 | 4 8 16 32 64 1 2 | Digital filtering. 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 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. See Section 8.6 on page 35 for more information on digital filtering. |
| DFSSENS | 8OUT 16OUT 32OUT 64OUT 128OUT 2OUT 4OUT | Digital filter cutout sensitivity. Specifies the number of consecutive readings that must fall outside the filter threshold (DFTHRHR parameter) before digital filtering is suspended. |
| DFTHRHR | NONE 2DD 5DD 10DD 20DD 50DD 100DD 200DD 250DD | Digital filter cutout threshold. Specifies the filter threshold, in display divisions. When a specified number of consecutive scale readings (DFSSENS parameter) fall outside of this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled. |
| TAREFN | BOTH NOTARE PBTARE KEYED | Tare function. Enables or disables push-button and keyed tares. Possible values are: BOTH: Both push-button and keyed tares are enabled NOTARE: No tare allowed (gross mode only) PBTARE: Push-button tares enabled KEYED: Keyed tare enabled |

Table 3-2. Configuration Menu Parameters (Continued)

3.2.2 Format Menu

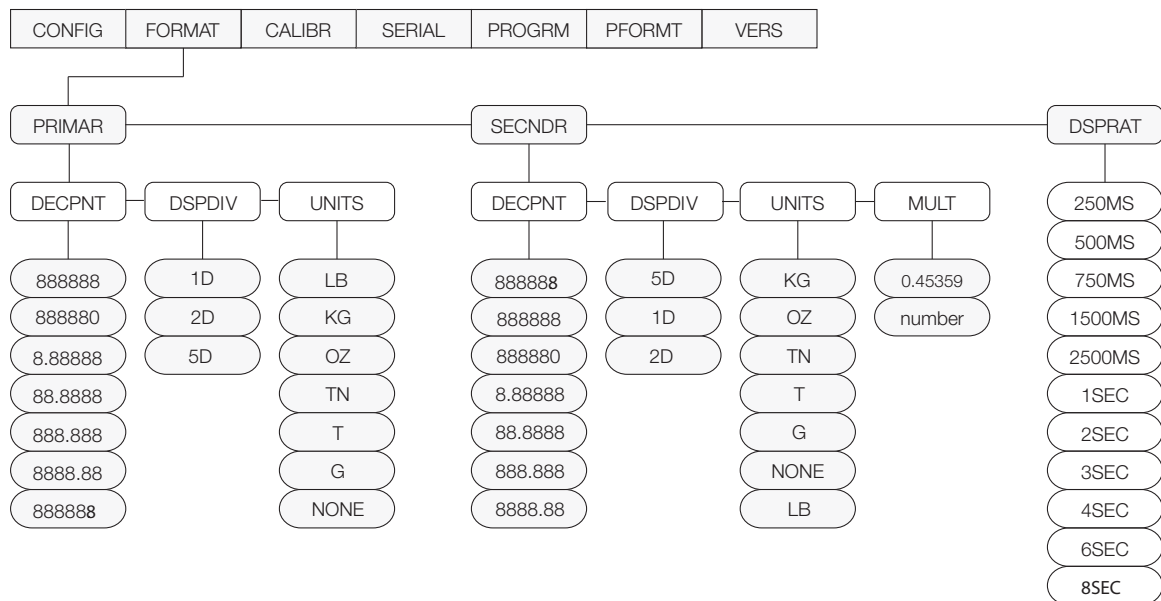


Figure 3-6. Format Menu

| FORMAT Menu | | |
|-------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| Level 2 submenus | | |
| PRIMAR | DECPNT DSPDIV UNITS | Specifies the decimal position, display divisions, and units used for the primary units. See Level 3 submenu parameter descriptions. |
| SECNDR | DECPNT DSPDIV UNITS MULT | Specifies the decimal position, display divisions, units, and conversion multiplier used for the secondary units. See Level 3 submenu parameter descriptions. |
| DSPRAT | 250MS 500MS 750MS 1500MS 2500MS 1SEC 2SEC 3SEC 4SEC 6SEC 8SEC | Display rate. Sets the update rate for displayed values. Values are in milliseconds (MS) or seconds (SEC). |

Table 3-3. Format Menu Parameters

| <i>FORMAT Menu</i> | | |
|-------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| Level 3 submenus | | |
| Primary Units (PRIMAR Parameter) | | |
| DECPNT | 888888 888880 8.88888 88.8888 888.888 8888.88 88888.8 | 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 OZ TN T G NONE | Specifies primary units for displayed and printed weight. Values are: LB=pound; KG=kilogram; OZ=ounce; TN=short ton; T=metric ton; G=gram. NOTE: Indicators sold outside North America are configured with KG for both primary and secondary units. |
| Secondary Units (SECNDR Parameter) | | |
| DECPNT | 88888.8 888888 888880 8.88888 88.8888 888.888 8888.88 | Decimal point location. Determines the location of the decimal point or dummy zeros in the secondary unit display. |
| DSPDIV | 5D 1D 2D | Display divisions. Selects the value of minimum division size of the displayed weight. |
| UNITS | KG OZ TN T G LB NONE | Specifies secondary units for displayed and printed weight. Values are: KG=kilogram; OZ=ounce; TN=short ton; T=metric ton; G=gram; LB=pound. |
| MULT | 0.45359 <i>Enter other choices via keyboard</i> | Multiplier. Specifies the conversion factor by which the primary units are multiplied to obtain the secondary units. The default is 0.45359, which is the conversion factor for changing pounds to kilograms. See Section 8.5 on page 33 for a list of multipliers. To toggle between primary and secondary units, press the UNITS key. |

Table 3-3. Format Menu Parameters (Continued)

3.2.3 Calibration Menu

See Section 4.0 on page 20 for calibration procedures.

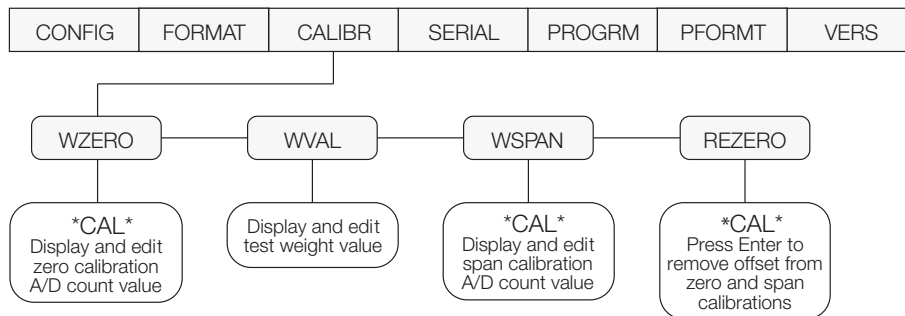


Figure 3-7. Calibration Menu

| CALIBR Menu | | |
|-------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| Level 2 submenus | | |
| WZERO | — | Calibrate zero, display and edit the zero calibration A/D count value. |
| WVAL | — | Display and edit the test weight value. |
| WSPAN | — | Calibrate span, display and edit the span calibration A/D count value. |
| REZERO | — | Press Enter to remove an offset value from the zero and span calibrations. Use this parameter only after WZERO and WSPAN have been set. See Section 4.1 on page 20 for more information about using this parameter. |

Table 3-4. Calibration Menu Parameters

3.2.4 Serial Menu

See Section 8.2 on page 30 for information about the 390HE serial data format.

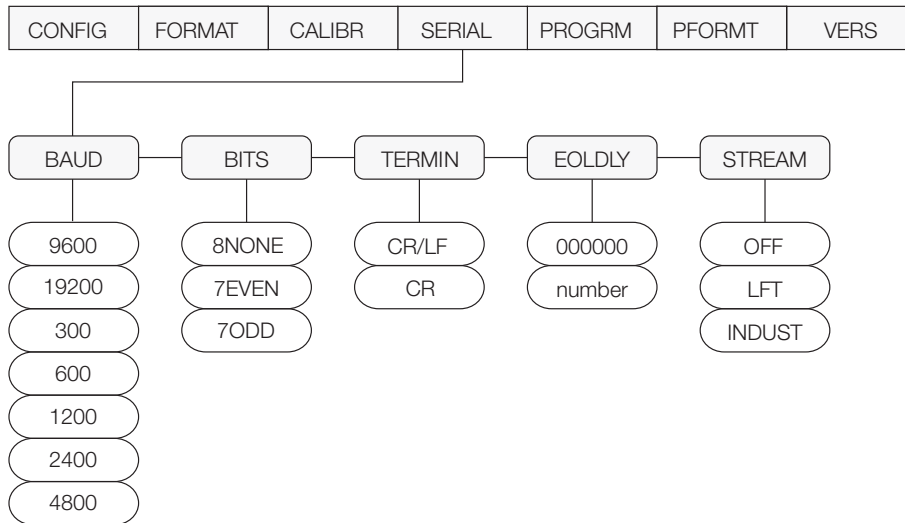


Figure 3-8. Serial Menu

| SERIAL Menu | | |
|-------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| Level 2 Submenus | | |
| BAUD | 9600 19200 300 600 1200 2400 4800 | Baud rate. Selects the transmission speed for the EDP port. |
| BITS | 8NONE 7EVEN 7ODD | Selects number of data bits and parity of data transmitted from the EDP port. |
| TERMIN | CR/LF CR | Termination character. Selects termination character for data sent from the EDP port. |
| EOLDLY | 0 number | End-of-line delay. Sets the delay period, in 0.1-second intervals, from when a formatted line is terminated to the beginning of the next formatted serial output. Value specified must be in the range 0-255, in tenths of a second (10 = 1 second). |
| STREAM | OFF LFT INDUST | Selects whether continuous data output is streamed from the serial port. Select LFT for legal-for-trade applications in which the streamed data must match the current displayed weight. Select INDUST to stream the latest weight data, regardless of the value displayed. See Section 8.2 on page 30 for information about the 390HE continuous data format. |

Table 3-5. Serial Menu Parameters

3.2.5 Program Menu

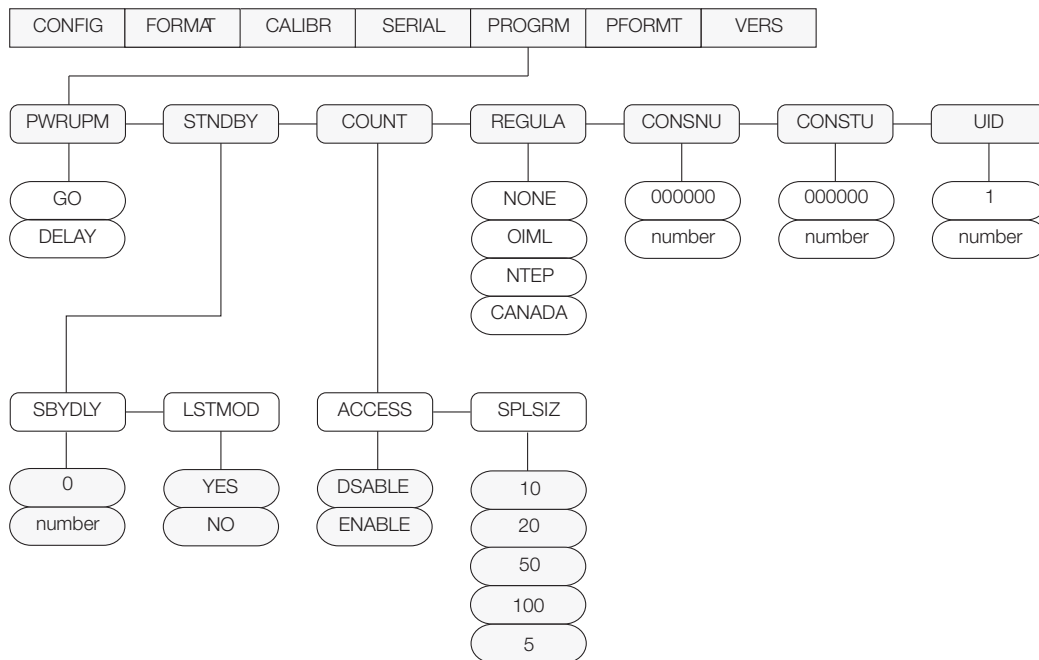


Figure 3-9. ProgramMenu

| PROGRAM Menu | | |
|-------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| Level 2 submenus | | |
| PWRUPM | 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. |
| STNDBY | SBYDLY LSTMOD | Specifies standby mode delay and whether indicator returns to the last operating mode or performs a power-up sequence when standby mode ends. See Level 3 submenu parameter descriptions. |
| COUNT | ACCESS SPLSIZ | Specifies whether operator has access to piece count mode and the default sample size used for parts counting. See Level 3 submenu parameter descriptions. |

Table 3-6. Program Menu Parameters

| <i>PROGRM Menu</i> | | |
|-------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter | Choices | Description |
| REGULA | NONE OIML NTEP CANADA | Regulatory mode. Specifies the regulatory agency having jurisdiction over the scale site. <ul style="list-style-type: none"> • 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. |
| CONSNU | 000000 <i>number</i> | Consecutive numbering. Allows sequential numbering for print operations. The consecutive number value is incremented following each print operation. The initial value of this parameter is set to the start up value specified on the CONSTU parameter. Changing either CONSTU or CONSNU immediately resets the consecutive number used for printing. |
| CONSTU | 000000 <i>number</i> | Consecutive number start up value. Specifies the initial consecutive number (CONSNU) value used when the indicator is powered on. |
| UID | 1 <i>number</i> | Unit ID. Specify a unit identifier for the indicator in the range 1–999999. The unit ID can be added to print ticket formats to identify the indicator used to generate the ticket. |
| Level 3 submenus | | |
| SBYDLY | 0 <i>number</i> | Standby mode delay. Specifies the number of minutes the indicator must be inactive before entering standby mode. Valid values are 0 (off) or 1–120 minutes. The indicator enters standby mode if no key presses, serial communications, or scale motion occur for the length of time specified on this parameter. Set this parameter to 0 to disable standby mode. |
| LSTMOD | YES NO | Last mode. Specifies whether the indicator resumes operation in the last mode it was in before entering standby mode (YES) or performs the standard power-up sequence (NO). |
| ACCESS | DSABLE ENABLE | Operator access to piece count mode. Specify DSABLE if piece count mode will not be used. With access disabled, pressing the GROSS/NET (MODE) key toggles between gross and net modes only. |
| SPLSIZ | 10 20 50 100 5 | Sample size. Specify the default sample size used for counting scale operations. Sample size can be changed in counting mode during sample acquisition. |

Table 3-6. Program Menu Parameters (Continued)

3.2.6 Print Format Menu

See Section 7.0 on page 27 for information about custom print formatting.

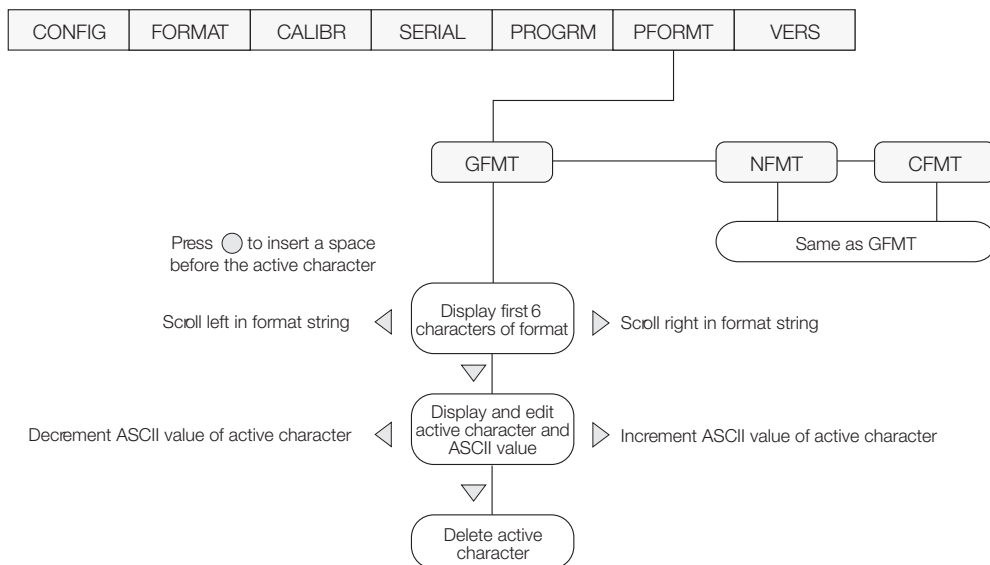


Figure 3-10. Print Format Menu

3.2.7 Version Menu

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

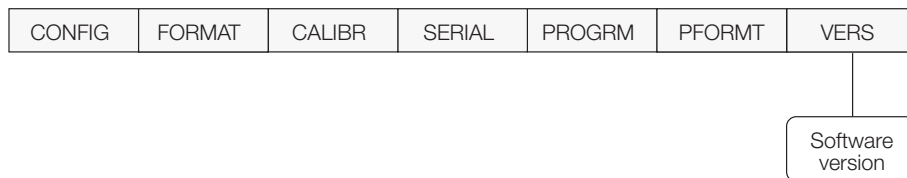


Figure 3-11. Version Menu

4.0 Calibration

The 390HE can be calibrated using the front panel, EDP commands, or the Revolution™ configuration utility. Each method consists of the following steps:

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

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

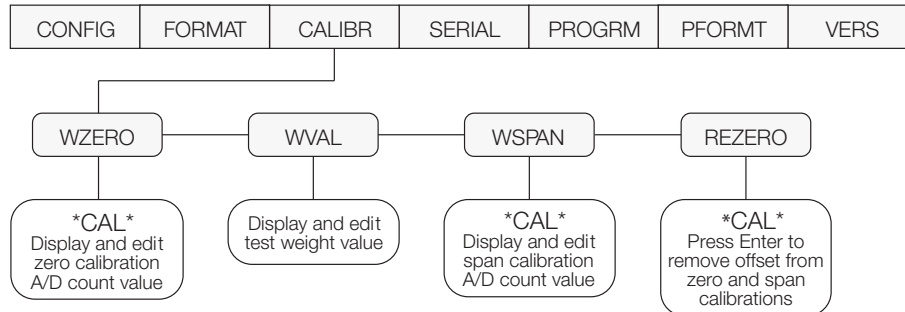


Figure 4-1. Calibration (CALIBR) Menu

4.1 Front Panel Calibration

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

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Press \triangleright until the display reads *CALIBR* (see Figure 4-1). Press ∇ to go to zero calibration (*WZERO*).
3. With *WZERO* displayed, press \bigcirc to calibrate zero. The indicator displays **CAL** while calibration is in progress. When complete, the A/D count for the zero calibration is displayed. Press \bigcirc again to save the zero calibration value and go to the next prompt (*WWAL*).



When editing numeric values, press \triangleleft or \triangleright to change the digit selected. Press \triangle or ∇ to increment or decrement the value of the selected digit. Press \bigcirc to save the value.



After entering the value, press \triangleleft or \triangleright to change the decimal point location. Press \bigcirc again to save the value and exit the parameter.

Figure 4-2. Editing Procedure for Numeric Values

4. With *WWAL* displayed, place test weights on the scale and press \bigcirc to show the test weight value. Use the procedure shown in Figure 4-2 to enter the actual test weight, then press \bigcirc to save the value and go to span calibration (*WSPAN*).
5. With *WSPAN* displayed, press \bigcirc to calibrate span. The indicator displays **CAL** while calibration is in progress. When complete, the A/D count for the span calibration is displayed. Press \bigcirc again to save the span calibration value and go to the next prompt (*REZERO*).
6. The rezero function is used to remove a calibration offset when hooks or chains are used to hang the test weights.
 - If no other apparatus was used to hang the test weights during calibration, remove the test weights and press \triangle to return to the *CALIBR* menu.
 - If hooks or chains were used during calibration, remove these and the test weights from the scale. With all weight removed, press \bigcirc to rezero the scale. This function adjusts the zero and span calibration values. The indicator displays **CAL** while the zero and span calibrations are adjusted. When complete, the adjusted A/D count for the zero calibration is displayed. Press \bigcirc to enter the value, then press \triangle to return to the *CALIBR* menu.
7. Press \triangleleft until the display reads *CONFIG*, then press \triangle to exit setup mode.

4.2 EDP Command Calibration

To calibrate the indicator using EDP commands, the indicator EDP port must be connected to a terminal or personal computer. See Section 2.3.2 on page 5 for EDP port pin assignments; see Section 5.0 on page 22 for more information about using EDP commands.

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

1. Place the indicator in setup mode (display reads *CONFIG*) and remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Send the WZERO EDP command to calibrate zero. The indicator displays *CAL* while calibration is in progress.
3. Place test weights on the scale and use the WVAL command to enter the test weight value in the following format:
WVAL=nnnnnn<CR>
4. Send the WSPAN EDP command to calibrate span. The indicator displays *CAL* while calibration is in progress.
5. To remove an offset value, clear all weight from the scale, including hooks or chains used to hang test weights, then send the REZERO EDP command. The indicator displays *CAL* while the zero and span calibrations are adjusted.
6. Send the KUPARROW EDP command to exit setup mode.

4.3 Revolution™ Calibration

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

Use the following procedure to calibrate the indicator:

1. Select *Calibrate Indicator* from the Revolution main menu.
2. On the Indicator Calibration display, select the indicator model (*IQ+390-DC*) and communications port, then click *OK*.
3. Revolution uploads calibration data from the indicator then presents the information in a display like that shown in Figure 4-3.
4. Enter the *Value of Test Weight* to be used for span calibration then click *OK*.
5. The Zero Calibration dialog box prompts you to remove all weight from the scale. Clear the scale and click *OK* to begin zero calibration. **NOTE:** If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
6. When zero calibration is complete, the Span Calibration dialog box prompts you to place test weights on the scale for span calibration. Place test weights on the scale then click *OK*.
7. When span calibration is complete, the Rezero dialog box prompts you to remove weights from the scale. Remove the weights then click *OK*.
8. When calibration is complete, the *New Settings* fields of the Indicator Calibration display are filled in. Click *Exit* to save the new values and return to the Revolution main menu; to restore the previous calibration values, click *Restore Settings*.

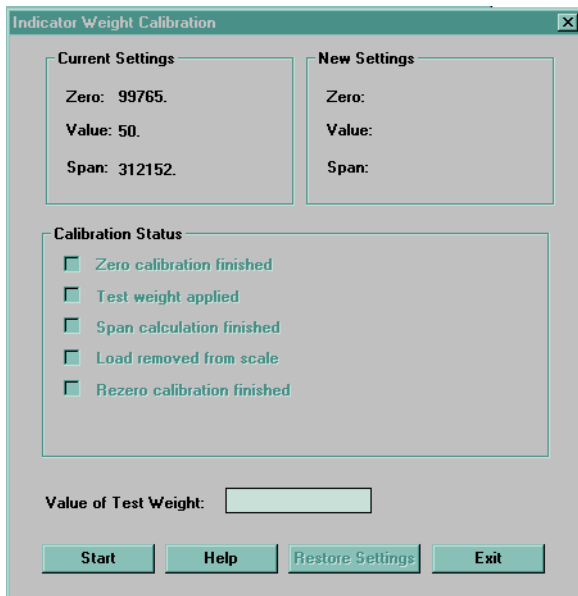


Figure 4-3. Revolution Calibration Display

4. Enter the *Value of Test Weight* to be used for

5.0 EDP Commands

The 390HE indicator can be controlled by a personal computer or remote keyboard connected to the indicator EDP port. Control is provided by a set of EDP commands that can simulate front panel key press functions, display and change setup parameters, and perform reporting functions. The EDP port provides the capability to print configuration data or to save that data to an attached personal computer. This section describes the EDP command set and procedures for saving and transferring data using the EDP port.

5.1 The EDP Command Set

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

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


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

5.1.1 Key Press Commands

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

For example, to enter a 15-pound tare weight using EDP commands:

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

The indicator displays the  symbol when a tare has been entered and shifts the display to net mode.

| Command | Function |
|-------------|---------------------------------------|
| KZERO | Press the ZERO key |
| KGROSSNET | Press the GROSS/NET key |
| KGROSS | Go to gross mode (pseudo key) |
| KNET | Go to net mode (pseudo key) |
| KCOUNT | Go to piece count mode (pseudo key) |
| KTARE | Press the TARE key |
| KUNITS | Press the UNITS key |
| KPRIM | Go to primary units (pseudo key) |
| KSEC | Go to secondary units (pseudo key) |
| KPRINT | Press the PRINT key |
| KLEFTARROW | In setup mode, move left in the menu |
| KRIGHTARROW | In setup mode, move right in the menu |
| KUPARROW | In setup mode, move up in the menu |
| KDOWNARROW | In setup mode, move down in the menu |
| K0 | Press number 0 (zero) |
| K1 | Press number 1 |
| K2 | Press number 2 |
| K3 | Press number 3 |
| K4 | Press number 4 |
| K5 | Press number 5 |
| K6 | Press number 6 |
| K7 | Press number 7 |
| K8 | Press number 8 |
| K9 | Press number 9 |
| KDOT | Press the decimal point (.) |
| KENTER | Press the ENTER key |

Table 5-1. Key Press EDP Commands

5.1.2 Reporting Commands

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

| Command | Function |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DUMPALL | List all parameter values |
| VERSION | Write 390HE software version |
| RS | Reset the indicator |
| P | Write current displayed weight with units identifier. The P command returns the current displayed weight value to the EDP port, along with the units identifier. If the indicator is in an underrange or overload condition, the weight value is replaced with ##### (overload) or %%%%%%%%% (underrange). |
| S | Write one frame of stream format |

Table 5-2. EDP Reporting Commands

5.1.3 The RESETCONFIGURATION Command

The RESETCONFIGURATION command can be used to restore all configuration parameters to their default values. Before issuing this command, the indicator must be placed in setup mode or test mode (press and hold setup switch for approximately four seconds to enter test mode).

Sending this command, followed by the RS (RESET) EDP command, is equivalent to using the DEFLT function on the TEST menu. See Section 8.7 on page 36 for more information about test mode and using the TEST menu. **NOTE:** All load cell calibration settings are lost when the RESETCONFIGURATION command is run.

5.1.4 Parameter Setting Commands

Parameter setting commands allow you to display or change the current value for a particular configuration parameter (Tables 5-3 through Table 5-8).

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. 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 ??.

Changes to the parameters do not take effect until you exit setup mode.

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

`MOTBAND=5D<ENTER>`

| Command | Description | Values |
|----------------------------------|-----------------------------------|-------------------------------------------------------|
| GRADS | Graduations | 1-999 999 |
| ZTRKBND | Zero track band | OFF, 0.5D, 1D, 3D |
| ZRANGE | Zero range | 1.9%, 100% |
| MOTBAND | Motion band | 1D, 2D, 3D, 5D, 10D, 20D, OFF |
| OVRLD | Overload | FS+2%, FS+1D, FS+9D, FS |
| DIGFLTR1 DIGFLTR2 DIGFLTR3 | Digital filtering | 1, 2, 4, 8, 16, 32, 64 |
| DFSNS | Digital filter cutout sensitivity | 2OUT, 4OUT, 8OUT, 16OUT, 32OUT, 64OUT, 128OUT |
| DFTHR | Digital filter cutout threshold | NONE, 2DD, 5DD, 10DD, 20DD, 50DD, 100DD, 200DD, 250DD |
| TAREFN | Tare function | BOTH, NOTARE, PBTARE, KEYED |

Table 5-3. CONFIG EDP Commands

| Command | Description | Values |
|------------|-----------------------------------|-------------------------------------------------------------------------|
| PRI.DPCNT | Primary units decimal position | 8.88888, 88.8888, 888.888, 8888.88, 88888.8, 888888, 888880 |
| PRI.DSPDIV | Primary units display divisions | 1D, 2D, 5D |
| PRI.UNITS | Primary units | LB, KG, OZ, TN, T, G, NONE |
| SEC.DPCNT | Secondary units decimal position | 8.88888, 88.8888, 888.888, 8888.88, 88888.8, 888888, 888880 |
| SEC.DSPDIV | Secondary units display divisions | 1D, 2D, 5D |
| SEC.UNITS | Secondary units | LB, KG, OZ, TN, T, G, NONE |
| SEC.MULT | Secondary units multiplier | 0.00000–999999 |
| DSPRATE | Display rate | 250MS, 500MS, 750MS, 1500MS, 2500MS, 1SEC, 2SEC, 3SEC, 4SEC, 6SEC, 8SEC |

Table 5-4. FORMAT EDP Commands

| Command | Description | Values |
|---------|--------------------------|--------------------------|
| WZERO | Zero calibration | – |
| WVAL | Test weight value | <i>test_weight_value</i> |
| WSPAN | Span calibration | – |
| REZERO | Rezero | – |
| LC.CD | Set deadload coefficient | <i>value</i> |
| LC.CW | Set span coefficient | <i>value</i> |

Table 5-5. CALIBR EDP Commands

| Command | Description | Values |
|------------|-----------------------|-----------------------------------------|
| EDP.BAUD | Baud rate | 300, 600, 1200, 2400, 4800, 9600, 19200 |
| EDP.BITS | Data bits/parity | 8NONE, 7EVEN, 7ODD |
| EDP.TERMIN | Termination character | CR/LF, CR |
| EDP.EOLDLY | End-of-line delay | 0–255 (0.1-second intervals) |
| EDP.STREAM | Stream format | OFF, LFT, INDUST |

Table 5-6. SERIAL EDP Commands

| Command | Description | Values |
|---------|-----------------------------------|--------------------------|
| PWRUPMD | Power up mode | GO, DELAY |
| SBYDLY | Standby delay | 0–120 |
| LSTMOD | Last mode | YES, NO |
| CNTMOD | Counting mode | ENABLE, DSABLE |
| SAMPSIZ | Default sample size | 5, 10, 20, 50, 100 |
| REGULAT | Regulatory compliance | NONE, OIML, NTEP, CANADA |
| CONSNUM | Consecutive number | 0–999 999 |
| CONSTUP | Consecutive number start-up value | 0–999 999 |
| UID | Unit identifier | 0–999 999 |

Table 5-7. PROGRM EDP Commands

| Command | Description | Values |
|---------|-----------------------------------|-----------------------------------------------------|
| GFMT | Gross demand print format string | See Section 7.0 on page 27 for detailed information |
| NFMT | Net demand print format string | |
| CFMT | Counting mode print format string | |

Table 5-8. PFORMT EDP Commands

5.1.5 Normal Mode Commands

The serial transmit weight data commands (see Table 5-9) transmit data to the EDP port on demand. The transmit weight data commands are valid only in normal operating mode.

| Command | Description | Response Format |
|---------|----------------------------------------------|------------------------------------------------------------------------------------------------|
| SX | Start EDP streaming | OK or ?? |
| EX | Stop EDP streaming | OK or ?? |
| XG | Transmit gross weight in displayed units | <i>nnnnnn UU</i> where <i>nnnnnn</i> is the weight value, <i>UU</i> is the units. |
| XN | Transmit net weight in displayed units | |
| XT | Transmit tare weight in displayed units | |
| XG2 | Transmit gross weight in non-displayed units | NOTE: In count mode, displayed units = primary units; non-displayed units = secondary units |
| XN2 | Transmit net weight in non-displayed units | |
| XT2 | Transmit tare weight in non-displayed units | |
| XC | Transmit current part count | <i>nnnnnn</i> |

Table 5-9. Normal Mode EDP Commands

5.2 Saving and Transferring Data

Connecting a personal computer to the 390HE EDP port allows you to save indicator configuration data to the PC or to download configuration data from the PC to an indicator. The following sections describe the procedures for these save and transfer operations.

5.2.1 Saving Indicator Data to a Personal Computer

Configuration data can be saved to a personal computer connected to the EDP port. The PC must be running a communications program such as PROCOMMPLUS®. See Section 2.3.2 on page 5 for information about serial communications wiring and EDP port pin assignments.

When configuring the indicator, ensure that the values set for the BAUD and BITS parameters on the SERIAL menu match the baud rate, bits, and parity settings configured for the serial port on the PC.

To save all configuration data, place the indicator in setup mode and send the DUMPALL EDP command to the indicator. The 390HE responds by sending all configuration parameters to the PC as ASCII-formatted text.

5.2.2 Downloading Configuration Data from PC to Indicator

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

To download configuration data, connect the PC to the EDP port as described in Section 5.2.1. Place the indicator in setup mode and use the PC communications software to send the saved configuration data to the indicator. When transfer is complete, calibrate the indicator as described in Section 4.0 on page 20.

NOTES:

- Calibration settings are included in the configuration data downloaded to the indicator. If the receiving indicator is a direct replacement for another 390HE and the attached scale is not changed, recalibration is not required.
- When downloading configurations that include changed serial communications settings, edit the data file to place the serial communications changes at the end of the file. Communication between the PC and indicator will be lost once the indicator receives settings for baud rate (BAUD parameter) or data bits and parity (BITS parameter) that do not match those configured for the PC.

6.0 Counting Operations

The 390HE provides a piece count mode that allows the indicator to serve as a portable counting scale. In piece count mode, the indicator display shows the number of parts on the scale rather than the weight of those parts.

NOTE: *Legal-for-trade applications require product to be sold by weight rather than an equivalent parts count. Operator access to piece count mode is disabled when the indicator is shipped from the factory.*

To enable operator access to piece count mode, set the ACCESS parameter to ENABLE (COUNT submenu on the PROGRM menu) or send the CNTMOD=ENABLE EDP command.

Piece count mode has two submodes:

- Count display mode displays the current parts count and allows ticket printing using the CFMT print format.
- Sample acquisition mode is used to calibrate the indicator for parts counting.

Count Display Mode

Piece count mode is entered by pressing the **MODE (GROSS/NET)** key from normal weighing mode. In count display mode, the display shows the number of parts rather than weight, the arrow annunciator at the right side of the LCD display points to piece count (PC), and pressing the **PRINT** key sends the CFMT print format data string to the serial port.

If a sample weight has not yet been acquired, the indicator switches automatically to sample acquisition mode, described below.

Sample Acquisition Mode

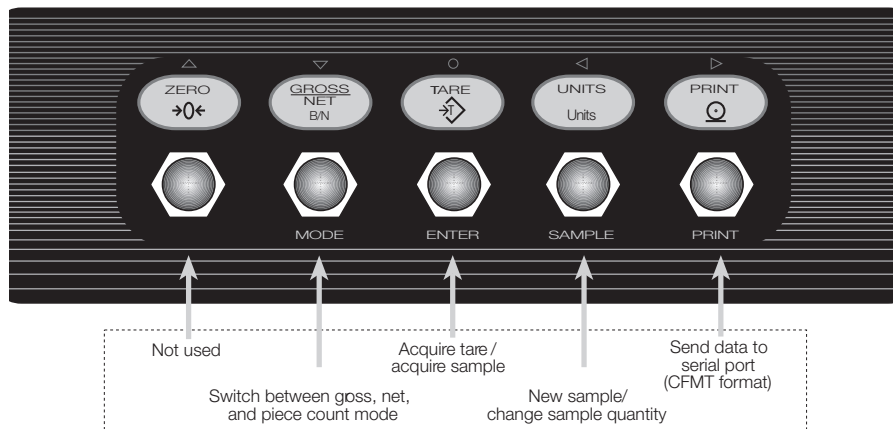
Sample acquisition mode is used to select the sample quantity and calibrate the indicator for the parts being counted.

To set a new sample weight, do the following:

1. Place empty parts container on scale. Wait for standstill, then press **TARE** to acquire the tare weight of the container.
2. Press **MODE** to enter piece count mode.
3. From count display mode, press the **SAMPLE (UNITS)** key to enter sample acquisition mode.
4. The indicator display shows the message *Addnnn*, where *nnn* is the sample quantity to be placed on the scale. Add the number of parts shown or choose a different sample size by pressing the **SAMPLE** key to scroll through the selectable sample quantities (5, 10, 20, 50, 100).
5. Once the sample quantity is on the scale, press **ENTER** to calibrate the indicator for counting the new parts. The indicator display shows the message *-CNT-* as it acquires the sample weight, then switches to count display mode and shows the part quantity.

If the weight of the sample quantity is insufficient for piece counting, the indicator automatically requests the next higher sample quantity by showing the *Addnnn* message again. If the sample quantity is at maximum (100) and the sample weight is still not sufficient, the indicator shows the message *CNTERR*.

To view gross and net weight of parts, press **MODE** to switch from count display mode to normal weighing mode.



COUNTING MODE KEY FUNCTIONS

Figure 6-1. Front Panel Key Functions in Piece Count Mode

7.0 Print Formatting

The 390HE provides three print formats, GFMT, NFMT, and CFMT that determine the format of the printed output when the **PRINT** key is pressed or when a **KPRINT** EDP command is received. If no tare has been entered, the GFMT print format is used; if a tare has been entered, NFMT is used; in counting mode, CFMT is used.

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

7.1 Print Formatting Commands

Table 7-1 lists commands you can use to format the gross and net 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 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <code><G></code> | Gross weight in displayed units |
| <code><G2></code> | Gross weight in non-displayed units |
| <code><N></code> | Net weight in displayed units |
| <code><N2></code> | Net weight in non-displayed units |
| <code><T></code> | Tare weight in displayed units |
| <code><T2></code> | Tare weight in non-displayed units |
| <code><C></code> | Current piece count |
| <code><ID></code> | Unit identifier |
| <code><CN></code> | Consecutive number |
| <code><NLnn></code> | New line (<i>nn</i> = number of termination (<code><CR/LF></code> or <code><CR></code>) characters)* |
| <code><SPnn></code> | Space (<i>nn</i> = number of spaces)* |
| <code><SU></code> | Toggle weight data format (formatted/unformatted)** |
| Gross, net, and tare weights are 10 digits in length, including sign, followed by a space and a two-digit units identifier. Total field length with units identifier is 13 characters. | |
| ID and consecutive number (CN) fields are 1–6 characters in length, as required. | |
| * If <i>nn</i> is not specified, 1 is assumed. Value must be in the range 1–99. | |

Table 7-1. Print Format Commands

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

Table 7-1. Print Format Commands

The default GFMT and NFMT print formats use only the new line (`<NL>`) command and the commands for gross, net, and tare weights in displayed units (`<G>`, `<N>`, and `<T>`).

The default 390HE print formats are shown in Table 7-2:

| Format | Default Format String | Sample Output |
|--------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| GFMT | <code><G> GROSS<NL></code> | 2046.81 LB GROSS |
| NFMT | <code><G> GROSS<NL></code> <code><T> TARE<NL></code> <code><N> NET<NL></code> | 4053.1 LB GROSS 15.6 LB TARE 4037.5 LB NET |
| CFMT | <code><C> PIECES<NL></code> | 512 PC PIECES |

NOTE: In OIML and CANADA modes, the letters *PT* (preset tare) are automatically inserted after the printed tare weight.

Table 7-2. Default Print Formats

NOTES:

- The `<G2>`, `<N2>`, and `<T2>` commands listed in Table 7-1 print the gross, net, and tare weights in non-displayed units—that is, in the units *not* currently displayed on the indicator. In count count mode, formatting commands for displayed units (`<G>`, `<N>`, `<T>`) use primary units, non-displayed units commands (`<G2>`, `<N2>`, `<T2>`) use secondary units.
- ID numbers included in the print format string (`<ID>` command) must be set using the UID EDP command.
- The 300-character limit of each print format string includes the output field length of the print formatting commands, not the command length. For example, if the indicator is configured to show a decimal point, the `<G>` command generates an output field of 13 characters: the 10-character weight value (including decimal point), one space, and a two-digit units identifier.

7.2 Customizing Print Formats

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

7.2.1 Using the EDP Port

With a personal computer, terminal, or remote keyboard attached to the 390HE EDP port, you can use the EDP command set to customize the print format strings.

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

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

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

```
GFMT=MLC SHIPPING<NL>1357 WEST HOWARD  
ROAD<NL>BIGTOWN<NL2><G> GROSS<NL>
```

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

```
MLC SHIPPING  
1357 WEST HOWARD ROAD  
BIGTOWN
```

```
27862 LB GROSS
```

7.2.2 Using the Front Panel

If you have no access to equipment for communication through the EDP port or are working at a site where such equipment cannot be used, you can use the PFORMT menu (see Figure 7-1) to customize the print formats.

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

NOTE: Lower-case letters and some special characters cannot be displayed on the 390HE front panel (see the ASCII character chart on page 31) and are shown as blanks. The 390HE can send or receive any ASCII character; the character printed depends on the particular ASCII character set implemented for the receiving device.

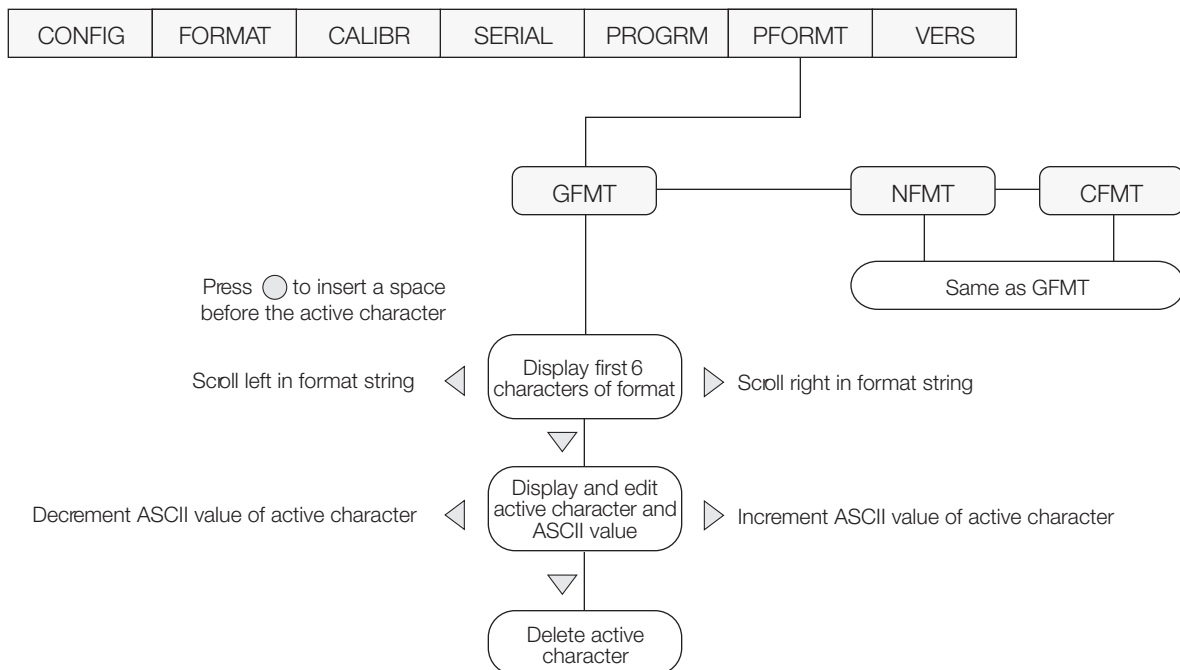


Figure 7-1. PFORMT Menu, Showing Alphanumeric Character Entry Procedure

7.2.3 Using Revolution

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

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

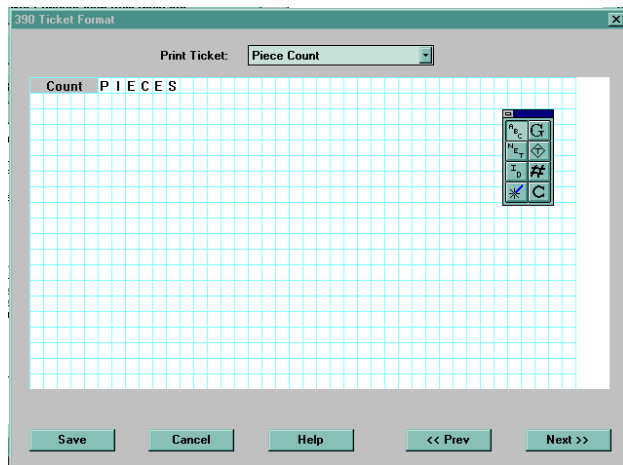


Figure 7-2. Revolution Print Format Grid

8.0 Appendix

8.1 Error Messages

The 390HE provides a number of front panel error messages to assist in problem diagnosis. Table 8-1 lists these messages and their meanings.

| Error Message | Description | Solution |
|---------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| ADCERR | A/D not responding | Call Rice Lake Weighing Systems (RLWS) Service. |
| ADCKSM | A/D coefficient checksum error | |
| CFCKSM | Configuration checksum error | Use TEST menu to perform DEFLT (restore defaults) procedure, then recalibrate load cells. |
| CNTERR | Count error; insufficient sample size | Increase sample size. |
| DSPERR | Display error | Call RLWS Service. |
| EEPERR | EEPROM write error | |
| LCCKSM | Load cell calibration checksum error | Recalibrate load cells. |
| LCPERR | Load cell power failure | Call RLWS Service. |
| PFCKSM | Print format checksum error | Check print formats for errors. |
| RAMERR | RAM test failed | Call RLWS Service. |
| TARERR | EEPROM read error | Use TEST menu to perform DEFLT (restore defaults) procedure, then recalibrate load cells. |
| VIREE | EEPROM error | Use TEST menu to perform DEFLT (restore defaults) procedure, then recalibrate load cells and reconfigure indicator. |
| ----- | Overflow error | Weight value too large (> 999999) to be displayed or gross value exceeds overload limit. Check configuration. |
| _____ | A/D underrange | Weight value too small (< -99999) to be displayed or A/D reading < -2.5 mV. Check scale for binding or damage. |
| STNDBY | Standby mode | Press any key to return to operating mode. |

Table 8-1. 390HE Error Messages

8.2 Continuous Output (Stream) Format

Figure 8-1 shows the continuous output format sent to the 390HE serial port when the STREAM parameter (SERIAL menu) is set to either LFT or INDUST.

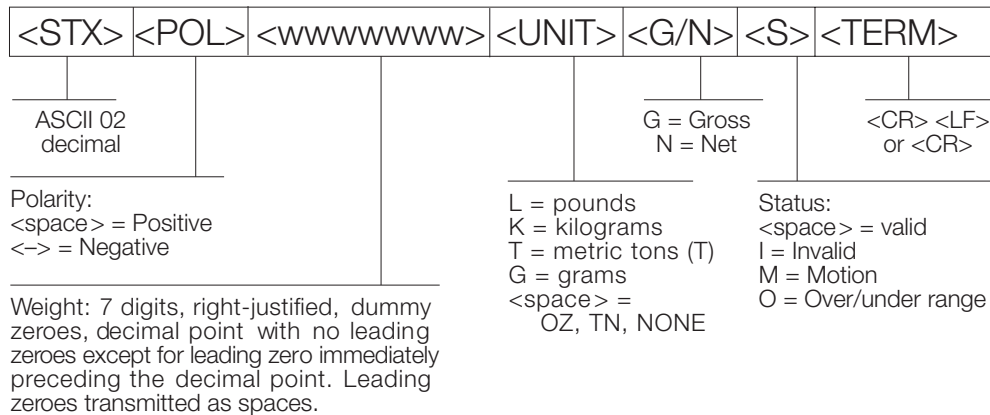


Figure 8-1. Continuous Output Data Format

8.3 ASCII Character Chart

Use the decimal values for ASCII characters listed in Tables 8-2 and 8-3 when specifying print format strings on the 390HE PFORMAT menu. The actual character printed depends on the character mapping used by the output device. The 390HE can send or receive any ASCII character value (decimal 0–255), but the indicator display is limited to the set described in Section 8.4 on page 33.

| 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- <u>_</u> | US | 31 | 1F | ? | 63 | 3F | _ | 95 | 5F | DEL | 127 | 7F |

Table 8-2. 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 | ½ | 171 | AB | | 203 | CB | δ | 235 | EB |
| î | 140 | 8C | ¼ | 172 | AC | | 204 | CC | ∞ | 236 | EC |
| ì | 141 | 8D | ¡ | 173 | AD | | 205 | CD | φ | 237 | ED |
| Ä | 142 | 8E | « | 174 | AE | | 206 | CE | ε | 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 |
| φ | 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 8-3. ASCII Character Chart (Part 2)

8.4 Front Panel Display Characters

Figure 8-2 shows the 7-segment LCD character set used to display alphanumeric characters on the 390HE front panel.

| | | | | | | | |
|---|----|----|---|----|---|----|---|
| . | 8. | : | 8 | Ff | 8 | Rr | 8 |
| / | 8 | ; | 8 | Gg | 8 | Ss | 8 |
| 0 | 8 | < | 8 | Hh | 8 | Tt | 8 |
| 1 | 8 | = | 8 | li | 8 | Uu | 8 |
| 2 | 8 | > | 8 | Jj | 8 | Vv | 8 |
| 3 | 8 | ? | 8 | Kk | 8 | Ww | 8 |
| 4 | 8 | @ | 8 | LI | 8 | Xx | 8 |
| 5 | 8 | Aa | 8 | Mm | 8 | Yy | 8 |
| 6 | 8 | Bb | 8 | Nn | 8 | Zz | 8 |
| 7 | 8 | Cc | 8 | Oo | 8 | [| 8 |

Figure 8-2. 390HE Display Characters

8.5 Conversion Factors for Secondary Units

The 390HE has the capability to mathematically convert a weight into many different types of units and instantly display those results with a press of the **UNITS** key. Secondary units can be specified on the **FORMAT** menu using the **SECNDR** parameter, or by using EDP commands.

- To configure secondary units using the front panel menus, use Table 8-4 to find the conversion multiplier for the **MULT** parameter. For example, if the primary unit is pounds and the secondary unit is short tons, set the **MULT** parameter to 0.00050, then press **○** to save the value.

For secondary units with a conversion factor of 10 or more, enter the value as described above without regard to decimal position,

then use the **◀** or **▶** key to move the decimal point to the correct position. Press **○** a second time to save the value.

For example, if the primary unit is ounces and the secondary unit is grams, the conversion factor shown in Table 8-4 is 28.3495. To enter this value using the menus, first enter 2.83495 for the **MULT** parameter, then use the left and right front panel keys to adjust the decimal point to 28.3495. Press **○** again to save the value and exit the **MULT** parameter.

- To configure secondary units using EDP commands, use the Table 8-4 to find the conversion multiplier for the **SEC.MULT** command. For example, if the primary unit is pounds and the secondary unit is short tons,

send the EDP command SEC.MULT=0.0005<CR> to set the multiplier for the secondary units.

- Long tons and grains units listed in Table 8-4 cannot be directly specified as primary or secondary units on the 390HE indicator. For these or other unlisted units of weight, specify NONE on the UNITS parameter.

NOTE: Ensure that the secondary decimal point position is set appropriately for the scale capacity in the secondary units. If the converted value requires more digits than are available, the indicator will display an overflow message (*OVERFL*).

For example, if the primary units are short tons, secondary units are pounds, and the secondary decimal point is set to 8888.88, the indicator will overflow if 5 tons or more are applied to the scale. With 5 tons applied, and a conversion factor of 2000, the secondary units display needs five digits to the left of the decimal point to display the 10000 lb secondary units value.

| Primary Unit | x Multiplier | Secondary Unit |
|--------------|--------------|----------------|
| grains | 0.06480 | grams |
| | 0.00229 | ounces |
| | 0.00014 | pounds |
| | 0.00006 | kilograms |
| ounces | 437.500 | grains |
| | 28.3495 | grams |
| | 0.06250 | pounds |
| | 0.02835 | kilograms |
| pounds | 7000.00 | grains |
| | 453.592 | grams |
| | 16.0000 | ounces |
| | 0.45359 | kilograms |
| | 0.00050 | short tons |
| | 0.00045 | long tons |
| | 0.00045 | metric tons |
| short tons | 2000.00 | pounds |
| | 907.185 | kilograms |
| | 0.89286 | long tons |
| | 0.90718 | metric tons |
| grams | 15.4324 | grains |
| | 0.03527 | ounces |
| | 0.00220 | pounds |
| | 0.00100 | kilograms |
| kilograms | 15432.4 | grains |
| | 35.2740 | ounces |
| | 1000.00 | grams |
| | 2.20462 | pounds |
| | 0.00110 | short tons |
| | 0.00098 | long tons |
| | 0.00100 | metric tons |
| metric tons | 2204.62 | pounds |
| | 1000.00 | kilograms |
| | 1.10231 | short tons |
| | 0.98421 | long tons |
| long tons | 2240.00 | pounds |
| | 1016.05 | kilograms |
| | 1.12000 | short tons |
| | 1.01605 | metric tons |

Table 8-4. Conversion Factors

8.6 Digital Filtering

The 390HE uses averaged digital filtering to reduce the effect of vibration on weight readings. Adjustable threshold and sensitivity functions allow quick settling by suspending filter averaging, allowing the weight reading to jump to the new value. Figure 8-3 shows the digital filter parameters on the CONFIG menu.

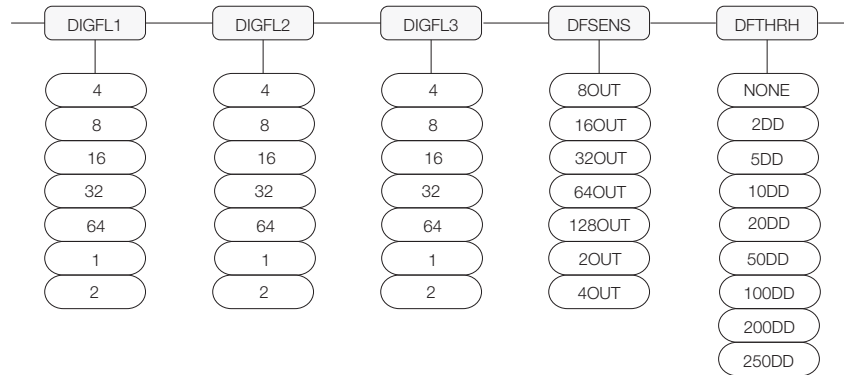


Figure 8-3. Digital Filtering Parameters on the Configuration (CONFIG) Menu

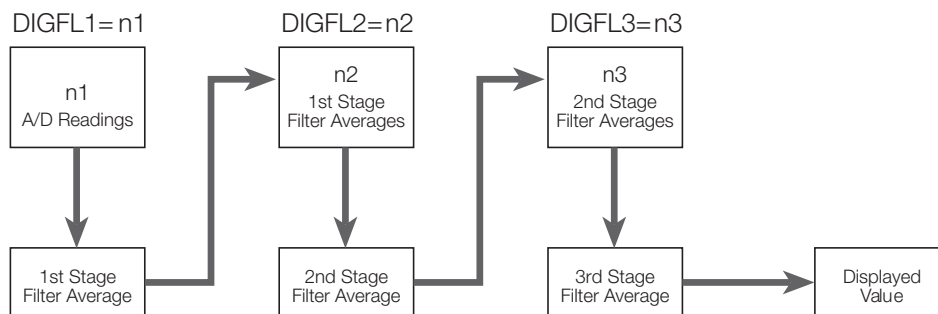


Figure 8-4. Flow Diagram for 390HE Digital Filters

8.6.1 DIGFLx Parameters

The first three digital filtering parameters, DIGFL1, DIGFL2, and DIGFL3, 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 (see Figure 8-4).

The overall filtering effect can be expressed by multiplying the values assigned to the three filter stages:

$$DIGFL1 \times DIGFL2 \times DIGFL3$$

For example, if the filters are configured as DIGFL1=4, DIGFL2=8, DIGFL3=8, the overall filtering effect is 256 (4 x 8 x 8). With this configuration, each A/D reading has a 1-in-256 effect on the displayed weight value. Setting the filters to 1 effectively disables digital filtering (1 x 1 x 1 = 1).

8.6.2 DFSENS and DFTHRH Parameters

The three digital filters can be used by themselves 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.

8.6.3 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 all three digital filters (DIGFL1, DIGFL2, DIGFL3) to 1. Set DFTHRH to NONE. Return indicator to normal mode.
2. Remove all weight from the scale, then watch the indicator display to determine the magnitude of vibration effects on the scale. Record the weight below which all but a few readings fall. This value is used to calculate the DFTHRH parameter value in Step 4.

For example, if a heavy-capacity scale produces vibration-related readings of up to 50 lb, with occasional spikes to 75 lb, record 50 lb as the threshold weight value.

3. Place the indicator in setup mode and set the digital filters (DIGFLx) to eliminate the vibration effects on the scale. (Leave DFTHRH set to NONE.) Reconfigure as necessary to find the lowest effective values for the DIGFLx parameters.
4. With optimum values assigned to the DIGFLx parameters, calculate the DFTHRH parameter value by converting the weight value recorded in Step 2 to display divisions:

$$\text{threshold_weight_value} / \text{DSPDIV}$$

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

5. Finally, set the DFSENS parameter high enough to ignore transient peaks. Longer transients (typically caused by lower vibration frequencies) will cause more consecutive out-of-band readings, so DFSENS should be set higher to counter low frequency transients.

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

8.7 Test Mode

In addition to normal and setup modes, test mode provides a number of diagnostic functions for the 390HE, including:

- Display raw A/D count
- Set A/D offset and gain calibration
- Reset configuration parameters to default values
- Print indicator configuration

To enter test mode, press and hold the setup switch until the front panel display shows the word *TEST*. After about three seconds, the test mode display automatically shifts to the first test menu function, A/DTST.



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

Figure 8-5 shows the Test Menu structure; Figure 8-6 shows the front panel key functions in test mode. Note that, because the Test Menu functions are all on a single menu level, the GROSS/NET (▽) key has no function. Press the ZERO (△) key to exit test mode.

Table 8-5 on page 37 summarizes the test menu functions.



Figure 8-5. Test Menu

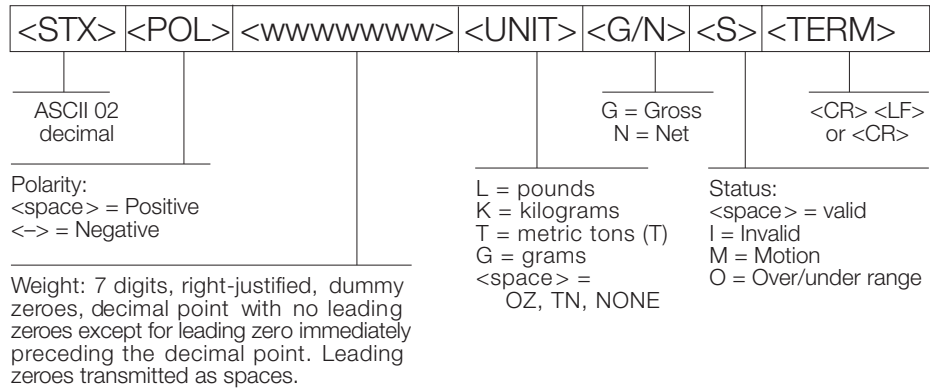


Figure 8-6. Front Panel Key Functions in Test Mode

| TEST Menu | |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function | Description |
| A/DTST | Display A/D test Press and hold Enter key to display raw count from A/D converter. |
| ADOFFS | A/D offset calibration (-0.5 mv/V) <i>Read Caution! statement on page 36 before using this function.</i> Press and hold the setup switch, then press the Enter key to perform offset calibration. |
| ADGAIN | A/D gain calibration (+4.5 mv/V) <i>Read Caution! statement on page 36 before using this function.</i> Press and hold the setup switch, then press the Enter key to perform gain calibration. |
| DEFLT | Default parameters Press and hold the setup switch, then press the Enter key to reset configuration and calibration parameters to factory default values. This function is equivalent to using the RESETCONFIGURATION EDP command followed by the RS (reset) EDP command. |
| PRTCFG | Print configuration Press the Enter key to print the indicator configuration to the serial port. This function is equivalent to using the DUMPALL EDP command. |

Table 8-5. Test Menu Functions

8.8 Specifications

Power

| | |
|-------------------|------------------------------------|
| Line voltages | 115 VAC |
| Frequency | 50 or 60 Hz |
| Power Consumption | 100 mA (using 4 x 350W load cells) |

Analog Specifications

| | |
|-------------------------|--------------------------------------------------|
| Full Scale Input Signal | Up to 17 mV |
| Excitation Voltage | 5 ± 0.25 VDC, 4 x 350Ω or 8 x 700Ω load cells |
| Sense Amplifier | Differential amplifier with |

Analog Signal

| | |
|----------------------|-------------------------------------------------------|
| Input Range | -2.5 mV/V – 22.5 mV/V |
| Sensitivity | 0.3 μV/graduation minimum, 1.5 μV/grad recommended |
| Input Impedance | 200 MΩ, typical |
| Noise (ref to input) | 0.3 μV p-p with digital filters at 4-4-4 |
| Internal Resolution | 2 ²⁰ (approx. 1 000 000) counts |
| Display Resolution | 999 999 dd |

4- and 6-wire sensing

| | |
|-----------------------|-------------------------------------------------------------------|
| Measurement Rate | 15 measurements/sec, nominal |
| Input Sensitivity | 155 nV per internal count |
| System Linearity | Within 0.01% of full scale |
| Zero Stability | 155 nV/°C, maximum |
| Span Stability | 4.0 ppm/°C, maximum |
| Calibration Method | Software, constants stored in EEPROM |
| Common Mode Voltage | 2.5 ± 25 VDC |
| Rejection | 140 dB minimum @ 50 or 60 Hz |
| Normal Mode Rejection | 90 dB minimum @ 50 or 60 Hz |
| Input Overload | ± 12 V continuous, static discharge protected |
| RFI Protection | Signal, excitation, and sense lines protected by capacitor bypass |

Digital Specifications

| | |
|-----------------|------------------------------------------------|
| Microcomputer | Phillips P51XAG30 microcontroller @ 12.288 MHz |
| Digital Filters | 3 filters, software selectable |

Serial Communications

| | |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|
| EDP/Printer Port | Full duplex RS-232 19 200, 9600, 4800, 2400, 1200, 600, 300 bps; 8 data bits, no parity, or 7 data bits, even or odd parity |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|

Operator Interface

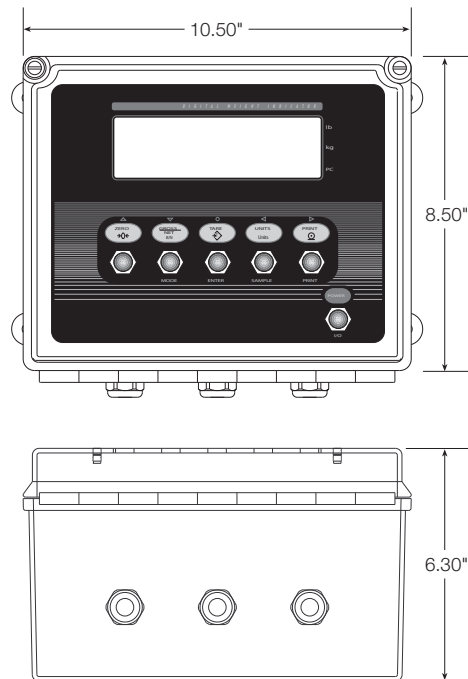
| | |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display | 6-digit LCD display: 7-segment, 1.0 in (25 mm) digits |
| Additional Symbols | Annunciators for gross, net, standstill, center of zero, tare, low battery. ▷ annunciators for units (lb/kg), piece count mode (PC). Adhesive labels provided for units other than lb and kg. |
| Keyboard | 5 pushbutton switches |

Environmental

| | |
|-----------------------|----------------------------------------------------|
| Operating Temperature | -10 to +40°C (legal); -10 to +50°C (industrial) |
| Storage Temperature | -25 to +70°C |
| Humidity | 0-95% relative humidity |
| Altitude | 2000 m (6500 ft) maximum |

Enclosure

Enclosure Dimensions:



| | |
|------------------|-----------------|
| Weight | 6.8 Lb (3.1 Kg) |
| Shipping Weight: | 7.5 Lb (3.4 Kg) |
| Rating/Material | NEMA 4X |

| | |
|----------------|----------------------------------|
| NTEP | |
| CoC Number | 98-203 |
| Accuracy Class | III/III L $n_{max} : 10\ 000$ |

| | |
|--------------------|-------------------------|
| Measurement Canada | |
| Approval | AM-5300 |
| Accuracy Class | III $n_{max} : 10\ 000$ |

III HD $n_{max} : 20\ 000$

| | |
|--------------------|-------------------------------------------------------|
| Measurement Canada | |
| Approval | AM-xxxx |
| Accuracy Class | III $n_{max} : 10\ 000$ III HD $n_{max} : 20\ 000$ |



SURVIVOR® 390HE 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.

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

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RICE LAKE WEIGHING SYSTEMS • 230 WEST COLEMAN STREET • RICE LAKE, WISCONSIN 54868 • USA



230 W. Coleman St. • Rice Lake, WI 54868 • USA
U.S. 800-472-6703 • Canada/Mexico 800-321-6703
International 715-234-9171

www.ricelake.com

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