LaserLT-60 and LaserLT-100

Large-Display Weight Indicators
Firmware Version: 8.05

Technical Manual

LaserLT-60

LaserLT-100

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WEIGHING SYSTEMS

Revision History

This section tracks and describes the current and previous manual revisions for awareness of major updates and when the updates took place.

Revision	Date	Description
A	January 27, 2021	Initial manual release with the launch of the product; firmware version 8.05
B	November 1, 2021	Updated wording in section 3.3; updated part number of available firmware
C	March 24, 2022	Added installation information
D	December 21, 2022	Added cord grip specifications

Table i. Revision Letter History

*Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at **www.ricelake.com/training** or obtained by calling 715-234-9171 and asking for the training department.*

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*Rice Lake continually offers web-based video training on a growing selection of product-related topics at no cost. Visit **www.ricelake.com/webinars***

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1.0   Introduction

The purpose of this manual is to help the technician understand the LaserLT-60 and LaserLT-100 Large-Display Weight Indicator functioning modes, key functions, display indications, setup and configuration. Configuration and calibration of the indicator can be accomplished by pressing the indicator front panel keys, the serial command set or the RLTools utility. The LaserLT-60 and LaserLT-100 Large-Display Weight Indicators are designed to work with up to 4 load cells in either a dependent or independent channel mode.

NOTE: The LaserLT-60 and LaserLT-100 require firmware version 8.05 to operate as a weight indicator. Firmware can be downloaded from the product page at www.ricelake.com and a replacement board (PN 206796) is also available with the weight indicator firmware version 8.05 already installed.

Manuals are available from Rice Lake Weighing Systems at **www.ricelake.com/manuals**

Warranty information is available at **www.ricelake.com/warranties**

1.1   Safety

Safety Definitions:

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death. Includes hazards that are exposed when guards are removed.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.

IMPORTANT: Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

General Safety

Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed could result in serious injury or death.

Electric shock hazard!

There are no user serviceable parts. Refer to qualified service personnel for service.

The unit has no power switch, to completely remove power from the unit, disconnect the power source.

For pluggable equipment the socket outlet must be installed near the equipment and must be easily accessible.

Always disconnect from main power before performing any work on the device.

Do not allow minors (children) or inexperienced persons to operate this unit.

Do not operate without all shields and guards in place.

Do not use for purposes other then weighing applications.

Do not place fingers into slots or possible pinch points.

Do not use this product if any of the components are cracked.

Do not make alterations or modifications to the unit.

Do not remove or obscure warning labels.

Do not use near water, avoid contact with excessive moisture.

1.2 FCC Compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

1.3 Disposal

Product Disposal

The product must be brought to appropriate separate waste collection centers at the end of its life cycle.

Proper separate collection to recycle the product helps prevent possible negative effects on the environment and to health, and promotes the recycling of the materials. Users who dispose of the product illegally shall face administrative sanctions as provided by law.

1.4   Product Dimensions

Product	Dimensions
LaserLT-60	
LaserLT-100	
Standard Mounting Bracket for LaserLT-60 and LaserLT-100	
Optional Side Mount Bracket for LaserLT-100	

Table 1-1. Product Dimensions

1.5   Product Displays

The front panel of the LaserLT-60 Weight Indicator has a six digit display that is 2.4" high, six LED annunciators and five function keys.

The front panel of the LaserLT-100 Weight Indicator has a six digit display that is 3.9" high, six LED annunciators and five function keys.
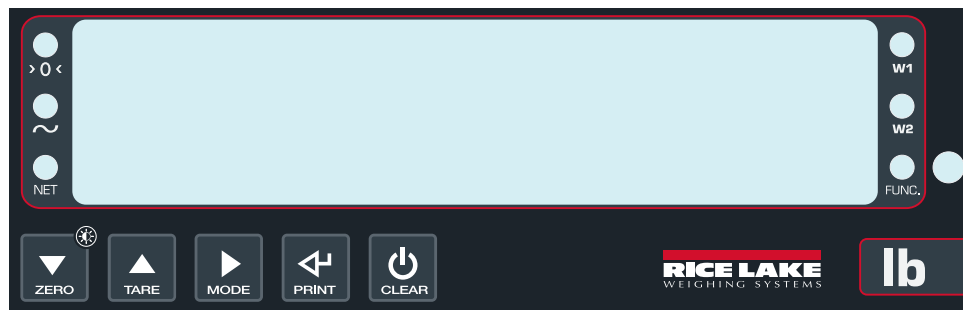

Figure 1-1. LaserLT-60 Weight Indicator Front Panel

The following table describes the function keys:

Key	Description
▼ ZERO	Zero – Clears the displayed gross weight of up to ± 2% of the total capacity; Cancels tare; At power up – Momentary press during startup displays current settings (Section 3.1 on page 17); In setup – Scroll through parameters; In numeric input – Decreases the digit to be modified; To modify display intensity press and hold until L in⊢ 01 (Lint 01) displays then press again to increment the display intensity from L in⊢ 01 – L in⊢ 05 (Lint 01 – Lint 05)
▲ TARE	Tare – Momentary press executes semiautomatic tare; Cancels tare; At power up – Momentary press during startup displays **Setup** mode (Section 4.1 on page 24); Long press allows for entering a manual tare from the keyboard; In setup – Scroll through the parameters; In numeric input – Increases the digit to be modified
▶ MODE	Mode – Executes a specific function (set in the **Setup** mode) (Section 3.11 on page 21); Long press allows for toggling the displayed channel (if configured in **Independent Channels** mode (ınd .Ch); At power up – Momentary press during startup displays quick **Setup** menu (Section 4.2 on page 25); In setup – Enter into a parameter or to confirm a setting; In numeric input – Confirms the entry made
⏎ PRINT	Print – Executes a specific function (set in the **Setup** mode) (Section 4.4.1 on page 33); Executes a printout or transmission of data from the serial port dedicated to the printer; In setup – Enter into a parameter or to confirm a setting; In numeric input – Confirms the entry made
⏻ CLEAR	Clear (Power On/Off) – Turns the instrument on and off; In setup – Press multiple times to display SAUE? and/or press to exit a step without confirming the setting; In numeric input – Momentary press clears the present value; Long press beyond -oFF- – Displays information of the scale (capacity, division, minimum weight for each configured range, gravitational acceleration value, number of configured channels)

Table 1-2. Front Panel Key Descriptions

The following table describes the function LEDs:

Annunciator	Description
>0<	Illuminates when the weighing system is within ±1/4 division of zero
~	Illuminates when the weight is unstable
Net	Illuminates when a tare is established, measuring net weight
W1	Indicates the activation of the first output (Sp1)
W2	Indicates the activation of the second output (Sp2)
Func	Illuminates: • When the specification function of the instrument is active (set in F .ℿodE→FunĿⱠ parameter) • When a key is pressed Turns off: • When the specification function of the instrument is disabled with an active function • Blinking indicates instrument function is active for five seconds

Table 1-3. LED Annunciator Descriptions

> **NOTE: Net, W1 and W2 require setting values in Adv.CEd.**
> **The labeled default unit of measurement is pound.**
> **A kilogram sticker label is provided with the unit to indicate a change in units of measurement.**
> **Stickers for unit of measurement are provided to replace W1 and W2 function LED labels.**

2.0   Installation

This section provides an overview of LaserLT-60 and LaserLT-100 Weight Indicator installation.

Install the instrument on a stable, vibration free, flat surface. Disconnect from power source to completely power off the instrument. The back mounting bracket is for vertical mounting. An optional side mount for horizontal surfaces is available for the LaserLT-100.

(i) *IMPORTANT: Remove protective film from the overlay as it may become difficult to remove if exposed to heat or sunlight.*

2.1   Electrical Precautionary Measures

(i) *IMPORTANT: The following electrical precautionary measures must be considered when installing this equipment:*

* *Main power supply must be maintained within ± 10% of the rated voltage*

* *Electrical best practices must be observed by the installing technician*

* *Follow recommended minimal separation distances given for cable categories, See Section 2.2*

* *The extension leads of the load cells, or signal amplifiers connecting to the serial ports and analog output, must be within stated maximum lengths, See Section 2.2*

* *It is recommended that load cell cables are shielded and run in conduit at an acceptable distance from power transmission lines to avoid signal interference and signal noise*

* *All cable not in conduit or otherwise shielded should be of minimal length and terminated as close to conduit exit as possible to avoid extraneous signal noise*

* *Install RC filters on the contact coils, solenoid valves and all devices producing electric fields*

* *It is recommended to leave the instrument powered on at all times to avoid condensation forming on the inside of the instrument*

2.2   Maximum Cable Length

Load Cell Cable
The maximum length of a standard load cell cable with sense wires is:

* 150 ft (45.72 m) at 30#AWG
* 300 ft (91.44 m) at 24#AWG

RS-232 Cable
The maximum length of the RS-232 cable is 50' with a maximum baud rate of 19200.

RS-485 Cable
The maximum RS-485 cable length is 4000'.

Analog Output Cable
The maximum length of the analog current output cable at 4-20mA is 300'.
The maximum length of the analog voltage output cable at 0-10VDC is 150'.

2.3   Grounding the System

A centrally located, single point ground, such as the ground bar of the electric panel, must be created and/or identified for proper grounding and functioning of the system. The ground must be sized so that the total resistance of grounding is lower than 1Ω. Connect grounding points of all instrumentation, load cells and weighing structure to this single point ground.

2.4 Wiring Schematic

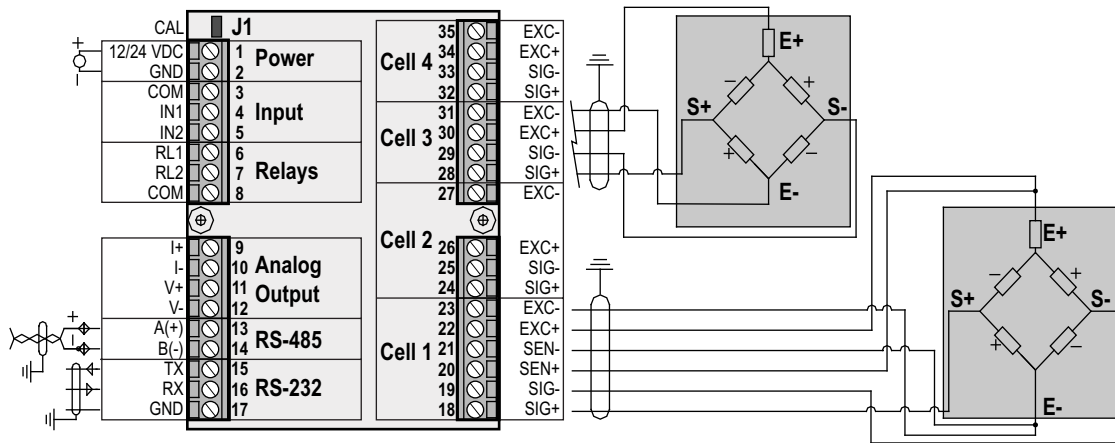For proper device wiring, refer to Figure 2-1 and Table 2-1.

Figure 2-1. Wiring Schematic

Pin Number	Label	Description
VE 12-24 VDC Power Supply		
1	+VDC	+12-24 VDC
2	GND	0VDC (GND)
Inputs and Outputs		
Optoisolated Inputs Positive Logic (12-24VDC,5-20mA max)		
3	COM	Common Output
4	IN1	Input 1
5	IN 2	Input 2
Relays		
6	RL1	Relay 1
7	RL2	Relay 2
8	COM	Common Relay

Pin Number	Label	Description
Analog Output		
Voltage		
9	I+	+20mA
10	I-	-0mA (GND)
Current		
11	V+	+10V
12	V-	0V (GND)
Serial Port		
RS-485		
13		(A) 485 + Line
14		(B) 485 - Line
RS-232		
15	TX	Transmission
16	RX	Reception
17	GND	Ground

Pin Number	Label	Description
Load Cell 1		
18	SIG+	Signal +
19	SIG-	Signal -
20	SEN+	Sense +
21	SEN-	Sense -
22	EXC+	Excitation +
23	EXC-	Excitation -
Load Cell 2		
24	SIG+	Signal +
25	SIG-	Signal -
26	EXC+	Excitation +
27	EXC-	Excitation -

Pin Number	Label	Description
Load Cell 3		
28	SIG+	Signal +
29	SIG-	Signal -
30	EXC+	Excitation +
31	EXC-	Excitation -
Load Cell 4		
32	SIG+	Signal +
33	SIG-	Signal -
34	EXC+	Excitation +
35	EXC-	Excitation -

Table 2-1. LaserLT-60 and LaserLT-100 Wiring Schematic

NOTE: The maximum resistance applicable on the output current is 350 Ω and the minimum resistance applicable on the output voltage is 10 kΩ.

2.5   Connection to the Load Cell

The load cell 1 terminal board of the LaserLT-60 and LaserLT-100 must be connected to the 6-wire load cell; if using a 4-wire load in the load cell 1 terminal board, cell excitation must jumper to sense, see Figure 2-2. Load cells 2, 3, and 4 must be connected to 4-wire load cells, see Figure 2-3.

> **IMPORTANT: Sense is always enabled and, when not using 6-wire load cell, the sense terminals must be jumpered to the same polarity excitation wires.**

> **NOTE: Sense compensates for drops in voltage along the cable that connects the instrument to the load cell. Voltage is lost when the instrument and the load cell are greater than 30 ft apart. A cable is typically provided with a load cell. When exceeding the length of the provided load cell cable, six wires must be used to compensate for voltage drop. It is recommended to never cut or shorten the load cell cable.**
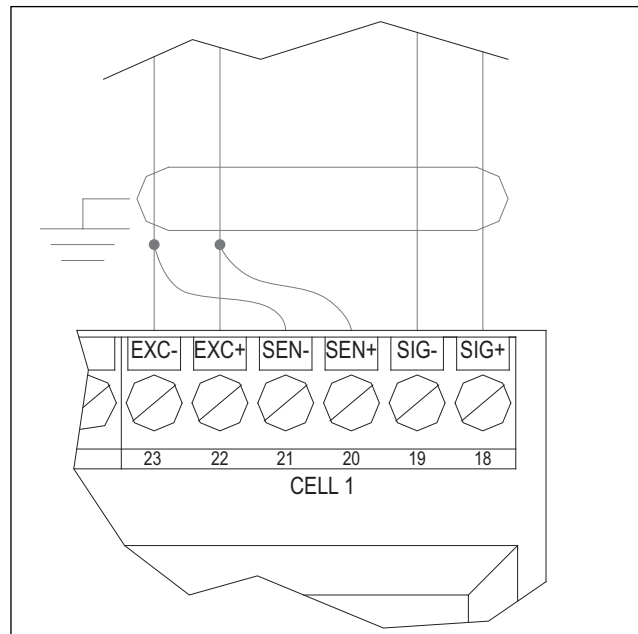
Figure 2-2. Jumpered 6-Wire Connect
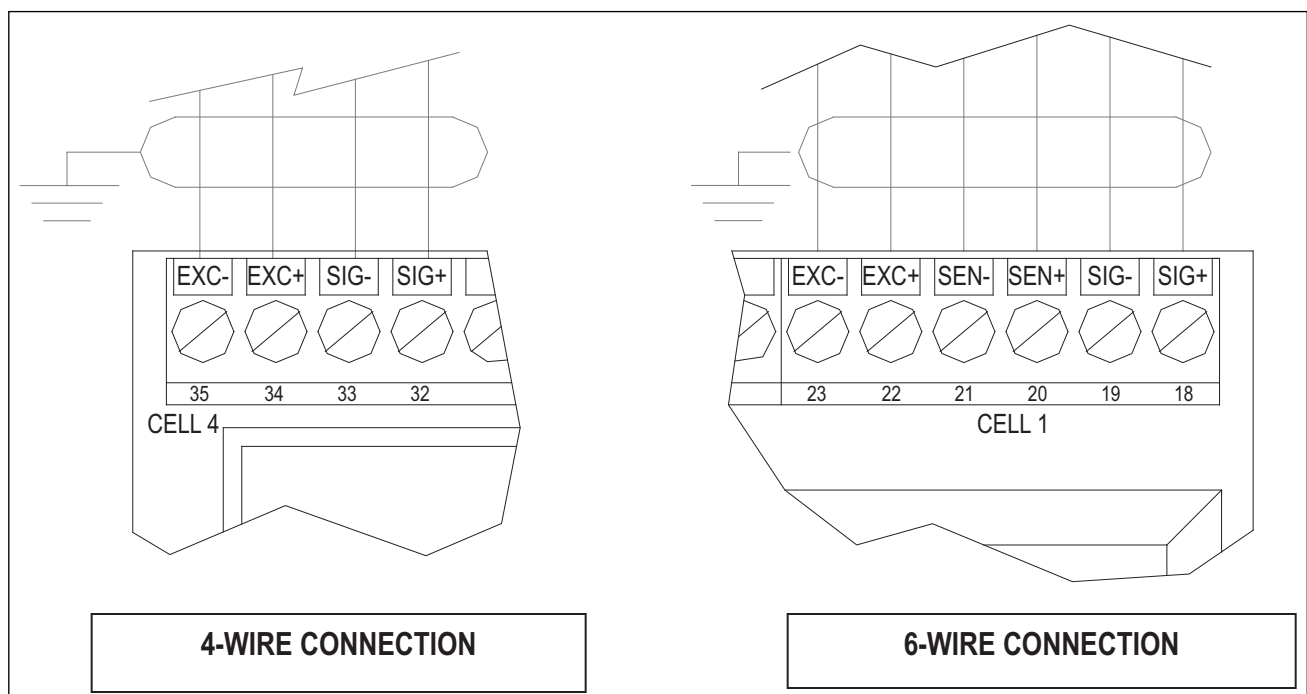
Figure 2-3. 4- and 6-Wire Connections

2.5.1 Input/Output Wiring
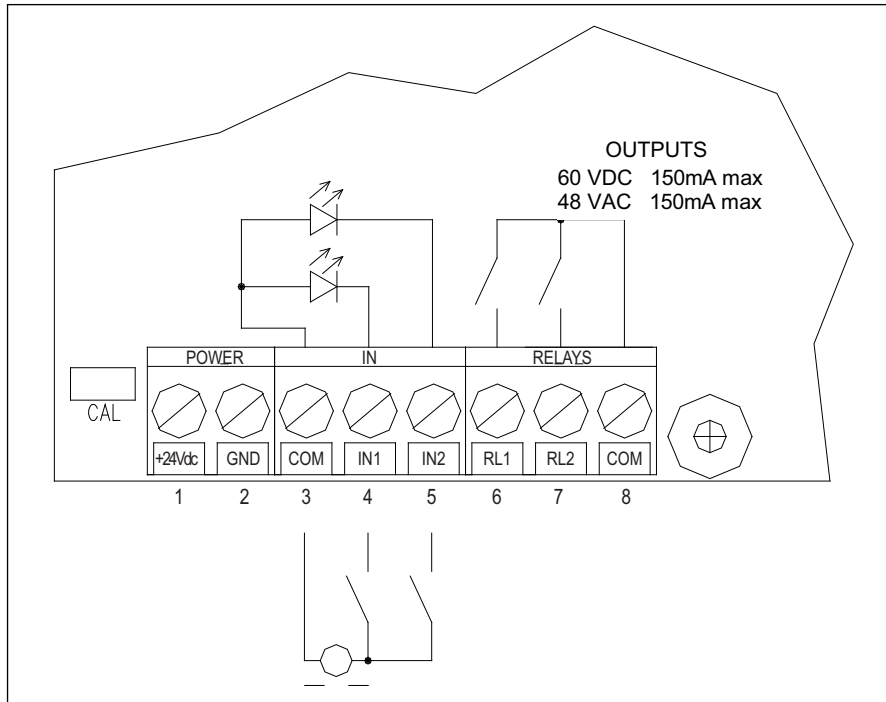
Figure 2-4. Input/Output Wiring

- Output power: 48 VAC, 150 mA max (or 60 VDC, 150 mA max)
- Input voltage: 12 VDC - 24 VDC max
- Input current: 5 mA min - 20 mA max

2.6 Basic Operation

Power must be provided to the LaserLT through an external AC/DC charger that supplies a stabilized voltage of 12 VDC to 24 VDC while connected to an appropriately rated AC power supply. Connect the two power supply wires to the appropriate terminals on the side of the instrument.

2.6.1 Power Supply

The instrument is supplied with an AC power cord, connected to an internal AC/DC power adapter. To power the instrument with 12 VDC or 24 VDC, connect the power supply cable directly to the terminal strip on the CPU board, see J1 in Figure 2-1 on page 12. This input is for static DC, not for an automotive source.

The maximum power of the outputs 48 VAC 0.15A max (or 60 VDC 0.15 A max), the maximum voltage applicable to the inputs is between 12 VDC and 24 VDC with current from minimum 5 mA to maximum 20 mA.

2.6.2 Cable Specifications

Cord Grip	Part Number	Diameter Range
PG9	15626	0.138 - 0.315 in (3.5 - 8 mm)

Table 2-2. Cord Grip Specifications

Connector	Torque
Around cables	22 in-lb
Cord grip to enclosure	33 in-lb

Table 2-3.   Cord Grip Torque Specifications

2.7   Legal-for-Trade

In Legal-for-Trade applications, it is necessary to modify and seal the unit.

2.7.1   LED Modification

Cover the lower LED of each decimal separator with black epoxy or equivalent.

NOTE: Do not cover or block the upper LED. Each digit must show a period.

If any digit displays a coma while powered on the device is not Legal-for-Trade.
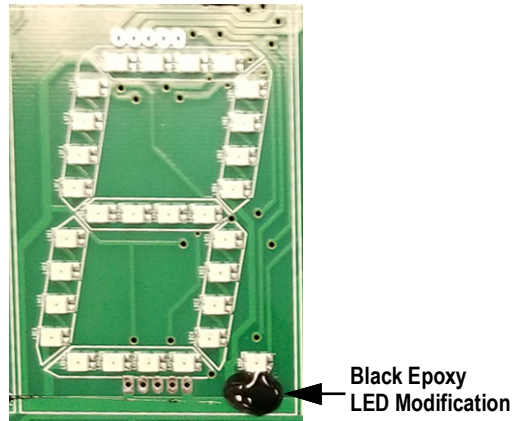
Figure 2-5. Black Epoxy LED Modification

2.7.2   Sealing

In certain Legal-for-Trade applications, it is necessary to seal the unit to restrict access.

Seal the LaserLT-60 and LaserLT-100 Weight Indicators as shown below:

NOTE: For proper sealing, four standoff screws (PN 202259) (not provided) are required.

1. Remove the four corner screws of the unit.
2. Install four standoff screws (PN 202259) (not provided) where the four corner screws have been removed in Step 1.
3. Feed sealing wire through two standoff screws located on the same side of the unit.
4. Crimp the sealing wire for proper sealing.
5. Repeat for the other side of the unit.
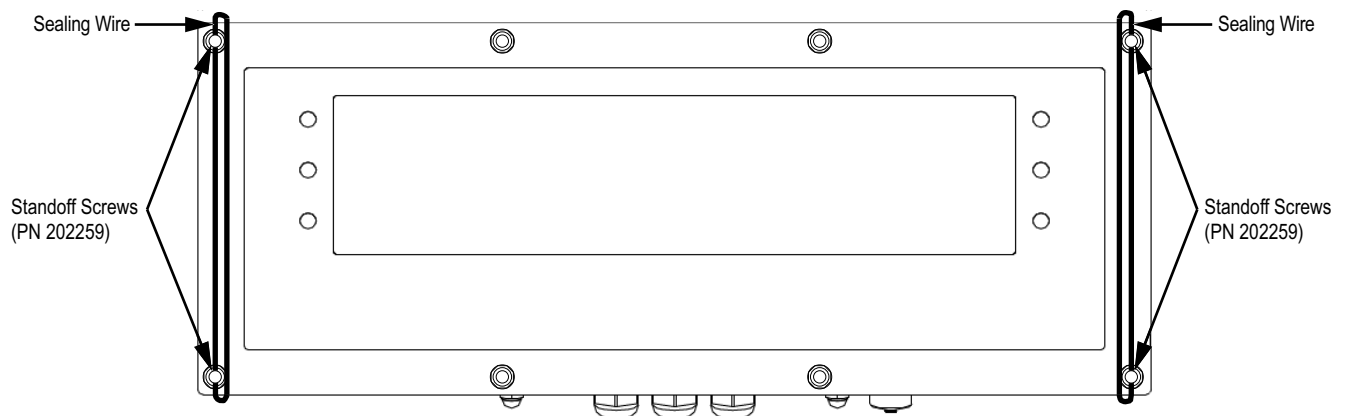
Figure 2-6. LaserLT-60 Weight Indicator Four-Point Sealing Method

Seal the LaserLT-100 Weight Indicator as shown below:

Sealing Wire

Standoff Screws
(PN 202259)

Sealing Wire

Standoff Screws
(PN 202259)
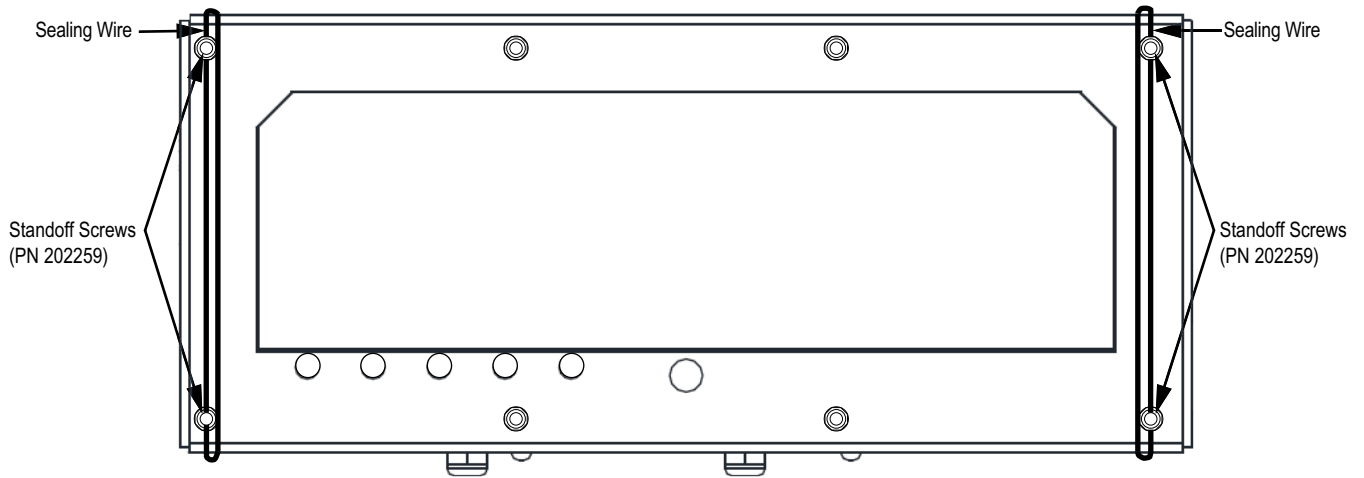
Figure 2-7. LaserLT-100 Weight Indicator Four-Point Sealing Method

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3.0 Operation

This section provides an overview of LaserLT-60 and LaserLT-100 Weight Indicator operation.

3.1 Power On

Press [⏻ CLEAR] until the unit powers on. The unit executes a start up procedure and displays the installed software version.

An auto zero function zeros the instrument at startup if the weight detected on the scale is ± 10% of the capacity.
If the weight is not within this tolerance the instrument displays *2Er0* and, after 10 seconds, the current weight is displayed.

> **NOTE: The auto zero function at startup can be disabled in the Setup mode.**
>
> See *5EtuP*→*Conf iG*→*PArAN*→*Auto-0* in **Table 4-6 on page 31.**

To view the following settings momentarily press [▼ ZERO] while the display self-check is running:

- *HH.YY – HH* – The software release and *YY* is the sub release
- *HH.YY – HH* – Indicates the type of instrument, *YY* indicates the software version
- *HH.YY.22* – The installed software version
- *HHHHHH* – The name of the installed software
- *HHH.HHH* – Capacity and division of channel 1
- *h irES* – Displayed together with the gravitational acceleration value of the area of use

The instrument then executes a self-check.

3.2 Standby

Press then hold [⏻ CLEAR] until *OFF* displays. The LED at the left of the display remains on.

3.3 Power Off

To completely power off the unit, remove the power supplied voltage.

3.4 Zero

Press [▼ ZERO] to zero a gross weight within ± 2% of the total capacity (or as set). Weight value displays as 0 and the relative annunciators illuminate.

3.5 Tare

3.5.1 Semiautomatic Tare

Press [▲ TARE] to tare the weight value on the scale. *tArE* displays momentarily then 0 displays (net weight). The relative annunciators illuminate.

3.5.2 Manual Tare

Press [▲ TARE] for a few seconds. *-tN-* displays and then *000000*. Enter the desired tare value with the following keys:

- [▶ MODE] selects the digit to be modified (moves left to right, selected digit blinks)
- [▼ ZERO] decreases the blinking digit
- [▲ TARE] increases the blinking digit
- [⏻ CLEAR] momentary press clears the present value, long press returns to the *Weigh* mode without saving changes
- [⏎ PRINT] confirms the entered tare value

The tare value is subtracted from the weight on the scale and the relative annunciators illuminate.

> **NOTE: The entered tare will be rounded off to the nearest division.**

3.5.3　Cancel a Tare

A tare value can be manually canceled in multiple ways:

- Unload the scale and press [▲ TARE] or [▼ ZERO]

- Press [⏻ CLEAR] without unloading the scale

- Enter a manual tare equal to zero

3.5.4　Locked or Unlocked Tare

When a tare value is entered manually, automatically or from storage the tare value displays with a negative sign when the scale is unloaded. This is known as a locked tare. An unlocked tare is automatically canceled each time the scale is unloaded.

To set the tare type:

1. Turn on the instrument and press [▲ TARE] while the firmware version displays. $F.\Pi odE$ displays.

2. Press [⏎ PRINT] to enter the menu.

3. Press [▼ ZERO] or [▲ TARE] until $tArE$ displays. Press [⏎ PRINT] to select.

4. Press [▼ ZERO] or [▲ TARE] to scroll through options.
    - $LoC\bar{h}$ – Locked tare
    - $unLoC\bar{h}$ – Unlocked tare
    - $d\,i5Ab$ – Disable tare

5. Press [⏎ PRINT] to confirm selection.

6. Slowly press [⏻ CLEAR] multiple times until $5AUE?$ displays.
    - Press [⏎ PRINT] to confirm and store to the instrument memory
    - Press any other key to cancel and exit without saving

3.6　Multi-Range Function

The multi-range function allows for subdividing the scale capacity in two, each up to 3000 divisions.

> *Example: With a 10 kg cell platform it is possible to approve the weighing system with:*
>
> > *Single Range: 6 kg capacity and 2 g division (3000 div.)*
> >
> > *Dual Range: 6/3 kg capacity and 2/1 g division (3000 + 3000 div.)*

📝 ***NOTE:*** *Multi-range functioning is indicated by illumination of the relative LED identifying the operating range.*
When the weight on the scale enters into the second range, the division of the second range is enabled.
The first range division is restored only when the weight on the scale goes below the gross zero of the scale.

The selection of the range number with multi-range functioning is made during the instrument's calibration (**).

3.7   Display Configuration Data

The *ınFO* function makes it possible to view the configuration data:

- First range capacity, first range minimum weight, first range division
- Second range capacity, second range minimum weight, second range division (if set)
- Gravitational Acceleration Value

NOTE: The minimum weight corresponds to 20 net weight divisions.

The data of the second range appears only if a range is configured.

To view the configuration data:

1. Press and hold [⏻ CLEAR] until *ınFO* displays.

2. Release [⏻ CLEAR]. The capacity value of the first range displays. Press [▼ ZERO] or [▲ TARE] to scroll forward or back through the following data.
    - First range capacity *(Ch 1.ΠAH)*
    - First range minimum weight *(Ch 1.Π ın)*
    - First range division *(Ch 1.E)*
    - Second range division *(Ch 1.ΠAH)*
    - Second range minimum weight *(Ch 1.Π ın)*
    - Second range division *(Ch 1.E)*
    - Gravitational Acceleration Value *(GrAU ıE)*
    - Number of Configured Channels *(ConF.Ch)*

3. Press [⏻ CLEAR] to return to the **Weigh** mode.

Pressing [▶ MODE] when information of the currently active channel is displayed allows for the data of the other configured channels to be viewed. This selects and pauses the information for each channel, otherwise the information automatically cycles through all channels.

Example: If channels 2 and 3 are configured, for the maximum capacity of the 1st range:

1st range capacity channel 1 (1 Ch 1.ΠAH). Press [▶ MODE]. 1st range capacity channel 2 (Ch2 .ΠAH).

Press [▶ MODE]. 1st range capacity channel 3 (Ch3 .ΠAH).

3.8   Selecting the Channel to be Displayed

When indicator has multiple scale channels configured in *ErAnSΠ* type mode or *ınd .Ch* type mode, it is possible to select the channel to be displayed using [▶ MODE]. See Section 4.3.1 on page 28 for configuring type parameters. See Section 4.4 on page 31 for configuring the number of channels.

1. Press and hold [▶ MODE]. The currently selected channel displays first followed by *ChAn* momentarily. A menu of available channels displays.

2. Select the channel to be displayed. Press [⏎ PRINT] to confirm.

3.9   Simultaneous Transmitter Mode

The *Transmitter* mode makes it possible to have simultaneous transmission of the values on each single channel via the serial line. In addition, through the optional alibi memory board, the transmitted weight values can be stored in a computer for data processing and/or integration. The filed values can then be recalled from the PC serial line or directly on the instrument's display. See Section 4.3.1 on page 28 for configuring type parameters and Section 4.4 on page 31 for configuring the number of channels.

📝 *NOTE: In this mode the zero tracking and the scale keys* ▼(ZERO), ▲(TARE) *and* ⏎(PRINT) *are disabled. It is not possible to set*

functioning modes and the Aibi mode is set automatically.

To set the *Transmitter* mode:

1. Power on the instrument and press ▲(TARE) while firmware version displays. *type* displays.

2. Press ⏎(PRINT) to enter the menu.

3. Navigate until *trAnSN* displays. Press ⏎(PRINT) to select.

4. Press ⏻(CLEAR) multiple times until *SAUE?* displays. Press ⏎(PRINT) to confirm.

Operation

In the simultaneous *Transmitter* mode it is possible to view the weighing information. See Section 3.11.2 on page 21 regarding Reviewing Stored Weigh Information.

- Press ▶(MODE) to switch channels, if the scale is configured as multichannel
- Only functions which can be enabled through serial commands can be performed; Not all serial commands can be performed (Section 6.3 on page 51); It is not possible to carry out other operations in simultaneous *Transmitter* mode
- The list of usable serial commands includes: *PID*, *ALRD*, *ALDL*, *VER*, *REXT*, *REXTA*, *READ*, *MVOL*, *RAZF*, *CGCHN*, *ECHO*, *DISP*, *DINT*, *PCOK*, *STAT*, *KEYP*, *KEYR*, *KEYEE*, *KEYED*

📝 *NOTE: Pressing simulation of the scale keys through the KEYP and KEYR commands allows for management of the*

functions linked to ▶(MODE).

3.10   Selecting Printing Functions

Use the following procedure below to set printing functions (Section 4.3.2 on page 28):

1. Turn on the instrument and press ▲(TARE) while the firmware version displays. *F.NodE* displays.

2. Press ⏎(PRINT) to enter the menu.

3. Press ▼(ZERO) or ▲(TARE) until *rEACt* displays. Press ⏎(PRINT) to enter the menu.

4. Press ▼(ZERO) or ▲(TARE) to scroll through the options.
    - *2Ero* – Rearms print at zero; Only prints after rearming
    - *inSt* – Rearms print when weight becomes stable
    - *ALUAYS* – Prints when ⏎(PRINT) is pressed, regardless of condition

5. Press ⏎(PRINT) to confirm.

6. Slowly press ⏻(CLEAR) multiple times until *SAUE?* displays.
    - Press ⏎(PRINT) to confirm and store to the instrument memory
    - Press any other key to cancel and exit without saving

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3.11   Selecting the Operating Mode

In addition to the *Standard Weighing* mode, the instrument can be set to carry out four alternative operational functions.

Each operating mode activates certain LEDs.

To set the operating mode:

1.   Turn on the instrument and press ▲ (TARE) when firmware version displays then *F.ΠodE* displays.

2.   Press ⏎ (PRINT) to enter the menu.

3.   Navigate to *FunCt*. Press ⏎ (PRINT) to enter the menu.

4.   Select operating mode:
    • *ConUEr* – Convert displayed value to a calculated value (Section 3.11.1)
    • *ALib i* – Alibi memory (Section 3.11.2)
    • *U i55* – Sensitivity times ten (Section 3.11.3 on page 22)
    • *PEAh* – Peak hold detector (Section 3.11.4 on page 23)

5.   Press ⏎ (PRINT) to confirm selection.

6.   Slowly press ⏻ (CLEAR) multiple times until *5AUE?* displays.

    • Press ⏎ (PRINT) to confirm and store to the instrument memory
    • Press any other key to cancel and exit without saving

3.11.1   Conversion

This function toggles the displayed weight between the scale unit of measure and an alternative unit measure.

    • Long press ▶ (MODE) to set the conversion factor

    • Short press ▶ (MODE) to toggle between the unit of measures

    • Press ⏎ (PRINT) to save the conversion value

3.11.2   Alibi Memory

The alibi memory allows for transmitted weight values to be filed in the PC for data processing and/or integration.

The filed values can then be recalled from the PC serial line or directly on the instrument's display for a following check.

Storage of a weight value occurs following the reception of the serial command or by pressing ⏎ (PRINT). The instrument transmits the gross and tare weights and an ID on the serial port.

The ID has the format: <Rewriting number>-<Weigh number>

    • The rewriting number is a five digit number from 00000-00255; It indicates the number of complete rewritings of the alibi memory
    • Weigh number is a six digit number from 000000-131072; It indicates the weigh number in the current rewriting of the alibi memory; The weigh number is increased by 000001 with each weigh storage; Once the value reaches 131072, it restarts from 000000

The storage of a weigh value occurs only if the gross weight is greater than or equal to zero, it is stable and valid (not in under-load or overload). Depending on how *F.ΠodE→rEACt* has been configured in the technical set up, the storage of a weight by pressing a key is possible only if the condition is met (weight exceeds zero, weight instability or always).

Reviewing Stored Weigh Information

To review stored information:

1. Press [MODE] . ᵣEᵂ . ᵢd displays.

2. Enter the rewriting number (from 00000-00255).

3. Press [PRINT] . ᵢd displays.

4. Enter the weigh number (from 000000-131072).

5. Press [PRINT] . The weigh information displays.

6. Press [ZERO] or [TARE] to view the weigh information.

   • cʰ . ᴴ-ᴴ is the scale number (from 1-4)
   • uᴺ ᵞᵞ-ᵞᵞ is the unit of measure (Lb, ᴷᴳ, ᴳ)
   • ᴳᵣoss momentarily displays and then the gross weight value
   • ᵗᴬᵣᴱ or ᵗᴬᵣᴱᴾᵗ (manual tare) momentarily displays and then the tare weight value

7. Press [CLEAR] to return to the **Weigh** mode.

> 📝 NOTE: If the alibi memory is empty and [MODE] is pressed, ᴱᴺᴾᵗᵞ displays momentarily and the instrument returns to the Weigh mode.If the entered ID is not valid, no ᵢd displays and the instrument returns to the Weigh mode.

Clearing the Alibi Memory

The alibi memory can be cleared directly on the instrument in the ᔆᴱᵗuᴾ→ ᵢnᵢ.ᴬL parameter.

1. Turn on the instrument and press [TARE] while the firmware version displays. F.ᴺodᴱ displays.

2. Press [ZERO] until ᔆᴱᵗuᴾ displays. Press [PRINT] to enter the menu.

3. Press [ZERO] or [TARE] until ᵢnᵢ.ᴬL displays. Press [PRINT] . ᵢ.ᴬL ᵢb.ᴾ displays.

4. Press [PRINT] to clear the alibi memory or any other key to cancel.
   • ᴬL.Oᴷ displays if the operation is successful
   • ᴬL.ᴱᵣᵣ displays if the memory was not successfully cleared (repeat procedure)

5. Press [CLEAR] to return to the **Weigh** mode.

> 📝 NOTE: It is not possible to clear an individual weigh record.

3.11.3 Sensitivity Times Ten

This mode converts the weight to sensitivity times ten for display and is used for testing during calibration.

Press [MODE] to toggle the weight display between standard sensitivity and sensitivity times ten.The last digit on the right of the display has a sensitivity equal to the scale's division divided by 10.

3.11.4 Peak Hold Weight Detection

This mode can be used to store the maximum (peak) weight value measured during the weighment.

Operation

If Peak Hold Weight Detection has been set as the functioning mode, the following functions are enabled while in **Weigh** mode:

1. Press [MODE ▶] to enable the peak weight detection. -PEAK- displays alternately with the maximum weight value reached up to that point.

2. Press [MODE ▶] again to terminate the peak weight detection. Peak weight detection also terminates if the weight surpasses the maximum capacity of the instrument. In both cases, PEAK.oF displays and then the current weight on the scale displays. The detected weight value will be:
   • The maximum before a rapid decrease of the weight (measurement of the highest weight)
   • The maximum and persistent weight detected on the scale

> **NOTE: Exit the Peak mode to toggle from one scale to another when multiple scales are connected to the instrument.**

Setting Sampling Time

To set the minimum sample time of the peak weight detection while in **Weigh** mode:

1. Press and hold [PRINT ↵].

2. Select P iC.ELП. -EP- displays followed by a number which corresponds to the minimum time length of the impulse expressed in hundredths of seconds.

3. Press [ZERO ▼] or [TARE ▲] until the desired value displays. See Table 3-1 for a list of settable values.

4. Press [PRINT ↵] to confirm. The instrument returns to the **Weigh** mode.

Time in 1/100 sec	Sample per Second	Acquired Values	Mediated Values
1	400	1	1
2	200	1	1
3	100	1	1
4	100	4	2
5	50	4	2
10	25	4	2
20	12	4	2
50	6	4	2
100	6	8	2
127	6	12	2

Table 3-1. Sample Times in Peak Weight Detection

The peak detection function sensitivity is dependent on the parameter set. The higher the number of samplings, the greater the sensitivity. If an unexpected peak is detected immediately, decrease the sensitivity.

> *Example: If 0.000 lb is on the load cell of 20 lb (350 Ω), and the sampling time is equal to 1, when the peak function is enabled, 0.005 lb displays.*

4.0   Setup Mode

The **Setup** mode is used to set the functioning parameters of the instrument.

There are two setup menus in the LaserLT-60 and LaserLT-100 Weight Indicator:

Quick Setup Menu

The **Quick Setup** menu is a limited menu that includes settings essential to basic scale configuration such as quick calibration and communication. See for more information on the **Quick Setup** menu

- To enter the **Quick Setup** menu, press ⏻ **CLEAR** to turn the instrument on then press ▶ **MODE** as the firmware version displays

Setup Mode Menu

The **Setup Mode** menu is a more in-depth menu that incorporates all configuration settings. See for more information on the **Setup Mode** menu.

- To enter the **Setup Mode** menu, press ⏻ **CLEAR** to turn the instrument on then press ▲ **TARE** as the firmware version displays

4.1   Menu Navigation

Use the keys on the front panel of the indicator to navigate through the menu options as follows:

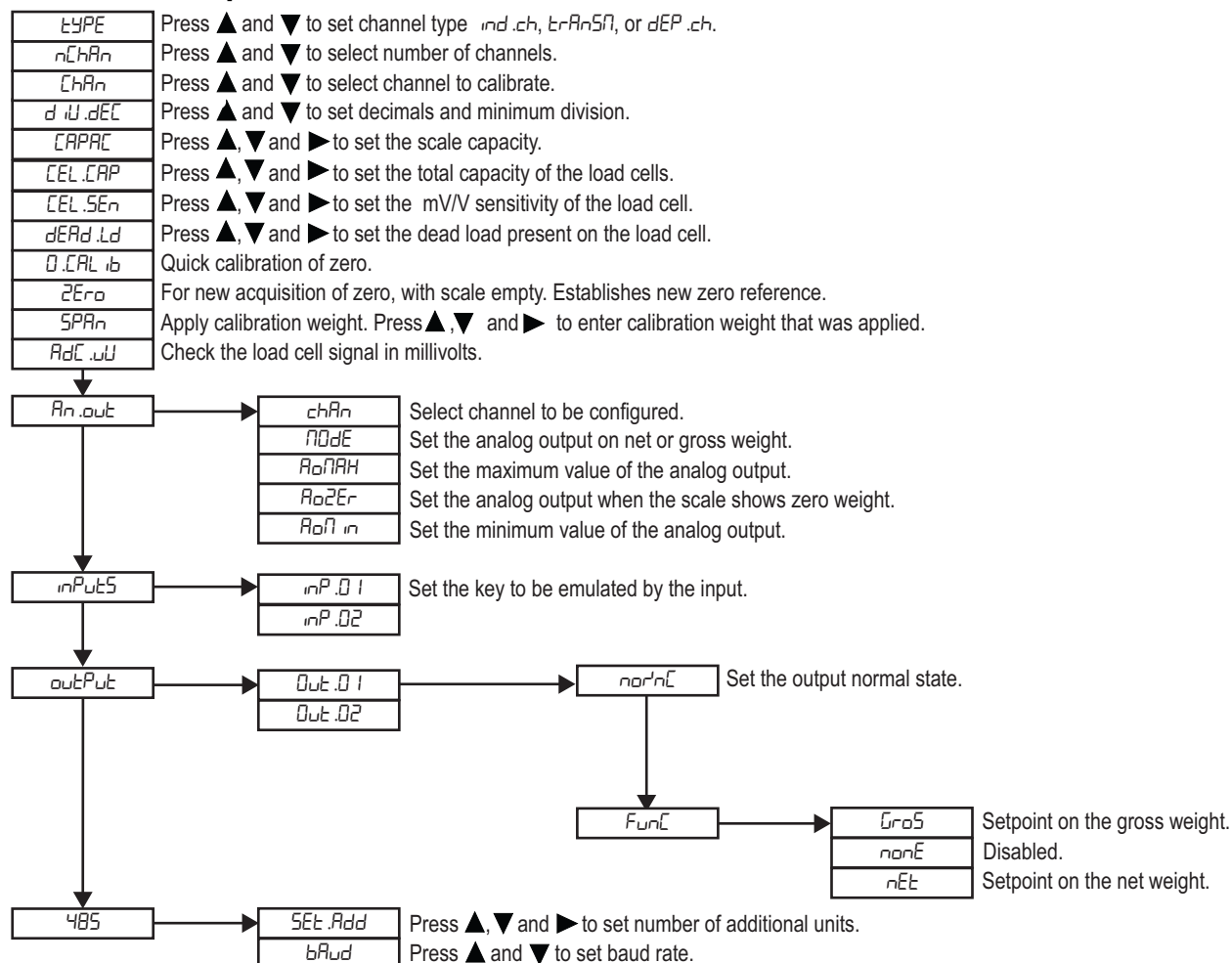| Key	Function
▼ ZERO	Scroll through parameters; In numeric input: Decreases the digit to be modified
▲ TARE	Scroll through the parameters; In numeric input: Increases the digit to be modified
▶ MODE	Quickly position at the first step of a menu; In numeric input: Selects the digit to be modified, from left to right
⏎ PRINT	Enter into a parameter or confirm a setting; In numeric input: Confirms the entry made
⏻ CLEAR	Exit a step without confirming the setting; In setup: Press multiple times to display *SAUE?* prompt and/or press to exit a step without confirming the setting; In numeric input: Clears the present value

Table 4-1. Menu Navigation Key Functions

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4.2 Quick Setup Menu

`EYPE`	Press ▲ and ▼ to set channel type `ind.ch`, `ErAnSN`, or `dEP.ch`.
`nChAn`	Press ▲ and ▼ to select number of channels.
`ChAn`	Press ▲ and ▼ to select channel to calibrate.
`d iU.dEC`	Press ▲ and ▼ to set decimals and minimum division.
`CAPAC`	Press ▲, ▼ and ► to set the scale capacity.
`CEL.CAP`	Press ▲, ▼ and ► to set the total capacity of the load cells.
`CEL.SEn`	Press ▲, ▼ and ► to set the mV/V sensitivity of the load cell.
`dEAd.Ld`	Press ▲, ▼ and ► to set the dead load present on the load cell.
`0.CAL ib`	Quick calibration of zero.
`2Ero`	For new acquisition of zero, with scale empty. Establishes new zero reference.
`SPAn`	Apply calibration weight. Press ▲, ▼ and ► to enter calibration weight that was applied.
`AdC.uU`	Check the load cell signal in millivolts.

`An.out` →		
	`chAn`	Select channel to be configured.
	`NOdE`	Set the analog output on net or gross weight.
	`AoNAX`	Set the maximum value of the analog output.
	`Ao2Er`	Set the analog output when the scale shows zero weight.
	`AoN in`	Set the minimum value of the analog output.

`inPutS` →	
	`inP.0 1` Set the key to be emulated by the input.
	`inP.02`

`outPut` →		
	`Out.0 1`	`nornC` Set the output normal state.
	`Out.02`	

`FunC` →		
	`GroS`	Setpoint on the gross weight.
	`nonE`	Disabled.
	`nEt`	Setpoint on the net weight.

`485` →		
	`SEt.Add`	Press ▲, ▼ and ► to set number of additional units.
	`bAud`	Press ▲ and ▼ to set baud rate.

Figure 4-1. Quick Setup Menu

NOTE: When settings are complete press [⏻ CLEAR] **until the indicator displays** `SAUEP`**. Press** [◄┘ PRINT] **to save set up and return to Weigh mode. Pressing any other key exits the setup and discards changes.**

4.2.1 Default Factory Calibration

The instrument is shipped with the following default calibration settings:

- Capacity – 10,000 lb
- Load cell sensitivity – 2.000 mV/V
- Division – 1

NOTE: See *Table 4-4 on page 29* to return indicator to default settings.

4.2.2 Quick Scale Setup

Use this procedure to set the scale. Cells may need to be rimmed and summed with a junction box if more than one is connected.

📝 *NOTE: See Section 5.0 on page 39 for full calibration procedures.*

1. Restart indicator. Momentarily press [▶ MODE] during startup to display **Quick Setup** menu. *tYPE* displays. Press [⏎ PRINT] to set parameter.

2. Navigate to select desired channel type. Press [⏎ PRINT]. *nChAn* displays. Press [⏎ PRINT] to set parameter.

3. Navigate to select number of channels to be used. Press [⏎ PRINT]. If multiple channels are chosen, *ChAn* displays. Press [⏎ PRINT] to set parameter.

4. Navigate to select a channel to configure. Press [⏎ PRINT] *d iU .dEC* displays. Press [⏎ PRINT] to set parameter.

5. Navigate to select decimal and minimum division settings. Press [⏎ PRINT]. *CAPAC* displays. Press [⏎ PRINT] to set parameter.

6. Set the total capacity of the scale. Press [⏎ PRINT] to confirm. *CEL .CAP* displays. Press [⏎ PRINT] to set parameter.

7. Set the total capacity of the load cells. Press [⏎ PRINT] to confirm. *CEL .SEn* displays. Press [⏎ PRINT] to set parameter.

8. Set the mV/V sensitivity of the load cells. Press [⏎ PRINT] to confirm. *dEAd .Ld* displays. Press [⏎ PRINT] to set parameter.

9. Set the dead load. If unknown, enter all zeros. Press [⏎ PRINT] to confirm.

10. If configuring multiple channels, navigate to return to *ChAn*. Repeat Step 6 – Step 12 for each channel to be configured.

11. Press [⏻ CLEAR] until the instrument displays *SAUE?*.

12. Press [⏎ PRINT] to confirm. *StorE* displays momentarily and the instrument reboots.

4.2.3 Input Functions

See Section 4.5.1 on page 34 for **Inputs Functions** setup parameters.

4.2.4 Output Functions

See Section 4.5.2 on page 35 for **Output Functions** setup parameters.

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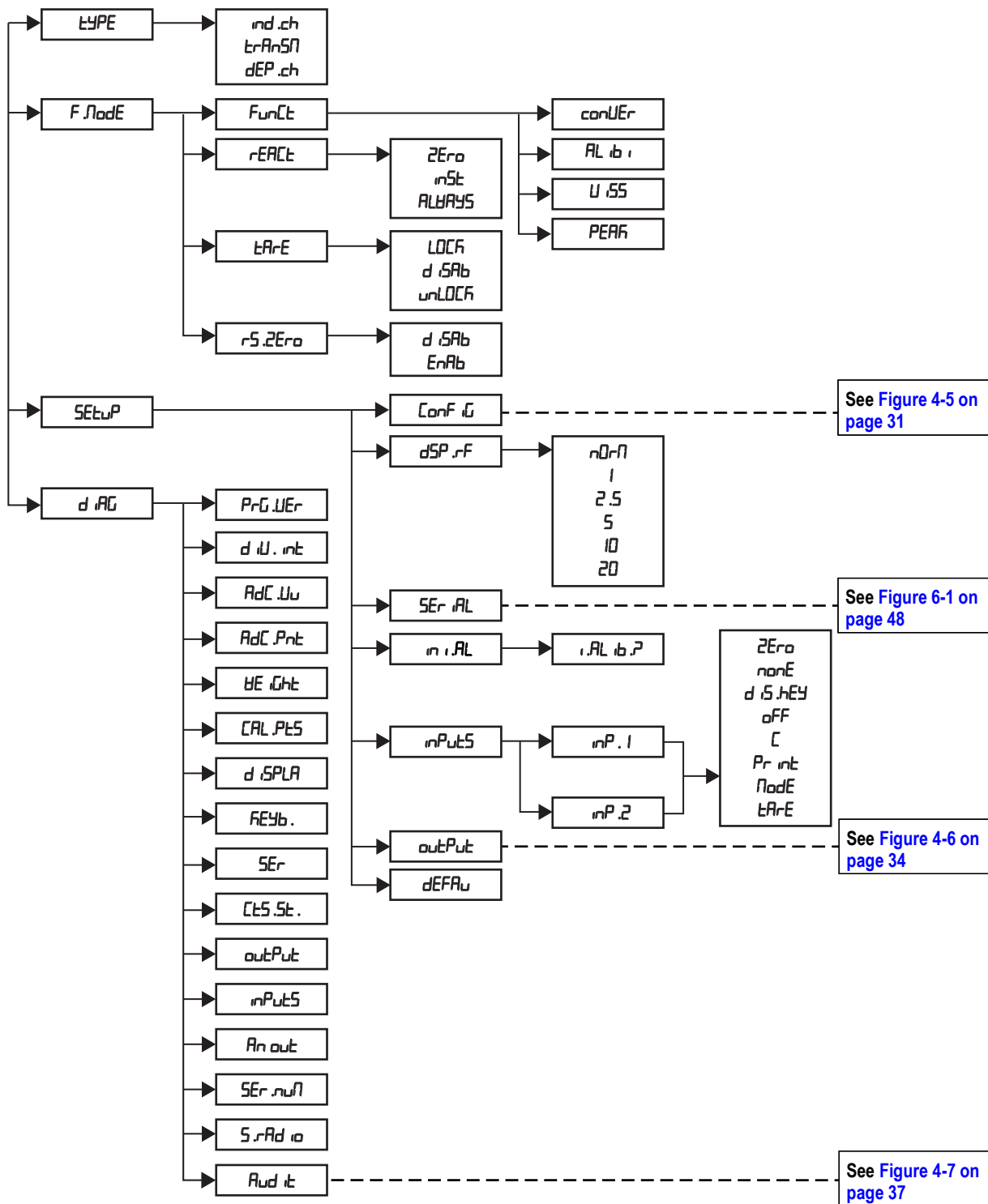WEIGHING SYSTEMS

4.3 Setup Mode Menu

Figure 4-2. Setup Mode Menu

4.3.1 Type Parameters

Select the application type:
- An independent scale on each channel
- A scale with dependent channels summed
- Scales with independent channels simultaneously viewable on the PC

Settings	Description
ind.Ch	Instrument connected to 1, 2, 3 or 4 independent scales; To set channels (Section 3.8 on page 19)
dEP.Ch	Instrument connected to a scale with 2, 3, or 4 dependent load cells (could be digitally summed)
trAnSN	Independent channel; Transmits values read by each channel through the serial line (Section 3.9 on page 20)

Table 4-2. Type Parameter

4.3.2 F.Mode Parameters

The F.ModE (**Function Mode**) parameters set the functionality of the scale. The **Function Mode** parameters set four operations that can be accessed by pressing [MODE]. It also sets the functionality of printing, taring and zeroing.
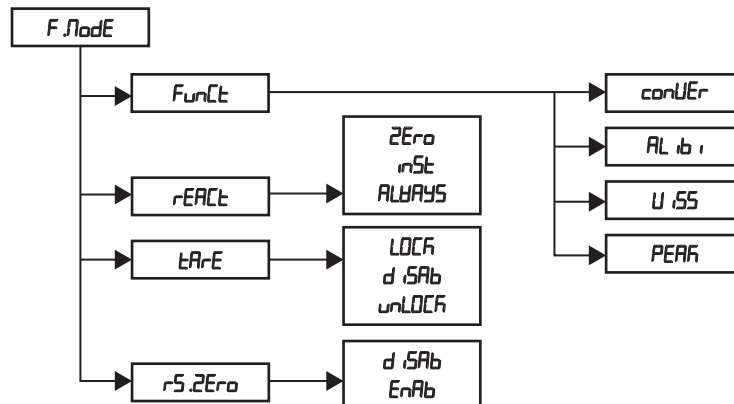
Figure 4-3. Function Mode Menu

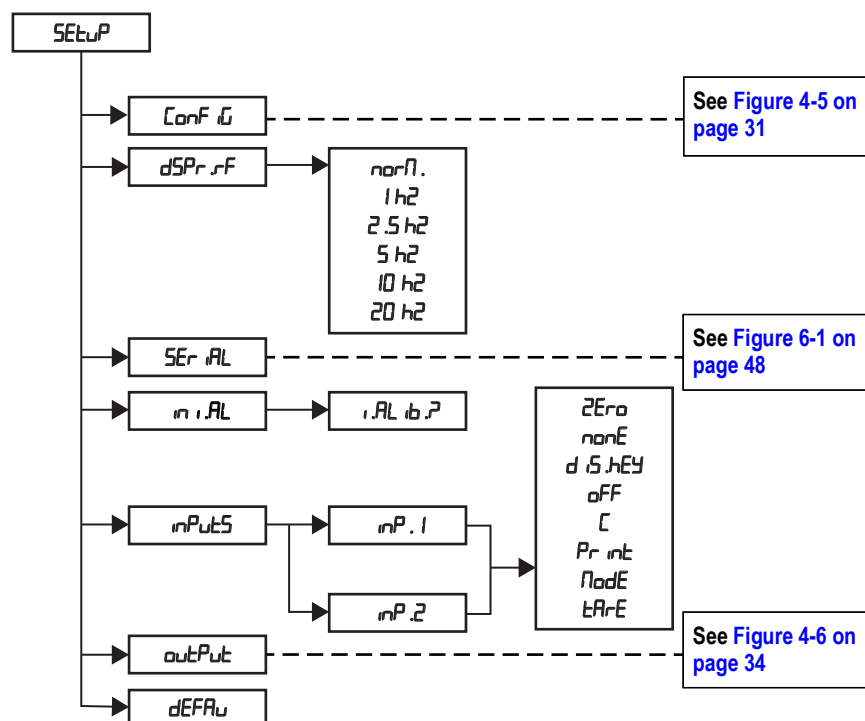| Parameter	Settings	Description
Funct (Function)		Functioning Mode *NOTE: See Section 3.11 on page 21 for the details of the operating modes. Once the functioning mode is selected, if a printer is configured, the printout is automatically enabled. This parameter is not displayed if trAnSN is set in the tYPE parameter.*
	ConUEr	Convert – Converts the current displayed value to a calculated value; If [MODE] is pressed for 1 second, the conversion value can be edited (Section 3.11.1 on page 21)
	AL ib i	Alibi memory – See Section 3.11.2 on page 21
	U iSS	Sensitivity times ten when [MODE] is pressed (Section 3.11.3 on page 22)
	PEAK	Peak hold detector displays PEAK and alternates with displaying the highest captured value after [MODE] is pressed (Section 3.11.4 on page 23)
rEACt (React)		Sets the re-enable function of printout based on this criteria: Rearm at zero, rearm when weight is unstable, or always print when the print button is pressed (Section 3.10 on page 20)
	2Ero	Rearms print function after weight returns to zero; Only prints once after rearming
	inSt	Always prints when [PRINT] is pressed
	ALWAYS	Instability rearms the print function when weight becomes unstable; Only prints once after rearming and weight becomes stable
tArE (Tare)		When a tare value is entered manually, automatically or from storage the tare value displays with a negative sign when the scale is unloaded (this is known as a locked tare); An unlocked tare is automatically canceled each time the scale is unloaded (Section 3.5 on page 17)
	LoCK	Retains tare value until manually cleared
	d iSAb	Tare value cannot be entered
	unLoCK	Tare value is automatically cleared when gross weight is zero
rS.2Ero (Restore Zero)		Enables restoring the last captured zero after a power cycle
	d iSAb	Disables restore zero after power cycle
	EnAb	Enables restore zero after power cycle
		NOTE: This parameter does not display if trAnSN is selected in the tYPE parameter.

Table 4-3. Function Mode Parameter

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4.3.3 Setup Parameters

Figure 4-4. Setup Menu

Parameter	Settings		Description
`ConF iG` (Configuration)	Configuration (Table 4-6 on page 31)		
`dSP .rF` (Display Refresh)	Sets the speed of the display refresh		
	`norN`	The function is disabled	
	`20 hz`	20 display update / sec refresh rate	
	`10 hz`	10 display update / sec refresh rate	
	`5 hz`	5 display update / sec refresh rate	
	`2 .5 hz`	2.5 display update / sec refresh rate	
	`1 hz`	1 display update / sec refresh rate	
`5Er iAL` (Serial)	Serial Communications Setup (Table 6-3 on page 49)		
`in i.AL` (Initialize)	Initialize Alibi Memory – The initialization cancels all the data stored in alibi memory; Press ⏎ PRINT to enter the operation then `i.AL ib .?` displays; Press ⏎ PRINT again to confirm or any other key to cancel; `AL .OR` displays if the operation is successful; If not, `AL .Err` displays; Parameter displays only if the **Alibi** mode is selected		
`inPutS` (Inputs)	Input Configuration – Sets the function of each input		
`outPut` (Outputs)	Output Configuration (Table 4-9 on page 35)		
`An .out`	Not applicable		
`dEFAu` (Default)	Default settings – Restores instrument default settings; Press ⏎ PRINT ; `dEFAu?` displays; Press ⏎ PRINT to confirm or exit by pressing another key ***NOTE: Returning the instrument to default settings cancels the present calibration.***		

Table 4-4. Setup Parameters

4.3.4 Diagnostic Menu

See the Figure 4-2 on page 27 for the ⌐ ⌐*AG* (***Diagnostic***) menu structure.

Settings	Description
PrG.UEr	Press [PRINT] to display the software version
d ⌐U . ⌐nt	Press [PRINT] to display the calibration internal divisions; The parameter displays only in a primary instrument
AdC .uU	Press [PRINT] to display the microvolts relative to the weight on the scale; Use [ZERO] or [TARE] to display the microvolts for each configured channel of the scale; In the *dEP .Ch* mode it is also possible to view the sum of the microvolts of the configured channels; *Sun* displays briefly; If the unit displays the message *ErrOr* check the connection of the LaserLT to the junction box and load cells; The parameter displays only in a primary instrument ***NOTE: The maximum input voltage the instrument accepts is 30 mV (30000 µV). The scale system is powered by the instrument at 5 VDC; in a properly operating system there will be less than 30000 µV with full capacity on the scale system.***
AdC .Pnt	Press [PRINT] to display the A/D converter points relative to the weight on the scale; Press [ZERO] or [TARE] to display the A/D converter points for each configured channel; In the *dEP .Ch* mode the sum of the microvolts of the configured channels can be viewed (*C Sun* displays momentarily)
UE ⌐Ght	Press [PRINT] to display the weight on the scale; Press [ZERO] or [TARE] to view the weight on each connected scale
CAL .PtS	Press [PRINT] to alternately display the A/D converter points and the corresponding weight value; Use [ZERO] or [TARE] to switch the display to each calibration point and relative weight value
d ⌐SPLA	Display Test – Press [PRINT] to turn on display segments one at a time; continue pressing [PRINT]; The instrument turns on the display segments, one at a time, then exits automatically from this step
KEYb	Keyboard Test – Press [PRINT], then 0000 displays; Press the keys on the keyboard, one at a time, to display related codes; Press any key three times to exit
SEr	RS-232 Serial Port Test – Press [PRINT] then *S HY;H* displays, in which *Y* indicates the status of the PC serial port • *0* – Serial port is not working • *1* – Serial port is working Press [ZERO] or [TARE] to change the status of the serial port
CtS .St	CTS Status Test – Press [PRINT] to view the CTS signal status of the printer connected to the PRN serial port
outPut	Output Test – Press [PRINT] then *rEL . 1* displays and output 1 is enabled; Press [ZERO] or [TARE] to enable the other outputs
⌐nPutS	Input Status – Press [PRINT] then *1.bH-Y; H* displays, in which *Y* indicates the input status • *0* – Disabled • *1* – Enabled Press [ZERO] or [TARE] to change the input status
AnOut	Not applicable
SEr .nun	Serial Number – Displays the instrument's serial number
S .rAd ⌐o	Press [PRINT] to select the desired radio channel; *OH* displays if the configuration is successful, *Error* displays if not successful
Aud ⌐t	See Section 4.6 on page 37

Table 4-5. Diagnostics Menu

4.4 Configuration Menu
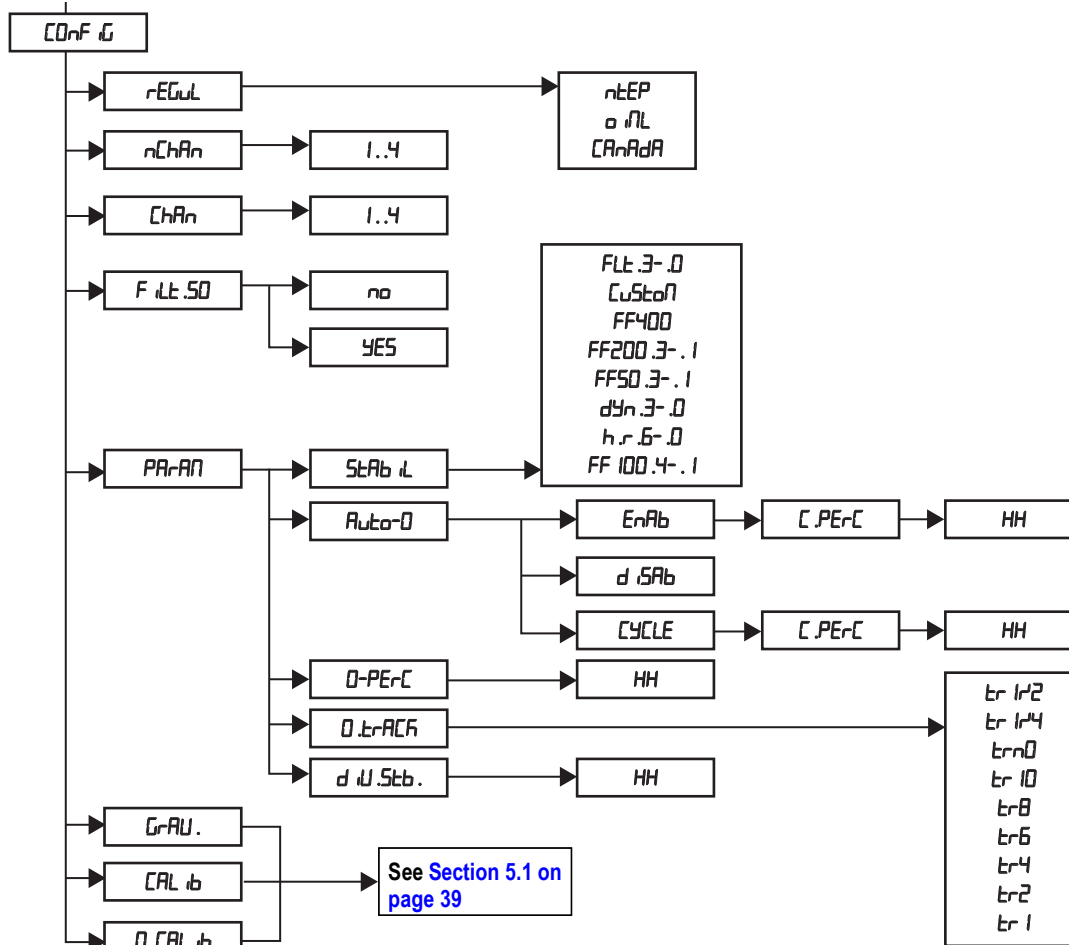
Figure 4-5. Configuration Menu

Parameter	Settings	Description

rEGuL
(Regulation)
	ntEP
	o iML
	CAnAdA
		Selection of regulatory body
		    NTEP
		    OIML
		    Measurement Canada

nChAn (Number of Channels)	Ch.1 Ch.2 Ch.3 Ch.4	Selection of number of channels to be utilized
ChAn (Channel)	Ch.1 Ch.2 Ch.3 Ch.4	Selection of active channel; 1 to 4 in scales with non dependent channels functioning mode (ind .Ch/trAnSM) ***NOTE: The parameter is not displayed if*** dEP .Ch *is set in the* tYPE. *parameter or in the event of a single channel application,* SEtuP →ConF iG → nChAn*.
F iLt.50 (Filter 50 Hz)	no = disable YES = enable	Enable or disable the 50 Hz filter

Table 4-6. Config Menu Parameters and Settings

Parameter	Settings	Description
PArAN (Parameters)		Metrologic parameters
	StAb iL	Select and set the type and degree of filtering (Section 4.4.1 on page 33) FLt 0-3 – Filter for simple weighing CuStoN – Customizable filter for manufacturer use F.F .200 . 1-3 – Filter at 200 Hz F.F .50 . 1-3 – Filter at 50 Hz dYn .0-3 – Filter for crane scale h.r .0-6 – Filter for high resolution F.F . 100 . 1-4 – Filter at 100 Hz F.F .400 – Filter at 400 Hz **NOTE:** F.F .200 . 1-3 **and** F.F .400 **filters cannot be used in the** dEP .Ch **2, 3 and 4 channel functioning modes.**
	Auto-0	Automatic acquisition of the gross zero at startup (default is 2% of capacity) d iSAb – Disabled EnAb – Enabled on scale 1 CYCLE – Executed cyclically on all the present scales; This parameter is not visible if there is only one scale **NOTE: If auto zero parameter is enabled,** 0 .PErC **displays and a value between 1 and 50 as a percentage of the capacity of the auto zero must be set.**
	0-PErc	Zero capacity – This menu allows to set (0-50%) of capacity that can be zeroed by pressing ▼ZERO; Entering 0% disables ▼ZERO
	0 .trACk	Zero tracking – This menu allows setting the zero tracking (compensation parameter of the scale's thermal drift); The set value corresponds to the number of divisions tracked off in 1 second tr 1r2 ± half division tr 1r4 ± one fourth of a division tr no ± tracking disabled tr 10 ± ten divisions tr 8 ± eight divisions tr 6 ± six divisions tr 4 ± four divisions tr 2 ± two divisions tr 1 ± one division
	d iU .Stb	Divisions by stability – Enter the number of divisions by which the instrument detects the weight stability; A higher number of divisions makes stability more easily detected; Settable values are 0 (weight always stable) to 99
GrAU . (Gravity)	- -	Gravity acceleration – See Section 5.7 on page 46
CAL ib (Calibration)	- -	Scale calibration – See Section 5.0 on page 39
0 .CAL ib (Zero Calibration)	- -	Zero calibration – See Section 5.0 on page 39

Table 4-6. Config Menu Parameters and Settings (Continued)

4.4.1   Filter Parameters

Standard digital filtering uses mathematical averaging to compensate for the noise that the A/D converter sends periodically because of external vibration. This filter compensation makes data less susceptible to a DC signal bias error for some signals.

Each of the filters of the LaserLT are intended to compensate for different types and intensities of digital noise and vibration. Below, find general usage for each family of filters and the *A/D Rate* and *Window* for each filter within those families:

Name	A/D Rate	Window
Static Weighing on Platform		
FLt3	25	24
FLt2	25	16
FLt1	25	12
FLt0	25	8
Custom	For Manufacturer Use Only	
High Speed Weight Capture		
F.F.400	400	24
Filling or Dosing		
F.200.3	200	30
F.200.2	200	32
F.200.1	200	32
Instability, Motion or Vibration		
F.50.3	50	20
F.50.2	50	22
F.50.1	50	22

Name	A/D Rate	Window
Suspended and Oscillating Loads		
dyn.3	6	12
dyn.2	6	12
dyn.1	6	12
dyn.0	6	12
High Resolution Weighing		
h.r.6	6	32
h.r.5	6	24
h.r.4	6	24
h.r.3	6	12
h.r.2	6	12
h.r.1	6	10
h.r.0	6	8
Filling or Dosing		
F.100.4	100	26
F.100.3	100	24
F.100.2	100	20
F.100.1	100	10

Table 4-7. Filter Values

4.5 Input/Output Functions

The instrument is fitted with two opto-isolated inputs and two dry contact outputs. See specifications in .

NOTE: Some of functioning modes of the outputs are relative to the specific functioning modes of the instrument; See the following descriptions for the details.

Figure 4-6. Inputs and Outputs Menu

4.5.1 Inputs Functions

The inPutS (*Inputs*) menu sets the function of each of the inputs.

Parameter	Settings	Description
inPutS (Inputs)	inP.01 inP.02	Input 1 or Input 2 **NOTE: In the event two inputs are simultaneously enabled, only the lowest number input will activate.**
		2Ero – **Zero** key – ▼ ZERO
		nonE – Disabled (Default for input 1)
		diS.KEY – Disables the keyboard
		oFF – Turning off the instrument
		C – **C** key – **ON/OFF** key – ⏻ CLEAR
		Print – **Print** key ⏎ PRINT
		NodE – **Mode** key (Default for input 2) – ▶ MODE
		tArE – **Tare** key – ▲ TARE

Table 4-8. Inputs Functions

4.5.2 Output Functions

The parameters of each of the outputs is set in the ⌐ٱۻۻﯘ (**Outputs**) menu (Figure 4-6 on page 34).

📝 *NOTE: Some of functioning modes of the outputs are relative to the specific functioning modes of the instrument; see the following descriptions for the details.*
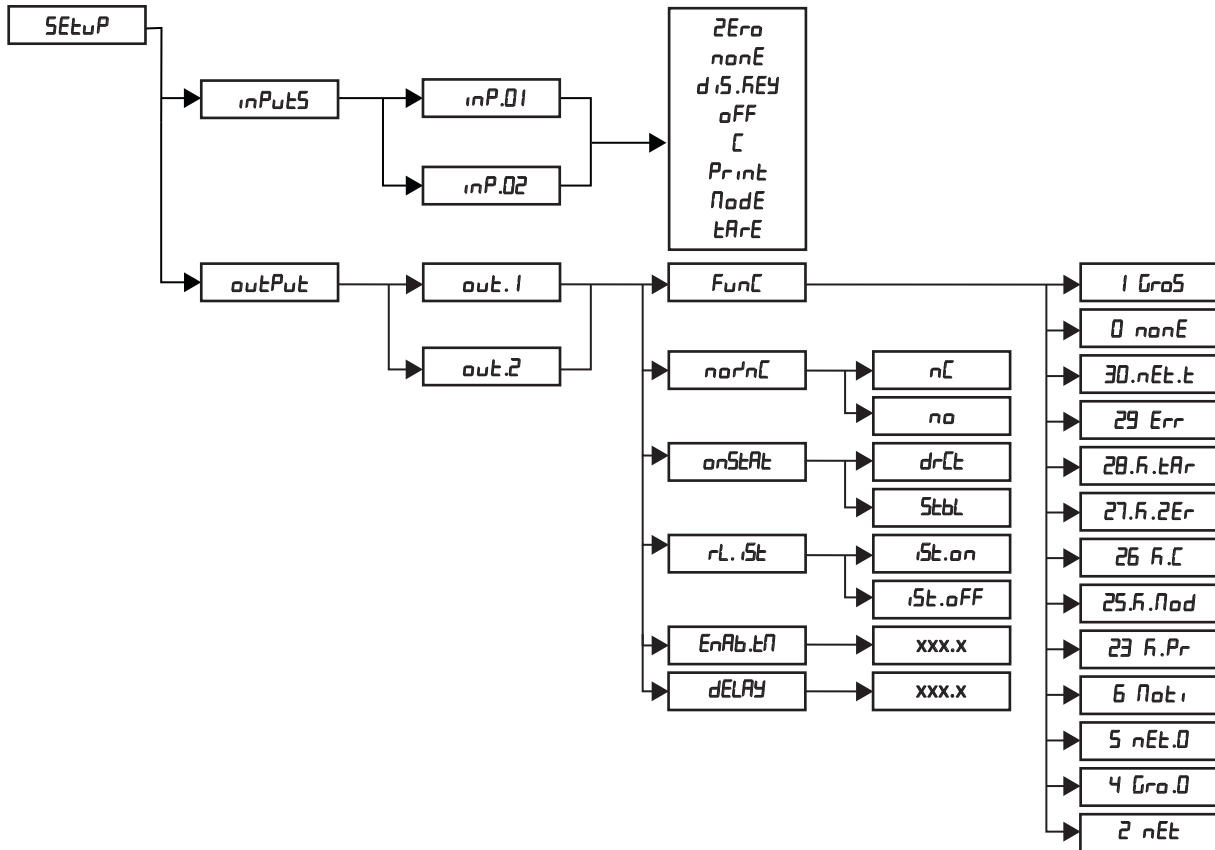
Parameter	Settings	Description
ﬁﬄ⌐Ⴚ	Define the functionality of each output	
(Function)	ﬀ Ⴚ⌐ﬁﬄ	Setpoint based on the gross weight (Default); **Functioning with hysteresis** (⌐Ⴚ . ﬀﬄﬀ parameter set at ﬀﬄﬀ .⌐ﬁ); Setpoint based on gross weight; Two setpoints for each output must be set; One which disables the output when the gross weight falls below that setpoint and one which enables the output when the gross weight is equal or greater than that setpoint; 1. Press and hold [PRINT] to enter the setpoint values for each configured output; 2. Select ﬀ⌐ﬂ .ﬀﬄﬀ. ﬀ . ﬀ ⌐ﬁ displays (output 1 – this enables the setpoint); Press [PRINT] ; 3. Enter the weight value; See Section 4.1 on page 24 for key function; Press [PRINT] to confirm; ﬀ . ﬀ ⌐ﬀﬀ displays (output 1 – this disables setpoint); Press [PRINT] ; 4. Enter the weight value. Press [PRINT] to confirm; 5. Repeat for all outputs; 6. Slowly press [CLEAR] multiple times until ﬀﬀﬁﬀﬂ displays; - Press [PRINT] to confirm and store to the instrument memory; - Press any other key to cancel and exit without saving **Functioning without hysteresis** (⌐Ⴚ . ﬀﬄﬀ parameter set at ﬀﬄﬀ .⌐ﬀﬀ); Enables output function on gross weight; One setpoint for each output is set; 1. Press and hold [PRINT] to enter the setpoint values for each configured output; 2. Select ﬀ⌐ﬂ .ﬀﬄﬀ. ﬀ . ﬀ ⌐ﬁ displays (output 1 – enabling setpoint) Press [PRINT] ; 3. Enter the weight value; See Section 4.1 on page 24 for key function; Press [PRINT] to confirm; 4. Repeat for all outputs; 5. Slowly press [CLEAR] multiple times until ﬀﬀﬁﬀﬂ displays; - Press [PRINT] to confirm and store to the instrument memory; - Press any other key to cancel and exit without saving; * *The configuration of setpoints cannot be accessed if all outputs are set in the ⌐ﬁﬄﬁ functioning mode, or if the selected functioning mode does not require entry of a setpoint value* * *With the instrument off or in standby outputs are normally open* * *The disabling setpoint must be equal to or less than the enabling setpoint; if the disabling setpoint is set at a value greater than the enabling setpoint the instrument sets the setpoint to zero until a valid value is entered* * *If the enabling setpoint is set at a value lower than the disabling setpoint, the enabling setpoint is entered and accepted, however, the disabling setpoint will be set to zero* * *A zero value is valid on both the enabling and disabling setpoints* * *A setpoint value remains active while modifying the setpoint until the new value is confirmed* * *The tare operations are active* * *These outputs are enabled by pressing a key ([ZERO] , [TARE] , [MODE] , [CLEAR] or [PRINT]); If the key press time is greater than two seconds the output is disabled and remains disabled until the following pressing of the key*
		NOTE: The weight thresholds set with [PRINT] are common to all connected scales; It is not possible to have different thresholds for different scales. The value assumes the unit of measure and decimals of the selected channel; For example, if 1000 is the set value, the setpoint values will be the following: Channel Unit of Measure Decimals Setpoint Value 1 kg 3 1.000 kg 2 g 0 1000 g 3 kg 2 10.00 kg 4 g 1 100.0 g

Table 4-9. Output Functions

Parameter	Settings	Description
FunC (Function)	0 nonE	No function, the output is inactive
	2 nEt	Setpoint based on net weight; Setpoints are set in the same manner as gross weight; See 1 GroS in Table 4-9 on page 35; In addition setpoints can be set and activated on a negative weight; • Positive weight (S iGn set at POS it); • Negative weight (S iGn set at nEGAt)
	30 .nEt .t	Setpoint based on the net weight with tare activated; Selecting this mode the function of the output on the net weight is activated if a tare is entered
	29Err	Error indication – Function of the output is enabled on an invalid weight (overload/under-load), or without the signal coming from the cell (disconnected cell) ***NOTE: In the ind .Ch and trAnSN mode the output is enabled only when the condition takes place on the selected channel.*** ***In the dEP .Ch mode the output is enabled when the condition takes place on any of the set channels.***
	28 h .tAr	**Tare** Key – Function is enabled when ▲ TARE is pressed
	27 h .2Er	**Zero** Key – Function is enabled when ▼ ZERO is pressed
	26 h .c	**C** Key – Function is enabled when ⏻ CLEAR is pressed
	25 h .Nod	**Mode** Key – Function is enabled when ▶ MODE is pressed
	23 h .Pr	**Print** Key – Function is enabled when ↵ PRINT is pressed
	6 not i	Instability – Output is on for an unstable weight
	5 nEt .o	Setpoint based on net weight being at zero
	4 Gro .0	Setpoint based on gross weight being at zero
nornc (NO/NC Contacts)		NO/NC Contacts; • no – Output normally opened; • nC – Output normally closed
onStAt (On Status)		Switching condition; • drCt – The output is activated when the weight reaches the set threshold, (independently from the stability) and is disabled when the weight goes below the set disabling threshold; • StbL – The output is activated when the weight, after reaching the set activation thresholds, becomes stable; The output is disabled when the weight, after going below the set disabling threshold, becomes stable
rL . iSt (Hysteresis)		Hysteresis; • iSt .oFF – Hysteresis disabled; • iSt .on– Hysteresis enabled
EnAb .tN (Enabling Time)		Enter the length of time the output is enabled in seconds (four digits with a decimal); The output is disabled once the set time has passed, starting from the moment of the activation (see dELAY); By setting 000.0 the output remains always active ***NOTE: The delay time is only evaluated when a setpoint on gross weight, setpoint on net weight or is selected as an output function.***
dELAY (Delay)		Enables delay period – Enter the enabling delay period in seconds (four digits with a decimal); The output is enabled once the set time has passed, starting from the moment the condition takes place; By setting 000.0 the output is enabled when the enabling condition takes place ***NOTE: The output is enabled only if the enabling condition takes place for the length of time set. The delay is valid only for the enabling of the output. When the enabling condition no longer takes place the output is disabled.*** ***NOTE: In a switching condition with stability, the output is enabled only when the weight is stable. The delay time is evaluated when a setpoint on gross weight or setpoint on net weight is selected as an output function.***

Table 4-9. Output Functions (Continued)

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4.6   Audit Menu

The **Aud it** (*Audit*) menu enables the user to view the number of times that configurations have been changed on the LaserLT.
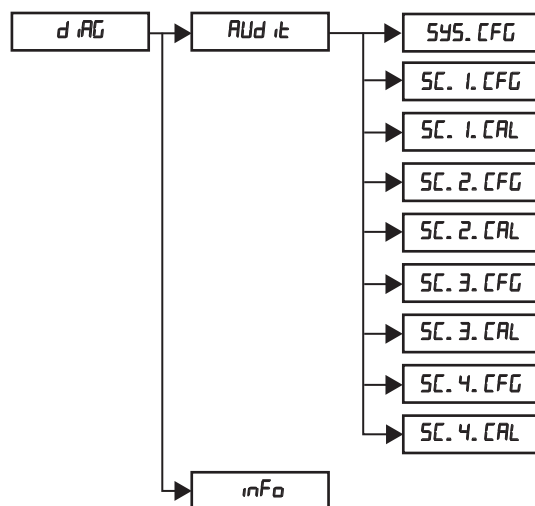

Figure 4-7. Audit Menu

Parameter	Setting	Description
Aud it (Audit)	5YS.CFG	**System configuration audit trail** – Displays number of times that any of the following system parameters has been changed; TYPE, TARE, RS.ZERO, NCHAN, AUTO-0, C.PERC, 0.PERC, GRAV, REGUL, OV.LOAD
	SC.1.CFG SC.2.CFG SC.3.CFG SC.4.CFG	**Scale configuration audit trail** – Displays number of times at any of the following scale parameters has been changed; STABIL, 0.TRACK, DIV.STB, DEC1, UM, DIV, RANGE
	SC.1.CAL SC.2.CAL SC.3.CAL SC.4.CAL	**Scale calibration audit trail** – Displays number of times the scale has been calibrated
inFO (Information)		Indicator scrolls through settings

Table 4-10. Audit Menu Parameters

4.6.1 Access the Audit Menu

The *Audit* menu is accessed through the *Setup* mode or, in Legal-for-Trade applications, from *Weigh* mode without power cycling the indicator. Indicator must be sealed as in Section 2.7.2 on page 15 for Legal-for-Trade applications.

From Setup Mode

1. Power cycle indicator.
2. Press ▲ [TARE] as the firmware version displays.
3. Navigate to *d iAG* > *Aud it*.

From Weigh Mode

1. Press [CLEAR] until *Aud it* displays.
2. Press ▼ [ZERO]. *inFo* displays. Press ▼ [ZERO] again, *Aud it* displays.
3. Press ↵ [PRINT]. Displays LRV number then displays *SYS .CFG*.
4. Press ▼ [ZERO] or ▲ [TARE] to toggle between audit counter options.
5. Press ↵ [PRINT] to view Audit trail number for the selected audit counter.
6. Press [CLEAR] to exit to previous menu. Repeat Step 4 – Step 5 as needed.
7. Press [CLEAR] to return to *Weigh* mode.

Recall Procedure

These devices use a category 2 sealing method:

1. Hold [CLEAR] until *Aud it* displays.
2. Press ▼ [ZERO]. *inFo* displays then press ▼ [ZERO] again, *Aud it* displays.
3. Press ↵ [PRINT]. Displays LRV number then displays *SYS .CFG* (System Configurations).
4. Press ▼ [ZERO] or ▲ [TARE] to toggle between *SYS .CFG, SC . 1.CFG* (Scale 1 Configurations) or *SC . 1.CAL* (Scale 1 Calibrations).
5. Press ↵ [PRINT] to view the Audit Trail number for the selected counter.
6. Press [CLEAR] to toggle between *SYS .CFG, SC . 1.CFG* or *SC . 1.CAL*. If multiple scales are used it will toggle to *SC .4 .CFG*.
7. Press [CLEAR] to exit *Audit Trail* mode to the previous menu.

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5.0   Calibration

The type of calibration used is dependent on the type of application chosen for the instrument: ᵢₙd.Ch (***Independent Channels***) and dEP.Ch (***Dependent Channels***), which can be digitally equalized. See the type parameter in Table 4-2 on page 28.
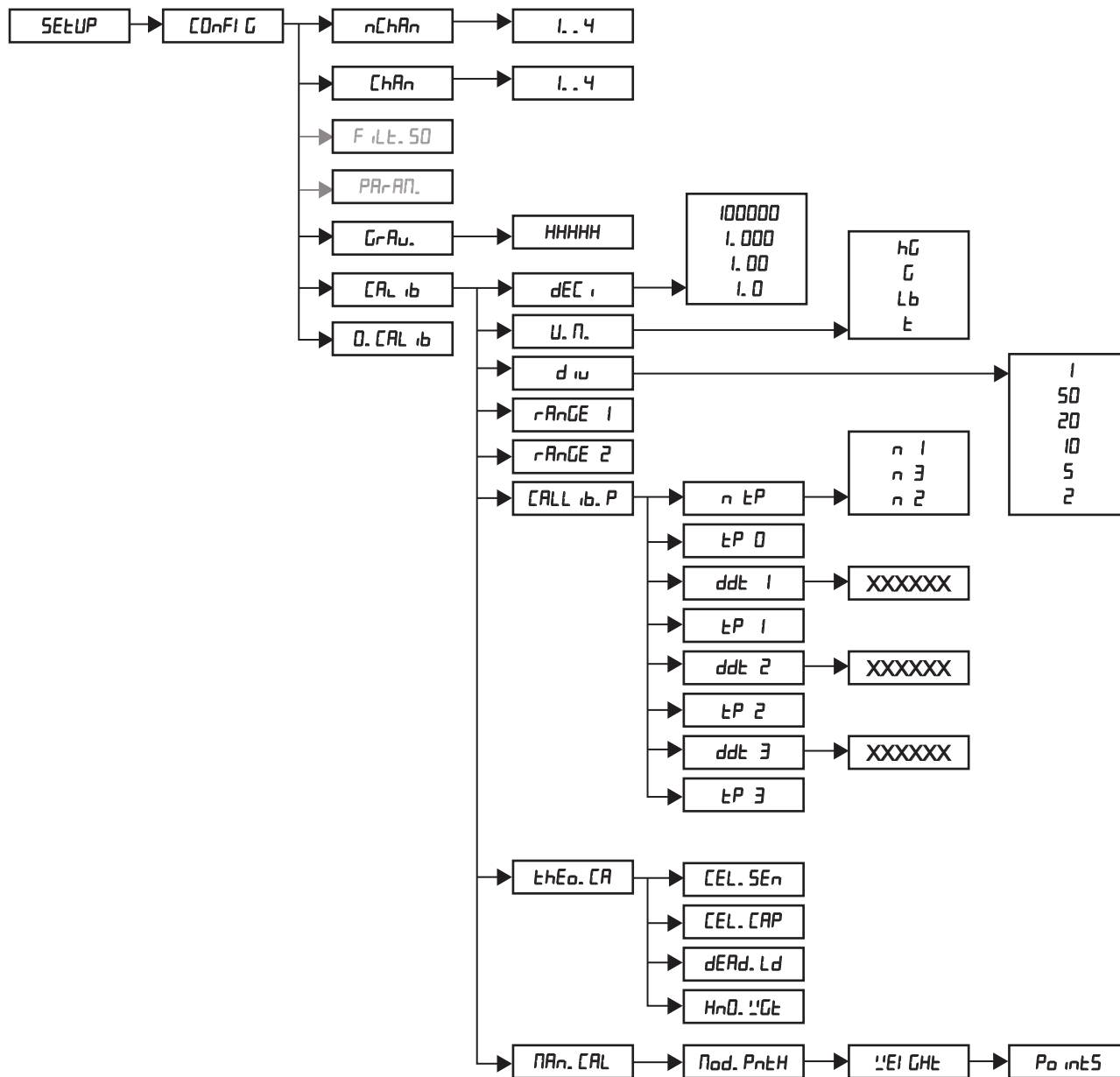
5.1   Calibration Menu

Figure 5-1. Calibration Menu

5.1.1 Calibration Parameters

Parameter	Settings	Decription	
nChAn (Number of Channels)	Select number of channels (Table 4-6 on page 31)		
ChAn (Channel)	Select current channel to configure (Table 4-6 on page 31)		
GrAV. (Gravity)	9.75001-9.84999 default: 9.80655	Gravity acceleration – Select the acceleration value of calibration location and installation location of the instrument; Manual entry of the g value (the gravitational acceleration value may be manually entered); The minimum decimal value is 9.75001m/s^2; Any decimal number that is not between 9.75001 and 9.84999 m/s^2 (inclusive), is incorrect	
dEc (Decimal)	Decimal Point Location – When combined with the decimal point location, specifies the location of the decimal point or dummy zeroed in the unit display		
u.n. (Units)	Units – Specifies units for displayed and printed weight		
div (Display Divisions)	Display Divisions – Selects the minimum division size for the displayed weight; scale capacity is determined by display division x graduations		
rAnGE1 (Range 1)	Maximum weight for first range or interval		
rAnGE2 (Range 2)	Maximum weight for second range or interval		
CALLib.P (Calibration)	ntP	Number of calibration points	
	tP0	Set weight value of unloaded scale	
	ddt1	Enter weight value of first sample weight	
	tP1	Add first sample weight and set calibration point	
	ddt2	Enter weight value of second sample weight	
	tP2	Add second sample weight and set calibration point	
	ddt3	Enter weight value of third sample weight	
	tP3	Add third sample weight and set calibration point	
thEO.CA (Theoretical Calibration)	CEL.SEn	Cell sensitivity in mV/V	
	CEL.CAP	Cell Capacity in the configured unit of measure	
	dEAd.Ld	Weight of the structure bearing on the load cells	
	FnO.HGt	Known value of the sample weight	
nAn.CAL (Manual Calibration)	Manual Calibration - Manually change the weight and ADC value of calibration points		
	nOd.Pnth	Select calibration point to change	
	HEiGht	Enter or confirm weight value	
	POintS	Enter or confirm ADC value	
O.cALib (Zero Calibration)	Performs a zero calibration		

Table 5-1. Calibration Parameters

NOTE: In the case that a number needs to be entered to set a parameter, press ▶ (MODE) **to select the digit to be modified and** ▼ (ZERO) **or** ▲ (TARE) **to increase or decrease the digit. To navigate a menu to select an option, Press** ▼ (ZERO) **or** ▲ (TARE) **.**

5.2   Scale Configuration

Use this procedure to configure the scale(s). To connect more than four cells, it is necessary to trim the cells.

1. Restart indicator. Momentarily press ▲ during startup to display setup mode. ᵗYPE displays. Press ⏎ .

2. Navigate to select channel type. Press ⏎ when the desired channel type is displayed to select it.

3. Navigate to 5EᵗuP➜ConF ᵢG➜nChAn . Press ⏎ to set parameter.

4. Navigate to set the number of channels (Ch 1 - Ch4). Press ⏎ to confirm the desired number of channels. F ᵢLᵗ.50 displays.

5. Navigate to CAL ᵢb. Press ⏎ to set parameter. dEC ᵢ displays. Press ⏎ to set parameter.

6. Navigate menu to select the decimal point location. Press ⏎ to confirm selection. u .�. displays. Press ⏎ to set parameter.

> 📝 NOTE: By setting the divisions of the first range, the divisions for the second range are automatically set.

7. Navigate to select the unit of measure. Press ⏎ to confirm selection. d ᵢu displays. Press ⏎ to set parameter.

8. Navigate to select the scale's minimum division, or the first range of dual range. Press ⏎ to confirm value. rAnGE 1 displays. Press ⏎ to set parameter.

9. Enter the total capacity of the scale, or rAnGE 1 if using multi-range functioning. Press ⏎ to confirm.
    See Section 3.6 on page 18 for more information on multi-range functioning.

10. For dual range scale only:
    • Navigate to select rAnGE2; Press ⏎ to set parameter
    • Enter the second range; Press ⏎ to confirm; CAL ᵢb .P displays

11. Press ⏻ until the instrument displays 5AuEP. Press ⏎ to confirm. 5ᵗorE displays momentarily and the instrument reboots.

> 📝 NOTE: Perform this procedure for each connected channel.

5.3   Calibration Single Channel (Known Weight)

Use this procedure to calibrate a scale in ᵢnd .Ch, dEP .Ch or ᵗrAn5� functioning mode and with a known calibration weight.

1. Restart indicator. Momentarily press ▶ during startup to display quick setup menu.

2. Navigate to 2Ero. Ensure all weight is off the scale then press ⏎ .

3. Wait until HE ᵢGhᵗ displays. Press ⏎ to set parameter.

4. Enter the weight value of first sample weight. Press ⏎ .

5. Place calibration weight on the scale. Press ⏎ to confirm.

6. Wait until AdC .�uu displays, then remove the weight from the scale.

7. Press ⏻ . 5AuEP displays.

8. Press ⏎ to confirm. 5ᵗorE displays momentarily and the instrument reboots.

5.4   Calibration Multi Channel (Known Weight)

Use this procedure to calibrate a scale in the ᵢₙᵈ.ᴸʰ, ᵈᴱᴾ.ᴸʰ or ᵗʳᴿₙₛᴹ functioning mode and with a known calibration weight.

1. Restart indicator. Momentarily press ▶ during startup to display quick setup menu.

2. Navigate to ₙᴸʰᴿₙ. Press ⏎ to set parameter.

3. Select number of channels. Press ⏎ to confirm. ᴸʰᴿₙ displays.

4. Select channel to be calibrated. Press ⏎ to confirm.

5. Navigate to ᄅᴱʳₒ. Ensure all weight is off the scale then press ⏎ .

6. Wait until ʜᴱ ᵢᴳʰᵗ displays. Press ⏎ to set parameter.

7. Enter the weight value of first sample weight. Press ⏎ .

8. Place calibration weight on the scale. Press ⏎ to confirm.

9. Wait until ᴿᵈᴸ.ₙᵤᵘ displays, then remove the weight from the scale.

10. Navigate to ᴸʰᴿₙ. Repeat Step 4 – Step 9 for each channel to be calibrated.

11. Press ⏻ . ₛᴿᵘᴱᴾ displays.

12. Press ⏎ to confirm. ₛᵗₒʳᴱ displays momentarily and the instrument reboots.

5.5   Calibration With Linearization Points

5.5.1   Dependent Channels

Use this procedure to calibrate a scale in the ᵈᴱᴾ.ᴸʰ mode with linearization points.

1. Restart indicator. Momentarily press ▲ during startup to display *Setup* mode.

2. Navigate to ₛᴱᵗᵤᴾ➔ᴸₒₙF ᵢᴳ➔ᴸᴿᴸ ᵢb➔ᴸᴿᴸ ᵢb.ᴾ➔ₙ ᵗᴾ. Press ⏎ to set parameter.

3. Navigate to set the number of calibration points. Press ⏎ to confirm. ᵗᴾ ᴼ displays.

4. Ensure all weight is off the scale and then press ⏎ .

5. Wait until ᵈᵈᵗ ₁ is displayed. Press ⏎ to set parameter.

6. Enter the calibration weight of the first point. Press ⏎ to confirm. ᵗᴾ ₁ (ᵗᴾᄅ, ᵗᴾᴲ) displays.

7. Place the calibration weight on the scale and then press ⏎ . ₙ ᵗᴾ displays when all points are complete.

> 📝 **NOTE: The unit advances to (dd2, dd3) if using multiple points. Repeat Step 4 – Step 7 for each point.**

8. Remove the weight from the scale.

9. Press ⏻ until the instrument displays ₛᴿᵘᴱᴾ.

10. Press ⏎ to confirm. ₛᵗₒʳᴱ displays momentarily and the instrument reboots.

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5.5.2   Independent Channels

Use this procedure to calibrate a scale in the *ind.Ch* or *trAnSN* functioning mode with linearization points.

1. Restart indicator. Momentarily press **▲** (TARE) during startup to display setup mode.

2. Navigate to *SEtuP→ConFiG→ChAn* . Press **⏎** (PRINT) to set parameter.

3. Select channel to calibrate (*Ch1* - *Ch4*). Press **⏎** (PRINT) to confirm. *FiLt.50* displays.

4. Navigate to *CALib→CALib.P→ntP* . Press **⏎** (PRINT) to set parameter. *n1* displays.

5. Enter the number of calibration points. Press **⏎** (PRINT) to confirm. *tP0* displays.

6. Ensure all weight is off the scale then press **⏎** (PRINT) .

7. Wait until *ddt1* is displayed. Press **⏎** (PRINT) to set parameter.

8. Enter the calibration weight of the first point. Press **⏎** (PRINT) to confirm. *tP1* (*tP2, tP3*) displays.

9. Place the calibration weight on the scale and then press **⏎** (PRINT) . *ntP* displays when all points are complete.

> 📝 *NOTE: The unit advances to (*ddt2, ddt3*) if using multiple points. Repeat* Step 7 – Step 9 *for each point.*

10. Remove the weight from the scale.

11. Repeat Step 2 – Step 10 to calibrate each channel.

12. Press **⏻** (CLEAR) until the instrument displays *SAVE?*.

13. Press **⏎** (PRINT) to confirm. *StorE* displays momentarily and the instrument reboots.

5.6 Theoretical Calibration

A theoretical calibration can be used if a weight of known value is not available, or a manual calibration cannot be performed.

5.6.1 Independent Channels

Use this procedure to perform a theoretical calibration on a scale in the *ınd.Ch* functioning mode.

1. Restart indicator. Momentarily press [▲ TARE] during startup to display setup mode.

2. Navigate to *SEtuP*➔*ConF ıG*➔*ChAn* . Press [◁ PRINT] to enter the menu.

3. Select channel to calibrate (*Ch 1 - Ch4*). Press [◁ PRINT] to confirm. *F ıLt.50* displays.

4. Navigate to *CAL ıb*. Press [◁ PRINT] . to enter menu. *dEC ı* displays. Press [◁ PRINT] to set parameter.

5. Navigate to set the decimal place. Press [◁ PRINT] to confirm. *u.П.* displays. Press [◁ PRINT] to set parameter.

6. Navigate to set the weight unit. Press [◁ PRINT] to confirm. *d ıU* displays. Press [◁ PRINT] to set parameter.

7. Navigate to set the display divisions. Press [◁ PRINT] to confirm. *rAnGE 1* displays. Press [◁ PRINT] .

8. Enter the total capacity of the scale or the first range in case of multi-range functioning. Press [◁ PRINT] to confirm. *rAnGE 2* displays. Press [◁ PRINT] to set parameter.

9. Enter the second range or enter all zeros, if only one range. Press [◁ PRINT] to confirm. *CAL ıb.P* displays.

10. Navigate to *thEo.CA* displays. Press [◁ PRINT] to confirm. *CEL.SEn* displays. Press [◁ PRINT] to set parameter.

11. Enter cell sensitivity. Press [◁ PRINT] to confirm. *CEL.CAP* displays. Press [◁ PRINT] to set parameter.

12. Enter cell capacity. Press [◁ PRINT] to confirm. *dEAd.Ld* displays. Press [◁ PRINT] to set parameter.

13. Enter the dead load. If unknown, enter all zeros. Press [◁ PRINT] to confirm. *Fıno.ЯGt* displays.

> 📝 NOTE: *Cell Sensitivity – If several load cells are connected through a junction box enter average sensitivity value of the cells.*
>
> *Cell Capacity – If several load cells are connected through a junction box, enter the sum of the load cells.*
>
> *By setting the value to zero, the dead load is acquired.*

14. Repeat Step 3 – Step 13 for each connected scale.

15. Press [⏻ CLEAR] until the instrument displays *SAUEP*. Press [◁ PRINT] to confirm. *StorE* displays momentarily and the instrument reboots.

5.6.2 Dependent Channels

Use this procedure to perform a theoretical calibration on a scale in the *dEP.Ch* functioning mode.

1. Restart indicator. Momentarily press [▲ TARE] during startup to display setup mode. *tYPE* displays. Press [◁ PRINT] to set parameter.

2. Navigate to select *dEP.Ch*. Press [◁ PRINT] to confirm. *F.ПodE* displays.

3. Navigate to *SEtuP*➔*ConF ıG*➔*nChAn* . Press [◁ PRINT] to set parameter.

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4. Navigate to set the number of channels (Ch 1 - Ch4). Press ⏎ PRINT to confirm. F ILt .50 displays.

5. Navigate to CAL ib. Press ⏎ PRINT . dEC i displays. Press ⏎ PRINT to set parameter.

6. Navigate to set the decimal place. Press ⏎ PRINT to confirm. u .n . displays. Press ⏎ PRINT to set parameter.

7. Navigate to set the weight unit. Press ⏎ PRINT to confirm. d iu displays. Press ⏎ PRINT to set parameter.

8. Navigate to set divisions. Press ⏎ PRINT to confirm. rAnGE 1 displays. Press ⏎ PRINT to set parameter.

9. Enter the total capacity of the scale or the first range in case of multi-range functioning. Press ⏎ PRINT to confirm. rAnGE2 displays. Press ⏎ PRINT to set parameter.

10. Enter the second range or enter all zeros, if only one range. Press ⏎ PRINT to confirm. CAL ib .P displays.

11. Navigate to thEo .CA. Press ⏎ PRINT to enter menu. CEL .SEn displays. Press ⏎ PRINT to set parameter.

12. Enter cell sensitivity. Press ⏎ PRINT to confirm. CEL .CAP displays. Press ⏎ PRINT to set parameter.

13. Enter cell capacity. Press ⏎ PRINT to confirm. ⏎ PRINT dEAd .Ld displays. Press ⏎ PRINT to set parameter.

14. Enter the dead load. If unknown, enter all zeros.

📝 ***NOTE: Cell Sensitivity – If several load cells are connected through a junction box enter average sensitivity value of cells.***
Cell Capacity – If several load cells are connected through a junction box, enter the sum of the load cells.
 By setting the value to zero, the dead load is acquired.

15. Press ⏎ PRINT to confirm. Fino .HGt displays.

16. Repeat for each connected scale.

17. Press ⏻ CLEAR until the instrument displays SAUEP.

18. Press ⏎ PRINT to confirm. StorE displays momentarily and the instrument reboots.

5.7 Gravity Setting

Use this procedure to correct the weight error caused by a different gravitational value between the calibration zone and the zone of use.

1. Calibrate the indicator. Restart.

2. Navigate to 5EtuP➔ConF iG➔GrAu. Press ⏎ to set parameter.

3. Enter the local gravity. Press ⏎. Default is 9.80390.

4. Slowly press ⏻ multiple times to exit the menus until 5AuEP displays.

   • Press ⏎ to confirm and return to the weigh mode

   • Press any other key to cancel and exit without saving

Weight error caused by a different gravitational value between calibration zone and zone of use is automatically corrected.

Press and hold ▼ when turning on the instrument. The g value relative to the gravitation zone of the user displays for a few seconds, after the name and the installed software version.

NOTE: To find the local gravity, enter the latitude and elevation into the International Gravity Formula.

Listed are links to websites that can be used to determine local latitude and altitude. Please note these website address are provided for reference only and may change.

Map Coordinates uses Google maps to find latitude and elevation: **www.mapcoordinates.net/**

Once local latitude and altitude have been determined, use the following link to calculate local gravity **http://www.sensorsone.com/local-gravity-calculator/**

IMPORTANT: The gravity correction function has not been evaluated by an approvals agency, therefore it is up to the authorized scale dealer to ensure the device is accurate at the intended point of use.

5.8 Zero Dead Load A/D Counts

Table 5-2 lists the ideal A/D counts that result from input signals of 0Ð45 mV with zero dead-load. Actual values are typically higher than the values shown in Table 5-2. The ideal values can be used when calibrating the indicator with no attached scale.

Input Signal (mV)	Raw A/D Count
0	1830
2.5	543564
5.0	1085373
7.5	1627166
10	2168897
12.5	2710715
15	3252467

Table 5-2. Ideal A/D Raw Counts

6.0   Communications

This section provides an overview of LaserLT-60 and LaserLT-100 Weight Indicator communication information.

6.1   Serial Outputs

The instrument has two bidirectional serial outputs which are ASCII code compatible with most printers, remote displays, PCs and other devices. See Section 2.4 on page 12 for connection information.

Transmission of data through the serial ports can be configured in the parameters *PC SEL*, *PCModE* and *Pr.ModE* in the setup mode (Section 6.2 on page 48).

6.1.1   COM1 Serial Port

The COM1 serial port is bi-directional (half duplex) and uses RS-485 for transmitting data. It is mainly used to connect PCs, PLCs and additional remote displays. The transmission speed may be selected in the setup as: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud (bit/sec).

On the same RS-485 line, it is possible to connect up to 32 devices (instruments, RS-485/RS-232 signal converter).

Considerations when making RS-485 connections:

- Use a Shielded Twisted Pair cable to make the connection (twisted and shielded pair(s) with single shielding for each pair through aluminum band and total shielding through external shielding)
- Using 2x24 AWG duplex cable with external shielding, the RS-485 cable should not exceed 4000' (1200 m) (Section 8.0 on page 60)
- With very long cables, cable capacity becomes a dominant factor in power consumption (normally near 50pF/m); Cable capacity decreases as length increases; Capacity also decreases when speed is increased; The maximum distance cannot be covered with the maximum possible speed

Baud Rate (bit/sec)	Total Cable Capacity (pF)
1200	400000
2400	200000
4800	100000
9600	50000
19200	25000
38400	12000
57600	8000
115200	4000

Table 6-1. Cable Capacity

- Verify single point grounding on all equipment (Section 2.3 on page 11)
- Use correct single point grounding to avoid forming ground loops
- On the RS-485 network, two termination resistances equal to the impedance of the cable (typically 120 Ω) are normally connected on the two devices at the ends of the cable; Terminal resistance is not supplied with the ports of the instrument
- Consult the device product data sheet for all connected devices to ensure consistency in the markings

6.1.2   COM2 Serial Port

The COM2 serial port is bi-directional (full duplex) and uses an RS-232 for transmitting data. It is mainly used to connect printers, PCs, and PLCs. The transmission speed may be selected in the setup as: *1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200* baud.

6.2   Serial Port Transmission Modes

SErIAL

PC SEL → 485 / 232

Pr-no
PrPC.hR
rEPE.6
PrPC.EH
PrPC.St
ALL.EHt
ALL.Std
tPr

CoN.Prn → Pr NodE

bAud.Pr →
9600
4800
2400
1200
115200
57600
38400
19200

bit.Pr →
n-8-1
o-8-1
o-7-2
-7-1
E-7-2
E-7-1
n-7-2
n-8-2

PUr.Prn → PUr.EHt / EHt.oFF

Prn.CtS →
CtSh
StSL
noCtS
ENuCtS

PrConF → LAn9 →
En9L
itAL
ESPA
FrAn
dEut

CoN.PC → PCNodE →
NodbuS
FLd.buS
ALL.NAH
ALL.Std
ALL.EHt
StAb.St
StAb.EH
ondE
rEPE.6
Prin.St
Print.EH
485

bAud →
9600
4800
2400
1200
115200
57600
38400
19200

bit →
n-8-1
o-8-1
o-7-2
-7-1
E-7-2
E-7-1
n-7-2
n-8-2

Figure 6-1. Serial Menu

6.2.1   PC Port Selection

It's possible to select the serial port to be used as a PC port. When a port is selected for PC port transmission, the other serial port is selected as default for PRN port transmission.

This setting is made in the SEtuP→SErIAL→PC SEL step.

Select the RS-485 serial port as the PC PORT and the RS-232 serial port sets as the PRN PORT.

Select the RS-232 serial port as the PC PORT and the RS-485 port sets as the PRN PORT.

Parameter	Settings	Description
PCSEL (PC Select)	Select the communication carrier for the ports	
	485	Communication between the instrument and the PC takes place through the RS-485 port and transmission of data to the printer through the RS-232 port
	232	Communication between the instrument and the PC takes place through the RS-232 port and transmission of data to the printer through the RS-485 port

Table 6-2. PC Port Selection

6.2.2   PRN PORT

This section describes the selectable serial weight transmission modes of the PRN serial port through the parameter set in Pr.ꞶodE

Parameter	Settings	Description
CoꞶ.Prn (Communication Printer)	–	Serial Format for the printer port
Pr.ꞶodE (Print Mode)	–	Transmission to serial printer
	Pr-no	Transmission disabled
	PrPC.hꞶ	Transmission of the weight string by pressing enter
	rEPE.6	The weight is displayed on the instrument and is transmitted to a 6 digit remote display
	PrPC.EH PrPC.St	PrPC.EH allows for transmission of the extended string by pressing **Enter** (Section 6.4.2 on page 56) or multi-scale string in the trAnSꞶ mode
		PrPC.St allows for transmission of the standard string by pressing **Enter** (Section 6.4.1 on page 56)
		Transmission when ⏎ PRINT is pressed – The instrument transmits the weight data through the serial port when ⏎ PRINT is pressed; Transmission takes place if the weight is stable and the net weight is > 20 divisions; Re-enabling the transmission depends on how rEACt is set in the setup mode (passing by zero of the net weight, weight instability or always); Data is transmitted with the standard string Pr.in.St or the extended string; See Section 6.4 on page 56 for a description of the strings; The transmission is confirmed when trAnSꞶ displays
	ALL.EHt ALL.Std	Continuous Transmission for interfacing to the PC, remote displays and other devices which request a constant stream of the data independently from the weight stability; The instrument transmits data with each A/D cycle: • Baud rate at 9600 up to 10 transmissions per second are possible • Baud rate at 115200 up to 16 transmissions per second are possible for the PC port and up to 12 for the printer port The data transmits both positive and negative values: • ALL.Std – The data is transmitted using the standard string • ALL.EHt – The data is transmitted using the extended string (or multi-scale string in the trAnSꞶ mode) - See Section 6.4 on page 56 for a description of the strings ***NOTE: Filter selection directly affects data transmission; To obtain 250TX/sec configure the filter F.F.400 (SEtuP→ConF.iG→PArAꞶ.→StAb.iL)***
	tPr	Enables printing with ASCII compatible printer: Data is transmitted to the printer by pressing ⏎ PRINT on the instrument; The print command is inhibited if the weight is in motion and in all other circumstances in which the data is not valid
NOTE: In the rEPE.6 protocol, the serial output is automatically set at 4800, N-8-1 but can be configured differently. *NOTE: For the protocol and transmission mode specifications (Section 6.2 on page 48).*		
bAud.Pr (Baud.Pr)	Set baud rate – Selection of the data transmission speed (baud = bit/second); (9600 default)	
bit.Pr (Bit.Pr)	Set parity, word, stop bit	
PꞶr.Prn	Manufacturer use only	
Prn.CtS	Manufacturer use only	
Pr.ConF (Pr.Conf)	LAn9	Select Language of Printouts ***NOTE: Language selection only available if tPr is selected.***

Table 6-3. Serial Menu Parameters and Settings

6.2.3   PC PORT

This section described the selectable serial weigh transmission modes of the PC serial port.

Parameter	Settings	Description
ConΠ.PC (PC Serial)	PC Serial	
PCΠodE (PC Mode)	Transmission on the PC Serial	
	ΠodbuS	Transmission with the MODBUS protocol: • *Πod .tYP* displays; Press ⏎ PRINT ; select *RSc ii* or *rtu*; press ⏎ PRINT • *Πod .Rdd* displays; Press ⏎ PRINT ; enter the address of the unit (0 to 98); press ⏎ PRINT • Enter baud rate; Press ⏎ PRINT • Enter bit parameters; Press ⏎ PRINT

	RLL .ΠRH *RLL .Std* *RLL .EHt*	Continuous Transmission for interfacing to the PC, remote displays and other devices which request a constant stream of the data independently from the weight stability; The instrument transmits data with each A/D cycle:
		• Baud rate at 9600 up to 10 transmissions per second are possible
		• Baud rate at 115200 up to 16 transmissions per second are possible for the PC port and up to 12 for the printer port
		The data transmits both positive and negative values:
		• *RLL .Std* – The data is transmitted using the standard string
		• *RLL .EHt* – The data is transmitted using the extended string (or multi-scale string in the *trRnSΠ* mode)
		  - See Section 6.4 on page 56 for a description of the strings
		• *RLLΠRH2* The weight is transmitted in hexadecimal format (example: 03E8= 1000g), without decimal point
		  - This transmission protocol is recommended for applications where a high number of output transmissions is required. (up to 250TX/sec. with baud rate equal to 115200)
		NOTE: Filter selection directly affects data transmission; To obtain 250TX/sec configure the filter* F .F .400 *(SEtuP→ConF iG→PRrRΠ .→StRb iL)

	StRb .St *StRb .Eh*	Transmission on stability – each time a weight on the scale becomes stable, a communication string is transmitted on the PC port; • The transmission takes place when weight is stable and the net weight is greater than 10 display divisions • Re-enabling the transmission depends how *rERCt* has been set in the setup mode (Table 4-3 on page 28) • The data is transmitted with the standard string *StRb .St* or the extended string *StRb .EH* (or multi-scale string in the *trRnSΠ* mode); See Section 6.4 on page 56 for a description of the three strings
	ondE	Transmission requested on demand, from an external device – the instrument waits for a command before transmitting data (Section 6.3 on page 51) With baud rate at 9600, up to 10-11 requests per second are possible through the READ command; with baud rate at 115200, up to 16 requests per second are possible through the READ command; The data transmits both positive and negative values
	rEPE .6	Transmission to 6 digit remote display / Reception of the "*rEPE .6*" string The weight display occurs both in the instrument and is transmitted to a 6 digit remote display
	Pr in.St *Pr in.Eh*	The instrument communicates the weight data through the serial port when ⏎ PRINT is pressed: • Transmission takes place if the weight is stable and the net weight is > 20 divisions; re-enabling transmission depends on how the *rERCt* is set in the setup mode (passing by zero of the NET weight, weight instability or always) • *Pr in.St* - The data is transmitted using the standard string • *Pr in.EH* - The data is transmitted using the extended string - See Section 6.4 on page 56 for a description of the strings • The transmission is confirmed when *trRnSΠ* displays
	485	Transmission in RS-485 serial mode; Protocol mimics the command that was sent; the instrument responds only if its ID is the one requested (before the request the module ID must be input, i.e. 00READ<CRLF>); If a broadcast address command (99) is received no answer is given; If the command is correct it is executed
bRud (Baud)	Set baud rate – Selection of the data transmission speed (baud = bit/second)	
b it (Bit)	Set parity, word, stop bit	

Table 6-4. PC Port Parameters and Settings

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6.3 Serial Commands Format

Legend	
[CC] o <II>	Instrument ID, e.g. 00 (The ID is only used with RS-485 protocol)
<CR LF>	Carriage Return plus Line Feed (ASCII character 13 and 10)
<ESC>	ASCII character 27
<STX>	ASCII character 02
B	Space character, ASCII character 32

Table 6-5. Serial Command Legend

Serial Errors

The instrument transmits a response string or it transmits one of the following indications with each serial command received:

Status Response	Description
OK<CR LF>	Displays when a correct command is transmitted from the PC to the instrument; OK does not mean the instrument executes the zero
ERR01<CR LF>	Displays when a correct command is transmitted from the PC to the instrument, but the command is followed by unexpected letters; For example READF, TARES instead of READ, TARE
ERR02<CR LF>	Displayed when a correct command is transmitted from the PC to the instrument, but contains wrong data
ERR03<CR LF>	Displayed when an incorrect command is received; When the command may not be used in the selected functioning mode or when the command is received while the keyboard buffer is already full
ERR04<CR LF>	Displayed when a nonexistent command is received

Table 6-6. Serial Status Response

> **NOTE: The instrument does not transmit an indication with momentary commands; For example, those made up of only one letter and then the parameter.**

Version Reading Command

[CC]VER<CR LF>

Instrument response: [CC]VER,vvv,DGT1S**bbb**<CR LF>

In which:

- vvv is the firmware version
- **b** is the space character, ASCII 32

Extended Weight Read Command

[CC]REXT<CR LF>

Instrument response in the V mode or in the *dEP.Ch* mode: extended string (Section 6.4.2 on page 56).

Instrument response in the *trAnSM* mode: multi-scale string (Section 6.4.3 on page 57).

> **NOTE: If the instrument is in the *ind.Ch* mode (scale with independent channels) or in the *dEP.Ch* mode (scale with dependent channels and digitally equalized) the weight value is read relative to the active channel; To read the values of other channels (if configured) switch to the desired channel (Converter Channel Switching Command on page 52).**
>
> **If the instrument is in the *trAnSM* mode (scale with independent channels) it is possible to simultaneously read the values for all the configured channels**

Weight Read Command

[CC]READ<CR LF>

Instrument response: standard string (Section 6.4.1 on page 56).

Weight Reading Command With Sensitivity Times 10

[CC]GR10<CR LF>

Instrument response: standard string (Section 6.4.1 on page 56).

Reading Command of MicroVolts Relative to the Weight

[CC]MVOL<CR LF>

Instrument response in ınd.Ch. mode: standard string (Section 6.4.1 on page 56).

Response of the instrument in trAnSΠ and dEP.Ch mode: multi-scale string (Section 6.4.3 on page 57).

> **NOTE: If the instrument is in the ınd.Ch mode (scale with independent channels) or in the dEP.Ch mode (scale with dependent channels and digitally equalized) the weight value is read relative to the active channel; to read the values of the other channels (if configured) switch to the desired channel. See Converter Channel Switching Command.**
>
> **If the instrument is in the trAnSΠ mode (scale with independent channels) it is possible to read simultaneously the values for all the configured channels.**

Tare Command

[CC]TARE<CR LF> or [CC]T<CR LF>

Instrument response: [CC]OK<CR LF>

Zero Command

[CC]ZERO<CR LF> or [CC]Z<CR LF>

Instrument response: [CC]OK<CR LF>

Clear Command

[CC]CLEAR<CR LF> or [CC]C<CR LF>

Instrument response: [CC]OK<CR LF>

The command also works in the setup mode.

Converter Channel Switching Command

[CC]CGCHN<CR LF>

Instrument answer: [CC]OK<CR LF> if the CGCH command has been received.

N is the number of the channel on which to position the instrument

Test Command

[CC]ECHO<CR LF>

Instrument response: [CC]ECHO<CR LF>

Print Command

[CC]PRNT<CR LF> or [CC]P <CR LF>

Instrument response: [CC]OK<CR LF> if the command has been received, no answer for the P command.

Tare Insertion Command

[CC]TMANVVVVVV<CR LF> or [CC]WVVVVVV <CR LF>

VVVVVV is the manual tare value with the decimal point, from 1 to 6 characters; the non significant zeros can be omitted.

Instrument response: [CC]OK<CR LF> if the command has been received; no answer for the W command.

Command for Displaying Temporary Message on an Instrument

[CC]DISPNNVVVVVV <CR LF>

- NN is the instrument display number, standard 00 (ASCII hex)
- V is the message:
  - If present, it is shown on the NN display
  - If not present, the command interrupts the possible visualization enabled with a previous DISP command, restoring the visualization of the weight data

NOTE: If the display shown in the command is numeric (for example the standard display 00) and in the transmitted message there are two consecutive points, the message is stopped after the first of the two points. When the display is showing a message transmitted serially through the DISP command, the instrument does not display those messages usually shown in the scale status (ZERO, TARE, HOLD, etc.).

Instrument response: [CC]OK<CR LF>

The message remains for the time set through the DINT command

The ASCII characters having the decimal code greater than 31 are accepted.

Command for Setting Display Message Interval

[CC]DINTNNNN<CR LF>

In which: NNNN is the visualization interval (in milliseconds), expressed in ASCII hex character; for example, in order to set a visualization time of 2 seconds (2000 milliseconds, which converted into hex it becomes 07D0), the command becomes [CC]DINT07D0<CR><LF>.

By setting a time equal to zero, the message transmitted with the DISP command remains permanently shown on the display.

Instrument response: [CC]OK<CR LF>

PC Confirmation Command

[CC]PCOK<CR LF>

The instrument shows on the display the - PCOK- message for about two seconds.

Instrument response: [CC]OK<CR LF>

Serial Command which Returns the Instrument Status

[CC]STAT<CR LF>

Instrument response: [CC]STATXX<CR LF>

In which: XX is a decimal value which returns the status of the instrument; the possible values are:

XX	Instrument Status
00	Normal scale status
01	Normal scale status in input
02	Instrument in technical setup
03	Instrument in boot phase
04	Instrument in rx/tx setup phase
05	Instrument in test phase of the serial ports
06	Instrument in print test
07	Instrument in firmware update phase
08	Instrument in standby
09	Instrument in automatic zero phase
10	Instrument in change channel
11	Instrument in inputs test phase

Table 6-7. Instrument Status Commands

Key Press Simulation Command

[CC]KEYPXX<CR LF>

XX	Code of Pressed Key
00	▼ ZERO – **ZERO** key
01	▲ TARE – **TARE** key
02	▶ MODE – **MODE** key
03	⏎ PRINT – **PRINT** key
04	⏻ CLEAR – **C** key
05	Numeric 1 key
06	Numeric 2 key
07	Numeric 3 key
08	Numeric 4 key
09	Numeric 5 key
0A	Numeric 6 key
0B	Numeric 7 key
0C	Numeric 8 key
0D	Numeric 9 key
0E	Numeric 0 key

Table 6-8. Key Press Simulation Commands

Instrument response: [CC]OK<CR LF>: accepted command.

In the event the simulated key has two linked functions, key momentarily pressed or pressed at length, if the KEYP command is followed by the release command (KEYR) within a maximum time of 1.5 seconds, the momentary key press is executed; otherwise the key pressed at length is executed.

Release Key Press Simulation Command

[CC]KEYR<CR LF>

Instrument response: [CC]OK<CR LF>

📝 ***NOTE:** The instrument does not respond OK to the following momentary commands (P, Q, T, W, X, Z).*

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Scale Information Reading

[CC]RALL<CR LF>

Instrument response:
[CC]SS,B,NNNNNNNUM,LLLLLLLUM,YYTTTTTTTTUM,XXXXXXXUM,SSS,AAA,CCC,TTT,XXXXX-YYYYYY<CR LF>

Characters	Description
SS	UL Under-load OL Overload ST Stability of the display US Instability of the display TL Active inclination input
B	Number of platform on which the totalization has been made
NNNNNNNUM	Net weight with unit of measure
LLLLLLLUM	Gross weight with unit of measure
YY	Tare Type; Blank spaces if semi-automatic tare; PT If preset tare
TTTTTTTTUM	Tare value with unit of measure
XXXXXXXUM	Not used
SSS	Scale status: • 000 Weighing • 001 Numeric value input • 002 Setup menu
AAA	Counter of pressed keys
CCC	Code of last key pressed
TTT	Not used
XXXXX	Last rewriting number stored in the alibi memory
YYYYYY	Last weigh number stored in the alibi memory

Table 6-9. RALL Command Response Characters

Setpoint Command

[CC]STPTntxxxxxxtyyyyyy<CR LF>

In which: n indicates the setpoint number (1, 2)

t→F if the following weight value indicates that the setpoint will disable the outputs (OFF).

t→O if the following weight value indicates that the setpoint will enable the outputs (ON).

xxxxxx and yyyyyy represent the weight value of the setpoint that disables or enables the outputs: the digits must be entered without the decimal point, omitting the non-significant zeros.

Instrument responses: [CC]OK<CR LF> correct syntax and correct values have been received

[CC]NO<CR LF> correct syntax but wrong values have been received

Example of instrument with capacity 10.000 kg and division 1 g:

*Command: **STPT1F5000O6500** (Disabling first output at 5 kg and enabling at 6.5 kg)*

*Instrument response: **OK***

NOTE: The ERR 02 code displays when:
One of the two entered values is greater than the capacity.
One of the two entered values has a minimum division that is inconsistent compared to the one set in the instrument.
The disabling value is greater than that of enabling.
The transmitted values are valid until the instrument is turned off. To permanently save these on the unit use the saving command (CMDSAVE). To save various setpoints set all of them and at the end transmit the saving command.

Setpoint Saving Command

[CC]CMDSAVE<CR LF>
Response: [CC]OK<CR LF>

Enable/Disable Keyboard

To enable the keyboard: [CC]KEYEE<CR LF>
Instrument response: [CC]OK<CR LF>
To disable the keyboard: [CC]KEYED<CR LF>
Instrument response: [CC]OK<CR LF>

6.4   Transmission Protocols

The weight data transmission on the PC and PRN serial ports may take place in 3 formats: standard string, extended string or multi-scale string.

6.4.1   Standard String

String transmitted in the dependent or independent channel mode: [CC]hh,kk,pppppppp,uu <CR LF>
String transmitted in the TRANSM mode: [CC]hh,pppppppp,uu <CR LF>

Characters	Description
[CC]	The instrument ID as two ASCII decimal digits (RS-485 protocol)
hh	UL Under-load OL Overload ST Stability of the display US Instability of the display
,	Comma character
kk	NT Net weight GS Gross weight GX Gross weight with sensitivity times 10 VL Value in microvolts relative to the weight RZ Value in converter points relative to the weight
,	Comma character
pppppppp	8 digits (including sign and decimal point) which identify the weight; The insignificant digits are filled with spaces; Through the MVOL and RAZF command the instrument transmits the relative value on 10 digits instead of 8
uu	Unit of measurement kg, bg, bt, lb, mv (microvolts), vv (A/D counts); (b signifies blank)
<CR LF>	Carriage Return + Line Feed (ASCII decimal character 13 and 10)

Table 6-10. Standard String Characters

NOTE: Transmitted weight is gross weight (GS) if no tare weight has been entered; Otherwise, net weight (NT) is transmitted.

6.4.2   Extended String

Without APW (any mode other than in response to the REXT command):
[CC]B,hh,NNNNNNNNNN,YYTTTTTTTTTT,PPPPPPPPPP,uu,(dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>
With APW (in response to the REXT command):
[CC]B,hh,NNNNNNNNNN,YYTTTTTTTTTT,PPPPPPPPPP,AAAA.AAAAA,uu<CR LF>

Characters	Description
[CC]	The instrument ID as two ASCII decimal digits (RS-485 protocol)
B	Scale number is always 1
,	Comma character
hh	UL Under load OL Overload ST Stability of display US Instability of display
,	Comma character
NNNNNNNNNN	Net weight on 10 characters including possible sign and decimal point
,	Comma character
YY	PT if the tare is manual, if YY = two empty spaces display with semiautomatic tare
,	Comma character
TTTTTTTTTT	Tare weight on 10 characters including possible sign and decimal point
,	Comma character
PPPPPPPPPP	Always 0
,	Comma character
uu	Unit of measure Kg, **b**g, **b**t, lb; (**b** signifies blank)
,	Comma character
dd/mm/yy	Date in the dd/mm/yy format (only with REXD command)
bb	Two space characters, ASCII decimal 32 character (only with REXD command)
hh:mm:ss	Time format (only with REXD command)
<CR LF>	Carriage Return + Line Feed (ASCII decimal character 13 and 10)

Table 6-11. Extended String Characters

NOTE: The non significant digits of the net, tare, pieces and gross weights are filled with spaces (space characters, ASCII decimal 32 character). If the optional TIME DATE board has not been detected, in response to the REXD command, only the weight is transmitted and not the date and time; in its place there is NO DATE TIME.

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6.4.3 Multi-Scale String

The string can vary depending on the configured channels:

- [CC]hh,pppppppp,uu, (dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>

- [CC]hh,pppppppp,uu,hh,pppppppp,uu, (dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>

- [CC]hh,pppppppp,uu,hh,pppppppp,uu,hh,pppppppp,uu, (dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>

- [CC]hh,pppppppp,uu,hh,pppppppp,uu,hh,pppppppp,uu,hh,pppppppp,uu, (dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>

Characters	Description
[CC]	The instrument code as two ASCII decimal digits (RS-485 protocol)
For each set channel:	
hh	ST Stability of the display US Instability of the display VL Value in microvolts relative to the weight RZ Value in converter points relative to the weight
,	Comma character
pppppppp	8 digits (including eventual sign and decimal point) which identify the weight; The insignificant digits are filled with spaces; Through the MVOL and RAZF commands the instrument transmits the relative value on 10 digits instead of 8
,	Comma character
uu	Unit of measure (**b** signifies blank) • kg • **b**g • **b**t • lb • mv (microvolts) • vv (converter points)
,	Comma character
dd/mm/yy	Date in the dd/mm/yy format (only with REXD command)
bb	2 space characters, ASCII decimal 32 character (only with REXD command)
hh:mm:ss	Time format (only with REXD command)

Table 6-12. Multi-Scale String Characters

6.4.4 Secondary Mode Strings

Secondary Standard String

Standard string transmitted on the print port when *Pr .ПОdE* = *ALL .Std* or *PrPC .St*; SS,NT,WWWWWWWW,UU<CR LF>

Characters	Description
SS	Status: NV Weight not valid
,	Comma character
NT	ST Stable data US Unstable data UL Under-load OL Overload
,	Comma character
WWWWWWWW	Weight
,	Comma character
UU	Unit of measure

Table 6-13. Secondary Standard String Characters

Secondary Extended String

Extended string transmitted on the print port when $Pr.\Pi DdE$ = $RLL.EHt$ or $PLPr.EH$

C, SS,NT,WWWWWWWW,UU<CR LF>

Characters	Description
C	Secondary or sum: • S, if the sum is sent
,	Comma character
SS	UL Under-load (not transmitted in the TRANSM mode) OL Overload (not transmitted in the TRANSM mode) ST Stability of the display US Instability of the display
,	Comma character
WWWWWWWW	Weight
,	Comma character

Table 6-14. Secondary Extended String Characters

NOTE: FWhen the $Pr.\Pi DdE$ = $PLPr.HH$ **is set, only the weight is transmitted on the printer port.**

6.5 Connection to a Remote Display

Use the following procedure to connect the LaserLT to a remote display.

1. Restart indicator. Momentarily press [▲ TARE] during startup to display setup mode. $tYPE$ displays.

2. Navigate to $SEtuP$→$ConF.G$→$SEr.RL$→$Con.PC$→$PCNodE$→$RLL.Std$ then press [↵ PRINT] to confirm selection.

3. Press [⏻ CLEAR] until the instrument displays $SRUEP$.

4. Press [↵ PRINT] to confirm. $StorE$ displays momentarily then unit reboots.

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7.0   Troubleshooting

Use the following table to troubleshoot error messages on the instrument.

Message	Description
AL .Err	Displays when not connected at start-up, if there are communication problems between the instrument and the board or when the alibi memory operation is selected; The unit of measure conversion is automatically set, but not saved in the setup mode
bu5Y	Printing – PRN serial port is occupied or the instrument is waiting to transmit a print job to a PC
un5tAb	Trying to print with an unstable weight
un .0UEr	Trying to print with the weight in under-load or in overload; With a weight of 9 divisions greater than the capacity or 100 divisions below the gross zero
- - - - -	The weight is 9 divisions above the maximum capacity
- - - - -	The weight is under the gross zero (- capacity – 9 divisions)
Gro5 .Er	Trying to print with a negative gross weight (equal or less than 0)
nEt .Err	Trying to print with a negative net weight (equal or less than 0)
Lou	Net weight less than the minimum necessary for the printing or the totalization
no .0 .un5	Weight did not exceed net 0 or was not stable
ConU .	Trying to print while the instrument is converting the unit of measure
no in	Second attempt to acquire the input weight (input/output mode, set as in .out)
noout	Second attempt to acquire the output weight (input/output mode, set as in .out)
no 1	Second attempt to acquire the input weight (input/output mode, set as G .t . or 15t .2nd)
no2	Second attempt to acquire the output weight (input/output mode, set as G .t . or 15t .2nd)
PrEC	Displays when trying to calibrate a point without first having confirmed the number of calibration points
ErNot	Weight is unstable during the acquisition of a point during calibration
ErPnt	During the acquisition of a calibration point a null value has been read by the converter
Er- 11	Calibration error – Sample weight used was too small; Use a weight equal to at least half of the scale capacity
Er- 12	Calibration error – Acquired calibration point (tP 1 o tP2 o tP3) is equal to the zero point (tP0)
Er-37	Scale must be calibrated; Perform a technical default (dEFAu) parameter, before proceeding (Table 4-4 on page 29) **NOTE: Press** [▲ TARE] **to access the Setup menu.**
Er-39	Scale must be calibrated; Perform a technical default (dEFAu) parameter, before proceeding (Table 4-4 on page 29) **NOTE: Press** [▲ TARE] **to access the Setup menu.**
C_Er_-36	During calibration some internal negative points have been calculated: • The calibration point is less than the zero point • The signal is negative (check the connections)
C_Er_-37	During the calibration some internal points less than the minimum value have been calculated: • The calibration point is equal to the zero point • A capacity too high in relation to the division has been set
hu-Err	Hardware Error – Software not compatible with the installed hardware; The hardware expansion component which allows the software to function is missing

Table 7-1. Error Messages

8.0   Specifications

Power
AC voltages: 100 – 240 VAC
DC voltages: 12 – 24 VDC

Power Consumption
AC: 180 mA, DC: 1.4 A

Excitation Voltage
5 VDC, 120 mA, 16 x 350 Ω

Analog Signal Input Range
± 39 mV

Analog Signal Sensitivity
0.03 µV/graduation minimum
0.3 µV/graduation recommended

A/D Sample Rate
Four channel A/D 24-bit sigma-delta conversion,
up to 200 conv. /sec. auto select

Resolution
Internal resolution: 1.5 million counts
Weight display resolution: 800,000

Display
6-digit, 7-segment discrete oval
red LED lamps, single width
2.4" (60 mm) or 4" (100 mm) digit
Decimal/comma indication in any position
Annunciators for NT, Stability, COZ

Maximum Viewing Distance
LaserLT-60: 2.4" digit, 75' (25 m)
LaserLT-100: 4" digit, 150' (50 m)

Serial Interface
RS-232 (1), RS-485 (1)

Input Data Format
Baud Rate: 1200 to 115.2 K software selectable.
Even parity 7 data bits, or no parity 8 data bits

Update
Software selectable 1-20/sec

Digital Inputs/Outputs
Two inputs: 12/24 VDC
Two outputs: 150 mA 48 VAC / 150 mA 60 VDC

Keyboard
Five key, Zero (Down), Tare (Up),
Mode (Right), Print (Enter), C (On/Off)

Weight
10 lb (4.5 kg)

Operating Temperature
-40ºF – 120ºF (-40ºC – 49ºC)

Rating/Material
304 stainless steel, IP68

Warranty
One-year limited warranty

Approvals

NTEP
Certificate Number: 20-046
Accuracy Class III; 10,000 d

Measurement Canada AM-6165C

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