# SCT-2200 Advanced Series

*Weight Transmitter*
*Version 8.05*

# Technical Manual



**RICE LAKE**
WEIGHING SYSTEMS

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PN 183522 Rev B

# Contents

*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.*

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

# 1.0    Introduction

The purpose of this manual is to help the technician understand the SCT-2200 functioning modes, key functions and display indications. This manual applies to indicators using version 8.00 or higher of the STC-2200 firmware. Configuration and calibration of the indicator can be accomplished by pressing the indicator front panel keys, the serial command set or Rice Lake Tools configuration utility. Each indicator is designed to work with one scale and has the capability to be daisy chained to one protocol interface to communicate with a network interface controller for larger jobs.

Manuals and additional resources are available from the Rice Lake Weighing Systems website at **www.ricelake.com**

Warranty information can be found on the website at **www.ricelake.com/warranties**

## 1.1    Safety

**Safety Signal 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 DC power from the unit, disconnect the DC power cable from the main socket.*

*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.*

## General Safety Continued

| IMPORTANT | *Failure to follow could result in damage to equipment or corruption to and loss of data.* |

*Keep away from heat sources and direct sunlight.*

*Protect the instrument from environmental factors: rain, snow, dust, etc.*

*Do not wash, dip in water or spill liquid on the instrument.*

*Do not use solvents to clean the instrument.*

*Do not install in areas subject to explosion hazard.*

*Always mount the instrument and platform in a vibration free setting.*

*All instrument connections must be made with respect to local zone and environment standards.*

# 1.2 Options

## Features Include

- 5-key, dual-function, push button switches
- 6-digit LED display, 0.30" (8 mm) high
- (6) red LED Annunciators
- 12 - 24 VDC power
- NEMA type 1 plastic enclosure
- Mountable to a DIN 35mm rail
- Supports six wire load cell connections and 4 wire load cell connections with sense jumpers
- Two configurable digital inputs and two configurable digital outputs
- Analog Output (PN 182589)
  - 0-20 mA, 4-20 mA (Maximum 350,000 ohm)
  - 0-5 VDC, 0-10 VDC (Minimum 10,000 ohm)
- (1) RS-485 bidirectional port configurable for connection to a PC/PLC
- (1) RS-232 bidirectional port for connection to a printer or PC
- Optional communication modules:
  - PROFIBUS-DP
  - DeviceNet
  - PROFINET IO
  - EtherNet/IP
  - EtherNet TCP/IP (Wi-Fi or RJ45)
  - Modbus TCP/IP
  - EtherCAT
  - CANopen
- Modbus RTU through serial or RS-485 port. No optional Module needed
- Unit of measure conversion
- Peak detector
- Alibi memory
- Weight or Theoretical calibration with linearity points

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## 1.3   Overview

Case Dimensions and Connections

The instrument has a plastic case; external dimensions and connections are shown in Figure 1-1.
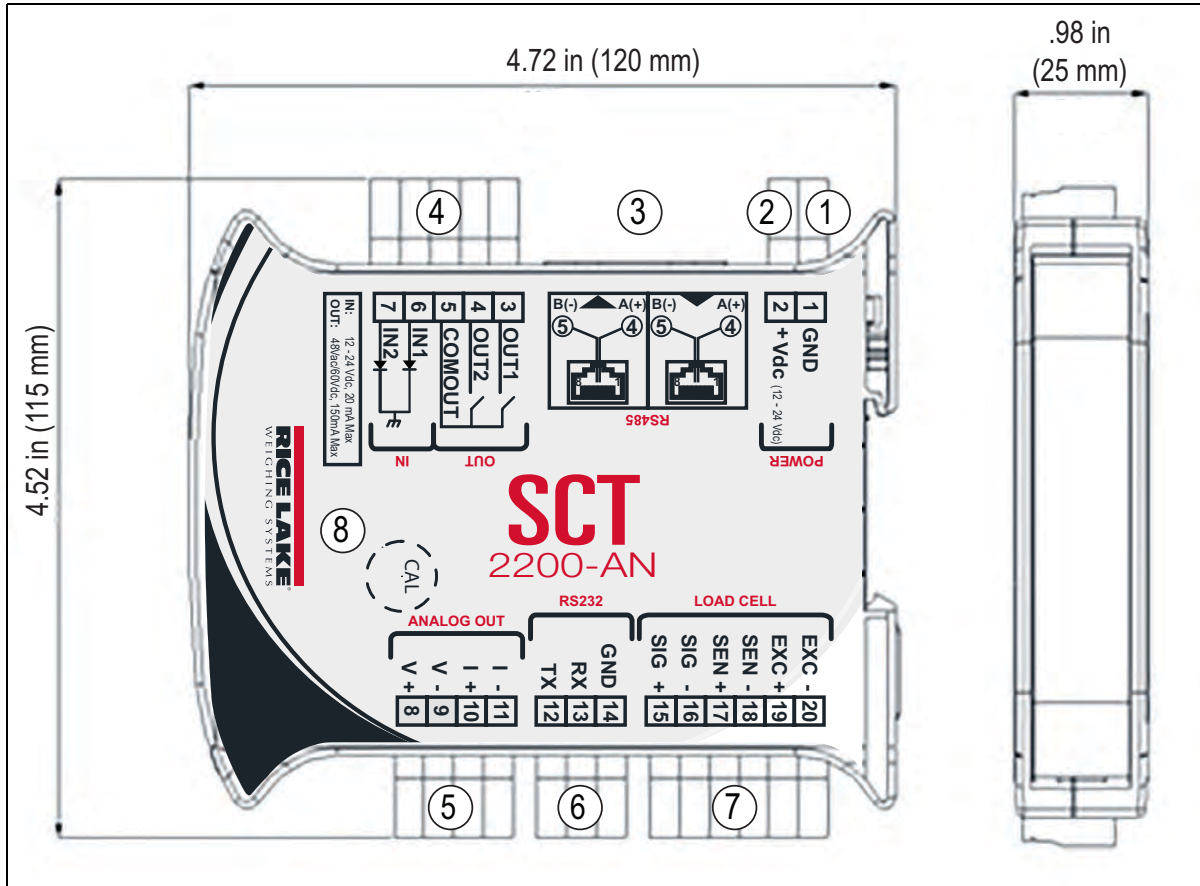


*Figure 1-1. SCT-2200 Dimensions and Connections*

| Item No. | Description |
|---|---|
| 1 | GND power supply input |
| 2 | (+) 12-24 VDC power supply input |
| 3 | Connection for serial line RS-485 |
| 4 | Digital I/O |
| 5 | Analog output (PN 182589 only) |
| 6 | Connection for serial line RS-232 |
| 7 | Connection for load cell |
| 8 | Access point to J1 to restrict calibration |

*Table 1-1.  SCT-2200 Connections*

### 1.3.1 Panel Display

The front panel of the SCT-2200 consists of a display with six digits that are 0.31 in (8 mm) high, six LED annunciators and a five key keyboard.
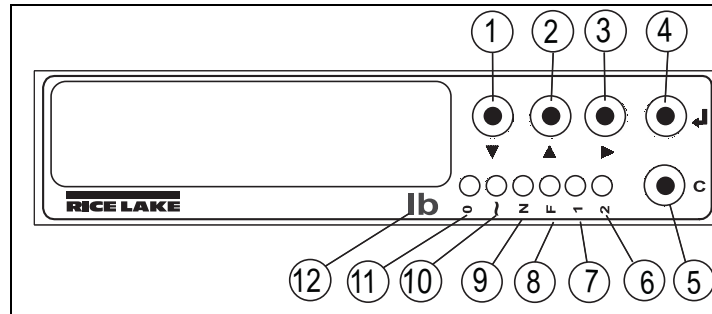


*Figure 1-2. SCT-2200 Front Panel*

| Item No. | Symbol | Description |
|---|---|---|
| 1 | ▼ | **ZERO** – Clears the displayed gross weight of up to ± 2% of the total capacity; Cancels tare <br> At power up: Momentary press during startup displays current settings. See Section 3.1.1 on page 10 <br> In setup: scroll through parameters <br> In numeric input: decreases the digit to be modified |
| 2 | ▲ | **TARE** – Momentary press executes semiautomatic tare; Cancels tare <br> At power up: Momentary press during startup displays setup mode. See Section 4.1 on page 16 <br> Long press allows for entering a manual tare from the keyboard <br> In setup: scroll through the parameters <br> In numeric input: increases the digit to be modified |
| 3 | ▶ | **MODE** – Executes a specific function (set in the setup mode) See Section 3.5 on page 13 <br> At power up: Momentary press during startup displays quick setup menu. See Section Figure 1-2. <br> In setup: quickly position the first step of a menu <br> In numeric input: selects the digit to be modified, from left to right |
| 4 | ↵ | **PRINT** – Executes a specific function (set in the setup mode) See Section 4.5 on page 26 <br> Executes a printout or transmission of data from the serial port dedicated to the printer <br> In setup: enter into a parameter or to confirm a setting <br> In numeric input: confirms the entry made |
| 5 | C | **ON/OFF** – Turns the instrument on and off <br> In setup: press multiple times to display 5AᴜEℲ and/or press to exit a step without confirming the setting <br> In numeric input: momentary press clears the present value <br> Long press beyond -ₒℲℲ- : Displays information of the scale (capacity, division, minimum weight for each configured range, gravitational acceleration value, number of configured channels) |
| 6 | 2 | Indicates the activation of the second output (Sp2) |
| 7 | 1 | Indicates the activation of the first output (Sp1) |
| 8 | F | Illuminates: <br> • when the specification function of the instrument is active (set in *F. ∏ₒdE*→*FᴜnℂԐ* parameter) See Section 3.5 on page 13 <br> • when a key is pressed <br> Turns off: <br> • when the specification function of the instrument is disabled <br> • with an active function (a key is released) <br> Blinking means the instrument function is active for five seconds |
| 9 | N | Illuminates when a tare is established, measuring net weight |
| 10 | ~ *(tilde)* | Illuminates when the weight is unstable |
| 11 | 0 | Illuminates when the weighing system is within ±1/4 division of zero |
| 12 | Lb | Units - **Lb** is printed on the instrument; **kg**, **Ton**, **g**, stickers are included for changing the units on the overlay |

*Table 1-2. SCT-2200 Front Panel*

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# 2.0    Installation

Rice Lake Weighing Systems recommends the instrument and the platform (transducer) be installed on a flat level surface, that is stable and vibration free.

## 2.1    Location Selection

**IMPORTANT**    *The following should be considered when selecting a location for the equipment:*

- *Dust-free*
- *Free of strong breezes or vapors*
- *Moderate temperature and humidity (59 to 86°F and 40-70%)*
- *Use waterproof conduit and couplings in order to protect the load cell cables*
- *Use a waterproof junction box to connect the cells*
- *Avoid welding with load cells installed*

**IMPORTANT**    *During operation, unit will get hot*

When the SCT-2200 is installed inside of the electrical panel, it is recommended that the units be installed vertically 1/4'' apart to a horizontal DIN rail.This minimizes heat buildup from multiple units being stacked and also enables optimal ventilation through the unit. If possible, it is recommended that the unit be installed towards the bottom of a panel to avoid the warmest parts of the panel. If panel size is small, some air circulation may be required.

## 2.2    Electrical Precautionary Measures

**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 2.3*
- *The cable extension of the load cells, or signal amplifiers connecting to the serial ports and analog output, must be within stated maximum lengths, See Section 2.3*
- *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 runs 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*
- *If the instrument is situated inside an electric panel, the power supply cable must be shielded and as short as possible, separate from every coil supply cable, inverter, electromotive force, and others. In addition, provide dedicated power supply to the instrument*
- *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*

## 2.3    Maximum Cable Length

### 2.3.1    Load Cell Cable

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

- 150' at 30#AWG
- 300' at 24#AWG

### 2.3.2    RS-232 Cable

The maximum length of an RS-232 cable is 50' at a maximum baud rate of 19200.

### 2.3.3    RS-485 Cable

The maximum length of RS-485 cable is 4000', See Section 6.1 on page 37.

### 2.3.4    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'.

# 2.4    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.

## 2.4.1    Load Cells and Junction Box

When the load cells are connected to the instrument through a junction box, the shielding of the load cell cables and the instrument must be connected to the junction box grounding.

When the load cells are directly connected to the instrument, the load cell cable shielding must be connected to the single point ground.

System cabling should be kept as short as possible to minimize noise potential. After exiting conduit or other shielding, a ferrite device should be used prior to conductor termination.

After platform and the load cell are properly grounded, connect the shield from the load cell cable to the instrument ground. See Figure 1-1 on page 3.
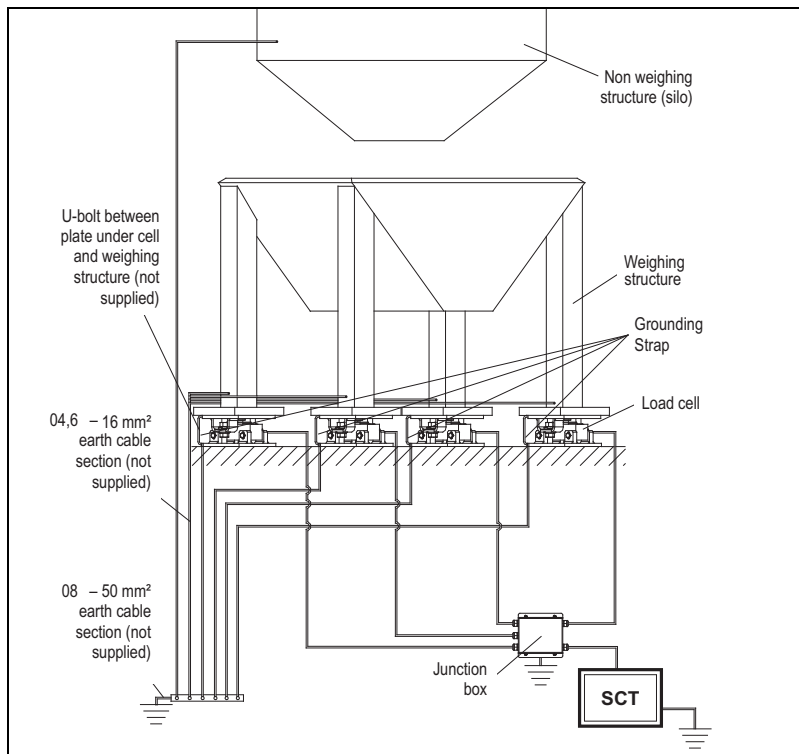


*Figure 2-1. Grounding Example*

| IMPORTANT | *Procedures not expressly described in this manual are considered improper use of the equipment.* |
|---|---|
| | *Ensure the platform is level or the load cells are shimmed evenly.* |
| | *All connections must meet all local zone and environment standards.* |
| | *Follow the recommended electrical precautionary measures described in Section 2.2 on page 5.* |
| | *Make sure that the grounding is made correctly, See Section 2.4.* |

## 2.5    Wiring Schematic



*Figure 2-2. SCT-2200 Wiring Schematic*

| Pin Number | Label | Description |
|---|---|---|
| **VE 12-24 Vdc Power Supply** | | |
| 1 | GND | 0Vdc (GND) |
| 2 | +Vdc | +12-24 Vdc |
| **Inputs and Outputs** | | |
| Outputs (48Vac or 60Vdc, 150mA max) | | |
| 3 | OUT1 | Output 1 |
| 4 | OUT2 | Output 2 |
| 5 | COMOUT | Common Output |
| Optoisolated Inputs Positive Logic (12-24Vdc,5-20mA max) | | |
| 6 | IN1 | Input 1 |
| 7 | IN2 | Input 2 |
| | | Connect input common to ground |
| **Analog Output (PN 182589 only)** | | |
| Voltage | | |
| 8 | V+ | +10V |
| 9 | V- | 0V (GND) |
| Current | | |
| 10 | I+ | +20mA |
| 11 | I- | -0mA (GND) |

*NOTE:*
*Max. resistance on output current: 350Ω*
*Min. resistance on output voltage: 10kΩ*

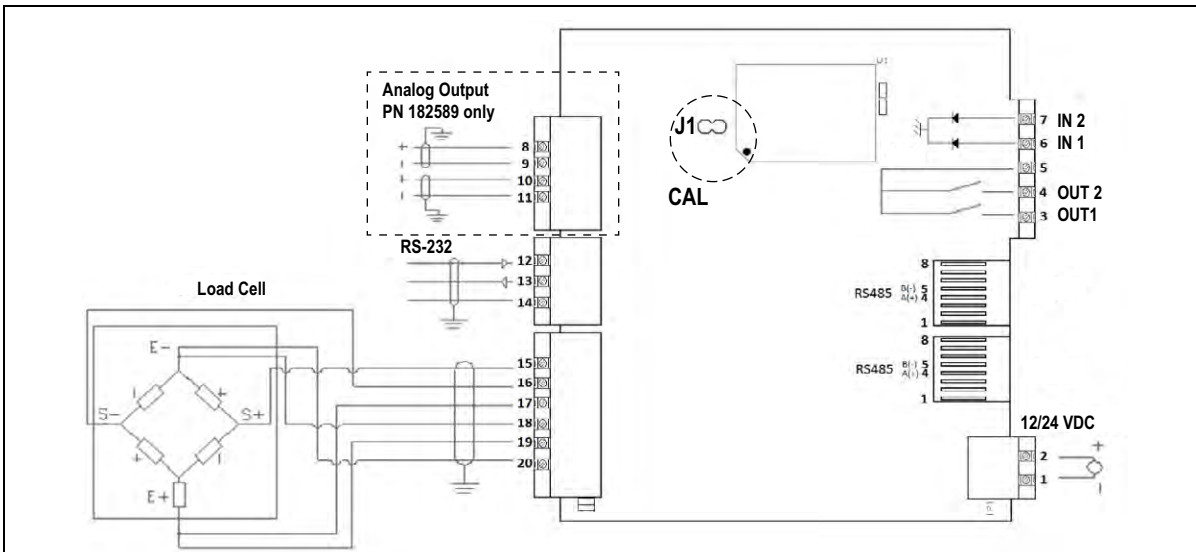| Pin Number | Label | Description |
|---|---|---|
| **Serial Port** | | |
| RS-232 | | |
| 12 | TX | Transmission |
| 13 | RX | Reception |
| 14 | GND | Ground |
| RS-485 | | |
| RJ45 Plug-IN/OUT | | 485 Line |
| RJ45 Plug-IN/OUT | | 485 Line |
| **Load Cell Connections** | | |
| 15 | SIG+ | Signal + |
| 16 | SIG- | Signal - |
| 17 | SEN+ | Sense + |
| 18 | SEN- | Sense - |
| 19 | EXC+ | Excitation + |
| 20 | EXC- | Excitation - |

*Table 2-1.  SCT-2200 Wiring Schematic*

> **Note** *J1 disables/enables calibration menu in SCT-2200 firmware. This function allows calibration to be limited to authorized personnel. Access to J1 is possible by breaking seal in SCT-2200 label. Restrict access to calibration by jumpering J1 and covering CAL access hole with tamper proof sticker.*

## 2.6    Connection to the Load Cell

The load cell terminal board of the SCT-2200 must be connected to the 6-wire load cell; if using a 4-wire load, cell excitation must jumper to sense.

| 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 | *The 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 30ft 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, however, recommended to never cut or shorten the load cell cable.* |
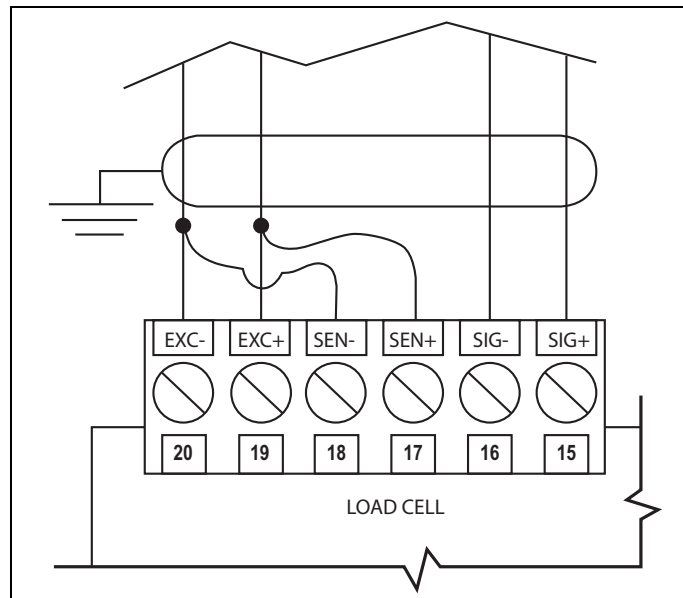


*Figure 2-3. 6-Wire Connection*

## 2.7    Input/Output Wiring
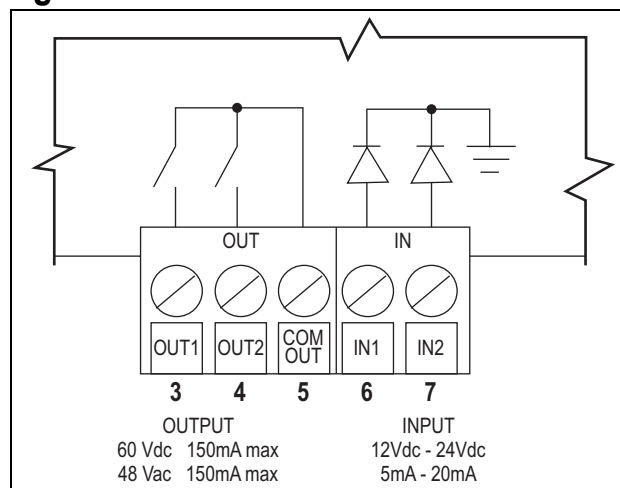


*Figure 2-4. Input/Output Wiring*

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

## 2.8 Legal for Trade

The SCT-2200 indicator can be sealed in Legal for Trade applications using a tamper proof sticker placed on the side seam of the indicator. The Audit menu can be accessed from weigh mode without power cycling the indicator. (See Section 4.7 on page 31)
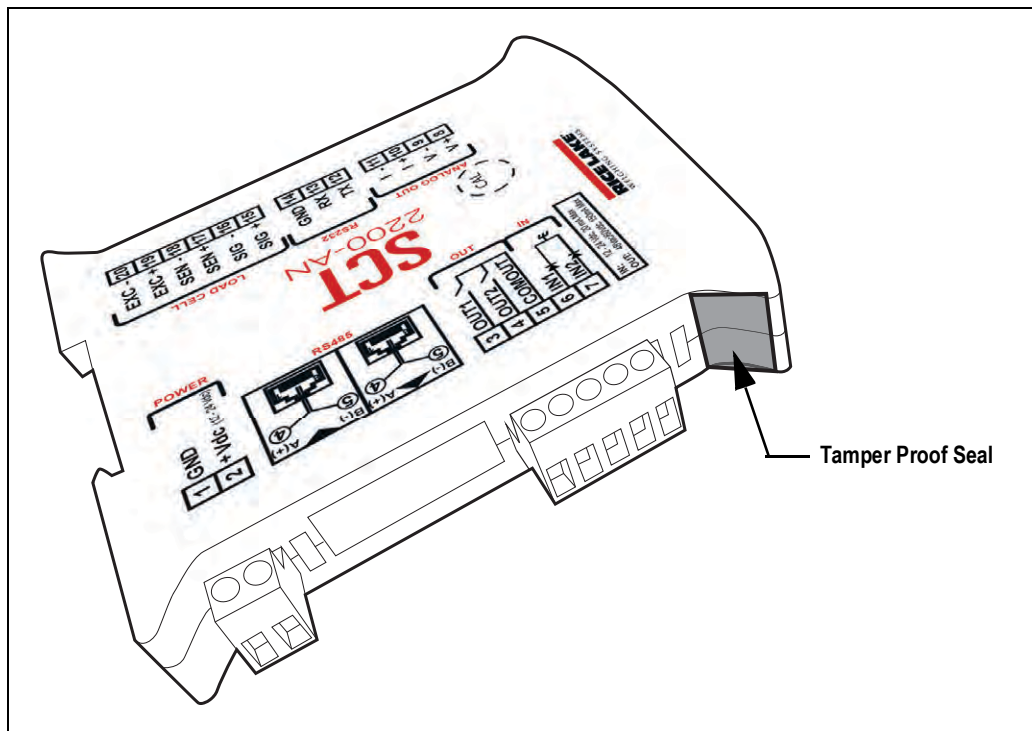


*Figure 2-5. Location of Legal for Trade Seal*

# 3.0    Operation

## 3.1    Basic Operation

Power must be provided to the SCT-2200 through an external AC/DC charger that supplies a stable voltage of 12 VDC or 24 VDC while connected to an appropriately rated AC power supply. Connect the two power supply wires to the appropriate terminals, see Figure 1-1 on page 3 on the side of the instrument.

### 3.1.1    Turn on the Instrument

Press  ⊂  until the instrument turns on, then release. The instrument 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 *ZErO* and, after 10 seconds, the current weight is displayed.

> **Note** | ***The auto zero function at start-up can be disabled in the setup mode.***
> ***See*** *SEtuP→ConFiG→PArAN→Auto-0* ***in*** *Table 4-5 on page 24.*

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

- *HH.YY* – *HH* is the software release and *YY* is the sub release
- *HH.YY* – *HH* indicates the type of instrument, *YY* indicates the software version
- *HH.YY.ZZ* – the installed software version
- *HHHHHH* – the name of the installed software
- *HHH.HHH* – capacity and division of channel 1
- *hirES* – displayed together with the gravitational acceleration value of the area of use

The instrument then executes a self-check.

### 3.1.2    Standby

Press  ⊂  until *OFF* displays. The LED at the left of the display remains on.

### 3.1.3    Power Off the Instrument

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

### 3.1.4    Zero

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

### 3.1.5 Tare

**Semiautomatic Tare**

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

**Manual Tare**

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

- ▶ selects the digit to be modified (moves left to right, selected digit blinks)
- ▼ decreases the blinking digit
- ▲ increases the blinking digit
- C momentary press clears the present value, long press returns to the weigh mode without saving changes
- ↵ 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.*

**Cancel a Tare**

A tare value can be manually canceled in multiple ways:

- Unload the scale and press ▲ or ▼
- Press C without unloading the scale
- Enter a manual tare equal to zero

**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 ▲ while the firmware version displays. *F.ᴹᴼᵈᴱ* displays.
2. Press ↵ to enter the menu.
3. Press ▼ or ▲ until *ᵗᴬʳᴱ* displays. Press ↵ to select.
4. Press ▼ or ▲ to scroll through options.
   - *ᴸᴼᶜᴷ* – locked tare
   - *ᵘⁿᴸᴼᶜᴷ* – unlocked tare
   - *ᵈⁱˢᴬᵇ* – disable tare
5. Press ↵ to confirm selection.
6. Slowly press C multiple times until *ˢᴬᵛᴱ?* displays.
   - Press ↵ to confirm and store to the instrument memory
   - Press any other key to cancel and exit without saving

## 3.2 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, See Section 5.0 on page 32.*

## 3.3 Display Configuration Data

The ᴉɴF◌ function makes it possible to view the configuration data, such as:.

- 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 C until ᴉɴF◌ displays.

2. Release C. The capacity value of the first range displays. Press ▼ or ▲ to scroll forward or back through the following data:
   - First range capacity *Ch 1.MAH*
   - First range minimum weight *Ch 1.M ᴉɴ*
   - First range division *Ch 1.E*
   - Second range division *Ch 1.MAH*
   - Second range minimum weight *Ch 1.M ᴉɴ*
   - Second range division *Ch 1.E*
   - Gravitational Acceleration Value *GrAU ᴉt*

3. Press C to return to the weigh mode.

## 3.4 Selecting Printing Functions

Use the following procedure below to set printing functions, See Section 4.3.1 on page 20:

1. Turn on the instrument and press ▲ while the firmware version displays. *F.ModE* displays.

2. Press ◄┘ to enter the menu.

3. Press ▼ or ▲ until *rEACt* displays. Press ◄┘ to enter the menu.

4. Press ▼ or ▲ to scroll through the options.
   - *2Ero* – rearms print at zero; only prints after rearming
   - *ᴉɴSt* – rearms print when weight becomes stable
   - *ALWAYS* – prints when print key is pressed, regardless of condition

5. Press ◄┘ to confirm.

6. Slowly press C multiple times until *SAUE?* displays.
   - Press ◄┘ to confirm and store to the instrument memory
   - Press any other key to cancel and exit without saving

## 3.5    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 ▲ while the firmware version displays. *F.ΠodE* displays.

2.   Press ◀━ to enter the menu.

3.   Press ▼ or ▲ until *FunCt* displays. Press ◀━ to set parameter.

4.   Press ▼ or ▲ to scroll through the options.
   - *ConUEr* – convert displayed value to a calculated value, see Section 3.5.1
   - *AL ib i* – alibi memory, See Section 3.5.2
   - *U i55* – sensitivity times ten, See Section 3.5.3 on page 14
   - *PEAㅅ* – peak hold detector, See Section 3.5.4 on page 15

5.   Press ◀━ to confirm selection.

6.   Slowly press C multiple times until *SAUE?* displays.
   - Press ◀━ to confirm and store to the instrument memory
   - Press any other key to cancel and exit without saving

### 3.5.1    Conversion

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

- Long press ▶ to set the conversion factor
- Short press ▶ to toggle between the unit of measures
- Press ◀━ to save the conversion value

### 3.5.2    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 ◀━. 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 ▶. *rEW . id* displays.
2. Enter the rewriting number (from 00000-00255).
3. Press ◀┘. *id* displays.
4. Enter the weigh number (from 000000-131072).
5. Press ◀┘. The weigh information displays.
6. Press ▼ or ▲ to view the weigh information.
   - *ch . H-H* is the scale number (from 1-4)
   - *uΠ YY-YY* is the unit of measure (*Lb, HG, 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 C to return to the weigh mode.

> **Note** *If the alibi memory is empty and ▶ is pressed, ENPtY 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 *SEtuP→ iniAL* parameter.

1. Turn on the instrument and press ▲ while the firmware version displays. *F.ΠodE* displays.
2. Press ▼ until *SEtuP* displays. Press ◀┘ to enter the menu.
3. Press ▼ or ▲ until *iniAL* displays. Press ◀┘. *iAL ib.?* displays.
4. Press ◀┘ to clear the alibi memory or any other key to cancel.
   - *AL.OH* displays if the operation is successful
   - *AL.Err* displays if the memory was not successfully cleared (repeat procedure)
5. Press C to return to the weigh mode.

It is not possible to clear an individual weigh record.

### 3.5.3 Sensitivity Times Ten

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

Press ▶ 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.

### 3.5.4 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 ▶ to enable the peak weight detection. -PEAK- displays alternately with the maximum weight value reached up to that point.

2. Press ▶ 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

### Setting Sampling Time

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

1. Press and hold ◀┘.

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

3. Press ▼ or ▲ until the desired value displays. See Table 3-1 for a list of settable values.
4. Press ◀┘ 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 setting of samples per second. 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, 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 SCT-2200.

- The **Quick Setup** Menu is a limited menu that includes settings essential to basic scale configuration such as quick calibration and communication. To enter the quick setup menu, press ⊂ to turn the instrument on. Press ▶ as the firmware version displays. See Section 4.2 on page 17 for more information on the quick setup menu

- The **Setup mode** Menu is a more in-depth menu that incorporates all configuration settings. To enter the setup mode, press ⊂ to turn the instrument on. Press ▲ as the firmware version displays. See Section 4.3 on page 19 for more information on the

## 4.1　　Setup Mode Navigation

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

| Key | Function |
|---|---|
| ▼ | Scroll through parameters |
| | In numeric input: decreases the digit to be modified |
| ▲ | Scroll through the parameters |
| | At power up: Momentary press during startup displays setup mode. |
| | In numeric input: increases the digit to be modified |
| ▶ | Quickly position at the first step of a menu |
| | At power up: Momentary press during startup displays quick setup menu. |
| | In numeric input: selects the digit to be modified, from left to right |
| ← | Enter into a parameter or confirm setting of a parameter |
| | In numeric input: confirms the entry made |
| ⊂ | Exit a step without confirming the setting |
| | In setup: press multiple times to display 5RUE? prompt and/or press to exit a step without confirming the setting |
| | In numeric input: clears the present value |

*Table 4-1.  Key Functions in Setup Mode*

## 4.2    Quick Setup Menu

Press ⊂ to turn the instrument on. Enter the quick setup menu by pressing ▶ as the firmware version displays. After every parameter, press enter to accept settings.
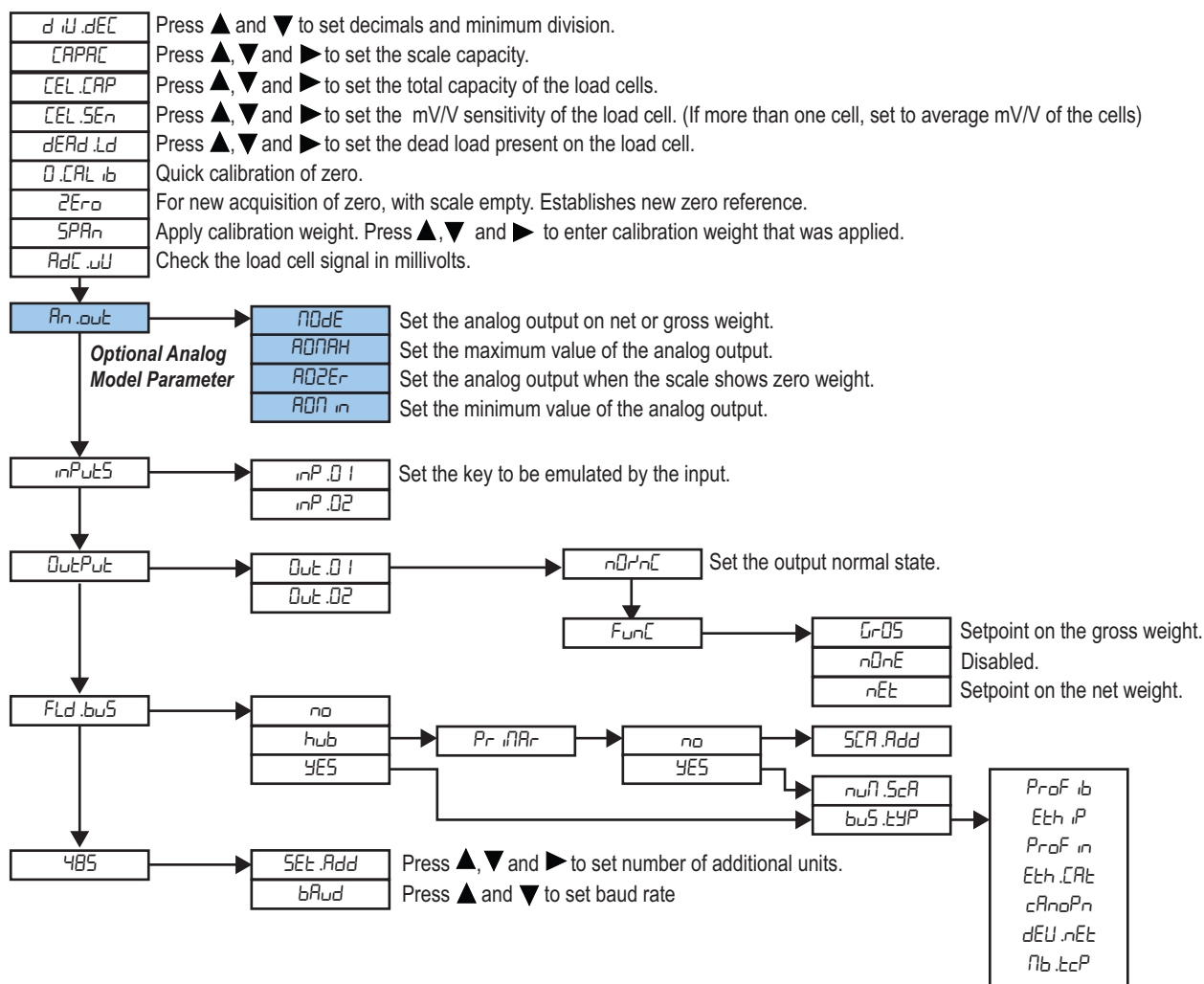
| | |
|---|---|
| d iU .dEC | Press ▲ and ▼ to set decimals and minimum division. |
| CAPAC | Press ▲,▼ and ▶ to set the scale capacity. |
| CEL .CAP | Press ▲,▼ and ▶ to set the total capacity of the load cells. |
| CEL .SEn | Press ▲,▼ and ▶ to set the  mV/V sensitivity of the load cell. (If more than one cell, set to average mV/V of the cells) |
| 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
*Optional Analog Model Parameter*

| | |
|---|---|
| NOdE | Set the analog output on net or gross weight. |
| AONAH | 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 / Out .02 → nOrnC    Set the output normal state.

FunC

| | |
|---|---|
| GrOS | Setpoint on the gross weight. |
| nOnE | Disabled. |
| nEt | Setpoint on the net weight. |

FLd .buS →
no
hub → Pr iNAr →
no
YES → SCA .Add
nuN .ScA
buS .tYP →

ProF ib
Eth iP
ProF in
Eth .CAt
cAnoPn
dEU .nEt
Nb .tcP

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 pres*s ⊂ *until the indicator displays* SAUEP. ***Pres**s ◀━ **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: See  Table 4-3 on page 21 to return indicator to default settings.

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

### 4.2.2 Theoretical Calibration

Use the quick setup menu to perform a theoretical calibration. See Figure 4-1 on page 17.

1. Navigate to  *d iU .dEc*. Press ◀━┛.

2. Press ▲ and ▼ to set decimals and minimum division. Press ◀━┛.

3. Select *CEL .CAP* Press ◀━┛.

4. Press ▲ and ▼ to set the total load capacity of the load cells. Press ◀━┛.

5. Select *CEL .SEn*. Press ◀━┛

6. Press ▲, ▼ and ▶ to set the mV/V sensitivity of the load cell. Press ◀━┛.

7. Select *dEAd .Ld*. Press ◀━┛

8. Press ▲, ▼ and ▶ to set the weight value of the dead load present on the load cell. Press ◀━┛.

9. Slowly press C multiple times until *SAuE?* displays.
   - Press ◀━┛ to exit and save the calibration
   - Press any other key to exit without saving

### 4.2.3 Calibration Using a Known Weight

Use the quick setup menu (Figure 4-1 on page 17) to perform a standard calibration with a known weight.

1. Select *d iU .dEc*. Press ◀━┛.

2. Press ▲ and ▼ to select decimals and minimum division. Press ◀━┛.

3. Select *CAPAC*. Press ◀━┛.

4. Press ▲, ▼ and ▶ to set capacity. Press ◀━┛.

5. Select *0 .CAL ib*. Press ◀━┛.

6. Clear weight from scale. Press ◀━┛. *CAL .0?* Displays. Press ◀━┛.

7. Select *SPAn*. Press ◀━┛.

8. Press ▲, ▼ and ▶ to set the weight value used for the calibration.

9. Place calibration weight on scale. Press ◀━┛.

10. Slowly press C multiple times until  *SAuE?* displays.
    - Press ◀━┛ to exit and save the calibration
    - Press any other key to exit without saving

### 4.2.4 Analog Output

See Section 4.6 on page 29 for Analog Output Settings.

### 4.2.5 Inputs

See Section 4.3.2 on page 21 for Input setup parameters.

### 4.2.6 Output Functions

See Section 4.5 on page 26 for Output Functions.

### 4.2.7 Fieldbus Parameters

For detailed Fieldbus configuration information, See Fieldbus Card Manual (RLWS Part #183523).

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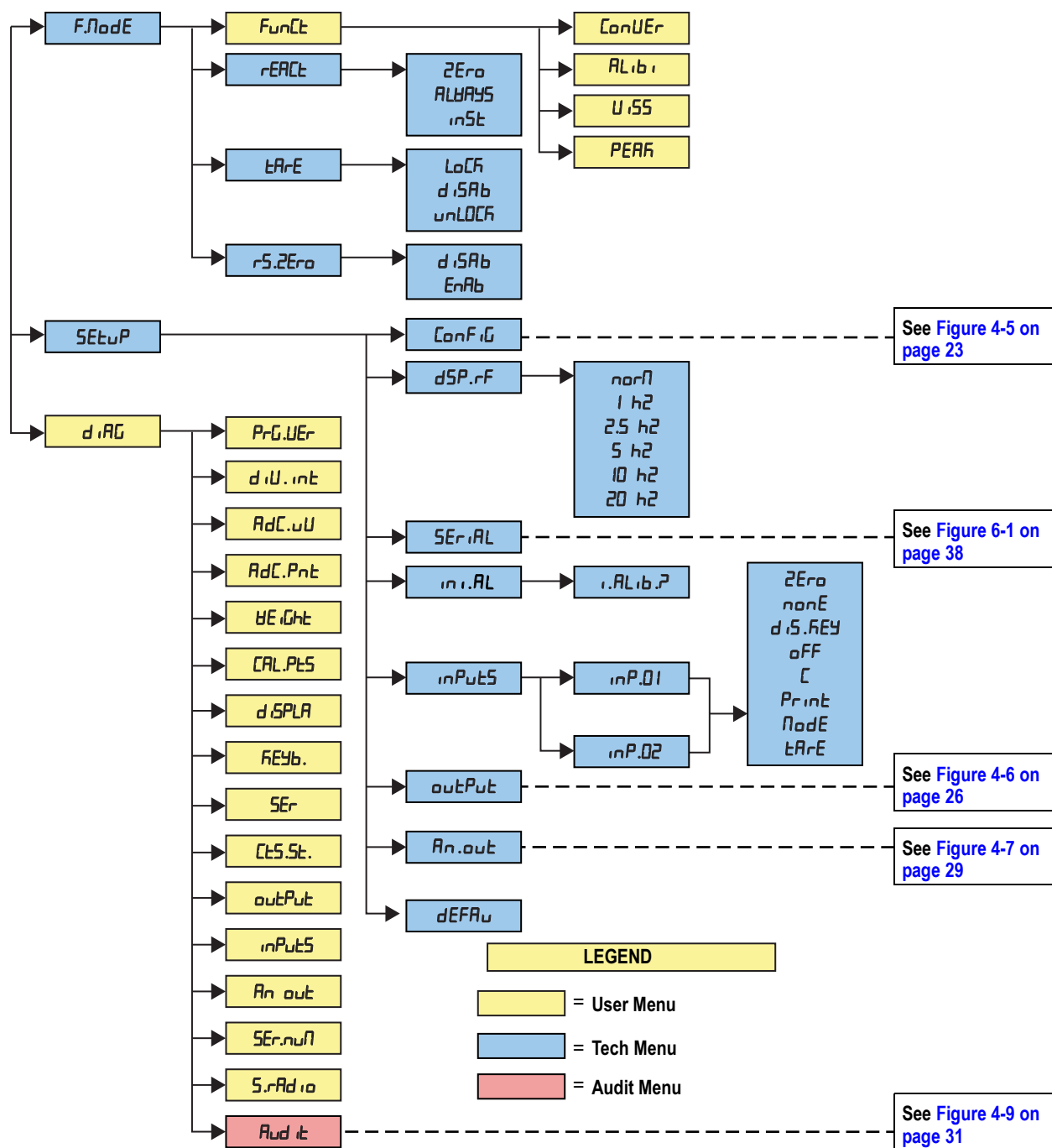
## 4.3    Setup Mode Menu



*Figure 4-2. Setup Mode Menu*

> **Note** *Settings adjusted in Tech Menu will increment the Audit Trail. Settings adjusted in the User Menu will not increment the Audit Trail.*

### 4.3.1 F.Mode Parameters

The function mode parameters set the functionality of the scale. The function mode parameters set four operations that can be accessed with the > key. It also sets the functionality of printing, taring and zeroing.
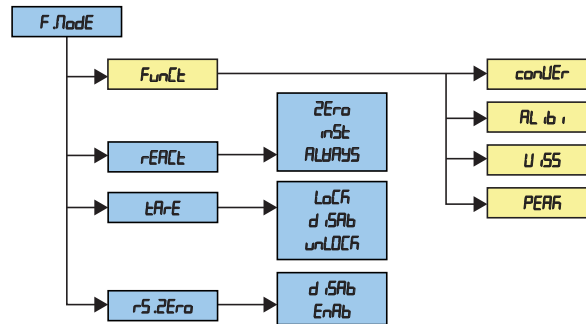


*Figure 4-3. F.Mode Menu*

| Parameter | Settings | Description |
|---|---|---|
| FunEt | | Functioning Mode |
| | | **NOTE: For the details of the operating modes, See *Section 3.5 on page 13*.** |
| | | ***Once the functioning mode is selected, if a printer is configured, the printout follows the selected function.*** |
| | ConUEr | Convert the current displayed value to a calculated value; if the Mode key is pressed for 1 second, the conversion value can be edited, See Section 3.5.1 on page 13 |
| | ALib i | Alibi memory, See Section 3.5.2 on page 13 |
| | U iSS | Sensitivity times ten when the mode key is pressed, See Section 3.5.3 on page 14 |
| | PEAR | Peak hold detector displays PEAK and alternates with displaying the highest captured value after the mode key is pressed, See Section 3.5.4 on page 15 |
| rEAEt | | 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, See Section 3.4 on page 12 |
| | ZEro | Rearms print function after weight returns to zero; only prints once after rearming |
| | ALWAYS | Always prints when print key is pressed |
| | inSt | Instability rearms the print function when the weight becomes unstable; only prints once after rearming and weight becomes stable |
| 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, See Section 3.1.5 on page 11 |
| | LoER | Retains tare value until manually cleared |
| | d iSAb | Tare value cannot be entered |
| | unLoER | Tare value is automatically cleared when gross weight is zero |
| rS.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 |

*Table 4-2. Function Mode Parameter*

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### 4.3.2    Setup Parameters
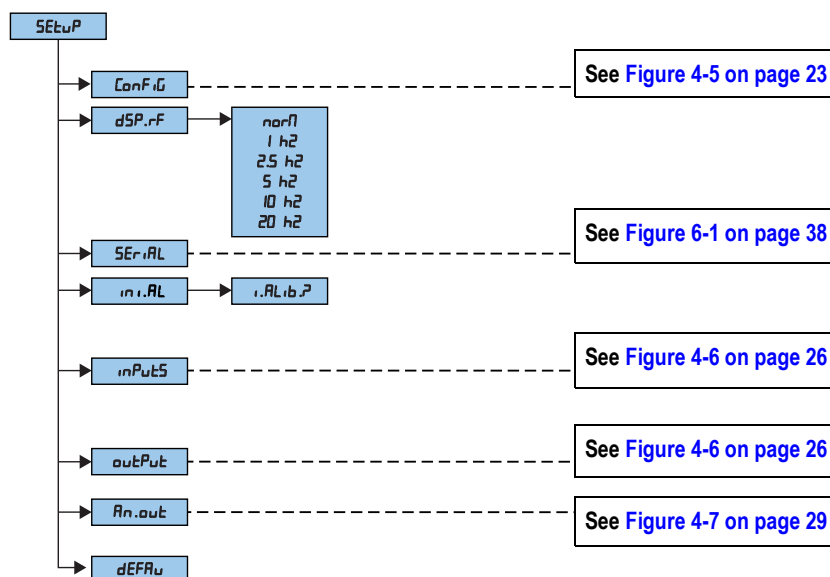


*Figure 4-4. Setup Menu*

| Parameter | Settings | Description |
|---|---|---|
| ConFiG | | Configuration Parameter - See Table 4-5 on page 24 |
| dSP.rF | | Sets the speed of the display refresh |
| | norN | The function is disabled |
| | 20 h2 | 20 display update / sec refresh rate |
| | 10 h2 | 10 display update / sec refresh rate |
| | 5 h2 | 5 display update / sec refresh rate |
| | 2.5 h2 | 2.5 display update / sec refresh rate |
| | 1 h2 | 1 display update / sec refresh rate |
| SEr.iAL | | Serial Communications Setup, See Table 6-4 on page 40 |
| in i.AL | | Initialize alibi memory – the initialization cancels all the data stored in the alibi memory; press ◄┘ to enter the operation, then i.ALib.? displays; press ◄┘ again to confirm or any other key to cancel; AL.OA displays if the operation is successful; if not, AL.Err displays; the parameter displays only if the alibi functioning mode is selected |
| inPutS | | Input Configuration – sets the function of each input, See Section 4.5.1 on page 26 |
| outPut | | Output configuration – See Table 4-6 on page 26 |
| An.out | | Analog output – See Table 4-9 on page 29 |
| dEFAu | | Default settings – restores instrument default settings; press ◄┘ ; dEFAu? displays; press ◄┘ to confirm or exit by pressing any other key<br>*NOTE: Returning the instrument to default settings cancels the present calibration.* |

*Table 4-3.  Setup Parameters*

### 4.3.3  Diagnostic Menu

See the Figure 4-2 on page 19 for the diagnostic (*d ιRG*) menu structure.

| Settings | Description |
|---|---|
| *PrG.UEr* | Press ◄━━ to display the software version |
| *d ιU. ιnE* | Press ◄━━ to display the calibration internal divisions |
| *RdC .uU* | Press ◄━━ to display the microvolts relative to the weight on the scale; use ▼ or ▲ to display the microvolts of the scale<br><br>***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*** |
| *RdC .Pnt* | Press ◄━━ to display the A/D converter points relative to the weight on the scale; press ▼ or ▲ to display the A/D converter points for each configured channel. See Table 4-10 on page 30 for ideal Raw A/D count numbers. |
| *HE ιGhE* | Press ◄━━ to display the weight on the scale; press ▼ or ▲ to view the weight on each connected scale |
| *CRL .PES* | Press ◄━━ to alternately display the A/D converter points and the corresponding weight value; use ▼ or ▲ to display for each calibration point and relative weight value |
| *d ιSPLR* | Display Test – press ◄━━ to turn on display segments one at a time; continue pressing ◄━━; The instrument turns on the display segments, one at a time, then exits automatically from this step |
| *REYb* | Keyboard Test – press ◄━━, 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 ◄━━, then *S  HY*; *H* displays, in which *Y* indicates the status of the PC serial port<br><br>• *0* – Serial port is not working<br>• *1* – Serial port is working<br><br>Press ▼ or ▲ to change the status of the serial port |
| *CES .SE* | CTS Status Test – press ◄━━ to view the CTS signal status of the printer connected to the PRN serial port |
| *ouEPuE* | Output Test – press ◄━━, displays *rEL . 1* and output 1 is enabled; press ▼ or ▲ to enable the other outputs |
| *ιnPuES* | Input status – press ◄━━, displays *ιn .bH-Y*; *H* displays, in which *Y* indicates the input status<br><br>• *0* – disabled<br>• *1* – enabled<br><br>Press ▼ or ▲ to change the input status |
| *Rn ouE* | Analog Output Test – provides a basic test to verify correlation of weight and analog output, when equipped with analog output option; See Section 4.6 on page 29<br><br>Press ◄━━,  00000 displays. Enter a value between 00000 and 65535 and confirm by pressing ◄━━; the instrument assigns the corresponding analog value in output<br><br>Press ◄━━ on the same entered value to exit |
| *SEr .nuΠ* | Serial Number – Displays the instrument's serial number |
| *S .rRd ιo* | Press ◄━━ to select the desired radio channel; *OH* displays if the configuration is successful, *Error* displays if not successful |
| *Rud ιE* | Press ◄━━ to view counters for System Configuration, Scale Configuration, and Scale Calibration; See Section 4.7 on page 31 |

*Table 4-4.  Diagnostics Menu*

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## 4.4    Configuration Menu
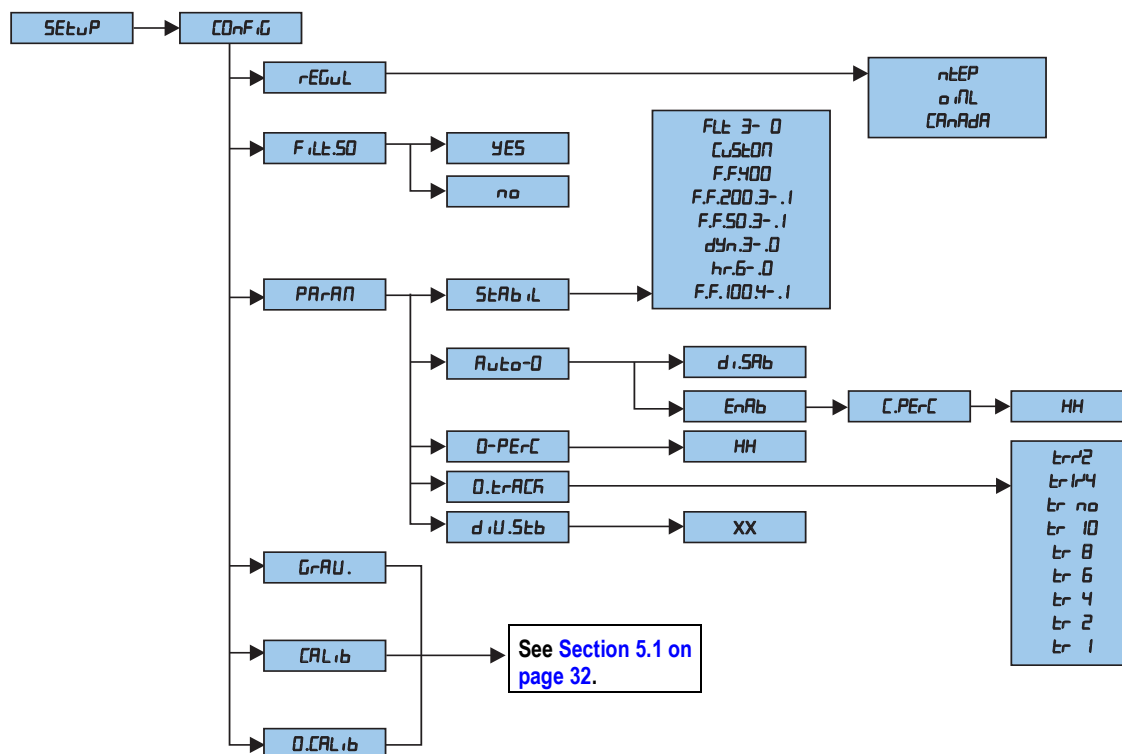


*Figure 4-5. Configuration Menu*

| Parameter | Settings | Description |
|---|---|---|
| rEGuL | ntEP<br>o iNL<br>CAnAdA | Selection of regulatory body<br>   NTEP<br>   OIML<br>   Measurement Canada |
| F iLt .50 | no = disable<br>YES = enable | Enable or disable the 50Hz filter |
| PArAN | Metrologic parameters | |
| | StAb iL | Select and set the type and degree of filtering; See Section 4.4.1 on page 25<br>   FLt 0-3 – filter for simple weighing<br>   CuStoN – customizable filter for manufacturer use<br>   F .F .200 . 1-3 – filter at 200 Hz<br>   F .F .50 . 1-3 – filter at 50 Hz<br>   dYn .0-3 – filter for crane scale<br>   h .r .0-6 – filter for high resolution<br>   F .F . 100 . 1-4 – filter at 100 Hz<br>   F .F .400 – filter at 400 Hz<br>**With a Legal for Trade instrument, only the FLt0, FLt 1, FLt2, FLt3 parameters can be selected.** |
| | Auto-0 | Automatic acquisition of the gross zero at startup (default is 2% of capacity)<br>   d iSAb – disabled<br>   EnAb – enabled on scale 1<br>*NOTE: If auto zero 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 key (▼); Entering 0% disables the zero key (▼) |
| | 0 .trACA | 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<br>   tr 1⁄2  – ± half division<br>   tr 1⁄4  – ± one fourth of a division<br>   tr no  –  tracking disabled<br>   tr 10  – ± ten divisions<br>   tr 8  – ± eight divisions<br>   tr 6  – ± six divisions<br>   tr 4  – ± four divisions<br>   tr 2  – ± two divisions<br>   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 acceleration – See Section 5.4 on page 35 |
| CAL ib | -- | Scale calibration – See Section 5.0 on page 32 |
| 0 .CAL ib | -- | Zero calibration – See Section 5.0 on page 32 |

*Table 4-5.  Config Menu Parameters and Settings*

### 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 SCT-2200 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 4-6.  Filter Values*

## 4.5 Input/Output Functions

The instrument is fitted with two opto-isolated inputs and two dry contact outputs. See specifications in Section 2.7 on page 8.
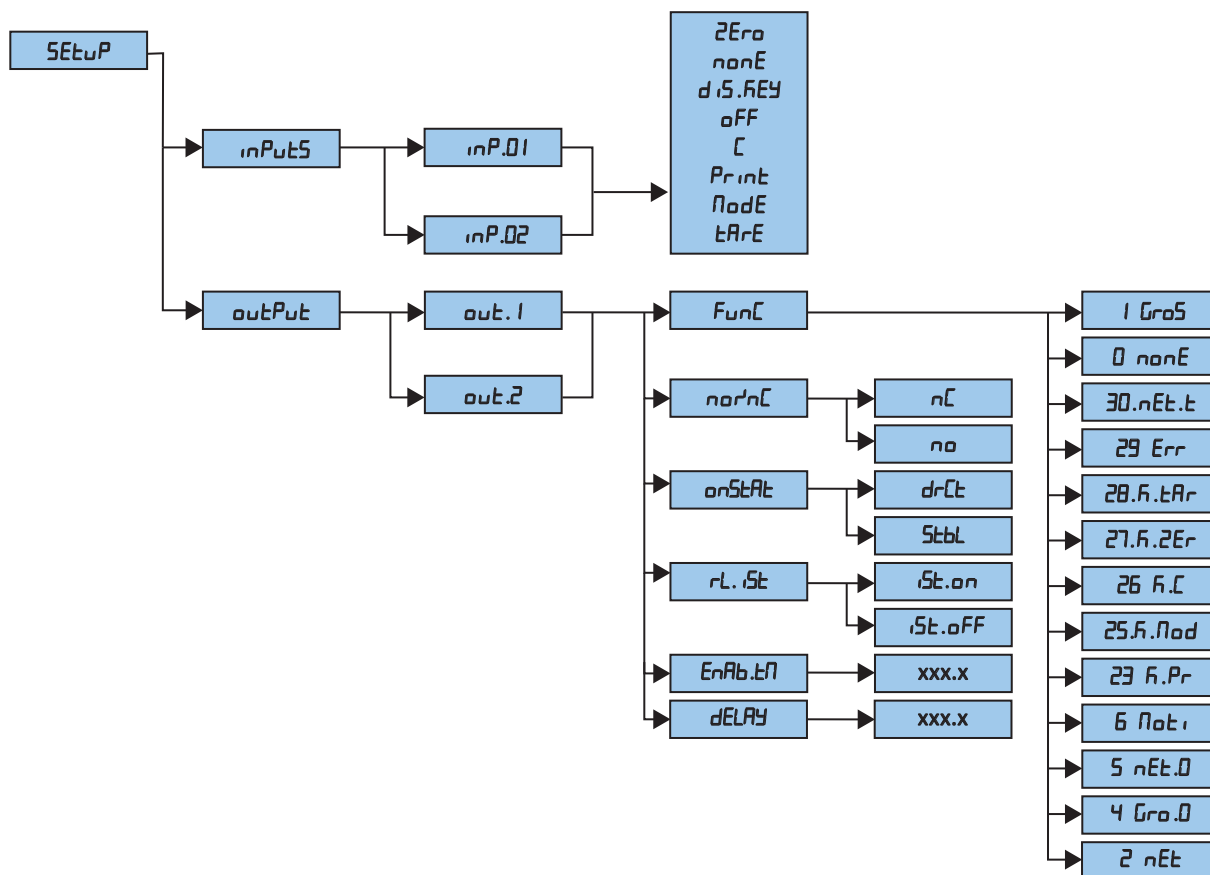


*Figure 4-6. Output Menu*

### 4.5.1 Input Functions

The input configuration menu sets the function of each of the inputs.

| Parameter | Settings | Description |
|---|---|---|
| inPut5 | inP.01 inP.02 | Input 1 or Input 2 <br> **NOTE: In the event two inputs are simultaneously enabled, only the lowest number input will activate.** |
| | | 2Ero – Zero key |
| | | nonE – Disabled (Default for input 1) |
| | | di5.KEY – Disables the keyboard |
| | | oFF – Turning off the instrument |
| | | C – C key – ON/OFF key |
| | | Print – Print key |
| | | ModE – Mode key (Default for input 2) |
| | | tArE – Tare key |

*Table 4-7. Input Functions*

### 4.5.2 Output Functions

The parameters of each of the outputs is set in the setup 𝗈𝗎𝗍𝖯𝗎𝗍 menu, See Figure 4-6 on page 26.

📝 **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 |
|---|---|---|
| FunC | Define the functionality of each output | |
| | 1 GroS | Setpoint based on the gross weight (Default) |
| | | **Functioning with hysteresis** (rL. iSt parameter set at iSt. on) |
| | | 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 ◀━┛ to enter the setpoint values for each configured output |
| | | 2. Select inP.StP. S.1 on displays (output 1 – this enables the setpoint). Press ◀━┛ |
| | | 3. Enter the weight value. See Section 4.1 on page 16 for key function. Press ◀━┛ to confirm. S.1 oFF displays (output 1 – this disables setpoint) Press ◀━┛ |
| | | 4. Enter the weight value. Press ◀━┛ to confirm |
| | | 5. Repeat steps 1 to 8 for all outputs |
| | | 6. Slowly press C multiple times until SAUE? displays |
| | |    - Press ◀━┛ to confirm and store to the instrument memory<br>   - Press any other key to cancel and exit without saving |
| | | **Functioning without hysteresis** (rL. iSt parameter set at iSt. oFF) |
| | | Setpoint based on gross weight; One setpoint for each output is set |
| | | 1. Press and hold ◀━┛ to enter the setpoint values for each configured output |
| | | 2. Select inP.StP. S.1 on displays (output 1 – enabling setpoint) Press ◀━┛ |
| | | 3. Enter the weight value; See Section 4.1 on page 16 for key function. Press ◀━┛ to confirm |
| | | 4. Repeat steps 1 to 5 for all outputs |
| | | 5. Slowly press C multiple times until SAUE? displays |
| | |    - Press ◀━┛ to confirm and store to the instrument memory<br>   - Press any other key to cancel and exit without saving |
| | | • *The configuration of setpoints cannot be accessed if all outputs are set in the nOnE 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 ( ▼ , ▲ , ▶ , C or ◀━┛); if the key press time is greater than two seconds the output is disabled and remains disabled* |
| | 0 nonE | No function, this output is inactive |
| | 2 nEt | Setpoint based on net weight. Setpoints are set in the same manner as gross weight; See 1 GroS above. In addition setpoints can be set and activated on a negative weight<br>  • Positive weight (S iGn set at POS it)<br>  • 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 |

*Table 4-8. Output Functions*

| Parameter | Settings | Description |
|---|---|---|
| FunC | 29 Err | Error indication. Function of the output is enabled on an invalid weight (overload/underload), or without the signal coming from the cell (disconnected cell) |
| | 28 F.tAr | Tare Key – function is enabled when ▲ is pressed |
| | 27 F.2Er | Zero Key – function is enabled when ▼ is pressed |
| | 26 F.c | C Key – function is enabled when C is pressed |
| | 25 F.Nod | Mode Key – function is enabled when ▶ is pressed |
| | 23 F.Pr | Print Key – function is enabled when the ⏎ 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 |
| nordnc | NO/NC Contacts<br>• no – output normally opened<br>• nC – output normally closed | |
| onStAt | Switching condition<br>• 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<br>• 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<br>• iSt.oFF – hysteresis disabled<br>• iSt.on – hysteresis enabled | |
| EnAb.tN | Enabling time – enter the length of time the output is enabled in seconds (4 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<br><br>***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 | Enables delay period – enter the enabling delay period in seconds (4 digits with a decimal);<br><br>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<br><br>***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.***<br><br>***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 4-8. Output Functions (Continued)*

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## 4.6    Analog Output Option

An optional analog output is configurable at 0-20mA, 4-20mA, 0-10Vdc, 0-5Vdc; with minimum and maximum settable values. The output voltage and the current from the interface are proportional to the gross weight or net weight present on the scale.

The analog output is updated every 20ms and takes on the value corresponding to the weight converted in that instant; therefore, as the filter is increased, the analog output update rate will slow down.

📝 **Note** | *Scale needs to be calibrated per Section 5 before analog output can be calibrated*

To configure the parameters, enter the setup mode and 5EtuP→An.out.
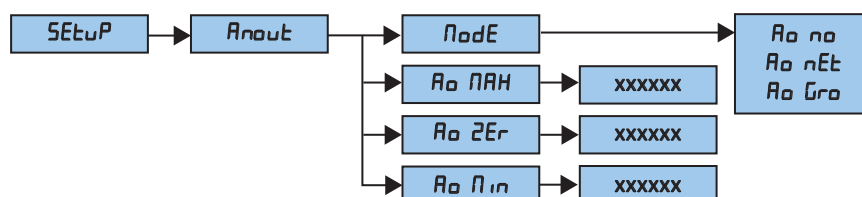


*Figure 4-7. Analog Output Menu*

| Parameter | Descrption |
|-----------|-----------|
| ∏odE | **Select the type of analog output:**<br>Аоно – analog output disabled<br>АоⳐro – analog output tracks gross weight<br>АоnEt – analog output tracks net weight<br>Once the functioning mode is confirmed, set the values of the analog output; the digital/analog converter values are entered (between 0-65535) which corresponds to an output value in voltage or in current<br>The instrument keys have the functions:<br>▼ – decreases the selected digit (blinking)<br>▲ – increases the selected digit (blinking)<br>▶ – selects the digit (blinking) from left to right<br>◀┘ – press once to enter a value, the corresponding output analog value is enabled; press a second time to confirm and exit the step<br>C – press to quickly zero the present value to 000000 |
| Ао∏АH | Set the maximum value of the analog output:<br>• **With a positive weight** – the value of the output when the weight is greater than or equal to the full scale capacity; also corresponds to the overload condition<br>• **With negative weight** – the value of the output when the negative weight is greater than or equal to the full scale capacity, also corresponds to the underload condition<br>The value can be between 0-65535 (values of the digital/analog converter); if a higher value is entered, the instrument zeros the value |
| Ао2Er | Set the analog output value when the scale displays zero weight (supplied when the scale is in underload); this value can be between 0-65535 (values of the digital/analog converter); if a higher value is entered, the instrument zeros it |
| Ао∏in | Set the minimum value of the analog output:<br>• **With positive weight** – the minimum value provided by the analog output, corresponding also to the underload condition<br>• **With negative weight** – the minimum value provided by the analog output, corresponding also to the overload condition<br>This value can be between 0-65535 (values of the digital/analog converter); If a higher value is entered, the instrument zeros it |

*Table 4-9.  Analog Output Parameters*

## Calibrating Analog Output

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

1. Enter setup mode and go to the *An out* menu (see Figure 4-7 on page 29).
   - Set *Ao M in* to lowest weight value to be tracked by the analog output
   - Set *Ao MAH* to highest weight value to be tracked by the analog output

2. Connect multimeter to analog output:
   - For voltage output, connect voltmeter leads to pins 3 and 4
   - For current output, connect ammeter leads to pins 1 and 2

3. Adjust zero calibration: Scroll to the *Ao ZEr* parameter. Check voltage or current reading on multimeter. Press and hold ▼ or ▲ to adjust the zero value up or down.

4. Return to normal mode. Analog output function can be verified using test weights.

Approximate Values Between The DA Converter and Analog Output:

| D/A Converter | Voltage | Current (mA) |
|---|---|---|
| 1200 | 0 | 0 |
| 12700 | -- | 4 |
| 58600 | -- | 20 |
| 62650 | 10 | -- |

*Table 4-10.  DA Converter and Analog Output*
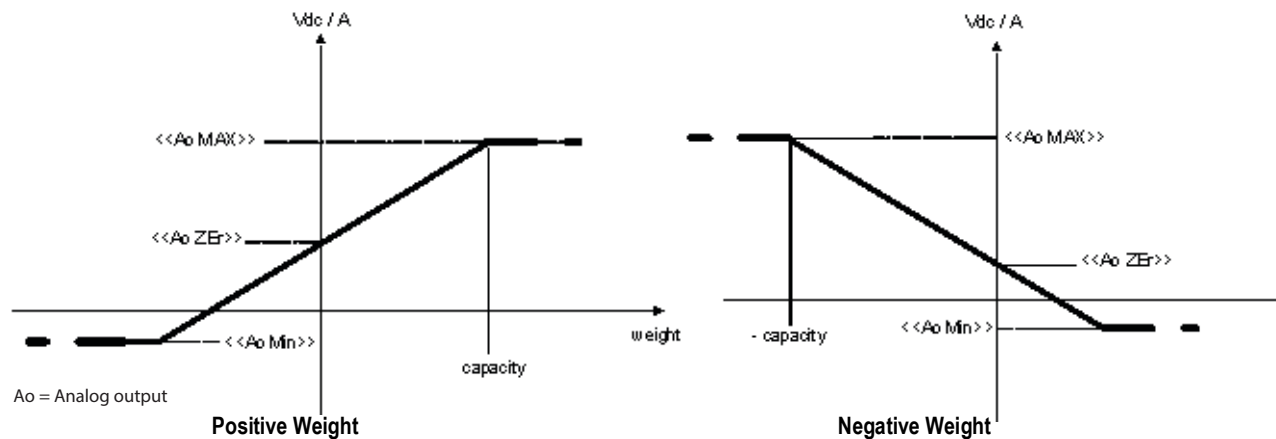


*Figure 4-8. Analog Output*

## 4.7 Audit Menu

Audit menu enables the user to view the number of times that configurations have been changed on the SCT-2200. The Audit menu is accessed from weigh mode.

### 4.7.1 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 2.8 on page 9 for legal for trade applications.
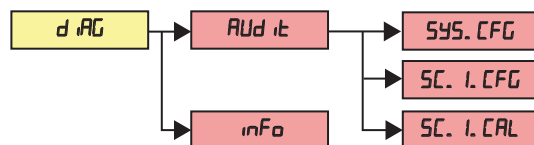
*Figure 4-9. Audit Menu*

| Menu | Parameter | Description |
|---|---|---|
| Aud it | SYS.CFG | **System configuration audit trail** - Displays number of times that any of the following system parameters has been changed<br><br>TYPE, TARE, RS.ZERO, NCHAN, AUTO-0, C.PERC, 0.PERC, GRAV, REGUL, OV.LOAD |
| | SC.1.CFG | **Scale configuration audit trail** - Displays number of times that any of the following scale parameters has been changed<br><br>STABIL, 0.TRACK, DIV.STB, DEC1, UM, DIV, RANGE |
| | SC.1.CAL | **Scale calibration audit trail** - Displays number of times the scale has been calibrated |
| inFO | | Indicator scrolls through settings |

*Table 4-11. Audit Menu Parameters*

**Access Audit Menu From Weigh Mode**

1. Press and hold C until Aud it displays.
2. Press ▼. inFo displays. Press ▼ again, Aud it displays.
3. Press ↵. Displays LRV number then displays SYS.CFG.
4. Press ▼ or ▲ to toggle between audit counter options.
5. Press ↵ to view Audit trail number for the selected audit counter.
6. Press C to exit to audit counter options. Repeat Steps 4 and 5 as needed.
7. Press C to return to weigh mode.

# 5.0 Calibration

## 5.1 Calibration Menu

The indicator can be calibrated using a known weight or theoretically.



*Figure 5-1. Calibration Menu*

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### 5.1.1 Calibration Parameters

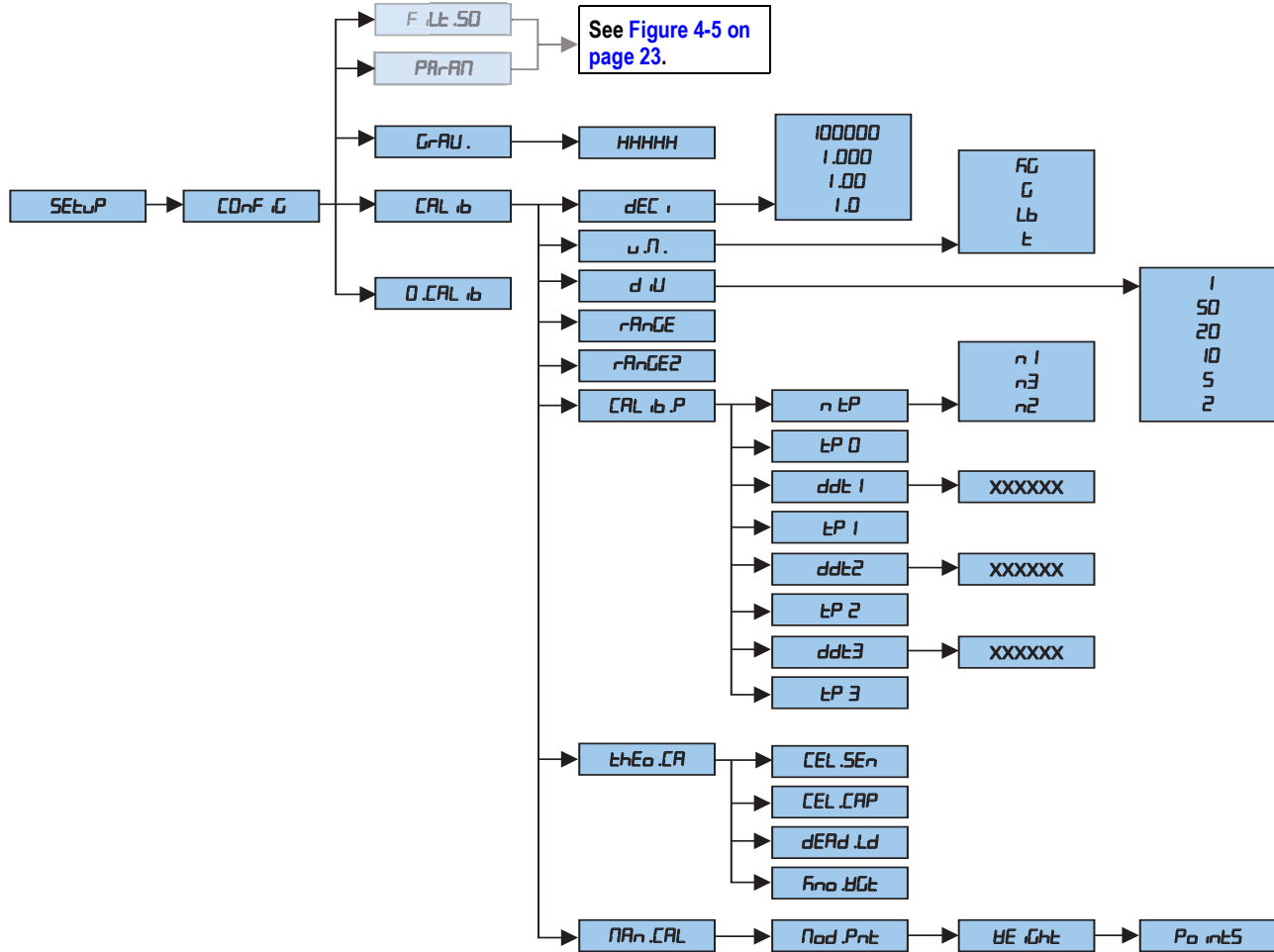| Parameter | Settings | Description |
|---|---|---|
| *GrAU.* | *9.75001-*<br>*9.84999*<br><br>default: *9.80655* | Gravity acceleration – select the acceleration value of calibration location and installation location of the instrument; manual entry of the g value: the gravitational acceleration value 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. |
| *dEC1* | | Decimal Point Location – when combined with the decimal point location, specifies the location of the decimal point or dummy zero in the unit display. ( *1.0*, *1.00*, *1.000*, *100000*) |
| *u.N.* | | Units – specifies units for displayed and printed weight; *Lb*, *KG*, *t*, *G*; (lb is standard on legend; stickers are available for g, t, and kg) |
| *diU* | | Display Divisions – selects the minimum division size for the displayed weight. ( *1, 2, 5, 10, 20, 50*) |
| *rAnGE1* | | Maximum weight for first range or interval (also sets scale capacity) |
| *rAnGE2* | | Maximum weight for second range or interval (also sets scale capacity) |
| *CAL ib.P* | | Calibration |
| | *n tP* | 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  ( *0* to *99.99999*) |
| | *CEL.CAP* | Total load cell capacity in the configured unit of measure. ( *0* to *999999*) |
| | *dEAd.Ld* | Weight of the scale structure on the load cells with no weights added |
| | *Kno.WGt* | Known value of the existing product that is not part of the dead load (0 to scale capacity) |
| *NAn.CAL* | | Manual Calibration - manually change the weight and ADC value of calibration points |
| | *Nod.Pnt* | Select calibration point to change |
| | *WEiGht* | Enter or confirm weight value |
| | *PO intS* | Enter or confirm ADC value |
| *0.cAL ib* | | 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* ▶ *to select the digit to be modified and* ▼ *or* ▲ *to increase or decrease the digit.*

*To navigate a menu to select an option, Press* ▼ *or* ▲*.*

## 5.2 Calibration Procedure

Use this procedure to calibrate the scale.

1. Navigate to *SEtuP*→*ConFiG*→*CAL ib*→*dEC1*. Press ⏎ to set parameter.

2. Navigate to select the decimal place value. Press ⏎ to confirm selection. *u.N.* displays. Press ⏎ to set parameter.

**Note** *By setting the divisions of the first range, the divisions for the second range are automatically set.*

3. Navigate to select the unit of measure. Press ⏎ to confirm selection. *diU* displays. Press ⏎ to set parameter.

4. Navigate to select the scale's minimum division, or the first range of dual range. Press ⏎ to confirm value. *rAnGE1* displays. Press ⏎ to set parameter.

5. Set the total capacity of the scale, or *rAnGE1* if using multi-range functioning.  Press ⏎ to confirm. See Section 3.2 on page 12 for more information on multi-range functioning.

6. For dual range scale only:
   - Navigate to select *rAnGE2* . Press ◄┙ to set parameter.
   - Set the second range. Press ◄┙ to confirm. *CAL ib .P* displays. Press ◄┙ to enter the menu. *ntP* displays. Press ◄┙ to set parameter.

> **Note** *The rAnGE2 is disabled if set at 000000. See Section 3.2 on page 12 for more information on multi-range functioning.*

7. Navigate to select the desired number (1-3) of calibration points and press ◄┙. *tP 0* displays. Press ◄┙.
8. Unload the scale and wait until *ddt 1* displays. Press ◄┙.
9. Set the weight value of first sample weight. Press ◄┙ to confirm.
10. Navigate to select *tP 1*. Press ◄┙.
11. Put the weight on the scale. Press ◄┙. Wait until the display stops flashing between the scale counts and *tP 1*.

> **Note** *When the weight acquisition is complete and a calibration point is set, the internal divisions value momentarily displays followed by ntP . If using multiple calibration points, the unit automatically advances to the next point (ddt2, ddt3).*

12. Repeat step 4-11 for each calibration point.

> **Note** *The calibration points must be in increasing order (point 1 < point 2 < point 3).*

13. Remove all weight from the scale. This step is optional, however, be aware if the auto-zero function is active, after saving the calibration the weight on the scale displays as zero even if the weight has not been removed. See *SEtuP→ConF iG→PArAn→Auto-0* in Table 4-5 on page 24.
14. Once the calibration is complete, press *C* until the instrument displays *SAUE2*.
15. Press ◄┙ to confirm and store the calibration to the instrument memory, *StorE* displays; press any other key to cancel and exit without saving.

## 5.3 Theoretical Calibration

Use a theoretical calibration when a weight of known value is not available, or a manual calibration cannot be performed.

1. Restart indicator. Momentarily press ▲ during startup to display setup mode.
2. Navigate to *SEtuP→ConF iG→CAL ib→dEC 1*. Press ◄┙ to set parameter.
3. Navigate to select the decimal place value. Press ◄┙. *u .n .* displays. Press ◄┙ to set parameter.

> **Note** *By setting the divisions of the first range, the divisions for the second range are automatically set.*

4. Navigate to select the unit of measure. Press ◄┙ to confirm selection. *d iU* displays. Press ◄┙ to set parameter.
5. Navigate to select the scale's minimum division. Press ◄┙. *rAnGE 1* displays. Press ◄┙ to set parameter.
6. Set the total capacity of the scale, or *rAnGE 1* if using multi-range functioning. Press ▶ to select the digit to be modified and ▼ or ▲ to increase or decrease the digit. Press ◄┙ to confirm.
7. For dual range scale only:
   - Navigate to select *rAnGE2* ; press ◄┙ to set parameter
   - Set the second range; Press ◄┙ to confirm

> **Note** *See Section 3.2 on page 12 for more information on multi-range functioning. The rAnGE2 is disabled if set at 000000; for more information on multi-range functioning.*

8. Navigate to select *thEo .CA.* Press ◄┙ to enter the menu. *CEL .SEn* displays. Press ◄┙ to set parameter.
9. Set the cell sensitivity in mV/V. Press ◄┙ to confirm. *CEL .CAP* displays. Press ◄┙ to set parameter.

> **Note** *If several load cells are connected through a junction box enter the average sensitivity value of the cells.*

10. Set the total load cell capacity in the configured unit of measure. Press ◄┛ to confirm. *dEAd .Ld* displays. Press ◄┛ to set parameter.

11. Enter the known weight of the scale structure dead load on the load cells with no weights added. Press ◄┛ to confirm. *Fno .UGt* displays. Press ◄┛ to set parameter. *GEt .UtP* displays.

> **Note** *The first character indicates the sign: 0 indicates a positive value, - indicates a negative value.*
>
> *The sign is changed by positioning on the first digit and pressing ▼ or ▲:*
>
> • *4 decimals: from -9.9999 to 9.9999*
>
> • *3 decimals: from -99.999 to 99.999*
>
> • *2 decimal: from   -999.99 to 999.99*
>
> • *1 decimals: from -9999.9 to 9999.9*
>
> • *Enter 000000 if the value is not known*

12. Enter the known value in the configured unit of measure. Press ◄┛ to confirm.

13. If the weight is unstable, *Er .NOt* may momentarily display, then *StorEP* displays.

    • Press ◄┛ to confirm and save and proceed to step 13

    • Press C for next confirmation. *rEtrYP* displays; press ◄┛ to confirm and repeat the operation

> **Note** *By setting the value to zero, the dead load is acquired.*

14. Press C to exit the calibration. *th .CALP* displays.

    • Press ◄┛ to confirm and apply the new calibration

    • Press C to cancel

Repeat this procedure for each connected scale.

## 5.4   Setting Local Gravity

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.

2. Restart indicator. Momentarily press ▲ during startup to display setup mode.

3. Navigate to *SEtuP→ConFiG→GrAU* . Press ◄┛ to set parameter.

4. Enter the local gravity. Press ◄┛. Default is 9.80390.

5. Slowly press C multiple times to exit the menus until *SAUEP* displays.

    • Press ◄┛ to confirm and return to the weigh mode

    • Press any other key to cancel and exit without saving

The weight error caused by a different gravitational value between the calibration zone and the 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.*

## 5.5    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 deadload. Actual values will typically be higher than the values shown in Table 5-2 but 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

## 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 2.7 on page 8 for connection information.

Transmission of data through the serial ports can be configured in the parameters *PCSEL*, *PCNodE* and *Pr.NodE* in the setup mode. See Section 6.2 on page 38.

### 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 (RS-232 instruments can use an 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 24 AWG duplex cable with external shielding, the RS-485 cable should not exceed 4000' (1200 m); See Section 2.3 on page 5
- 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; See Section 2.4 on page 6
- 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; The terminal resistance is not supplied with the ports of the instrument
- Consult the device product data sheet for all connected devices to ensure consistent wire labeling

### 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
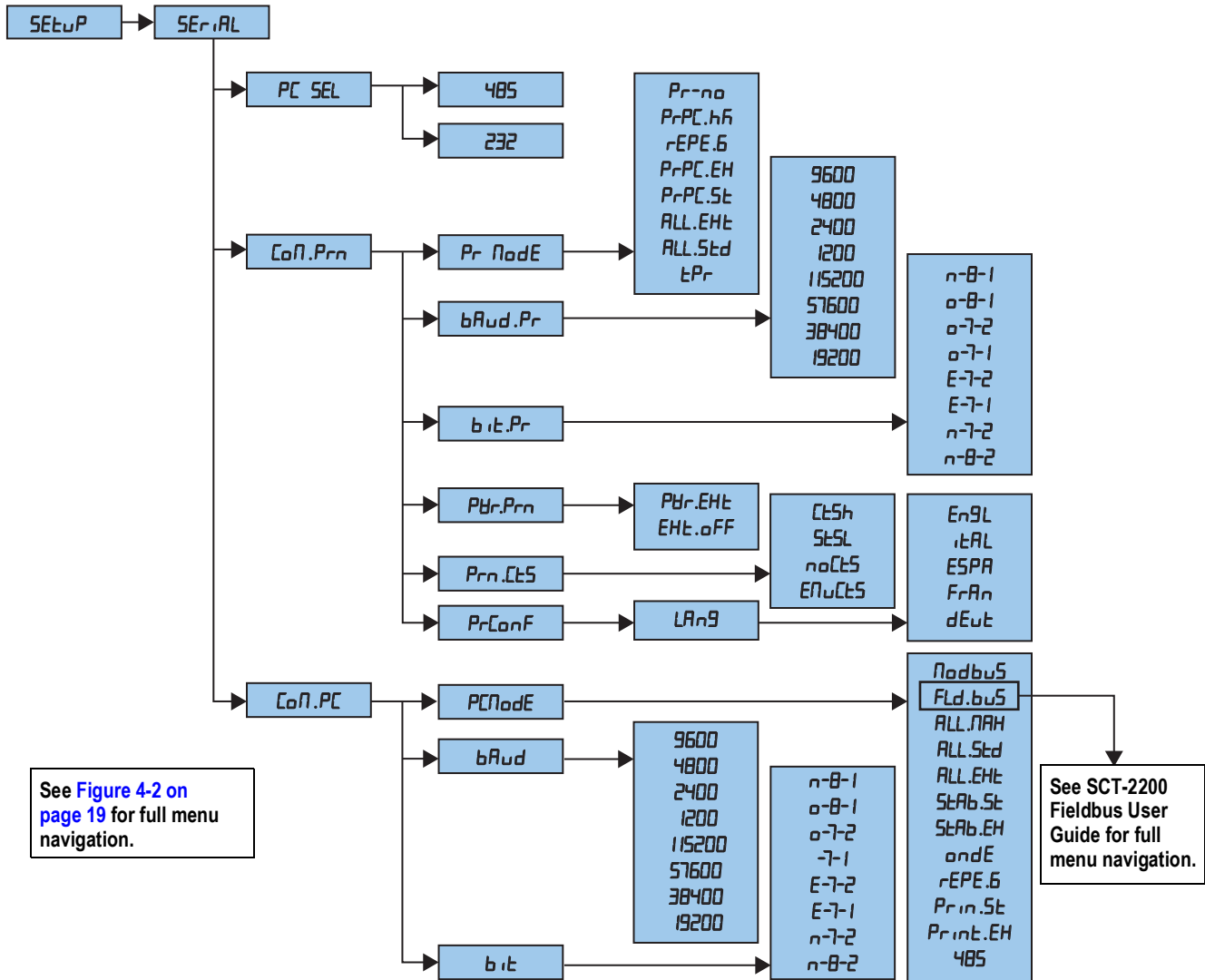


*Figure 6-1. Serial Menu*

### 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 | 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 *PrⁿodE*.

| Parameter | Settings | Description |
|---|---|---|
| *CoⁿPrn* | Serial Format for the printer port | |
| *Pr.ⁿodE* | Transmission to serial printer | |
| | *Pr-no* | Transmission disabled |
| | *PrPC.hⁿ* | 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 See Section 6.4.2 on page 46 |
| | | *PrPC.St* allows for transmission of the standard string by pressing enter See Section 6.4.1 on page 46 |
| | | Transmission when ⬅ is pressed – the instrument transmits the weight data through the serial port when ⬅ 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 46 for a description of the strings; The transmission is confirmed when *trAnSⁿ* 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: <br>• Baud rate at 9600 up to 10 transmissions per second are possible <br>• Baud rate at 115200 up to 16 transmissions per second are possible for the PC port and up to 12 for the printer port <br>The data transmits both positive and negative values <br>• *ALL.Std* - The data is transmitted using the standard string <br>• *ALL.EHt* - The data is transmitted using the extended string <br>  - See Section 6.4 on page 46 for a description of the strings <br>***NOTE: Filter selection directly affects data transmission; To obtain 250TX/sec configure the filter*** *F.F.400 (SEtuP→ConF.iG→PArAⁿ.→StAb.iL)* |
| | *tPr* | Enables printing with ASCII compatible printer |
| | | Data is transmitted to the printer by pressing ⬅ 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. For the protocol and transmission mode specifications, see Section 6.2 on page 38.* | | |
| *bAud.Pr* | Set baud rate - selection of the data transmission speed (baud = bit/second); (9600 default) | |
| *bit.Pr* | Set parity, word, stop bit | |
| *PЧr.Prn* | Manufacturer Use Only | |
| *Prn.CtS* | Manufacturer Use Only | |
| *Pr.ConF* | *LAn9* | Select Language of Printouts ***NOTE: Language selection only available if*** *tPr* ***is selected*** |

*Table 6-3.  PRN Port 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 |
|---|---|---|
| *CoП.PC* | | Serial format for the PC port |
| *PCПodE* | | Transmission on the PC port |
| | *ПodbuS* | Transmission with the MODBUS protocol<br>• *Пod.tYP* displays; press ↵; select *ASc ıı* or *rtu*; press ↵<br>• *Пod.Add* displays; press ↵; enter the address of the unit (0 to 98); press ↵<br>• Enter baud rate; press ↵<br>• Enter bit parameters; press ↵ |
| | *FLdbuS* | Fieldbus type; See SCT-2200 Fieldbus User Manual for more information; PN183523<br>　*ProF ıb* - Profibus<br>　*Eth ıP* - Ethernet/IP<br>　*ProF ın* - ProfiNet<br>　*EthcAt* - EtherCat<br>　*CAnoPn* - CANopen<br>　*dEUnEt* - DeviceNet<br>　*Пb .tcP* - Modbus TCP/IP |
| | *ALL .ПAH*<br>*ALL .Std*<br>*ALL .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;<br>the instrument transmits data with each A/D cycle:<br>• Baud rate at 9600 up to 10 transmissions per second are possible<br>• Baud rate at 115200 up to 16 transmissions per second are possible for the PC port and up to 12 for the printer port<br>The data transmits both positive and negative values<br>• *ALL .Std* - The data is transmitted using the standard string<br>• *ALL .EHt* - The data is transmitted using the extended string<br>　- See Section 6.4 on page 46 for a description of the strings<br>• *ALLПAH2* The weight is transmitted in hexadecimal format (for example: 03E8= 1000g), without decimal point<br>　- This transmission protocol is recommended for applications where a high nubmer of output transmissions is required. (up to 250TX/sec. with baud rate equal to 115200)<br>***NOTE: Filter selection directly affects data transmission; To obtain 250TX/sec configure the filter*** *F .F .400* ***(****SEtuP→ConF ıG→PArAП .→StAb ıL****)*** |
| | *StAb .St*<br>*StAb .Eh* | Transmission on stability – each time a weight on the scale becomes stable, a communication string is transmitted on the PC port;<br>• The transmission takes place when the weight is stable and the net weight is greater than 10 display divisions<br>• Re-enabling the transmission depends on how *rEACt* has been set in the setup mode; See Table 4-2 on page 20<br>• The data is transmitted with the standard string *StAb .St* or the extended string *StAb .EH*; See Section 6.4 on page 46 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; See Section 6.3 on page 41<br>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;<br>The data transmits both positive and negative values |
| | *rEPE .6* | Transmission to 6 digit remote display / Reception of the "*rEPE .6*" string<br>The weight display occurs both in the instrument and is transmitted to a 6 digit remote display |

*Table 6-4.  PC Port Parameters and Settings*

| Parameter | Settings | Description |
|---|---|---|
| PC ΠodE | Pr in.St<br>Pr in.EH | The instrument communicates the weight data through the serial port when ← is pressed<br>• Transmission takes place if the weight is stable and the net weight is > 20 divisions; re-enabling transmission depends on how the rEACt is set in the setup mode (passing by zero of the NET weight, weight instability or always)<br>• Pr in.St - The data is transmitted using the standard string<br>• Pr in.EH - The data is transmitted using the extended string<br>  - See Section 6.4 on page 46 for a description of the strings<br>• The transmission is confirmed when trAnSΠ 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>);<br>If a broadcast address command (99) is received no answer is given; If the command is correct it is executed |
| bAud | | Set baud rate - selection of the data transmission speed (baud = bit/second) |
| b it | | Set parity, word, stop bit |

*Table 6-4. PC Port Parameters and Settings (Continued)*

# 6.3    Serial Commands Format

Several characters are regularly used in serial commands. They are:

| Characters | Description |
|---|---|
| [CC] o <ll> | 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 responses with each serial command received:

| Status Response | Description |
|---|---|
| OK<CR LF> | Displays when a correct command is transmitted from the PC to the instrument; the OK does not imply that 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 a response 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

**Note** *Instrument responds if the command has been received. No response is sent when the instrument has executed the command.*

## Extended Weight Read Command

[CC]REXT<CR LF>

Instrument response: extended string, See Section 6.4.2 on page 46

## Weight Read Command

[CC]READ<CR LF>

Instrument response: standard string, See Section 6.4.1 on page 46

## Weight Reading Command With Sensitivity Times 10

[CC]GR10<CR LF>

Instrument response: standard string, See Section 6.4.1 on page 46

## Reading Command of MicroVolts Relative to the Weight

[CC]MVOL<CR LF>

Instrument response: standard string, See Section 6.4.1 on page 46

## Reading Command of A/D counts Relative to the Weight

[CC]RAZF<CR LF>

Instrument response: standard string, See Section 6.4.1 on page 46

## 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.

## 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>

In which: 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.

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## Command for Displaying Temporary Message on an Instrument

[CC]DISPNNVVVVVV <CR LF>

In which:

- 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 ⁻PCOH⁻ 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>

In which:

| XX | Code of Pressed Key |
|----|---------------------|
| 00 | ▼ - ZERO key |
| 01 | ▲ - TARE key |
| 02 | ▶ - MODE key |
| 03 | ◄┘ - PRINT key |
| 04 | C - 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.*

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).*

## Read Scale Information

[CC]RALL<CR LF>

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

In which:

| Characters | Description |
|------------|-------------|
| SS | UL    Underload<br>OL    Overload<br>ST    Stability of the display<br>US    Instability of the display<br>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 |

*Table 6-9. Scale Information Characters*

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| Characters | Description |
|---|---|
| SSS | Scale status<br>• 000    Weighing<br>• 001    Numeric value input<br>• 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.  Scale Information Characters  (Continued)*

## 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 recieved

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

*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 in comparison 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 instrument 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 will take place in one of two formats: standard string or extended string.

## 6.4.1 Standard String

String transmitted: [CC]hh,kk,pppppppp,uu <CR LF>
In which:

| Characters | Description |
|---|---|
| [CC] | The instrument ID as two ASCII decimal digits (RS-485 protocol) |
| hh | UL     Underload<br>OL     Overload<br>ST     Stability of the display<br>US     Instability of the display |
| , | Comma character |
| kk | NT     Net weight<br>GS     Gross weight<br>GX     Gross weight with sensitivity times 10<br>VL     Value in microvolts relative to the weight<br>RZ     Value in converter points relative to the weight |
| 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** *The transmitted weight is gross weight (GS) if no tare weight has been entered; otherwise, net weight (NT) is transmitted.*

## 6.4.2 Extended String

String Transmitted:
[CC]B,hh,NNNNNNNNNN,YYTTTTTTTTTT,PPPPPPPPPP,uu,(dd/mm/yybbhh:mm:ss|NO DATE TIME)<CR LF>
In which:

| 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<br>OL     Overload<br>ST     Stability of display<br>US     Instability of display |
| NNNNNNNNNN | Net weight on 10 characters including possible sign and decimal point |
| YY | PT if the tare is manual, if YY = two empty spaces display with semiautomatic tare |
| TTTTTTTTTT | Tare weight on 10 characters including possible sign and decimal point |
| PPPPPPPPPP | Always 0 |
| uu | Unit of measure Kg, **b**g, **b**t, lb; (**b** signifies blank) |
| <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, and gross weights are filled with spaces (space characters, ASCII decimal 32 character).*

### 6.4.3 Secondary Mode Strings

#### Secondary Standard String

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

In which:

| Characters | Description |
|---|---|
| SS | Status:<br>• NV    Weight not valid |
| , | Comma character |
| NT | ST    Stable data<br>US    Unstable data<br>UL    Underload<br>OL    Overload |
| WWWWWWWW | Weight |
| UU | Unit of measure |

*Table 6-12.  Secondary Mode String Characters*

#### Secondary Extended String

Extended string transmitted on the printer port when *Pr. ΠOdE* = *ALL. EHt* or *PCPr. EH*

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

In which:

| Characters | Description |
|---|---|
| C | Secondary or sum:<br>• S, if the sum is sent |
| , | Comma character |
| SS | UL    Underload (not transmitted in the TRANSM mode)<br>OL    Overload (not transmitted in the TRANSM mode)<br>ST    Stability of the display<br>US    Instability of the display |
| WWWWWWWW | weight |
| UU | unit of measure |

*Table 6-13.  Extended String Characters*

**Note**   *When rEtE .5 is selected the weight value is always zero.*
*When the Pr .ΠOdE = PcPr .hΠ is set, only the weight is transmitted on the printer port.*
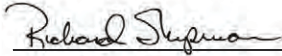
# 7.0    Troubleshooting

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 .OUEr | Trying to print with the weight in underload or in overload; with a weight of 9 divisions greater than the capacity or 100 divisions below the gross zero |
| – – – – – | The weight is nine 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) |
| LoY | 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 –  the sample weight used was too small; use a weight equal to at least half of the scale capacity |
| Er- 12 | Calibration error – the 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, See Table 4-3 on page 21<br>***NOTE: Press ▲ to access the setup.*** |
| Er-39 | Scale must be calibrated; perform a technical default (dEFAu) parameter, before proceeding, See Table 4-3 on page 21<br>***NOTE: Press ▲ to access the setup.*** |
| EcoH | Displays momentarily if the secondary connects to primary X; if connection is not possible, the error message remains fixed and the secondary instrument emits an audible signal |

*Table 7-1.  Error Messages*

# 8.0    Compliance

<table>
<tr><td rowspan="3">CE</td><td rowspan="3">**EU DECLARATION OF CONFORMITY**<br>*EU-KONFORMITÄTSERKLÄRUNG*<br>*DÉCLARATION UE DE CONFORMITÉ*</td><td>Rice Lake Weighing Systems<br>230 West Coleman Street<br>Rice Lake, Wisconsin 54868<br>United States of America</td></tr>
<tr><td>**RICE LAKE**<br>WEIGHING SYSTEMS</td></tr>
</table>

**Type/Typ/Type:** SCT indicator series

English    We declare under our sole responsibility that the products to which this declaration refers to, is in conformity with the following standard(s) or other regulations document(s).

Deutsch    Wir erklären unter unserer alleinigen Verantwortung, dass die Produkte auf die sich diese Erklärung bezieht, den folgenden Normen und Regulierungsbestimmungen entsprechen.

Francais    Nous déclarons sous notre responsabilité que les produits auxquels se rapporte la présente déclartion, sont conformes à la/aux norme/s suivante ou au/aux document/s normatif/s suivant/s.

| EU Directive | Certificates | Standards Used / Notified Body Involvement |
|---|---|---|
| 2014/30/EU  EMC | - | EN 61000-6-2:2015, EN 61000-6-4:2007+A1:2011, EN61326-1:2013, EN55011:2009 +A1:2010 |
| 2014/35/EU  LVD | - | EN 61010-1:2010 |
| 2011/65/EU  RoHS | - | EN 50581:2012 |

Signature: *Richard Shipman*              Place:    Rice Lake, WI   USA

Type Name:    Richard Shipman              Date:    May 3, 2019

Title:    Quality Manager

# 9.0    Specifications

## Power DC

| | |
|---|---|
| Power Supply | 12-24 VDC |
| Power Consumption | 70 mA min to 100 mA max |
| Excitation Voltage | 5 VDC, 120mA, 8 x 350Ω |
| Analog Signal Input Range | ±39 mV |
| Analog Signal Sensitivity | 0..03 µV/gradation minimum |
| | 0.3 µV/gradation recommended |

## Operator Interface

| | |
|---|---|
| Display | LED 6 digits 8mm high |
| Keypad | 5-key, tactile feel |
| LED | 6 status indicator red LEDs |

## Enclosure

| | |
|---|---|
| Case | Plastic console suitable for mounting on DIN rail or on the wall |
| Dimensions (W x H x D) | 0.98" x 4.52" x 4.72" (25mm x 115mm x 120mm) |
| Weight | 1 lb (0.5kg) |

## Operation

| | |
|---|---|
| Resolution Internal | 1.5 million counts |
| Display Resolution | 800,000 minimum |
| A/D Sample Rate | 1 channel A/D 24-bit sigma-delta conversion; up to 200 conv./sec auto select |
| Tare Function | Entire capacity can be subtracted |
| Auto Switch Off | Programmable form 1—255 minutes |

## Communication

| | |
|---|---|
| Digital Inputs/Outputs | |
| 2 Inputs | Opto isolated 12-24 VDC |
| 2 Outputs | 150 mA 48 VAC/150 mA 60 VDC |
| Serial Ports | 1 RS-485 bidirectional port configurable for connection to a PC/PLC or weight repeater |
| | 1 RS-232 bidirectional port for connection to a printer |
| Analog Output | Opto isolated, 16 bit |
| | 0-20 mA; 4-20 mA (max 350 Ω) |
| | 0-5 VDC, 0-10 VDC (min 10 Ω) |

## Optional Communication

| | |
|---|---|
| Modules | PROFIBUS-DP, DeviceNet, PROFINET IO, Ethernet/IP, Ethernet TCP/IP, Modbus TCP/IP EtherCAT, CANopen |

## Environmental

| | |
|---|---|
| Operating Temperature | 5°F to 104°F (-15°C—40°C) |
| Storage Temperature | -22° to 179°F (-30°C—80°C) |
| Humidity | 85% (non-condensing) |

## Load Cell

| | |
|---|---|
| Connection | 6-wires with Remote Sense |

## Compliance

The SCT complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

NTEP
| | |
|---|---|
| CoC Number | 20-046 |
| Accuracy Class | III/IIIL $n_{max}$ : 10 000 |

### Radio Certificate Number

When paired with optional module:
| | |
|---|---|
| WiFi: | US: ZXVHLK-RM04 |

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