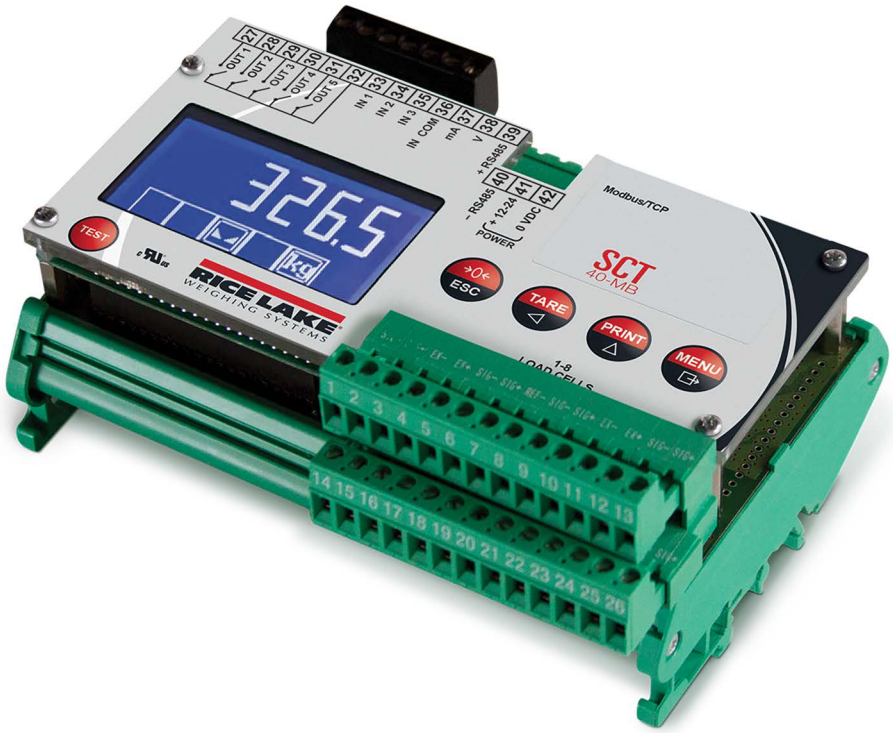
SCT-40 Series

Signal Conditioning Transmitter/Indicator

Technical Manual



RICE LAKE®
WEIGHING SYSTEMS

December 19, 2023

PN 171954 Rev F

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www.ricelake.com

Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
F	December 19, 2023	Established revision history; Added analog output details

Table i. Revision Letter History

Contents

1.0 Introduction

The SCT Weight Transmitter is an Omega/DIN rail mounted weight transmitter that can accommodate up to eight individual scale inputs.

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

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

1.1 Safety

Safety Definitions:

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

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

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

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

General Safety

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

WARNING

Failure to heed could result in serious injury or death.

Risk of electrical shock. No user serviceable parts. Refer to qualified service personnel for service.

The unit has no power switch, to completely remove D/C power from unit, disconnect D/C power cable from the main socket.

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.

1.2 Equipment Recommendations

IMPORTANT: Failure to follow the installation recommendations will be considered a misuse of the equipment.

To Avoid Equipment Damage

- Keep away from heat sources and direct sunlight.
- Protect the SCT Weight Transmitter from rain.
- Do not wash, immerse in water or spill liquids on the SCT Weight Transmitter.
- Do not use solvents to clean the instrument.
- Do not install in areas subject to explosion hazard (except special Atex versions).

1.3 Weighing Instrument Installation

The terminals to be connected to ground, as indicated on the SCT Weight Transmitter wiring guide, must have the same potential as the scale structure ground. If unable to ensure this condition, connect a ground wire between the SCT Weight Transmitter and the scale structure.

The load cell cable must be run separately to the SCT Weight Transmitter input and not share a conduit with other cables. A shielded connection must be continuous without a splice. Use RC filters (quenchares) on the instrument-driven solenoid valve and remote control switch coils. To avoid electrical noise in the SCT Weight Transmitter panel, use special filters and sheet metal partitions to isolate. The panel installer must provide electric protections for the instruments (fuses, door lock switch etc.). It is recommended to leave the equipment powered on at all times to prevent the formation of condensation.

Maximum Cable Lengths:

- RS-485: 1000 meters with AWG24, shielded and twisted cables
- Analog current output: up to 500 meters with 0.5 mm^2 cable
- Analog voltage output: up to 300 meters with 0.5 mm^2 cable

1.3.1 Load Cell Installation

The load cells must be placed on rigid, stable structures within 0.5% of plumb and level. It is important to use the mounting modules for load cells to compensate for misalignment of the support surfaces.

Use waterproof sheaths and joints in order to protect the load cell cables.

Mechanical Restraints

When pipes are present, the use of hoses and flexible couplings and rubber skirted joints is recommended. In the event of rigid conduit and pipes, place the pipe support or anchor bracket as far as possible from the weighed structure (at a distance at least 40 times the diameter of the pipe).

Welding

Avoid welding with the load cells already installed. If this cannot be avoided, place the welder ground clamp close to the required welding point to prevent sending current through the load cell body.

Windy Conditions - Shocks - Vibrations

The use of weigh modules is strongly recommended for all load cells to compensate for misalignment of the support surfaces. The system designer must ensure that the scale is protected against lateral shifting and tipping relating to shocks and vibration, windy conditions, seismic conditions and the stability of the support structure.

Weighed Structure Grounding

Using a 10 gauge solid or braided wire or braided grounding strap, connect the load cell upper support plate with the lower support plate, then connect all the lower plates to a single earth ground. Once installed, accumulated electrostatic charges are discharged to the ground without going through or damaging the load cells. Failure to implement a proper grounding system may not affect the operation of the weighing system; however, this does not rule out the possibility that the cells and connected SCT Weight Transmitter may become damaged in the future. Do not ground using metal parts contained in the weighed structure.

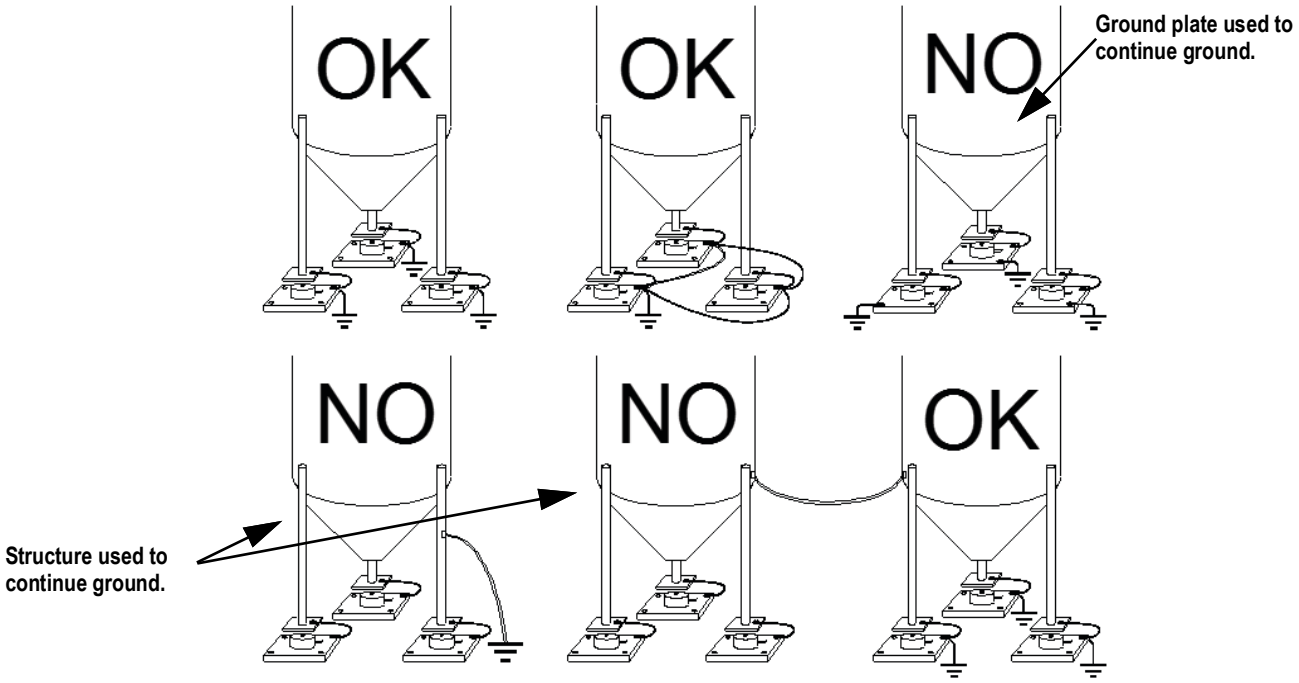

Figure 1-1. Installation Recommendations

1.4 Load Cells

1.4.1 Load Cell Input Test (Quick Access)

1. From the weight display, press and hold PRINT for three seconds. The display will read mV-CEL.
2. Press MENU. The top of the display shows the gross weight, the bottom shows the response signal of each load cell expressed in mV to three decimal places.

   Example: a load cell with 2.00 mV/V sensitivity provides a response signal between 0 and 10 mV. See Figure 1-2.
3. Press →0← ESC three times to exit test.

Figure 1-2. Load Cell Input Test

1.4.2 Load Cell Testing

Load Cell Resistance Measurement (Use a Digital Multimeter)

1. Power off the SCT Weight Transmitter.
2. The value between the positive signal wire and the negative signal wire must be equal or similar to the one indicated in the load cell data sheet (output resistance).
3. The value between the positive excitation wire and the negative excitation wire must be equal or similar to the one indicated in the load cell data sheet (input resistance).

Load Cell Voltage Measurement (Use a Digital Multimeter)

1. Power on the SCT Weight Transmitter.
2. Remove the weight of the scale from the load cell to be tested.
3. Make sure that the excitation of the load cell connected to the instrument (or amplifier) is 5 VDC =/- 3 percent.
4. Measure the millivolt signal between the positive and negative signal wires by directly connecting them to the multimeter, and make sure it reads between 0 and 0.5mV.
5. Apply load to the load cell and make sure that there is a signal increment.

IMPORTANT: If one of the above conditions is not met, please contact Rice Lake Weighing Systems Customer Support for assistance.

1.5 Electrical Connections

Basic Information

It is recommended the negative side of the power supply be grounded.

It is possible to supply up to 16 load cells at 350 ohm each.

Connect terminal **0 VDC** to the RS-485 common when interfacing to A/C powered equipment so that there is an opto-isolated RS-485 connection.

In the case of an RS-485 network with several devices, it is recommended to activate the 120 ohm termination resistance on the two devices located at the ends of the network. See Section 2.5.1 on page 27.

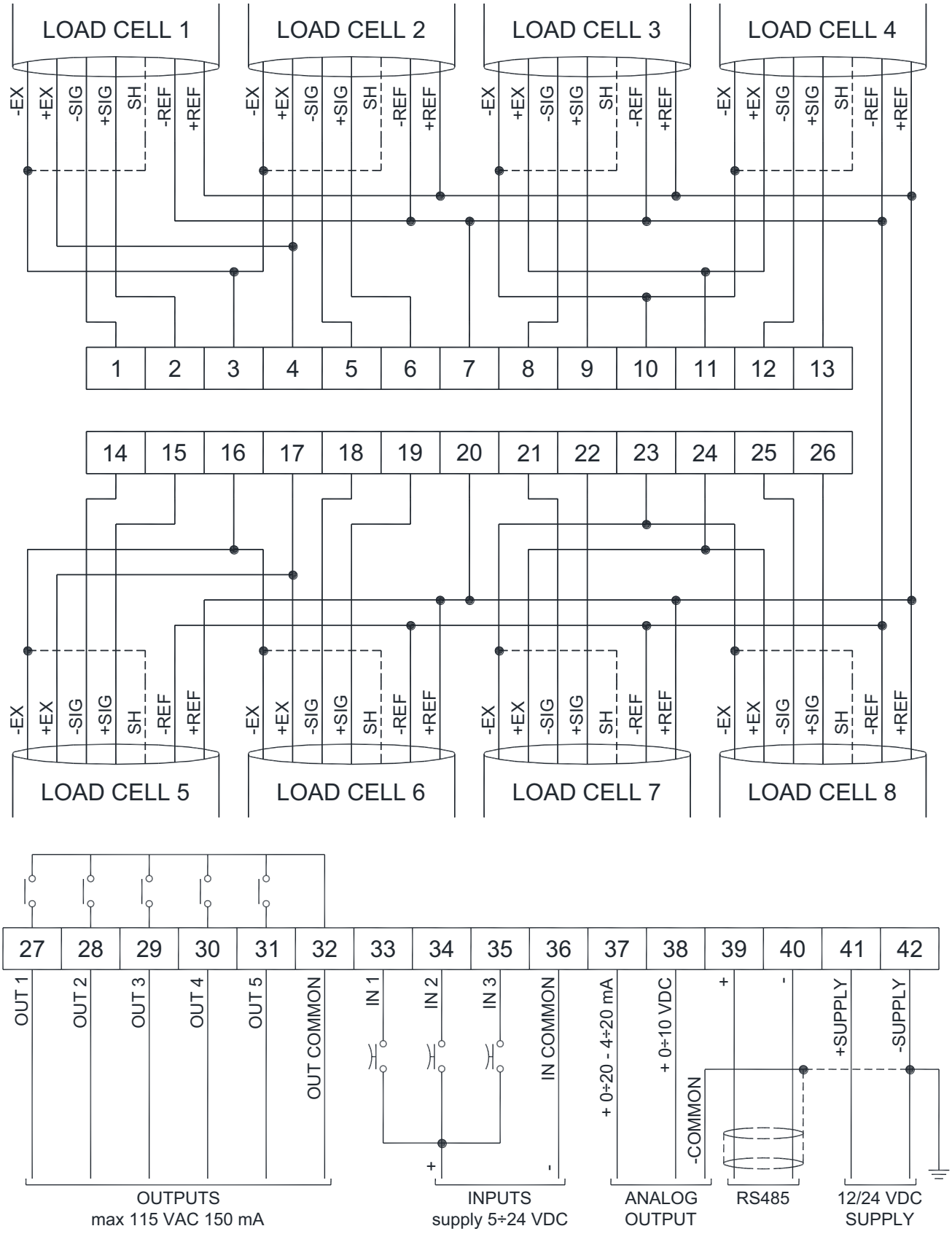

Figure 1-3. Wiring Diagram

No.	Description
1	-Load Cell 1 Signal
2	+Load Cell 1 Signal
3	-Load Cell 1 and 2 Excitation (-Ex) Load Cells Shield
4	+Load Cells 1 and 2 Excitation (+Ex)
5	-Load Cell 2 Signal
6	+Load Cell 2 Signal
7	-Load Cell Ref/Sense
8	-Load Cell 3 Signal
9	+Load Cell 3 Signal
10	-Load Cells 3 and 4 Excitation (-Ex) Load Cells Shield
11	+Load Cells 3 and 4 Excitation (+Ex)
12	-Load Cell 4 Signal
13	+Load Cell 4 Signal
14	-Load Cell 5 Signal
15	+Load Cell 5 Signal
16	-Load Cells 5 and 6 Excitation (-Ex) Load Cells Shield
17	+Load Cells 5 and 6 Excitation (+Ex)
18	-Load Cell 6 Signal
19	+Load Cell 6 Signal
20	+Load Cells Ref/Sense
21	-Load Cell 7 Signal

No.	Description
22	+Load Cell 7 Signal
23	-Load Cell 7 and 8 Excitation (-Ex) Load Cell Shield
24	+Load Cell 7 and 8 Excitation (+Ex)
25	-Load Cell 8 Signal
26	+Load Cell 8 Signal
27	Output No. 1
28	Output No. 2
29	Output No. 3
30	Output No. 4
31	Output No. 5
32	Output Common
33	Input No. 1 (+VDC min 5 V max 24 V)
34	Input No. 2 (+VDC min 5 V max 24 V)
35	Input No. 3 (+VDC min 5 V max 24 V)
36	Input Common (-VDC 0 V)
37	+Analog Output 0÷20 or 4÷20 mA
38	+Analog Output 0÷10 V
39	RS-485: +
40	RS-485: -
41	+Supply (12/24 VDC)
42	-Supply (12/24 VDC) RS-485: Shield, Gnd, -Analog Output Common

Table 1-1. Terminals Legend

If all the load cells used are 4-wire, make a jumper between EX-(10) and REF-(7) and between EX+(17) and REF+(20).

In the event of difficulty connecting all the reference wires of the installed load cells, connect those of the load cell located at the average distance from the transmitter. The reference wires not used must be individually isolated.

1.6 Key and Symbol Functions

Key	Short Press in Weigh Mode	Long Press (3 s) in Weigh Mode	Function within Setup Menus
ESC	Semi-automatic zero	Zero resetting	Press this key to escape from a parameter, cancel or return to previous menu or operation mode.
TARE	Captures Tare Gross → Net	Removes Tare Net → Gross	Press this key to move to the previous parameter or setting in a level, or to scroll to the next digit when setting a parameter value.
PRINT	Weight print	mV load cell test	Press this key to move to the next parameter in a level or increment a vaule in when setting a parameter value.
MENU	Setting setpoints and hysteresis	—	Press this key to move to the next level of configuration or to select and edit a parameter.
MENU ESC	Press and hold MENU then press ESC to enter set-up menu for setting general parameters.		
MENU TARE	Press and hold MENU then press TARE to enter set-up menu for setting preset tare.		
TEST	Press this key to display the load distribution.		

Symbol	Description
NET	This annunciator indicates a net weight when a semi-automatic tare or preset tare has been set.
→0←	This annunciator indicates a center of zero with a deviation from zero not more than +/- 0.25 divisions.
◣◢	This annunciator indicates scale stability.
kg	This indicates the unit of measure is kilograms.
g	This indicates the unit of measure is grams.
W1,W2,W3	Not used

Table 1-2. Key and Symbol Functions

NOTE: The symbols are activated in sequence within the menus to indicate that a setting and not a weight is being viewed.

1.7 Instrument Commissioning

1. Plug power cord into an outlet to power on the indicator. The display shows in sequence:
   - 111111-999999 (only in the event of approved program)
   - Instrument model (tLn8)
   - SU followed by the software code (SU 100)
   - Program type: ***bASE*** (bASE)
   - r followed by the software version (r 1.00.01)
   - HU followed by the hardware code (HU 600)
   - Serial number (005 15)
2. Check that the display shows the weight and that there is an increase in weight when loading the load cells.
3. If there is not, check and verify the connections and correct positioning of the load cells.
4. Confirm the SCT Weight Transmitter has been theoretically calibrated, the load cell's rated data is already entered, and that the plant system identification tag is present on the instrument and on the cover.

NOTE: If the SCT Weight Transmitter has not been calibrated, follow the calibration instructions in Section 2.2 before proceeding to next step.

5. Perform a zero setting. See Section 2.2.4 on page 18.
6. If the system uses load cells with different sensitivity, perform a theoretical calibration or real calibration. See Section 2.2.1 on page 15 or Section 2.2.6 on page 19.
7. Check the calibration with sample weights and correct the indicated weight if needed. See Section 2.2.6 on page 19.
8. Set the desired output type and the full scale value.
   - Analog Output Model (Section 2.6 on page 27)
   - DeviceNet™ Model (Section 3.8 on page 40)
   - EtherNet/IP™ (Section 3.11 on page 51)
   - Ethernet TCP/IP (Section 3.12 on page 55)
   - PROFIBUS-DP® Model (Section 3.9 on page 41)
   - PROFINET® Model (Section 3.10 on page 46)
   - Modbus/TCP (Section 3.13 on page 57)
9. If using serial communication, set the related parameter. See Section 2.5 on page 25.
10. If set points are used, set the required weight values and the relevant parameters. See Section 2.12 on page 32 and Section 2.7 on page 29.

2.0 Configuration

2.1 Navigating System Menus

Use the following steps when navigating through the system parameter menus.

1. From the weight display, press and hold MENU, then press →0← ESC to access parameter settings.
2. Press MENU to enter a menu or confirm the data entry.
3. Press PRINT △ to modify the displayed figure or menu entry.
4. Press TARE ◁ to select a new figure or modify the displayed menu item.
5. Press →0← ESC to cancel and return to the previous menu.

For numeric entries, the symbols are activated in sequence within the menus to indicate that a setting and not a weight is being viewed.

1. Press PRINT △ or TARE ◁. The first digit will flash and can be edited.
2. Press TARE ◁ to select desired digit.
3. Press PRINT △ to increment digit.

2.2 Calibration

2.2.1 Theoretical Calibration

This function allows the load cell rated values to be set.

To perform the theoretical calibration set FS-tEO, SEnS Ib, and dI UI S parameters in sequence.

1. Press and hold MENU, then press →0← ESC. CALI b is displayed.
2. Press MENU. FS-tEO is displayed. Press MENU.
3. Press TARE ◁ to select desired digit, then press PRINT △ to increment digit until total load cell capacity (system full scale) is displayed.

FS-tEO (Default: dEno); The system full scale is given by one cell capacity multiplied by the number of cells used.

Example: four cells of 1000 kg → FULL SCALE = 1000 x 4 = 4000. The instrument is supplied with a theoretical full scale value dEnO corresponding to 10000. To restore factory values, set 0 as full scale.

4. Press MENU. SEnS Ib is displayed. Press MENU.
5. Press TARE ◁ to select desired digit, then press PRINT △ to increment digit until desired load cell mV/V is displayed.

SEnS Ib (Default: 2.00000 mmV/V): Sensitivity is a load cell rated parameter expressed in mV/V. Set the average sensitivity value indicated on the load cells. It is possible to set a value between 0.50000 and 7.00000 mV/V.

Example: if a four cell system with sensitivity: 2.00100, 2.00150, 2.00200, 2.00250; enter 2.00175, calculated as (2.00100 + 2.0150 + 2.00200 + 2.00250) / 4.

6. Press MENU. dI UI S is displayed. Press MENU.
7. Press TARE ◁ to select desired digit, then press PRINT △ to increment digit until desired display division size is displayed.

8. Press MENU.

dIUI5: the division (resolution) is the minimum weight increment value which can be displayed. It is automatically calculated by the system according to the performed calibration, so that it is equal to the 1/10000 of full scale. It can be changed and can vary between 0.0001 and 100 with x1, x2, x5, and x10 increments.

9. This completes the Theoretical Calibration. Press ESC twice to exit setup menu.

NOTE: By modifying the theoretical full scale, the sensitivity or divisions, the Weight (Span) calibration is canceled and only the Theoretical Calibration is considered valid.

If the theoretical full scale and the recalculated full scale weight in the Weight (Span) calibration (Section 2.2.6) are equal, the calibration currently in use is Theoretical Calibration; if they are different, the calibration in use is the Weight (Span) Calibration based on test weights.

By modifying the theoretical full scale, the sensitivity or divisions and all the system's parameters containing a weight value will be set to default values.

2.2.2 Maximum Capacity

Maximum capacity (*MASS*) is the highest weight of live load/product that can be displayed. When the weight exceeds this value by 9 divisions, the following is displayed: **------**. To disable this function, set to 0.

1. Press and hold MENU, then press ESC. *CALIb* is displayed.
2. Press MENU. *FS-tEO* is displayed.
3. Press TARE or PRINT until *MASS* is displayed. Press MENU.
4. Press TARE to select desired digit, then press PRINT to increment digit until desired capacity is displayed.
5. Press MENU
6. Press ESC twice to exit setup menu.

2.2.3 Equalization

IMPORTANT: Use a sample weight equal to at least 50% of the single load cell capacity.

At the end of Equalization, perform a Zero Setting (Section 2.2.4).Check the calibration with known weights and correct the indicated weight, if needed, by performing a Weight (Span) Calibration. See Section 2.2.6 on page 19.

Real Equalization

1. Press and hold MENU, then press ESC. *CALIb* is displayed.
2. Press MENU. *FS-tEO* is displayed.
3. Press TARE or PRINT until *EQuAL* is displayed.
4. Press MENU. *EQrEA* is displayed.
5. Press MENU. *EQuALO* is displayed.
6. Unload scale, wait for stability and confirm by pressing MENU. *EQuAL 1* is displayed.
7. Place sample weight on load cell 1 and wait for stability. Confirm by pressing MENU. *EQuAL2* is displayed.

8. Place the sample weight on load cell 2 and wait for stability. Confirm by pressing MENU.
   - If equalization is successfully completed, VAL Id is displayed. Confirm by pressing MENU.
   - If an error occurs, FAILEd is displayed. Confirm by pressing MENU and repeat the equalization procedure.
9. Press ESC three times to exit setup menu.

Theoretical Equalization

1. Press and hold MENU, then press ESC. CALIb is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until EQuAL is displayed. Press MENU.
4. Press TARE or PRINT until EQtEO is displayed. Press MENU.
5. Press TARE or PRINT to scroll through and set the sensitivity for each load cell (SEnS 1 - SEnS 8), leaving it at 0 for non-active cells.
6. Press MENU to select desired load cell (SEnS 1 - SEnS 8).
7. Press TARE to select desired digit, then press PRINT to increment digit until desired sensitivity is displayed.
8. Press MENU to accept.
9. Press ESC four times to exit setup menu.

Equalization Coefficients

1. Press and hold MENU, then press ESC. CALIb is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until EQuAL is displayed. Press MENU.
4. Press TARE or PRINT until EQu H is displayed. Press MENU.
5. Press TARE or PRINT to scroll through the equalization coefficients (EQH 1 - EQH 8) calculated for each active channel.
6. Press ESC four times to exit setup menu.

Equalization Deletion

1. Press and hold MENU, then press ESC. CALIb is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until EQuAL is displayed. Press MENU.
4. Press TARE or PRINT until dELEQu is displayed.

5. Press MENU. SUrEP is displayed.
6. Press MENU to confirm or press ESC to cancel.
7. Press ESC three times to exit setup menu.

2.2.4 Zero Setting

Use Zero Setting to zero the scale after use or to compensate for variations due to environmental factors.

Perform this procedure after having set the Theoretical Calibration Data. See Section 2.2.1 on page 15.

NOTE: This menu may also be accessed directly from the weight display by holding down ESC for three seconds.

1. Press and hold MENU, then press ESC. CALI b is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until 2Er0 is displayed.
4. Press MENU. The weight value to be set to 2Er0 is displayed. In this phase all of the symbols are flashing.
5. Press MENU. The weight is set to 2Er0 (the value is stored to the permanent memory).
6. Press PRINT to display the value of the total weight reset by the instrument, determined by the sum of all of the previous zero settings.
7. Press ESC three times to exit setup menu.

Diagnostics on Zero

IMPORTANT: Diagnostics on Zero is performed only if the load distribution has been stored at least once.

If diagnostics on zero has been enabled (Section 2.8.1 on page 30), the display shows the current load distribution and the weight value.

1. Press and hold MENU, then press ESC. CALI b is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until 2Er0 is displayed.
4. Press MENU. The stored load distribution and weight set to 2Er0 are displayed. If the weight is zero and all channels are OFF, it means that no zero setting has been performed.
5. Press MENU. SAun0 is displayed.
6. Press TARE or PRINT to select SAuYES or SAun0.
   - Select SAuYES to store the current distribution and the zero mV values.
   - Select SAun0 and the current distribution and the zero mV values will not be stored.
7. Confirm by pressing MENU three times. InP0 is displayed.
8. Press MENU twice to exit to setup menu.

2.2.5 Zero Value Manual Entry

IMPORTANT: Perform this procedure only if it's not possible to zero off the scale structure; for example, because it contains product that cannot be unloaded.

1. Press and hold MENU, then press →0← ESC. CALI b is displayed.
2. Press MENU. FS-tED is displayed.
3. Press TARE ◁ or PRINT △ until InP 0 is displayed. Press MENU.
4. Press TARE ◁ to select desired digit, then press PRINT △ to increment digit until desired dead load value is displayed (from 0 to 999999, default is 0). Press MENU.
5. Press →0← ESC twice to exit setup menu.

2.2.6 Weight (Span) Calibration (With Test Weights)

After performing the Theoretical Calibration (Section 2.2.1), Equalization (Section 2.2.3), and Zero Setting (Section 2.2.4), this function allows correct calibration to be done using test weights of known value. If adjustment is required, change the displayed value to display the test weight value.

1. Load the test weight onto the scale. Use a test weight of at least 50% of the maximum quantity to be weighed.
2. Press and hold MENU, then press →0← ESC. CALI b is displayed.
3. Press MENU. FS-tED is displayed.
4. Press TARE ◁ or PRINT △ until WEI GHt is displayed.
5. Press MENU. The value of the weight currently on the system will be flashing on the display. All of the symbols are off. If adjustment is not required, skip to step 8.
6. Adjust the value on the display to match weight loaded on the scale by pressing TARE ◁ to select desired digit, then press PRINT △ to increment digit. The symbols will begin scrolling.
7. Press MENU. The new set weight will appear on the display with all the symbols flashing.
8. Press MENU. WEI GHt is displayed.
9. Press →0← ESC twice to exit setup menu.

Example: For a system with maximum capacity of 1000 kg and 1 kg division, two test weights are available: one 500 kg and one 300 kg. Load both weights onto the system and correct the indicated weight to 800 kg. Remove 300 kg weight, the system will show 500 kg. Remove the 500 kg weight and the system will read zero. If this does not happen, it means there is a mechanical problem affecting the system linearity.

IMPORTANT: Identify and correct any mechanical problems before repeating the procedure.

NOTE: If the theoretical full scale and recalculated full scale in the Weight (Span) Calibration are equal, it means that the Theoretical Calibration is currently in use; otherwise, the Weight (Span) Calibration based on test weights is in use.

If the correction made changes the previous full scale for more than 20 percent, all the parameters with settable weight values are reset to default values.

Linearization Option on Max 5 Points

It is possible to perform a linearization of the weight by performing the Weight (Span) Calibration (With Test Weights) (see Section 2.2.6 on page 19) with up to a maximum of five points, using five different test weights. The procedure ends by pressing ESC or after entering the fifth value. At this point it will no longer be possible to change the calibration value; a new Weight (Span) Calibration would need to be performed. To perform a new calibration, return to the weight display and then re-enter the calibration menu.

By pressing PRINT after the sample weight is confirmed, the full scale displays the value of the maximum test weight entered and references the cell sensitivity set in the Theoretical Calibration (Section 2.2.1 on page 15).

2.2.7 Confirmation and Change of Active Channels

After performing the calibration and verifying the system works properly, this function allows the channels to be automatically detected by the instrument. This ensures that in the event of accidental interruption of the cable of one or more load cells, the instrument displays the ErCEL 1 alarm.

Automatic load cell detection is enabled by default on all eight channels of the instrument.

1. Press and hold MENU, then press ESC. CALI b is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until SEL CH is displayed.
4. Press MENU, the display shows the automatically detected channels.

Figure 2-1. Load Cell Detection

5. Press ESC to exit with no change, or press MENU to make the current selection permanent and disable automatic detection.
6. In the event a channel is not working, the load cell can be moved to a free channel by pressing TARE or PRINT to select a new channel. Press MENU to select.
7. Press TARE or PRINT to select On or OFF to activate or deactivate it. Press MENU to confirm.
8. Press ESC. WAIt is displayed, then SEL CH will display. Do not proceed until SEL CH is displayed.
9. Press ESC twice to exit setup menu.

IMPORTANT: After editing the active channels, an Equalization (Section 2.2.3), Zero Setting (Section 2.2.4) and Weight (Span) Calibration (Section 2.2.6) must be performed.

To Cancel Manual Selection of Active Channels:

When the manual selection of the active channels is canceled, automatic detection on all channels is then enabled.

1. Press and hold MENU, then press ESC. CALI b is displayed.
2. Press MENU. FS-tED is displayed.
3. Press TARE or PRINT until dEL CH is displayed.
4. Press MENU. SUrEP is displayed.
5. Press ESC to cancel or press MENU to confirm. 'IAI t will display. Do not proceed until dEL CH displays.
6. Press ESC twice to exit setup menu.

2.2.8 Setting Units of Measure

Use the following steps to set the Units of Measure on the SCT Weight Transmitter. If the print function is enabled, the symbol of the selected unit of measure will be printed after the measured value.

1. Press and hold MENU, then press ESC. CALI b is displayed.
2. Press MENU. FS-tED is displayed.
3. Press TARE or PRINT until Unl t is displayed. Press MENU.
4. Press TARE or PRINT until desired unit is displayed. Press MENU.
5. Press ESC twice to exit setup menu.

Unit Display	Description
HI LOG=	Kilograms
G=	Grams
t=	Tons
Lb=	Pounds*
nE'ton	Newtons*
LI trE	Liters*
bAr	Bars*
AtO	Atmospheres*
PI ECE	Pieces*
nE'tn	Newton meters*
HI LO-n	Kilogram meters*
OtHEr	Other generic units of measure not included on the list*
* Indicates it is possible to set the display coefficient. To use COEFF it is necessary to enable it, closing the COEFF input. See Section 2.2.9 on page 22.	

Table 2-1. Units of Measure

2.2.9 Display Coefficient

By setting the coefficient (COEFF), the display is changed accordingly. If one of the inputs is set to COEFF mode (Section 2.7 on page 29), when the input is closed the value displayed will be modified according to the coefficient. When the input is opened, the standard weight display will be restored.

1. Press and hold MENU, then press ESC. CAL b is displayed.
2. Press MENU. FS-tEO is displayed.
3. Press TARE or PRINT until COEFF is displayed.Press MENU.
4. Press TARE to select desired digit, then press PRINT to increment digit until desired number is displayed.
5. Press MENU to accept.
6. Press ESC twice to exit setup menu.

Display	Definition	Display Coefficient
Lb	Pounds	The value set in COEFF will be multiplied by the weight value currently displayed.
nEWton	Newton	The value set in COEFF will be multiplied by the weight value currently displayed.
LI trE	Liters	In COEFF set the specific weight in KG/l, assuming that the system is calibrated in kg.
bAr	Bar	The value set in COEFF will be multiplied by the weight value currently displayed.
AtM	Atmosphere	The value set in COEFF will be multiplied by the weight value currently displayed.
PI ECE	Pieces	In COEFF set the weight of one piece.
nEU-M	Newton meters	The value set in COEFF will be multiplied by the weight value currently displayed.
HI LO-M	Kilogram meters	The value set in COEFF will be multiplied by the weight value currently displayed.
OthEr	Other generic units of measure not included on the list	The value set in COEFF will be multiplied by the weight value currently displayed.

Table 2-2. Display Coefficient

IMPORTANT: All other settings (setpoints, hysteresis, calibration) are expressed in weight value. To convert them to the new unit of measurement, perform a Theoretical Calibration For Other Units Of Measure or a Weight (Span) Calibration For Other Units Of Measure to change the system calibration.

The parameter COEFF must remain set to 1.0000.

Theoretical Calibration For Other Units Of Measure

Set in the parameter FS-tEO the F.SCALE value divided by the conversion coefficient from kg to the new unit of measure.

Example: The four load cells of 1000 kg are placed under a scale for olive oil, which has a specific gravity of 0.916 kg/L. Setting the F.SCALE = (4x1000)/0.916 = 4367, the system works in liters of olive oil. See Section 2.2.8 on page 21.

Weight (Span) Calibration For Other Units Of Measure

Load a known quantity of product liters on the scale, use as high a percentage of the maximum quantity to be weighed as possible, and enter in the parameter UEI GHt, the product loaded value in liters. See Section 2.2.8 on page 21.

2.3 Filter on the Weight

The filtering selection is used to eliminate environment noise, and is typically a compromise between responsiveness and stability. The lower the number, the more responsive the display will be to weight changes. The filter is used to stabilize a weight as long as the variations are smaller than the corresponding Response Time (Table 2-3 on page 24). The filter setting is dependent on the type of application and the required update rate.

Setting the parameter allows a stable weight display to be obtained. To increase the effect (weight more stable) increase the value.

1. Press and hold MENU, then press ESC. CALIb is displayed.
2. Press TARE or PRINT until FILtEr is displayed.
3. Press MENU. The currently configured filter type is displayed (tYPE 0 or tYPE 1).
4. Press TARE until desired filter type displayed.

NOTE: The two filter types provide different results as described below:

- Type 0: standard filter (default)
- Type 1: moving average filter with a fixed refresh frequency

5. Press MENU. The currently programmed filter value is displayed.
6. Press PRINT until desired filter value is displayed.
7. Press MENU to accept. VAIt is briefly displayed. The current weight then displays, with all symbols scrolling, and the displayed stability can be verified.
   - If stability is unsatisfactory, press ESC twice. This returns the indicator to the FILtEr option and the filter type and value may be modified again until an optimum result is achieved.
   - If stability is satisfactory, press MENU, VAIt is briefly displayed. Do not proceed until 0 is displayed. Then press ESC once to set anti-peak filter.

NOTE: The anti-peak filter can only be set after the instrument is connected to a load cell. When the weight is stable, the anti-peak filter removes sudden weight fluctuations determined by the configured time (see Table 2-3 on page 24), up to a maximum duration of one second.

8. Press TARE or PRINT to display AntPOn or AntPOF to set this filter on or off.
9. Press MENU to accept. F ILtEr is displayed.
10. Press ESC to exit setup menu.

NOTE: The filter stabilizes a weight as long as its variations are smaller than the corresponding "response time". It is necessary to set this filter according to the type of application and to the full scale value (see Table 2-3 on page 24).

	Response Time [ms]		Display and Serial Port Refresh Frequency [Hz]		
Filter Value	Type 0	Type 1	Type 0	Type 1	
				1-4 Active Channels	5-8 Active Channels
0	12	100	300	100	50
1	150	330	100	100	50
2	260	500	50	100	50
3	425	700	25	100	50
4*	850	1100	12.5	100	50
5	1700	1600	12.5	100	50
6	2500	2700	12.5	100	50
7	4000	3500	10	100	50
8	6000	5000	10	100	50
9	7000	6800	5	100	50
Anti-peak	6	-	600	-	
* Indicates default value.					

Table 2-3. Filter Values

2.4 Zero Parameters

1. Press and hold MENU, then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until PAr A 0 is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. Press MENU.
4. Press TARE to select desired digit, then press PRINT to increment digit until desired value is displayed.
5. Press MENU.
6. Press ESC twice to exit setup menu.

Parameter	Options	Description
0 SEt	Enter *number* 0-max full scale ??? Considered decimals: 300 – 30.0 – 3.00 – 0.300	Maximum zero range Indicates the maximum weight value that can be zeroed off by external contact, keypad or serial protocol.
AUtO 0	Enter *number* 0 - max 20% of full scale ?	Automatically zeroes the scale at power-on. If the weight value is lower than the value set in this parameter, the scale will zero itself provided the weight does not exceed the value in the 0 SET parameter. To disable this function set to 0.
trAC 0	nOnE 1-5	Zero tracking Automatically zeros the scale when within the range specified, as long as the weight is within the 0 SET parameter and the scale is at standstill for at least one second. To disable this function, set to none. *Example: if the parameter* ***dI UI S*** *is set to 5 and* trAC 0 *is set to 2, the weight will be automatically set to zero for variations smaller than or equal to 10 (*dI UI 5 x trAC 0*.*

Table 2-4. Zero Parameters

2.5 Serial Communication Setting

1. Press and hold MENU, then press →0← ESC. CAL ib is displayed.
2. Press TARE ◁ or PRINT △ until SERIAL is displayed.
3. Press MENU ⊡→. rS485 is displayed. Press MENU ⊡→.
4. Press TARE ◁ until desired parameter is displayed. See Table 2-5 on page 25.
5. Press MENU ⊡→ to select.
6. Press TARE ◁ or PRINT △ until desired setting is displayed, or if necessary, press TARE ◁ to select desired digit, then press PRINT △ to increment digit until desired value is displayed. See Table 2-6 on page 25.
7. Press MENU ⊡→ to select.
8. Press →0← ESC three times to exit setup menu.

Parameter	Choices	Description
rS-485 (communication Port)	nOnE	Disables any type of communication
	nOdbUS	Modbus-RTU possible addresses from 1-99. See Section 3.14 on page 59.
	ASCII	ACSII bidirectional protocol; possible addresses from 1-99. See Section 3.15 on page 64. NOdU6 NOdTd
	CONtIn	Continuous weight transmission protocol. See Section 3.17 on page 69. **MOd t** set: PARITY = none STOP = 1 **MOd td** set: PARITY = none STOP = 1
	rI P	Continuous weight transmission protocol to RIP5/20/60, RIP50SHA, RIPLED series remote displays. The remote display shows the net weight or gross weight according to its settings. Set: BAUD = 9600 PARITY = none STOP = 1
	Hdr 1P	Continuous weight transmission protocol to RIP675, RIP6125C series remote displays. The remote display shows the net or gross weight according to its settings. Set: BAUD = 9600 PARITY = none STOP = 1
	Hdr 1Pn	Continuous weight transmission protocol to RIP 675, RIP6125C series remote displays. Set: BAUD = 9600 PARITY = none STOP = 1 When the remote display is set to gross weight: - if the instrument displays the gross weight, the remote display shows the gross weight. - if the instrument shows the net weight, the remote display shows the net weight alternated with the message **nEt.**
	Pr intEr	See Table 2-6.

Table 2-5. Serial Communications Menu Parameters

Parameter	Choices	Description
bAUd	2400 4800 9600 19200 38400 115200	Transmission speed

Table 2-6. Serial Communications Menu Settings

Parameter	Choices	Description
HErtZ		Maximum transmission frequency To be set when CONt in transmission protocol is selected.
	10	
	20	20 Hz with minimum baud rate 2400 baud
	30	
	40	40 Hz with minimum baud rate 4800 baud
	50	
	60	
	70	
	80	80 Hz with minimum baud rate 9600 baud
	100	100 Hz with minimum baud rate 19200 baud
	200	200 Hz with minimum baud rate 38400 baud
	300	300 Hz with minimum baud rate 38400 baud
dELAY	0-200 SEc dEFAULtS 200	Delay in milliseconds which elapses before the instrument replies.
Addr	1-99 dEFAULtS 1	Instrument address
PAr itY	nonE EuEn Odd dEFAULtS nonE	Parity none Even parity Odd parity
StoP	1-2 dEFAULtS 1	Stop bit
nCOPY	1-9 dEFAULtS 1	Number of copies
EMPtY		Number of blank lines between one printout and the next.
HEAdEr	YES or no dEFAULtS no	Printing custom heading from PC
PrtnOd	P 190 StAUP StAUt	Connected printer type

Table 2-6. Serial Communications Menu Settings (Continued)

NOTE: For information about protocols and methods of communication Contact Rice Lake Weighing Systems Customer Support.

2.5.1 RS-485 Serial Communication

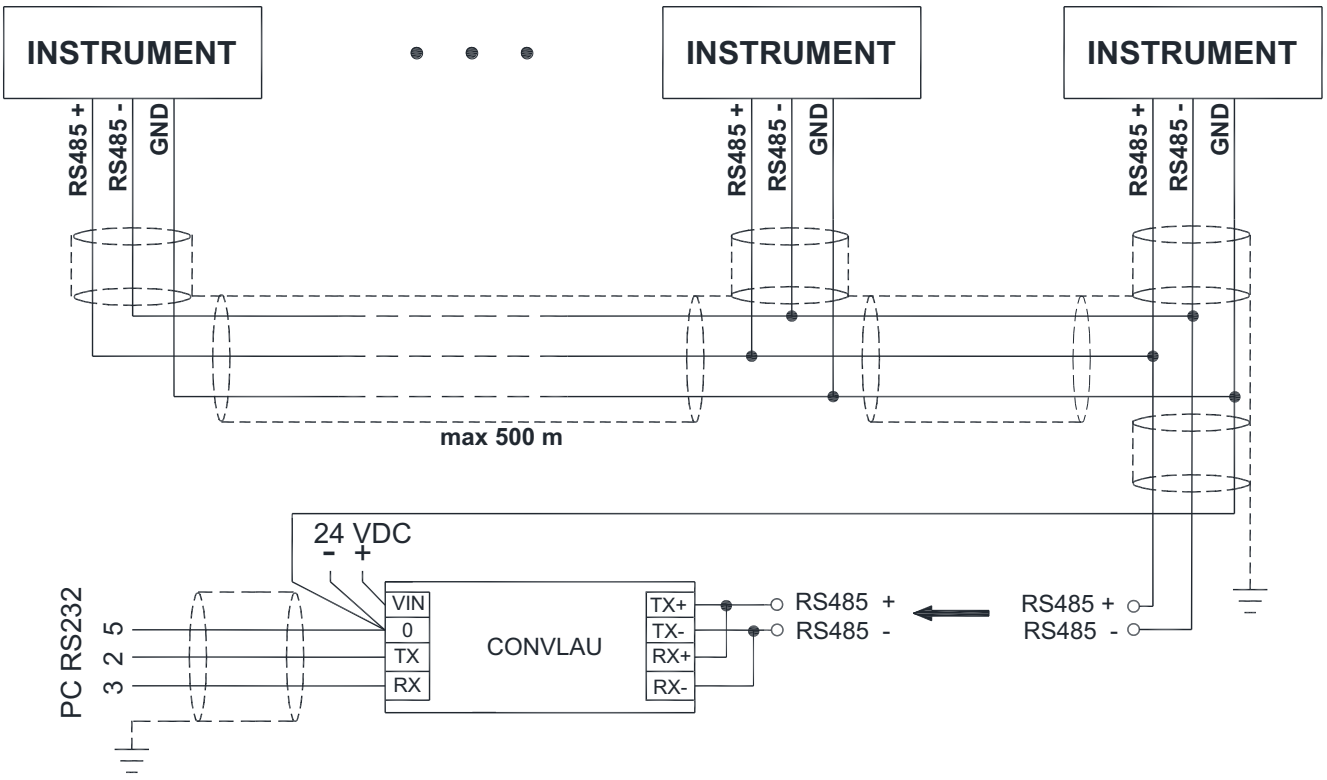

Figure 2-2. RS-485 Serial Communication

NOTE: If the RS-485 network exceeds 100 meters in length or a baud rate over 9600 is used, two terminating resistors are needed at the ends of the network. Two 120 ohm resistors must be connected between the + and - terminals of the line, on the terminal strip of the furthest instruments.

2.5.2 Direct Connection Between RS-485 and RS-232 Without Converter

Since a two-wire RS-485 output may be used directly on the RS-232 input of a PC, a remote display, or a printer, it is possible to implement instrument connection to an RS-232 port in the following manner.

Instrument	RS-232
RS-485 -	RXD
RS-485 +	GND

Table 2-7. Connection Between RS-485 and RS-232

NOTE: This type of connection allows a SINGLE instrument to be used in a ONE WAY mode.

2.6 Analog Output

1. Press and hold MENU, then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until AnALOG is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. Press MENU.

4. Press TARE or PRINT until desired setting is displayed; or, as necessary, press TARE to select desired digit, then press PRINT to increment digit until desired value is displayed. Press MENU.

5. Press →0← ESC twice to exit setup menu.

Parameter	Choices	Description
tYPE	4÷20 mA 0÷20 mA 0÷10 V 0÷5 V ±10 V ±5 V	Selects the analog output type.
nOdE	Enter *number* Gross Net	Choice of a weight followed by the analog output: gross or net If the net function is not active, the analog output varies according to gross weight.
AnA 0	Enter *number*	Set the desired weight value for the minimum analog output value. ***NOTE: Only set a value different from zero to limit the analog output range.*** ***Example: for a full scale value of 10000 kg, a 4 mA signal at 5000 kg and 20 mA at 10000 kg, in this case, instead of zero, set 5000.***
AnA FS	Enter *number*	Set the desired weight value to obtain the maximum analog output value; it must correspond to the value set in the PLC program (default: calibration full scale). ***Example: for a 4-20 mA output and in the PLC program a 20 mA = 8000 kg is desired, set the parameter to 8000.***
COr 0	Enter *number*	Analog output correction to zero if necessary adjust the analog output, allowing the PLC to indicate 0. the sign '-' can be set for the last digit on the left. ***Example: for a 20 mA output and a minimum analog setting, the PLC or tester reads 4.1 mA. Set the parameter to 3.9 to obtain 4.0 on the PLC or tester. Section on page 28.***
COr FS	Enter *number*	Full scale analog output correction: if necessary adjust the analog output, allowing the PLC to indicate the value set in the parameter. ***Example: for a 4-20 mA output with the analog set to full scale and the PLC or tester reads 19.9 mA, set the parameter-to 20.1 to obtain 20.0 on the PLC or tester. Section on page 28.***

Table 2-8. Analog Menu Parameters

Analog Output Type Scale Corrections

The minimum and maximum values which can be set for the zero and full scale corrections. Refer to COr 0 and COr FS.

Analog Output Type	Minimum	Maximum
0-10 V	-0.150	10.200
0-5 V	-0.150	5.500
0-20 mA	-0.200	22.000
4-20 mA	-0.200	22.000

Table 2-9. Analog Output Scale Corrections

NOTE: The analog output may also be used in the opposite manner, where. the weight setting that corresponds to the analog zero (AnA 0) may be greater than the weight set for the analog full scale (AnA FS). The analog output will increase towards full scale as the weight decreases; the analog output will decrease as the weight increases.

Example: analog output type having selected 0-10 V:

AnA 0 = 10000 AnA FS = 0

Weight = 0 kg analog output = 10 V

Weight = 5000 kg analog output = 5 V

Weight = 10000 kg analog output = 0 V

2.7 Outputs And Inputs Configuration

1. Press and hold MENU, then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until OUt-1 n is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. Press MENU.
4. Press TARE or PRINT until desired setting is displayed.
5. Press MENU. Press ESC twice to exit setup menu.

Parameter	Options	Description
OUt 1 OUt 2 OUt 3 OUt 4 OUt 5	OPEn CLoSE	Normally open: The relay is de-energized and the contact is open when the weight is lower than the programmed setpoint value. It closes when the weight is higher than or equal to the programmed setpoint value. Normally closed: The relay is energized and the contact is closed when the weight is lower than the programmed setpoint value. It opens when the weight is higher than or equal to the programmed setpoint.
OUt 1 OUt 2 OUt 3 OUt 4 OUt 5	SEt 1 SEt 2 SEt 3 SEt 4 SEt 5	Number corresponds with Out 1, 2, 3, 4, or 5 The contact will switch on the basis of weight according to setpoints. See Section 2.12 on page 32. For each setpoint select: Gross (default) - The contact will switch on the basis of gross weight. Net - The contact will switch on the basis of net weight.
	PLC	The contact will not switch on the basis of weight, but is controlled by remote protocol commands.
	StAbLE	Relay switching occurs when the weight is stable
	ALArM	Relay switching occurs when one of the following alarms is triggered: ErCEL, ErCELr, ErCEL 1, Er OL, Er Ad, ------, Er OF The operation mode is forced to close (normally closed).
SEt 1 SEt 2 SEt 3 SEt 4 SEt 5	GroSS	The contact will switch on the basis of gross weight.
	nEt	The contact will switch on the basis of net weight.
	PoSnEG	Relay switching occurs for both positive and negative weight values.
	POS	Relay switching occurs for positive weight values only.
	nEG	Relay switching occurs for negative weight values only.
SEt 1 SEt 2 SEt 3 SEt 4 SEt 5	OFF	Relay switching will not occur if the setpoint value is 0.
	On	Setpoint = 0 and switching = PosNeg: Relay switching occurs when the weight is zero. The relay will switch again when the weight is different from zero, taking hysteresis into account (for both positive and negative weights. Setpoint = 0 and switching = POS: Relay switching occurs for a weight higher than or equal to zero. The relay will switch again for values below zero, taking hysteresis into account. Setpoint = 0 and switching = Neg: Relay switching occurs for a weight lower than or equal to zero. The relay will switch again for values above zero, taking hysteresis into account.
In 1 In 2 In 3	nE-GO In 2	NET/GROSS: by closing this input for less than one second, it performs a semi-automatic tare and the display will show the net weight. To display the gross weight, hold the NET/GROSS input closed for three seconds.
	2Er0 In 1	By closing the input for no less than one second, the weight is set to zero. See Section 3.4 on page 37.
	PEAH	With the input closed the maximum weight value reached remains on display. Opening the input the current weight is displayed.
	PLC	Closing the input no operation is performed, the input status may be read remotely by way of the communication protocol.
	CONtIn	Closing the input for less than one second the weight is transmitted over the serial connection according to the fast continuous transmission protocol only once. only if CONtIn is set in the item SEr iAL.
	COEFF	When the input is closed the weight is displayed based on the set coefficient, otherwise the weight is displayed. See Section 2.2.8 on page 21 and Section 2.2.9 on page 22.
	Pr intr	When the input is closed the data is sent for printing if in the communication protocol of either serial port he parameter Pr intr is set.

Table 2-10. Outputs and Inputs Menu Parameters

2.8 Automatic Diagnostics of Load Distribution

NOTE: Use this function only in systems where load distribution can be repeated with each change of weight. For example: liquid weighing.

1. Press and hold MENU then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until diAG is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. Press MENU.
4. Press TARE or PRINT until desired setting is displayed. Press MENU.
5. Press ESC twice to exit setup menu.

Parameter	Options	Description
AUt	YES no	Enables load diagnostics.
StAtUS	—	Displays the active channels status (weight, load percentage on each channel, enabled channels and/or channels in error.
MEMrIP	—	Displays stored load distributions (weight and load percentage on each channel).
dELEtE	—	Deletes stored load distributions: Confirmation is requested (SUrE?). Press **MENU** to proceed or press **ESC** to cancel.
ErSEt	EntEr nUMbEr 0-999.9 5.0	Difference between the current and stored percentage beyond which the ErdLAG alarm is triggered.
AUt 0	YES no	Enables diagnostics on zero.
ErSEt0	EntEr nUMbEr 0-999.9 5.0	Difference between the current and stored percentage beyond which the ErdLAG alarm is triggered.
CMP 0	—	Displays current load distribution on zero and the one previously stored (weight, load percentage on each channel).

Table 2-11. Automatic Diagnostics of Load Distribution Parameters

2.8.1 Load Diagnostics

The instrument, with stable weight, calculates and stores the load percentage on each channel. If under normal operation, the load percentage error is higher than the value set in parameter ErSEt, the display shows the Erdi AG alarm alternated with the weight. The alarm also remains active upon instrument power-off. Press MENU to cancel.

2.8.2 Diagnostics on Zero

When a zero setting is performed from the CALI b menu, the instrument calculates the load percentage on each channel. Diagnostics on zero is performed only if the load distribution has been stored at least once.See Section 2.2.4 on page 18. When using an unloaded system, where the load percentage is higher than the value set in parameter ErSEt, the display shows the Erdi AG alarm alternated with the weight. The alarm also remains active upon instrument power-off.

Press MENU to cancel.

Example: current load distribution display:

Figure 2-3. Current Load Distribution Display

The top of the display shows the weight on the scale; the bottom shows the load percentage on each active channel. This screen can also be accessed directly from the weight display by pressing TEST.

2.9 Test

1. Press and hold MENU then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until tESt is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. See Table 2-12. Press MENU.
4. Press TARE or PRINT until desired setting is displayed. See Table 2-12. Press MENU.
5. Press ESC twice to exit setup menu.

Parameter	Options	Description
StAtUS	—	Load Distribution: Displays the active channels status (weight load percentage on each channel, enabled channels and/or channels in error. This menu can also be accessed directly from the weight display by pressing **TEST**.
In	—	Input Test: Zero is displayed for each open input. One is displayed when the input is closed.
Out	0 1	Output Test: Setting zero ensures that the corresponding output opens. Setting one ensures that the corresponding output closes.
AnALOG	AnALo9	Allows the analog signal to range between the minimum and maximum values starting from the minimum.
	nA	Current output test
	UOLt	Voltage output test
MV-CEL	—	Millivolt test: Displays the response signal of each load cell expressed in mV with three decimals.
MV-0-n	—	Millivolt stored at zero setting (only if AUtO= YES): displays the response signal of each load cell expressed in mV with three decimals.

Table 2-12. Test Parameters

2.10 Events Log

1. Press and hold MENU then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until EVEnt is displayed. Press MENU.
3. Press TARE or PRINT until desired parameter is displayed. Press MENU.
4. Press TARE or PRINT to scroll through events.
5. Press MENU on an event to display.
6. Press MENU to return to events listing.
7. Press ESC three times to exit EvEnt menu.

Parameter	Options	Description
dISEU	ZEro	Zero setting from the calibration menu: Press **MENU** to display the value set to zero.
	FtEO	Theoretical calibration: Press **MENU** to display the full scale set.
	FrEA	Real calibration: Press **MENU** to display the sample weight used.
	tAPO	Tare setting via the keypad: Press **MENU** to display the set value.
	dIAG	Load distribution error: Press **MENU** to display the weight value that triggered the alarm. Press **MENU** again to display the difference between he load percentage and the stored value.
	ALL	Weight alarm: Press **MENU** to display the alarm type.
	dELr	Load distribution deletion
	EQU	Equalization
	CHn	Modification or deletion of the manual selection of active channels
dEL EU	—	Delete stored events: Confirmation is requested (SUrE?), press **MENU** to proceed or press **ESC** to cancel.
Prt EU	—	Prints all events.

Table 2-13. Events Log Parameters

2.11 Info Menu

1. Press and hold MENU then press ESC. CAL ib is displayed.
2. Press TARE or PRINT until INFO is displayed.
3. Press MENU. OP2 displayed.
4. Press MENU. Active options are displayed.
5. Press ESC three times to exit menu.

2.12 Setpoint Programming

1. Press MENU to enter setpoints and hysteresis settings. CLASS is displayed.
2. Press TARE or PRINT until desired setpoint or hysteresis parameter is displayed.
3. Press MENU to enter.
4. Press TARE to select desired digit, then press PRINT to increment digit until desired value is displayed.
5. Press MENU to confirm.

6. Press ESC to exit setpoints and hysteresis settings.

Parameter	Options	Description
SEt 1 SEt 2 SEt 3 SEt 4 SEt 5	Enter *number* 0 - Full Scale **0**	Setpoint: Relay switching occurs when the weight exceeds the value set in this parameter. The type of switching is settable. See Section 2.7 on page 29.
HYStE 1 HYStE 2 HYStE 3 HYStE 4 HYStE 5	Enter *number* 0 - Full Scale **0**	Hysteresis: Value to be subtracted from the setpoint to obtain contact switching for decreasing weight. *For example with a setpoint at 100 and hysteresis at 10, the switching occurs at 90 for decreasing weight.*

Table 2-14. Setpoints Parameters

NOTE: These values are set to zero if the calibration is changed significantly. See Section 2.2.1 on page 15 and Section 2.2.6 on page 19.

2.13 Administrator Functions

2.13.1 Menu Locking

Through this procedure it is possible to block the access to any menu on the instrument.

1. Press and hold MENU then press ESC. CALI b is displayed.
2. Press ESC and TARE at the same time and hold for three seconds. C. ALI b is displayed. The decimal point between the first and second letter indicates that the menu is now locked. If the operator attempts to enter this menu, access is denied and bLOC is displayed.
3. Press ESC to the weight display.

2.13.2 Menu Unlocking

1. Press and hold MENU then press ESC. C. ALI b is displayed.
2. Press MENU and PRINT at the same time and hold for three seconds. CALI b is displayed. The decimal point between the first and second letter is gone, indicating the menu is now unlocked.
3. Press ESC to exit to the weight display.

2.13.3 Temporary Menu Locking

1. Press and hold MENU then press ESC. C. ALI b is displayed.
2. Press TARE and PRINT at the same time and hold for three seconds. CALI b is displayed. The decimal point between the first and second letter is gone, indicating the menu is now unlocked and it is possible to enter and modify all menus.
3. Press ESC to exit to the weight display. By returning to the weight display, the menu lock is restored.

2.13.4 Data Deletion

IMPORTANT: Contact technical support prior to performing data deletion.

NOTE: After each operation the display shows dOnE, press* MENU *to continue. By pressing* ESC *the procedure is canceled and no changes are made.

1. With power off, press and hold ESC, then power on. PrOG is displayed and constants restore (Calibration is not erased). Press MENU.
2. Press TARE or PRINT until PASSU is displayed. Press MENU.
3. Press TARE to select desired digit, then press PRINT to increment digit and enter code 6935.
4. Press MENU to confirm. UAIt is displayed.
5. Instrument will reboot.

2.13.5 Program Selection

Scale approval state is preset for not-legal. For other choices please contact technical support.

1. With power off, press and hold ESC, then power on. PrOG is displayed and constants restore (does not erase calibration. Press MENU.
2. Press TARE or PRINT to program.
3. Press MENU donE is displayed and the instrument is restored to default and data is erased. Or, press ESC to quit the program without introducing any changes and without deleting any of the set variables.

Parameter	Choices	Description
bASE	nOtLEG	Not Legal for Trade
rEUEr		Scale capacity is displayed when the scale is empty; as weight is added, the display will count down
r iP		Continuous weight transmission protocol, streams net and gross. (Set BAUD= 9600, Parity=none, Stop=1)

Table 2-15. Program Selection

IMPORTANT: If necessary, a manual for the newly set program can be requested from technical support.

2.13.6 Keypad or Display Locking

1. Press ESC immediately followed by PRINT. Hold both down for about 5 seconds. This operation is also possible via the Modbus and ASCII protocols.
2. Press TARE or PRINT until desired parameter is displayed. Press MENU.

Parameter	Description
FrEE	No lock
HEY	Keypad Lock: If active, when a key is pressed the message bLOC is displayed.
di SP	Keypad and Display Lock: If active, the keypad is locked and the display shows the instrument model (weight is not displayed); by pressing a key the display shows bLOC for three seconds.

Table 2-16. Keypad or Display Locking Parameters

3.0 Operation

3.1 Navigating System Menus

Use the following steps when navigating through the system parameter menus.

1. From the weight display, press and hold MENU, then press ESC to access parameter settings.
2. Press MENU to enter a menu or confirm the data entry.
3. Press PRINT to modify the displayed figure or menu entry.
4. Press TARE to select a new figure or modify the displayed menu item.
5. Press ESC to cancel and return to the previous menu.

For numeric entries, the symbols are activated in sequence within the menus to indicate that a setting and not a weight is being viewed.

1. Press PRINT or TARE. The first digit will flash and can be edited.
2. Press TARE to select desired digit.
3. Press PRINT to increment digit.

3.2 Semi-automatic Tare (Net/Gross)

NOTE: The semi-automatic tare value is lost upon instrument power-off.
The semi-automatic tare operation is not available if the gross weight is zero.

1. To perform a net operation (***Semi-Automatic Tare***), close the ***Net/Gross*** input or press TARE for less than three seconds. The instrument displays the net weight (just set to zero) and the ***Net*** LED lights up.
2. To display the gross weight again, keep the ***Net/Gross*** input closed or press TARE for three seconds.
3. This operation can be repeated by the operator to allow the loading of several products.

NOTE: Press and hold* PRINT *to display the gross weight temporarily. When* PRINT *is released, the net weight will be displayed again. The semi-automatic tare operation is not available if the gross weight is zero.

3.3 Preset Tare (Subtractive Tare Device)

It is possible to manually set a preset tare value to be subtracted from the display value provided that the P-tArE is less than Max capacity.

1. Press MENU and TARE at the same time and hold for three seconds. P-tArE is displayed.
2. Press MENU. By default the instrument displays the last programmed preset tare.
3. Press PRINT then press MENU to apply or, press TARE to select desired digit, then press PRINT to increment digit until desired value is displayed. Press MENU to apply.
4. Press ESC to exit P-tArE.

NOTE: Press and hold* PRINT *to display gross weight. When* PRINT *is released, the net weight will be displayed again.

To delete a preset tare and return to gross weight display:

1. Press and hold TARE for three seconds or keep the ***Net/Gross*** input, if any, closed for three seconds. The reset tare value is set to zero. The ***NET*** symbol is turned off when the gross weight is displayed again.

NOTE: If a Semi-automatic Tare (Net/Gross) is entered, it is not possible to access the Preset Tare (Subtractive Tare Device) function.

If a Preset Tare (Subtractive Tare Device) is entered, it is still possible to access the Semi-automatic Tare Net/Gross function. The two different types of tare are added.

The Semi-automatic Tare (Net/Gross) and Preset Tare (Subtractive Tare Device) functions will be lost when the instrument is turned off.

3.4 Semi-automatic Zero (Weight Zero Setting for Small Variations)

Closing the Semi-Automatic Zero input will set the weight to zero. Alternatively the weight is set to zero by:

1. Press ESC for less than three seconds. StOrE is displayed for three seconds.
2. Press MENU to set weight to zero.

NOTE: This function is only allowed if the weight is lower than the Zero Setting value (Section 2.2.4), otherwise the alarm E----- appears and the weight is not set to zero.

The Zero Setting will be lost when the instrument is turned off.

3.5 Peak

Keeping the ***Peak*** input closed displays the maximum weight value reached. Opening the input displays the current weight.

NOTE: To use this input to view a sudden variation peak, set the FILTER ONT THE WEIGHT to zero.

3.6 Alarms

Display	Description
nOCEL	No load cell detected; check the connections.
ErCEL	The load cell signal exceeds 39 mV; the conversion electronics (AD converter) is malfunctioning.
ErCELr	The references are not connected or are incorrectly connected; the load cell is a 4 and there are no jumpers between EX- and REF- and between EX+ and REF+.
ErCEL 1	The load cell is not connected or is incorrectly connected. The number indicates the channel on which the error is detected.
Er OL	The weight display exceeds 110% of the full scale.
Er Ad	Internal instrument converter failure; check load cell connections. If necessary contact technical support.
------	The weight exceeds the maximum capacity by 9 divisions.
Er OF	The maximum displayable value is exceeded (value higher than 999999 or lower than -999999).
E-----	The weight is too high and zero setting is not possible.
MAX-PU	This message appears in sample weight setting, in real calibration, after the fifth sample weight value has been entered.
Error	The value set for the parameter is beyond the permitted values. Press **ESC** to quit the setting mode leaving the previous value unchanged. Examples: a number of decimals is selected for full scale which exceed the instrument's display potential; value above the maximum setting value; the weight value set in sample weight verification does not match the detected mV increase; the analog output correction goes beyond the permitted limits.
bLOC	Lock is active on a menu item, the keypad or the display.
nOdI SP	Unable to display the number properly because it is greater than 999999 or less than -999999.
tUI CE	The current load has been equalized; press **MENU** to go back to the previous step and move the sample weight onto the next load cell.
LOAd	The sample weight was not loaded or is too light.
ErdI AC	The load percentage error is higher than the value set in parameter ErSEt or ErSEtO. Press **MENU** to cancel the alarm.
I n2Er0	The gross weight is equal to zero and the semi-automatic tare operation cannot be performed.

Table 3-1. Alarms

Serial Protocol Alarms

MODE	ErCEL	Er OL	Er Ad	------	Er OF	t-----
Bit LSB Status Register Modbus RTU	76543210 xxxxxxx1	7654321 xxxx1xxx	7654321 xxxxxx1x	7654321 xxxxx1xx	76534321 on gross: xxx1xxxx On net: xx1xxxxx	The response to the zero command is a "value not valid" error. (error code 3)
ASCII	__O-F_	__O-L_	__O-F_	__O-L_	__O-F_	AA Cr
RIP	__O-F_	__O-L_	__O-F_	__O-L_	__O-F_	__O-F_
HDRIP-N	_ErCEL	_Er_OL	_Er_Ad	######	_Er_OF	O_SEt
CONTIN	_ErCEL	_Er_OL	_Er_Ad	^^^^^^	_Er_OF	O_SEt

Table 3-2. Serial Protocol Alarms

NOTE: For RIP remote displays, if the message exceeds five digits ------ displays.

If an alarm becomes active, the relays open and the analog outputs go to the lowest possible value.

RANGE	0-20 mA	4-20 ma	0-5 V	0-10 V
Output Value	-0.2 mA	3.5 mA	-0.5 V	-0.5 V

Table 3-3. Analog Outputs with Active Alarms

3.7 Printing Examples

Basic Printout

If the printer has been set (Section 2.5 on page 25) from the weight display, press PRINT.

```
BASIC PRINTOUT
----------------------
TLM8    BASE      Addr:01

GROSS              878 kg
NET                589 kg
TARE               289 kg
```

```
BASIC PRINTOUT (PEAK ENABLED):
----------------------
TLM8    BASE      Addr:01

GROSS             1204 kg
NET                831 kg
TARE               373 kg
PEAK              2103 kg
```

```
PRINTOUT WITH COEFF ENABLED:
----------------------
TLM8    BASE      Addr:01

UNIT       kg |        bar
G        1195 |       1792
N        1195 |       1792
T           0 |          0
```

Figure 3-1. Printout Examples

Load Distribution Printout

To print the current distribution:

1. Press TEST. The current load distribution is displayed.
2. Press PRINT.

```
CURRENT DISTRIBUTION
----------------------
TLM8    BASE      Addr:01
CURRENT         (STATUS)
GROSS            2014 kg
CH1:               23.5 %
CH2:               24.1 %
CH3:               15.5 %
CH4:               16.7 %
CH5:                9.0 %
CH6:               10.2 %
CH7:                ERR   <-- Load cell connected but has an error
CH8:                OFF   <-- Load cell not connected
```

Figure 3-2. Current Distribution Printout

To print current and stored distribution:

1. Press and hold MENU, then press →0← ESC. CALIb is displayed.
2. Press TARE ◁ or PRINT △ until diAG is displayed.
3. Press MENU. AUt is displayed.
4. Press TARE ◁ or PRINT △ until mEM IP is displayed.
5. Press MENU. The load and weight distribution is displayed.
6. Press and hold PRINT △ for more than 3 seconds.
7. Press →0← ESC three times to return to the weigh mode.

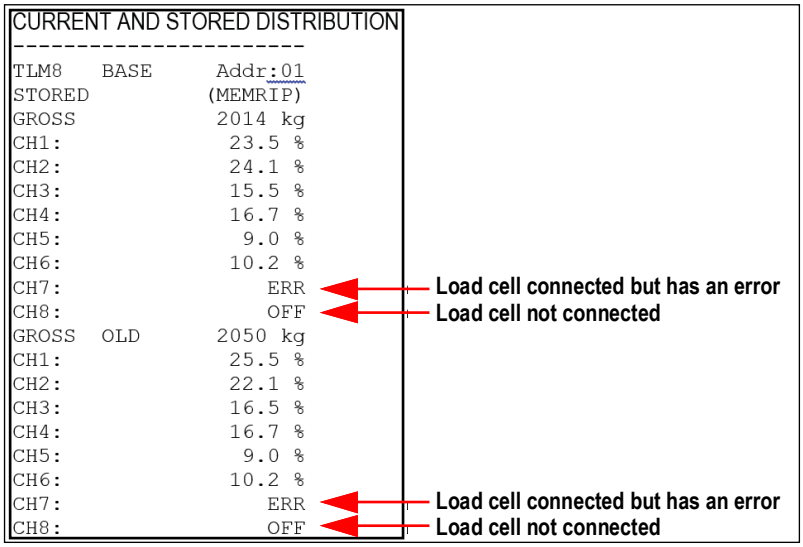

Figure 3-3. Current and Stored Distribution Printout

3.8 SCT-40 DeviceNet

The SCT-40 DeviceNet works as a source in a DeviceNet network.

Load the included EDS file (DeviceNet_40.eds) attached to the instrument in the development system of the DeviceNet primary.

Outgoing Data from SCT-40 DeviceNet (Read)	Address
Gross Weight [4 bytes]	0x0000-0x0003
Net Weight [4bytes]	0x0004-0x0007
Setpoint [4 bytes]	0x0008-0x000B
Status Register [2 bytes]	0x000C-0x000D
Digital Inputs Status [1 byte]	0x000E
Digital Outputs Status [1 byte]	0x000F

Input Data to SCT-40 DeviceNet (Write)	Address
Command Register [2 bytes]	0x0000-0x0001
Digital Outputs Command [2 bytes]	0x0002-0x0003
Setpoint [4 bytes]	0x0004-0x0007

Table 3-4. Exchanged Data SCT-40 DeviceNet

Command Register

Table 3-5 lists possible commands to send to command register:

Code	Description
0	No command
7	Semi-automatic tare (NET display)
8	Semi-automatic zero
9	Gross display
21	Keypad lock
22	Keypad and display unlock
23	Keypad and display lock

Code	Description
90	Read setpoint 1
91	Read setpoint 2
92	Read setpoint 3
93	Write setpoint 1
94	Write setpoint 2
95	Write setpoint 3
99	Save data in EEPROM
9999	Reset (reserved)

Table 3-5. Commands to Command Register (DeviceNet)

NOTE: To execute the same command twice consecutively, send command 0 between the first and second command

Gross Weight, Net Weight

The weight values are expressed as positive integer numbers; they include decimal figures without a decimal point.

Read the Status Register to obtain information about sign and possible errors on the weight.

Setpoints

The setpoints are weight values expressed as positive integer numbers; they include decimal figures without a decimal point.

- Reading: send to the command register the reading command of the required setpoint and read the content of the Setpoint Register

  Example: 90 for reading setpoint 1

- Writing: write the weight value to be set in the setpoint and send to the command register the writing command of the required setpoint

  Example: 93 for writing setpoint 1

NOTE: Setpoints are stored to the RAM volatile memory and lost upon instrument power off. To save them permanently in the EEPROM memory, so that they are maintained upon the instrument power on, it is necessary to send the command 99 (Save data in EEPROM) of the Command Register.

Digital Inputs Status

Bit No.	Description
Bit 0	Input 1 status
Bit 1	Input 2 status
Bit 2	—
Bit3	—

Bit No.	Description
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—

Table 3-6. Digital Inputs (DeviceNet)

Bit a 1: input high; Bit a 0: input is low.

Digital Outputs Command

Allows control of the output status in dEUnEt mode. See Section 2.7 on page 29.

Bit No.	Description
Bit 0	Output 1 status
Bit 1	Output 2 status
Bit 2	Output 3 status
Bit3	—
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—

Bit No.	Description
Bit 8	—
Bit 9	—
Bit 10	—
Bit 11	—
Bit 12	—
Bit 13	—
Bit 14	—
Bit 15	Force outputs

Table 3-7. Digital Outputs (DeviceNet)

Bit a 1: output is closed; Bit a 0: output is open

NOTE: Setting bit 15 to 1 on the PLC, DeviceNet takes control of all the outputs, even if they are in different modes.

Status Register

Bit No.	Description
Bit 1	Cell Error
Bit 2	A/D Converter Malfunction
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	—
Bit 7	Gross weight negative sign
Bit 8	Net weight negatie sign

Bit No.	Description
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within ±¼ of a division around zero
Bit 13	—
Bit 14	—
Bit 15	—

Table 3-8. Status Register (DeviceNet)

3.9 SCT-40 PROFIBUS

The SCT-40 PROFIBUS works as a PROFIBUS-DP® V0 source in a PROFIBUS-DP network.

Technical Specifications

Baud Rate	Up to 12 Mb/s
Addresses	1/99
Profibus Status LED Indications	Slow blinking: PROFIBUS error Fast blinking: PROFIBUS OK

Table 3-9. Specifications

It is necessary to activate the termination resistance on the two devices located at the ends of the network.

The instrument features a PROFIBUS-DP secondary port that allows for the exchange of weight and main parameters with a PROFIBUS-DP primary.

Instrument Setup

1. Press and hold MENU, then press ESC. PrOF 1 is displayed.
2. Set the instrument address in the Profibus network.

NOTE: Any changes become effective the next time the instrument is started.

PC/PLC Setup

Load the included GSD file (LAU80BBC.gsd) attached to the instrument in the development system of the PROFIBUS primary. Insert and configure the SCT-40 PROFIBUS in an existing project.

The available modules are:

- R = the register can be read only
- W = the register can be written only
- R/W = the register can be both read and written

Name	Description	R/W	Size
TLM8 Gross Weight	Gross Weight	R	4 byte
TLM8 Net Weight	Net Weight	R	4 byte
TLM8 Peak Weight	Peak Weight	R	4 byte
TLM8 Set-Point 1	Setpoint 1	R/W*	4 byte/4byte
TLM8 Set-Point 2	Setpoint 2	R/W*	4 byte/4byte
TLM8 Set-Point 3	Setpoint 3	R/W*	4 byte/4byte
TLM8 Set-Point 4	Setpoint 4	R/W*	4 byte/4byte
TLM8 Set-Point 5	Setpoint 5	R/W*	4 byte/4byte
TLM8 Hysteresis 1	Setpoint 1 Hysteresis	R/W*	4 byte/4byte
TLM8 Hysteresis 2	Setpoint 2 Hysteresis	R/W*	4 byte/4byte
TLM8 Hysteresis 3	Setpoint 3 Hysteresis	R/W*	4 byte/4byte
TLM8 Hysteresis 4	Setpoint 4 Hysteresis	R/W*	4 byte/4byte
TLM8 Hysteresis 5	Setpoint 5 Hysteresis	R/W*	4 byte/4byte
TLM8 Division/Unit	Divisions and Unites of Measure	R	2 byte
TLM8 Visual Coeff	Display Coefficient	R	4 byte
TLM8 Inputs	Inputs Status	R	2 byte
TLM8 Outputs	Outputs Status	R/W	2 byte/2 byte
TLM8 Status Reg	Status Register	R	2 byte
TLM8 Command Reg	Command Register	W	2 byte
TLM8 Sample Weight	Sample Weight	R/W*	4 byte/4 byte
TLM8 ZeroAn Weight	Zero Weight-Analog Output	R/W*	4 byte/4 byte
TLM8 FSAn Weight	Full Scale Weight-Analog Output	R/W*	4 byte/4 byte
TLM8 Divisions 1**	Channel 1 Divisions	R	4 byte
TLM8 Divisions 2**	Channel 2 Divisions	R	4 byte
TLM8 Divisions 3**	Channel 3 Divisions	R	4 byte
TLM8 Divisions 4**	Channel 4 Divisions	R	4 byte
TLM8 Divisions 5**	Channel 5 Divisions	R	4 byte
TLM8 Divisions 6**	Channel 6 Divisions	R	4 byte
TLM8 Divisions 7**	Channel 7 Divisions	R	4 byte
TLM8 Divisions 8**	Channel 8 Divisions	R	4 byte

Table 3-10. SCT-40 PROFIBUS Descriptions

* 0x00000000 value in writing is ignored. To reset the value, write out 0x80000000

**

Input Signal on Single Channel	Reading Divisions
0 mV	0
10 mV	2000000
-10 mV	-2000000

NOTE: Setpoints, hysteresis, Zero, and Full Scale weight of analog output are stored to RAM and lost upon instrument power off; to save them in EEPROM so they are maintained upon instrument power on, it is necessary to send the command 99 "Save data in EEPROM" of the Command Register.

Division and Units of Measure Module

This module contains the current setting of the divisions (d iu 15) and of the units of measure (un it).

H Byte	L Byte
Units of measure	Division

Table 3-11. Division and Units of Measure

Use this module together with the Coefficient module to calculate the value displayed by the instrument.

Least Significant Byte (L Byte)		
Division Value	**Divisor**	**Decimals**
0	100	0
1	50	0
2	20	0
3	10	0
4	5	0
5	2	0
6	1	0
7	0.5	1
8	0.2	1
9	0.1	1

Least Significant Byte (L Byte)		
Division Values	**Divisor**	**Decimals**
10	0.05	2
11	0.02	2
12	0.01	2
13	0.005	3
14	0.002	3
15	0.001	3
16	0.0005	4
17	0.0002	4
18	0.0001	4

Table 3-12. L Byte (PROFIBUS)

Most Significant Byte (H Byte)		
Unit of Measure Value	**Unit of Measure Description**	**Utilization of the Coefficient with Different Units of Measure Settings Compared to the Gross Weight Detected**
0	Kilograms	None active
1	Grams	None active
2	Tons	None active
3	Pounds	None active
4	Newton	Multiples
5	Liters	Divides
6	Bar	Multiples
7	Atmosphere	Multiples
8	Pieces	Divides
9	Newton Meters	Multiples
10	Kilogram Meters	Multiples
11	Coefficient	Multiples

Table 3-13. H Byte (PROFIBUS)

Digital Inputs and Outputs Status

Digital Inputs Status	
Bit No.	**Description**
Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	—
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—

Digital Outputs Status	
Bit No	**Description**
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	—
Bit 6	—
Bit 7	—

Table 3-14. Digital Inputs and Outputs Status (PROFIBUS)

Bit = 1: high input; Bit = 0: low input

Digital Outputs Command

It allows to control the outputs set to PLC mode.

Bit No.	Description
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	—
Bit 6	—
Bit 7	—

Bit No	Description
Bit 8	—
Bit 9	—
Bit 10	—
Bit 11	—
Bit 12	—
Bit 13	—
Bit 14	—
Bit 15	Force Outputs

Table 3-15. Digital Outputs Command (PROFIBUS)

Bit = 1: output is closed; Bit = 0: output is open

NOTE: When setting Bit 15 to 1 on the PLC, PROFIBUS takes control of all the outputs, whatever their setting.

Status Register

Bit No.	Description
Bit 0	Load cell error
Bit 1	A/D converter malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	—
Bit 7	Gross weight negative sign

Bit No	Description
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	Research in progress
Bit 14	—
Bit 15	Load cells not connected

Table 3-16. Status Register (PROFIBUS)

Command Register

Code	Description
0	No command
1	—
6	—
7	SEMI-AUTOMATIC TARE enabling (gross weight displaying)
8	SEMI-AUTOMATIC ZERO
9	SEMI -AUTOMATIC TARE disabling (gross weight displaying)
20	—
21	Keypad lock
22	Keypad and display unlock
23	Keypad and display lock
98	—

Code	Description
99	Saving data in EEPROM
100	TARE WEIGHT ZERO SETTING for calibration
101	Sample weight storage for calibration
110	Current weight storage and printing
111	—
120	—
121	—
130	Preset Tare enablign
131	Reserved
9999	Reset (reserved)

Table 3-17. Commands to Command Register (PROFIBUS)

NOTE: To execute same command twice consecutively, send command 0 between first command and the following one.

Real Calibration Commands (with Sample Weights)

The instrument calibration can be changed via PROFIBUS. To perform the edit calibration procedure:

1. Unload the system and then using the command 100 ***Tare Weight Zero-Setting for calibration*** of the command register.
1. Ensure the display reads zero.
2. Place a sample weight on the scale and send its value to the ***sample weight*** module.
3. Send zero to the ***sample weight*** module.
4. Send the command 101 ***Sample weight storage for calibration*** to record weight value in the exchange register. If the operation is successfully completed, the sample weight read is set to zero.

3.10 SCT-40 PROFINET-IO

The SCT-40 PROFINET-IO works as a source device in a PROFINET-IO network.

EthnEt (Ethernet Setup)

- SWAP — (default: no). The allows the selection of the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode. YES = LITTLE ENDIAN, no = BIG ENDIAN.
- I PAddr — (default: 192.8.0.141). Set the instrument IP address; Single port only - see note below
- SUbnEt — (default: 255.255.255.0). Set the instrument Subnet Mask.; Single port only - see note below
- GAtWAY — (default: 192.8.0.111). Set the Gateway address of Ethernet network; Single port only - see note below

NOTE: IP Address, Subnet Mask and Gateway Address parameters are configurable through the front panel of a single port device, but not a dual port. For a dual port device, parameters must be set using a PLC software such as Siemens Step 7 or Siemens TIA Portal. If a PLC software is not available, use the software program at the following link: https://kb.hilscher.com/display/ETHDEVCFG/V1.0900.2.3231

NOTE: Changes made to the Ethernet setup, IP address, Subnet Mask, and Gateway settings will not take effect on the device until after a power cycle.

PC/PLC Setup

Load the included XML file (Profinet_40.xml) attached to the instrument in the development system of the PROFINET-IO primary.

- Insert and configure the SCT-40 PROFINET-IO in an existing project.
- Using the Assign Device Name function, assign a name to the device using any combination of the following characters
  - lower case letters (a-z)
  - numbers (0-9)
  - hyphen (-)
- Set the PROFINET- I/O refresh time to at lease 8 milliseconds.

The data exchanged by the SCT-40 PROFINET-IO are:

Outgoing Data from SCT-40 PROFINET-IO (Read)	Address
Internal Status (2 bytes)	0x0000-0x0001
Gross Weight (4 bytes)	0x0002-0x0005
Net Weight (4 bytes)	0x0006-0x0009
Exchange Register (4bytes)	0x000A-0x000D
Status Register (2 bytes)	0x000E-0x000F
Digital Inputs status (2 bytes)	0x0010-0x0011
Digital Output status (2 bytes)	0x0012-0x0013

Input Data to SCT-40 PROFINET-IO (Write)	Address
Write Enable (2 bytes)	0x0000-0x0001
Command Register (2 bytes)	0x0002-0x0003
Digital Outputs Command (2 bytes)	0x0004-0x0005
Exchange Register (4 bytes)	0x0006-0x0009

Table 3-18. Single Port Interface – Exchanged Data (PROFINET)

Input Data from SCT-40 PROFINET-IO (Read)	Address	Type
Gross Weight (4 bytes)	0x0000-0x0003	16 byte input
Net Weight (4 bytes)	0x0004-0x0007	
Exchange Register (4bytes)	0x0008-0x000B	
Status Register (2 bytes)	0x000C-0x000D	
Digital Inputs status (2 bytes)	0x000E-0x000F	
Digital Output status (2 bytes)	0x0010-0x0011	2 byte input

Input Data to SCT-40 PROFINET (Write)	Address	Type
Command Register (2 bytes)	0x0000-0x0001	8 byte output
Digital Outputs Command (2 bytes)	0x0002-0x0003	
Exchange Register (4 bytes)	0x0004-0x0007	

Table 3-19. Dual Port Interface – Exchanged Data (PROFINET)

Internal Status

When the internal status is not 0 there is an internal error, so data from the SCT-40 PROFINET-IO is not reliable.

When the internal status is 0 data from the SCT-40 PROFINET-IO is reliable.

Write Enable

Write 0x0000 in **Write Enable** register to ensure that no data is written to the SCT-40 PROFINET-IO.

Write 0xFFFF in **Write Enable** register to enable that data is written to the SCT-40 PROFINET-IO.

Gross weight, Net weight

The weight values are expressed as positive integer numbers; they include decimal figures without a decimal point.

Read the ***Status Register*** to obtain informations about sign and possible errors on the weight.

Digital Inputs and Outputs Status

Digital Inputs Status	
Bit No.	**Description**
Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	—
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—

Digital Outputs Status	
Bit No	**Description**
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	—
Bit 6	—
Bit 7	—

Table 3-20. Digital Inputs and Outputs Status (PROFINET)

Bit = 1: high input; Bit = 0: low input

Digital Outputs Command

It allows control to the outputs status in PROFI. See Section 2.7 on page 29.

Bit No.	Description
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	—
Bit 6	—
Bit 7	—

Bit No	Description
Bit 8	—
Bit 9	—
Bit 10	—
Bit 11	—
Bit 12	—
Bit 13	—
Bit 14	—
Bit 15	Force Outputs

Table 3-21. Digital Outputs Command (PROFINET)

Bit = 1: output is closed; Bit = 0: output is open

NOTE: Setting bit 15 to 1 on the PLC, PROFINET takes control of all the outputs, even if they are in different modes.

Status Register

Bit No.	Description
Bit 0	Load cell error
Bit 1	A/D converter malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	—
Bit 7	Gross weight negative sign

Bit No	Description
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	Research in progress
Bit 14	—
Bit 15	Load cells not connected

Table 3-22. Status Register (PROFINET)

Command Register

Table 3-23 shows possible commands to send to the command register: r

Code	Description
0	No command
7	Net weight display
8	Semi-automatic zero
9	Gross weight display
21	Keypad lock
22	Keypad and display unlock
23	Keypad and display lock
24	Mode: 8x divisions LowRes
25	Mode: 4x divisions HiRes (ch1-4)
26	Mode: 4x divisions HiRes (ch 5-8)
27	Mode: standard
87	Preset tare reading**
88	Preset tare writing**

Code	Description
90	Setpoint 1 reading**
91	Setpoint 2 reading**
92	Setpoint 3 reading**
93	Setpoint 1 writing**
94	Setpoint 2 writing**
95	Setpoint 3 writing**
99	Save data in EEPROM
100	Zero-setting for calibration
101	Sample weight storage for calibration
102	Sample weight reading**
103	Sample weight writing**
110	Current weight storage and printing
130	Preset tare enable
150	Setpoint 4 reading**
151	Sepoint 5 reading**
160	Setpoint 4 writing**
161	Setpoint 5 writing**
9999	Reset (reserved)

Table 3-23. Commands to Command Register (PROFINET)

NOTE: To execute the same command twice consecutively, send command 0 between the first command and the following one.

** The SCT-40 PROFINET-IO features two exchange registers one for reading and one for writing. These must be used together with the command register to access these values. Use the following instructions to access these values:

- **Reading**: send the desired data reading command to the command register and read the content of the exchange register. *For example send command 90 for a Setpoint 1 reading.*
- **Writing**: write the value to be set in the exchange register and send the desired data writing command to the command register. *For example send command 93 for Setpoint 1 writing.*

Use this information with commands 24, 25, 26 and 27 of the command register.

Input Signal on Single Channel	Low Resolution	High Resolution
0 mV	0	0
10 mV	8000	2000000
-10 mV	-8000	-2000000

Table 3-24. Reading Divisions

Mode: 8x divisions Low Resolution

Send command 24 to the command register to modify the SCT-40 PROFINET-IO output data so that the low resolution (16bit) values of all 8 channels divisions are reported.

Output Data from SCT-40 PROFINET-IO (Reading)	Address
Internal Status (2 byte)	0x0000-0x0001
Channel 1 reading divisions - Low Res (2 bytes)	0x0002-0x0003
Channel 2 reading divisions - Low Res (2 bytes)	0x0004-0x00005
Channel 3 reading divisions - Low Res (2 bytes)	0x0006-0x0007
Channel 4 reading divisions - Low Res (2 bytes)	0x0008-0x0009
Channel 5 reading divisions - Low Res (2 bytes)	0x000A-0x000B
Channel 6 reading divisions - Low Res (2 bytes)	0x000C-0x000D
Channel 7 reading divisions - Low Res (2 bytes)	0x000E-0x000F
Channel 8 reading divisions - Low Res (2 bytes)	0x0010-0x0011
Status Register (2 bytes)	0x0012-0x0013

Table 3-25. 8x Divisions Low Res

Mode: 4x divisions High Resolution (ch 1-4)

Send command 25 to the command register to modify the SCT-40 PROFINET-IO output data so that the high resolution (24 bits) values of the first four channels divisions are reported.

Output Data from SCT-40 PROFINET-IO (Reading)	Address
Internal Status (2 byte)	0x0000-0x0001
Channel 1 reading divisions - HIgh Res (4 bytes)	0x0002-0x0005
Channel 2 reading divisions - HIgh Res (4 bytes)	0x0006-0x00009
Channel 3 reading divisions - HIgh Res (4 bytes)	0x000A-0x000D
Channel 4 reading divisions - HIgh Res (4 bytes)	0x000E-0x00011
Status Register (2 bytes)	0x0012-0x0013

Table 3-26. 4x Divisions High Res (ch 1-4)

Mode: 4x divisions High Resolution (ch 5-8)

Send command 26 to the command register to modify the SCT-40 PROFINET-IO output data so that the high resolution (24 bits) values of the second 4 channels divisions are reported as shown in Table 3-27.

Output Data from SCT-40 PROFINET-IO (Reading)	Address
Internal Status (2 byte)	0x0000-0x0001
Channel 5 reading divisions - High Res (2 bytes)	0x0002-0x0005
Channel 6 reading divisions - High Res (2 bytes)	0x0006-0x0009
Channel 7 reading divisions - HIgh Res (2 bytes)	0x000A-0x000D
Channel 8 reading divisions - HIgh Res (2 bytes)	0x00E-0x0011
Status Register (2 bytes)	0x0012-0x0013

Table 3-27. 4x Divisions High Res (ch 5-8)

Mode: standard

Send command 27 to command register to modify the SCT-40 PROFINET-IO output data so that the original data is reported.

Setpoints – Hysteresis

The weight values are expressed as positive integer numbers; they include decimal figures without a decimal point.

- **Reading**: send the desired data reading command to the command register and read the content of the exchange register. *For example send command 90 for a Setpoint 1 reading.*
- **Writing**: write the value to be set in the exchange register and send the desired data writing command to the command register. *For example send command 93 for Setpoint 1 writing.*

NOTE: Setpoints and Hysteresis are stored to the RAM volatile memory and lost upon instrument power off. To save them permanently in the EEPROM memory, so that they are maintained upon the instrument power on, it is necessary to send the command 99 Save data in EEPROM of the command register.

Real Calibration Commands (With Sample Weight)

The SCT-40 PROFINET-IO calibration can be changed via PROFINET.

To correctly set the sample weight, the value of the division module must be taken into consideration.

Example: to set the value to 100kg and the division value is 0.001, set the register value to 100000 (remove the decimal points from the value that would be 100.000 with decimals).

To perform the edit calibration procedure:

1. Unload the system, then using the command 100 ***Tare Weight Zero-Setting for calibration*** of the command register, ensure the display reads zero.
2. Place a sample weight on the scale.
3. Record the correct known weight value in the exchange register.
4. Send the command 103 ***Sample weight storage for calibration***.
5. To save the value, send the command 101 ***Sample weight storage for calibration*** to the command register.
6. Send the command 102 ***Sample weight storage*** to the command register. A returned value of zero verifies the correct execution of the calibration command.

See Table 3-23 on page 48 for a list of PROFINET commands.

NOTE: Changing some instrument parameters via keyboard can take the PROFIBUS network out of the data exchange status and put the PLC in stop status; when programming the instrument it is recommended that the instrument is off-line or in a stand-by status.

3.11 SCT-40 EtherNet/IP

The SCT-40 EtherNet/IP works as a device in an EtherNet/IP network.

3.11.1 Instrument Setup

1. Press and hold MENU and ESC. CALIb displays.
2. Press TARE or PRINT until EtHnEt displays. Press MENU.
3. Press TARE or PRINT to navigate through the menu.
   - SWAP: select the reading/writing of the byte in LITTLE ENDIAN or BIG ENDIAN mode
     - YES: BIG ENDIAN
     - nO: LITTLE ENDIAN (default)
   - I PAddr: set instrument IP address (default: 192.8.0.141)
   - SUbnEt: set instrument Subnet Mask (default: 255.255.255.0)
   - GAtWAY: set Gateway address of Ethernet network (default: 192.8.0.111)
4. Press ESC until EtHnEt displays to apply changes.

Load the included EDS file (EthernetIO_40.eds) in the EtherNet/IP scanner's development instrument. Or a Class 1 I/O Connection can be opened with the following settings:

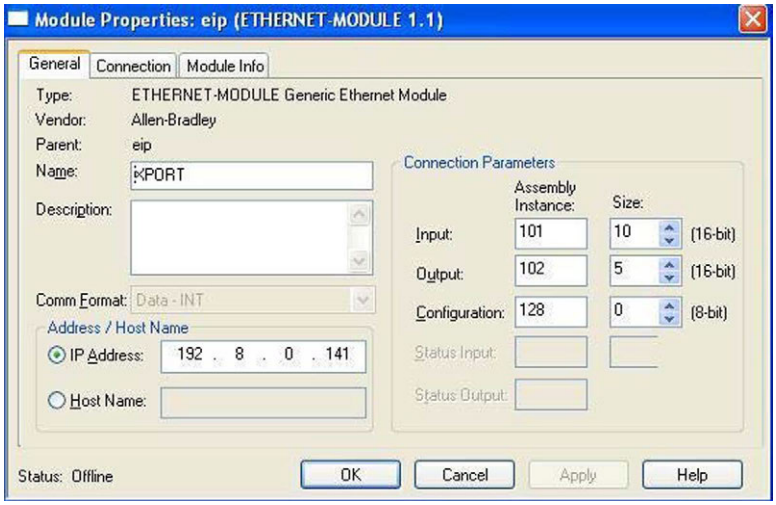

Figure 3-4. Module Properties (EtherNet/IP)

3.11.2 Single Port EtherNet/IP Interface

The data exchanged by the SCT-40 EtherNet/IP is:

Outgoing Data from SCT-40 EtherNet/IP (Read)	Addresses
Internal Status [2 bytes]	0x0000-0x0001
Gross Weight [4 bytes]	0x0002-0x0005
Net Weight [4bytes]	0x0006-0x0009
Exchange Register [4 bytes]	0x000A-0x000D
Status Register [2 bytes]	0x000E-0x000F
Digital Inputs Status [2 byte]	0x0010-0x0011
Digital Outputs Status [2 byte]	0x0012-0x0013

Input Data to SCT-40 EtherNet/IP (Write)	Addresses
Write Enable [2 bytes]	0x0000-0x0001
Command Register [2 bytes]	0x0002-0x0003
Digital Outputs Command [2bytes]	0x0004-0x0005
Exchange Register [4 bytes]	0x0006-0x0009

Table 3-28. Single Port Interface – Data Exchanged by SCT-40 EtherNet/IP

3.11.3 Dual Port EtherNet/IP Interface

Dual port interface uses a different configuration file compared to the single port, making the connection parameters different between the two outputs.

EDS File Setup

The configuration used when setting up a devise with the EDS file.

Outgoing Data from SCT-40 EtherNet/IP (Read)	Addresses	Type
Gross Weight [4 bytes]	0x0000-0x0003	Double Integer
Net Weight [4bytes]	0x0004-0x0007	Double Integer
Exchange Register [4 bytes]	0x0008-0x000B	Double Integer
Status Register [2 bytes]	0x000C-0x000D	Integer
Digital Inputs Status [2 byte]	0x000E-0x000F	Integer
Digital Outputs Status [2 byte]	0x0010-0x0011	Integer

Input Data to SCT-40 EtherNet/IP (Write)	Addresses	Type
Command Register [2 bytes]	0x0000-0x0001	Integer
Digital Outputs Command [2bytes]	0x0002-0x0003	Integer
Exchange Register [4 bytes]	0x0004-0x0007	Double Integer

Table 3-29. EDS Output Data – Dual Port Interface (EtherNet/IP)

Generic EtherNet/IP Module Setup

The configuration used when setting up a devise with the generic module file.

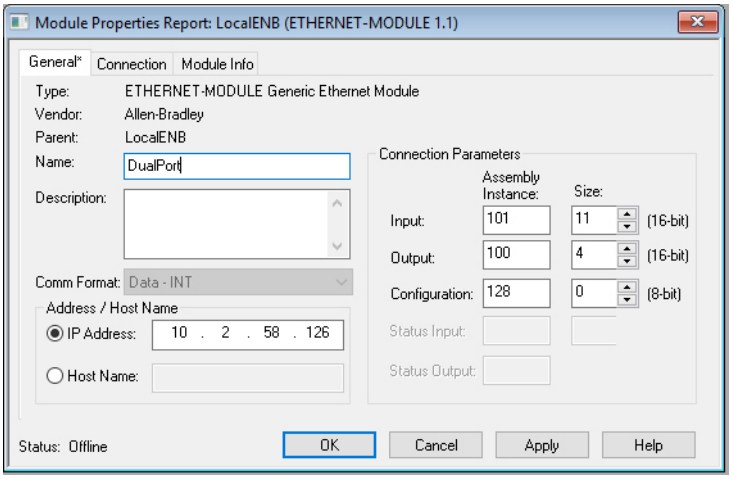

Figure 3-5. Dual Port – Generic EtherNet/IP Module Setup

Outgoing Data from SCT-40 EtherNet/IP (Read)	Addresses	Type
Header Information [4 bytes]	0x0000-0x0003	Double Integer
Gross Weight [4 bytes]	0x0004-0x0007	Double Integer
Net Weight [4bytes]	0x0008-0x000B	Double Integer
Exchange Register [4 bytes]	0x000C-0x000F	Double Integer
Status Register [2 bytes]	0x0010-0x0011	Integer
Digital Inputs Status [2 byte]	0x0012-0x0013	Integer
Digital Outputs Status [2 byte]	0x0014-0x0015	Integer

Input Data to SCT-40 EtherNet/IP (Write)	Addresses	Type
Command Register [2 bytes]	0x0000-0x0001	Integer
Digital Outputs Command [2bytes]	0x0002-0x0003	Integer
Exchange Register [4 bytes]	0x0004-0x0007	Double Integer

Table 3-30. Generic Module Output Data – Dual Port Interface (EtherNet/IP)

Command Register

Code	Description
0	No command
7	Semi-automatic tare (NET display)
8	SEMI-AUTOMATIC ZERO
9	GROSS display
21	Keypad lock
22	Keypad and display unlock
23	Keypad and display lock

Code	Description
90	Read setpoint 1
91	Read setpoint 2
92	Read setpoint 3
93	Write setpoint 1
94	Write setpoint 2
95	Write setpoint 3
99	Save data in EEPROM
9999	Reset (reserved)

Table 3-31. Commands to Command Register (EtherNet/IP)

NOTE: To execute same command twice consecutively, send command 0 between first command and the following one.

Internal Status

When the internal status is not 0 there is an internal error, so data from the SCT-40 EtherNet/IP is not reliable.

When the internal status is 0 data from the SCT-40 EtherNet/IP is reliable.

Header Information

The header information value must be a 1, if it is a 0 then the SCT-40 needs to be replaced.

Write Enable

Write 0x0000 in **Write Enable** register to ensure that **no** data is written to the SCT-40 EtherNet/IP.

Write 0xFFFF in **Write Enable** register to enable that data is written to the SCT-40 EtherNet/IP.

Gross weight, Net weight

The weight values are expressed as positive integer numbers; they include decimal figures without a decimal point.

Read the ***Status Register*** to obtain informations about sign and possible errors on the weight.

Setpoints

The setpoints are weight values expressed as positive integer numbers; they include decimal figures without a decimal point.

- Reading: send to the command register the reading command of the required setpoint and read the content of the Setpoint Register

  Example: 90 for reading setpoint 1

- Writing: write the weight value to be set in the setpoint and send to the command register the writing command of the required setpoint

  Example: 93 for writing setpoint 1

NOTE: Setpoints are stored to the RAM volatile memory; they are lost upon instrument power off. To save them permanently in the EEPROM memory, so that they are maintained upon the instrument power on. It is necessary to send the command 99 Save data in EEPROM to the command register.

Digital Input Status			
Bit No.	Description	Bit No.	Description
Bit 0	INPUT 1 status	Bit 4	—
Bit 1	INPUT 2 status	Bit 5	—
Bit 2	—	Bit 6	—

Digital Output Status			
Bit No.	Description	Bit No.	Description
Bit 0	OUTPUT 1 status	Bit 4	—
Bit 1	OUTPUT 2 status	Bit 5	—
Bit 2	OUTPUT 3 status	Bit 6	—
Bit 3	—	Bit 7	—

Table 3-32. Digital Status (EtherNet/IP)

Bit a 1: input high; Bit a 0: input is low

Command Register

Possible commands to send to command register allowing control to the outputs status in EtHnEt mode (Section 2.7 on page 29):

Bit No.	Description
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	—
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit No.	Description
Bit 8	
Bit 9	
Bit 10	
Bit 11	
Bit 12	
Bit 13	
Bit 14	
Bit 15	Force Outputs

Table 3-33. Commands Sent to Command Register (EtherNet/IP)

Bit a 1: output is closed; Bit a 0: output is open.

NOTE: Setting bit 15 to 1 on the PLC, DeviceNet takes control of all the outputs, even if they are in different modes.

Status Register

Bit No.	Description
Bit 0	Cell Error
Bit 1	A/D Converter Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	—
Bit 7	Gross weight negative sign

Bit No	Description
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	—
Bit 14	—
Bit 15	—

Table 3-34. Status Register (EtherNet/IP)

3.12 SCT-40 Ethernet TCP/IP

To configure Ethernet TCP/IP port of the SCT-40 TCP/IP, the Lantronix DeviceInstaller must be installed on a Windows PC.

1. Connect the PC and the SCT-40 TCP/IP through a LAN (point-to-point or with hub/switch).
2. Run the Lantronix DeviceInstaller file (DevInst.exe) on the CD or download and run installer from https://www.lantronix.com/.

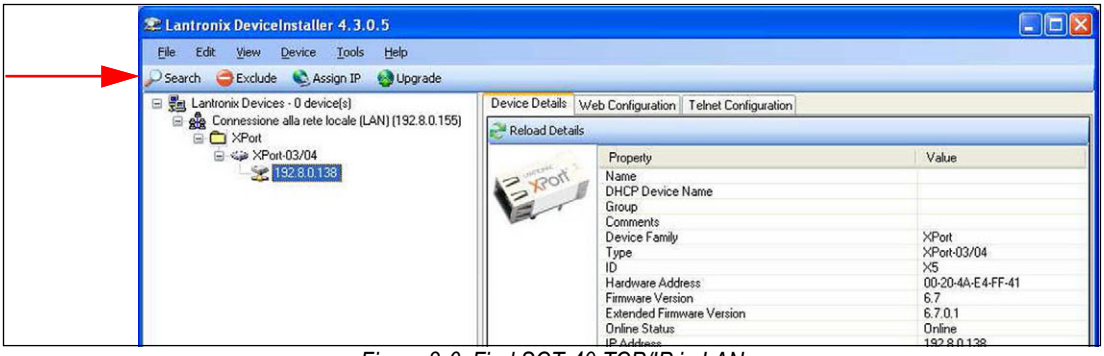

Figure 3-6. Find SCT-40 TCP/IP in LAN

3. Select ***Search*** and the application will find the SCT-40 TCP/IP in the LAN.

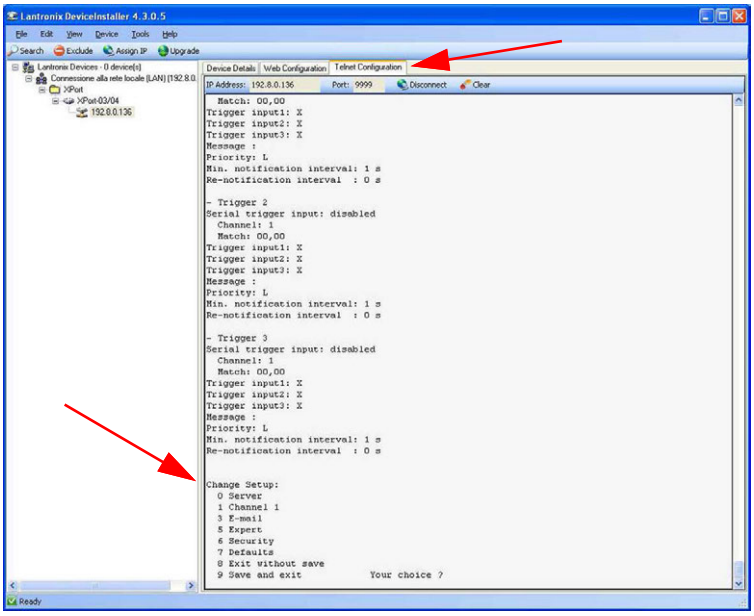

Figure 3-7. Telnet Configuration

4. Select the device and select ***Telnet Configuration.***
5. Select ***Connect*** and press **Enter**.
6. Select **0 Server** and change only the IP Address four fields. Do not change other parameters.
7. Press **Enter** to confirm.

NOTE: It is strongly recommended to set a fixed IP Address.

8. Select **1 Channel 1**, to change serial BaudRate of the Ethernet Module to match the BaudRate set in the SCT-40 TCP/IP Protocol Selection (default 9600). Do not change other parameters.
9. Press **Enter** to confirm.

Connecting the SCT-40 TCP/IP Using a Socket

To connect to the SCT-40 TCP/IP using a socket, for example Winsock, the port to use is 10001.

Connect to the SCT-40 TCP/IP via Ethernet TCP/IP through a serial virtual port, virtual COM port of a PC, perform the following steps:

1. Run TCPIP.exe found on the CD

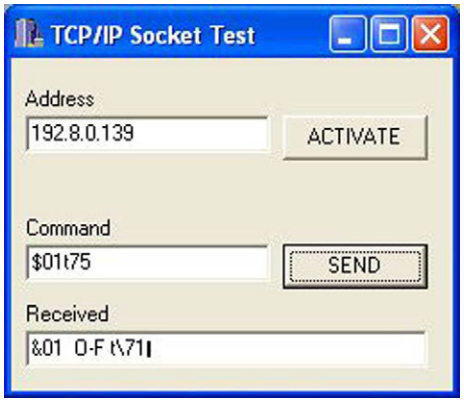

Figure 3-8. TCP/IP Socket Test Screen

2. Enter the IP Address of the SCT-40 TCP/IP and press **ACTIVATE**.
3. Type the ASCII command, without CR, and press **SEND**. The response is displayed in the ***Received box***.

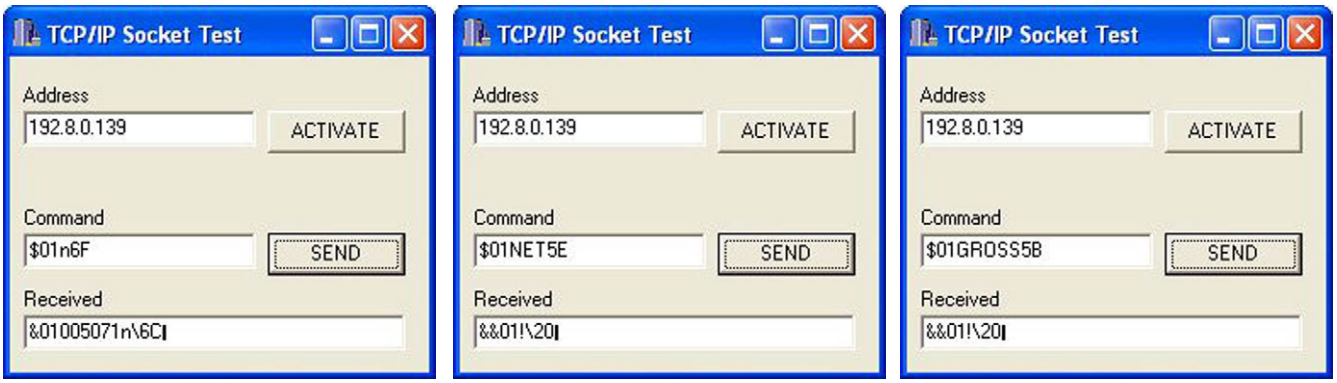

Figure 3-9. TCP/IP Socket Test Screen (Examples)

Use the added COM to communicate with the SCT-40 TCP/IP using the selected protocol.

Protocol Selection

To select the protocol to use on the Ethernet port choose one of the following:

- *EthnEt* - Mode lines of the list below (none, Modbus, ASCII, Contin, Rip, Hdrip, Hdripn). For details about these protocols see Section 2.5 on page 25.
- *I PAddr*, *SUbnEt*, *GAtURY* are not used yet, IPAddress, Subnet Mask or Gateway address cannot be assigned directly through the keyboard: use configuration SW Lantronix DeviceInstaller.
- *UEbSru* protocol is not implemented yet.

3.13 SCT-40 Modbus/TCP

The SCT-40 Modbus/TCP works as a source in a Modbus/TCP network. The instrument features a Modbus/TCP port that allows the exchange of weight and the main parameters with a Modbus/TCP leader. The RJ-45 port provides 10Base-T or 100Base-TX (auto-detect) and the following indicators:

RJ-45 Indicator	Description
Left LED Indicators	Off - No Link Amber - 10 Mb/s Green - 100 Mb/s
Right LED Inidcators	Off - no activity Amber - half duplex Green - Full duplex

Table 3-35. SCT-40MB LED Indicators

NOTE: The instrument operates as follower in a Modbus/TCP network. Use port 502 for the communication.

3.13.1 Set IP Address Via Telnet

The SCT-40 Modbus/TCP is configured with DHCP (default). The IP Address can be automatically assigned by DHCP or manually via Telnet. To manually set the IP address via a PC perform the following steps.

1. Enter ***telnet <ipaddress> 9999*** and press *Enter* to confirm. Figure 3-10 displays:

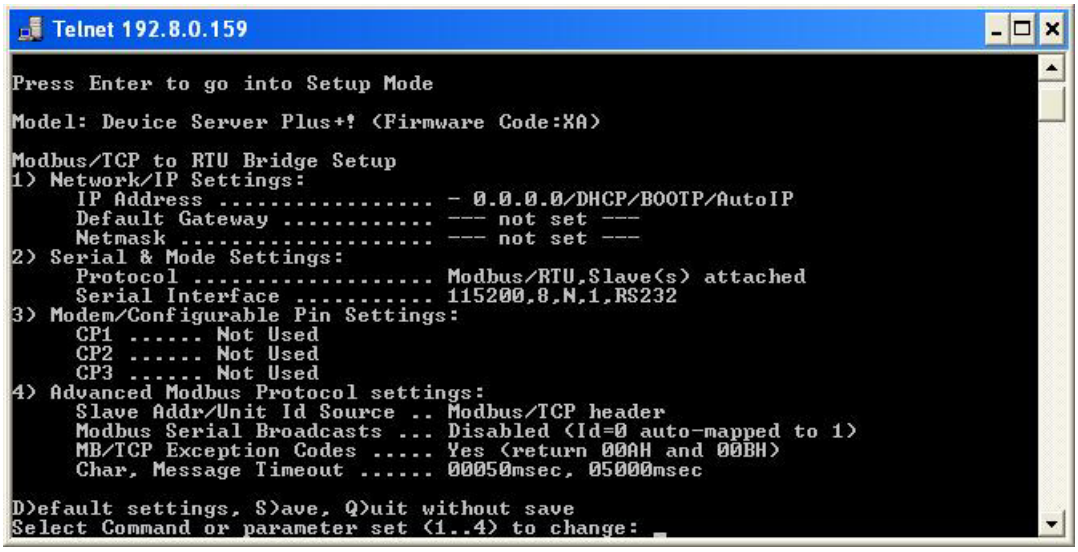

Figure 3-10. Modbus/TCP Set up Screen

2. Enter **1** to manually configure IP Address, Default Gateway Address and Netmask.
3. Enter **S** to save.

NOTE: Modbus/TCP commands and registers of the SCT-40 Modbus/TCP are the same as ModbusRTU protocol. See Section 3.14 on page 59.

3.13.2 Set IP Address with Lantronix Software

To configure IP address of SCT-40 TCP/IP, the Lantronix DeviceInstaller must be installed on a Windows PC.

1. Connect the PC and SCT-40 TCP/IP through a LAN, point-to-point or with hub/switch.
2. Run the Lantronix DeviceInstaller file (DevInst.exe) on the CD or download and run installer from https://www.lantronix.com/.
3. Select **Search**. The application will find the SCT-40 TCP/IP connected to the LAN.
4. Click **Assign IP**.

Figure 3-11. Lantronix DeviceInstaller

5. Select **Assign a specific IP address** then **Next**.

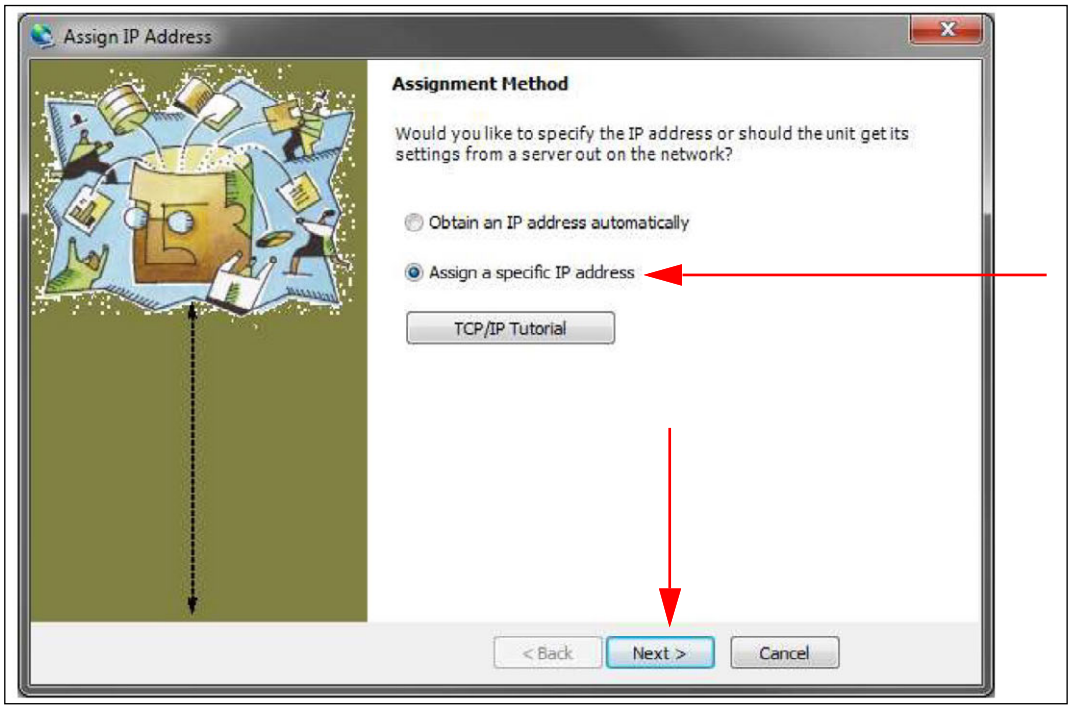

Figure 3-12. Assign IP Address Window

6. Follow remaining screen prompts to enter the desired values then click **Assign**.
7. Wait for the process to complete (no need to restart the SCT-40).

NOTE: Modbus/TCP commands and registers are the same as ModbusRTU protocol. For more information, see Section 3.14 on page 59.

3.14 Modbus-RTU Protocol.

The Modbus-RTU protocol enables management of the reading and writing of the registers listed below according to the specifications contained in the reference document for this standard Modicon PI-MBUS-300.

To select the communication with Modbus-RTU, refer to Section 2.5 on page 25.

When specifically indicated, certain data will be written directly to EEPROM type memories. This memory has a limited number of writing operations (100.000); therefore, unnecessary operations at said locations must be avoided. The instrument ensures that no writing occurs if the value to be stored is equal to the value already stored.

The numerical data is expressed in decimal notation, or hexadecimal notation if preceded by 0x. See Section Table 3-36. on page 59.

Modbus-RTU Data Format

The data received and transmitted via Modbus-RTU protocol has the following characteristics:

- 1 start bit
- 8 data bits, least significant bit sent first
- Instrument settable parity bit
- Instrument settable stop bit

Modbus Supported Functions

Among the commands available in the Modbus-RTU protocol, only the commands inTable 3-36 are used to manage communication with the instrument. Other commands may not be interpreted correctly and could generate errors or system shutdowns.

Functions	Description
03 (0x03)	Read Holding Register (Programmable Register Reading)
16 (0x10)	Preset Multiple Registers (Multiple Register Writing)

Table 3-36. Modbus-RTU Supported Functions

The interrogation frequency is linked with the preset communication rate; the instrument will stand by for at least 3 bytes before beginning to calculate a possible response to the query. The dELAY parameter (Section 2.5 on page 25) allows for a further delay in the instrument response, and this directly influences the number of possible queries in the unit of time.

For additional information on this protocol, refer to the general technical specification PI-MBUS-300. In general, the query and response to and from a source instrument are organized as follows.

Function 3: Read Holding Registers (Programmable Register Reading)

Query				
Address	**Function**	**Add. Reg 1**	**No. register**	**2 bytes**
A	0x03	0x0000	0x0002	CRC

Table 3-37. Programmable Register Reading Query (Modbus-RTU)

Total bytes = 8

RESPONSE					
Address	**Function**	**No. bytes**	**Register 1**	**Register 2**	**2 bytes**
A	0x03	0x04	0x0064	0x00C8	CRC

Table 3-38. Programmable Register Reading Response (Modbus-RTU)

Total bytes = 3+2 *No. registers+2, in which:

- No. registers = number of Modbus register to be read, starting from the Address 1° register;
- No. bytes = number of data bytes to follow.

Function 16: Preset Multiple Registers (Multiple Register Writing)

Query							
Address	**Function**	**Add. reg. 1**	**No. reg.**	**No. bytes**	**Val. reg.1**	**Val. reg.2**	**2 bytes**
A	0x10	0x0000	0x0002	0x04	0x0000	0x0000	CRC

Table 3-39. Multiple Register Writing Query (Modbus-RTU)

Tot. bytes = 7+2*No. registers+2

Response				
Address	**Function**	**Add. Reg. 1**	**No. register**	**2 bytes**
A	0x10	0x0000	0x0002	CRC

Table 3-40. Multiple Register Writing Response (Modbus-RTU)

Tot. bytes = 8, in which:

- No. registers = number of Modbus register to be read, starting from the Address 1° register;
- No. bytes = number of data bytes to follow;
- Val. reg. 1 = register contents beginning from the first.

The response contains the number of records changed starting from the Address 1° register.

Communication Error Management

The communication strings are controlled by CRC (Cyclical Redundancy Check).

In the event of a communication error, the source will not respond with any string. The primary must allow for a time-out before response reception. If no response is received, it infers that a communication error has occurred.

In the event of a string received correctly but not executable, the source responds with an Exceptional Response. The function field is transmitted with the msb at 1.

Exceptional Response			
Address	**Function**	**Code**	**2 bytes**
A	Funct = 0x80	See Table 3-40	CRC

Table 3-41. Exceptional Response (Modbus-RTU)

Code	Description
1	Illegal function: (function not valid or not supported).
2	Illegal data address: (specified data address is not available).
3	Illegal data value: (data received have no valid value).

Table 3-42. Exceptional Response Codes (Modbus-RTU)

List of Usable Registers

The Modbus-RTU protocol implemented on the instrument can manage a maximum of 32 registers read and written in a single query or response. See Table 3-43 on page 61.

- R = the register can be read only
- W = the register can be written only
- R/W = the register can be both read and written
- H = high half of the DOUBLE WORD forming the number
- L = low half of the DOUBLE WORD forming the number

Register	Description	Saving to EEPROM	Access
40001	Firmware version	—	R
40002	Type of instrument	—	R
40003	Year of Production	—	R
40004	Serial Number	—	R
40005	Active program	—	R
40006	COMMAND REGISTER (Table 3-47 on page 63)	NO	W
40007	STATUS REGISTER (Table 3-44 on page 62)	—	R
40008	GROSS WEIGHT H	—	R
40009	GROSS WEIGHT L	—	R
40010	NET WEIGHT H	—	R
40011	NET WEIGHT L	—	R
40012	PEAK WEIGHT H	—	RR
40013	PEAK WEIGHT L	—	R
40014	Divisions and Units of measure (Table 3-46 on page 63)	—	R
40015	Coefficient H	—	R
40016	Coefficient L	—	R
40017	Setpoint 1 H	Only after command ‘9’’ of the COMMAND REGISTER	R/W
40018	Setpoint 1 L		R/W
40019	Setpoint 2 H		R/W
40020	Setpoint 2 L		R/W
40021	Setpoint 3 H		R/W
40022	Setpoint 3 L		R/W
40023	Hysteresis 1 H		R/W
40024	Hysteresis 1 L		R/W
40025	Hysteresis 2 H	R/W	—
40026	Hysteresis 2 L	R/W	—
40027	Hysteresis 3 H	R/W	—
40028	Hysteresis 3 L	R/W	—
40029	Inputs (Table 3-45 on page 62)	—	R
40030	Outputs (Table 3-45 on page 62)	NO	R/W
40037	Test weight for calibration H	Use with command 101 of the COMMAND REGISTER	R/W
40038	Test weight for calibration L		R/W
40043	Weight value corresponding to ZERO of the analog output H	Ony after command 99 of the Command Register. (Analog Models Only)	R/W
40044	Weight value corresponding to ZERO of the analog output L		R/W
40045	Weight value corresponding to Full Scale of the analog output H		R/W
40046	Weight value corresponding to Full Scale of the analog output L		R/W

Table 3-43. Usable Registers (Modbus-RTU)

IMPORTANT: At the time of writing, the setpoint, hysteresis values are saved to the RAM and will be lost upon the next power off; to store them permanently to the EEPROM so that they are maintained at power-on, the 99command of the command register must be sent.

Weight (Span) Calibration Commands (With Test Weights)

The instrument calibration can be changed via Modbus. To perform this procedure, the system must be unloaded and the weight value display reset to zero with the command 100 of the Command Register. A load must then be placed on the system and the correct weight value must be sent to the registers 40037-40038. To save this value, send the control 101 from the command register. If the operation is completed successfully, the two test weight registers are set to zero.

Analog Output Setting (Analog Models Only)

NOTE: This feature is only available on SCT-40AN models with pin 37 and 38 marked for analog.

Write the weight in the registers 40045 (Weight value corresponding to the Full Scale of analog output H) and 40046 (Weight value corresponding to the Full Scale of analog output L), or write the weight in the registers 40043 (Weight value corresponding to the ZERO of the analog output H) and 40044 (Weight value corresponding to the ZERO of the analog output L). After writing the value, send the command 99 from the command register to save it to EEPROM memory.

Status Register (40007)			
Bit No.	**Description**	**Bit No.**	**Description**
Bit 0	Cell Error	Bit 8	Net weight negative sign
Bit 1	AD Converter Malfunction	Bit 9	Peak weight negative sign
Bit 2	Maximum weight exceeded by 9 divisions	Bit 10	Net display mode
Bit 3	Gross weight higher than 110% of full scale	Bit 11	Weight stability
Bit 4	Gross weight beyond 999999 or less than -999999	Bit 12	Weight within +/-¼ of a division around ZERO
Bit 5	Net weight beyond 999999 or less than -999999	Bit 13	—
Bit 6	—	Bit 14	—
Bit 7	Gross weight negative sign	Bit 15	—

Table 3-44. Status Register (40007) (Analog Model)

Inputs REGISTER (40029) (Read Only)	
Bit No.	**Description**
Bit 0	Input 1 Status
Bit 1	Input 2 Status
Bit 2	—
Bit 3	—
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—
Bit 8	—
Bit 9	—
Bit 10	—
Bit 11	—
Bit 12	—
Bit 13	—
Bit 14	—
Bit 15	—

Outputs REGISTER (40030) (Read and Write)	
Bit No.	**Description**
Bit 0	Output 1 Status
Bit 1	Output 2 Status
Bit 2	Output 3 Status
Bit 3	—
Bit 4	—
Bit 5	—
Bit 6	—
Bit 7	—
Bit 8	—
Bit 9	—
Bit 10	—
Bit 11	—
Bit 12	—
Bit 13	—
Bit 14	—
Bit 15	—

Table 3-45. Input and Output Registers (Analog Model)

NOTE: The output status can be read at any time but can be set (written) only if the output has been set as nOdbUS or dEUnEt (Section 2.7 on page 29); otherwise, the outputs will be managed according to the current weight status with respect to the relevant setpoints.

Divisions and Units of Measure Registry (40014)

This register contains the current setting of the divisions parameter (dIU S) and of the units of measure parameter (Unit).

Use this register together with the CoEFF registers to calculate the value displayed by the instrument.

Least significant byte L Byte (Division)			Most significant byte H Byte (Units of Measure)		
Division value	Divisor	Decimals	Units of measure value	Units of measure description	Utilization of the Coefficient value with the different units of measure settings compared to the gross weight detected
0	100	0	0	Kilograms	Does not intervene
1	50	0	1	Grams	Does not intervene
2	20	0	2	Tons	Does not intervene
3	10	0	3	Pounds	Does not intervene
4	5	0	4	Newton	Multiples
5	2	0	5	Liters	Divides
6	1	0	6	Bar	Multiples
7	0.5	1	7	Atmospheres	Multiples
8	0.2	1	8	Pieces	Divides
9	0.1	1	9	Newton Meter	Multiples
10	0.05	2	10	Kilogram Meter	Multiples
11	0.02	2	11	Other	Multiples
12	0.01	2			
13	0.005	3			
14	0.002	3			
15	0.001	3			
16	0.0005	4			
17	0.0002	4			
18	0.0001	4			

Table 3-46. Divisions and Units of Measure (Analog Model)

Command Register

Possible commands to send to command register (40006).

Code	Description
0	No command
1	—
2	—
3	—
4	—
5	—
6	—
7	NET display
8	SEMI-AUTOMATIC ZERO
9	GROSS display
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	Reserved

Code	Description
15	Reserved
16	Reserved
17	Reserved
18	Reserved
19	—
20	—
21	Keypad lock
22	Keypad and display unlock
23	Keypad and display lock
24	—
99	Save data in EEPROM
100	Zero setting for calibration
101	Test weight storage for calibration
—	—
9999	Reset (reserved)

Table 3-47. Commands to Command Register (Analog Model)

3.15 ASCII Bidirectional Protocol

NOTE: All the sample commands use address 1. If a different address is used, it needs a different Check-Sum calculated.

The instrument replies to the requests sent from a PC/PLC.

It is possible to set a delay time for the instrument before it transmits a response. See Section 2.5 on page 25.

The following communication modes are available. See Section 2.5 on page 25.

nOd t

nOd td

3.15.1 Data Identifiers

Data Sent	Definition
$	Beginning of a request string (36 ASCII)
& o &&	Beginning of a response string (38 ASCII)
aa	2 characters for instrument address (48 ÷ 57 ASCII)
!	1 character to indicate the correct reception(33 ASCII
?	1 character to indicate a reception error (63 ASCII)
#	1 character to indicate an error in the command execution (23 ASCII)
ckck	2 ASCII characters for Check-Sum. Section 3.15.14 on page 68)
CR	1 character for string end (13 ASCII)
\	1 character for separation (92 ASCII)

Table 3-48. Data Identifiers (ASCII)

3.15.2 Setpoint Values Setting

The PC transmits: **$aaxxxxxxyckckCR** in which:

Data	Definition
xxxxxx	6 characters for the setpoint value (48 ? 57 ASCII)
y	A (set the value in the Setpoint 1)*$01010000A40CR*
y	B (set the value in the Setpoint 2)*$01010000B42CR*
y	C (set the value in the Setpoint 3)*$01010000C43CR*

Table 3-49. Setpoint Value Definitions (ASCII)

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

Setpoints Storage Into EEPROM Memory:

The setpoints value relevant to the two setpoints programmed via the PC are stored to the RAM volatile memory and lost upon instrument power off. It is necessary to send a special command to save them permanently in the EEPROM memory. Please note that the number of writes allowed in the EEPROM memory is limited (about 100000).

The PC transmits: **$aaMEMckckCR*$01MEM44CR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.3 Reading Weight, the Setpoint and the Peak (If Present) from the PC

The PC transmits: **$aajckckCR**

Data	Definitions
j	a to read setpoint 1 *$01a60CR*
j	b to read setpoint 2 *$01b63CR*
j	c to read setpoint 3 *$01c62CR*
j	t to read gross weight *$01t75CR*
j	n to read net weight *$01n6FCR*
j	p to read the gross weight peak if the ASCII parameter is set as NOdU60; if the ASCII parameter is set on NOd td the gross weight will be read.

Table 3-50. Weight, Setpoint, Peak Definitions

To read the points, set the FS_LED equal to 50000. $01p71CR

Possible instrument responses:

- Correct reception: **&aaxxxxxxj\ckckCR;** in which **xxxxxx** = 6 value characters of the required weight
- Incorrect reception: **&&aa?\ckckCR**
- If the peak is not configured: **&aa#CR**

NOTE: In the event of negative weight, the first character on the left acquires the value « - » (minus sign - ASCII 45).

In the event the weight value is under -99999, the minus sign ('-') is sent alternated with the most significant figure.

3.15.4 Error Messages

In the event of an instrument alarm for exceeding 110% of the full scale or nine divisions above the value of the parameter MASS, the instrument sends the string **&aassO-Lst\ckck;** in which: s = 1 separator character (32 ASCII – space-).

In the event of a faulty connection of the load cells or other alarm, the instrument sends **&aassO-Fst\ckck;** in which: **s** = 1 separator character (32 ASCII – space-).

See Section 3.6 on page 37 for more information on alarms.

3.15.5 Semi-Automatic Zero

Weight Zero Setting For Small Variations

IMPORTANT: The zero setting will not be maintained after an instrument power-off.

The PC transmits: **$aaZEROckckCR*$01ZERO03CR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**
- The current weight is over the maximum value resettable: **&aa#CR**

3.15.6 Switching From Gross Weight To Net Weight

The PC transmits: **$aaNETckckCR*$01NET5ECR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.7 Switching From Net Weight To Gross Weight

The PC transmits: **$aaGROSSckckCR*$01GROSS5BCR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.8 Reading Of Decimals And Number Of Divisions

The PC transmits: **$aaDckckCR*$01D45CR***

Possible instrument responses:

- Correct reception: **&aaxy\ckckCR**

Response Value	Definition
x	number of decimals
y	division value
The y field acquires the following values	
3	for division value = 1
4	for division value = 2
5	for division value = 5
6	for division value = 10
7	for division value = 20
8	for division value = 50
9	for division value = 100

Table 3-51. Decimal and Division Definitions

- Incorrect reception: **&&aa?\ckckCR**

3.15.9 Tare Weight Zero Setting

The PC transmit the following ASCII string containing the zeroing command:

- **$aazckckCR*$01z7BCR***; in which: **z** = weight zeroing command (122 ASCII)

Possible instrument responses:

- Correct reception: **&aaxxxxxxt\ckckCR**

Data	Definition
xxxxxx	6 characters for the required weight value.
t	weight identification code (116 ASCII).

Table 3-52. Zeroing Command String Definition

- Incorrect reception: **&&aa?\ckckCR**
- If the instrument is not in gross weight displaying condition, the response is: **&aa#CR**

Example: Weight zero setting for instrument with address 2:

For the calibration, make sure that the scale is empty and the instrument measures a corresponding mV signal.

query: **$02z78(Cr)** response: **&02000000t\76(Cr)**

For a correct weight zero setting the read value (response) must be 0 (in the string 000000).

IMPORTANT: The zero values are stored to the EEPROM memory. Please note that the number of writes allowed is limited (about 100000). If it is necessary to reset the weight quite often, it is recommended to perform it by PC or PLC program, keeping in mind the weight deviation respect to the zero instrument.

3.15.10 Weight (Span) Calibration (With Test Weights)

After having performed the Tare Weight Zero Setting, this function allows correct calibration to be done using test weights of known value and, if necessary, any deviations of the indicated value from the known value will be corrected.

Load the test weight onto the scale using as high a percentage of the maximum quantity to be weighed as possible. Otherwise make sure that the instrument measures a corresponding mV signal.

The PC sends the following ASCII string containing the calibration command:

$aasxxxxxxckckCR in which:

Data	Definition
s	calibration command (115 ASCII)
xxxxxx	6 characters for test weight value.

Table 3-53. Calibration Command String Definitions

Possible instrument responses:

- Correct reception: **&aaxxxxxxt\ckckCR**

Data	Definition
t	gross weight identification code (116 ASCII).
xxxxxx	6 characters to indicate the current weight value.

Table 3-54. Calibration Response Definitions

- Incorrect reception or full scale equal to zero: **&&aa?\ckckCR**

For correct calibration, the read value must be equal to test weight.

Example: Calibration for instrument with address 1 and test weight of 20000 kg:

query: **$01s02000070(Cr)** response: **&01020000t\77(Cr)**

For correct calibration the read value will be 020000.

3.15.11 Keypad Lock (Access Protection To The Instrument)

The PC transmits: **$aaKEYckckCR*$01KEY56CR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.12 Keypad Unlock

The PC transmits: **$aaFREckckCR*$01FRE50CR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.13 Display And Keypad Lock

The PC transmits: **$aaKDISckckCR*$01KDIS14CR***

Possible instrument responses:

- Correct reception: **&&aa!\ckckCR**
- Incorrect reception: **&&aa?\ckckCR**

3.15.14 Check-Sum Calculation

The two ASCII control characters **(ckck)** are the representation of a hexadecimal digit in ASCII characters. The check digit is calculated by performing the operation XOR (exclusive or) 8-bit ASCII codes of the only part of the underlined string.

The procedure to calculate the check-sum is the following:

- Consider only the string characters highlighted with underlining.
- Calculate the EXCLUSIVE OR (XOR) of the ASCII codes for the characters.

Example:

Character	Decimal ASCII Code	Hexadecimal ASCII Code	Binary ASCII Code
0	48	30	00110000
1	49	31	00110001
t	116	74	01110100
XOR =	117	75	01110101

Table 3-55. Example Check Sum Calculation (ASCII)

The result of the XOR operation expressed in hexadecimal notation is made up of 2 hexadecimal digits (numbers from 0 to 9 or letters from A to F). In this case the hexadecimal code is 0x75.

The check-sum inserted in the strings transmitted is made up of the 2 characters which represent the result of the XOR operation in hexadecimal notation (in this example the character 7 and the character 5.

3.16 Fast Continuous Transmission Protocol

This protocol allows for continuous serial output at high update frequencies. Up to 300 strings per second are transmitted (with a minimum transmission rate of 38400 baud). See Section 2.7 on page 29 for limitations.

The communication modes available are (Section 2.5 on page 25):

- nOd t: communication compatible with TX RS-485 instruments.?
- nOd td: communication compatible with TD RS-485 instruments.?

If nOd t is set, the following string is transmitted to PC/PLC: **xxxxxxCRLF.**:

String Character	Definition
xxxxxx	6 ASCII characters for gross weight (48 ÷ 57 ASCII)
CR	1 character of carriage return (13 ASCII)
LF	1 character of line feed (10 ASCII)

Table 3-56. nOdt Communication String Definitions

In the event of negative weight, the first character on the left acquires the value « - » (minus sign - ASCII 45).

In the event of error or alarm, the 6 weight characters are replaced by the messages found in Table 3-2 on page 38.

If nOd td is set, the following string is transmitted to PC/PLC: **&TzzzzzzPzzzzzz\ckckCR**

Data	Definition
&	1 character of string start (38 ASCII).
T	reference character for gross weight.
P	reference character for gross weight.
zzzzzz	6 ASCII characters for gross weight (48 ? 57 ASCII).
\	1 character of separation (92 ASCII).
ckck	2 ASCII control characters calculated considering that the characters between & and \ are excluded. The control value is obtained by carrying out the XOR (or exclusive) operation for the 8 bit ASCII codes of the characters considered. A character expressed in hexadecimal is thus obtained, with 2 digits which may acquire values from 0 to 9 and from A to F. ckck is the ASCII code of the two hexadecimal digits.
CR	1 character for string end (13 ASCII).

Table 3-57. nOdtd Communication String Definitions

In the event of negative weight, the first character on the left acquires the value « - » (minus sign - ASCII 45).

In the event of error or alarm, the 6 gross weight characters are replaced by messages. See Table 3-1 on page 37.

Fast Transmission Via External Contact: A single string can be transmitted by closing a digital input, not exceeding 1 sec. See Section 2.5 on page 25 and Section 2.7 on page 29.

3.17 Continuous Transmission Protocol

Using this protocol, the instrument transmits, in continuous mode, the weight to remote displays; the communication string is transmitted 10 times per second. The communication modes available are (Section 2.5 on page 25):

- rL P: remote display shows the net or gross weight, depending on the remote display setting.
- HdrL P: remote display shows the net or gross weight, depending on the remote display setting.
- HdrL Pn:

The instrument sends the following string to the remote display:

- **&NxxxxxxLyyyyyy\ckckCR**

Data	Definition
&	1 character of string start (38 ASCII)
N	1 reference character for net weight. (78 ASCII)
xxxxxx	6 ASCII characters for net or peak weight if present (48 ÷ 57 ASCII)
L	1 reference character for gross weight (76 ASCII)
yyyyyy	6 ASCII characters for gross weight (48 ? 57 ASCII).
\	1 character for separation (92 ASCII)
ckck	2 ASCII control characters calculated considering that the characters between ***&*** and \ are excluded The control value is obtained by carrying out the XOR (or exclusive) operation for the 8 bit ASCII codes of the characters considered. character expressed in hexadecimal is thus obtained, with 2 digits which may acquire values from ***0*** to ***9*** and from ***A*** to ***F***. ***ckck*** is the ASCII code of the two hexadecimal digits.
CR	character for string end (13 ASCII).

Table 3-58. Continuous Transmission Protocol Data Definitions

In the event of negative weight, the first character on the left acquires the value « - » (minus sign - ASCII 45).

If the protocol on HdrL P has been set, the decimal point at the position shown on the instrument's display can also be transmitted. In this case, if the value exceeds five digits, only the five most significant digits are transmitted, while if the value is negative, no more than the 4 most significant digits are transmitted. In both cases, however, the decimal point shifts consistently with the value to display.

If HdrL Pn has been set, in addition to what is stated in HdrL P protocol, the instrument transmits the prompt net every four seconds in the gross weight field, when the instrument is in net mode. See Section 3.2 on page 36.

In case weight value is under -99999, the minus sign (-) is sent alternated with the most significant figure.

In the event of an error or alarm, the six characters of the gross and net weight are replaced by the messages found in Table 3-1 on page 37.

3.18 Interface to Remote Display

Remote Display (Laser Light)

1. Press and hold ↵, then press ✕. CALIb is displayed.
2. Press ◀ or ▲ until SErIAL is displayed.
3. Press ↵. rS485 is displayed.
4. Press ↵. nOnE is displayed.
5. Press ◀ or ▲ until rIP is displayed. Press ↵.
6. Press ✕ twice to exit set-up menu.

Laser Light			SCT
E CHAR = CR LWPOS = 7 LENGTH = 19	Connector	Pin	Connector
	J8 (RS-232)	\3	RS-485 RX-
		5	RS-485 RX+

Table 3-59. Laser Light Setup

3.19 Communication Examples

The numerical data below is expressed in hexadecimal notation with the prefix h.

Example 1: Command for multiple writing of registers (hexadecimal command 16, h10)

Assuming that we wish to write the value 0 to the register 40017 and the value 2000 to the register 40018, the string to generate must be:

h01 h10 h00 h10 h00 h02 h04 h00 h00 h07 hD0 hF1 h0F

The instrument will respond with the string:

h01 h10 h00 h10 h00 h02 h40 h0D

Query Field Name	Hex
Instrument Address	h01
Function	h10
Address of the first register H	h00
Address of the first register L	h10
Number of registers to send H	h00
Number of registers to send L	h02
Byte Count	h04
Datum 1 H	h00
Datum 1 L	h00
Datum 2 H	h07
Datum 2 L	hD0
CRC16 H	hF1
CRC16 L	h0F

Response Field Name	Hex
Instrument Address	h01
Function	h10
Address of the first register H	h00
Address of the first register L	h10
Number of registers H	h00
Number of registers L	h02
CRC16 H	h40
CRC16 L	h0D

Table 3-60. Communication Example 1

Example 2: Command for multiple writing of registers (hexadecimal command 16, h10).

Assuming that we wish to write the two setpoint values on the instrument, at 2000 and 3000 respectively, the string must be sent:

h01 h10 h00 h10 h00 h04 h08 h00 h00 h07 hD0 h00 h00 h0B hB8

hB0 hA2

The instrument will respond with the string:

h01 h10 h00 h10 h00 h04 hC0 h0F

Query Field Name	Hex
Instrument Address	h01
Function	h10
Address of the first register H	h00
Address of the first register L	h10
Number of registers to send H	h00
Number of registers to send L	h04
Byte Count	h08
Datum 1 H	h00
Datum 1 L	h00
Datum 2 H	h07
Datum 2 L	hD0
Datum 3 H	h00
Datum 3 L	h00
Datum 4 H	h0B
Datum 4 L	hB8
CRC16 H	hB0
CRC16 L	hA2

Response Field Name	Hex
Instrument Address	h01
Function	h10
Address of the first register H	h00
Address of the first register L	h10
Number of registers H	h00
Number of registers L	h04
CRC16 H	hC0
CRC16 L	h0F

Table 3-61. Communication Example 2

Example 3: Multiple command reading for registers (hexadecimal command 3, h03).

Assuming that we wish to read the two gross weight values (in the example 4000) and net weight values (in the example 3000), reading from address 40008 to address 40011 must be performed by sending the following string:

H01 h03 h00 h07 h00 h04 hF5 hC8

The instrument will respond with the string:

H01 h03 h08 h00 h00 hF hA0 h00 h00 h0B hB8 h12 h73

Query Field Name	Hex
Instrument Address	h01
Function	h03
Instrument Address	h01
Function	h03
Address of the first register H	h00
Address of the first register L	h07
Number of registers to send H	h00
Number of registers to send L	h04
CRC16 H	hF5
CRC16 L	hC8

Response Field Name	Hex
Instrument Address	h01
Function	h03
Instrument Address	h01
Function	h03
Address of the first register H	h08
Address of the first register L	h00
Datum 1 H	h00
Datum 1 L	h00
Datum 2 H	h0F
Datum 2 L	hA0
Datum 3 H	h00
Datum 3 L	h00
Datum 4 H	h0B
Datum 4 L	hB0
CRC16 H	h12
CRC16 L	h73

Table 3-62. Communication Example 3

For additional examples regarding the generation of correct control characters (CRC16) refer to the manual **Modicon PI-MBUS-300.**

4.0 Compliance

EU DECLARATION OF CONFORMITY

EU-KONFORMITÄTSERKLÄRUNG
DÉCLARATION UE DE CONFORMITÉ

Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, Wisconsin 54868
United States of America

Type/Typ/Type: SCT-10, SCT-20, SCT-30, SCT-40

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
2014/35/EU low voltage	-	EN 61010-1:2010 for 230/115 VAC type
2014/30/EU EMC	-	EN 55011:2016+A1+A11:2020 EN 61000-6-2:2019 EN 61000-6-4:2019 EN 61000-4-2:2009 EN 61000-4-3:2006+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014+A1:2017 EN 61000-4-6:2014
2011/65/EU RoHS	-	EN 50581:2012

Signature: Brandi Harder
Name: Brandi Harder
Title: Quality Manager

Place: Rice Lake, WI USA
Date: February 4, 2022

UKCA

UK DECLARATION OF CONFORMITY

Rice Lake Weighing Systems
230 West Coleman Street
Rice Lake, Wisconsin 54868
United States of America

RICE LAKE WEIGHING SYSTEMS

Type: SCT-10, SCT-20, SCT-30, SCT-40

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).

UK Regulations	Certificates	Standards Used / Approved Body Involvement
2016/1101 Low Voltage	-	EN 61010-1:2010 for 230/115 VAC type
2016/1091 EMC	-	EN 55011:2016+A1+A11:2020 EN 61000-6-2:2019 EN 61000-6-4:2019 EN 61000-4-2:2009 EN 61000-4-3:2006+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014+A1:2017 EN 61000-4-6:2014
2012/3032 RoHS	-	EN 50581:2012

Signature: Brandi Harder

Name: Brandi Harder

Title: Quality Manager

Place: Rice Lake, WI USA

Date: February 4, 2022

5.0 Specifications

Power
Input: 12 to 24 VDC

Power Consumption
5W

Excitation Voltage
5 VDC, 240 mA, 16 x 350 ohm load cells

Analog Signal Input Range
+/-39 mV

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

A/D Sample Rate
600 Hz

Resolution
Internal:16,000,000 counts
Display: 999,999

System Linearity
± 0.01% full scale

Digital I/O
3 inputs 5 to 24 VDC, 5 outputs, 115 VAC/150 mA

Communication Ports
RS-232 transmit only, or RS-485 half duplex
Supports up to 115,200 bps

Analog Output (SCT-40AN only)
Opto isolated, 16 bit
0-20 mA, 4-20 mA (max 300 ohm)
0-10 VDC, 0-5 VDC (min 10,000 ohm)

Display
Backlit graphic LCD, transmissive
128 × 64 pixel resolution, 60 x 32 mm visible area

Keys/Buttons
Five-key tactile keypad
Test, Zero, Tare, Print Menu, Escape, Left and Up, Navigator, Enter

Dimensions
(L × W × H)
5.82 × 3.62 × 2.36 in
(148 × 92 × 60 mm)

Temperature & Humidity
Operating: -4 °F to 140 °F (-20 °C to 60 °C)
Humidity: 85% non-condensing

Rating/Material
DIN rail mount: NEMA Type 1

Weight
1 lb (0.5 kg)

Warranty
One-year limited

Certifications and Approvals

UL Recognized

5.1 FCC Compliance

United States

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

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

RICE LAKE®
WEIGHING SYSTEMS

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