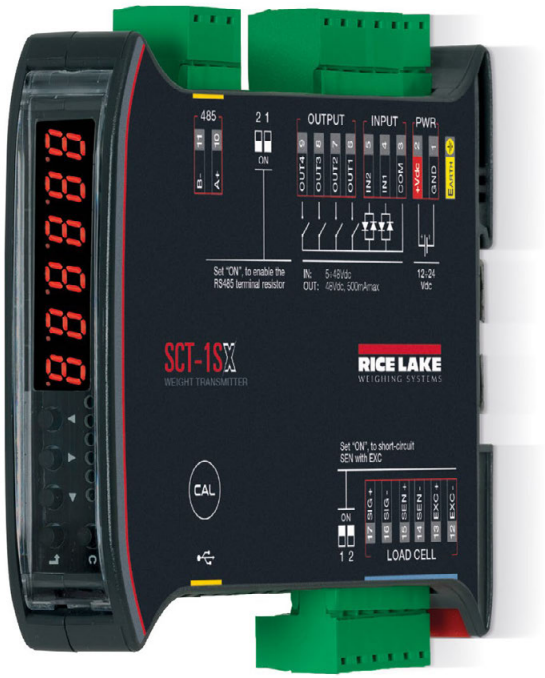
SCT-1SX-AN

Firmware version 01.21.01

Modbus Protocol



RICE LAKE®
WEIGHING SYSTEMS

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www.ricelake.com

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Introduction

Thank you for purchasing this product.

This manual contains modbus information for the following SCT-1SX digital weight transmitters:

- SCT-1SX-AN

It is recommended that you carefully follow the instructions for programming the weight transmitter; performing actions not indicated in this manual could compromise the functionality of the scale.

Manuals are available from Rice Lake Weighing Systems at www.ricelake.com/manuals
Warranty information is available at www.ricelake.com/warranties

Any problem with the product must be reported to the manufacturer or to the retailer where it was purchased.
Always TURN OFF THE POWER SUPPLY prior to installation or repair action.

Modbus Functions

Function	Description
01 (0x01)	Coil reading
03 (0x03)	Holding data Area registers reading
04 (0x04)	Input Area registers reading
05 (0x05)	Single coil writing
06 (0x06)	Single register writing
15 (0x0F)	Several coils writing
16 (0x10)	Several registers writing

Functions 01, 03, 04 - Coil / Register Reading

Query:	Add	01 / 03 / 04	00	00	00	02	CRC / LRC
	Modbus address	Function	Starting address 00 = 30001 (input) 40001 (holding) 1 (coil)		Number of registers to read		Error control (2 bytes)

Response:	Add	01 / 03 / 04	04	xx	xx	xx	xx	CRC / LRC
	Modbus address	Function	No. of Bytes	Data value				Error control (2 bytes)

Functions 05, 06 - Single Coil / Single Register Writing

Query:	Add	05 / 06	00	00	xx	xx	CRC / LRC
	Modbus address	Function	Register address 00 = 40001 (holding) 1 (coil)		Value to write		Error control (2 bytes)

Response:	Add	05 / 06	04	00	xx	xx	CRC / LRC
	Modbus address	Function	Register address		Written value		Error control (2 bytes)

Functions 15, 16 - Several Coils / Registers Writing

Query:	Add	0F / 10	00	00	00	02	04	xx	xx	xx	xx	CRC / LRC
	Modbus address	Function	Starting address 00 = 30001 (input) 40001 (holding) 1 (coil)		Number of registers / coils to write		No. of bytes to write	Value to write in the first register		Value to write in the second register		Error control (2 bytes)

Response:	Add	0F / 10	00	00	00	02	CRC / LRC
	Modbus address	Function	Starting address		Number of registers / coils modified		Error control (2 bytes)

Error Control

CYCLICAL REDUNDANCY CHECK (CRC)

In RTU transmission mode the messages include an error control field based on a CRC method, calculated as follows:

1. Load the value 0xFFFF into a 16bit register (called CRC).
2. Perform the exclusive OR operation between the first byte of the message and the least significant byte of the CRC register.
3. Shift the CRC register one position to the right, a 0 is entered in place of the MSB. The LSB is extracted and examined.
4. If LSB = 0 ➜ repeat point 3.
   If LSB = 1 ➜ Perform the exclusive OR operation between the CRC register and the value 0xA001.
5. Repeat steps 3 and 4 until 8 shifts have been performed.
6. Repeat steps 2 to 5 for the next byte of the message.
7. The least significant byte must be transmitted first, followed by the most significant byte.

LONGITUDINAL REDUNDANCY CHECK (LRC)

In ASCII transmission mode the messages include an error control field based on a LRC method, calculated as follows:

1. Add together all the bytes of the message, excluding the first character (: or ;) and the final CRLF, within an 8-bit field. In this way the carryovers are discarded.
2. Subtract the value obtained from 0xFF, thus obtaining the complement to 1.
3. Add 1 to obtain the complement to 2.
4. The most significant byte must be transmitted first, followed by the least significant byte.

Communication Speed

The reading frequency depends on the number and which registers are being interrogated. The standard frequency is 25-30 Hz.
A read frequency of **110 Hz** can be achieved by reading only these registers in a single frame:

30001	Gross weight
30002	
30003	Net weight
30004	
30005	Input status register

or

40001	Gross weight
40002	
40003	Net weight
40004	
40005	Input status register

Examples

READING OF REGISTER 30005 (INPUT STATUS REGISTER)

Query:	A	04	00	04	00	01	CRC / LRC
	Modbus address	Function	Starting address (30005)		Number of registers to read		Error control (2 bytes)

Response:	01	04	02	xx	xx	CRC / LRC	
	Modbus address	Function	No. of Bytes	Data value		Error control (2 bytes)	

READING OF REGISTERS 30001, 30002 (GROSS WEIGHT)

Query:	A	04	00	00	00	02	CRC / LRC
	Modbus address	Function	Starting address (30001)		Number of registers to read		Error control (2 bytes)

Response:	01	04	04	xx	xx	xx	xx	CRC / LRC
	Modbus address	Function	No. of Bytes	Data value				Error control (2 bytes)

WRITING OF REGISTERS 40001, 40002, 40003 (SEND MANUAL TARE COMMAND WITH VALUE 1000 kg)

Query:	A	10	00	00	00	03	06	00	03	00	00	03	E8	CRC / LRC
	Modbus address	Function	Starting address (40001)		Number of registers / coils to write		No. of bytes to write	Manual tare command		Parameter 1 0x03E8 = 1000				Error control (2 bytes)

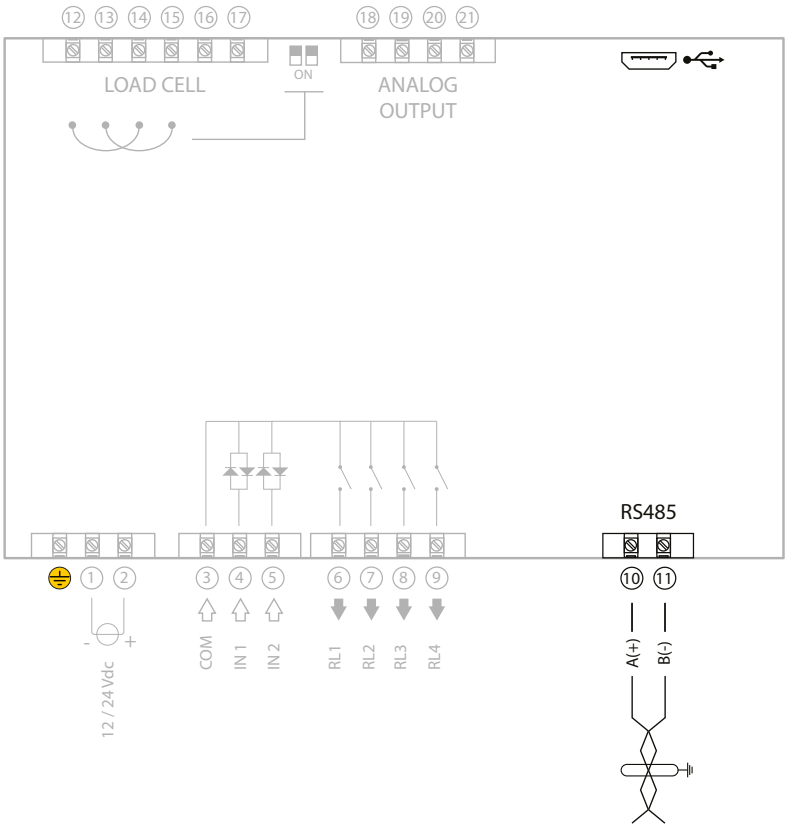
Response:	01	10	00	00	00	03	CRC / LRC
	Modbus address	Function	Starting address		Number of registers modified		Error control (2 bytes)

WRITING OF REGISTER 40001 (SEND ZERO COMMAND)

Query:	Add	06	00	00	00	01	CRC / LRC
	Modbus address	Function	Register address (40001)		Zero command (01)		Error control (2 bytes)

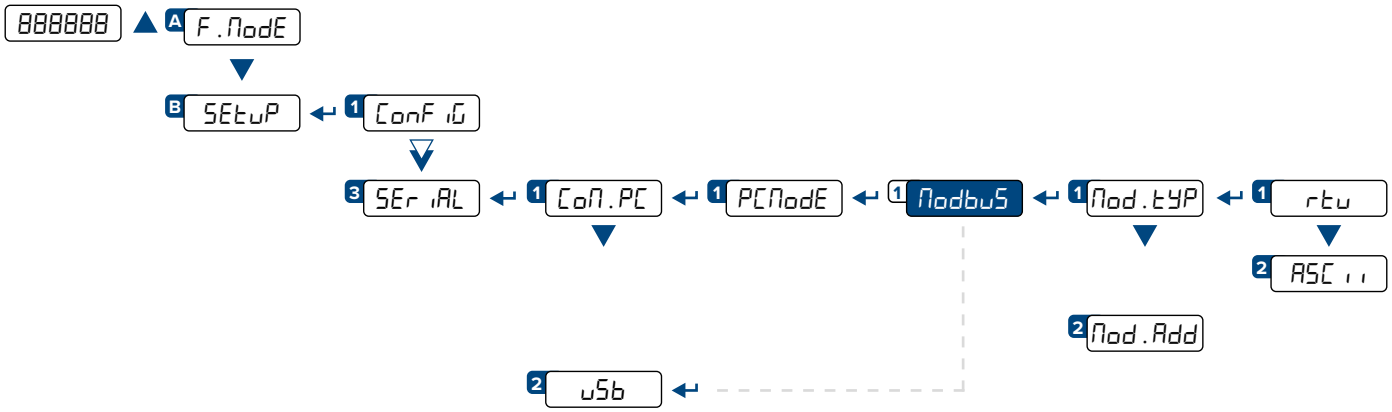
Response:	Add	06	00	00	00	01	CRC / LRC
	Modbus address	Function	Register address		Value written		Error control (2 bytes)

SCT-1SX-AN



The connection is made via the **RS485 or USB** port on the instrument.

Selection of Modbus Protocol



1. Select the *ModbuS* transmission mode in the parameter *PC.ModE* / *u5b*.

2. Select the type of transmission *ASC ii* / *rtu* in the parameter *Mod.tYP*.

3. Set the modbus address (0 - 98) of the transmitter in the parameter *Mod.Add*.

Data Reading (Input Area)

- The available data are divided into registers.
- Each register consists of 2 Bytes.

Register	Name
30001	Gross weight.
30002	
30003	Net weight.
30004	
30005	Input register (see Table 1 on page 12).
30006	Command register (see Table 3 on page 13).
30007	Output register (see Table 2 on page 12).

...

30101	Firmware release.
30102	
30103	ADC points.
30104	
30111	µV.
30115	Analog output current value (DAC).
30116	Calibration (see page 28)
30117	Analog output current value (V, 1 decimal).
30118	Analog output current value (mA, 1 decimal).
30120	Type approval status (0 = internal use / 1 = restricted).
30122	Serial number.
30123	
30128	Pre-calibration status (0 = not pre-calibrated / 1 = pre-calibrated).
30129	Setup size (in bytes)
30132	Firmware name (characters 1,2).
30133	Firmware name (characters 3,4).
30134	Firmware name (characters 5,6).
30135	Firmware name (characters 7,8).
30136	Current zero value.
30137	
30144	Indicator status (see Table 6 on page 14)
30145	Theoretical ADC points per mV/V
30146	

Table 1 - **Input Register**

Bit	Description	Bit meaning	
		0	1
15	Not used.		
14			
13			
12	Endian.	Big Endian	Little Endian
11	Not used.		
10			
9	Input 2.	Deactivated	Activated
8	Input 1.	Deactivated	Activated
7	Gross weight = 0.	No	Yes
6	Manual Tare condition.	No	Yes
5	Tare condition entered.	No	Yes
4	Overload condition.	No	Yes
3	Underload condition.	No	Yes
2	Weight stability.	No	Yes
1	Gross weight polarity.	+	-
0	Net weight polarity.	+	-

Table 2 - **Output Register**

Bit	Description	Bit meaning	
		0	1
15	Not used.		
14	Decimals.	00 = 0	01 = 1
13		10 = 2	11 = 3
12	Not used.		
11			
10			
9			
8	Cell error.	No	Yes
7	Unit of measure.	00 = g	01 = kg
6		10 = t	11 = lb
5	Not used.		
4			
3	Relay 4.	Not energized	Energized
2	Relay 3.	Not energized	Energized
1	Relay 2.	Not energized	Energized
0	Relay 1.	Not energized	Energized

Table 3 - **Command Register**

Bit	Description	Bit meaning
15	Last command received.	
14		
13		
12		
11		
10		
9		
8		
7	Result of last command received:	0 = Command correct and executed. 1 = Incorrect command. 2 = Incorrect command data. 3 = Command not allowed. 4 = Command non-existent.
6		
5		
4		
3	Processed command count.	Value in module 16.
2		
1		
0		

Table 4 - **Alibi Register**

Bit	Description	Bit meaning	
		0	1
15	Not used.		
14			
13			
12			
11	Type of tare.	Semi-automatic	Manual
10	Not used.		
9			
8			
7	Number of rewrites.	From 0 to 255 rewrites.	
6			
5			
4			
3			
2			
1			
0			

Table 5 - **Output Functions**

0 = No function.
1 = Setpoint on gross weight.
2 = Setpoint on net weight.
4 = Gross weight on zero.
5 = Net weight on zero.
6 = Weight in motion.
23 = PRINT key pressed.
25 = MODE key pressed.
26 = Key C pressed.
27 = ZERO key pressed.
28 = TARE key pressed.
29 = Error.
30= Setpoint on net weight if a tare is set.

Table 6 - **Indicator Status**

0 = Weighing
1 = Numeric entering
2 = Setup
3 = Boot
4 = TxRx Setup
5 = Serial test
6 = Print test
7 = Firmware update
8 = Stand-by
9 = Auto-zero
10 = Change channel
11 = Digital input test
12 = Exclude scheduler
13 = Warm-up

i Values in grey rows can be ignored.

Coil Data Area

Read and write data area, consisting of 6 coils of 1 bit each.

Register	Name	Bit meaning	
		0	1
1	Digital output 1.	Output not active.	Output active.
2	Digital output 2.	Output not active.	Output active.
3	Digital output 3.	Output not active.	Output active.
4	Digital output 4.	Output not active.	Output active.

Reading and Writing Data (Holding Data Area)

Register	Name
40001	Gross weight.
40002	
40003	Net weight.
40004	
40005	Input Register (see Table 1 on page 12).
40006	Command Register (see Table 3 on page 13).
40007	Output Register (see Table 2 on page 12).

Weights and Setpoints

Register	Name
40101	Gross weight.
40102	
40103	Net weight.
40104	
40105	Tare.
40106	
40107	Input Register (see Table 1 on page 12).
40108	Output Register (see Table 2 on page 12).
40109	Setpoint 1 ON temporary.
40110	
40111	Setpoint 2 ON temporary.
40112	
40113	Setpoint 3 ON temporary.
40114	
40115	Setpoint 4 ON temporary.
40116	
40121	Setpoint 1 OFF temporary.
40122	
40123	Setpoint 2 OFF temporary.
40124	

Register	Name
40133	Setpoint 1 ON permanent.
40134	
40135	Setpoint 2 ON permanent.
40136	
40137	Setpoint 3 ON permanent.
40138	
40139	Setpoint 4 ON permanent.
40140	
40145	Setpoint 1 OFF permanent.
40146	
40147	Setpoint 2 OFF permanent.
40148	
40149	Setpoint 3 OFF permanent.
40150	
40151	Setpoint 4 OFF permanent.
40152	

Commands

Register	Name
40231	Command Register (see Table 3 on page 13).
40232	Command (see list of commands on page 27).
40233	Parameter 1.
40234	
40235	Parameter 2.
40236	
40237	Parameter 3.
40238	

Alibi

Register	Name	
40251	Alibi Gross weight.	
40252		
40253	Alibi tare weight.	
40254		
40255	ID.	
40256		
40257	Alibi Register (see Table 4 on page 13).	
40258	Alibi memory availability.	0 = Ok.
		1 = Alibi mode not selected.
		2 = Alibi memory not present.
		3 = Alibi memory not initialized.
		4 = Alibi memory empty.

Setup

Register	Name
43001	Word 1.
...	
45048	Word 2048.

Calibration

Register	Name
40901	Number of calibration points.
40902	Calibration weight 1.
40903	
40904	Calibration weight 2.
40905	
40906	Calibration weight 3.
40907	
40908	ADC value at zero.
40909	
40910	ADC value of calibration point 1.
40911	
40912	ADC value of calibration point 2.
40913	
40914	ADC value of calibration point 3.
40915	

Metrological Data

Register	Name	
40951	Unit of measure.	0 = g
		1 = kg
		2 = t
		3 = lb
40952	Division 1.	
40953	Division 2.	
40954	Decimals.	
40955	Range 1.	
40956		
40957	Range 2.	
40958		

Filter

Register	Name	
40959	Filter Index (see example on page 31).	
40960	Custom filter rate.	Active only if Custom filter is selected.
40961	Win custom filter.	
40962	Avg custom filter.	
40963	Pit custom filter.	

Metric Parameters

Register	Name	
40964	Auto zero.	0 = Disabled.
		1 = Enabled.
40965	Auto zero percentage.	
40966	Zero key percentage.	
40967	Zero tracking divisions.	
40968	Stability divisions.	
40969	Calibration zone G.	
40970	Zone of use G.	
40974	Zero tracking time.	(100-5000ms)
40975	Stability detection time.	(10-10000ms)
40976	Additional filter for stability detection.	(0-2000ms, 0 disabled)
40977	Stability filter divisions	(1 to 100 divisions)

Anti-Peak Filter

Register	Name
41021	Lock divisions (PA.LA.dU).
41022	Unlocked to locked switch time (PA.LA.tM, 0,01 s).
41023	Unlock divisions (PA.d iU).
41024	Locked band divisions (PA.bn.dU).
41025	Locked peak time (PA.t iME, 0,01 s).

To save these settings send command **28** (0x1C) **"SAVE SETUP"**.

Metric Parameters

Register	Name
41001	Filter 1 ID.
41002	Filter 1 value.
41003	Filter 2 ID.
41004	Filter 2 value.
41005	Filter 3 ID.
41006	Filter 3 value.

ID	Filter	Value
1	Coarse	Frequency, 1 decimal (the value 30 stands for 3,0 Hz)
4	Selective	Frequency, 1 decimal (the value 500 stands for 50,0 Hz)
5	Fine	Percentage, 2 decimals (the value 100 stands for 10%)

To save these settings send command **36** (0x24) "**WRITE AND SAVE DATA**" with parameter 1 equal to 0.

Tare and Modbus ID Configuration

Register	Name	
40981	Tare configuration.	0 = Disabled.
		1 = Locked.
		2 = Unlocked.
40982	Modbus ID.	0 to 98.
40983	Channel excluded to dependent channels. Not approved	
40984	Function of use.	
40985	Restore zero.	0 = Disabled.
		1 = Enabled.
40986	Restore tare.	0 = Disabled.
		1 = Enabled.
40987	Unit of measure 2 decimals (0 to 4).	
40988	Unit of measure 2.	0 = Default.
		1 = Custom.
40989	Division of the unit of measure 2 (1, 2, 5, 10, 20, 50).	
40990	Unit of measure 2 conversion factor (fixed-point integer, 5 decimal places).	
40991		

To save these settings send command **28** (0x1C) **"SAVE SETUP"**.

Weights and Setpoints on 1 Word

Register	Name
41101	Gross weight.
41102	Net weight.
41103	Tare.
41104	Input Register (see Table 1 on page 12).
41105	Output Register (see Table 2 on page 12).
41106	Setpoint 1 ON temporary.
41107	Setpoint 2 ON temporary.
41108	Setpoint 3 ON temporary.
41109	Setpoint 4 ON temporary.
41112	Setpoint 1 OFF temporary.
41113	Setpoint 2 OFF temporary.
41114	Setpoint 3 OFF temporary.
41115	Setpoint 4 OFF temporary.
41118	Setpoint 1 ON permanent.
41119	Setpoint 2 ON permanent.
41120	Setpoint 3 ON permanent.
41121	Setpoint 4 ON permanent.
41124	Setpoint 1 OFF permanent.
41125	Setpoint 2 OFF permanent.
41126	Setpoint 3 OFF permanent.
41127	Setpoint 4 OFF permanent.

Configuration of Inputs, Outputs

Register	Name	
41601	Input 1 function.	0 = No function. 1 = ZERO key pressed. 2 = TARE key pressed. 3 = MODE key pressed. 4 = PRINT key pressed. 5 = C key pressed. 6 = Off. 7 = Disabling keypad.
41602	Input 2 function.	
41603	Not used.	
41604		
41605	Output 1: Function.	See Table 5 on page 14.
41606	Output 1: Type of contact (NO/NC).	
41607	Output 1: Switching condition (direct / stability).	
41608	Output 1: Hysteresis (disabled / enabled).	
41609	Output 1: Sign (positive / negative).	
41610	Output 1: Switching delay.	
41611	Output 1: Activation time.	
41612	Output 2: Function.	See Table 5 on page 14.
41613	Output 2: Type of contact (NO/NC).	
41614	Output 2: Switching condition (direct / stability).	
41615	Output 2: Hysteresis (disabled / enabled).	
41616	Output 2: Sign (positive / negative).	
41617	Output 2: Switching delay.	
41618	Output 2: Activation time.	
41619	Output 3: Function.	See Table 5 on page 14.
41620	Output 3: Type of contact (NO/NC).	
41621	Output 3: Switching condition (direct / stability).	
41622	Output 3: Hysteresis (disabled / enabled).	
41623	Output 3: Sign (positive / negative).	
41624	Output 3: Switching delay.	
41625	Output 3: Activation time.	
41626	Output 4: Function.	See Table 5 on page 14.
41627	Output 4: Type of contact (NO/NC).	
41628	Output 4: Switching condition (direct / stability).	
41629	Output 4: Hysteresis (disabled / enabled).	
41630	Output 4: Sign (positive / negative).	
41631	Output 4: Switching delay.	
41632	Output 4: Activation time.	

Analog Output Configuration (DAC Values)

Register	Name
41647	Analog output function.
41648	Not used.
41649	
41650	Value weight 1.
41651	
41652	Value weight 1.
41653	Value weight 2.
41654	
41655	DAC value weight 2.
41656	Value weight 3.
41657	
41658	DAC value weight 3.

Analog Output Configuration (V values)

Register	Name
41693	V value Underload.
41694	Value weight 1.
41695	
41696	V value weight 1.
41697	Value weight 2.
41698	
41699	V value weight 2.
41700	Value weight 3.
41701	
41702	V value weight 3.
41703	V value Overload.

Analog Output Calibration (V)

Register	Name
41801	DAC value at 0 V.
41802	DAC value at 10 V.

Analog Output Configuration (mA values)

Register	Name
41737	mA value Underload.
41738	Value weight 1.
41739	
41740	mA value weight 1.
41741	Value weight 2.
41742	
41743	mA value weight 2.
41744	Value weight 3.
41745	
41746	mA value weight 3.
41747	mA value Overload.

Analog Output Calibration (mA)

Register	Name
41803	DAC value at 0 mA.
41804	DAC value at 20 mA.

Commands

COMMAND	DESCRIPTION	PARAMETER 1	PARAMETER 2
0 (0x00)	No command.	*Use this command before repeating the same command twice.*	
1 (0x01)	Zero.	-	0 (0x00) = check stability. 1 (0x01) = immediate zero.
2 (0x02)	Tare.	-	0 (0x00) = check stability. 1 (0x01) = immediate tare.
3 (0x03)	Manual tare.	Tare value.	-
10 (0x0A)	Writing setpoint 1.	Output activation “threshold” weight.	Output deactivation “threshold” weight.
11 (0x0B)	Writing setpoint 2.	Output activation “threshold” weight.	Output deactivation “threshold” weight.
12 (0x0C)	Writing setpoint 3.	Output activation “threshold” weight.	Output deactivation “threshold” weight.
13 (0x0D)	Writing setpoint 4.	Output activation “threshold” weight.	Output deactivation “threshold” weight.
25 (0x19)	Set relay status. (Relays must have function: 0 "no function").	• Status bitmask of the relays to be enabled *(bit 0 = relay 1, bit 1 = relay 2 bit 2 = relay 3, bit 3 = relay 4).* • Analog output DAC.	If = 0: Parameter 1 refers to the relays. If = 1: Parameter 1 refers to the analogue output.
28 (0x1C)	Save setup.	-	-
30 (0x1E)	Read Alibi memory.	Rewrite number.	Weighing operation alibi ID.
31 (0x1F)	Saving a weighing operation in the Alibi memory.	-	-
34 (0x22)	Restart instrument.	-	-
35 (0x23)	Data reading.	-	-
36 (0x24)	Write and save data.	Parameter 1 = 0 (0x00) for saving data.	-
37 (0x25)	Calibration point acquisition.	0 (0x00) = Zero point 1 (0x01) = First point 2 (0x02) = Second point 3 (0x03) = Third point.	-
38 (0x26)	Cancel current calibration.	-	-
39 (0x27)	Zero calibration.	-	-
40 (0x28)	Enabling / Disabling keypad.	0 (0x00) = disabled. 1 (0x01) = enabled.	-
55 (0x37)	Disable a peripheral device.	0 (0x00) = disables digital outputs (parameter 2). 1 (0x01) = disables analog output (parameter 2).	Bit 0 = 1 disables relays 1 / analog output. Bit 1 = 1 disables relays 2.
60 (0x3C)	ID Modbus setting.	SN of the instrument.	Bit 0 to 3 = ID. Bit 4 to 7 = 1 to save data.
65 (0x41)	Serial baud rate setting.	Baud rate index: 0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200	-
66 (0x42)	Theoretical calibration.	See Theoretical calibration on page 29	

1. Give the command **35** (0x23) **"DATA READING"**.

2. If necessary, modify the metrological data registers (40951 - 40970).

3. Set the number of calibration points and the weight value of the calibration points in registers 40901 - 40907.

4. Check the correct progress of calibration in register 30116.

0	CALIBRATION NOT STARTED
1	ACQUISITION IN PROGRESS
2	ACQUISITION OK
3	ACQUISITION ERROR
4	CALIBRATION OK
5	CALIBRATION ERROR
6	ZERO CALIBRATION IN PROGRESS
8	THEORETICAL CALIBRATION

5. Unload the scale and send command **37** (0x25) **"CALIBRATION POINT ACQUISITION"** with parameter 1 equal to 0 to acquire the calibration zero point. In register 30116, the calibration status changes to **ACQUISITION IN PROGRESS** and, if it then changes to **ACQUISITION OK**, it is possible to proceed (if instead it changes to **ACQUISITION ERROR** the point has not been acquired, send command **38** (0x26) **"CANCEL CALIBRATION"** and try to acquire the point again. Check that the weight is stable).

6. Load the scale with the first sample weight and send command **37** (0x25) **"CALIBRATION POINT ACQUISITION**" with parameter 1 equal to 1 to acquire the first calibration point. In register 30116, the calibration status changes to **ACQUISITION IN PROGRESS** and, if it then changes to **ACQUISITION OK**, it is possible to proceed (if instead it changes to **ACQUISITION ERROR** the point has not been acquired, send command **38** (0x26) **"CANCEL CALIBRATION**" and start again from step 5. Check if the weight is stable, and check that the µV are greater than the zero point).

Repeat step 6 for each calibration point (the number of calibration points has been set in register 40901).

7. Send command **36** (0x24) **"WRITE AND SAVE DATA"** with parameter 1 equal to 0 to save the calibration.
The calibration status changes to **CALIBRATION OK** (if it changes to **CALIBRATION ERROR**, send command **38** (0x26) **"CANCEL CALIBRATION"** and repeat the procedure from step 5).

1. Write parameters registers:

Registers 40233-40234 (PARAMETER 1): total load cells capacity. Scale decimals.
Registers 40235-40236 (PARAMETER 2): load cells sensitivity (*). 5 decimals.
Registers 40237-40238 (PARAMETER 3): mechanical tare value (if not known, insert the value 0). Scale decimals + 1.

2. Send the command **66** (0x42) "**THEORETICAL CALIBRATION**".

3. Save the parameters by sending the command **28** (0x1C) "**SAVE SETUP**".

If there are several load cells connected via a junction/equalisation box, enter the average value:

$$\frac{(\text{mV/V cell 1}) + (\text{mV/V cell 2}) + (\text{mV/V cell 3}) + \ldots + (\text{mV/V cell n})}{n}$$

Example:
Theoretical calibration of a platform with 4 load cells.
Total capacity = 2000kg Mechanical tare = 55 kg
Load cells sensitivity: cell 1 = 2,01032 cell 2 = 1,99420 cell 3 = 1,98846 cell 4 = 2,00375

Register	Value	
40232	66 (0x42)	
40233	2000 (0x07D0)	
40234		
40235	199918 (0x00030CEE)	(1,99918)
40236		
40237	550 (0x0226)	(55,0)
40238		

Zeroing the Scale

Send the command **1** (0x01) **“ZERO”**.

Note: This command does not affect calibration. When the instrument is switched off the zeroing is lost.

Quick Zero Calibration - Mechanical Tare Zeroing

- Send the command **35** (0x23) **“DATA READING”**.
- Send the command **39** (0x27) **“ZERO CALIBRATION”**.
- Check that the value in register 30116 changes from 6 (0x06) “Zero calibration in progress” to 2 (0x02) “Acquisition ok”.
- Give the command **36** (0x24) **“WRITE AND SAVE DATA”** entering the value 0 in PARAMETER 1 (0x00). Check that the value in register 30116 changes from 2 (0x02) “Acquisition ok” to 4 (0x04) “Calibration ok”.

Note: Unlike the ZERO command, the ZERO CALIBRATION command acts on the calibration of the scale and makes the change of the zero point definitive.

Filter Setting

The filters available are the following and can be set by modifying the register 40959, entering the index of the filter to be set. Before reading the value in the register, give the command **35** (0x23) **"DATA READING"** (register 40001).

CONTENTS	FILTER	DESCRIPTION
0	F 1	Filter at 5 Hz
1	F 2	Filter at 10 Hz
2	F 3	Filter at 20 Hz
3	F 4	Filter at 40 Hz
4	F 5	Filter at 80 Hz
5	F 6	Filter at 160 Hz
6	F 7	Filter at 325 Hz

Then give the command **36** (0x24) **"WRITE AND SAVE DATA"** to save the change (register 40001).

Backup and Restoring the Setup

It is possible to make a **complete backup** of the system by copying the content of the registers 43001 to 45048.

To **restore** the setup:
Write the data previously copied in registers 43001 to 45048.
Then give the command **28** (0x1C) **"SAVE SETUP"** (register 40001)

Examples

Saving or Reading a weighing operation in the Alibi memory

To save a weighing operation in the Alibi memory give the command **31** (0x1F) **"SAVE IN ALIBI MEMORY"**.

To read a weighing operation saved in the Alibi memory give the command, with parameter 1 equal to the rewrite number and parameter 2 equal to the ID number.

E.g. Reading of the weighing operation with ID = 131071 and rewrite number 00255.

Register	Value	Description
40001	31	Command READ ALIBI MEMORY.
40002	0	Rewrite number = 255.
40003	255	
40004	1	ID number = 131071 (0x1FFFF).
40005	65535	

MODBUS Calibration

Calibration of a scale with 4 cells with a capacity of 50 kg, division 2 g (0.002 kg), only one calibration point (besides zero) with a weight of 20 kg.

1. Use command **35** (0x23) **"DATA READING"** with parameter 1 equal to 0 (dependent channels).

Register	Value	Description
40001	35	DATA READING command.
40002	00	Parameter 1 = 0 because the system has dependent channels.
40003	00	

2. Set the correct values in the registers for the metrological data.

Register	Value	Description
40901	1	Number of calibration points.
40902	0	Calibration weight
40903	20000	
40951	1	Unit of measure (kg = 1).
40952	2	Division 1.
40953	0	Division 2.
40954	3	Decimals.
40955	0	Range 1 (value to be entered without considering the decimal point).
40956	50000	
40957	0	Range 2.
40958	0	

3. Unload the scale and use command **37** (0x25) **"CALIBRATION POINT ACQUISITION"** with parameter 1 equal to 0 to acquire calibration zero.

Register	Value	Description
40001	37	Command CALIBRATION POINT ACQUISITION.
40002	0	Parameter 1 = 0 to acquire the zero point.
40003	0	

30116	X	Check that the value is 2 before proceeding (see calibration procedure on page 28).

4. Load the scale with the sample weight and give command **37** (0x25) **"CALIBRATION POINT ACQUISITION"** with parameter 1 equal to 1 to acquire the first calibration point.

Register	Value	Description
40001	37	Command CALIBRATION POINT ACQUISITION.
40002	0	Parameter 1 = 1 to acquire the first calibration point.
40003	1	

30116	X	Check that the value is 2 before proceeding (see calibration procedure on page 28).

5. Use command **36** (0x24) **"WRITE AND SAVE DATA"** with parameter 1 equal to 0 to save the changed parameters and the calibration. Check that the value in register 30116 changes from 2 (0x02) "Acquisition ok" to 4 (0x04) "Calibration ok".

Output Setting

Example of setting output 1 with setpoint on gross weight, contact normally open, direct switching condition, no hysteresis, positive sign, no switching delay and enabled for 10 s.

Register	Value	Description
41605	1	1 = Setpoint on gross.
41606	0	NO.
41607	0	Direct switching condition.
41608	0	Hysteresis disabled.
41609	0	Positive sign.
41610	0	No communication delay.
41611	100	Activation time in tenths of a second.

Input Setting

Example of setting input 1 to disable the keypad and input 2 to carry out tare.

Register	Value	Description
41601	7	7 = Disabling keypad.
41602	2	2 = Simulation of the tare key.

Analog Output Setting

Example of analog output configuration for operation on gross weight at 4 - 20 mA.
Using 3 calibration points at 0 kg, 50 kg, 100 kg. *(the values used are indicative)*

1. SELECTING THE OPERATING MODE:

Register	Value	Description
41647	1	0: analog output disabled. 1: analog output on gross weight. 2: analog output on net weight.

2. CALIBRATING THE ANALOG OUTPUT (V / mA)

Register	Value	Description
41801	0	DAC value at 0 V.
41802	63300	DAC value at 10 V.

41803	0	DAC value at 0 mA.
41804	58200	DAC value at 20 mA.

3. ASSOCIATING AN OUTPUT VALUE (OR ADC POINTS) WITH THE WEIGHT:

	Value (mA)	Description
41737	0	Output for underload (0 mA).
41738	0	Weight 1 (0 kg).
41739		
41740	40	Output for weight 1 (4.0 mA).
41741	50	Weight 2 (50 kg).
41742		
41743	120	Output for weight 2. (12.0 mA).
41744	100	Weight 3 (100 kg).
41745		
41746	200	Output for weight 3. (20.0 mA)
41747	200	Output for overload. (20.0 mA)

Notes

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