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SCT-4X-AN

Quick Start Guide

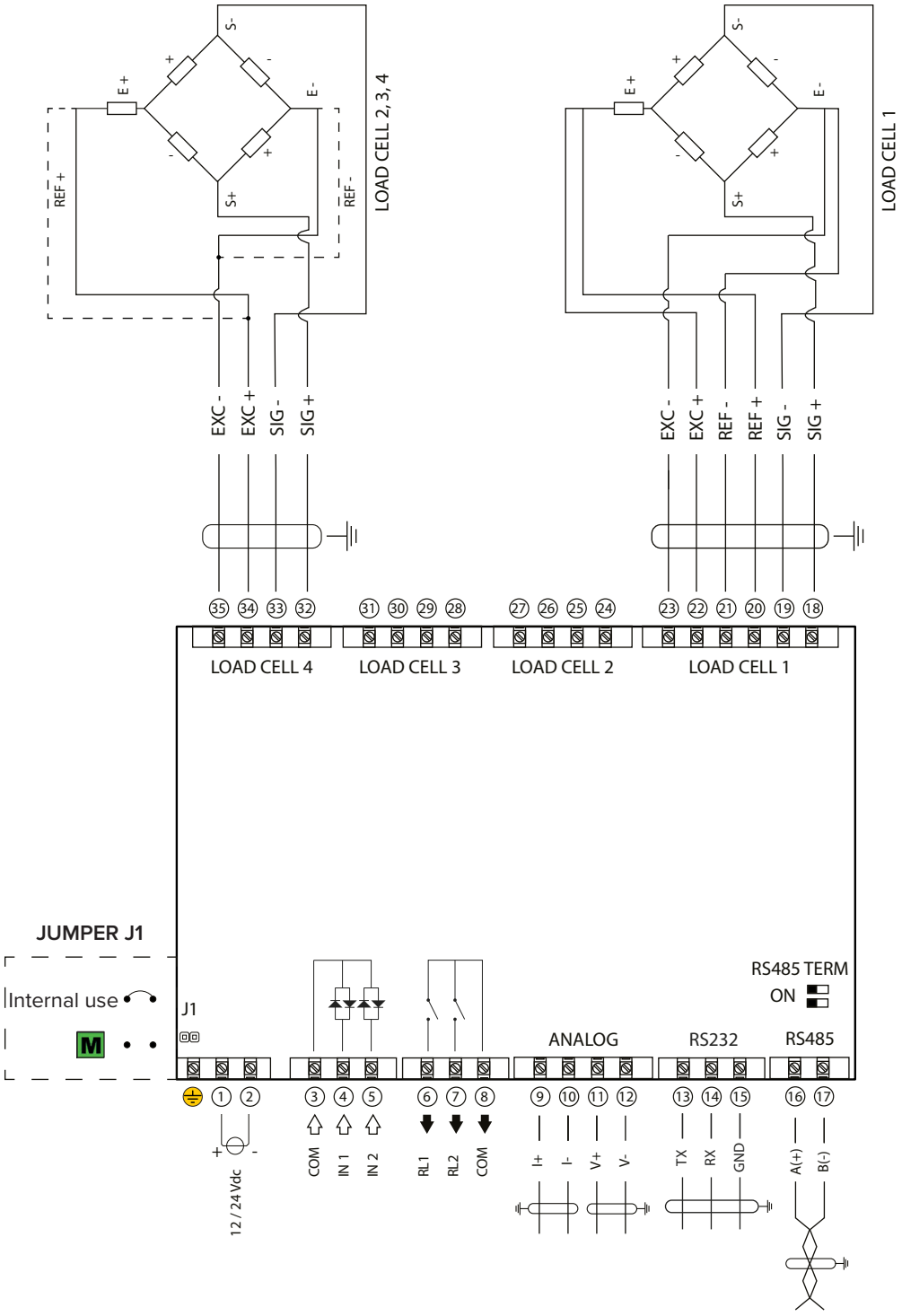


RICE LAKE®
WEIGHING SYSTEMS

May 25, 2023

PN 219722 Rev A

1. Electrical Schematic



8e BE o2 1 3BB 6 6 Sf eeUSja
H3D + jf 3X1 +
H3D - jf 3X1 -

l YUi ZeXbU H3DH3 SZfSkZ
Sf d f Uei PjUi Pbb bf PT SUbbə

Bf PT SUbb UxSZPjZ ea Və
Bf PT SUbb fjkf kja d VVd Pxə

4fbJ B Pf f hfUT d f TUbba
UqkZ d Uej jf RU f flUHUT Rn
jf VTS BFH fh1 bPi i
f flUhi fHSUə

1 E DHJ MFI 8E Da
ə L d Pxə

8DFJ l a jf 8 VTS

E J l FJ l a 8VPS fh VTS6 ə
o d Px

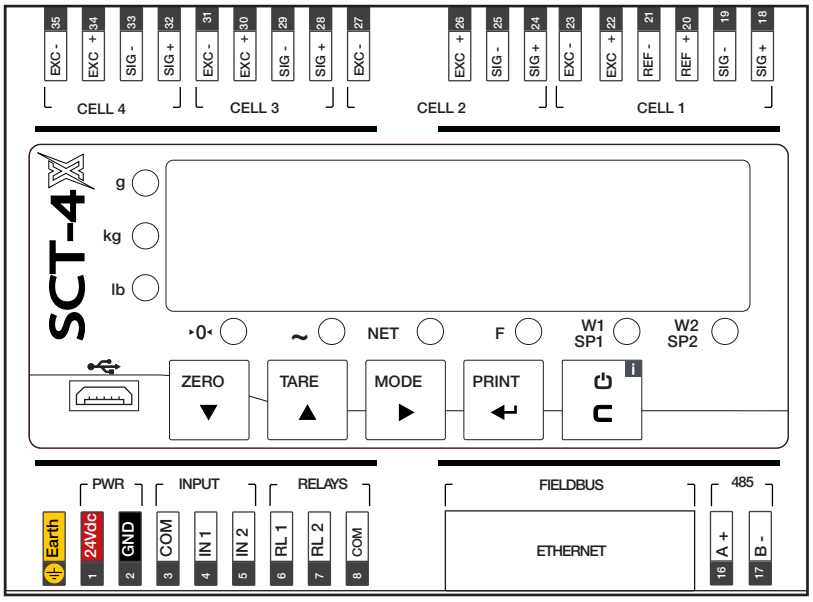
MPx HUi ZjPeSU f e SkHHUej
PePbf X fjkf kja Ω

MZe HUi ZjPeSU f e l fjbPXU
PePbf X fjkf kja aΩ

MPekPbb PHU Pl PZbPRbU Vf d GZSU BPaU L UZXYZeX Hhi jUdi Pj l l l BZSUbPaUSf d /d PekPbb
L PHHPejn ZeVbd PjZ e Z Pl PZbPRbU Pj l l l BZSUbPaUSf d /l PHHPejZUi

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2. Key Functions



Configuration menu	
▼	Decreases digit / Scrolls down.
▲	Increases digit / Scrolls up.
▶	Enters the setup. Selects digit to modify.
↵	Enters a step / Confirms.
C	Clears / Exits a step (no save).

Weighing mode	
▼	Clears the displayed gross weight.
▲	Short press: executes semiautomatic tare. Long press: allows to enter known tare.
▶	Long press: switches between scales (only in Mode 2 “ ind.Ch”).
↵	Short press: executes data transmission on the printer serial port. Long press: Setpoint configuration.
C	ON/Standby of the instrument.

3. Indicator Light Descriptions

›0‹	Weight on zero.
~	Unstable weight.
NET	A tare is active.
F	A function is active.
W1 SP1	Digital output 1 is active.
W2 SP2	Digital output 2 is active.

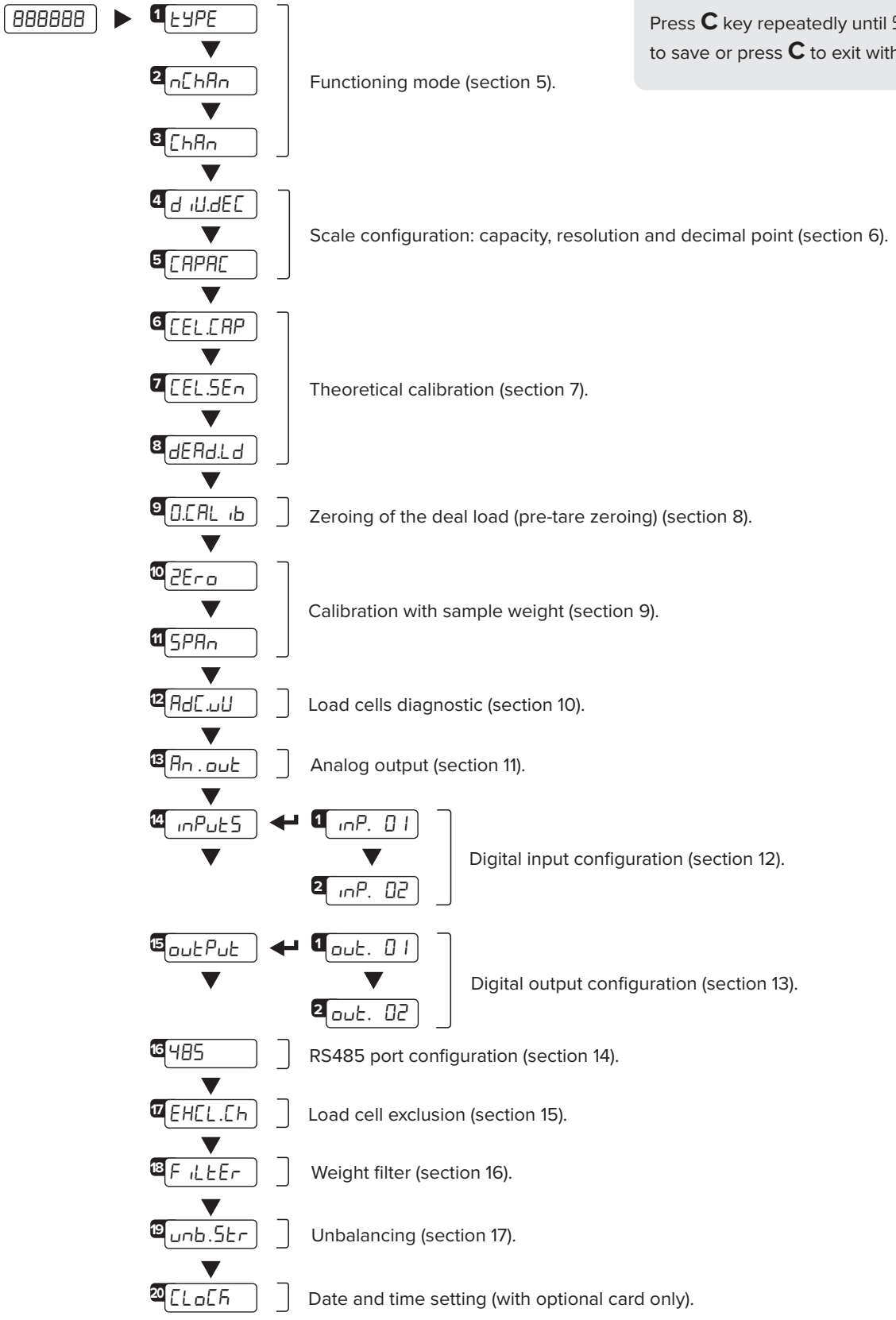
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4. Configuration Menu

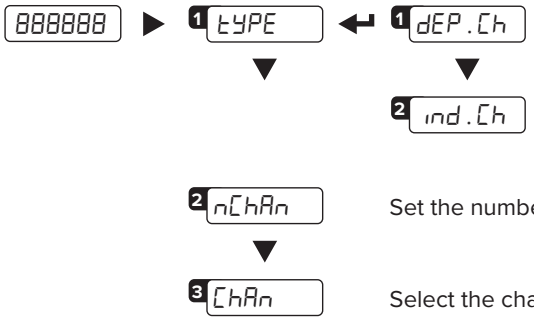
1. Reboot the weight transmitter
2. Press the ▶ key when display shows the 888888 message:

HOW TO EXIT THE MENU AND SAVE YOUR CONFIGURATION

Press **C** key repeatedly until SAVE? appears; press ↵ to save or press **C** to exit without saving.



5. Function Mode



Digital equalization box mode.

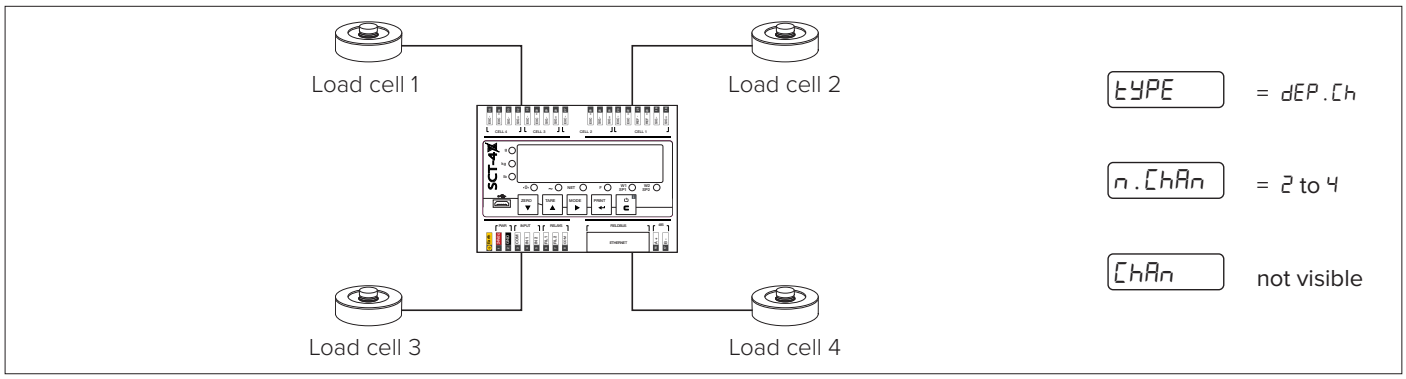
Multi-scale mode.

Set the number of active channels.

Select the channel to be programmed (for ind.Ch mode only).

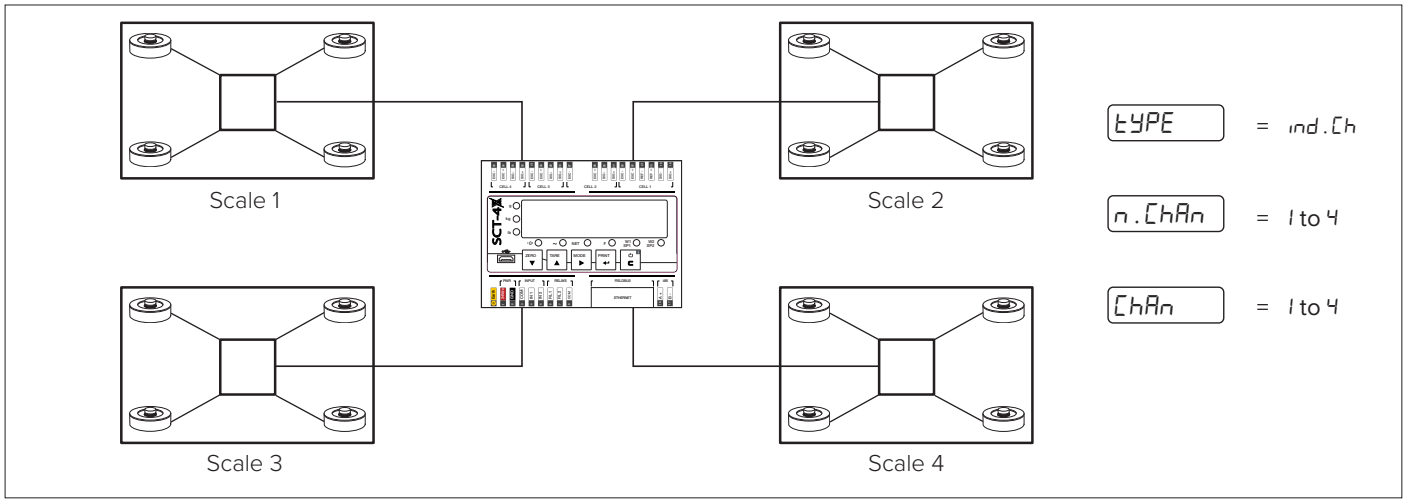
MODE 1 "DEP.CH"

Allows to connect directly the load cells, equalize them (if necessary) and transmit each load cell data and the total weight through Fieldbus.



MODE 2 "IND.CH"

Allows to manage up to 4 independent scales and transmit all data of each scale through Fieldbus.



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6. Maximum Scale Capacity, Increment and Decimal Point Settings

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4 d iU.dEC — Set the decimal point position and the minimum scale increment*1
(0.001 - 0.002 - 0.005 - 0.01 - 0.02 - 0.05 - 0.1 - 0.2 - 0.5 - 1 - 2 - 5 - 10 - 20 - 50).

5 CAPAC — Set the maximum scale capacity*2 *(max 999999).*

Examples:

For a 60000 lb scale, with 2 lb increment:
d iU.dEC = 2
CAPAC = 60000

For a 10000 g scale, with 0.1 g increment:
d iU.dEC = 0.1
CAPAC = 10000.0

For a 3000 lb scale, with 0.05 lb increment:
d iU.dEC = 0.05
CAPAC = 3000.00

*1 *Increment = the amount that the scale will increment by as weight is added or removed.*
*2 *Maximum capacity = the maximum weight that can be measured using the scale you are creating.*

7. Theoretical Calibration

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6 CEL.CAP — Set the total load cells capacity *(up to 999999).*

7 CEL.SEn — Set the load cells sensitivity *(up to 999999).* ✱

8 dEAd.Ld — Dead load weight *(from -9999.9 to 99999.9).*

1. Set d iU.dEC and CAPAC (section 4).

2. Set in CEL.CAP the total load cells capacity *(sum of the nominal load cell capacities).*

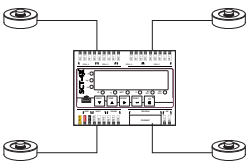
3. Set in CEL.SEn the theoretical signal value of the load cells. ✱

4. Enter in dEAd.Ld step. The display shows the theoretical dead load value. Modify the value and confirm with ↵.

5. Save calibration (Press **C** key many times until SAVE? message will appear, then press ↵ to confirm).

✱

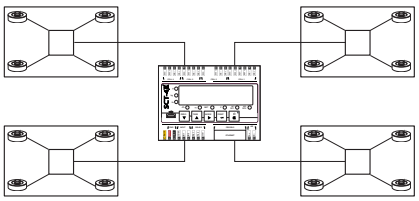
MODE 1 "DEP.CH"



Insert in CEL.SEn parameter, the load cells sensitivity sum value:

(mV/V cell1) + (mV/V cell2) + (mV/V cell3) + (mV/V cell4)

MODE 2 "IND.CH"



For each scale to calibrate, insert in CEL.SEn parameter the average sensitivity value of the load cells:

$$\frac{(\text{mV/V cell1}) + (\text{mV/V cell2}) + \ldots + (\text{mV/V cell}n)}{n}$$

8. Zero Mechanical Tare (pre-tare zeroing)

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▼

9 0.CAL ib — Zeroing of the pre-tare (or mechanical tare).

This functionality allows to zero the weigh of the scale structure (e.g. empty silo, conveyor, etc.) without changing the calibration in memory.

9. Calibration with Sample Weight

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▼

10 ZEro — Zero point acquisition.

▼

11 SPAn — Sample weight acquisition.

1. Unload the scale.

2. Enter the ZEro step to adjust the zero point.

3. Load the scale with span weight.

4. Enter the SPAn step, type the span weight value and press ↵ to adjust.

5. Save adjustment (Press **C** key many times until SAVEP message will appear, then press ↵ to confirm).

10. Load Cell Diagnostics (µV/V)

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▼

12 AdC.uU

It allows to verify signal of each channel. It must be included into the range 0 to 3 mV/V. Signal have to be stable and it have to increase by increasing the weight on the scale.

i With more channels connected, it's possible to scroll between channels with keys ▼ and ▲.

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11. Analog Output

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13 An.out ↵ 1 Ao.tYPE ↵

1 0 10U — Analog output in voltage 0 to 10 V.

2 0 5U — Analog output in voltage 0 to 10 V.

3 0 20mA — Analog output in current 0 to 20 mA.

3 4 20mA — Analog output in current 4 to 20 mA.

2 ModE ↵

1 Ao Gro — Analog output proportional to gross weight.

2 Ao nEt — Analog output proportional to net weight.

3 ChAn — Channel selection (*Visible only if* tYPE = ind.Ch *and* nChAn ≥ 2).

4 WGt.Min — Weight related to the analog output minumum value (default = 0).

5 Cor.Min — Minumum value fine adjustment.

6 WGt.MAX — Weight related to the analog output maximum value. (default = CAPAC).

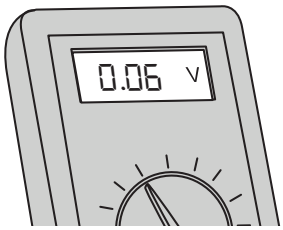
7 Cor.MAX — Maximum value fine adjustment.

11.1 ANALOG OUTPUT FINE ADJUSTMENT

1. Connect a multimeter to pin 9 (+) and 10 (-) for the current analog output or 11 (+) and 12 (-) for the voltage analog output.
2. Follow the procedure:

A. Enter the parameter Cor.0.

B. Check the value on the multimeter



C. Use ▲ and ▼ keys to increase or decrease the output value on the multimeter.

By keeping the ▲ or ▼ key pushed, the value will change faster.

Confirm with ↵.

D. Repeat the operation from point "**A**" for Cor.MAX parameter.

E. Save setting (Press **C** key many times until SAVEP message will appear, then press ↵ to confirm).

11.2 EXAMPLES

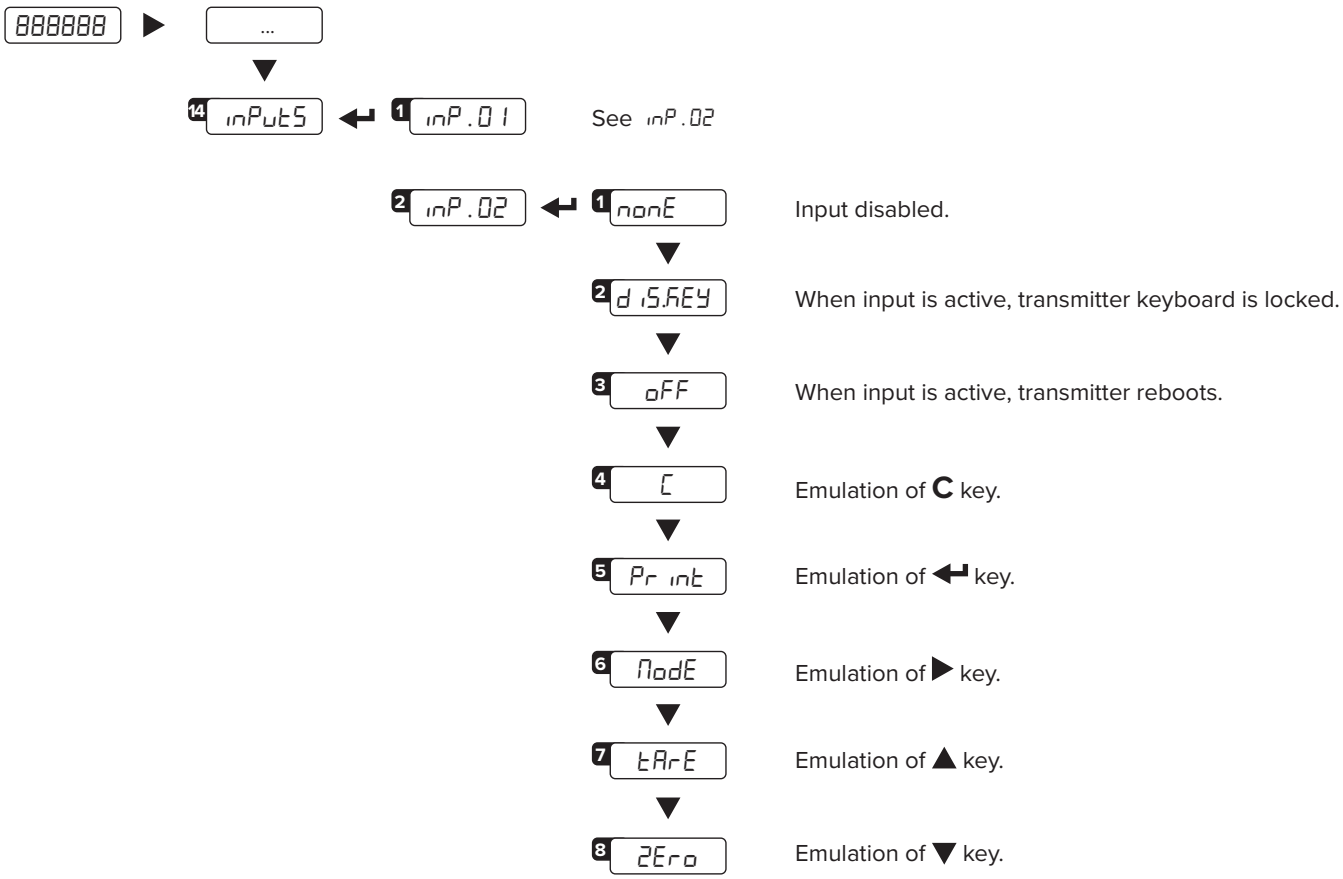
Analog output setting for gross weight at 10 V with a 1000 lb scale:

- Connect a multimeter to pins 11 (+) e 12 (-).
- Select 0- 10 U in the parameter Ao.tYPE.
- Select Ao Gro in the parameter ModE.
- Select the channel (if necessary) in the parameter ChAn.
- Set the weight at 0 V in the parameter WGt.0 in (default = 0 lb).
- Set the weight at 10 V in the parameter WGt.MAX (default = 1000 lb).
- Correct, if necessary, the output values as shown in section 11.2.

Analog output setting for net weight at 4 20 mA with a 20000 lb scale:

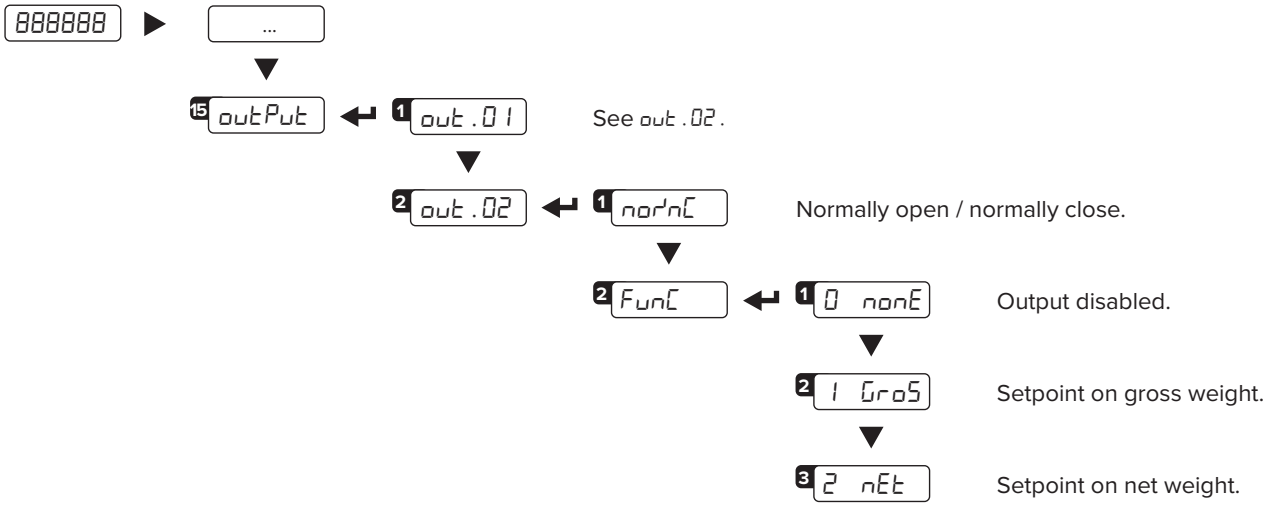
- Connect a multimeter to pins 9 (+) e 10 (-).
- Select 4-20.mA in the parameter Ao.tYPE.
- Select Ao nEt in the parameter ModE.
- Select the channel (if necessary) in the parameter ChAn.
- Set the weight at 4 mA in the parameter WGt.0 in (default = 0 lb).
- Set the weight at 20 mA in the parameter WGt.MAX (default = 20000 lb).
- Correct, if necessary, the output values as shown in section 11.2.

12. Input Settings



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13. Output Settings



13.1 HOW TO PROGRAM SETPOINTS

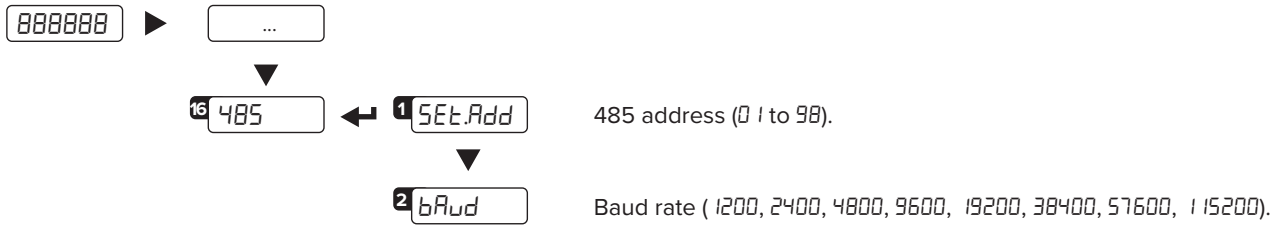
1. In weighing mode, press ↵ for 3 second.

2. Select the setpoint to modify:

- 5.1 on — Set the output 1 setpoint value.
- 5.2 on ↵ — Set the output 2 setpoint value.

3. Press **C** key to save and exit the menu.

14. RS485 Port

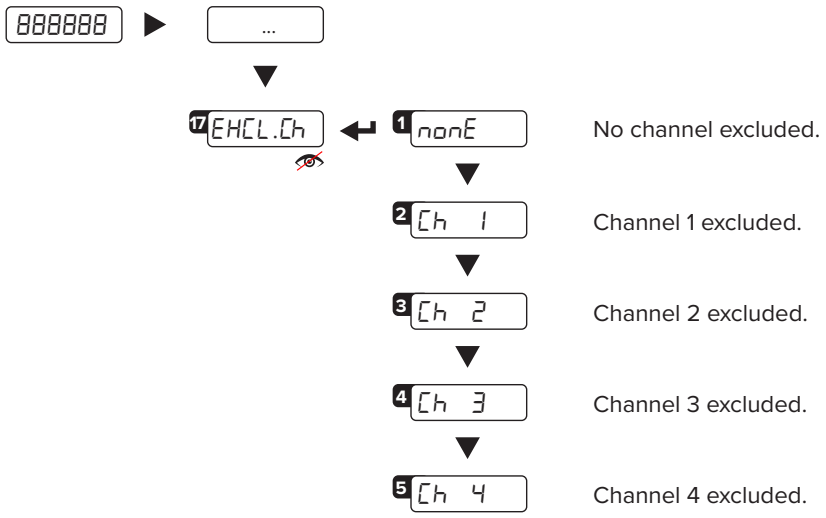


i The RS485 port is configured by default to communicate in Modbus RTU (section 18).

15.Load Cell Exclusion (for dependent channel systems)

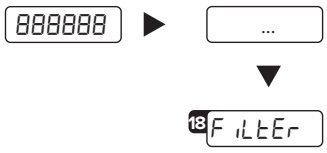
If a load cell is broken, it's possible to temporarily exclude the channel where it is connected and continue to weigh, pending replacement.

⚠ **WARNING:** this operation reduces the accuracy of the weighing system. We recommend use for liquid weighing or in applications where the load is evenly distributed.



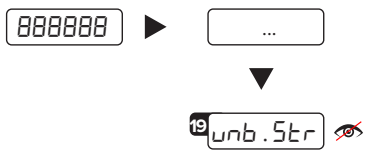
Visible only in dEP.Ch mode.

16. Weight Filter



The active weight filter is displayed, alternating with the weight value.
Press ▲ and ▼ keys to scroll through the available filters (from slowest to fastest, F1 to F10).

17. Unbalancing



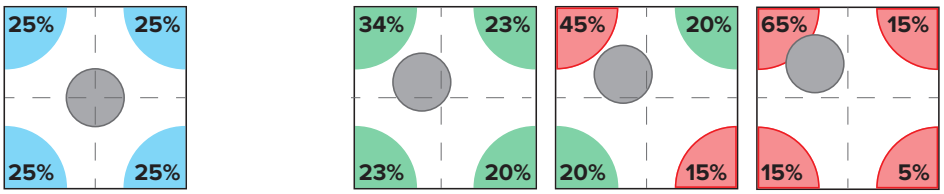
Visible only in dEP.Ch mode.

The instrument has an active unbalance function as standard that signals if the load is unevenly distributed, compared to the condition saved via step Str.unb.

Imbalance occurs when the load distribution percentage value on a cell deviates by at least 10% for more than 3 seconds.

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Example:



The unbalance condition is signalled via Modbus / Fieldbus or a digital output (refer to the complete manual to set the output).

i

This function is only available if EHCL .Ch = nonE.
Use this function only in systems where the load is evenly distributed.

18. Programming Errors

MESSAGE	DESCRIPTION	SOLUTION
PrEC.	Calibration error	First calibrate the zero point (ZEro), then proceed with sample weight acquisition (SPAn) (section 9).
Err.Pnt	Calibration error	Check the connection of the load cell. Verify the load cell signal is stable, valid and greater than the previously acquired point.
Er 11	Calibration error	Increase the calibration weight.
Er 12	Calibration error	Check the signal from the load cell increases when weight is incremented on the scale.
Er 37	Calibration error	Repeat calibration and verify capacity and division have been correctly set.
Er 39	Instrument not configured	Transmitter needs to be configurated.
C.Er.36	Calibration error	Verify the signal from the load cell is not negative.
C.Er.37	Calibration error	Verify the signal from the load cell is not negative.
Err.Not	Weight unstable	Check in AdC .uU parameter that the signal is stable. If the connection of the cells is with 4 wires, check that the sense jumpers are inserted.
AdC .Err	A/D converter error	Converter failure. Reboot the instrument.
CEL .Err	Global load cell error	Signal anomaly: check the load cells connection.
Er .CEL . 1 ... Er .CEL .4	Load cell error	Signal anomaly: check the indicated load cell connection.

19. Modbus

19.1 MODBUS REGISTERS - dEP.Ch / ind.ch (1 SCALE)

Data	Register	DESCRIPTION
5hfi l UZKYj		5hfi L UZKYj l PlkxUƏ
DUj l UZKYj		DUj L UZKYj l PlkxUƏ
&f kj i jPjki hUXZjUh		ØZ4 ÆbiRHb oSjZlUSYPeeUlsƏ ØZ4 oSjZlUSYPeeUlsƏ ØZ4 Df VkeSjZleƏ ØZ4 Df VkeSjZleƏ ØZ4 Df VkeSjZleƏ ØZ4 Df VkeSjZleƏ ØZ49 HjPjki f VZef kj eƏ Ə ØZ48 ÆbRHb HjPjki f VZef kj eƏƏ ØZ47 ÆbiRHb = HSPlbJkelóPTUT ÆbhfilUZKYj = lHb ØZ4 l PhU Fl Æb= Fl jPhUZl PSjZlUHb ØZ4 l PhU Æb= l PhUZl PSjZlUHb ØZ4 El Uhó PT Sf eTZZle Æb= Df ; = El Uhó PTHb ØZ4 J eTUhó PT Sf eTZZle Æb= Df ; = J eTUhó PTHb ØZ4 L UZKYj HjPRZZn Æb= J ei jPRlbJ; = HjPRlbJHb ØZ4 5hfi L UZKYj FfPhZn Æb= “+”; = “-”Hb ØZ4 ÆbRHb DUj L UZKYj FfPhZn Æb= “+”; = “-”Hb **Bit 15 / Bit 14 / Active Channel** 1 YPeeUb 1 YPeeUb 1 YPeeUb 1 YPeeUb
1 f d d PeT i jPjki hUXZjUh		BPi j hUSUZlUT Sf d d PeTƏ ØZ47 ÆbiRHb BPi j Sf d d PeT hUi kljƏ ØZ4 BPi j Sf d d PeT hUi kljƏ ØZ4 BPi j Sf d d PeT hUi kljƏ ØZ4 BPi j Sf d d PeT hUi kljƏ ØZ4 1 fkjZeX f Vf lf SUi i UT Sf d d PeTi Ə ØZ4 1 fkjZeX f Vf lf SUi i UT Sf d d PeTi Ə ØZ4 1 fkjZeX f Vf lf SUi i UT Sf d d PeTi Ə ØZ4 ÆbRHb 1 fkjZeX f Vf lf SUi i UT Sf d d PeTi Ə
E kjf kj i jPjki hUXZjUh	7	Df 4keSjZleƏ ØZ47 ÆbiRHb Df VkeSjZleƏ ØZ4 Df VkeSjZleƏ ØZ4 2ZKZPbfjkf kj i jPjki Æb= E44; = E DHb ØZ4 ÆbRHb 2ZKZPbfjkf kj i jPjki Æb= E44; = E DHb
µVl YPeeUb		µVl PlkxUf VjYUSYPeeUb Ə
µVl YPeeUb		µVl PlkxUf VjYUSYPeeUb Ə
µVl YPeeUb		µVl PlkxUf VjYUSYPeeUb Ə
µVl YPeeUb		µVl PlkxUf VjYUSYPeeUb Ə

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19.2 MODBUS REGISTERS - ind.ch (4 SCALES)

Data	Register	DESCRIPTION
HjPjki hUXZjUh iSPbU		ØZ. ÆbiRH-b Dfjki UTƏ ØZ. Dfjki UTƏ ØZ. Dfjki UTƏ ØZ. HSPbU PSjZU Л-b= “ef ”; = “nUi ”hƏ. ØZ. 2USZd Pb Л-b = ; = ; = ; = H-b ØZ. ØZ.9 J eZ.f VMUPikhUЛ-b = “X”; = “αX”; = “j”; = “bR”hƏ. ØZ.8 ÆbRH-b
		ØZ.7 ÆbiRH-b I PhUFI Л-b= FI jPhUZ PSjZUhƏ. ØZ. I PhUЛ-b= I PhUZ PSjZUhƏ. ØZ. DUj L UZXYj FfBhZn Л-b= “+”; = “-”hƏ. ØZ. = HSPbUkeb PTUT ЛXhfi l UZXYj = hƏ. ØZ. E l Uhb PT Sf eTZZe Л-b= Df ; = fUhb PThƏ. ØZ. J eTUhb PT Sf eTZZe Л-b= Df ; = keTUhb PThƏ. ØZ. HjPRZZn Л-b= “kei jPRbU”; = “i jPRbU”hƏ. ØZ. ÆbRH-b 5hfi L UZXYj FfBhZn Л-b= “+”; = “-”hƏ.
5hfi l UZXYj iSPbU		5hfi L UZXYj f ViSPbUƏ
HjPjki hUXZjUh iSPbU		HPd UPi HjPjki hUXZjUhiSPbUƏ
5hfi l UZXYj iSPbU	7	5hfi L UZXYj f ViSPbUƏ
HjPjki hUXZjUh iSPbU	8	HPd UPi HjPjki hUXZjUhiSPbUƏ
5hfi l UZXYj iSPbU	9	5hfi L UZXYj f ViSPbUƏ
HjPjki hUXZjUh iSPbU		HPd UPi HjPjki hUXZjUhiSPbUƏ
5hfi l UZXYj iSPbU		5hfi L UZXYj f ViSPbUƏ
DUj l UZXYj iSPbU		DUj L UZXYj f ViSPbUƏ
DUj l UZXYj iSPbU	7	DUj L UZXYj f ViSPbUƏ
DUj l UZXYj iSPbU	8 9	DUj L UZXYj f ViSPbUƏ
DUj l UZXYj iSPbU		DUj L UZXYj f ViSPbUƏ

19.3 MODBUS REGISTERS FOR COMMAND SENDING

Data	Register	DESCRIPTION
1 f d d PeT		MPZe Pl PZbPRtbU Sf d d PeTi a Value / Command 7 Ux — Df Sf d d PeT 7 Ux — HSPtbUpUhf ZeX 7 Ux — l PhU 7 Ux — FhUi Uj l PhU 0 7 Ux — HUjf f Zej i UjjZeX ø 7 Ux — HUjf f Zej i UjjZeX 9 7 Ux — 2ZXZjPbfjfkj i UjjZeX 7 Ux — GURfjjYUl UZXYj jhPei d ZjUh
FPhPd UjUh		4Zi j f PhPd UjUhf VjYU Sf d d PeTə FPhPd UjUhZl Ptb Pni Uxf hUi i UT Ze PRi fkjU d f TU JEbf TUSZd Ptb6ef i ZXekeb
FPhPd UjUh		HUSf eT f PhPd UjUhf VjYU Sf d d PeTə FPhPd UjUhZl Ptb Pni Uxf hUi i UT Ze PRi fkjU d f TU JEbf TUSZd Ptb6ef i ZXekeb

EXAMPLE 1

For zeroing the weight on the scale:

2. Set the command in byte 2

Byte	Value
1	7 Ux
2	7 Ux

EXAMPLE 2

For setting a preset tare of 1000 lb:

1. Set the tare value in parameter 1 (byte 3, 4, 5, 6)
2. Set the command in byte 2

Byte	Value
1	7 Ux
2	7 Ux
3(MSB)	7 Ux
4	7 Ux
5	7 Ux
6(LSB)	38 7 Ux

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