SCT-4X-Ethernet/IP

Quick Start Guide

RICE LAKE
WEIGHING SYSTEMS
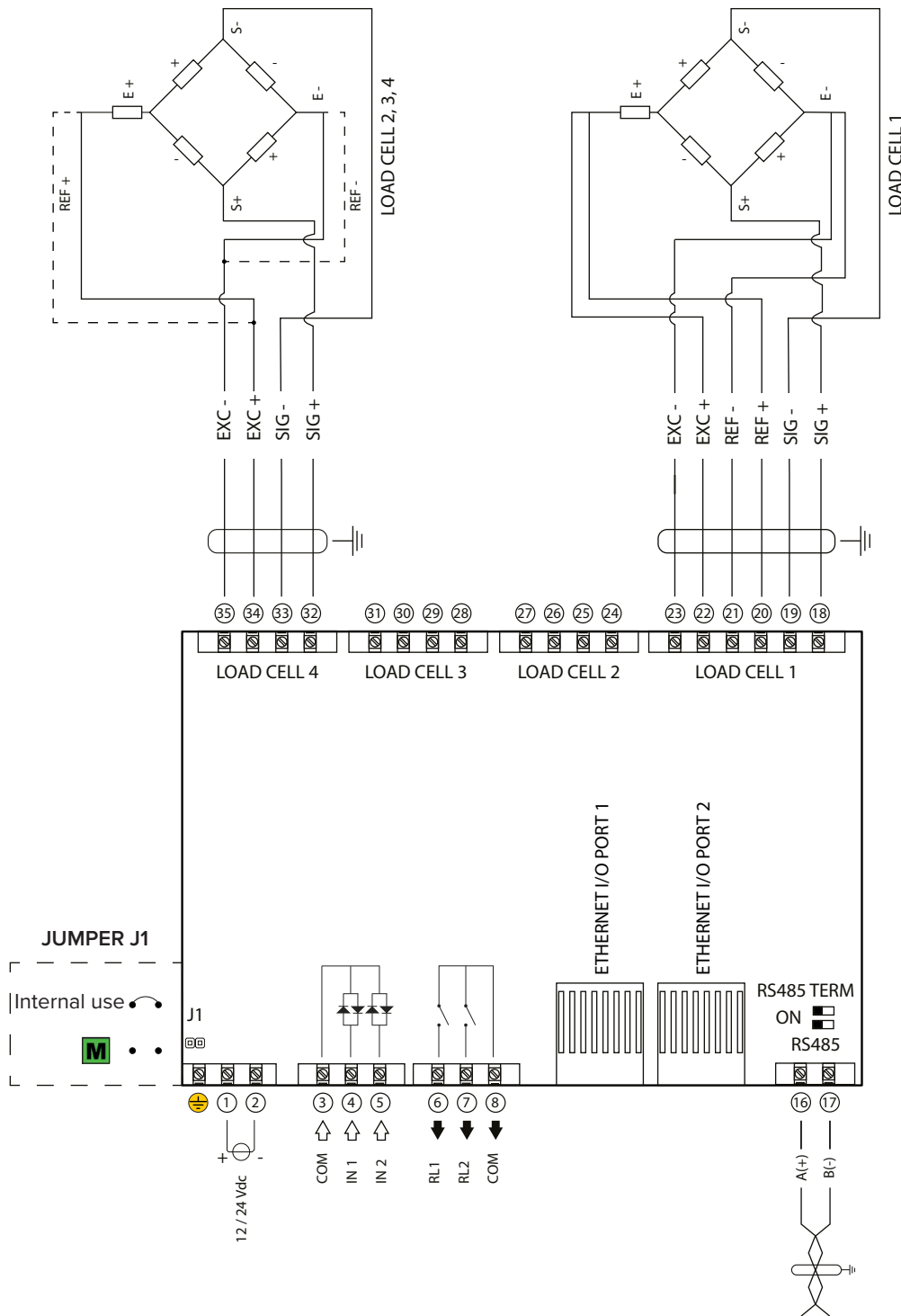
1. Electrical Schematic

In LOAD CELL 2, 3, 4 connect:
SEN + to EXC +
SEN - to EXC -

The single SENSE circuit compensates all 4 load cells.

Load cells excitation: 5 V.
Load cells output: 6 mV/V max.

For UL approved models: equipment to be powered by 12 to 24 Vdc LPS or Class 2 power source.

CONSUMPTION: 4.5 W max.

INPUT: 12 to 48 Vdc

OUTPUT: 48Vac or 60Vdc, 0.5 A max

LOAD CELL 2, 3, 4

LOAD CELL 1

EXC - EXC + SIG - SIG +

EXC - EXC + REF - REF + SIG - SIG +

㉟ ㉞ ㉝ ㉜   ㉛ ㉚ ㉙ ㉘   ㉗ ㉖ ㉕ ㉔   ㉓ ㉒ ㉑ ⑳ ⑲ ⑱

LOAD CELL 4   LOAD CELL 3   LOAD CELL 2   LOAD CELL 1

JUMPER J1

Internal use

J1

ETHERNET I/O PORT 1

ETHERNET I/O PORT 2

RS485 TERM
ON
RS485

① ②   ③ ④ ⑤   ⑥ ⑦ ⑧   ⑯ ⑰

12 / 24 Vdc

COM IN 1 IN 2   RL1 RL2 COM   A(+) B(-)

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

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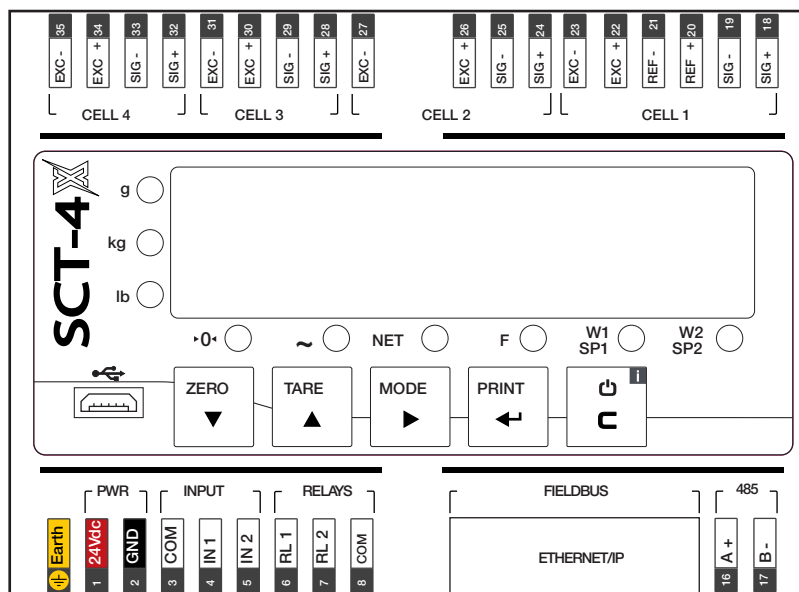
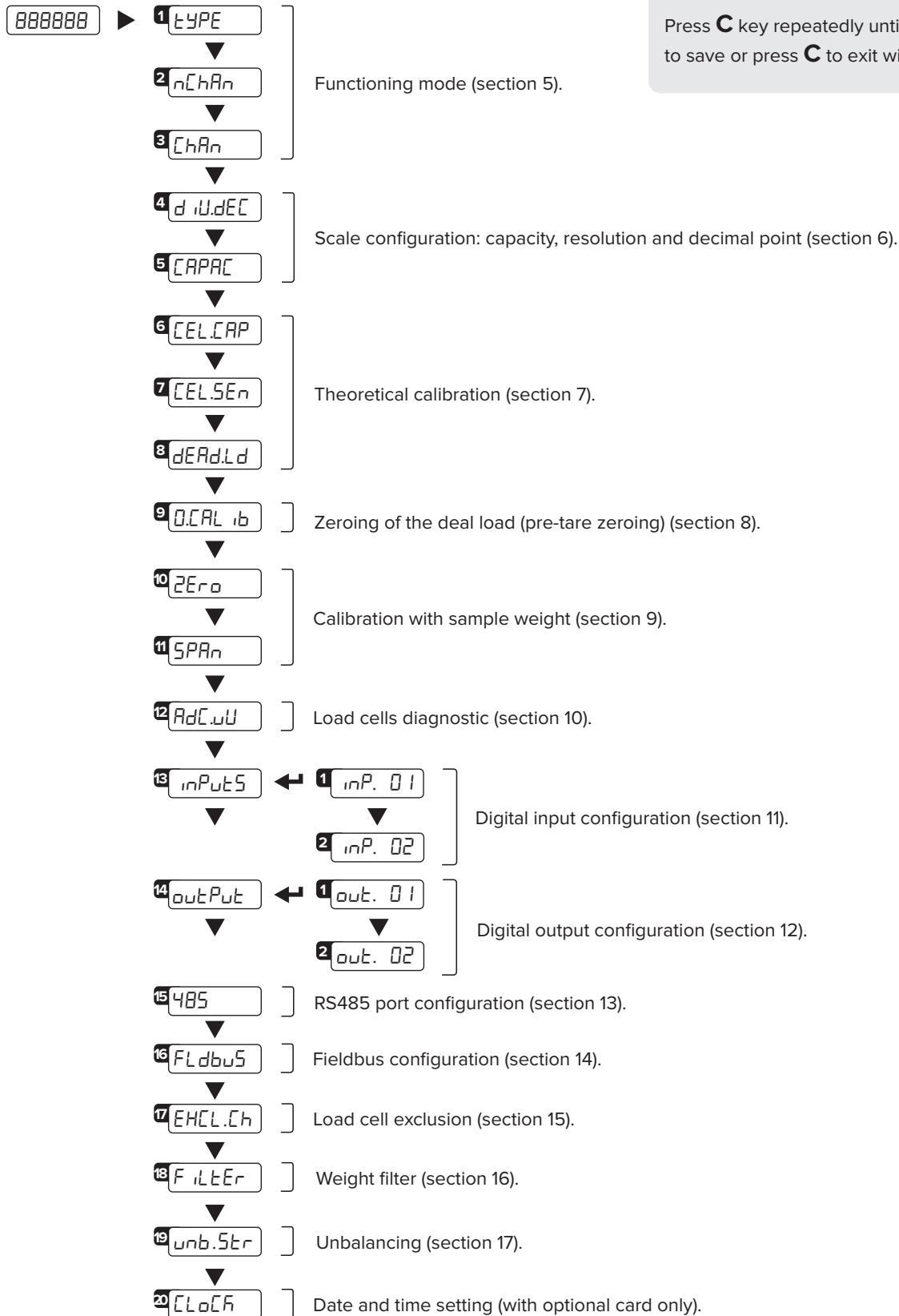| Configuration menu	
▼	Decreases digit / Scrolls down.
▲	Increases digit / Scrolls up.
▶	Enters the setup. Selects digit to modify.
↵	Enters a step / Confirms.
C	Clears / Exits a step (no save).

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 " ɪnd.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

·O·	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.

4. Configuration Menu

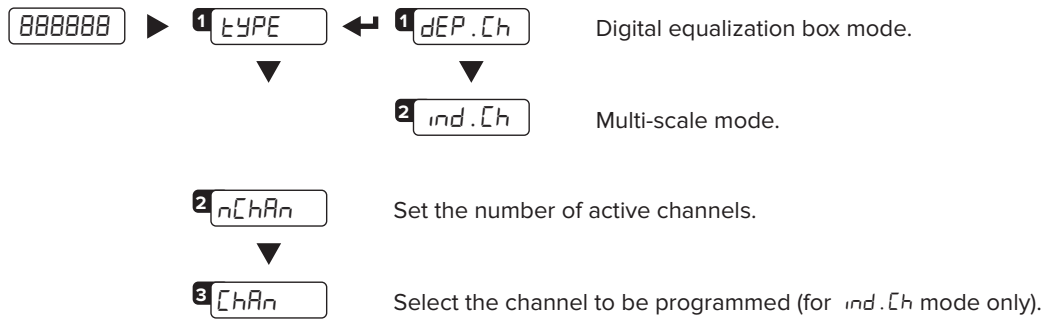**1.** Reboot the weight transmitter

2. Press the ▶ key when display shows the *888888* message:

<div style="float:right; border:1px solid #ccc; padding:10px;">

HOW TO EXIT THE MENU AND SAVE YOUR CONFIGURATION

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

</div>

888888 ▶

1 *tYPE*
▼
2 *nChAn*
▼
3 *ChAn*
⎫
⎬ Functioning mode (section 5).
⎭

▼

4 *d iU.dEC*
▼
5 *CAPAC*
⎫
⎬ Scale configuration: capacity, resolution and decimal point (section 6).
⎭

▼

6 *CEL.CAP*
▼
7 *CEL.SEn*
▼
8 *dEAd.Ld*
⎫
⎬ Theoretical calibration (section 7).
⎭

▼

9 *0.CAL ib* ⎬ Zeroing of the deal load (pre-tare zeroing) (section 8).

▼

10 *2Ero*
▼
11 *SPAn*
⎫
⎬ Calibration with sample weight (section 9).
⎭

▼

12 *AdC.uU* ⎬ Load cells diagnostic (section 10).

▼

13 *inPutS* ↵ **1** *inP. 01*
▼
2 *inP. 02*
⎫
⎬ Digital input configuration (section 11).
⎭

▼

14 *outPut* ↵ **1** *out. 01*
▼
2 *out. 02*
⎫
⎬ Digital output configuration (section 12).
⎭

▼

15 *485* ⎬ RS485 port configuration (section 13).

▼

16 *FLdbuS* ⎬ Fieldbus configuration (section 14).

▼

17 *EHCL.Ch* ⎬ Load cell exclusion (section 15).

▼

18 *F iLtEr* ⎬ Weight filter (section 16).

▼

19 *unb.Str* ⎬ Unbalancing (section 17).

▼

20 *CLoCh* ⎬ Date and time setting (with optional card only).

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W E I G H I N G   S Y S T E M S

5. Function Mode

| `888888` | ▶ | **1** `type` | ↵ | **1** `dEP.Ch` | Digital equalization box mode. |

▼

2 `ind.Ch`   Multi-scale mode.

2 `nChAn`   Set the number of active channels.

▼

**3** `ChAn`   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.
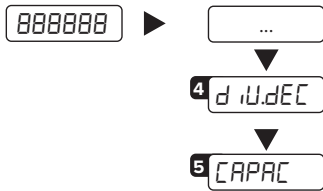

`type`   = `dEP.Ch`

`n.ChAn`   = `2` to `4`

`ChAn`   not visible
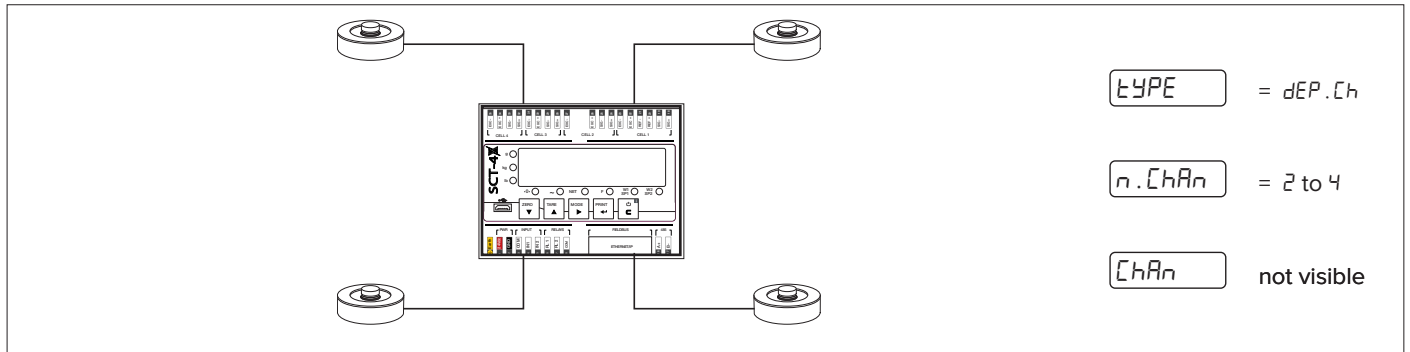
MODE 2 "IND.CH"

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

`type`   = `ind.Ch`

`n.ChAn`   = `1` to `4`

`ChAn`   = `1` to `4`
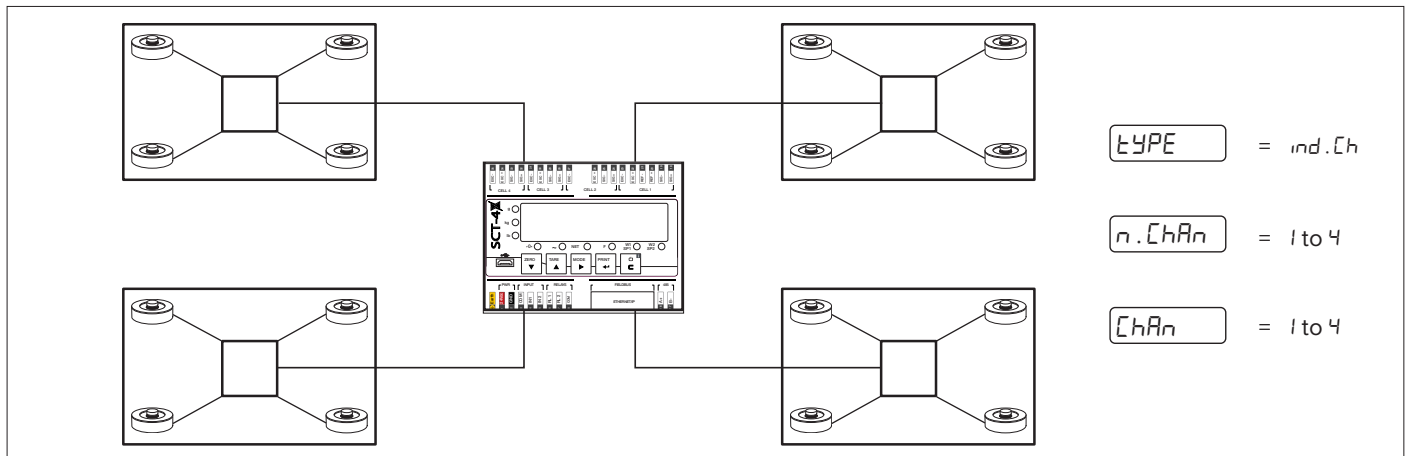
6. Maximum Scale Capacity, Increment and Decimal Point Settings

| 888888 | ▶ | ... |

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

| 888888 | ▶ | ... |
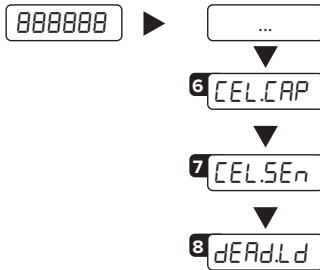
6 `CEL.CAP` Set the total load cells capacity *(up to 999999).*

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/or confirm with ⏎.

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

✱

MODE 1 "DEP.CH"	**MODE 2 "IND.CH"**
Insert in `CEL.SEn` parameter, the load cells sensitivity sum value:	For each scale to calibrate, insert in `CEL.SEn` parameter the average sensitivity value of the load cells:
(mV/V cell1) + (mV/V cell2) + (mV/V cell3) + (mV/V cell4)	$$\frac{(mV/V\ cell1) + (mV/V\ cell2) + ... + (mV/V\ cell n)}{n}$$

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8. Zero Mechanical Tare (pre-tare zeroing)

`888888` ▶ `...`

▼

9 `0.CAL ib`   Zeroing of the pre-tare (or mechanical tare).
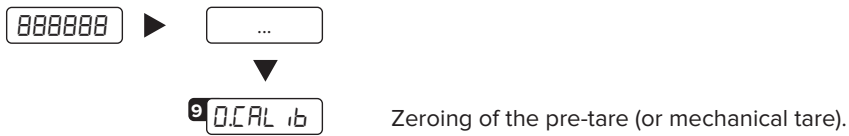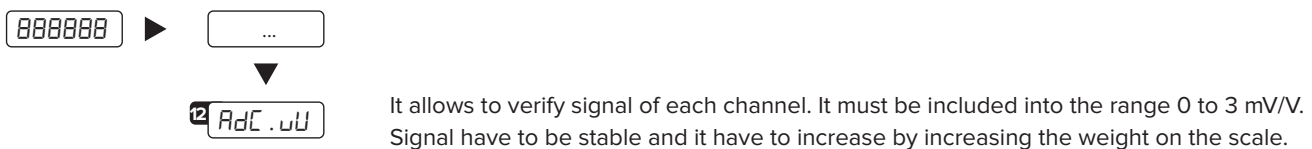
This functionality allows to zero the weigh of the scale structure (e.g. empty silo, conveyor, etc.) without changing the calibration in memory.

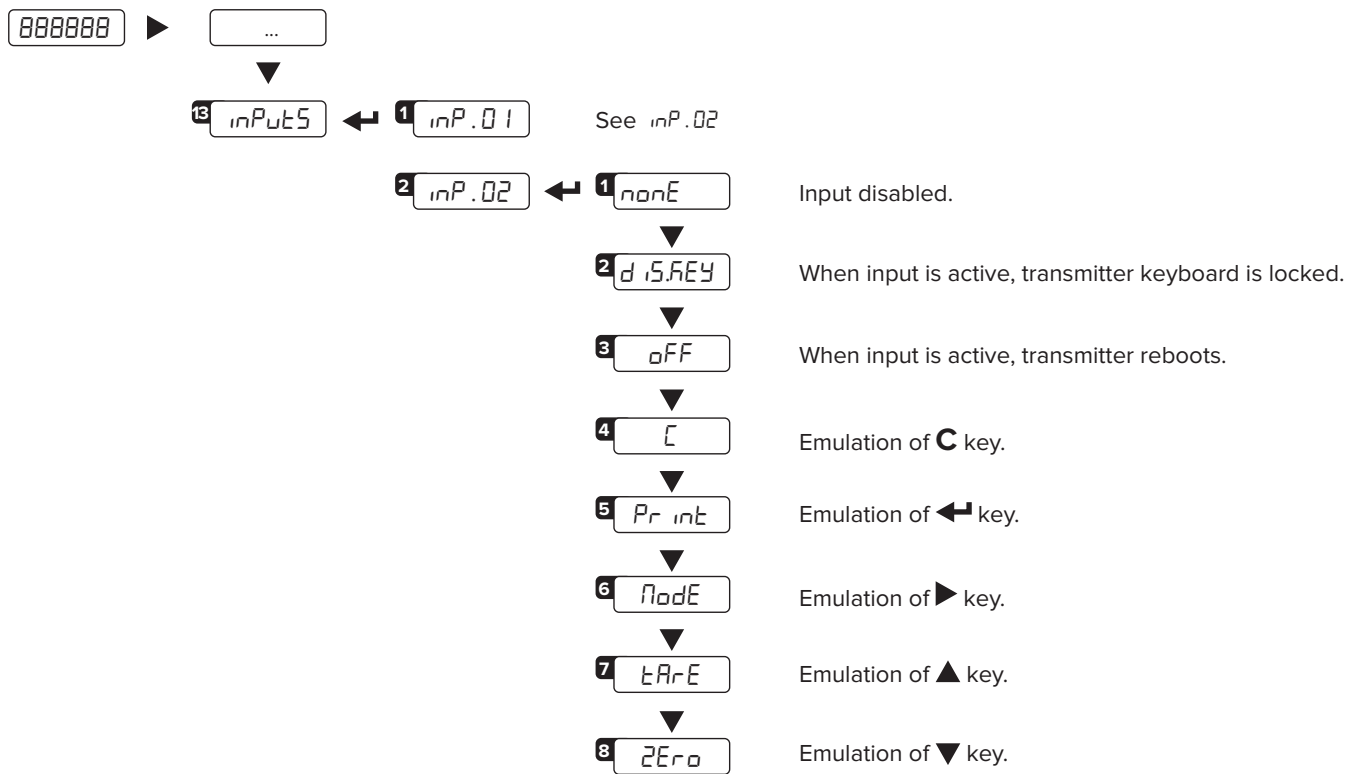## 9. Calibration with Sample Weight

`888888` ▶ `...`

▼

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 `SAUE?` message will appear, then press ⏎ to confirm).
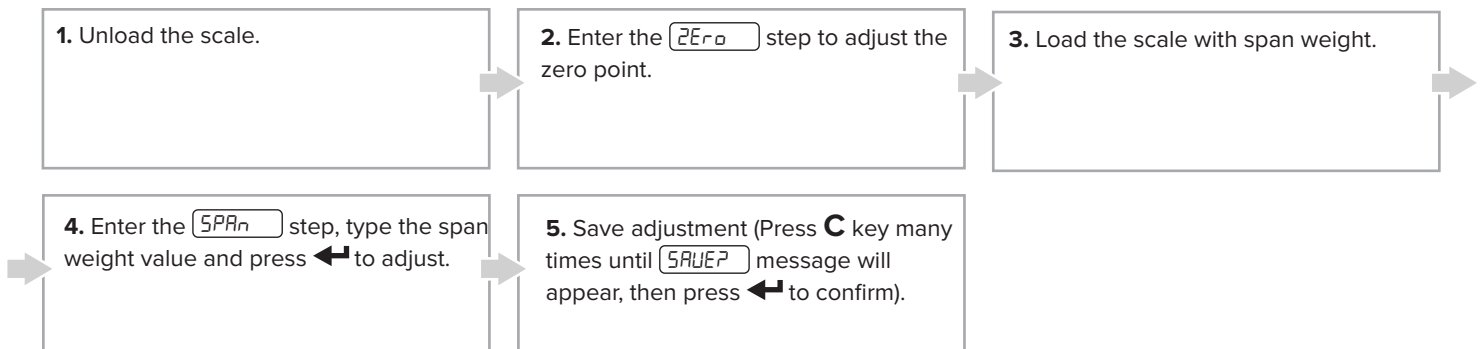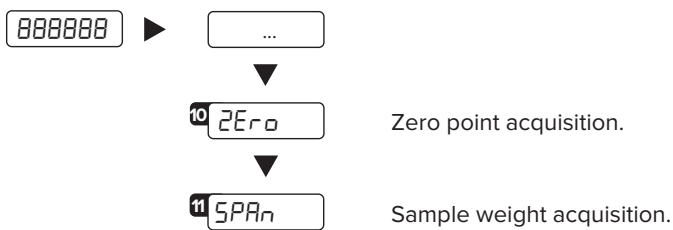
10. Load Cell Diagnostics (µV/V)

`888888` ▶ `...`

▼

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 ▲.

11. Inputs Settings

| 888888 | ▶ | ... |

▼

13 inPutS ↵ **1** inP.01   See inP.02

2 inP.02 ↵ **1** nonE   Input disabled.

▼

2 d iS.REY   When input is active, transmitter keyboard is locked.

▼

3 oFF   When input is active, transmitter reboots.

▼

4 C   Emulation of **C** key.

▼

5 Pr int   Emulation of ↵ key.

▼

6 ModE   Emulation of ▶ key.

▼

7 tArE   Emulation of ▲ key.

▼

8 ZEro   Emulation of ▼ key.

12. Outputs Settings

| 888888 | ▶ | ... |

▼

14 outPut ↵ **1** out.01   See out.02.

▼

2 out.02 ↵ **1** nor'nC   Normally open / normally close.

▼

2 FunC ↵ **1** 0 nonE   Output disabled.

▼

2 1 GroS   Setpoint on gross weight.

▼

3 2 nEt   Setpoint on net weight.

12.1 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. |

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13. RS485 Port

`888888` ▶ `...`

▼

15 `485` ↵ **1** `SEt.Add`   485 address (*01* to *98*).

▼

2 `bAud`   Baud rate (*1200*, *2400*, *4800*, *9600*, *19200*, *38400*, *57600*, *115200*).
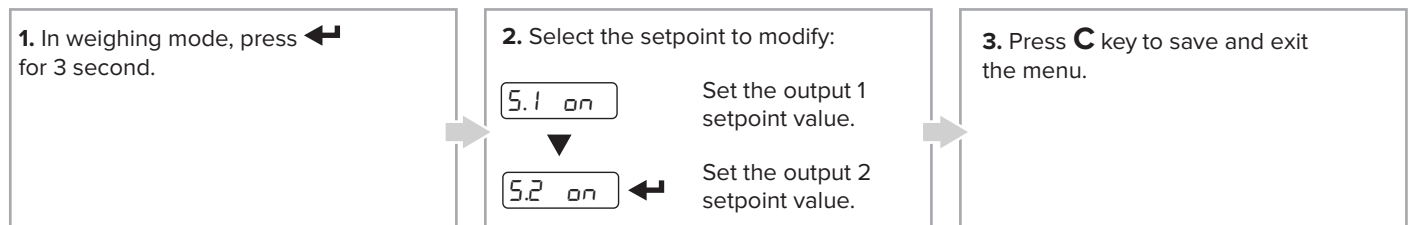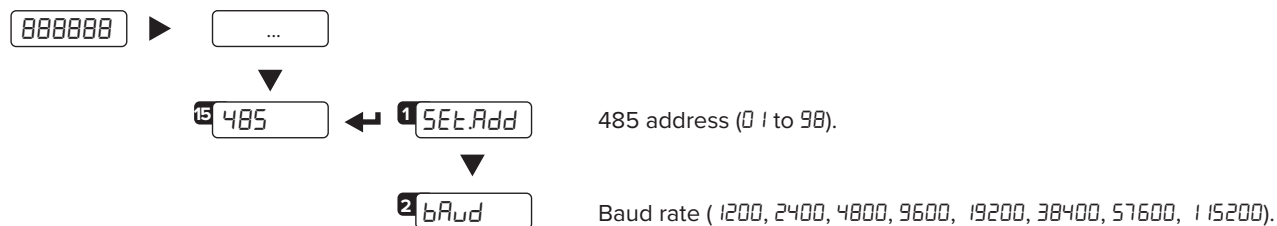
i

The RS485 port is configured by default to communicate in Modbus RTU.

14. Fieldbus Settings

`888888` ▶ `...`

▼

16 `FLdbuS` ↵ `YES` ↵ `Fb. in it` ... `Eth iP` ... `Fb.SEtP`

▼

`no`

Set the IP address:

`Fb.SEt` ↵ **1** `Aut.CFG`   Dynamic IP address.

2 `iP.Add`   Static IP address.

3 `nEt.MSA`   Subnet mask.

4 `GAt.HAY`   Default gateway.
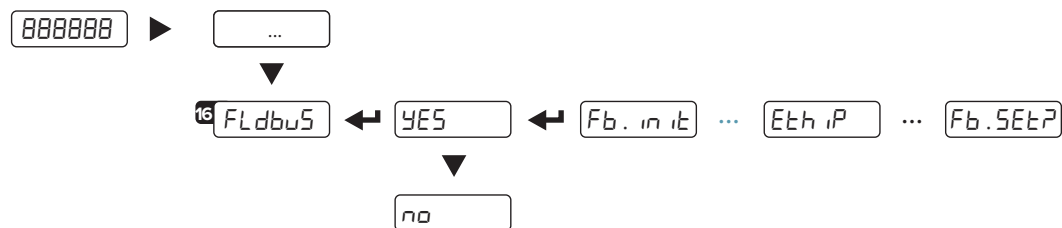
15. Load Cell Exclusion (for dependent channel systems)

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.

🔟 `EHCL.Ch` ← **1** `nonE`		No channel excluded.
2 `Ch  1`		Channel 1 excluded.
3 `Ch  2`		Channel 2 excluded.
4 `Ch  3`		Channel 3 excluded.
5 `Ch  4`		Channel 4 excluded.
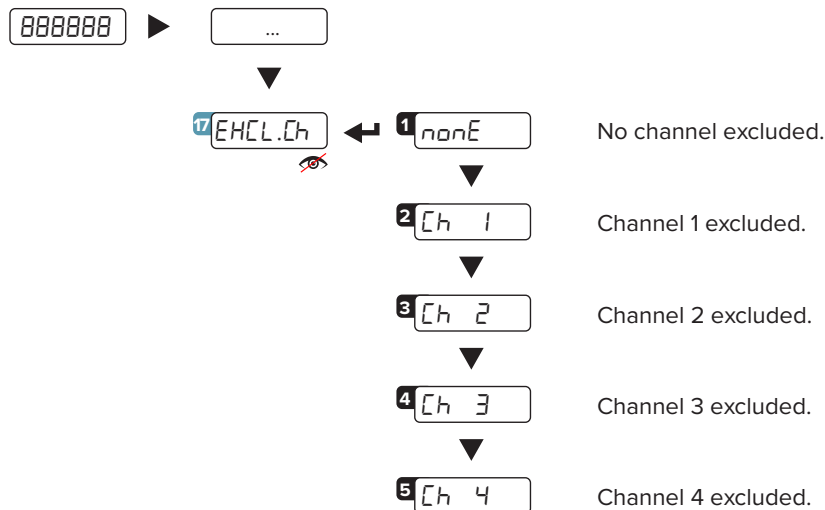
👁 *Visible only in dEP.Ch mode.*

16. Weight Filter
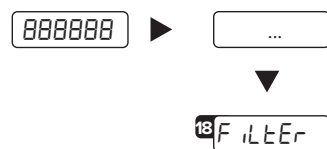
🔟 `F ILtEr`

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

🔟 `unb.Str` 👁
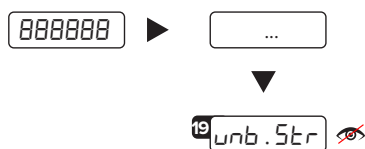
👁 *Visible only in dEP.Ch mode.*

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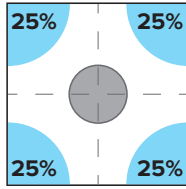
Condition saved
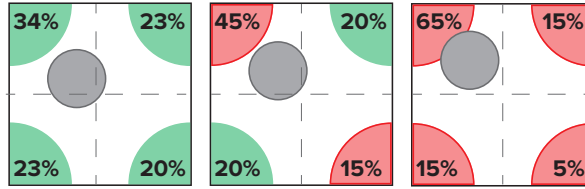
The unbalance condition is signaled via Modbus / Fieldbus or a digital output (refer to the complete manual to set the output).

> ℹ️ This function is only available if $EHEL.Eh = nonE$.
> 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 ($2Ero$), then proceed with sample weight acquisition ($5PAn$) (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 configured.
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 $AdE.uU$ 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. Ethernet/IP

19.1 ETHERNET/IP REGISTERS - dEP.Ch / ind.ch **(1 SCALE)**

Data	Byte	DESCRIPTION
Gross weight	0 (MSB) 1 2 3 (LSB)	Bytes 1, 2, 3 and 4 contain the Gross Weight value.
Net weight	4 (MSB) 5 6 7 (LSB)	Bytes 5, 6, 7 and 8 contain the Net Weight value.
Input status register	8 (MSB)	Bit 15 (msb) Active channel. Bit 14 Active channel. Bit 13 No function. Bit 12 No function. Bit 11 No function. Bit 10 No function. Bit 9 Status of input n. 2. Bit 8 (lsb) Status of input n. 1.
	9 (LSB)	Bit 7 (msb) 1 = Scale unloaded (gross weight = 0). Bit 6 Tare PT (1 = PT tare is active). Bit 5 Tare (1 = Tare is active). Bit 4 Overload condition (0 = No; 1 = Overload). Bit 3 Underload condition (0 = No; 1 = Underload). Bit 2 Weight Stability (0 = Unstable; 1 = Stable). Bit 1 Gross Weight Polarity (0 = "+"; 1 = "-"). Bit 0 (lsb) Net Weight Polarity (0 = "+"; 1 = "-").
Command status register	10 (MSB)	Last received command.
	11 (LSB)	Bit 7 (msb) Last command result. Bit 6 Last command result. Bit 5 Last command result. Bit 4 Last command result. Bit 3 Counting of processed commands. Bit 2 Counting of processed commands. Bit 1 Counting of processed commands. Bit 0 (lsb) Counting of processed commands.
Output status register	12 (MSB)	No Function.
	13 (LSB)	Bit 7 (msb) No function. ... ... Bit 2 No function. Bit 1 Digital output 2 status (0 = OFF; 1 = ON). Bit 0 (lsb) Digital output 1 status (0 = OFF; 1 = ON).
Selected page	14 (MSB) 15 (LSB)	Shows the value of the selected page (3001).
µV Channel 1	16 (MSB) 17 (LSB)	Bytes 16 and 17 contain the µV value of the channel 1.
µV Channel 2	18 (MSB) 19 (LSB)	Bytes 18 and 19 contain the µV value of the channel 2.
µV Channel 3	20 (MSB) 21 (LSB)	Bytes 20 and 21 contain the µV value of the channel 3.
µV Channel 4	22 (MSB) 23 (LSB)	Bytes 22 and 23 contain the µV value of the channel 4.

Bit 15	Bit 14	Active Channel
0	0	Channel 1
0	1	Channel 2
1	0	Channel 3
1	1	Channel 4

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19.2 ETHERNET/IP REGISTERS - ınd.ch (4 SCALES)

Data	Byte	DESCRIPTION			
Status register scale 1	0 (MSB)	Bit 15 (msb) — Not used. Bit 14 — Not used. Bit 13 — Not used. Bit 12 — Scale active (0 = "no"; 1 = "yes"). Bit 11 — Decimals (00 = 0; 01 = 1; 10 = 2; 11 = 3) Bit 10 Bit 9 — Unit of Measure (00 = "g"; 01 = "kg"; 10 = "t"; 11 = "lb"). Bit 8 (lsb)			
	1 (LSB)	Bit 7 (msb) — Tare PT (1 = PT tare is active). Bit 6 — Tare (1 = Tare is active). Bit 5 — Net Weight Polarity (0 = "+"; 1 = "-"). Bit 4 — 1 = Scale unloaded (gross weight = 0). Bit 3 — Overload condition (0 = No; 1 = overload). Bit 2 — Underload condition (0 = No; 1 = underload). Bit 1 — Stability (0 = "unstable"; 1 = "stable"). Bit 0 (lsb) — Gross Weight Polarity (0 = "+"; 1= "-").			
Status register scale 2	2 (MSB) 3 (LSB)	Same as Status register scale 1.			
Status register scale 3	4 (MSB) 5 (LSB)	Same as Status register scale 1.			
Status register scale 4	6 (MSB) 7 (LSB)	Same as Status register scale 1.			
Input status register	8 (MSB)	Bit 15 (msb) — Active channel. Bit 14 — Active channel. Bit 13 — No function. Bit 12 — No function. Bit 11 — No function. Bit 10 — No function. Bit 9 — Status of input n. 2. Bit 8 (lsb) — Status of input n. 1.	**Bit 15** / **Bit 14** / **Active Channel**: 0 / 0 / Channel 1 0 / 1 / Channel 2 1 / 0 / Channel 3 1 / 1 / Channel 4		
	9 (LSB)	No function.			
Command status register	10 11 (LSB)	Same as Command status register page 10.			
Output status register	12 (MSB) 13	Same as Output status register page 10.			
Selected page	14 15 (LSB)	Shows the value of the selected page (2000).			
Gross weight scales 1, 2, 3 and 4	16, 20, 24, 28 (MSB) 17, 20, 24, 29 18, 22, 26, 30 19, 23, 27, 31 (LSB)	Bytes 16, 17, 18 and 19 contain the Gross Weight of scale 1. Bytes 20, 21, 22 and 23 contain the Gross Weight of scale 2. Bytes 24, 25, 26 and 27 contain the Gross Weight of scale 3. Bytes 28, 29, 30 and 31 contain the Gross Weight of scale 4.			

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19.3 ETHERNET/IP REGISTERS FOR COMMAND SENDING

Data	Byte	DESCRIPTION
Not used	0	Always 0.
Command	1	Main available commands:

Value	Command
00 Hex	No command
01 Hex	Scale zeroing
02 Hex	Tare
03 Hex	Preset Tare
0A Hex	Setpoint 1 setting
0B Hex	Setpoint 2 setting
19 Hex	Digital output setting
22 Hex	Reboot the weight transmitter

Data	Byte	DESCRIPTION
Parameter 1	2 (MSB) 3 4 5 (LSB)	First parameter of the command. Parameter is always expressed in absolute mode (no decimals, no sign).
Parameter 2	6 (MSB) 7 8 9 (LSB)	Second parameter of the command. Parameter is always expressed in absolute mode (no decimals, no sign).
	10 (MSB) ... 31 (LSB)	Used in advanced configuration, refer to the complete Fieldbus manual for further information.

EXAMPLE 1

For zeroing the weight on the scale:

2. Set the command in byte 2

Byte	Value
1	00 Hex
2	01 Hex

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	00 Hex
2	03 Hex
3(MSB)	00 Hex
4	00 Hex
5	03 Hex
6(LSB)	E8 Hex

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