

MANUAL

ETLB

INTELLIGENT JUNCTION BOX, 8 CHANNELS

Installation and user manual



Document	Version	Date	Applies to
Installation and user manual	V00x	10/2026	ETLB, rail and board version

This manual describes installation, connection and operation of the ETLB intelligent junction box through keypad and display and through the communication interface, as well as the communication protocols and the Ethernet TCP/IP option. The approved (legal for trade) version has manuals of its own.



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1 About this manual

Display texts are set in a fixed-width typeface, as they appear on the display, for example **CALib**. Keys are written in square brackets (section 8.1). A menu path is a sequence of keys and display texts, for example:

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO**

000000 stands for the weight display. “[ENTER]+[ESC]” means: press [ENTER] immediately followed by [ESC].

1.1 Symbols

Notice	Meaning
Caution	Risk of electric shock, or: this operation must be performed by skilled personnel.
Important	Pay particular attention to the following instructions.
Note	Further information.

1.2 Keypad and communication interface

This manual explains the operation of the instrument through keypad and display and through the communication interface. For example, the section filter on the weight first explains what the filter does and how to modify it via keypad; the part “Via the communication interface” explains how to perform the same operation with the communication interface commands.

Knowledge of the following topics is assumed: weight values via the communication interface (section 11.1, division), alarms (chapter 19) and registers of the communication interface (chapter 9). The registers are listed in chapter 23 (Modbus RTU).

2 Safety, warranty and disposal

2.1 Recommendations for proper use

- Keep away from heat sources and direct sunlight.
- Protect the instrument from rain (except special IP versions).
- Do not wash with water jets (except special IP versions).
- Do not dip in water.
- Do not spill liquid on the instrument.
- Do not use solvents to clean the instrument.
- Do not install in areas subject to explosion hazard (except special Atex versions).

2.2 Warranty

24 months from the date of the delivery note. The warranty covers only failures of defective components (due to construction defects or defects in materials) and includes replacement or repair of the components and related labour costs.

The warranty is automatically forfeited in the event of:

- tampering, deletion, removal of the identification label and/or serial number of the product;
- misuse, transformation, alteration, repair of products not carried out by the manufacturer.

A 1-year warranty from the date of the delivery note applies to defects in material or manufacture of the battery.

2.3 Guidelines for proper disposal

- This is electrical/electronic equipment and cannot be disposed of as municipal solid waste, but must be delivered to a recycling centre.
- Improper use or disposal can pollute the environment or damage human health.
- Non-compliance with these guidelines will be penalised in accordance with the regulations in force in the country of destination.
- Dispose of the packing and packaging as required by local regulations.

3 Installation

3.1 Installation of the instrument

The terminals indicated on the wiring diagram to be connected to earth must have the same potential as the weighed structure (same earthing pit or earthing system). If you are unable to ensure this condition, connect the terminals of the instrument (including the terminal –SUPPLY) to the weighed structure with an earthing wire.

- Lead the cell cable individually to its panel input and do not share a conduit with other cables; connect it directly to the instrument terminal strip without breaking its route with support terminal strips.
- Use RC filters on the instrument-driven solenoid valve and remote control switch coils.
- Avoid inverters in the instrument panel; if inevitable, use special filters for the inverters and separate them with sheet metal partitions.
- The panel installer must provide electric protections for the instruments (fuses, door lock switch etc.).
- It is advisable to leave the equipment always switched on to prevent the formation of condensation.

Maximum cable lengths

Connection	Length
RS485	1000 m with AWG24 shielded and twisted cables
RS232	15 m for baud rates up to 19200

3.2 Installation of the load cells

Sizing of load cell capacity

For safety reasons, in case of static weighing, use the load cells at a maximum of 70–80 % of their nominal capacity (assuming that the load is uniformly distributed over the entire weighed structure); depending on the handling mode of the load (e.g. forklifts, bridge cranes), consider reducing the percentage further. With dynamic loads the installer has to estimate the thrust speed, the acceleration, the frequency etc.

Installing load cells

The load cells must be placed on rigid, stable in-line structures; use the mounting modules for load cells to compensate for misalignment of the support surfaces.

Protection of the cell cable

Use waterproof sheaths and joints in order to protect the cables of the cells.

Mechanical restraints (pipes etc.)

When pipes are present, use hoses and flexible couplings with open mouthpieces with rubber protection; with hard pipes, place the pipe support or anchor bracket as far as possible from the weighed structure (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 welding point to prevent sending current through the load cell body.

Wind, knocks, 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 plant is protected against lateral shifting and tipping relating to shocks and vibration, windy conditions, seismic conditions in the installation setting and stability of the support structure.

Earthing the weighed structure

By means of a copper wire with suitable cross-section, connect the cell upper support plate with the lower support plate, then connect all the lower plates to a single earthing system. Electrostatic charges accumulated because of the product rubbing against the pipes and the weighed container walls are discharged to the ground without going through or damaging the load cells. Failure to implement a proper earthing system might not affect the operation of the weighing system; this, however,

does not rule out the possibility that the cells and connected instrument may become damaged in the future. It is forbidden to ensure earthing system continuity by using metal parts contained in the weighed structure.

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

4 Testing the load cells

4.1 Load cell input test (quick access)

Menu **000000** > **[PRINT] 3 s** > **mV-CEL** > **[ENTER]** > **CH 1**

From the weight display, press [PRINT] for 3 seconds: the response signal of each load cell (**CH 1** ... **CH 8**) is displayed in mV with three decimals. Example: a load cell with 2.000 mV/V sensitivity provides a response signal between 0 and 10 mV.

4.2 Load cell testing

Resistance measurement (with a digital multimeter)

- Turn off the instrument.
- The value between the positive and the negative signal wire must be equal or similar to the output resistance given in the load cell data sheet.
- The value between the positive and the negative excitation wire must be equal or similar to the input resistance given in the load cell data sheet.

Voltage measurement (with a digital multimeter)

- Turn on the instrument.
- Take out the load cell to be tested from underneath the container, or lift the container support.
- Make sure that the excitation of the two wires of the load cell connected to the instrument is 5 V DC $\pm$ 3 %.
- Measure the response signal between the positive and the negative signal wire directly with the tester; it must be between 0 and $\pm$ 0.5 mV.
- Apply load to the cell and make sure that the signal increases.

Important If one of these conditions is not met, contact the technical assistance service.

5 Product description

5.1 Main specifications

Intelligent junction box with 6-wire load cell inputs for assembly on an Omega/DIN rail on the back panel. Dimensions 125 × 92 × 52 mm. Backlit alphanumeric LCD display, 38 × 16 mm viewing area, two lines of eight digits (5 mm height). 4-key keypad.

Two serial ports (RS485 and RS232) for connection to PC/PLC (up to 32 instruments, max. 99 with line repeaters) by ASCII or Modbus RTU protocol, to a remote display and to a printer. Optional: integrated Ethernet TCP/IP output (chapter 24). Two ETLB together form a 16-channel system (chapter 17). Manufacturer designation: CLM8.

Function	Description
8 independent channels	automatic detection of the connected load cells
Digital equalization	load cell response uniformed via software
Load distribution	indication of the weight percentage on each load cell
Automatic diagnostics	load distribution check to detect any faults
Events log	storage of the last 50 events: calibrations, zero settings, errors, equalizations

5.2 Versions

Version	Dimensions	Remark
Rail version	125 × 92 × 52 mm	assembly on Omega/DIN rail
Board version	151 × 72 × 30 mm	naked, board only
IP67 box, stainless steel AISI 304	200 × 148 × 45 mm	8 + 2 cable glands/plugs

Further boxes and options (inclinometer, Ethernet TCP/IP) are listed in the ETLB datasheet.

6 Technical specifications

Item	Value
Power supply and consumption	12/24 V DC ± 10 %; 5 W
No. of load cells in parallel and supply	max. 16 (350 Ω); 5 V DC / 240 mA
Linearity	< 0.01 % F.S.
Thermal drift	< 0.0005 % F.S./°C
A/D converter	8 channels, 24 bit (16 000 000 points), 4.8 kHz
Divisions (measurement range ± 10 mV = sens. 2 mV/V)	± 999999
Measurement range	± 39 mV
Max. sensitivity of usable load cells	± 7 mV/V
Max. conversions per second	600
Display range	± 999999
No. of decimals / display increments	0 ... 4 / x1 x2 x5 x10 x20 x50 x100
Digital filter / readings per second	21 levels / 5 ... 600 Hz
Serial ports	RS485, RS232
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 115200
Humidity (non-condensing)	85 %
Storage temperature	−30 ... +80 °C
Working temperature	−20 ... +60 °C

UL version

Item	Value
Working temperature	−20 ... +60 °C
Supply	equipment to be powered by a 12 ... 24 V DC LPS or Class 2 power source

7 Electrical connections

7.1 Basic information

- Connect terminals 39 and 40 to the earthing system.
- It is possible to supply up to 16 load cells of 350 Ω .
- Connect terminal –SUPPLY to the RS485 common of the connected instruments if these receive alternating current input or have an optically isolated RS485.
- In an RS485 network with several devices, activate the 120 Ω termination resistance on the two devices at the ends of the network (section 15.3).

7.2 Terminals

No.	Function	No.	Function
1	–load cell 5 signal	21	+supply (12/24 V DC)
2	+load cell 5 signal	22	–supply (12/24 V DC) · RS232, RS485: shield, GND
3	–load cells 5 and 6 excitation (–EX)	23	load cells 3 and 4 shield
4	+load cells 5 and 6 excitation (+EX)	24	+load cell 4 signal
5	–load cell 6 signal	25	–load cell 4 signal
6	+load cell 6 signal	26	+load cells 3 and 4 excitation (+EX)
7	load cells 5 and 6 shield	27	–load cells 3 and 4 excitation (–EX)
8	+load cells 5, 6, 7, 8 REF/SENSE	28	+load cell 3 signal
9	–load cells 5, 6, 7, 8 REF/SENSE	29	–load cell 3 signal
10	–load cell 7 signal	30	–load cells 1, 2, 3, 4 REF/SENSE
11	+load cell 7 signal	31	+load cells 1, 2, 3, 4 REF/SENSE
12	–load cells 7 and 8 excitation (–EX)	32	load cells 1 and 2 shield
13	+load cells 7 and 8 excitation (+EX)	33	+load cell 2 signal
14	–load cell 8 signal	34	–load cell 2 signal
15	+load cell 8 signal	35	+load cells 1 and 2 excitation (+EX)
16	load cells 7 and 8 shield	36	–load cells 1 and 2 excitation (–EX)
17	+RS485	37	+load cell 1 signal
18	–RS485	38	–load cell 1 signal
19	RX RS232	39	GND – earthing system
20	TX RS232	40	GND – earthing system

Terminals 23 ... 38 are on one long side (load cells 1 ... 4), terminals 1 ... 16 on the other (load cells 5 ... 8). Each load cell has its own signal pair (one channel per cell); each two cells share excitation and shield, each four cells one REF/SENSE pair.

7.3 4-wire load cells and reference wires

Important If all the load cells used are 4-wire, close the two jumpers “4 | 6 Wire connection” on the board next to terminals 39 and 40.

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

8 Display, symbols and keys

8.1 Keys

Key	Short press	Long press (3 s)	Into menus
[ESC] (>0< ESC)	semi-automatic zero	tare resetting	cancel or return to the previous menu
[TARE] (left arrow)	gross > net	net > gross	select the figure to be modified or go to the previous menu item
[PRINT] (up arrow)	weight print	gross weight: mV load cell test · net weight: temporarily display the gross weight	modify the selected figure or go to the next menu item
[ENTER] (MENU ENTER)	–	–	confirm or enter a submenu
[ENTER]+[ESC]	setting general parameters	–	–
[ENTER]+[TARE]	setting preset tare	–	–

“+” means: press the first key immediately followed by the second. Changes in the menus are applied right after pressing [ENTER], no further confirmation is required.

8.2 Display symbols

Symbol	Function
n	net weight (semi-automatic tare or preset tare)
0	zero (deviation from zero not more than ± 0.25 divisions)
s	stability
k	unit of measure: kg
g	unit of measure: g
1, 2, 3	not used

The symbols are activated in sequence within the menus to indicate that the display is not showing a weight.

8.3 Menu map, system parameters

Access	Menu	Items	Section
[ENTER]+[ESC]	CALIB	FS-tEO SeNSIb dIVIS mASS 2Er0 INP 0 WEIGHt StAbLE (tYPE tIME) unIt SEL CH EquAL (MOde EqrEA EqteO Equ H EqCOr dELEqu)	11, 12, 13.4
	FILtEr	tYPE 0 tYPE 1	13.1
	PARA 0	0 SEt AUt0 0 trAC 0	13.3
	SERIAL	rS485 / rS232: nOnE ModBUS ASCII COnTIn rIP HdrIP HdrIPn YHL PrIntr CMAStE CSLAUe InCL · bAUd Addr dELAY PARItY StOP	15
	dIAG	AUt StAtUS MEMrIP dELEtE ErSEt AUt 0 ErSEt0 CMP 0	16
	tEst	StAtUS mV-CEL mV-0-M	16.6
	EUEnt	dIS EU dEL EU Prt EU	16.7
	InFO	GENrIC	16.8
[ESC] 3 s	2Er0	–	11.3
[PRINT] 3 s	mV-CEL	–	4.1
[ENTER]+[TARE]	P-tArE	–	14.2

The menus below **CALIB** are selected with [TARE] and [PRINT]. With the Ethernet TCP/IP option the **EtHnEt** menu is added (chapter 24).

9 Communication interface

9.1 Parameters and registers

The following parameters are used by the communication interface; their position among the data exchanged by the instrument is shown in the register list, section 23.4.

Code	Meaning
GW, NW	gross weight, net weight: positive integer numbers including decimal figures, without decimal point; sign and errors are in the status register.
R1, W1	exchange registers for reading (R1) and writing (W1), used for instrument management.
SR1	status register (section 9.2).
ERC, AERC	error code and auxiliary error code (section 19.3).
EXC, AEXC	execution code and auxiliary execution code of the commands sent to CMDR (section 9.3).
CMDR	command register: the commands are sent to the instrument through this register.
DU	division (L byte) and unit of measure (H byte), sections 11.1 and 13.4.
CALW	sample weight for instrument calibration (section 11.5).
PT	preset tare (section 14.2).

9.2 Status register SR1

Bit	Meaning	Bit	Meaning
0	load cell error	8	net weight negative sign
1	AD converter malfunction	9	—
2	maximum weight exceeded by 9 divisions	10	net display mode
3	gross weight over 110 % of full scale	11	weight stability
4	gross weight over 999999 or less than -999999	12	weight within $\pm 1/4$ of a division around ZERO
5	net weight over 999999 or less than -999999	13	—
6	—	14	—
7	gross weight negative sign	15	load cells references not connected

9.3 Command execution status

Read the execution code command in EXC and the auxiliary execution code command in AEXC. Both are expressed through a 4-byte number in which the two H bytes represent EXC and the two L bytes AEXC.

EXC	AEXC	Description
command code sent to CMDR	0	execution completed successfully
1	0	running
-2	0	the limits allowed for the parameter have been exceeded
-3	1	sample weight equal to zero
-3	2	maximum number of calibration points reached
-3	3	sample weight already used in the current calibration
-3	4	number of active channels other than one: this filtering level cannot be selected
-3	5	no active channels
-3	6	invalid function selected
-3	7	equalization disabled
-3	8	slow set, function not available
-3	9	the current load cell has already been equalized
-3	10	preset tare equal to zero
-3	11	semi-automatic tare active: preset tare not allowed
-3	12	gross weight equal to zero
-3	14	set value less than or equal to the preset value
-3	15	preset value greater than the set value
-3	16	incorrect requested configuration
-3	17	invalid output index
-3	18	invalid channel index
-3	19	unstable weight
-3	20	gross weight greater than the maximum capacity

EXC	AEXC	Description
-3	21	semi-automatic tare active: semi-automatic zero not allowed
-3	22	weight greater than the value of parameter 0 Set
-3	31	weight less than the minimum allowed value
-3	32	no load cell or axis is loaded
-3	33	incorrect index of load cell or axis
-4	0	qualified access required for parameter modification
-5	0	command not available in the current configuration

Example: content of R1 when prompted to enter a calibration point while all available points are already used – H (2 bytes)
0xFFFD = -3, L (2 bytes) 0x0002 = 2, total 0xFFFD0002 = -196606.

10 Instrument commissioning

Upon switch-on, the display shows in sequence:

- **111111** > **999999** (ONLY in case of an approved program);
- the instrument model;
- **SU** followed by the software code;
- the program type **bASE** (base);
- **r** followed by the software version;
- **HU** followed by the hardware code;
- the serial number.

Check that the display shows the weight and that the weight increases when loading the load cells. If not, check the connections and the correct positioning of the load cells.

Instrument already theoretically calibrated

(plant system identification tag present on the instrument and on the cover: the load cells' rated data are already entered)

- If the system uses load cells with different sensitivity, perform a real or theoretical equalization (sections 12.3 to 12.5).
- Reset to zero (section 11.3).
- Check the calibration with sample weights and correct the indicated weight if necessary (section 11.5).

Instrument not calibrated

(missing plant system identification tag) – proceed with calibration:

- If the system uses load cells with different sensitivity, perform a real or theoretical equalization (sections 12.3 to 12.5).
- If the load cell data are unknown, follow the procedure in section 11.5.
- Enter the rated data of the load cells following section 11.1.
- Reset to zero (section 11.3).
- Check the calibration with sample weights and correct the indicated weight if necessary (section 11.5).

If you use serial communication, set the related parameters (chapter 15).

11 System parameters and calibration

From the weight display, press [ENTER] and [ESC] to access the parameter setting. Into menus:

Key	Function
[ENTER]	enter a menu or confirm the data entry
[PRINT]	modify the displayed figure or menu item
[TARE]	select a new figure or modify the displayed menu item
[ESC]	cancel and return to the previous menu

11.1 Theoretical calibration

This function allows the load cell rated values to be set: set in sequence the theoretical full scale, the sensitivity and the division.

Important Modifying the theoretical full scale or the sensitivity cancels the real calibration, only the theoretical calibration is considered valid, and the system parameters containing a weight value are set to default values. If the theoretical full scale and the full scale recalculated in real calibration are equal, the calibration in use is theoretical; if they are different, it is the real calibration based on sample weights.

Theoretical full scale

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO

FS-tEO (default: **dEMO**): the system full scale is one cell capacity multiplied by the number of cells used. Example: 4 cells of 1000 kg > full scale = $1000 \times 4 = 4000$. The instrument is supplied with a theoretical full scale value **dEMO** corresponding to 10000. To restore factory values, set 0 as full scale.

Via the communication interface

Writing	Reading
write the value in W1 > send command 6501 to CMDR	send command 6502 to CMDR > read the value in R1

Sensitivity

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > SenSIb

SenSIb (default: 2.00000 mV/V): load cell rated parameter in mV/V. Set the average sensitivity indicated on the load cells, between 0.50000 and 7.00000 mV/V. Example of a 4-cell system: 2.00100, 2.00150, 2.00200, 2.00250 > enter 2.00175, calculated as $(2.00100 + 2.00150 + 2.00200 + 2.00250) / 4$.

Via the communication interface

Writing	Reading
multiply the value by 100000 > write the value in W1 > send command 6503 to CMDR	send command 6504 to CMDR > read the value in R1 > divide the value by 100000

The sensitivity is expressed as a six-digit integer number. Example: to set 2.00175, write 200175.

Division

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > dIVIS

dIVIS: the division is the minimum weight increment that can be displayed. It is calculated automatically from the calibration so that it equals 1/10000 of full scale. It can be changed between 0.0001 and 100 with x1 x2 x5 x10 increments.

Index	Division	Decimals	Index	Division	Decimals
0	100	0	10	0.05	2
1	50	0	11	0.02	2
2	20	0	12	0.01	2
3	10	0	13	0.005	3
4	5	0	14	0.002	3
5	2	0	15	0.001	3
6	1	0	16	0.0005	4
7	0.5	1	17	0.0002	4
8	0.2	1	18	0.0001	4
9	0.1	1			

Via the communication interface

Writing	Reading
write the index in W1 > send command 6505 to CMDR	read the index in the least significant byte (L byte) of DU

Important When a parameter is expressed as a weight value, the divisions and active decimals set on the instrument apply: multiply or divide the value by 10 to the power of n (n = active decimals, table above) and round it to the set division.

Weight value	Division	Decimals	value to write	rounded
100	0.1	1	$1000 = 100 \times 10$	100.0
12.00	0.05	2	$1200 = 12.00 \times 100$	12.00
33	5	0	$33 = 33 \times 1$	35
20.123	0.002	3	$20123 = 20.123 \times 1000$	20.122

value read	Division	Decimals	Weight value
1000	0.1	1	$100.0 = 1000 / 10$
1200	0.05	2	$12.00 = 1200 / 100$
35	5	0	$35 = 35 / 1$
20122	0.002	3	$20.122 = 20122 / 1000$

11.2 Maximum capacity

Menu **[ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > mASS**

mASS: maximum displayable weight (from 0 to full scale; default: 0). When the weight exceeds this value by 9 divisions, the display shows ----- . To disable this function, set 0.

Via the communication interface

Writing	Reading
write the value in W1 > send command 6511 to CMDR	send command 6512 to CMDR > read the value in R1

11.3 Tare weight zero setting

Menu **[ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > 2Er0**

This menu may also be accessed directly from the weight display by holding down [ESC] for 3 seconds. Perform this procedure after having set the theoretical calibration. Use it to set to zero the weight of the empty system after commissioning and later on to compensate zero variations due to product residues.

- Confirm the message **2Er0** by pressing [ENTER].
- The weight value to be set to zero is displayed; all symbols are flashing.
- Confirm once again: the weight is set to zero and stored in the permanent memory.
- Press [PRINT] to display the total weight reset by the instrument, the sum of all previous zero settings.

With diagnostics on zero

If diagnostics on zero has been enabled (section 16.2), the instrument can display and store the load distributions on zero and the mV on active channels (section 16.6). If the stored weight is zero and all channels are **OFF**, no zero setting has been performed yet. Procedure:

Menu **2Er0** > **[ENTER]** > **A 5** > **[ENTER]** > **o 2**

- Confirm the message **2Er0** by pressing **[ENTER]**: the current weight value, preceded by the letter **A**, is displayed.
- Press **[TARE]** and **[PRINT]** to display in sequence the current load distribution on each channel (**1C ... 8C**); press **[ENTER]** to return to the previous display.
- Press **[ENTER]**: the last weight set to zero, preceded by the letter **o**, is displayed; press **[TARE]** and **[PRINT]** to display the load distribution stored during the last zero setting on each channel (**1o ... 8o**); press **[ENTER]** to return to the previous display.
- Press **[ENTER]**: the weight value to be set to zero is displayed; all symbols are flashing.
- Confirm once again: the weight is set to zero and stored in the permanent memory.
- Press **[PRINT]** to display the total weight reset by the instrument.

Caution Diagnostics on zero is performed only if the load distribution has been stored at least once.

Via the communication interface

Command
send command 100 to CMDR

11.4 Zero value manual entry

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **INP 0**

Caution Perform this procedure only if it is not possible to reset the weighed structure tare, for example because it contains product that cannot be unloaded.

Set the estimated zero value in this parameter (from -999999 to +999999; default: 0).

Via the communication interface

Writing	Reading
write the value in W1 > send command 6527 to CMDR	send command 6528 to CMDR > read the value in R1

11.5 Real calibration (with sample weights)

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **WEIGHT**

After the theoretical calibration, the equalization and the tare weight zero setting, this function allows calibration with sample weights of known value and correction of any deviations of the indicated value. Load a sample weight of at least 50 % of the maximum quantity to be weighed.

- Confirm **WEIGHT**: the flashing value of the weight currently on the system is displayed; all symbols are off.
- Adjust the value on display with the arrow keys if necessary.
- Confirm: the new set weight appears with all symbols flashing.
- Confirm again: **WEIGHT** is restored; press **[ESC]** repeatedly to return to the weight display.

Example: for a system of 1000 kg maximum capacity and 1 kg division, two sample weights of 500 kg and 300 kg are available. Load both and correct the indicated weight to 800. Remove the 300 kg weight: the system must show 500; remove the 500 kg weight too: the system must read zero. If not, a mechanical problem is affecting the system linearity.

Caution Identify and correct any mechanical problems before repeating the procedure. If the correction changes the previous full scale by more than 20 %, all parameters with settable weight values are reset to default values.

Linearisation on max. 8 points

The procedure can be repeated for up to eight points with eight different sample weights. It ends by pressing **[ESC]** or after the eighth value; afterwards only a new real calibration is possible – return to the weight display and re-enter the calibration menu. Pressing **[PRINT]** after confirming the sample weight shows the full scale recalculated from the maximum sample weight and the cell sensitivity (**SenSIb**).

Via the communication interface

Single calibration point	Multiple calibration points	Cancel real calibration
load a sample weight of at least 50 % of the maximum quantity > write the loaded weight value in CALW > send command 101 to CMDR > read the outcome in CALW (0 = OK)	load a sample weight > write the loaded weight value in CALW > send command 106 to CMDR > read the outcome in CALW (0 = OK) > repeat for up to 8 sample weights	send command 104 to CMDR

A single calibration point replaces the existing calibration. CALW is a 32-bit signed number; if the development system does not handle signed numbers, enter the two's complement, e.g. -56 kg = 0xFFFFFC8.

12 Stability, channels and equalization

12.1 Stability

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > StABLE

- **tYPE**: select how the weight is considered stable – **MOde0**: the weight value must remain within the same division for a time greater than or equal to **tIME**; **MOde 1**: the variation of the weight value must be less than or equal to one division for a time greater than or equal to **tIME**.
- **tIME** (from 0.1 to 3.0 s; default: 1.0 s): time needed to consider the weight stable.

Via the communication interface

Writing	Reading
write the value in W1 > send command 6579 to CMDR	send command 6580 to CMDR > read the value in R1

tYPE: 0 = **MOde0**, 1 = **MOde 1**.

Writing	Reading
write the value in W1 > send command 6581 to CMDR	send command 6582 to CMDR > read the value in R1

tIME in tenths of a second; example: to set 2.2 seconds, write 22 in W1.

12.2 Confirmation and change of active channels

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > SEL CH

After performing the calibration and verifying that the system works properly, you can confirm the channels automatically detected by the instrument; in case of accidental interruption of the cable of one or more load cells, the instrument then displays the **ErCEL 1** alarm (the number indicates the channel).

- **Auto** (default): **SURE?** is displayed; press [ENTER] to proceed or [ESC] to cancel. The display shows the number of channels automatically detected; press [ENTER] to confirm and save or [ESC] to exit with no change.
- **MANUAL**: **SURE?** is displayed; press [ENTER] to proceed or [ESC] to cancel. Press [TARE] or [PRINT] to select the channel, confirm with [ENTER] and press [TARE] or [PRINT] to activate (**On**) or deactivate it (**OFF**); press [ESC] to save the selection and exit.

Important After editing, repeat equalization, zero setting and calibration using a sample weight.

Via the communication interface

Active channels register (ACR): bit 0 ... 15 = channel 1 ... 16; bit = 1 active channel, bit = 0 not active channel. Example with 16-channel mode not enabled (channels 1 to 8, 9 to 16 not available): ACR 0x001B = 0b0000000000011011 – channels 1, 2, 4, 5 active, 3, 6, 7, 8 not active.

Manual setting – writing	Reading	Automatic setting
write the ACR value in W1 > send command 6575 to CMDR	send command 6576 to CMDR > read the ACR value in R1	send command 6094 to CMDR

Important At the end of the equalization (sections 12.3 to 12.8) perform the tare weight zero setting (section 11.3) and, if necessary, the real calibration (section 11.5).

12.3 Real equalization mode

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **MOdE**

- **COrnEr**: the load cells are considered individually (default).
- **AHIS**: the load cells are considered as pairs forming an axis – useful for weighing systems in which it is not possible to put the sample weight on the single load cells.

Via the communication interface

Writing	Reading
write the mode in W1 > send command 6741 to CMDR	send command 6742 to CMDR > read the mode in R1

0 = **COrnEr**, 1 = **AHIS**.

12.4 Real equalization

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **EqrEA**

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

- **EquAL0**: unload the scale, wait for stability and confirm by pressing **[ENTER]**.
- **EquAL 1**: place the sample weight on load cell 1 or axis 1, wait for stability and confirm by pressing **[ENTER]**.
- **EquAL2**: place the sample weight on load cell 2 or axis 2, wait for stability and confirm by pressing **[ENTER]**.
- Repeat the operation for each connected load cell or axis defined in the weighing system.

If equalization is successfully completed, the display shows **UALId**; press **[ENTER]** to exit. If an error occurs, the display shows **FAILED**; confirm with **[ENTER]** and repeat the procedure.

Via the communication interface

Start	Equalization zero	Equalization points	Conclusion
send command 6700 to CMDR	unload the weighing system > wait for the weight to be stable > write 0 in W1 > send command 6701 to CMDR	place the sample weight on a load cell or axis > wait for the weight to be stable > write the index of the point (1 to number of active channels or axes) in W1 > send command 6701 to CMDR > repeat for the remaining load cells or axes	send command 6702 to CMDR

Select the real equalization mode first (section 12.3).

12.5 Theoretical equalization

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **EqtEO**

SEnS 1 ... SEnS 16: set the sensitivity for each load cell, leaving it at 0 for non-active channels. If 16-channel mode is not enabled, channels 9 to 16 are not available.

Via the communication interface

Writing sensitivity values	Reading sensitivity values	Conclusion
write the channel index in W1 > send command 6703 to CMDR > write sensitivity × 100000 in W1 (0 if no load cell is connected) > send command 6563 to CMDR > repeat for all available channels	write the channel index in W1 > send command 6564 to CMDR > read the value in R1 > divide the value by 100000	send command 6704 to CMDR

Example: 2.00175 > write 200175; read 203170 > 2.03170.

12.6 Equalization coefficients

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **Equ H**

EqH 1 ... EqH 16: displays the equalization coefficients calculated for each active channel. If 16-channel mode is not enabled, channels 9 to 16 are not available.

Channel	Writing	Reading	Channel	Writing	Reading
1	6707	6708	9	6723	6724
2	6709	6710	10	6725	6726
3	6711	6712	11	6727	6728
4	6713	6714	12	6729	6730
5	6715	6716	13	6731	6732
6	6717	6718	14	6733	6734
7	6719	6720	15	6735	6736
8	6721	6722	16	6737	6738

Via the communication interface

Writing	Reading
multiply the value by 100000 > write the value in W1 > send the command from the table to CMDR	send the command from the table to CMDR > read the value in R1 > divide the value by 100000

The coefficients are expressed as six-digit integer numbers. Example: 1.20175 > write 120175; read 183170 > 1.83170.

12.7 Manual coefficient correction

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **EqCOR**

Important Use a sample weight equal to at least 50 % of the single load cell capacity. The channel whose equalization coefficient is to be corrected must be active.

- Confirm **Eq cor** with **[ENTER]**; the current weight is displayed.
- Place the sample weight on the load cell whose coefficient is to be corrected, wait for stability and confirm with **[ENTER]**.
- The current equalization coefficient is displayed: enter a value between 0.5 and 2, press **[ENTER]** to confirm or **[ESC]** to cancel.
- The weight calculated with the new coefficient is displayed: **[ENTER]** confirms and saves, **[ESC]** returns to the previous display.
- Repeat the procedure for each coefficient to be corrected.

Via the communication interface

Procedure
place the sample weight on the load cell > send command 6739 to CMDR > check the command execution status > with no error conditions, send command 6740 to CMDR > read the index of the loaded load cell in R1 > read the coefficient and write the new one (section 12.6) > check the calculated weight; repeat for each coefficient

12.8 Equalization deletion

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[TARE] [PRINT]** > **EquAL** > **[ENTER]** > **dLEqu**

SURE? is displayed: press **[ENTER]** to reset the equalization or **[ESC]** to cancel.

Via the communication interface

Command
send command 6046 to CMDR

13 Weight parameters

13.1 Filter on the weight

Menu **[ENTER]+[ESC]** > **CALib** > **[TARE] [PRINT]** > **FILtEr**

The filter stabilises the weight display. Two filter types are available: **tYPE 0** – standard filter (default); **tYPE 1** – moving average filter with fixed refresh frequency. To increase the effect (more stable weight) increase the filter level (from 0 to 9, default 4).

- Confirming **FILtEr** displays the currently programmed filter type.
- Select the filter type and confirm: the currently programmed filter level is displayed.
- Select the filter level and confirm: the weight is displayed so that its stability can be verified.
- If stability is not satisfactory, repeat the procedure until the result is optimal.

The filter stabilises a weight as long as its variations are smaller than the corresponding response time. Set it according to the application and the full scale.

Level	Response time tYPE 0 [ms]	Response time tYPE 1 [ms]	Refresh tYPE 0 [Hz]	Refresh tYPE 1, 1–4 channels [Hz]	Refresh tYPE 1, 5–8 channels [Hz]
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 (default)	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
A	6	–	600	–	–

Indicative values. Level “A” can only be set if the instrument is connected to one load cell only. Refresh = display and serial ports.

Via the communication interface

Writing	Reading
write the level in the two L bytes of W1 > write the type in the two H bytes of W1 > send command 6519 to CMDR	send command 6520 to CMDR > read the level in the two L bytes and the type in the two H bytes of R1

Example type 1, level 5: H 0x0001, L 0x0005, total 0x00010005 = 65541.

13.2 Anti peak

When the weight is stable, the anti peak filter removes any sudden disturbances with a maximum duration of 1 second. Confirm the filter on the weight with **[ENTER]** and select: **AntPOn** – anti peak filter enabled (default); **AntPOf** – anti peak filter disabled.

Via the communication interface

Writing	Reading
write the enabling status in W1 > send command 6541 to CMDR	send command 6542 to CMDR > read the enabling status in R1

0 = disabled, 1 = enabled.

13.3 Zero parameters

Menu [ENTER]+[ESC] > CALib > [TARE] [PRINT] > PARa 0

Resettable weight setting for small weight changes

0 SET (from 0 to full scale; default 300, decimals considered 300 – 30.0 – 3.00 – 0.300): maximum weight value resettable by external contact, keypad or serial protocol.

Via the communication interface

Writing	Reading
write the value in W1 > send command 6529 to CMDR	send command 6530 to CMDR > read the value in R1

Automatic zero setting at power-on

Auto 0 (from 0 to 10 % of full scale; default 0): if at switch-on the weight is lower than this value, the weight is reset. To disable this function, set 0.

Via the communication interface

Writing	Reading
write the value in W1 > send command 6521 to CMDR	send command 6522 to CMDR > read the value in R1

0 = function disabled.

Zero tracking

trAC 0 (from 1 to 5; default **nOnE**): when the weight is stable and, after a second, deviates from zero by a number of divisions smaller than or equal to this value, the weight is set to zero. To disable, set **nOnE**. Example: **dIVIS** = 5 and **trAC 0** = 2 – the weight is automatically set to zero for variations smaller than or equal to 10 (**dIVIS** × **trAC 0**).

Via the communication interface

Writing	Reading
write the value in W1 > send command 6531 to CMDR	send command 6532 to CMDR > read the value in R1

0 = function disabled.

13.4 Setting units of measure

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [TARE] [PRINT] > unIt

Index	Display	Unit
0	HILOG	kilograms
1	G	grams
2	t	tons
3	Lb	pounds
4	nEUton	newtons
5	LITrE	litres
6	bAr	bars
7	AtM	atmospheres
8	PIECE	pieces
9	nEU-M	newton metres
10	HILO-M	kilogram metres
11	Other	other

If the print function is enabled, the symbol of the selected unit of measure is printed after the measured value.

Via the communication interface

Writing	Reading
write the unit of measure index in W1 > send command 6523 to CMDR	read the index in the most significant byte (H byte) of DU

14 Tare and zero setting

14.1 Semi-automatic tare (net/gross)

Important The semi-automatic tare is lost upon instrument power-off.

To perform a net operation, press [TARE] for less than 3 seconds: the instrument displays the net weight (just set to zero) and the NET symbol lights up. To display the gross weight again, press [TARE] for 3 seconds. The operation can be repeated many times, for instance to load several products.

Example: put the box on the scale – the display shows the box weight; press [TARE] – the display shows the net weight as zero; put the product into the box – the display shows the product weight.

Note While the net weight is displayed, keep [PRINT] pressed to display the gross weight; when the key is released the net weight is displayed again. The semi-automatic tare is not allowed if the gross weight is zero (the display shows In2Er0).

Via the communication interface

Activation	Deactivation
send command 7 to CMDR	send command 9 to CMDR

14.2 Preset tare (subtractive tare device)

Menu **000000** > [ENTER]+[TARE] > **P-tArE**

A preset tare value can be set manually and subtracted from the displayed value, provided that $P-tArE \leq \text{max capacity}$. By default the last programmed preset tare is shown: to apply it press [PRINT] and then [ENTER]. Back in the weight display, the net weight (minus the preset tare) is shown and the NET symbol lights up. To delete it and return to the gross weight, hold down [TARE] for about 3 seconds; the preset tare is set to zero and the NET symbol goes off.

- While the net weight is displayed, keeping [PRINT] pressed displays the gross weight.
- If a semi-automatic tare (net) is entered, the preset tare function cannot be accessed.
- If a preset tare is entered, the semi-automatic tare is still possible; the two tares are added.
- Both tare functions are lost when the instrument is turned off.

Via the communication interface

Writing	Reading	Activation	Deactivation
write the value in PT	read the value in PT	send command 130 to CMDR	send command 9 to CMDR

Example 69312: H 0x0001, L 0x0ECO, total 0x00010ECO.

14.3 Semi-automatic zero

Press [ESC] for less than 3 seconds: **St0rE?** is displayed for 3 seconds; press [ENTER] to set the weight to zero. This is only allowed if the weight is lower than **0 SEt** (section 13.3); otherwise the alarm **t - - - -** appears and the weight is not set to zero. The zero setting is lost upon power-off.

Via the communication interface

Command
send command 8 to CMDR

15 Serial communication

15.1 Setting

Menu **[ENTER]+[ESC]** > **CALib** > **[TARE] [PRINT]** > **SERIAL** > **[ENTER]** > **rS485 / rS232**

- **nOnE**: disables any type of communication (default).
- **ModbUS**: Modbus RTU protocol; addresses from 1 to 99 (chapter 23).
- **ASCIi**: ASCII bidirectional protocol; addresses from 1 to 99; communication modes **MOdu60** and **MOd td** (chapter 22).
- **ContIn**: continuous weight transmission at the frequency set in **HErt2** (10 to 300) – **MOd t** or **MOd td** (each with **PARitY** = **nOnE**, **StOP** = 1; section 21.1).
- **rIP**: continuous transmission to remote displays, e.g. octagon EDLD; the remote display shows the net or gross weight according to its settings (**bAUd** = 9600, **PARitY** = **nOnE**, **StOP** = 1; section 21.2).
- **HdrIP**: continuous transmission to remote displays, e.g. octagon EDLF, EDLG; net or gross weight according to the remote display settings (**bAUd** = 9600, **PARitY** = **nOnE**, **StOP** = 1).
- **HdrIPn**: as **HdrIP**. When the remote display is set to gross weight, it shows the gross weight if the instrument displays the gross weight, and the net weight alternated with **nEt** if the instrument shows the net weight.
- **YHL**: continuous weight transmission protocol (section 21.3).
- **PrIntr**: printer (chapter 20).
- **CMAStE**: instrument as master, **CSLAUE**: as slave (16-channel mode, chapter 17).
- **InCL**: communication protocol with inclinometer (see inclinometer manual).

Parameter	Meaning
bAUd	transmission speed 1200, 2400, 4800, 9600, 19200, 38400, 115200 (default 9600)
Addr	instrument address, 1 to 99 (default 1)
HErt2	maximum transmission frequency with ContIn : 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200 – 300 (default 10)
dELAY	delay before the instrument replies, 0 to 200 ms (default 0)
PARitY	nOnE no parity (default) · EUEn even parity · Odd odd parity
StOP	stop bit 1 or 2 (default 1)
St bIt	stability character YES or nO (default nO); to be set with ContIn in MOd t mode (section 21.1)
nCOPY	number of copies, 1 to 9 (default 1)
EMPtY	number of blank lines between one printout and the next
HEAdEr	printing of a custom heading from PC, YES or nO (default nO)
PrtMOD	connected printer type: P 190 , StAUP , StAut

HErt2 maximum	Minimum baud rate
20 Hz	2400
40 Hz	4800
80 Hz	9600
100 Hz	19200
200 Hz	38400
300 Hz	38400

15.2 RS232 serial connection to a PC

Instrument	Terminal	PC, DB9-F connector, pin
RS232 TXD	20	2
RS232 RXD	19	3
GND	22	5

Shielded cable; max. 15 m for baud rates up to 19200 (section 3.1).

15.3 RS485 serial connection

The instruments are connected in parallel to a shielded cable via RS485+, RS485– and GND (up to 500 m in the example of the documentation); a PC with RS232 is connected through an RS485/RS232 converter supplied with 24 V DC.

Important If the RS485 network exceeds 100 m in length or baud rates over 9600 are used, two terminating resistors are needed at the ends of the network: close the two jumpers “RS485 Termination” on the furthest instruments. With other instruments or converters, refer to their manuals.

15.4 Direct connection RS485 – RS232 without converter

A two-wire RS485 output may be used directly on the RS232 input of a PC, remote display or printer: RS485 – of the instrument to RXD, RS485 + to GND of the RS232.

Caution This connection allows only ONE instrument to be used, in ONE-WAY mode.

16 Diagnostics, test and events

Menu **[ENTER]+[ESC]** > **CALiB** > **[TARE] [PRINT]** > **dIAG**

Important Only use the automatic diagnostics of load distribution in systems where load distribution can be repeated with each change of weight (for example: liquid weighing).

16.1 Load diagnostics

With stable weight, the instrument calculates and stores the load percentage on each channel. If under normal operation the load percentage error is higher than **ErSet**, the display shows the **ErdIAG** alarm alternated with the weight; the alarm remains active also upon power-off; press **[ENTER]** to cancel.

Display	Meaning
AUt	load diagnostics on (YES) or off (n0 ; default)
StAtUS	current weight preceded by the letter A ; press [ENTER] and then [TARE] and [PRINT] to display the load percentage on each active channel (1C ... 8C)
MEMrIP	stored load distributions (weight, load percentage on each channel, number of the distribution): confirm MEMrIP with [ENTER] – the weight of the first stored distribution is displayed preceded by the letter o ; [TARE] and [PRINT] show the stored weights in ascending order; [ENTER] shows the related distribution on each channel; [ENTER] or [ESC] returns
dELEtE	deletes the stored load distributions; SURE? is displayed – [ENTER] proceeds, [ESC] cancels
ErSet	difference between current and stored percentage beyond which ErdIAG is triggered (default 5.0)

Via the communication interface

Enabling writing	Enabling reading	Threshold writing	Threshold reading
write the enabling status in W1 > send command 6571 to CMDR	send command 6572 to CMDR > read the enabling status in R1	write threshold × 10 in W1 > send command 6567 to CMDR	send command 6568 to CMDR > read R1, divide by 10

Status 0 = disabled, 1 = enabled. Thresholds are integer numbers with one decimal: 15 % = 150. Cancellation of the stored load distributions: send command 6072 to CMDR.

16.2 Diagnostics on zero

When a zero setting is performed from the **CALiB** 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 (section 11.3). If with unloaded system the error is higher than **ErSet0**, **ErdIAG** is displayed alternated with the weight; the alarm remains active also upon power-off; press **[ENTER]** to cancel.

Display	Meaning
AUt 0	diagnostics on zero on (YES) or off (n0 ; default)
ErSet0	difference between current and stored percentage beyond which ErdIAG is triggered (default 5.0)
CMP 0	current load distribution on zero and the one previously stored: confirm CMP 0 with [ENTER] – the current weight is displayed with A ; [TARE] and [PRINT] show the last weight set to zero with o ; [ENTER] shows the distribution on each channel (1o ... 16o stored, 1C ... 16C current); [ENTER] or [ESC] returns

Via the communication interface

Enabling writing	Enabling reading	Threshold writing	Threshold reading
write the enabling status in W1 > send command 6573 to CMDR	send command 6574 to CMDR > read the enabling status in R1	write threshold × 10 in W1 > send command 6569 to CMDR	send command 6570 to CMDR > read R1, divide by 10

Tare weight zero setting and storage of the load distribution on zero: send command 6122 to CMDR.

16.3 Confirmation of the diagnostics error

To confirm **ErdIAG** via keypad see chapter 19.

Via the communication interface

Command
send command 6084 to CMDR

16.4 Load percentages on each channel via interface

On the display: section 16.6. When the function is enabled, the exchange registers contain the load percentage of each channel as an integer with one decimal (152 = 15.2 %): registers 40053 ... 40060 = channel 1 ... 8 or 9 ... 16 (2 bytes each).

Via the communication interface

Enabling	Disabling
write the percentage type in W1 > send command 6808 (channels 1 to 8) or 6810 (channels 9 to 16) to CMDR	send command 6809 to CMDR

Type: 0 = % of load related to the gross weight, 1 = related to the total weight (gross weight + zeroing component).

16.5 Response signals of the cells in mV via interface

When the function is enabled, registers 40053 ... 40060 contain the response signal of each channel (1 ... 8 or 9 ... 16) as a signed integer with two decimals (520 = 5.20 mV).

Via the communication interface

Enabling	Disabling
send command 6902 (channels 1 to 8) or 6908 (channels 9 to 16) to CMDR	send command 6903 to CMDR

16.6 Test

Menu **[ENTER]+[ESC] > CALib > [TARE] [PRINT] > tEst**

- Load distribution – **StAtUS**: current weight preceded by the letter **A**; press **[ENTER]** and then **[TARE]** and **[PRINT]** to display the load percentage on each active channel.
- Millivolt test – **mV-CEL**: response signal of each load cell (**CH 1 ... CH 8**) in mV with three decimals.
- Millivolt stored at zero setting (only if **Aut 0 = YES**) – **mV-0-M**: response signal of each load cell (**CH 1 ... CH 8**) in mV with three decimals (section 11.3).

16.7 Events log

Menu **[ENTER]+[ESC] > CALib > [TARE] [PRINT] > EUEnt**

The instrument can store up to 50 events; the oldest records are overwritten. **dIS EU** displays the last 50 events, starting from the most recent one:

Display	Event
2Er0	zero setting from the calibration menu; [ENTER] shows the value set to zero
FtE0	theoretical calibration; [ENTER] shows the full scale set
FrEA	real calibration; [ENTER] shows the sample weight used
InP0	tare setting via the keypad; [ENTER] shows the set value
dIAG	load distribution error; [ENTER] shows the weight that triggered the alarm, [ENTER] again the differences between the load percentages and the stored value in sequence
ALL	weight alarm; [ENTER] shows the alarm type
dELr	load distribution deletion
EqU	equalization
CHn	modification or deletion of the manual selection of active channels

- **dEL EU**: deletes the stored events; **SURE?** is displayed – **[ENTER]** proceeds, **[ESC]** cancels.
- **Prt EU**: prints all events.

16.8 Info menu

Menu **[ENTER]+[ESC]** > **CALib** > **[TARE] [PRINT]** > **InFO**

GENrIC: identification data of the instrument – **InStrM** model, **SU C0d** software code, **PrOGrM** program type, **FU UEr** software version, **SER nu** serial number.

17 16-channel mode with two ETLB

Two ETLB connected to each other and configured as master and slave form a 16-channel system.

17.1 Connections

Signal	Master	Slave
RS485 +	17	17
RS485 –	18	18
Shield	22	22

Via RS232 (for connections less than 15 m):

Signal	Master	Slave
TXD	20	19
RXD	19	20
Shield	22	22

17.2 Configuration

- Master: on the serial port used, set the **CMASrE** protocol (section 15.1). All configurations and operations for all 16 channels are carried out by the master instrument.
- Slave: on the serial port used, set the **CSLAUE** protocol. The instrument operates as a simple junction box and displays **SLAUE**; the only operation allowed is the restore of the standard 8-channel mode by disabling the **CSLAUE** protocol.

Caution It is not possible to enable 16-channel mode on several serial ports; in case of conflict, the last serial port set remains active.

18 Use with weight indicators EILA ... EILH

Caution The weight indicator must be properly configured before operating in combination with the intelligent junction box (section data deletion and program selection in the indicator manual), and the approval status set on both instruments must be the same.

When the ETLB is used in combination with an octagon weight indicator EILA ... EILH, the load cells are connected to the junction box, which transmits the weight to the indicator; calibration, zeroing, equalization and channel selection can be performed remotely through the indicator.

18.1 Connection to the weight indicator

Signal	ETLB	Weight indicator
RS485 +	17	RS485 +
RS485 –	18	RS485 –
Shield	22	Shield

Via RS232 (for connections less than 15 m):

Signal	ETLB	Weight indicator
TXD	20	RXD
RXD	19	TXD
Shield	22	Shield

- Weight indicator: on the serial port used, set the **MASnUL** protocol with **bAUd** = 9600, **PARitY** = **nOnE**, **StOP** = 1. **MASnUL** appears in the serial port menu of the connected indicator (section 18.2).
- ETLB: on the serial port used, set the **ModbUS** protocol with **bAUd** = 9600, **PARitY** = **nOnE**, **StOP** = 1. By default, the remote control is configured on the RS485 port.

18.2 Additional menus on the indicator

On the weight indicator the following additional items appear under [ENTER]+[ESC] (only these are listed): **CALib** > **SEL CH** and **EquAL** (**EgrEA**, **EqteO**, **Equ H**, **dELEqu**); **SERIAL** > **rs485 ... rs232** with the **MASnUL** protocol; **DIAG** (**AUt**, **StAtUS**, **MEMrIP**, **dELEtE**, **ErSEt**, **AUt 0**, **ErSEt0**, **CMP 0**); **tEST** > **StAtUS ... mV-0-M**; **EUEnt** (**dIS EU**, **dEL EU**, **Prt EU**) and **nOHEYb**. Changes are applied right after pressing [ENTER].

18.3 Remote control of the ETLB

The following functions of the ETLB can be performed remotely through the weight indicator: instrument commissioning, tare weight zero setting, confirmation and change of active channels, equalization (**COrneR** mode only), filter on the weight, anti peak, automatic diagnostics of load distribution, load diagnostics, diagnostics on zero, test and events log.

Caution The weight indicator display replicates exactly what would be displayed on the ETLB display. If the configuration is performed on the ETLB, the connected indicator must be restarted to allow synchronization.

Menu **000000** > [ENTER]+[ESC] > **CALib** > [TARE] [PRINT] > **nOHEYb**

Remote keypad locking: **YES** keypad locked, **nO** keypad unlocked.

18.4 Additional alarms on the indicator

Display	Meaning
Er COM	the ETLB is not responding; check connections and serial port settings.
Er rES	the ETLB responds incorrectly; check connections and serial port settings.
ErUArt	issues with the serial communication device.
SYnC	the indicator is synchronizing with the ETLB; wait for the end of the operation.

19 Alarms

Display	Meaning
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 load cell excitation is not connected or incorrectly connected; the references are not connected or incorrectly connected; the load cell is a 4-wire cell and there are no jumpers between EX- and REF- and between EX+ and REF+ (section 7.3).
ErCEL 1	the load cell is not connected or 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 assistance.
-----	the weight exceeds the maximum capacity by 9 divisions.
Er OF	maximum displayable value exceeded (higher than 999999 or lower than -999999).
t-----	weight too high: zero setting not possible.
mAH-PU	appears in real calibration after the eighth sample weight has been entered.
Error	the value set is beyond the permitted values; press [ESC] to quit the setting leaving the previous value unchanged. Examples: more decimals for full scale than the display can show; value above the maximum; the sample weight does not match the detected mV increase.
bLOC	lock active on menu item, keypad or display.
nOdISP	the number cannot be displayed properly (greater than 999999 or less than -999999).
nO MIN	weight too low; the instrument returns to the previous screen.
tUICE	the current load cell has already been equalized; press [ENTER] to go back to the previous step and move the sample weight on the next load cell.
LOAD	the sample weight was not loaded or is too light.
ErdIAG	the load percentage error is higher than ErSEt or ErSEt0 ; press [ENTER] to cancel the alarm.
In2Er0	gross weight equal to zero: the semi-automatic tare cannot be performed.
Er SLA	communication problems between master and slave; check connections and instrument settings.
bUS Er	issues with the fieldbus device.
ErrCHH	issues with data contained in external memory; contact technical assistance.

19.1 Serial protocol alarms

Protocol	ErCEL	Er OL	Er Ad	---	Er OF	t---
Modbus RTU, status register (bit LSB 76543210)	xxxxxxx1	xxxx1xxx	xxxxx1x	xxxxx1xx	gross xxx1xxxx · net xx1xxxx	zero command: error "value not valid" (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__
HdrIPn	_ERCEL	_ER_OL	_ER_AD	#####	_ER_OF	O__SET
CntIn	_ERCEL	_ER_OL	_ER_AD	^^^^^^	_ER_OF	O__SET
YHL	99999999	99999999	99999999	99999999	99999999	99999999

* With remote displays using the **rIP** protocol, ----- appears if the message exceeds 5 digits.

19.2 Remote alarms management

The status of the instrument alarms is expressed through a 4-byte number in which the two H bytes represent ERC and the two L bytes AERC. Reading: send command 6800 to CMDR, then read ERC in the two H bytes and AERC in the two L bytes of R1.

ERC	AERC	Cause of error
1 – load cell error	1	ErCELr
	2, 4, 8 ... 32768 (bit 1 ... 15)	ErCEL 1 ... ErCE 15 (channel 1 ... 15)
	0	ErCE 16 (as given in the documentation)
4 – instrument error	1 / 2 / 4	----- / Er OL / Er Ad
	16	gross weight over the maximum displayable value
	32	net weight over the maximum displayable value
8 – diagnostics error, load diagnostics enabled (AUT = YES)	1, 2, 4 ... 32768 (bit 0 ... 15)	load percentage on channel 1 ... 16 > ErSEt
8 – diagnostics error, diagnostics on zero enabled (AUT 0 = YES)	1, 2, 4 ... 32768 (bit 0 ... 15)	load percentage on channel 1 ... 16 > ErSEt0
16 – writing error	1	the data to be saved is incorrect
256 – command error	0	the received command does not exist

20 Printing examples

If the printer has been set (**PrIntr**, section 15.1), press [PRINT] from the weight display. <Model> stands for the model designation the instrument prints in the heading.

Basic printout

```
-----
<Model>  BASE  Addr:01

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

Load distribution print

Current distribution: press [PRINT] from the **StAtUS** menu. Current and stored distribution: from the **CMP 0** and **MEMrIP** menus keep [PRINT] pressed for more than 3 seconds while the weight is displayed. ERR = load cell connected but in error; OFF = load cell not connected.

```
-----
<Model>  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
CH8:      OFF

-----
<Model>  BASE  Addr:01
STORED   (MEMRIP)
GROSS    2014 kg
CH1:     23.5 %
CH2:     24.1 %
CH3:     15.5 %
CH4:     16.7 %
CH5:      9.0 %
CH6:     10.2 %
CH7:      ERR
CH8:      OFF
GROSS  OLD  2050 kg
CH1:     25.5 %
CH2:     22.1 %
CH3:     16.5 %
CH4:     16.7 %
CH5:      9.0 %
CH6:     10.2 %
CH7:      ERR
CH8:      OFF
```

21 Continuous transmission protocols

21.1 Continuous fast weight transmission

The instrument transmits the weight continuously at high update frequencies: up to 300 strings per second with a minimum transmission rate of 38400 baud. Communication modes (section 15.1): **M0d t** and **M0d td**.

M0d t: the following string is transmitted to PC/PLC:

```
xxxxxxCRLF
```

Character	Meaning
xxxxxx	6 characters of gross weight (ASCII 48 ... 57)
CR	carriage return (ASCII 13)
LF	new line (ASCII 10)

With **St bIt** = **YES** (section 15.1) the instrument sends **yxxxxxxCRLF**; y = weight stability identification (S = weight stable, N = weight not stable).

M0d td: the following string is transmitted to PC/PLC:

```
&TzzzzzzPzzzzzz\ckckCR
```

Character	Meaning
&	initial string character (ASCII 38)
T, P	1 character of gross weight identification each
zzzzzz	6 characters of gross weight (ASCII 48 ... 57)
\	separation character (ASCII 92)
ckck	2 ASCII control characters: XOR of the 8-bit ASCII codes of the characters between "&" and "\" (excluded), as two hexadecimal digits 0 ... 9, A ... F
CR	end of string (ASCII 13)

With negative weight the first character from the left is "-" (ASCII 45). In case of error or alarm, the 6 weight characters are replaced by the messages of section 19.1.

21.2 Continuous transmission to remote displays

The string is transmitted 10 times per second. Communication modes (section 15.1, each **bAud** = 9600, **PARitY** = **nOnE**, **StOP** = 1): **rIP** – e.g. octagon EDLD; the remote display shows the net or gross weight according to its settings; **HdrIP** and **HdrIPn** – e.g. octagon EDLF, EDLG.

```
&NxxxxxxLyyyyyy\ckckCR
```

Character	Meaning
&	initial string character (ASCII 38)
N	net weight identification (ASCII 78)
xxxxxx	6 characters of net weight or PEAK if present (ASCII 48 ... 57)
L	gross weight identification (ASCII 76)
yyyyyy	6 characters of gross weight (ASCII 48 ... 57)
\	separation character (ASCII 92)
ckck	checksum as in section 21.1
CR	end of string (ASCII 13)

- With negative weight the first character from the left is "-" (ASCII 45).
- With **HdrIP** the decimal point at the position shown on the display can also be transmitted. If the value exceeds 5 digits, only the 5 most significant digits are transmitted, with a negative value no more than the 4 most significant; the decimal point shifts consistently.
- With **HdrIPn**, in addition, the instrument transmits **nEt** every 4 seconds in the gross weight field if a net operation has been carried out on the instrument (section 14.1).
- Below -99999 the minus sign "-" is sent alternated with the most significant figure.
- In case of error or alarm, the 6 characters of gross and net weight are replaced by the messages of section 19.1.

21.3 Continuous weight transmission (YHL)

The string is transmitted 5 times per second. **YHL**: if a net operation has been performed (section 14.1) the net weight is transmitted, otherwise the gross weight.

=xxxxxxxx

Character	Meaning
=	initial string character (ASCII 62)
xxxxxxxx	9 characters of net or gross weight (ASCII 48 ... 57), LITTLE ENDIAN sorting

With negative weight the first character from the right is “-” (ASCII 45); the decimal point can also be transmitted at the position determined by the calibration. Example: gross weight -20.7 kg > =7.02000-. In case of error or alarm, the 9 characters are replaced by “999999999”.

22 ASCII bidirectional protocol

The instrument replies to the requests sent from a PC/PLC; a waiting time before the reply can be set (**DELAY**, section 15.1).
Communication modes: **Modu60** and **Mod td** – two variants compatible with older weighing instruments.

Character	Meaning
\$	beginning of a request string (ASCII 36)
& or &&	beginning of a response string (ASCII 38)
aa	2 characters of instrument address (ASCII 48 ... 57)
!	correct reception (ASCII 33)
?	reception error (ASCII 63)
#	error in the command execution (ASCII 35)
ckck	2 ASCII characters of checksum (section 22.11)
CR	end of string (ASCII 13)
\	separation character (ASCII 92)

22.1 Reading weight from PC

Direction	String
PC transmits	\$aa jckckCR
correct reception	&aaxxxxxx j\ckckCR
incorrect reception	&&aa?\ckckCR

j = t: gross weight, j = n: net weight; xxxxxx = 6 characters of the weight value. With negative weight the first character from the left is "-" (ASCII 45); below -99999 "-" is sent alternated with the most significant figure. In case of an alarm for exceeding 110 % of full scale or 9 divisions above **maSS** the instrument sends **&aass0-Lst\ckck**, in case of faulty load cell connection or another alarm **&aass0-Fst\ckck** (s = space, ASCII 32); see chapter 19.

22.2 Semi-automatic zero

Direction	String
PC transmits	\$aaZER0ckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR
weight over the maximum resettable value	&aa#CR

22.3 Gross > net

Direction	String
PC transmits	\$aaNETckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR

22.4 Net > gross

Direction	String
PC transmits	\$aaGROSSckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR

22.5 Reading of decimals and division

Direction	String
PC transmits	\$aaDckckCR
correct reception	&aaxy\ckckCR
incorrect reception	&&aa?\ckckCR

x = number of decimals; y = 3, 4, 5, 6, 7, 8, 9 for division value 1, 2, 5, 10, 20, 50, 100.

22.6 Tare zero setting

Direction	String
PC transmits	\$aazckckCR
correct reception	&aaxxxxxxt\ckckCR
incorrect reception	&&aa?\ckckCR
gross weight not displayed	&aa#CR

z = zero setting command (ASCII 122); xxxxxx = weight value; t = weight identification (ASCII 116). The system must be unloaded or the instrument must measure the corresponding mV signal. Example address 2: query **\$02z78(Cr)**, response **&02000000t\76(Cr)** – with correct zeroing “000000”. The values are stored in the EEPROM; the number of allowed writings is limited (about 100000).

22.7 Real calibration (with sample weight)

Direction	String
PC transmits	\$aasxxxxxckckCR
correct reception	&aaxxxxxxt\ckckCR
incorrect reception or full scale zero	&&aa?\ckckCR

After the tare zero setting load a sample weight of at least 50 % of full scale (or apply the corresponding mV signal). s = calibration command (ASCII 115); xxxxxx = sample weight (negative values are not allowed); in the response xxxxxx = current weight, t = gross weight identification (ASCII 116) – with correct calibration equal to the sample weight. Example address 1, 20000 kg: query **\$01s02000070(Cr)**, response **&01020000t\77(Cr)**.

22.8 Keypad lock

Direction	String
PC transmits	\$aaKEYckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR

22.9 Keypad unlock

Direction	String
PC transmits	\$aaFREckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR

22.10 Display and keypad lock

Direction	String
PC transmits	\$aaDISckckCR
correct reception	&&aa!\ckckCR
incorrect reception	&&aa?\ckckCR

22.11 Checksum calculation

The two check characters ckck represent a hexadecimal number in ASCII characters: the XOR (exclusive OR) of the 8-bit ASCII codes of only the characters of the underlined part of the string (in the response between “&” and “\”). Example with the characters 0, 1, t:

Character	decimal	hexadecimal	binary
0	48	30	00110000
1	49	31	00110001
t	116	74	01110100
XOR	117	75	01110101

The result 0x75 gives the checksum made of the characters "7" and "5".

23 Modbus RTU protocol

The Modbus RTU protocol allows the reading and writing of the registers listed below according to the Modicon PI-MBUS-300 specification. Selection: section 15.1. Check whether the Modbus master (or the development tool) numbers the registers from 40001 or from 0; in the second case the register is the table value minus 40001 (e.g. 40028 > 27).

Some data are written directly to the EEPROM, whose writing operations are limited (100000); avoid useless writings. The instrument does not write if the value equals the stored one. Numbers without prefix are decimal, with 0x hexadecimal.

23.1 Data format and functions

1 start bit; 8 data bits, least significant bit sent first; settable parity bit and stop bit. Use only the following functions – others could be incorrectly interpreted and generate errors or blocks of the system:

Function	Description
03 (0x03)	READ HOLDING REGISTER (read programmable registers)
16 (0x10)	PRESET MULTIPLE REGISTERS (write multiple registers)

The interrogation frequency depends on the baud rate (the instrument stands by for at least 3 bytes before calculating a response); **DELAY** (section 15.1) adds a further delay.

Function 3 – read holding registers

	Address	Function	Content	CRC	Bytes
Query	A	0x03	1st register 0x0000 · no. registers 0x0002	2 byte	8
Response	A	0x03	no. bytes 0x04 · 1st register 0x0064 · 2nd register 0x00C8	2 byte	3 + 2 × no. registers + 2

Function 16 – preset multiple registers

	Address	Function	Content	CRC	Bytes
Query	A	0x10	1st register 0x0000 · no. registers 0x0002 · no. bytes 0x04 · value 1 0x0000 · value 2 0x0000	2 byte	7 + 2 × no. registers + 2
Response	A	0x10	1st register 0x0000 · no. registers 0x0002	2 byte	8

The response contains the number of registers modified beginning from the first address.

23.2 Broadcast requests and communication errors

- Broadcast (address 0): read requests are not executed and not answered; write requests are executed but not answered.
- The strings are checked by CRC. In case of communication error the slave does not respond; the master must consider a time-out and deduce a communication error.
- If a correctly received string is not executable, the slave responds with an exceptional response: address, function + 0x80, code, CRC.

Code	Description
1	ILLEGAL FUNCTION (the function is not valid or is not supported)
2	ILLEGAL DATA ADDRESS (the specified data address is not available)
3	ILLEGAL DATA VALUE (the data received has an invalid value)

23.3 List of available registers

A maximum of 32 registers can be read or written in a single query or response. R = read only, W = write only, R/W = read and write; H/L = high/low half of the DOUBLE WORD. R1/W1: registers 40051–40052 for reading and writing.

Register	Description	Code	EEPROM	Access
40001	firmware version	—	—	R
40002	instrument type	—	—	R
40003	year of manufacture	—	—	R
40004	serial number	—	—	R
40005	program type	—	—	R
40006	command register	CMDR	no	R/W
40007	status register	SR1	—	R
40008 / 40009	gross weight H / L	GW	—	R
40010 / 40011	net weight H / L	NW	—	R
40014	divisions and units of measure	DU	—	R
40051 ... 40061	register 1 ... 11 (40051–40052: R1/W1)	R1/W1	no	R/W
40062	register 12	AEXC	no	R/W
40063	register 13	—	no	R/W
40064	register 14	EXC	no	R/W
40065 / 40066	sample weight for instrument calibration H / L (with command 101)	CALW	—	R/W
40073 / 40074	preset tare H / L (with command 130)	PT	—	R/W
40418	channel status 1	—	—	R
40419	channel status 2	—	—	R
40420 ... 40451	mV/V on channel 1 ... 16, H and L each (channel n: 40418 + 2n and 40419 + 2n)	—	—	R

23.4 Channel status

Channel status 1 (40418): bit 0 ... 7 = channel 1 ... 8 error, bit 8 ... 15 = channel 1 ... 8 active. Channel status 2 (40419): bit 0 ... 7 = channel 9 ... 16 error, bit 8 ... 15 = channel 9 ... 16 active.

23.5 Communication examples

Values in hexadecimal notation with prefix h. Example 1 – function 16 (h10): write 0 to register 40050 and 2000 to register 40051:

Direction	String
Query	h01 h10 h00 h32 h00 h02 h04 h00 h00 h07 hD0 h72 hCE
Response	h01 h10 h00 h32 h00 h02 hE0 h07

Query: address h01, function h10, first register h0032, number h0002, byte count h04, data h0000 and h07D0, CRC16 L h72 / H hCE. Response: address, function, first register, number, CRC16 L hE0 / H h07.

Example 2 – function 3 (h03): read gross weight (4000) and net weight (3000) from 40008 to 40011:

Direction	String
Query	h01 h03 h00 h07 h00 h04 hF5 hC8
Response	h01 h03 h00 h07 h00 h00 h0F hA0 h00 h00 h0B hB8 h37 h11

Query: address h01, function h03, first register h0007, number h0004, CRC16 L hF5 / H hC8. Response: address, function, first register h0007, data h0000 h0FA0 (4000) and h0000 h0BB8 (3000), CRC16 L h37 / H h11. Further CRC16 examples: Modicon PI-MBUS-300.

24 Ethernet TCP/IP (option)

24.1 Technical specifications

Item	Value
Port	RJ45 10Base-T or 100Base-TX (auto-detect)
Link LED	off: Ethernet link not established · amber: 10 Mb/s · green: 100 Mb/s
Activity LED	off: Ethernet activity not detected · amber: half duplex · green: full duplex

The Ethernet TCP/IP port allows the weight and the main parameters to be exchanged in an Ethernet network, for example with a PC.

24.2 Instrument setup

Menu **[ENTER]+[ESC]** > **EtHnEt**

Display	Meaning
IPAddr	instrument IP address (default 192.8.0.141)
SubnEt	subnet mask (default 255.255.255.0)
GAtUAY	gateway address of the Ethernet network (default 192.8.0.111)
ModE	protocol: nOnE (default), ModBUS and ASCII (addresses 1 to 99; ASCII with MOdu60 or MOd td), ContIn (MOd t or MOd td , frequency 10 to 200 in HErt2), rIP , HdrIP , HdrIPn , YHL as in section 15.1, UEbSru website (section 24.5)
Addr	instrument address, 1 to 99 (default 1)
HErt2	maximum transmission frequency with ContIn : 10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200 (default 10)
dELAY	delay before the instrument replies, 0 to 200 ms (default 0)

Important In order to apply the changes, turn the instrument off, wait for 10 seconds and turn it back on.

24.3 PC setup

A PC can be connected to the instrument via Ethernet TCP/IP by a virtual serial port. To install the virtual COM port, use the CPR Manager included in the supply: run the file CPR.exe on the CD, add a serial port, set the IP address (host) and the TCP port 10001, then save. Use this COM port to communicate with the instrument with the protocol selected on it – or connect directly using a socket (e.g. Winsock) on port 10001.

24.4 Diagnostics

To verify the Ethernet configuration of the instrument, install the application Lantronix DeviceInstaller on a PC with Microsoft Windows (file DevInst.exe on the CD). Connect PC and instrument via LAN (point-to-point or through hub/switch), run the application and click “Search”. Select the device found, open the “Telnet Configuration” tab, click “Connect” and press Enter. Press 0 to change the server settings: change only the 4 fields of the IP address and confirm the other parameters with Enter. Set a static IP address.

24.5 Website

In the **EtHnEt** menu set the **UEbSru** operation mode and restart the instrument. Open the web browser at the instrument address and enter the user name and the password supplied with the instrument on the login page (octogon provides the user name on request), then “Login”. In case of incorrect parameter setting, “INSTRUMENT DATA READING ERROR” is displayed. The status page shows the gross and net weight (decimals and unit of measure read from the instrument), sends the main commands (tare, zero setting, E2PROM saving etc.) and shows the instrument status:

Indication	Meaning
ErCell	load cell error
ErAD	instrument converter error
>9div	weight exceeds maximum weight by 9 divisions
>110%	weight exceeds 110 % of full scale
GrOver	gross weight over 999999
NetOver	net weight over 999999
Net	instrument shows the net weight
Stab	weight is stable
ZERO	weight is zero

The screen is selected through the drop-down menu: Load Distr. — percentage load distribution; mV — current response signal of each load cell in mV; mV zero — response signal of each load cell stored during zero setting, in mV; Points — current response signal of each load cell in converter points. Under “Settings” language and page refresh time can be set; “SAVE SETTINGS” stores them on the instrument for subsequent accesses.

25 Use and calibration of converter points

When this operating mode is enabled via the communication interface, the instrument transmits the points of each connected load cell in low (16 bit) or high (24 bit) resolution.

Input signal on single channel	Low resolution	High resolution
0 mV	0	0
10 mV	8000	2000000
-10 mV	-8000	-2000000

Important Only the points of each connected load cell are transmitted, without any filter applied; the calculation of the weight value and the zeroing and calibration operations are carried out by the customer.

Mode	Enabling	Disabling	Registers (reading)
8x divisions LowRes, channel 1 ... 8	command 24	command 27	40051 ... 40058 = channel 1 ... 8 (2 bytes each)
8x divisions LowRes, channel 9 ... 16	command 32	command 27	40051 ... 40058 = channel 9 ... 16 (2 bytes each)
4x divisions HiRes, channel 1 ... 4	command 25	command 27	40051–52, 40053–54, 40055–56, 40057–58 = channel 1 ... 4 (4 bytes each)
4x divisions HiRes, channel 5 ... 8	command 26	command 27	as above = channel 5 ... 8
4x divisions HiRes, channel 9 ... 12	command 33	command 27	as above = channel 9 ... 12
4x divisions HiRes, channel 13 ... 16	command 34	command 27	as above = channel 13 ... 16

The commands are sent to CMDR.

25.1 Example

The weight can be read directly from the protocol or calculated by the PC or PLC. In the latter case: if the transmitter sends e.g. 6500 points with the tank empty and 49833 points with a sample weight of 10000 kg, the constant is $(49833 - 6500) / 10000 = 4.333$. If the PC or PLC receives 40000 points, the weight is $(40000 - 6500) / 4.333 = 7731$ kg.

26 Reserved for the installer

26.1 Menu locking

This procedure blocks the access to any menu. Select the menu to lock (e.g. **CALIB**) and press [ESC] and [TARE] simultaneously for 3 seconds: the display shows **C.ALIB** – the point on the left indicates the lock. If the operator tries to enter this menu, **bLOC** is displayed.

26.2 Menu unlocking

Select the locked menu (**C.ALIB**) and press [ENTER] and [PRINT] simultaneously for 3 seconds: the display shows **CALIB**, the point is off.

26.3 Temporary menu unlocking

At **C.ALIB** press [PRINT] and [TARE] simultaneously for 3 seconds: all menus, including the locked ones, can be entered and modified. Returning to the weight display restores the lock.

26.4 Data deletion and program selection

Caution Only perform after contacting technical assistance. After each operation **dOnE** is displayed; press [ENTER] to continue. Pressing [ESC] cancels the procedure without changes.

Upon power-on hold down [ESC] until the display shows **PrOG**, then:

- Constants restore (does not erase the calibration): confirm **PrOG**, select **PASSU** with the arrow keys, set code 6935 and confirm.
- Program selection: confirm **PrOG** and select the program with the arrow keys – **bASE**: basic program.
- Set the approval status: **notLEG** not approved program · **LEGAL** approved, single interval * · **LEGMI** approved, multi-interval * · **LEGMr** approved, multiple range *.
- Set the active regulation (only if **notLEG** has not been set): **OIML** according to OIML · **InMETr** according to INMETRO; the standards observed in the regions are listed in the technical specifications of the approved-version manuals.

When the ETLB is used in combination with a weight indicator (chapter 18), the approval status set on both devices must be the same. Confirming restores the instrument to default and erases the data. * For approval, request the proper manual and the correct procedures from technical assistance, stating hardware code and serial number (chapter 10). If you do not have a manual for the newly set program, you can request it from technical assistance.

26.5 Keypad or display locking

Press [ESC] immediately followed by [PRINT] and hold them down for about 5 seconds (also possible via the Modbus and ASCII protocols):

- **FrEE**: no lock.
- **HEY**: keypad lock – when a key is pressed, **bLOC** is displayed for 3 seconds.
- **dISP**: keypad and display lock – the keypad is locked and the display shows the instrument model instead of the weight; when a key is pressed, **bLOC** is displayed for 3 seconds.

Via the communication interface

Keypad locking	Keypad and display locking	Keypad and display unlock
send command 21 to CMDR	send command 23 to CMDR	send command 22 to CMDR

27 Dimensions, directives and standards

27.1 Dimensions

Version	Dimensions
Rail version (Omega/DIN rail)	125 × 92 × 52 mm
Board version	151 × 72 × 30 mm
IP67 box, stainless steel AISI 304	200 × 148 × 45 mm

27.2 Directives and standards

According to the manufacturer's declarations of conformity (EU and United Kingdom, 21/04/2026):

Directive	Standards
2014/35/EU Low Voltage	EN 61010-1:2010+A1:2019 – not applicable for the VDC type (only 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
2014/31/EU NAWI (only if the M mark is applied)	EN 45501:2015 · OIML R76-1:2006
United Kingdom	Electrical Equipment (Safety) Regulations 2016, Electromagnetic Compatibility Regulations 2016, Non-automatic Weighing Instruments Regulations 2016 (only if the M mark is applied) – with the corresponding BS EN standards

The declarations of conformity are available on request.