

MANUAL

ETLH

WEIGHT TRANSMITTER, 4 CHANNELS

Installation and user manual



Document	Version	Date	Applies to
Installation and user manual	V00x	09/2026	ETLH, all 13 versions

This manual describes installation, connection and operation of the ETLH four-channel weight transmitter in all versions, with the base program (setpoints) and the batching program. The communication protocols (Modbus RTU, ASCII, continuous transmission, fieldbuses) are described in the communication protocols manual; the approved versions have manuals of their own.



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1 About this manual

This manual applies to all versions of the ETLH (overview in section 5.2). Sections that apply to the ETLH Analog only are marked accordingly.

Display texts are set in a fixed-width typeface, as they appear on the display, for example **CAL1b**. Keys are written in square brackets (section 8.2). A menu path is a sequence of keys and display texts, for example:

Menu **[ENTER]+[ESC] > CAL1b > [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 BASE and LOAD programs

The instrument works with one of two programs (selection in section 23.4): **BASE** – basic program, setpoint management only; **LOAD** – single product loading program (chapter 21). Sections that apply to one program only are marked “BASE” or “LOAD”.

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).
- If the working temperature reaches the permitted limits, it is advisable to distance the instruments to ensure adequate air flow and avoid malfunctions (e.g. sudden shutdowns or disconnections).

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
Analogue current output	up to 500 m with 0.5 mm ² cable
Analogue voltage output	up to 300 m with 0.5 mm ² cable

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 mounting modules to compensate for misalignment of the support surfaces.

Connecting several cells in parallel

Connect several cells in parallel by using, if necessary, a watertight junction box with terminal box. The extension cables must be shielded, led individually into their piping or conduit and laid as far as possible from the power cables (with 4-wire connections use cables with 4 × 1 mm² minimum cross-section).

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 of 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 upper support plate of each cell with its 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 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 that the cells and the connected instrument may become damaged in the future. It is forbidden to ensure earthing continuity by using metal parts of 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** > **[UP] 3 s** > **mV-CEL**

From the weight display, press [UP] for 3 seconds: the display shows the response signal of each load cell (**CH 1 ... CH 4**) 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 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

Weight transmitter with 6-wire load cell inputs for assembly on an Omega/DIN rail on the back panel or on the front panel using the included mounting kit. Dimensions 26 × 115 × 120 mm. Six-digit semi-alphanumeric display, 8 mm height, 7 segment. Four-key keyboard. IP30 front panel protection rating.

RS485 serial port 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. Depending on the version, additionally integrated: Profibus DP, DeviceNet, CANopen, PROFINET IO, EtherNet/IP, Ethernet TCP/IP, Modbus/TCP, SERCOS III, POWERLINK, CC-Link. ETLH Analog only: opto-isolated 16 bit analogue output (voltage or current).

Function	Description
4 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
Overload diagnostics	overload check on each load cell
Events log	the last 50 events: calibrations, zero settings, errors, equalizations
Alarm relay	outputs can be set to switch in case of alarm

5.2 Versions

Every version is equipped with an RS485 serial port.

Version	Interface
ETLH Analog	RS485 + opto-isolated analogue output
ETLH485	RS485
ETLHCANOPEN	CANopen, slave
ETLHDEVICENET	DeviceNet, slave
ETLHCCLINK	CC-Link, remote device station
ETLHPROFI	Profibus DP, slave (rail mounting only)
ETLHMODBUSTCP	Modbus/TCP, slave
ETLHETHETCP	Ethernet TCP/IP, web browser
ETLHETHEIPN	2 × EtherNet/IP, adapter
ETLHPROFINETION	2 × PROFINET IO, device
ETLHETHERCAT	2 × EtherCAT, slave
ETLHPOWERLINK	2 × POWERLINK, slave
ETLHSERCOS	2 × SERCOS III, slave

6 Technical specifications

Item	Value
Power supply and consumption	12/24 V DC $\pm$ 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.
Analogue output linearity (ETLH Analog only)	< 0.01 % F.S.
Thermal drift	< 0.0005 % F.S./°C
Analogue output thermal drift (ETLH Analog only)	< 0.003 % F.S./°C
A/D converter	4 channels, 24 bit (16 000 000 points), 4.8 kHz
Divisions (measurement range $\pm$ 10 mV = sens. 2 mV/V)	$\pm$ 999999
Measurement range	$\pm$ 39 mV
Max. sensitivity of usable load cells	$\pm$ 7 mV/V
Max. conversions per second	600
Display range	$\pm$ 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
Relay outputs	3 – max. 115 V AC; 150 mA
Digital inputs	2 – opto-isolated, 5 ... 24 V DC PNP
Serial port	RS485
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 115200
Humidity (non-condensing)	85 %
Storage temperature	–30 ... +80 °C
Working temperature	–20 ... +60 °C
Opto-isolated analogue output (ETLH Analog only), 16 bit = 65535 divisions	0 ... 20 mA; 4 ... 20 mA (max. 300 Ω); 0 ... 10 V; 0 ... 5 V; $\pm$ 10 V; $\pm$ 5 V (min. 10 k Ω)

UL version

Item	Value
Relay outputs	3 – max. 30 V AC, 60 V DC; 150 mA
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

- It is recommended that the power supply negative pole be grounded.
- The instrument can 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 16.2).

7.2 Terminals

1	output no. 1	17	+excitation load cells 1 and 2 (+EX)
2	output no. 2	18	–excitation load cells 1 and 2 (–EX) · shield
3	output no. 3	19	+signal load cell 2
4	common of the outputs	20	–signal load cell 2
5	input no. 1 (+5 ... 24 V DC)	21	+REF / SENSE load cells
6	input no. 2 (+5 ... 24 V DC)	22	–REF / SENSE load cells
7	common of the inputs (0 V)	23	+signal load cell 3
8	+supply 12 / 24 V DC	24	–signal load cell 3
9	–supply · RS485 shield, GND	25	+excitation load cells 3 and 4 (+EX)
10	+analogue output 0...20 or 4...20 mA ¹	26	–excitation load cells 3 and 4 (–EX) · shield
11	+analogue output 0...10 V ¹	27	+signal load cell 4
12	–common of the analogue output ¹	28	–signal load cell 4
15	+signal load cell 1	29	RS485 +
16	–signal load cell 1	30	RS485 –

¹ ETLH Analog only

Terminals 1 ... 12 and 15 ... 30. ¹ ETLH Analog only.

The four load cells each have their own signal pair (channel 1 ... 4); cells 1 and 2 and cells 3 and 4 each share one excitation pair, the reference wires (REF/SENSE) are common. If it is difficult to connect all the reference wires, simply connect those of the load cell located at the average distance from the instrument; isolate the unused reference wires individually.

Important 4-wire load cells: if all the load cells used are 4-wire, make a jumper between –EX (26) and –REF (22) and between +EX (25) and +REF (21).

3 outputs: in the base program controlled by setpoints or via protocol, in the batching program fixed (section 13.4). 2 inputs (default in the base program: input 1 = SEMI-AUTOMATIC ZERO, input 2 = NET/GROSS; section 13.3).

8 Display, LEDs and keys

8.1 LED functions

LED	Main function	Secondary function *
NET	net weight (semi-automatic tare or preset tare)	LED lit: output 3 closed
>0<	zero (deviation from zero not more than ± 0.25 divisions)	LED lit: output 2 closed
Stability	stability	LED lit: output 1 closed
kg	unit of measure: kg	—
g	unit of measure: g	LED lit: input 2 closed
L	unit of measure other than kg or g	LED lit: input 1 closed

* To activate the secondary LED function, during weight display press and hold down [ENTER] and [UP] (press [ENTER] immediately followed by [UP]).

8.2 Keys

Key	Short press	Long press (3 s)	Into menus
[ESC] (cross)	semi-automatic zero	tare resetting	cancel or return to the previous menu
[LEFT] (left arrow)	gross > net	net > gross	select the figure to be modified or go to the previous menu item
[UP] (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] (enter arrow)	setting setpoint and hysteresis	—	confirm or enter a submenu
[ENTER]+[ESC]	setting general parameters	—	—
[ENTER]+[LEFT]	setting preset tare	—	—

“+” means: press the first key immediately followed by the second. Into menus the LEDs light up in sequence to indicate that no weight is displayed. Changes in the menus are applied right after pressing [ENTER], no further confirmation is required. In the batching program [ENTER] opens the batching menus (section 8.4).

8.3 Menu map, base program (BASE)

Access	Menu	Items	Section
[ENTER]	SEt 1 ... SEt 3	HYStE1 ... HYStE3 CHSEt	18
[ENTER]+[ESC]	CALIB	FS-tEO SEnSib dIVIS mASS 2ErO INP 0 WEIGHt StABLE unIt COEFF SEL CH EQUAL	10, 11, 12
	FILtEr	tYPE 0 tYPE 1	12.1
	PARA 0	0 SEt AUt0 0 trAC 0	12.3
	AnALOG ¹	tYPE MOdE ErrUAL AnA 0 AnA FS Cor 0 Cor FS	15
	SERIAL	rS485: nOnE ModBUS ASCII ContIn rIP HdrIP HdrIPn YHL PrIntr InCL · bAUd Addr dELAY PARItY StOP	16
	Out-In	Out 1 Out 2 Out 3 In 1 In 2	13
	dIAG	AUt StAtUS MEMrIP dELEtE ErSEt AUt 0 ErSEt0 CMP 0	17.1
	tEST	StAtUS In Out AnALOG ¹ mV-CEL mV-0-M	17.3
	EUEnt	dIS EU dEL EU Prt EU	17.4
	InFO	GENrIC	17.5
[ESC] 3 s	2ErO	—	10.3
[UP] 3 s	mV-CEL	—	4.1
[ENTER]+[LEFT]	P-tArE	—	14.2

¹ ETLH Analog only. The menus below CALIB are selected with [LEFT] and [UP].

8.4 Menu map, batching program (LOAD)

Access	Menu	Items	Section
[ENTER]	F0rP	PrESet SEt	21.7
	CAnCF0	SUR	21.7
	tOtAL *	123456	21.5
	CAnCt0 *	SUR	21.5
	COnSt	MIn MASS tSIC tIMEAt tnCOMP tnLOAd tnUnLO MOdFAL FALdIU FALL tOL SLOU SLOUOn SLOUOf AtArE tIMeTA StAbtA tOtAL PrInt nCOPY SLAU	21.6
[ENTER]+[ESC]	CALib	FS-tEO SEnSib dIVIS 2Er0 INP 0 WEIGHt StABle unIt SEL CH EquAL	10, 11, 12
	FILtEr	tYPE 0 tYPE 1	12.1
	PARA 0	0 SEt AUt0 0 trAC 0	12.3
	AnALOG ¹	tYPE MOdE ErrUAL AnA 0 AnA FS Cor 0 Cor FS	15
	SERIAL	rS485: nOnE ModBUS ASCII COnTIn rIP HdrIP HdrIPn YHL PrIntr InCL · bAUd Addr dELAY PARItY StOP	16
	dIAG	AUt StAtUS MEMrIP dELEtE ErSEt AUt 0 ErSEt0 CMP 0	17.1
	tESt	StAtUS In Out AnALOG ¹ mV-CEL mV-0-M	17.3
	SEttIn	nEHt P PSS EndnEt	21.3
	EUEnt	dIS EU dEL EU Prt EU	17.4
	InFO	GENrIC	17.5
[ENTER]+[LEFT]	P-tArE	—	14.2

* appears only if **tOtAL = YES** is set in the constants. ¹ ETLH Analog only. The batching program has no **Out-In** menu: inputs and outputs are fixed (section 13.4).

9 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, e.g. **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 11.3 to 11.5).
- Reset to zero (section 10.3).
- Check the calibration with sample weights and correct the indicated weight if necessary (section 10.5).

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 11.3 to 11.5).
- If the load cell data are unknown, follow the procedure in section 10.5.
- Enter the rated data of the load cells following section 10.1.
- Reset to zero (section 10.3).
- Check the calibration with sample weights and correct the indicated weight if necessary (section 10.5).
- If you use the analogue output, set the analogue output type and the full scale value (chapter 15).
- If you use serial communication, set the related parameters (chapter 16).

Base program only (BASE)

If setpoints are used, set the weight values and the relevant parameters (chapter 18 and section 13.1).

Batching program only (LOAD) — required settings for the first batching

- set the minimum weight value (section 21.6, **MIn**);
- set the **PSS** parameter (section 21.3);
- set the formula (section 21.7);
- start the batching by closing the START contact or remotely.

10 System parameters and calibration

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

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

10.1 Theoretical calibration

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

This function allows the load cell rated values to be set. Set the following parameters in sequence:

- **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.
- **SEnSib** (default: 2.00000 mV/V): the sensitivity is a 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 $(2.00100 + 2.00150 + 2.00200 + 2.00250) / 4$.
- **dIVIS**: the division (resolution) 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.

Important Modifying the theoretical full scale or the sensitivity cancels the real calibration, and only the theoretical calibration is considered valid; the parameters containing a weight value (setpoint, hysteresis etc.) 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.

10.2 Maximum capacity (BASE)

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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. In the batching program **MASS** is one of the batching constants (section 21.6).

10.3 Tare weight zero setting

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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 LEDs are flashing.
- Confirm once again: the weight is set to zero and stored in the permanent memory.
- Press [UP] to display the total weight reset by the instrument, the sum of all previous zero settings.

With diagnostics on zero

If diagnostics on zero is enabled (**AUT 0 = YES**, section 17.1), the instrument displays and stores the load distributions on zero and the mV on the active channels (section 17.3). If the stored weight is zero and all channels are **OFF**, no zero setting has been performed yet. Procedure:

- Confirm **2Er0** with [ENTER]: the current weight is displayed, preceded by **A**.
- Press [LEFT] and [UP] to display in sequence the current load distribution on each channel (**1C ... 4C**); [ENTER] returns.
- [ENTER]: the last weight set to zero is displayed, preceded by **o**.

- Press [LEFT] and [UP] to display in sequence the load distribution stored during the last zero setting on each channel (10 ... 40); [ENTER] returns.
- [ENTER]: the weight to be set to zero is displayed, all LEDs are flashing. Confirm once again: the weight is set to zero and stored. [UP] shows the sum of all previous zero settings.

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

10.4 Zero value manual entry

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > INP 0

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

Set the estimated zero value in this parameter (from -99999 to +999999; default: 0).

10.5 Real calibration with sample weights

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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 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 LEDs are off.
- Adjust the value on display with the arrow keys if necessary.
- Confirm: the new set weight appears with all LEDs 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 up to 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 [UP] after confirming the sample weight shows the full scale recalculated from the maximum sample weight and the cell sensitivity (**SenSIb**).

11 Stability, channels and equalization

11.1 Stability

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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.

11.2 Confirmation and change of active channels

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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 [LEFT] or [UP] to select the channel, confirm with [ENTER] and press [LEFT] or [UP] 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.

Important At the end of the equalization (sections 11.3 to 11.7) perform the tare weight zero setting (section 10.3) and, if necessary, the real calibration (section 10.5).

11.3 Real equalization mode

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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.

11.4 Real equalization

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > 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.

11.5 Theoretical equalization

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > EquAL > [ENTER] > EqtEO

SEnS 1 ... SEnS 4: set the sensitivity for each load cell, leaving it at 0 for non-active channels.

11.6 Equalization coefficients

Menu [ENTER]+[ESC] > CALib > [ENTER] > FS-tEO > [LEFT] [UP] > EquAL > [ENTER] > Equ H

EqH 1 ... EqH 4: displays the equalization coefficients calculated for each active channel.

11.7 Manual coefficient correction

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

11.8 Equalization deletion

Menu **[ENTER]+[ESC]** > **CALib** > **[ENTER]** > **FS-tEO** > **[LEFT] [UP]** > **EquAL** > **[ENTER]** > **dELEqu**

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

12 Weight parameters

12.1 Filter on the weight

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **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 [Hz]
0	12	100	300	100
1	150	330	100	100
2	260	500	50	100
3	425	700	25	100
4 (default)	850	1100	12.5	100
5	1700	1600	12.5	100
6	2500	2700	12.5	100
7	4000	3500	10	100
8	6000	5000	10	100
9	7000	6800	5	100
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 port.

12.2 Anti Peak

When the weight is stable, the anti peak filter removes 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.

12.3 Zero parameters

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **PARA 0**

- **0 SET** – resettable weight for small weight changes (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.
- **Auto 0** – automatic zero setting at power-on (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, set 0.
- **trAC 0** – zero tracking (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**).

12.4 Units of measure

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

Display	Unit
HILOG	kilograms
G	grams
t	tons
Lb	pounds *
nEUton	newtons *
LItre	litres *
bAr	bars *
AtM	atmospheres *
PIECE	pieces *
nEU-M	newton metres *
HILO-M	kilogram metres *
Other	other generic unit of measure not included in the list *

If the print function is enabled, the symbol of the selected unit is printed after the measured value. * For these units the display coefficient **COEFF** can be set as well (section 12.5). To use **COEFF** it has to be enabled, via fieldbus or by closing the **COEFF** input (section 13.3).

12.5 Display coefficient (BASE)

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

Setting the coefficient **COEFF** changes the display accordingly. If one of the inputs is set to **COEFF** mode (section 13.3), the value modified by **COEFF** is displayed while the input is closed; when it is opened the standard weight display is restored; the coefficient can also be enabled via fieldbus. **COEFF** (max. 99.9999; default 1.0000) has a different meaning according to the unit set in **unIt**:

- **Lb, nEUton, bAr, AtM, nEU-M, HILO-M, Other**: the value set in **COEFF** is multiplied by the weight value currently displayed.
- **LItre**: set in **COEFF** the specific weight in kg/l, assuming the system is calibrated in kg.
- **PIECE**: set in **COEFF** the weight of one piece.

Caution All other settings (setpoint, hysteresis, calibration ...) are expressed in weight values. To convert them to the new unit, change the system calibration as described below; **COEFF** must then remain set to 1.0000.

Theoretical calibration for other units of measure

Set in **FS-tEO** the full scale divided by the conversion coefficient from kg to the new unit. Example: 4 load cells of 1000 kg under a scale for olive oil with a specific gravity of 0.916 kg/l – with full scale $(4 \times 1000) / 0.916 = 4367$ the system works in litres of olive oil. With **unIt** = **LItre** it displays and prints “l” instead of “kg”.

Real calibration for other units of measure

Load a known quantity of product in litres (at least 50 % of the maximum amount to be weighed) and enter the value in litres in **WEIGHT**. With **unIt** = **LItre** the system displays and prints “l” instead of “kg”.

13 Outputs and inputs

13.1 Outputs (BASE)

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **Out-In** > **[ENTER]** > **Out 1 ... Out 3 / In 1 ... In 2**

Default: **OPEn / SEt / GrOSS / POSnEG / OFF**. Operation modes:

- **OPEn** (normally open): the relay is de-energised and the contact open while the weight is lower than the setpoint; it closes when the weight is higher than or equal to the setpoint.
- **CLOSE** (normally closed): the relay is energised and the contact closed while the weight is lower than the setpoint; it opens when the weight is higher than or equal to the setpoint.
- **SEt**: the contact switches on the basis of weight, according to the setpoint (chapter 18).
- **PLC**: the contact does not switch on the basis of weight but is controlled by remote protocol commands.
- **StABLE**: relay switching occurs when the weight is stable.
- **ALARm**: relay switching occurs when one of the alarms **ErCEL**, **ErCElR**, **ErCEL 1**, **Er OL**, **Er Ad**, -----, **Er OF** is triggered; the operation mode is forced to **CLOSE** (normally closed).
- **CHOL**: relay switching occurs when the gross weight on a single channel is higher than **CHSEt**, or when the gross weight detected by the system is higher than the setpoint.

If the operation mode **SEt** is selected, the following options are also active:

- **GrOSS**: switching on the basis of gross weight; **nEt**: on the basis of net weight (if the net function is not active, on the basis of gross weight).
- **POSnEG**: switching for both positive and negative weight values; **POS**: for positive values only; **NEG**: for negative values only.

Confirming with **[ENTER]**, the setpoint operation at the value 0 is set:

- **OFF**: relay switching does not occur if the setpoint value is 0.
- **On** with **POSnEG**: relay switching occurs when the weight is 0; the relay switches again when the weight is different from zero, taking hysteresis into account (positive and negative weights).
- **On** with **POS**: relay switching occurs for a weight higher than or equal to 0; the relay switches again below 0, taking hysteresis into account.
- **On** with **NEG**: relay switching occurs for a weight lower than or equal to 0; the relay switches again above 0, taking hysteresis into account.

13.2 Switching examples (output 1)

Seven examples for the setting of output 1:

Setting Out 1	SEt 1	HYSSt1
OPEn / SEt / GrOSS / POS / OFF	500 kg	0 kg
CLOSE / SEt / GrOSS / POS / OFF	500 kg	0 kg
OPEn / SEt / GrOSS / POS / OFF	500 kg	100 kg
OPEn / SEt / GrOSS / nEG / OFF	500 kg	0 kg
OPEn / SEt / GrOSS / POSnEG / OFF	500 kg	0 kg
OPEn / SEt / GrOSS / POS / On	0 kg	0 kg
OPEn / SEt / GrOSS / POSnEG / On	0 kg	0 kg

13.3 Inputs (BASE)

Default: input 1 = **2Er0**, input 2 = **nE-L0**. Operation modes:

- **nE-L0** (NET/GROSS): closing the input for no more than one second performs a semi-automatic tare and the display shows the net weight. To display the gross weight again, hold the input closed for 3 seconds.
- **2Er0**: closing the input for no more than one second sets the weight to zero (section 14.3).
- **PEAH**: while the input is closed the maximum weight reached remains on display; opening the input shows the current weight.
- **PLC**: closing the input performs no operation; the input status may be read remotely via the communication protocol.

- **ContIn**: closing the input for max. one second transmits the weight once over the serial connection with the fast continuous transmission protocol (only if **ContIn** is set in **SERIAL**).
- **COEFF**: while the input is closed the weight is displayed with the set coefficient (section 12.5), otherwise the weight is displayed.
- **PrIntr**: when the input is closed the data are sent for printing if **PrIntr** is set in the communication protocol of the serial port.

13.4 Inputs and outputs in the batching program (LOAD)

Terminal	Function
Output 1	PRESET (operation: section 21.3)
Output 2	SET (operation: section 21.3)
Output 3	CYCLE END (the relay closes when the cycle end is reached)
Input 1	START
Input 2	STOP

14 Tare, zero and peak

14.1 Semi-automatic tare (net/gross)

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

To perform a net operation, close the NET/GROSS input or press [LEFT] for less than 3 seconds: the instrument displays the net weight (just set to zero) and the NET LED lights up. To display the gross weight again, keep the NET/GROSS input closed or press [LEFT] 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 [LEFT] – 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 [UP] 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**).

14.2 Preset tare (subtractive tare device)

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

A preset tare value can be set manually and subtracted from the displayed value, provided that **P-tArE** ≤ max capacity. By default the last programmed preset tare is shown: to apply it press [UP] and then [ENTER]. Back in the weight display, the net weight (minus the preset tare) is shown and the NET LED lights up. To delete it and return to the gross weight, hold down [LEFT] for about 3 seconds or keep the NET/GROSS input closed for the same time; the preset tare is set to zero and the NET LED goes off.

- While the net weight is displayed, keeping [UP] 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.

14.3 Semi-automatic zero

Closing the SEMI-AUTOMATIC ZERO input sets the weight to zero. Alternatively press [ESC] for less than 3 seconds: **St0rE?** is displayed for 3 seconds; pressing [ENTER] sets the weight to zero. This is only allowed if the weight is lower than **0 SET** (section 12.3); otherwise **t-----** appears and the weight is not set to zero. The zero setting is lost upon power-off.

14.4 Peak (BASE)

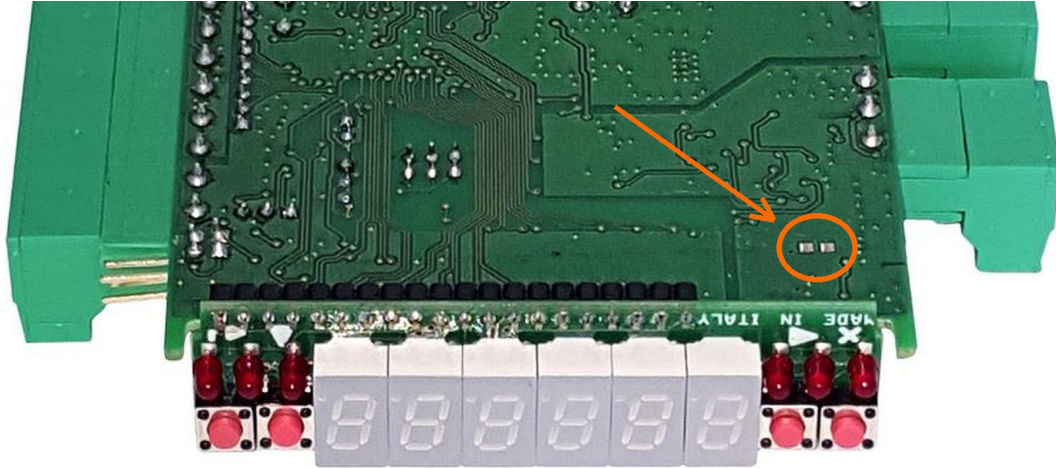
While the PEAK input is closed or the function is activated via fieldbus, the maximum weight reached remains displayed; opening the input or deactivating the function shows the current weight. To catch sudden peaks, set the filter on the weight to 0.

15 Analogue output (ETLH Analog only)

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **AnALOG**

- **tYPE**: analogue output type (4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V, 0 ... 5 V, ± 10 V, ± 5 V; default 4 ... 20 mA).

Caution For ± 10 V and ± 5 V a soldered jumper must be closed: open the instrument, locate the soldered jumper marked below on the printed circuit board and short the pads with a drop of tin.



Position of the soldered jumper for ± 10 V and ± 5 V.

- **MOdE**: operating mode – **GROSS** output follows the gross weight, **nEt** the net weight, **PLC** remote control (communication protocols manual), **PEAH** the output transmits the peak weight.
- **ErrUAL**: analogue output value in error condition – **Std** or **FuLL** (table in section 20.2).
- **AnA 0**: weight value for the minimum output value. Only set a value other than zero to limit the range – e.g. with 10000 kg full scale, 4 mA at 5000 kg and 20 mA at 10000 kg: set 5000 kg instead of zero.
- **AnA FS**: weight value for the maximum output value; it must correspond to the value in the PLC program (default: calibration full scale). Example: 4 ... 20 mA, in the PLC 20 mA = 8000 kg > set 8000.
- **Cor 0**: correction at zero so that the PLC indicates 0; the sign “-” can be set on the last digit on the left. Example: 4 ... 20 mA, at minimum output the PLC reads 4.1 mA > set 3.9 to obtain 4.0.
- **Cor FS**: correction at full scale so that the PLC indicates the value of **AnA FS**. Example: 4 ... 20 mA, at full scale the PLC reads 19.9 mA > set 20.1 to obtain 20.0.

Output type	Minimum	Maximum
0 ... 10 V	-0.150	10.200
0 ... 5 V	-0.150	5.500
± 10 V	-10.300	10.200
± 5 V	-5.500	5.500
0 ... 20 mA	-0.200	22.000
4 ... 20 mA	-0.200	22.000

Settable limits of the corrections **Cor 0** and **Cor FS**. The output can also be used the opposite way: **AnA 0** may be greater than **AnA FS**; the output then increases as the weight decreases. Example with 0 ... 10 V, **AnA 0** = 10000, **AnA FS** = 0: 0 kg > 10 V, 5000 kg > 5 V, 10000 kg > 0 V.

Important All analogue outputs are ACTIVE and SINGLE ENDED; only PASSIVE receiver devices may be connected. Minimum load of the voltage outputs 10 k Ω , maximum load of the current outputs 300 Ω .

16 Serial communication

16.1 Setting

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **SERIAL** > **[ENTER]** > **rS485**

- **nOnE**: disables any type of communication (default).
- **ModbUS**: MODBUS-RTU protocol; addresses from 1 to 99 (communication protocols manual).
- **ASCIi**: ASCII bidirectional protocol; addresses from 1 to 99; items **MOdu60** and **MOd td**.
- **COntIn**: continuous weight transmission at the frequency set in **HErt2** (10 to 300) – **MOd t** or **MOd td** (each with **PARitY** = **nOnE**, **StOP** = 1).
- **rIP**: continuous transmission to remote displays; the remote display shows the net or gross weight according to its settings (**BAud** = 9600, **PARitY** = **nOnE**, **StOP** = 1).
- **HdrIP**: as **rIP** (**BAud** = 9600, **PARitY** = **nOnE**, **StOP** = 1).
- **HdrIPn**: continuous transmission to remote displays (**BAud** = 9600, **PARitY** = **nOnE**, **StOP** = 1). 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.
- **PrIntr**: printer.
- **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 Hz (default 10)
dELAY	delay before the instrument replies, 0 to 200 ms (default 0)
PARitY	nOnE no parity (default) · EUEn even · Odd odd
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 (communication protocols manual)
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)
PrtM0d	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

16.2 RS485 network

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

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 (marked “RS485 Termination” on the housing) on the furthest instruments. With other instruments or converters, refer to their manuals.

16.3 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.

17 Diagnostics, test and events

17.1 Automatic diagnostics of load distribution

Menu [ENTER]+[ESC] > CALIB > [LEFT] [UP] > dIAG

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

Display	Meaning
Aut	load diagnostics on (YES) or off (n0; default)
StAtUS	status of the active channels: weight, load percentage on each channel, enabled channels and/or channels in error
MEMrIP	stored load distributions: weight, load percentage on each channel, number of the stored distribution
dELEtE	deletes the stored load distributions; SURE? is displayed – [ENTER] proceeds, [ESC] cancels
ErSEt	difference between current and stored percentage beyond which the ErdIAG alarm is triggered (default 5.0)
Aut 0	diagnostics on zero on (YES) or off (n0; default)
ErSEt0	as ErSEt , for diagnostics on zero (default 5.0)
CMP 0	current load distribution on zero and the one previously stored (weight, load percentage on each channel)

- 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.
- 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 10.3). 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.

17.2 Current load distribution display

- Confirm **StAtUS** with [ENTER]: the current weight is displayed, preceded by **A**.
- [ENTER], then [LEFT] and [UP]: in sequence the current load distribution on each channel, including the zeroing component (**1C** ... **4C**); [ESC] returns.
- [LEFT]: the current weight is displayed, preceded by **2**.
- [ENTER], then [LEFT] and [UP]: in sequence the current load distribution on each channel without the zeroing component (**1C** ... **4C**); [ESC] returns.

17.3 Test

Menu [ENTER]+[ESC] > CALIB > [LEFT] [UP] > tEST

- Load distribution – **StAtUS**: status of the active channels (weight, load percentage on each channel, enabled channels and/or channels in error).
- Input test – **In**: 0 must be displayed for each open input, 1 when the input is closed.
- Output test – **Out**: setting 0 the corresponding output must open, setting 1 it must close.
- Analogue output test (ETLH Analog only) – **AnALOG**: the signal ranges between the minimum and the maximum value, starting from the minimum; **mA** current, **VOLT** voltage.
- Millivolt test – **mV-CEL**: response signal of each load cell in mV with three decimals.
- Millivolt stored at zero setting (only if **Aut 0** = YES) – **mV-0-M**: response signal of each load cell in mV with three decimals (section 10.3).

17.4 Events log

Menu [ENTER]+[ESC] > CALIB > [LEFT] [UP] > 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	zero entry via the keypad; [ENTER] shows the set value
dIAG	load distribution error; [ENTER] shows the weight that triggered the alarm, [ENTER] again the difference between the load percentage and the stored value
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
CHOL	overload error; [ENTER] again shows the channels that generated the alarm

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

17.5 Info menu

Menu [ENTER]+[ESC] > **CALib** > [LEFT] [UP] > **Info**

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

18 Setpoint programming (BASE)

Menu **000000** > **[ENTER]** > **Set 1 ... Set 3** > **[ENTER]** > **HYStE1 ... HYStE3** > **[ENTER]** > **CHSEt**

From the weight display, press **[ENTER]** to access the setpoint setting (keys as in chapter 10).

- **SEt** (from 0 to full scale; default 0): setpoint – relay switching occurs when the weight exceeds this value; the type of switching is settable (section 13.1).
- **HYStE** (from 0 to full scale; default 0): hysteresis – subtracted from the setpoint to obtain the switching point for decreasing weight. Example: setpoint 100, hysteresis 10 – switching occurs at 90 for decreasing weight.
- **CHSEt** (from 0 to full scale; default 0): gross weight value for each channel after which the contact switches, if the **CHOL** function is associated (section 13.1).

Note These values are set to zero if the calibration is changed significantly (sections 10.1 and 10.5).

19 Use with W series weight indicators (BASE)

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

When the ETLH is used in combination with a W series weight indicator, the load cells are connected to the transmitter, which transmits the weight to the indicator; all calibration, zeroing, equalization and channel selection operations can be performed remotely through the indicator.

19.1 Connection to the weight indicator

Signal	ETLH	Weight indicator
RS485 +	29	RS485 +
RS485 –	30	RS485 –
Shield	9	Shield

- Weight indicator: on the serial port used, set the **MASnUL** protocol with **bAUd** = 9600, **PARItY** = **nOnE**, **StOP** = 1.
- ETLH: on the serial port used, set the **ModBUS** protocol with **bAUd** = 9600, **PARItY** = **nOnE**, **StOP** = 1.

19.2 Additional menus on the indicator

On the weight indicator the following additional items appear under [ENTER]+[ESC]: **CALib** > **SEL CH** and **Equal** (**EqrEA**, **EqTE0**, **Equ H**, **dELEqu**); **SERIAL** > **rS485 ... rS232** with the **MASnUL** protocol; **dIAG** (all items as in section 17.1); **tEST** > **StAtUS ... mV-0-M**; **EUEnt** (**dIS EU**, **dEL EU**, **Prt EU**) and **nOHEYb**. Changes are applied right after pressing [ENTER].

19.3 Remote control of the ETLH

The following functions can be performed remotely through the weight indicator: 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 ETLH display. If the configuration is performed on the ETLH, the connected indicator must be restarted to allow synchronization.

Menu **000000** > [ENTER]+[ESC] > **CALib** > [LEFT] [UP] > **nOHEYb**

Remote keypad locking: **YES** keypad locked, **n0** keypad unlocked.

19.4 Additional alarms on the indicator

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

20 Alarms

Display	Meaning
nOCEL	no load cell detected; check the connections.
ErCEL	the load cell signal exceeds 39 mV; the conversion electronics (A/D 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+.
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 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 than the display can show at full scale; value above the maximum; the sample weight does not match the detected mV increase; the analogue output correction goes beyond the limits.
bLOC	lock active on menu item, keypad or display.
nOdISP	the number cannot be displayed (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.
bUS Er	issues with the fieldbus device.
CHOL 1	the weight detected by the channel indicated by the number is greater than CHSet .
ErrCHH	issues with data contained in external memory; contact technical assistance.

20.1 Serial protocol alarms

Protocol	ErCEL	Er OL	Er Ad	---	Er OF	t---
Modbus RTU, status register (bit LSB 76543210)	xxxxxx1	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__
HDRIP-N	_ERCEL	_ER_OL	_ER_AD	#####	_ER_OF	O__SET
CONTIN	_ERCEL	_ER_OL	_ER_AD	^^^^^^	_ER_OF	O__SET
YHL	999999999	999999999	999999999	999999999	999999999	999999999

* With RIP remote displays, ----- appears if the message exceeds 5 digits.

20.2 Relays and analogue output in case of alarm

In case of alarm the relays open and the analogue output (ETLH Analog only) is brought to the value belonging to the **ErrUAL** setting (chapter 15):

ErrUAL	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	0 ... 10 V	± 10 V	± 5 V
Std	0 mA	3.5 mA	0 V	0 V	0 V	0 V
FuLL	20 mA	20 mA	5 V	10 V	10 V	5 V

21 Batching (LOAD)

21.1 Introduction to the operation

The instrument automatically loads a settable amount of product on the weighing structure, driving the batching organ (including two-speed) through the PRESET and SET contacts. Features:

- 1 settable formula (section 21.7);
- automatic fall calculation (section 21.6, **MODFAL**);
- autotare at batching start (section 21.6, **AtARE**);
- tolerance error control (section 21.6, **tOL**);
- precision batching through the slow function (**SLOU**) or the tapping function (**SLOUOn**, **SLOUOF**);
- consumption storage (section 21.5).

Start via external contact or remotely via fieldbus. At the end of every batching the instrument stores the consumed amount; it can be viewed on the display or via the communication protocol when the instrument is in standby. If an alarm occurs during batching, the instrument shows it and waits for operator intervention to abort or continue the batching.

21.2 Batching sequence

Batching sequence programming (with remote control: select the number of cycles) – start – execution – waiting phase – cycle end.

Batching start

Start the batching by closing the START external contact for at least 0.5 s. If at the end of the batching the START contact is closed, the same batching sequence is repeated. The instrument first checks that:

- the formula has been programmed, otherwise alarm **EMPTY**;
- the amount set in the formula does not exceed the maximum weight (**MASS**), otherwise **MASFor**;
- the gross weight is lower than the minimum weight (**Min**), otherwise alarm **tARE?** (the start can be forced with [ENTER]);
- only with **tOTAL = YES**: if the consumed amount exceeds 999000, **tOTAL** appears for a second; if it exceeds 999999, it is automatically set to zero.

Batching execution

The batching consists of an initial FAST phase and a subsequent SLOW phase. During the entire batching the instrument monitors the batched quantity, commands the PRESET and SET contacts according to **PSS** (section 21.3) and activates the **LOAD** alarm if **tnLOAD** is set and the product is not loaded by at least 20 divisions within this time.

- The FAST phase ends when the batched quantity reaches the set value minus **SLOU** (only if **SLOU** is set) or the preset value of the formula.
- In the SLOW phase the instrument does not compare until **tnCOMP** has elapsed (if set); with a tapping value set, the SET contact opens and closes according to **SLOUOn** and **SLOUOF**.
- When the batched quantity reaches the set value of the formula minus the fall value, the SLOW phase ends and the SET contact opens.

Waiting phase

After opening the SET, the instrument shows the weight preceded by **A** and waits until – according to **neht P** (section 21.3)

– the waiting time **tIMEAt** has elapsed, the START input has been closed, [ENTER] has been pressed or it has been confirmed via fieldbus, or the weight is stable. If the tolerance (**tOL**) is set:

- quantity less than the set quantity minus the tolerance: the SLOW phase is performed again; if the error persists, the **tOL** alarm is activated.
- quantity greater than the set quantity plus the tolerance: **tOL** alarm.
- quantity within the tolerance limits: continue.

To cancel the **tOL** alarm and proceed, press [ENTER] or confirm via fieldbus.

Cycle end phase

The CYCLE END contact is closed; with **tOTAL** = **YES** the consumption is stored. If **tnUnLO** is set and the product is not extracted by at least 20 divisions within this time from the beginning of the extraction, the **UnLOAD** alarm is activated. The instrument opens CYCLE END only after verifying that the weight is lower than **Min** and the safe emptying time **tSIC** has elapsed. With **SLAUe** = **YES** it waits for remote data reading. If several cycles have been set, a new cycle starts.

21.3 Operation settings

Menu **[ENTER]+[ESC]** > **CALib** > **[LEFT] [UP]** > **SettIn**

- **neht P**: switch condition from the SET opening to the CYCLE END closing – **tIME** (default **YES**): time **tIMEAt** set in the constants; **COMand** (default **n0**): START input closure or **[ENTER]** key pressure; **StABLE** (default **n0**): stable weight.
- **PSS** (default 2): operating mode of SET and PRESET – **PSS** = 1: at start only PRESET is closed; once the preset value is reached PRESET opens and SET closes; once the set value is reached SET opens. **PSS** = 2: SET and PRESET close together at start; once the preset value is reached PRESET opens (beginning of the slow phase), once the set value is reached SET opens too – for single-speed batching program **PSS** = 2 and use only the SET contact. **PSS** = 3: at start only PRESET is closed; once the preset value is reached SET closes too; once the set value is reached both open.
- **EndnEt** (default **n0**): display during the CYCLE END phase (unloading of the scale) – **YES**: net weight, after the CYCLE END opening the gross weight; **n0**: gross weight.

21.4 Display during batching and batching stop

During batching the display shows the weight preceded by **b.** **[UP]** shows the formula number, **[UP]** again the number of the running cycle. To stop the batching, open the START contact and close the STOP contact – if START is still closed, **StArt?** is displayed – or stop it via fieldbus.

21.5 Consumption

Menu **000000** > **[ENTER]** > **FORP** > **[LEFT] [UP]** > **tOTAL** > **[ENTER]** > **123456**

If consumption is enabled in the constants (**tOTAL** = **YES**), the batched quantities are stored. **tOTAL** displays the total quantity consumed divided by 100; it is printed in full.

Menu **000000** > **[ENTER]** > **FORP** > **[LEFT] [UP]** > **CAnCt0** > **[ENTER]** > **SURe**

To delete the consumption confirm **CAnCt0**; at **SURe** confirm again with **[ENTER]** or press **[ESC]** to cancel.

21.6 Batching constants

From the weight display press **[ENTER]**, then **[UP]** several times until **cOnSt** is displayed, and confirm (keys as in chapter 10).

Display	Meaning	Range; default
Min	minimum weight: below it the scale is considered empty; batching start only below it; during unloading CYCLE END opens when this value is reached and tSIC is over	0 ... full scale; 10
MASS	maximum weight (settable and displayable); 9 divisions above it - - - - - appears, a greater amount in the formula gives Error ; 0 = off	0 ... full scale; 0
tSIC	safe emptying time: after reaching Min the instrument waits for this time before opening CYCLE END	0.0 ... 999.9 s; 5.0
tIMEAt	waiting time between the SET end and the CYCLE END closing, to let the weight get steady; only required with automatic fall, consumption, printing, tolerance or confirmation from PC	0.0 ... 999.9 s; 5.0
tnCOMP	no comparison time: after the opening of PRESET the instrument waits for this time before comparing the weight with the set value	0.0 ... 999.9 s; 0.0
tnLOAD	no product load time during batching, then alarm LOAD	0.0 ... 999.9 s; 0.0
tnUnLO	no product unload time during unloading (cycle end), then alarm UnLOAD ; the control starts only after the weight has decreased by at least 10 divisions	0.0 ... 999.9 s; 0.0
ModFAL	fall: 0 = manual; other than 0 = automatic, updated every so many batchings (e.g. 3 = every three cycles)	1 ... 99; 0
FALdIU	only if ModFAL ≠ 0: limit within which the automatic fall is updated according to ModFAL ; outside it every cycle (e.g. ModFAL = 3, FALdIU = 5, weight 100: every batching until the result is within 95 ... 105); 0 = off	0 ... full scale; 0
FALL	fall value: set it (with ModFAL = 0) or view and modify the calculated value (with ModFAL ≠ 0)	0 ... maximum weight; 0

Display	Meaning	Range; default
tOL	tolerance: if the batched weight deviates more, tOL appears (e.g. SET 1000, tolerance 100: 900 ... 1100 allowed); 0 = off	0 ... maximum weight; 0
SLOU	slow quantity, replaces the preset value: the slow phase starts at set value minus SLOU (e.g. SET 100, SLOU 15: from 85); if the value is greater than the quantity, the whole batching is slow; 0 = off	0 ... maximum weight; 0
SLOUOn	tapping function (for batching organs without a slow speed): time in which SET remains closed during the SLOW phase; 0 = off	0 ... 9.9; 0
SLOUOF	tapping function: time in which SET remains open during the SLOW phase; 0 = off	0 ... 9.9; 0
AtArE	autotare at batching start, updated every so many cycles of a sequence; only if the gross weight is lower than Min , otherwise tArE? ; 0 = off	0 ... 999; 0
tIMEtA	only if AtArE ≠ 0: delay after the start of the formula before the autotare	0 ... 99.9; 0
StAbtA	only if AtArE ≠ 0: YES autotare after the delay and only with stable weight; nO right after the delay	YES / nO; nO
tOtAL	consumption memory (total batched quantity) on or off	YES / nO; nO
PrInt	printing of batching data at cycle end on or off	YES / nO; nO
nCOPY	number of copies of the batching printout	1 ... 9; 1
SLAUE	waiting for confirmation from PC: YES the instrument waits for the PC to read the batching data before another batching (otherwise alarm SLAUE); nO no	YES / nO; nO

Caution Set the waiting time **tIMEAt** so that the weight is stable at the end of the batching, otherwise the automatic fall is not updated correctly. In batching cycles in which the fall is not updated the waiting time is not applied, unless other functions require it (e.g. prints) – a high **MODFAL** value therefore reduces the duration of batchings.

21.7 Formula programming

Menu **000000** > **[ENTER]** > **FORP** > **[ENTER]** > **PRESet / SET**

Confirm **FORP** with **[ENTER]** and set **PRESet** and **SET** of the formula. **PRESet** is NOT displayed if a slow value (**SLOU**) has been set in the constants. A value higher than **MASS** gives **Error**.

Menu **000000** > **[ENTER]** > **FORP** > **[LEFT] [UP]** > **CAnCFO**

Deleting the formula: confirm **CAnCFO** with **[ENTER]**; at **SUR**e confirm again with **[ENTER]** or press **[ESC]** to cancel.

21.8 Additional alarms relating to batching

Display	Meaning
tArE?	at batching start the weight is higher than Min ; [ESC] returns to the weight display, [ENTER] cancels the alarm and continues; if the weight comes back below Min , the batching starts
tOL	at batching end the weight differs from the formula by more than the tolerance; [ENTER] or fieldbus confirms and continues
FALL	at batching start the fall value is higher than the quantity to be batched; [ESC] cancels the alarm and the batching
EMPTy	at batching start the formula recalled for running is not programmed; [ESC] quits
MASFor	at batching start the formula recalled for running exceeds the maximum weight; [ESC] quits
LOAD	during batching the product is not loaded; cancelled automatically if the product increases, otherwise stop the batching (section 21.4)
UnLOAD	during unloading (CYCLE END closed) the product is not extracted; cancelled automatically if the product decreases, otherwise stop the batching (section 21.4)
StArt?	displayed for 3 s if you try to stop the batching with the STOP input while START is closed; open START
PARSer	batching cancelled; [ESC] quits; if the alarm persists, contact technical assistance
ErUEIG	weight alarm, the current batching is cancelled; [ESC] returns to the weight display, check the alarm
Error	value set beyond the permitted values (as in chapter 20)
COMAnd	waiting for START closure or [ENTER] to continue the batching
SLAUE	the PC has not read the batching data

22 Printing examples

Prerequisite: printer set (**PrIntr**, section 16.1). <Model> stands for the model designation the instrument prints in the heading.

22.1 Base program (BASE)

From the weight display press [UP].

Basic printout; peak enabled; with COEFF enabled

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

GROSS      878 kg
NET        589 kg
TARE       289 kg

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

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

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

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

22.2 Load distribution

Current distribution: press [UP] from the **StAtus** menu. Current and stored distribution: from the **CMP 0** and **MEMrIP** menus keep [UP] 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:         ERR
CH4:         OFF

-----
<Model>  BASE  Addr:01
STORED      (MEMRIP)
GROSS       2014 kg
CH1:        23.5 %
CH2:        24.1 %
CH3:         ERR
CH4:         OFF
GROSS OLD   2050 kg
CH1:        25.5 %
CH2:        22.1 %
CH3:         ERR
CH4:         OFF
```

22.3 Batching program (LOAD)

From the weight display press [UP] and select: **WEIGHT** prints the displayed weight; **COnSt** the batching constants; **FOrP** one or all formulas ([ENTER] shows **FOrPO 1**: set the formula number or 00 for all); **tOtAL** the consumption (only with **tOtAL = YES**).

Batching printout: without tare (AtArE = 0), with tare each cycle (AtArE = 1)

```

-----
<Model>  LOAD  Addr:01
FORMULA:                01
CYCLE:      1/          1

INIT.WEIGHT      10 kg
GROSS  1005:    1000 kg
-----
<Model>  LOAD  Addr:01
FORMULA:                01
CYCLE:      1/          1

TARE                34 kg
NET    1005:    1000 kg

```

Batching printout with reset every X cycles (AtArE = X)

```

-----
<Model>  LOAD  Addr:01
FORMULA:                01
CYCLE:      2/          2

INIT.WEIGHT      1 kg
GROSS  1070:    1000 kg
-----
<Model>  LOAD  Addr:01
FORMULA:                01
CYCLE:      1/          2

ZERO WEIGHT      12 kg
GROSS  1026:    1000 kg

```

Constants printout

```

-----
<Model>  LOAD  Addr:01
CONSTANTS
MIN                10
MASS               0
TIME SIC          5.0
TIME WAIT         5.0
TIME NCOMP        0.0
TIME NLOAD        0.0
TIME NUNLOAD      0.0
FALL              MANUAL
SLOW              0
TIME SLOWON       0.0
TIME SLOWOF       0.0
PSS               2
AUTOTARE          NO
UNLOAD            GROSS
TOTAL             NO
PRINT             NO
SLAVE             NO
BLACKOUT          MANUAL

FOR.      FALL    TOLER
01         0      100

```

Formula: standard (SLOU = 0) and with slow value (SLOU = 200); consumption

```

-----
<Model>  LOAD  Addr:01
FORMULA:                01
PSET      2500 kg
SET       3000 kg
-----
<Model>  LOAD  Addr:01
FORMULA:                01
SLOW      200 kg
SET       3000 kg
-----
<Model>  LOAD  Addr:01
CONSUMPTION
TOTAL    2604 kg

```

If consumption is set to zero, CONSUMPTION ERASED is printed as well.

23 Reserved for the installer

23.1 Menu locking

This procedure blocks the access to any menu. Select the menu to lock (e.g. **CALIB**) and press [ESC] and [LEFT] 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.

23.2 Menu unlocking

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

23.3 Temporary menu unlocking

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

23.4 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, setpoint management only; **LOAD**: single product loading program.
- Set the approval status: **notLEG** not approved program · **LEGAL** approved, single interval * · **LEGMI** approved, multi-interval *.
- Set the active regulation (only if **notLEG** has not been set): **OIML** according to OIML · **InMETr** according to INMETRO (**bASE** program only); the standards observed in the regions are listed in the technical specifications of the approved-version manuals.

When the ETLH is used in combination with a W series weight indicator, 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 manual and the correct procedures from technical assistance, stating the hardware code and serial number (chapter 9). If you do not have a manual for the newly set program, you can request it from technical assistance.

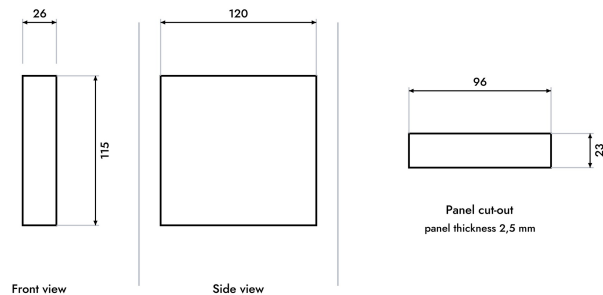
23.5 Keypad or display locking

Press [ESC] immediately followed by [UP] 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.

24 Dimensions, mounting, directives and standards

24.1 Dimensions



Dimensions in mm: 26 × 115 × 120.

24.2 Front panel mounting

Besides the Omega/DIN rail, the ETLH can be installed on the front panel using the included mounting kit – except the ETLHPROFI version (Profibus DP). Drilling size 23 × 96 mm, maximum panel thickness 2.5 mm.

- Pull out the terminal strips and insert the instrument into the hole.
- Insert the mounting brackets into the housings, on both sides of the instrument.
- Tighten the four screws to lock the instrument.

24.3 Directives and standards

According to the manufacturer's declarations of conformity (EU and United Kingdom, 14/01/2026) for all versions:

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 – with the corresponding BS EN standards

The declarations of conformity are available on request.