

MANUAL

ETLG

WEIGHT TRANSMITTER

Installation and user manual



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

This manual describes installation, connection and operation of the ETLG weight transmitter in all versions. 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 ETLG (overview in section 5.2). Sections that apply to the ETLG Analog only are marked accordingly.

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 8.2). 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.

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 the load cells in mV with four 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.
- Disconnect the load cells from the instrument and check that there is no moisture in the junction box caused by condensation or water infiltration; if so, drain the system or replace it if necessary.
- 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.
- The insulation value between the shield and any other cell wire, and between any cell wire and the body of the load cell, must be higher than 20 MΩ.

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 input for assembly on the back panel on an Omega/DIN rail. Dimensions 25 × 115 × 120 mm. Six-digit semi-alphanumeric display, 8 mm height, 7 segment. Four-key keyboard.

RS485 serial port for connection to PC/PLC (up to 32 instruments, max. 99 with line repeaters) by ASCII or Modbus RTU protocol, and to a remote display. Depending on the version, additionally integrated: CANopen, DeviceNet, CC-Link, PROFIBUS DP, Modbus/TCP, Ethernet TCP/IP, EtherNet/IP, PROFINET IO, EtherCAT, POWERLINK or SERCOS III. ETLG Analog only: opto-isolated 16 bit analogue output (voltage or current).

5.2 Versions

Every version is equipped with an RS485 serial port.

Version	Interface
ETLG Analog	RS485 + opto-isolated analogue output
ETLG485	RS485
ETLGCANOPEN	CANopen, slave
ETLGDEVICENET	DeviceNet, slave
ETLGCCLINK	CC-Link, remote device station
ETLGPROFI	Profibus DP, slave
ETLGMODBUSTCP	Modbus/TCP, slave
ETLGETHETCP	Ethernet TCP/IP, web browser
ETLGETHEIPN	2 × EtherNet/IP, adapter
ETLGPROFINETION	2 × PROFINET IO, device
ETLGETHERCAT	2 × EtherCAT, slave
ETLGPOWERLINK	2 × POWERLINK, slave
ETLGSERCOS	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. 8 (350 Ω); 5 V DC / 120 mA
Linearity	< 0.01 % F.S.
Analogue output linearity (ETLG Analog only)	< 0.01 % F.S.
Thermal drift	< 0.0005 % F.S./°C
Analogue output thermal drift (ETLG Analog only)	< 0.003 % F.S./°C
A/D converter	24 bit (16 000 000 points)
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	300
Display range	$\pm$ 999999
No. of decimals / display increments	0 ... 4 / x1 x2 x5 x10 x20 x50 x100
Digital filter / readings per second	10 levels / 5 ... 300 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 (ETLG 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 8 load cells of 350 Ω or 16 load cells of 700 Ω .
- For 4-wire load cells, make a jumper between EX– and REF– and between EX+ and REF+.
- 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 15.2).

7.2 Terminals

ETLG Analog · ETLG485 · ETLGPROFI

1	–load cell excitation (–EX)	11	+analogue output 0...10 V ¹
2	+load cell excitation (+EX)	12	–common of the analogue output ¹
3	+load cell REF / SENSE	13	output no. 1
4	–load cell REF / SENSE	14	output no. 2
5	–load cell signal	15	output no. 3
6	+load cell signal	16	common of the outputs
7	input no. 1 (+5 ... 24 V DC)	17	RS485 +
8	input no. 2 (+5 ... 24 V DC)	18	RS485 –
9	common of the inputs (0 V)	19	+supply 12 / 24 V DC
10	+analogue output 0...20 / 4...20 mA ¹	20	–supply · RS485 shield, GND

All other versions (fieldbus)

1	–load cell excitation (–EX)	15	output no. 1
2	+load cell excitation (+EX)	16	output no. 2
3	+load cell REF / SENSE	17	output no. 3
4	–load cell REF / SENSE	18	common of the outputs
5	–load cell signal	19	RS485 +
6	+load cell signal	20	RS485 –
7	input no. 1 (+5 ... 24 V DC)	21	+supply 12 / 24 V DC
8	input no. 2 (+5 ... 24 V DC)	22	–supply · RS485 shield, GND
9	common of the inputs (0 V)		

¹ ETLG Analog onlyTop: ETLG Analog, ETLG485 and ETLGPROFI (20 terminals); bottom: all other versions (fieldbus, 22 terminals). ¹ ETLG Analog only.

3 outputs: controlled by setpoint values or by a remote device via protocol. 2 inputs (default: input 1 = SEMI-AUTOMATIC ZERO, input 2 = NET/GROSS), settable to SEMI-AUTOMATIC ZERO, NET/GROSS, PEAK or REMOTE CONTROL (section 12.3).

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)	—	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.

8.3 Menu map

Access	Menu	Items	Section
[ENTER]	SEt 1 ... SEt 3	HYStE1 ... HYStE3	17
[ENTER]+[ESC]	CALib	FS-tE0 SenSib dIVIS mASS 2Er0 INP 0 WEIGHt unIt COEFF	10, 11
	FILtEr	—	11.1
	PARA 0	0 SEt AUt0 0 trAC 0	11.3
	AnALOG ¹	tYPE mOdE AnA 0 AnA FS Cor 0 Cor FS	14
	SErIAL	rS485: nOnE ModbUS ASCII COnTIn rIP HdrIP HdrIPn YHL · bAUd Addr dELAY PARItY StOP	15
	Out-In	Out 1 Out 2 Out 3 In 1 In 2	12
	tEst	In Out AnALOG ¹ mV-CEL	16.1
	InFO	—	16.2
[ESC] 3 s	2Er0	—	10.3
[UP] 3 s	mV-CEL	—	4.1
[ENTER]+[LEFT]	P-tArE	—	13.2

¹ ETLG Analog only. The menus below CALib are selected with [LEFT] and [UP].

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: **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)

- 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 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 (section 14).
- If you use serial communication, set the related parameters (section 15).
- If setpoints are used, set the weight values and the relevant parameters (sections 17 and 12).

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

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.

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.

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 0 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 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 Weight parameters

11.1 Filter on the weight

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

The filter stabilises the weight display. To increase the effect (more stable weight) increase the value (from 0 to 9, default 4).

- Confirming **FILtEr** displays the currently programmed filter value.
- After changing and confirming the value, the weight is displayed so that its stability can be verified.
- If stability is not satisfactory, confirming brings back **FILtEr** and the filter may be modified again 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.

Filter value	Response time [ms]	Display and serial port refresh [Hz]
0	12	300
1	150	100
2	260	50
3	425	25
4 (default)	850	12.5
5	1700	12.5
6	2500	12.5
7	4000	10
8	6000	10
9	7000	5

11.2 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.

11.3 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**).

11.4 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 *

* For these units the display coefficient **COEFF** can be set as well (section 11.5). To use **COEFF** it has to be enabled by closing the **COEFF** input (section 12.3).

11.5 Display coefficient

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 12.3), the value modified by **COEFF** is displayed while the input is closed; when it is opened the standard weight display is restored.

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 shows “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 shows “l” instead of “kg”.

12 Outputs and inputs

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

12.1 Outputs

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 (section 17).
- **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**, **Er OL**, **Er Ad**, -----, **Er OF** is triggered; the operation mode is forced to **CLOSE**.

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.

12.2 Switching examples (output 1)

Seven examples for the setting of output 1:

Setting Out 1	SEt 1	HYSStE1
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

12.3 Inputs

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 13.3).
- **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 11.5), otherwise the weight is displayed.

13 Tare, zero and peak

13.1 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 preset tare; when the key is released the net weight is displayed again. The semi-automatic tare is not allowed if the gross weight is zero.

13.2 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.

13.3 Semi-automatic zero

Closing the SEMI-AUTOMATIC ZERO input sets the weight to zero. Alternatively press [ESC]: **StOrE?** 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 11.3); otherwise **t-----** appears and the weight is not set to zero. The zero setting is lost upon power-off.

13.4 Peak

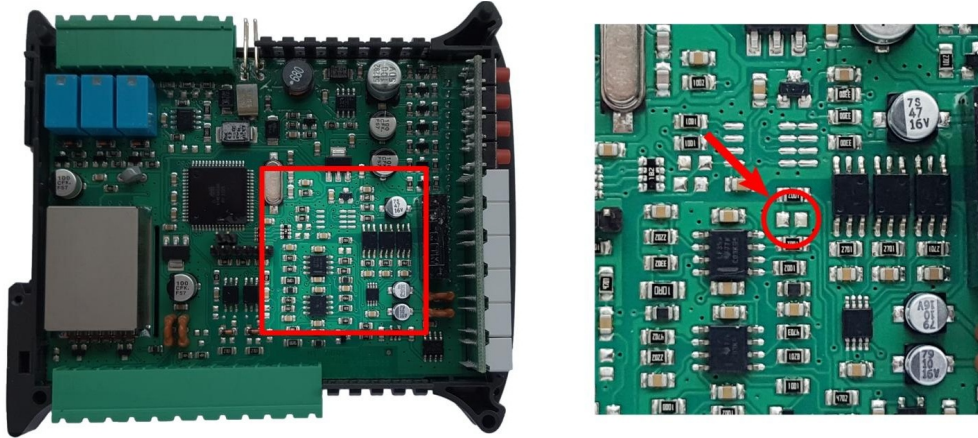
While the PEAK input is closed the maximum weight reached remains displayed; opening the input shows the current weight. To catch sudden peaks, set the filter on the weight to 0.

14 Analogue output (ETLG 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; the other analogue outputs are then unusable. 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).
- **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 .

15 Serial communication

15.1 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.
- **ASCIi**: ASCII bidirectional protocol; addresses from 1 to 99; items **ModU60** and **Mod t d**.
- **ContIn**: continuous weight transmission at the frequency set in **HErt2** (10 to 300) – **Mod t** (set **PARitY** = **nOnE**, **StOP** = 1) or **Mod t d** (set **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.

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 · Oddd odd
StOP	stop bit 1 or 2 (default 1)

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 RS485 network

The instruments are connected in parallel to a shielded cable via RS485+, RS485– and GND (up to 500 m in the manufacturer's example); 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.

15.3 Direct connection RS485 – RS232 without converter

A two-wire RS485 output may be used directly on the RS232 input of a PC or remote display:

Instrument	RS232
RS485 –	RXD
RS485 +	GND

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

16 Test and info

16.1 Test

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

- 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 (ETLG 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**: load cell response signal in mV with four decimals.

16.2 Info menu

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

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

17 Setpoint programming

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

From the weight display, press **[ENTER]** to access the setpoint setting (keys as in section 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 12.1).
- **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.

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

18 Alarms

Display	Meaning
ErCEL	the load cell is not connected or incorrectly connected; the load cell signal exceeds 39 mV; the conversion electronics (A/D converter) is malfunctioning; the load cell is a 4-wire cell and there are no jumpers between EX- and REF- and between EX+ and REF+; the references are not connected or incorrectly connected.
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.
n0dISP	the number cannot be displayed (greater than 999999 or less than -999999).
In2Er0	gross weight equal to zero: the semi-automatic tare cannot be performed.
bUS Er	issues with the fieldbus device.
ErrCHH	issues with data contained in external memory; contact technical assistance.

18.1 Serial protocol alarms

Protocol	ErCEL	Er OL	Er Ad	-----	Er OF	t-----
Modbus RTU, status register (bit LSB 76543210)	xxxxxxx1	xxxx1xxx	xxxxxx1x	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

* With RIP remote displays, ----- appears if the message exceeds 5 digits. With an alarm the relays open and the analogue outputs go to the lowest possible value:

Range	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	0 ... 10 V	± 10 V	± 5 V
Output value	-0.2 mA	3.5 mA	-0.5 V	-0.5 V	0 V	0 V

19 Reserved for the installer

19.1 Menu locking

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

19.2 Menu unlocking

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

19.3 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.

19.4 Data deletion and program selection

Caution Only perform after contacting technical assistance. 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.
- Set the approval status: **nOtLEG** not approved program · **LEGAL** approved, single interval * · **MULT-I** approved, multi-interval *.
- Set the active regulation (only if **nOtLEG** has not been set): **OIML** · **nTEP** · **InMEtr** (standards by region: see the technical specifications of the approved-version manuals).

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 (section 9).

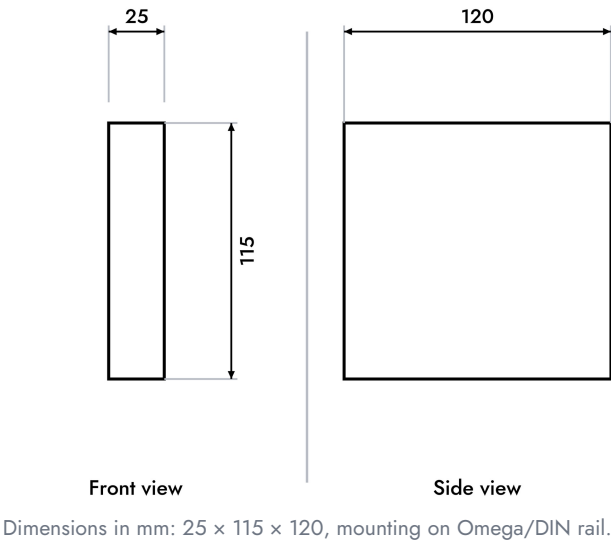
19.5 Keypad or display locking

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.

20 Dimensions, directives and standards

20.1 Dimensions



20.2 Directives and standards

According to the manufacturer’s declarations of conformity (EU and United Kingdom, 18/05/2026) 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.