ENGLISH ENGLISH ENGLISH ENGLISH

Installation and User Manual

version 1.01

CLM8

CE **2004/108/EC**

EN55022 EN61000-6-2 EN61000-6-4

SYSTEM IDENTIFICATION

KEY TO SYMBOLS

Below are the symbols used in the manual to draw the reader's attention:

Warning! Risk of electrocution.

Warning! This operation must be performed by skilled workers.

Read the following indications carefully.

Further information.

GUARANTEE

24 months from the delivery document date. The guarantee covers only defected parts and includes the replacement parts and labour. All shipping and packing costs are paid by the customer. It is possible to have the repair in guarantee on condition that the returned product has not been transformed, damaged or repaired without authorization. No guarantee is applicable on returned products without the original label and/or serial number. No guarantee against misuse.
Batteries: Laumas provides 1 year guarantee from the date of delivery note, against material defects or battery manufacturing faults.

Disposal of Waste Equipment by Users in Private Households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. It is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help preserve natural resources and protect human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local waste disposal Authority or the equipment retailer.

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USER WARNINGS

RECOMMENDATIONS FOR THE PROPER USE OF WEIGHING INSTRUMENT

- Keep away from heat sources and direct sunlight
- Repair 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)

RECOMMENDATIONS FOR CORRECT INSTALLATION OF WEIGHING INSTRUMENTS

The terminals indicated on the instrument's 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 with an earthing wire the terminals of the instrument (including the terminal – SUPPLY) to the weighed structure.
The cell cable must be individually led to its panel input and 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

- RS485: 1000 metres with AWG24, shielded and twisted cables
- RS232: 15 metres for baud rates up to 19200

RECOMMENDATIONS FOR CORRECT INSTALLATION OF THE LOAD CELLS

INSTALLING LOAD CELLS: The load cells must be placed on rigid, stable in-line structures; it is important to use the mounting modules for load cells to compensate for misalignment of the support surfaces.

PROTECTION OF THE CELL CABLE: Use water-proof sheaths and joints in order to protect the cables of the cells.

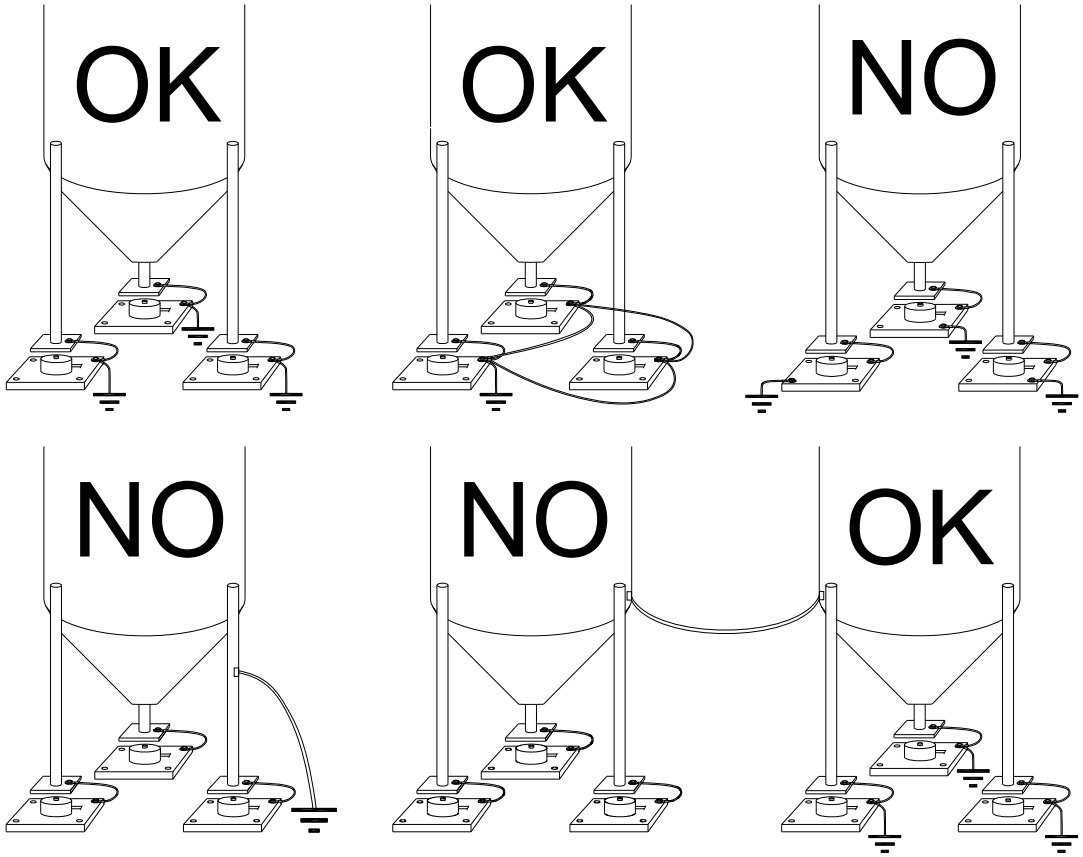
MECHANICAL RESTRAINTS (pipes, etc.): When pipes are present, we recommend the use of hoses and flexible couplings with open mouthpieces with rubber protection; in case of hard pipes, place the pipe support or anchor bracket as far as possible from the weighed structure (at a distance at least 40 times 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 required welding point to prevent sending current through the load cell body.

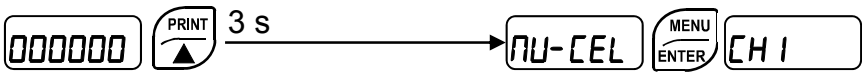
WINDY CONDITIONS - KNOCKS - VIBRATIONS: The use of weigh modules is strongly recommended for all load cells to compensate for misalignment of the support surfaces. The system designer must ensure that the plant is protected against lateral shifting and tipping relating to: shocks and vibration; windy conditions; seismic conditions in the installation setting; stability of the support structure.

EARTHING THE WEIGHED STRUCTURE: By means of a copper wire with suitable cross-section, connect the cell upper support plate with the lower support plate, then connect all the lower plates to a single earthing system. Electrostatic charges accumulated because of the product rubbing against the pipes and the weighed container walls are discharged to the ground without going through or damaging the load cells. Failure to implement a proper earthing system might not affect the operation of the weighing system; this, however, does not rule out the possibility that the cells and connected instrument may become damaged in the future. It is forbidden to ensure earthing system continuity by using metal parts contained in the weighed structure.

FAILURE TO FOLLOW THE INSTALLATION RECOMMENDATIONS WILL BE CONSIDERED A MISUSE OF THE EQUIPMENT



LOAD CELL INPUT TEST (QUICK ACCESS)



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

LOAD CELL TESTING

Load cell resistance measurement (use a digital multimeter):

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

Load cell voltage measurement (use a digital multimeter):

- Turn on the instrument.
- Take out the load cell to be tested from underneath the container, or alternatively, lift the container support.
- Make sure that the excitation of two wires of the load cell connected to the instrument (or amplifier) is 5 VDC ±3%.
- Measure the response signal between the positive and the negative signal wires by directly connecting them to the tester, and make sure that it is comprised between 0 and 0.5 mV.
- Apply load to the cell and make sure that there is a signal increment.

IF ONE OF THE ABOVE CONDITIONS IS NOT MET, PLEASE CONTACT THE TECHNICAL ASSISTANCE SERVICE.

MAIN SPECIFICATIONS OF THE INSTRUMENT

Intelligent junction box with 6-wire load cells inputs suitable for assembly on back panel fitted Omega/DIN rail. Dimensions: 125x92x52 mm. Backlit alphanumeric LCD display, 38x16 mm viewing area, two-line by eight-digit (5 mm height). 4-key keypad.
Two serial ports (RS485 e RS232) for connection to: PC/PLC up to 32 instruments (max 99 with line repeaters) by ASCII Laumas or ModBus R.T.U. protocol, remote display, printer. Optional: integrated Ethernet TCP/IP output.

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

TECHNICAL SPECIFICATIONS

POWER SUPPLY and CONSUMPTION **(VDC)**	12/24 VDC ±10%; 5 W
NO. OF LOAD CELLS IN PARALLEL and SUPPLY	max 16 (350 ohm); 5 VDC / 240 mA
LINEARITY	< 0.01% F.S.
THERMAL DRIFT	< 0.0005% F.S./°C
A/D CONVERTER	8 channels, 24 bit (16000000 points), 4.8 kHz
DIVISIONS (with measurement range ±10 mV = sens. 2 mV/V)	max 1000000 – 0.01 µV/d
MEASUREMENT RANGE	±39 mV
MAX SENSITIVITY OF USABLE LOAD CELLS	±7 mV/V
MAX CONVERSIONS PER SECOND	600 conversions/second
DISPLAY RANGE	±999999
NO. OF DECIMALS / DISPLAY INCREMENTS	0÷4 / x 1 x 2 x 5 x 10 x 20 x 50 x 100
DIGITAL FILTER / READINGS PER SECOND	0.006÷7 s / 5÷600 Hz
SERIAL PORTS	RS485, RS232
BAUD RATE	2400, 4800, 9600, 19200, 38400, 115200
HUMIDITY (non condensing)	85%
STORAGE TEMPERATURE	-30°C +80°C
WORKING TEMPERATURE	-20°C +60°C

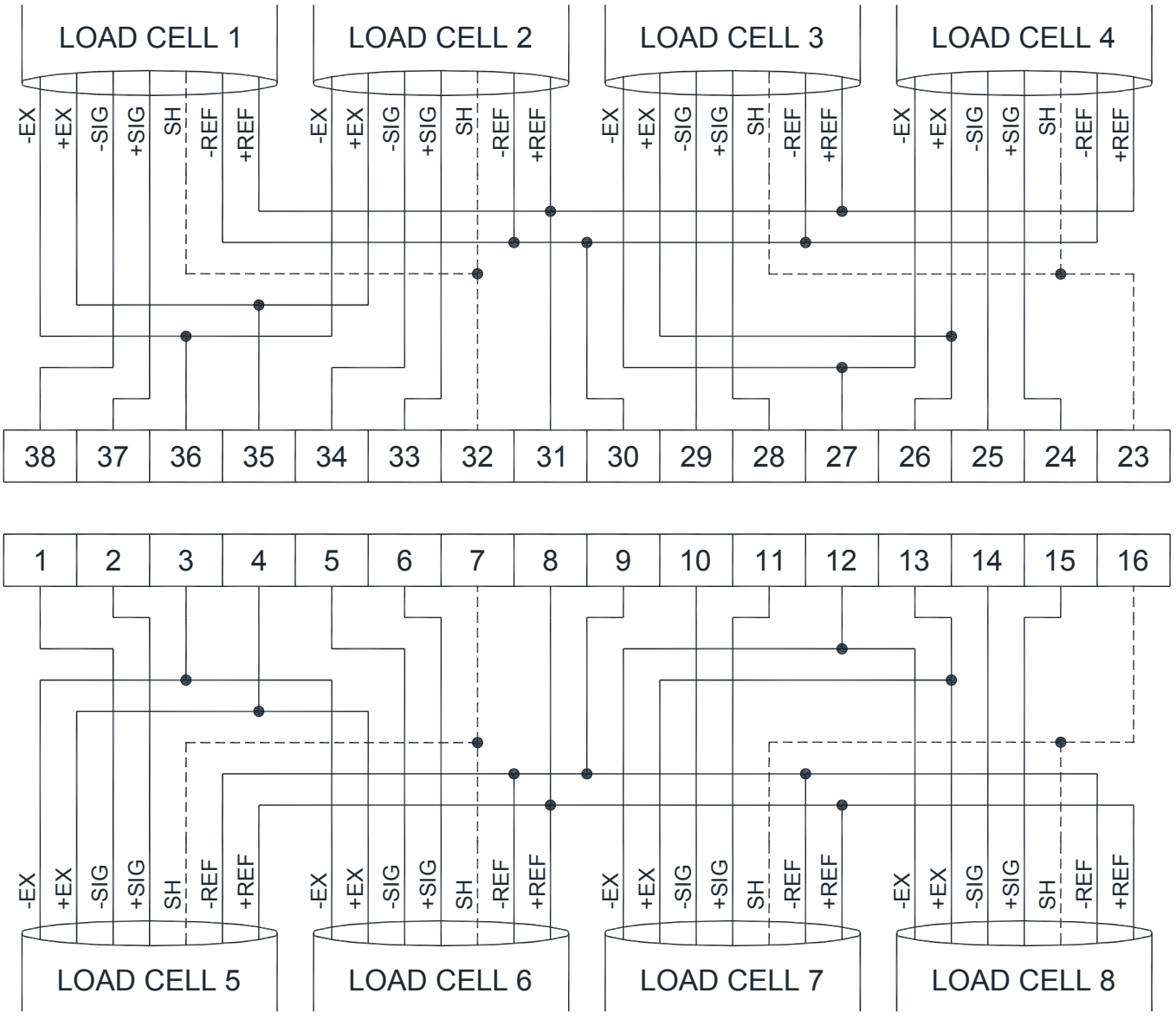
CLM8I	Naked version, board only; 151x72x30 mm;
CLM8INOX	IP67 AISI 304 stainless steel verion; 200x148x45 mm; 8+2 cable glands-plugs
CLM4ABS	IP67 ABS version with transparent cover; 210x130x40 mm; 4+2 cable glands-plugs
CLM8ABS	IP67 ABS version with transparent cover; 210x130x40 mm; 8+2 cable glands-plugs

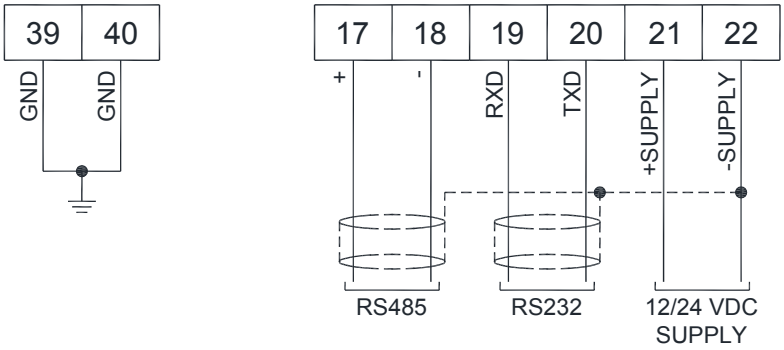
ELECTRICAL CONNECTIONS

BASIC INFORMATION

- Connect terminals 39 and 40 to the earthing system.
- It is possible to supply up to 16 350 ohm load cells.
- Connect terminal "–SUPPLY" to the RS485 common of the connected instruments in the event that these receive alternating current input or that they have an optically isolated RS485.
- In case of an RS485 network with several devices it is recommended to activate the 120 ohm termination resistance on the two devices located at the ends of the network, as described in the paragraph **RS485 SERIAL CONNECTION.**

WIRING DIAGRAM



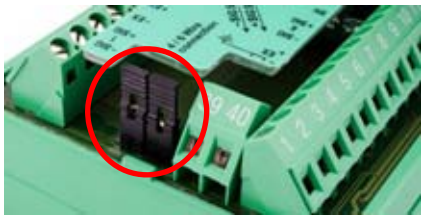


TERMINALS LEGEND

1	-LOAD CELL 5 SIGNAL	20	TX RS232
2	+LOAD CELL 5 SIGNAL	21	+SUPPLY (12/24 VDC)
3	-LOAD CELLS 5 and 6 EXCITATION (-EX)	22	-SUPPLY (12/24 VDC) RS232, RS485: SHIELD
4	+LOAD CELLS 5 and 6 EXCITATION (+EX)	23	LOAD CELLS 3 and 4 SHIELD
5	-LOAD CELL 6 SIGNAL	24	+LOAD CELL 4 SIGNAL
6	+LOAD CELL 6 SIGNAL	25	-LOAD CELL 4 SIGNAL
7	LOAD CELLS 5 and 6 SHIELD	26	+LOAD CELLS 3 and 4 EXCITATION (+EX)
8	+LOAD CELLS 5, 6, 7, 8 REF/SENSE	27	-LOAD CELLS 3 and 4 EXCITATION (-EX)
9	-LOAD CELLS 5, 6, 7, 8 REF/SENSE	28	+LOAD CELL 3 SIGNAL
10	-LOAD CELL 7 SIGNAL	29	-LOAD CELL 3 SIGNAL
11	+LOAD CELL 7 SIGNAL	30	-LOAD CELLS 1, 2, 3, 4 REF/SENSE
12	-LOAD CELLS 7 and 8 EXCITATION (-EX)	31	+LOAD CELLS 1, 2, 3, 4 REF/SENSE
13	+LOAD CELLS 7 and 8 EXCITATION (+EX)	32	LOAD CELLS 1 and 2 SHIELD
14	-LOAD CELL 8 SIGNAL	33	+LOAD CELL 2 SIGNAL
15	+LOAD CELL 8 SIGNAL	34	-LOAD CELL 2 SIGNAL
16	LOAD CELLS 7 and 8 SHIELD	35	+LOAD CELLS 1 and 2 EXCITATION (+EX)
17	+RS485	36	-LOAD CELLS 1 and 2 EXCITATION (-EX)
18	-RS485	37	+LOAD CELL 1 SIGNAL
19	RX RS232	38	-LOAD CELL 1 SIGNAL

If all the load cells used are 4-wire, close the two jumpers as shown in picture.

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



KEYS AND SYMBOLS FUNCTIONS

KEY	Short press	Long press (3 s)	Into menus
→0← ESC	Semi-automatic zero	Tare resetting	Cancel or return to previous menu
TARE ◀	Gross → Net	Net → Gross	Select figure to be modified or go to previous menu item.
PRINT ▲	Weight print	mV load cell test	Modify selected figure or go to next menu item
MENU ENTER			Confirm or enter in submenu
MENU ENTER + →0← ESC	Setting general parameters (press MENU ENTER immediately followed by →0← ESC)		
MENU ENTER + TARE ◀	Setting preset tare (press MENU ENTER immediately followed by TARE ◀)		

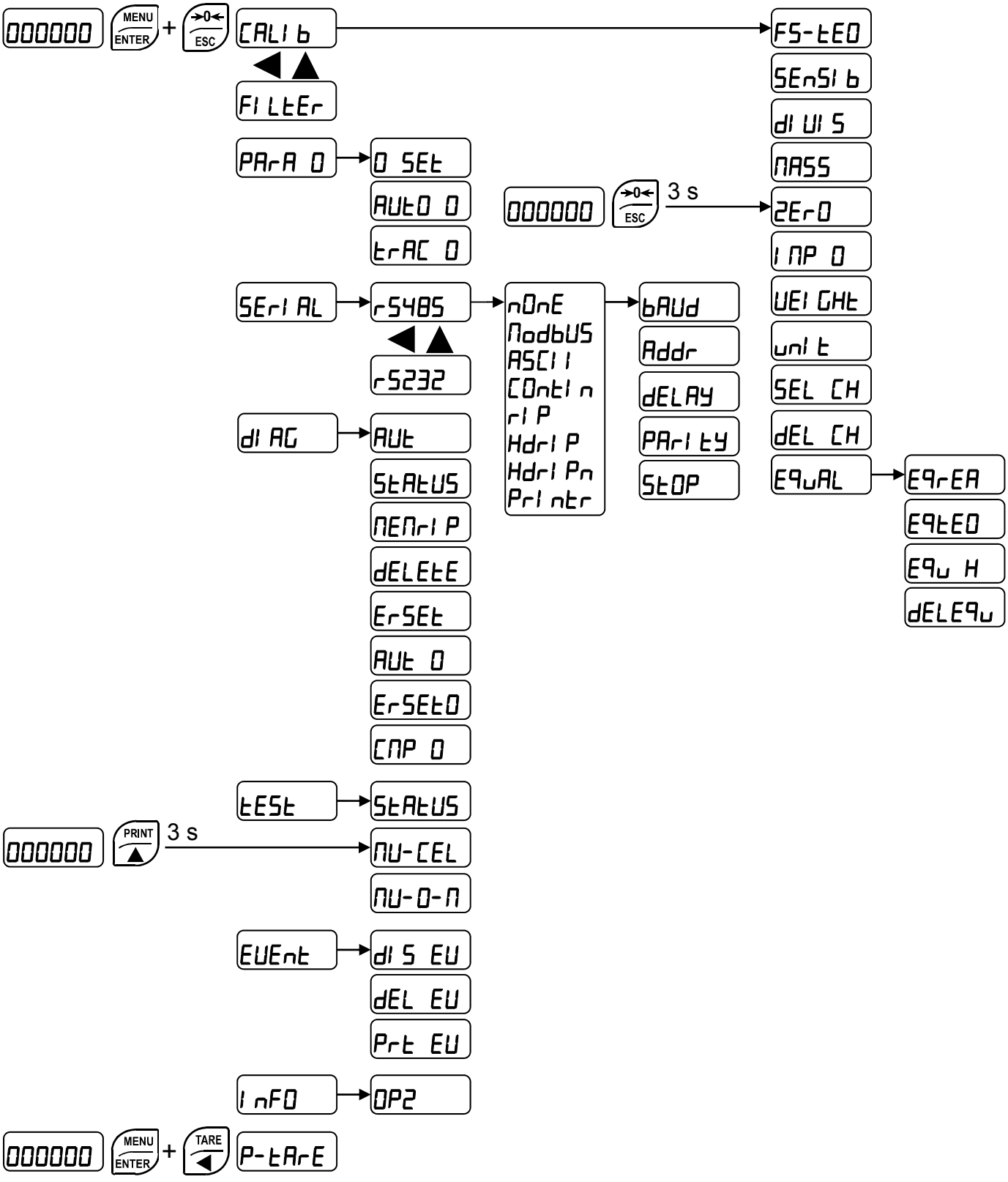
SYMBOL	Function
n	net weight (semi-automatic tare or preset tare)
0	zero (deviation from zero not more than ±0.25 divisions)
s	stability
k	unit of measure: kg
g	unit of measure: g
1	not used
2	
3	

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

MENU MAP

Into menus changes are applied right after pressing the ENTER key (no further confirmation is required).

SYSTEM PARAMETERS



INSTRUMENT COMMISSIONING

Upon switch-on, the display shows in sequence:
- 111111 → 999999 (ONLY in case of approved program);
- instrument model (e.g.: CLM8);
- SU followed by the software code (e.g.: SU 101);
- program type: BASE (base);
- r followed by the software version (e.g.: r 1.01.01);
- HU followed by the hardware code (e.g.: HU 660);
- serial number (e.g.: 1005 15);

Check that the display shows the weight and that when loading the load cells there is an increase in weight. If there is not check and verify the connections and correct positioning of the load cells.

- **If the instrument has already been theoretical CALIBRATED** (plant system identification tag present on the instrument and on the cover: load cell's rated data already entered):
  - If the system uses load cells with different sensitivity perform a real or theoretical equalization (see section **EQUALIZATION**).
  - Reset to zero (see section **TARE WEIGHT ZERO SETTING**).
  - Check the calibration with sample weights and correct the indicated weight if necessary (see section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**).

- **If the instrument HAS NOT BEEN CALIBRATED** (missing plant system identification tag) proceed with calibration:
  - If the system uses load cells with different sensitivity perform a real or theoretical equalization (see section **EQUALIZATION**).
  - If load cells data are unknown, follow the procedure in section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**.
  - Enter the rated data of load cells following the procedure given in section **THEORETICAL CALIBRATION**.
  - Reset to zero (see section **TARE WEIGHT ZERO SETTING**).
  - Check the calibration with sample weights and correct the indicated weight if necessary (see section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**).

- If you use serial communication, set the related parameters (see section **SERIAL COMMUNICATION SETTING**).

PROGRAMMING OF SYSTEM PARAMETERS

From the weight display, press simultaneously keys MENU and ESC to access the parameter setting.

MENU/ENTER: to enter a menu/confirm the data entry.
▲: to modify the displayed figure or menu item.
◀: to select a new figure or modify the displayed menu item.
ESC: to cancel and return to the previous menu.

THEORETICAL CALIBRATION

000000 MENU/ENTER + →0← ESC CALIb MENU/ENTER FS-tEO MENU/ENTER SEnSIb MENU/ENTER diVIS

This function allows the load cell rated values to be set.

To perform the theoretical calibration set the following parameters in sequence:

- FS-tEO (Default: dEMo)**:** The **system full scale** is given by one cell capacity multiplied by the number of cells used. Example: 4 cells of 1000 kg → FULL SCALE = 1000 x 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): **Sensitivity** is a load cell rated parameter expressed in mV/V. Set the average sensitivity value indicated on the load cells. It's possible to set a value between 0.50000 and 7.00000 mV/V. Example of 4-cell system with sensitivity: 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 value which can be displayed. It is automatically calculated by the system according to the performed calibration, so that it is equal to 1/10000 of full scale. It can be changed and be variable between 0.0001 and 100 with x1 x2 x5 x10 increments.

- By modifying the theoretical full scale, the sensitivity or divisions, the real calibration is cancelled and the theoretical calibration only is considered valid.
- If the theoretical full scale and the recalculated full scale in real calibration (see section **REAL CALIBRATION (WITH SAMPLE WEIGHTS)**) are equal, this means that the calibration currently in use is theoretical; if they are different, the calibration in use is the real calibration based on sample weights.
- By modifying the theoretical full scale, the sensitivity or divisions and all the system's parameters containing a weight value will be set to default values.

MAXIMUM CAPACITY

000000 (MENU ENTER) + (→0← ESC) CALI b (MENU ENTER) FS-tEO ◀ ▲ MASS

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

TARE WEIGHT ZERO SETTING

000000 (MENU ENTER) + (→0← ESC) CALI b (MENU ENTER) FS-tEO ◀ ▲ ZEr0

This menu may also be accessed directly from the weight display, holding down the →0← key for 3 seconds.

Perform this procedure after having set the THEORETICAL CALIBRATION data.

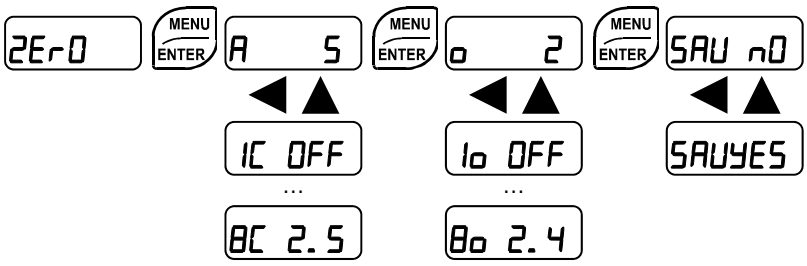
Use this function to set to zero the weight of the empty system after commissioning and then later on to compensate zero variations due to the presence of product residues.
Procedure:

- Confirm the message ZEr0 by pressing ENTER.
- The weight value to be set to zero is displayed. In this phase all of the symbols are flashing.
- Confirming once again, the weight is set to zero (the value is stored to the permanent memory).
- Press ▲ to display the value of the total weight reset by the instrument, given by the sum of all of the previous zero settings.

DIAGNOSTICS ON ZERO: if diagnostics on zero has been enabled, the instrument can display and store the load distributions on zero and the mV on active channels (see section **TEST**). If the stored weight is zero and all channels are OFF, it means that no zero-setting has yet been performed.

WARNING: diagnostics on zero is performed only if the load distribution has been stored at least once.

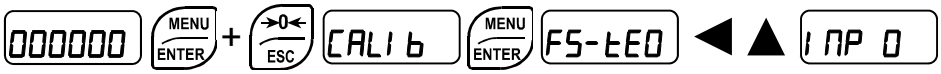
The tare weight zero-setting procedure is the following:



- Confirm the message ZEr0 by pressing ENTER.
- The current weight value, preceded by the letter A, is displayed.
- Press ◀ and ▲ to display in sequence the current load distribution on each channel (IC ÷ 8C); press ENTER to return to the previous display.
- By pressing ENTER the last weight set to zero, preceded by the letter o, is displayed.

- Press ◄ and ▲ to display in sequence the load distribution stored during the last zero-setting on each channel (Io ÷ 8o); press ENTER to return to the previous display.
- Press ENTER and select SAUYES or SAu nO to store or not the current distribution and the zero mV values (see section **TEST**).
- By pressing ENTER the weight value to be set to zero is displayed, in this phase all of the symbols are flashing.
- Confirming once again, the weight is set to zero (the value is stored to the permanent memory).
- Press ▲ to display the value of the total weight reset by the instrument, given by the sum of all of the previous zero settings.

ZERO VALUE MANUAL ENTRY



WARNING: Perform this procedure only if it's not possible to reset the weighed structure tare, for example because it contains product that cannot be unloaded.
Set in this parameter the estimated zero value (from 0 to max 999999; default: 0).

REAL CALIBRATION (WITH SAMPLE WEIGHTS)

000000 MENU ENTER + →0← ESC CALIb MENU ENTER FS-tEO ◀ ▲ UEI GHt

After having performed the THEORETICAL CALIBRATION, EQUALIZATION and TARE WEIGHT ZERO SETTING, this function allows correct calibration to be done using sample weights of known value and, if necessary, any deviations of the indicated value from the correct value to be corrected.

Load onto the weighing system a sample weight, which must be **at least 50%** of the maximum quantity to be weighed.
By confirming the message UEI GHt the flashing value of the weight currently on the system is displayed. In this phase all of the symbols are off. Adjust the value on display by using the arrow keys if necessary. After confirming, the new set weight will appear with all the symbols flashing. After an additional confirmation, the message UEI GHt will be restored and by repeatedly pressing the key ESC the weight will once again be displayed.

Example: for a system of maximum capacity 1000 kg and 1 kg division, two sample weights are available, one of 500 kg and the other one of 300 kg. Load both weights onto the system and correct the indicated weight to 800. Now remove the 300 kg weight, the system must show 500; remove the 500 kg weight too; the system must read zero. If this does not happen, it means that there is a mechanical problem affecting the system linearity.

WARNING: identify and correct any mechanical problems before repeating the procedure.

- If theoretical full scale and recalculated full scale in real calibration are equal, it means that the theoretical calibration is currently in use; otherwise, the real calibration based on sample weights is in use.
- If the correction made changes the previous full scale for more than 20%, all the parameters with settable weight values are reset to default values.

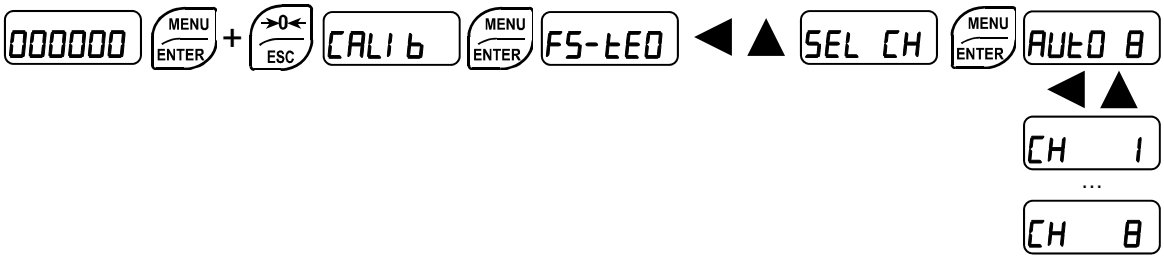
LINEARISATION OPTION ON MAX 5 POINTS:

It is possible to perform a linearisation of the weight repeating the above-described procedure up to a maximum of five points, using five different sample weights. The procedure ends by pressing the ESC **button or after entering the fifth value;** at this point it will no longer be possible to change the calibration value, but only to perform a new real calibration. To perform a new calibration, should return to the weight display and then re-entering into the calibration menu.
By pressing ▲ after having confirmed the sample weight that has been set, the full scale appears, recalculated according to the value of the maximum sample weight entered and making reference to the cell sensitivity set in the theoretical calibration (SEnSI b).

CONFIRMATION AND CHANGE OF ACTIVE CHANNELS

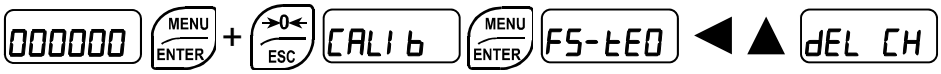
After performing the calibration and verifying that the system works properly, you can confirm the channels automatically detected by the instrument; in this way, in case of accidental interruption of the cable of one or more load cells, the instrument displays the *ErCEL 1* alarm.

Automatic load cells detection is enabled by default on all 8 channels of the instrument.



SEL CH: the display shows the number of automatically detected channels; press ESC to exit with no change; press ENTER to make the current selection permanent and disable automatic detection. In case a channel is not working, you can move the load cell on a free channel: in this screen press ◀ or ▲ to select the new channel, press ENTER and select with ◀ o ▲ *On* or *OFF* to activate or deactivate it.

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



dEL CH: manual selection of active channels is cancelled; automatic detection on all channels is enabled. Confirmation is requested (*SUrE?*),press ENTER to proceed or press ESC to cancel.

EQUALIZATION

At the end of the equalization you must perform the **TARE WEIGHT ZERO SETTING** and, if necessary,the **REAL CALIBRATION**.

REAL EQUALIZATION

000000 MENU ENTER + →0← ESC CALIb MENU ENTER FS-tEO ◀ ▲ EQuAL MENU ENTER EQrEA

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

EQuALO: unload the scale, wait for stability and confirm by pressing ENTER.
EQuAL 1: place the sample weight on load cell 1, wait for stability and confirm by pressing ENTER.
EQuAL2: place the sample weight on load cell 2, wait for stability and confirm by pressing ENTER.
Repeat the operation for each connected load cell.
If equalization is successfully completed, the display shows UALId, confirm by pressing ENTER to exit; if an error occurs, the display shows FAILEd, confirm by pressing ENTER and repeat the procedure.

THEORETICAL EQUALIZATION

000000 MENU ENTER + →0← ESC CALIb MENU ENTER FS-tEO ◀ ▲ EQuAL MENU ENTER EQtEO

SEnS 1 ÷ SEnS 8: set the sensitivity for each load cell, leaving it at 0 for non-active channels.

EQUALIZATION COEFFICIENTS

000000 MENU ENTER + →0← ESC CALIb MENU ENTER FS-tEO ◀ ▲ EQuAL MENU ENTER EQu H

EQH 1 ÷ EQH 8: it displays the equalization coefficients calculated for each active channel.

EQUALIZATION DELETION

000000 MENU ENTER + →0← ESC CALIb MENU ENTER FS-tEO ◀ ▲ EQuAL MENU ENTER dELEQu

Confirmation is requested (SUrE?), press ENTER to reset the equalization or press ESC to cancel the command.

FILTER ON THE WEIGHT

000000 MENU/ENTER + →0← ESC CALIb ◀ ▲ FILtEr

Setting this parameter allows a stable weight display to be obtained.
To increase the effect (weight more stable) increase the value (from 0 to 9, default 4).
As seen in the diagram:

- By confirming the FILtEr message, the currently programmed filter value is displayed.
- By changing and confirming the value, the weight is displayed and it will be possible to experimentally verify its stability.
- If stability is not satisfactory, confirming brings back the message FILtEr and the filter may be modified again until an optimum result is achieved.

The filter enables to stabilise a weight as long as its variations are smaller than the corresponding "response time". It is necessary to set this filter according to the type of application and to the full scale value set.

FILTER VALUE	Response times [ms]	Display and serial port refresh frequency [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
A	6	600

The "A" filter can only be set if the instrument is connected to one load cell only.

ANTI PEAK

When the weight is stable, the anti peak filter removes any sudden disturbances with a maximum duration of 1 second. Confirm the filter on the weight with ENTER and select one of the following options:

- AntPOn: anti peak filter enabled (default);
- AntPOF: anti peak filter disabled.

RESETTABLE WEIGHT SETTING FOR SMALL WEIGHT CHANGES

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

AUTOMATIC ZERO SETTING AT POWER-ON

AUt0 0 (from 0 to max 20% of full scale; default: 0): If at switch-on the weight value is lower than the value set in this parameter and does not exceed the 0 SEt value, the weight is reset. To disable this function, set 0.

ZERO TRACKING

trAC 0 (from 1 to 5, default: nOnE): When the weight value is stable and, after a second, it deviates from zero by a figure in divisions smaller or equal to the figure in divisions set in this parameter, the weight is set to zero. To disable this function, set nOnE.
Example: if the parameter dI UI 5 is set to 5 and trAc 0 is set to 2, the weight will be automatically set to zero for variations smaller than or equal to 10 (dI UI 5 x trAC 0).

SETTING UNITS OF MEASURE

000000 MENU/ENTER + →0← ESC CALIb MENU/ENTER FS-tEO ◀ ▲ unit

These are the available units of measure:

HI LOG: kilograms
G: grams
t: tons
Lb: pounds
nEUton: newtons
LI trE: litres
bAr: bars
AtM: atmospheres
PI ECE: pieces
nEU-M: newton metres
HI LO-M: kilogram metres
OtHEr: other generic units of measure not included in the list

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

SEMI-AUTOMATIC TARE (NET/GROSS)

THE SEMI-AUTOMATIC TARE OPERATION IS LOST UPON INSTRUMENT POWER-OFF.

To perform a net operation (SEMI-AUTOMATIC TARE) press the TARE key for less than 3 seconds. The instrument displays the net weight (just set to zero) and the NET symbol lights up. To display the gross weight again press TARE for 3 seconds.
This operation can be repeated many times by the operator to allow the loading of several products.

Example:
Put the box on the scale, the display shows the box weight; press TARE, the display shows the net weight to zero; introduce the product in the box, the display shows the product weight. This operation can be repeated several times.

While the net weight is displayed, keep ▲ pressed to display gross weight. When the key is released the net weight will be displayed again.

The semi-automatic tare operation is not allowed if the gross weight is zero (the display shows I nZErO).

PRESET TARE (SUBTRACTIVE TARE DEVICE)

000000 MENU/ENTER + TARE P-tArE

It is possible to manually set a preset tare value to be subtracted from the display value provided that the P-tArE ≤ max capacity condition is verified.

By default the instrument shows the last programmed preset tare value: to apply it press ▲ and then ENTER.
After setting the tare value, going back to the weight display, the display shows the net weight (subtracting the preset tare value) and the NET symbol lights up to show that a tare has been entered. To delete a preset tare and return to gross weight display hold down TARE for about 3 seconds. The preset tare value is set to zero. The NET symbol is turned off when the gross weight is displayed once again.

While the net weight is displayed, keep ▲ pressed to display the gross weight. When the key is released the net weight will be displayed again.

- **IF A SEMI-AUTOMATIC TARE (NET) IS ENTERED, IT IS NOT POSSIBLE TO ACCESS THE ENTER PRESET TARE FUNCTION.**
- **IF A PRESET TARE IS ENTERED, IT'S STILL POSSIBLE TO ACCESS THE SEMI-AUTOMATIC TARE (NET) FUNCTION. THE TWO DIFFERENT TYPES OF TARE ARE ADDED.**

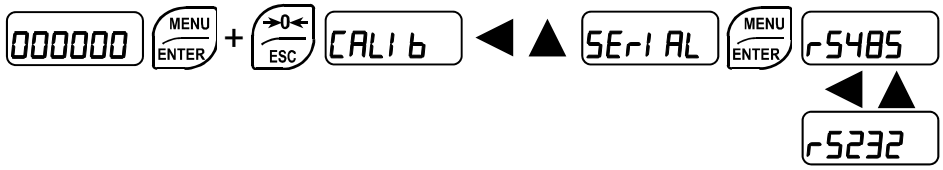
ALL THE SEMI-AUTOMATIC TARE (NET) AND PRESET TARE FUNCTIONS WILL BE LOST WHEN THE INSTRUMENT IS TURNED OFF.

SEMI-AUTOMATIC ZERO (WEIGHT ZERO-SETTING FOR SMALL VARIATIONS)

By pressing the →0← key for less than 3 seconds, the StOrEP message is displayed for 3 seconds, by pressing ENTER the weight is set to zero.
This function is only allowed if the weight is lower than the 0 SEt value (see section **RESETTABLE WEIGHT SETTING FOR SMALL WEIGHT CHANGES**), otherwise the alarm t ----- appears and the weight is not set to zero.

The zero-setting is lost upon instrument power-off.

SERIAL COMMUNICATION SETTING

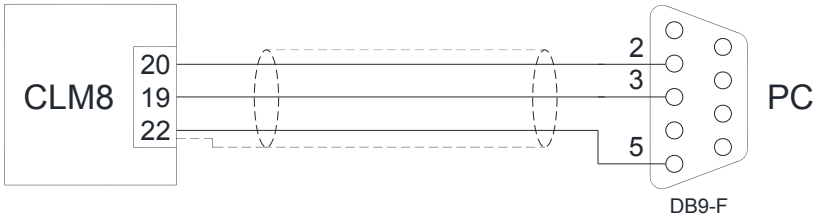


- nOnE: it disables any type of communication (default).
- ModbUS: MODBUS-RTU protocol; possible addresses: from 1 to 99.
- ASCII : ASCII bidirectional protocol; possible addresses: from 1 to 99.
  - nOdU60
  - nOd td
- CONTIn: continuous weight transmission protocol, at the frequency set in HErt2 item (from 10 to 300).
  - nOd t (set: PArITY = nOnE, StOP = 1).
  - nOd td (set: PArITY = nOnE, StOP = 1).
- rIP: continuous weight transmission protocol to RIP5/20/60, RIP50SHA, RIPLED series remote displays; the remote display shows the net weight or gross weight according to its settings (set: bAUd = 9600, PArITY = nOnE, StOP = 1).
- HdrIP: continuous weight transmission protocol to RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings (set: bAUd = 9600, PArITY = nOnE, StOP = 1).
- HdrIPn: continuous weight transmission protocol to RIP675, RIP6125C series remote displays (set: bAUd = 9600, PArITY = nOnE, StOP = 1).
  When the remote display is set to gross weight:
  - if the instrument displays the gross weight, the remote display shows the gross weight.
  - if the instrument shows the net weight, the remote display shows the net weight alternated with the message nEt.
- PrIntr: printer.

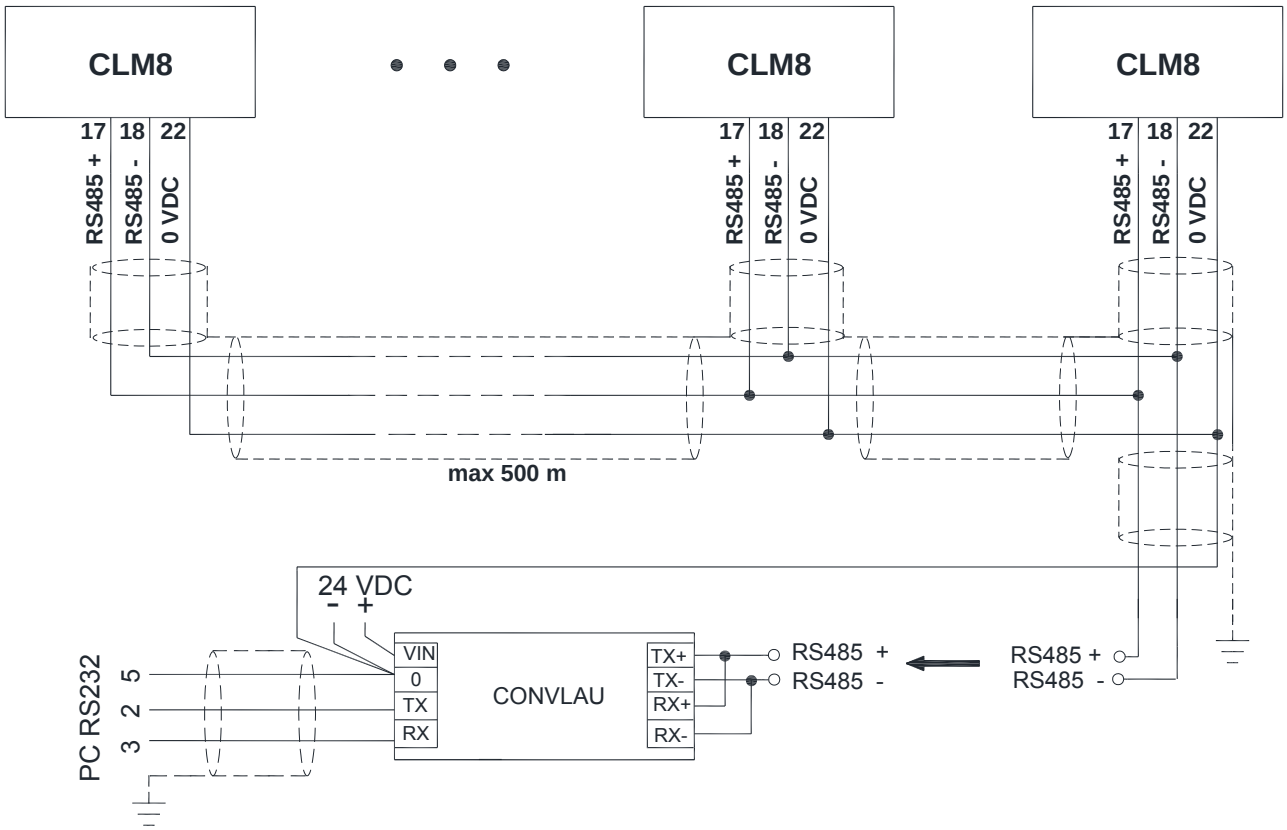
  - bAUd: transmission speed (2400, 4800, 9600, 19200, 38400, 115200; default: 9600).
  - Addr: instrument address (from 1 to 99; default: 1).
  - HErt2: maximum transmission frequency (10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200 – 300; default: 10); to be set when the CONTIn transmission protocol is selected.
    Maximum setting frequency **(HErt2)**:
    - 20 Hz with minimum baud rate 2400 baud.
    - 40 Hz with minimum baud rate 4800 baud.
    - 80 Hz with minimum baud rate 9600 baud.
    - 100 Hz with minimum baud rate 19200 baud.
    - 200 Hz with minimum baud rate 38400 baud.
    - 300 Hz with minimum baud rate 38400 baud.
  - dELAY: delay in milliseconds which elapses before the instrument replies (from 0 to 200 ms; default: 0).
  - PArITY:
    - nOnE: no parity (default).
    - EUEn: even parity.

    - Odd: odd parity.
- StOP: stop bit (1 – 2; default: 1).
- nCOPY: number of copies(1 – 9; default: 1).
- EMPtY: number of blank lines between one printout and the next.
- HEAdEr: printing of custom heading from PC (YES – nO; default: nO).
- PrtMOd: connected printer type:
    - P 190
    - StAUP
    - StAUt

RS232 SERIAL COMMUNICATION



RS485 SERIAL COMMUNICATION



If the RS485 network exceeds 100 metres in length or baud-rate over 9600 are used, two terminating resistors are needed at the ends of the network. Two 120 ohm resistors must be connected between the "+" and "–" terminals of the line, on the terminal strip of the furthest instruments. Should there be different instruments or converters, refer to the specific manuals to determine whether it is necessary to connect the above-mentioned resistors.

DIRECT CONNECTION BETWEEN RS485 AND RS232 WITHOUT CONVERTER

Since a two-wire RS485 output may be used directly on the RS-232 input of a PC or remote display or printer, it is possible to implement instrument connection to an RS-232 port in the following manner:

INSTRUMENT		RS232
RS485 –	→	RXD
GND	→	GND

This type of connection allows A SINGLE instrument to be used in a ONE WAY mode.

AUTOMATIC DIAGNOSTICS OF LOAD DISTRIBUTION

000000 (MENU ENTER) + (→0← ESC) CALIb ◀ ▲ dI AC

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

LOAD DIAGNOSTICS

The instrument, with stable weight, calculates and stores the load percentage on each channel. If under normal operation the load percentage error is higher than the value set in parameter ErSEt, the display shows the ErdI AC alarm alternated with the weight; the alarm remains active also upon instrument power-off, press ENTER to cancel.

- AUt (YES/nO; default: nO): it enables load diagnostics.
- StAtUS: it displays the current weight preceded by the letter A; press ENTER and then use ◀ and ▲ to display the load percentage on each active channel.

StAtUS (MENU ENTER) A 235 (MENU ENTER) 1C OFF … 8C 2.5

- MEMrI P: it displays stored load distributions (weight, load percentage on each channel).

MEMrI P (MENU ENTER) o 235 (MENU ENTER) 1C OFF … 8C 2.4

◀ ▲ o 516 … o 824

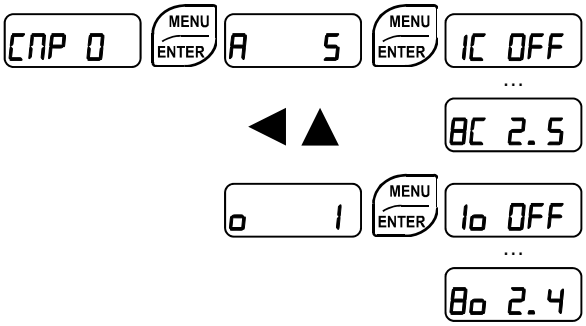
  - Confirm the message MEMrI P by pressing ENTER.
  - The weight of the first stored load distribution, preceded by the letter o, is displayed; press ◀ and ▲ to display in sequence the stored weight values, in ascending order.
  - Press ENTER to display the related stored load distribution on each channel (1o ÷ 8o); press ENTER or ESC to return to the previous display.

- dELEtE: it deletes stored load distributions; confirmation is requested (SUrE?),press ENTER to proceed or press ESC to cancel.
- ErSEt (default: 5.0): difference between the current and stored percentage beyond which the ErdI AC alarm is triggered.

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 (see section **TARE WEIGHT ZERO SETTING**).
If with unloaded system the load percentage error is higher than the value set in parameter ErSEtO, the display shows the ErdI AG alarm alternated with the weight; the alarm remains active also upon instrument power-off, press ENTER to cancel.

- AUt O (YES/nO; default: nO): it enables diagnostics on zero.
- ErSEtO (default: 5.0): difference between the current and stored percentage beyond which the ErdI AG alarm is triggered.
- CnP O: it displays the current load distribution on zero and the one previously stored (weight, load percentage on each channel).



- Confirm the message CnP O by pressing ENTER.
- The current weight value, preceded by the letter A, is displayed; press ◀ and ▲ to display the stored value of the last weight set to zero, preceded by the letter o.
- Press ENTER to display the related load distribution on each channel: 1o ÷ 8o (stored weight) or 1C ÷ 8C (current weight); press ENTER or ESC to return to the previous display.

TEST

- **Load distribution:**
  StAtUS: it displays the current weight preceded by the letter A; press ENTER and then use ◀ and ▲ to display the load percentage on each active channel.
- **Millivolt Test:**
  nU-CEL: it displays the response signal of each load cell (CH 1 ÷ CH 8) expressed in mV with three decimals.
- **Millivolt stored at zero setting (only if AUt O = YES):**
  nU-O-n: it displays the response signal of each load cell (CH 1 ÷ CH 8) expressed in mV with three decimals (see section **TARE WEIGHT ZERO SETTING**).

EVENTS LOG

000000 MENU/ENTER + →0← ESC CALIb ◀ ▲ EUEnt

The instrument can store up to 50 events; the oldest records are overwritten.

- dIS EU: it displays the last 50 events stored, starting from the most recent one:
  - 2Er0: zero-setting from the calibration menu, press ENTER to display the value set to zero.
  - FtE0: theoretical calibration, press ENTER to display the full scale set.
  - FrEA: real calibration, press ENTER to display the sample weight used.
  - INP0: tare setting via the keypad, press ENTER to display the set value.
  - dIAG: load distribution error, press ENTER to display the weight value that triggered the alarm, press ENTER again to display in sequence the differences between the load percentages and the stored value.
  - ALL: weight alarm, press ENTER to display the alarm type.
  - dELr: load distribution deletion.
  - E9U: equalization.
  - CHn: modification or deletion of the manual selection of active channels.
- dEL EU: it deletes stored events; confirmation is requested (SUrE?),press ENTER to proceed or press ESC to cancel.
- Prt EU: it prints all events.

INFO MENU

000000 MENU/ENTER + →0← ESC CALIb ◀ ▲ InF0

OP2: active options are displayed.

ALARMS

nOCEL: no load cell detected, check the connections.

ErCEL: the load cell signal exceeds 39 mV; the conversion electronics (AD converter) is malfunctioning.

ErCELr: the references are not connected or are incorrectly connected; the load cell is a 4-wire and there are no jumpers between EX- and REF- and between EX+ and REF+.

ErCEL 1: the load cell is not connected or is incorrectly connected (the number indicates the channel on which the error is detected).

Er OL: the weight display exceeds 110% of the full scale.

Er Ad: internal instrument converter failure; check load cell connections, if necessary contact technical assistance.

------: the weight exceeds the maximum capacity by 9 divisions.

Er OF: maximum displayable value exceeded (value higher than 999999 or lower than -999999).

t-----: weight too high: zero setting not possible.

MAX-PU: this message appears in the sample weight setting, in real calibration, after the fifth sample weight value has been entered.

Error: the value set for the parameter is beyond the permitted values; press ESC to quit the setting mode leaving the previous value unchanged. Examples: a number of decimals is selected for full scale which exceeds the instrument's display potential; value above the maximum setting value; the weight value set in sample weight verification does not match the detected mV increase.

bLOC: lock active on menu item, keypad or display.

nOdI SP: It's not possible to display properly the number because is greater than 999999 or less than -999999.

tUI CE: 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.

ErdI AC: the load percentage error is higher than the value set in parameters ErSEt or ErSEtO; press ENTER to cancel the alarm.

I n2ErO: gross weight equal to zero: the semi-automatic tare operation cannot be performed.

Serial protocol alarms:

	ErCEL	Er OL	Er Ad	------	Er OF	t-----
MODE						
Bit LSB	76543210	76543210	76543210	76543210	76543210	The response to the zero command is a 'value not valid' error (error code 3)
Status Register MODBUS RTU	**xxxxxxx1**	**xxxx1xxx**	**xxxxxx1x**	**xxxxx1xx**	On gross: **xxx1xxxx** On net: **xx1xxxxx**	
ASCII	**__0-F_**	**__0-L_**	**__0-F_**	**__0-L_**	**__0-F_**	**&aa#CR**
RIP *	**__0-F_**	**__0-L_**	**__0-F_**	**__0-L_**	**__0-F_**	**__0-F_**
HDRIP-N	**_ERCEL**	**_ER_0L**	**_ER_AD**	######	**_ER_0F**	**0__SET**
CONTIN	**_ERCEL**	**_ER_0L**	**_ER_AD**	^^^^^^	**_ER_0F**	**0__SET**

*** For RIP remote displays, if the message exceeds 5 digits the display reads ------.**

PRINTING EXAMPLES

If the printer has been set (see section **SERIAL COMMUNICATION SETTINGS**), from the weight display press the PRINT key:

BASIC PRINTOUT

```
----------------------
CLM8   BASE     Addr:01

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

LOAD DISTRIBUTION PRINT

Current distribution: press the PRINT key from the STATUS menu.
Current and stored distribution: from the CMP 0 and MEMRIP menus, keep pressed the PRINT key for more than 3 seconds while the weight is displayed.

CURRENT DISTRIBUTION

```
----------------------
CLM8   BASE     Addr:01
CURRENT        (STATUS)
GROSS           2014 kg
CH1:             23.5 %
CH2:             24.1 %
CH3:             15.5 %
CH4:             16.7 %
CH5:              9.0 %
CH6:             10.2 %
CH7:                ERR    (load cell connected but in error)
CH8:                OFF    (load cell not connected)
```

CURRENT AND STORED DISTRIBUTION

```
----------------------
CLM8   BASE     Addr:01
STORED         (MEMRIP)
GROSS           2014 kg
CH1:             23.5 %
CH2:             24.1 %
CH3:             15.5 %
CH4:             16.7 %
CH5:              9.0 %
CH6:             10.2 %
CH7:                ERR    (load cell connected but in error)
CH8:                OFF    (load cell not connected)
GROSS  OLD      2050 kg
CH1:             25.5 %
CH2:             22.1 %
CH3:             16.5 %
CH4:             16.7 %
CH5:              9.0 %
CH6:             10.2 %
CH7:                ERR    (load cell connected but in error)
CH8:                OFF    (load cell not connected)
```

CONTINUOUS FAST WEIGHT TRANSMISSION PROTOCOL

This protocol allows the continuous transmission of the weight at high update frequencies. Up to 300 strings per second are transmitted with a minimum transmission rate of 38400 baud.
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- *MOd t*: communication compatible with TX RS485 instruments
- *MOd td*: communication compatible with TD RS485 instruments

If *MOd t* is set, the following string is transmitted to PC/PLC:

xxxxxxCRLF

where: **xxxxxx**.....6 characters of gross weight (48 ÷ 57 ASCII)
CR .....1 character return to the start (13 ASCII)
LF .....1 character on new line (10 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
In case of error or alarm, the 6 characters of the weight are substituted by the messages found in the table of the ALARMS section.

If *MOd td* is set, the following string is transmitted to PC/PLC:

&TzzzzzzPzzzzzz\ckckCR

where: **&**..... 1 initial string character (38 ASCII)
T .....1 character of gross weight identification
P .....1 character of gross weight identification
zzzzzz.....6 characters of gross weight (48 ÷ 57 ASCII)
**** .....1 character of separation (92 ASCII)
ckck.....2 ASCII control characters or calculated considering the characters included between "&" and "\" excluded. The control value is obtained executing the XOR operation (or exclusive) for the 8 bit ASCII codes of the characters considered. Therefore, a character expressed in hexadecimal is obtained with 2 numbers that may assume values from "0" to "9" and from "A" to "F". "**ckck**" is the ASCII code of the two hexadecimal digits
CR .....1 character of end string (13 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
In case of error or alarm, the 6 characters of the gross weight are substituted by the messages found in the table of the ALARMS section.

CONTINUOUS WEIGHT TRANSMISSION TO REMOTE DISPLAYS PROTOCOL

This protocol allows the continuous weight transmission to remote displays. The communication string is transmitted 10 times per second.
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- *rI P*: communication with RIP5/20/60, RIP50SHA, RIPLED series remote displays; the remote display shows the net weight or gross weight according to its settings
- *HdrI P*: communication with RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings
- *HdrI Pn*: communication with RIP675, RIP6125C series remote displays

The instrument sends the following string to the remote display:

&NxxxxxxLyyyyyy\ckckCR

where: **&** .....1 initial string character (38 ASCII)
N .....1 character of net weight identification (78 ASCII)
xxxxxx .....6 characters of net weight or PEAK if present (48 ÷ 57 ASCII)
L .....1 character of gross weight identification (76 ASCII)
yyyyyy .....6 characters of gross weight (48 ÷ 57 ASCII)
\ .....1 character of separation (92 ASCII)
ckck .....2 ASCII checksum characters calculated considering the characters between "**&**" and "****" excluded. The checksum value is obtained from the calculation of XOR (or exclusive) of the 8-bit ASCII codes of the characters considered. This obtains a character expressed in hexadecimals with two digits that can have the values from "0" to "9" and from "A" to "F". "**ckck**" is the ASCII code of the two hexadecimal digits
CR .....1 character of end string (13 ASCII)

In case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45).
If *HdrI P* has been set, the decimal point at the position shown on the instrument's display can also be transmitted. In this case, if the value exceeds 5 digits, only the 5 most significant digits are transmitted, while if the value is negative, no more than the 4 most significant digits are transmitted. In both cases, however, the decimal point shifts consistently with the value to display.
If *HdrI Pn* has been set, in addition to what stated in *HdrI P* protocol, the instrument transmits the prompt *nEt* every 4 seconds in the gross weight field, if on the instrument, it has been carried out a net operation (see section **SEMI-AUTOMATIC TARE (NET/GROSS)**).
In case of weight value is under -99999, the minus sign "-" is sent alternated with the most significant figure.
In case of error or alarm, the 6 characters of the gross weight and net weight are substituted by the messages found in the table of the ALARMS section.

ASCII BIDIRECTIONAL PROTOCOL

The instrument replies to the requests sent from a PC/PLC.
It is possible to set a waiting time for the instrument before it transmits a response (see dELAY parameter in the **SERIAL COMMUNICATION SETTINGS** section).
Following communication modes availables (see section **SERIAL COMMUNICATION SETTINGS**):

- MOdU60: communication compatible with instruments series W60000, WL60 Base, WT60 Base, TLA600 Base
- MOd td: communication compatible with TD RS485 instruments

Captions:

$ .....Beginning of a request string (36 ASCII)
& o **&&**.....Beginning of a response string (38 ASCII)
aa .....2 characters of instrument address (48 ÷ 57 ASCII)
! .....1 character to indicate the correct reception (33 ASCII)
? .....1 character to indicate a reception error (63 ASCII)
.....1 character to indicate an error in the command execution (23 ASCII)
ckck:.....2 ASCII characters of Check-Sum (for further information, see section **CHECK-SUM CALCULATION**)
CR .....1 character for string end (13 ASCII)
**** .....1 character of separation (92 ASCII)

1. READING WEIGHT FROM PC

The PC transmits the following ASCII string: **$aajckckCR**

where: **j** = t.....to read gross weight
j = n.....to read net weight

Possible instrument responses:

- correct reception: **&aaxxxxxxj\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

where: **xxxxxx**.....6 characters of the required weight value

Notes: in case of negative weight, the first character from the left of the weight characters takes on the value "-" (minus sign - ASCII 45). In case of weight value is under -99999, the minus sign "-" is sent alternated with the most significant figure.

Error messages:
in case of an instrument alarm for exceeding 110% of the full scale or 9 divisions above the value of the parameter MASS, the instrument sends the string:
&aassO-Lst\ckck

in case of faulty connection of the load cells or of another alarm, the instrument sends:
&aassO-Fst\ckck

where: **s** .....1 separator character (32 ASCII – space)

Generally refer to the **ALARMS** section.

2. SEMI-AUTOMATIC ZERO (WEIGHT ZERO-SETTING FOR SMALL VARIATIONS)

The PC transmits the following ASCII string: **$aaZEROckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- the current weight is over the maximum value resettable: **&aa#CR**

3. COMMUTATION OF GROSS WEIGHT TO NET WEIGHT

The PC transmits the following ASCII string: **$aaNETckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

4. COMMUTATION OF NET WEIGHT TO GROSS WEIGHT

The PC transmits the following ASCII string: **$aaGROSSckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

5. READING OF DECIMALS AND DIVISION NUMBER

The PC transmits the following ASCII string: **$aaDckckCR**

Possible instrument responses:

- correct reception: **&aaxy\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

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

6. TARE ZERO-SETTING

The PC transmits the following ASCII string: **$aazckckCR**

where: **z** .....command of weight zero-setting (122 ASCII)

Possible instrument responses:

- correct reception: **&aaxxxxxxt\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- the gross weight is not displayed on the instrument: **&aa#CR**

where: **xxxxxx**.....6 characters to indicate the required weight value
t .....character to indicate the weight (116 ASCII)

Example: zeroing the weight of the instrument with address 2:
For the calibration you have to make sure that the system is unloaded or that the instrument measures a signal equal to the mV in the same situation:
query: **$02z78(Cr)**
response: **&02000000t\76(Cr)**

If the zeroing works correctly the instrument sends the zeroed weight value (“000000”).

The calibration values are stored permanently in the EEPROM memory and the number of allowed writings is limited (about 100000).

7. REAL CALIBRATION (WITH SAMPLE WEIGHT)

After the tare zero-setting, this function allow the operator to check the calibration obtained by using sample weights and correct automatically any change between the displayed value and the correct one.

Load onto the weighing system a sample weight, which must be at least 50% of the Full Scale, or make so that that the instrument measures a corresponding mV signal.

The PC transmits the following ASCII string: **$aasxxxxxxckckCR**

where: **s** .....calibration command (115 ASCII)
xxxxxx.....6 characters to indicate the value of sample weight

Possible instrument responses:
- correct reception: **&aaxxxxxxt\ckckCR**
- incorrect reception or full scale equal to zero: **&&aa?\ckckCR**

where: **t** .....character of gross weight identification (116 ASCII)
xxxxxx.....6 characters to indicate the value of current weight

In case of correct reception, the read value has to be equal to the sample weight.

Example: calibration of the instrument no. 1 with a sample weight of 20000 kg:
query: **$01s02000070(Cr)**
response: **&01020000t\77(Cr)**
In case of correct calibration, the read value has to be “020000”.

8. KEYPAD LOCK (BLOCK THE ACCESS TO THE INSTRUMENT)

The PC transmits the following ASCII string: **$aaKEYckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

9. KEYPAD UNLOCK

The PC transmits the following ASCII string: **$aaFREckckCR**

Possible instrument responses:
- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

10. DISPLAY AND KEYPAD LOCK

The PC transmits the following ASCII string: **$aaKDISckckCR**

Possible instrument responses:

- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**

11. CHECK-SUM CALCULATION

The two ASCII characters (**ckck**) are the representation of a hexadecimal digit in ASCII characters. The check digit is calculated by executing the operation of XOR (exclusive or) of 8-bit ASCII codes of only the string underlined.

The procedure to perform the calculation of check-sum is the following:

- Consider only the string characters highlighted with underlining
- Calculate the EXCLUSIVE OR (XOR) of 8-bit ASCII codes of the characters

Example:

character	decimal ASCII code	hexadecimal ASCII code	binary ASCII code
0	48	30	00110000
1	49	31	00110001
t	116	74	01110100
XOR =	117	75	01110101

- The result of the XOR operation expressed in hexadecimal notation is made up of 2 hexadecimal digit (that is, numbers from 0 to 9 or letters from A to F). In this case the hexadecimal code is 0x75.
- The checksum is made up of the 2 characters that represent the result of the operation and XOR in hexadecimal notation (in our example the character "7" and the character "5").

MODBUS-RTU PROTOCOL

The MODBUS-RTU protocol allows the management of the reading and writing of the following registries according to the specifications found on the reference document for this **Modicon PI-MBUS-300** standard**.**

To select the MODBUS-RTU communication see **SERIAL COMMUNICATION SETTINGS** section.

Check if the Master MODBUS-RTU in use (or the development tool) requires the disclosure of registers based on 40001 or 0. In the first case the registers numbering corresponds to the one in the table; in the second case the register must be determined as the value in the table minus 40001. E.g.: the register 40028 shall be reported as 27 (= 40028-40001).

Certain data, when specifically indicated, will be written directly in the EEPROM type memory. This memory has a limited number of writing operations (100000), therefore it is necessary to pay particular attention to not execute useless operations on said locations. The instrument in any case makes sure that no writing occurs if the value to be memorised is equal to the value in memory.

The numerical data found below are expressed in decimal notation; if the prefix 0x is entered the notation will be hexadecimal.

MODBUS-RTU DATA FORMAT

The data received and transmitted by way of the MODBUS-RTU protocol have the following characteristics:

- 1 start bit
- 8 bit of data, *least significant bit* sent first
- Settable parity bit
- Settable stop bit

FUNCTIONS SUPPORTED IN MODBUS

Among the commands available in the MODBUS-RTU protocol, only the following are utilised for management of communication with the instruments; other commands could be incorrectly interpreted and generate errors or blocks of the system:

FUNCTIONS	DESCRIPTION
03 (0x03)	READ HOLDING REGISTER (READ PROGRAMMABLE REGISTERS)
16 (0x10)	PRESET MULTIPLE REGISTERS (WRITE MULTIPLE REGISTERS)

Interrogation frequency is linked to the communication speed set (the instrument stands by for at least 3 bytes before starting calculations an eventual response to the interrogation query). The dELAY parameter present in the **SERIAL COMMUNICATION SETTING** section, allows the instrument to respond with a further delay and this directly influences the number of interrogations possible in the unit of time.

For additional information on this protocol refer to the general technical specifications PI_MBUS_300.

In general queries and answers toward and from one slave instrument are composed as follows:

FUNCTION 3: Read holding registers (READ PROGRAMMABLE REGISTERS)

QUERY

Address	Function	1st register address	No. registers	2 byte
A	0x03	0x0000	0x0002	CRC

Tot. byte = 8

RESPONSE

Address	Function	No. bytes	1st register	2nd register	2 byte
A	0x03	0x04	0x0064	0x00C8	CRC

Tot. byte = 3+2*No. registers+2

where: No. registers...number of Modbus registers to write beginning from the address no. 1
No. byte .....number of bytes of the following data

FUNCTION 16: Preset multiple registers (WRITE MULTIPLE REGISTERS)

QUERY

Address	Function	1st reg. add.	No. reg.	No. bytes	Val.reg.1	Val.reg.2	2 byte
A	0x10	0x0000	0x0002	0x04	0x0000	0x0000	CRC

Tot. byte = 7+2*No. registers+2

RESPONSE

Address	Function	1st reg. address	No. reg.	2 byte
A	0x10	0x0000	0x0002	CRC

Tot. byte = 8

where: No. registers...number of Modbus registers to read beginning from the address no. 1
No. byte .....number of bytes of the following data
Val.reg.1 .....Contents of the register beginning from the first

The response contains the number of registers modified beginning from the address no. 1.

COMMUNICATION ERROR MANAGEMENT

The communication strings are controlled by way of the CRC (Cyclical Redundancy Check).
In case of communication error the slave will not respond with any string. The master must consider a time-out for reception of the answer. If it does not receive an answer it deduces that there has been a communication error.

In the case of the string received correctly but not executable, the slave responds with an EXCEPTIONAL RESPONSE. The "Function" field is transmitted with the msb at 1.

EXCEPTIONAL RESPONSE

Address	Function	Code	2 byte
A	Funct + 0x80		CRC

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

LIST OF AVAILABLE REGISTERS

The MODBUS-RTU protocol implemented on this instrument can manage a maximum of 32 registers read and written in a single query or response.

R .....the register may only be read
W .....the register may only be written
R/W.....the register may be both read and written
H .....high half of the DOUBLE WORD containing the number
L.....low half of the DOUBLE WORD containing the number

Register	Description	Saving in EEPROM	Access
40001	Firmware Version	-	R
40002	Instrument type	-	R
40003	Year of manufacture	-	R
40004	Serial Number	-	R
40005	Program type	-	R
40006	COMMAND REGISTER	NO	R/W
40007	STATUS REGISTER	-	R
40008	GROSS WEIGHT H	-	R
40009	GROSS WEIGHT L	-	R
40010	NET WEIGHT H	-	R
40011	NET WEIGHT L	-	R
40012	PEAK WEIGHT H	-	R
40013	PEAK WEIGHT L	-	R

40014	Divisions and Units of measure	-	R
40015	Coefficient H	-	R
40016	Coefficient L	-	R
40050	INSTRUMENT STATUS	-	R
40051	REGISTER 1	NO	R/W
40052	REGISTER 2	NO	R/W
40053	REGISTER 3	NO	R/W
40054	REGISTER 4	NO	R/W
40055	REGISTER 5	NO	R/W
40056	REGISTER 6	NO	R/W
40057	REGISTER 7	NO	R/W
40058	REGISTER 8	NO	R/W
40059	REGISTER 9	NO	R/W
40060	REGISTER 10	NO	R/W
40061	REGISTER 11	NO	R/W
40062	REGISTER 12	NO	R/W
40063	REGISTER 13	NO	R/W
40064	REGISTER 14	NO	R/W
40065	Sample weight for instrument calibration H	Use with command 101 of the “Command Register”	R/W
40066	Sample weight for instrument calibration L		R/W
40067	Weight value corresponding to ZERO of the analog output H	Only after command 99 of the “Command Register”	R/W
40068	Weight value corresponding to ZERO of the analog output L		R/W
40069	Weight value corresponding to the Full Scale of the analog output H		R/W
40070	Weight value corresponding to the Full Scale of the analog output L		R/W
40073	Preset Tare H	Use with command 103 of the “Command Register”	R/W
40074	Preset Tare L		R/W
40080			
40081			
40082			
40083			
40084			
40085			
40086			
40087			
40088			
40089			
40090			

STATUS REGISTER (40007)

Bit 0	Load cell error
Bit 1	AD convertor malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within ±¼ of a division around ZERO
Bit 13	Research in progress
Bit 14	
Bit 15	Load cells references not connected

DIVISION AND UNITS OF MEASURE REGISTER (40014)

This register contains the current setting of the divisions (parameter dIUI5) and of the units of measure (parameter Unit).

H Byte	L Byte
Unit of measure	Division

Use this register together with the Coefficient registers to calculate the value displayed by the instrument.

Least significant byte (L Byte)

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

Most significant byte (H Byte)

Unit of measure value	Unit of measure description	Utilisation of the coefficient with the different units of measure settings compared to the gross weight detected
0	Kilograms	No active
1	Grams	No active
2	Tons	No active
3	Pounds	No active
4	Newton	Multiplies
5	Litres	Divides
6	Bar	Multiplies
7	Atmospheres	Multiplies
8	Pieces	Divides
9	Newton Metres	Multiplies
10	Kilogram Metres	Multiplies
11	Other	Multiplies

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER (40006)

0	No command	**1**	
6		**7**	SEMI-AUTOMATIC TARE enabling (net weight displaying)
8	SEMI-AUTOMATIC ZERO	**9**	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
20		**21**	Keypad lock
22	Keypad and display unlock	**23**	Keypad and display lock
24	The equalized points of the eight channels are distributed into the exchange registers from 1 to 8, in low resolution (16 bit, the lower 8 bit are lost)	**25**	The equalized points of channels 1-2-3-4 are allocated into exchange registers from 1 to 8. Exchange register 1: channel 1 H Exchange register 2: channel 1 L Exchange register 3: channel 2 H Exchange register 4: channel 2 L Etc.
26	The equalized points of channels 5-6-7-8 are allocated into exchange registers from 1 to 8. Exchange register 1: channel 5 H Exchange register 2: channel 5 L Exchange register 3: channel 6 H Exchange register 4: channel 6 L Etc.	**27**	Cancels commands 24-25-26
98		**99**	Saving data in EEPROM
100	TARE WEIGHT ZERO SETTING for calibration	**101**	Sample weight storage for calibration
110	Current weight storage and printing	**111**	
120		**121**	
130	Preset Tare enabling	**131**	Reserved
9999	Reset (reserved)		

READING DIVISIONS WITH SIGN OF EACH WEIGHTING CHANNEL (commands 24, 25, 26, 27 of Command Register)

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

ANALOG OUTPUT SETTING

Write the weight into registers “Weight value corresponding to the Full Scale of the analog output H” (40069) and “Weight value corresponding to the Full Scale of the analog output L” (40070), otherwise write the weight into registers “Weight value corresponding to ZERO of the analog output H” (40067) and “Weight value corresponding to ZERO of the analog output L” (40068). Once the value has been written, save it to EEPROM by sending command 99 from Command Register.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 “TARE WEIGHT ZERO SETTING for calibration” of the Command Register.
- Load a sample weight on the system and send its value to the registers 40065-40066.
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the two sample weight registers are set to zero.

In order to correctly set the sample weight, consider the value of the Division register (40014). Example: to set the sample weight to 100 kg and the division is 0.001, then the value to enter is 100000 (100 / 0.001 = 100000).

COMMUNICATION EXAMPLES

The numerical data below are expressed in hexadecimal notation with prefix h.

EXAMPLE 1
Command for multiple writing of registers (hexadecimal command 16, h10):
Assuming that we wish to write the value 0 to the register 40017 and the value 2000 to the register 40018, the string to generate must be:

h01 h10 h00 h10 h00 h02 h04 h00 h00 h07 hD0 hF1 h0F

The instrument will respond with the string:

h01 h10 h00 h10 h00 h02 h40 h0D

Query field name	hex	Response field name	hex
Instrument Address	**h01**	Instrument Address	**h01**
Function	**h10**	Function	**h10**
Address of the first register H	**h00**	Address of the first register H	**h00**
Address of the first register L	**h10**	Address of the first register L	**h10**
Number of registers H	**h00**	Number of registers H	**h00**
Number of registers L	**h04**	Number of registers L	**h04**
Byte Count	**h08**	CRC16 H	**hC0**
Datum 1 H	**h00**	CRC16 L	**h0F**
Datum 1 L	**h00**		
Datum 2 H	**h07**		
Datum 2 L	**hD0**		
Datum 3 H	**h00**		
Datum 3 L	**h00**		
Datum 4 H	**h0B**		
Datum 4 L	**hB8**		
CRC16 H	**hB0**		
CRC16 L	**hA2**		

EXAMPLE 2
Multiple commands reading for registers (hexadecimal command 3, h03):
Assuming that we wish to read the two gross weight values (in the example 4000) and net weight values (in the example 3000), reading from address 40008 to address 40011 must be performed by sending the following string:

H01 h03 h00 h07 h00 h04 hF5 hC8

The instrument will respond with the string:

H01 h03 h08 h00 h00 hF hA0 h00 h00 h0B hB8 h12 h73

Query field name	hex	Response field name	hex
Instrument Address	**h01**	Instrument Address	**h01**
Function	**h03**	Function	**h03**
Address of the first register H	**h00**	Address of the first register H	**h08**
Address of the first register L	**h07**	Address of the first register L	**h00**
Number of registers H	**h00**	Datum 1 H	**h00**
Number of registers L	**h04**	Datum 1 L	**h00**
CRC16 H	**hF5**	Datum 2 H	**h0F**
CRC16 L	**hC8**	Datum 2 L	**hA0**
		Datum 3 H	**h00**
		Datum 3 L	**h00**
		Datum 4 H	**h0B**
		Datum 4 L	**hB0**
		CRC16 H	**h12**
		CRC16 L	**h73**

For additional examples regarding the generation of correct control characters (CRC16) refer to the manual **Modicon PI-MBUS-300.**

ETHERNET TCP/IP

TECHNICAL SPECIFICATIONS

Port	RJ45 10Base-T or 100Base-TX (auto-detect)

Link led indications (RJ45 – left side)	off ..... no link amber ..... 10 Mb/s green ..... 100 Mb/s
Activity led indications (RJ45 – right side)	off ..... no activity amber ..... Half Duplex green ..... Full Duplex

The instrument features an ethernet TCP/IP port that allows to exchange the weight and the main parameters in an ethernet network, for example with a PC.

INSTRUMENT SETUP

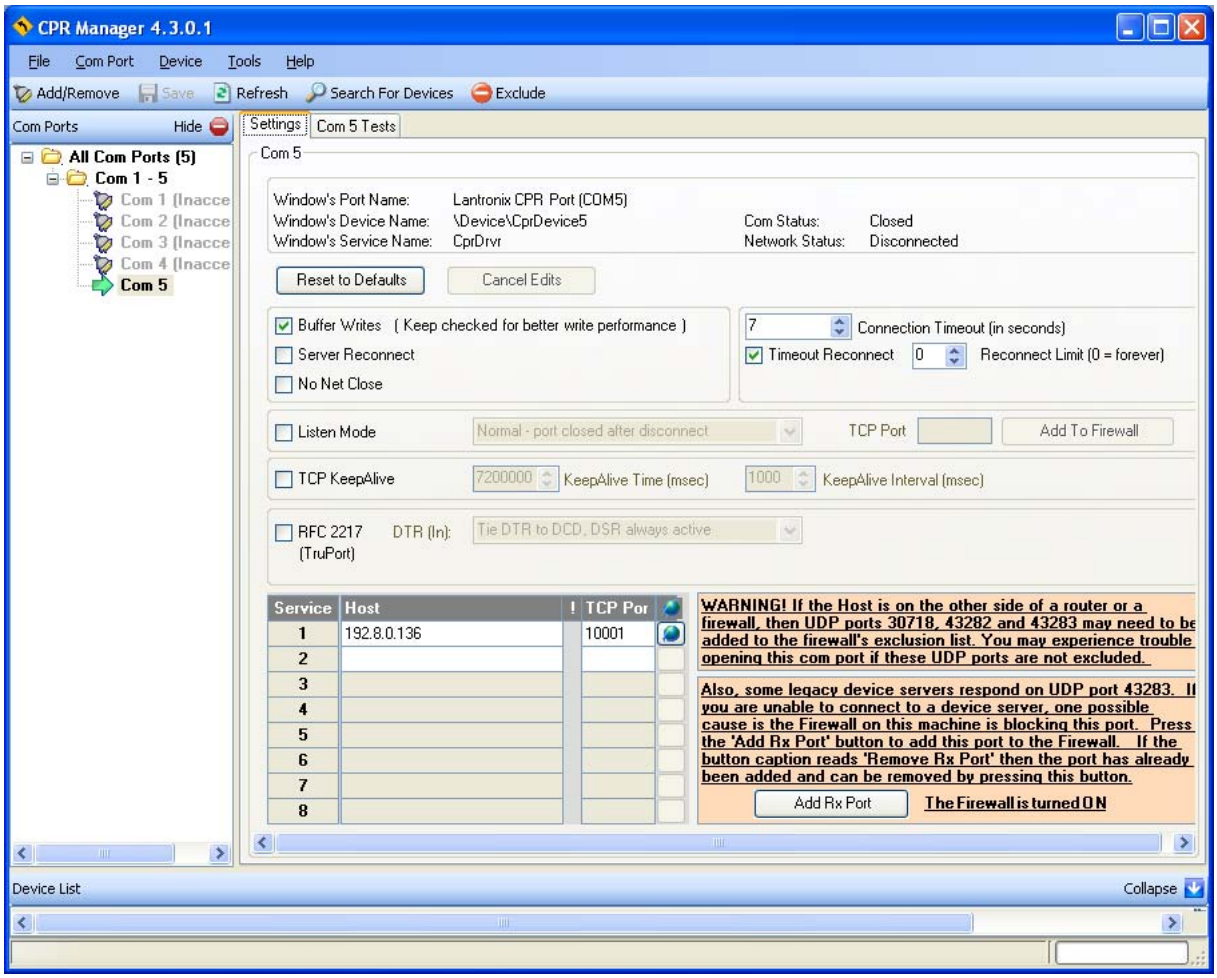
ENTER + ESC → *EtHnEt*

- *I PAddr* (default: 192.8.0.141): set instrument IP address
- *SUbnEt* (default: 255.255.255.0): set instrument Subnet Mask
- *GAtUAY* (default: 192.8.0.111): set Gateway address of Ethernet network
- *nOdE*: select communication protocol (see section **SERIAL COMMUNICATION SETTING**)

Any changes will be effective the next time the instrument is started.

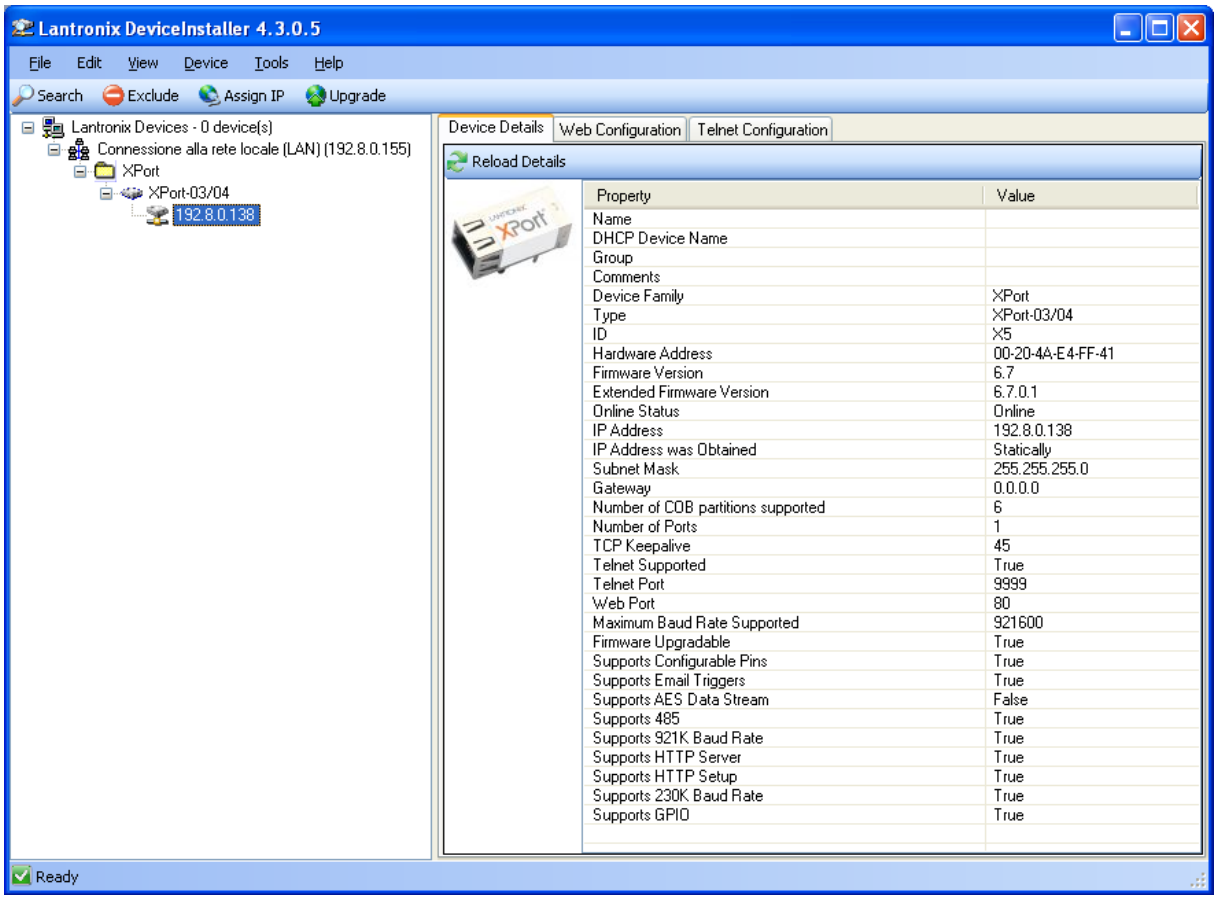
PC SETUP

A PC can be connected, by a virtual serial port, to the instrument via ethernet TCP/IP.
To install the virtual COM port, use the CPR Manager included in the supply: run file *CPR.exe* on CD, add a serial port, set an IP address (host) and a TCP port (10001), then save.

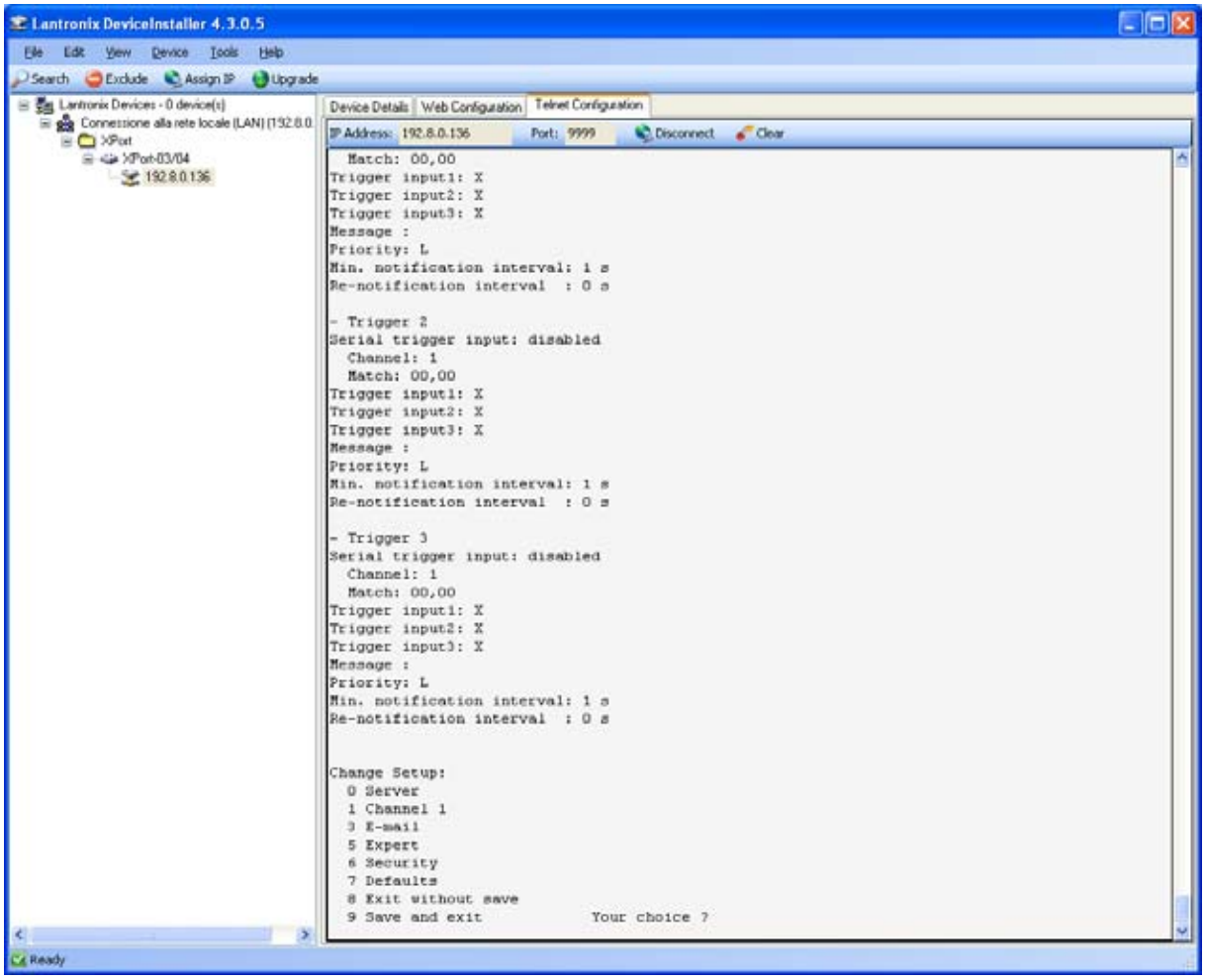


Use the just created virtual COM port to communicate with the instrument, using the protocol selected on it.
Alternatively connect to the instrument using a socket (e.g.: Winsock) on port 10001.

To verify the ethernet configuration of the instrument, you can install the application Lantronix DeviceInstaller on a PC with Microsoft Windows operating system (run file *DevInst.exe* on CD). Connect PC and instrument via LAN (point-to-point or through hub/switch), run the application and click on Search:

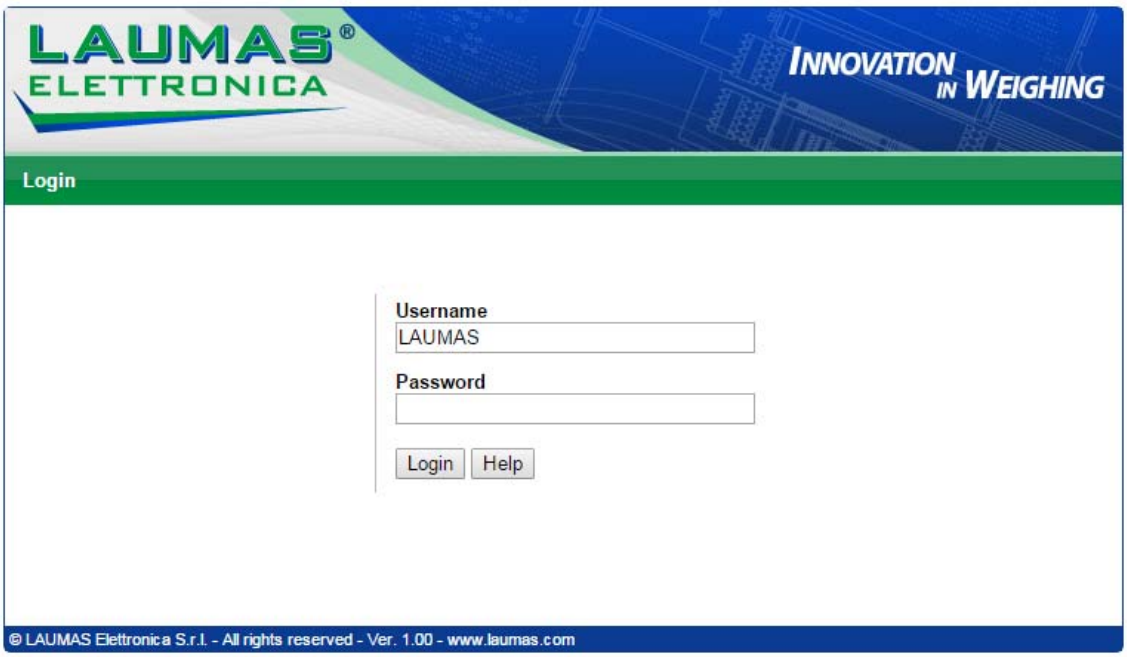


Select the found device and click on Telnet Configuration tab; click on Connect, and then press Enter on keyboard.

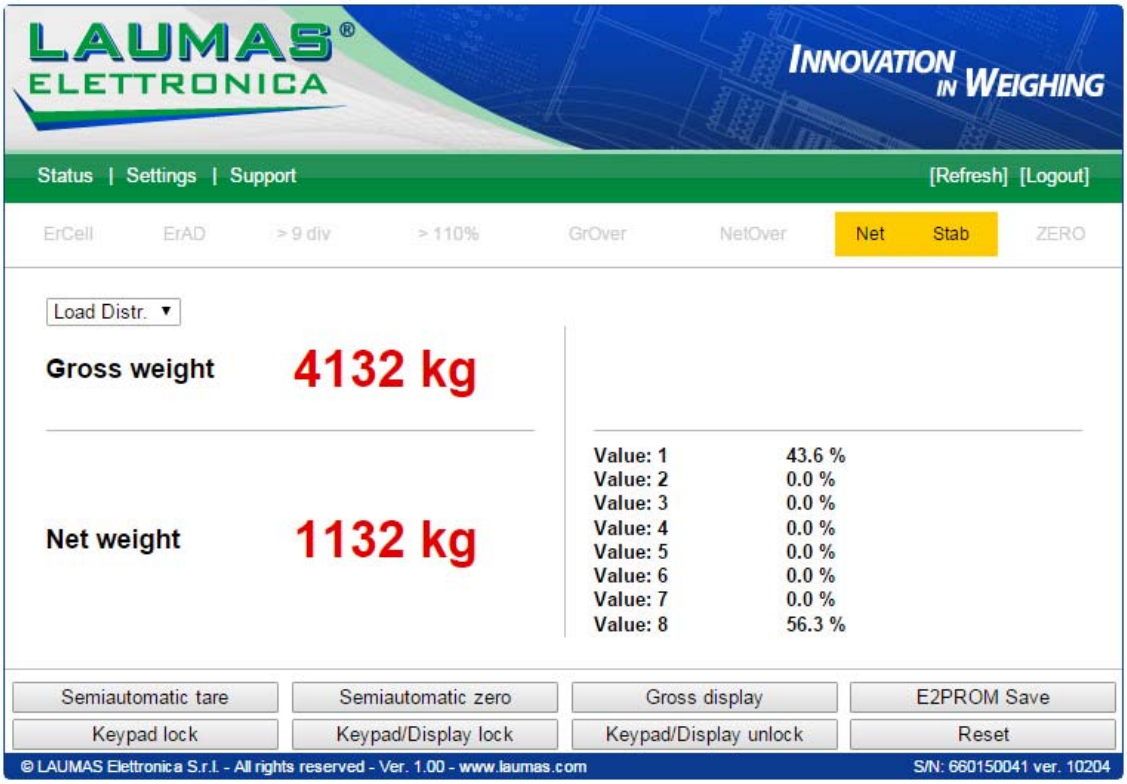


Press 0 to change server settings: change only the 4 fields of IP address and confirm the other parameters by pressing Enter. Set a static IP address.

Set UEbSru operation mode (into EtHnEt menu) and restart the instrument to apply changes.
Open your web browser and point to the instrument address to be monitored; it will open the following page:



Enter the "LAUMAS" user name and the password supplied with the instrument in respective fields, then press Login to enter the status page:



In case of incorrect parameter setting, the "INSTRUMENT DATA READING ERROR" message is displayed.

The instrument status page shows the gross and net weight read and allows you to send the main commands (Tare, Zero setting, E2PROM saving, etc.); it also shows instrument status, including possible anomalies:

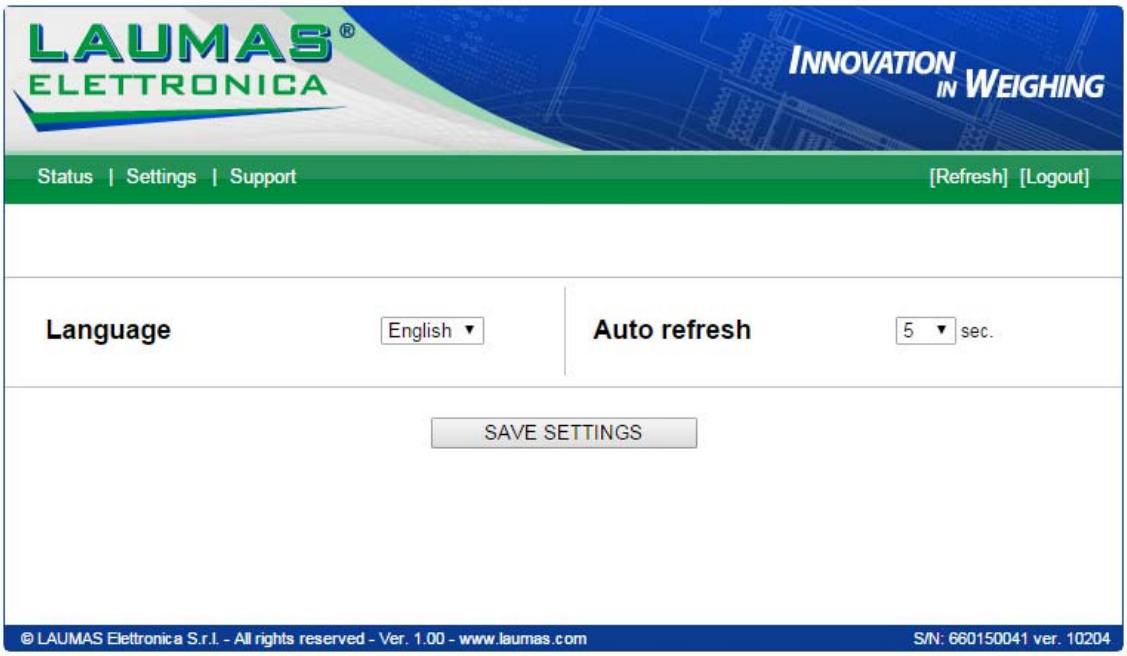
ErCell: ..... load cell error
ErAD: ..... instrument converter error
>9div: ..... weight exceeds maximum weight by 9 divisions
>110% ..... weight exceeds 110% of full scale
GrOver ..... gross weight over 999999
NetOver ..... net weight over 999999
Net ..... instrument shows the net weight
Stab..... weight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

Number of decimals and unit of measure are read by the instrument.

The screen to be displayed is selected through the drop down menu:

Load Distr.:.. percentage load distribution
mV:..... current response signal of each load cell expressed in mV
mV zero: ..... response signal of each load cell, stored during zero setting, expressed in mV
Points: ..... current response signal of each load cell expressed in converter points

Click on Settings to enter the instrument configuration page:



In the configuration page you can set language and page refresh time: by pressing SAVE SETTINGS data are saved on the instrument and will be used for subsequent accesses;

RESERVED FOR THE INSTALLER

MENU LOCKING

Through this procedure, it's possible to block the access to any menu on the instrument.
Select the menu that you wish to lock:

000000 MENU/ENTER CALIb press ESC and ◄ simultaneously for 3 seconds, the display shows C.ALIb (the left point on the text indicates that this menu item is now locked). If the operator tries to enter this menu, the access is denied and the display shows bLOC.

MENU UNLOCKING

000000 MENU/ENTER C.ALIb press ENTER and ▲ simultaneously for 3 seconds, the display shows CALIb (the left point on the text is off to indicate that this menu item is unlocked).

TEMPORARY MENU UNLOCKING

000000 MENU/ENTER C.ALIb press ▲ and ◄ simultaneously for 3 seconds: it is now possible to enter and modify all menus including those which are locked. By returning to weight display, the menu lock is restored.

DATA DELETION AND PROGRAM SELECTION

WARNING: operations must only be performed after contacting technical assistance.
After each operation the display shows dOnE, press ENTER to continue.
By pressing ESC the procedure is cancelled and no changes are made.

Upon instrument power-on hold down the ESC key until the display shows PrOG, then proceed as follows:

CONSTANTS RESTORE (does not erase the calibration): confirm PrOG, use arrow keys to select PASSU, set code 6935 and confirm.

PROGRAM SELECTION: confirm PrOG and use the arrow keys to select the desired program:
bASE: basic program.
rEuEr: to be used when the loaded weighing system correspond to not loaded cells and vice versa (product increases while weight on load cells actually decreases).
r iP: weight remote display program.

After confirming the choice of the program (except rEuEr and r iP), the user must choose its approval state among the following possible choices:

nOtLEG: not approved program;
LEGAL: approved program, single interval (Dir. 2009/23/EC, art. 1)*;
LEGNI : approved program, multi-interval (Dir. 2009/23/EC, art. 1)*;
LEGNr: approved program, multiple range (Dir. 2009/23/EC, art. 1)*;

***)** Contact technical assistance to request the proper manual and the correct procedures for approval, indicating mandatory hardware code and serial number (see section **INSTRUMENT COMMISSIONING**).

By confirming, the instrument is restored to default and data is erased.

If you do not have a specific manual for the newly set program, you can request it to technical assistance.

KEYPAD OR DISPLAY LOCKING

Press ESC immediately followed by ▲ hold them down for about 5 seconds (this operation is also possible via the MODBUS and ASCII protocols):

- FrEE: no lock.
- HEY: keypad lock: if active, when a key is pressed the message bLOC is displayed for 3 seconds.
- dI SP: keypad and display lock: if active, the kaypad is locked and the display shows the instrument model (weight is not displayed); by pressing a key the display shows bLOC for 3 seconds.

DECLARATION OF CONFORMITY CE

LAUMAS ELETTRONICA

SISTEMI DI PESATURA INDUSTRIALE - CELLE DI CARICO

Sistema di gestione
Qualità certificato
UNI EN ISO 9001:2008

CERTIFICAZIONE DEL SISTEMA DI GARANZIA DELLA QUALITÀ DELLA PRODUZIONE

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Fabbricante metrico Prot. N. 7340 Parma - R.E.A. PR N. 169833 - Reg. Imprese PR N.19393 - Registro Nazionale Pile N° IT09060P00000982 - Registro A.E.E. N° IT08020000002494 - N. Mecc. PR 008385 - Cap. Soc. Euro 10.400 int. vers.

EC-Konformitätserklärung
EC- Déclaration de conformité
EC-Dichiarazione di conformità
EC- Declaração de conformidade
EC-Deklaracja zgodności

EC-Declaration of Conformity
EC-Declaración de Conformidad
EC-Conformiteitverklaring
EC- Prohlášení o shode
EC-Заявление о соответствии

I	Dichiarazione di conformità	Dichiariamo che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.
GB	Declaration of conformity	We hereby declare that the product to which this declaration refers conforms with the following standards.
E	Declaración de conformidad	Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las siguientes normas
D	Konformitäts-erklärung	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
F	Déclaration de conformité	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
CZ	Prohlášení o shode	Tímto prohlašujeme, že výrobek, kterého se toto prohlášení týká, je v souladu s níže uvedenými normami.
NL	Conformiteit-verklaring	Wij verklaren hiermede dat het product, waarop deze verklaring betrekking heeft, met de hierna vermelde normen overeenstemt.
P	Declaração de conformidade	Declaramos por meio da presente que o produto no qual se refere esta declaração, corresponde às normas seguintes.
PL	Deklaracja zgodności	Niniejszym oświadczamy, że produkt, którego niniejsze oświadczenie dotyczy, jest zgodny z poniższymi normami.
RUS	Заявление о соответствии	Мы заявляем, что продукт, к которому относится данная декларация, соответствует перечисленным ниже нормам.

Models: CLM8

Mark Applied	EU Directive	Standards
CE	**2006/95/EC** Low Voltage Directive	*Not Applicable (N/A)* for VDC type EN 61010-1 for 230/115 VAC type
CE	**2004/108/EC** EMC Directive	EN 55022 EN 61000-6-2 EN 61000-6-4 EN 61000-4-2/3/4/5/6
CE M (only if "M" mark is applied)	**2009/23/EC** NAWI Directive	EN 45501:1992 OIML R76-1:2006

Montechiarugolo (PR), 04/06/2015

LAUMAS Elettronica s.r.l.
M. Consonni (***RCQ***)