LOAD CELL SYSTEMS

Installation and User Manual

version 1.02

WEBLAU

CE **2014/30/EU**

EN55022:2010 EN61000-6-2:2005 EN61000-6-4:2007

SYSTEM IDENTIFICATION

Web: https://loadcellsys.com
Email: sales@loadcellsys.com
Phone: 607-426-1467

KEY TO SYMBOLS

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

Caution! High Voltage.

Caution! 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. Instead, 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

RECOMMENDATIONS FOR CORRECT INSTALLATION OF WEIGHING INSTRUMENTS

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
- ETHERNET: follow the standards relating to this type of network.

MAIN SPECIFICATIONS OF THE INSTRUMENT

Weight indicator and transmitter for Omega/DIN rail mounting suitable for back panel; space-saving vertical shape. Six-digit semialphanumeric display (8 mm h), 7 segment. Four-key keyboard. Dimensions: 25x115x120 mm.
It displays the weight and status of maximum 8 Laumas instruments of the W and TLB series, connected via RS485 network with 9600 bps MODBUS RTU communication protocol;
It features an Ethernet TCP/IP port and a web server to connect to in order to display the status and check the operation of the instruments in the RS485 network.

WARNING: port RS485 is used by the WEBLAU instrument as MODBUS-RTU master and may be connected to instruments of the TLB or W LAUMAS series only, in MODBUS mode with 9600 baudrate, no parity, 1 stop bit and in any case always as slave instruments.

TECHNICAL SPECIFICATIONS

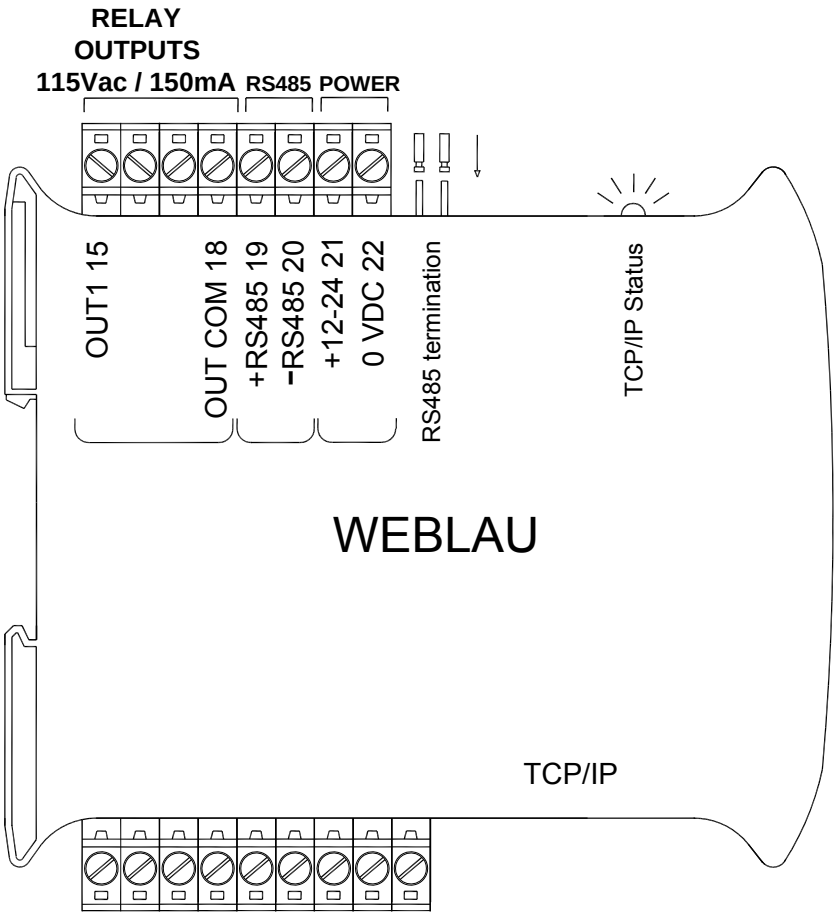
POWER SUPPLY and CONSUMPTION (VDC)	12 - 24 VDC +/- 10% ; 5 W
RELAY OUTPUTS	N.1 - max 115 VAC ; 150mA
SERIAL PORTS	RS485 @ 9600bps
ETHERNET TCP/IP PORT	RJ45 10Base-T or 100Base-TX (auto-detect)
HUMIDITY (non condensing)	85 %
STORAGE TEMPERATURE	- 30°C + 80°C
WORKING TEMPERATURE	- 20°C + 60°C

ELECTRICAL CONNECTIONS

BASIC INFORMATION

- It is recommended that the power supply negative pole be grounded.
- Connect terminal “0 VDC” to the RS485 common of the connected instruments in the event that these receive alternating current input or that they have an optoisolated 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 section RS485 SERIAL CONNECTION.

WIRING DIAGRAM



1 output: alarm in case of failed communication with one or more of the instruments on the RS485 network.

LED AND KEY FUNCTIONS

LED	Function
NET	no meaning
→0←	no meaning
▬◢	no meaning
kg	no meaning
g	no meaning
L	no meaning
Ethernet TCP/IP status	fast blink: on
RJ45 socket link LED (on left)	Off: no link Amber: 10 Mbps Green: 100 Mbps
RJ45 socket activity LED (on right)	Off: no activity Amber: Half Duplex Green: Full Duplex

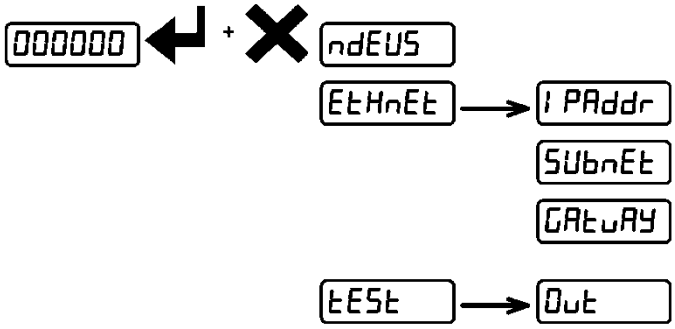
KEY	Short press	Long press (3 sec)	Into menus
✕			Cancel or return to previous menu
◄			Select figure to be modified or return to previous menu item
▲			Modify selected figure or go to next menu item
↵			Confirm or enter in submenu
↵+✕	Setting general parameters (press ↵ immediately followed by ✕)		

i The LEDs light up in sequence to indicate that a setting and not a weight is being viewed

MENU MAP

Within the menu, the changes are applied immediately after pressing the ↵ button (no further confirmation).

SYSTEM PARAMETERS



INSTRUMENT COMMISSIONING AND OPERATION

Upon switch-on, the display shows in sequence:

- instrument model (e.g.: UEbLAU);
- SU followed by the software code (e.g.: SU 5);
- program type: bASE (base);
- r followed by the software version (e.g.: r 1.04.01);
- HU followed by the hardware code (e.g.: HU 104);
- the serial number (e.g.: 130001);

- If Ethernet TCP/IP is used, set the related parameters (see section ETHERNET TCP/IP SETTING).

The WEBLAU cyclically queries all the main operating parameters of the instruments connected in RS485 (max 8). The address of the queried instrument (e.g. dEU 1) is shown on the display for about one second, followed by the gross weight value, for about two seconds.

In case of communication alarm for one or more instruments in the network, the message 'Er CON' appears. At the same time as the only instrument not correctly connected is displayed, the alarm relay closes (relay 1). The relay reopens when the next instruments is connected correctly.
The WEBLAU display normally shows the gross weight detected by the individual instruments in the network (also when these are in the net display status) or any other alarm is displayed.

PROGRAMMING OF SYSTEM PARAMETERS

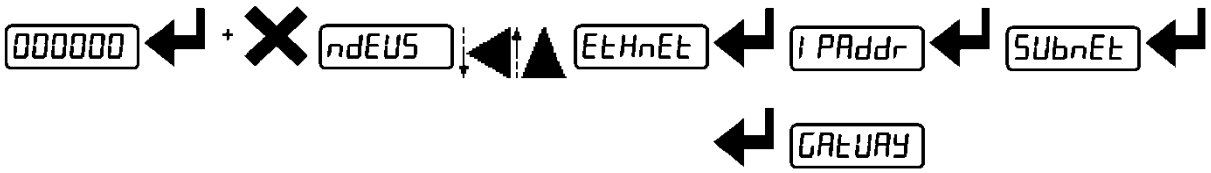
From the weight display, press simultaneously keys ↵ and ✕ to access the parameter setting.

↵: to enter a menu/confirm the data entry.
▲: to modify the displayed value or menu item.
◀: to select a new value or modify the displayed menu item.
✕: to cancel and return to the previous menu.

SETTING INSTRUMENTS NUMBER CONNECTED

ndEUS: set the number of devices connected in the RS485 network. Valid values from 1 to 8.

I ETHERNET TCP/IP SETTING



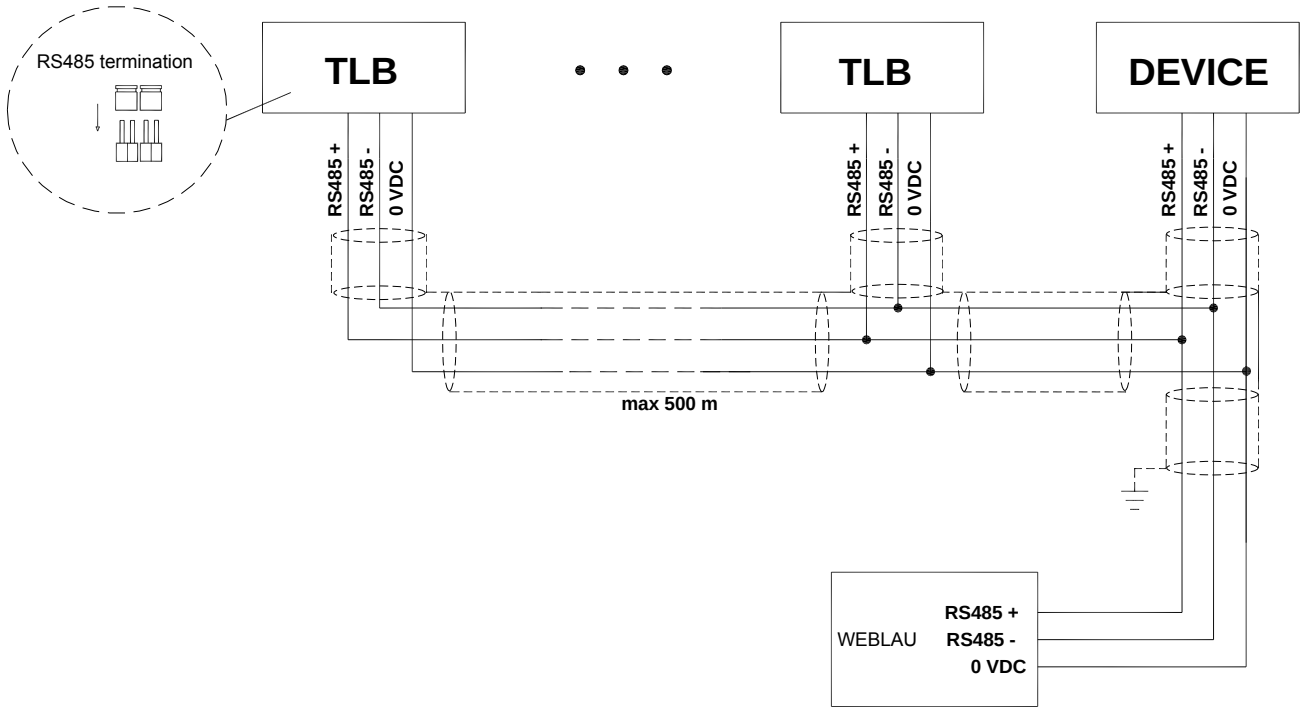
EtHnEt: select the parameters of the TCPIP connection.

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.

WARNING: If the parameters of the ETHERNET menu have been changed, restart the instrument to apply changes.

RS485 SERIAL CONNECTION

WARNING: port RS485 is used by the WEBLAU instrument as MODBUS-RTU master and may be connected to instruments of the TLB or Wxxx LAUMAS series only, in MODBUS mode with 9600 baudrate, no parity, 1 stop bit and in any case always as slave instruments.



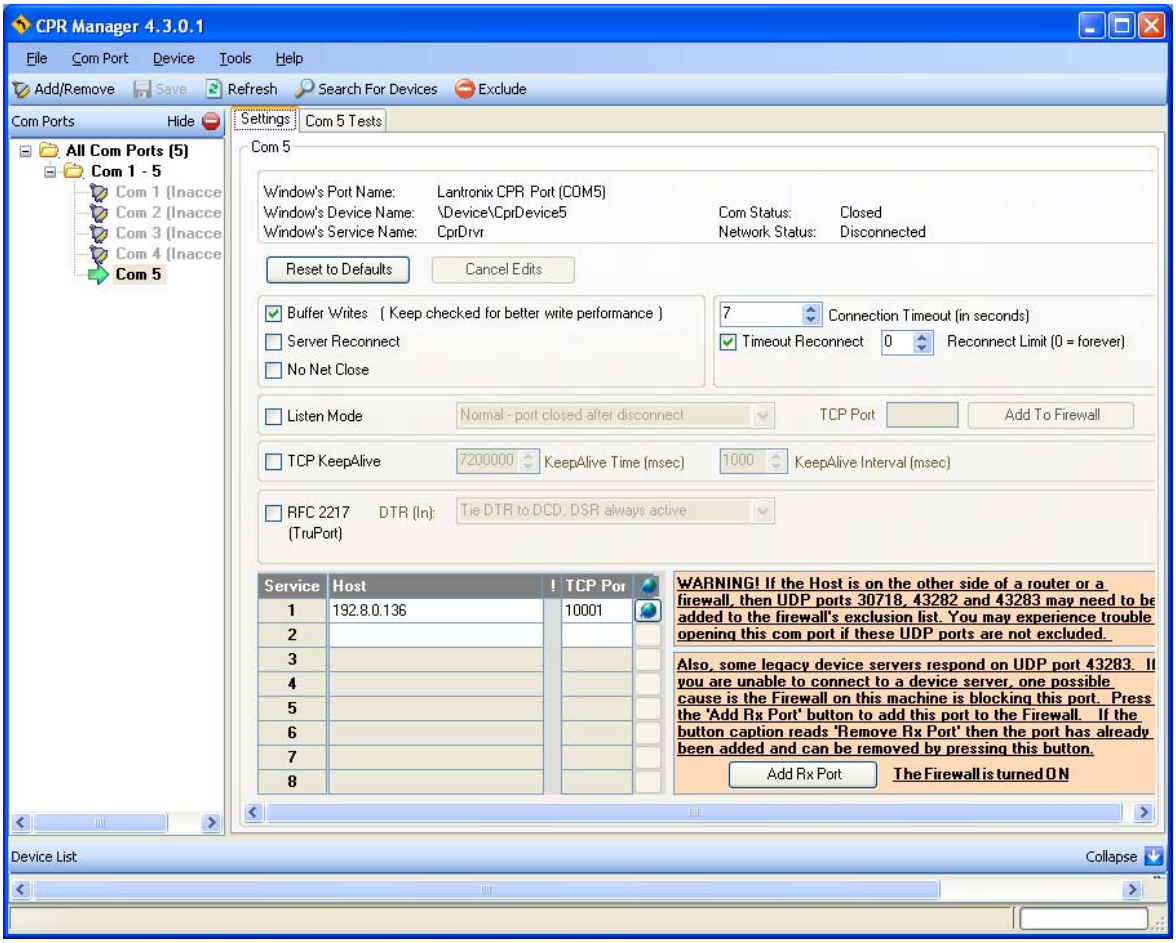
TEST

- Output Test:

  Out: setting 0 ensure that the corresponding output opens. Setting 1 ensure that the corresponding output closes.

ETHERNET CONNECTION TO PC

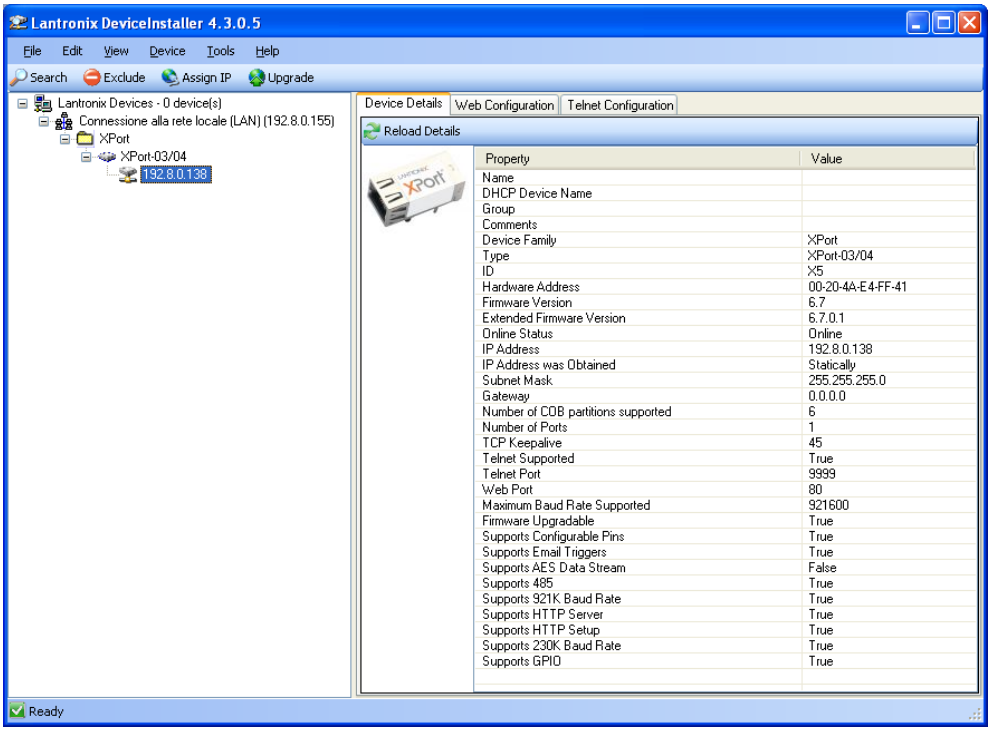
A PC can be connected, by a virtual serial port, to the instrument via ethernet TCP/IP.
To install the virtual COM port, use the CPR Manager included in the supply: run file CPR.exe on CD, add a serial port, set an IP address (host) and a TCP port (10001), then save.



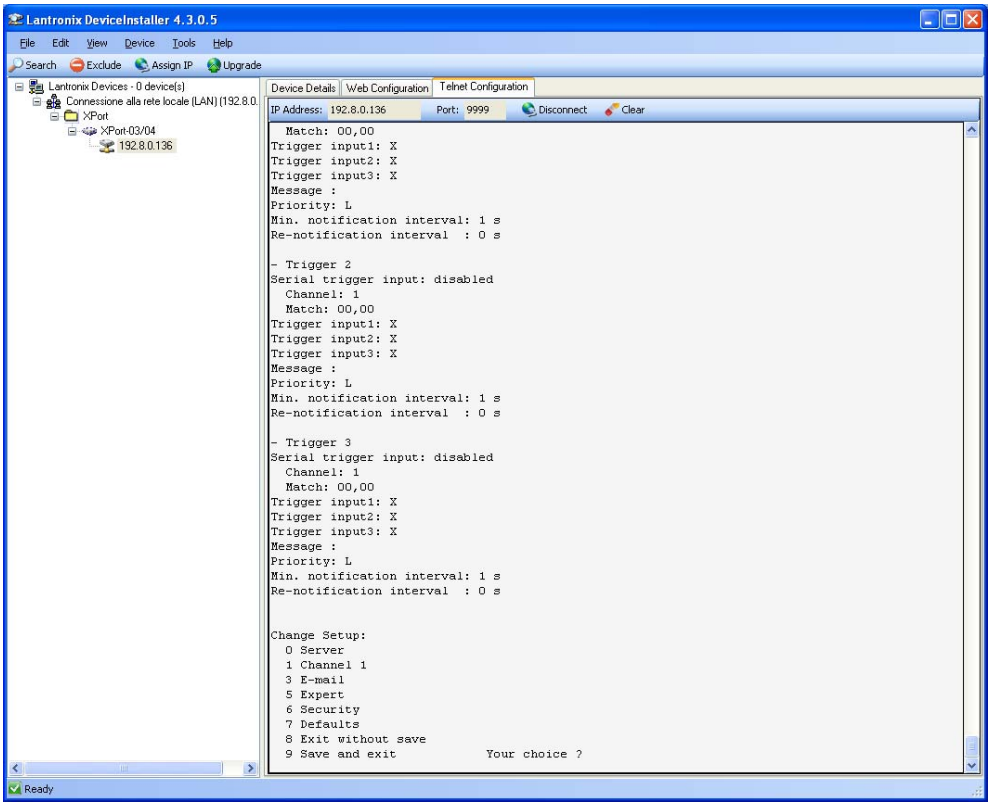
Use the just created virtual COM port to communicate with WEBLAU using the MODBUS-RTU protocol selected on the instrument
Alternatively connect to the instrument using a socket (e.g.: Winsock) on port 10001.

DIAGNOSTIC

To verify the ethernet configuration of WEBLAU, 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:



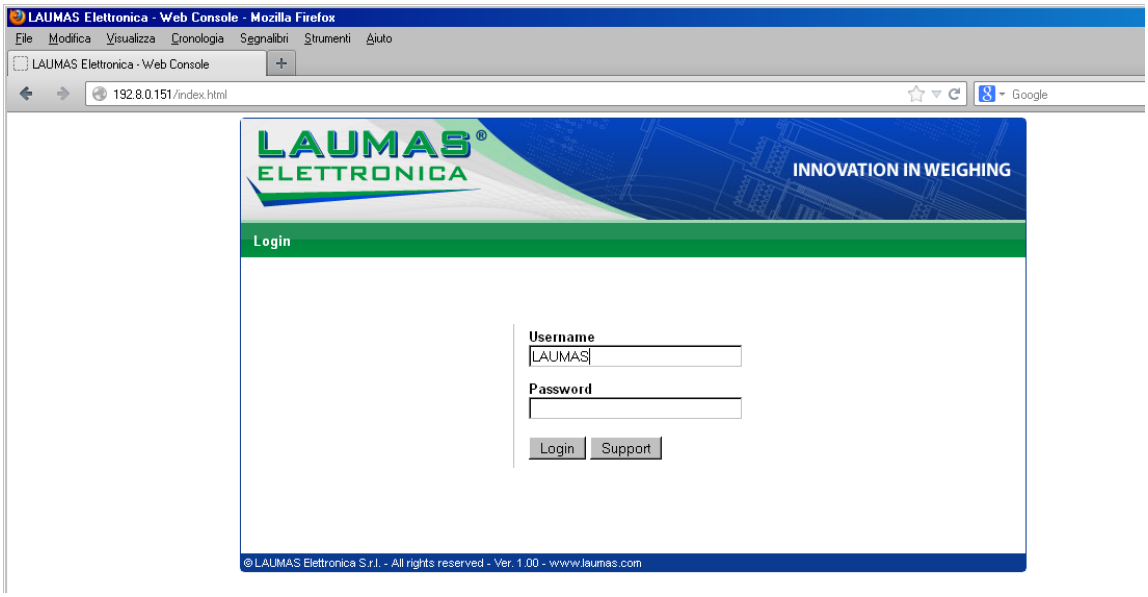
Select the found device and click on Telnet Configuration tab; click on Connect, and then press Enter on keyboard.



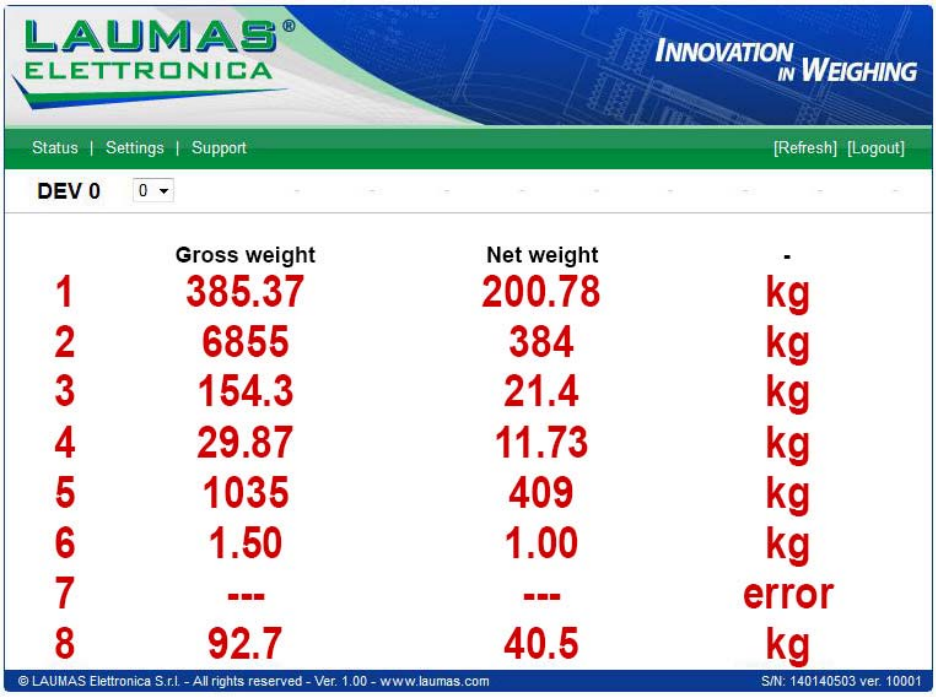
Press 0 to change server settings: change only the 4 fields of IP address and confirm the other parameters by pressing Enter. Set a static IP address.

WARNING: when this type of communication is used, communication via the virtual serial port is inhibited automatically.

Set the IP parameters from the ETHNET menu (see the section ETHERNET TCP/IP SETTING) 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:

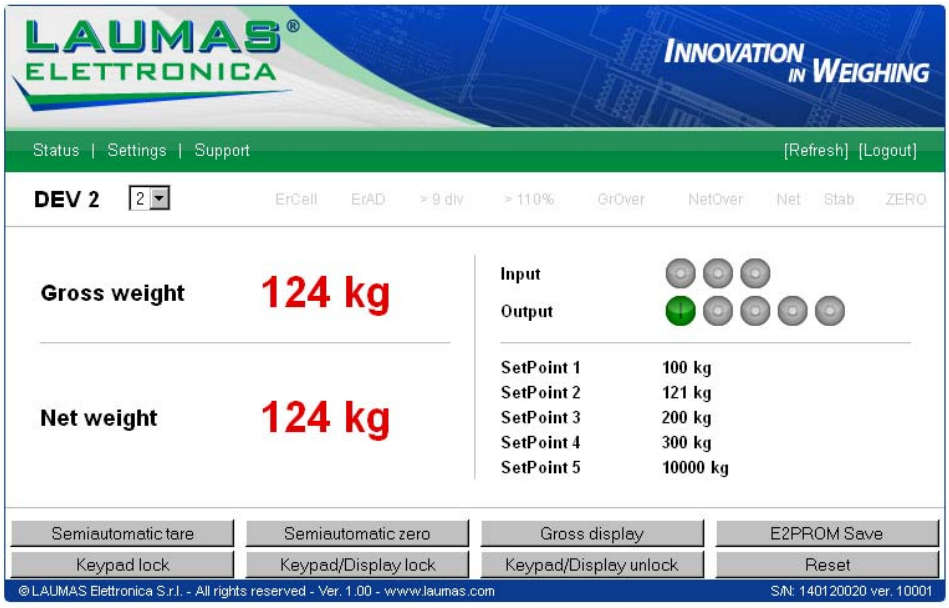


Enter the “LAUMAS” user name and the password supplied with the instrument in the respective fields, then press Login to access the first page, the summary page of instruments connected to WEBLAU appears:



In case of error or malfunction of one of connected instruments, the general alarm "error" appears. To view the specific instrument details, select its address from the drop-down menu at the top.

The following image shows the detail of a connected instrument:



In case of incorrect parameter setting, the "INSTRUMENT DATA READING ERROR" message is displayed and in case of incorrect RS485 communication, the "WEBLAU-INSTRUMENT COM ERROR" appears.

The instrument status page shows the gross and net weight read, the setpoint values set 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; if the outputs of the instrument are set in PLC mode, click on the respective icons to remotely check the status.

The address of the instrument where the data are currently published on the web page is specified in the top part of the window ("DEV: n"). To view the data of another instrument connected in RS485, select the desired address from the drop-down menu to the side. The page will be updated in just a few seconds.

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;
- set setpoint: by pressing SAVE SETTINGS the new values are sent to the instrument and activated, but will be lost at instrument restart or power off; to permanently save setpoint values, press E2PROM Save in status page.

WARNING: to avoid contrasting commands or requests, only one browser at a time must access the single WEBLAU.

MODBUS-RTU PROTOCOL

A virtual serial port needs to be installed to use the MODBUS-RTU protocol from PC/PLC. The CPR MANAGER software included in the CD can be used (see the section ETHERNET CONNECTION TO PC). Otherwise connect to the instrument using a socket (eg. Winsock) on port 10001.

WARNING: when this type of communication is used, the web site integrated in the WEBLAU is inhibited automatically.

The MODBUS-RTU protocol enables to manage the reading and writing of the registers listed here below according to the specifications contained in the reference document for this standard Modicon PI-MBUS-300.
When specifically indicated certain data will be written directly to EEPROM type memories. This memory has a limited number of writing operations (100.000), therefore unnecessary operations at said locations must be avoided. The instrument, in any case, ensures that no writing occurs if the value to be stored is equal to the stored value.

The numerical data listed below are expressed in decimal notation, or hexadecimal notation if preceded by 0x.

MODBUS-RTU DATA FORMAT

The data received and transmitted via MODBUS-RTU protocol have the following characteristics:

- 1 start bit
- 8 data bits, *least significant bit* sent first
- Instrument settable parity bit
- Instrument settable stop bit

MODBUS SUPPORTED FUNCTIONS

Among the commands available in the MODBUS-RTU protocol, only the following are used to manage communication with the instruments. Other commands may not be interpreted correctly and could generate errors or system shut-downs:

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

The interrogation frequency is linked with the preset communication rate (the instrument will stand by for at least 3 bytes before beginning to calculate a possible response to the query).
For additional information on this protocol, refer to the general technical specification PI_MBUS_300. In general, the query and response to and from a slave instrument are organised as follows:

FUNCTION 3: Read holding registers (PROGRAMMABLE REGISTER READING)

QUERY

Address	Function	Add. Register1	No. register	2 bytes
A	0x03	0x0000	0x0002	CRC

Tot. bytes = 8

RESPONSE

Address	Function	No. bytes	Register1	Register 2	2 bytes
A	0x03	0x04	0x0064	0x00C8	CRC

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

where: No. registers= number of Modbus register to be read, starting from the Address 1° register;
No. bytes = number of data bytes to follow;

FUNCTION 16: Preset multiple registers (MULTIPLE REGISTER WRITING)

QUERY

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

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

RESPONSE

Address	Function	Add. reg. 1	No. reg.	2 bytes
A	0x10	0x0000	0x0002	CRC

Tot. bytes = 8

where: No. registers = number of Modbus register to be read, starting from the Address 1° register;
No. bytes = number of data bytes to follow;
Val.reg.1 = register contents beginning from the first.

The Response contains the number of records changed starting from the Address 1° register.

COMMUNICATION ERROR MANAGEMENT

The communication strings are controlled by CRC (Cyclical Redundancy Check).
In case of a communication error the slave will not respond with any string. The master must allow for a time-out before response reception. If no response is received it infers that a communication error has occurred.
In the event of a 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 bytes
A	Funct + 0x80		CRC

CODE	DESCRIPTION
1	ILLEGAL FUNCTION (Function not valid or not supported)
2	ILLEGAL DATA ADDRESS (The specified data address is not available)
3	ILLEGAL DATA VALUE (The data received have no valid value)

LIST OF USABLE 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 can be read only
W = the register can be written only
R/W = the register can be both read and written
H = high half of the DOUBLE WORD forming the number
L = low half of the DOUBLE WORD forming the number

REGISTER	*INSTRUMENT*	*DESCRIPTION*	*ACCESS*
40001	WEBLAU	Firmware version	R
40002	WEBLAU	Type of instrument	R
40003	WEBLAU	Year of Production	R
40004	WEBLAU	Serial Number	R
40005	WEBLAU	Active program	R
40006	WEBLAU	COMMAND REGISTER	W
40007			
40008	WEBLAU	CURRENT SLAVE INSTRUMENT ADDRESS	R
40009			
40010	CURRENT SLAVE	STATUS REGISTER	R
40011	CURRENT SLAVE	GROSS WEIGHT H	R
40012	CURRENT SLAVE	GROSS WEIGHT L	R
40013	CURRENT SLAVE	NET WEIGHT H	R
40014	CURRENT SLAVE	NET WEIGHT L	R
40015	CURRENT SLAVE	Divisions and Units of measure	R
40016	CURRENT SLAVE	Reading SETPOINT 1 H	R
40017	CURRENT SLAVE	Reading SETPOINT 1 L	R
40018	CURRENT SLAVE	Reading SETPOINT 2 H	R
40019	CURRENT SLAVE	Reading SETPOINT 2 L	R
40020	CURRENT SLAVE	Reading SETPOINT 3 H	R
40021	CURRENT SLAVE	Reading SETPOINT 3 L	R
40022	CURRENT SLAVE	Reading SETPOINT 4 H	R
40023	CURRENT SLAVE	Reading SETPOINT 4 L	R
40024	CURRENT SLAVE	Reading SETPOINT 5 H	R
40025	CURRENT SLAVE	Reading SETPOINT 5 L	R

40026	CURRENT SLAVE	Reading INPUTS STATUS	R
40027	CURRENT SLAVE	Reading OUTPUTS STATUS	R
40028	CURRENT SLAVE	Writing OUTPUTS STATUS	W
40029	CURRENT SLAVE	Writing SETPOINT 1 H	W
40030	CURRENT SLAVE	Writing SETPOINT 1 L	W
40037	CURRENT SLAVE	Writing SETPOINT 2 H	W
40038	CURRENT SLAVE	Writing SETPOINT 2 L	W
40039	CURRENT SLAVE	Writing SETPOINT 3 H	W
40040	CURRENT SLAVE	Writing SETPOINT 3 L	W
40041	CURRENT SLAVE	Writing SETPOINT 4 H	W
40042	CURRENT SLAVE	Writing SETPOINT 4 L	W
40043	CURRENT SLAVE	Writing SETPOINT 5 H	W
40044	CURRENT SLAVE	Writing SETPOINT 5 L	W

POSSIBLES COMMAND TO SEND TO THE COMMAND REGISTER (40006)

COMMAND	*RECEIVER*	*DESCRIPTION*
0		No command
10001	WEBLAU	Set address 1 as slave for communication
10002	WEBLAU	Set address 2 as slave for communication
10003	WEBLAU	Set address 3 as slave for communication
10004	WEBLAU	Set address 4 as slave for communication
10005	WEBLAU	Set address 5 as slave for communication
10006	WEBLAU	Set address 6 as slave for communication
10007	WEBLAU	Set address 7 as slave for communication
10008	WEBLAU	Set address 8 as slave for communication
11000	WEBLAU	Write the setpoints on the slave
12000	WEBLAU	Set the status of the slave outputs
OTHERS*	CURRENT SLAVE	The commands are redirected to the slave indicated in register 40008

*) Refer to the instrument manual for a full list of commands supported by selected slave.

CAUTION: To avoid conflicting commands or requests, only one MODBUS master must communicate with the WEBLAU.

PROGRAM SELECTION AND DATA DELETION

CAUTION: operation must only be performed after contacting technical assistance
Upon instrument power-on, hold down the key ✕ until the display shows:

DATA DELETION: confirm the *PrOG* prompt, use the arrow keys to select the item *PASSU*, enter the code 6935 and confirm.

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