User Manual
version 1.07

COMMUNICATION PROTOCOLS

for weight indicators SERIES W

(programs: BASE – LOAD – UNLOAD – 3/6/14 PRODUCTS)

Protocols for instruments
CE-M APPROVED EN45501:2015-2014/31/UE-OIML R76:2006

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.

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CONTINUOUS FAST WEIGHT TRANSMISSION PROTOCOL - Only for BASE program

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 **SERIAL COMMUNICATION SETTINGS** section in instrument manual):

- *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 (see the instrument manual).

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 (exclusive OR) 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 (see the instrument manual).

FAST TRANSMISSION VIA EXTERNAL CONTACT: it's possible to transmit the weight, just once, even closing an input for no more than a second (see **OUTPUTS AND INPUTS CONFIGURATION** and **SERIAL COMMUNICATION SETTINGS** sections in instrument manual).

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 **SERIAL COMMUNICATION SETTINGS** section in instrument manual):

- *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 (exclusive OR) 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 **SEMI-AUTOMATIC TARE (NET/GROSS)** section in instrument manual).
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 (see the instrument manual).

ASCII BIDIRECTIONAL PROTOCOL - Only for BASE program

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 in the instrument manual).
Following communication modes availables (see **SERIAL COMMUNICATION SETTINGS** section in instrument manual):

- nOdU60: communication compatible with instruments series W60000, WL60 Base, WT60 Base, TLA600 Base
- nOd td: communication compatible with TD RS485 instruments

Captions:

$.....Beginning of a request string (36 ASCII)
& or **&&** .....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 **CHECK-SUM CALCULATION** section)
CR.....1 character for string end (13 ASCII)
****.....1 character of separation (92 ASCII)

1. SETPOINT PROGRAMMING

The programming of setpoint depends on the presence of E/EC option on the instrument:

Without E/EC option	With E/EC option
----------	Selecting the class of setpoint to be programmed
Setting setpoint values	Setting setpoint values
Storage of the setpoint in the EEPROM memory	Storage of the setpoint in the EEPROM memory

1.1. SELECTING THE CLASS OF SETPOINT (E/EC OPTION) TO BE PROGRAMMED*

***)** Only for instruments provided with E/EC option.

The PC transmits the ASCII string: **$aaFffckckCR**

where: **F**.....command of selection of the class to be programmed
ff.....number of the setpoint class (from 01 to 12)

Possible instrument responses:

- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- **ff** exceeds the maximum allowable: **&aa#\ckckCR**

Example: to select the class no. 11 to program for the instrument no. 01, the PC must transmit the following command: **$01F1147(Cr)**.

1.2. READING THE SELECTED CLASS OF SETPOINT (E/EC OPTION) TO BE PROGRAMMED*

***)** Only for instruments provided with E/EC option.

The PC transmits the ASCII string: **$aafckckCR**

where: **f**..... command of reading of the selected class to be programmed

Possible instrument responses:

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

where: **ff**.....setpoint class (from 01 to 12)

1.3. SETTING SETPOINT VALUES CURRENTLY IN USE

Warning: if the E/EC option is not present on the instrument, the new values of setpoint are active immediately, but if the E/EC option is present, the new values are active only if the class to be programmed coincides with the class currently in use.

The PC transmits the ASCII string: **$aaxxxxxxyckckCR**

where: **xxxxxx**.....6 characters to indicate the setpoint value (48 ÷ 57 ASCII)
y = A .....set the value in the setpoint 1
y = B .....set the value in the setpoint 2
y = C .....set the value in the setpoint 3
y = D .....set the value in the setpoint 4
y = E .....set the value in the setpoint 5

Possible instrument responses:

- correct reception: **&&aa!\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- **ff** exceeds the maximum allowable: **&aa#\ckckCR**

Example: to set 500 in the setpoint no. 4, the PC must transmit the following command:
$01000500D70(Cr)

1.4. SETPOINT STORAGE IN EEPROM MEMORY

The setpoint are stored in the RAM memory and lost upon instrument power off. It is necessary to send a special command to save them permanently in the EEPROM memory. Please note that the writing number allowed in the EEPROM memory is limited (about 100000).

The PC transmits the ASCII string: **$aaMEMckckCR**

Possible instrument responses:

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

1.5. READING THE CLASS OF SETPOINT (E/EC OPTION) CURRENTLY IN USE*

***)** Only for instruments provided with E/EC option.

The PC transmits the ASCII string: **$aagckckCR**

where: **g**..... command of reading of the class currently in use

Possible instrument responses:

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

where: **ff** .....setpoint class (from 01 to 12)

2. READING WEIGHT, SETPOINT AND PEAK (IF PRESENT) FROM PC

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

where: **j** = a.....to read setpoint 1
j = b.....to read setpoint 2
j = c.....to read setpoint 3
j = d.....to read setpoint 4
j = e.....to read setpoint 5
j = t.....to read gross weight
j = n.....to read net weight
j = p .....to read the gross weight peak if the *ASCII* parameter is set as *MODBUS*; if, instead, the *ASCII* parameter is set on *MOd tD* the gross weight will be read. **To read the points, set the *FS_tEO* parameter equal to 50000**

Possible instrument responses:

- correct reception: **&aaxxxxxxj\ckckCR**
- incorrect reception: **&&aa?\ckckCR**
- In case of peak not configured: **&aa#CR**

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 (see the instrument manual).

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

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

Possible instrument responses:

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

4. SWITCHING FROM GROSS TO NET WEIGHT

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

Possible instrument responses:

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

Weighbridge instruments only: command not available if net functions are disabled (see **NET FUNCTIONS** section in instrument manual).

5. SWITCHING FROM NET TO GROSS WEIGHT

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

Possible instrument responses:

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

6. READING OF DECIMALS AND DIVISION NUMBER

The PC transmits the 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

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

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

Possible instrument responses:

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

8. KEYPAD UNLOCK

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

Possible instrument responses:

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

9. DISPLAY AND KEYPAD LOCK

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

Possible instrument responses:

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

10. 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 and/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 XOR operation 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 in instrument manual.

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 in the instrument manual, 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 *(only for BASE program)*	-	R
40016	Coefficient L *(only for BASE program)*	-	R
40017	INPUTS	-	R
40018	OUTPUTS	NO	R/W
40019	SETPOINT 1 H *(only for BASE program)*	Only after command 99 of the Command Register	R/W
40020	SETPOINT 1 L *(only for BASE program)*		R/W
40021	SETPOINT 2 H (*only for BASE program*)		R/W
40022	SETPOINT 2 L *(only for BASE program)*		R/W
40023	SETPOINT 3 H *(only for BASE program)*		R/W
40024	SETPOINT 3 L (*only for BASE program)*		R/W
40025	SETPOINT 4 H *(only for BASE program)*		R/W
40026	SETPOINT 4 L *(only for BASE program)*		R/W
40027	SETPOINT 5 H *(only for BASE program)*		R/W
40028	SETPOINT 5 L *(only for BASE program)*		R/W
40037	Setpoint class selected by E/EC option *(only for BASE program equipped with E/EC option)*	-	R

40038	Setpoint class to be set and read *(only for BASE program equipped with E/EC option)*	NO	R/W
40039	HYSTERESIS 1 H *(only for BASE program)*	YES	R/W
40040	HYSTERESIS 1 L *(only for BASE program)*		R/W
40041	HYSTERESIS 2 H *(only for BASE program)*		R/W
40042	HYSTERESIS 2 L *(only for BASE program)*		R/W
40043	HYSTERESIS 3 H *(only for BASE program)*		R/W
40044	HYSTERESIS 3 L *(only for BASE program)*		R/W
40045	HYSTERESIS 4 H *(only for BASE program)*		R/W
40046	HYSTERESIS 4 L *(only for BASE program)*		R/W
40047	HYSTERESIS 5 H *(only for BASE program)*		R/W
40048	HYSTERESIS 5 L *(only for BASE program)*		R/W
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	Totalized weight H *(only for WDOS with TOTALS program)*	-	R
40062	Totalized weight L *(only for WDOS with TOTALS program)*	-	R
40063	Number of pieces H *(only for WDESK-L\R, WDESK-LIGHT, WINOX-L\R and WTAB-L/R with counting function activated)*	-	R
40064	Number of pieces L *(only for WDESK-L\R, WDESK-LIGHT, WINOX-L\R and WTAB-L/R with counting function activated)*	-	R
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	YES	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 130 of the Command Register	R/W
40074	Preset Tare L		R/W
40080	Password seed	-	R
40081	Identification code / Password	NO	R/W
40082	Alibi memory identification number H	NO	R/W
40083	Alibi memory identification number L	NO	R/W
40084	Weight read from the alibi memory H	-	R
40085	Weight read from the alibi memory L	-	R
40086	Tare read from the alibi memory H	-	R
40087	Tare read from the alibi memory L	-	R
40088	Decimals read from the alibi memory	-	R
40089	Unit of measure read from the alibi memory	-	R
40090	Type of data read from the alibi memory	-	R

WARNING: at the time of writing the setpoint values are saved to RAM (they will be lost upon the next power-off); to store them permanently to EEPROM so that they are maintained at power-on, the 99 command of the Command Register must be sent.

SPECIAL REGISTERS

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

INSTRUMENT STATUS REGISTER (40050)

0	Instrument in sleep condition *(weight* displaying*)*
1	Formulas displaying *(only for BATCHING programs)*
2	Batching constants displaying *(only for BATCHING programs)*
3	Consumption displaying *(only for BATCHING programs)*
4	System parameters displaying
5	Setting of formula number and cycles to batch *(only for BATCHING programs)*
6	Instrument in batching condition *(only for BATCHING programs)*
7	EMPtY alarm *(only for BATCHING programs)*
8	------ alarm *(not available for UNLOAD program)*
9	CONSP alarm *(only for BATCHING programs)*
10	tArEP alarm *(only for BATCHING programs)*
11	- LOAd alarm *(only for LOAD and 3/6/14 PRODUCTS programs)* - UnLOAd alarm *(only for UNLOAD program)*
12	- *LOAD/UNLOAD programs:* phase elapsing between the opening of the SET and the closing of the CYCLE END - *3-6-14 PRODUCTS programs:* phase elapsing between the opening of batched product contact and the next product or closing of the CYCLE END
13	Batching pause *(only for BATCHING programs)*
14	Cycle end *(only for BATCHING programs)*
15	UnLOAd alarm *(only for LOAD and 3/6/14 PRODUCTS programs)*
16	bLACH alarm *(only for BATCHING programs)*
17	MI nLEG alarm – quantity in formula lower than 20**e** *(only for BATCHING programs)*
18	FALL alarm *(only for BATCHING programs)*
19	ALI FUL alarm
20	unStbL alarm
21	------ alarm
22	nEG-0 alarm
23	MI nLEG alarm - batched weight lower than 20**e**
24	ProdPP alarm *(only for UNLOAD program)*
25	tOL alarm *(only for BATCHING programs)*
26	Instrument waits for the printing to complete
27	Operating menu displaying *(only for BATCHING programs)*
28	Setpoint class displaying (*only for BASE program)*
29	AUTOMATIC LOADING phase *(only for UNLOAD program*)
30	USb Er alarm *(only if OPZWUSBW option is present)*
31	StOCH alarm *(only for WDOS series instruments)*
32	StOCHM alarm *(only for WDOS series instruments)*
33	ErUEI G alarm *(only for BATCHING programs)*
34	MEMFUL alarm *(only if OPZWUSBW or OPZWDATIPC options are present)*
35	MEMOUr alarm *(only if OPZWUSBW or OPZWDATIPC options are present)*
36	Partial unloading at cycle end phase *(only for 3/6/14 PRODUCTS and OPZWSCARI programs)*

37	Waiting for confirmation by the operator to run the partial unloading at cycle end *(only for 3/6/14 PRODUCTS and OPZWSCARP programs)*
38	The operator is starting an automatic batching *(only for BATCHING programs)*
39	The operator is starting a manual batching *(only for BATCHING programs)*
40	SLAVE alarm *(only for BATCHING programs)*
41	Partial unloading at cycle end phase *(only for 3/6/14 PRODUCTS and OPZWSCARP programs)*

INPUTS AND OUTPUTS REGISTERS

INPUTS REGISTER (40017)
(reading only)

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	
Bit 8	
Bit 9	
Bit 10	
Bit 11	
Bit 12	
Bit 13	
Bit 14	
Bit 15	

OUTPUTS REGISTER (40018)
(reading only *)
** BASE program: reading and writing*

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	
Bit 8	
Bit 9	
Bit 10	
Bit 11	
Bit 12	
Bit 13	
Bit 14	
Bit 15	

Only for BASE program:

The output status can be read at any time but can be set (written) only if the output has been set as PLC (see **OUTPUTS AND INPUTS CONFIGURATION** section); otherwise, the outputs will be managed according to the current weight status with respect to the relevant setpoint.

DIVISIONS AND UNITS OF MEASURE REGISTER (40014)

This register contains the current setting of the scale verification division (parameter *E* or *E I* for multi-interval or multiple range instruments) and of the units of measure (parameter *Un iE*).

H Byte	L Byte
Unit of measure	Scale verification division

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

Least significant byte (L Byte)

Scale verification 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
0	Kilograms
1	Grams
2	Tons

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
98		**99**	Save data in EEPROM ▪ *Only for BASE program:* saving the setpoint in EEPROM into class set in the register 40038
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
110***	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
130^^^	Preset Tare enabling	**131**	Reserved
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
200		**201**	Batching: START
202	Batching: PAUSE	**203**	Batching: RESUMES from PAUSE
204	Batching: STOP	**205^^**	Batching: accepts alarm and stop
206^^	Batching: ignores the alarm tArEP *(not available for UNLOAD program)*	**207^^**	Batching: ignores the alarm tOL
208	Interruption of the AUTOMATIC LOADING *(only for UNLOAD program)*	**209**	Batching: continues when the message CONAnd appears or if STATUS REGISTER=12 (only if CONAnd=YES)
250	Confirmation of batching data reading	**251**	
2000^	See note		

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

****)** The instrument features Exchange Registers, which must be used together with the Command Register in order to access these values. These are the procedures to follow:
- READING: send the desired datum reading command (e.g.: 132 for "PTARE1 reading") to the Command Register and read the content of 40051 and 40052 Exchange Registers.
- WRITING: write the value that you want to set in 40051 and 40052 Exchange Registers and send the desired datum writing command (e.g.: 135 for "PTARE2 writing") to the Command Register.

*****)** Only for WTAB-L/R.

******)** Only for BASE program.

^) For commands from 2000 to 2999 refer to **CONSTANTS AND FORMULAS READING AND WRITING** section.

^^) In case of alarm signals during the batching, send the command 205 to accept the alarm and stop the batching; in the particular case of tOL alarm, it is possible to ignore the alarm and continue the batching by sending the command 207; for the tArEP alarm it is possible to ignore the alarm and continue the batching by sending the command 206.

^^^) Weighbridge instruments only: command not available if net functions are disabled (see **NET FUNCTIONS** section in instrument manual).

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via Modbus, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):
- write your identification code (user password) in the "Identification code/Password" register;
- send the command 120 to the Command Register;
- read the password seed in the "Password seed" register;
- enter the password read in the password table in the "Identification code/Password" register;
- send the command 121 to the Command Register;
- if the operation is successfully completed the "Password seed" register is set to zero;
- it is now possible to perform calibration operations (see **REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)** section);

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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).

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).

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the “Alibi memory identification number” register (40082 - 40083) increases and the stored values can be read in the 40084 ÷ 40090 registers; see the next section for more information about these registers. If printing is enabled, the stored weight value will be printed.
The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the “Alibi memory overwrite” bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To recall a stored value from the alibi memory:
- write the identification number of the value to recall in the “Alibi memory identification number” register;
- send the command 111 to the Command Register;
- read the data from the 40084 ÷ 40090 registers:
  - “Weight read from the alibi memory” register (40084 - 40085): gross weight or net weight (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross);

- "Tare read from the alibi memory" register (40086 - 40087): when the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight;
- "Decimals read from the alibi memory" register (40088): number of decimals to apply to weight values;
- "Unit of measure read from the alibi memory" register (40089): unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend);
- see the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** (40090) for a description of the same-named register; use this register to check if the weight reading refers to a net weight and if the tare reading is a preset tare;

- if the requested value does not exist, all the registers from 40084 to 40090 will be set to zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER (40090)

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

ONLY FOR BASE PROGRAM

SETPOINT PROGRAMMING

Warning: if the E/EC option is not present, the new values of the setpoint are active immediately; but if the E/EC option is present, the new values of the setpoint are active only if the class to be programmed coincides with the class currently in use.

- Write the number of class to be programmed in the register 40038 (only for instruments provided with E/EC option);
- Write the setpoint values to be programmed in the registers 40019 – 40028;

SETPOINT READING

- Write the number of class to be read in the register 40038 (only for instruments provided with E/EC option);
- Read the setpoint values in the registers 40019 – 40028.

CONSTANTS AND FORMULAS READING AND WRITING

Legend:

CMD R: reading command.
CMD W: writing command.
H: high half of the DOUBLE WORD containing the number.
L: low half of the DOUBLE WORD containing the number.

For the exchange of values by using the following commands, use the Exchange Registers from **40051** to **40060** together with the Command Register.
To perform a read command you need to set the values highlighted in **bold**.

Example: command 2002
- In the **40053** register set the formula number (**No. Formula**) for which you want to read the total set;
- Send the command **2002** to the Command Register (**40006**);
- Read continuously **40060** register until you find the command echo (in this case 2002) which indicates "data ready" or 0xFFFF indicates that "error in the command";
- Read the values present in **40051…40060** registers and use them according to the following table.

VARIABLE		CMD R	CMD W	REGISTER	DESCRIPTION
FORMULAS PROGRAMMING	*for 3/6/14 PRODUCTS program*	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	**Product No.**
				40054	**Step No.**
				40055	**Formula No.**
	for LOAD and UNLOAD programs	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	**1 = Set** **2 = Preset**
				40054	**1 = Set** **2 = Preset**
				40055	**Formula No.**

TOTAL SET BY FORMULA	*OPZWQMC option: for 3/6/14 PRODUCTS and LOAD programs* *OPZFORPERC option: for 3/6/14 PRODUCTS program*	2002	2003	40051	Quantity H
				40052	Quantity L
				40053	**Formula No.**
TOTALS MANAGEMENT	*for W200, W200BOX, WDESK-L\R, WINOX-L\R only for 3/6/14 PRODUCTS program*	2020		40051	Quantity H
				40052	Quantity L
				40053	**Product No.**
				40054	**1 = Consumption**
	for W200, W200BOX, WDESK-L\R, WINOX-L\R only for LOAD and UNLOAD programs	2020		40051	Quantity H
				40052	Quantity L
				40053	**Formula No.**
				40054	**1 = Consumption**
	for WDOS (Consumption & Stocks)	2020	2021*	40051	Quantity H
				40052	Quantity L
				40053	**Product No.**
				40054	**1 = Consumption** **4 = Total Stocks** **5 = Add Stocks** **6 = Subtract Stocks** **7 = Minimum Stocks**
	for WDOS (Production)	2020		40051	Quantity H
				40052	Quantity L
				40053	**Formula No.**
				40054	**2 = Production (Quantity)** **3 = Production (Cycles No.)**
TOTALS DELETION DATE & TIME		2022		40051	Day
				40052	Month
				40053	Year
				40054	Hours
				40055	Minutes
				40056	Seconds
				40057	**1 = Consumption** **2 = Production** *(only for WDOS)*

FORMULA No. AND CYCLES No.TO RUN	2030	2031	40051	Formula No.
			40052	Cycles H
			40053	Cycles L
CURRENT CYCLE	2032		40051	Cycle H
			40052	Cycle L
			40053	Step H
			40054	Step L
			40055	Product H
			40056	Product L
			40057	Set H
			40058	Set L
BATCHING DATA READING	2100		*See examples in the related section*	

***) WARNING:**
- **40054** = 4 (total stocks): the value sent is substituted for the currently total stocks.
- **40054** = 5 (added stocks): the value sent is added to the currently total stocks.
- **40054** = 6 (subtract stocks): the value sent is subtracted to the currently total stocks.

FORMULAS WRITING

For 3/6/14 PRODUCTS program
- Write in **40051** and **40052** registers the quantity to be batched.
- Write in the **40053** register the product number.
- Write in the **40054** register the step number (only if FSTEP = YES) otherwise 1.
- Write in the **40055** register the formula number.

For LOAD and UNLOAD program
- Write in **40051** and **40052** registers the quantity to be batched.
- Write in the **40053** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **40054** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **40055** register the formula number.

Send the command **2001** to the COMMAND REGISTER (40006);

FORMULAS READING

For 3/6/14 PRODUCTS program

- Write in the **40053** register the product number.
- Write in the **40054** register the step number (only if FSTEP = YES) otherwise 1.
- Write in the **40055** register the formula number.

For LOAD and UNLOAD program

- Write in the **40053** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **40054** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **40055** register the formula number.

Send the command **2000** to the COMMAND REGISTER (40006);
Read continuously the **40060** register until it is different from 2000 (command echo) or 0xFFFF (command error).
After reading the command echo, read **40051** and **40052** registers to obtain the quantity defined in the formula.

BATCHING START AND STOP

To start the batching:

- Write in **40051…40053** register the formula and cycles number to be executed; send the command **2031** to the COMMAND REGISTER to set this values;
- Send the command **201** to the COMMAND REGISTER to start the batching.

To stop the batching:

- Send the command **204** to the COMMAND REGISTER.

BATCHING DATA READING

At the end of the batching, the instrument makes the data available; to verify that they are ready, send the command **1114** to the COMMAND REGISTER, read the **40051** register to verify that it is 1 (1 = data ready to be read);

WARNING: unlike other commands, this is the only command that doesn't use a different system to provide the execution echo. In this case, wait for the bit 7 of the **40060** register to be equal to 1.

Send one of the following queries to the COMMAND REGISTER and read the corresponding values in the exchange registers (**40051-40060**):

Query: BATCHING STEP

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
	2100		**STEP No.**									

Note: for LOAD and UNLOAD programs STEP NO. = 1

Response:

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
			REAL BATCHED H	REAL BATCHED L	THEORIC. BATCHED H	THEORIC. BATCHED L	ALARM H	ALARM L	ALIBI ID H	ALIBI ID L	PRODUCT NUMBER	Value detail

Note: "Negative value" bit of the "Value detail" refers only to double word REAL BATCHED.

Query: INITIAL TARE

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
	2100		**1005**									

Response:

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
			VALUE H	VALUE L			ALARM H	ALARM L				Value detail

Query: FINAL GROSS WEIGHT *(for 3/6/14 PRODUCTS program)*

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
	2100		**1003**									

Response:

VARIABLE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
			VALUE H	VALUE L			ALARM H	ALARM L	ALIBI ID H	ALIBI ID L		Value detail

After the reading of batching data, report it has been read by sending the command **250** to the COMMAND REGISTER. In this case the instrument accepts the alarm **SLAVE** and continues the sequence of batching.

Content of the register Detail value:

Bit 0	Negative value	**Bit 1**	
Bit 2		**Bit 3**	
Bit 4		**Bit 5**	
Bit 6		**Bit 7**	Data ready

BATCHING DATA ALARMS (40055; 40056)

An alarm take up one byte, if more than one alarm is present, up to four bytes will be sent in chronological order; up to 4 byte (up to 4 alarms).

0	no alarm
1	general alarm
2	EMPtY
3	MASFOr
4	tArEP *(not available for UNLOAD program)*
5	CMnSP
6	bLACH
7	tOL
8	- LOAd *(for LOAD and 3/6/14 PRODUCTS programs)* - UnLOAd *(for UNLOAD program)*
9	UnLOAd *(only for LOAD and 3/6/14 PRODUCTS programs)*
10	
11	
12	Batching STOP
13	ErUEI G
14	FALL
15	SLAvE
16	MI nLEG - batched weight lower than 20**e**
17	ALI FUL
18	------
19	unStbL
20	nEG-0
21	MI nLEG - quantity in formula lower than 20**e**
22	ProdPP *(only for UNLOAD program)*
23	LOAd: *AUTOMATIC LOADING function (only for UNLOAD program)*
24	Er tOt *(OPZWQMC option)*
25	StOCH *(only for WDOS series instruments)*
26	StOCHM (*only for WDOS series instruments)*
27	USb Er *(only for OPZWUSBW_ option)*
28	MEMFUL *(only for OPZWUSBW_ and OPZWDATIPC options)*
29	MEMOur *(only for OPZWUSBW_ and OPZWDATIPC options)*

COMMUNICATION EXAMPLES

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

EXAMPLE 1
Command for multiple writing of registers (command 16, h10 hexadecimal):
Assuming that we wish to write the value 0 to the register 40019 and the value 2000 to the register 40020, the string to generate must be:

h01 h10 h00 h12 h00 h02 h04 h00 h00 h07 hD0 h70 hD6

The instrument will respond with the string:

h01 h10 h00 h12 h00 h02 hE1 hCD

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	**h12**	Address of the first register L	**h12**
Number of registers H	**h00**	Number of registers H	**h00**
Number of registers L	**h02**	Number of registers L	**h02**
Byte count	**h04**	CRC16 L	**hE1**
Datum 1 H	**h00**	CRC16 H	**hCD**
Datum 1 L	**h00**		
Datum 2 H	**h07**		
Datum 2 L	**hD0**		
CRC16 L	**h70**		
CRC16 H	**hD6**		

EXAMPLE 2
Command for multiple writing of registers (command 16, h10 hexadecimal):
Assuming that we wish to write two setpoint values on the instrument, at 2000 (setpoint 1: 40019-40020) and 3000 (setpoint 2: 40021-40022) respectively, the string must be sent:

h01 h10 h00 h12 h00 h04 h08 h00 h00 h07 hD0 h00 h00 h0B hB8 h49 h65

The instrument will respond with the string:

h01 h10 h00 h12 h00 h04 h61 hCF

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	**h12**	Address of the first register L	**h12**
Number of registers H	**h00**	Number of registers H	**h00**
Number of registers L	**h04**	Number of registers L	**h04**
Byte count	**h08**	CRC16 L	**h61**
Datum 1 H	**h00**	CRC16 H	**hCF**
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 L	**h49**		
CRC16 H	**h65**		

EXAMPLE 3
Multiple commands reading for registers (command 3, h03 hexadecimal):
Assuming that we wish to read the gross weight value (in the example 4000) and net weight value (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:

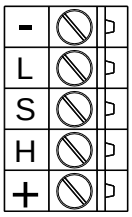
h01 h03 h00 h07 h00 h00 h0F hA0 h00 h00 h0B hB8 h37 h11

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	**h00**
Address of the first register L	**h07**	Address of the first register L	**h07**
Number of registers H	**h00**	Datum 1 H	**h00**
Number of registers L	**h04**	Datum 1 L	**h00**
CRC16 L	**hF5**	Datum 2 H	**h0F**
CRC16 H	**hC8**	Datum 2 L	**hA0**
		Datum 3 H	**h00**
		Datum 3 L	**h00**
		Datum 4 H	**h0B**
		Datum 4 L	**hB8**
		CRC16 L	**h37**
		CRC16 H	**h11**

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

CANOPEN

TECHNICAL SPECIFICATIONS AND CONNECTIONS



CAN -
CAN L
CAN SHIELD
CAN H
CAN +

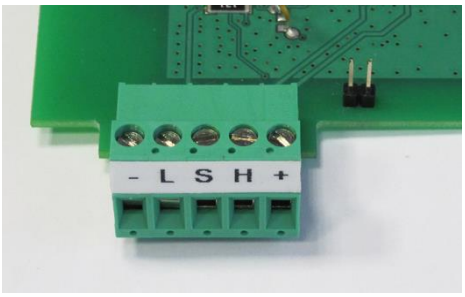
For instruments:
W200/W200BOX, WDOS, WDESK-P, WDESK-X, WINOX-P, WINOX-X

D-SUB 9P FEMALE
2 = **CAN L**
3 = **CAN –**
5 = **CAN SHIELD**
7 = **CAN H**

For instruments:
WDESK-D
WINOX-D
WTAB

TERMINAL
2 = **CAN SHIELD**
3 = **CAN L**
4 = **CAN –**
5 = **CAN H**

For instruments:
WDESK-Q
WINOX-Q



terminal and jumper for
W200/W200BOX and WDOS instruments

terminal and jumper for
WDESK-P/X and WINOX-P/X instruments

It is necessary to activate the termination resistance on the two devices located at the ends of the network, closing the jumper shown in the photo. For WDESK-D/Q, WINOX-D/Q and WTAB instruments: connect a 120 ohm terminating resistor between CAN H and CAN L signals.
The instrument features a CANopen port that allows to exchange the weight and the main parameters with a CANopen *master*.

INSTRUMENT SETUP

ENTER + ESC → CAnOPn

- Addr (from 1 to 99; default: 1): set the instrument address in the CANopen network
- bAUd (10, 20, 25, 50, 100, 125, 250, 500, 800, 1000 kb/s; default: 10 kb/s): set the instrument baud rate in the CANopen network
- SWAP (default: nO): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - YES: BIG ENDIAN
  - nO: LITTLE ENDIAN

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

The instrument works as *slave* in a synchronous CANopen network (activate the SYNC object on the network master).
Load the eds file attached to the instrument to the CANopen *master* development system.
When configuring CANopen Guard Time and Lifetime Factor, set values 100 ms and 4.
The data exchanged by the instrument are:

Output Data from instrument (Reading)	Index	Sub-Index	Data type	Addresses
Gross Weight [4 byte]	4100	01	UNSIGNED32	0x0000-0x0003
Net Weight [4byte]	4100	02	UNSIGNED32	0x0004-0x0007
Exchange Register [4 byte]	4101	01	UNSIGNED32	0x0008-0x000B
Status Register [2 byte]	4101	02	UNSIGNED16	0x000C-0x000D
Digital Inputs status [1 byte]	4101	03	UNSIGNED8	0x000E
Digital Outputs status [1 byte]	4101	04	UNSIGNED8	0x000F

Input Data to instrument (Writing)	Index	Sub-Index	Data type	Addresses
Command Register [2 byte]	4000	01	UNSIGNED16	0x0000-0x0001
Digital Outputs Command [2 byte]	4000	02	UNSIGNED16	0x0002-0x0003
Exchange Register [4 byte]	4000	03	UNSIGNED32	0x0004-0x0007

GROSS WEIGHT, NET WEIGHT: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.

DIGITAL INPUTS STATUS

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit = 1: high input; Bit = 0: low input

DIGITAL OUTPUTS STATUS

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see **OUTPUTS AND INPUTS CONFIGURATION** section):

Bit 0	OUTPUT 1 status	**Bit 8**	
Bit 1	OUTPUT 2 status	**Bit 9**	
Bit 2	OUTPUT 3 status	**Bit 10**	
Bit 3	OUTPUT 4 status	**Bit 11**	
Bit 4	OUTPUT 5 status	**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	Force outputs

Bit = 1: output is closed; Bit = 0: output is open

Setting bit 15 to 1 on the PLC, the master takes control of all the outputs, whatever their setting.

STATUS REGISTER

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

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
80**	Alibi memory identification number reading	**81****	Alibi memory identification number writing
82**	Weight reading from alibi memory	**83****	Tare reading from alibi memory
84**	Decimals reading from alibi memory	**85****	Unit of measure reading from alibi memory
86**	Alibi memory status reading	**87****	Preset Tare reading
88**	Preset Tare writing	**89**	
90**	Setpoint 1 reading	**91****	Setpoint 2 reading
92**	Setpoint 3 reading	**93****	Setpoint 1 writing
94**	Setpoint 2 writing	**95****	Setpoint 3 writing
98		**99**	Save data in EEPROM
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
102**	Sample Weight reading	**103****	Sample Weight writing
110****	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
122**	Password seed reading	**123****	Identification code/Password reading
124*	Identification code/Password writing	**125**	
130	Preset Tare enabling	**131**	
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
150**	Setpoint 4 reading	**151****	Setpoint 5 reading
160**	Setpoint 4 writing	**161****	Setpoint 5 writing

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

**) The instrument features two Exchange Registers (one for reading and one for writing), which must be used together with the Command Register in order to access these values. These are the procedures to follow:
- READING: send the desired datum reading command (e.g.: 90 for "Setpoint 1 reading") to the Command Register and read the content of the Exchange Register.
- WRITING: write the value that you want to set in the Exchange Register and send the desired datum writing command (e.g.: 93 for "Setpoint 1 writing") to the Command Register.

***) Only for WTAB-L/R.

****) Only for BASE program.

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

SETPOINT READING/WRITING: the setpoint are weight values expressed as positive integer numbers, include decimal figures but without decimal point.
- READING: send to the Command Register the reading command of the required setpoint and read the content of the Exchange Register.
- WRITING: write the value to be set in the Exchange Register and send to the Command Register the writing command in the required setpoint.

Setpoint are stored to RAM and lost upon instrument power off; to save them in EEPROM, so that they are maintained upon instrument power on, it is necessary to send the command 99 “Save data in EEPROM” of the Command Register.

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via protocol, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):
- write your identification code (user password) in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 120 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content;
- write the password read from the password table in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 121 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content, if the datum read is zero the operation is successfully completed;
- access to legally relevant parameters is disabled at instrument power off.

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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, write its value into the Exchange Register and send the command 103 “Sample Weight writing” to the Command Register;
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the command 102 “Sample Weight reading” returns a value equal to zero.

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the “Alibi memory identification number” register increases and the stored values can be read; see the next section for more information about these registers. If printing is enabled, the stored weight value will be printed.

The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the “Alibi memory overwrite” bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To know the identification number of the last value stored:

- send command 80 “Alibi memory identification number reading”;
- read the Exchange Register content.

To recall a stored value from the alibi memory:

- write the identification number of the value to recall in the Exchange Register and send command 81 “Alibi memory identification number writing” to Command Register;
- send the command 111 to the Command Register;
- send command 82 “Weight reading from alibi memory” and read the Exchange Register content, (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross);
- send command 83 “Tare reading from alibi memory” and read the Exchange Register content: if the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight;
- send command 84 “Decimals reading from alibi memory” and read the Exchange Register content: it indicates the number of decimals to apply to weight values;
- send command 85 “Unit of measure reading from alibi memory” and read the Exchange Register content: it represents the unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend);
- send command 86 “Alibi memory status reading” and read the Exchange Register content: it indicates if the weight reading refers to a net weight and if the tare reading is a preset tare (see the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER**).

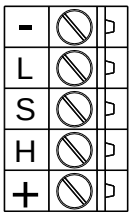
If the requested value does not exist, all the values read with the previous commands are zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

DEVICENET

TECHNICAL SPECIFICATIONS AND CONNECTIONS



CAN -
CAN L
CAN SHIELD
CAN H
CAN +

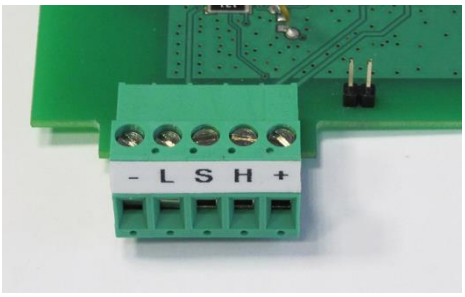
D-SUB 9P FEMALE
2 = **CAN L**
3 = **CAN –**
5 = **CAN SHIELD**
7 = **CAN H**
9 = **CAN +**

TERMINAL
2 = **CAN SHIELD**
3 = **CAN L**
4 = **CAN –**
5 = **CAN H**
6 = **CAN +**

For instruments:
W200/W200BOX, WDOS, WDESK-P, WDESK-X, WINOX-P, WINOX-X

For instruments:
WDESK-D
WINOX-D
WTAB

For instruments:
WDESK-Q
WINOX-Q



terminal and jumper for
W200/W200BOX and WDOS instruments

terminal and jumper for
WDESK-P/X and WINOX-P/X instruments

It is necessary to activate the termination resistance on the two devices located at the ends of the network, closing the jumper shown in the photo. For WDESK-D/Q, WINOX-D/Q and WTAB instruments: connect a 120 ohm terminating resistor between CAN H and CAN L signals.
The instrument features a DeviceNet port that allows to exchange the weight and the main parameters with a DeviceNet *master*.

INSTRUMENT SETUP

ENTER + ESC → dEUnEt

- Addr (from 1 to 63; default: 1): set the instrument address in the DeviceNet network
- bAUd (125, 250, 500 kb/s; default: 125 kb/s): set the instrument baud rate in the DeviceNet network
- SWAP (default: nO): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - YES: BIG ENDIAN
  - nO: LITTLE ENDIAN

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

PC/PLC SETUP

The instrument works as *slave* in a DeviceNet network.
Load the eds file attached to the instrument to the DeviceNet *master* development system.
The data exchanged by the instrument are:

Output Data from instrument (Reading)	Addresses
Gross Weight [4 byte]	0x0000-0x0003
Net Weight [4byte]	0x0004-0x0007
Exchange Register [4 byte]	0x0008-0x000B
Status Register [2 byte]	0x000C-0x000D
Digital Inputs status [1 byte]	0x000E
Digital Outputs status [1 byte]	0x000F

Input Data to instrument (Writing)	Addresses
Command Register [2 byte]	0x0000-0x0001
Digital Outputs Command [2 byte]	0x0002-0x0003
Exchange Register [4 byte]	0x0004-0x0007

GROSS WEIGHT, NET WEIGHT: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.

DIGITAL INPUTS STATUS

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit = 1: high input; Bit = 0: low input

DIGITAL OUTPUTS STATUS

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see **OUTPUTS AND INPUTS CONFIGURATION** section):

Bit 0	OUTPUT 1 status	**Bit 8**	
Bit 1	OUTPUT 2 status	**Bit 9**	
Bit 2	OUTPUT 3 status	**Bit 10**	
Bit 3	OUTPUT 4 status	**Bit 11**	
Bit 4	OUTPUT 5 status	**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	Force outputs

Bit = 1: output is closed; Bit = 0: output is open

Setting bit 15 to 1 on the PLC, the master takes control of all the outputs, whatever their setting.

STATUS REGISTER

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

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
80**	Alibi memory identification number reading	**81****	Alibi memory identification number writing
82**	Weight reading from alibi memory	**83****	Tare reading from alibi memory
84**	Decimals reading from alibi memory	**85****	Unit of measure reading from alibi memory
86**	Alibi memory status reading	**87****	Preset Tare reading
88**	Preset Tare writing	**89**	
90**	Setpoint 1 reading	**91****	Setpoint 2 reading
92**	Setpoint 3 reading	**93****	Setpoint 1 writing
94**	Setpoint 2 writing	**95****	Setpoint 3 writing
98		**99**	Save data in EEPROM
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
102**	Sample Weight reading	**103****	Sample Weight writing
110****	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
122**	Password seed reading	**123****	Identification code/Password reading
124*	Identification code/Password writing	**125**	
130	Preset Tare enabling	**131**	
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
150**	Setpoint 4 reading	**151****	Setpoint 5 reading
160**	Setpoint 4 writing	**161****	Setpoint 5 writing

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

) The instrument features two Exchange Registers (one for reading and one for writing), which must be used together with the Command Register in order to access these values. These are the procedures to follow:
- READING: send the desired datum reading command (e.g.: 90 for "Setpoint 1 reading") to the Command Register and read the content of the Exchange Register.
- WRITING: write the value that you want to set in the Exchange Register and send the desired datum writing command (e.g.: 93 for "Setpoint 1 writing") to the Command Register.

***)** Only for WTAB-L/R.

****)** Only for BASE program.

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

SETPOINT READING/WRITING: the setpoint are weight values expressed as positive integer numbers, include decimal figures but without decimal point.
- READING: send to the Command Register the reading command of the required setpoint and read the content of the Exchange Register.
- WRITING: write the value to be set in the Exchange Register and send to the Command Register the writing command in the required setpoint.

Setpoint are stored to RAM and lost upon instrument power off; to save them in EEPROM, so that they are maintained upon instrument power on, it is necessary to send the command 99 “Save data in EEPROM” of the Command Register.

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via protocol, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):
- write your identification code (user password) in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 120 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content;
- write the password read from the password table in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 121 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content, if the datum read is zero the operation is successfully completed;
- access to legally relevant parameters is disabled at instrument power off.

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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, write its value into the Exchange Register and send the command 103 “Sample Weight writing” to the Command Register;
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the command 102 “Sample Weight reading” returns a value equal to zero.

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the “Alibi memory identification number” register increases and the stored values can be read; see the next section for more information about these registers. If printing is enabled, the stored weight value will be printed.
The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the “Alibi memory overwrite” bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To know the identification number of the last value stored:

- send command 80 “Alibi memory identification number reading”;
- read the Exchange Register content.

To recall a stored value from the alibi memory:

- write the identification number of the value to recall in the Exchange Register and send command 81 “Alibi memory identification number writing” to Command Register;
- send the command 111 to the Command Register;
- send command 82 “Weight reading from alibi memory” and read the Exchange Register content, (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross);
- send command 83 “Tare reading from alibi memory” and read the Exchange Register content: if the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight;
- send command 84 “Decimals reading from alibi memory” and read the Exchange Register content: it indicates the number of decimals to apply to weight values;
- send command 85 “Unit of measure reading from alibi memory” and read the Exchange Register content: it represents the unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend);
- send command 86 “Alibi memory status reading” and read the Exchange Register content: it indicates if the weight reading refers to a net weight and if the tare reading is a preset tare (see the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER**).

If the requested value does not exist, all the values read with the previous commands are zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

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
- MOdE: select communication protocol.
  - 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.
    - MOdU60
    - MOd td
  - CONtI n: continuous weight transmission protocol, at the frequency set in HErt2 item (from 10 to 200).
    - MOd t
    - MOd td
  - rI P: 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.
  - HdrI P: continuous weight transmission protocol to RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings.
  - HdrI Pn: continuous weight transmission protocol to RIP675, RIP6125C series remote displays, 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.

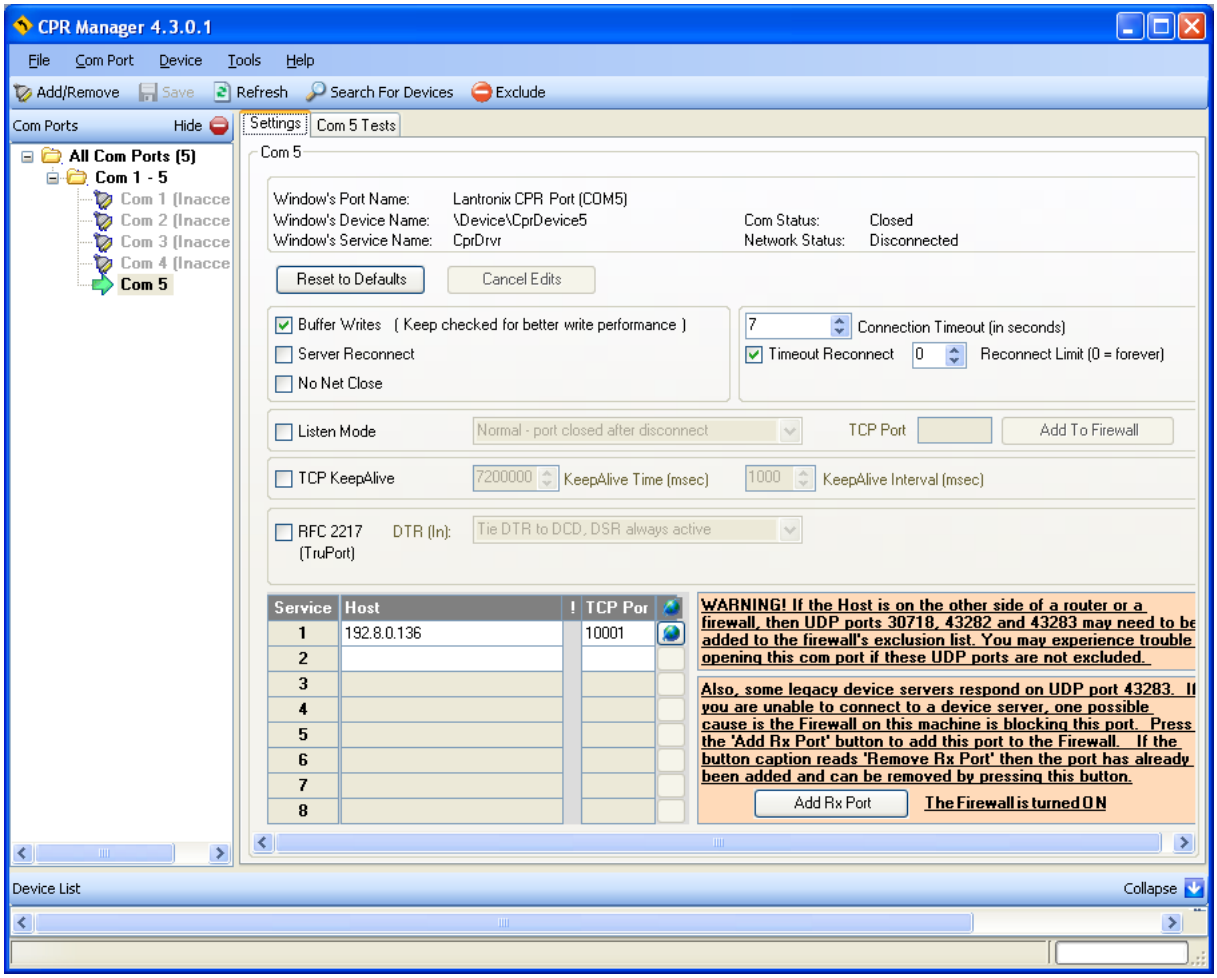
- UEbSru: see **WEBSITE** section.

  - Addr: instrument address (from 1 to 99; default: 1).
  - HErtZ: maximum transmission frequency (10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200; default: 10); to be set when the CONtI n transmission protocol is selected.
  - dELAY: delay in milliseconds which elapses before the instrument replies (from 0 to 200 ms; default: 0).

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

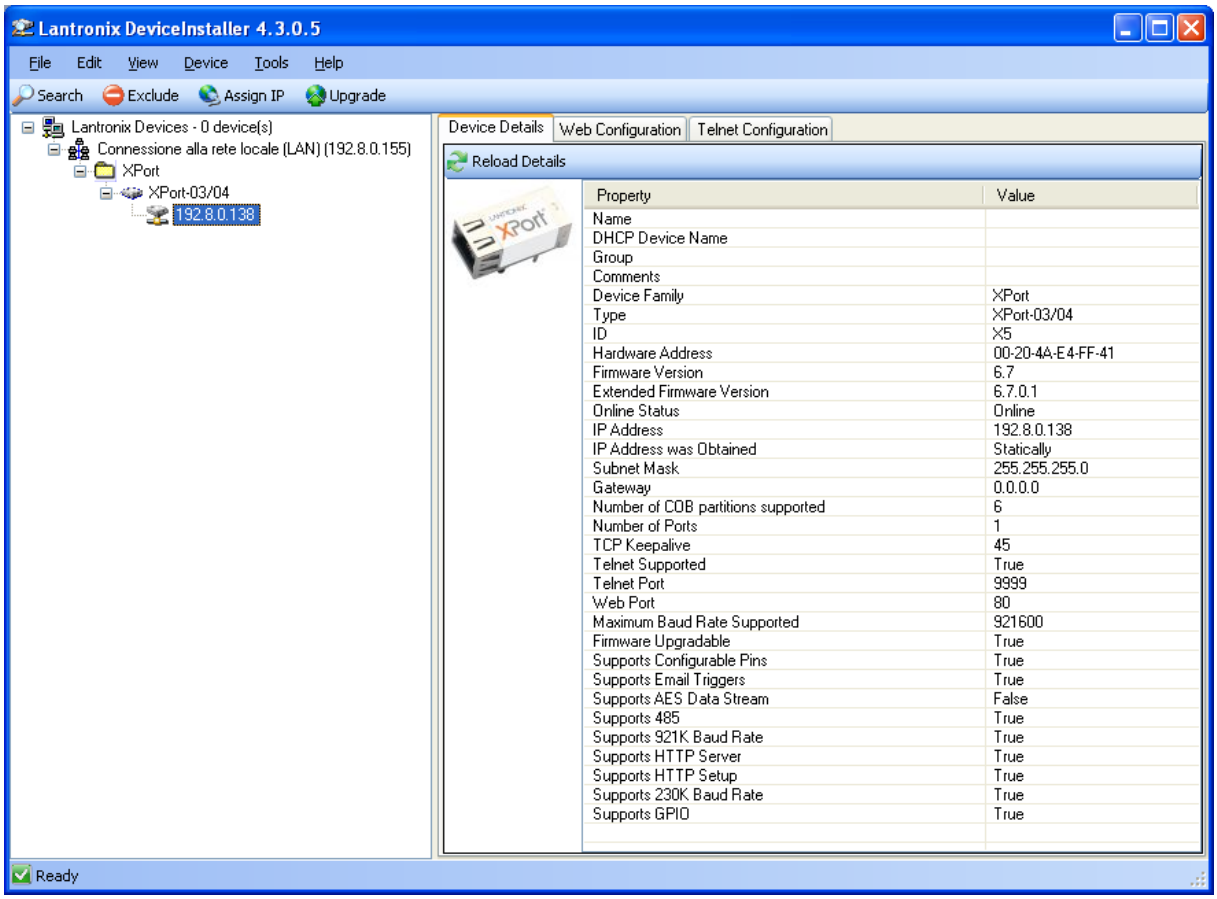
PC SETUP

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.

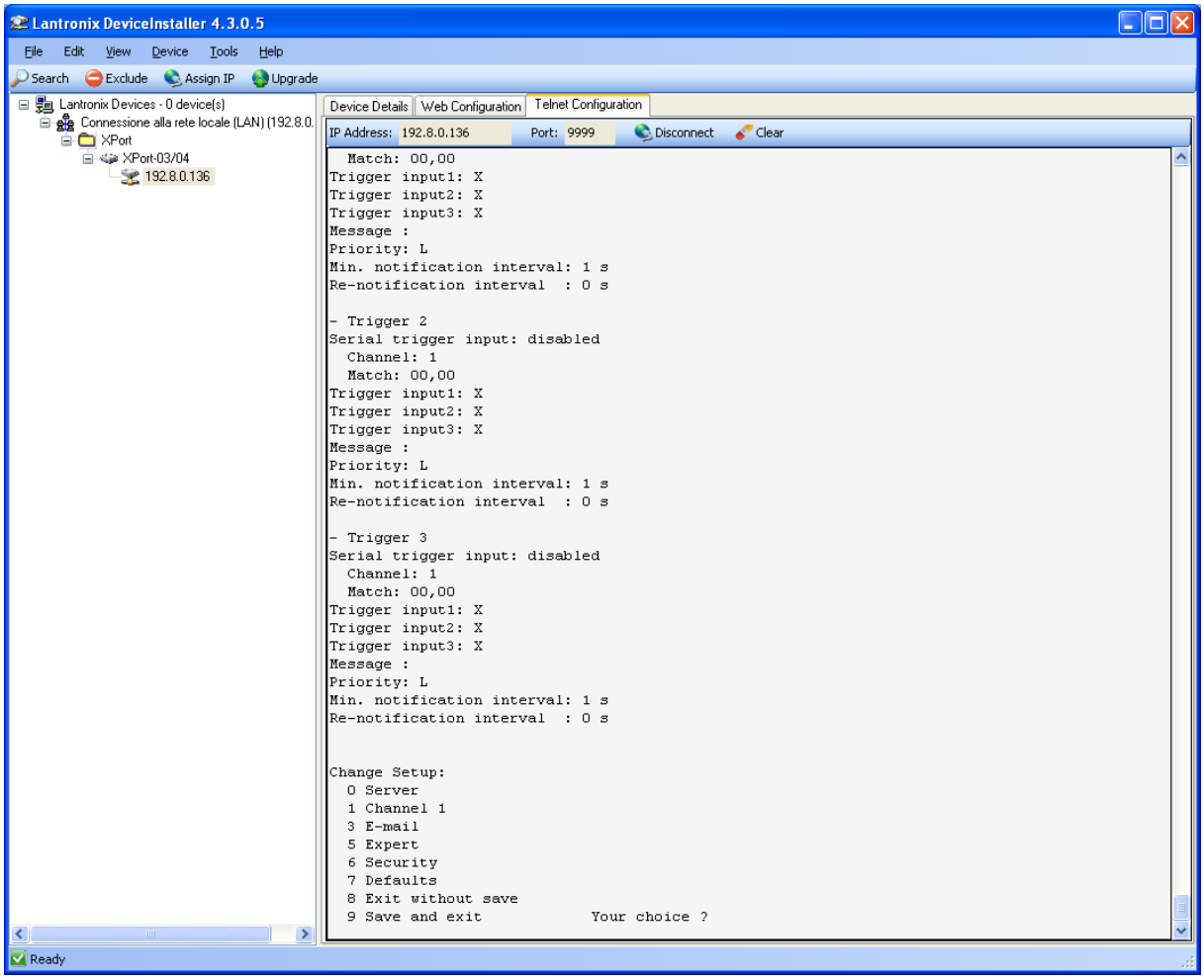


Use the just created virtual COM port to communicate with the instrument, using the protocol selected on it.
Alternatively connect to the instrument using a socket (e.g.: Winsock) on port 10001.

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:

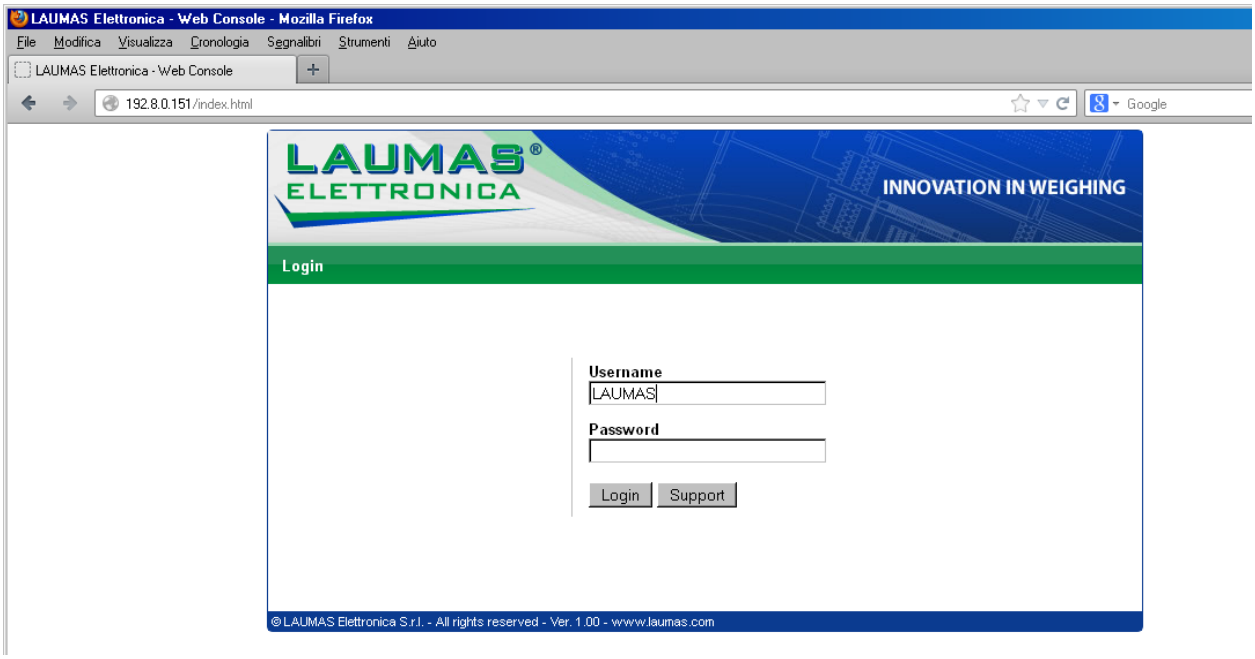


Select the found device and click on Telnet Configuration tab; click on Connect, and then press Enter on keyboard.

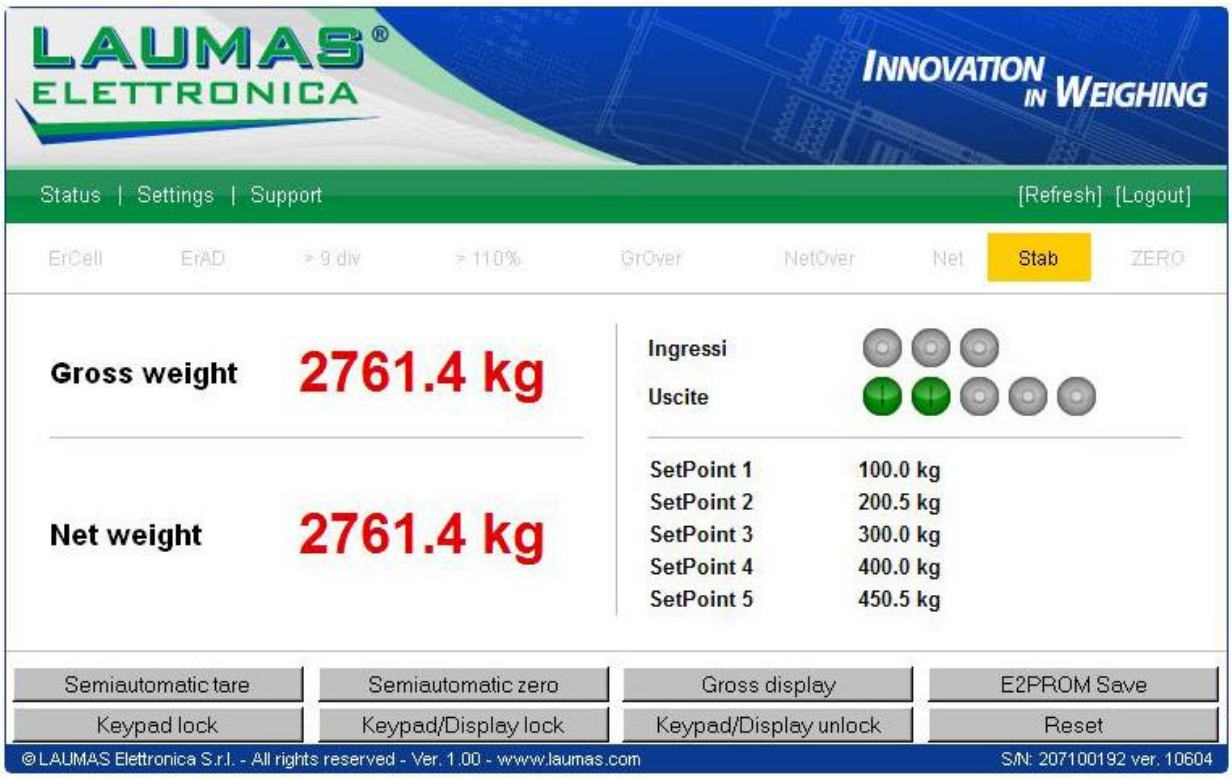


Press 0 to change server settings: change only the 4 fields of IP address and confirm the other parameters by pressing Enter. Set a static IP address.

Set *UEb5ru* operation mode (into *EtHnEt* menu on the instrument) 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:



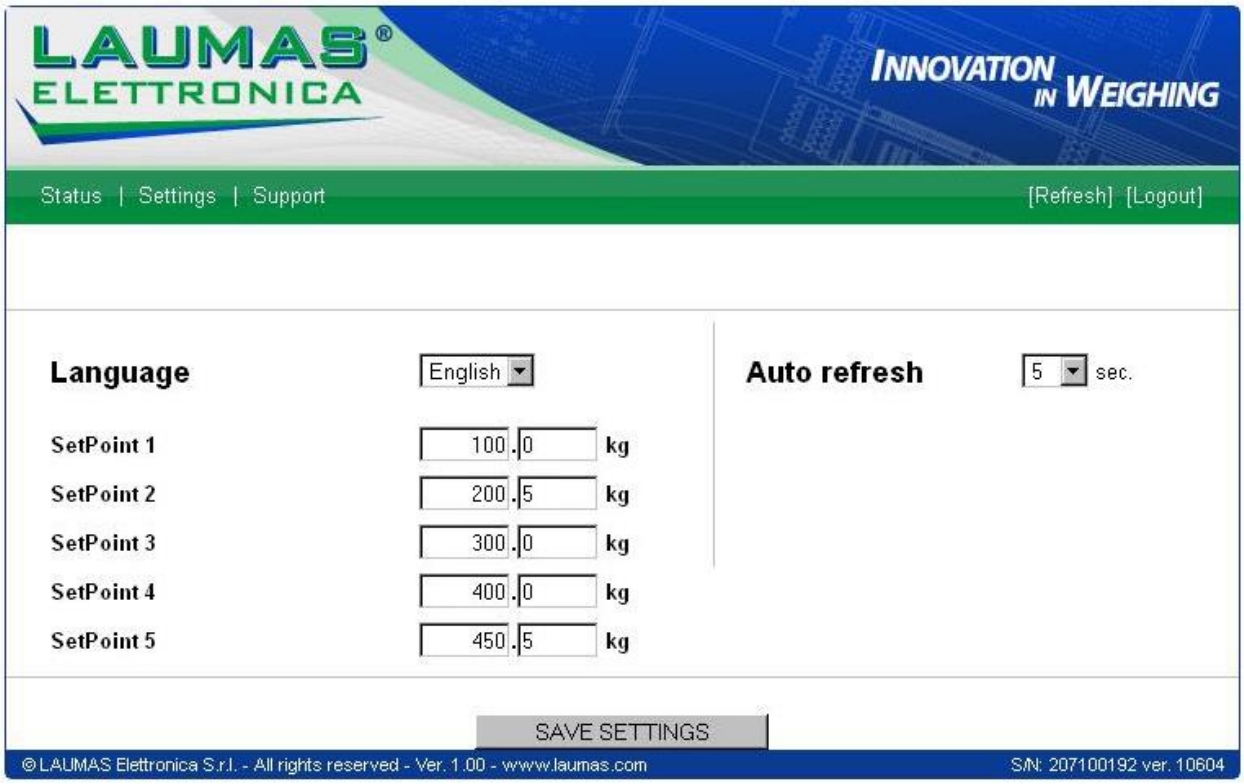
In case of incorrect parameter setting, the "INSTRUMENT DATA READING ERROR" message is displayed.

The instrument status page shows the gross and net weight read, 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 outputs are set in PLC mode, click on related icons to do a remote status check.

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.

ETHERNET/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/IP port that allows to exchange the weight and the main parameters with an Ethernet/IP *scanner*.

INSTRUMENT SETUP

ENTER + ESC → EtHnEt

- SWAP (default: nO): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - YES: BIG ENDIAN
  - nO: LITTLE ENDIAN
- 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

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

The instrument works as *adapter* in an Ethernet/IP network.
Refer to one of the following procedures to configure the communication with the instrument:
- load the eds file attached to the instrument to the Ethernet/IP *scanner* development system;
- using a generic Ethernet/IP module, open a class 1 I/O connection with the following settings:

Settings for class 1 communication		
Assembly	**Assembly Instance**	**Size (16-bit)**
Input	101	10
Output	102	5
Configuration	128	0

- If explicit messages are used and PLC supports class 3 connections (with appropriate interface), insert the data shown on table “Settings for class 1 communication”.
- If explicit messages are used and PLC needs data read/write messages to be constructed manually, see table “Manual settings for communication”. The arrays dimensions of exchanged data are the same as those reported on table “Settings for class 1 communication” (see “size” column, Assembly “Input” and “Output” rows).

Manual settings for communication		
Field	**Read**	**Write**
Service	0x0E	0x10
Class	0x04	0x04
Instance	0x65	0x66
Attribute	0x03	0x03
Data	NO	Byte array to be written

The data exchanged by the instrument are:

Output Data from instrument (Reading)	Addresses – input assembly
Internal Status [2 byte]	0x0000-0x0001
Gross Weight [4 byte]	0x0002-0x0005
Net Weight [4 byte]	0x0006-0x0009
Exchange Register [4 byte]	0x000A-0x000D
Status Register [2 byte]	0x000E-0x000F
Digital Inputs status [2 byte]	0x0010-0x0011
Digital Outputs status [2 byte]	0x0012-0x0013

Input Data to instrument (Writing)	Addresses – output assembly
Write Enable [2 byte]	0x0000-0x0001
Command Register [2 byte]	0x0002-0x0003
Digital Outputs Command [2 byte]	0x0004-0x0005
Exchange Register [4 byte]	0x0006-0x0009

INTERNAL STATUS: if different from zero it indicates an internal error, so data from instrument are not reliable; if equal to zero, it indicates that the instrument works properly and data are reliable.

GROSS WEIGHT, NET WEIGHT: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.

WRITE ENABLE: write 0x0000 in this register to disable data writing on the instrument; write 0xFFFF to enable it.

DIGITAL INPUTS STATUS

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit = 1: high input; Bit = 0: low input

DIGITAL OUTPUTS STATUS

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see **OUTPUTS AND INPUTS CONFIGURATION** section):

Bit 0	OUTPUT 1 status	**Bit 8**	
Bit 1	OUTPUT 2 status	**Bit 9**	
Bit 2	OUTPUT 3 status	**Bit 10**	
Bit 3	OUTPUT 4 status	**Bit 11**	
Bit 4	OUTPUT 5 status	**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	Force outputs

Bit = 1: output is closed; Bit = 0: output is open

Setting bit 15 to 1 on the PLC, the master takes control of all the outputs, whatever their setting.

STATUS REGISTER

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

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
80**	Alibi memory identification number reading	**81****	Alibi memory identification number writing
82**	Weight reading from alibi memory	**83****	Tare reading from alibi memory
84**	Decimals reading from alibi memory	**85****	Unit of measure reading from alibi memory
86**	Alibi memory status reading	**87****	Preset Tare reading
88**	Preset Tare writing	**89**	
90**	Setpoint 1 reading	**91****	Setpoint 2 reading
92**	Setpoint 3 reading	**93****	Setpoint 1 writing
94**	Setpoint 2 writing	**95****	Setpoint 3 writing
98		**99**	Save data in EEPROM
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
102**	Sample Weight reading	**103****	Sample Weight writing
110****	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
122**	Password seed reading	**123****	Identification code/Password reading
124*	Identification code/Password writing	**125**	
130	Preset Tare enabling	**131**	
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
150**	Setpoint 4 reading	**151****	Setpoint 5 reading
160**	Setpoint 4 writing	**161****	Setpoint 5 writing

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

**) The instrument features two Exchange Registers (one for reading and one for writing), which must be used together with the Command Register in order to access these values. These are the procedures to follow:
- READING: send the desired datum reading command (e.g.: 90 for "Setpoint 1 reading") to the Command Register and read the content of the Exchange Register.
- WRITING: write the value that you want to set in the Exchange Register and send the desired datum writing command (e.g.: 93 for "Setpoint 1 writing") to the Command Register.

***) Only for WTAB-L/R.

****) Only for BASE program.

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

SETPOINT READING/WRITING: the setpoint are weight values expressed as positive integer numbers, include decimal figures but without decimal point.
- READING: send to the Command Register the reading command of the required setpoint and read the content of the Exchange Register.
- WRITING: write the value to be set in the Exchange Register and send to the Command Register the writing command in the required setpoint.

Setpoint are stored to RAM and lost upon instrument power off; to save them in EEPROM, so that they are maintained upon instrument power on, it is necessary to send the command 99 “Save data in EEPROM” of the Command Register.

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via protocol, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):
- write your identification code (user password) in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 120 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content;
- write the password read from the password table in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 121 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content, if the datum read is zero the operation is successfully completed;
- access to legally relevant parameters is disabled at instrument power off.

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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, write its value into the Exchange Register and send the command 103 “Sample Weight writing” to the Command Register;
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the command 102 “Sample Weight reading” returns a value equal to zero.

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the “Alibi memory identification number” register increases and the stored values can be read; see the next section for more information about these registers. If printing is enabled, the stored weight value will be printed.
The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the “Alibi memory overwrite” bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To know the identification number of the last value stored:

- send command 80 “Alibi memory identification number reading”;
- read the Exchange Register content.

To recall a stored value from the alibi memory:

- write the identification number of the value to recall in the Exchange Register and send command 81 “Alibi memory identification number writing” to Command Register;
- send the command 111 to the Command Register;
- send command 82 “Weight reading from alibi memory” and read the Exchange Register content, (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross);
- send command 83 “Tare reading from alibi memory” and read the Exchange Register content: if the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight;
- send command 84 “Decimals reading from alibi memory” and read the Exchange Register content: it indicates the number of decimals to apply to weight values;
- send command 85 “Unit of measure reading from alibi memory” and read the Exchange Register content: it represents the unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend);
- send command 86 “Alibi memory status reading” and read the Exchange Register content: it indicates if the weight reading refers to a net weight and if the tare reading is a preset tare (see the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER**).

If the requested value does not exist, all the values read with the previous commands are zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

MODBUS/TCP

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

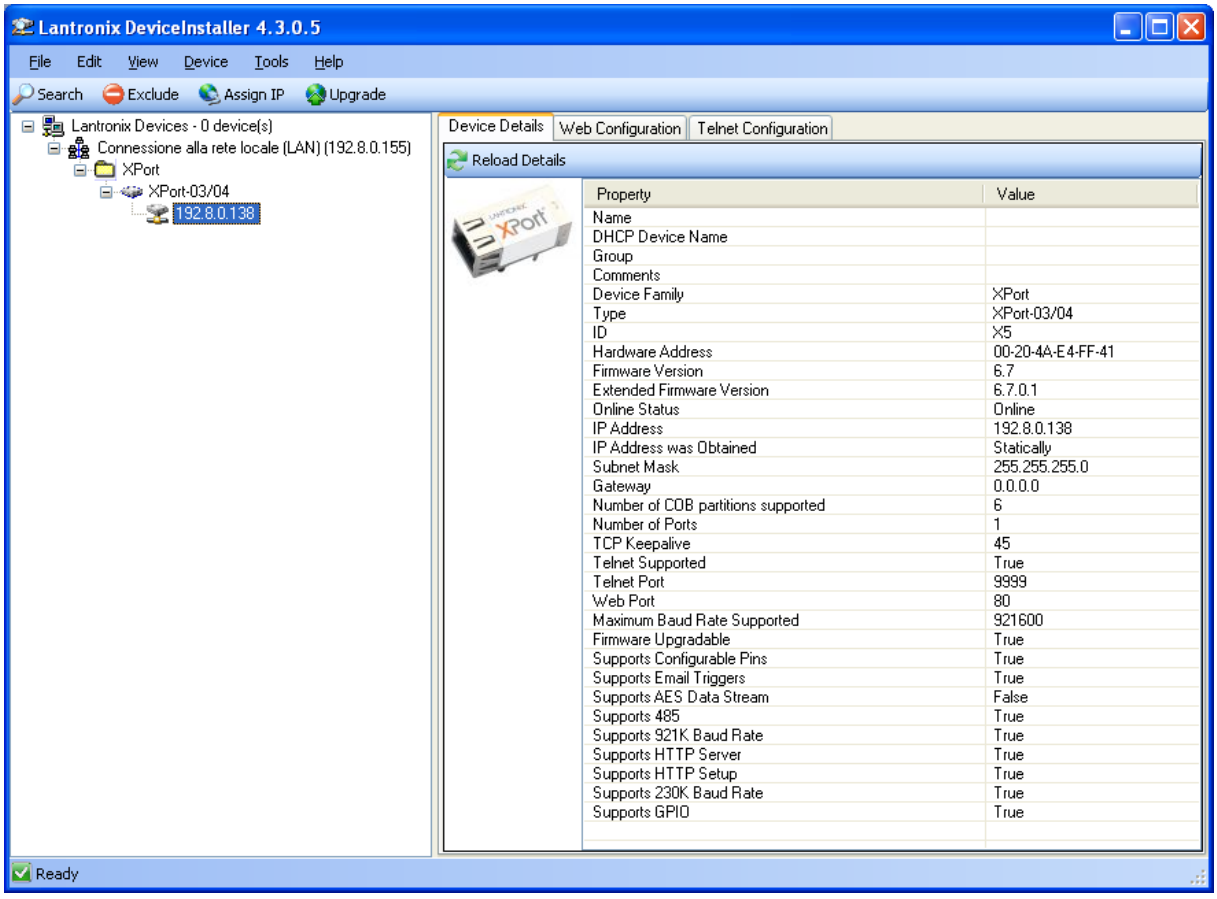
The instrument features a Modbus/TCP port that allows to exchange the weight and the main parameters with a Modbus/TCP *master*.

PC/PLC SETUP

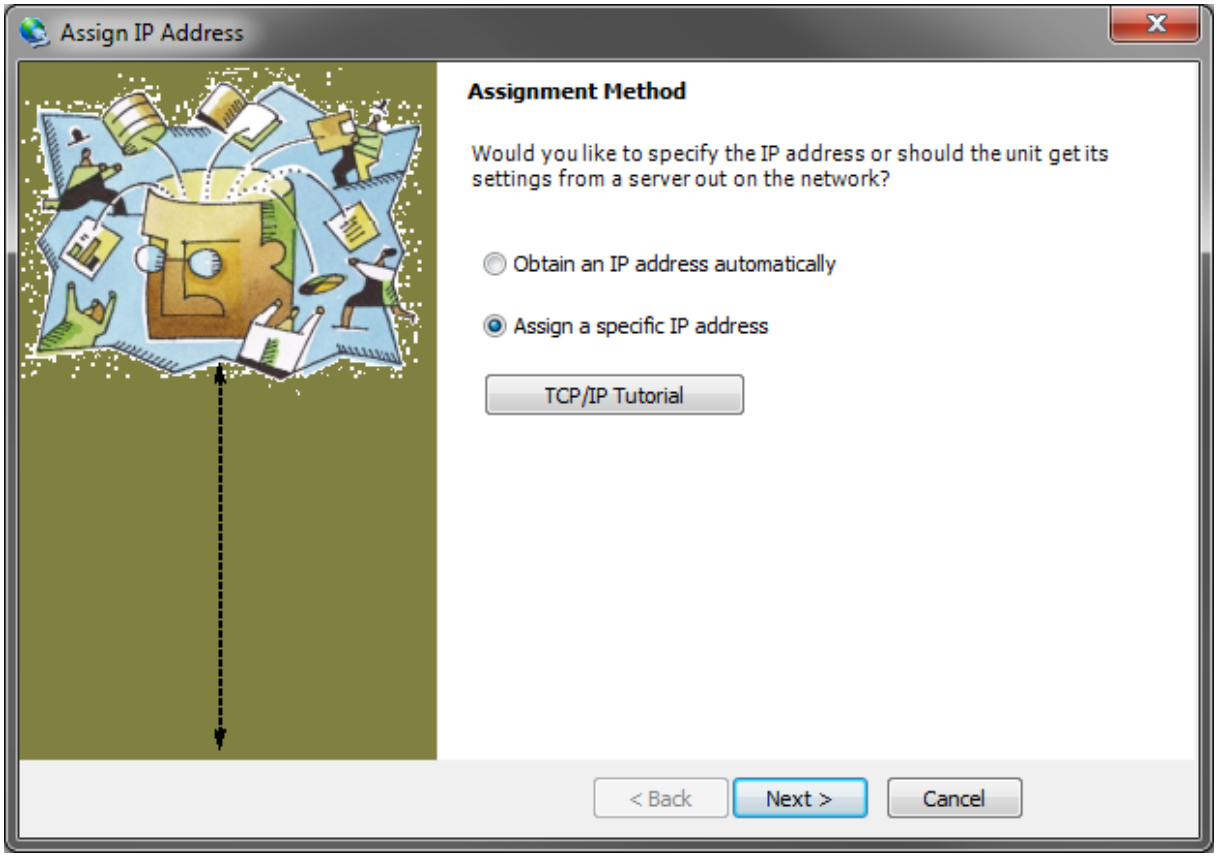
The instrument works as *slave* in a Modbus/TCP network. Use port 502 for the communication.

IP ADDRESS SETTING

Install the Lantronix DeviceInstaller application on a PC with Microsoft Windows operating system (run the *DEVINST.exe* file on the CD). Connect the PC to the instrument via LAN (point-to point or by hub/switch), run the application and click on Search:



Select the device found and click on Assign IP.

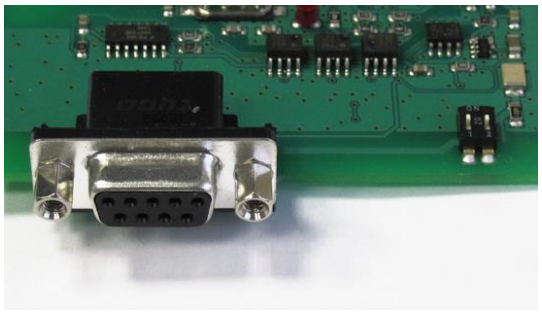


Select Assign a specific IP address, enter the desired values and click on Assign; wait for the procedure to complete (no need to restart the instrument).

Modbus/TCP commands and registers are the same as ModbusRTU protocol: for details see **MODBUS-RTU PROTOCOL** section.

PROFIBUS

TECHNICAL SPECIFICATIONS AND CONNECTIONS



connector and dip switch for
W200/W200BOX and WDOS instrument

terminal and dip switch for
WDESK and WINOX instrument

It is necessary to activate the termination resistance on the two devices located at the ends of the network, moving to ON the two dip switch shown in the photo.

Name of the converter port pins for communication with PC or PLC.

	W200/W200BOX WDOS WDESK-D WINOX-D WTAB	WDESK-P WDESK-X WINOX-P WINOX-X	WDESK-Q WINOX-Q
PROFIBUS	**D-SUB 9P FEMALE**	**TERMINAL**	**TERMINAL**
	pin	pin	pin
B_LINE	3	B	3
RTS	4		1
GND BUS	5		6
+5V BUS	6		5
A_LINE	8	A	4
SHIELD		S	2

The instrument features a Profibus-DP port that allows to exchange the weight and the main parameters with a Profibus-DP *master*.

INSTRUMENT SETUP

ENTER + ESC → *PrOFI*

- *Addr* (from 1 to 99; default: 1): set the instrument address in the Profibus network

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

The instrument works as *slave* in a Profibus-DP network.
Load the gsd file attached to the instrument to the Profibus-DP development system.
Insert and configure the instrument in an existing project.

Do not use the "universal module" in hardware configuration.

Usable software modules are:

FOR BASE PROGRAM: [W BASE]

NAME	DESCRIPTION	R/W	SIZE
W BASE Gross Weight	Gross Weight	R	4 byte
W BASE Net Weight	Net Weight	R	4 byte
W BASE Peak Weight	Peak Weight	R	4 byte
W BASE Set-Point 1	Setpoint 1	R/W*	4 byte / 4 byte
W BASE Set-Point 2	Setpoint 2	R/W*	4 byte / 4 byte
W BASE Set-Point 3	Setpoint 3	R/W*	4 byte / 4 byte
W BASE Set-Point 4	Setpoint 4	R/W*	4 byte / 4 byte
W BASE Set-Point 5	Setpoint 5	R/W*	4 byte / 4 byte
W BASE Hysteresis 1	Setpoint 1 Hysteresis	R/W*	4 byte / 4 byte
W BASE Hysteresis 2	Setpoint 2 Hysteresis	R/W*	4 byte / 4 byte
W BASE Hysteresis 3	Setpoint 3 Hysteresis	R/W*	4 byte / 4 byte
W BASE Hysteresis 4	Setpoint 4 Hysteresis	R/W*	4 byte / 4 byte
W BASE Hysteresis 5	Setpoint 5 Hysteresis	R/W*	4 byte / 4 byte
W BASE Division/Unit	Divisions and Units of Measure	R	2 byte
W BASE VisualCoeff	Display coefficient	R	4 byte
W BASE Inputs	Inputs status	R	2 byte
W BASE Outputs	Outputs status	R/W	2 byte / 2 byte
W BASE Status Reg	Status register	R	2 byte
W BASE Command Reg	Command register	W	2 byte
W BASE Sample Weight	Sample weight	R/W*	4 byte / 4 byte
W BASE ZeroAn Weight	Zero Weight-Analog Output	R/W*	4 byte / 4 byte
W BASE FSAn Weight	Full Scale Weight-Analog Output	R/W*	4 byte / 4 byte
W BASE InstrStatus	Instrument status register	R	2 byte
W BASE Password Seed	Password seed	R	2 byte
W BASE Password	Identification code	R/W	2 byte / 2 byte
W BASE Alibi ID	Alibi memory identification number	R/W	4 byte / 4 byte
W BASE Weight Alibi	Weight read from alibi memory	R	4 byte
W BASE Tare Alibi	Tare read from alibi memory	R	4 byte
W BASE Dec Alibi	Decimals read from alibi memory	R	2 byte
W BASE Unit Alibi	Unit of measure read from alibi memory	R	2 byte
W BASE Status Alibi	Status read from alibi memory	R	2 byte
W BASE Preset Tare	Preset Tare (Use with command 130 of the Command Register)	R/W	4 byte / 4 byte

***)** 0x00000000 value in writing is ignored. To reset the value, write out 0x80000000.

FOR LOAD/UNLOAD PROGRAMS: [W BATCHING]

NAME	DESCRIPTION	R/W	SIZE
W BATCHING Gross W	Gross Weight	R	4 byte
W BATCHING Net W	Net Weight	R	4 byte
W BATCHING Peak W	Peak Weight	R	4 byte
W BATCHING Div/Unit	Divisions and Units of Measure	R	2 byte
W BATCHING Inputs	Inputs status	R	2 byte
W BATCHING Outputs	Outputs status	R/W	2 byte / 2 byte
W BATCHING Status	Status register	R	2 byte
W BATCHING Command	Command register	W	2 byte
W BATCHING Sample W	Sample weight	R/W*	4 byte / 4 byte
W BATCHING ZeroAn W	Zero Weight-Analog Output	R/W*	4 byte / 4 byte
W BATCHING FSAn W	Full Scale Weight-Analog Output	R/W*	4 byte / 4 byte
W BATCHING ExcReg1-10	Exchange Registers	R/W	2 byte / 2 byte
W BATCHING WrEn	Exchange Registers writing enable register	W	2 byte
W BATCHING Password Seed	Password seed	R	2 byte
W BATCHING Password	Identification code	R/W	2 byte / 2 byte
W BATCHING Alibi ID	Alibi memory identification number	R/W	4 byte / 4 byte
W BATCHING Weight Alibi	Weight read from alibi memory	R	4 byte
W BATCHING Tare Alibi	Tare read from alibi memory	R	4 byte
W BATCHING Dec Alibi	Decimals read from alibi memory	R	2 byte
W BATCHING Unit Alibi	Unit of measure read from alibi memory	R	2 byte
W BATCHING Status Alibi	Status read from alibi memory	R	2 byte
W BATCHING Preset Tare	Preset Tare (Use with command 130 of the Command Register)	R/W	4 byte / 4 byte

***)** 0x00000000 value in writing is ignored. To reset the value, write out 0x80000000.

GROSS WEIGHT, NET WEIGHT, PEAK WEIGHT: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.
To find out the decimal figures use the Division module; example: if the read net weight is 100000 and the scale verification division (e) is 0.001, the real weight value is 100.000 kg.

SETPOINT, HYSTERESIS: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point.

- to set 0, write the conventional hexadecimal value hex 80000000 to the register (the most significant bit set to 1 and the other to 0).
- to set the values correctly use the Division module; example: if you want to set a setpoint to 100 kg and the scale verification division (e) is 0.001, set the setpoint value to 100000 (weight value with three decimals but without decimal point).

The setpoint are stored to RAM and lost upon instrument power off; to save them in EEPROM, so that they are maintained upon instrument power on, it is necessary to send the command 99 “Save data in EEPROM” of the Command Register.

ZERO WEIGHT – ANALOG OUTPUT: it’s the weight value to which the zero of the analog output is associated.

FULL SCALE WEIGHT – ANALOG OUTPUT: it’s the weight value to which the full scale of the analog output is associated.

PRESET TARE

- Set the desired value in the “Preset Tare” module.
- Send command 130 “Preset Tare enabling” to the Command Register.

DIVISION AND UNITS OF MEASURE MODULE

This module contains the current setting of the scale verification division (parameter *E* or *E I* for multi-interval or multiple range instruments) and of the units of measure (parameter *Unit*).

H Byte	L Byte
Unit of measure	Scale verification division

Use this module together with the Display coefficient module to calculate the value displayed by the instrument.

Least significant byte (L Byte)

Scale verification 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
0	Kilograms
1	Grams
2	Tons

DISPLAY COEFFICIENT: contains the COEFF parameter value expressed as integer number, with four decimal figures, but without decimal point.
Example: if the module contains 12000, the COEFF parameter value is 1.2000.

DIGITAL INPUTS STATUS (reading only)

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit = 1: high input; Bit = 0: low input

DIGITAL OUTPUTS STATUS (reading and writing)

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see **OUTPUTS AND INPUTS CONFIGURATION** section):

Bit 0	OUTPUT 1 status	**Bit 8**	
Bit 1	OUTPUT 2 status	**Bit 9**	
Bit 2	OUTPUT 3 status	**Bit 10**	
Bit 3	OUTPUT 4 status	**Bit 11**	
Bit 4	OUTPUT 5 status	**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	Force outputs

Bit = 1: output is closed; Bit = 0: output is open

Setting bit 15 to 1 on the PLC, the master takes control of all the outputs, whatever their setting.

STATUS REGISTER

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

INSTRUMENT STATUS REGISTER

0	Instrument in sleep condition *(weight* displaying*)*
1	Formulas displaying *(only for BATCHING programs)*
2	Batching constants displaying *(only for BATCHING programs)*
3	Consumption displaying *(only for BATCHING programs)*
4	System parameters displaying
5	Setting of formula number and cycles to batch *(only for BATCHING programs)*
6	Instrument in batching condition *(only for BATCHING programs)*
7	EMPtY alarm *(only for BATCHING programs)*
8	------ alarm *(only for UNLOAD program)*
9	CONSP alarm *(only for BATCHING programs)*
10	tArEP alarm *(only for BATCHING programs)*
11	- LOAd alarm *(only for LOAD and 3/6/14 PRODUCTS programs)* - UnLOAd alarm *(only for UNLOAD program)*
12	- *LOAD/UNLOAD programs:* phase elapsing between the opening of the SET and the closing of the CYCLE END - *3-6-14 PRODUCTS programs:* phase elapsing between the opening of batched product contact and the next product or closing of the CYCLE END
13	Batching pause *(only for BATCHING programs)*
14	Cycle end *(only for BATCHING programs)*
15	UnLOAd alarm *(only for LOAD and 3/6/14 PRODUCTS programs)*
16	bLACH alarm *(only for BATCHING programs)*
17	MI nLEG alarm - quantity in formula lower than 20**e** *(only for BATCHING programs)*
18	FALL alarm *(only for BATCHING programs)*
19	ALI FUL alarm
20	unStbL alarm
21	------ alarm
22	nEG-0 alarm
23	MI nLEG alarm - batched weight lower than 20**e**
24	ProdPP alarm *(only for UNLOAD program)*
25	tOL alarm *(only for BATCHING programs)*
26	Instrument waits for the printing to complete
27	Operating menu displaying *(only for BATCHING programs)*
28	Setpoint class displaying (*only for BASE program)*
29	AUTOMATIC LOADING phase *(only for UNLOAD program*)
30	USb Er alarm *(only if OPZWUSBW option is present)*
31	StOCH alarm *(only for WDOS series instruments)*
32	StOCHM alarm *(only for WDOS series instruments)*
33	ErUEI G alarm *(only for BATCHING programs)*
34	MEMFUL alarm *(only if OPZWUSBW or OPZWDATIPC options are present)*
35	MEMOUr alarm *(only if OPZWUSBW or OPZWDATIPC options are present)*

36	Partial unloading at cycle end phase *(only for 3/6/14 PRODUCTS and OPZWSCARI programs)*
37	Waiting for confirmation by the operator to run the partial unloading at cycle end *(only for 3/6/14 PRODUCTS and OPZWSCARP programs)*
38	The operator is starting an automatic batching *(only for BATCHING programs)*
39	The operator is starting a manual batching *(only for BATCHING programs)*
40	SLAVE alarm *(only for BATCHING programs)*
41	Partial unloading at cycle end phase *(only for 3/6/14 PRODUCTS and OPZWSCARP programs)*

EXCHANGE REGISTERS:
They correspond respectively to 40051 ÷ 40060 registers of ModbusRTU protocol and they can be used to set formulas, parameters, to read batched quantities**.**

EXCHANGE REGISTERS WRITING ENABLE REGISTER:
To enable writing on Exchange Registers, set corresponding bits in Exchange Registers writing enable register:

0000 0000 0000 0001 → Exchange Register 1
0000 0000 0000 0010 → Exchange Register 2
0000 0000 0000 0100 → Exchange Register 3
0000 0000 0000 1000 → Exchange Register 4
0000 0000 0001 0000 → Exchange Register 5
0000 0000 0010 0000 → Exchange Register 6
0000 0000 0100 0000 → Exchange Register 7
0000 0000 1000 0000 → Exchange Register 8
0000 0001 0000 0000 → Exchange Register 9
0000 0010 0000 0000 → Exchange Register 10

Note: when you want to read Exchange Registers, reset corresponding bits in the Exchange Registers writing enable register

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

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
98		**99**	Save data in EEPROM
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
110**	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
130	Preset Tare enabling	**131**	
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
200		**201**	Batching: START
202	Batching: PAUSE	**203**	Batching: RESUMES from PAUSE
204	Batching: STOP	**205^^**	Batching: accepts alarm and stop
206^^	Batching: ignores the alarm tArEP *(not available for UNLOAD program)*	**207^^**	Batching: ignores the alarm tOL
208	Interruption of the AUTOMATIC LOADING *(only for UNLOAD program)*	**209**	Batching: continues when the message CONAnd appears or if STATUS REGISTER=12 (only if CONAnd=YES)
250	Confirmation of batching data reading	**251**	
2000^	See note		

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

****)** The instrument features Exchange Registers, which must be used together with the Command Register in order to access these values. These are the procedures to follow:

- READING: send the desired datum reading command (e.g.: 132 for “PTARE1 reading”) to the Command Register and read the content of ExcReg1 and ExcReg2 Exchange Registers.
- WRITING: write the value that you want to set in ExcReg1 and ExcReg2 Exchange Registers and send the desired datum writing command (e.g.: 135 for “PTARE2 writing”) to the Command Register.

*****)** Only for WTAB-L/R.

******)** Only for BASE program.

^) For commands from 2000 to 2999 refer to **CONSTANTS AND FORMULAS READING AND WRITING** section.

^^) In case of alarm signals during the batching, send the command 205 to accept the alarm and stop the batching; in the particular case of tOL alarm, it is possible to ignore the alarm and continue the batching by sending the command 207; for the tArEP alarm it is possible to ignore the alarm and continue the batching by sending the command 206.

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

CONSTANTS AND FORMULAS READING AND WRITING

Legend:

CMD R: reading command.
CMD W: writing command.
H: high half of the DOUBLE WORD containing the number.
L: low half of the DOUBLE WORD containing the number.

For the exchange of values by using the following commands, use the Exchange Registers from **ExcReg1** to **ExcReg10** together with the Command Register.
To perform a read command you need to set the values highlighted in **bold**.

Example: command 2002
- In the **ExcReg3** register set the formula number (**Formula No.**) for which you want to read the total set;
- Send the command **2002** to the Command Register;
- Read continuously **ExcReg10** register until you find the command echo (in this case 2002) which indicates "data ready" or 0xFFFF indicates that "error in the command".
- Read the values present in **ExcReg1…ExcReg10** registers and use them according to the following table;

VARIABLE		CMD R	CMD W	REGISTER	DESCRIPTION
FORMULAS PROGRAMMING	*for 3/6/14 PRODUCTS program*	2000	2001	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Product No.**
				ExcReg4	**Step No.**
				ExcReg5	**Formula No.**
	for LOAD and UNLOAD programs	2000	2001	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**1 = Set** **2 = Preset**
				ExcReg4	**1 = Set** **2 = Preset**
				ExcReg5	**Formula No.**

TOTAL SET BY FORMULA	*OPZWQMC option: for 3/6/14 PRODUCTS and LOAD programs* *OPZFORPERC option: for 3/6/14 PRODUCTS program*	2002	2003	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Formula No.**
TOTALS MANAGEMENT	*for W200, W200BOX, WDESK-L\R, WINOX-L\R only for 3/6/14 PRODUCTS program*	2020		ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Product No.**
				ExcReg4	**1 = Consumption**
	for W200, W200BOX, WDESK-L\R, WINOX-L\R only for LOAD and UNLOAD programs	2020		ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Formula No.**
				ExcReg4	**1 = Consumption**
	for WDOS (Consumption & Stocks)	2020	2021*	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Product No.**
				ExcReg4	**1 = Consumption** **4 = Total Stocks** **5 = Add Stocks** **6 = Subtract Stocks** **7 = Minimum Stocks**
	for WDOS (Production)	2020		ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	**Formula No.**
				ExcReg4	**2 = Production (Quantity)** **3 = Production (Cycles No.)**
TOTALS DELETION DATE & TIME		2022		ExcReg1	Day
				ExcReg2	Month
				ExcReg3	Year
				ExcReg4	Hours
				ExcReg5	Minutes
				ExcReg6	Seconds
				ExcReg7	**1 = Consumption** **2 = Production** *(only for WDOS)*
FORMULA No. AND CYCLES No.TO RUN		2030	2031	ExcReg1	Formula No.
				ExcReg2	Cycles H
				ExcReg3	Cycles L

CURRENT CYCLE	2032		ExcReg1	Cycle H
			ExcReg2	Cycle L
			ExcReg3	Step H
			ExcReg4	Step L
			ExcReg5	Product H
			ExcReg6	Product L
			ExcReg7	Set H
			ExcReg8	Set L
BATCHING DATA READING	2100		*See examples in the related section*	

***) WARNING:**
- **ExcReg4** = 4 (total stocks): the value sent is substituted for the currently total stocks.
- **ExcReg4** = 5 (added stocks): the value sent is added to the currently total stocks.
- **ExcReg4** = 6 (subtract stocks): the value sent is subtracted to the currently total stocks.

FORMULAS WRITING

For 3/6/14 PRODUCTS program
- Write in **ExcReg1** e **ExcReg2** registers the quantity to be batched.
- Write in the **ExcReg3** register the product number.
- Write in the **ExcReg4** register the step number (only if FSTEP = YES) otherwise 1.
- Write in the **ExcReg5** register the formula number.

For LOAD and UNLOAD program
- Write in **ExcReg1** e **ExcReg2** registers the quantity to be batched.
- Write in the **ExcReg3** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **ExcReg4** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **ExcReg5** register the formula number.

Send the command **2001** to the COMMAND REGISTER;

FORMULAS READING

For 3/6/14 PRODUCTS program
- Write in the **ExcReg3** register the product number.
- Write in the **ExcReg4** register the step number (only if FSTEP = YES) otherwise 1.
- Write in the **ExcReg5** register the formula number.

For LOAD and UNLOAD program
- Write in the **ExcReg3** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **ExcReg4** register the value 1 to set the SET, 2 to set the PRESET.
- Write in the **ExcReg5** register the formula number.

Send the command **2000** to the COMMAND REGISTER;
Read continuously the **ExcReg10** register until it is different from 2000 (command echo) or 0xFFFF (command error).
After reading the command echo, read **ExcReg1** and **ExcReg2** registers to obtain the quantity defined in the formula.

BATCHING START AND STOP

To start the batching:
- Write in **ExcReg1…ExcReg3** register the formula and cycles number to be executed; send the command **2031** to the COMMAND REGISTER to set this values;
- Send the command **201** to the COMMAND REGISTER to start the batching.

To stop the batching:
- Send the command **204** to the COMMAND REGISTER.

BATCHING DATA READING

At the end of the batching, the instrument makes the data available; to verify that they are ready, send the command **1114** to the COMMAND REGISTER, read the **ExcReg1** register to verify that it is 1 (1 = data ready to be read);

WARNING: unlike other commands, this is the only command that doesn't use a different system to provide the execution echo. In this case, wait for the bit 7 of the **ExcReg10** register to be equal to 1.

Send one of the following queries to the COMMAND REGISTER and read the corresponding values in the exchange registers (**ExcReg1-ExcReg10**):

Query: BATCHING STEP

VARIABLE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg 9	ExcReg 10
	2100		STEP No.									

Note: for LOAD and UNLOAD programs STEP NO. = 1

Response:

VARIABLE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg9	ExcReg10
			REAL BATCHED H	REAL BATCHED L	THEORIC. BATCHED H	THEORIC. BATCHED L	ALARM H	ALARM L	ALIBI ID H	ALIBI ID L	PRODUCT NUMBER	Value detail

Note: “Negative value” bit of the “Value detail” refers only to double word REAL BATCHED.

Query: INITIAL TARE

VARIABLE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg 9	ExcReg 10
	2100		**1005**									

Response:

VARIABLE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg9	ExcReg10
			VALUE H	VALUE L			ALARM H	ALARM L				Value detail

Query: FINAL GROSS WEIGHT *(for 3/6/14 PRODUCTS program)*

VARIABILE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg 9	ExcReg 10
	2100		**1003**									

Response:

VARIABILE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg8	ExcReg9	ExcReg10
			VALUE H	VALUE L			ALARM H	ALARM L	ALIBI ID H	ALIBI ID L		Value detail

After the reading of batching data, report it has been read by sending the command **250** to the COMMAND REGISTER. In this case the instrument accepts the alarm SLAVE and continues the sequence of batching.

Content of the register Detail value:

Bit 0	Negative value	**Bit 1**	
Bit 2		**Bit 3**	
Bit 4		**Bit 5**	
Bit 6		**Bit 7**	Data ready

BATCHING DATA ALARMS (ExcReg5; ExcReg6)

An alarm take up one byte, if more than one alarm is present, up to four bytes will be sent in chronological order; up to 4 byte (up to 4 alarms).

0	no alarm
1	general alarm
2	EMPtY
3	MASFOr
4	tArEP *(not available for UNLOAD program)*
5	CMnSP
6	bLACH
7	tOL
8	- LOAd *(for LOAD and 3/6/14 PRODUCTS programs)* - UnLOAd *(for UNLOAD program)*
9	UnLOAd *(only for LOAD and 3/6/14 PRODUCTS programs)*
10	
11	
12	Batching STOP
13	ErUEI G
14	FALL
15	SLAuE
16	MI nLEG - batched weight lower than 20**e**
17	ALI FUL
18	------
19	unStbL
20	nEG-0
21	MI nLEG - quantity in formula lower than 20**e**
22	ProdPP *(only for UNLOAD program)*
23	LOAd: *AUTOMATIC LOADING function (only for UNLOAD program)*
24	Er tOt *(OPZWQMC option)*
25	StOCH *(only for WDOS series instruments)*
26	StOCHM (*only for WDOS series instruments)*
27	USb Er *(only for OPZWUSBW_ option)*
28	MEMFUL *(only for OPZWUSBW_ and OPZWDATIPC options)*
29	MEMOur *(only for OPZWUSBW_ and OPZWDATIPC options)*

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via protocol, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):

- write your identification code (user password) by the “Identification code” module;
- send the command 120 to the Command Register;
- read the password seed in the “Password seed” module;
- enter the password read in the password table by the “Identification code” module;
- send the command 121 to the Command Register;

If the “Password seed” module is set to zero, the operation is successfully completed: it’s now possible to carry out all operations that require a qualified access.
Access to legally relevant parameters is disabled at instrument power off.

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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 “Sample weight” module.
- Send zero to the “Sample weight” module.
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the sample weight read is set to zero.

Perform this operation in gross weight visualization or it twill not be executed. Perform the calibration with a number of read points, excluded the points at zero, equal to the maximum quantity that is to be weighed or at least the 50% of it. In this way every weight unit will correspond to at least one converter point.

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the "Alibi memory identification number" module increases and the stored values can be read; see the next section for more information about these modules. If printing is enabled, the stored weight value will be printed.

The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the "Alibi memory overwrite" bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To recall a stored value from the alibi memory:

- send the identification number of the value to recall by the "Alibi memory identification number" module;
- send the command 111 to the Command Register;
- Use proper commands to read recalled data:
  - "Weight read from the alibi memory" module: gross weight or net weight (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross).
  - "Tare read from the alibi memory" module: when the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight.
  - "Decimals read from the alibi memory" module: number of decimals to apply to weight values.
  - "Unit of measure read from the alibi memory" module: unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend)
  - to check if the weight reading refers to a net weight and if the tare reading is a preset tare, use the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER**.

If the requested value does not exist, all previous modules are set to zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER

Data contained in the "Status Alibi" module:

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

PROFINET-IO

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 a Profinet-IO port that allows to exchange the weight and the main parameters with a Profinet-IO *controller*.

INSTRUMENT SETUP

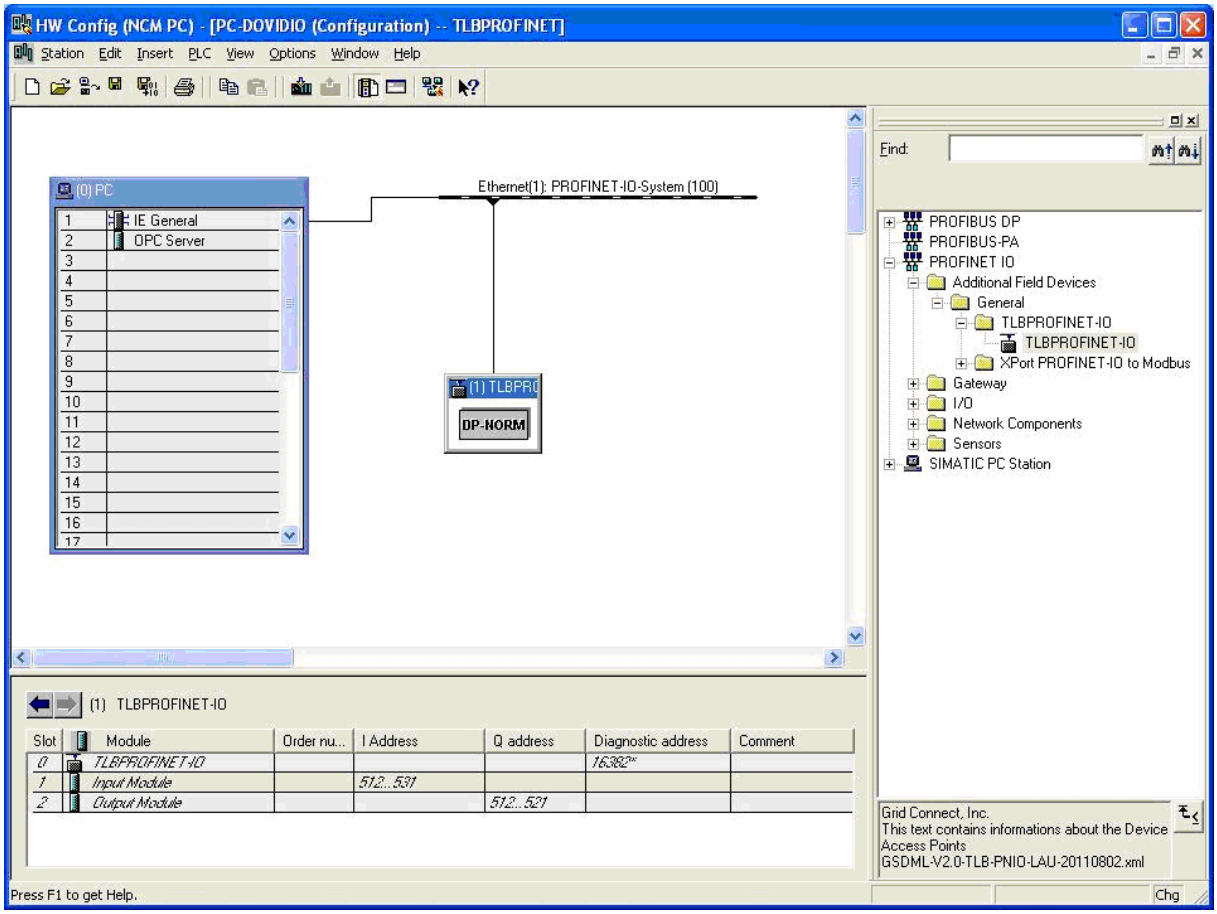
ENTER + ESC → EtHnEt

- SWAP (default: no): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - YES: LITTLE ENDIAN
  - no: BIG ENDIAN
- I PAddr (default: 192.8.0.141): set instrument IP address
- SUbnEt (default: 255.255.255.0): set instrument Subnet Mask
- GAtWAY (default: 192.8.0.111): set Gateway address of Ethernet network

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

PC/PLC SETUP

The instrument works as *device* in a Profinet-IO network.
Load the gsdml file attached to the instrument to the Profinet-IO *controller* development system.
Insert and configure the instrument in an existing project.
Assign a name to the device (function *Assign Device Name*) using the following characters: lower case letters (a-z), numbers (0-9), minus character (-).
Set at least 8 ms as Profinet's I/O refresh time.



The data exchanged by the instrument are:

Output Data from instrument (Reading)	Addresses
Internal Status [2 byte]	0x0000-0x0001
Gross Weight [4 byte]	0x0002-0x0005
Net Weight [4 byte]	0x0006-0x0009
Exchange Register [4 byte]	0x000A-0x000D
Status Register [2 byte]	0x000E-0x000F
Digital Inputs status [2 byte]	0x0010-0x0011
Digital Outputs status [2 byte]	0x0012-0x0013

Input Data to instrument (Writing)	Addresses
Write Enable [2 byte]	0x0000-0x0001
Command Register [2 byte]	0x0002-0x0003
Digital Outputs Command [2 byte]	0x0004-0x0005
Exchange Register [4 byte]	0x0006-0x0009

INTERNAL STATUS: if different from zero it indicates an internal error, so data from instrument are not reliable; if equal to zero, it indicates that the instrument works properly and data are reliable.

GROSS WEIGHT, NET WEIGHT: the weight values are expressed as positive integer numbers, including decimal figures, but without decimal point. Read the Status Register to obtain information about sign and possible errors on the weight.

WRITE ENABLE: write 0x0000 in this register to disable data writing on the instrument; write 0xFFFF to enable it.

DIGITAL INPUTS STATUS

Bit 0	INPUT 1 status
Bit 1	INPUT 2 status
Bit 2	INPUT 3 status
Bit 3	
Bit 4	
Bit 5	
Bit 6	
Bit 7	

Bit = 1: high input; Bit = 0: low input

DIGITAL OUTPUTS STATUS

Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see **OUTPUTS AND INPUTS CONFIGURATION** section):

Bit 0	OUTPUT 1 status	**Bit 8**	
Bit 1	OUTPUT 2 status	**Bit 9**	
Bit 2	OUTPUT 3 status	**Bit 10**	
Bit 3	OUTPUT 4 status	**Bit 11**	
Bit 4	OUTPUT 5 status	**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	Force outputs

Bit = 1: output is closed; Bit = 0: output is open

Setting bit 15 to 1 on the PLC, the master takes control of all the outputs, whatever their setting.

STATUS REGISTER

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	Weight below -20e
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 (alibi)
Bit 14	Alibi memory overwrite
Bit 15	

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

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
80**	Alibi memory identification number reading	**81****	Alibi memory identification number writing
82**	Weight reading from alibi memory	**83****	Tare reading from alibi memory
84**	Decimals reading from alibi memory	**85****	Unit of measure reading from alibi memory
86**	Alibi memory status reading	**87****	Preset Tare reading
88**	Preset Tare writing	**89**	
90**	Setpoint 1 reading	**91****	Setpoint 2 reading
92**	Setpoint 3 reading	**93****	Setpoint 1 writing
94**	Setpoint 2 writing	**95****	Setpoint 3 writing
98		**99**	Save data in EEPROM
100*	TARE WEIGHT ZERO SETTING for calibration	**101***	Sample weight storage for calibration
102**	Sample Weight reading	**103****	Sample Weight writing
110****	Weight storage in alibi memory	**111**	Alibi memory value reading
120	Identification code sending for qualified access	**121**	Password sending for qualified access
122**	Password seed reading	**123****	Identification code/Password reading
124*	Identification code/Password writing	**125**	
130	Preset Tare enabling	**131**	
132**	PTARE1 reading***	**133****	PTARE1 writing***
134**	PTARE2 reading***	**135****	PTARE2 writing***
136**	PTARE3 reading***	**137****	PTARE3 writing***
138**	PTARE4 reading***	**139****	PTARE4 writing***
140**	PTARE5 reading***	**141****	PTARE5 writing***
142**	PTARE6 reading***	**143****	PTARE6 writing***
144**	PTARE7 reading***	**145****	PTARE7 writing***
146**	PTARE8 reading***	**147****	PTARE8 writing***
148**	PTARE9 reading***	**149****	PTARE9 writing***
150**	Setpoint 4 reading	**151****	Setpoint 5 reading
160**	Setpoint 4 writing	**161****	Setpoint 5 writing

***)** To use these commands a qualified access is required (see **ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS** section).

**) The instrument features two Exchange Registers (one for reading and one for writing), which must be used together with the Command Register in order to access these values. These are the procedures to follow:
- READING: send the desired datum reading command (e.g.: 90 for "Setpoint 1 reading") to the Command Register and read the content of the Exchange Register.
- WRITING: write the value that you want to set in the Exchange Register and send the desired datum writing command (e.g.: 93 for "Setpoint 1 writing") to the Command Register.

***) Only for WTAB-L/R.

****) Only for BASE program.

If it is necessary to execute the same command twice consecutively, send command 0 between the first command and the following one.

SETPOINT READING/WRITING: the setpoint are weight values expressed as positive integer numbers, include decimal figures but without decimal point.
- READING: send to the Command Register the reading command of the required setpoint and read the content of the Exchange Register.
- WRITING: write the value to be set in the Exchange Register and send to the Command Register the writing command in the required setpoint.

Setpoint are stored to RAM and lost upon instrument power off; to save them in EEPROM, so that they are maintained upon instrument power on, it is necessary to send the command 99 “Save data in EEPROM” of the Command Register.

ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS

To access to modification of legally relevant parameters and be able to change the instrument calibration via protocol, apply the following procedure (a customer password table, supplied by the manufacturer to authorised service centres only, is required):
- write your identification code (user password) in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 120 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content;
- write the password read from the password table in the Exchange Register and send command 124 “Identification code/Password writing“ to Command Register;
- send the command 121 to the Command Register;
- send command 122 “Password seed reading” and read the Exchange Register content, if the datum read is zero the operation is successfully completed;
- access to legally relevant parameters is disabled at instrument power off.

WARNING: the instrument configuration must be done when the plant is in standby condition.

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

To access this register/command a qualified access is required (see section ACCESS TO LEGALLY RELEVANT PARAMETERS COMMANDS)

- 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, write its value into the Exchange Register and send the command 103 “Sample Weight writing” to the Command Register;
- To save the value send the command 101 “Sample weight storage for calibration” to the Command Register.

If the operation is successfully completed, the command 102 “Sample Weight reading” returns a value equal to zero.

ALIBI MEMORY OPERATION CONTROLS

SAVING A WEIGHT IN ALIBI MEMORY

To save a weight in alibi memory send the command 110 to the Command Register. If the operation is successfully completed, the “Alibi memory identification number” register increases and the stored values can be read; see the next section for more information about these registers. If printing is enabled, the stored weight value will be printed.
The alibi memory is used in a circular mode: once reached the memory end, the system starts from the beginning by overwriting the first record; the “Alibi memory overwrite” bit of the Status Register is enabled until the following saving in the alibi memory.

READING OF VALUES STORED IN ALIBI MEMORY

To know the identification number of the last value stored:

- send command 80 “Alibi memory identification number reading”;
- read the Exchange Register content.

To recall a stored value from the alibi memory:

- write the identification number of the value to recall in the Exchange Register and send command 81 “Alibi memory identification number writing” to Command Register;
- send the command 111 to the Command Register;
- send command 82 “Weight reading from alibi memory” and read the Exchange Register content, (check the Net weight bit in the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER** to determine whether it is net or gross);
- send command 83 “Tare reading from alibi memory” and read the Exchange Register content: if the value is equal to zero, it means that you are reading a gross weight, otherwise you are reading a net weight;
- send command 84 “Decimals reading from alibi memory” and read the Exchange Register content: it indicates the number of decimals to apply to weight values;
- send command 85 “Unit of measure reading from alibi memory” and read the Exchange Register content: it represents the unit of measure code (see table in **DIVISIONS AND UNITS OF MEASURE REGISTER** section for the codes legend);
- send command 86 “Alibi memory status reading” and read the Exchange Register content: it indicates if the weight reading refers to a net weight and if the tare reading is a preset tare (see the table **TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER**).

If the requested value does not exist, all the values read with the previous commands are zero.

TYPE OF DATA READ FROM THE ALIBI MEMORY REGISTER

Bit 0	The read weight is a net weight	**Bit 8**	
Bit 1	The read tare is a preset tare	**Bit 9**	
Bit 2		**Bit 10**	
Bit 3		**Bit 11**	
Bit 4		**Bit 12**	
Bit 5		**Bit 13**	
Bit 6		**Bit 14**	
Bit 7		**Bit 15**	

OUTPUTS AND INPUTS CONFIGURATION

MENU + ESC → OUt-1 n:

OUTPUTS

The outputs are set by default as follows: OPEn / SEt / GrOSS / POSnEG / OFF.

Possible operation modes:

- OPEn **(normally open)**: the relay is de-energised and the contact is open when the weight is lower than the programmed setpoint value; it closes when the weight is higher than or equal to the programmed setpoint value.
- CLOSE **(normally closed)**: the relay is energised and the contact is closed when the weight is lower than the programmed setpoint value; it opens when the weight is higher than or equal to the programmed setpoint value.

- SEt: the contact will switch on the basis of weight, according to setpoint (see **SETPOINT PROGRAMMING** section in the instrument manual).
- PLC: the contact will not switch on the basis of weight, but is controlled by remote protocol commands.
- StAbLE: relay switching occurs when the weight is stable.

  If the operation mode SEt is selected, the following options are also active:
  - GrOSS: the contact will switch on the basis of gross weight.
  - nEt: the contact will switch on the basis of net weight (If the net function is not active, the contact will switch on the basis of gross weight).

  - POSnEG: relay switching occurs for both positive and negative weight values.
  - POS: relay switching occurs for positive weight values only.
  - nEG: relay switching occurs for negative weight values only.

  By confirming with ENTER the setpoint operation can be set to the value 0:
  - OFF: relay switching will not occur if the setpoint value is 0.
  - On:
    - Setpoint = 0 and relay switching = POSnEG, relay switching occurs when the weight is 0; the relay will switch again when the weight is different from zero, taking hysteresis into account (both for positive and for negative weights).
    - Setpoint = 0 and relay switching = POS, relay switching occurs for a weight higher than or equal to 0, the relay will switch again for values below 0, taking hysteresis into account.
    - Setpoint = 0 and relay switching = nEG, relay switching occurs for a weight lower than or equal to 0, the relay will switch again for values above 0, taking hysteresis into account.

Default: input 1 = *2Er0* input 2 = *nE-L0* input 3 = *PEAH*

Possible operation modes:

- *nE-L0* (NET/GROSS): by closing this input for no more than one second, it's making an operation of SEMI-AUTOMATIC TARE and the display will show the net weight. To display the gross weight again, hold the NET/GROSS input closed for 3 seconds.
- *2Er0*: by closing the input for no more than one second, the weight is set to zero (see **WEIGHT ZERO-SETTING FOR SMALL VARIATIONS (SEMI-AUTOMATIC ZERO)** section in the instrument manual).
- *PEAH*: keeping the input closed the maximum weight value reached remains on display. Opening the input the current weight is displayed.
- *PLC*: closing the input no operation is performed, the input status may however be read remotely by way of the communication protocol.
- *Cntl n*: closing the input for max one second the weight is transmitted over the serial connection according to the fast continuous transmission protocol only once (**only if *Cntl n* is set in the item *SEri AL*)**.
- *COEFF*: when the input is closed the weight is displayed based on the set coefficient (see setting of the units of measure and coefficient), otherwise the weight is displayed.
- *Pri ntr*: when the input is closed the data are sent for printing if in the communication protocol of either serial port the parameter *Pri ntr* is set.