User Manual
version 1.06

COMMUNICATION PROTOCOLS

for weight indicators SERIES W

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

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).

The first character from the left takes on the value « - » (minus sign - ASCII 45) in case of negative weight.
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 c. of separation (92 ASCII).
ckck = 2 ASCII control characters or calculated considering the characters included between & and \ excluded. The control value is obtained executing the XOR operation (or exclusive) for the 8 bit ASCII codes of the characters considered. Therefore, a character expressed in hexadecimal is obtained with 2 numbers that may assume values from "0" to "9" and from "A" to "F". "**ckck**" is the ASCII code of the two hexadecimal digits.
CR = 1 c. of end string (13 ASCII).

The first character from the left of the weight characters takes on the value « - » (minus sign - ASCII 45) in case of negative weight.
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):

- *rIP*: communication with RIP5/20/60, RIP50SHA, RIPLED series remote displays; the remote display shows the net weight or gross weight according to its settings.
- *HdrIP*: communication with RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings.
- *HdrIPn*: 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 c. of separation (92 ASCII).
ckck = 2 ASCII checksum characters calculated considering the characters between **&** and **** excluded. The checksum value is obtained from the calculation of XOR (or exclusive) of the 8-bit ASCII codes of the characters considered. This obtains a character expressed in hexadecimals with two digits that can have the values from “0” to “9” and from ”A” to “F”. “**ckck**” is the ASCII code of the two hexadecimal digits.
CR = 1 c. of end string (13 ASCII).

In case of negative weight, the first character on the left acquires the value « - » (minus sign - ASCII 45).
If *HdrIP* 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 *HdrIPn* has been set, in addition to what stated in *HdrIP* 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 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, TLA60 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 furthers information, see section CHECK-SUM CALCULATION);
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 (OPTION E/EC) TO BE PROGRAMMED*

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

The PC transmits the following 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 (OPTION E/EC) TO BE PROGRAMMED*

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

The PC transmits the following 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 option E/EC is not present on the instrument, the new values of setpoint are active immediately, but if the option E/EC 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 following 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 volatile 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: **$aaMEMckckCR**

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

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

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

The PC transmits the following 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 following 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 MOdUS0; if, instead, the ASCII parameter is set on MOd td the gross weight will be read. To read the points, set the FS_tE0 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 on the left acquires 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 following ASCII string: **$aaZEROckckCR**

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

4. COMMUTATION OF GROSS WEIGHT TO NET WEIGHT

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

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

5. COMMUTATION OF NET WEIGHT TO GROSS WEIGHT

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

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

6. READING OF DECIMALS AND DIVISION NUMBER

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

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

where: **x** = number of decimals.
y = value of division.

The **y** field can have the following values:

'3' for division value = 1;
'4' for division value = 2;
'5' for division value = 5;
'6' for division value = 10;
'7' for division value = 20;
'8' for division value = 50;
'9' for division value = 100;

7. TARE ZERO-SETTING

The PC transmits the following ASCII string containing the zeroing command: **$aazckckCR**

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

Possible instrument responses:

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

where: **xxxxxx** = 6 characters to indicate the required weight value;
t = 1 character to indicate the weight (116 ASCII).

Example: Zeroing the weight of the instrument with address 2:

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

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

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

8. REAL CALIBRATION (WITH SAMPLE WEIGHT)

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

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

The PC transmits the following ASCII string containing the calibration command: **$aasxxxxxxckckCR**

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

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

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

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

Example: calibration of the instrument no. 1 with a sample weight of 20000 kg:
query: **$01s02000070(Cr)** response: **&01020000t\77(Cr)**

In case of correct calibration, the read value has to be "020000".

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

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

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

10. KEYPAD UNLOCK

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

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

11. DISPLAY AND KEYPAD LOCK

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

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

12. CHECK-SUM CALCULATION

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

The procedure to perform the calculation of check-sum is the following:
- Consider only the string characters highlighted with underlining;
- Calculate the EXCLUSIVE OR (XOR) of 8-bit ASCII codes of the characters;

Example:

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

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

MODBUS-RTU PROTOCOL

INTRODUCTION

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.

Certain data, when specifically indicated, will be written directly in the EEPROM type memory. This memory has a limited number of writing operations (100,000), 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 DI 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 in the settings menu for the serial connections, 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	Add. 1st register	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 DI REGISTERS)

QUERY

Address	Function	Ind. 1st reg.	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	Ind. 1st reg.	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	Instrumento 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 option EC/E *(only for "BASE" program equipped with EC/E option)*	-	R

40038	Setpoint class to be set and read *(only for "BASE" program equipped with EC/E option)*	NO	R/W
40039	HYSTERESIS 1 H *(only for "BASE" program)*	Only after command 99 of the "Command Register"	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	Only after command 99 of the "Command Register"	R/W
40068	Weight value corresponding to ZERO of the analog output L		R/W
40069	Weight value corresponding to the Full Scale of the analog output H		R/W
40070	Weight value corresponding to the Full Scale of the analog output L		R/W

At the moment of writing, the analog output zero and full scale values are saved in RAM (in the "BASE" program setpoint and hysteresis values are also saved); they are lost upon shut down. To save them permanently in the EEPROM so that they remain upon re-start, it is necessary to send the command 99 to the "Command Register".

REAL CALIBRATION (WITH SAMPLE WEIGHTS)

The instrument calibration can be changed via MODBUS.
To set correctly the sample weight, consider the value of the Division module (40014); E.g. if you want to set the value to 100kg and the division value is 0.001, set the register value to 100000 (100/0,001=100000).
To carry out this procedure, the system must be unloaded and the weight value display reset to zero with the command 100 of the "Command Register". Then, a sample weight must be placed on the system, equal to at least 50% of the maximum capacity (in order to obtain greater accuracy) and the correct weight value must be sent to the registers 40065-40066, to save this value, send the command 101 from the "Command Register". If the operation is successfully completed, the two sample weight registers are set to zero.

ANALOG OUTPUT SETTING

Write the weight in the registers "Weight value corresponding to the Full Scale of analog output H" (40069) and "Weight value corresponding to the Full Scale of analog output L" (40070) or write the weight in the registers "weight value corresponding to ZERO of the analog output H" (40067) and "weight value corresponding to ZERO of the analog output L" (40068). After writing the value, send the command 99 from the "Command Register" to save it in EEPROM memory.

SPECIAL REGISTERS

STATUS REGISTER (40007)

Bit 0	Cell Error
Bit 1	AD Convertor malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	

Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within ±¼ of a division around ZERO
Bit 13	Research in progress
Bit 14	
Bit 15	

INSTRUMENT STATUS REGISTER (40050)

0	Instrument in sleep condition
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	alarm EMPtY *(only for "BATCHING" programs)*
8	alarm ------ *(not available for "UNLOAD" program)*
9	alarm CONSP *(only for "batching" programs)*
10	alarm tArEP *(only for "batching" programs)*
11	- alarm LOAd *(only for "LOAD" and "3/6/14 PRODUCTS" program)* - alarm UnLOAd *(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	alarm UnLOAd *(only for "LOAD" e "3/6/14 PRODUCTS" programs)*
16	alarm bLACH *(only for "BATCHING" programs)*
17	
18	alarm FALL *(only for "BATCHING" programs)*
19	
20	
21	
22	
23	
24	alarm ProdPP (*only for "UNLOAD" program)*
25	alarm tOL *(only for "BATCHING" programs)*
26	Instrument waits for the printing to complete
27	Displaying of menu parameters during the batching *(only for "BATCHING" programs)*
28	Displaying the Setpoint class (*only for "BASE" program)*

29	AUTOMATIC LOADING phase *(only for "UNLOAD" program)*
30	alarm USb Er *(only if OPZWUSBW option is present)*
31	alarm StOCH *(only for instruments WDOS)*
32	alarm StOCHn *(only for instruments WDOS)*
33	alarm ErUEI G *(only for "BATCHING" programs)*
34	alarm nEnFUL (*only if OPZWUSBW or OPZWDATIPC options are present)*
35	alarm nEnOUr *(only if OPZWUSBW or OPZWDATIPC options are present)*
36	Instrument in partial unloading phase at end of cycle *(only for "3/6/14 PRODUCTS" programs)*
37	waiting for confirmation by the operator to run the partial unloading at end of cycle *(only for "3/6/14 PRODUCTS" 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	SLAUE Alarm *(only for BATCHING programs)*
41	CYCLE END PARTIAL UNLOADING phase (*only for "3/6/14 PRODUCTS" 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 1 Status
Bit 2	OUTPUT 1 Status
Bit 3	OUTPUT 1 Status
Bit 4	OUTPUT 1 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 section OUTPUTS AND INPUTS CONFIGURATION); otherwise, the outputs will be managed according to the current weight status with respect to the relevant setpoint.

DIVISION AND UNITS OF MEASURE REGISTER (40014)

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

H Byte	L Byte
unit of measure	division

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

Least significant byte (L Byte)

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

Most significant byte (H Byte)

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

COMMAND REGISTER (40006)

0	No command	1	
6		7	NET weight displaying (see section SEMI-AUTOMATIC TARE (NET/GROSS))
8	SEMIAUTOMATIC ZERO	9	GROSS weight displaying (see section SEMI-AUTOMATIC TARE (NET/GROSS))

20		21	Keypad lock
22	Keypad and display unlock	23	Keypad and display lock
98		99	- Saving data in EEPROM - *Only for "BASE" program:* saving the setpoint in EEPROM into class set in the register 40038
100	Zero-setting for calibration (see section TARE WEIGHT ZERO SETTING)	101	Sample weight storage for calibration
132***	Read PTARE1	133***	Write PTARE1
134***	Read PTARE2	135***	Write PTARE2
136***	Read PTARE3	137***	Write PTARE3
138***	Read PTARE4	139***	Write PTARE4
140***	Read PTARE5	141***	Write PTARE5
142***	Read PTARE6	143***	Write PTARE6
144***	Read PTARE7	145***	Write PTARE7
146***	Read PTARE8	147***	Write PTARE8
148***	Read PTARE9	149***	Write PTARE9
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)
210		211	
250	Confirmation of batching data reading	251	
2000**	See the following table		
9999	Reset (Reserved)		

*) 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.

**) For commands from 2000 to 2999 refer to the following section.

***) WTAB: read and write of preset tares, example PTARE5:

- READ: send command 140 to command register (40006); read values of 40050 and 40051 registers.
- WRITE: write preset tare value into 40050 and 40051 registers; send command 141 to command register (40006).

Only for “BASE” program

SETPOINT PROGRAMMING

Warning: if the option E\EC is not present, the new values of the setpoint are active immediately; but if the option E\EC 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.

Only for “BATCHING” programs (LOAD – UNLOAD – 3/6/14 PRODUCTS)

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**.

For example: Command 2002

- In the register 40053 set the formula number (No. Formula) for which you want to read the set total;
- Send the command 2002 to the “Command Register” (40006);
- Read continuously register 40060 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 the registers 40051…40060 and use them according to the following table;

VARIABLE		CMD R	CMD W	REGISTER	DESCRIPTION
FORMULAS PROGRAMMING	*for "3/6/14 PRODUCTS" programs*	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	No. Product
				40054	No. Step
				40055	No. Formula
	for "LOAD" and "UNLOAD" programs	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	1= Set 2 = Preset
				40054	1= Set 2 = Preset
				40055	No. Formula
TOTAL SET BY FORMULA	*Option OPZWQMC: for "3/6/14 PROD" and "LOAD" programs*	2002	2003	40051	Quantity H
				40052	Quantity L
	Option OPZFORPERC: for "3/6/14 PROD" programs			40053	No. Formula
TOTALS MANAGEMENT	*for W200/W200BOX, WDESK-L\R, WINOX-L\R, WTAB-L/R only for "3/6/14 PROD." programs*	2020		40051	Quantity H
				40052	Quantity L
				40053	No. Product
				40054	1 = Consumption
	for W200/W200BOX, WDESK-L\R, WINOX-L\R, WTAB-L/R only for "LOAD"and "UNLOAD" programs	2020		40051	Quantity H
				40052	Quantity L
				40053	No. Formula
				40054	1 = Consumption
	for WDOS (Consumption & Stocks)	2020	2021*	40051	Quantity H
				40052	Quantity L
				40053	No. Product
				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	No. Formula

				40054	2 = Production (Quantity) 3 = Production (No. Cycles)
DATE & TIME TOTALS DELETION		2022		40051	Day
				40052	Month
				40053	Year
				40054	Hours
				40055	Minutes
				40056	Seconds
				40057	1 = Consumption 2 = Production *(only for WDOS)*
No. FORMULA AND No. CYCLES TO EXECUTE		2030	2031	40051	No. Formula
				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 concerning section*	

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

FORMULAS WRITING

- For "3/6/14 PRODUCTS" program

- Write in the register 40051 and 40052 the quantity to be batched.
- Write in the register 40053 the product number.
- Write in the register 40054 the step number (only if FSTEP = YES) otherwise 1.
- Write in the register 40055 the formula number.

- For "LOAD" and "UNLOAD" program

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

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

FORMULAS READING

- For "3/6/14 PRODUCTS" program

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

- For "LOAD" and "UNLOAD" program

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

Send the command 2000 to the COMMAND REGISTER (40006);

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

BATCHING START AND STOP

To start the batching:

- Write in the register 40051…40053 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 registry 40051 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 register 40060 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		No. STEP									

Note: for "LOAD" and "UNLOAD" programs NO. STEP =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	ID ALIBI H	ID ALIBI 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 PROD." programs)*

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

Response:

VARIABIE	CMD R	CMD W	40051	40052	40053	40054	40055	40056	40057	40058	40059	40060
			VALUE H	VALUE L			ALARM H	ALARM L	ID ALIBI H	ID ALIBI 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	tArE? *(not available for "UNLOAD" program)*
5	CMnS?
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	
17	
18	
19	
20	
21	
22	Prod?? *(only for "UNLOAD" program)*
23	LOAd: *AUTOMATIC LOADING function (only for "UNLOAD" program)*
24	Er tOt *(OPZWQMC option)*
25	StOCH *(only for WDOS instruments)*
26	StOCHM *(only for WDOS instruments)*
27	USb Er *(only for OPZWUSBW_option)*
28	MEMFUL *(only for OPZWUSBW_ and OPZWDATIPC options)*
29	MEMOur *(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 (hexadecimal command 16, h10):
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 to send H	**h00**	Number of registers H	**h00**
Number of registers to send L	**h02**	Number of registers L	**h02**
Byte Count	**h04**	CRC16 H	**hE1**
Datum 1 H	**h00**	CRC16 L	**hCD**
Datum 1 L	**h00**		
Datum 2 H	**h07**		
Datum 2 L	**hD0**		
CRC16 H	**h70**		
CRC16 L	**hD6**		

EXAMPLE 2
Command for multiple writing of registers (hexadecimal command 16, h10):
Assuming that we wish to write the two setpoint values on the instrument, at 2000 and 3000 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**
Fuction	**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 H	**h61**
Datum 1 H	**h00**	CRC16 L	**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 H	**h49**		
CRC16 L	**h65**		

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

h01 h03 h00 h07 h00 h04 hF5 hC8

The instrument will respond with the string:

h01 h03 h08 h00 h00 h0F hA0 h00 h00 h0B hB8 h12 h73

Query field name	hex	Response field name	hex
Instrument Address	**h01**	Instrument Address	**h01**
Function	**h03**	Function	**h03**
Address of the first register H	**h00**	Byte Count	**h08**
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 H	**hF5**	Datum 2 H	**h0F**
CRC16 L	**hC8**	Datum 2 L	**hA0**
		Datum 3 H	**h00**
		Datum 3 L	**h00**
		Datum 4 H	**h0B**
		Datum 4 L	**hB8**
		CRC16 H	**h12**
		CRC16 L	**h73**

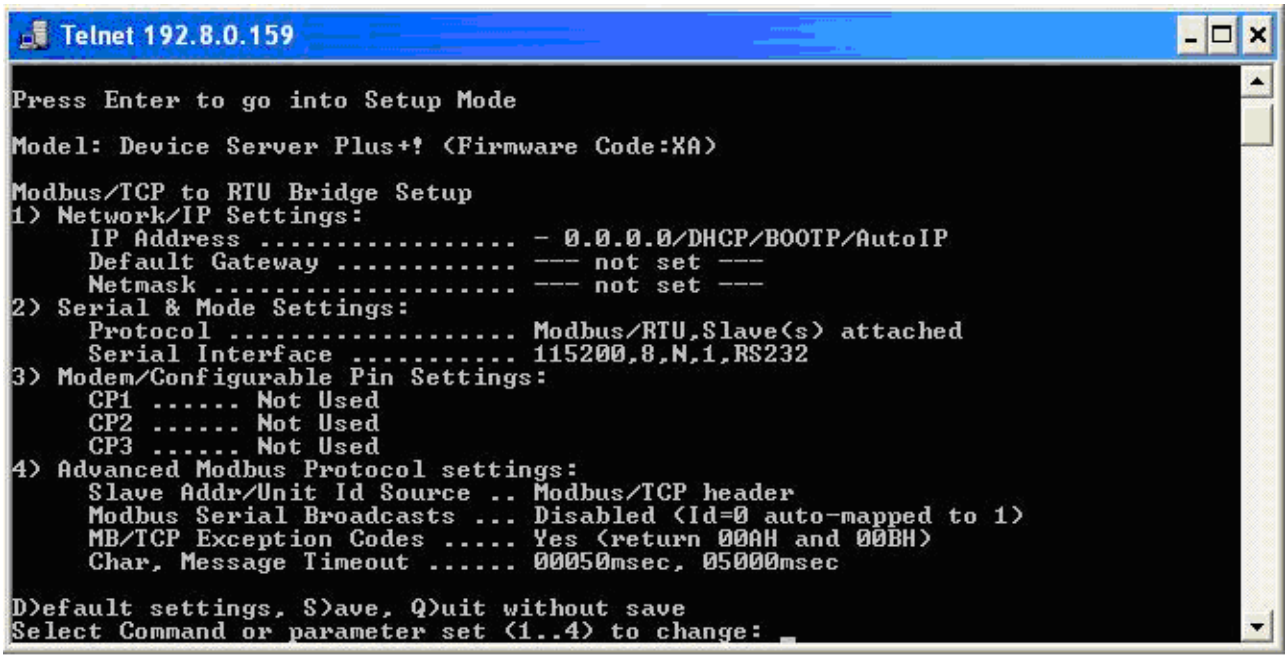
For additional examples regarding the generation of correct control characters (CRC16) refer to the manual Modicon PI-MBUS-300.

for instruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB

LED	Function
RJ45 connector Left side [Link LED]	Off: No Link Amber: 10 Mbps Green: 100 Mbps
RJ45 connector Right side [Activity LED]	Off: No Activity Amber: Half Duplex Green: Full Duplex

PC / PLC SETUP

- The instrument works as a slave in a Modbus/TCP network.
- The instrument is configured with DHCP (default). IP Address can be automatically assigned by DHCP or manually via Telnet.
  To manually set the IP address via PC, type "telnet <IPADDRESS> 9999" and press Enter to confirm. The following screen appears:



Type “1” if you want to manually configure IP Address, Default Gateway Address and Netmask. Then type “S” to save.

Modbus/TCP commands and registers of instrument are the same as ModbusRTU protocol

for instruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB.

By using this option, the instrument will be able to use an Ethernet/IP device port to exchange the weight data and the main instrument parameters with an Ethernet/IP scanner.

LED	Function
RJ45 connector Left side [Link LED]	Off: No link Amber: 10 Mbps Green: 100 Mbps
RJ45 connector Right side [Activity LED]	Off: No activity Amber: Half Duplex Green: Full Duplex

INSTRUMENT SETUP

ENTER + ESC → EtHnEt → SWAP

SWAP (default n0): it allows to select the reading/writing of the bytes in LITTLE-ENDIAN or BIG-ENDIAN mode.

- YES: BIG ENDIAN
- n0: LITTLE ENDIAN

IPAddr (A.B.C.D, default: 192.8.0.141): set the IP address in the Ethernet/IP network.

SUbnEt (A.B.C.D, default: 255.255.255.0): set the Subnet Mask

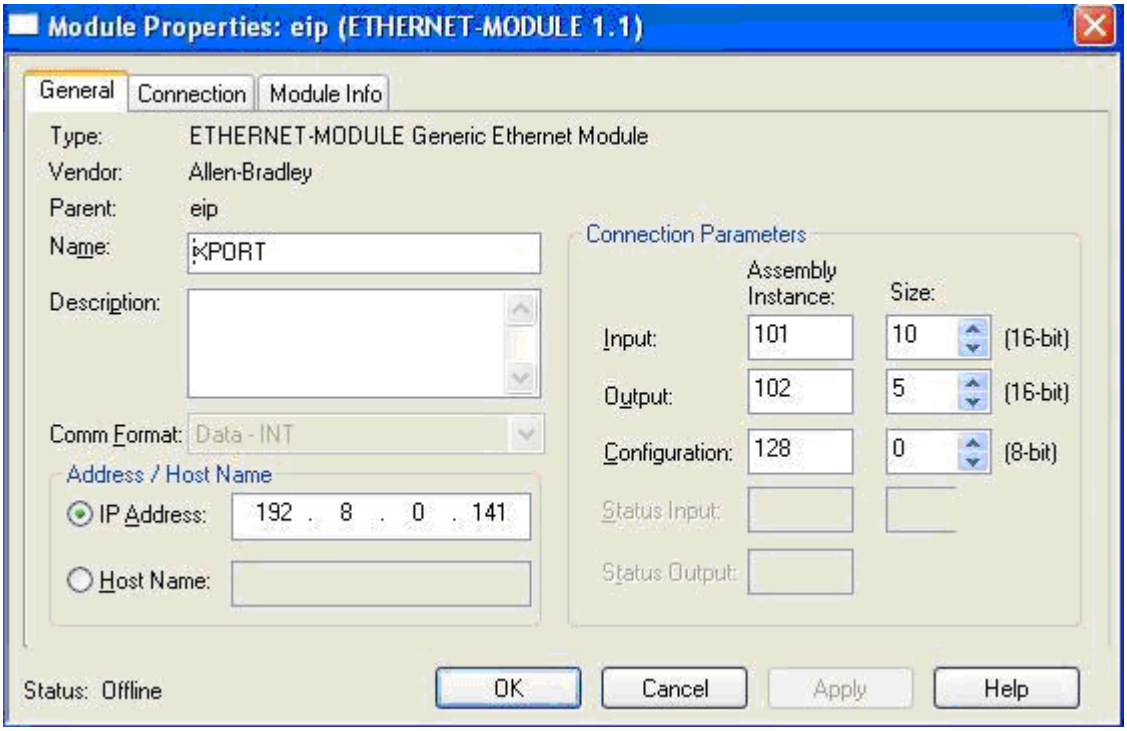
GAtWAY (A.B.C.D, default: 192.8.0.111): set the Gateway address

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

PC / PLC SETUP

The instrument works as a device in a Ethernet/IP network.
Load the included eds file (WxxxEIP.eds) in the Ethernet/IP scanner's development instrument. Or you can open Class 1 I/O Connection with the following settings:

- Assembly Instance = 101; Size = 10
- Assembly Instance = 102; Size = 5
- Assembly Instance = 128; Size = 0



The data exchanged by instrument are:

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

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

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

0	No command	93	Write setpoint 1 *
7	NET display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	94	Write setpoint 2 *
8	SEMI-AUTOMATIC ZERO	95	Write setpoint 3 *
9	GROSS display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	160	Write setpoint 4 *
21	Keypad lock	161	Write setpoint 5 *
22	Keypad and display unlock	99	Save data in EEPROM
23	Keypad and display lock	100	Reset for calibration (see section TARE WEIGHT ZERO SETTING)
90	Read setpoint 1 *	101	Save sample weight for full scale

			calibration
91	Read setpoint 2 *	102	Read Sample Weight *
92	Read setpoint 3 *	103	Write Sample Weight *
150	Read setpoint 4 *	9999	Reset (reserved)
151	Read setpoint 5 *		

*) 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.

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

Internal Status

When it is not 0 there is an internal error, so data from instrument are not reliable.
When it is 0 data from instrument are reliable.

Write Enable

Write 0x0000 in Write Enable register if you want that no data are written to instrument.
Write 0xFFFF in Write Enable register if you want to enable that data are written to instrument.

Gross weight, Net weight:

The weight values are expressed as positive integer numbers, include decimal figures but without decimal point.
Read the “Status Register” to obtain information about sign and possible errors on the weight.

Setpoint:

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

DIGITAL INPUTS STATUS

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

Bit a 1: high input; Bit a 0: low input.

DIGITAL OUTPUTS STATUS

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

DIGITAL OUTPUTS COMMAND

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

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

Setting bit 15 to 1 on the PLC, Ethernet/IP scanner takes control of all the outputs, even if they are in different modes

STATUS REGISTER

Bit 0	Cell Error
Bit 1	AD Converter Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

The instrument calibration can be changed via ETHERNET/IP. To carry out this procedure, the system must be unloaded and the weight value displayed must be reset to zero with the command 100 “Resetting for calibration” of the Command Register. Then, a simple weight must be placed on the system and the correct weight value must be sent to 103 “Write Sample Weight” command; to save this value, send the command 101 “Save sample weight for full scale calibration”. If the operation is successfully completed, the command 102 “Read Sample Weight” returns a value equal to zero.

for instruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB.

The instrument has an Profinet-IO device port that allows to exchange the main system parameters with an Profinet-IO controller.

LED	Function
RJ45 connector Left side [Link LED]	Off: No link Amber: 10 Mbps Green: 100 Mbps
RJ45 connector Right side [Activity LED]	Off: No activity Amber: Half Duplex Green: Full Duplex

INSTRUMENT SETUP

ENTER + ESC → EtHnEt → SWAP

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

- YES : LITTLE ENDIAN
- nO : BIG ENDIAN

IPAddr (A.B.C.D, default: 192.8.0.141): set the IP address in the Profinet-IO network.

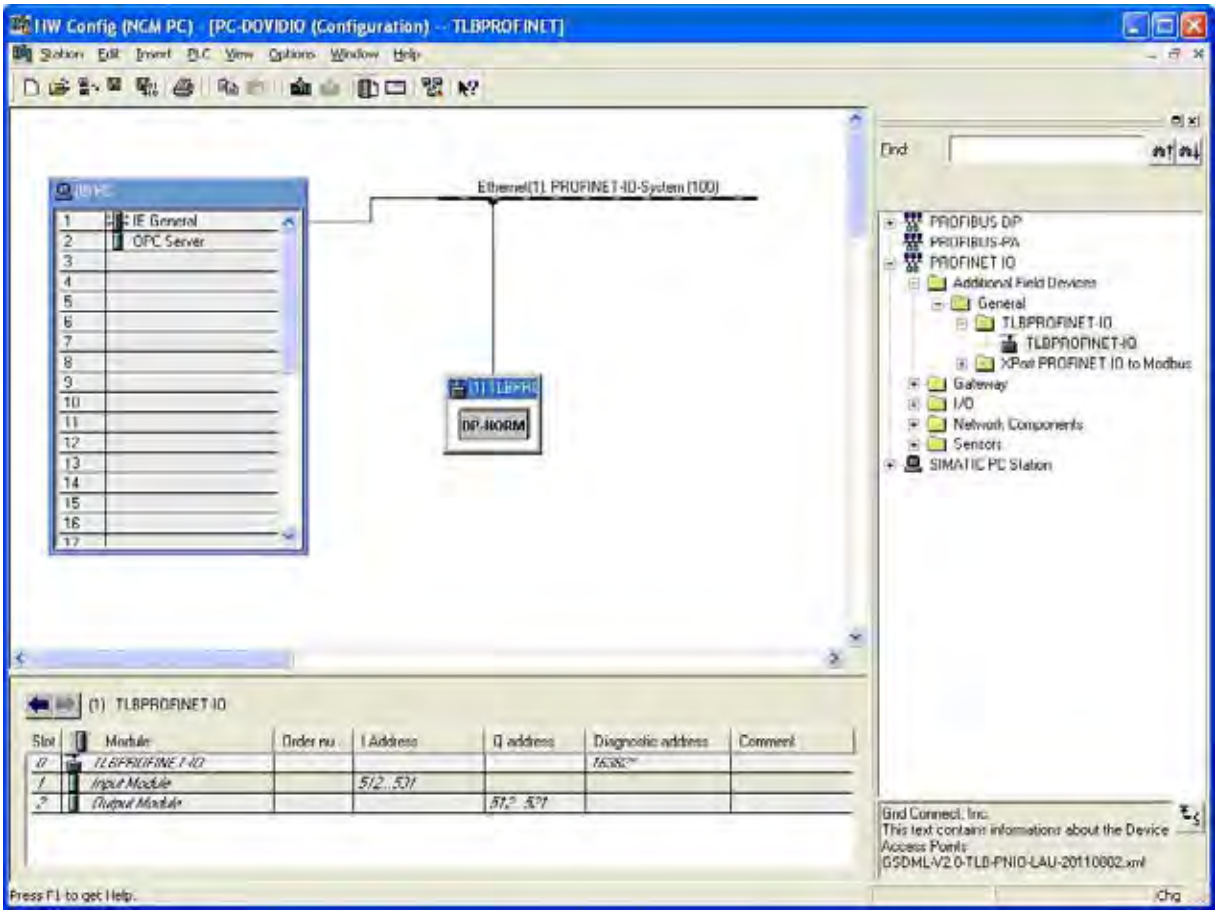
SUbnEt (A.B.C.D, default: 255.255.255.0): set the Subnet Mask

GAtWAY (A.B.C.D, default: 192.8.0.111): set the Gateway address

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

PC / PLC SETUP

The instrument works as a slave-device in a Profinet-IO network.
Load the included gsdml file (GSDML-V2.0-Wxxx-PNIO-LAU-20110802.xml) in the Profinet-IO controller’s development instrument.
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 8ms, as Profinet's I/O refresh time.



The data exchanged by instrument are:

Outgoing Data from instrument (Read)	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 (Write)	Addresses
Write Enable [2 byte]	0x0000-0x0001
Command Register [2 byte]	0x0002-0x0003
Digital Output Command [2 byte]	0x0004-0x0005
Exchange Register [4 byte]	0x0006-0x0009

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

0	No command	93	Write setpoint 1 *
7	NET display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	94	Write setpoint 2 *
8	SEMI-AUTOMATIC ZERO	95	Write setpoint 3 *
9	GROSS display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	160	Write setpoint 4 *

21	Keypad lock	161	Write setpoint 5 *
22	Keypad and display unlock	99	Save data in EEPROM
23	Keypad and display lock	100	Reset for calibration (see section TARE WEIGHT ZERO SETTING)
90	Read setpoint 1 *	101	Save sample weight for full scale calibration
91	Read setpoint 2 *	102	Read Sample Weight *
92	Read setpoint 3 *	103	Write Sample Weight *
150	Read setpoint 4 *	9999	Reset (reserved)
151	Read setpoint 5 *		

*) 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.

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

Internal Status

When it is not 0 there is an internal error, so data from instrument are not reliable.
When it is 0 data from instrument are reliable.

Write Enable

Write 0x0000 in “Write Enable” register if you want that no data are written to instrument.
Write 0xFFFF in “Write Enable” register if you want to enable that data are written to instrument.

Gross weight, Net weight:

The weight values are expressed as positive integer numbers, include decimal figures but without decimal point.
Read the “Status Register” to obtain information about sign and possible errors on the weight.

Setpoint:

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

DIGITAL INPUTS STATUS

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

Bit a 1: high input; Bit a 0: low input.

DIGITAL OUTPUTS STATUS

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

DIGITAL OUTPUTS COMMAND

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

Bit 0	OUTPUT 1status	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 a 1: output is closed; Bit a 0: output is open

Setting bit 15 to 1 on the PLC, Profinet-IO controller takes control of all the outputs, even if they are in different modes.

STATUS REGISTER

Bit 0	Cell Error
Bit 1	AD Converter Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHT)

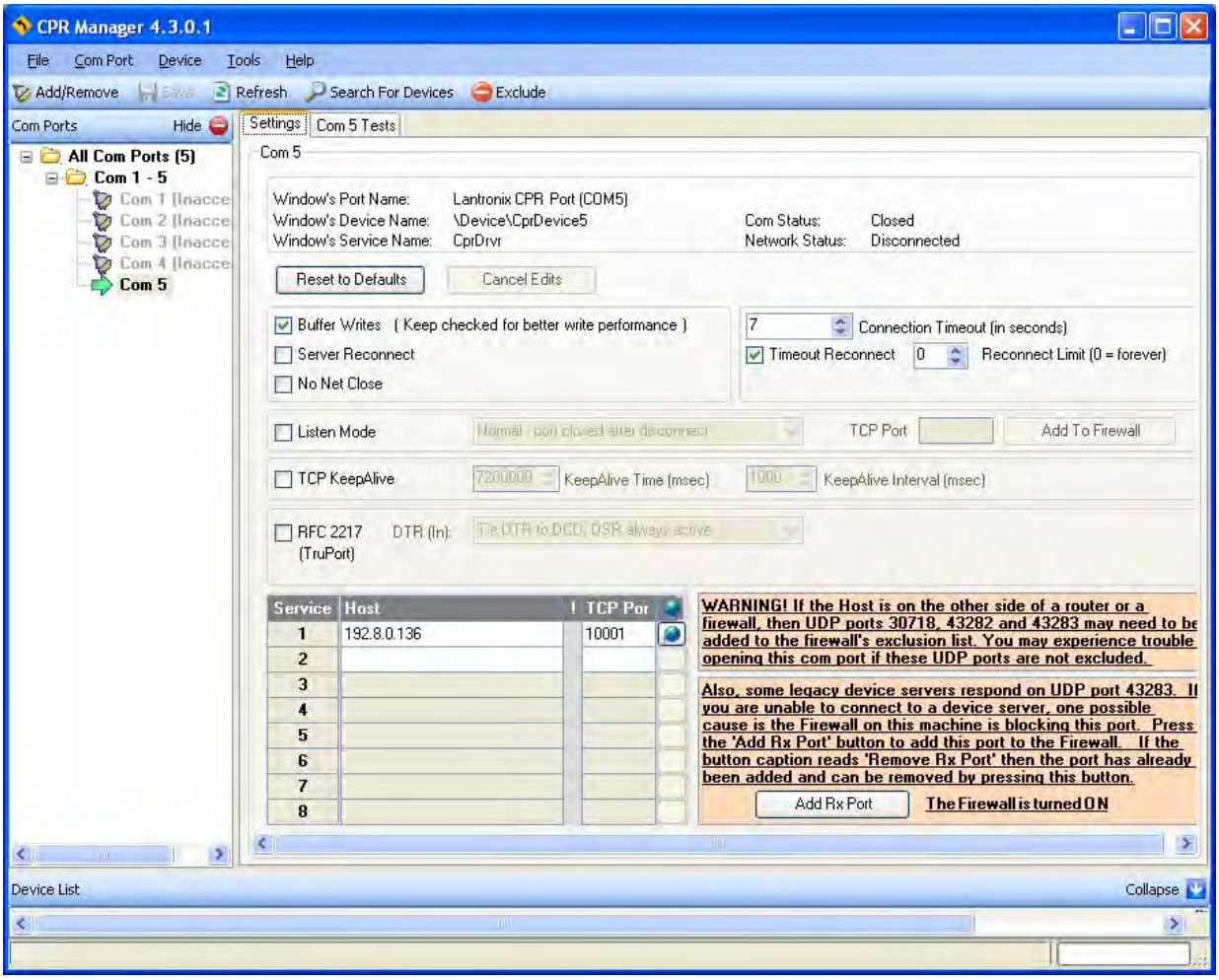
The instrument calibration can be changed via PROFINET-IO. To carry out this procedure, the system must be unloaded and the weight value displayed must be reset to zero with the command 100 “Resetting for calibration” of the Command Register. Then, a simple weight must be placed on the system and the correct weight value must be sent to 103 “Write Sample Weight” command; to save this value, send the command 101 “Save sample weight for full scale calibration”. If the operation is successfully completed, the command 102 “Read Sample Weight” returns a value equal to zero.

for instruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB.

The instrument has an Ethernet TCP/IP port that allows to exchange the main system parameters with an Ethernet network.

LED	Function
RJ45 connector Left side [Link LED]	Off: No link Amber: 10 Mbps Green: 100 Mbps
RJ45 connector Right side [Activity LED]	Off: No activity Amber: Half Duplex Green: Full Duplex

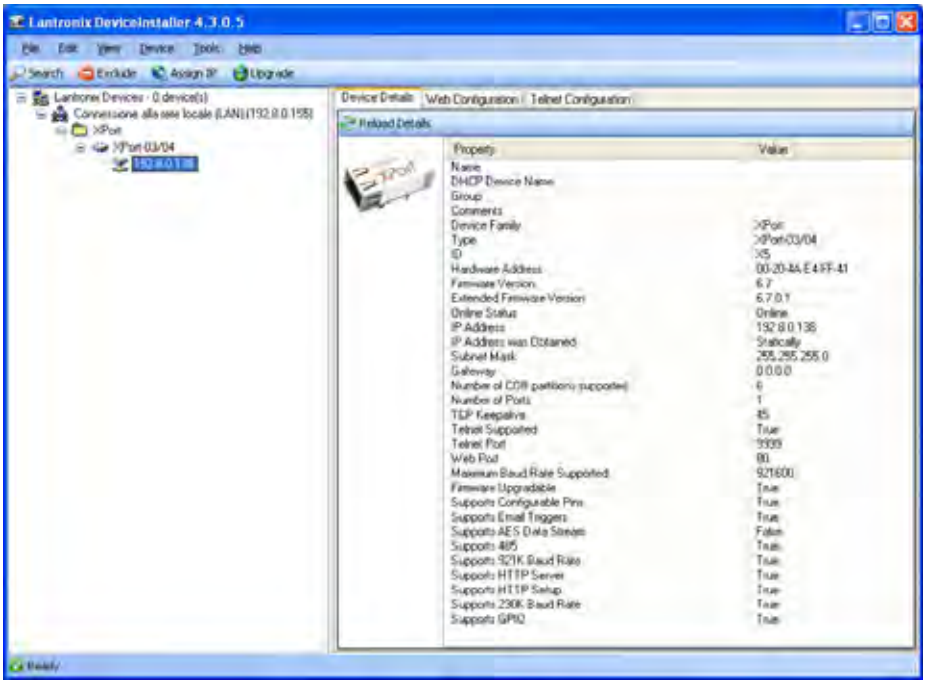
A PC can be connected, by a virtual serial port, to the instrument via ethernet TCP/IP.
To install the virtual COM port, use the CPR Manager included in the supply: run file CPR.exe on CD, add a serial port, set an IP address (host) and a TCP port (10001), then save.



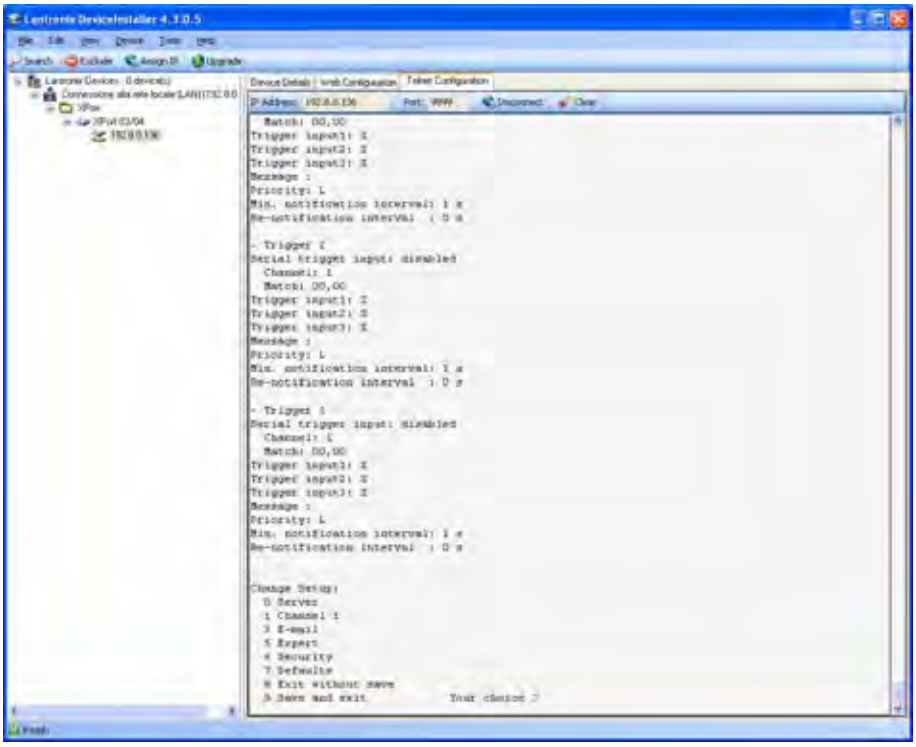
Use the just created virtual COM port to communicate with the instrument using the protocol selected on it.
Alternatively connect to the instrument using a socket (e.g.: Winsock) on port 10001.

DIAGNOSTIC

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.

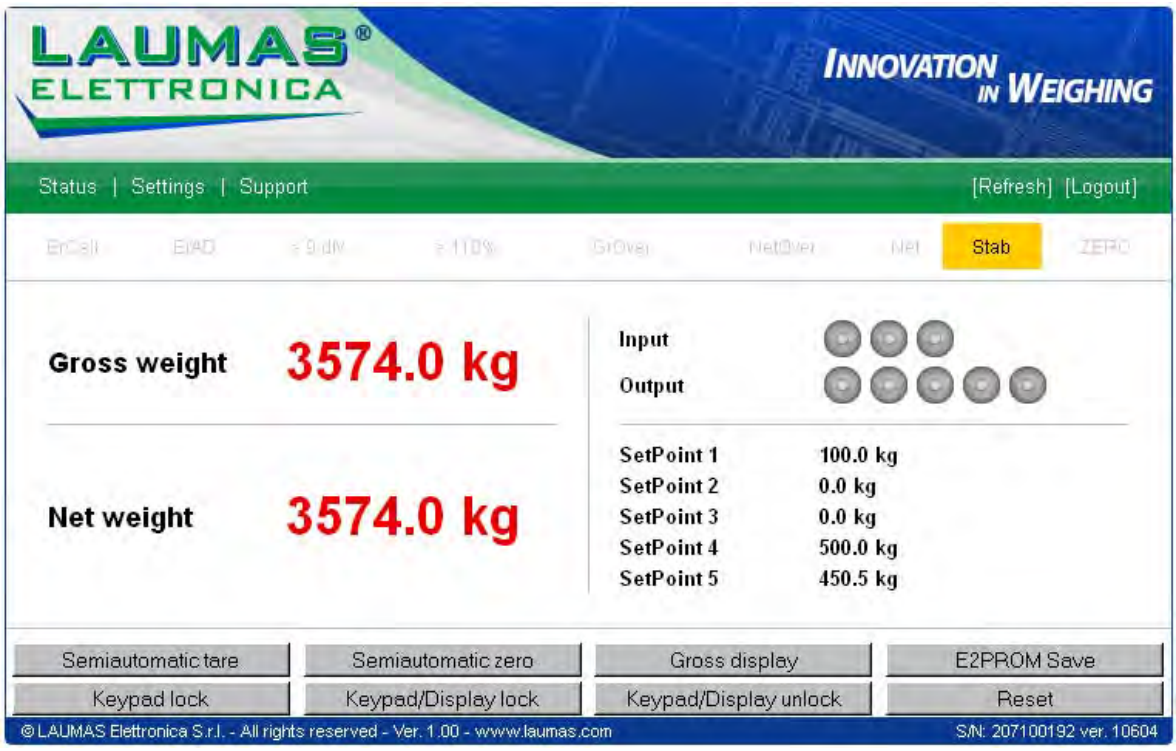


Press 0 to change server settings: change only the 4 fields of IP address and confirm the other parameters by pressing Enter. Set a static IP address.

WEBSITE

Set UEbSru 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:

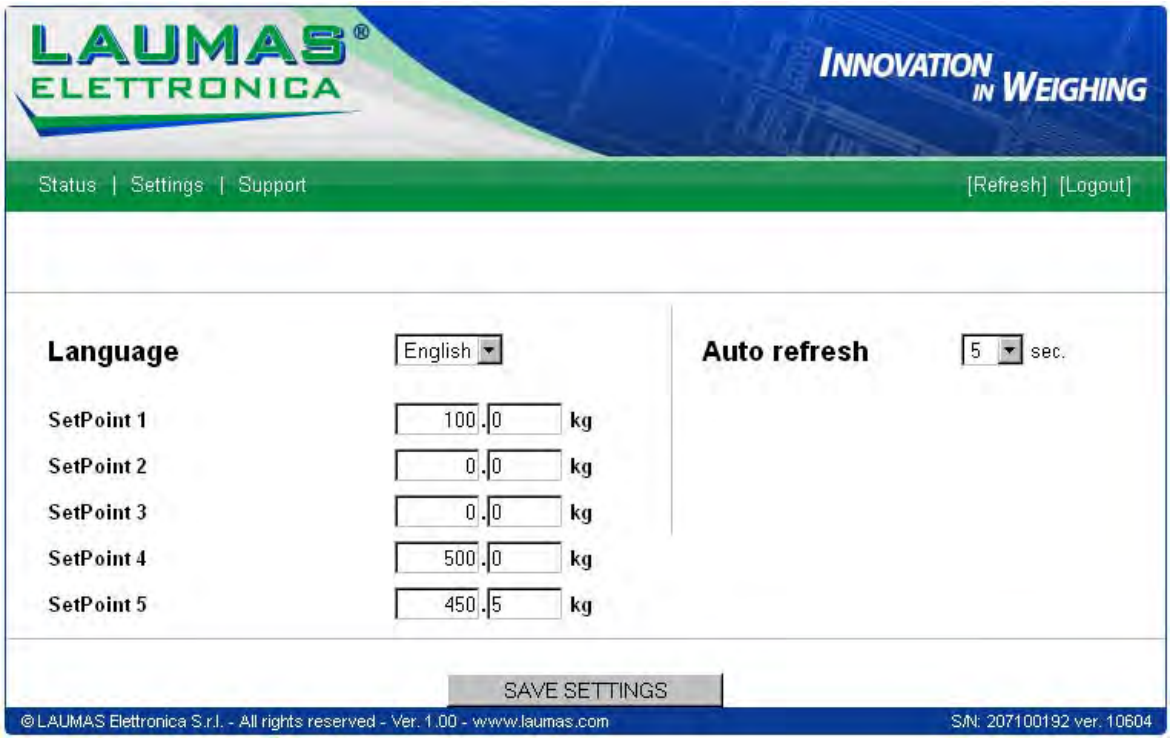


In case of incorrect parameter setting, the “INSTRUMENT DATA READING ERROR” message is displayed.

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:

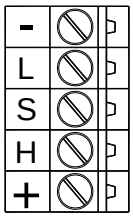
ErCell: load cell error
ErAD: instrument converter error
>9div: weight exceeds maximum weight by 9 divisions
>110% weight exceeds 110% of full scale
GrOver gross weight over 999999
NetOver net weight over 999999
Net instrument shows the net weight
Stab weight is stable
ZERO weight is zero

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.

for intruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB



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.

INSTRUMENT SETUP

ENTER + ESC → CAnOPn → Addr

Addr (from 1 to 99, default:1): set the instrument address in the CANopen network.

ENTER + ESC → CAnOPn → bAUd

bAUd (default:1000kb/s): set the instrument baud rate in the CANopen network.

ENTER + ESC → CAnOPn → SWAP

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

- YES: BIG ENDIAN
- nO: LITTLE ENDIAN

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

PC / PLC SETUP

The instrument works as a slave in a CANopen network.
Load the eds file (WxxxCNP.eds) 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)	Addresses
Gross Weight [4 bytes]	0x0000-0x0003
Net Weight [4 bytes]	0x0004-0x0007
Exchange Register [4 bytes]	0x0008-0x000B
Status Register [2 bytes]	0x000C-0x000D
Status of Digital Inputs [1 byte]	0x000E
Status of Digital Outputs [1 byte]	0x000F

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

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

0	No command	93	Write setpoint 1 *
7	NET display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	94	Write setpoint 2 *
8	SEMI-AUTOMATIC ZERO	95	Write setpoint 3 *
9	GROSS display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	160	Write setpoint 4 *
21	Keypad lock	161	Write setpoint 5 *
22	Keypad and display unlock	99	Save data in EEPROM
23	Keypad and display lock	100	Reset for calibration (see section TARE WEIGHT ZERO SETTING)
90	Read setpoint 1 *	101	Save sample weight for full scale calibration
91	Read setpoint 2 *	102	Read Sample Weight *
92	Read setpoint 3 *	103	Write Sample Weight *
150	Read setpoint 4 *	9999	Reset (reserved)
151	Read setpoint 5 *		

*) 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.

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

Gross weight, Net weight:

The weight values are expressed as positive integer numbers, include decimal figures but without decimal point.

Read the “Status Register” to obtain information about sign and possible errors on the weight.

Setpoint:

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

DIGITAL INPUTS STATUS

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

Bit a 1: high input; Bit a 0: low input.

DIGITAL OUTPUTS STATUS

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

DIGITAL OUTPUTS COMMAND

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

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

Setting bit 15 to 1 on the PLC, CANopen takes control of all the outputs, even if they are in different modes.

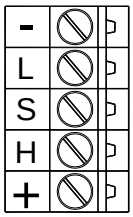
STATUS REGISTER

Bit 0	Cell Error
Bit 1	AD Converter Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHT)

The instrument calibration can be changed via CANOPEN. To carry out this procedure, the system must be unloaded and the weight value displayed must be reset to zero with the command 100 “Resetting for calibration” of the Command Register. Then, a simple weight must be placed on the system and the correct weight value must be sent to 103 “Write Sample Weight” command; to save this value, send the command 101 “Save sample weight for full scale calibration”. If the operation is successfully completed, the command 102 “Read Sample Weight” returns a value equal to zero.

for instruments: W200/W200BOX, WDOS, WDESK, WINOX, WTAB



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
9 = CAN +

For instruments:
WDESK-D, WINOX-D, WTAB

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

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.

INSTRUMENT SETUP

ENTER + ESC → dEUnEt → Addr

Addr (from 1 to 63, default:1): set the instrument address in the DeviceNet network..

ENTER + ESC → dEUnEt → bAUd

bAUd (125kb/s, 250kb/s e 500kb/s; default: 500 kb/s): set the instrument baud rate in the DeviceNet network

ENTER + ESC → dEUnEt → SUAP

SUAP (default nO): it allows to select the reading/writing of the bytes in LITTLE-ENDIAN or BIG-ENDIAN mode.

- YES : BIG ENDIAN
- nO : LITTLE ENDIAN

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

PC / PLC SETUP

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

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

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

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

0	No command	93	Write setpoint 1 *
7	NET display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	94	Write setpoint 2 *
8	SEMI-AUTOMATIC ZERO	95	Write setpoint 3 *
9	GROSS display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	160	Write setpoint 4 *
21	Keypad lock	161	Write setpoint 5 *
22	Keypad and display unlock	99	Save data in EEPROM
23	Keypad and display lock	100	Reset for calibration (see section TARE WEIGHT ZERO SETTING)
90	Read setpoint 1 *	101	Save sample weight for full scale calibration
91	Read setpoint 2 *	102	Read Sample Weight *
92	Read setpoint 3 *	103	Write Sample Weight *
150	Read setpoint 4 *	9999	Reset (reserved)
151	Read setpoint 5 *		

*) 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.

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

Gross weight, Net weight:

The weight values are expressed as positive integer numbers, include decimal figures but without decimal point.

Read the “Status Register” to obtain information about sign and possible errors on the weight.

Setpoint:

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

DIGITAL INPUTS STATUS

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

Bit a 1: high input; Bit a 0: low input.

DIGITAL OUTPUTS STATUS

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

DIGITAL OUTPUTS COMMAND

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

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

Setting bit 15 to 1 on the PLC, DeviceNet takes control of all the outputs, even if they are in different modes.

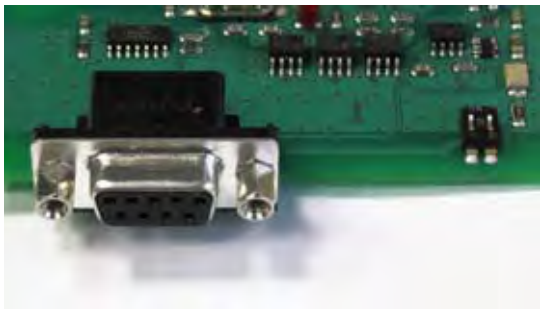
STATUS REGISTER

Bit 0	Cell Error
Bit 1	AD Converter Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHT)

The instrument calibration can be changed via DEVICENET. To carry out this procedure, the system must be unloaded and the weight value displayed must be reset to zero with the command 100 “Resetting for calibration” of the Command Register. Then, a simple weight must be placed on the system and the correct weight value must be sent to 103 “Write Sample Weight” command; to save this value, send the command 101 “Save sample weight for full scale calibration”. If the operation is successfully completed, the command 102 “Read Sample Weight” returns a value equal to zero.

for instrument: W200/W200BOX, WDOS, WDESK, WINOX, WTAB.



connector and dipswitch for
W200/W200BOX and WDOS instrument

terminal and dipswitch 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 dipswitch.

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

INSTRUMENT SETUP

ENTER + ESC → dEUnEt → Addr

Addr (from 1 to 99, default:1): impostare l’indirizzo dello strumento sulla rete Profibus.

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

PC / PLC SETUP

Configuration “.gsd” file (*LAU_0BBC.gsd*) allows to choose which SW-modules to use in SW automation.

FOR BASE PROGRAM: [W BASE]

NAME	DESCRIPTION	R/W	DIMENSION
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	Setpoint1	R/W*	4 byte / 4 byte
W BASE Set-Point 2	Setpoint2	R/W*	4 byte / 4 byte
W BASE Set-Point 3	Setpoint3	R/W*	4 byte / 4 byte
W BASE Set-Point 4	Setpoint4	R/W*	4 byte / 4 byte
W BASE Set-Point 5	Setpoint5	R/W*	4 byte / 4 byte
W BASE Hysteresis 1	Hysteresis 1	R/W*	4 byte / 4 byte
W BASE Hysteresis 2	Hysteresis 2	R/W*	4 byte / 4 byte
W BASE Hysteresis 3	Hysteresis 3	R/W*	4 byte / 4 byte
W BASE Hysteresis 4	Hysteresis 4	R/W*	4 byte / 4 byte
W BASE Hysteresis 5	Hysteresis 5	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 bye
W BASE Inputs	Input status	R	2 byte
W BASE Outputs	Output 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

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

At the time of writing, the setpoint, hysteresis values, the Zero Analog Output Weight and FS Analog Output Weight values are saved to the RAM and will be lost upon the next power-off; to store them permanently to the EEPROM so that they are maintained at power-on, the 99 command of the Command Register must be sent.

FOR LOAD / UNLOAD PROGRAMS: [W LOAD/UNLOAD]

NAME	DESCRIPTION	R/W	DIMENSION
W LOAD/UNLOAD Gross W	Gross Weight	R	4 byte
W LOAD/UNLOAD Net W	Net Weight	R	4 byte
W LOAD/UNLOAD Peak W	Peak Weight	R	4 Byte
W LOAD/UNLOAD Div/Unit	Divisions and Units of Measure	R	2 byte
W LOAD/UNLOAD Inputs	Input status	R	2 byte
W LOAD/UNLOAD Outputs	Output status	R/W	2 byte / 2 byte
W LOAD/UNLOAD Status	Status register	R	2 byte
W LOAD/UNLOAD Command	Command register	W	2 byte
W LOAD/UNLOAD Sample W	Sample weight	R/W*	4 byte / 4 byte
W LOAD/UNLOAD ZeroAn W	Zero Weight-Analog Output	R/W*	4 byte / 4 byte
W LOAD/UNLOAD FSAn W	Full Scale Weight-Analog Output	R/W*	4 byte / 4 byte
W LOAD/UNLOAD BatComm	Batching command register	W	2 byte
W LOAD/UNLOAD BatStatus	Batching Status	R	2 byte

W LOAD/UNLOAD ExcReg1-8	Exchange Register	R/W	2 byte / 2 byte
W LOAD/UNLOAD WrEn	Exchange Registers writing enable register	W	2 byte

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

At the time of writing, the analog output zero and full scale values are saved to the RAM and will be lost upon the next power-off; to store them permanently to the EEPROM so that they are maintained at power-on, the 99 command of the Command Register must be sent.

SPECIAL REGISTERS:

Divisions and Units of Measure:
This register contains the current setting of the divisions (parameter dIvS) and of the units of measure (Unit parameter).

H Byte	L Byte
UNIT	DIVIS

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

Least significant byte (L Byte)

DIVISION VALUE	DIVISOR	DECIMALS
0	100	0
1	50	0
2	20	0
3	10	0
4	5	0
5	2	0
6	1	0
7	0.5	1
8	0.2	1
9	0.1	1
10	0.05	2
11	0.02	2
12	0.01	2
13	0.005	3
14	0.002	3
15	0.001	3
16	0.0005	4
17	0.0002	4

Most significant byte (H Byte)

UNITS OF MEASURE VALUE	UNITS OF MEASURE	Utilisation of the Coefficient value with the different units of measure settings compared to the gross weight detected
0	Kilograms	Does not invervene
1	Grams	Does not invervene
2	Tons	Does not invervene
3	Pounds	Does not invervene
4	Newton	Multiples
5	Litres	Divides
6	Bar	Multiples
7	Atmospheres	Multiples
8	Pieces	Divides
9	Newton Meter	Multiples
10	Kilogram Meter	Multiples
11	Coefficient	Multiples

18	0.0001	4

Inputs and Outputs Status:

The status of the relays may be read at any moment but may be set only if the function has bee selected in the PLC output settings, otherwise, the relays will be managed according to the current weight status with respect to the relative set points.

INPUTS status (read only)

Bit 0	Input status 1
Bit 1	Input status 1
Bit 2	Input status 1

OUTPUTS (read and write)

Bit 0	Output status 1
Bit 1	Output status 2
Bit 2	Output status 3
Bit 3	Output status 4
Bit 4	Output status 5

Status Register:

Bit 0	Cell Error
Bit 1	AD Convertor Malfunction
Bit 2	Maximum weight exceeded by 9 divisions
Bit 3	Gross weight higher than 110% of full scale
Bit 4	Gross weight beyond 999999 or less than -999999
Bit 5	Net weight beyond 999999 or less than -999999
Bit 6	
Bit 7	Gross weight negative sign
Bit 8	Net weight negative sign
Bit 9	Peak weight negative sign
Bit 10	Net display mode
Bit 11	Weight stability
Bit 12	Weight within +/-¼ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

Command register:

0	No command	16	Reserved
1		17	Reserved
2		18	Reserved
3		19	
4		20	
5		21	Keypad lock
6		22	Keypad and display unlock
7	NET display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	23	Keypad and display lock
8	SEMI-AUTOMATIC ZERO	24	
9	GROSS display (see section SEMI-AUTOMATIC TARE (NET/GROSS))	99	Save data in EEPROM

10	Reserved	100	Zero-setting for calibration (see section TARE WEIGHT ZERO SETTING)
11	Reserved	101	Sample weight storage for calibration
12	Reserved		
13	Reserved		
14	Reserved		
15	Reserved	9999	Reset (reserved)

Note: To send a command to the device, first put a 0 in the command register and then put the wanted command. It makes possible to give a command only once to the device. To give more consecutive commands to the device, first put 0 in the command register and then put the wanted command in the command register.

Zero Weight – Analog output:
It 's the weight value which is associated the ZERO analog output.

Full Scale Weight – Analog output:
It 's the weight value which is associated the analog output's Full Scale

Batching Command Register:

0	No command	4	Stop
1	Start	5	Alarm acknoledge
2	Pause	6	Continue with tare alarm
3	Restart after Pause	7	Continue with tolerance alarm

In case of alarm during batching, use 5 command to ignore the alarm and go on. For Tolerance alarm use 7 command.

Batching Status:

0	Weight viewing	13	pause
1	Formulas viewing	14	End cycle
2	Batching constants viewing	15	
3	Consumptions viewing	16	Black out alarm
4	System constants viewing	17	
5	Start batching viewing	18	Fall greater than quantity to be batched alarm
6	batching	19	
7	Empty formula alarm	20	
8	Max weight alarm	21	
9	Approval alarm	22	
10	Tare alarm	23	
11	Not unload alarm	24	Not enough product alarm
12	Wait time waiting	25	Tolerance alarm

Exchange Registers:
They correspond to 40051 – 40058 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

Note: when you want to read exchange registers, reset corresponding bits in Exchange registers Writing Enable Register

Example: CALIBRATION (CORRECT THE DISPLAYED WEIGHT WITH A SAMPLE WEIGHT)
To execute the procedure you have to unload the system and set to zero the displayed weight with command 100 of the Command Register. Then you have to put a load onto the system and write its weight in the Sample Weight Module; then put 0 in the Sample Weight Module. Then send the command 101 of the Command Register to store the sample weight value. If the operation works correctly, the modules containing the sample weight in reading are 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.

Example: PROGRAMMING FORMULAS

1. how to write the set:
    a. write 0 in the BatComm [Batching Command Register, see table]. Every time you execute a command on the BatComm, set it to 0 afterwards.
    b. write the set's top section in ExcReg1, the set's bottom section in ExcReg2, 1 in ExcReg3, 2 in ExcReg4 and the formula's number in ExcReg5
    c. increase the bits corresponding to the 5 exchange registers to be written in WrEn (i.e. write 0x1F = b00011111)
    d. write 1061 in the BatComm [Batching Command Register, see table]
2. how to write the preset:
    a. write 0 in the BatComm [Batching Command Register, see table]
    b. write the set's top section in ExcReg1, the preset's bottom section in ExcReg2, 1 in ExcReg3, 1 in ExcReg4 and the formula's number in ExcReg5
    c. increase the bits corresponding to the 5 exchange registers to be written in WrEn (i.e. write 0x1F = b00011111)
    d. write 1061 in the BatComm [Batching Command Register, see table]

3. batching start
    a. write 0 in the BatComm [Batching Command Register, see table]
    b. write 1 in the BatComm [Batching Command Register, see table]
4. the BatStatus [Batching Status Register, see table] will at all times contain the batching status.

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.

INPUTS

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.
- Cont1n: 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 Cont1n is set in the item SEr1AL).
- 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.
- Pr1ntr: when the input is closed the data are sent for printing if in the communication protocol of either serial port the parameter Pr1ntr is set.
  If the alibi memory is active, data storage is carried out too.