

ENGLISH



ENGLISH



ENGLISH



ENGLISH

# User Manual

## version 1.10

# COMMUNICATION PROTOCOLS

## *for weight indicators SERIES W*

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



## SYMBOLS

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



Caution! Risk of electric shock.



Caution! This operation must be performed by skilled personnel.



Pay particular attention to the following instructions.



Further information.

## TABLE OF CONTENTS

CONTINUOUS FAST WEIGHT TRANSMISSION PROTOCOL - Only for BASE program ..	1
CONTINUOUS WEIGHT TRANSMISSION TO REMOTE DISPLAYS PROTOCOL.....	2
ASCII BIDIRECTIONAL PROTOCOL - Only for BASE program .....	3
1. SETPOINT PROGRAMMING .....	3
1.1. SELECTING THE CLASS OF SETPOINT (E/EC OPTION*) TO BE PROGRAMMED .....	3
1.2. READING THE SELECTED CLASS OF SETPOINT (E/EC OPTION*) TO BE PROGRAMMED.....	4
1.3. SETTING SETPOINT VALUES CURRENTLY IN USE .....	4
1.4. SETPOINT STORAGE IN EEPROM MEMORY .....	5
1.5. READING THE CLASS OF SETPOINT (E/EC OPTION*) CURRENTLY IN USE.....	5
2. READING WEIGHT, SETPOINT AND PEAK (IF PRESENT) FROM PC.....	5
3. SEMI-AUTOMATIC ZERO (WEIGHT ZERO-SETTING FOR SMALL VARIATIONS).....	6
4. SWITCHING FROM GROSS TO NET WEIGHT .....	6
5. SWITCHING FROM NET TO GROSS WEIGHT .....	7
6. READING OF DECIMALS AND DIVISION NUMBER .....	7
7. TARE ZERO-SETTING.....	7
8. REAL CALIBRATION (WITH SAMPLE WEIGHT).....	8
9. KEYPAD LOCK (BLOCK THE ACCESS TO THE INSTRUMENT) .....	8
10. KEYPAD UNLOCK.....	9
11. DISPLAY AND KEYPAD LOCK.....	9
12. CHECK-SUM CALCULATION.....	9
MODBUS-RTU PROTOCOL .....	10
FUNCTIONS SUPPORTED IN MODBUS.....	10
COMMUNICATION ERROR MANAGEMENT .....	12
LIST OF AVAILABLE REGISTERS .....	12
POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER (40006) .....	19
ANALOG OUTPUT SETTING.....	20
REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS).....	21
ONLY FOR BASE PROGRAM.....	22
SETPOINT PROGRAMMING .....	22
SETPOINT READING.....	22
ONLY FOR BATCHING PROGRAMS (LOAD – UNLOAD – 3/6/14 PRODUCTS).....	22
CONSTANTS AND FORMULAS READING AND WRITING.....	22
FORMULAS WRITING .....	25
FORMULAS READING .....	25
BATCHING START AND STOP .....	25
BATCHING DATA READING .....	26
BATCHING DATA ALARMS (40055; 40056).....	27
COMMUNICATION EXAMPLES .....	28
CANOPEN.....	31
TECHNICAL SPECIFICATIONS AND CONNECTIONS.....	31

INSTRUMENT SETUP .....	32
PC/PLC SETUP .....	32
POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER .....	35
<i>REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)</i> .....	36
DEVICENET .....	37
TECHNICAL SPECIFICATIONS AND CONNECTIONS .....	37
INSTRUMENT SETUP .....	38
PC/PLC SETUP .....	38
POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER .....	41
<i>REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)</i> .....	42
ETHERNET TCP/IP .....	43
TECHNICAL SPECIFICATIONS .....	43
INSTRUMENT SETUP .....	43
PC SETUP .....	45
DIAGNOSTIC .....	46
WEBSITE .....	48
ETHERNET/IP .....	50
TECHNICAL SPECIFICATIONS .....	50
INSTRUMENT SETUP .....	50
PC/PLC SETUP .....	51
POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER .....	54
<i>REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)</i> .....	55
MODBUS/TCP .....	56
TECHNICAL SPECIFICATIONS .....	56
PC/PLC SETUP .....	56
IP ADDRESS SETTING .....	56
PROFIBUS-DP .....	58
TECHNICAL SPECIFICATIONS AND CONNECTIONS .....	58
INSTRUMENT SETUP .....	59
PC/PLC SETUP .....	59
POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER .....	66
<i>CONSTANTS AND FORMULAS READING AND WRITING</i> .....	67
<i>FORMULAS WRITING</i> .....	70
<i>FORMULAS READING</i> .....	70
<i>BATCHING START AND STOP</i> .....	70
<i>BATCHING DATA READING</i> .....	71
<i>BATCHING DATA ALARMS (ExcReg5; ExcReg6)</i> .....	72
<i>REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)</i> .....	73
PROFINET-IO .....	74
TECHNICAL SPECIFICATIONS .....	74
INSTRUMENT SETUP .....	74
PC/PLC SETUP .....	75

POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER .....	78
<i>REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)</i> .....	79
USE AND CALIBRATION OF CONVERTER POINTS .....	80
OUTPUTS AND INPUTS CONFIGURATION .....	81

## 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 are available (see section **SERIAL COMMUNICATION SETTINGS** in instrument manual):

- **NOd E**: communication compatible with TX RS485 instruments
- **NOd Ed**: communication compatible with TD RS485 instruments

If **NOd E** 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 **NOd Ed** 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 are available (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
- **Hdrl P**: communication with RIP6100, RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings
- **Hdrl Pn**: communication with RIP6100, 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 hexadecimal 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 **Hdrl 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 **Hdrl Pn** has been set, in addition to what stated in **Hdrl 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 available (see **SERIAL COMMUNICATION SETTINGS** section in instrument manual):

- **Modbus**: communication compatible with instruments series W60000, WL60 Base, WT60 Base, TLA600 Base
- **Mod RTU**: 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 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 (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** ..... umber 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: **\$aaf\ckckCR**

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

Possible instrument responses:

- correct reception: **&aaf\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: **\$axxxxxxy\ckckCR**

where: **xxxxxx** .....6 characters for 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** parameter exceeds the maximum allowable: **&aa\ckckCR**

Example: to set 500 in the setpoint no. 4, the PC must transmit the following command: **\$01000500D40 (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 **NOAUTO**; if, instead, the **ASCII** parameter is set on **NO** **Ed** the gross weight will be read.

**To read the points, set the **FS\_LED** 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 **PA55**, 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**

## 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. TARE ZERO-SETTING

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

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

Possible instrument responses:

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

where: **xxxxxx**.....6 characters to indicate the required weight value

**t**.....character to indicate the weight (116 ASCII)

**Example:** zeroing the weight of the instrument with address 2

For the calibration you have to make sure that the system is unloaded or that the instrument measures a signal equal to the mV in the same condition:

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 actual 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 ASCII string: **\$aasxxxxxxckckCR**

where : **s**.....calibration command (115 ASCII)

**xxxxxx**.....6 characters to indicate the value of sample weight (negative values are not allowed).

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 ASCII string: **\$aaKEYckckCR**

Possible instrument responses:

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

## 10. KEYPAD UNLOCK

The PC transmits the ASCII string: \$aaFREckckCR

Possible instrument responses:

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

## 11. DISPLAY AND KEYPAD LOCK

The PC transmits the 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 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
<b>03 (0x03)</b>	READ HOLDING REGISTER (READ PROGRAMMABLE REGISTERS)
<b>16 (0x10)</b>	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 and 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 <i>(only for BASE program)</i>	-	R
40016	Coefficient L <i>(only for BASE program)</i>	-	R
40017	INPUTS	-	R
40018	OUTPUTS	NO	R/W
40019	SETPOINT 1 H <i>(only for BASE program)</i>	Only after command 99 of the Command Register	R/W
40020	SETPOINT 1 L <i>(only for BASE program)</i>		R/W
40021	SETPOINT 2 H <i>(only for BASE program)</i>		R/W
40022	SETPOINT 2 L <i>(only for BASE program)</i>		R/W
40023	SETPOINT 3 H <i>(only for BASE program)</i>		R/W
40024	SETPOINT 3 L <i>(only for BASE program)</i>		R/W
40025	SETPOINT 4 H <i>(only for BASE program)</i>		R/W
40026	SETPOINT 4 L <i>(only for BASE program)</i>		R/W
40027	SETPOINT 5 H <i>(only for BASE program)</i>		R/W
40028	SETPOINT 5 L <i>(only for BASE program)</i>		R/W
40037	Setpoint class selected by E/EC option <i>(only for BASE program equipped with E/EC option)</i>	-	R
40038	Setpoint class to be set and read <i>(only for BASE program equipped with E/EC option)</i>	NO	R/W
40039	HYSTERESIS 1 H <i>(only for BASE program)</i>	YES	R/W
40040	HYSTERESIS 1 L <i>(only for BASE program)</i>		R/W
40041	HYSTERESIS 2 H <i>(only for BASE program)</i>		R/W
40042	HYSTERESIS 2 L <i>(only for BASE program)</i>		R/W
40043	HYSTERESIS 3 H <i>(only for BASE program)</i>		R/W
40044	HYSTERESIS 3 L <i>(only for BASE program)</i>		R/W
40045	HYSTERESIS 4 H <i>(only for BASE program)</i>		R/W
40046	HYSTERESIS 4 L <i>(only for BASE program)</i>		R/W
40047	HYSTERESIS 5 H <i>(only for BASE program)</i>		R/W
40048	HYSTERESIS 5 L <i>(only for BASE program)</i>		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 <i>(only for WDOS with TOTALS program)</i>	-	R
40062	Totalized weight L <i>(only for WDOS with TOTALS program)</i>	-	R

<b>40063</b>	Number of pieces H ( <i>only for WDESK-L\R, WDESK-LIGHT, WINOX-L\R and WTAB-L\R with counting function activated</i> )	-	R
<b>40064</b>	Number of pieces L ( <i>only for WDESK-L\R, WDESK-LIGHT, WINOX-L\R and WTAB-L\R with counting function activated</i> )	-	R
<b>40065</b>	Sample weight for instrument calibration H	Use with command 101 of the Command Register	R/W
<b>40066</b>	Sample weight for instrument calibration L		R/W
<b>40067</b>	Weight value corresponding to ZERO of the analog output H	YES	R/W
<b>40068</b>	Weight value corresponding to ZERO of the analog output L		R/W
<b>40069</b>	Weight value corresponding to the full scale of the analog output H		R/W
<b>40070</b>	Weight value corresponding to the full scale of the analog output L		R/W
<b>40073</b>	Preset tare H	Use with command 130 of the Command Register	R/W
<b>40074</b>	Preset tare L		R/W

**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.

## STATUS REGISTER (40007)

<b>Bit 0</b>	Load cell error
<b>Bit 1</b>	AD convertor malfunction
<b>Bit 2</b>	Maximum weight exceeded by 9 divisions
<b>Bit 3</b>	Gross weight higher than 110% of full scale
<b>Bit 4</b>	Gross weight beyond 999999 or less than -999999
<b>Bit 5</b>	Net weight beyond 999999 or less than -999999
<b>Bit 6</b>	
<b>Bit 7</b>	Gross weight negative sign
<b>Bit 8</b>	Net weight negative sign
<b>Bit 9</b>	Peak weight negative sign
<b>Bit 10</b>	Net display mode
<b>Bit 11</b>	Weight stability
<b>Bit 12</b>	Weight within $\pm 1/4$ of a division around ZERO
<b>Bit 13</b>	
<b>Bit 14</b>	
<b>Bit 15</b>	

## INSTRUMENT STATUS REGISTER (40050)

<b>0</b>	Instrument in idle condition ( <i>weight displaying</i> )
<b>1</b>	Formulas displaying ( <i>only for BATCHING programs</i> )
<b>2</b>	Batching constants displaying ( <i>only for BATCHING programs</i> )
<b>3</b>	Consumption displaying ( <i>only for BATCHING programs</i> )
<b>4</b>	System parameters displaying
<b>5</b>	Setting of formula number and cycles to batch ( <i>only for BATCHING programs</i> )
<b>6</b>	Instrument in batching condition ( <i>only for BATCHING programs</i> )
<b>7</b>	<b>EMPTY</b> alarm ( <i>only for BATCHING programs</i> )
<b>8</b>	<b>-----</b> alarm ( <i>not available for UNLOAD program</i> )
<b>9</b>	<b>CORSP</b> alarm ( <i>only for BATCHING programs</i> )
<b>10</b>	<b>BAR-EP</b> alarm ( <i>only for BATCHING programs</i> )
<b>11</b>	<ul style="list-style-type: none"> <li>- <b>LOAD</b> alarm (<i>only for LOAD and 3/6/14 PRODUCTS programs</i>)</li> <li>- <b>UNLOAD</b> alarm (<i>only for UNLOAD program</i>)</li> </ul>
<b>12</b>	<ul style="list-style-type: none"> <li>- <b>LOAD/UNLOAD programs</b>: phase elapsing between the opening of the SET and the closing of the CYCLE END</li> <li>- <b>3-6-14 PRODUCTS programs</b>: phase elapsing between the opening of batched product contact and the next product or closing of the CYCLE END</li> </ul>
<b>13</b>	Batching pause ( <i>only for BATCHING programs</i> )
<b>14</b>	Cycle end ( <i>only for BATCHING programs</i> )
<b>15</b>	<b>UNLOAD</b> alarm ( <i>only for LOAD and 3/6/14 PRODUCTS programs</i> )
<b>16</b>	<b>BLRCH</b> alarm ( <i>only for BATCHING programs</i> )
<b>17</b>	
<b>18</b>	<b>FALL</b> alarm ( <i>only for BATCHING programs</i> )
<b>19</b>	
<b>20</b>	

21	
22	
23	
24	<i>ProdPP alarm (only for UNLOAD program)</i>
25	<i>LDL alarm (only for BATCHING programs)</i>
26	Instrument waits for the printing to complete
27	Operating menu displaying <i>(only for BATCHING programs)</i>
28	Setpoint class displaying <i>(only for BASE program)</i>
29	AUTOMATIC LOADING phase <i>(only for UNLOAD program)</i>
30	<i>USB E- alarm (only if OPZWUSBW option is present)</i>
31	<i>SDCH alarm (only for WDOS series instruments)</i>
32	<i>SDCHN alarm (only for WDOS series instruments)</i>
33	<i>E-UEI G alarm (only for BATCHING programs)</i>
34	<i>PEPFUL alarm (only if OPZWUSBW or OPZWDTIPC options are present)</i>
35	<i>PEPDUR alarm (only if OPZWUSBW or OPZWDTIPC options are present)</i>
36	Partial unloading at cycle end phase <i>(only for 3/6/14 PRODUCTS and OPZWSCARI programs)</i>
37	Waiting for confirmation by the operator to run the partial unloading at cycle end <i>(only for 3/6/14 PRODUCTS and OPZWSCARP programs)</i>
38	The operator is starting an automatic batching <i>(only for BATCHING programs)</i>
39	The operator is starting a manual batching <i>(only for BATCHING programs)</i>
40	<i>SLRUE alarm (only for BATCHING programs)</i>
41	Partial unloading at cycle end phase <i>(only for 3/6/14 PRODUCTS and OPZWSCARP programs)</i>

**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 section **OUTPUTS AND INPUTS CONFIGURATION**); 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 divisions (parameter *dl Ul 5*) and of the units of measure (parameter *Unl L*).

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	Coefficient effect on the read gross weight
0	Kilograms	No effect
1	Grams	No effect
2	Tons	No effect
3	Pounds	No effect
4	Newton	Multiplies
5	Litres	Divides
6	Bar	Multiplies
7	Atmospheres	Multiplies
8	Pieces	Divides
9	Newton Metres	Multiplies
10	Kilogram Metres	Multiplies
11	Other	Multiplies

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

0	No command	1	
6		7	SEMI-AUTOMATIC TARE enabling (net weight displaying)
8	SEMI-AUTOMATIC ZERO	9	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
20		21	Keypad lock
22	Keypad and display unlock	23	Keypad and display lock
98		99	Save data in EEPROM <ul style="list-style-type: none"> <li>Only for BASE program: saving the setpoint in EEPROM into class set in the register 40038</li> </ul>
100	TARE WEIGHT ZERO SETTING for calibration	101	Save first sample weight for calibration
104	Real calibration cancellation	106	Add sample weight for calibration
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 <i>LA-EP</i> (not available for UNLOAD program)	207^^	Batching: ignores the alarm <i>LDL</i>
208	Interruption of the AUTOMATIC LOADING (only for UNLOAD program)	209	Batching: continues when the message <i>CONFAnd</i> appears or if STATUS REGISTER=12 (only if <i>CONFAnd=YES</i> )
250	Confirmation of batching data reading	251	
2000^	See note		



- \*\*)
- 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.
- ^)
- 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 **LDL** alarm, it is possible to ignore the alarm and continue the batching by sending the command 207; for the **LR-EP** 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.

### **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).

## REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system and send its value to the registers 40065-40066.
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



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 ( $100 / 0.001 = 100000$ ).



In order to correctly set a sample weight of negative value, it is necessary to consider the registers "Sample weight for instrument calibration" (40065–40066) as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the values indicated in the table in the registers "Sample weight for instrument calibration".

REGISTER	DESCRIPTION	VALUE	
		HEX	DECIMAL
40065	Sample weight for instrument calibration H	0xFFFF	-1
40066	Sample weight for instrument calibration L	0xFFC8	-56

## 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.

## 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**.

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	<i>for 3/6/14 PRODUCTS program</i>	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	<b>Product No.</b>
				40054	<b>Step No.</b>
				40055	<b>Formula No.</b>
	<i>for LOAD and UNLOAD programs</i>	2000	2001	40051	Quantity H
				40052	Quantity L
				40053	<b>1 = Set 2 = Preset</b>
				40054	<b>1 = Set 2 = Preset</b>
				40055	<b>Formula No.</b>
TOTAL SET BY FORMULA	<i>OPZWQMC option: for 3/6/14 PRODUCTS and LOAD programs</i>	2002	2003	40051	Quantity H
	<i>OPZFORPERC option: for 3/6/14 PRODUCTS program</i>			40052	Quantity L
				40053	<b>Formula No.</b>
TOTALS MANAGEMENT	<i>for W200, W200BOX, WDESK-L\IR, WINOX-L\IR only for 3/6/14 PRODUCTS program</i>	2020		40051	Quantity H
				40052	Quantity L
				40053	<b>Product No.</b>
				40054	<b>1 = Consumption</b>
	<i>for W200, W200BOX, WDESK-L\IR, WINOX-L\IR only for LOAD and UNLOAD programs</i>	2020		40051	Quantity H
				40052	Quantity L
				40053	<b>Formula No.</b>
				40054	<b>1 = Consumption</b>

TOTALS MANAGEMENT	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 **FSLEEP = 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 **FSLEEP = 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 **SLARE** and continues the sequence of batching.

Content of the register Detail value:

<b>Bit 0</b>	Negative value	<b>Bit 1</b>	
<b>Bit 2</b>		<b>Bit 3</b>	
<b>Bit 4</b>		<b>Bit 5</b>	
<b>Bit 6</b>		<b>Bit 7</b>	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	<i>ENPEY</i>
3	<i>PARFOR</i>
4	<i>EREP</i> (not available for UNLOAD program)
5	<i>CONSP</i>
6	<i>BLACH</i>
7	<i>EDL</i>
8	- <i>LOAD</i> (for LOAD and 3/6/14 PRODUCTS programs) - <i>UNLOAD</i> (for UNLOAD program)
9	<i>UNLOAD</i> (only for LOAD and 3/6/14 PRODUCTS programs)
10	
11	
12	Batching STOP
13	<i>ERUEIG</i>
14	<i>FALL</i>
15	<i>SLAE</i>
16	
17	
18	
19	
20	
21	
22	<i>ProdPP</i> (only for UNLOAD program)
23	<i>LOAD</i> : AUTOMATIC LOADING function (only for UNLOAD program)
24	<i>ER EDL</i> (OPZWQMC option)
25	<i>SEDOCH</i> (only for WDOS series instruments)
26	<i>SEDOCHP</i> (only for WDOS series instruments)
27	<i>USB ER</i> (only for OPZWUSBW_ option)
28	<i>PEPFUL</i> (only for OPZWUSBW_ and OPZWATIPC options)
29	<i>PEPOUR</i> (only for OPZWUSBW_ and OPZWATIPC 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 h10 h00 h02 h40 h0D**

Query field name	hex	Response field name	hex
Instrument address	<b>h01</b>	Instrument address	<b>h01</b>
Function	<b>h10</b>	Function	<b>h10</b>
Address of the first register H	<b>h00</b>	Address of the first register H	<b>h00</b>
Address of the first register L	<b>h12</b>	Address of the first register L	<b>h12</b>
Number of registers H	<b>h00</b>	Number of registers H	<b>h00</b>
Number of registers L	<b>h02</b>	Number of registers L	<b>h02</b>
Byte count	<b>h04</b>	CRC16 L	<b>hE1</b>
Datum 1 H	<b>h00</b>	CRC16 H	<b>hCD</b>
Datum 1 L	<b>h00</b>		
Datum 2 H	<b>h07</b>		
Datum 2 L	<b>hD0</b>		
CRC16 L	<b>h70</b>		
CRC16 H	<b>hD6</b>		

## 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	<b>h01</b>	Instrument address	<b>h01</b>
Function	<b>h10</b>	Function	<b>h10</b>
Address of the first register H	<b>h00</b>	Address of the first register H	<b>h00</b>
Address of the first register L	<b>h12</b>	Address of the first register L	<b>h12</b>
Number of registers H	<b>h00</b>	Number of registers H	<b>h00</b>
Number of registers L	<b>h04</b>	Number of registers L	<b>h04</b>
Byte count	<b>h08</b>	CRC16 L	<b>h61</b>
Datum 1 H	<b>h00</b>	CRC16 H	<b>hCF</b>
Datum 1 L	<b>h00</b>		
Datum 2 H	<b>h07</b>		
Datum 2 L	<b>hD0</b>		
Datum 3 H	<b>h00</b>		
Datum 3 L	<b>h00</b>		
Datum 4 H	<b>h0B</b>		
Datum 4 L	<b>hB8</b>		
CRC16 L	<b>h49</b>		
CRC16 H	<b>h65</b>		

### 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 h08 h00 h00 h0F hA0 h00 h00 h0B hB8 h12 h73**

Query field name	hex	Response field name	hex
Instrument address	<b>h01</b>	Instrument address	<b>h01</b>
Function	<b>h03</b>	Function	<b>h03</b>
Address of the first register H	<b>h00</b>	Byte count	<b>h08</b>
Address of the first register L	<b>h07</b>	Datum 1 H	<b>h00</b>
Number of registers H	<b>h00</b>	Datum 1 L	<b>h00</b>
Number of registers L	<b>h04</b>	Datum 2 H	<b>h0F</b>
CRC16 L	<b>hF5</b>	Datum 2 L	<b>hA0</b>
CRC16 H	<b>hC8</b>	Datum 3 H	<b>h00</b>
		Datum 3 L	<b>h00</b>
		Datum 4 H	<b>h0B</b>
		Datum 4 L	<b>hB8</b>
		CRC16 L	<b>h12</b>
		CRC16 H	<b>h73</b>

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

# CANOPEN

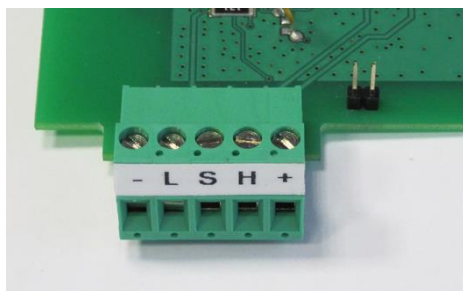
## TECHNICAL SPECIFICATIONS AND CONNECTIONS

<b>Baud rate [kb/s]</b>	10, 20, 25*, 50, 100*, 125, 250, 500, 800, 1000
<b>Node ID</b>	1÷99

\*Obsolete

-	⊗	⊐	CAN -
L	⊗	⊐	CAN L
S	⊗	⊐	CAN SHIELD
H	⊗	⊐	CAN H
+	⊗	⊐	CAN +

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



terminal and jumper for  
W200/W200BOX and WDOS instruments

### D-SUB 9P FEMALE

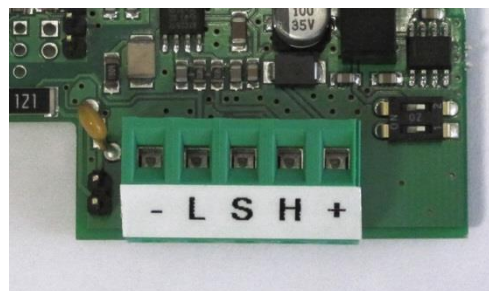
2 = CAN L  
3 = CAN -  
5 = CAN SHIELD  
7 = CAN H

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  
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** → **CA<sub>n</sub>OP<sub>n</sub>**

- **Addr** (default: 1): set the instrument address in the CANopen network
- **baud** (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.

## PC/PLC SETUP

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 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 = 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

<b>Bit 0</b>	Load cell error
<b>Bit 1</b>	AD convertor malfunction
<b>Bit 2</b>	Maximum weight exceeded by 9 divisions
<b>Bit 3</b>	Gross weight higher than 110% of full scale
<b>Bit 4</b>	Gross weight beyond 999999 or less than -999999
<b>Bit 5</b>	Net weight beyond 999999 or less than -999999
<b>Bit 6</b>	
<b>Bit 7</b>	Gross weight negative sign
<b>Bit 8</b>	Net weight negative sign
<b>Bit 9</b>	Peak weight negative sign
<b>Bit 10</b>	Net display mode
<b>Bit 11</b>	Weight stability
<b>Bit 12</b>	Weight within $\pm 1/4$ of a division around ZERO
<b>Bit 13</b>	
<b>Bit 14</b>	
<b>Bit 15</b>	

## POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

<b>0</b>	No command	<b>1</b>	
<b>6</b>		<b>7</b>	SEMI-AUTOMATIC TARE enabling (net weight displaying)
<b>8</b>	SEMI-AUTOMATIC ZERO	<b>9</b>	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
<b>20</b>		<b>21</b>	Keypad lock
<b>22</b>	Keypad and display unlock	<b>23</b>	Keypad and display lock
		<b>87**</b>	Preset tare reading
<b>88**</b>	Preset tare writing	<b>89</b>	
<b>90**</b>	Setpoint 1 reading	<b>91**</b>	Setpoint 2 reading
<b>92**</b>	Setpoint 3 reading	<b>93**</b>	Setpoint 1 writing
<b>94**</b>	Setpoint 2 writing	<b>95**</b>	Setpoint 3 writing
<b>98</b>		<b>99</b>	Save data in EEPROM
<b>100</b>	TARE WEIGHT ZERO SETTING for calibration	<b>101</b>	Save first sample weight for calibration
<b>102**</b>	Sample Weight reading	<b>103**</b>	Sample Weight writing
<b>104</b>	Real calibration cancellation	<b>106</b>	Add sample weight for calibration
<b>130</b>	Preset tare enabling	<b>131</b>	
<b>132**</b>	PTARE1 reading***	<b>133**</b>	PTARE1 writing***
<b>134**</b>	PTARE2 reading***	<b>135**</b>	PTARE2 writing***
<b>136**</b>	PTARE3 reading***	<b>137**</b>	PTARE3 writing***
<b>138**</b>	PTARE4 reading***	<b>139**</b>	PTARE4 writing***
<b>140**</b>	PTARE5 reading***	<b>141**</b>	PTARE5 writing***
<b>142**</b>	PTARE6 reading***	<b>143**</b>	PTARE6 writing***
<b>144**</b>	PTARE7 reading***	<b>145**</b>	PTARE7 writing***
<b>146**</b>	PTARE8 reading***	<b>147**</b>	PTARE8 writing***
<b>148**</b>	PTARE9 reading***	<b>149**</b>	PTARE9 writing***
<b>150**</b>	Setpoint 4 reading	<b>151**</b>	Setpoint 5 reading
<b>160**</b>	Setpoint 4 writing	<b>161**</b>	Setpoint 5 writing

**\*\*) 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.**



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.



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.

## Preset tare

Write the preset tare value through the command 88 "Write preset tare".

Send the command 130 "Enable preset tare" to enable the preset tare.

## REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system, write its value into the Exchange Register and send the command 103 "Sample Weight writing" to the Command Register;
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



In order to correctly set a sample weight of negative value, it is necessary to consider the Exchange Register as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the value indicated in the table in the Exchange Register.

REGISTER	VALUE	
	HEX	DECIMAL
Exchange Register	0xFFFF FFC8	-56

# DEVICENET

## TECHNICAL SPECIFICATIONS AND CONNECTIONS

<b>Baud rate [kb/s]</b>	125, 250, 500
<b>Addresses</b>	1÷63

-	⊗	⊐	CAN -
L	⊗	⊐	CAN L
S	⊗	⊐	CAN SHIELD
H	⊗	⊐	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:

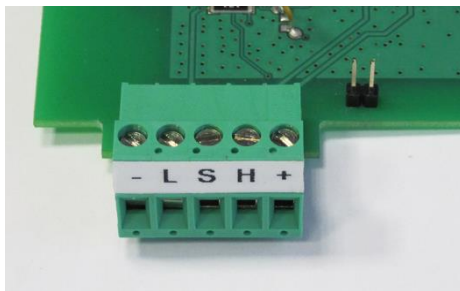
W200/W200BOX, WDOS, WDESK-P,  
WDESK-X, WINOX-P, WINOX-X

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** (default: 1): set the instrument address in the DeviceNet network
- **baud** (default: 125 kb/s): set the instrument baud rate in the DeviceNet network
- **SWAP** (default: *n0*): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - **YES**: BIG ENDIAN
  - **n0**: 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 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 = 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

<b>Bit 0</b>	Load cell error
<b>Bit 1</b>	AD convertor malfunction
<b>Bit 2</b>	Maximum weight exceeded by 9 divisions
<b>Bit 3</b>	Gross weight higher than 110% of full scale
<b>Bit 4</b>	Gross weight beyond 999999 or less than -999999
<b>Bit 5</b>	Net weight beyond 999999 or less than -999999
<b>Bit 6</b>	
<b>Bit 7</b>	Gross weight negative sign
<b>Bit 8</b>	Net weight negative sign
<b>Bit 9</b>	Peak weight negative sign
<b>Bit 10</b>	Net display mode
<b>Bit 11</b>	Weight stability
<b>Bit 12</b>	Weight within $\pm 1/4$ of a division around ZERO
<b>Bit 13</b>	
<b>Bit 14</b>	
<b>Bit 15</b>	

## POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

<b>0</b>	No command	<b>1</b>	
<b>6</b>		<b>7</b>	SEMI-AUTOMATIC TARE enabling (net weight displaying)
<b>8</b>	SEMI-AUTOMATIC ZERO	<b>9</b>	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
<b>20</b>		<b>21</b>	Keypad lock
<b>22</b>	Keypad and display unlock	<b>23</b>	Keypad and display lock
		<b>87**</b>	Preset tare reading
<b>88**</b>	Preset tare writing	<b>89</b>	
<b>90**</b>	Setpoint 1 reading	<b>91**</b>	Setpoint 2 reading
<b>92**</b>	Setpoint 3 reading	<b>93**</b>	Setpoint 1 writing
<b>94**</b>	Setpoint 2 writing	<b>95**</b>	Setpoint 3 writing
<b>98</b>		<b>99</b>	Save data in EEPROM
<b>100</b>	TARE WEIGHT ZERO SETTING for calibration	<b>101</b>	Save first sample weight for calibration
<b>102**</b>	Sample Weight reading	<b>103**</b>	Sample Weight writing
<b>104</b>	Real calibration cancellation	<b>106</b>	Add sample weight for calibration
<b>130</b>	Preset tare enabling	<b>131</b>	
<b>132**</b>	PTARE1 reading***	<b>133**</b>	PTARE1 writing***
<b>134**</b>	PTARE2 reading***	<b>135**</b>	PTARE2 writing***
<b>136**</b>	PTARE3 reading***	<b>137**</b>	PTARE3 writing***
<b>138**</b>	PTARE4 reading***	<b>139**</b>	PTARE4 writing***
<b>140**</b>	PTARE5 reading***	<b>141**</b>	PTARE5 writing***
<b>142**</b>	PTARE6 reading***	<b>143**</b>	PTARE6 writing***
<b>144**</b>	PTARE7 reading***	<b>145**</b>	PTARE7 writing***
<b>146**</b>	PTARE8 reading***	<b>147**</b>	PTARE8 writing***
<b>148**</b>	PTARE9 reading***	<b>149**</b>	PTARE9 writing***
<b>150**</b>	Setpoint 4 reading	<b>151**</b>	Setpoint 5 reading
<b>160**</b>	Setpoint 4 writing	<b>161**</b>	Setpoint 5 writing

**\*\*)** 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.



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.



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.

## Preset tare

Write the preset tare value through the command 88 "Write preset tare".

Send the command 130 "Enable preset tare" to enable the preset tare.

## REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system, write its value into the Exchange Register and send the command 103 "Sample Weight writing" to the Command Register;
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



In order to correctly set a sample weight of negative value, it is necessary to consider the Exchange Register as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the value indicated in the table in the Exchange Register.

<b>REGISTER</b>	<b>VALUE</b>	
	<b>HEX</b>	<b>DECIMAL</b>
Exchange Register	0xFFFF FFC8	-56

## ETHERNET TCP/IP

### TECHNICAL SPECIFICATIONS

<b>Port</b>	RJ45 10Base-T or 100Base-TX (auto-detect)
<b>Link led indications (RJ45 – left side)</b>	off..... No link amber ..... 10 Mb/s green ..... 100 Mb/s
<b>Activity led indications (RJ45 – right side)</b>	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*

- *IPAddr* (default: 192.8.0.141): set instrument IP address
- *Subnet* (default: 255.255.255.0): set instrument Subnet Mask
- *Gateway* (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.
  - *Modbus*
  - *Mod Et*
  - *Cont n*: continuous weight transmission protocol, at the frequency set in *HEt2* item (from 10 to 300).
    - *Mod Et* (set: *Parl Et*=*none*, *StOp*= 1)
    - *Mod Et* (set: *Parl Et*=*none*, *StOp*= 1)
  - *rIP*: continuous weight transmission protocol to RIP5/20/60, RIP50SHA, RIPLD series remote displays; the remote display shows the net weight or gross weight according to its settings (set: *bAud*=9600, *Parl Et*=*none*, *StOp*= 1).
  - *HdriP*: continuous weight transmission protocol to RIP6100, RIP675, RIP6125C series remote displays; the remote display shows the net weight or gross weight according to its settings (set: *bAud*=9600, *Parl Et*=*none*, *StOp*= 1).



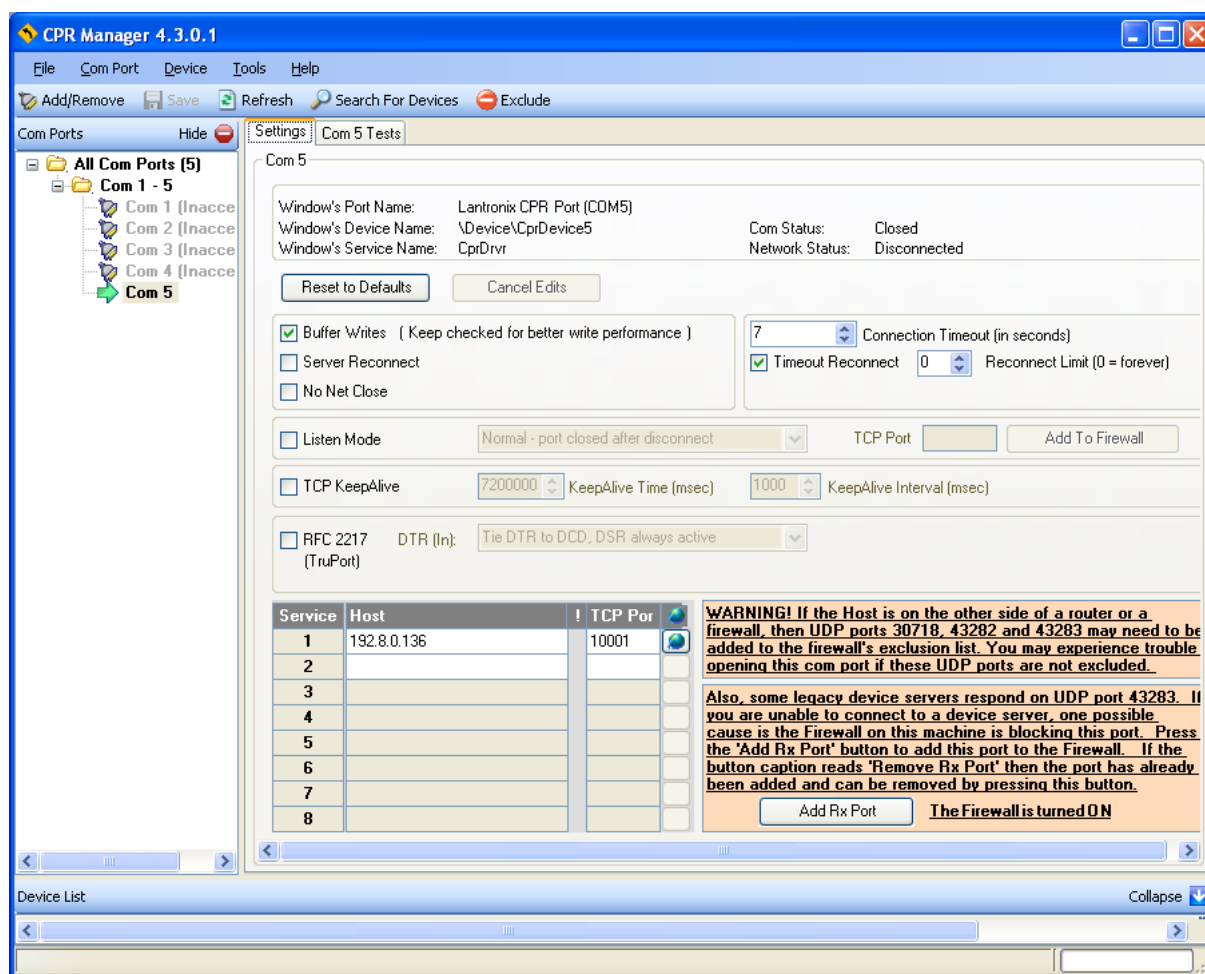
- **Hdrl Pn**: continuous weight transmission protocol to RIP6100, RIP675, RIP6125C series remote displays (set: **bAUD=9600**, **PARLTY=none**, **STOP= 1**), when the remote display is set to gross weight:
  - if the instrument displays the gross weight, the remote display shows the gross weight.
  - if the instrument shows the net weight, the remote display shows the net weight alternated with the message **nEt**.
- **UEb5rU**: see section **WEBSITE**.
- **Addr**: instrument address (from 1 to 99; default: 1).
- **HErt2**: maximum transmission frequency (10 – 20 – 30 – 40 – 50 – 60 – 70 – 80 – 100 – 200 – 300; default: 10); to be set when the **Cont 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.

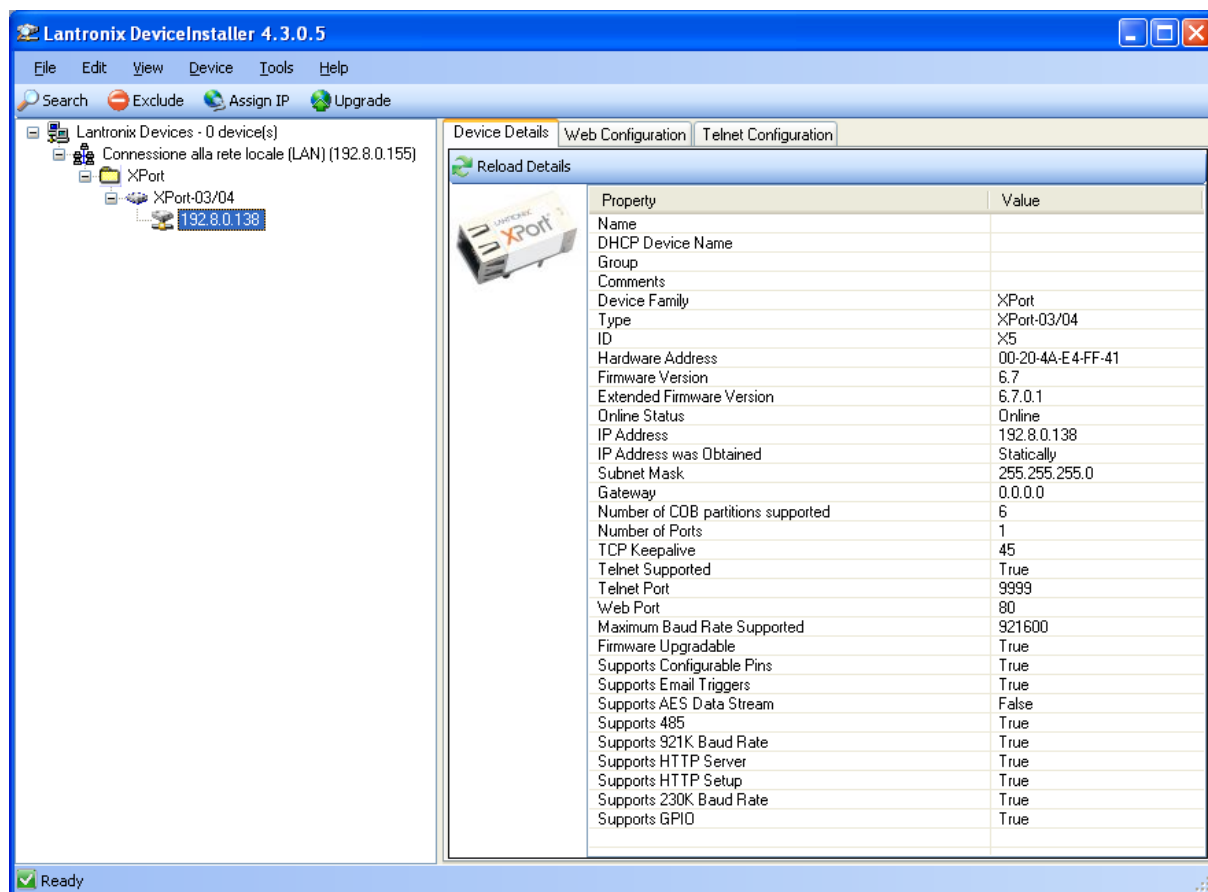


Use the just created virtual COM port to communicate with the instrument, using the protocol selected on it.

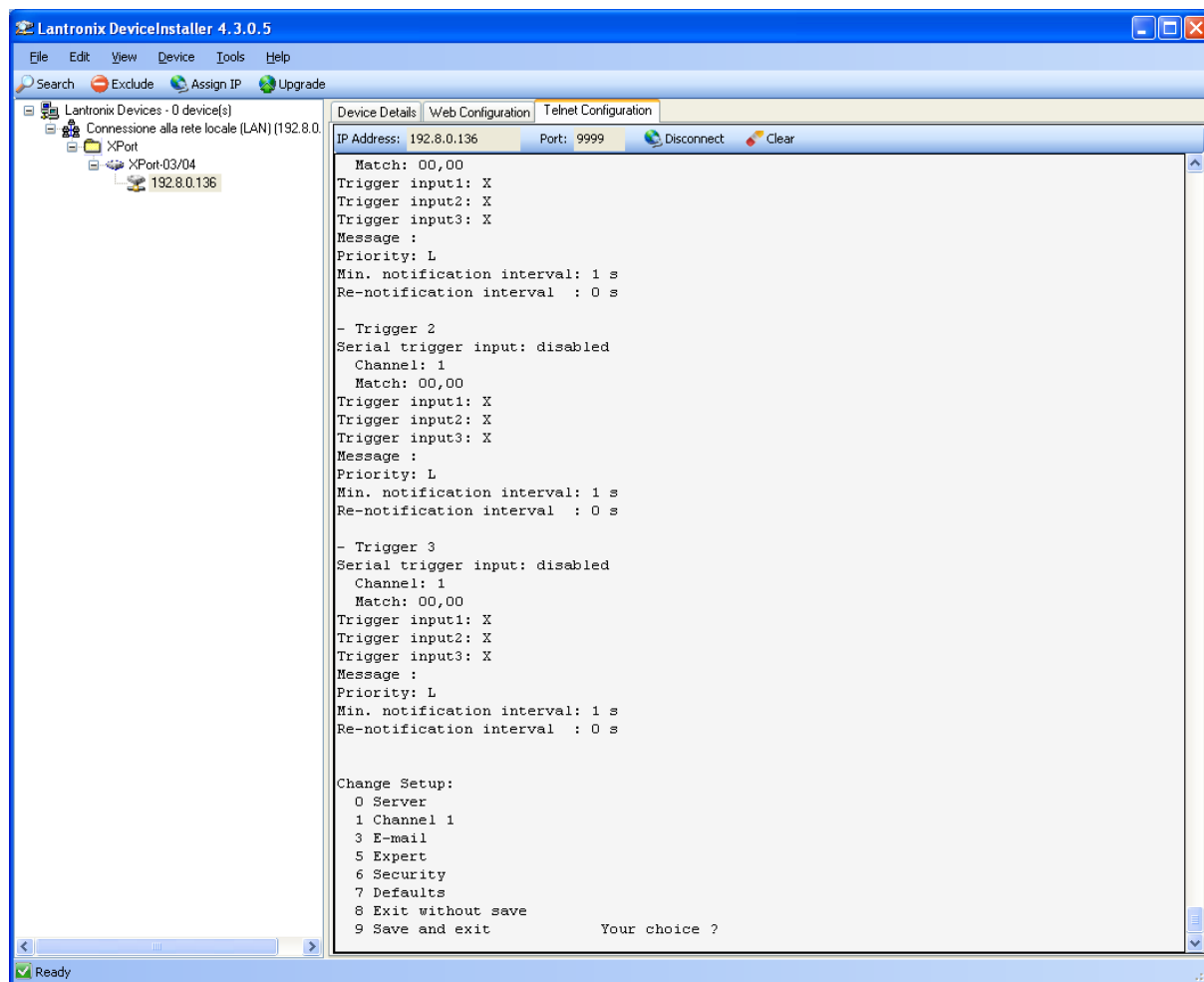
Alternatively connect to the instrument using a socket (e.g.: Winsock) on port 10001.

## 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:



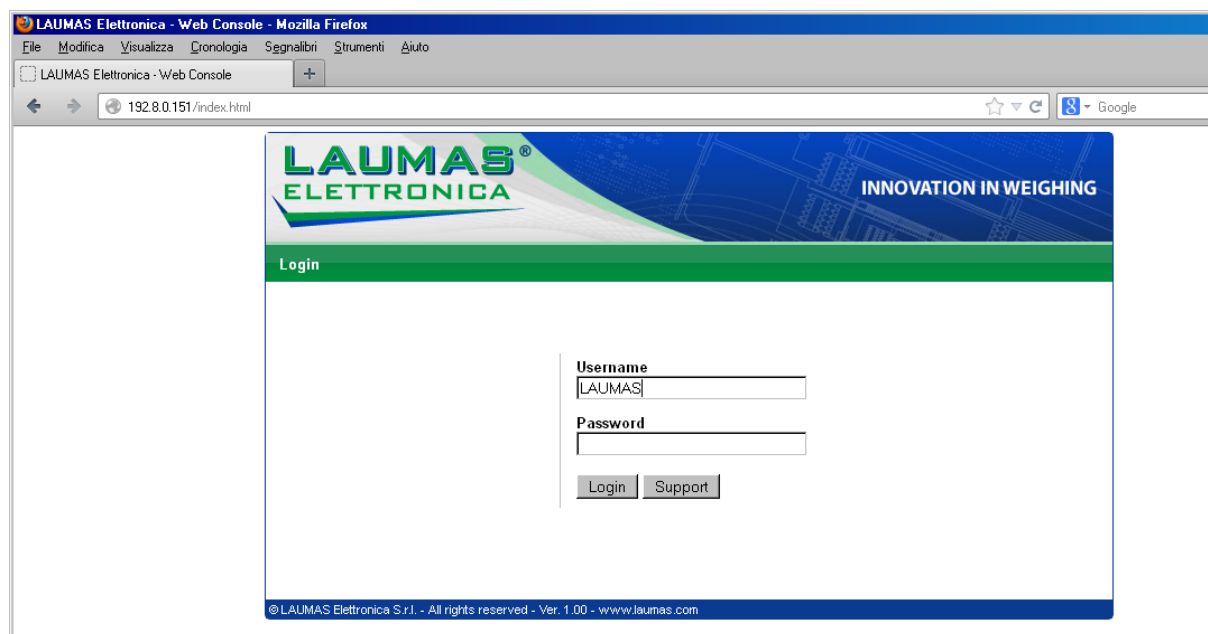
Select the found device and click on Telnet Configuration tab; click on Connect, and then press Enter on keyboard.



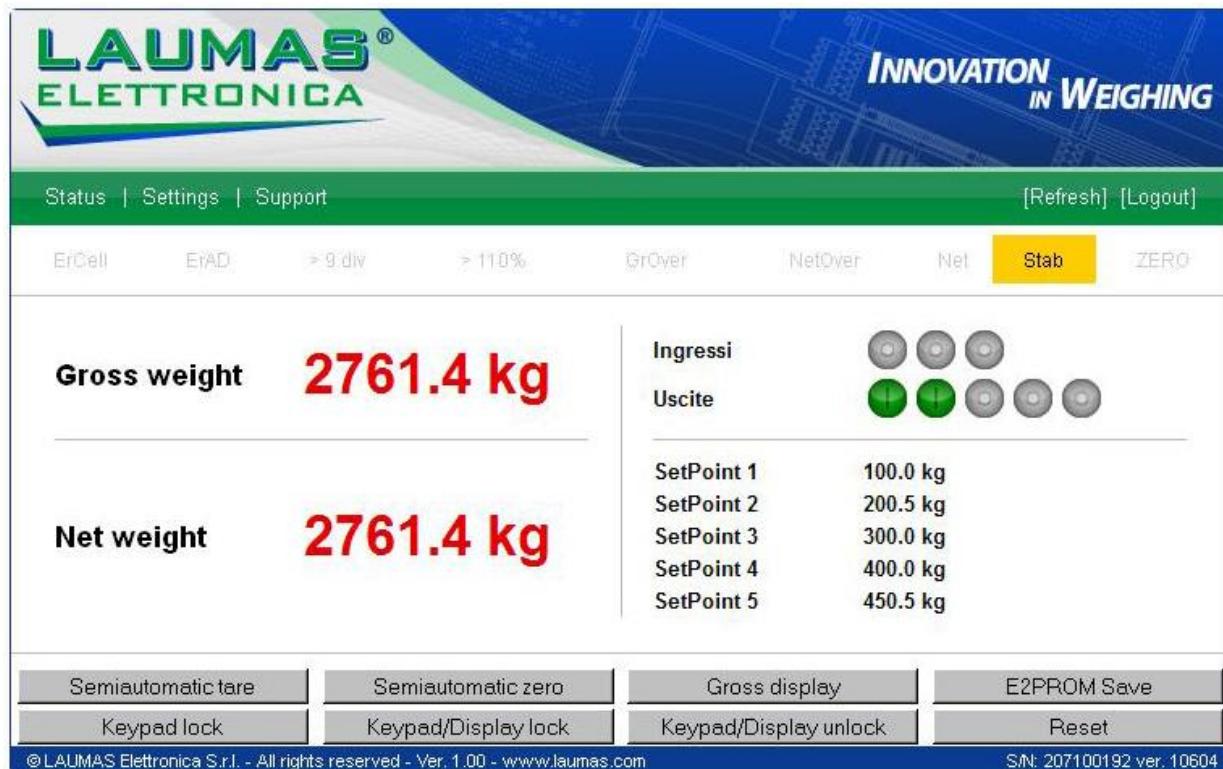
Press 0 to change server settings: change only the 4 fields of IP address and confirm the other parameters by pressing Enter. Set a static IP address.

## WEBSITE

Set **WEBS-UI** operation mode (into **EEHnEE** 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:



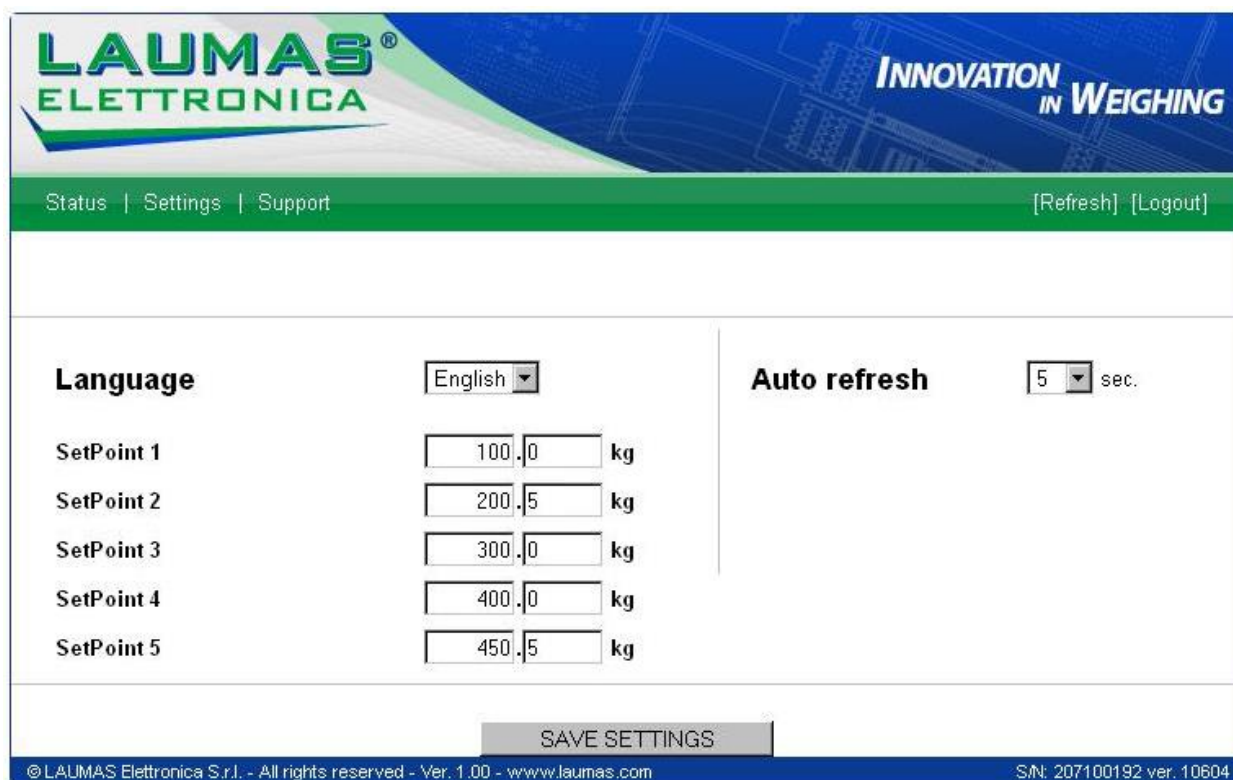
In case of incorrect parameter setting, the “INSTRUMENT DATA READING ERROR” message is displayed.

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:



**LAUMAS<sup>®</sup>**  
**ELETRONICA**

**INNOVATION  
IN WEIGHING**

Status | Settings | Support [Refresh] [Logout]

**Language** English

**Auto refresh** 5 sec.

**SetPoint 1** 100.0 kg

**SetPoint 2** 200.5 kg

**SetPoint 3** 300.0 kg

**SetPoint 4** 400.0 kg

**SetPoint 5** 450.5 kg

**SAVE SETTINGS**

© LAUMAS Elettronica S.r.l. - All rights reserved - Ver. 1.00 - www.laumas.com S/N: 207100192 ver. 10604

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

<b>Port</b>	RJ45 10Base-T or 100Base-TX (auto-detect)
<b>Link led indications (RJ45 – left side)</b>	off .....No link amber .....10 Mb/s green .....100 Mb/s
<b>Activity led indications (RJ45 – right side)</b>	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: *n0*): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - *YES*: BIG ENDIAN
  - *n0*: LITTLE ENDIAN
- *IPAddr* (default: 192.8.0.141): set instrument IP address
- *SubnEt* (default: 255.255.255.0): set instrument Subnet Mask
- *GAUARY* (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 *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

<b>Bit 0</b>	INPUT 1 status
<b>Bit 1</b>	INPUT 2 status
<b>Bit 2</b>	INPUT 3 status
<b>Bit 3</b>	
<b>Bit 4</b>	
<b>Bit 5</b>	
<b>Bit 6</b>	
<b>Bit 7</b>	

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

#### DIGITAL OUTPUTS STATUS

<b>Bit 0</b>	OUTPUT 1 status
<b>Bit 1</b>	OUTPUT 2 status
<b>Bit 2</b>	OUTPUT 3 status
<b>Bit 3</b>	OUTPUT 4 status
<b>Bit 4</b>	OUTPUT 5 status
<b>Bit 5</b>	
<b>Bit 6</b>	
<b>Bit 7</b>	

#### DIGITAL OUTPUTS COMMAND

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

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

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



Setting bit 15 to 1 on the PLC, the *scanner* Ethernet/IP takes control of all the outputs, whatever their setting.

## STATUS REGISTER

<b>Bit 0</b>	Load cell error
<b>Bit 1</b>	AD convertor malfunction
<b>Bit 2</b>	Maximum weight exceeded by 9 divisions
<b>Bit 3</b>	Gross weight higher than 110% of full scale
<b>Bit 4</b>	Gross weight beyond 999999 or less than -999999
<b>Bit 5</b>	Net weight beyond 999999 or less than -999999
<b>Bit 6</b>	
<b>Bit 7</b>	Gross weight negative sign
<b>Bit 8</b>	Net weight negative sign
<b>Bit 9</b>	Peak weight negative sign
<b>Bit 10</b>	Net display mode
<b>Bit 11</b>	Weight stability
<b>Bit 12</b>	Weight within $\pm 1/4$ of a division around ZERO
<b>Bit 13</b>	
<b>Bit 14</b>	
<b>Bit 15</b>	

## POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

<b>0</b>	No command	<b>1</b>	
<b>6</b>		<b>7</b>	SEMI-AUTOMATIC TARE enabling (net weight displaying)
<b>8</b>	SEMI-AUTOMATIC ZERO	<b>9</b>	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
<b>20</b>		<b>21</b>	Keypad lock
<b>22</b>	Keypad and display unlock	<b>23</b>	Keypad and display lock
		<b>87**</b>	Preset tare reading
<b>88**</b>	Preset tare writing	<b>89</b>	
<b>90**</b>	Setpoint 1 reading	<b>91**</b>	Setpoint 2 reading
<b>92**</b>	Setpoint 3 reading	<b>93**</b>	Setpoint 1 writing
<b>94**</b>	Setpoint 2 writing	<b>95**</b>	Setpoint 3 writing
<b>98</b>		<b>99</b>	Save data in EEPROM
<b>100</b>	TARE WEIGHT ZERO SETTING for calibration	<b>101</b>	Save first sample weight for calibration
<b>102**</b>	Sample Weight reading	<b>103**</b>	Sample Weight writing
<b>104</b>	Real calibration cancellation	<b>106</b>	Add sample weight for calibration
<b>130</b>	Preset tare enabling	<b>131</b>	
<b>132**</b>	PTARE1 reading***	<b>133**</b>	Scrittura PTARE1***
<b>134**</b>	PTARE2 reading***	<b>135**</b>	Scrittura PTARE2***
<b>136**</b>	PTARE3 reading***	<b>137**</b>	Scrittura PTARE3***
<b>138**</b>	PTARE4 reading***	<b>139**</b>	Scrittura PTARE4***
<b>140**</b>	PTARE5 reading***	<b>141**</b>	Scrittura PTARE5***
<b>142**</b>	PTARE6 reading***	<b>143**</b>	Scrittura PTARE6***
<b>144**</b>	PTARE7 reading***	<b>145**</b>	Scrittura PTARE7***
<b>146**</b>	PTARE8 reading***	<b>147**</b>	Scrittura PTARE8***
<b>148**</b>	PTARE9 reading***	<b>149**</b>	Scrittura PTARE9***
<b>150**</b>	Setpoint 4 reading	<b>151**</b>	Setpoint 5 reading
<b>160**</b>	Setpoint 4 writing	<b>161**</b>	Setpoint 5 writing

**\*\*)** 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.



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.



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.

## Preset tare

Write the preset tare value through the command 88 "Write preset tare".

Send the command 130 "Enable preset tare" to enable the preset tare.

## REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system, write its value into the Exchange Register and send the command 103 "Sample Weight writing" to the Command Register;
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



In order to correctly set a sample weight of negative value, it is necessary to consider the Exchange Register as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the value indicated in the table in the Exchange Register.

<b>REGISTER</b>	<b>VALUE</b>	
	<b>HEX</b>	<b>DECIMAL</b>
Exchange Register	0xFFFF FFC8	-56

# MODBUS/TCP

## TECHNICAL SPECIFICATIONS

<b>Port</b>	RJ45 10Base-T or 100Base-TX (auto-detect)
<b>Link led indications (RJ45 – left side)</b>	off .....No link amber .....10 Mb/s green .....100 Mb/s
<b>Activity led indications (RJ45 – right side)</b>	off .....No activity amber .....Half Duplex green .....Full Duplex

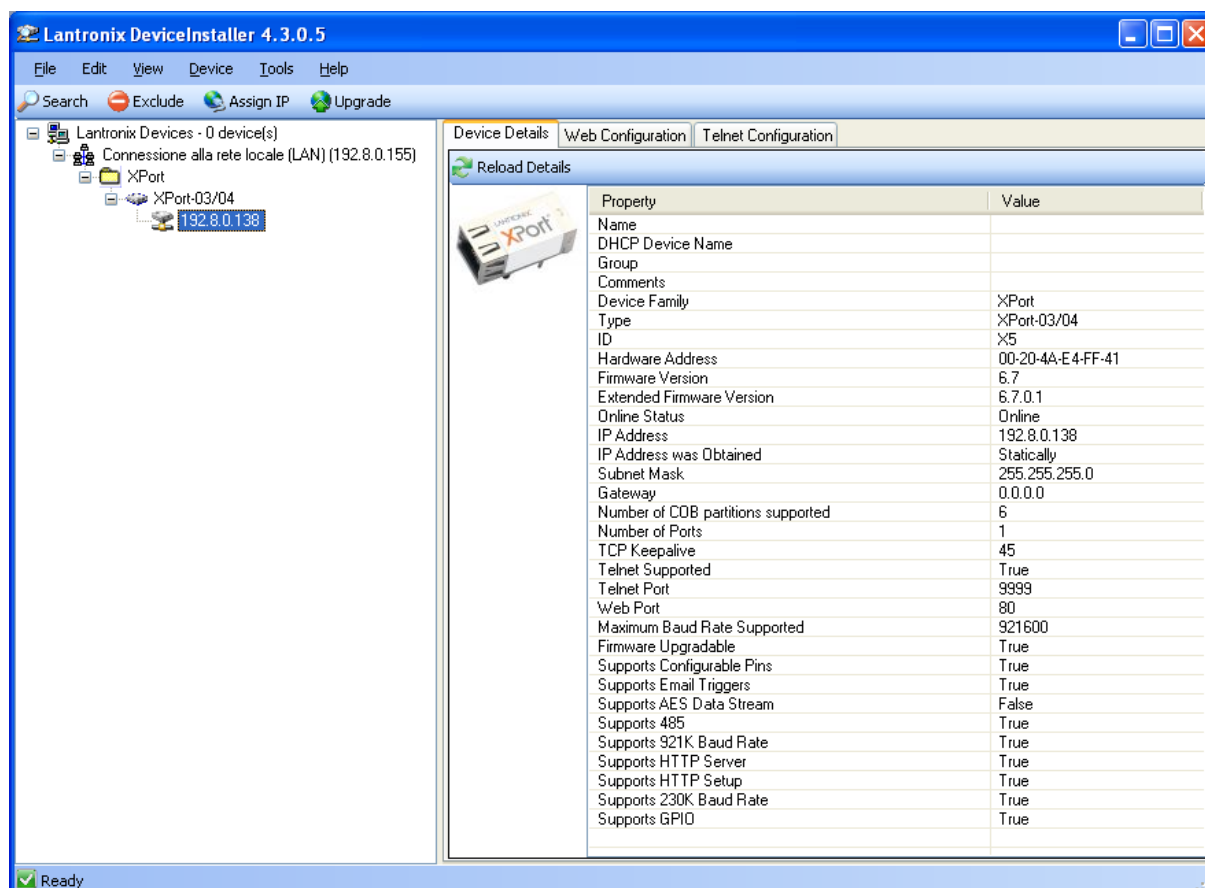
The instrument features a Modbus/TCP port that allows to exchange the weight and the main parameters with a Modbus/TCP *master*.

## PC/PLC SETUP

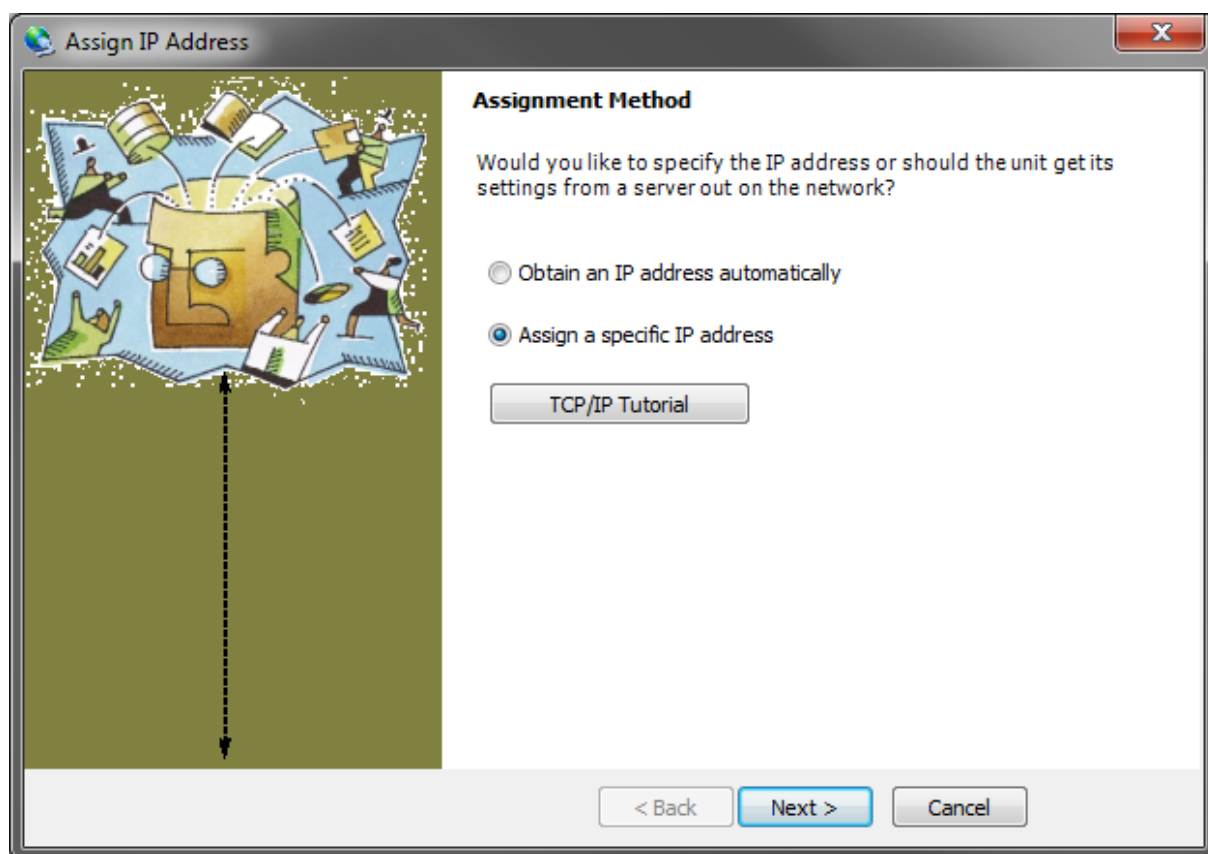
The instrument works as *slave* in a Modbus/TCP network. Use port 502 for the communication.

## 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.



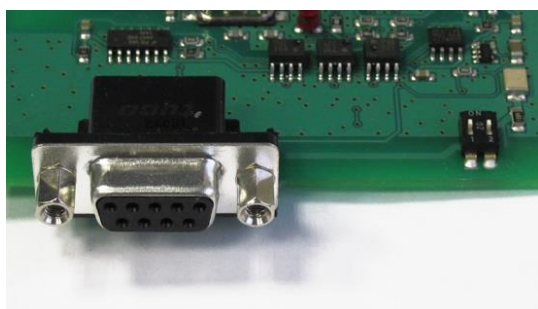
Select Assign a specific IP address, enter the desired values and click on Assign; wait for the procedure to complete (no need to restart the instrument).

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

## PROFIBUS-DP

### TECHNICAL SPECIFICATIONS AND CONNECTIONS

<b>Baud rate</b>	Up to 12 Mb/s
<b>Addresses</b>	1÷99
<b>Profibus status led indications</b>	slow blinking .....Profibus error fast blinking.....Profibus OK



connector and dip switch for  
W200 and WDOS instrument



terminal and dip switch for  
W200BOX, 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 WDOS WDESK-D WINOX-D WTAB	W200BOX 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** → *PrOFl*

- **Addr** (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.

## PC/PLC SETUP

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 FSAAn Weight	Full Scale Weight-Analog Output	R/W*	4 byte / 4 byte



W BASE InstrStatus	Instrument status register	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 FSAAn W	Full Scale Weight-Analog Output	R/W*	4 byte / 4 byte
W BATCHING InstrStatus	Instrument status register	R	2 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 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 divisions (*dl Ul 5* parameter) and of the units of measure (*Unit L* parameter).

H Byte	L Byte
Unit of measure	Division

Use this module together with the Display coefficient module 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	Coefficient effect on the read gross weight
0	Kilograms	No effect
1	Grams	No effect
2	Tons	No effect
3	Pounds	No effect
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

**DISPLAY COEFFICIENT:** contains the *COEFF* parameter value expressed as positive integer number, including 4 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)

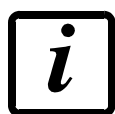
Bit 0	OUTPUT 1 status
Bit 1	OUTPUT 2 status
Bit 2	OUTPUT 3 status
Bit 3	OUTPUT 4 status
Bit 4	OUTPUT 5 status
Bit 5	
Bit 6	
Bit 7	

## DIGITAL OUTPUTS COMMAND

It allows to control the outputs set to *PLC* mode (see 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 = 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	
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 $\pm 1/4$ of a division around ZERO
Bit 13	
Bit 14	
Bit 15	

## INSTRUMENT STATUS REGISTER

0	Instrument in idle condition ( <i>weight displaying</i> )
1	Formulas displaying ( <i>only for BATCHING programs</i> )
2	Batching constants displaying ( <i>only for BATCHING programs</i> )
3	Consumption displaying ( <i>only for BATCHING programs</i> )
4	System parameters displaying
5	Setting of formula number and cycles to batch ( <i>only for BATCHING programs</i> )
6	Instrument in batching condition ( <i>only for BATCHING programs</i> )
7	<i>ЕПРЛУ</i> alarm ( <i>only for BATCHING programs</i> )

8	----- alarm (only for UNLOAD program)
9	CO <sub>n</sub> SP alarm (only for BATCHING programs)
10	ERR <sub>E</sub> P alarm (only for BATCHING programs)
11	<ul style="list-style-type: none"> <li>- LOAd alarm (only for LOAD and 3/6/14 PRODUCTS programs)</li> <li>- UNLOAd alarm (only for UNLOAD program)</li> </ul>
12	<ul style="list-style-type: none"> <li>- LOAD/UNLOAD programs: phase elapsing between the opening of the SET and the closing of the CYCLE END</li> <li>- 3-6-14 PRODUCTS programs: phase elapsing between the opening of batched product contact and the next product or closing of the CYCLE END</li> </ul>
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	BLRCH alarm (only for BATCHING programs)
17	
18	FALL alarm (only for BATCHING programs)
19	
20	
21	
22	
23	
24	ProdPP alarm (only for UNLOAD program)
25	EDL 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 Err alarm (only if OPZWUSBW option is present)
31	SE <sub>0</sub> CH alarm (only for WDOS series instruments)
32	SE <sub>0</sub> CH <sub>0</sub> alarm (only for WDOS series instruments)
33	ERR <sub>E</sub> I G alarm (only for BATCHING programs)
34	PE <sub>0</sub> FUL alarm (only if OPZWUSBW or OPZWDATIPC options are present)
35	PE <sub>0</sub> QU <sub>0</sub> 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	SLRUE 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

<b>0</b>	No command	<b>1</b>	
<b>6</b>		<b>7</b>	SEMI-AUTOMATIC TARE enabling (net weight displaying)
<b>8</b>	SEMI-AUTOMATIC ZERO	<b>9</b>	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
<b>20</b>		<b>21</b>	Keypad lock
<b>22</b>	Keypad and display unlock	<b>23</b>	Keypad and display lock
<b>98</b>		<b>99</b>	Save data in EEPROM
<b>100</b>	TARE WEIGHT ZERO SETTING for calibration	<b>101</b>	Save first sample weight for calibration
<b>104</b>	Real calibration cancellation	<b>106</b>	Add sample weight for calibration
<b>130</b>	Preset tare enabling	<b>131</b>	
<b>132**</b>	PTARE1 reading***	<b>133**</b>	PTARE1 writing***
<b>134**</b>	PTARE2 reading***	<b>135**</b>	PTARE2 writing***
<b>136**</b>	PTARE3 reading***	<b>137**</b>	PTARE3 writing***
<b>138**</b>	PTARE4 reading***	<b>139**</b>	PTARE4 writing***
<b>140**</b>	PTARE5 reading***	<b>141**</b>	PTARE5 writing***
<b>142**</b>	PTARE6 reading***	<b>143**</b>	PTARE6 writing***
<b>144**</b>	PTARE7 reading***	<b>145**</b>	PTARE7 writing***
<b>146**</b>	PTARE8 reading***	<b>147**</b>	PTARE8 writing***
<b>148**</b>	PTARE9 reading***	<b>149**</b>	PTARE9 writing***
<b>200</b>		<b>201</b>	Batching: START
<b>202</b>	Batching: PAUSE	<b>203</b>	Batching: RESUMES from PAUSE
<b>204</b>	Batching: STOP	<b>205^^</b>	Batching: accepts alarm and stop
<b>206^^</b>	Batching: ignores the alarm <i>EA-EP</i> (not available for UNLOAD program)	<b>207^^</b>	Batching: ignores the alarm <i>EDL</i>
<b>208</b>	Interruption of the AUTOMATIC LOADING (only for UNLOAD program)	<b>209</b>	Batching: continues when the message <i>END</i> appears or if STATUS REGISTER=12 (only if <i>END=YES</i> )
<b>250</b>	Confirmation of batching data reading	<b>251</b>	
<b>2000^</b>	See note		

- \*\*)** 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.
- ^) 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 **L<sub>DL</sub>** alarm, it is possible to ignore the alarm and continue the batching by sending the command 207; for the **L<sub>AE</sub>** 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	<i>for 3/6/14 PRODUCTS program</i>	2000	2001	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	<b>Product No.</b>
				ExcReg4	<b>Step No.</b>
				ExcReg5	<b>Formula No.</b>
	<i>for LOAD and UNLOAD programs</i>	2000	2001	ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	<b>1 = Set 2 = Preset</b>
				ExcReg4	<b>1 = Set 2 = Preset</b>
				ExcReg5	<b>Formula No.</b>
TOTAL SET BY FORMULA	<i>OPZWQMC option: for 3/6/14 PRODUCTS and LOAD programs</i>	2002	2003	ExcReg1	Quantity H
	<i>OPZFORPERC option: for 3/6/14 PRODUCTS program</i>			ExcReg2	Quantity L
				ExcReg3	<b>Formula No.</b>
TOTALS MANAGEMENT	<i>for W200, W200BOX, WDESK-L\IR, WINOX-L\IR only for 3/6/14 PRODUCTS program</i>	2020		ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	<b>Product No.</b>
				ExcReg4	<b>1 = Consumption</b>
	<i>for W200, W200BOX, WDESK-L\IR, WINOX-L\IR only for LOAD and UNLOAD programs</i>	2020		ExcReg1	Quantity H
				ExcReg2	Quantity L
				ExcReg3	<b>Formula No.</b>
				ExcReg4	<b>1 = Consumption</b>

TOTALS MANAGEMENT	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 **STEP = 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 **STEP = 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	ExcReg 8	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	ExcReg 8	ExcReg 9	ExcReg 10
			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	ExcReg 8	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	ExcReg 8	ExcReg 9	ExcReg 10
			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	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg 8	ExcReg 9	ExcReg 10
	2100		1003									

### Response:

VARIABLE	CMD R	CMD W	ExcReg 1	ExcReg 2	ExcReg 3	ExcReg 4	ExcReg 5	ExcReg 6	ExcReg 7	ExcReg 8	ExcReg 9	ExcReg 10
			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:

<b>Bit 0</b>	Negative value	<b>Bit 1</b>	
<b>Bit 2</b>		<b>Bit 3</b>	
<b>Bit 4</b>		<b>Bit 5</b>	
<b>Bit 6</b>		<b>Bit 7</b>	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	<i>ENPEY</i>
3	<i>PARFDr</i>
4	<i>EREP</i> (not available for UNLOAD program)
5	<i>CONSP</i>
6	<i>BLACH</i>
7	<i>EDL</i>
8	- <i>LOAD</i> (for LOAD and 3/6/14 PRODUCTS programs) - <i>UNLOAD</i> (for UNLOAD program)
9	<i>UNLOAD</i> (only for LOAD and 3/6/14 PRODUCTS programs)
10	
11	
12	Batching STOP
13	<i>ERUEIG</i>
14	<i>FALL</i>
15	<i>SLAE</i>
16	
17	
18	
19	
20	
21	
22	<i>ProdPP</i> (only for UNLOAD program)
23	<i>LOAD</i> : AUTOMATIC LOADING function (only for UNLOAD program)
24	<i>ER EDL</i> (OPZWQMC option)
25	<i>SEDLCH</i> (only for WDOS series instruments)
26	<i>SEDLCHH</i> (only for WDOS series instruments)
27	<i>USB ER</i> (only for OPZWUSBW_ option)
28	<i>NEPFUL</i> (only for OPZWUSBW_ and OPZW DATIPC options)
29	<i>NEPDUR</i> (only for OPZWUSBW_ and OPZW DATIPC options)

## **REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)**

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system and send its value to the "Sample weight" module.
- Send zero to the "Sample weight" module.
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



In order to correctly set a sample weight of negative value, it is necessary to consider the content of the "Sample weight" module as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the values indicated in the table in the "Sample weight" module.

<b>MODULE</b>	<b>VALUE</b>	
	<b>HEX</b>	<b>DECIMAL</b>
Sample weight	0xFFFF FFC8	-56

## PROFINET-IO

### TECHNICAL SPECIFICATIONS

<b>Port</b>	RJ45 10Base-T or 100Base-TX (auto-detect)
<b>Link led indications (RJ45 – left side)</b>	off .....No link amber .....10 Mb/s green .....100 Mb/s
<b>Activity led indications (RJ45 – right side)</b>	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: *n0*): it allows to select the reading/writing of the byte in LITTLE-ENDIAN or BIG-ENDIAN mode
  - *YES*: LITTLE ENDIAN
  - *n0*: BIG ENDIAN
- *IPAddr* (default: 192.8.0.141): set instrument IP address
- *SubnEt* (default: 255.255.255.0): set instrument Subnet Mask
- *GAUARY* (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

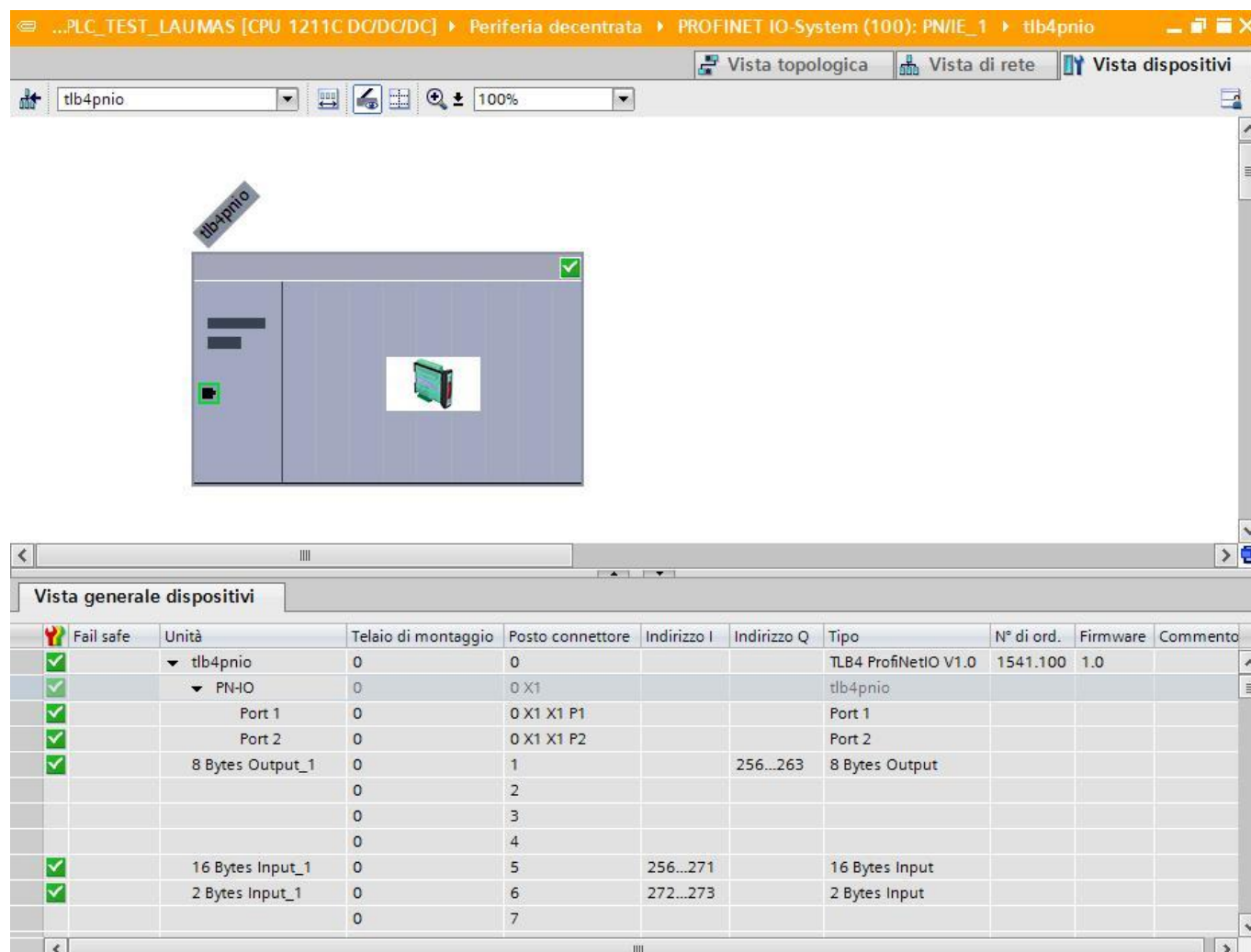
The instrument works as *device* in a Profinet-IO network.

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 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 = 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

<b>Bit 0</b>	Load cell error
<b>Bit 1</b>	AD convertor malfunction
<b>Bit 2</b>	Maximum weight exceeded by 9 divisions
<b>Bit 3</b>	Gross weight higher than 110% of full scale
<b>Bit 4</b>	Gross weight beyond 999999 or less than -999999
<b>Bit 5</b>	Net weight beyond 999999 or less than -999999
<b>Bit 6</b>	
<b>Bit 7</b>	Gross weight negative sign
<b>Bit 8</b>	Net weight negative sign
<b>Bit 9</b>	Peak weight negative sign
<b>Bit 10</b>	Net display mode
<b>Bit 11</b>	Weight stability
<b>Bit 12</b>	Weight within $\pm 1/4$ of a division around ZERO
<b>Bit 13</b>	
<b>Bit 14</b>	
<b>Bit 15</b>	

## POSSIBLE COMMANDS TO BE SENT TO THE COMMAND REGISTER

<b>0</b>	No command	<b>1</b>	
<b>6</b>		<b>7</b>	SEMI-AUTOMATIC TARE enabling (net weight displaying)
<b>8</b>	SEMI-AUTOMATIC ZERO	<b>9</b>	SEMI-AUTOMATIC TARE disabling (gross weight displaying)
<b>20</b>		<b>21</b>	Keypad lock
<b>22</b>	Keypad and display unlock	<b>23</b>	Keypad and display lock
		<b>87**</b>	Preset tare reading
<b>88**</b>	Preset tare writing	<b>89</b>	
<b>90**</b>	Setpoint 1 reading	<b>91**</b>	Setpoint 2 reading
<b>92**</b>	Setpoint 3 reading	<b>93**</b>	Setpoint 1 writing
<b>94**</b>	Setpoint 2 writing	<b>95**</b>	Setpoint 3 writing
<b>98</b>		<b>99</b>	Save data in EEPROM
<b>100</b>	TARE WEIGHT ZERO SETTING for calibration	<b>101</b>	Save first sample weight for calibration
<b>102**</b>	Sample Weight reading	<b>103**</b>	Sample Weight writing
<b>104</b>	Real calibration cancellation	<b>106</b>	Add sample weight for calibration
<b>130</b>	Preset tare enabling	<b>131</b>	
<b>132**</b>	PTARE1 reading***	<b>133**</b>	PTARE1 writing***
<b>134**</b>	PTARE2 reading***	<b>135**</b>	PTARE2 writing***
<b>136**</b>	PTARE3 reading***	<b>137**</b>	PTARE3 writing***
<b>138**</b>	PTARE4 reading***	<b>139**</b>	PTARE4 writing***
<b>140**</b>	PTARE5 reading***	<b>141**</b>	PTARE5 writing***
<b>142**</b>	PTARE6 reading***	<b>143**</b>	PTARE6 writing***
<b>144**</b>	PTARE7 reading***	<b>145**</b>	PTARE7 writing***
<b>146**</b>	PTARE8 reading***	<b>147**</b>	PTARE8 writing***
<b>148**</b>	PTARE9 reading***	<b>149**</b>	PTARE9 writing***
<b>150**</b>	Setpoint 4 reading	<b>151**</b>	Setpoint 5 reading
<b>160**</b>	Setpoint 4 writing	<b>161**</b>	Setpoint 5 writing

**\*\*)** 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.



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.



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.

## Preset tare

Write the preset tare value through the command 88 "Write preset tare".

Send the command 130 "Enable preset tare" to enable the preset tare.

## REAL CALIBRATION COMMANDS (WITH SAMPLE WEIGHTS)

- Unload the system and reset to zero the displayed weight value with the command 100 "TARE WEIGHT ZERO SETTING for calibration" of the Command Register.
- Load a sample weight on the system, write its value into the Exchange Register and send the command 103 "Sample Weight writing" to the Command Register;
- To save the first sample weight value and remove the previously saved values, send the command 101 "Save first sample weight for calibration" to the Command Register;
- To store a sample weight value and keep the previously saved values, send the command 106 "Add sample weight for calibration" to the Command Register;
- Up to 8 different sample weights can be saved to perform a linearization on multiple points.
  - The same sample weight can only be saved once for each calibration.
  - Zero sample weight values cannot be saved.

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

To cancel the real calibration and return to the theoretical calibration, send the command 104 to the Command Register. The tare reset is not cancelled.



In order to correctly set a sample weight of negative value, it is necessary to consider the Exchange Register as a 32-bit signed number. If the development system does not handle signed numbers, enter the values in two's complement.

Example: to set the sample weight to -56 kg, enter the value indicated in the table in the Exchange Register.

<b>REGISTER</b>	<b>VALUE</b>	
	<b>HEX</b>	<b>DECIMAL</b>
Exchange Register	0xFFFF FFC8	-56

## USE AND CALIBRATION OF CONVERTER POINTS

When the instrument is connected to a system, it can be used to read the weight directly from the protocol or, alternatively, the weight can be calculated by the PC or PLC system to which the instrument is connected. In the latter case, the calibration can be performed as follows: if the transmitter sends e.g. 6500 divisions (converter points) when the tank is empty, and after putting a sample weight of 10000 kg it sends 49833 divisions, in order to find out the weight you will simply need to subtract from the divisions read those relative to the empty tank and then divide the result by a constant given by the following calculation:

$$(49833-6500)/10000=4,333$$

so, if the PC or PLC receives 40000 divisions, the weight will be given by:

$$(40000-6500)/4,333=7731 \text{ kg}$$

## OUTPUTS AND INPUTS CONFIGURATION

**MENU** + **ESC** → *OUT-IN*:

### 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 = **ZE<sub>0</sub>**            input 2 = **NE-L<sub>0</sub>**            input 3 = **PEAH**

### Possible operation modes:

- **NE-L<sub>0</sub>** (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.
- **ZE<sub>0</sub>**: by closing the input for no more than one second, the weight is set to zero (see section **WEIGHT ZERO-SETTING FOR SMALL VARIATIONS (SEMI-AUTOMATIC ZERO)** 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.
- **CO<sub>NT</sub> 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 CO<sub>NT</sub> n is set in the item SE<sub>rl</sub> 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.
- **Pr<sub>nt</sub>**: when the input is closed the data are sent for printing if in the communication protocol of either serial port the parameter **Pr<sub>nt</sub>** is set.
- **L<sub>IM</sub> E**: when the input is open, the alarm **-- --** is displayed; the weight cannot be saved (see section **LIMIT MODE** in the instrument manual).

On our website [www.laumas.com](http://www.laumas.com) there are videos on the guidelines for correct installation of weighing systems and video tutorials on configuring our transmitters and weight indicators.

All Laumas product manuals are available online. You can download the manuals in PDF format from [www.laumas.com](http://www.laumas.com) by consulting the Products section or the Download Area. Registration is required.

Think about the environment before you print!  
CERTIFICATION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM  
in accordance with UNI EN ISO 14001.  
Laumas contributes to environmental protection by saving on paper consumption.