WT 11

SERIAL AND ANALOG WEIGHING INDICATOR/TRANSMITTER

Technical manual

Software version WT1101_09

VPG force sensors

Celtron • Revere • Sensortronics • Tedea-Huntleigh

INDEX

PRECAUTIONS

READ this manual ***BEFORE*** using or servicing the instrument.

FOLLOW these instructions carefully.

KEEP this manual for future reference.

WARNING

Installation and maintenance of this instrument must be performed only by qualified personnel.

Exercise caution when performing checks, tests, and adjustments while the instrument is powered on.

Perform electrical connections only when the power supply is turned off.

Failure to observe these precautions may result in hazards.

DO NOT allow untrained personnel to operate, clean, inspect, repair, or tamper with this instrument.

INTRODUCTION

The WT 11 is a weight transmitter designed to be used with load cells to measure weight in any application.

The module is easy to install and can be mounted on a ***35 mm (1.38 in) DIN*** rail.

The display allows for easy reading of weight, configuration parameters, and error messages.

The three buttons, located below the display and protected by the front cover, enable the operator to perform ***ZERO***, ***TARE***, programming, and calibration (both theoretical and real).

With its multiple serial interfaces (RS485, RS232, ASCII, and Modbus RTU protocols), the WT 11 can be connected to ***PCs, PLCs***, and remote units.

The analog output (0–20 mA, 4–20 mA, 0–10 V DC, 0–5 V DC) allows further interfacing with PLCs and remote displays.

The WT 11 also features two programmable weight thresholds, which can be used as levels, set points, etc..

AVAILABLE VERSIONS:

- **WT 11:** Base version with Inputs, Outputs, RS232, and RS485.
- **WT 11/A:** Includes analog output in addition to the base version.
- **WT 11/PROFINET:** Replaces RS485 with PROFINET.
- **WT 11/ETHERNET IP:** Replaces RS485 with ETHERNET IP.
- **WT 11/ETHERCAT:** Replaces RS485 with ETHERCAT.
- **WT 11/ETHERNET:** Replaces RS485 with ETHERNET.
- **WT 11/PROFIBUS:** Replaces RS485 with PROFIBUS.
- **WT 11/CANOPEN:** Replaces RS485 with CANOPEN.

WARNINGS

The following procedures must be carried out by qualified personnel.

All connections must be made with the instrument powered off.

TECHNICAL FEATURES

SPECIFICATION	DESCRIPTION
POWER SUPPLY	24 V DC ±10%, PROTECTED AGAINST POLARITY REVERSAL. RESETTABLE FUSE PROTECTION.
MAX POWER CONSUMPTION	3W
INSULATION	CLASS II
OPERATING TEMPERATURE	-10°C TO +50°C (14 °F TO 122 °F) (MAX 85% HUMIDITY, NON-CONDENSING)
STORAGE TEMPERATURE	-20°C TO +60°C (–4 °F TO 140 °F)
WEIGHT DISPLAY	NUMERIC 6-DIGIT RED LED, 7-SEGMENT H 7 mm (0.28 in)
LED INDICATORS	2 LEDS, 3 mm (0.12 in)
KEYBOARD	3 MECHANICAL BUTTONS (BEHIND THE FRONT COVER)
OVERALL DIMENSIONS	112 X 119 X 23 mm (4.41 x 4.69 x 0.91 in) (W X H X D), INCLUDING TERMINALS
MOUNTING	SUPPORT FOR DIN RAIL OR OMEGA BAR
MATERIAL	SELF-EXTINGUISHING PC/ABS BLEND
CONNECTIONS	REMOVABLE SCREW TERMINALS, 5.08 mm (0.20 IN) PITCH
LOAD CELL INPUT	MAX 4 LOAD CELLS OF 350 Ω IN PARALLEL (OR 8 LOAD CELLS OF 700 Ω)
LOAD CELL EXCITATION VOLTAGE	4 V DC
LINEARITY	< 0.01% OF FULL SCALE
TEMPERATURE DRIFT	< 0.001% OF FULL SCALE /°C
INTERNAL RESOLUTION	24-BIT
MEASUREMENT RANGE	-7.6 TO +7.6 MV/V
DIGITAL FILTER	SELECTABLE FROM 0.1 TO 250 HZ
DECIMAL PLACES	0 TO 4 DECIMAL DIGITS
ZERO AND FULL SCALE CALIBRATION	PERFORMED VIA BUTTONS USING CALIBRATION WEIGHTS OR DATASHEET VALUES
LOAD CELL CABLE BREAK DETECTION	ALWAYS ACTIVE
LOGIC OUTPUTS	2 RELAY OUTPUTS WITH 1 NO CONTACT (24 V DC/AC, 0.1 A)
LOGIC INPUTS	2 OPTO-ISOLATED INPUTS
SERIAL PORTS	RS232 HALF-DUPLEX, RS485 HALF-DUPLEX, USB C DEVICE
BAUD RATE	2400 TO 115200 BAUD
MAX CABLE LENGTH	15 m (49.21 ft) (RS232) AND 1000 m (3280.84 ft) (RS485)
OPTIONAL FIELDBUS INTERFACES	PROFIBUS DP V1, PROFINET, CANOPEN, ETHERNET IP, ETHERCAT, ETHERNET
ETHERNET PROTOCOLS	TCP, MODBUS/TCP, UDP, IP, ICMP, ARP. INTEGRATED WEB SERVER
COMMUNICATION MODE	TCP SERVER
BUFFER SIZE	256 BYTES
CONNECTION TIMEOUT	MIN 30 SECONDS - MAX 90 SECONDS
LINK TIMEOUT (CABLE DISCONNECTED)	30 SECONDS
VOLTAGE OUTPUT	± 10 V / ± 5 V (MIN. 10 KΩ)
CURRENT OUTPUT	0-20 MA / 4-20 MA (MAX. 300 Ω)
RESOLUTION	16-BIT
CALIBRATION	DIGITAL VIA BUTTONS
LINEARITY	0.03% OF FULL SCALE
TEMPERATURE DRIFT	0.002% OF FULL SCALE /°C
MICROCONTROLLER	ARM CORTEX M0+ 32-BIT, 256KB FLASH, REPROGRAMMABLE ON-BOARD VIA USB
DATA MEMORY	32 KBYTES + OPTIONAL ALIBY MEMORY (1 MBYTE)
COMPLIANCE STANDARDS	EN61000-6-2, EN61000-6-3, EN61326-1:2013 FOR EMC, EN61010-1 FOR ELECTRICAL SAFETY

INSTALLATION

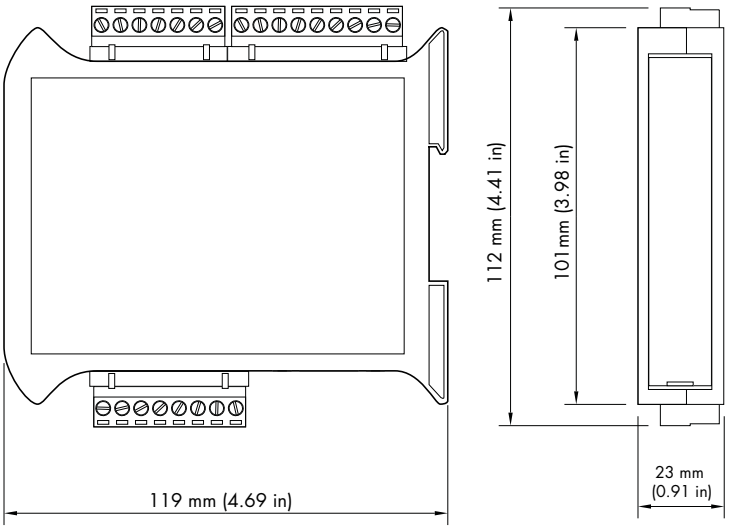
GENERAL INFORMATION

The WT 11 consists of a motherboard with additional available options, housed in a plastic enclosure designed for **35 mm (1.38 in) DIN** rail mounting.

The WT 11 must not be immersed in water, exposed to water jets, or cleaned with solvents.

Do not expose it to heat sources or direct sunlight.

DIMENSIONS



ELECTRICAL INSTALLATION

The WT 11 uses removable screw terminals with a **5.08 mm (0.20 in)** pitch for electrical connections.

The load cell cable must be shielded and routed away from power cables to prevent electromagnetic interference.

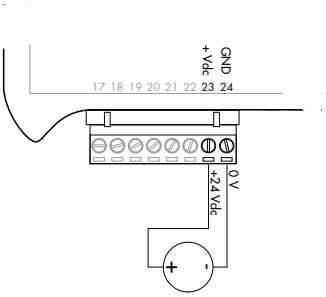
POWER SUPPLY

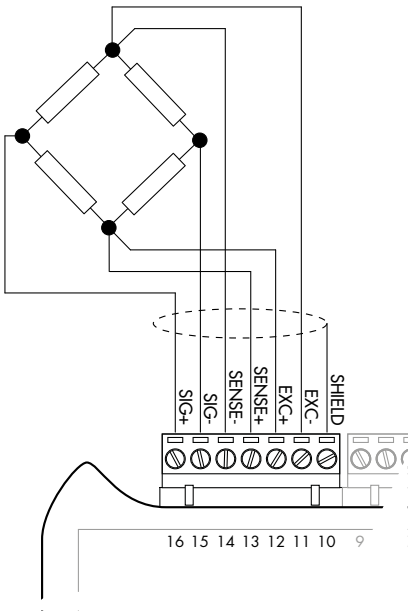
The instrument is powered via terminals **23** and **24**.

The power cable must be routed separately from other cables.

The power supply is galvanically isolated.

Power supply voltage: 24 V DC ±10%, max 3W.





LOAD CELL CONNECTIONS

The load cell cable must not be routed together with other cables; it should follow a separate path.

The instrument supports up to **4** load cells of **350 ohms** in parallel.

The load cell excitation voltage is **4 V DC**, protected against temporary short circuits.

The instrument supports load cells with sensitivities up to 7.6 mV/V.

Wiring Instructions:

Connect the load cell cable to terminals **10** to **16** on the **7-pole** removable terminal block.

For a **4-wire** load cell cable, create jumper connections:

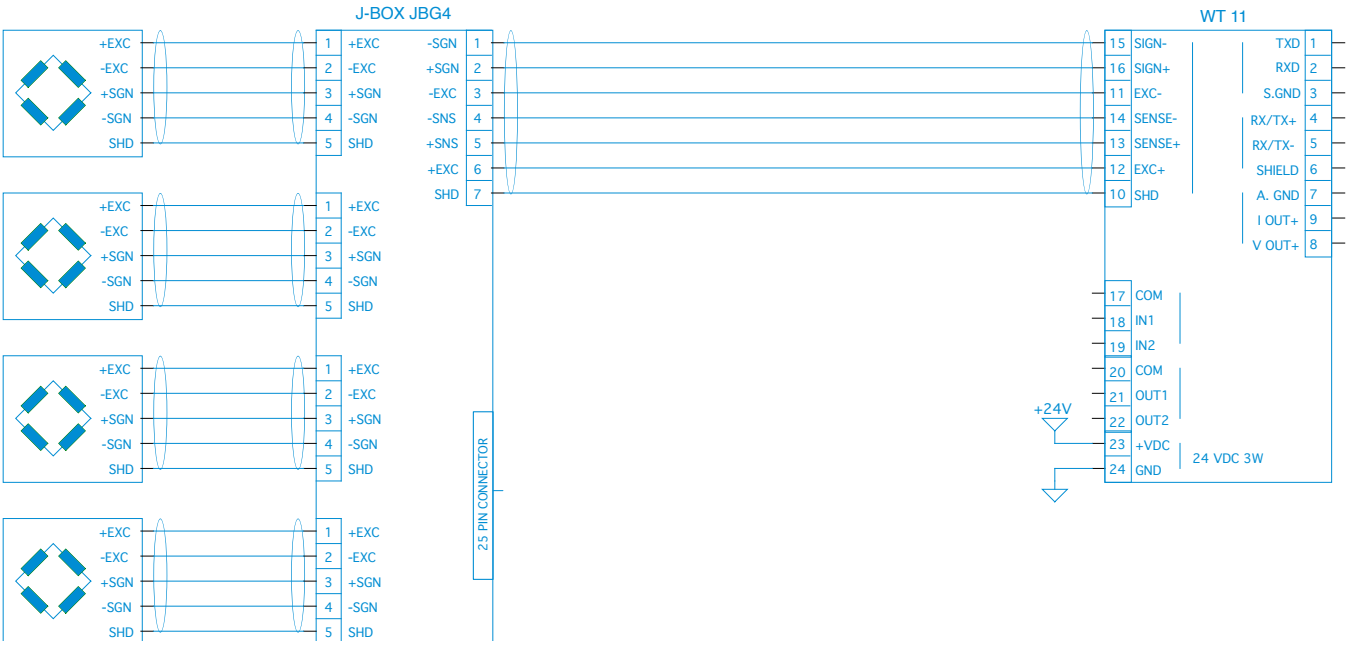
- Terminal **11** to Terminal **14**
- Terminal **12** to Terminal **13**

Connect the cable shield to terminal **10**.

Multiple Load Cells:

When using two or more load cells, use appropriate junction boxes (JBG4 or JBU4).

The connection diagram for these junction boxes is provided in the manual.



LOGIC INPUTS

The two logic inputs are optoisolated.

Logic input cables must not be routed with power cables.

Input Functions:

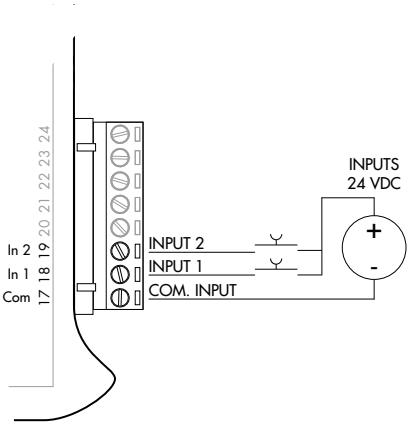
- **INPUT 1 --> TARE/ZERO**

If the gross weight is positive, toggles the display between gross and net weight.

If the gross weight is negative, resets the weight to zero.

- **INPUT 2 --> PRINT**

These functions are activated by applying 24 V DC from an external power source to the respective terminals via push buttons, as shown in the manual.



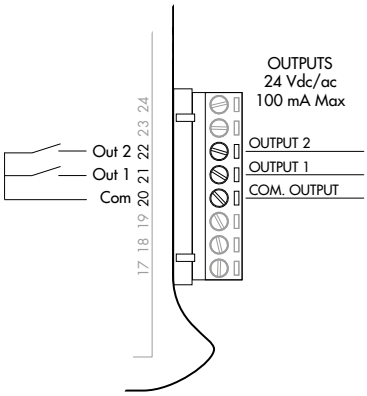
RELAY OUTPUTS

The two relay outputs have normally open (NO) contacts.

Contact rating: 24 V DC/AC, max 100 mA.

Relay output cables must not be routed with power cables.

The connection should be as short as possible to ensure signal integrity.



SERIAL COMMUNICATION

RS232:

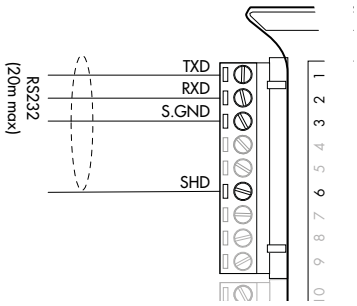
Always present and supports various protocols.

Use a shielded cable for the connection, ensuring that the shield is grounded at only one end:

- **At pin 6** if connected to the instrument side.
- **At ground** if connected to the opposite end.

Maximum cable length: 15 meters (49.21 ft) (EIA RS-232-C standard).

For distances beyond 15 meters (49.21 ft), an optional RS485 interface is required.



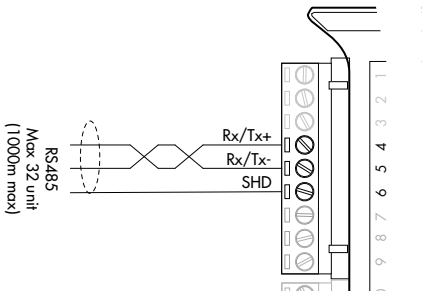
RS485 (2-wire):

Available only on the WT 11/RS485 model.

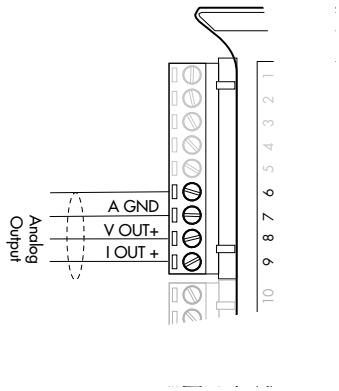
Use a shielded cable, grounding the shield at only one end:

- **At pin 6** if connected to the instrument side.
- **At ground** if connected to the opposite end.

RS485 cables must not be routed with power cables..



WT 11/A TRANSMITTER



ANALOG OUTPUT

The transmitter provides an analog output in current or voltage mode.

Voltage Output:

- Range: ±10V or ±5V
- Minimum load resistance: 10KΩ

Current Output:

- **Range:** 0-20 mA or 4-20 mA
- **Maximum load resistance:** 300Ω
- **Connection:** Use a shielded cable, grounding the shield at only one end.

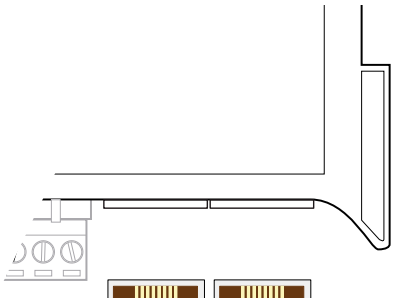
USB DEVICE (SPECIFICATION 2.0 COMPLIANT; FULL-SPEED 12 MBPS)

Used for direct PC interface via a USB port.

Requires a USB Type-C cable for connection.

A specific driver must be installed on the PC according to the operating system.

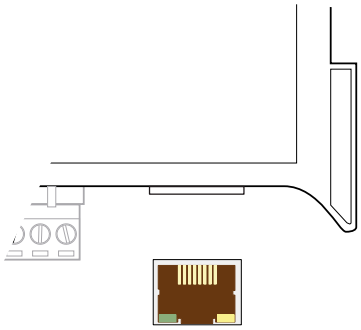
Follow the installation instructions provided.



OPTIONAL FIELDBUS CONNECTIONS

Instead of the RS485 serial port, various industrial fieldbus options are available.

Only one fieldbus can be used and must be specified when ordering.



ETHERNET CONNECTION

An RJ45 Ethernet connector is located on the lower left side of the instrument.

Specifications:

- **Transmission speed:** 10 Mbps
- **Compatible with:** 10/100/1000 Base-T networks
- **Supported Protocols:** TCP, Modbus/TCP, UDP, IP, ICMP, ARP
- **Communication mode:** TCP Server
- **LED indicators (2):** Ethernet connection status and communication/diagnostics
- **Buffer size:** 256 bytes
- **Connection Timeout:** Min 30s – Max 90s
- **Link Timeout (disconnected cable):** 30s

ETHERNET CONNECTION TO MASTER

Use a twisted pair Ethernet cable with an RJ45 connector.

Maximum cable length depends on the cable type:

A shielded **Cat5** cable can reach up to **180 meters (590.55 ft)**.

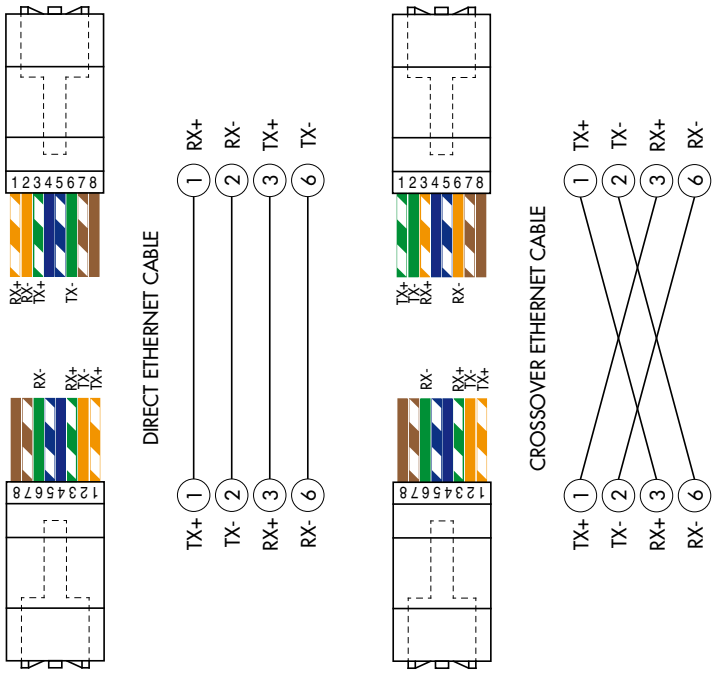
PIN	DESCRIPTION
1	TX+
2	TX-
3	RX+
4	
5	
6	RX-
7	
8	

Direct Connection to PC:

- The Ethernet port can be connected directly to a PC, bypassing network devices (router, switch, hub, LAN bridge, etc.), but requires a special "crossover" RJ45 cable.

- Standard Ethernet cables ("straight-through") allow connections to network devices (e.g., routers, hubs) but do not support direct PC-to-PC connections, unless using network cards with auto-sensing technology, which automatically detect cable type and connection mode.

- Connection diagrams for crossover and straight-through cables are shown in the manual..

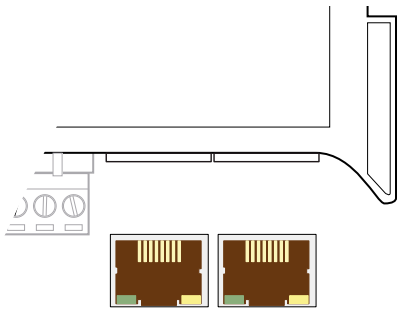


ETHERNET/IP CONNECTION

EtherNet/IP is a real-time industrial protocol based on Ethernet networks.

Two RJ45 connectors are available, allowing multiple devices to be connected to the same network.

Follow the general Ethernet connection guidelines and precautions mentioned above.

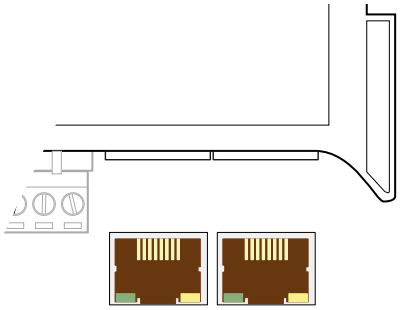


Specifications:

Supports 10/100 Mbps operation (Full and Half Duplex).

Handles up to 128 bytes of I/O fieldbus data in each direction..

PROFINET CONNECTION



There are **2 RJ45** connectors to allow the connection of multiple instruments under the same network.

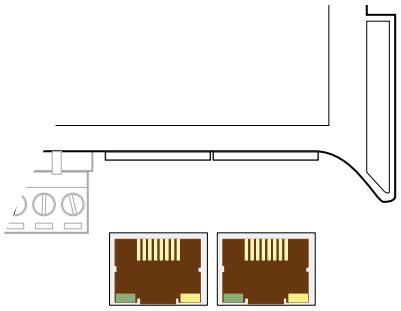
Please refer to the previous page for connection notes and warnings.

Features:

- PROFINET IO Real Time (RT) communications
- Up to 128 bytes of I/O fieldbus in each direction.

ETHERCAT CONNECTION

EhterCAT is an industrial real-time protocol based on the Ethernet network.



The EhterCAT protocol requires that the RJ45 connectors have the function of **IN** and **OUT**.

By connecting multiple WT 11 instruments in series, the MASTER must be connected to the **IN** connector of the first WT 11 whose **OUT** connector will connect to the **IN** connector of the next one, etc.

Please refer to the previous page for connection notes and warnings.

MAC ADDRESS IN INSTRUMENTS WITH INDUSTRIAL ETHERNET FIELDBUS

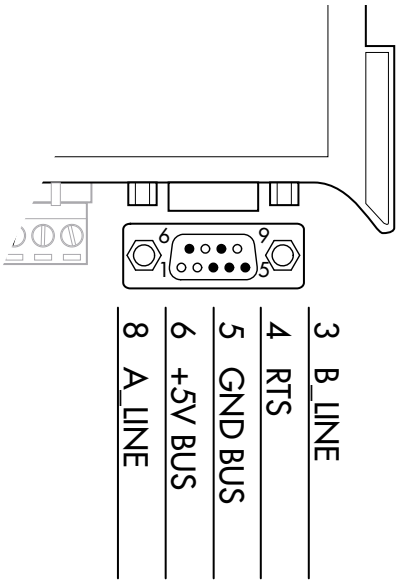
Instruments that mount Hilscher modules with Industrial Ethernet protocol (Profinet, EthernetIP, Ethercat, etc.) have a label above the connectors, as shown in the figure.

This label shows the MAC Address of the module (red box), an identification number of the module (blue box) and a QR code containing the MAC Address.

The latter can be read with a smartphone using a **QR** reading app (e.g., on the Google Play Store, "QR Code Reader").

PROFIBUS CONNECTION

PIN	SIGNAL	DESCRIPTION
1	-	-
2	-	-
3	B line	+RxD/+TxD, livello RS485
4	RTS	Request to send
5	GND	Ground (isolated)
6	+ 5V Bus Output	+5V termination (isolated)
7	-	-
8	A line	-RxD/-TxD, livello RS485
9	-	-
Housing	Hollow Screen	Internally connected to protective earth according to Profibus specifications



For connection to the Profibus **MASTER**, use a standard Profibus cable. Typical cable impedance should be between **100** and **130** Ohm (f > 100 kHz). The cable capacitance (measured between conductors) should be less than 60 pF/meter (18.29 pF/ft) and the minimum conductor cross-section should not be less than 0.22 mm^2 (0.00866 in) .

In a Profibus-DP network, either type **A** or type **B** cables can be used, depending on the performance required. The following table summarizes the characteristics of the cable to be used:

CHARACTERISTIC	TYPE A CABLE	TYPE B CABLE
Impedance	135 to 165 ohms f = 3 – 20 MHz)	100 to 300 ohm (f > 100 kHz)
Capacitance	< 30 pF/m (9.14 pF/ft)	< 60 pF/m (18.29 pF/ft)
Resistance	< 110 ohm/km	-
Conductor cross-section	> 0,34 mm^2 (0.000527 in^2)	> 0,22 mm^2 (0.000341 in^2)

The following table shows the maximum line length with type A cable and type B cable depending on the different communication speeds required:

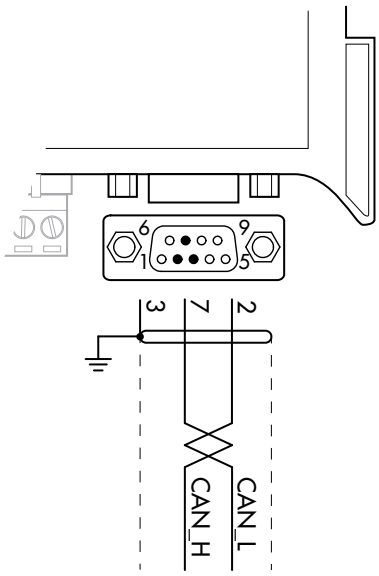
Baud rate (kbit/s)	9.6	19.2	187.5	500	1500	3000	6000	12000
Max Length (m/ft) Type A Cable	1200 / 3937	1200 / 3937	1000 / 3281	400 / 1312	200 / 656	100 / 328	100 / 328	100 / 328
Max Length (m/ft) Type B Cable	1200 / 3937	1200 / 3937	600 / 1969	200 / 656	–	–	–	–

For reliable operation of the Fieldbus, a line termination should be used at both ends.

In case of multiple WT 11 instruments, use the line termination only on one instrument.

For the configuration of the card, the GSD file (hms_1810.gsd) is available and must be installed in the master.

CANOPEN CONNECTION



Pin	Segnale	Description
2	CAN_L	CAN low bus line
3	CAN_GND	
7	CAN_H	CAN high bus line

CANOPEN is a higher level communication protocol based on the CAN serial bus system.

For the connection use a cable with differential twisted pair and common return in compliance with **ISO 11898**. The length of the bus is limited by the communication speed chosen according to the following table:

Bit Rate	Max Bus Length (m)	Max Bus Length (ft)
1 Mbit/sec	25	82
500 Kbit/sec	100	328
250 Kbit/sec	250	820
125 Kbit/sec	500	1640
≤ 50 Kbit/sec	1000	3281

The CAN line must have a **120Ω** termination resistance.

The CAN_GND reference must be connected to Earth at only one point of the line.

The cable must **NOT** be channeled with power cables.

For the configuration of the board, the ESD file is available and must be installed in the master.

FRONT PANEL OF THE INSTRUMENT

The WT 11 is equipped with a door that protects the 6-digit display, 3 status LEDs and three keys.

In operating mode, the display shows the weight and the LEDs indicate the status of the weight.

The set-up parameters are easily accessible and modifiable through the use of the three front keys used to select, modify, confirm and save the new settings.

DISPLAY

Normally the display shows the measured net weight. Based on the various programming procedures, the display is used for programming the parameters to be entered into the memory, i.e. messages that indicate the type of operation in progress and are therefore of assistance to the operator in the management and programming of the instrument.

N.B: *In case of free operation the LED function can be selected*

STAND-BY FUNCTION

The display can assume the stand-by state, during which the display brightness is reduced and the keyboard is locked. All other functions of the instrument are active and functional.

See the paragraph relating to the activation / deactivation of the stand-by state.

LED INDICATORS

Immediately after the display there are 3 status LEDs:

LED 1 (on = stable weight)

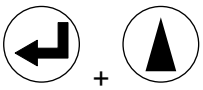
LED 2 (on = net weight indication)

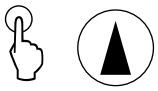
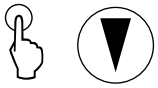
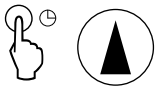
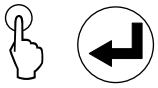
LED 3 (zero band = gross weight within the Zero Band value).

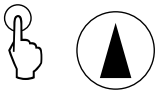
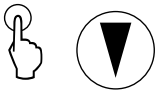
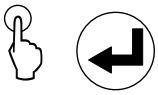
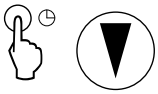
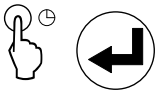
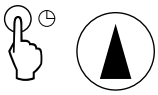
USE OF THE KEYBOARD

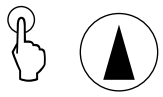
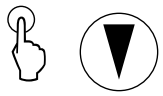
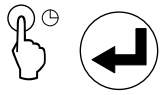
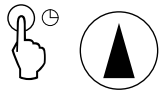
The instrument is programmed and controlled via the keyboard consisting of **3 keys**, with the following functions:

SYMBOL	DESCRIPTION
	Short press on a single key.
	Long press on a single key.

KEY	OPERATION	FUNCTIONS DURING WEIGHT DISPLAY
		Access to the set point value programming menu
	 	Display view selection (gross weight, net weight). (Long press) Weight / peak display selection
		In Net Weight display: Autotare ***(See specific procedure)*** In Gross Weight display: Semi-Automatic Zero ***(See specific procedure)***
		Sending a string from serial (if on demand protocol selected on RS232) or printing (if printer protocol selected on RS232)
		***(Press for 3 sec) Access the set-up menu.***

KEY	FUNCTION DURING NAVIGATION PROGRAMMING MENU
	Selects the next menu.
	Selects the previous menu.
	Exits the programming menu or returns to the upper level.
	Accesses the relevant submenu or programming or confirmation of the selected parameter.

KEY	FUNCTION WHILE SETTING NUMERICAL VALUES
	Increases the value of the selected digit.
	Decreases the value of the selected digit.
	Selects the rightmost digit.
	Clear all digits.
	Finishes dialing and stores the value.
	Exits without saving changes.

KEY	FUNCTION WHILE SETTING PROPOSED VALUES
	Selects the next value.
	Selects the previous value.
	Confirms and stores the displayed value.
	Exits without saving changes.

Pressing the button  *always causes a switch to the previous menu.*

KEYBOARD LOCK/UNLOCK FUNCTIONS

OPERATION	DESCRIPTION
	**Keypad Lock**—The keys are deactivated until they are unlocked. The display goes into low power mode. The instrument is locked by pressing the DOWN + ENTER keys simultaneously for 5 seconds. By turning the instrument off and on again it is automatically unlocked.
	**Keypad Unlock**—By pressing the DOWN + ENTER keys simultaneously for 5 seconds, the keys are reactivated and the display brightness returns to standard.

EXITING THE SETUP MENU

Press the key  to return to the main menu. Press the key again  . "StorEP" appears.

Press and hold the key  until the word "SEtUP" appears. Press the key  to return to the weight display.

INFO DISPLAY

P3330 1 — When the instrument is turned on, the display test is performed, then the software identification code and its version are displayed in sequence. Codes to be communicated ***in case of request for assistance***.

When a programming procedure is not in progress, the display shows the detected weight expressed in kg. Under certain conditions, the following messages are displayed:

FIXED MESSAGE

P <picco>	Display of peak value.
rEMotE	During communication with "**VTW Connect**" PC utility software.
------	Overload. The weight applied to the load cells exceeds the maximum capacity of the weighing system by more than 9 divisions.
------	Underload. The displayed weight is less than -99999.
0-L	Load cell signal missing or outside the mV/V measurement range.

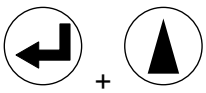
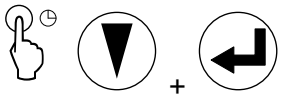
FLASHING MESSAGE, ALTERNATING WITH THE DETECTED WEIGHT

No CAL	Weight calibration not performed.
No CoN	Fieldbus network disconnected.
E-FbuS	Fieldbus interface connection error.

OPERATIONAL FUNCTIONS

Once calibrated, the display shows the current weight whenever it is switched on.

The following are the possible operations that can be carried out from the keyboard when viewing the weight of the instrument.

BUTTON	OPERATION	FUNCTION
		Display of Gross Weight to Net Weight.
		Display of the peak.
		Net Weight being displayed: Auto-tare.
		Gross Weight being displayed: Semi-Automatic zero.
		Transmission of a string from serial (only protocol on-demand)
		Set-Point function programming.
		Entry into the Programming Menu
		**Keyboard Lock** - The keys are disabled until released. The display goes into low power mode. The instrument is locked by simultaneously pressing the DOWN + ENTER keys for 5 seconds. By switching the instrument on and off the instrument automatically unlocks.
		**Keyboard Unlock** - By simultaneously pressing the DOWN + ENTER keys for 5 seconds, the keys are reactivated and the brightness of the display returns to standard.

GROSS WEIGHT / NET WEIGHT DISPLAY

Press the  key to toggle between the gross weight and the net weight and vice versa. The value displayed is signalled by the **NET LED** (lit: net weight). If the tare is not entered, the net weight is equal to the gross weight.

In the case of negative weight, the minus sign is shown before the digit.

WEIGHT RESET AND AUTOTARE

These two functions are performed by the key  .

When the instrument is in the "Net" operating mode (LED "NET" on) the button  , held down for a few seconds, performs the autotare function.

When the instrument is in the "Gross" operating mode (the "NET" LED is off), the button  , held down for a few seconds, performs the gross weight zeroing function.

ZEROING

The gross weight zeroing command is used to correct small zero shifts in the weighing system during normal operation. These shifts are typically caused by thermal drift or material residues accumulating over time.

Conditions for Executing the Zeroing Command

- The instrument must be in Gross weight mode (with the **NET LED** off).
- The weight deviation from the scale's zero (set during the zero calibration procedure) must be within the "**0 BAND**" parameter limit (**PARAM** menu).

Conditions that Prevent Zeroing Execution

The zeroing command will not be executed if any of the following conditions occur:

1. **Unstable Weight**

- If the weight stability control is enabled, the command will take effect only if the weight stabilizes within **3** seconds.
- If the weight stability control is disabled ("**MOTION**" parameter set to zero), the zeroing command executes immediately.

2. **Weight Exceeds "0 BAND" Parameter**

- If the gross weight exceeds the positive or negative limit of the "**0 BAND**" parameter and the auto-zero threshold is not programmed, the command is not executed.

Memory Retention and Cumulative Zeroing Limit

- The **zero obtained** through the gross weight zeroing operation is stored in memory even after the instrument is turned o**ff.**
- **The** zeroing operation can be repeated multiple times, but the total zeroed divisions are cumulative.
- Once the cumulative total exceeds the "**0 BAN**D" parameter limit, further zeroing is no longer possible.
- In this case, a **Zero Calibration** must be performed.

Effect of the Auto-Zeroing Parameter at Startup (AUTO 0)

- The **AUTO 0** parameter can reduce or completely cancel the operating range of the zeroing command.
- If "**AUTO 0**" > "**0 BAND**", the zeroing command is completely disabled.

AUTOTARE

The autotare function can be executed under the following conditions:

- The instrument is in "Net" mode (with the "***NET***" LED on).
- The gross weight is positive.
- The gross weight does not exceed the maximum capacity.
- The weight is stable.
- Unstable weight: In this condition, two cases must be distinguished:

1. If the weight stability control is enabled ("***MOTION***" parameter different from zero): the command executed while the weight is unstable takes effect only if the weight stabilizes within 3 seconds from the moment the command is given.
2. If the weight stability control is disabled ("***MOTION***" parameter equal to zero): the command takes effect immediately, even with an unstable weight.

(*) The operating modes of the "MOTION" parameter are described in the corresponding section.

The autotare value is retained in memory even after the instrument is turned off.

PEAK FUNCTION

The instrument continuously stores the peak value of the gross weight.

This function is only available if the peak calculation function is enabled via the relevant parameter in the instrument setup menu. The peak display is indicated by the letter P on the left of the display. The peak value is detected at the same frequency as the weight acquisition (see filter table). In addition to the display, the peak value can be used in the following functions:

FUNCTION	DESCRIPTION
LOGIC OUTPUTS	The set-points can be configured to have the peak value as a reference. (See the logic output operation configuration procedure).
SERIAL PORT	Peak value acquisition (peak hold) through the CONTIN, AUTOM, DEMAND, SLAVE and MODBUS protocols.
ANALOG OUTPUT	The analog output value can assume the peak value (peak hold). (See the analog output configuration procedure).

FREEZING THE WEIGHT GAINED

It is possible to freeze the weight in the face of a variation of the logic inputs, if one of these is set to **HOLD** mode.

TEST FUNCTIONS - RS232 AND RS485

The test consists in transmitting the string received from the relative serial line (echo) and displaying the number of strings received and the number of characters received in the last string.

00C = 00

TEST FUNCTIONS - ANALOG OUTPUT TEST

Once you enter the test out function out. An, the following message will appear:

out 0 where **0** indicates the output value (in current or voltage based on what is selected) expressed as a % of the full scale.
You can change this value from **0** to **100**, with a 10% interval, by pressing the UP key

Press the **ENTER** key to **exit** the function.

TEST FUNCTIONS (INPUT / OUTPUT)

Once you enter the **1N OUT** test function, the following will appear In 00 where 00 depends on the state of the logic inputs, as per table:

VALUE	MEANING
00	No active inputs
01	Input 1 active
10	Input 2 active
11	Inputs 1 and 2 active

In the same menu you can enable or disable the outputs by repeatedly pressing the button  .

The status of the two outputs is indicated by the first 2 status LEDs.

Press the button  to exit the function.

WEIGHT THRESHOLD PROGRAMMING

The set threshold values are compared with the weight to control the corresponding logic output.

The comparison criterion is established in the logic **inputs/outputs** setup procedure (see the relevant paragraph).

To access the Setpoint setting, press the **UP** key while the weight is displayed:

MENU	MESSAGE	DESCRIPTION	TYPE	DEFAULT	RANGE	IND. FIELD-BUS
Setpoint	SEtP. 1	Set Setpoint 1 value	Com.	0	0÷Range	201(MSB) 202(LSB)
	SEtP. 2	Set Setpoint 2 value	Com.	0	0÷Range	203 (MSB) 204 (LSB)

THRESHOLD BEHAVIOR AND LOGIC OUTPUT ACTIVATION

- The set threshold values are compared with the weight to control the corresponding logic output.
- The comparison criterion is defined in the threshold setup procedure.
- If the weight is not detectable or out of scale, all outputs are deactivated (contact open or closed depending on the **MODE** setting—see the relevant chapter).
- During the threshold setup phase, both outputs are deactivated.
- If the threshold value stored in memory is **0**, the corresponding output never activates, regardless of the selected threshold setup.

WEIGHT ACQUISITION

The weight can be printed or sent via a serial port/fieldbus (depending on the communication port settings) using the following methods:

- **In automatic mode** (if the "automatic" serial communication protocol is selected).
- **Via the instrument's keyboard** (by pressing the **ENTER** key, if the "on-demand" serial communication protocol is selected).
- **From an external input** (if the "on-demand" serial communication protocol is selected and the "on-demand data transmission" mode is enabled on at least one input).
- **Via a serial line** (if the "slave" serial communication protocol is selected), by sending the command to execute the weighing.
- **Via fieldbus**, using the weighing execution command in the command register..

The conditions required for weight acquisition are:

- **Stable weight** (or stabilized within **3** seconds from the command).
- Since the last acquisition, the weight has changed by at least **20** divisions (weight delta).
- Gross weight is **equal to or greater than the minimum weighing value** (20 divisions) and below the maximum capacity.
- **Net weight is not zero**.

METRIC Operation Mode

- If alibi memory is configured, the transaction is recorded.
- The net weight and weight identification code are stored in a memory register (accessible via fieldbus upon request).

FREE Operation Mode (Exceptions)

If printing is executed via a button or external input, weighing is allowed even if:

- **Gross weight** is below the minimum weighing value.
- **Net weight** is zero.

CALIBRATION JUMPER

For metrological use, enabling the setting of metric parameters can be done by positioning the jumper inside the board.

SETTING

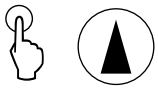
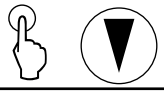
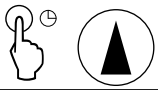
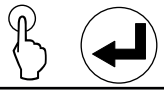
GENERAL

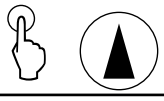
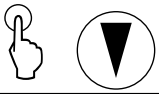
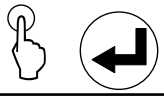
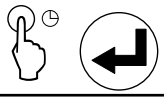
All functions of the WT 11 can be activated and modified by accessing a simple setup menu, shown on the next page. All selected or activated settings remain stored even after the transmitter is powered off.

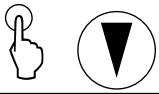
The WT 11 comes preconfigured with factory settings. The default values for each parameter are listed in the following pages.

During the initial field installation, some parameters need to be adjusted to ensure correct weight display (theoretical calibration). This operation can also be requested at the time of purchase.

The setup menu settings can be modified using the front keys or through the "**VTW Connect**" software utility, which is included.

KEY	FUNCTION DURING NAVIGATION PROGRAMMING MENU
	Selects the next menu.
	Selects the previous menu.
	Exits the programming menu or returns to the upper level.
	Accesses the relevant submenu or programming or confirmation of the selected parameter.

KEY	FUNCTION WHILE SETTING NUMERICAL VALUES
	Increases the value of the selected digit.
	Decreases the value of the selected digit.
	Selects the rightmost digit.
	Clear all digits.
	Finishes dialing and stores the value.
	Exits without saving changes.

KEY	FUNCTION WHILE SETTING PROPOSED VALUES
	Selects the next value.
	Selects the previous value.
	Confirms and stores the displayed value.
	Exits without saving changes.

PROCEDURE FOR MODIFYING AND INSERTING PARAMETERS:

The procedure for accessing the menu depends on the selected operating mode: **FREE or METRIC.**

MENU ACCESS IN FREE OPERATING MODE

In **FREE** operating mode, all instrument parameters can be modified by the operator.

MENU ACCESS IN METRIC OPERATING MODE

In **METRIC** operating mode, the programming of weighing parameters and weight calibration settings is allowed only for personnel authorized by current regulations, through password-protected access.

For this procedure, it is necessary to have the password table.

Id	To access the menu the operator's identification code is requested. The "ID" timed message is displayed and then you are prompted to enter the code.
0000	Enter the identification code of the operator who has authorised access, corresponding with the number of the password table and confirm with PRG. If the value 0000 is confirmed or if the procedure is cancelled with the ZERO key access to the menu parameters will be limited (you will not be able to access the programming of the weighing parameters and the calibration settings of the weight).
Cod.000	The display shows a 3 digit number randomly selected. Locate on the table the corresponding password (4 digits) and press PRG to access the password setting.
0000	Enter the password obtained from the table and confirm with the PRG key. If 0000 is confirmed or if the procedure is cancelled with the ZERO key access to the menu parameters will be limited (you will not be able to access the programming of the weighing parameters and the calibration settings of the weight).

Each access by authorized personnel is recorded in the memory, storing the last five accesses for review.

To directly access the programming menu, turn on the device with the calibration enable jumper set to **CALIBRATION** mode. (Note: If the calibration jumper is active, exiting the programming menu is not possible).

Upon startup, the display will show "InFo". Use the arrow keys to navigate through the available menus:

InFo Menu – Displays identification and configuration information for the instrument.

tESt Menu – Contains functional test procedures for the instrument.

SEtuP Menu – Allows programming of parameters that determine the instrument's operation.

Accessing the Setup Menu

Press **ENTER**, then SU, and hold them simultaneously for **3** seconds.

Alternatively, press and hold only **ENTER** for at least **6** seconds.

Confirm the selection by pressing **ENTER**.

MESSAGE	NAME	DESCRIPTION
InFo	Information	Menu of parameters that can be displayed to identify the instrument and its configuration.
tESt	Test	Menu of the instrument hardware operation test procedures.
SEtuP	Setup	Menu of the programmable parameters that determine the instrument start-up

INFO MENU

MENU	MESSAGE	NAME	DESCRIPTION	TYPE
InFo	Cod. FW	Firmware Code	Indication of the installed Firmware code	Vis.
	rEL. FW	Firmware Revision	Indication of the installed Firmware revision	Vis.
	F.SCALE	Instrument Full Scale	Indication of the set full scale value	Vis.
	F. bUS	Fieldbus Present	Indication of the configured Fieldbus type	Vis.
	Addr.	Fieldbus Address	**Indication of the set Fieldbus address. This menu item is displayed only in the RS485, ETHERNET, PROFIBUS and CANOPEN configurations.**	Vis.
	IP	Fieldbus IP Address	Indication of the set Fieldbus IP address. This menu item is displayed only in the **ETHERNET, PROFINET and ETHERNET/IP** configurations.	Vis.
	SubnEt.	Fieldbus Subnet Mask	Indication of the set Fieldbus subnet mask. This menu item is displayed only in the **ETHERNET, PROFINET and ETHERNET/IP** configurations.	Vis.
	oUt. An	Analog Output Configuration	Indication of the presence and type of the analog output (Not present - Unipolar - Bipolar)	Vis.
	MEMory	Optional Memory Configuration	Indication of the presence and type of memory (None - Alibi memory - µSD card)	Vis.

In case of **PROFINET** fieldbus: the IP address and Subnet Mask parameters are programmable by PLC and are updated in this menu only when the instrument is turned on. After a change of these parameters by PLC, it is necessary to turn the instrument off and on again to display the correct value.

It is important to keep in mind that even if the IP address and subnet mask parameters are set to Temporary, these parameters are not automatically updated in the instrument. Furthermore, when the instrument is turned off and then on again, these parameters will all be set to 0.0.0.0.

TEST MENU

MENU	MESSAGE	NOME	DESCRIPTION	TYPE
tESt	SIGnAL	Cell signal	Display of the mV/V signal input to the instrument	Vis.
	HI rES.	Resolution x10	Display of the weight with a resolution 10 times greater than the one set	Vis.
	PSuPPL.	Supply voltage	Display of the correct voltage (r ıght, LOW, h ıgh)	Vis.
	MEMorY	Memory Test (Only with configured memory)	Automatic test of operation of the additional memory	Test.
	In oUt.	I/O Test	I/O test with simultaneous display of inputs and outputs (See specific description)	Test.
	rS 232	RS232 Test	Transmission and reception test (See specific description)	Test.
	rS 485	RS485 Test	Transmission and reception test (See specific description)	Test.
	oUt. An	Analog Output Test	Test procedure with manual activation of the output value (See specific description)	Test.

SETUP MENU

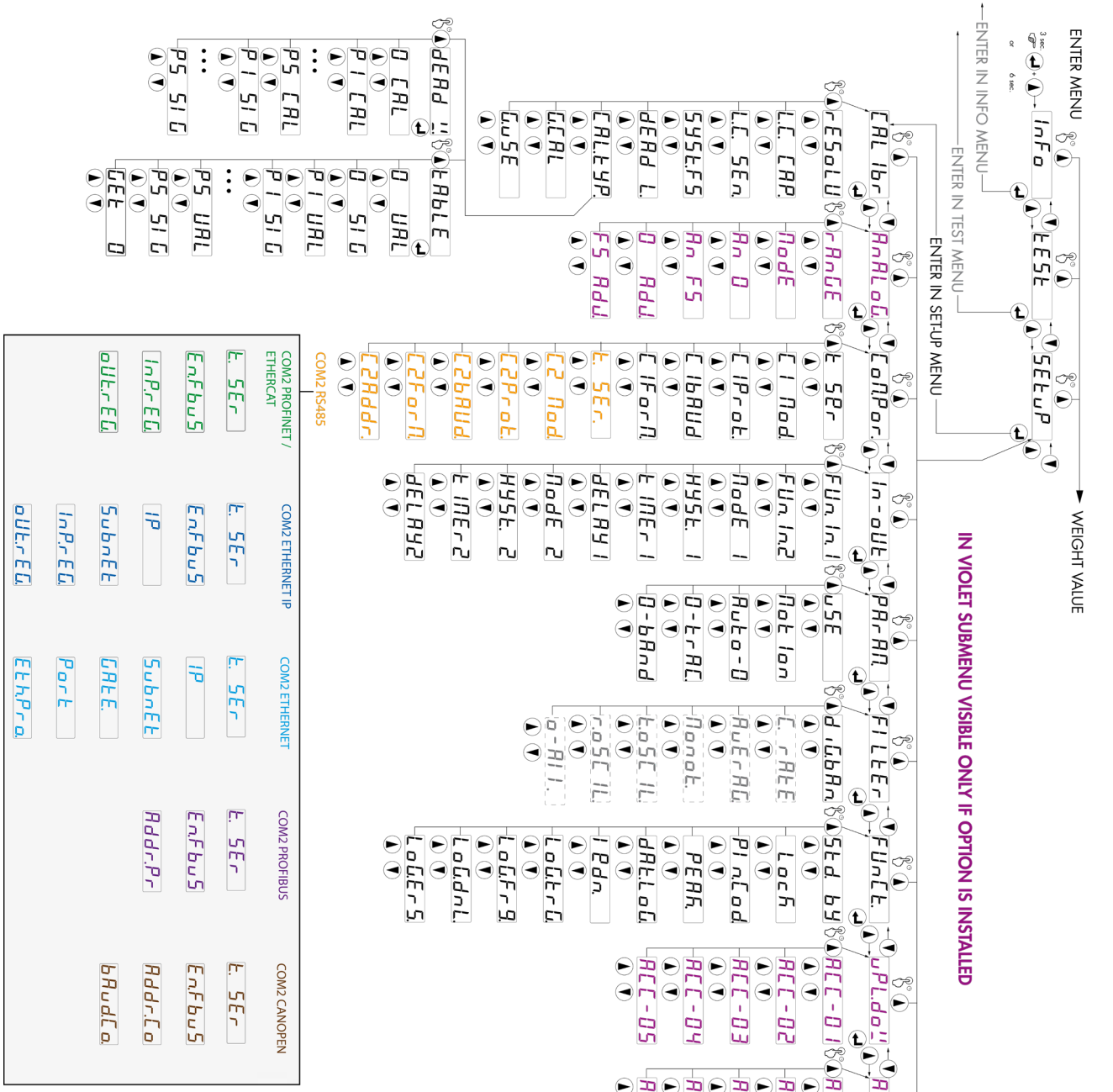
MENU	SUB MENU	NAME
SEtuP	CAL ibr.	Calibration Settings (*)
	AnALoG	Analog Output Settings (Only with configured analog output)
	ConPor.	Serial Port and Fieldbus Settings
	In-oUt.	Logic Input and Output Settings
	PArAM	Weighing Metrological Parameter Settings
	FILtEr	Filter Settings
	FUnCt	Functional Features Settings
	uPL.doW	Upload/Download function of stored setup data
	AccESS	Viewing of the last 5 accesses by authorized personnel (***)
	AI ıMEM	Consultation of fiscal memory (***)

(*) This menu item is displayed only in the case of FREE operation; in the case of METRIC operation, access is protected by a password known only to authorized personnel.

(***) These menu items are displayed only in the case of METRIC operation.

When exiting the setup menu, if changes have been made to the parameters, the message is displayed StorE, to be confirmed with 

DIAGRAM OF THE MENU



CONFIGURATION PARAMETERS

The following pages describe all the settable parameters. At the end of the description of each parameter, where present, the fieldbus address corresponding to the parameter is indicated. If the parameter is of the selectable type, the value to be inserted in the register for the desired selection is indicated between "[ ]".

CALIBRATION MENU

Access to this menu is permitted only in case of **FREE** operation or in case of **METRIC** operation with password access by authorised personnel.

rESoLU

DIVISION VALUE [1101÷1102]

Value of a single division, expressed in kg. The ratio of the system capacity to the division value is the system resolution (number of divisions).

After changing the division value, if the system capacity is not changed, the weight calibration is automatically corrected.

Selectable values:
0.0001 - 0.0002 - 0.0005
0.001 - 0.002 - 0.005
0.01 - 0.02 - 0.05
0.1 - 0.2 - 0.5
1 -2 - 5
10 - 20 - 50
Default: *1*

L.C. CAP.

LOAD CELL CAPACITY [1103-1104]

Defines the value corresponding to the sum of the nominal capacity of the load cells expressed in kg. In the case of systems with a single load cell and "N" fixed supports, enter the value of the cell capacity for the total number of supports. This data constitutes the full scale value of the weighing system.

Following the modification of the parameter value, the theoretical weight calibration is recalculated.

Values: *from 1 to 999999*
Default: *0*

L.C. SEn.

SENSITIVITY OF LOAD CELLS [1105]

Set the value corresponding to the average of the load cell sensitivities, in mV/V. Values between 0.0 and **7.6 mV/V** are accepted. If no value is programmed, **2mV/V** is assumed.

Following the modification of the sensitivity value, the theoretical calibration of the weight is performed.

Values: *from 0.1000 to 7.6000 mV/V*
Default: *2.0000*

SYST.FS

WEIGHING SYSTEM RANGE [1301-1302]

Programming the useful (net) capacity of the weighing system.

Values: *from 0 to Load Cells Capacity*
Default: *0*

dEAd L.

FIXED TARE OF WEIGHING SYSTEM [1106-1107]

Programming the fixed tare value of the weighing system.

Values: *from 0 to Value Flowrate*
Default: *00000*

CAL.TYP

SELECTING THE CALIBRATION TYPE

Select the type of calibration. Upon confirmation, one of the following procedures is started.

dEAd ''

DEAD WEIGHT TYPE CALIBRATION [501÷503]

Zero and Full Scale calibration up to **5** linearization points using sample weights.

tAbLE

CALIBRATION TYPE TABLE [1151÷1172]

It allows to manually program up to 5 calibration points. The values correspond to those determined by the linearization procedure with sample weights. In this way it is possible to copy the calibration values made with sample weights.

PARAMETERS DISPLAYED ONLY IN CASE OF METRIC OPERATION

G-CAL

GRAVITY CALIBRATION PLACE [1108-1109]

Programming the value of the gravity force of the place where the calibration takes place.
Values: *from 9.77000 to 9.84000*
Default: *0*

G-USE

GRAVITY PLACE OF USE [1110-1111]

Programming the value of the gravitational force of the place where the instrument will be used.

Values: *from 9.77000 to 9.84000*
Default: *0*

CONFIGURATION/CALIBRATION EXAMPLE

Through the setting of the parameters listed above, the theoretical calibration of the Full Scale of the WT 11 is performed. This procedure must be completed with the zero calibration described below. The procedure ensures, in the absence of mechanical issues, a good system accuracy (max error <1% F.S.).

When the **rESOLU** selection is modified, the full scale calibration is automatically recalculated. Incompatible selections with the calibration parameters or the calibration stored in memory will not be accepted.

Calibration Procedure Example

To perform the calibration, weigh a tank that has an empty weight of 750 Kg and a capacity of 1000 liters, containing a product with a specific weight of 1.3 Kg/dm^3, and which is intended to be read with a display resolution of 0.2 Kg.

Before proceeding with the configuration, ensure that the load cells are properly connected to the unit and that the tank is empty. Once confirmed, proceed to set the parameters.

Required equipment:

3 load cells with a capacity of **1000 Kg**

Sensitivities of 2.0015, 2.0008, and 1.9998 mV/V (average value = 2.0007 mV/V)

Set the following values in the configuration parameters:

L.C. CAP = **3000**

L.C. SEn = **2.0007**

SYSt.FS = **1500**

dEAd L. = **0**

rESoLU = **0.2**

Ensure that the value read in the s1gnAl parameter of the **TEST** menu corresponds to the tare weight of the system according to the following proportion:

3000 : 2.0007 = 750 : X

Where **X** is the signal value expressed in **mV/V** corresponding to the theoretical weight of the empty tank. The value should be approximately 0.5 mV/V.

At this point, you can proceed with the calibration described in the next section, or exit the configuration menu while saving the entered data.

The instrument should display the value corresponding to the empty tank weight (e.g., 756.8).

You can then re-enter the configuration menu and input the value of the weight read in the dEad L parameter, entering the value 756.8.

Exit the configuration menu again while saving the data.

For greater accuracy, use calibration weights or pre-weighed material on a certified scale and proceed with the calibration described in the next section.

CALIBRATION WITH REFERENCE WEIGHTS

The calibration method described here must be performed using certified reference weights and/or pre-weighed products measured on a calibrated reference scale.

Before proceeding with **full-scale calibration**, always perform zero calibration first.

During the calibration process, the display will alternate between showing the weight value and the message **CAL**.

***WARNING**: If the instrument is turned off before exiting the setup menu, any programming changes will not be saved.*

***Note**: If linearity errors occur after calibration, ensure that the weighing structure is completely free from mechanical constraints.*

ZERO CALIBRATION

Perform this operation with an empty scale (including any fixed tare weight) and ensure the weight is stable.

The system is reset by holding down the button for a few seconds  DOWN arrow.

The displayed weight resets to zero and the display shows CAL alternating with 0.

You can repeat this operation several times.

Exit the **CAL** function by long pressing the button  **ENTER**

FULL-SCALE CALIBRATION

Before proceeding:

Load the reference weight onto the scale and wait for stabilization.

The display will show a weight value.

To adjust the displayed weight press the UP arrow key  .

All digits will be set to 0, and the leftmost digit will flash.

Use the arrow keys to enter the actual reference weight, starting from the flashing digit.

Press **ENTER** to move to the next digit.

Confirm the last digit (rightmost one) with **ENTER**, This applies the correction.

The display will show **SAVE**, then alternate between CAL and the entered weight value.

If the entered value exceeds the instrument's resolution, the weight will not be accepted, and an error message will appear for a few seconds.

The full-scale calibration procedure can be repeated as needed.

Hold down the **ENTER** key to return to the CAL ibr menu.

LINEARIZATION PROCEDURE

Linearization with Reference Weights (Long Press UP Key)  Up to 5 linearization points can be set on the positive scale. The sequence number of the linearization points is displayed alternately with the current weight. Press the **UP** arrow key  to set the reference weight loaded and stabilized. After confirmation, the procedure moves to the next point.

If **0** is entered, the value is not saved.

To exit the procedure, hold down the  key.

Fewer than **5** points can be stored if necessary.

Entered weights cannot exceed full-scale, be lower than the previous point, or be unstable.

If the entered value is accepted, the next point will be prompted; otherwise, the same point will be requested again.

Linearization points are automatically reset whenever:

- A theoretical calibration parameter is changed.
- A full-scale calibration is performed.

TABLE CALIBRATION

It allows you to manually program up to five calibration points, in addition to the zero value.

The values correspond to those determined by the sample weight linearization procedure. In this way it is possible to view the values determined automatically with this procedure or modify and program them according to predetermined values.

SUBMENU	MESSAGE	NAME	DESCRIPTION	TYPE
tAbLE	0 SIG.	Zero signal	Signal value in mV/V corresponding to the zero scale	Com.
	P1 JAL.	Weight point 1	Weight value corresponding to the 1st calibration point	Com.
	P1 SIG.	Signal point 1	Signal value in mV/V corresponding to the 1st calibration point	Com.
	P2 JAL.	Weight point 2	Weight value corresponding to the 2nd calibration point	Com.
	P2 SIG.	Signal point 2	Signal value in mV/V corresponding to the 2nd calibration point	Com.
	P3 JAL.	Weight point 3	Weight value corresponding to the 3rd calibration point	Com.
	P3 SIG.	Signal point 3	Signal value in mV/V corresponding to the 3rd calibration point	Com.
	P4 JAL.	Weight point 4	Weight value corresponding to the 4th calibration point	Com.
	P4 SIG.	Signal point 4	Signal value in mV/V corresponding to the 4th calibration point	Com.
	P5 JAL.	Weight point 5	Weight value corresponding to the 5th calibration point	Com.
	P5 SIG.	Signal point 5	Signal value in mV/V corresponding to the 5th calibration point	Com.
	GEt 0.	Acquisition of zero signal	Signal acquisition function in mV/V corresponding to the zero scale	Spc.

Values programmed to zero are not considered. The data sheet calibration is automatically cancelled when a new theoretical or sample weight calibration is performed.

After executing the zero signal acquisition function, using the key  , the signals in the table are recalculated. An offset is added to each signal value, which is the difference between the new acquired zero signal and the old zero signal value.

EXIT CALIBRATION MENU

Exiting the CAL1b menu is done by pressing the button  until the writing appears StorE?.

To save the new calibration and exit the setup menu, press the **ENTER** key again.

ANALOG OUTPUT PARAMETERS (OPTIONAL)

rAnGE.

ANALOG OUTPUT RANGE [1506]

Analog output range selection.

Selectable value:

- *0÷10 Vdc [0]*
- *0÷5 Vdc [1]*
- *4÷20 mA [2]*
- *0÷20 mA [3]*

Default: *0÷10 Vdc*

nodE.

ANALOG OUTPUT OPERATING MODE [1505]

Selection of the value to be associated with the analog output, corresponding to the net weight, gross weight or peak value.

Selectable value:

- *NET [0]*
- *GROSS [1]*
- *PEAK [2]*

Default: *NET*

An 0.

ANALOG OUTPUT ZERO VALUE [1501-1502]

Analogue value to be subtracted referred to the analogue output full scale.

An FS.

FULL SCALE [1503-1504]

It is the weight corresponding to the full scale of the analog output.

*Value settable from **0** to **Flow***

Default: *Range*

0 AdJ.

ZERO OFFSET ADJUSTMENT

Measure the analog output value with a tester to perform zero (0) calibration.

Use the keys  and  to adjust the analog output. Long press the button for rapid variation.

Press the key  to return to the menu.

FS.AdJ.

FULL SCALE OFFSET ADJUSTMENT

Measure the analog output value with a tester to perform full scale (FS) calibration.

Use the keys  and  to adjust the analog output. Long press the button for rapid variation.

Press the key  to return to the **ANALOG** menu.

This procedure is available to the user for adjustment, for each selectable range. In the event of a complete reset of the setup memory (with PC configurator) the factory calibrations are re-established.

SERIAL OUTPUT PARAMETERS

This menu allows you to configure the COM1 and COM2 serial ports and the communication parameters. The instrument has two independent serial ports:

COM1 always with RS232 interface; COM2 can alternatively mount the following interfaces: **RS485, PROFINET, ETHERCAT, ETHERNET IP, ETHERNET, PROFIBUS, CANOPEN.**

t.SEr

SERIAL MODE

Select if the operation is similar to WT 14 or WT 1

Selectable values:

- WT 14
- WT 11

Default: *WT 14*

C 1 Mod.

RS232 OUTPUT MODE

Selection of the value transmitted on RS 232 output.

Selectable values:

- *nEt*
- *GroSS*
- *PEAk*

Default: *nEt*

C 1Prot.

COM1 PROTOCOL

VALUE	DESCRIPTION
None	Serial communication disabled.
Contin	Continuous transmission of the weight string. Can be used, for example, to control a weight repeater. See details in the specific paragraph.
on deM	When the key is pressed or via Input, a weight string is transmitted, accepted only if stable. A minimum variation of 20 divisions is required between two transmissions.
Autom	A weight string is automatically transmitted when the weight stabilizes at a value higher than the minimum weight (20 divisions).
Slave	ASCII protocol. See details in the specific paragraph.
Print	The weight string is transmitted when the key is pressed or via Input, if the weight is stable. A minimum variation of 20 divisions is required between two consecutive transmissions.

Default: Slave

C 1bAud

BAUD RATE COM1

Defines the baud rate of the RS232 serial port.

The value must be set to the same value as the PC/PLC or the remote display.

Selectable values:

- *1200 - 2400 - 4800 - 9600 - 19200 - 38400 - 57600 - 115200*

Default: *9600*

C 1ForM

PROTOCOLLO COM1

Frame type. In case of **SLAVE** protocol it is not possible to select 7-bit data format (E-7-1 and O-7-1):

Selectable values:

- n-8-1
- n-8-2
- E-7-2
- E-8-1
- o-7-2
- o-8-1

Default: *n-8-1*

COM 2 PARAMETERS WHEN PRESENT RS485

C2 Mod.

COM2 OUTPUT MODE

Selecting the value transmitted on output RS 485.

Selectable values:

- *nEt*
- *GroSS*
- *PEAk*

Default: *nEt*

C2Prot.

COM2 PROTOCOL

It defines how to use the RS485 serial port:

Selectable values:

VALUE	DESCRIPTION
None	Serial communication OFF.
Contin	Continuous transmission of the weight string. Can be used, for example, to drive a weight repeater. See details in the relevant section.
on deM	When the operator presses the relevant front key or via Input 2, a weight string is transmitted. The command is accepted if the weight is stable. Between two subsequent transmissions, the weight must undergo a variation of at least 20 divisions.
Autom	A weight string is sent automatically when the weight stabilizes at a value above the minimum weight (20 divisions). The weight must vary by at least 20 divisions between two consecutive transmissions.
Slave	ASCII protocol. See details in the relevant section.
Modbus	MODBUS RTU protocol. See details in the relevant section.
Riplead	Continuous weight string transmission for a special repeater.

Default: *Slave*

C2bAud.

COM2 BAUD RATE

Defines the baud rate of serial port RS485.

The value must be set at the same value as PC/PLC or remote display.

Selectable values:

- *1200 - 2400 - 4800 - 9600 - 19200 - 38400 - 57600 - 115200*

Default: *9600*

C2ForN

COM2 PROTOCOL

Type of frame. For the **SLAVE** or **MODBUS** protocol you cannot select 7-bit data format (E-7-1 e O-7-1):

Selectable values:

- *n-8-1*
- *n-8-2*
- *E-7-2*
- *E-8-1*
- *o-7-2*
- *o-8-1*

Default: *n-8-1*

C2Addr.

COM2 ADDRESS

Communication address of the serial port:

Values: *from 1 to 32*

Default: *1*

COM 2 PARAMETERS WHEN PROFINET / ETHERCAT IS PRESENT

EnFbuS.

FIELDBUS ENABLING

Enabling **PROFINET / ETHERCAT** fieldbus, if **OFF** error messages concerning **FIELDBUS** communication are never displayed:

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

InP.rEG.

INPUT AREA DIMENSION

Input area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: 128

oUt.rEG.

OUTPUT AREA DIMENSION

Output area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

rES.bUS.

RESET FIELDBUS

Select whether to reset the module in case of NO-COM (no communication).

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

In case of PROFINET fieldbus, the XML configuration file "GSDML-V2.3-HILSCHER-NIC 50-RE PNS 32-20160122.xml" is provided. The size of the input and output areas set in the PLC (possible selections: 32, 64, 96 or 128 bytes) must correspond to the size of the input and output areas selected in the instrument (parameters "INP.REG." and "OUT .REG.").

- **Option /PNet: GSDML-V2.3-HILSCHER-NIC 50-RE PNS 32- 20160122.xml**
- **Option /PNet X90: GSDML-V2.35-HILSCHER-NETX 90-RE-PNS-32byte- M-20200507.xml**

The instruments are supplied with the parameter "Profinet Name" not configured and IP address set at 0.0.0.0.

PARAMETERS COM 2 WHEN ETHERNET IP IS PRESENT

EnFbuS.

FIELDBUS ENABLING

Enabling ETHERNET IP fieldbus, if OFF error messages concerning Fieldbus communication are never displayed:

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

IP

IP ADDRESS

ETHERNET IP protocol address

Values: *from 0.0.0.0 to 255.255.255.255*
Default: *0.0.0.0*

SubnEt

SUBNET MASK

ETHERNET IP protocol Subnet Mask.

Values: *from 0.0.0.0 to 255.255.255.255*
Default: *0.0.0.0*

InP.rEG.

INPUT AREA DIMENSION

Input area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

oUt.rEG.

OUTPUT AREA DIMENSION

Output area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

oUt.rEG.

RESET FIELDBUS

Select whether to reset the module in case of NO-COM (no communication).

- OFF
- ON

Default: OFF

The **EDS** configuration file to be used for the PLC must be selected based on the configured option, which is specified on the instrument's identification label.

Option /E IP: HILSCHER NIC 50-RE EIS V1.1.EDS

The size of the input and output areas set in the PLC (default input area 128 bytes, default output area 128 bytes) must correspond to the size of the input and output areas selected in the instrument (parameters "INP.REG. " and "OUT.REC.").

Option /E IP X90: 4 different EDS configuration files are provided:

- HILSCHER NETX90 EIS V5-32.EDS
- HILSCHER NETX90 EIS V5-64.EDS
- HILSCHER NETX90 EIS V5-96.EDS
- HILSCHER NETX90 EIS V5-128.EDS

The file that corresponds to the size of the input and output areas selected in the instrument must be imported into the PLC (for example if IMP.REG.=128 and OUT.REC.=128 are set in the instrument, the file must be imported into the PLC "HILSCHER NETX90 EIS V5 -128.EDS").

COM 2 PARAMETERS WHEN ETHERNET IS PRESENT

IP

IP ADDRESS

ETHERNET protocol IP address

Values: *from 0.0.0.0 to 255.255.255.255*
Default: *192.168.0.201*

SubnEt

SUBNET MASK

ETHERNET protocol Subnet Mask.

Values: *from 0.0.0.0 to 255.255.255.255*
Default: *255.255.255.0*

GAtE

GATEWAY

ETHERNET protocol gateway.

Values:*from 0.0.0.0 to 255.255.255.255*
Default:*192.168.0.1*

Port

PORT

Communication port for ETHERNET protocol.

Values: *from 1 to 65535*
Default:*1800*

EthPro.

ETHERNET COMMUNICATION PROTOCOL

Selecting communication type for Ethernet protocol.

VALUE	DESCRIPTION
None	Serial communication OFF.
Contin	Continuous transmission of the weight string. Can be used, for example, to drive a weight repeater. See details in the relevant section.
on deM	When the operator presses the relevant front button or uses Input 2, a weight string is sent. The command is accepted if the weight is stable. A variation of at least 20 divisions is required between two consecutive transmissions.
Autom	A weight string is sent automatically when the weight stabilizes at a value above the minimum weight (20 divisions).
Slave	ASCII protocol. See details in the relevant section.
Modbus	Modbus TCP protocol.

Default: *Slave*

COM 2 PARAMETERS WHEN PROFIBUS DP IS PRESENT

EnFbuS.

FIELDBUS ENABLING

Enabling PROFIBUS DP fieldbus, if OFF error messages concerning Fieldbus communication are never displayed:

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

Addr.Pr

PROFIBUS ADDRESS

Programming the address used in the PROFIBUS protocol.

Values: *from 0 to 126*

Default: *01*

InP.rEG.

INPUT AREA DIMENSION

Input area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

oUt.rEG.

OUTPUT AREA DIMENSION

Output area dimension for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

In the case of PROFIBUS fieldbus, the GSD configuration file "hms_1810.gsd" is provided. The size of the input and output areas set in the PLC (possible selections: 32, 64, 96 or 128 bytes) must correspond to the size of the input and output areas selected in the instrument (parameters "INP.REG." and "OUT .REG.").

Option /E IP: hms_1810.gsd
Option /E IP X90: hil_x90.gsd

COM 2 PARAMETERS WHEN CANOPEN IS PRESENT

EnFbuS.

FIELDBUS ENABLING

Enabling CANOPEN fieldbus, if OFF error messages concerning Fieldbus communication are never displayed:

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

Addr.Co

CANOPEN ADDRESS

Programming the address used in the CANOPEN protocol.

Values: *from 1 to 127*

Default: *1*

BAud.Co.

CANOPEN BAUD RATE

Defines the baud rate of the Canopen protocol.

The value must be set to the same value as the PC / PLC.

Values that can be selected (expressed in Kbit/sec.):

- *10*
- *20*
- *50*
- *125*
- *250*
- *500*
- *1000*

Default: *20*

COM 2 PARAMETERS WHEN ETHERCAT IS PRESENT

EnFbuS.

FIELDBUS ENABLING

ETHERCAT fieldbus enabling, if OFF any error messages regarding Fieldbus communication are never displayed:

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

InP.rEG.

INPUT AREA SIZE

Input area size for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

oUt.rEG.

OUTPUT AREA SIZE

Output area size for fieldbus (value expressed in Bytes).

Selectable values:

- *32, 64, 96, 128*

Default: *128*

rESbUS.

RESET FIELDBUS

Select whether to reset the module in case of NO-COM

Selectable values:

- *OFF*
- *ON*

Default: *OFF*

The XML configuration file to be used for the PLC must be selected based on the type of configured option, specified on the instrument identification label. The devices must be connected with a ring type (as per the EtherCAT specification), refer to the manual installation for using the ***INPUT*** *and* ***OUTPUT*** *ports.*

Option /ECat: *4 different configuration files are provided:*

- *Hilscher NIC 50-RE ECS V2.2 32 Byte.xml*
- *Hilscher NIC 50-RE ECS V2.2 64 Byte.xml*
- *Hilscher NIC 50-RE ECS V2.2 96 Byte.xml*
- *Hilscher NIC 50-RE ECS V2.2 128 Byte.xml*

Opzione /ECat X90: *4 different configuration files are provided:*

- *Hilscher NETX90 RE ECS V5.2.0-32.xml*
- *Hilscher NETX90 RE ECS V5.2.0-64.xml*
- *Hilscher NETX90 RE ECS V5.2.0-96.xml*
- *Hilscher NETX90 RE ECS V5.2.0-128.xml*

The file that corresponds to the size of the input and output areas selected in the instrument must be imported into the PLC (for example if IMP.REG.=128 and OUT.REG.=128 are set in the instrument, the file must be imported into the PLC "Hilscher NIC 50-RE ECS V2.2 128 Byte.xml"). Multiple files with different sizes can be imported, but in this case it will not be possible to perform the search function and automatic configuration of devices on the network.

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INPUT/OUTPUT PARAMETERS

FUn. In.1

INPUT 1 FUNCTION

Selecting the function associated with input 1. **[1401]**

VALUE	DESCRIPTION
Zero	Calibrates to zero. [0]
Tare	Executes the automatic tare. [1]
Del.Tar	Cancels the tare. [2]
Peak	Reset of the peak function. [3]
Hold	Holds acquired weight. [4]
Send	Data transmission on demand. [5]
Log	Activates the datalogger function. [6]

Default: *Zero*

FUn. In.2

INPUT 2 FUNCTION

Selecting the function associated with input 2. [1402]

VALUE	DESCRIPTION
Zero	Calibrates to zero. [0]
Tare	Executes the automatic tare. [1]
Del.Tar	Cancels the tare. [2]
Peak	Resets the peak function. [3]
Hold	Holds acquired weight. [4]
Send	Data transmission on demand. [5]
Log	Activates the datalogger function. [6]

Default: *Zero*

nodE 1

SET-POINT 1 OPERATING MODE

Select in sequence 4 operating criteria of set-point 1: [1403]

Comparison with net weight, with gross weight or with peak. In the latter case the comparison is carried out with the last acquired peak value, even when the peak function is not active.

VALUE	DESCRIPTION
NET	The relay output is active in Net Weight mode. [0]
GROSS	The relay output is active in Gross Weight mode. [1] (Default)
PEAK	The relay output is active in Peak mode. [2]
PROCESS	The relay output is active when the instrument is working normally. [3]

Default: *GROSS*

Selecting the output status if normally open or closed: [1404]

VALUE	DESCRIPTION
n.oPEn.	Relay 1 is normally open. [0] (Default)
n.CLoSE	Relay 1 is normally closed. [1]

Defaul: *n. oPEn.*

Select if positive or negative values have to be compared. [1405]

VALUE	DESCRIPTION
PoSIt..	The output is operative with positive weight. [0] (Default)
nEGAt.	The output is operative with negative weight. [1]
ALL	The output is operative both with positive and negative weight. [2]

Default: *PoSIt*

Select whether only stable weight values are to be compared or also unstable: [1406]

VALUE	DESCRIPTION
norMAL	Output 1 is active with unstable weight. [0] (Default)
StAbLE	The output is active with stable weight. [1]

Default: *norMAL*

HYSt. 1

SET-POINT 1 HYSTERESIS [1407]

Hysteresis value with respect to the set-point

Value: *from 0 to Capacity*

Default: *2*

t INEr 1

SET-POINT 1 TIMING [1408]

Value of time, in tenths of a second, during which, when the weight value set is exceeded, the output associated with set-point 1 remains enabled.

After this time, even if the weight value is still above the set-point, theoutput is automatically disabled.

The function is not active with programmed time equal to zero.

Values: *from 000 to 999*

Default: *0*

dELAY 1

SET-POINT 1 DELAY [1409]

Value of time, in tenths of a second, after which, when the set weight value is exceeded, the output associated with set-point 1 is enabled.

The function is not active with programmed time equal to zero

Values: *from 000 to 999*

Default: *0*

nodE 2

SET-POINT 2 OPERATING MODE

Select in sequence 4 operating criteria of set-point 2: [1410]

Comparison with net weight, with gross weight or with peak. In the latter case the comparison is carried out with the last acquired peak value, even when the peak function is not active.

VALUE	DESCRIPTION
NET	The relay output is active in Net Weight mode. [0]
GROSS	The relay output is active in Gross Weight mode. [1] (Default)
PEAK	The relay output is active in Peak mode. [2]
PROCESS	The relay output is active when the instrument is working normally. [3]

Default: *GROSS*

Selecting the output status if normally open or closed: [1411]

VALUE	DESCRIPTION
n.oPEn.	Relay 2 is normally open. [0] (Default)
n.CLoSE	Relay 2 is normally closed. [1]

Defaul: *n. oPEn.*

Select if positive or negative values have to be compared. [1412]

VALUE	DESCRIPTION
PoSIt..	The output is operative with positive weight. [0] (Default)
nEGAt.	The output is operative with negative weight. [1]
ALL	The output is operative both with positive and negative weight. [2]

Default: *PoSIt*

Select whether only stable weight values are to be compared or also unstable: [1413]

VALUE	DESCRIPTION
norMAL	Output 2 is active with unstable weight. [0] (Default)
StAbLE	Output 2 is active with stable weight. [1]

Default: *norMAL*

HYSt. 2

SET-POINT 2 HYSTERESIS [1414]

Hysteresis value with respect to the set-point

Value: *from 0 to Capacity*

Default: *2*

t IMEr2

SET-POINT 2 TIMING [1415]

Value of time, in tenths of a second, during which, when the weight value set is exceeded, the output associated with set-point 2 remains enabled.

After this time, even if the weight value is still above the set-point, theoutput is automatically disabled.

The function is not active with programmed time equal to zero.

Values: *from 000 to 999*

Default: *0*

dELAY2

SET-POINT 2 DELAY [1416]

Value of time, in tenths of a second, after which, when the set weight value is exceeded, the output associated with set-point 2 is enabled.

The function is not active with programmed time equal to zero

Values: *from 000 to 999*

Default: *0*

WEIGHING PARAMETERS

The parameters in this menu permit adjustment of the times for acquisition and updating of the display and manual or automatic resetting by the transmitter.

uSE

INSTRUMENT OPERATION

Selecting the operation of the instrument. In case of a change from **FREE** operation to **METRIC** operation, to confirm the setting authentication is required through the password of authorised personnel.

VALUE	VARIATION
Free	Free operation. [0] (Default)
Trade	METRIC instrument operation. [1]

Default: *Free*

Not Ion

STABILITY OF WEIGHT [1303]

This parameter defines the number of divisions needed to consider the weight stable.

A high number of divisions allows the transmitter to quickly detect stability of the weight, which is needed when executing tare and print commands.

VALUE	VARIATION
0	Weight always stable.
1	Stability determined quickly.
2	Stability determined with medium parameters. (Default)
3	Stability determined accurately.
4	Stability determined with the highest accuracy.

Default: *2*

AUto-0

AUTOZERO WHEN SWITCHING ON [1304-1305]

This parameter defines the value of maximum weight that can be reset when the instrument is switched on.

This operation corresponds to zero calibration of the system andis executed only if the weight is stable and below the set value.

Value: *from 0 to Capacity.*
Default: *0*

0-trAC

ZERO TRACKING [1306]

This function allows you to perform temporary zero calibration compensating for the temperature drift of the weight.

Switching off the transmitter automatically restores the previous zero calibration.

The maximum weight that can be reset by this parameter is **2%** of the capacity of the system.

To disable this function, set the value **0**.

VALUE	VARIATION
0	Control excluded.
1	0.5 divisions per second.
2	1 division per second.
3	2 divisions per second.
4	3 divisions per second.

Default: *0*

0-bAnd

ZERO BAND [1307]

This parameter defines the number of divisions that can be reset by pressing the zero button on the front or the associated Input.

Values: *from 0 to 200.*

Default: *100*

0-AI I

TOTAL RESET

If enabled, pressing the 0 button for 5 seconds or closing the 0 input for 5 seconds performs the 0 calibration.

Values:

ON / OFF

Default: *OFF*

FILTER - SETTING FILTER PARAMETERS

d IG.bAn.

WEIGHT FILTER VALUE [1201]

This parameter adjusts not only the refresh rate of the display, but specially the serial and analogue output. The maximum refresh rate of the display is limited to 25 Hz

High filter values speed up the weight update.

Low values of the filter slow down the weight update.

Factor (Hz)	Settling Time (mS)	ADC Freq (Hz)	N readings	Monotony Time (mS)	Oscillation time (mS)	Oscillation range (div)
MANUAL [0]		Selectable	Settable	Settable	Settable	Settable
50 [1]	20	250	5	20	4000	10
25 [2]	40	100	5	40	3000	12
10 [3]	100	50	5	80	2500	16
5 [4]	200	50	10	100	2000	20
2 [5]	500	50	25	250	1500	25
1,25 [6]	800	12,5	10	300	1500	25
1 [7]	1000	12,5	12	400	1500	25
0,7 [8]	1500	12,5	19	500	1200	30
0,5 [9]	2000	12,5	25	600	1000	30

Default: 2 Hz

The following parameters are visible and therefore can be set, only if the parameter selection is MANUAL.

C. rAtE.

ADC SPEED [1202]

With this parameter, the frequency of weight acquisition is adjusted. If the parameter changes to values higher than 12.5 Hz, the weight must be stable. In case of instability the instrument will immediately indicate an error message.

Selectable values:

- *12,5 [0]*
- *50 [1]*
- *100 [2]*
- *250 [3]*
- *1000 [4]*

AJEr AG.

NUMBER OF READINGS ON AVERAGE [1203]

With this parameter you set the number of readings that the filter will use to establish the average weight value.

Values: *from 0 to 50.*

nonot.

MONOTONY TIME [1204]

Parameter used to stabilize the weight when continuous variation of the last digit is detected. Normally used in case of resolution of the weight exceeding 10,000 divisions or with low sensitivity of the input signal. Value expressed in mS.

Values: *from 0 to 999.*

t.oSC IL.

OSCILLATIONS TIME [1205]

Parameter used in conjunction with oscillation Range to reduce the lens weight changes and repetitive typical in lifting systems. Enter the value of the oscillation time expressed in mS.

Values: *from 0 to 999.*

r.oSC IL.

OSCILLATIONS RANGE [1206]

As for the parameter Oscillation time, used to reduce the oscillations. Enter the value of the oscillation expressed in weight divisions.

Values: *from 0 to 99.*

SETTING FUNCTIONAL FEATURES

Std. bY.

STAND BY [1001]

Idle time beyond which the instrument automatically assumes a low brightness status and keypad lock.

0 = deactivated function.

Values: *from 0 to 999.*
Default: *0*

LoCK.

KEYPAD LOCK [1002]

Set of **3** binary values that correspond to the **3** keys.

0 —> key not locked

1—> key locked

(e.g. 0101 corresponds to locking the 2nd and 4th key).

Values: *from 000 to 111.*
Default: *000*

P InCod.

PASSWORD SETTING [1003]

If programmed, to access the programming menu you must enter the password. In the event of subsequent accesses it is no longer necessary to type the password until the stand-by intervenes or the instrument is powered off.

Values: *from 0 to 9999.*
Default: *0000 (no Pasword)*

PEAK.

PEAK FUNCTION [1004]

Allows the peak function to be available or not and refers it to the net or gross weight.

If the application does not provide this feature you can disable it.

Selectable setting:

- *NONE [0]*
- *NET [1]*
- *GROSS [2]*

Default: *NONE*

LEd n

LED OPERATION

*Allows you to select the function of the **3 LEDs** on the instrument; **LED 4** is the decimal point of the rightmost digit*

Selectable values:

- *STABLE*
- *NET*
- *MIN*
- *SET 1*
- *SET2*
- *NONE*

DISPLAYED PARAMETERS ONLY IF OPTIONAL MEMORY INSTALLED

dAt.LoG.

DATALOGGER [1005]

*Allows you to store the weight and **I/O** status in Excel format in the optional memory. Logging can be of a single measurement or a continuous series of measurements from the start of storage (max **1000** measurements). The memory can contain a maximum of **60,000** records, beyond which the oldest records are overwritten.*

Selectable values:

- *NONE [0]*
- *SINGLE [1]*
- *CONTIN. [2]*

Default:

- *NONE*
- *LED N*

LoG.trG.

TRIGGER DATALOGGER [1006]

In the case of activated datalogger, select whether the storage occurs manually (from key or input), or when output 1 or 2 is activated. To start storage from the key, press and hold the SET button. Storage can be interrupted at any time by pressing the ZERO button.

Selectable values:

- *MANUAL [0]*
- *OUT1 [1]*
- *OUT2 [2]*

Default: *MANUAL*

LoG.FrQ.

DATALOGGER FREQUENCY [1007]

If the datalogger is enabled, select the storage frequency of data (datalogger). The maximum frequency corresponds to that of weight acquisition (maximum frequency 250 Hz).

Selectable values:

- *10 MIN. [0]*
- *5 MIN. [1]*
- *1 MIN. [2]*
- *10 SEC. [3]*
- *5 SEC. [4]*
- *2 SEC. [5]*
- *1 HZ [6]*
- *5 HZ [7]*
- *10 HZ [8]*
- *HIGH [9]*

Default: *10 MIN.*

LoGdnL.

DOWNLOAD LOG

Log download function, the records are transmitted through the USB key of the instrument. This function can be interrupted at any time by pressing the  key.

At the end of the transmission you are prompted to delete the log, confirm by pressing PRG or cancel by pressing the  weight key.

LoGErS

LOG DELETION

Log delete function, confirm with the  key or cancel with the  key.

NOTE: During the log download function, records are transmitted in the following format, starting from the **oldest record:**

Standard Format:

<Time>	<Gross>	<Net>	<Peak>	<Inputs>	<Outputs>	*CR LF*

Format with Date and Time Option:

<Date>	*<Time>*	*<Gross>*	<Net>	*<Peak>*	*<Inputs>*	*<Outputs>*	*CR LF*

WHERE:

FIELD	DESCRIPTION
Time	6 ASCII characters representing the recording time in seconds (0-999999). Justified to the right, without insignificant zeros. If the LOG function is set to store only one record at a time, this field is always 0.
Date	8 ASCII characters in the format "dd/mm/yy" (day/month/year).
Time	8 ASCII characters in the format "hh:mm:ss" (hour:minute:second).
Gross	8 ASCII characters representing the gross weight, justified to the right (without insignificant zeros, with decimal points and negative signs).
Net	8 ASCII characters representing the net weight, formatted similarly to Gross.
Peak	8 ASCII characters representing the peak weight, formatted similarly to Gross.
Inputs	2 ASCII characters representing input status: "0" (30h, input disabled) or "1" (31h, input enabled). The first character indicates Input 1, and the second character indicates Input 2.
Outputs	2 ASCII characters representing output status: "0" (30h, output disabled) or "1" (31h, output enabled). The first character indicates Output 1, and the second character indicates Output 2.

ACCESS VIEWING

This menu only appears in case of **METRIC** functioning.

SUB MENU	MESSAGGE	NAME	DESCRIZIPTION	TYPE
ACCESS	ACC-01	Access 01	Procedure for wiewing last access of authorized personnel.	Spc
	ACC-02	Access 02	Procedure for wiewing last but one access of authorized personnel.	Spc
	ACC-03	Access 03	Procedure for wiewing last but two access of authorized personnel.	Spc
	ACC-04	Access 04	Procedure for wiewing last but three access of authorized personnel.	Spc
	ACC-05	Access 05	Procedure for wiewing last but four access of authorized personnel.	Spc

PROCEDURE FOR ACCES VIEWING

Press PRG to enter: you will see the operator code used to access the programming of the instrument and the sequential number of accesses as indicated below:

Id.0000

The display shows the ID code used for access (the password table). In the case where access is made through calibration jumper, it displays the identification code 0000.

Press the PRG key to continue with the visualization of the progressive access number.

Pr.0000

The display shows the sequence number of access (this value is incremented at each access and is never reset). Press the PRG key to exit the access viewing procedure.

ALIBI MEMORY CONSULTATION

This menu only appears in case of **METRIC** functioning.

SUB MENU	MESSAGGE	NAME	DESCRIZIPTION	TYPE	RANGE
AL .MEM	SEE.MEM.	Aliby memory	Procedure for consulting weigh stored in aliby memory.	Spc	0÷959999

In case of **METRIC** functioning and with aliby memory enabled:

- Each executed weigh is stored in the aliby memory.
- For each weighing it is associated an identification code, with value range from **0** to **959999**
- The identification code of the weighing is transmitted to the serial port at the time of weighing.

ALIBI MEMORY CONSULTATION PROCEDURE

000000

Enter the ID code of the weighing and confirm with the **PRG** key.

0.000

The display shows the weight associated with the required identification code. Press the  **DOWN** key to exit the consultation procedure of the alibi memory.

no Cod.

If the required identification code is not present in the alibi memory, a timed message "**NO CODE**" is showed.

SERIAL COMMUNICATION PROTOCOLS

CONTINUOUS, AUTOMATIC AND MANUAL ASCII PROTOCOLS

The continuous transmission is carried out at the refresh rate of the weight, consistent with the serial transmission baud rate. In case of communication on the ethernet port, the continuous transmission frequency is limited to **12.5 Hz.**

In case of FREE mode, the string is transmitted with Continuous, On Demand and Automatic protocols:

STX	<status>	<weight>	ETX	<chksum>	EOT

In case of METRIC mode, the string is transmitted with On Demand and Automatic protocols:

STX	<status>	<weight>	weighing ID	ETX	<chksum>	EOT

WHERE:

- **STX** (start of text) = 0x02h
- **ETX** (end of text) = 0x03h
- **EOT** (end of transmission) = 0x04.

<status> = character encoded as per the following table (bit = 1 if condition TRUE):

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	1	1	Tare Entered	Zero band	Stable weight	Centre zero

WEIGHT DATA FORMAT AND TRANSMISSION DETAILS

<weight> Field:

- Consists of 8 ASCII characters with the weight value, justified to the right (without insignificant zeros, with decimal points and negative signs).

The transmitted weight value can be:

- **Net weight**
- **Gross weight**
- **Peak weight** (Depends on the selected data mode – see parameter MODE in the serial communication configuration menu.)

Special Conditions:

CONDITION	DISPLAYED VALUE
Overweight	"^^^^^^^^"
Underweight (> 999999)	"_ _ _ _ _ _ _ _"
Weight Reading Error	" O-L "

<weighing ID> Field:

- Consists of 7 ASCII characters.
- Represents the identifier code of the weight.
- Justified to the right, without insignificant zeros.

<chksum> (Checksum) Field:

- A checksum is calculated using an exclusive OR (XOR) operation on all characters between:
    - **STX** (or <Addr>) and ETX, excluding the last two characters.
- The result is split into two ASCII-encoded characters, separating:
    - **Upper 4 bits** (first character).
    - **Lower 4 bits** (second character).
- **Example:**
    - **XOR result** = 5Dh
    - **<chksum>** = "5Dh" –> Encoded as **35h** and **44h**.

Transmission Rules:

- In automatic and manual communication protocols, between two successive transmissions, the weight must change by at least 20 divisions.

SLAVE TRANSMISSION PROTOCOL

LIST OF THE CONTROLS AVAILABLE:

1. Request for the net and gross weight and current peak.
2. Execution weghing command
3. Autotare command
4. Zero command
5. Peak reset command
6. Programming two weight setpoints
7. Requesting the programmed setpoints.
8. Logic output activation
9. Request Input status
10. Command of setpoints storage in permanent memory.
11. Change in net weight.
12. Change in gross weight.
13. DeleteTare command.
14. Request for Net weight.
15. Request for Gross weight.

The unit connected to the instrument (typically a personal computer) functions as the **MASTER** and is solely responsible for initiating the communication process. Communication occurs through the transmission of a string from the **MASTER**, followed by a corresponding reply from the **SLAVE** unit.

CONTROL FORMAT DESCRIPTION

- **Constant Characters:** Enclosed in double quotes (""), case-sensitive.
- **Variable Numeric Fields:** Enclosed in angle brackets (<>).
- **Instrument Identification (<addr>):** Used to identify the specific instrument in the communication network.

ADDRESSING BASED ON COMMUNICATION INTERFACE:

- **RS485:** The <addr> is determined by adding 80h to the instrument's address.
    - **Example:** If the instrument address is 03h, then <addr> = 80h + 03h = 83h.
- **RS232:** The <addr> is always 81h.
- **Ethernet:** The <addr> is always FFh.

This structured protocol ensures reliable communication between the **MASTER** and **SLAVE** units across different interfaces.

COMMAND LIST & FORMATS

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
1	Request Net, Gross, or Peak Weight	<Addr> "N" EOT	<Addr> "N" <status> <weight> ETX <chksum> EOT or <Addr> NAK EOT

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
2	Weighing Execution Command	<Addr> "P" EOT	<Addr> "P" <status> <weight> <Weighing ID> ETX <chksum> EOT or <Addr> NAK EOT

This command is available only in METRIC mode. The conditions for its use are:

- Stable weight.
- Since the last weighing, the weight must have changed by at least 20 divisions (weight delta).
- Gross weight must be equal to or greater than the minimum weighing value (20 divisions) and less than the maximum capacity.
- Net weight must not be zero.
- Between two successive requests, the weight must change by 20 divisions; if the weight is unstable, the command will not be executed.

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
3	Auto-Tare Command	<Addr> "A" EOT	<Addr> "A" ACK EOT or <Addr> NAK EOT

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
4	Semi-Automatic Zero Command	<Addr> "Z" EOT	<Addr> "Z" ACK EOT or <Addr> NAK EOT

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
5	Reset Peak Value Command	<Addr> "X" EOT	<Addr> "X" ACK EOT or <Addr> NAK EOT

	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
6	Set Two Weight Thresholds	<Addr> "S" <s1> <s2> ETX <csum> EOT	<Addr> "S" ACK EOT or <Addr> NAK EOT

7	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Request Programmed Thresholds	<Addr> "R" EOT	<Addr> "R" <s1> <s2> ETX <csum> EOT or <Addr> NAK EOT

8	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Activate Logic Outputs	<Addr> "U" <outputs> EOT	<Addr> "U" ACK EOT or <Addr> NAK EOT

9	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Request Logic Input Status	<Addr> "I" EOT	<Addr> "I" <inputs> ETX <csum> EOT or <Addr> NAK EOT

10	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Store Thresholds in Memory	<Addr> "E" EOT	<Addr> "E" ACK EOT or <Addr> NAK EOT

In case of a communication error or an unrecognized command from WT 11, it will respond with the following string:

WT 11: **<Addr> NAK EOT**

- **<s1> and <s2>:** formatted as a weight field.
- **<outputs> and <inputs>:** a single ASCII character encoded according to the following table (bit = 1 if the input/output is active).

BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
0	0	1	1	0	0	Input 2 / Output 2	Input 1 / Output 1

11	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Display Gross to Net Weight	<Addr> "CN" EOT	<Addr> "C" ACK EOT or <Addr> NAK EOT

12	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Display Net to Gross Weight	<Addr> "CL" EOT	<Addr> "C" ACK EOT or <Addr> NAK EOT

13	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Delete Tare Command	<Addr> "DT" EOT	<Addr> "D" ACK EOT or <Addr> NAK EOT

14	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Request Net Weight (PDAT06)	<Addr> "W" "N" EOT	<Addr> "W" <repeater status> <net weight> ETX <csum> EOT or <Addr> NAK EOT

15	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 11
	Request Gross Weight (PDAT06)	<Addr> "W" "G" EOT	<Addr> "W" <repeater status> <gross weight> ETX <csum> EOT or <Addr> NAK EOT

WHERE:

<stato rip>: Character encoded according to the following table (bit = 1 if the condition is true).

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	1	1	Displayed weight 0 = net 1 = gross	Zero band	Stable weight	Zero center

COMMUNICATION ERROR HANDLING

If a command is unrecognized or there is a communication error, the **SLAVE** responds with:

WT 11: <Addr> NAK EOT

DATA FORMATTING NOTES

<s1> and <s2>: formatted as weight field.

BIT MAPPING FOR LOGIC INPUTS/OUTPUTS

The **<outputs>** and **<inputs>** fields are ASCII-encoded values representing the enabled logic states.

BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
0	0	1	1	0	0	Input 2 / output 2	Input 1 / output 1

WHERE:

<rip status>: character encoded as per the following table (bit = 1 in case of true condiction).

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	1	1	Displayed weight 0 = net 1 = gross	Zero band	Stable weight	Zero center

WEIGHT DATA FORMATTING

The **<net>** and **<gross>** fields represent the net and gross weight values, respectively. These fields are 8-character ASCII strings, formatted as follows:

- **Right-aligned:** The weight values are justified to the right within the 8-character field.
- **No Insignificant Zeros:** Leading zeros are omitted.
- Includes **Decimal Points** and **Negative Signs** (if applicable).

SPECIAL CONDITIONS & ERROR STATES

CONDITION	DISPLAYED VALUE	DESCRIPTION
Normal Weight Value	<net> or <gross>	Displays the actual weight value with decimal points and negative signs.
Overweight Condition	"^^^^^^^^"	The weight exceeds the maximum measurable capacity.
Extreme Underweight	" _ _ _ _"	The weight is below -999999.
Weight Reading Error	" O-L "	A weight reading error has occurred.

PRINTER PROTOCOL

Data transmission protocol to Plus Printer

Printing can be started by pressing a key (see section FUNCTION OPERATIONAL) or by input (see paragraph SETTING I/O).

Here is an example of printer.

```
21/06/16 15:32
Net      209.0 kg
Gross    211.5 kg
Tare     2.5 kg
Peak     268.5 kg
Code      212456
```

- Date is printed only in case of hardware with time clock.
- The peak value is only printed if the peak function is enabled.
- The identification code of the weighing is printed only in case of METRIC operation and alibi memory configured.

The conditions to printing are:

- Stable weight (or stabilized within 3 seconds from command).
- Since the last executed weigh, the weight has undergone a change of at least 20 divisions (delta weight).
- Gross weight equal to or greater than the minimum weight (20 divisions) and less than the maximum capacity.
- Net weight not null.

Only in case of **FREE** functioning, printing is permitted even with gross weight less than the minimum weight or with zero net weight.

MODBUS RTU PROTOCOL

The addresses used in the tables follow the standard routing specified in the **Modicon PI-MBUS-300** reference guide. Below is an excerpt to assist users in communicating with the instrument:

"All data addresses in Modbus messages are referenced to zero. The first occurrence of a data item is addressed as item number zero.

For example:

- **Coil 1** in a programmable controller is addressed as coil **0000** in the data address field of a Modbus message.
- **Coil 127** (decimal) is addressed as **coil 007E** (hex) or **12**6 (decimal).
- **Holding register 40001** is addressed as register 0000 in the data address field. The function code field already specifies a 'holding register' operation, making the '**4XXXX**' reference implicit."

DATA CONFIRMATION AND E²PROM STORAGE

To confirm any new value entered into **E²PROM**, the **MAKE – BACKUP** function must be executed.

- If this function is not performed before powering off the WT 11, any changes will be lost, and the previous values will be restored.

NUMERICAL VALUE REPRESENTATION

- Unless otherwise specified, numerical values (addresses, codes, and data) are expressed in decimal format.

MODBUS RTU PROTOCOL

- The **MODBUS RTU** protocol is available only on **COM2 (RS485).**

HANDLING OF COMMUNICATION ERRORS

To ensure the integrity of communication, a Cyclic Redundancy Check (**CRC**) is performed on all communication strings.

- If a **communication error** occurs, the slave does not respond with a string.
- The **master must implement** a timeout for receiving the response.
- If no response is received within the timeout period, a communication error is detected.

HANDLING OF RECEIVED DATA ERRORS

In the case of a string that has been received correctly but cannot be executed, the slave responds with an **EXCEPTIONRESPONSE** as indicated in the table below.

CODE	DESCRIPTION
1	ILLEGAL FUNCTION (The function is not valid or not supported)
2	ILLEGAL DATA ADDRESS (The address of the specified data is not available)
3	ILLEGAL DATA VALUE (The values of the received data are invalid)

SUPPORTED FUNCTIONS:

FUNCTION	DESCRIPTION
01	READ COIL STATUS (Reading the status of the logic outputs)
02	READ INPUT STATUS (Reading the status of the logic inputs)
03	READ HOLDING REGISTERS (Reading the programmable registers)
04	READ INPUT REGISTERS (Reading the "read only" registers")
05	FORCE SINGLE COIL (Writing the status of each output)
06	PRESET SINGLE REGISTER (Writing a programmable register)
15	FORCE MULTIPLE COILS (Multiple writing of outputs)
16	PRESET MULTIPLE REGISTERS (Multiple writing of registers)
Funct + 80h	EXCEPTION RESPONSE

LIST OF THE MODBUS PROTOCOL HOLDING REGISTERS

The following table lists the instrument parameters that can be read or programmed via the available communication interfaces, depending on the hardware configuration.

Register Types:

- **R (Read-only):** Can only be read.
- **W (Write-only):** Can only be written.
- **R/W (Read & Write):** Supports both reading and writing.

MODBUS Addressing Considerations:

When using the **MODBUS T**CP protocol, the instrument address (the "Unit Identifier" field) must always be **FFh**.

When using a fieldbus (other than MODBUS):

- **R** or **R/W** registers are available in the input area.
- **W** or **R/W** registers are available in the output area.

All registers are **16-bit** in size.

IN THE CASE OF SELECTING T.SER, THE INSTRUMENT WILL OPERATE IN WT 14 MODE, WHICH IS SET AS THE DEFAULT CONFIGURATION.

Indirizzo	Holding Register	R/W	Note
0001	Status register	R	See related table.
0002	Gross weight (MSB)	R	INT. Value - Most significant word
0003	Gross weight (LSB)	R	INT. Value - Least significant word
0004	Net weight (MSB)	R	INT. Value - Most significant word
0005	Net weight (LSB)	R	INT. Value - Least significant word
0006	Peak (MSB)	R	INT. Value - Most significant word
0007	Peak (LSB)	R	INT. Value - Least significant word
0008	Digital inputs	R	See Relative table.
0009	Digital outputs	R	
0101	Net weight weighed (MSB)	R	INT. Value - Most Significant Word
0102	Net weight weighed (LSB)	R	INT. Value - Least Significant Word
0103	Weighing code (MSB)	R	INT. Value - Most Significant Word
0104	Weighing code (LSB)	R	INT. Value - Least Significant Word
0201	Setpoint 1 (MSB)	R/W	INT. Value - Most Significant Word
0202	Setpoint 1 (LSB)	R/W	INT. Value - Least Significant Word
0203	Setpoint 2 (MSB)	R/W	INT. Value - Most Significant Word
0204	Setpoint 2 (LSB)	R/W	INT. Value - Least Significant Word
0501	Data log (MSB)	W	INT. Value - Most Significant Word (See related table)
0502	Data log (LSB)	W	INT. Value - Least Significant Word (See related table)
0503	Command log	W	See related table.
1001	Stand-by function	R/W	INT. Value
1002	Keyboard lock function	R/W	See Relative Table
1003	Password function	R/W	INT. Value
1004	Peak function	R/W	See Correspondence on page 60
1005	Data logger function	R/W	See Correspondence on page 61
1006	Data logger trigger	R/W	See Correspondence on page 61
1007	Data logger frequency	R/W	See Correspondence on page 61
1101	Weight division value (*)	R/W	See relevant table.
1102	Decimals (*)	R/W	
1103	Load cell capacity (MSB) (*)	R/W	INT. Value - Most significant word
1104	Load cell capacity (LSB) (*)	R/W	INT. Value - Least significant word
1105	Load cell sensitivity (*)	R/W	INT. Value
1106	Fixed Tare (MSB) (*)	R/W	INT. Value - Most significant word
1107	Fixed Tare (LSB) (*)	R/W	INT. Value - Least significant word
1108	Gravity Calibration (MSB) (*)	R/W	INT. Value - Most significant word
1109	Gravity Calibration (LSB) (*)	R/W	INT. Value - Least significant word
1110	Use Area Gravity (MSB) (*)	R/W	INT. Value - Most significant word
1111	Use Area Gravity (LSB) (*)	R/W	INT. Value - Least significant word
1151	Zero Signal Cal. Table (MSB) (*)	R/W	INT. Value - Most significant word
1152	Zero Signal Cal. Table (LSB) (*)	R/W	INT. Value - Least significant word

1153	Table cal. P1 signal (MSB) (*)	R/W	INT. Value - Most significant word
1154	Table cal. P1 signal (LSB) (*)	R/W	INT. Value - Least significant word
1155	Table cal. P2 signal (MSB) (*)	R/W	INT. Value - Most significant word
1156	Table cal. P2 signal (LSB) (*)	R/W	INT. Value - Least significant word
1157	Table cal. P3 signal (MSB) (*)	R/W	INT. Value - Most significant word
1158	Table cal. P3 signal (LSB) (*)	R/W	INT. Value - Least significant word
1159	Table cal. P4 signal (MSB) (*)	R/W	INT. Value - Most significant word
1160	Table cal. P4 signal (LSB) (*)	R/W	INT. Value - Least significant word
1161	Table cal. P5 signal (MSB) (*)	R/W	INT. Value - Most significant word
1162	Table cal. P5 signal (LSB) (*)	R/W	INT. Value - Least significant word
1163	Table cal. P1 value (MSB) (*)	R/W	INT. Value - Most significant word
1164	Table cal. P1 value (LSB) (*)	R/W	INT. Value - Least significant word
1165	Table cal. P2 value (MSB) (*)	R/W	INT. Value - Most significant word
1166	Table cal. P2 value (LSB) (*)	R/W	INT. Value - Least significant word
1167	Table cal. P3 value (MSB) (*)	R/W	INT. Value - Most significant word
1168	Table cal. P3 value (LSB) (*)	R/W	INT. Value - Least significant word
1169	Table cal. P4 value (MSB) (*)	R/W	INT. Value - Most significant word
1170	Table cal. P4 value (LSB) (*)	R/W	INT. Value - Least significant word
1171	Table cal. P5 value (MSB) (*)	R/W	Valore INT. - Most significant word
1172	Table cal. P5 value (LSB) (*)	R/W	Valore INT. - Least significant word
1201	Filter factor	R/W	See correspondence on page 58
1202	ADC output rate	R/W	See correspondence on page 58
1203	Number of readings per average	R/W	INT value.
1204	Monotone time	R/W	INT value.
1205	Oscillation time	R/W	INT value.
1206	Oscillation range	R/W	INT value.
1301	Full scale (MSB) (*)	R/W	INT. Value - Most Significant Word
1302	Full scale (LSB) (*)	R/W	INT. Value - Least Significant Word
1303	Weight stability (*)	R/W	See correspondence on page 56
1304	Auto-zero at power-on (MSB) (*)	R/W	INT. Value - Most Significant Word
1305	Auto-zero at power-on (LSB) (*)	R/W	INT. Value - Least Significant Word
1306	Zero tracking (*)	R/W	See correspondence on page 56
1307	Resettable divisions (MSB) (*)	R/W	INT. Value - Most Significant Word
1308	Resettable divisions (LSB) (*)	R/W	INT. Value - Least Significant Word
1401	Input function 1	R/W	See correspondence on page 52
1402	Input function 2	R/W	See correspondence on page 52
1403	Output mode 1 — Function	R/W	See correspondence on page 53
1404	Output mode 1 — Logic	R/W	See correspondence on page 53
1405	Output mode 1 — Polarity	R/W	See correspondence on page 53
1406	Output mode 1 — Stability	R/W	See correspondence on page 53
1407	Output hysteresis 1	R/W	INT value.
1408	Output timing 1	R/W	INT value.
1409	Output delay 1	R/W	INT Value.

1410	Output mode 2— Function	R/W	See correspondence on page 54
1411	Output mode 2— Logic	R/W	See correspondence on page 54
1412	Output mode 2— Polarity	R/W	See correspondence on page 54
1413	Output mode 2— Stability	R/W	See correspondence on page 54
1414	Output hysteresis 2	R/W	INT Value.
1415	Output Timing 2	R/W	INT Value.
1416	Output Delay 2	R/W	INT Value.
1501	Analog Tare (MSB)	R/W	INT Value. - Most significant word
1502	Analog Tare (LSB)	R/W	INT Value. - Least significant word
1503	Analog Full Scale (MSB)	R/W	INT Value. - Most significant word
1504	Analog Full Scale (LSB)	R/W	INT Value. - Least significant word
1505	Analog Output Mode	R/W	See correspondence on page 38
1506	Analog Output Range	R/W	See correspondence on page 38
1507	Analog Zero Adjustment	R/W	INT Value. Analogue output zero points, to end the regulation procedure it is necessary to send the command to save data in permanent memory in the Command Register.
1508	Analog Full Scale Adjustment	R/W	INT Value. Analogue output full scale points, to end the regulation procedure it is necessary to send the command to save data in permanent memory in the Command Register.
2000	Monitor register	W	The programmed value is automatically copied into the Monitor Register (2100).
2100	Monitor register	R	

(*) These registers can only be modified in FREE mode or if in METRIC mode with a calibration bridge enabled.

TABLE A - REGISTER STATUS CODING

BIT	15	14	13	12	11	10	9	8
Description	Setup (***)	Weight difference	Output 2	Output 1	Input 2	Input 1	Run Backup	Hold function

BIT	7	6	5	4	3	2	1	0
Description	Not calibrated	Weight error	Over-load	Under-load	Tare entered	Zero band	Stable weight	Zero centre

TABLE B - KEYPAD LOCK CODING

BIT	15÷3	2	1	0
Description	Not used	UP key	DOWN key	ENTER key

ATTENTION: the bits from 15 to 4 are not managed and are always equal to 0.

TABLE C - INPUTS/OUTPUTS CODING

BIT	15÷2	1	0
Description	Not used	IN/OUT 2 Active	IN/OUT 1 Active

ATTENTION: the bits from 15 to 4 are not managed and are always equal to 0.

TABLE D - DECIMALS AND DIVISION VALUE CODING

ADDRESS	DESCRIPTION	ACCEPTED VALUES
1104	Division Value	1, 2, 5, 10, 20, 50
1105	Number of Decimals	0, 1, 2, 3, 4

TABLE E - DATA REGISTER / COMMAND REGISTER CODING

REGISTER VALUE	COMMAND REGISTER FUNCTION	FUNCTION DATA REGISTER
0x0001	Semiautomatic zero	
0x0002	Auto-tare	
0x0003	Peak Reset	
0x0004	Zero calibration (**)	
0x0005	Full scale calibration (**)	Sample weight value in MSB and LSB
0x0006	Analogue Test	Value between 0 and 100 at intervals of 10 in LSB
0x0007	Saving the data in the permanent memory	
0x000A	Run command.	
0x000B	Change from gross to net	
0x000C	Change from net to gross	
0x000D	Acquisition of the zero signal (calibration table)	
0x0015	Linearization point storage (**)	Sample weight value in MSB and LSB
0x0055	Interruption of the linearization procedure (**)	
0x3FFF	Enabling Output Data Area (*)	

(*) The instrument parameters managed in the Fieldbus Output Data Area are not changed until this command is sent. When the instrument is switched on the Output Data area is completely reset, the master fieldbus must read the parameter values from the Input Data Area and copy them in the relevant registers of the Output Data Area, then it must send the enable command in the Command Register. Otherwise all parameters managed in the Output Data area would be reset when switched on.

(**) Function only available in FREE mode or if in METRIC mode with a calibration jumper enabled.

(***) The instrument is undergoing configuration (TRUE flag during access to the SETUP menu of the instrument or during connection with PC "VTW Connect" software).

EXAMPLES

ZERO CALIBRATION

In condiction of stable and unloaded scale write hexadecimal value **0004** in Command Register (0503). To permanentely store in the memory the new Zero value, write hexadecimal value 0007 in Command Register (0503).

FULL SCALE CALIBRATION

- Put a sample weight on the scale, i.e 1256 kg.
- **Write in Data Register** (0501 and 0502) the hex value of the sample weight: 04E8.
- **Write to the Command Register** (0503), the hexadecimal value 0005.

You can write at the same time the Comand Register and Data Register using the multiple registers function.

To permanentely store in the memory the new value, write hexadecimal value 0007 in Command Register (0503).

FIELDBUS LINEARIZATION PROCEDURE

The linearization procedure remotely replicates the operations that can be performed from the keyboard as described in the manual for the dead weight calibration:

- **Zero calibration:** send the command 0x0004; carry out the operation with unloaded scale but complete of the fixed tare, with stabilized weight. The gross weight acquired must be reset. It is possible to repeat this operation several times.
- Up to **5 linearization points** on a positive scale are possible. Program the value of the actual weight loaded and stabilized in the Data Register and send the command 0x0015. It is possible to verify the successful operation by checking the gross weight acquired, the instrument automatically switches to the next linearization point; if the weight is not stable the operation is not carried out. The linearization command (0x0015) can be repeated up to 5 points.
- **End the linearization procedure** by sending the command 0x0055 after the acquisition of the last point. It is possible to store a number of points lower than 5.
- Send the **command 0x0007 to sav**e the calibration in permanent memory.

FIELDBUS PROTOCOL

IF SELECTED T.SER WT 14 (DEFAULT SELECTION)

The following table lists the registers of the input area (produced from the instrument and read by the master), common to all **PROFIBUS, PROFINET, ETHERCAT, ETHERNET/IP fieldbuses.**

The registers are **16 bit** in size. The input area is updated at a fixed frequency of **125 Hz** (80 Hz in case of PROFIBUS).

The size of the output area configured in the master fieldbus must match the size configured in the instrument.

INPUT DATA AREA

Byte	Register address	INPUT AREA REGISTER	Notes
1-2	0	Status Register	See related table.
3-4	1	Gross weight (MSB)	INT. Value - Most significant word
5-6	2	Gross weight (LSB)	INT. Value - Least significant word
7-8	3	Net weight (MSB)	INT. Value - Most significant word
9-10	4	Net weight (LSB)	INT. Value - Least significant word
11-12	5	Peak (MSB)	INT. Value - Most significant word
13-14	6	Peak (LSB)	INT. Value - Least significant word
15-16	7	Digital inputs	See Relative table.
17-18	8	Digital outputs	
19-20	9	Monitor register	Value corresponds to the equivalent register in the output area.
21-22	10	Net weight weighing (MSB)	INT. Value - Most Significant Word
23-24	11	Net weight weighing (LSB)	INT. Value - Least Significant Word
25-26	12	Weighing code (MSB)	INT. Value - Most Significant Word
27-28	13	Weighing code (LSB)	INT. Value - Least Significant Word
29-30	14	Set-Point 1 (MSB)	INT. Value - Most Significant Word
31-32	15	Set-Point 1 (LSB)	INT. Value - Least Significant Word
33-34	16	Set-Point 2 (MSB)	INT. Value - Most Significant Word
35-36	17	Set-Point 2 (LSB)	INT. Value - Least Significant Word
37-38	18	Load cell capacity (MSB)	INT. Value - Most Significant Word
39-40	19	Load cell capacity (LSB)	INT. Value - Least Significant Word
41-42	20	Load cell sensitivity	INT Value.
43-44	21	Weight division value	See related table.
45-46	22	Decimals	See related table.
47-48	23	Fixed Tare (MSB)	INT Value. - Most significant word
49-50	24	Fixed Tare (LSB)	INT Value. - Least significant word
51-52	25	Stand-By function	INT Value.
53-54	26	Keyboard lock function	See related table
55-56	27	Password function	INT Value.
57-58	28	Peak Function	See correspondence on page 60

59-60	29	Data Logger Function	See correspondence on page 61
61-62	30	Data Logger Trigger	See correspondence on page 61
63-64	31	Data Logger Frequency	See correspondence on page 61
65-66	32	Filter Factor	See correspondence on page 58
67-68	33	ADC Output Rate	See correspondence on page 58
69-70	34	Number of Readings per Average	INT. value
71-72	35	Monotone Time	INT Value.
73-74	36	Oscillation Time	INT Value.
75-76	37	Oscillation Range	INT Value.
77-78	38	Full Scale (MSB)	INT. Value - Most Significant Word
79-80	39	Full Scale (LSB)	INT. Value - Least Significant Word
81-82	40	Weight Stability	See correspondence on page 55
83-84	41	Auto Zero at Power On (MSB)	INT. Value - Most Significant Word
85-86	42	Auto Zero at Power On (LSB)	INT. Value - Least Significant Word
87-88	43	Zero Tracking	See correspondence on page 56
89-90	44	Input Function 1	See correspondence on page 52
91-92	45	Input Function 2	See correspondence on page 52
93-94	46	Output Mode 1—Function	See correspondence on page 53
95-96	47	Output Mode 1—Logic	See correspondence on page 53
97-98	48	Output Mode 1—Polarity	See correspondence on page 53
99-100	49	Output Mode 1—Stability	See correspondence on page 53
101-102	50	Output Hysteresis 1	INT Value.
103-104	51	Output Timing 1	INT Value.
105-106	52	Output Delay 1	INT Value.
107-108	53	Output Mode 2—Function	See correspondence on page 54
109-110	54	Output Mode 2—Logic	See correspondence on page 54
111-112	55	Output Mode 2—Polarity	See correspondence on page 54
113-114	56	Output Mode 2—Stability	See correspondence on page 54
115-116	57	Output Hysteresis 2	INT Value.
117-118	58	Output Timing 2	INT Value.
119-120	59	Output Delay 2	INT Value.
121-122	60	Analog Fixed Tare (MSB)	INT. Value - Most Significant Word
123-124	61	Analog Fixed Tare (LSB)	INT. Value - Least Significant Word
125-126	62	Analog Full Scale (MSB)	INT. Value - Most Significant Word
127-128	63	Analog Full Scale (LSB)	INT. Value - Least Significant Word

READING EXAMPLE

To read the gross weight on the WT 11 it is needed to read the addresses from **3** to **6** of the Input Area.

To read the net weight is needed to read the addresses from **7** to **10** of the Input Area.

When the display shows the gross weight value of **12351** in the corresponding bytes there will be:

	Byte 3	Byte 4	Byte 5	Byte 6
Hex	00	00	30	3F

The following table lists the registers of the output area (written by the master and acquired by the instrument), common to all **PROFIBUS, PROFINET, ETHERCAT, ETHERNET / IP Fieldbuses.**

The registers are **16 bit** in size. The registers written by the master in the output area, are read by the instrument at a fixed frequency of 125 Hz. (80 Hz in case of PROFIBUS)

The size of the output area configured in the master fieldbus must match the size configured in the instrument.

OUTPUT DATA AREA

Byte	Register address	OUTPUT AREA REGISTER	Notes
1-2	0	Command Register	See related table.
3-4	1	Data Register (MSB)	INT. Value - Most significant word (See Table)
5-6	2	Data Register (LSB)	INT. Value - Least significant word (See Table)
7-8	3	Monitor register	Value corresponds to the equivalent register in the output area.
9-10	4	Set-Point 1 (MSB)	INT. Value - Most significant word
11-12	5	Set-Point 1 (LSB)	INT. Value - Least significant word
13-14	6	Set-Point 2 (MSB)	INT. Value - Most significant word
15-16	7	Set-Point 2 (LSB)	INT. Value - Least significant word
17-18	8	Load cell capacity (MSB)	INT. Value - Most significant word
19-20	9	Load cell capacity (LSB)	INT. Value - Least significant word
21-22	10	Load cell sensitivity	INT. Value
23-24	11	Weight division value	See related table.
25-26	12	Decimals	See related table.
27-28	13	Fixed Tare (MSB)	INT. Value - Most significant word
29-30	14	Fixed Tare (LSB)	INT. Value - Least significant word
31-32	15	Stand-By function	INT. Value
33-34	16	Keyboard Lock function	See Related Table
35-36	17	Password function	INT. Value
37-38	18	Peak function	See Correspondence on page 60
39-40	19	Data-Logger function	See Correspondence on page 61
41-42	20	Data-Logger Trigger	See Correspondence on page 61
43-44	21	Data-Logger frequency	See Correspondence on page 61
45-46	22	Filter factor	See Correspondence on page 58

47-48	23	ADC Output Rate	See correspondence on page 58
49-50	24	Number of Readings per Average	INT. value
51-52	25	Monotone Time	INT Value.
53-54	26	Oscillation Time	INT Value.
55-56	27	Oscillation Range	INT Value.
57-58	28	Full Scale (MSB)	INT. Value - Most Significant Word
59-60	29	Full Scale (LSB)	INT. Value - Least Significant Word
61-62	30	Weight Stability	See correspondence on page 56
63-64	31	Auto Zero at Power Up (MSB)	INT. Value - Most Significant Word
65-66	32	Auto Zero at Power Up (LSB)	INT. Value - Least Significant Word
67-68	33	Zero Tracking	See correspondence on page 56
69-70	34	Resettable Divisions (>0< Key)	INT. Value
71-72	35	Input Function 1	See correspondence on page 52
73-74	36	Input Function 2	See correspondence on page 52
75-76	37	Output Mode 1—Function	See correspondence on page 53
77-78	38	Output Mode 1—Logic	See correspondence on page 53
79-80	39	Output Mode 1—Polarity	See correspondence on page 53
81-82	40	Output Mode 1—Stability	See correspondence on page 53
83-84	41	Output Hysteresis 1	INT Value.
85-86	42	Output Timing 1	INT Value.
87-88	43	Output Delay 1	INT Value.
89-90	44	Output Mode 2—Function	See correspondence on page 54
91-92	45	Output Mode 2—Logic	See correspondence on page 54
93-94	46	Output Mode 2—Polarity	See correspondence on page 54
95-96	47	Output Mode 2—Stability	See correspondence on page 54
97-98	48	Output Hysteresis 2	INT Value.
99-100	49	Output Timing 2	INT Value.
101-102	50	Output Delay 2	INT Value.
103-104	51	Analog Fixed Tare (MSB)	INT. Value - Most Significant Word
105-106	52	Fixed Tare Analog (LSB)	INT. Value - Least Significant Word
107-108	53	Analog Full Scale (MSB)	INT. Value - Most Significant Word
109-110	54	Analog Full Scale (LSB)	INT. Value - Least Significant Word
111-112	55	Analog Output Mode	See correspondence on page 38
113-114	56	Analog Output Range	See correspondence on page 38

(*) These registers can only be modified in FREE mode or if in METRIC mode with a calibration bridge enabled.

WRITING EXAMPLES

To write the set-up parameters following the example:

In bytes **1-2** (Command Register) write the **HEX** value **3FFF** which opens the internal writing area of the WT 11.

Example: to change the default values of the WT 11 like the Capacity of the load cells, the Sensitivity and Division value to **15000, 2.9965** and **2**:

Capacity	Byte 17	Byte 18	Byte 19	Byte 20
Hex	00	00	3A	98

Sensitivity	Byte 21	Byte 22
Hex	75	0D

Division	Byte 23	Byte 24
Hex	00	0A

Save the data by writing the value Hex 7 in Command Register.

N.B. The WT 11 does not accept the writing of a value equal to the value already present.

To perform the Zero and Full Scale Calibration it is not necessary to enable the internal writing area of the WT 11.

ZERO CALIBRATION:

Whit empty system put **Hex 4** in Command Register (**bytes 1-2**).

The new Zero value is stored.

FULL SCALE CALIBRATION:

Put a know weight on the system and write its value in the Data Register (**from byte 3 to 6**).

Put value **Hex 5** in Command Register. The weight value will be displayed.

FIELDBUS PROTOCOL

IF SELECTED T.SER WT 11

The following table lists the input area registers (produced by the instrument and read by the master), common to all **PROFIBUS, PROFINET, ETHERCAT, ETHERNET/IP fieldbuses.**

The registers have a size of **16 bit**s. The input area is updated at a fixed frequency of **125 Hz** (**80 Hz** in case of **PROFIBUS** fieldbus).

The size of the Input area configured in the fieldbus master must coincide with the size configured in the instrument.

INPUT DATA AREA

Byte	Register address	INPUT AREA REGISTER	Notes
1-2	0	Status Register	See related table.
3-4	1	Gross Weight (MSB)	INT. Value - Most significant word
5-6	2	Gross Weight (LSB)	INT. Value - Least significant word
7-8	3	Net Weight (MSB)	INT. Value - Most significant word
9-10	4	Net Weight (LSB)	INT. Value - Least significant word
11-12	5	Peak (MSB)	INT. Value - Most significant word
13-14	6	Peak (LSB)	INT. Value - Least significant word
15-16	7	Load Cell Capacity (MSB)	INT. Value - Most significant word
17-18	8	Load Cell Capacity (LSB)	INT. Value - Least significant word
19-20	9	Load Cell Sensitivity	
21-22	10	Weight Division Value	See relevant table
23-24	11	Weight Filter Factor	
25-26	12	Weight Stability Factor	
27-28	13	Auto Zero Threshold (MSB)	INT. Value - Most Significant Word
29-30	14	Auto Zero Threshold (LSB)	INT. Value - Least Significant Word
31-32	15	Zero Tracking Factor	
33-34	16	Zero Band	
35-36	17	Weight Delta	
37-38	18	Monitor Register	

OUTPUT DATA AREA

Byte	Register address	OUTPUT AREA REGISTER	Note
1-2	0	Data register (MSB)	INT. Value - Most Significant Word
3-4	1	Data register (LSB)	INT. Value - Least Significant Word
5-6	2	Command register	See related table
7-8	3	Load cell capacity (MSB)	
9-10	4	Load cell capacity (LSB)	
11-12	5	Load cell sensitivity	
13-14	6	Weight division value	See relevant table.
15-16	7	Weight filter factor	
17-18	8	Weight stability factor	
19-20	9	Autozero threshold (MSB)	INT. Value - Most Significant Word
21-22	10	Autozero threshold (LSB)	INT. Value - Least Significant Word
23-24	11	Zero tracking factor	
25-26	12	Zero band	
27-28	13	Weight delta	
29-30	14	Monitor register	

STATUS REGISTER CODING TABLE

Bit	15	14	13	12	11	10	9	8
Description	Not used	Not used	Not used	Not used	Not used	Not used	Memory flag	Not used

Bit	7	6	5	4	3	2	1	0
Description	Not calibrated	Weight error	Overloaded	Underload	Tare entered	Zero band	Stable weight	Center of zero

CANOPEN - DESCRIPTION

The protocol supports the CiA DS301 "**communication profile area**".

Network Management (**NMT**) manages Pre-Operational, Operational, Stopped, Reset and Reset Communication states with its protocols.

The Heartbeat protocol is supported, setted by default at 1 second, and can be switched off by programming at 0 the intervention time. (**Index = 1017h**).

The Emergency Message Management intervenes when the following events occur or cease:

- **Fault Sensor** (code = 5030h according to CiA DS404) when the load cell signal is not detected due to failure or incorrect connection or failure of the hardware of the instrument.
- **Sensor Calibration** (code = 6310h based on CiA DS404), when no weight calibration was performed.
- **Input Overload** (code = F001h according to CiA DS404), when the load cell signal is out of the instrument reading range.

Two transmission PDO's are handled with the following transmission types:

- **Synchronous acyclic (00h):** The data is transmitted in response to the **SYNC** signal only if the data has been updated with respect to the previous transmission.
- **Synchronous cyclic (01h):** The data is transmitted in response to the **SYNC** signal even though it has not been updated yet.
- **Asynchronous (FFh):** This is the default operation that involves the transmission of the **PDO** to a predetermined frequency programmable in communication parameters (default = 0, transmission disabled).

The PDO1 is mapped to transmit the following values (updated at 125 Hz frequency):

- **Gross weight** (Index = 2001h), formatted as 32-bit Signed.
- **Net weight** (Index = 2002h), formatted as 32-bit Signed.

The PDO2 is mapped to transmit the following values (updated at 125 Hz frequency):

- **Peak** (index = 2003h), formatted as 32-bit Signed.
- **Status Register** (index = 2000h), formatted as 16-bit Signed.
- **Digital input** (index = 2004h), formatted as 8-bit Unsigned.
- **Output** (index = 2005h), formatted as 8-bit Unsigned.

SPECIFICATION

PARAMETER	VALUE
NMT	NMT slave
Error Log	Heartbeat producer
Boot-up	Yes
Node ID Range	1 - 127
CANopen Bit Rates	10 – 1000 kbit/sec
Number of PDOs	1 TPDO
PDO Modes	Event-triggered (timer) Synchronous (cyclic) Synchronous (acyclic)
PDO Mapping	Yes (6 obj/PDO)
Emergency Message	Yes (Producer)
Number of SDOs	1 SDO server ("expedited" and "segmented" transfer) No SDO client
Sync	Sync producer: No Sync counter: No
Time Stamp	No
Additional Functions	-
Application Layer	CiA 301 V 4.0.2
Supported Frameworks	-
Supported Profiles	-
Certified	No
Certificate	No

CANOPEN PROTOCOL

GENERIC PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1000h	0	DEV_TYPE	Device type information (*)	U32	R
1001h	0	ERR_REG	Error log	U8	R
1005h	0	COB_ID SYNC	COB_ID Sync message (80h)	U32	R/W
1010h	0	STORE_PAR	Sub-index number(4)	U8	R
	1		Store all parameters (**)	U32	R/W
	2		Store communication parameters (**)	U32	R/W
	3		Store application parameters (**)	U32	R/W
1011h	0	RESTORE_PAR	Sub-index number(4)	U8	R
	1		Restore default parameters (***)	U32	R/W
	2		Restore communication parameters (***)	U32	R/W
	3		Restore application parameters (***)	U32	R/W
1014h	0	COB_ID EMCY	COB_ID Emergency message (80+Node_ID)	U32	R
1017h	0	HBT_TIME	Heartbeat time (expressed in ms, default 1000 mS)	U16	R/W
1018h	0	OBJ_ID	Sub-index number (4)	U8	CONST
	1		ID Vendor	U32	CONST
	2		Product code	U32	CONST
	3		Version number	U32	CONST

(*) 00070194h (according to CiA DS404 for mesurement device).

(**) 65766173h ('a','v','e','s').

(***) 64616F6Ch ('d','a','o','l').

SDO SERVER PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1200h	0	SDO_PAR	SDO record number(2)	U8	R
	1		COB_ID Client->Server (rx) (= 600h + Node_ID)	U32	R
	2		COB_ID Server->Client (tx) (= 580h + Node_ID)	U32	R

T_PDO COMMUNICATION PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1800h	0	AI_T_PDO_CPAR	Sub-index number(5)	U8	R
	1		COB_ID used from PDO (180h + Node_ID)	U32	R
	2		Transmission type PDO (*)	U8	R
	3		Inhibition time (0)	U16	R/W
	4		Reserved	U8	R/W
	5		Event timer (expressed in ms, default 8 ms)	U16	R/W

(*) PDO Transmission type:

00h = synchronous acyclic (PDO is transmitted following the receipt of SYNC, but only if a new measurement has been acquired).

01h = synchronous cyclic (PDO is always transmitted after receiving SYNC).

FFh = asynchronous (default) (PDO is periodically transmitted according to the set time, setting "event timer" to zero, transmission is disabled).

Other types of transmission provided by the CIA DS-301 are not supported.

T_PDO MAPPING PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1A00h	0	T_PDO_MPAR1	Number of "application objects" mapped in the PDO (2)	U8	R
	1		Applic.Obj.map 1 (*)	U32	R
	2		Applic.Obj.map 2 (*)	U32	R

Below is the sub-index structure from **1h** to **6h**.

Byte: **MSB**		**LSB**
Index (16 bit)	sub-index (8 bit)	object lenghtr (8 bit)

(*) The following default values are defined:

- **Sub-index 0** = 6h.
- **Sub-index 1** = 2001 0120h (Index = 2001h, sub-index 01, 32 bit lenght).
- **Sub-index 2** = 2002 0120h (Index = 2002h, sub-index 01, 32 bit lenght).

T_PDO COMMUNICATION PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1801h	0	AI_T_PDO_CPAR2	Sub-index number(5)	U8	R
	1		COB_ID used from PDO (180h + Node_ID)	U32	R
	2		Transmission type PDO (*)	U8	R
	3		Inhibition time (0)	U16	R/W
	4		Reserved	U8	R/W
	5		Event timer (expressed in ms, default 8 ms)	U16	R/W

(*) PDO Transmission type:

00h = synchronous acyclic (PDO is transmitted following the receipt of SYNC, but only if a new measurement has been acquired).

01h = synchronous cyclic (PDO is always transmitted after receiving SYNC).

FFh = asynchronous (default) (PDO is periodically transmitted according to the set time, setting "event timer" to zero, transmission is disabled).

Other types of transmission provided by the **CIA DS-301** are not supported.

T_PDO MAPPING PARAMETERS

Index	Sub-Index	Name	Description	Type	Attribute
1A01h	0	T_PDO_MPAR2	Number of "application objects" mapped in the PDO (2)	U8	R
	1		Applic.Obj.map 1 (*)	U32	R
	2		Applic.Obj.map 2 (*)	U32	R
	3		Applic.Obj.map 3 (*)	U32	R
	4		Applic.Obj.map 4 (*)	U32	R

Below is the sub-index structure from **1h** to **6h**.

Byte:	**MSB**		**LSB**
	Index (16 bit)	sub-index (8 bit)	object lenghtr (8 bit)

(*) The following default values are defined:

- **Sub-index 0** = 6h.
- **Sub-index 1** = 2003 0120h (Index = 2003h, sub-index 01, 32 bit lenght).
- **Sub-index 2** = 2000 0110h (Index = 2000h, sub-index 01, 16 bit lenght).
- **Sub-index 1** = 2004 0120h (Index = 2004h, sub-index 01, 8 bit lenght).
- **Sub-index 2** = 2005 0120h (Index = 2005h, sub-index 01, 8 bit lenght).

PARAMETERS DEFINED BY THE MANUFACTURER

Index	Sub-Index	Name	Description	Type	Attribute
2000h	0	UD_STATUS	Sub-index number(1)	U8	R
	1		Status Register	U16	R/W
2001h	0	UD_LORDO	Sub-index number(1)	U8	R
	1		Gross weight	S32	R
2002h	0	UD_NETTO	Sub-index number(1)	U8	R
	1		Net weight	S32	R
2003h	0	UD_PICCO	Sub-index number(1)	U8	R
	1		Peak	S32	R
2004h	0	UD_IN	Sub-index number(1)	U8	R
	1		Digital input	U8	R
2005h	0	UD_OUT	Sub-index number(1)	U8	R
	1		Digital output	U8	R
2006h	0	UD_COMMAND	Sub-index number(1)	U8	R
	1		Command Register	U16	R/W
2007h	0	UD_DATA	Sub-index number(1)	U8	R
	1		Data Register	U32	R/W
2008h	0	UD_MONITOR_R	Sub-index number(1)	U8	R
	1		Monitor Register (reading)	U16	R
2009h	0	UD_MONITOR_W	Sub-index number(1)	U8	R
	1		Monitor Register (writing)	U16	W
200Ah	0	UD_W_VAL	Sub-index number(1)	U8	R
	1		Net weight weighing	S32	R
200Bh	0	UD_W_CODE	Sub-index number(1)	U8	R
	1		Weighing code	S32	R
200Ch	0	UD_SET_1	Sub-index number(1)	U8	R
	1		Set-Point 1	S32	R/W
200Dh	0	UD_SET_2	Sub-index number(1)	U8	R
	1		Set-Point 2	S32	R/W
200Eh	0	UD_PORTATA	Sub-index number(1)	U8	R
	1		Load cells capacity	S32	R/W
200Fh	0	UD_SENS	Sub-index number(1)	U8	R
	1		Load cells sensitivity	U16	R/W
2010h	0	UD_DIV	Sub-index number(1)	U8	R
	1		Weight division value	U8	R/W

Index	Sub-Index	Name	Description	Type	Attribute
2011h	0	UD_DEC	Sub-index number (1)	U8	R
	1		Decimal	U8	R/W
2012h	0	UD_TARA_F	Sub-index number (1)	U8	R
	1		Fixed tare	S32	R/W
2013h	0	UD_STAND_B	Sub-index number (1)	U8	R
	1		Stand by function	U16	R/W
2014h	0	UD_BLOCCO_T	Sub-index number (1)	U8	R
	1		Keypad lock function	U8	R/W
2015h	0	UD_PASS	Sub-index number (1)	U8	R
	1		Password function	U16	R/W
2016h	0	UD_PICCO	Sub-index number (1)	U8	R
	1		Peak function	U8	R/W
2017h	0	UD_LOG	Sub-index number (1)	U8	R
	1		Datalogger function	U8	R/W
2018h	0	UD_FILT	Sub-index number (1)	U8	R
	1		Filter factor	U8	R/W
2019h	0	UD_RATE	Sub-index number (1)	U8	R
	1		Output rate ADC	U8	R/W
201Ah	0	UD_N_MEDIA	Sub-index number (1)	U8	R
	1		Number of readings on average	U8	R/W
201Bh	0	UD_T_MON	Sub-index number (1)	U8	R
	1		Monotony Time	U16	R/W
201Ch	0	UD_T_OSC	Sub-index number (1)	U8	R
	1		Oscillations Time	U16	R/W
201Dh	0	UD_R_OSC	Sub-index number (1)	U8	R
	1		Oscillations Range	U8	R/W
201Eh	0	UD_FS	Sub-index number (1)	U8	R
	1		Full Scale	S32	R/W
201Fh	0	UD_STAB	Sub-index number (1)	U8	R
	1		Weight stability	U8	R/W
2020h	0	UD_AUTO_Z	Sub-index number (1)	U8	R
	1		Auto zero when switching on	S32	R/W
2021h	0	UD_INS_Z	Sub-index number (1)	U8	R
	1		Zero tracking	U8	R/W

Index	Sub-Index	Name	Description	Tipo	Attributo
2022h	0	UD_FUN_IN1	Sub-index number (1)	U8	R
	1		Input 1 function	U8	R/W
2023h	0	UD_FUN_IN2	Sub-index number (1)	U8	R
	1		Input 2 function	U8	R/W
2024h	0	UD_FUN_OUT1	Sub-index number (1)	U8	R
	1		Output mode 1— Function	U8	R/W
2025h	0	UD_LOG_OUT1	Sub-index number (1)	U8	R
	1		Output mode 1— Logic	U8	R/W
2026h	0	UD_POL_OUT1	Sub-index number (1)	U8	R
	1		Output mode1— Polarity	U8	R/W
2027h	0	UD_STAB_OUT1	Sub-index number (1)	U8	R
	1		Output mode 1— Stability	U8	R/W
2028h	0	UD_IST_OUT1	Sub-index number (1)	U8	R
	1		Hysteresis input 1	S32	R/W
2029h	0	UD_T_OUT1	Sub-index number (1)	U8	R
	1		Timing input 1	U16	R/W
202Ah	0	UD_R_OUT1	Sub-index number (1)	U8	R
	1		Delay input 1	U16	R/W
202Bh	0	UD_FUN_OUT2	Sub-index number (1)	U8	R
	1		Output mode 2— Function	U8	R/W
202Ch	0	UD_LOG_OUT2	Sub-index number (1)	U8	R
	1		Output mode 2— Logic	U8	R/W
202Dh	0	UD_POL_OUT2	Sub-index number (1)	U8	R
	1		Output mode 2— Polarity	U8	R/W
202Eh	0	UD_STAB_OUT2	Sub-index number (1)	U8	R
	1		Output mode 2— Stability	U8	R/W
202Fh	0	UD_IST_OUT2	Sub-index number (1)	U8	R
	1		Hysteresis input 2	S32	R/W
2030h	0	UD_T_OUT2	Sub-index number (1)	U8	R
	1		Timing input 2	U16	R/W
2031h	0	UD_R_OUT2	Sub-index number (1)	U8	R
	1		Delay input 2	U16	R/W
2032h	0	UD_ANA_T	Sub-index number (1)	U8	R
	1		Analogue Fixed Tare	S32	R/W
2033h	0	UD_ANA_FS	Sub-index number (1)	U8	R
	1		Analogue Full Scale	S32	R/W
2034h	0	UD_ANA_M	Sub-index number (1)	U8	R
	1		Analogue Output Mode	U8	R/W
2035h	0	UD_ANA_R	Sub-index number (1)	U8	R
	1		Analog output range	U8	R/W

BACKWARD COMPATIBILITY WITH WT 1 AND WT 2

MODBUS PROTOCOL IN CASE OF T.SER SELECTION: WT 11

Index	Holding Register	R/W	Notes
0001	Status Register	R	See related table
0002	No. of decimal places of weight	R	
0003	Gross weight (MSB)	R	Signed value in 2's complement
0004	Gross weight (LSB)	R	
0005	Net weight (MSB)	R	Signed value in 2's complement
0006	Net weight (LSB)	R	
0007	Peak (MSB)	R	Signed value in 2's complement
0008	Peak (LSB)	R	
0009	Logic inputs	R	WT 11 / ANA only. In other versions it is always 0
0010	Logic outputs	R/W	Writing of outputs is possible only if the thresholds are programmed to 0
0021	Threshold 1 (MSB)	R/W	Used only for WT 11 / ANA
0022	Threshold 1 (LSB)	R/W	Used only for WT 11 / ANA
0023	Threshold 2 (MSB)	R/W	Used only for WT 11 / ANA
0024	Threshold 2 (LSB)	R/W	Used only for WT 11 / ANA
0051	Data Register (MSB)	W	Write before or with the same query as Command Register
0052	Data Register (LSB)	W	
0053	Command Register	W	See related table
0100	Load Cell Capacity (MSB)	R/W	
0101	Load Cell Capacity (LSB)	R/W	
0102	Load Cell Sensitivity	R/W	
0103	Weight Division Value	R/W	See related table
0200	Weight Filter Factor	R/W	
0201	Weight Stability Factor	R/W	
0202	Autozero Threshold	R/W	
0203	Zero Tracking Factor	R/W	
0204	Zero Band	R/W	
0205	Weight Delta	R/W	Not used, fixed at 20 divisions
0301	Threshold 1 Operating Mode	R/W	See related table. Used only for WT 11 / ANA
0302	Threshold 1 Hysteresis	R/W	Used only for WT 11 / ANA
0303	Threshold 2 Operating Mode	R/W	See related table. Used only for WT 11 / ANA
0304	Threshold 2 Hysteresis	R/W	Used only for WT 11 / ANA
0401	Analog Full Scale (MSB)	R/W	Used only for WT 11 / ANA
0402	Analog Full Scale (LSB)	R/W	Used only for WT 11 / ANA
0403	Analog Out Operating Mode	R/W	0 = gross, 1 = net, 2 = peak. Used only for WT 11 / ANA
0404	Analog Out Range	R/W	0 = 0-20 mA, 1 = 4-20 mA, 2 = 0-10 V, 3 = 0-5 V
0405	Analog Out Value	W	0 = zero offset, 65535 = analog full scale

STATUS REGISTER CODING TABLE

Bit	15...7	6	5	4	3	2	1	0
Description	Not used	Zero executed	Weight error	Over - load	Tare entered	Band of 0	Stable weight	Zero center

COMMAND REGISTER / DATA REGISTER CODING TABLE T.SER WT 11

REGISTER VALUE	COMMAND REGISTER FUNCTION	DATA REGISTER FUNCTION
0x0001	Semi-automatic zero	
0x0002	Autotare	
0x0003	Peak reset	
0x0004	Switch to gross weight display	
0x0005	Switch to net weight display	
0x0006	Switch to peak display	
0x0010	Zero calibration	
0x0011	Full scale calibration	Sample weight
0x0020	Save in permanent memory	
0x0030	Logic outputs managed by MODBUS and input function disabled	
0x0031	Logic outputs managed by instrument	
0x0040	Analog output managed by MODBUS (value in register 40405)	
0x0041	Analog output managed by instrument	
0x7FFF	Direct memory access (FIELDBUS only)	

N.B the value in the data register must be present when the command register is commanded.

DIVISION VALUE CODING TABLE

Register value	0	1	2	3	4	5	6	7	8
Division value	0.0001	0.0002	0.0005	0.001	0.002	0.005	0.01	0.02	0.05

Register value	9	10	11	12	13	14	15	16	17
Division value	0.1	0.2	0.5	1	2	5	10	20	50

N.B. compared to the WT 1 there are 3 more selectable division values (0.0001 - 0.0002 - 0.0005) as there are more digits available.

BACKWARDS COMPATIBLE FIELDBUS PROTOCOL

IF SELECTED T.SER WT 11

The following table lists the input area registers (produced by the instrument and read by the master), common to all **PROFIBUS, PROFINET, ETHERCAT, ETHERNET/IP fieldbuses.**

The registers have a size of **16 bits**. The input area is updated at a fixed frequency of **125 Hz** (80 Hz in case of PROFIBUS fieldbus).

The size of the Input area configured in the fieldbus master must match the size configured in the instrument.

INPUT DATA AREA

Byte	Register address	INPUT REGISTER AREA	Note
1-2	0	Status Register	See related table.
3-4	1	Gross Weight (MSB)	INT. Value - Most significant word
5-6	2	Gross Weight (LSB)	INT. Value - Least significant word
7-8	3	Net Weight (MSB)	INT. Value - Most significant word
9-10	4	Net Weight (LSB)	INT. Value - Least significant word
11-12	5	Peak (MSB)	INT. Value - Most significant word
13-14	6	Peak (LSB)	INT. Value - Least significant word
15-16	7	Load Cell Capacity (MSB)	INT. Value - Most significant word
17-18	8	Load Cell Capacity (LSB)	INT. Value - Least significant word
19-20	9	Load Cell Sensitivity	
21-22	10	Weight Division Value	See relevant table
23-24	11	Weight Filter Factor	
25-26	12	Weight Stability Factor	
27-28	13	Auto Zero Threshold (MSB)	INT. Value - Most Significant Word
29-30	14	Auto Zero Threshold (LSB)	INT. Value - Least Significant Word
31-32	15	Zero Tracking Factor	
33-34	16	Zero Band	
35-36	17	Weight Delta	
37-38	18	Monitor Register	

OUTPUT DATA AREA

Byte	Register address	OUTPUT AREA REGISTER	Notes
1-2	0	Data register (MSB)	INT. Value - Most Significant Word
3-4	1	Data register (LSB)	INT. Value - Least Significant Word
5-6	2	Command register	See related table
7-8	3	Load cell capacity (MSB)	
9-10	4	Load cell capacity (LSB)	
11-12	5	Load cell sensitivity	
13-14	6	Weight division value	See relevant table.
15-16	7	Weight filter factor	
17-18	8	Weight stability factor	
19-20	9	Autozero threshold (MSB)	INT. Value - Most Significant Word
21-22	10	Autozero threshold (LSB)	INT. Value - Least Significant Word
23-24	11	Zero tracking factor	
25-26	12	Zero band	
27-28	13	Weight delta	
29-30	14	Monitor register	

STATUS REGISTER CODING TABLE

Bit	15	14	13	12	11	10	9	8
Description	Not used	Not used	Not used	Not used	Not used	Not used	Memory flag	Not used

Bit	7	6	5	4	3	2	1	0
Description	Not calibrated	Weight error	Overloaded	Underload	Tare entered	Zero band	Stable weight	Center of zero

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The display shows the O-L message	The weight cannot be detected because the cell is not available or has been connected incorrectly.	Check the connections of the cells.
The hyphen is shown in the top display.	The acquired weight cannot be shown because it exceeds the available five digits or is greater than the capacity of the cells.	Configure setup parameters that are compatible with system features
The number of decimal places is wrong.	Incorrect division value selected.	Select the correct division value inthe main menu.
The Instrument remains switched off	Wrong supply voltage	Power up the instrument with the correct supply voltage
Weight display is frozen	The load cell is not functioning properly or has not been properly connected	Use a multimeter and measure 5Vdc between EXC+ and EXC- and a lower value between SENSE+ and SENSE- (greater are the distance between the instrument and the load cells and lower will be the SENSE voltage) and check the variation in millivolt between SGN+ and SGN- when loading or unloading the load cells
Inputs and / or outputs does not work properly	Wiring or Software Setup Errors	Use the I / O Test Function to verify the correct operation of inputs and outputs and verify the settings of the specific program
The serial communication does not work properly.	Installation has been completed properly. Selection of operation of theserial interface is incorrect.	Check the connections as describedin the installation manual. Select the settings as appropriate.
The semi-automatic zero-setting function does not work.	The gross weight exceeds the action limit of semi-automatic zero-setting. The weight doesn't stabilise.	To re-establish the zero, calibrate the weight. Wait for the weight to stabilise or adjust the weight filter parameter.
The semi-automatic tare function does not work.	The gross weight is negative orexceeds the maximum capacity. The weight doesn't stabilise.	Check the gross weight. Wait for the weight to stabilise or adjust the weight filter parameter.

USE OF SERIAL APPLICATIONS VIA THE USB PORT

PC software "**VTW Connect**" allows:

- total configuration of all the setup parameters;
- testing of the different hardware sections;
- consultation of the instrument documentation
- updating of instrument firmware
- storage over time of the weight values acquired by the instrument using the Datalogger function;
- saving and loading of the configuration parameters of the instrument on file.

Certificate of Compliance

Certificate Number:
E546509

Report Reference:
E546509-20250306

Issue Date:
2025-06-06

Issued to:

VPG Technology Development Ltd.
Tsela Ha-Har 18, Modi'In Makabim-Re'Ut Israel 7179574
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See Addendum Page for Product Designation(s).

Have been evaluated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.

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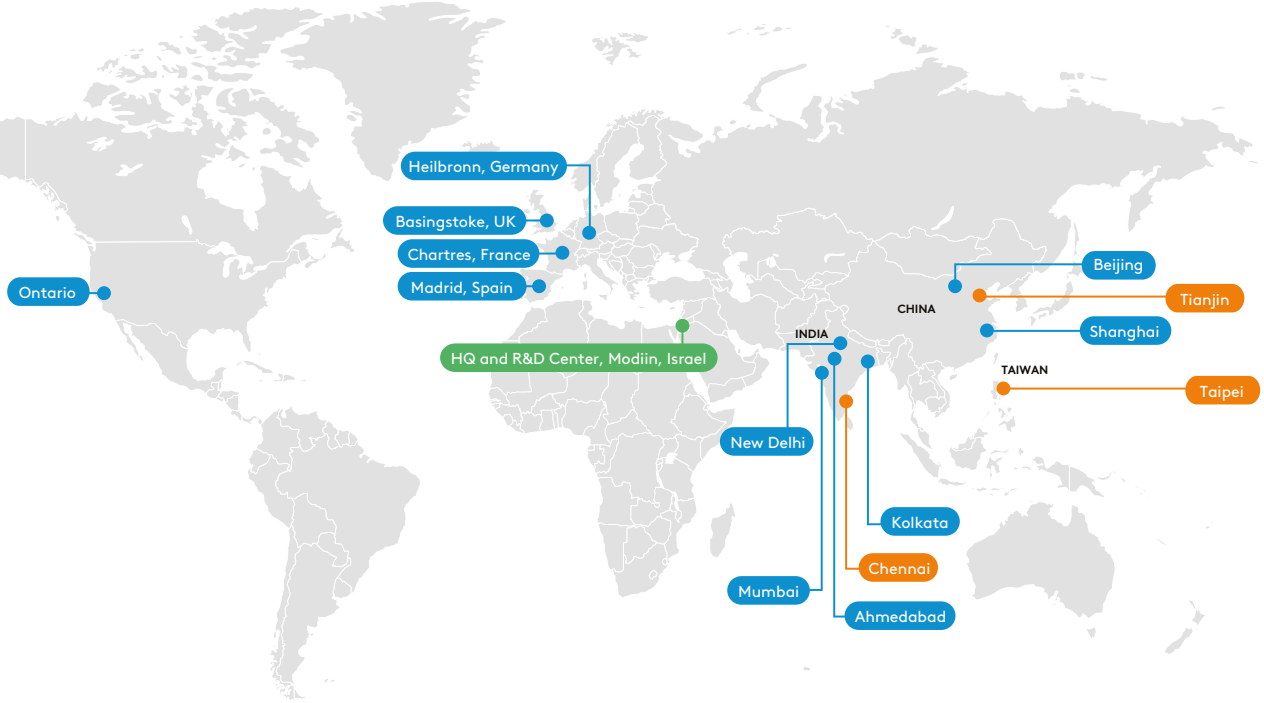

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