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WT 15

WEIGHT INDICATOR/TRANSMITTER WITH SERIAL, ANALOG, AND FIELDBUS OUTPUT.

Technical manual

Software version WT1503_22

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

The purpose of this manual is to provide the operator with clear information—through both text and illustrations—regarding the essential guidelines and requirements for the proper installation and use of the instrument.

Installation, maintenance, and repair must be carried out only by qualified personnel who have read and understood this manual.

"Qualified personnel" refers to individuals who, due to their training and professional experience, have been explicitly authorized by the plant safety manager to perform the installation.

Ensure the instrument is powered with a voltage that falls within the specified limits indicated in the technical specifications.

It is the user's responsibility to ensure that the installation complies with current regulations and standards.

Any attempt to disassemble or modify the instrument without explicit authorization will void the warranty and release Pavone Sistemi from any liability.

Installation and maintenance of this instrument must be restricted to qualified personnel.

Exercise caution during inspection, testing, and adjustments when the instrument is powered on.

Perform all electrical connections with the power supply turned off.

Failure to observe these precautions may result in hazardous situations.

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

CAUTIONS

The following procedures must be carried out by qualified personnel only.

INTRODUCTION

The **WT 15** is a touchscreen weight indicator designed to work with strain gauge load cells and built to meet a wide range of industrial applications.

The instrument is panel-mounted, fitting into a cutout measuring **138 x 53 mm (5.43 x 2.09 in)**, and is secured using the two tightening screws provided.

The **WT 15** communicates via an **RS-232** serial port using **ASCII** protocols, allowing connection to PCs, PLCs, and remote units over distances of up to 15 meters. For longer distances, it is necessary to use the RS-422/RS-485 serial output, which supports MODBUS RTU protocol and allows the connection of up to **32** addressable devices.

The availability of the most common fieldbus systems, as an alternative to RS-485, enables easy integration with virtually any supervisory system available on the market.

A **USB 2.0** port is also provided for straightforward interfacing with PCs using the accompanying utility software.

Additionally, the instrument includes 6 digital inputs and 6 digital outputs, all configurable through the setup menu.

An analog output (voltage or current) is also available, and can be used even when a fieldbus interface is active.

AVAILABLE VERSIONS:

- **WT 15:** weight transmitter with RS-232, USB, and RS-485 serial outputs, including peak function. Supported protocols: Modbus RTU, continuous, slave, and on request. Includes six digital inputs and six digital outputs.
- **WT 15/A:** version with analog output.
- **WT 15/PROFINET:** weight transmitter with RS-232, USB, and PROFINET outputs.
- **WT 15/ETHERNET IP:** weight transmitter with RS-232, USB, and ETHERNET IP outputs.
- **WT 15/ETHERCAT:** weight transmitter with RS-232, USB, and ETHERCAT outputs.
- **WT 15/PROFIBUS:** weight transmitter with RS-232, USB, and PROFIBUS outputs.
- **WT 15/ETHERNET:** weight transmitter with RS-232, USB, and standard ETHERNET outputs.

The analog output can also be included alongside the FIELDBUS option.

TECHNICAL FEATURES

SPECIFICATION	VALUE
Power Supply	24 VDC ±25%
Maximum Power Consumption	5 W
Insulation	Class II
Installation Category	Category II
Operating Temperature	-10°C to +50°C (14 °F to 122 °F) (max 85% humidity, non-condensing)
Storage Temperature	-20°C to +70°C (4 °F to 158 °F)
Display	Graphic LCD 240x128 pixels
Keyboard	4-wire resistive touch screen
Overall Dimensions	150 x 95 x 26 mm (5.91×3.74×1.02 in) (W x H x D, including terminals) 150 x 95 x 56 mm (5.91 × 3.74 × 2.20 in) (with FIELDBUS option)
Panel Cut-out	138 x 82 mm (5.43 × 3.23 in)
Mounting	Panel flush mounting
Enclosure Material	Aluminum
Connections	Removable screw terminals, pitch 3.81 mm (0.15 in)
Load Cell Power Supply	5 VDC / 120 mA (up to 8 x 350Ω cells in parallel), short-circuit protected
Input Sensitivity	Minimum 0.02 µV
Linearity	< 0.01% of full scale
Temperature Drift	< 0.001% of full scale / °C
Internal Resolution	24 bit
Displayed Weight Resolution	Up to 999,999 divisions over the full scale
Measuring Range	-3.9 mV/V to +3.9 mV/V
Weight Acquisition Rate	12 Hz - 1000 Hz
Digital Filter	Selectable from 0.1 to 250 Hz
Decimal Places	From 0 to 4 digits
Zero and Full-Scale Calibration	Automatic (theoretical) or manual via keyboard
Logic Outputs	6 opto-isolated (dry contact), max 24 VDC / 100 mA each
Logic Inputs	6 opto-isolated PNP at 24 VDC (external power supply)
Serial Ports (x2)	RS-232C and RS-422/485
Max Cable Length	15 m (49.21 ft) (RS-232C), 1000 m (3280.84 ft) (RS-422/485)
Serial Protocols	ASCII, Modbus RTU
Baud Rate	Selectable: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
USB Device Port	Compliant with USB 2.0; speed up to 12 Mbps
Analog Output (optional)	Opto-isolated, 16 Bit, Voltage: 0–5/10 V (min. load 10 KΩ) Current: 0/4–20 mA (max. load 300 Ω)
Analog Output Calibration	Via keyboard
Analog Linearity	< 0.02% FS
Thermal Drift	0.001% FS / °C
MICROCONTROLLER	32-bit ARM Cortex M0+, 256KB Flash, reprogrammable via USB
Data Memory	64 KB, expandable up to 1024 KB
Fieldbus (alternative to RS-485)	PROFINET, ETHERNET IP, ETHERCAT, PROFIBUS, ETHERNET
COMPLIANCE STANDARDS	EN61000-6-2, EN61000-6-3, EN61326-1, EN61010-1, EN45501

INSTALLATION

GENERAL

The **WT 15** is a compact panel-mount instrument made of aluminum.

It is installed in a panel cut-out measuring 138 x 82 mm (5.43 × 3.23 in) and secured using the four supplied clamping screws.

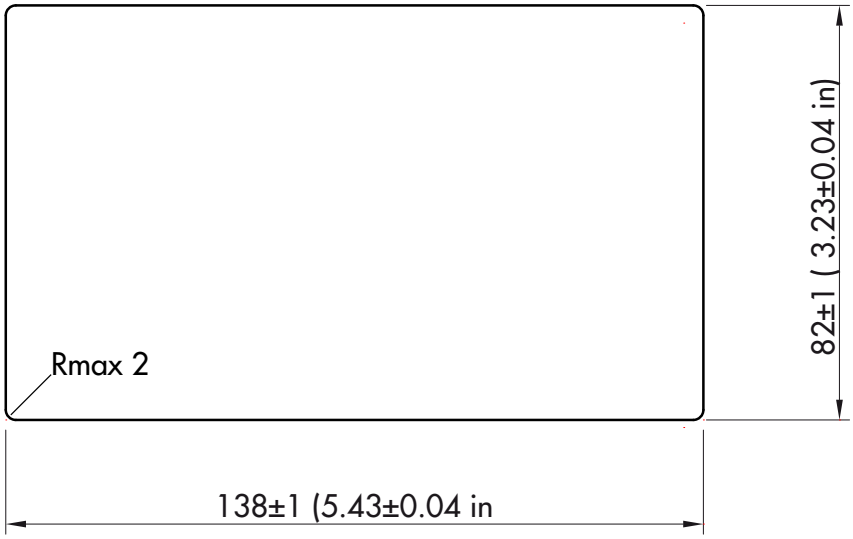
THE WT 15 MUST NOT BE:

- Immersed in water
- Exposed to water jets
- Cleaned or washed with solvents

Do not expose the unit to heat sources or direct sunlight.

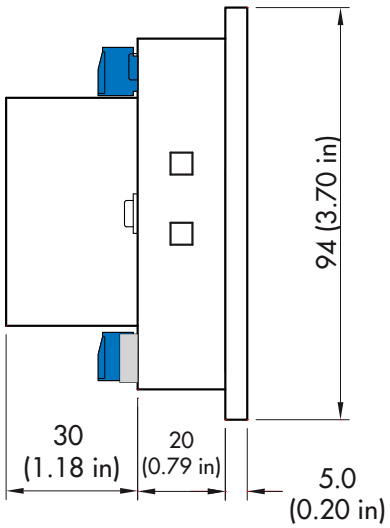
Do not install the instrument near power equipment (e.g., motors, inverters, contactors, etc.) or any equipment that does not comply with CE regulations for electromagnetic compatibility.

- The load cell connection cable must have a maximum length of 140 meters per mm^2 (296,244 ft/in^2) of conductor cross-section.
- The RS-232 serial line must not exceed 15 meters (49.21 ft) in length (according to EIA RS-232-C standards).
- All connection instructions for the respective peripherals must be strictly followed.

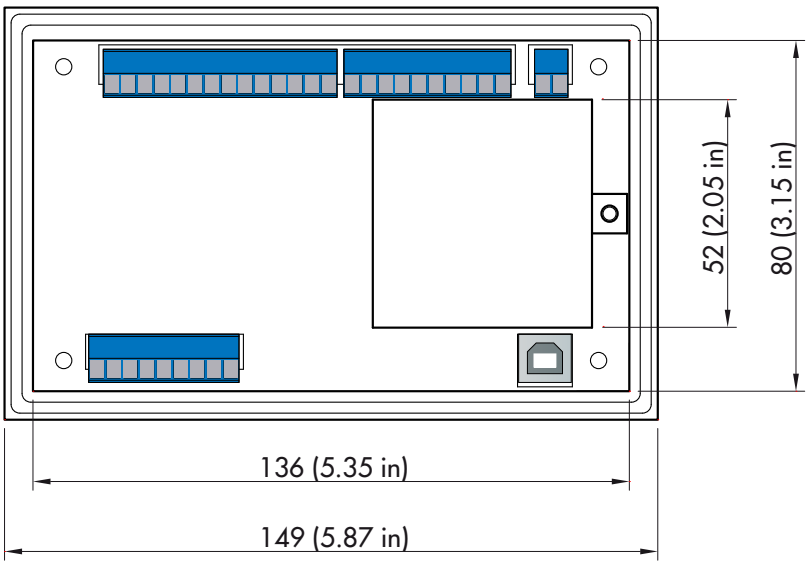


OVERALL DIMENSIONS

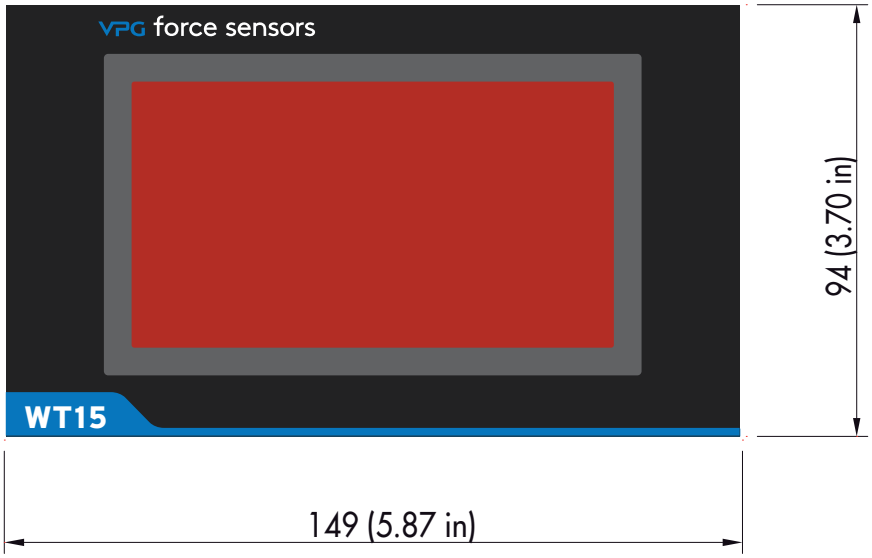
Side View:



Rear View:



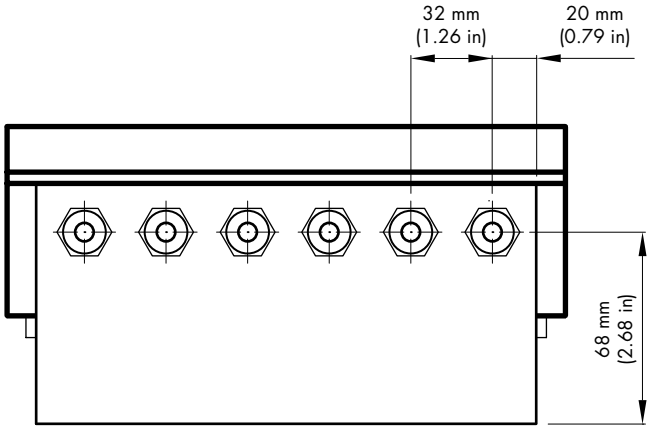
Front View:



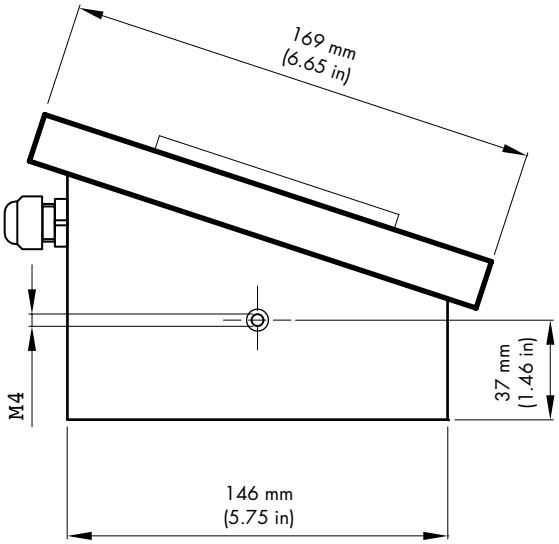
WT S 15 DIMENSIONS

Instrument with Stainless Steel Enclosure

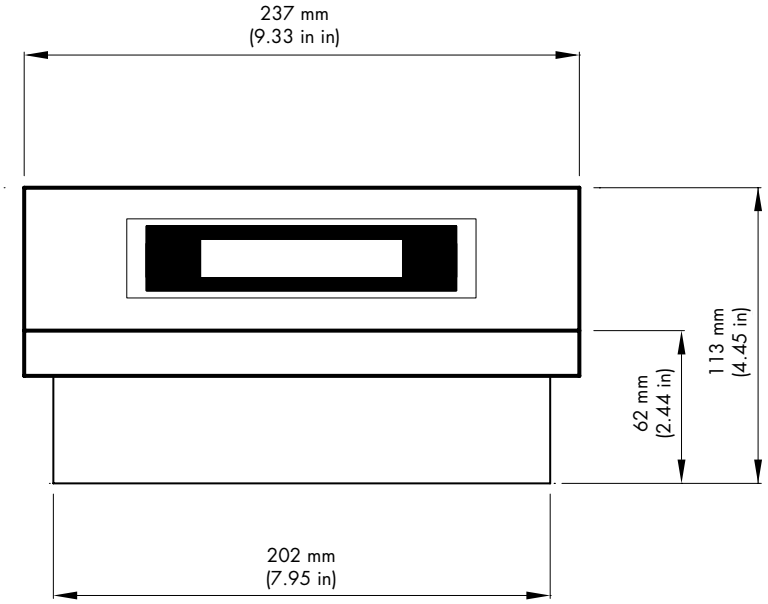
Rear View:



Side View:



Front View:



ELECTRICAL INSTALLATION

The **WT 15** instrument uses removable screw terminals with **3.81 mm (0.15 in)** pitch for all electrical connections.

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

Field wiring must be suitable for the environment in which the instrument is used and must comply with all national regulations.

A switch or circuit breaker must be included in the electrical system.

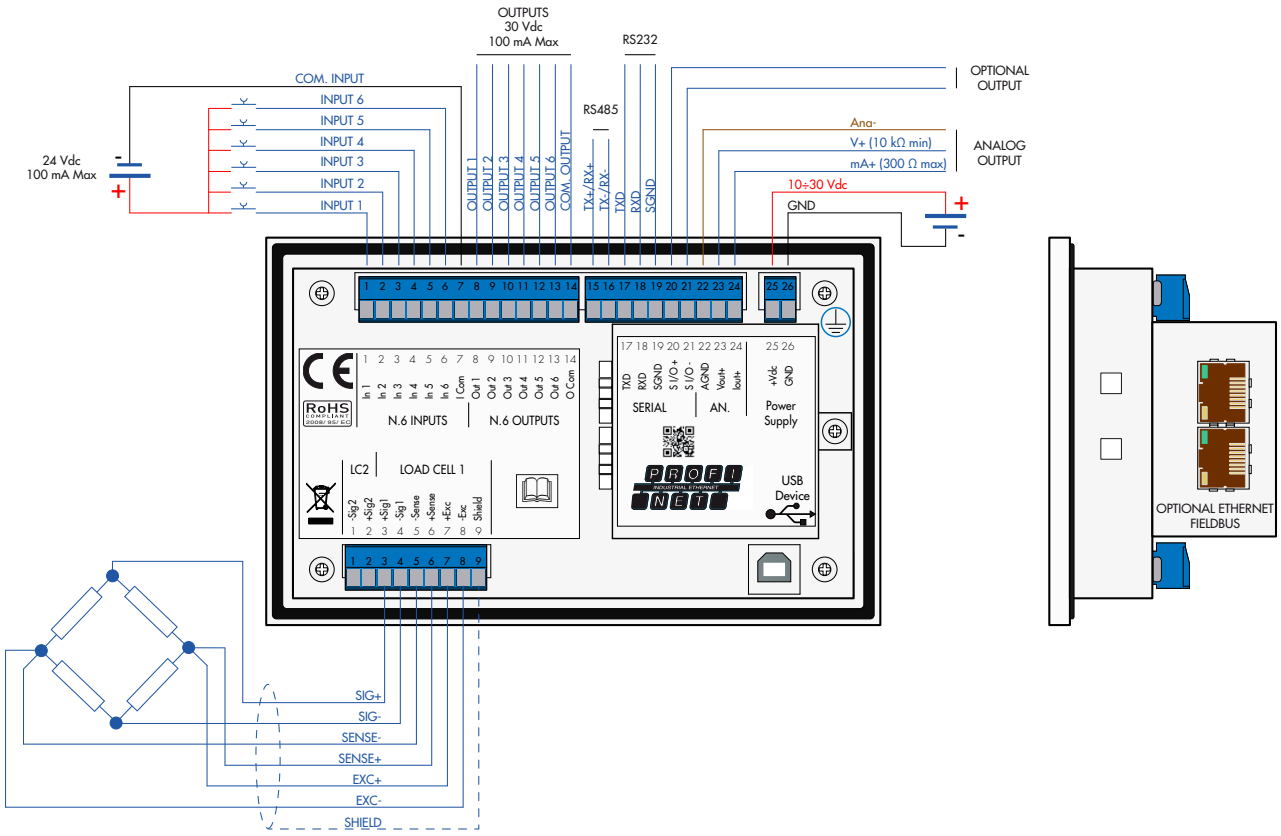
This switch must be located near the device and easily accessible to the operator.

It must be clearly marked as the disconnecting device for the equipment.

The switch or disconnector used as the isolation device must comply with the relevant requirements of **IEC 60947-1 and IEC 60947-3.**

WARNING

Disconnect the device from the power supply before making any electrical connections.

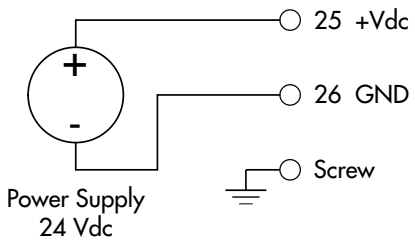


POWER SUPPLY CONNECTION

The instrument is powered through terminals **25** and **26**.

The power cable must be routed separately from other cables to avoid interference.

- The electrical ground (terminal 26) is connected to the metal housing.
- Terminal **26** should be connected both to the power supply GND and to earth ground using the screw located near the power supply terminals.
- **Supply Voltage:** 18–30 VDC
- **Maximum Power Consumption:** 5 W



LOAD CELL CONNECTION

The load cell cable must be routed separately from other cables and follow its own dedicated path.

Any cable extensions must be carefully shielded, must follow the correct color coding, and use the same type of cable supplied by the manufacturer.

Extensions must be made by soldering, using intermediate terminal blocks, or via a junction box (available separately).

The instrument supports up to **8** load cells (**350 Ω each**) connected in parallel.

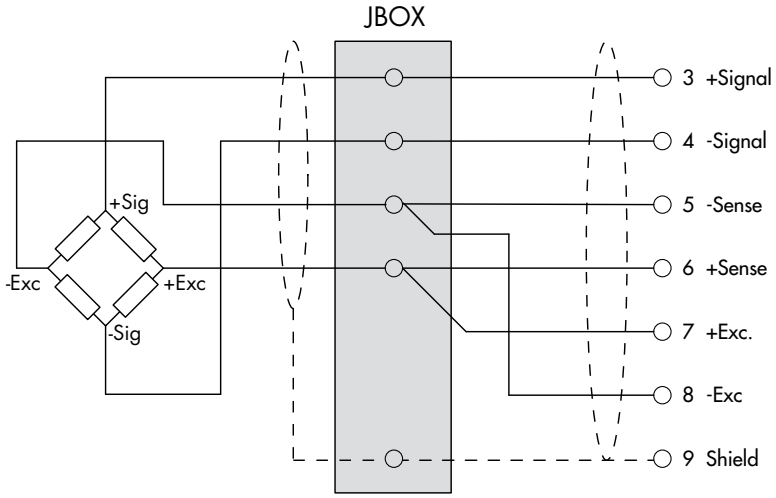
The load cell excitation voltage is **5 VDC**, with temporary short-circuit protection.

The input range is compatible with load cells up to **3.9 mV/V** sensitivity.

Connect the load cell cable to terminals 3 to 9:

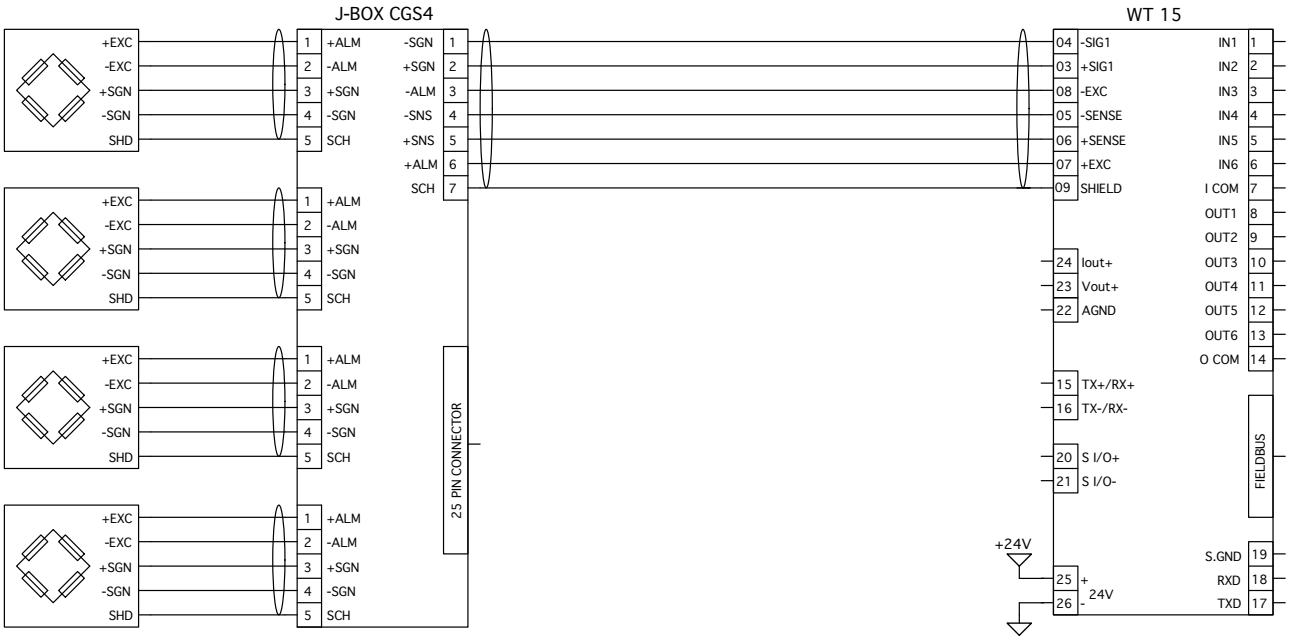
For 4-wire load cells, place jumpers between terminals **5** and **8**, and **6** and **7**.

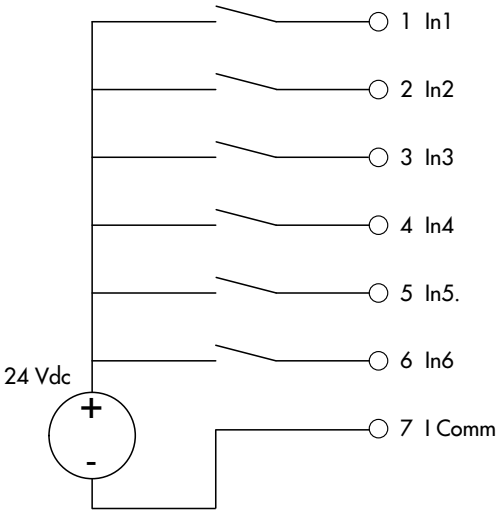
Connect the shield of the load cell cable to terminal **9**.



When using two or more load cells, appropriate junction boxes such as CEM4/C or CSG4/C must be used. The connection diagram for these junction boxes is provided below.

WIRING DIAGRAM FOR J-BOX CGS4-C WITH WT 15





LOGICAL INPUTS

The logical inputs are electrically isolated from the instrument using optoisolators.

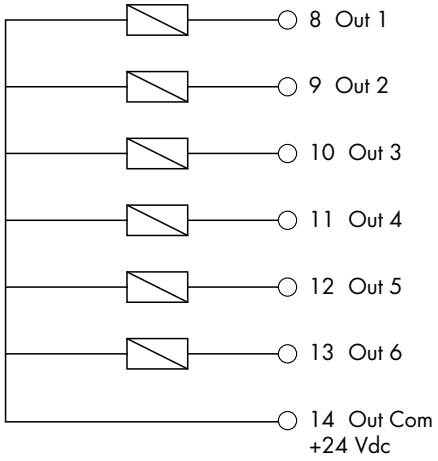
Input signal cables must not be routed together with power or supply cables.

Use the shortest possible connection cables.

To activate a logical input:

- Apply a positive signal from a **24 VDC** power supply to the input.
- Connect the common line to the negative of the same power supply.

The function of each input can be configured through the Setup menu.



LOGICAL OUTPUTS

The 6 logical outputs are photo-relay (dry contact) type with a shared common.

Each contact is rated for **100 mA** at **30 VDC**.

When an output is enabled, the contact closes (normally open – NO).

Since the equipment may be installed in environments exposed to strong magnetic fields or electrical disturbances caused by nearby machinery, standard precautions should be taken to ensure proper operation of this precision electronic device.

EXAMPLES INCLUDE:

- Filters on contactors
- Flyback diodes on **24 VDC** relays
- Proper shielding and cable separation

A diagram for the logical output connections is provided below.

CONNECTION TO ADDITIONAL I/O EXPANSION BOARD

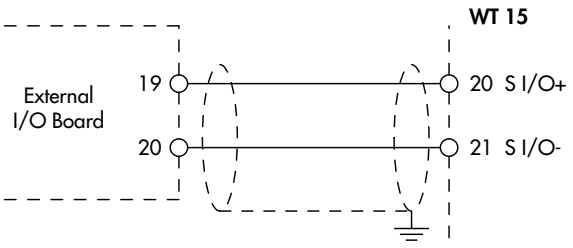
In applications where additional inputs and outputs are required, it is possible to connect optional I/O boards via the dedicated serial connection.

Use a shielded cable for the connection.

- The shield must be grounded at only one end.
- If the cable contains more conductors than needed, connect the unused wires to the shield.

The serial connection cable must:

- Have a maximum length of **100 meters (328.08 ft)**
- Be routed separately from power or other signal cables, following a dedicated path if possible



SERIAL COMMUNICATION – RS-232

The RS-232 serial connection cable must not exceed a maximum length of **15 meters (49.21 ft)**, in accordance with EIA RS-232-C standards.

For longer distances, use the instrument's RS-485 interface instead.

The cable must not be routed together with other cables (e.g., those connected to contactors or power supply lines).

It should preferably follow a dedicated, separate path.

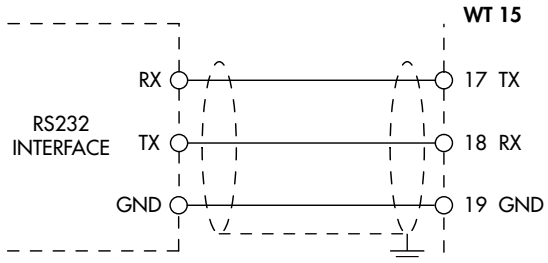
The PC used for the connection must comply with EN 60950 safety standards.

The RS-232 serial port is typically used for connection to:

- PCs
- Printers
- Remote displays or repeaters

To establish the serial connection:

- Use a suitable shielded cable
- Ground the shield at only one end



RS-485

The RS-485 serial interface allows for long-distance connections of up to **1000 meters (3280.84 ft)**.

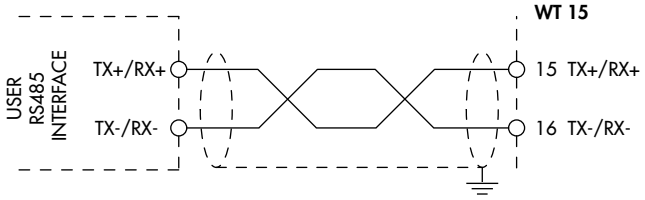
The RS-485 connection is 2-wire type and supports the connection of up to 32 instruments to a single MASTER unit (e.g., PC, PLC), using a twisted and shielded cable.

- Ensure the shield is grounded at only one end.

The cable must not be routed with other cables (e.g., outputs connected to contactors or power lines).

It should follow a dedicated path wherever possible.

The PC used for the connection must comply with EN 60950 safety standards.



ANALOG OUTPUT (OPTIONAL)

When equipped with the appropriate hardware configuration, the instrument provides an opto-isolated analog output in both voltage and current.

Specifications:

Voltage Output:

- **Range:** 0 to 10 V or 0 to 5 V
- **Minimum load:** 10 kΩ

Current Output:

- **Range:** 0 to 20 mA or 4 to 20 mA
- **Maximum load:** 300 Ω

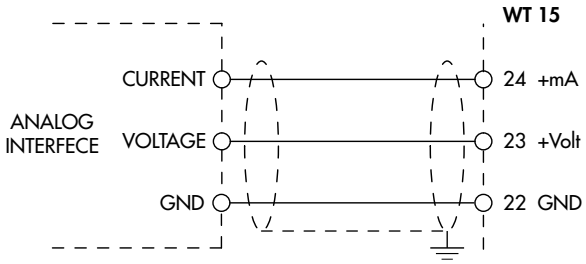
Use a shielded cable for the connection, ensuring the shield is grounded at only one end.

Since analog transmission is sensitive to electromagnetic interference, it is recommended to:

Keep the cables as short as possible

Route them along a dedicated path

Warning: Do not connect the analog output to active devices (e.g., powered signal sources).



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

Use this communication port to interface directly with a **PC** via a **USB** connection.

- A standard USB cable should be used for the connection.
- To connect the instrument through the USB device port, the appropriate driver must be installed on the PC for the operating system in use.
- Follow the specific installation instructions provided with the driver package.

FIELDBUS CONNECTIONS

As an alternative to the RS-485 serial port, some of the most common fieldbus protocols are available.

Note: Only one fieldbus can be used, and it must be specified at the time of order.

ETHERNET CONNECTION

An RJ45 Ethernet port is located on the bottom left of the instrument.

Specifications:

- **Transmission Speed:** 10 Mbps
- **Network Compatibility:** Compatible with 10/100/1000 Base-T networks

Supported Protocols:

- Ethernet TCP
- Modbus/TCP
- UDP
- IP
- ICMP
- ARP

Communication Mode: TCP Server

LED Indicators (2):

- Ethernet link presence
- Communication/diagnostics status

Buffer Size: 256 bytes

Connection Timeout: 30 to 90 seconds (configurable)

Link Timeout (cable disconnected): 30 seconds

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

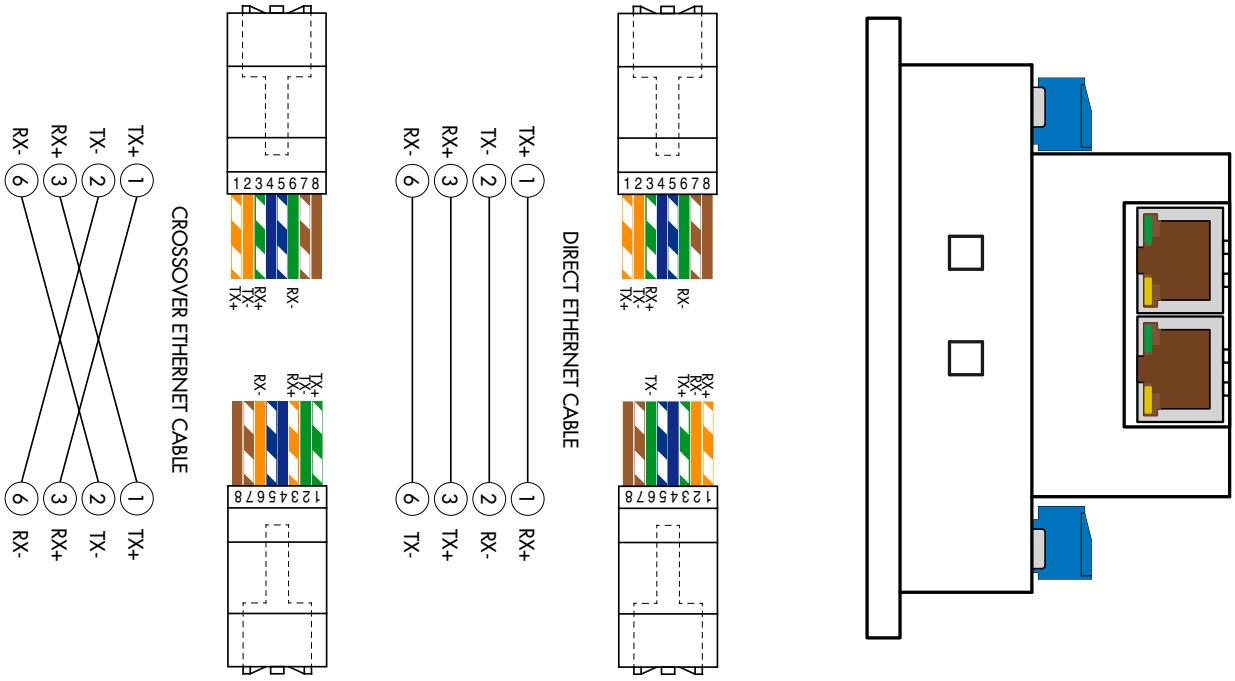
To connect the device to a **MASTER**, use a twisted pair Ethernet cable with an **RJ45 connector**.

- The maximum cable length for an **RJ45** Ethernet connection depends on the type of cable used. A standard shielded Cat5 cable typically allows a maximum length of approximately **180** meters (590.55 ft).
- It is possible to connect the Ethernet communication port directly to a PC, without using additional network devices such as routers, switches, hubs, or **LAN** bridges.

In this case, a special "crossover" RJ45 cable must be used.

- Standard Ethernet cables are typically "**straight-through**", designed for connections to network devices like routers or hubs.These cannot be used to directly connect two PCs—unless both have auto-sensing network cards, which automatically detect the type of cable and support direct PC-to-PC communication, even with a standard (non-crossover) cable.

The next page includes diagrams of both cable types and their respective wiring layouts.



ETHERNET/IP CONNECTION

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

The device features two RJ45 connectors, allowing multiple instruments to be daisy-chained on the same network.

Refer to the general Ethernet connection section above for wiring guidelines and precautions.

Specifications:

- **Supported Speeds:** 10 and 100 Mbit/s
- **Duplex Modes:** Full and Half Duplex
- **I/O Capacity:** Up to 128 bytes of fieldbus I/O in each direction

PROFINET CONNECTION

The device is equipped with two RJ45 connectors, allowing multiple instruments to be connected on the same PROFINET network.

Refer to the previous page for wiring guidelines and important precautions.

Specifications:

- **Communication Type:** PROFINET IO Real-Time (RT)
- **I/O Capacity:** Up to 128 bytes of fieldbus I/O in each direction

ETHERCAT CONNECTION

EtherCAT is a real-time industrial communication protocol based on **Ethernet** technology.

The **EtherCAT** protocol requires that the RJ45 connectors function as **IN** and **OUT** ports.

When connecting multiple WT 15 units in series:

- The **MASTER** must be connected to the IN connector of the first **WT 15**.
- The **OUT** connector of that unit is then connected to the **IN** connector of the next device, and so on.
- Refer to the previous page for wiring notes and safety precautions.

MAC ADDRESS IN INSTRUMENTS WITH INDUSTRIAL ETHERNET FIELDBUS

Instruments equipped with Hilscher modules for Industrial Ethernet protocols (such as PROFINET, Ethernet/IP, EtherCAT, etc.) feature a label beneath the connectors, as shown in the illustration.

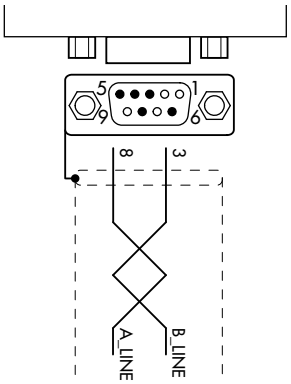
This label contains the following information:

- The **MAC** Address of the module **(red box)**
- A unique module identification number **(blue box)**
- A **QR code** that encodes the MAC Address

The QR code can be scanned using a smartphone with any QR code reader app (e.g., QR Code Reader available on the Google Play Store).

PROFIBUS CONNECTION

Pin	Signal	Description
3	B line	+RxD/+TxD, livello RS485
4	RTS	Request To Send
5	GND	Ground (isolated)
6	+5V Bus Output	+5V termination (isolated)
8	A line	-RxD / -TxD, RS-485 level
Housing	Cable Shield	Internally connected to protective earth per Profibus specs



To connect to a **PROFIBUS** Master, use a standard **PROFIBUS** cable.

Cable Requirements:

Typical impedance: 100 to 130 Ohms (at frequencies > 100 kHz)

Capacitance (conductor to conductor): Less than 60 pF/m (18.29 pF/ft)

Minimum conductor cross-section: 0.22 mm² (0.000341 in²)

In a PROFIBUS-DP network, both Type A and Type B cables can be used, depending on the performance required:

Characteristic	Type A Cable	Type B Cable
Impedance	135 to 165 Ω (f = 3–20 MHz)	100 to 300 Ω (f > 100 kHz)
Capacitance	< 30 pF/m (9.14 pF/ft)	< 60 pF/m (18.29 pF/ft)
Resistance	< 110 Ω/km	–
Conductor Cross-section	> 0.34 mm² (0.000527 in²)	> 0.22 mm² (0.000341 in²)

The following table shows the maximum allowable line length when using **Type A** or **Type B PROFIBUS** cable, based on the required communication speed:

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 Fieldbus operation, a line termination should be applied at both ends of the bus line.

- When using multiple **WT 15** units, enable the line termination on only one instrument—typically at the end of the bus.

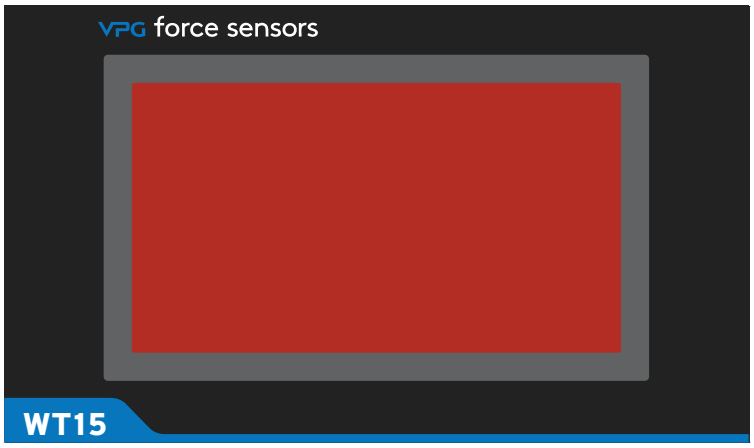
To configure the PROFIBUS module, the GSD file (hms_1810.gsd) must be installed on the master device (e.g., PLC or PC-based controller).

FRONT PANEL OF THE INSTRUMENT

The **WT 15** is a device dedicated to industrial weighing, featuring a touchscreen display.

In operating mode, the display shows all the necessary information for complete system monitoring and control.

The setup parameters are easily accessible and editable through the use of function keys that appear on the display as needed. These keys are used to select, modify, confirm, and save new settings.



DISPLAY

In operating mode, the display shows all the necessary information for complete system monitoring and control.

Depending on the selected programming procedures, the display is also used to:

- Program parameters to be stored in memory
- Show messages indicating the type of operation in progress, these messages serve as guidance for the operator during the use and configuration of the instrument.

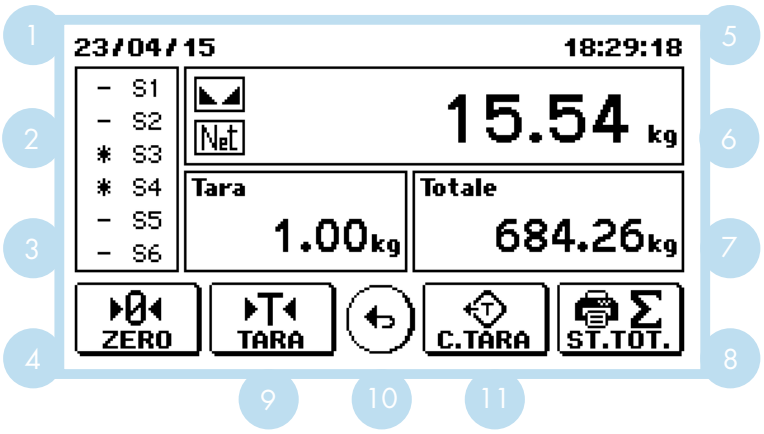
POWERING ON THE INSTRUMENT

At startup, the display temporarily shows an introductory screen indicating the firmware code and version number.

After a few seconds, the main screen is displayed, from which it is possible to access all operating functions of the device.

MAIN SCREEN

From this screen, it is possible to access all operational and programming functions of the instrument by following the indicated commands.



1. Current date
2. Output status
3. Tare quadrant
4. F1 function key
5. Current time
6. Weight quadrant
7. Totalization quadrant
8. F4 function key
9. F2 function key
10. Menu button
11. F3 function key

The display mode of the main screen can be selected via the dedicated parameter in the "Operating Mode" menu:

Standard Main Screen:

Displays all quadrants: Weight, Outputs, Tare, and Totalization.

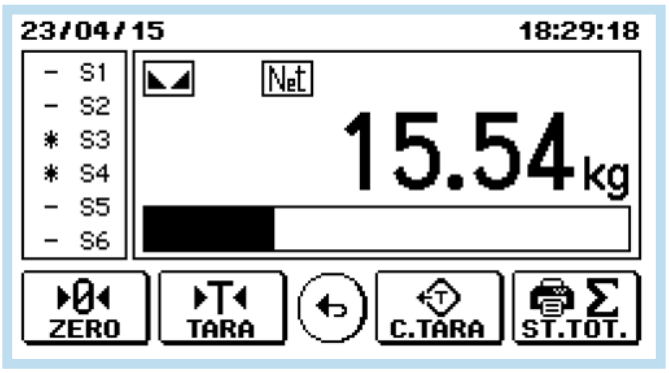
Weight-Only Main Screen:

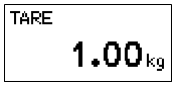
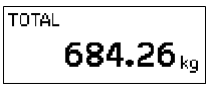
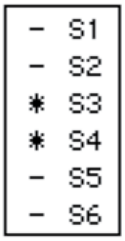
Displays only the Output Status and Weight quadrants.

In this mode:

- The weight value is shown in a larger size compared to the standard view.
- A bar graph is displayed within the weight quadrant, representing the gross weight relative to the full-scale value.

The functions of the **operation keys** (F1, F2, F3, and F4) are programmable through specific parameters in the "**Operating Mode**" menu.

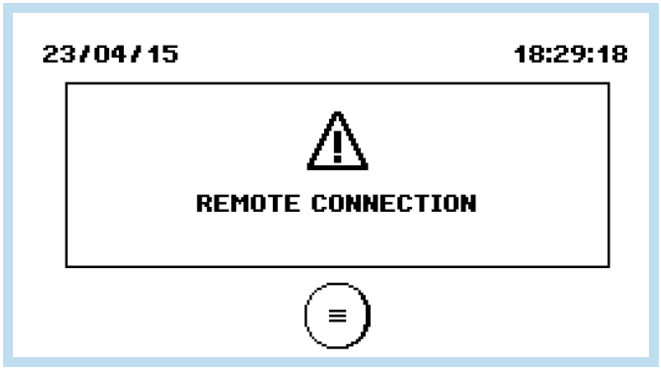


OPERATION KEYS	
	Enters the parameter programming menu.
	Tap the weight quadrant to switch between net, gross, or peak weight.
	Tap the tare quadrant to set a manual tare value. Available only if no tare has been previously set via the function key.
	Tap the total quadrant to clear the totalized weight. A confirmation screen will appear before execution.
	Tap the output status quadrant to access the setpoint configuration menu. Access can be password-protected via the “Operating Mode” menu.
	Executes a semi-automatic zero of the weight.
	Performs a tare operation.
	Cancels or clears the tare value.
	Resets the peak weight reading.
	Adds current weight to the total. Executable only if the weight change is greater than 20 divisions. Does not trigger printing.
	Prints the current weight. Does not totalize the weight.
	Prints and adds the weight to the total. Executable only if the weight change exceeds 20 divisions.
	Saves the weight value to optional memory (log). In “continuous log” mode, press again to stop logging.

DISPLAY MESSAGES / INDICATORS

WEIGHT INDICATIONS AND ERROR MESSAGES	
Net Min NO-CAL kg	Flashing message alternates with the detected weight. Indicates that weight calibration has not been done.
Net Min ------ kg	Displayed at startup while the instrument waits for conditions to perform automatic zeroing. Not shown if automatic zero is disabled.
Net Min ^^^^^^ kg	Appears when gross weight exceeds the full scale by more than 9 divisions, or if the weight exceeds 999999.
Net Min O-L kg	Indicates absence of weight signal or a value outside the measurable range.
Net Min NO-COM kg	The connected Fieldbus communication line is not detected.
Net Min E-FBUS kg	Error in communication with the Fieldbus interface.

When communicating with the "**VTW Connect**" PC software for remote setup of the instrument, the following screen will appear.



*In the case of metric operation, to enable communication with the "***VTW Connect***" software, you must log in using the credential password*

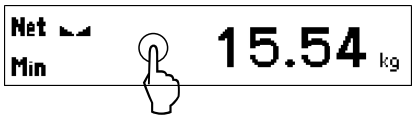
*(see "***Access to Setup Menu***" for instructions).*

WEIGHT STATUS INDICATORS	
Net	The display is showing the net weight value.
Peak	The display is showing the peak value recorded.
Min	The gross weight on the scale is less than 20 divisions (below minimum threshold).
	The weight is stable and can be reliably processed or recorded.
C1	The current weight falls within range 1 of the multirange configuration.
C2	The current weight falls within range 2 of the multirange configuration.
C3	The current weight falls within range 3 of the multirange configuration.

OUTPUT STATUS INDICATORS	
– S1	Contact is open (output is inactive).
* S1	Contact is closed (output is active).

OPERATIONAL FUNCTIONS

SWITCHING BETWEEN GROSS / NET / PEAK WEIGHT DISPLAY



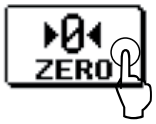
To switch the weight display mode, tap the weight quadrant on the instrument's main screen.

Each tap cycles the display through the following modes:

- Gross – The gross weight is shown in the weight quadrant.
- Net – The net weight (gross minus tare) is displayed.
- Peak – The peak weight value is shown (only available if the peak function is enabled in the setup menu via the appropriate parameter).

This function allows the operator to easily view different weight values without navigating through menus.

SEMI-AUTOMATIC ZEROING



This operation is used to correct small zero drifts of the scale.

The gross weight zeroing command will not be executed under the following conditions:

- Unstable weight: The weight does not stabilize within 3 seconds after the zeroing command is issued.
- The gross weight, compared to the original zero calibration, is outside the positive or negative range defined by the Zero Band parameter (configured in the setup menu under metrological parameters).

If this parameter is set to 0, the semi-automatic zeroing function is disabled.

When successfully executed, the gross weight zeroing is retained even after powering off the instrument.

AUTO-TARE

Press the designated key to perform an auto-tare operation.

The auto-tare command will not be executed under the following conditions:

- Unstable weight: The weight does not stabilize within 3 seconds after the auto-tare command is issued.
- The gross weight is equal to or exceeds the maximum capacity of the weighing system.

The tare value is stored even after the instrument is powered off.

CANCEL TARE

This operation clears the previously entered tare value.

MANUAL TARE

Tap the tare quadrant on the main screen to access the manual tare value setting function.

The manual tare value is saved even after the instrument is powered off.

CLEAR PEAK

This operation is used to reset the peak value to zero.

WEIGHING STORAGE AND TOTALIZATION

The weighing command can be triggered:

- Manually via the touchscreen,
- Through an external input,
- Via serial line or Fieldbus.

This command initiates:

- The totalization of the net weight,
- The transmission or printing of data via the serial port (depending on the communication settings),
- The storage of the net weight in a memory register accessible via Fieldbus.

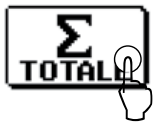
*In **METRIC mode**, if alibi memory is configured, the transaction is also recorded for legal-for-trade purposes.*

Conditions required to perform a weighing totalization:

- The weight is stable, or stabilizes within 3 seconds after the command.
- Since the last totalization, the weight has changed by at least 20 divisions.
- Gross weight is equal to or above the minimum weighing threshold (20 divisions) and below the maximum capacity.
- Net weight is not zero.
- In METRIC mode, both net and gross weight must be positive.

Note: To enable automatic weighing, the external command input can be kept continuously closed.

AVAILABLE TOTALIZATION BUTTONS:



Totalization Button

- Executes the totalization of the weight — no printout is generated.

Print & Totalization Button

- Executes weight totalization and, if a printer protocol is selected, generates a receipt.

PRINT, TOTALIZATION & AUTO-TARE BUTTON

- Executes totalization and, if a printer or Kube protocol is selected, generates the appropriate receipt and finally performs an auto-tare operation.

Ticket with "PRINT" Protocol

Header 1
Header 2
12/11/2025 10:30
OPERATOR CODE 1
GROSS WEIGHT 211.5 kg
TARE 2.5 kg

Ticket with "KUBE SIN." Protocol

Header 1
Header 2
12/11/2025 10:30
WEIGHING NO. 145
NET WEIGHT 209.0 kg

Ticket with "PRINT" Protocol

Double Height Weights
OPERATOR CODE 209.0 kg
Header 1
Header 2
12/11/2025 10:30
OPERATOR CODE 1
GROSS WEIGHT
211.5 kg
TARE
2.5 kg
NET WEIGHT
209.0 kg

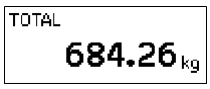
The operator code is printed only if the corresponding parameter is enabled in the "**Operating Mode**" menu.

The totalized weight value is retained in memory even after the instrument is powered off.

When using the standard "PRINT" protocol, weight values can be printed in double-height mode, which can be enabled via the relevant parameter in the COM1 menu.

The totalized value remains stored in memory even after power-down.

CLEAR TOTAL



Tap the totalized value quadrant on the main screen to access the clear total function.

Before executing the operation, a confirmation screen will appear.

If the Printer or Kube protocol is selected, one of the predefined receipt formats (sample tickets) will be printed.

When using the standard "PRINT" protocol, weight values can be printed in double-height mode, which can be enabled via the corresponding parameter in the COM1 menu.

Ticket with "PRINT" Protocol

12/11/2025	10:30
TOTAL	
NET WEIGHT	209.0 kg

Ticket with "PRINT" Protocol

12/11/2015 10:30

TOTAL

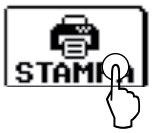
NET WEIGHT

209.0 kg

Ticket with "KUBE SIN." Protocol

Header 1	
Header 2	
12/11/2025	10:30
NET TOTAL	345.8 kg
N. WEIGHINGS	79

PRINT



This operation allows the printing of the weighing data.

If the Printer or Kube protocol is selected, one of the illustrated receipt formats will be generated.

This operation is always executable — it does not require the conditions normally needed for totalization.

When using the standard "**PRINT**" protocol, weight values can be printed in double-height mode.

This function can be enabled via the corresponding parameter in the **COM1 menu**.

If the "**ON DEMAND**" protocol is active, the weight is transmitted instead of printed.

Ticket with "PRINT" Protocol

12/11/2025	10:30
OPERATOR CODE	1
GROSS WEIGHT	211.5 kg
TARE	2.5 kg
NET WEIGHT	209.0 kg

Ticket with "KUBE SIN." Protocol

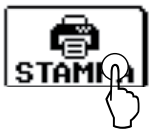
Ticket with "KUBE MUL." Protocol

Header 1	
Header 2	
12/11/2025	10:30
WEIGHING NO.	145
NET WEIGHT	209.0 kg

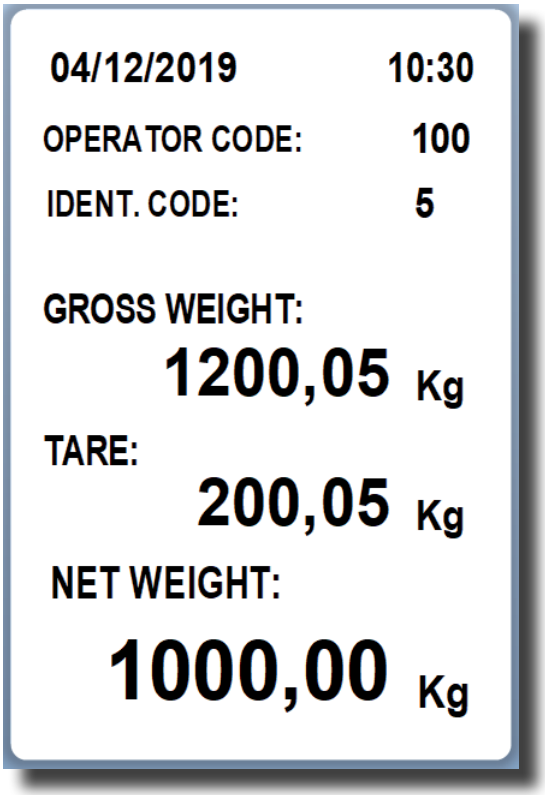
Ticket with "PRINT" Protocol and double-height weights

Header 1	
Header 2	
12/11/2025	10:30
OPERATOR CODE	1
GROSS WEIGHT	**211.5 kg**
TARE	**2.5 kg**
NET WEIGHT	**209.0 kg**

LABEL PRINTING



If COM1 (RS-232) is connected to a TDP 247-type printer, and the "LABEL PRINTER" protocol is selected in the settings menu, pressing the PRINT or PRINT & TOTAL buttons will generate the following label.

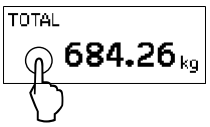


CUMULATIVE TICKET

By configuring the COM1 serial port (RS-232) protocol to "**KUBE MUL.**", it is possible to generate a cumulative ticket.

This ticket lists all totalized weighings until the total is cleared using the dedicated total reset quadrant.

Through these buttons, it is possible to totalize a weighing, which is immediately added to the cumulative ticket currently in progress.



To close the active cumulative ticket, perform a total reset, which will print the net total weight and the total number of weighings recorded in the ticket.

The following is a sample layout of a cumulative ticket generated by a KUBE printer.

Header 1	
Header 2	
03/22/2024	10:30
WEIGHING NO.	1
NET WEIGHT	209.0 kg
03/22/2024	10:35
WEIGHING NO.	2
NET WEIGHT	175.8 kg
03/22/2024	10:38
WEIGHING NO.	3
NET WEIGHT	196.4 kg
— — — — — — — — — —	
03/22/2024	10:42
TOTAL NET	581.2 kg
NO. OF WEIGHINGS	3

WEIGHING DATA LOG

This function allows the storage of weighing values in the optional memory (log).

- If the “continuous log” mode is active, the same button must be pressed again to stop the logging process.

USING THE PEAK FUNCTION

The peak value can also be displayed and used in the following functions.

FUNCTION	DESCRIPTION
LOGIC OUTPUTS	Thresholds can be configured to reference the peak value (see logic output configuration procedure).
SERIAL PORT	The peak value can be transmitted using the following protocols: Continuous, Automatic, On Demand, Slave, and Modbus.
ANALOG OUTPUT	The analog output value can be linked to the peak value (see analog output configuration procedure).

The peak value is calculated at the same frequency as the weight acquisition, and it refers to either the net weight or the gross weight, depending on the selection made in the “Enable Peak” parameter within the “**OPERATING MODE**” menu.”

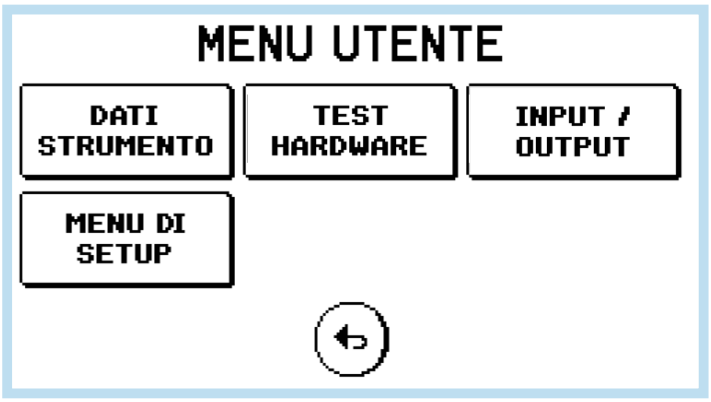
MENU STRUCTURE

The menu screens are divided into two types: Command Menus and Parameter Menus, depending on the context and structure of the data programming interface.

By pressing the button containing the description, the user enters the corresponding submenu.

Each screen can display a maximum of 6 parameters.

Additional parameters are accessible via page navigation buttons, which appear automatically when needed.

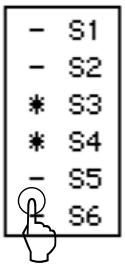


By pressing the button that contains the parameter description, you access the corresponding setting.

OPERATION BUTTONS	
PRECEDENTE	**Function Key F1** - Switches to the previous page of the menu. This key is only displayed if the menu contains more than 6 items and is never shown on the first page.
SUCCESSIVO	**Function Key F2** - Switches to the next page of the menu. This key is only displayed if the menu contains more than 6 items and is never shown on the last page.
	Exit Key - Exits the current menu and displays either the higher-level menu or the main screen.

SETPOINT PROGRAMMING MENU

To access the setpoint configuration menu, tap the output status quadrant on the main screen.
Access to this menu can be protected by a password, which can be set in the "Operating Mode" menu.

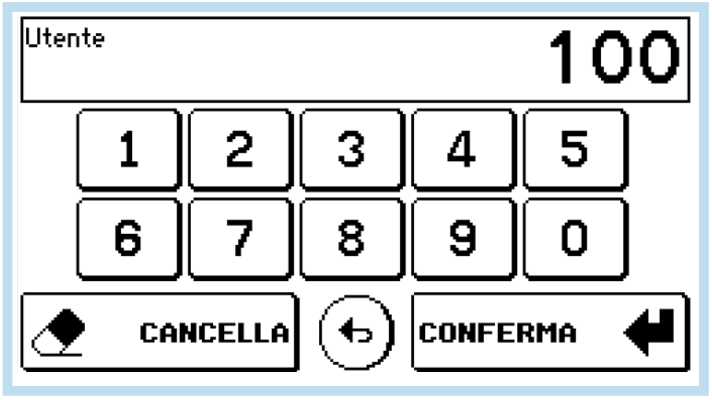


SETPOINT PROGRAMMING – PARAMETER TABLE						
MESSAGE	**DESCRIPTION**	**TYPE**	**UNIT**	**DEFAULT**	**RANGE**	**FIELDBUS ADDRESS**
Setpoint 1	"The instrument manages 6 programmable weight thresholds. Each output can be enabled according to operational setup, with options to compare: – Gross, net, or peak weight – Positive, negative, or absolute weight – Activation when weight is < or ≥ threshold – Custom hysteresis setting. In case of overload or unreadable weight, all outputs are disabled (open contact)."	Numeric Input	Weight unit	0	0 ÷ Full Scale	201 (MSW) – 202 (LSW)
Setpoint 2		Numeric Input	Weight unit	0	0 ÷ Full Scale	203 (MSW) – 204 (LSW)
Setpoint 3		Numeric Input	Weight unit	0	0 ÷ Full Scale	205 (MSW) – 206 (LSW)
Setpoint 4		Numeric Input	Weight unit	0	0 ÷ Full Scale	207 (MSW) – 208 (LSW)
Setpoint 5		Numeric Input	Weight unit	0	0 ÷ Full Scale	209 (MSW) – 210 (LSW)
Setpoint 6		Numeric Input	Weight unit	0	0 ÷ Full Scale	211 (MSW) – 212 (LSW)

USER MENU ACCESS

In METRIC operation mode, the programming of weighing parameters and weight calibration settings is allowed only for personnel authorized by applicable regulations, and access is protected by password.

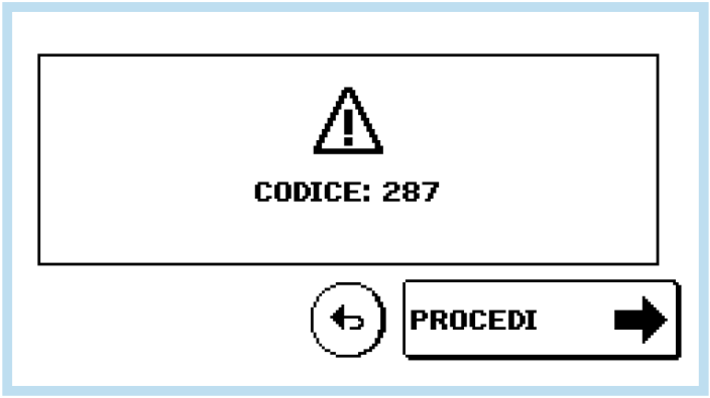
Upon entering the user menu, the system prompts for the operator's identification code.



Enter the identification code of the authorized operator, which corresponds to a number in the password table provided with the instrument, and confirm by pressing the **CONFIRM** key.

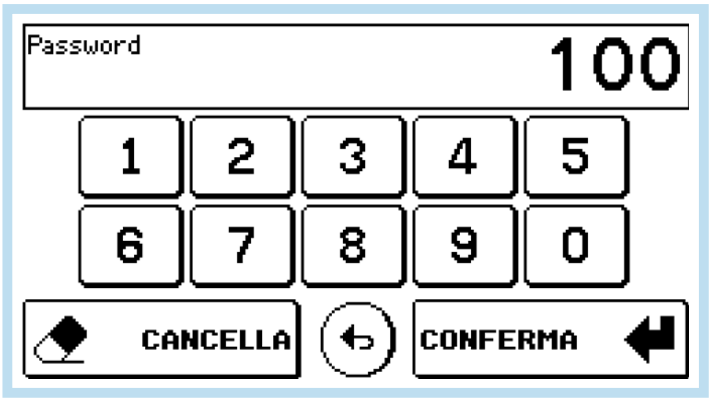
If the entered code is 0000, access to the menu parameters will be limited:

- You will not be able to access weighing parameter programming or calibration settings.
- If a valid code is entered, the system will display a random 3-digit number. Locate the corresponding 4-digit password in the reference table supplied with the device.
- Press the PROCEED key to enter the password and gain access to the protected functions.



Enter the password obtained from the reference table and confirm by pressing the **CONFIRM** key.

- If the password is incorrect, the system will return to the user code entry screen.
- If the password is correct, access will be granted to the full menu, including metrological parameters.



USER MENU

USER MENU – COMMANDS	
MESSAGE	**DESCRIPTION**
INSTRUMENT DATA	Summary screen displaying configuration parameters and firmware identification (program code and version number).
HARDWARE TEST	Menu for executing hardware functionality test procedures.
INPUT / OUTPUT	Menu for configuring the functions of the instrument's inputs and outputs.
SETUP MENU	Menu of programmable parameters required for putting the instrument into operation.

INSTRUMENT DATA DISPLAY

The instrument data display screen is divided into four sections:

FIRMWARE

Displays the firmware code and version installed on the instrument.

These details are important to provide when requesting technical support.

PARAMETERS

Shows key configuration details, including:

- The configured full scale
- The status of the internal jumper enabling metrological calibration
- The instrument's supply voltage

CONNECTIONS

Displays information about communication interfaces:

The configured Fieldbus type

The Fieldbus address

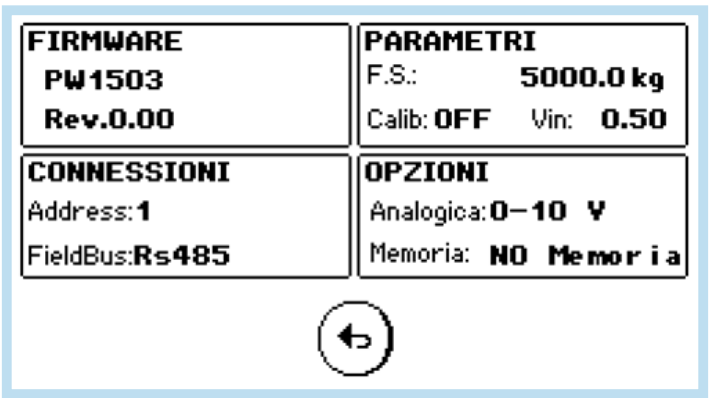
OPTIONS

Displays optional features and modules:

- The configured analog output type
- Presence of additional memory: None or Alibi Memory

If a PROFINET fieldbus is used, this screen also shows the IP address programmed by the PLC.

This field is updated only at power-up. If the PLC changes the IP address, the instrument must be restarted to display the correct value.



HARDWARE TEST MENU

HARDWARE TEST – COMMANDS	
MESSAGE	**DESCRIPTION**
LOAD CELLS	Displays the weight with 10x resolution, the acquired signal in mV/V, and the percentage of full scale of the weighing system.
MEMORIES	Tests the operation of the optional memory (not shown if no memory is installed).
INPUT / OUTPUT	Displays the status of digital inputs and allows manual setting of digital outputs.
COMMUNICATION PORTS	Tests the configured active communication ports. Performs an echo test by retransmitting the received string and displays the number of strings and characters received.
ANALOG OUTPUT	Tests the analog output function with manual setting to predefined percentage values (not shown if analog output is not installed).

MENU INPUT/OUTPUT

OUTPUT (COMMANDS)	
MESSAGE	**DESCRIPTION**
OUTPUT 1	Programming menu for parameters relating to logic outputs.
[...]	
OUTPUT 6	

OUTPUT N (PARAMETERS)						
Message	**Description**	**Type**	**Unit**	**Default**	**Range / Options**	**Fieldbus Address**
Reference Weight	Selects the weight type used for threshold control: Net, Gross, or Peak. The peak is compared even if the peak function is disabled.	Selection	-	0	[0] Net [1] Gross [2] Peak	1411 (1) 1421 (2) 1431 (3) 1441 (4) 1451 (5) 1461 (6)
Contact Logic	Logic type of the output: Normally Open (NO) or Normally Closed (NC).	Selection	-	0	[0] NO [1] NC	1412 (1) 1422 (2) 1432 (3) 1442 (4) 1452 (5) 1462 (6)
Weight Polarity	Threshold can react to: Positive, Negative, or Bidirectional weights.	Selection	-	0	[0] Positive [1] Negative [2] Bidirectional	1413 (1) 1423 (2) 1433 (3) 1443 (4) 1453 (5) 1463 (6)
Weight Stability	Output activates on: any reading or only when weight is stable.	Selection	-	0	[0] Normal [1] Stable	1414 (1) 1424 (2) 1434 (3) 1444 (4) 1454 (5) 1464 (6)
Hysteresis	Hysteresis value around the threshold.	Numeric Input	Weight unit	2	0 ÷ Full Scale	1415 (1) 1425 (2) 1435 (3) 1445 (4) 1455 (5) 1465 (6)

INPUT N (PARAMETERS)						
Message	**Description**	**Type**	**Unit**	**Default**	**Range / Options**	**Fieldbus Address**
Function	Function assigned to the corresponding digital input. (*)	Selection	-	0	[0] Zero, [1] Tare, [2] Clear Tare, [3] Peak, [4] On Demand, [5] Weighing, [6] Log Data	1401 (1) 1402 (2) 1403 (3) 1404 (4) 1405 (5) 1406 (6)

(*) Each logic input can be associated with one of the following functions:

- **Zero:** Perform Zero calibration.
- **Tare:** Perfoms Autotare.
- **Canc. Tare:** Delete Tare.
- **Peak:** Delete Peak.
- **On Demand:** Data transmission on serial port.
- **Weight:** Execution weight command.
- **Log Dati:** Saving command of the weighing values on optional alibi memory (log).

ACCESS TO THE SETUP MENU

In **METRIC** operation mode, the programming of weighing parameters and weight calibration is allowed only to authorized personnel, through password-protected access.

When entering the setup menu, the system prompts for the operator identification code, which must be a value between **100** and **109**.

1. Enter the operator ID code and press the **CONFIRM** key.

If 0000 is entered, access will be limited:

- Programming of weighing parameters and calibration settings will not be allowed.

2. If a valid code is entered, a random 3-digit number will appear.

Locate the corresponding 4-digit password in the reference table.

3. Press the **PROCEED** key to go to the password entry screen.
4. Enter the 4-digit password and press **CONFIRM**.

- If the password is incorrect, the system returns to the operator ID entry screen.
- If the password is correct, access is granted to the full setup menu, including metrological parameters.

MENU SETUP

MESSAGE	DESCRIPTION
WEIGHT CALIBRATION	Menu for programming parameters related to weight calibration. Also allows execution of sample weight calibration or table-based calibration via selection. (*)
ANALOG OUTPUT	Menu for programming parameters related to the analog output. Also allows execution of analog output adjustment. This menu is visible only if the analog option is active.
COMM. PORTS	Menu for configuring parameters related to the serial communication ports.
METROLOGICAL PARAM.	Menu for configuring metrological weighing parameters. (*)
WEIGHT FILTER	Menu for setting the weight filter value. Choose from 9 predefined filter levels or manually configure parameters such as output rate, number of averages, etc.
OPERATING MODE	Menu for configuring the functional characteristics of the instrument (e.g., standby behavior, setup menu password, etc.).
DATE / TIME	Function for setting the real-time clock and calendar.
DISPLAY CONTRAST	Function for adjusting the display contrast.
UPLOAD/ DOWNLOAD	Function for performing upload/download of the setup memory.
METROLOGICAL ACCESS	Displays the last 5 logins of authorized personnel. (**)
ALIBI MEMORY	Access and consultation of the fiscal memory. (**)

(*) These menu items are displayed only in FREE mode, or in METRIC mode with authorized personnel password access.

(**) These menu items are displayed only in METRIC mode.

The following pages describe all configurable parameters.

At the end of each parameter description, the corresponding Fieldbus address is provided (if applicable).

If the parameter is of selectable type, the value to be written to the register for the desired selection is shown in square brackets [ ].

CALIBRATION MENU

Access to this menu is only allowed when operating in FREE mode or when operating in METRIC with access using the password of authorised personnel.

MEASUREMENT UNIT

Measurement unit of the weight value; it is displayed on the main screen and in all the weight parameter settings.

Values that can be selected:

- *[0] kg, [1] g [2] t [3]*
- *lb, [4] N, [5] kN*

Default: *kg*

DIVISION VALUE [1101÷1102]

Value of a single division, expressed in kg. The ratio between the capacity of the system and the division valuerepresents the resolution of the system (number of divisions).

Following the change of the division value, if the maximum capacity is not changed, calibration of the weight is corrected automatically.

Values that can be selected:

- 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*

(*) The setting of division values via Fieldbus is handled differently than when configured directly from the instrument.

Please refer to addresses 1101 and 1102 in the MODBUS register table for proper configuration.

LOAD CELL CAPACITY [1103–1104]

Defines the value corresponding to the total nominal capacity of the load cells, expressed in the selected unit of measure.

- For systems with a single load cell and "N" fixed supports, enter the cell's capacity multiplied by the total number of supports.
- This value determines the full scale of the weighing system.

When this parameter is modified, the theoretical weight calibration is automatically recalculated.

Values: 0 to 999999

Default: 0

LOAD CELL SENSITIVITY [1105]

Set the value corresponding to the average sensitivity of the load cells, expressed in mV/V.

Accepted values range from 0.0001 to 4.0000 mV/V.

If no value is set, the default value of 2.0000 mV/V is assumed.

When the sensitivity value is modified, the instrument performs an automatic theoretical weight calibration.

Values: *0.0001 to 4.0000 mV/V*

Default: *2.0000 mV/V*

FULL SCALE [1301–1302]

Sets the usable capacity (net weight) of the weighing system.

Values: *0 to Load Cell Capacity*

Default: *0*

PRESET TARE [1106–1107]

Programs the fixed tare value of the weighing system.

Values: *0 to Load Cell Capacity*

Default: *0*

CALIBRATION TYPE

Select the desired type of calibration.

Upon confirmation, one of the following calibration procedures is initiated.

DEAD WEIGHT CALIBRATION [501–503]

Performs zero and full-scale calibration using certified test weights, with support for up to 5 linearization points.

TABLE CALIBRATION [1151–1172]

Allows manual programming of up to 5 calibration points.

The values correspond to those determined by the dead weight linearization procedure, enabling the user to replicate calibration values obtained with test weights.

MULTIRANGE 1 [1112–1113]

Sets the first threshold value for multirange application.

Set to 0 to disable multirange control.

Values: *0 to 999999*

Default: *0*

MULTIRANGE 2 [1114-1115]

Sets the second threshold value for multirange application.

Set to 0 to disable multirange control.

Values: *0 to 999999*

Default: *0*

THESE PARAMETERS ARE VISIBLE ONLY WHEN THE INSTRUMENT IS OPERATING IN METRIC MODE.

GRAVITY CALIBRATION [1108–1109]

Programs the local gravitational acceleration value used during calibration.
Values: *9.77000 to 9.84000*
Default: *0*

GRAVITY USE [1110–1111]

Programs the gravitational acceleration value of the location where the instrument will be used.
Values: *9.77000 to 9.84000*
Default: *0*

EXAMPLE OF CONFIGURATION / CALIBRATION

Using the parameter settings listed above, a theoretical full-scale calibration of the **WT 15** is performed.

This procedure must be completed with a zero calibration, described later.

If no mechanical issues are present, the procedure ensures good system accuracy (maximum error < 1% of full scale).

When the division value is modified, the full-scale calibration is automatically recalculated.

Selections that are incompatible with calibration parameters or existing calibration memory will not be accepted.

Application Scenario:

A tank needs to be weighed with the following characteristics:

- **Empty weight:** 750 kg
- **Capacity:** 1000 liters
- **Product density:** 1.3 kg/dm^3
- **Required display resolution:** 0.2 kg

Preparation:

Before configuration:

- Ensure the load cells are correctly connected to the unit.
- Make sure the tank is empty.

Equipment Used:

- **Number of load cells:** 3
- **Load cell capacity:** 1000 kg each
- **Sensitivities:** 2.0015, 2.0008, and 1.9998 mV/V

  –> Average sensitivity = 2.0007 mV/V

PARAMETER	VALUE
Unit of Measure	kg
Division Value	0.2
Load Cell Capacity	3000
Load Cell Sensitivity	2.0007 mV/V
Full Scale	1500
Preset Tare	0

SIGNAL CHECK AND INITIAL VALIDATION

Make sure that the signal value read in the HARDWARE TEST menu under LOAD CELLS corresponds to the tare weight of the system using the following proportion:

3000 : 2.0007 = 750 : X

Where X is the signal value in mV/V that theoretically corresponds to the empty tank's weight.

This value should be approximately 0.5 mV/V.

NEXT STEPS

At this point, you can:

- Proceed with the calibration described in the next paragraph,

or

- Exit the configuration menu and save the entered data.

The instrument should now display a weight corresponding to the empty tank, e.g., **756.8 kg**.

PRESET TARE ADJUSTMENT (OPTIONAL)

You may re-enter the configuration menu and enter the displayed weight (e.g., *756.8*) into the Preset Tare parameter.

Then, exit the menu again, saving the new settings.

FOR GREATER ACCURACY

Prepare certified test weights or pre-weighed material (weighed using a certified scale), and proceed with the calibration procedure described in the next paragraph.

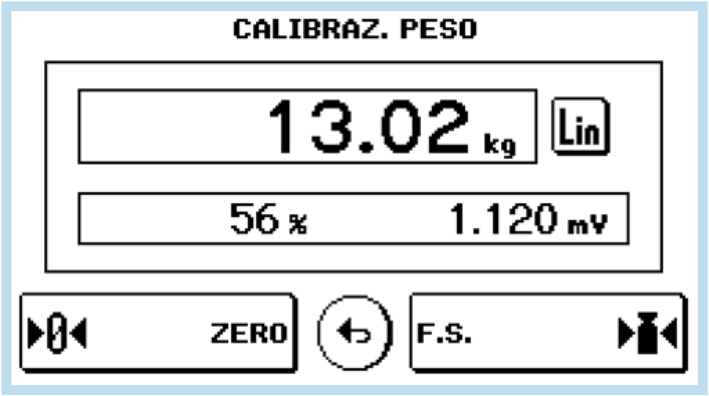
CALIBRATION WITH TEST WEIGHTS

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

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

WARNING: *If the instrument is turned off without exiting the setup menu, the programmed settings will not be saved.*

Note: *If, after calibration, the system shows linearity errors, check that the weighed structure is completely free from mechanical constraints.*



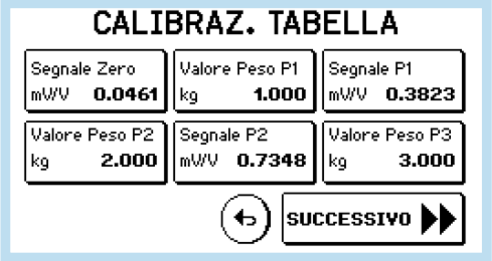
OPERATION KEY	DESCRIPTION
ZERO	**Zero Calibration** - Perform this operation with the scale unloaded, but including tare weight, and after weight stabilization. The displayed weight should reset to zero. This operation can be repeated multiple times.
F.S.	**Calibration with Test Weight** - Before performing this operation, place the test weight on the scale and wait for stabilization. The display will show the measured value. Use the touchscreen to enter the corresponding actual weight. If the entered value exceeds the instrument's resolution, an error message will be shown briefly. Can be repeated multiple times.
Lin	**Activate Linearization with Test Weights** - Allows up to 5 linearization points to be set on the positive scale. During this process, the display alternates between the current weight and the active point (e.g., "LIN 1"). Press the F.S. key to enter the value of the current test weight. To finish, press LIN again. Fewer than 5 points may be set.
	Exit Calibration Function - Exits the calibration procedure and returns to the previous menu.

TABLE CALIBRATION

Allows manual programming of up to 5 calibration points, plus the zero value.

The values correspond to those determined through the linearization procedure using test weights.

This feature allows the operator to view the values automatically generated by that procedure, or to edit and program them manually using predefined values.



MESSAGE	DESCRIPTION	UNIT
Zero Signal	Signal value corresponding to the zero weight of the scale.	mV/V
Weight Value P1	Weight value corresponding to the 1st calibration point.	Weight unit
Signal P1	Signal value corresponding to the 1st calibration point.	mV/V
Weight Value P2	Weight value corresponding to the 2nd calibration point.	Weight unit
Signal P2	Signal value corresponding to the 2nd calibration point.	mV/V
Weight Value P3	Weight value corresponding to the 3rd calibration point.	Weight unit
Signal P3	Signal value corresponding to the 3rd calibration point.	mV/V
Weight Value P4	Weight value corresponding to the 4th calibration point.	Weight unit
Signal P4	Signal value corresponding to the 4th calibration point.	mV/V
Weight Value P5	Weight value corresponding to the 5th calibration point.	Weight unit
Signal P5	Signal value corresponding to the 5th calibration point.	mV/V
Zero Signal Acquisition	Function to acquire the mV/V signal corresponding to zero weight.	_

NOTES ON TABLE CALIBRATION

Zero values entered manually are not taken into account.

Table calibration is automatically cleared when a new theoretical or test weight (dead weight) calibration is performed.

After executing the zero signal acquisition function, the signal values in the table are automatically recalculated.

An offset is added to each signal value, based on the difference between the newly acquired zero signal and the previous zero signal value.

ANALOG OUTPUT PARAMETERS (OPTIONAL)

ANALOG OUTPUT RANGE [1506]

Selects the range of the analog output.

Selectable Values:

- *[0] 0–10 VDC*
- *[1] 0–5 VDC*
- *[2] 4–20 mA*
- *[3] 0–20 mA*

Default: *0÷10 Vdc*

OUTPUT MODE [1505]

Selects the weight value associated with the analog output: Net, Gross, or Peak.

Selectable Values:

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

Default: *NET*

ANALOG ZERO VALUE [1501–1502]

Sets the weight value corresponding to 0 on the analog output. The value is subtracted from full scale as an offset.

0 to Full Scale

ANALOG FULL SCALE VALUE [1503–1504]

Sets the weight value corresponding to the full scale of the analog output.

Selectable Values:

0 to Load Cell Capacity

Default: *Full Capacity*

ZERO OFFSET ADJUSTMENT [1507]

Used to adjust analog output at 0% using a multimeter. Use + / – keys for fine or rapid adjustment. Press SAVE to store the new value.

FULL SCALE OFFSET ADJUSTMENT [1508]

Used to adjust analog output at 100% using a multimeter. Use + / – keys for fine or rapid adjustment. Press SAVE to store the new value.

Note:

- *The analog output is factory-calibrated for each selectable range.*
- *This procedure is provided for optional fine-tuning by the user.*
- *If a full setup memory reset is performed, the factory calibration is restored.*

SERIAL OUTPUT PARAMETERS

This menu allows configuration of serial ports COM1, COM2, and COM3, along with their respective communication parameters.

The instrument includes two independent serial ports, with the following characteristics:

- **COM1:** Always equipped with an RS-232 interface.
- **COM2:** Can be equipped with one of the following interchangeable interfaces:
  – RS-485, ETHERCAT, ETHERNET, ETHERNET IP, or PROFINET.
- **COM3:** Always uses an RS-485 interface, typically used for connecting external I/O modules.

COM1 (RS-232)

TRANSMITTED VALUE

Selects the type of weight value to be transmitted via the RS-232 output.

Selectable values:

- [NET] Net weight
- [GROSS] Gross weight
- [PEAK] Peak value

Default: *NET (Net weight)*

PROTOCOL

Defines the operating mode of the RS-232 serial port.

Selectable values:

VALUE	DESCRIPTION
NONE	Serial communication is disabled
CONTINUOUS	Continuous transmission of the weight string (e.g., for weight repeaters)
ON DEMAND	Transmission triggered by a front panel button or Input 2 (if weight is stable and has changed ≥20 divisions)
AUTO	Automatic transmission when weight stabilizes above the minimum threshold (20 divisions)
SLAVE	ASCII protocol (see specific section)
PRINT	ASCII printing protocol (see specific section)
ETICHET	Dedicated protocol for TDP 247 label printer
KUBE SIN	Dedicated protocol for KUBE printer – single ticket
KUBE MUL	Dedicated protocol for KUBE printer – cumulative/multiple ticket

Default: *NONE*

BAUD RATE

Function:

Defines the baud rate (transmission speed) of the RS-232 serial port.

The value must match the setting of the connected device (e.g., PC, PLC, or remote display).

Selectable values:

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

Default: *9600*

FRAME FORMAT

Function:

Defines the data frame format for serial communication.

Note: When using the SLAVE protocol, 7-bit data formats (E-7-1 and O-7-1) cannot be selected.

Selectable values:

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

Default: *n-8-1*

HEADER 1

Function:

Defines the first line of the ticket header when using the "PRINT" or "KUBE" protocol.

Selectable Value:

30 characters

HEADER 2

Function:

Defines the second line of the ticket header for protocols "PRINT" and "KUBE".

Selectable Value:

30 characters

WEIGHT PRINT FORMAT

Function:

Selects the printing mode for weight values when using the standard "PRINT" protocol.

This parameter allows choosing between standard character size or double-height mode.

Selectable values:

- [0] STANDARD
- [1] HEIGHT ×2

Default: *0*

COM 2 PARAMETERS (WHEN RS-485 IS INSTALLED)

TRANSMITTED VALUE (RS-485)

Function:

Selects the type of weight value to be transmitted via the RS-485 output.

Selectable values:

- *NET (Net weight)*
- *GROSS (Gross weight)*
- *PEAK (Peak value)*

Default: *NET (Net weight)*

PROTOCOLS

Defines the operating mode of the RS-485 serial port.

Selectable values:

VALUE	DESCRIPTION
NONE	Serial communication is disabled.
CONTINUOUS	Continuous transmission of the weight string. Commonly used to drive a weight repeater. See related section for details.
ON DEMAND	Transmits a weight string when the operator presses the front key or via Input 2. Requires stable weight and a change of at least 20 divisions.
AUTO	Automatically transmits the weight string when weight stabilizes above the minimum threshold (20 divisions).
SLAVE	Uses the ASCII protocol. See dedicated section for implementation details.
MODBUS	Uses the MODBUS RTU protocol. See dedicated section for implementation details.

Default: *NONE*

BAUD RATE

Defines the baud rate of the RS-485 serial port.

This value must match the setting of the connected device (e.g., PC, PLC, or remote display).

Selectable values:

1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Default: *9600*

FRAME FORMAT

Defines the data frame format for the RS-485 serial port.

When using SLAVE or MODBUS protocols, it is not possible to select 7-bit data formats (E-7-2 and O-7-2).

Selectable values:

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

Default: *n-8-1*

ADDRESS

Sets the communication address for the serial port.

Selectable values: *1 to 32*

Default: *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*

C2For n

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*

rESbUS.

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.

COM3 RS-485

NUMBER OF MODULES

Sets the number of input/output modules managed by the instrument via COM3 RS-485.

Selectable values:

0÷4

Default: *0*

BAUD RATE

Defines the baud rate of the COM3 RS-485 port.

The value must match the setting of the connected I/O module.

Selectable values:

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

Default: *9600*

METROLOGICAL PARAMETERS

ACCESS TO THIS MENU IS ALLOWED ONLY IN THE FOLLOWING CASES:

- When the instrument is operating in FREE mode,
- Or in METRIC mode, via password access typically known only to authorized personnel.

THESE PARAMETERS ALLOW CONFIGURATION OF:

- Acquisition and display update timing,
- Manual and automatic zeroing operations performed by the instrument.

OPERATING MODE

Function:

Selects the operating mode of the instrument.

When switching from FREE to METRIC mode, confirmation requires authentication via password known only to authorized personnel.

Selectable values:

- *FREE*
- *METRIC*

Default: *FREE*

STABILITY FACTOR [1303]

Defines the number of divisions required for the instrument to consider the weight as stable.

A higher number of divisions allows the transmitter to detect stability more quickly, which is essential when performing tare and print operations.

Selectable values: *0÷4*

Default: *2*

AUTO ZERO THRESHOLD [1304–1305]

Defines the maximum weight value that can be automatically zeroed at power-on.

This operation acts as a zero calibration of the system and is only performed if the weight is stable and below the set value.

Values: *0 to Load Cell Capacity*

Default: *0*

ZERO TRACKING [1306]

This function performs a temporary zero calibration to compensate for possible thermal drift in the weight.

When the transmitter is powered off, the previous zero calibration is automatically restored.

The maximum weight that can be zeroed using this function is 2% of the system's full capacity.

To disable this function, set the value to 0.

VALUE	TRACKING RATE
0	Function disabled
1	0.5 divisions/second
2	1 division/second
3	2 divisions/second
4	3 divisions/second

Default: *0*

ZERO BAND [1307–1308]

Defines the number of divisions that can be zeroed using the touchscreen or the associated digital input.

Values: *0 to 200 divisions*

Default: *100*

MANUAL TARE

Selects the type of manual tare:

- NORMAL (subtractive),
- or ADDITIVE (the tare value is added to the weight).

The ADDITIVE mode is only available when the instrument is operating in FREE mode.

Selectable values:

- *NORMAL*
- *ADDITIVE*

Default: *NORMAL*

FILTER PARAMETERS

FILTER VALUE [1201]

This parameter controls the update speed of the display, as well as the serial and analog outputs.

- The maximum display update rate is limited to 10 Hz.
- Higher filter values result in faster weight updates.
- Lower filter values provide slower, more stable updates.

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.

OUTPUT RATE [1202]

This parameter sets the weight acquisition frequency.

If the value is set above 12.5 Hz, the weight must be stable.

If the weight is not stable, the instrument will immediately display an error message.

Selectable values:

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

Default: *Depends on the value set in the Filter Value parameter.*

NUMBER OF AVERAGES [1203]

Sets the number of readings used by the filter to calculate the average weight value.

Values: *0 to 50*

Default: *Depends on the value set in the Filter Value parameter.*

MONOTONY [1204]

Used to stabilize the displayed weight when there are frequent fluctuations in the last digit.

Typically applied in systems with weight resolution above 10,000 divisions or with low input signal sensitivity.

The value is expressed in milliseconds (ms).

Values: *0 to 999 ms*
Default: *Depends on the value set in the Filter Value parameter.*

OSCILLATION TIME [1205]

Used in combination with the Oscillation Range parameter to dampen slow and repetitive weight variations, typically found in lifting systems.

Enter the oscillation time in milliseconds (ms).

Values: *0 to 999 ms*
Default: *Depends on the value set in the Filter Value parameter.*

OSCILLATION RANGE [1206]

Like the Oscillation Time parameter, this setting is used to dampen oscillations in the weight reading.

Enter the oscillation range expressed in weight divisions.

Values: *0 to 99 divisions*
Default: *Depends on the value set in the Filter Value parameter.*

OPERATING MODE PARAMETERS

STANDBY TIME [1001]

Sets the inactivity period (in seconds) after which the instrument will automatically dim the display brightness.

A value of 0 disables the standby function.

Values: *0 to 999 seconds*

Default: *0*

SETUP PASSWORD [1003]

If configured, a password must be entered to access the instrument's SETUP menu.

Once entered, the password will not be required again until the instrument enters standby or is powered off.

Values: *0000 to 9999*

Default: *0000 (No password)*

SETPOINT PASSWORD [1009]

If configured, a password must be entered to access the Setpoint programming menu.

Once entered, the password will not be requested again until the instrument enters standby or is turned off.

Values: *0000 to 9999*

Default: *0000 (No password)*

ENABLE PEAK [1004]

Allows enabling or disabling the peak function, and defines whether it refers to the net weight or the gross weight.

If the application does not require peak detection, the function can be disabled.

Selectable values:

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

Default: *DISABLED*

LANGUAGE [1008]

Allows selection of the operator interface language.

Selectable values:

- *[0] ITALIAN*
- *[1] ENGLISH*
- *[2] OTHER*

Default: *ITALIAN*

BASE SCREEN [1012]

Selects the display mode for the main screen.

Selectable values:

- *[0] Standard – Displays all quadrants (weight, outputs, tare, total, etc.)*
- *[1] Weight Only – Displays only the weight and output status (with enlarged weight value and bargraph)*

Default: *Standard*

F1 KEY FUNCTION [1013]

Selects the operation assigned to the F1 function key on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Zero (Default)*
- *[2] Tare*
- *[3] Clear Tare*
- *[4] Clear Peak*
- *[5] Totalize*
- *[6] Print*
- *[7] Print and Totalize*
- *[8] Data Log*
- *[9] Print Total and Auto Tare*

Default: *[1] Zero*

F2 KEY FUNCTION [1014]

Selects the operation assigned to the F2 function key on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Zero*
- *[2] Tare (Default)*
- *[3] Clear Tare*
- *[4] Clear Peak*
- *[5] Totalize*
- *[6] Print*
- *[7] Print and Totalize*
- *[8] Data Log*
- *[9] Print Total and Auto Tare*

Default: *[2] Tare*

F3 KEY FUNCTION [1015]

Assigns an operation to the F3 key on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Zero*
- *[2] Tare*
- *[3] Clear Tare (Default)*
- *[4] Clear Peak*
- *[5] Totalize*
- *[6] Print*
- *[7] Print and Totalize*
- *[8] Data Log*
- *[9] Print Total and Auto Tare*

Default: *Clear Tare*

F4 KEY FUNCTION [1016]

Assigns an operation to the F4 key on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Zero*
- *[2] Tare*
- *[3] Clear Tare*
- *[4] Clear Peak*
- *[5] Totalize (Default)*
- *[6] Print*
- *[7] Print and Totalize*
- *[8] Data Log*
- *[9] Print Total and Auto Tare*

Default: *Totalize*

SETPOINTS BUTTON [1017]

Locks or enables access to the Setpoints quadrant.

Selectable values:

- *[0] Locked*
- *[1] Active*

Default: *Active*

WEIGHT BUTTON [1018]

Locks or enables access to the Weight quadrant.

Selectable values:

- *[0] Locked*
- *[1] Active*

Default: *Active*

TARE BUTTON [1019]

Locks or enables access to the Tare quadrant on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Active*

Default: *Active*

TOTAL BUTTON [1020]

Locks or enables access to the Total quadrant on the main screen.

Selectable values:

- *[0] Locked*
- *[1] Active*

Default: *Active*

OPERATOR CODE [1010–1011]

If configured, the operator code will be printed on the ticket.

Selectable values:

0 to 999999

Note: The following parameters are only visible in FREE mode and when an optional memory module is installed.

DATALOGGER [1005]

Enables data logging of weight and I/O status to the optional memory in CSV format.

Logging can be configured for:

a single measurement, or

a continuous series of measurements from the moment logging begins.

Maximum 1000 sequential records per session

The memory can store up to 60,000 records total; older entries are overwritten when the limit is reached.

Selectable values:

- *[0] Off*
- *[1] Single*
- *[2] Continuous*

Default: *[0] Off*

LOG TRIGGER [1006]

When the datalogger is enabled, this parameter selects how data logging is triggered:
Manually via key or digital input
Automatically via a specific digital output activation
To start manual logging, press the LOG key on the main screen.
Press it again to stop logging at any time.

Selectable values:

- *[0] Manual (Default)*
- *[1] Output 1*
- *[2] Output 2*
- *[3] Output 3*
- *[4] Output 4*
- *[5] Output 5*
- *[6] Output 6*

Default: *[0] Manual*

LOG FREQUENCY [1007]

When the datalogger is enabled, this parameter sets the data logging frequency.
The maximum frequency corresponds to the weight acquisition rate, up to a limit of 250 Hz.

Selectable values:

- *[0] 10 Minutes (Default)*
- *[1] 5 Minutes*
- *[2] 1 Minute*
- *[3] 10 Seconds*
- *[4] 5 Seconds*
- *[5] 2 Seconds*
- *[6] 1 Hz*
- *[7] 5 Hz*
- *[8] 10 Hz*
- *[9] Maximum*

Default: *10 Minutes*

DOWNLOAD LOG

Performs the download of the log data, with records transmitted via the instrument's USB port.

At the end of the transmission, the system will prompt whether to delete the log.

Follow the instructions provided in the user manual of the **VTW CONNECT** software utility to complete the procedure.

LOG DELETION

Executes the deletion of all stored log records.

NOTE:

During the log download, records are transmitted in the following format (starting from the oldest record):

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

Where:

- Date: 8 ASCII characters in the format **dd/mm/yyyy**
- Time: 8 ASCII characters in the format **hh:mm:ss**
- Gross / Net / Peak:

8 ASCII characters each
Right-aligned
No leading zeros
May include decimal point and minus sign

Inputs:

- 6 ASCII characters
- "0" (30h) = input OFF
- "1" (31h) = input ON
- Representing input states 1 to 6

Outputs:

- 6 ASCII characters
- "0" (30h) = output OFF
- "1" (31h) = output ON
- Representing output states 1 to 6

METROLOGICAL ACCESSES

This menu is only visible when operating in METRIC mode.

Access 1 to Access 5:

Each entry on the display shows:

- The user code used for access (according to the password table)
- The sequential number of the access
- The date and time of access

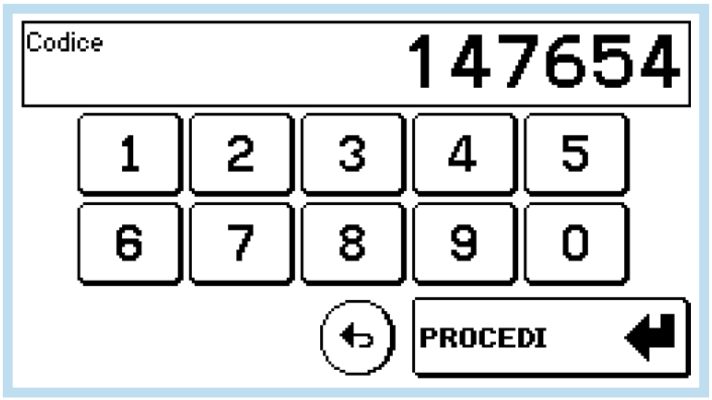
If access was made via the calibration jumper, the displayed user code will be 0000.
Access 1 is the most recent access.

ALIBI MEMORY

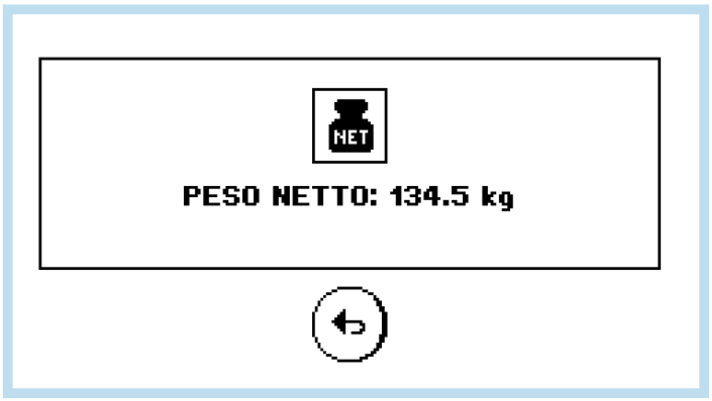
Verification of the weight saved in the Alibi Memory.

Procedure:

- Enter the code corresponding to the weighing transaction you want to check.

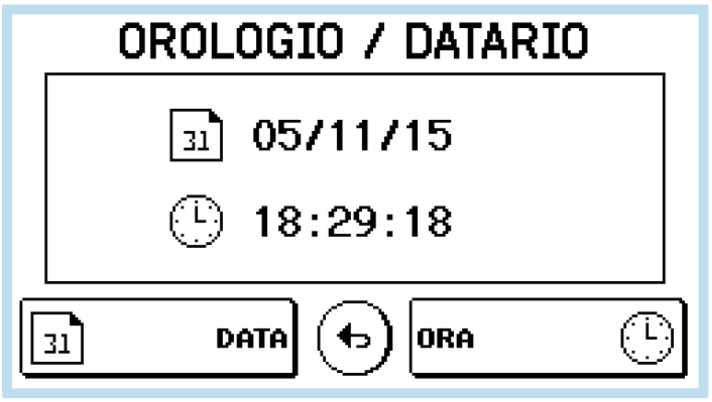


- The system will display the saved weight related to that code.

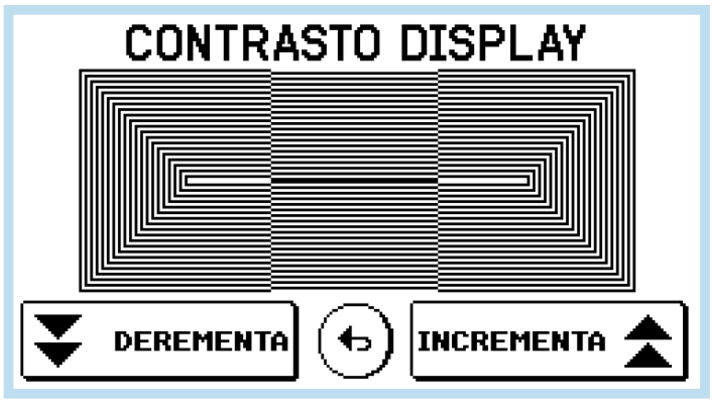


Note: If no value in memory corresponds to the entered code, a message will be displayed instead of the weight value.

MENU – CLOCK / DATE SETTINGS



DISPLAY CONTRAST



UPLOAD/DOWNLOAD

The TESTER 1008 must be connected to the instrument's COM1 (RS-232) serial port.

This function allows you to download or upload the instrument's stored setup and calibration configuration data.

- **Download function:**

The instrument's setup parameters are saved into a file.

- **Upload function:**

The instrument is configured using the setup parameters read from a file.

To perform these operations, you must activate the corresponding procedure ("Receive File" or "Send File") on the TESTER 1008 device.

SERIAL COMMUNICATION PROTOCOLS

ASCII PROTOCOL – CONTINUOUS, AUTOMATIC, AND MANUAL

- Continuous transmission occurs at the weight update frequency, limited by the serial baud rate.
- If communication is over the Ethernet port, the maximum frequency is limited to 12.5 Hz.

In FREE Mode, the transmitted string using Continuous, On Demand, or Automatic protocols is:

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

In METRIC Mode, the transmitted string using the On Demand protocol is:

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

WHERE:

- STX (Start of Text) = 0x02h
- ETX (End of Text) = 0x03h
- EOT (End of Transmission) = 0x04h
- <status> = a character encoded according to a specific bitmask (details follow; each bit = 1 if the condition is TRUE)
- <weight> = current weight value
- <Weighing ID> = ID associated with the weighing operation (in METRIC mode)
- <checksum> = error-checking character

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	1	1	Tare Applied	Zero Band Active	Stable Weight	Center of Zero

WEIGHT AND CHECKSUM FIELD DESCRIPTIONS

<weight> (weight field):

- Composed of **8** ASCII characters.
- Right-justified without leading zeros.
- May include a decimal point and a negative sign if applicable.
- The transmitted weight can be net weight, gross weight, or peak value, depending on the **MODE** parameter set in the serial communication port configuration menu.

SPECIAL CASES FOR <WEIGHT> FIELD

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

<weighing identification> (weighing identification field):

- Composed of 7 ASCII characters.
- Right-justified without leading zeros.

<chksum> (checksum field):

- Calculated as the exclusive OR (XOR) of all characters from STX (or <Addr>) to ETX, excluding STX and ETX.
- The XOR result is split into two characters, separating the upper 4 bits (first character) and the lower 4 bits (second character).
- The two obtained characters are then encoded in ASCII.
- ***Example:*** If XOR = 5Dh, the checksum = "5Dh" (which corresponds to 35h and 44h in ASCII).

For automatic and manual communication protocols:

The weight must change by at least 20 divisions between two consecutive transmissions.

LAVE PROTOCOL

LIST OF AVAILABLE COMMANDS:

1. Request net weight, gross weight, and peak value.
2. Execute weighing command.
3. Auto-tare command.
4. Semi-automatic zeroing command.
5. Reset peak value command.
6. Program two weight thresholds.
7. Request programmed thresholds.
8. Activate logical outputs.
9. Request logical input status.
10. Store thresholds in permanent memory.
11. Switch display from gross weight to net weight.
12. Switch display from net weight to gross weight.
13. Cancel tare command.
14. Request net weight.
15. Request gross weight.

The unit connected to the instrument (typically a personal computer) acts as the **MASTER** and is the only unit that can initiate a communication procedure.

The communication procedure must always consist of the transmission of a string by the **MASTER**, followed by a response from the addressed **SLAVE**.

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

COMMAND LIST & FORMATS

1	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Request Net, Gross, or Peak Weight	<Addr> "N" EOT	<Addr> "N" <status> <weight> ETX <chksum> EOT or <Addr> NAK EOT

2	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	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.

3	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Auto-Tare Command	<Addr> "A" EOT	<Addr> "A" ACK EOT or <Addr> NAK EOT

4	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Semi-Automatic Zero Command	<Addr> "Z" EOT	<Addr> "Z" ACK EOT or <Addr> NAK EOT

5	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Reset Peak Value Command	<Addr> "X" EOT	<Addr> "X" ACK EOT or <Addr> NAK EOT

6	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	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 15
	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 15
	Activate Logic Outputs	<Addr> "U" <outputs> EOT	<Addr> "U" ACK EOT or <Addr> NAK EOT

9	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	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 15
	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 15, it will respond with the following string:

WT 15: <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 15
	Display Gross to Net Weight	<Addr> "CN" EOT	<Addr> "C" ACK EOT or <Addr> NAK EOT

12	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Display Net to Gross Weight	<Addr> "CL" EOT	<Addr> "C" ACK EOT or <Addr> NAK EOT

13	COMMAND NAME	MASTER COMMAND	SLAVE RESPONSE WT 15
	Delete Tare Command	<Addr> "DT" EOT	<Addr> "D" ACK EOT or <Addr> NAK EOT

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

DATA FRAME DETAILS (ADDITIONAL ELEMENTS)

- **<index>:**

A single ASCII character representing the threshold number, ranging from '**1**' to '**6**'.

- **<threshold>:**

Formatted the same way as a <weight> field (typically right-justified ASCII string).

- **<outputs> and <inputs>:**

These are **2 ASCII** characters, each representing 8 bits of I/O state.

Each bit = 1 if the corresponding input or output is active.

1st Character

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

2nd Character

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

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 Type 0 = Net 1 = Gross	Zero Band Active	Stable Weight	Center of Zero

MODBUS RTU PROTOCOL

The addresses listed in the tables follow the standard addressing specified in the Modicom PI-MBUS-300 reference guide. Below is an excerpt that helps the user communicate with the device:

"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:

- The coil known as '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 **007E** (hex), which corresponds to **126** (decimal).
- Holding register **40001** is addressed as register **0000** in the data address field of the message.
- The function code field already specifies a 'holding register' operation, so the '**4XXXX**' reference is implicit."

IMPORTANT NOTES

- To confirm the insertion of a new value into the instrument's EEPROM, you must execute the MAKE–BACKUP function.

If this is not done, powering off the **WT 15** will revert the value to its previous state.

- Unless stated otherwise, numeric values (such as addresses, codes, and data) are expressed in decimal format.
- The MODBUS RTU protocol is available only on COM2 RS-485.

COMMUNICATION ERROR HANDLING

Communication strings are verified using CRC (Cyclic Redundancy Check).

If a communication error occurs, the slave does not respond with any string.

The master device must implement a timeout for receiving a response.

If no response is received within the expected time frame, the master should assume a communication error has occurred.

HANDLING ERRORS IN RECEIVED DATA

If a string is received correctly but cannot be executed, the slave responds with an EXCEPTION RESPONSE, as shown in the table below:

CODE	DESCRIPTION
1	ILLEGAL FUNCTION – The requested function is not valid or not supported
2	ILLEGAL DATA ADDRESS – The specified data address is not available
3	ILLEGAL DATA VALUE – The received data contains an invalid value

SUPPORTED FUNCTIONS:

FUNCTION	DESCRIPTION
01	READ COIL STATUS – Read the status of logical outputs.
02	READ INPUT STATUS – Read the status of logical inputs.
03	READ HOLDING REGISTERS – Read programmable registers.
04	READ INPUT REGISTERS – Read "read-only" registers.
05	FORCE SINGLE COIL – Write the status of a single output.
06	PRESET SINGLE REGISTER – Write to a programmable register.
15	FORCE MULTIPLE COILS – Write multiple outputs.
16	PRESET MULTIPLE REGISTERS – Write multiple registers.
Funct + 80h	EXCEPTION RESPONSE

LIST OF HOLDING REGISTERS – MODBUS PROTOCOL

The parameters of the device that can be read or programmed through the available communication interfaces, depending on the hardware configuration, are listed in the following table.

- **R-type registers** are readable.
- **W-type registers** are writable.

For Modbus TCP protocol, the device address ("Unit Identifier" field) must always be set to FFh.

If a fieldbus other than Modbus is used:

- The input area will contain only **R** or **R/W** registers.
- The output area will contain only **W** or **R/W** registers.

All registers have a **16-bit** size.

Address	Holding Register	R/W	Notes
0001	Status Register	R	See corresponding status table
0002	Gross Weight (MSW)	R	Integer value – Most Significant Word
0003	Gross Weight (LSW)	R	Integer value – Least Significant Word
0004	Net Weight (MSW)	R	Integer value – Most Significant Word
0005	Net Weight (LSW)	R	Integer value – Least Significant Word
0006	Peak Weight (MSW)	R	Integer value – Most Significant Word
0007	Peak Weight (LSW)	R	Integer value – Least Significant Word
0008	Digital Inputs	R	See corresponding inputs table
0009	Digital Outputs	R	See corresponding outputs table
0010	Load Cell Signal	R	Integer value
0011	Tare (MSW)	R/W	Integer value – Most Significant Word
0012	Tare (LSW)	R/W	Integer value – Least Significant Word
0101	Weighing Net Weight (MSW)	R/W	Integer value – Most Significant Word
0102	Weighing Net Weight (LSW)	R/W	Integer value – Least Significant Word
0103	Weighing Code (MSW)	R	Integer value – Most Significant Word
0104	Weighing Code (LSW)	R	Integer value – Least Significant Word
0105	Net Weight Total (MSW)	R/W	Integer value – Most Significant Word
0106	Net Weight Total (LSW)	R/W	Integer value – Least Significant Word
0201	Set-Point 1 (MSW)	R/W	Integer value – Most Significant Word
0202	Set-Point 1 (LSW)	R/W	Integer value – Least Significant Word
0203	Set-Point 2 (MSW)	R/W	Integer value – Most Significant Word
0204	Set-Point 2 (LSW)	R/W	Integer value – Least Significant Word
0205	Set-Point 3 (MSW)	R/W	Integer value – Most Significant Word
0206	Set-Point 3 (LSW)	R/W	Integer value – Least Significant Word
0207	Set-Point 4 (MSW)	R/W	Integer value – Most Significant Word
0208	Set-Point 4 (LSW)	R/W	Integer value – Least Significant Word
0209	Set-Point 5 (MSW)	R/W	Integer value – Most Significant Word
0210	Set-Point 5 (LSW)	R/W	Integer value – Least Significant Word
0211	Set-Point 6 (MSW)	R/W	Integer value – Most Significant Word
0212	Set-Point 6 (LSW)	R/W	Integer value – Least Significant Word
0501	Data Register (MSW)	W	Integer value – Most Significant Word (See related table)
0502	Data Register (LSW)	W	Integer value – Least Significant Word (See related table)
503	Command Register	W	See related table

1001	Stand-By Function	R/W	Integer value
1002	Reserved	R	
1003	Password Function	R/W	Integer value
1004	Peak Function	R/W	See page 50
1005	Data Logger Function	R	See page 53
1006	Data Logger Trigger	R	See page 53
1007	Data Logger Frequency	R	See page 53
1008	Language	R/W	See page 50
1009	Setpoint Password Function	R/W	Integer value
1010	Operator Code for Print (MSW)	R/W	INT – Most Significant Word
1011	Operator Code for Print (LSW)	R/W	INT – Least Significant Word
1012	Base Screen Selection	R/W	Integer value
1013	Function Key F1	R/W	Integer value
1014	Function Key F2	R/W	Integer value
1015	Function Key F3	R/W	Integer value
1016	Function Key F4	R/W	Integer value
1017	Setpoint Key Lock	R/W	Integer value
1018	Weight Key Lock	R/W	Integer value
1019	Tare Key Lock	R/W	Integer value
1020	Total Key Lock	R/W	Integer value
1101	Weight Division Value (*)	R/W	See related table
1102	Decimals (*)	R/W	
1103	Load Cell Capacity (MSW) (*)	R/W	INT – Most Significant Word
1104	Load Cell Capacity (LSW) (*)	R/W	INT – Least Significant Word
1105	Load Cell Sensitivity (*)	R/W	Integer value
1106	Fixed Tare (MSW) (*)	R/W	INT – Most Significant Word
1107	Fixed Tare (LSW) (*)	R/W	INT – Least Significant Word
1108	Calibration Gravity (MSW) (*)	R/W	INT – Most Significant Word
1109	Calibration Gravity (LSW) (*)	R/W	INT – Least Significant Word
1110	Operating Gravity (MSW) (*)	R/W	INT – Most Significant Word
1111	Operating Gravity (LSW) (*)	R/W	INT – Least Significant Word
1112	Multirange 1 (MSW) (*)	R/W	INT – Most Significant Word
1113	Multirange 1 (LSW) (*)	R/W	INT – Least Significant Word
1114	Multirange 2 (MSW) (*)	R/W	INT – Most Significant Word
1115	Multirange 2 (LSW) (*)	R/W	INT – Least Significant Word
1151	Table Cal. Zero Signal (MSW) (*)	R/W	INT – Most Significant Word
1152	Table Cal. Zero Signal (LSW) (*)	R/W	INT – Least Significant Word
1153	Table Cal. Signal P1 (MSW) (*)	R/W	INT – Most Significant Word
1154	Table Cal. Signal P1 (LSW) (*)	R/W	INT – Least Significant Word
1155	Table Cal. Signal P2 (MSW) (*)	R/W	INT – Most Significant Word
1156	Table Cal. Signal P2 (LSW) (*)	R/W	INT – Least Significant Word
1157	Table Cal. Signal P3 (MSW) (*)	R/W	INT – Most Significant Word
1158	Table Cal. Signal P3 (LSW) (*)	R/W	INT – Least Significant Word
1159	Table Cal. Signal P4 (MSW) (*)	R/W	INT – Most Significant Word
1160	Table Cal. Signal P4 (LSW) (*)	R/W	INT – Least Significant Word
1161	Table Cal. Signal P5 (MSW) (*)	R/W	INT – Most Significant Word

1162	Table Cal. Signal P5 (LSW) (*)	R/W	INT – Least Significant Word
1163	Table Cal. Value P1 (MSW) (*)	R/W	INT – Most Significant Word
1164	Table Cal. Value P1 (LSW) (*)	R/W	INT – Least Significant Word
1165	Table Cal. Value P2 (MSW) (*)	R/W	INT – Most Significant Word
1166	Table Cal. Value P2 (LSW) (*)	R/W	INT – Least Significant Word
1167	Table Cal. Value P3 (MSW) (*)	R/W	INT – Most Significant Word
1168	Table Cal. Value P3 (LSW) (*)	R/W	INT – Least Significant Word
1169	Table Cal. Value P4 (MSW) (*)	R/W	INT – Most Significant Word
1170	Table Cal. Value P4 (LSW) (*)	R/W	INT – Least Significant Word
1171	Table Cal. Value P5 (MSW) (*)	R/W	INT – Most Significant Word
1172	Table Cal. Value P5 (LSW) (*)	R/W	INT – Least Significant Word
1201	Filter Factor	R/W	See page 48
1202	ADC Output Rate	R/W	See page 48
1203	Number of Readings for Average	R/W	Integer value
1204	Monotony Time	R/W	Integer value
1205	Oscillation Time	R/W	Integer value
1206	Oscillation Range	R/W	Integer value
1301	Full Scale (MSW) (*)	R/W	INT – Most Significant Word
1302	Full Scale (LSW) (*)	R/W	INT – Least Significant Word
1303	Weight Stability (*)	R/W	See page 46
1304	Autozero on Startup (MSW) (*)	R/W	INT – Most Significant Word
1305	Autozero on Startup (LSW) (*)	R/W	INT – Least Significant Word
1306	Zero Tracking (*)	R/W	See page 46
1307	Zero Band (MSW) (*)	R/W	INT – Most Significant Word
1308	Zero Band (LSW) (*)	R/W	INT – Least Significant Word
1401	Input 1 Function	R/W	See Input/Output menu
1402	Input 2 Function	R/W	See Input/Output menu
1403	Input 3 Function	R/W	See Input/Output menu
1404	Input 4 Function	R/W	See Input/Output menu
1405	Input 5 Function	R/W	See Input/Output menu
1406	Input 6 Function	R/W	See Input/Output menu
1411	Output 1 Mode — Function	R/W	See Input/Output menu
1412	Output 1 Mode — Logic	R/W	See Input/Output menu
1413	Output 1 Mode — Polarity	R/W	See Input/Output menu
1414	Output 1 Mode — Stability	R/W	See Input/Output menu
1415	Output 1 Hysteresis	R/W	Integer value
1421	Output 2 Mode — Function	R/W	See Input/Output menu
1422	Output 2 Mode — Logic	R/W	See Input/Output menu
1423	Output 2 Mode — Polarity	R/W	See Input/Output menu
1424	Output 2 Mode — Stability	R/W	See Input/Output menu
1425	Output 2 Hysteresis	R/W	Integer value
1431	Output 3 Mode — Function	R/W	See Input/Output menu
1432	Output 3 Mode — Logic	R/W	See Input/Output menu
1433	Output 3 Mode — Polarity	R/W	See Input/Output menu
1434	Output 3 Mode — Stability	R/W	See Input/Output menu
1435	Output 3 Hysteresis	R/W	Integer value

1441	Output 4 Mode — Function	R/W	See Input/Output menu
1442	Output 4 Mode — Logic	R/W	See Input/Output menu
1443	Output 4 Mode — Polarity	R/W	See Input/Output menu
1444	Output 4 Mode — Stability	R/W	See Input/Output menu
1445	Output 4 Hysteresis	R/W	Integer value
1451	Output 5 Mode — Function	R/W	See Input/Output menu
1452	Output 5 Mode — Logic	R/W	See Input/Output menu
1453	Output 5 Mode — Polarity	R/W	See Input/Output menu
1454	Output 5 Mode — Stability	R/W	See Input/Output menu
1455	Output 5 Hysteresis	R/W	Integer value
1461	Output 6 Mode — Function	R/W	See Input/Output menu
1462	Output 6 Mode — Logic	R/W	See Input/Output menu
1463	Output 6 Mode — Polarity	R/W	See Input/Output menu
1464	Output 6 Mode — Stability	R/W	See Input/Output menu
1465	Output 6 Hysteresis	R/W	Integer value
1501	Analog Zero Offset (MSW)	R/W	INT – Most Significant Word
1502	Analog Zero Offset (LSW)	R/W	INT – Least Significant Word
1503	Analog Full Scale (MSW)	R/W	INT – Most Significant Word
1504	Analog Full Scale (LSW)	R/W	INT – Least Significant Word
1505	Analog Output Mode	R/W	See details on page 38
1506	Analog Output Range	R/W	See details on page 38
1507	Analog Zero Adjustment	R/W	INT – Zero point setting. Must send "save to memory" command to apply.
1508	Analog Full Scale Adjustment	R/W	INT – FS point setting. Must send "save to memory" command to apply.
2000	Monitor Register (write)	W	Value is automatically copied to register 2100
2100	Monitor Register (read)	R	

*(*) These registers can only be modified when operating in **FREE** mode or in **METRIC** mode with the calibration jumper enabled.*

TABLE A – STATUS REGISTER CODING

BIT	15	14	13	12	11	10	9	8
Description	Setup (***)	Weight delta detected	Multirange status: 00 = Disabled 01 = Range 1 10 = Range 2 11 = Range 3		Peak value displayed	Displayed weight: 0 = Net 1 = Gross	Backup operation active	0

BIT	7	6	5	4	3	2	1	0
Description	Not calibrated	Weight error detected	Overload condition	Underload condition	Tare active	Within zero band	Stable weight	Center of zero

TABLE B – DIGITAL INPUT / OUTPUT CODING

BIT	15÷6	5	4	3	2	1	0
Description	Reserved	In 6 - Out 6 Active	In 5 - Out 5 Active	In 4 - Out 4 Active	In 3 - Out 3 Active	In 2 - Out 2 Active	In 1 - Out 1 Active

***Note:** Bits from 15 to 6 are not handled and are always set to 0.*

TABLE C – DIVISION VALUE AND DECIMAL PLACES ENCODING

ADDRESS	DESCRIPTION	ACCEPTED VALUES
1101	Division Value	1 - 2 - 5 - 10 - 20 - 50
1102	Number of Decimals	0 - 1 - 2 - 3 - 4

TABLE D – COMMAND REGISTER / DATA REGISTER ENCODING

REGISTER VALUE	COMMAND REGISTER FUNCTION	DATA REGISTER FUNCTION
0x0001	Semi-automatic zeroing	
0x0002	Auto-tare	
0x0003	Reset peak	
0x0004	Zero calibration (**)	
0x0005	Full-scale calibration (**)	Sample weight value in MSW and LSW
0x0006	Analog output test	Value between 0 and 100 in steps of 10 (in LSW)
0x0007	Save data to permanent memory	
0x000A	Execute weighing	
0x000B	Switch from gross to net weight	
0x000C	Switch from net to gross weight	
0x000D	Acquire zero signal (for table calibration)	
0x000E	Cancel tare	
0x000F	Print command	
0x7FFF	Enable Output Data Area (*)	

(*) The parameters managed in the Fieldbus Output Data Area are not modified until this command is sent.

When the instrument is powered on, the Output Data Area is completely reset.

The Fieldbus master must first read the values from the Input Data Area and copy them into the corresponding Output registers, then send the Enable Output command (0x7FFF) to the Command Register.

Otherwise, all parameters managed in the Output Data Area will be reset at power-on.

(**) Function available only when the instrument is in "FREE" mode, or in "METRIC" mode with calibration jumper enabled.

*(***) The instrument is in configuration mode (this flag is TRUE when accessing the instrument's SETUP menu or when connected to the "**VTW Connect**" PC 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).

INSTRUMENT RESPONSE TIMES

The response time of the instrument varies depending on the programmed parameters and the type of request. The following table outlines the response times:

Measurement update frequency	12,5 Hz	50 Hz	100 Hz	250 Hz	1000 Hz
Analog output update frequency	12,5 Hz	50 Hz	100 Hz	250 Hz	1000 Hz
Fieldbus memory area update and reading frequency	125 Hz	125 Hz	125 Hz	125 Hz	125 Hz
Logic output update frequency	12,5 Hz	50 Hz	100 Hz	250 Hz	1000 Hz
Weight and status acquisition cycle from Modbus RTU (*)	$fmax = \frac{1}{\left(\left(\frac{(nchar + 8) * 10}{baud}\right) + 0,004\right)}$				
Weight and status acquisition cycle from ASCII protocol (*)	$fmax = \frac{1}{\left(\left(\frac{(nchar + 8) * 10}{baud}\right) + 0,004\right)}$				

Weight and Status Acquisition Cycles

- Weight and status acquisition cycle via Modbus RTU (*)
- Weight and status acquisition cycle via ASCII protocol (*)

(*) nchar = sum of the characters in the master's request string (Query) and the **WT 15** response string (Response).

Example:

Requesting status, net weight, and gross weight (**5 register**s) with a baud rate of **115.2 kbit/sec**:

$$1/\left(\frac{(8+15+8)\times 10}{115200} + 0.004\right) = 171 \text{ Hz}$$

EXCEPTIONS:

E2PROM Backup Command –> Max response time = 350 ms

Writing the following registers –> Max response time = 550 ms

- Load Cell Capacity
- Load Cell Sensitivity
- Weighing Net Weight
- System Tare
- Filter.

VTW CONNECT - THE USE OF SERIAL APPLICATIONS VIA THE USB PORT

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

- the complete configuration of all setup parameters;
- the testing of different hardware sections;
- the consultation of the instrument documentation;
- the firmware update of the instrument;
- the time-based recording of weight values acquired from the instrument through the Data-logger function;
- the saving and loading of the instrument configuration parameters to/from a file.

FIELDBUS PROTOCOL

The input area registers (**16-bit**) are updated at **125 Hz** (80 Hz for PROFIBUS) and are common across all fieldbus types (PROFIBUS, PROFINET, ETHERCAT, ETHERNET/IP).

The input area size must match between the master and the instrument.

Byte Range	Register Address	INPUT AREA REGISTER	Notes
1–2	0	Status Register	See related status table
3–4	1	Gross Weight (MSW)	INT Value - Most Significant Word
5–6	2	Gross Weight (LSW)	INT Value - Least Significant Word
7–8	3	Net Weight (MSW)	INT Value - Most Significant Word
9–10	4	Net Weight (LSW)	INT Value - Least Significant Word
11–12	5	Peak (MSW)	INT Value - Most Significant Word
13–14	6	Peak (LSW)	INT Value - Least Significant Word
15–16	7	Digital Inputs	See corresponding table
17–18	8	Digital Outputs	
19–20	9	Load Cell Signal	INT Value
21–22	10	Tare (MSW)	INT Value - Most Significant Word
23–24	11	Tare (LSW)	INT Value - Least Significant Word
25–26	12	Monitor Register	Value corresponds to the same register in the Output Area
27–28	13	Weighing Net Weight (MSW)	INT Value - Most Significant Word
29–30	14	Weighing Net Weight (LSW)	INT Value - Least Significant Word
31–32	15	Weighing Code (MSW)	INT Value - Most Significant Word
33–34	16	Weighing Code (LSW)	INT Value - Least Significant Word
35–36	17	Net Weight Total (MSW)	INT Value - Most Significant Word
37–38	18	Net Weight Total (LSW)	INT Value - Least Significant Word
39–40	19	Set-Point 1 (MSW)	INT Value - Most Significant Word
41–42	20	Set-Point 1 (LSW)	INT Value - Least Significant Word
43–44	21	Set-Point 2 (MSW)	INT Value - Most Significant Word
45–46	22	Set-Point 2 (LSW)	INT Value - Least Significant Word
47–48	23	Set-Point 3 (MSW)	INT Value - Most Significant Word
49–50	24	Set-Point 3 (LSW)	INT Value - Least Significant Word
51–52	25	Set-Point 4 (MSW)	INT Value - Most Significant Word
53–54	26	Set-Point 4 (LSW)	INT Value - Least Significant Word
55–56	27	Set-Point 5 (MSW)	INT Value - Most Significant Word
57–58	28	Set-Point 5 (LSW)	INT Value - Least Significant Word
59–60	29	Set-Point 6 (MSW)	INT Value - Most Significant Word
61–62	30	Set-Point 6 (LSW)	INT Value - Least Significant Word
63–64	31	Analog Tare (MSW)	INT Value - Most Significant Word
65–66	32	Analog Tare (LSW)	INT Value - Least Significant Word
67–68	33	Analog Full Scale (MSW)	INT Value - Most Significant Word
69–70	34	Analog Full Scale (LSW)	INT Value - Least Significant Word
71–72	35	Analog Output Mode	See corresponding setup menu: Analog Output
73–74	36	Analog Output Range	See corresponding MENU SETUP: Analog Output

READING EXAMPLE

To read the gross weight from the **WT 15**, you need to read the address range from 3 to 6 in the Input Area.

To read the net weight, you need to read bytes from 7 to 10 in the Input Area.

If the instrument displays a gross weight value of 12351, the corresponding bytes will be:

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

OUTPUT DATA AREA

The following table lists the registers of the output data area (written by the master and acquired by the instrument), common to all major fieldbus protocols: PROFINET, ETHERCAT, ETHERNET/IP.

Each register is 16 bits in size. The registers written by the master in the output area are read by the instrument at a maximum frequency of 125 Hz (80 Hz in the case of PROFIBUS).

The size of the Output Data Area configured in the fieldbus master must match the size configured in the instrument.

Byte	Register Address	OUTPUT AREA REGISTER	Notes
1-2	0	Command Register	See related table.
3-4	1	Data Register (MSW)	INT value – Most Significant Word (See table)
5-6	2	Data Register (LSW)	INT value – Least Significant Word (See table)
7-8	3	Monitor Register	Value matches the corresponding register in the input area.
9-10	4	Tare (MSW)	INT value – Most Significant Word
11-12	5	Tare (LSW)	INT value – Least Significant Word
13-14	6	Weighing Net Weight (MSW)	INT value – Most Significant Word
15-16	7	Weighing Net Weight (LSW)	INT value – Least Significant Word
17-18	8	Total Net Weight (MSW)	INT value – Most Significant Word
19-20	9	Total Net Weight (LSW)	INT value – Least Significant Word
21-22	10	Set-Point 1 (MSW)	INT value – Most Significant Word
23-24	11	Set-Point 1 (LSW)	INT value – Least Significant Word
25-26	12	Set-Point 2 (MSW)	INT value – Most Significant Word
27-28	13	Set-Point 2 (LSW)	INT value – Least Significant Word
29-30	14	Set-Point 3 (MSW)	INT value – Most Significant Word
31-32	15	Set-Point 3 (LSW)	INT value – Least Significant Word
33-34	16	Set-Point 4 (MSW)	INT value – Most Significant Word
35-36	17	Set-Point 4 (LSW)	INT value – Least Significant Word
37-38	18	Set-Point 5 (MSW)	INT value – Most Significant Word
39-40	19	Set-Point 5 (LSW)	INT value – Least Significant Word
41-42	20	Set-Point 6 (MSW)	INT value – Most Significant Word
43-44	21	Set-Point 6 (LSW)	INT value – Least Significant Word
45-46	22	Analog Tare (MSW)	INT value – Most Significant Word
47-48	23	Analog Tare (LSW)	INT value – Least Significant Word
49-50	24	Analog Full Scale (MSW)	INT value – Most Significant Word
51-52	25	Analog Full Scale (LSW)	INT value – Least Significant Word
53-54	26	Analog Output Mode	See corresponding MENU SETUP: ANALOG OUTPUT
55-56	27	Analog Output Range	See corresponding MENU SETUP: ANALOG OUTPUT

EXAMPLES OF WRITING PARAMETERS

To write the setup parameters, follow the example below:

In bytes 1-2 (Command Register), write the HEX value 3FFF to unlock the internal write area of the **WT 15**.

Example:

You want to change the values of Set-Point 1 and Set-Point 2 to:

Set-Point 1	Byte 21	Byte 22
Hex	00	78

Set-Point 2	Byte 23	Byte 24
Hex	26	0C

After setting the values, save the data by writing HEX 0007 to bytes 1-2 (Command Register).

Note: The instrument does not accept writing a value if it is identical to the current value already stored.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The display shows the message O-L	The measured weight is not detectable because the load cell is missing or incorrectly connected.	Check the load cell connections.
The display shows a high dash on the upper display	The measured weight exceeds the five available digits or the capacity of the load cells.	
The display shows a low dash on the lower display	The measured weight is negative beyond -9999.	
The number of decimals is incorrect	The correct division value was not selected.	Select the correct division value in the main menu.
Serial communication is not working correctly	Installation was not performed correctly. The selected serial interface mode is incorrect.	Check connections as described in the installation manual. Select the appropriate settings.
The semi-automatic zerofunction does not work	The gross weight exceeds the auto-zero threshold. The weight is not stable.	Recalibrate the scale. Wait for weight stabilization or adjust the weight filter parameter.
The semi-automatic tarefunction does not work	The gross weight is negative or exceeds the maximum capacity. The weight is not stable.	Check the gross weight. Wait for weight stabilization or adjust the weight filter parameter.

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E546509

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E546509-20250306

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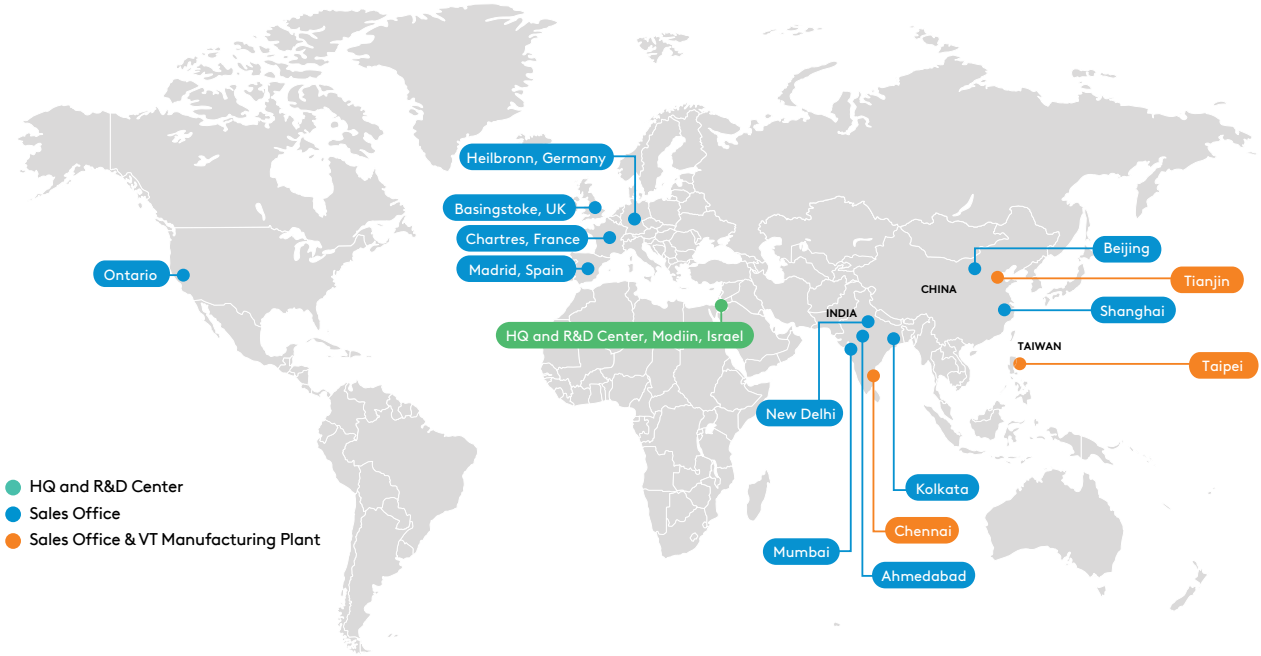




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