# ISOMAG

## The friendly magmeter

# OPERATING AND
# MAINTENANCE MANUAL

**MV255**

CE

**ISOIL**
**INDUSTRIA**

Release number: MAN_MV255_IT_EN_IS_R16_1.06.XXXX

The characters of file name in bold type indicate the software version which the manual refers to; it is visualized at the instrument start up, or by specific function on DIAGNOSTIC menu.

**INDEX:**

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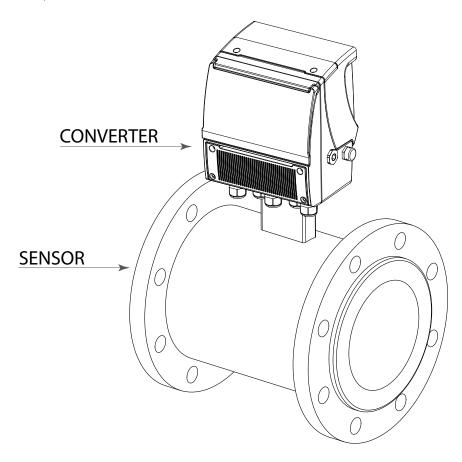The manufacturer guarantees only English text available on our web site www.isoil.com

# INTRODUCTION

❑ These operating instructions and description of device functions are provided as part of the scope of supply.

❑ They could be modified without prior notice. The improper use, possible tampering of the instrument or parts of it and substitutions of any components not original, renders the warranty automatically void.

❑ The flow meter realizes a measure with liquids of conductivity greater than 5μS/cm in closed conduits, and is composed of a converter (described in this manual) and a sensor (refer to the specific manual).

❑ The converter could be coupled directly on the sensor (compact version) or coupled to the sensor by cable supplied with it (remote version).

CONVERTER →

SENSOR →



# SAFETY INFORMATION

Any use other than described in this manual affects the protection provided by the manufacturer and compromises the safety of people and the entire measuring system and is, therefore, not permitted. The manufacturer is not liable for damaged caused by improper or non-designated use.

❑ Transport the measuring device to the measuring point in the original packaging. Do not remove covers or caps until immediately before installation. In case of cartons packaging it is possible to place one above the other but no more than three cartons. In case of wooden packaging do not place one above the other.

❑ Disposal of this product or parts of it must be carried out according to the local public or private waste collection service regulations.

❑ The converter must only be installed, connected and maintained by qualified and authorized specialists (e.g. electrical technicians) in full compliance with the instructions in this Operating Instruction, the applicable norms, legal regulations and certificates (depending on the application).

❑ The specialists must have read and understood these Operating Instructions and must follow the instructions it contains. The Operating Instructions provide detailed information about the converter. If you are unclear on anything in these Operating Instructions, you must call the ISOIL service department.

- ❑ The converter should only be installed after have verified technical data provided in these operating instructions and on the data plate.

- ❑ Specialists must take care during installation and use personal protective equipment as provided by any related security plan or risk assessment.

- ❑ Never mount or wire the converter while it is connected to the power supply and avoid any liquid contact with the

- ❑  The converter housing integrity

- ❑ The suitable tightness of the sealing elements

- ❑ The front panel integrity (display and keyboard)

- ❑ The mechanical fixing of the converter to the pipe or wall standinstrument's internal components. To connect remove the terminals from the terminal block.

- ❑ Before connecting the power supply check the functionality of the safety equipment.

- ❑ Repairs may only be performed if a genuine spare parts kit is available and this repair work is expressly permitted.

- ❑ For the cleaning of the device use only a damp cloth, and for the maintenance/repairs contact the service center (for details see the last page).

- ❑

- ❑ Before starting up the equipment please verify the following:

- ❑ Power supply voltage must correspond to that specified on the data plate

- ❑ Electric connections must be completed as described

- ❑ Ground (earth) connections must be completed as specified

- ❑ The power supply cables integrity, wiring and other connected electrical parts

- ❑ Verify periodically (every 3-4 months):

## SAFETY CONVENTION

**DANGER ELETTRIC SHOCK**    **WARNING**    **PRECAUTIONS**    **ATTENTION**

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# FIRST POWER-UP OF THE INSTRUMENT FOLLOWING COMMISSIONING

Follow the procedure below:

❑ Connect the USB port of the instrument to a PC or other equivalent device capable of delivering at least 500 mA from the USB interface;

❑ Make sure that both status LEDs on the instrument are flashing;

❑ Use the MCP interface to send a hardware reset command; and

❑ Wait for operation to resume and for all current operations on the modem to complete

❑ Send the "ATSIC" command and verify that the instrument has restarted correctly

**Follow this procedure also whenever battery power is completely disconnected.**

# SWITCHING OFF THE INSTRUMENT

Follow the procedure below:
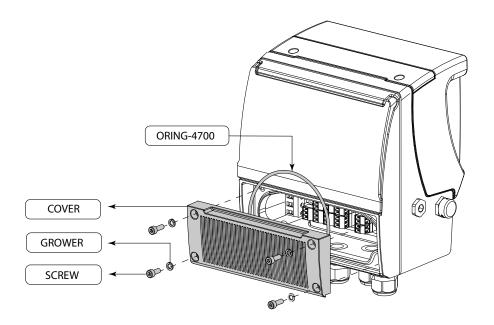
❑ Connect a PC or other equivalent device to the USB port and start the MCP interface.

❑ Disconnect any external power supply.

❑ Send the command "SSTBY" and wait for all the current operations on the modem to complete (it may take up to 2 minutes). A message appears on the MCP interface display indicating that the USB cable can be disconnected. If the cable is not disconnected, the instrument will NOT enter standby mode and both status LEDs will then remain lighted. If there are modem operations in progress, the status LED of the communication CPU will be flashing and will turn steady red only when all operations are completed.

❑ Once the USB cable is disconnected, make sure BOTH LEDs turn off and remain off.

❑ Disconnect the batteries from the device

## CONDITIONS DELIVERY OF THE CONVERTER

**WARNING!** The converter is supplied with the batteries disconnected so it is necessary to remove the terminal block cover, as shown below, and connect them according to the indications given in the section "power supply converter" pag. 20
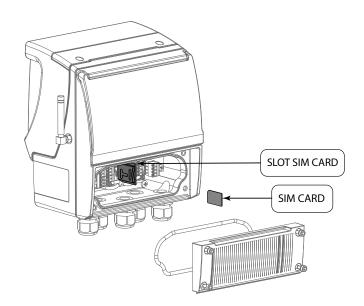


Programming is allowed in two ways:

❑ Connecting a power bank ≥0.5 Ah to the USB jack. (Programming from converter keyboard)

❑ Connecting a computer to the USB socket using the MCP program see section "Access via mcp interface (virtual display)" pag. 45.

## SIM-CARD INSTALLATION

**WARNING!** The SIM-CARD must be inserted in the device with the instrument not powered. For the position of the SIM-CARD slot see section "Internal layout" pag. 19.

# TECHNICAL CHARACTERISTICS

## Electrical Characteristic

Converter classification: class I,

IP67 (where: 6 = totally protected against dust, 7 = Protected against the effects of temporary immersion)

IP68 (where: 6 = totally protected against dust, 8 = continuous immersion 1.5 m; 1 h)

for aluminum and PA6 housing, installation category (overvoltage) II, rated pollution degree 2.

| Power supply version | Power supply voltage | Power supply frequency | Min Power | Max Power |
|---|---|---|---|---|
| HV | 100-240V~ | 45-66HZ | 1.5 W (Sensor only) | 4w (all loads) |
| LLV | 12-48V ⎓ | // | | |
| Lithium Battery Primary | 7,2 V | // | 40 mW | 200 mW |
| Alkaline Battery 6 Size D x 15v | 9V | // | 40 mW | 200 mW |

- ❑ Voltage variations must not exceed ±10% of the nominal one.

- ❑ Digital and analogue inputs and outputs are isolated up to 500V.

- ❑ The output 4-20mA (optional) is electrically connected to the ON/OFF outputs and the output power supply(24V ⎓ ).

- ❑ Version LV/LLV : inrush current < 20A

- ❑ Version HV : inrush current< 25A

**NOTE:** The system, if powered with HV / LLV voltage, requires the use of a rechargeable lithium battery and cannot function if it is disconnected from the system. This condition also applies if the system is connected with a USB socket.

## Environmental Use Conditions

| ALLUMINUM | | | NYLON PA6 | | |
|---|---|---|---|---|---|
| TEMPERATURE | Min* | Max | TEMPERATURE | Min* | Max |
| °C | -20 | +60 | °C | -10 | +50 |
| °F | -4 | +140 | °F | +14 | +122 |

If the converter is supplied in compact version, consider the most restrictive ambient temperatures between converter and sensor, otherwise refer to the respective manuals.* For discontinuous use install a heating resistor.

- ❑ The instrument is suitable for indoor and outdoor weather conditions
- ❑ Altitude: from –200m to 4000m
- ❑ Humidity range: 0-100%

**ATTENTION:** Temperature limits beyond which the battery is not recharged

- ❑ T Board MV255 < 0 °C
- ❑ Tboard MV255 > 50 °C

## Measurements Tolerance

- ❑ Flow rate (volume) = ±0,1% o.r.

- ❑ Out 4/20 mA = ± 0,2 % o.r.

- ❑ Frequency Out = ± 0,2% o.r

**Data Plate**

The instrument label contain the following information:

- ❑ MODEL: Convert Model
- ❑ S/N: Serial Number of the converter
- ❑ SUPPLY: Main power supply
- ❑ Hz: Supply frequency (AC)
- ❑ POWER: Maximum power consumption
- ❑ IP: Protection grade
- ❑ T: Operation temperature
- ❑ COUPLING: Serial number of sensor coupled
- ❑ ITEM: Free for user
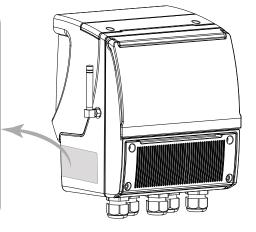
MAN_MV255_IT_EN_IS_R16_1.06.XXXX
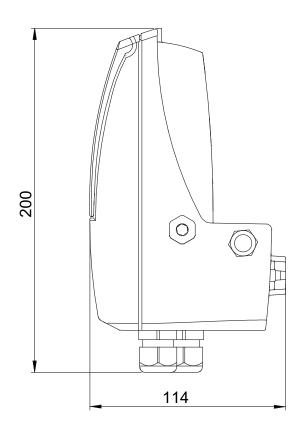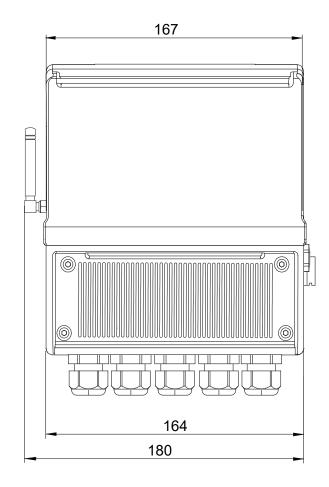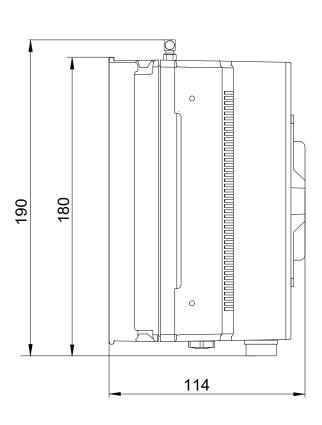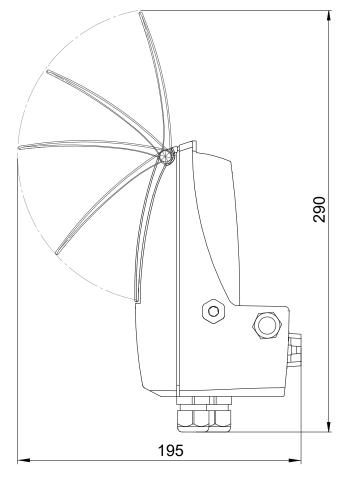
# OVERALL DIMENSIONS WITHOUT BATTERY CASE

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200

114

167

180

164

190

180

114

290

195
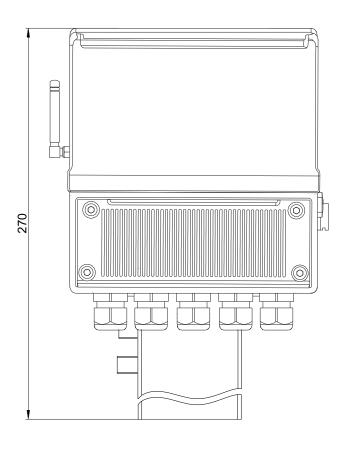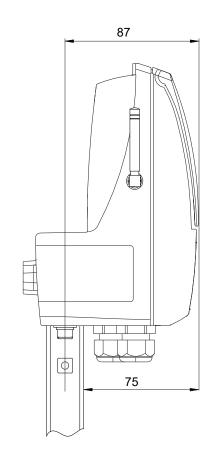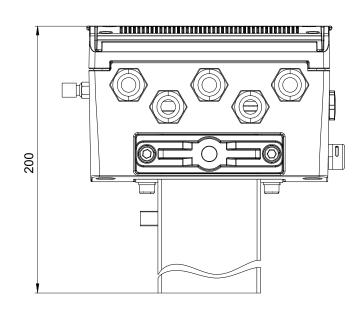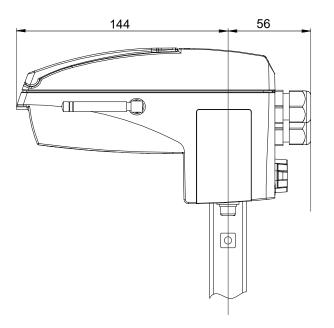
## Compact version



## Compact version (rotated)



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ISOIL
INDUSTRIA

**Separate version**

295

Ø7

30

142

28

120
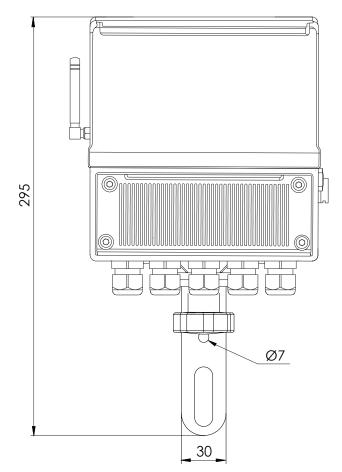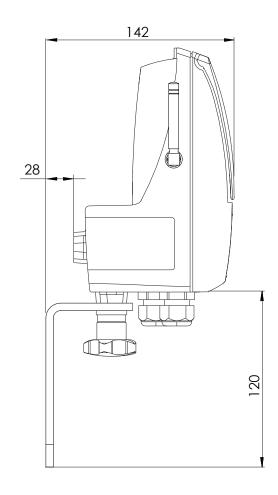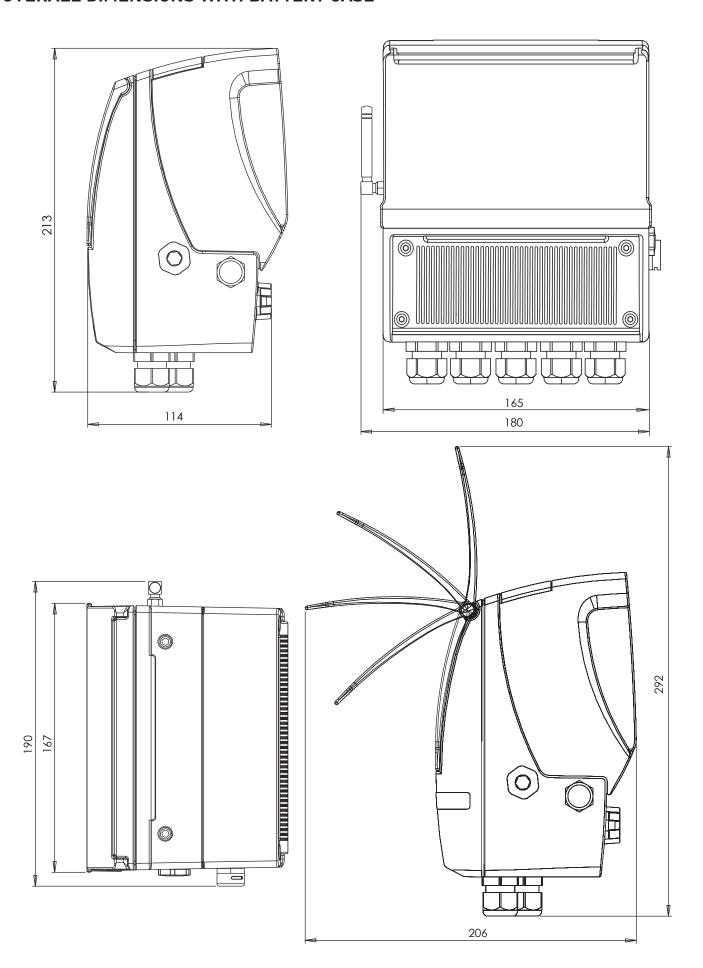
# OVERALL DIMENSIONS WITH BATTERY CASE

213

114

165

180

190

167

292

206

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MAN_MV255_IT_EN_IS_R16_1.06.XXXX

**Compact version**

114

270

75

**Compact version (rotated)**

157

56

200
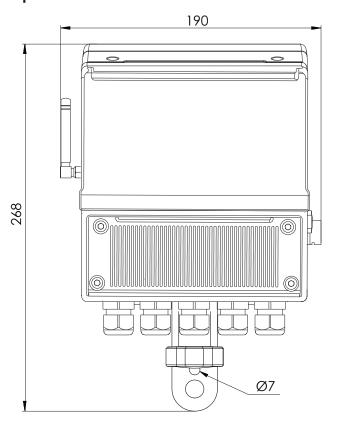
## Separate version



## Mil connector version

For details of connections with MIL connectors, refer to the manual:
MV145-255_MIL CONNECTOR POSITION.
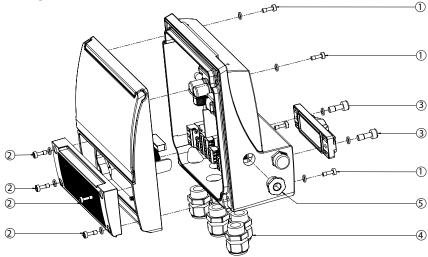
## TORQUES
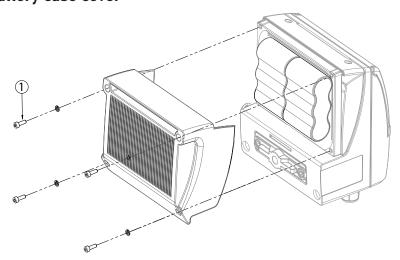
To guarantee the housing's IP degree the following torques are required:

| MATERIAL HOUSING | Housing screw (1) | Cover terminal block screw (2) | Fixing Display Frame | PCB Screw | Version Cap(3) | Cable Glands (4) | Cap USB-B (5) |
|---|---|---|---|---|---|---|---|
| **ALUMINIUM HOUSING** | 6 Nm | 5.5 Nm | 3 Nm | 0.8 Nm | 8 Nm | 4 Nm | 4 Nm |
| **PLASTIC HOUSING** | 2 Nm | 2 Nm | 2.5 Nm | 0.8 Nm | 7 Nm | 4 Nm | 4 Nm |
| **BATTERY HOUSING** | 2 Nm | // | // | // | // | // | // |

**Housing converter**



**Battery case cover**
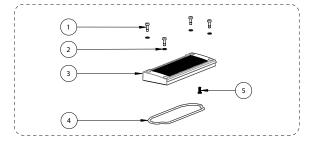
## CASE WEIGHT CONVERTER AND BATTERIES

| | WEIGHT CONVERTER | BATTERY WEIGHT LITHIUM | BATTERY WEIGHT ALKALINE |
|---|---|---|---|
| **PLASTIC HOUSING** | 2kg | EACH LITHIUM BATTERY WEIGHS 0.1kg; EXPECTED MAXIMUM 6 BATTERIES | EACH ALKALINE BATTERY WEIGHS 0.15 kg EXPECTED MAXIMUM 6 BATTERIES |
| **ALUMINIUM HOUSING** | 3kg | | |

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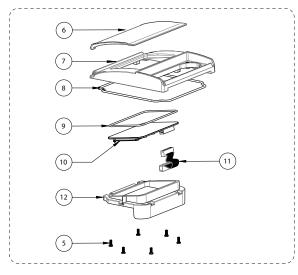
# MV255 CONSTRUCTION
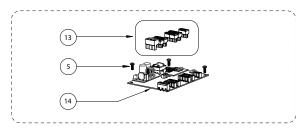
## TERMINAL BLOCK COVER
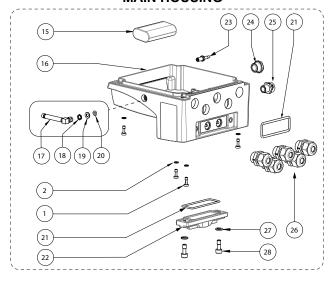


## MAIN HOUSING COVER



## PCB MV255



## MAIN HOUSING
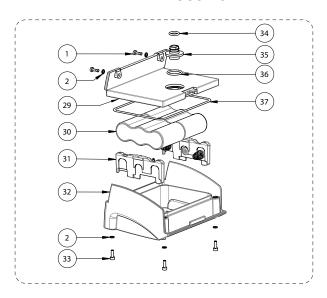


| POS. | DESCRIPTION | |
|------|-------------|---|
| | **PA6 VERSION** | **ALUMINIUM VERSION** |
| **1** | SCREW M4x12 | SCREW M5x12 |
| **2** | GROWER Ø4 | GROWER Ø5 |
| **3** | TERMINAL BLOCK COVER | TERMINAL BLOCK COVER |
| **4** | O-RING-4400 | |
| **5** | SELF-TAPPING SCREW 4x10 | SELF-TAPPING SCREW 4x10 |
| **6** | PROTECTION COVER | |
| **7** | HOUSING COVER | HOUSING COVER |
| **8** | ORING-4700 | |
| **9** | ORING-117x3 | |
| **10** | DISPLAY | |
| **11** | FLAT CABLE | |
| **12** | FIXING DISPLAY FRAME (MATERIAL PA06) | |
| **13** | TERMINAL BLOCK<br>SOLID WIRE: 26-16 AWG / 0.129-1.31 mm²<br>STRANDED WIRE: 26-16 AWG / 0.129-1.31 mm²<br>TORQUE: 3.0 Lb.In / 0.34 Nm | |
| **14** | PCB | |
| **15** | LITHIUM BATTERY | |
| **16** | PA6 MAIN HOUSING | ALUMINIUM MAIN HOUSING |
| **17** | 3G/4G ANTENNA<br>3G/4G ANTENNA WITH 3m CABLE | |
| **18** | LOCKING NUT | |
| **19** | WASHER Ø6 | |
| **20** | O-RING 2018 VITON | |
| **21** | O-RING-155 | |
| **22** | VERSION CAP (MATERIAL PA06) | |
| **23** | ANTENNA CABLE 15cm | |
| **24** | PG9 CAP | |
| **25** | PRESSURE COMPENSATION PLUG | |
| **26** | PG11 CABLE GLAND<br>CABLE DIAMETER: ø5-ø10mm | |
| **27** | GROWER Ø6 | |
| **28** | SCREW M6x16 | |

## BATTERY HOUSING
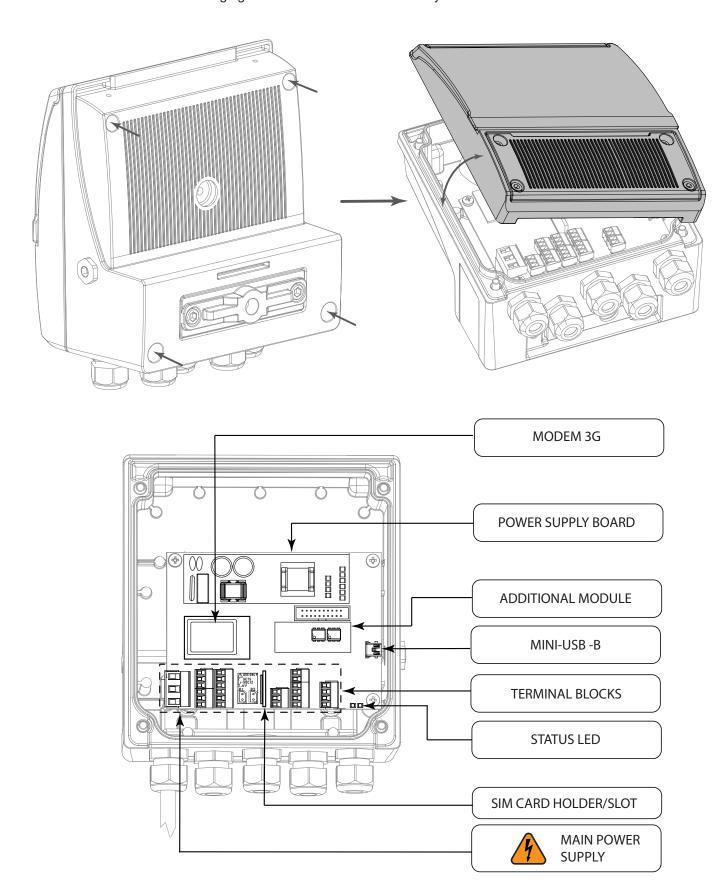
| POS. | DESCRIPTION | |
|------|-------------|-------------|
| | **PA6 VERSION** | **ALUMINIUM VERSION** |
| **29** | CAP BATTERY HOUSING PA6 | |
| **30** | LITHIUM OR ALKALINE BATTERY | |
| **31** | SUPPORT CONTACTS ALKALINE BATTERIES MV | |
| **32** | BATTERY HOUSING PA6 | |
| **33** | SCREW M4X12 | |
| **34** | O-RING 3050 | |
| **35** | SEAL BUSH | |
| **36** | O-RING 3081 | |
| **37** | O-RING 4575 | |

# INTERNAL LAYOUT

## Internal Converter Views

The 4 screws shown in the following figure can be removed if the battery case is disassembled first.

| | |
|---|---|
| | MODEM 3G |
| | POWER SUPPLY BOARD |
| | ADDITIONAL MODULE |
| | MINI-USB -B |
| | TERMINAL BLOCKS |
| | STATUS LED |
| | SIM CARD HOLDER/SLOT |
| ⚠ | MAIN POWER SUPPLY |
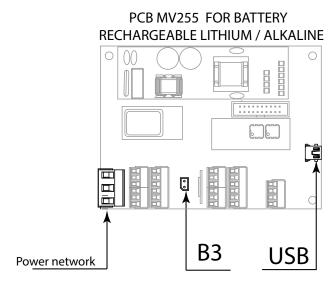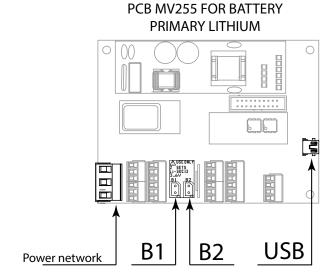
# POWER SUPPLY CONVERTER

MV255 can be powered in different modes

❑ Powered by lithium batteries in slots B1 / B2

❑ Power supply from alkaline batteries slot B3

❑ Power supply from the mains

Below are the positions of the terminal blocks for the different types of power supply.

PCB MV255  FOR BATTERY
RECHARGEABLE LITHIUM / ALKALINE

PCB MV255 FOR BATTERY
PRIMARY LITHIUM

Power network   B3   USB

Power network   B1   B2   USB

## General notes for converter power supplies

❑ The converter can have different power combinations. However, all versions are able to operate at 100% of the possibilities even with only the power coming from the USB cable, transmission included. However, note that these devices are seen by the USB controller that supplies the energy as a 500 mA class device, so not all devices are able to power these electronics correctly (for example tablets and cell phones unless they are rare).

❑ With the USB connection there is no battery consumption, however it is necessary that all the batteries are connected to ensure operation and connection to the MCP software.
NOTE: if the rechargeable battery is connected to B3, it is recharged by the USB connection.
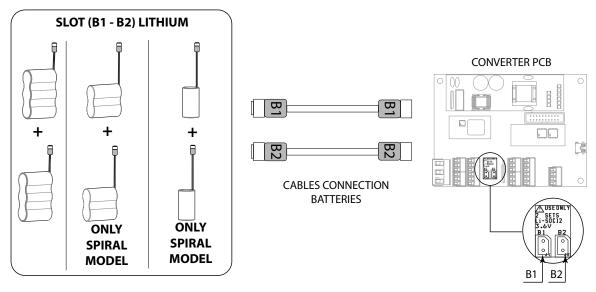
# POWER SUPPLY BATTERIES

When the B1 and B2 batteries are connected for the first time or after a long period of inactivity of the instrument, the super-capacitors coupled to the batteries are completely discharged, therefore for a certain period of time the indications will be "B1 LOW" and "B2 LOW "Until the nominal voltage of the batteries is reached. The time required depends on many factors (temperature, passivation status of the batteries, amount of battery charge remaining). The estimated time for this transition state is less than an hour.
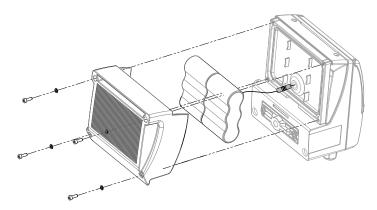
Primary lithium batteries

For primary lithium batteries, connections to slots B1, B2 (see "power supply converter" pag. 20) are prepared as follows:

In the slots B1 and B2 the installable batteries are:



The maximum number of battery elements housed in the battery holder is 6.

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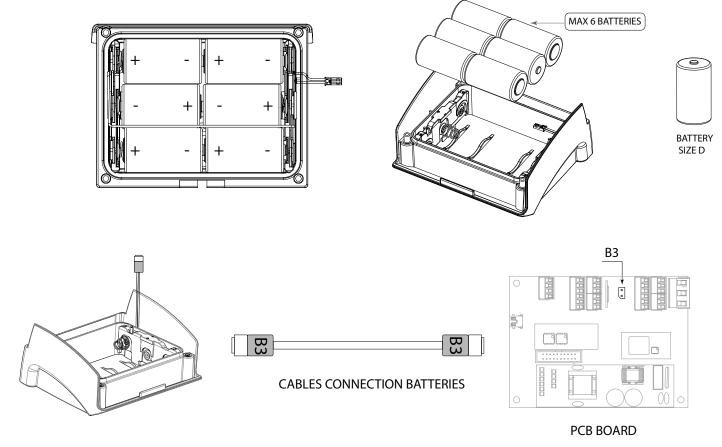
## Alkaline batteries

The alkaline batteries foreseen for the MV255 converter are 6 Size D elements. The alkaline battery pack is connected in the B3 slot of the converter ("power supply converter" pag. 20)



MAX 6 BATTERIES

BATTERY
SIZE D

B3

CABLES CONNECTION BATTERIES

PCB BOARD

## Operating notes

❑ Always replace all batteries at the same time as indicated on the battery holder.

❑ Do not mix new and used batteries or batteries with different characteristics.

❑ To maintain valid time and date when replacing batteries, connect the unit with a USB power source capable of supplying at least 500 mA.

**N.B: With fully discharged batteries, the instrument may operate abnormally because the internal voltages would not be stable, so operating the instrument in this state is to be avoided.**
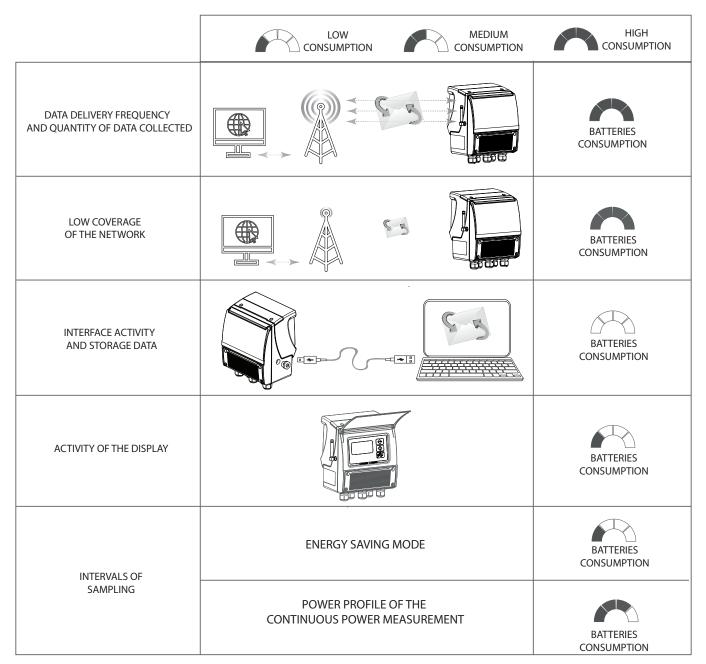
# ESTIMATED CONSUMPTION OF LITHIUM BATTERIES

The consumption of lithium batteries depends mainly on:

❑ Sensor diameter.

❑ Data logger sampling interval.

❑ Number of connections to external loggers (4-20 mA or via MODBUS).

❑ Measurement profile (CONTINUOUS, ENERGY SAVING MODE).

Note: for other configurations / type of batteries separate consumption cannot be estimated.

| | LOW CONSUMPTION | MEDIUM CONSUMPTION | HIGH CONSUMPTION |
|---|---|---|---|
| DATA DELIVERY FREQUENCY AND QUANTITY OF DATA COLLECTED | | | BATTERIES CONSUMPTION |
| LOW COVERAGE OF THE NETWORK | | | BATTERIES CONSUMPTION |
| INTERFACE ACTIVITY AND STORAGE DATA | | | BATTERIES CONSUMPTION |
| ACTIVITY OF THE DISPLAY | | | BATTERIES CONSUMPTION |
| INTERVALS OF SAMPLING | ENERGY SAVING MODE | | BATTERIES CONSUMPTION |
| | POWER PROFILE OF THE CONTINUOUS POWER MEASUREMENT | | BATTERIES CONSUMPTION |

For further details concerning the sampling interval and the management of the measurement power profiles see function POS "4.1" pag. 51

The average life of the batteries as far as the measurement part is concerned can be estimated in the standard conditions of use.
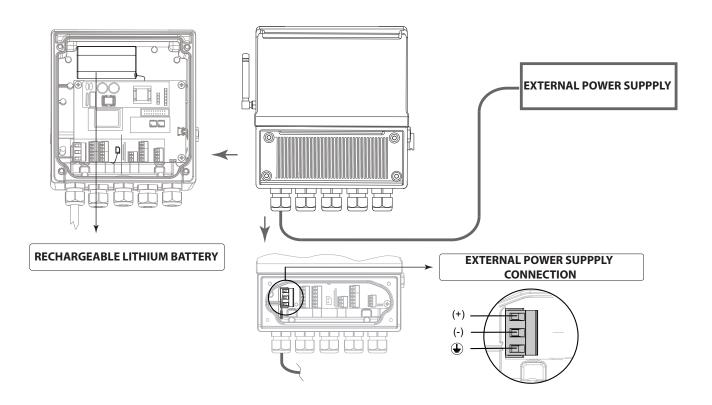
Consumption regarding the data transmission part depends on:

❑ The interval for sending data.

❑ Amount of data to send.

❑ Transmission conditions (connection protocol, type of radio link, distance from the receiving station)

It is possible to estimate the useful life of the batteries for the transmission part only within certain limits. In any case, the forecasts depend very much on the quality of the batteries.

# EXTERNAL POWER SUPPLY



**EXTERNAL POWER SUPPPLY**

**RECHARGEABLE LITHIUM BATTERY**

**EXTERNAL POWER SUPPPLY CONNECTION**

(+)
(-)
⏚

## Notes about MV255 external power supply

❑ When NON-rechargeable batteries are provided and equipped with an external power supply module, they CANNOT be powered directly by solar panel because this type of power supply is not constant and in low light can result in very high battery consumption. Therefore, for proper operation of the instruments, it is necessary for the external power supply to be able to provide constant power of at least 2 W. The minimum voltage under maximum load condition should NOT be less than 9V. The transition from a valid power supply state to one where the voltage/power can no longer support the consumption of the electronics is not sharp but being an analog value, it can remain in an ambiguous boundary condition. In addition, since the only input data for the electronics is the voltage, it happens that if the panel is dimly lit, the voltage AT VACUUM or in a condition of very low consumption of the electronics may also be sufficient, but as soon as the instrument passes into the active condition, the increased consumption causes the input voltage to drop immediately, causing the instrument to return to the low consumption mode. This causes the voltage to rise again, and the cycle repeats indefinitely if the conditions persist. In addition, the continuous state change could continuously activate and then deactivate the modem (if SMS control is active, for example), causing even higher consumption, since it takes on average about 20 seconds per phase to engage and then disengage the network. During this time, consumption is very high because the modem is transmitting synchronization data to the network and the whole thing would then rely on the instrument's battery. For the above reasons, it is necessary for the solar panel to feed a system with built-in voltage and power output regulation. Typically these systems include a battery and a regulator, so that the output voltage is stable and with well-defined cut-off in case of insufficient primary power.
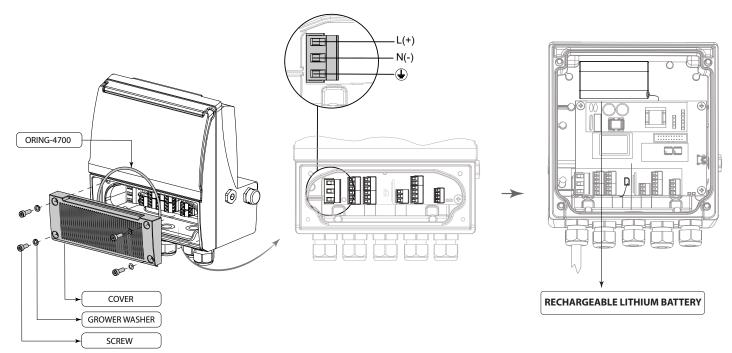
# POWER SUPPLY FROM MAIN LINE

Always ensure that the converter and the sensor are grounded (earthed) correctly. The grounding of the sensor and converter must ensure that the instrument and liquid are equipotential.



ORING-4700

L(+)
N(-)

COVER
GROWER WASHER
SCREW

RECHARGEABLE LITHIUM BATTERY

❑ Before connecting the power supply, verify that the mains voltage is within the limits indicated on data plate. The mains-powered converter is not supplied with the battery holder.

❑ For the connections use only approved conductors, with fire-proof properties, whose section varies from 0.25mm2 to 1.50mm2, based on distance/power; additionally fix the power supply wires with a additional fastening system located close to the terminal.

❑ The power supply line must be equipped with an external protection for overload current (fuse or automatic line breaker).

❑ Provide in close proximity the converter a circuit breaker easily accessible for the operator and clearly identified; whose symbols must conform to the electrical safety and local electrical requirements.

❑ Ensure that the component complies with the requirements of the standard for electrical safety distance.

❑ Check chemical compatibility of materials used in the connection security systems in order to minimize electrochemical corrosion. In the aluminum housing it should avoid direct contact between the ground connection cable and the aluminum housing. It is therefore recommended to connect the safety ground cable, by placing it between the washer and the metal bracket on the related terminal or use an eyelet terminal crimped on the ground protection cable.

❑ The sensor, hard wired inputs and outputs are connected to the converter through terminal blocks located inside the converter.

❑ To locate the terminal block loosen the 4 screws on the terminal block cover. When the front cover is lifted, the terminal block is visible. The terminal block is the hard wire connection of the converter to external equipment, including the sensor.

❑ A rechargeable lithium battery connected to slot B3 is provided inside the converter powered by the mains power supply (see "power supply converter" pag. 20).

## SLOT (B3)  RECHARGEABLE LITHIUM

**⚠ Operating notes for mains power supply**

❑ The system cannot work with the battery disconnected or completely discharged, even if it is powered by an external power source (network or USB).

❑ 3G/4G communication cannot work if the B3 battery is disconnected, even if the USB power supply is present.

❑ With the USB cable connected there is no battery consumption, however it is necessary that B3 is connected to ensure operation.

The following pages give informations on the terminal block numbering, and the respective connecting of the sensor cables, and inputs/outputs.
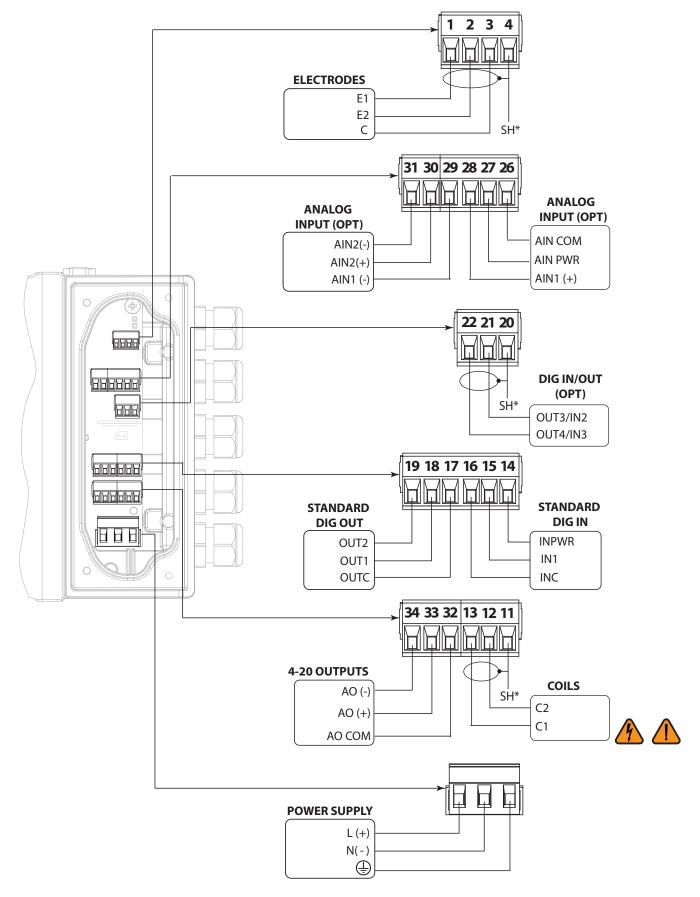
# ELECTRICAL CONNECTION CONVERTER- SENSOR

## Terminal block converter

**Sudden movements of the electrodes cable could introduce noise.**

**Maximum cable length: 20m.**

**ELECTRODES**

| 1 | 2 | 3 | 4 |
|---|---|---|---|

E1
E2
C

SH*

**ANALOG INPUT (OPT)**

| 31 | 30 | 29 | 28 | 27 | 26 |
|----|----|----|----|----|----|

**ANALOG INPUT (OPT)**

AIN2(-)
AIN2(+)
AIN1 (-)

AIN COM
AIN PWR
AIN1 (+)

| 22 | 21 | 20 |
|----|----|----|

**DIG IN/OUT (OPT)**

SH*

OUT3/IN2
OUT4/IN3

**STANDARD DIG OUT**

| 19 | 18 | 17 | 16 | 15 | 14 |
|----|----|----|----|----|----|

**STANDARD DIG IN**

OUT2
OUT1
OUTC

INPWR
IN1
INC

**4-20 OUTPUTS**

| 34 | 33 | 32 | 13 | 12 | 11 |
|----|----|----|----|----|----|

**COILS**

AO (-)
AO (+)
AO COM

SH*

C2
C1

**POWER SUPPLY**

L (+)
N( - )
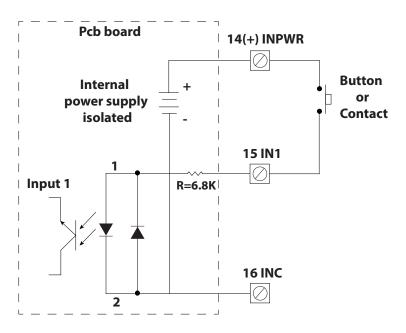
# INPUT CONNECTIONS

## Digital input connections on a base card (INP COM, INP I1, INP V+)
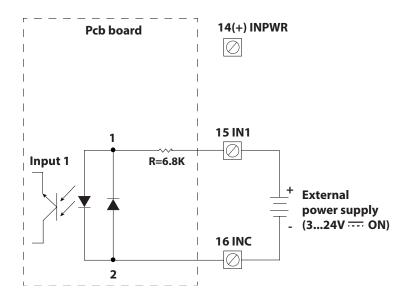
The digital input can be used in two ways as shown below:

❑ IN 1: input 1, positive terminal

❑ INC: common of all inputs

❑ INPWR: isolated voltage generator output for inputs power supply

## Internal power supply



## External Power Supply

## input on / off mode for operating inputs

In energy saving mode, the activation times of the Tmin input must be ≥15 seconds. For electrical connections see "ELECTRICAL CONNECTION CONVERTER- SENSOR" pag. 28.

| SCHEMES | CONDITIONS REQUIRED TO PERFORM THE FUNCTION |
|---|---|
|  | TOTALIZER RESET (Input 1): enable all or only the functions related to the totalizer to be reset. "6.1" pag. 52 "6.2" pag. 52 "6.3" pag. 52 "6.4" pag. 52 CALIBRATION (Input 1): T> 0.5 seconds "6.7" pag. 52 |
|  | TOTALIZER LOCK (Input 1): enable the function if the counting of the totalizers is to be blocked. "6.5" pag. 52 |
|  | MEASUREMENT BLOCK (Input 1): enable the function if desired flow measurement block. "6.6" pag. 52 |
|  | SYSTEM VIOLATION (Input 1): enable the function if you want to activate the system violation alarm. This function disables the previous functions "6.8" pag. 52 |
|  | SYSTEM / FLOOD VIOLATION (Input 2 and / or 3 if enabled): enable the function if you want to activate the system violation and / or flood alarm. "6.9" pag. 52 "6.10" pag. 52 |
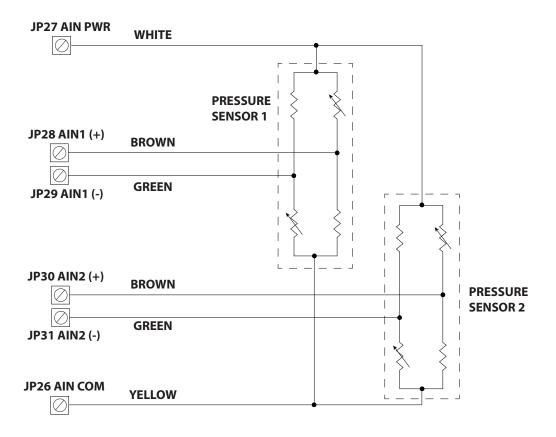
## Analog input connections (AI1+, AI1–, AI2+, AI2–, AI3+, COM)

❑ AIN1 +, AIN1-: inputs (+) and (-) for acquisition of analogue channel 1 measurements

❑ AIN2 +, AIN 2-: inputs (+) and (-) for acquisition of analogue channel 2 measurements

❑ AIN PWR +: output voltage excitation of pressure sensors (+)

❑ 26 AIN COM: common terminal for pressure sensors (-), connected to the internal mass of the board

The optional analogue measurement acquisition module is able to perform potential measurements, temperatures (max 2) and pressures (max 2). The diagrams for the connections to the sensors are shown below:

### Pressure sensor connections:
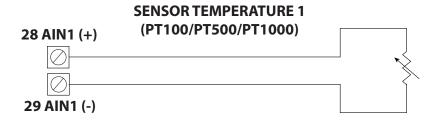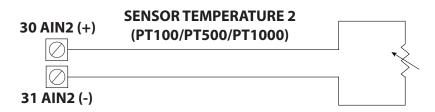
## Temperature sensor connections:

Since there is no cable resistance compensation, it is recommended to use PT500 or PT1000 sensors if the cable length is more than one meter. The recognition of the sensor type (PT100 / 500/1000) is automatic.

**SENSOR TEMPERATURE 1**
**(PT100/PT500/PT1000)**

**28 AIN1 (+)**

**29 AIN1 (-)**



**SENSOR TEMPERATURE 2**
**(PT100/PT500/PT1000)**

**30 AIN2 (+)**

**31 AIN2 (-)**
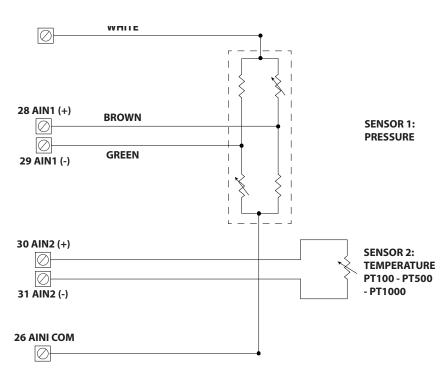
## Connection of a pressure/temperature sensor:

Two different types of sensors can be connected, a pressure sensor and a temperature sensor.

For the temperature sensor, because there is no compensation of cable resistance, we recommend the use of PT500 or PT1000 sensors if the cable length is more than one meter. The recognition of the sensor type (PT100 / 500/1000) is automatic.



WHITE

**28 AIN1 (+)**

BROWN

GREEN

**29 AIN1 (-)**

**SENSOR 1:**
**PRESSURE**

**30 AIN2 (+)**

**31 AIN2 (-)**

**SENSOR 2:**
**TEMPERATURE**
**PT100 - PT500**
**- PT1000**

**26 AINI COM**

**N.B: the pressure sensor MUST BE connected to input 1 and the temperature sensor MUST BE connected to Input 2!**
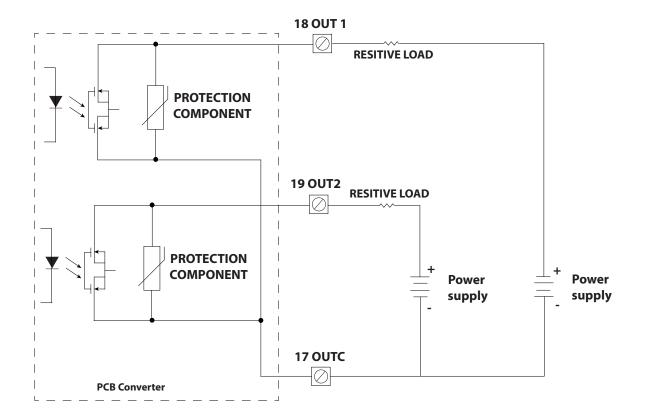
# OUTPUTS CONNECTIONS

## Digital output connections on the basic board (OUT01, OUT02, OUT COM)

The outputs are not polarized, therefore connection schemes can be adopted to positive or to common negative, as reported by the following diagram.

❑  OUT 01 = output 1

❑  OUT 02 = output 2

❑  OUT COM = common outputs



❑  Opto-insulated output (Opto-MOS)

❑  Maximum switching voltage: 40V ⎓ / 28V ~

❑  Maximum switching current: 100mA

❑  Maximum Ron= 70 Ω

❑  Maximum switching frequency (load RL= 24 Ω, VOUT=24 ⎓): 50Hz

❑  Insulation from other secondary circuits: 500 V ⎓

# USCITA 4-20MA

The 4-20 mA output can be passive (powered from outside) or active, only when the power supply is installed. There are 3 output terminals available, the passive output uses AO + and AO- (the minimum operating voltage is 5V). When the power supply is present, it is also possible to select the active mode by connecting the load between the AO- and AOCOM terminals. In this case, the loop should not be powered. The passive mode is always available even with the power supply installed, use the AO + and AO- terminals. When the passive mode is used and the loop is powered, the instrument exits sleep mode and remains active for 10 seconds and then returns to sleep mode. This status change can only be repeated after 1 minute. For the connections to the terminal block see also "ELECTRICAL CONNECTION CONVERTER- SENSOR" pag. 28

❑ AO-: OUTPUT current to the connected device (active or passive mode).

❑ AO+: INPUT current from the connected device (passive mode, loop supply from external source).

❑ AOC: return of the OUTPUT current (active mode).
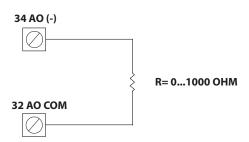
**ATTENTION:** the power supply of the loop supplies power only to the 4-20 mA output circuits and not to the whole device, which therefore remains active and consumes the batteries if it is not powered in any other way.

The 4-2mA output can have two operating modes:
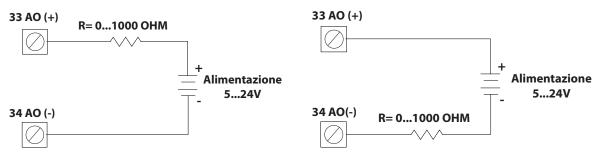
PASSIVE MODE: the power is supplied by an external source. Connect the POSITIVE of the external source to the AO + terminal. Connect the LOAD to the AO- terminal..

ACTIVE MODE: the power is supplied by the card power supply (if fitted). Connect the LOAD to the AO- terminal. Connect the RETURN to the AOC terminal.

## ACTIVE CONNECTION

**34 AO (-)**

**R= 0...1000 OHM**

**32 AO COM**

## PASSIVE CONNECTION 1-2

**33 AO (+)**      **R= 0...1000 OHM**

**+**
**Alimentazione 5...24V**
**-**

**34 AO (-)**

**33 AO (+)**

**+**
**Alimentazione 5...24V**
**-**

**34 AO(-)**      **R= 0...1000 OHM**

The maximum load value for the PASSIVE connection depends on the supply voltage supplied. The maximum 1000 ohms of load are guaranteed only with supply voltage> = 25V.

**ATTENTION! This output isn't galvanically insulated**

Externally supplied loop power gives power to the 4-20 mA output circuits only and not to the whole device. When power is applied to the 4-20 mA loop and the device is powered by the batteries alone, the device will come out of the low-power mode and remain active for the time set in the "display time" function to allow the current value on the loop to be read. During this phase, battery consumption is very high
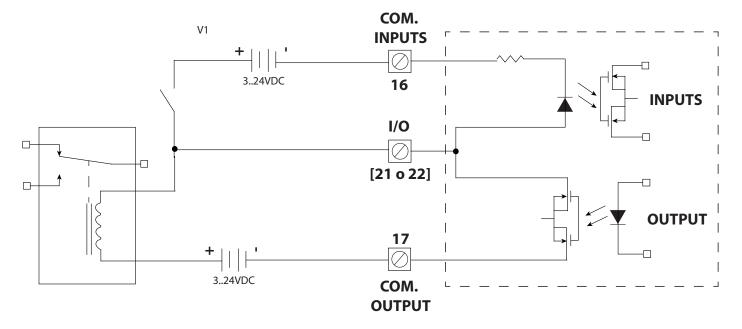
## Energy saving algorithm diagram

The externally supplied power supply of the loop energizes only the 4-20 mA output circuits and not the whole device. When power is applied to the 4-20 mA loop and the device is powered only by the batteries, the latter will exit the low-power mode and remain active for a certain time (about 10 seconds) to allow the reading of the current value on the loop. During this phase the battery consumption is very high. To save energy, there is a current reading time of about 10 seconds every minute. Increasing the number of readings, the minimum time elapsing between one reading and the other is automatically increased by one minute at a time, according to the diagram shown below.

The energy saving algorithm is activated only for intervals of less than or equal to one minute. For longer times it does not activate. For example, by reading the current every two minutes, energy saving is not activated.

## Simultaneous connection to digital input / output terminals on expansion module

The outputs and optional inputs on the expansion module share the same common terminals related to the card inputs and outputs. Since the input and output circuits have different common terminals, it is theoretically possible to use the same I / O terminal at the same time to read a signal via digital input and control a device via digital output. See the following diagram to understand how it works. The power supplies in this case must be separated if the possibility of simultaneous use of input and output is to be maintained.

MAN_MV255_IT_EN_IS_R16_1.06.XXXX
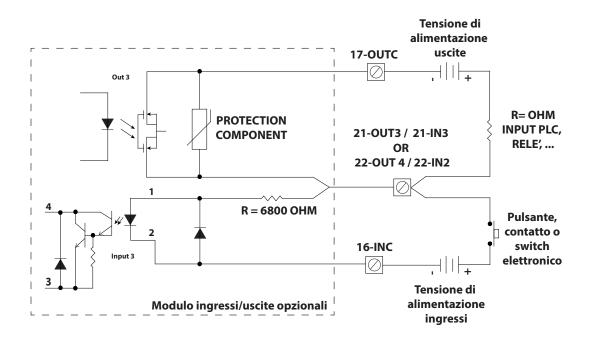
## Optional digital inputs / outputs connections (O4,I2, O3, I3, GND)

The digital output OUT 4 and the digital input INPUT 2 as the digital output OUT3 and the digital input INPUT 3 share the same terminal but have different municipalities, therefore the input and output circuits can be made independently 'from each other, as shown below for the OUT 3 / INPUT 3 scheme (OUT 4 / INPUT 2 are equivalent).
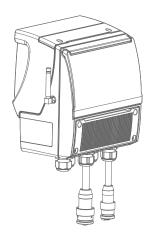


- ❑  O4 I2: digital output OUT 4 / digital input INPUT 2

- ❑  O3 I3: digital output OUT 3 / digital input INPUT 3

- ❑  GND: terminal connected to the protective earth (chassis) for connecting cable shields

**NOTES:** The digital outputs OUT 4 and OUT 3 use the OUTC terminal as common. The digital inputs INPUT 2 and INPUT 3 use the INC terminal as common.

## MIL CONNECTOR

For details of connections with MIL connectors, refer to the manual:
MV145-255_ MIL. CONNECTOR POSITION

## Notes on operation of out 4/20 mA

The MV255 can be equipped with an analog output that provides a current signal proportional to the flow rate, in the standard range of 4 to 20 mA.

The analog output can operate in two power modes:

❑ Active mode: powered by the optional internal power supply, enabling a permanent connection to external devices.

❑ Passive mode: powered by an external device connected to the analog output.

## Passive mode: functioning

The analog output provides a valid 4–20 mA signal only under the following conditions:

❑ When the device is powered via USB or via the optional internal power supply.

❑ When battery-operated, and a valid voltage is applied to the analog output pins (AO+ and AO-) during a specific time frame, which can be configured using the Display Time function ("9.2" pag. 54).

❑ When battery-operated, and a valid voltage is applied to AO+ and AO- during the entire measurement cycle (typically 50 to 200 ms)

**In all other cases, even if a correct voltage is applied to the output pins, the current remains fixed at approximately 24 mA, indicating that the device is connected, but the analog signal is not valid.**

To minimize power consumption, the reading time of the 4–20 mA signal must be kept as short as possible. This time is configurable via the Display Time function (MCP KBTMT command) "9.2" pag. 54. For proper operation, it must be set between 5 and 59 seconds. **A value greater than 59 seconds disables the programmed 4–20mA operation** but still allows reading the 4–20 mA signal during the measurement cycle (from 50 to 200 ms).

After the last valid acquisition of the 4–20 mA signal, and after the electronics have been appropriately woken up for this purpose (i.e., when the KBTMT time expires), the electronics will no longer respond to subsequent read requests for the next 60 seconds.

**Note: In any case, it is recommended to use the shortest possible time to acquire the analog signal.**

**When the power applied to the 4–20 mA output is continuous**, the device activates the output for the configured display time and remains off for the rest period (60 seconds). At the next valid measurement cycle, the interface is reactivated. **This is not the optimal scenario in terms of power consumption.**

**When the power is applied intermittently, i.e., at defined intervals (for example, every 10 minutes), the duty cycle is much lower**, thus reducing the energy required from the battery. In this case, the measurement cycle latency time (typically 15 seconds) must be taken into account, so the total measurement acquisition time for the connected device must be sufficiently long to cover the entire cycle time (typically 15 seconds) plus the analog signal reading time.

## Parameters to be set for optimal operation

❑ **MV145: KBTMT= 5s (**POS.9.2: VISUALITATION TIM**)**
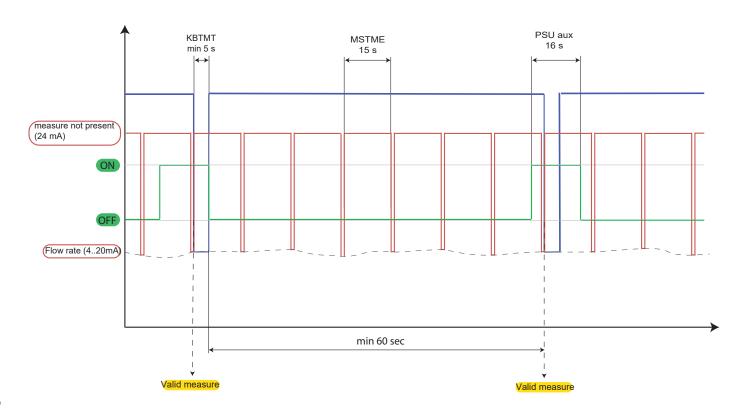
❑ ACQUISITION DEVICE (MASTER):

    ❑ minimum measurement acquisition time: 15 s + real acquisition time

    ❑ acquisition interval: as long as possible compatible with performance

**The following is a diagram describing the operation and the values to be set**

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MAN_MV255_IT_EN_IS_R16_1.06.XXXX

# START VISUALIZATION PAGES

Direct exposure of the converter to sunlight may damage the liquid crystal display.
The display of the pages can be changed with respect to some enabled or disabled functions.

Press the button to change the display.

| Display | Label |
|---------|-------|
| m³/h 0, T+m³ 6036.3, T−m³ 3181.3, TNm³ +2855.0, NO ALARMS | Totalizzatori Totali diretti |
| | Totalizzatori Totali inversi |
| | Totalizzatori Totali netti |
| | n° Allarmi |

| | Label |
|---------|-------|
| dm³/s 0.0001 ... m/s +0.000 | Direzione del flusso +/− |
| | Unità di misura |
| | Flag |
| | Lettura portata |
| | Trend di portata |
| | Velocità del Fluido |

| | Label |
|---------|-------|
| 0.0001 dm³/s +0.00% NO ALARMS | Fondoscala in uso (1-2) |
| | Lettura portata |
| | % Fondo Scale |
| | n° Allarmi |

| | Label |
|---------|-------|
| dm³/s 0.0000, T+dm³ 5127.629, P+dm³ 5127.626, NO ALARMS | Lettura portata |
| | Totalizzatori Diretti |
| | Totalizzatori Diretti |
| | n° Allarmi |

| | Label |
|---------|-------|
| dm³/s 0.0001, T−dm³ 0.254, P−dm³ 0.254, NO ALARMS | Lettura portata |
| | Totalizzatori Inversi |
| | Totalizzatori Parziali Inversi |
| | n° Allarmi |

| | Label |
|---------|-------|
| dm³/s 0.0001, TNdm³ +5127.345, PNdm³ +5127.342, NO ALARMS | Lettura portata |
| | Totalizzatori netti |
| | Totalizzatori Parziali netti |
| | n° Allarmi |

| | Label |
|---------|-------|
| dm³/s 0.0001, T+dm³ 5127.599, P+dm³ 5127.596, T−dm³ 0.254, P−dm³ 0.254, NO ALARMS | Lettura portata |
| | Totalizzatori Totali diretti |
| | Totalizzatori Parziali Diretti |
| | Totalizzatori Totali Diretti |
| | Totalizzatori Parziali Inversi |
| | n° Allarmi |

Press the button to change the display.

| Display | Label |
|---|---|
| T+dm³ 5127.599 | Totalizzatori Totali Diretti |
| P+dm³ 5127.596 | Totalizzatori Parziali Diretti |
| T-dm³ 0.254 | Totalizzatori Totali inversi |
| P-dm³ 0.254 | Totalizzatori Parziali inversi |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| 3 ALARM(S) | n°Allarmi |
| BATTERY LOW / CPU1 RESTART / CLOCK1 NOT SET | Allarm List |
|  | Date and Time |

| Display | Label |
|---|---|
| T+dm³ 5127.600 | Totalizzatori Totali Diretti |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| P+dm³ 5127.598 | Totalizzatori Parziali Diretti |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| T-dm³ 0.254 | Totalizzatori Totali Inversi |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| P-dm³ 0.254 | Totalizzatori Parziali Inversi |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| E1 V -0.001 / E2 V -0.001 | Potenziale Elettrodi |
| E1R kΩ 0.0 / E2R kΩ 0.0 | Resistenza Elettrodi |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| dm³/s +0.0001 | Lettura portata |
| NO ALARMS | n°Allarmi |

| Display | Label |
|---|---|
| dm³/s +0.0001 | Lettura portata |
| T+dm³ 5127.601 | Totalizzatori Totali Diretti |
| P+dm³ 5127.598 | Totalizzatori Parziali Diretti |
| NO ALARMS | n°Allarmi |

Press the button to change the display.

| Display | Label |
|---|---|
| `dm³/s +0.0001` | Flow rate value |
| `T-dm³ 0.254` | Direct Total Totalizer |
| `P-dm³ 0.254` | Direct Partial Totalizer |
| `NO ALARMS` | n°Alarm |

| Display | Label |
|---|---|
| `dm³/s -0.0000` | Flow rate value |
| `T+dm³ 5127.629` | Direct total totalizer |
| `T-dm³ 0.274` | Reverse total totalizer |
| `NO ALARMS` | n°Alarm |

| Display | Label |
|---|---|
| `dm³/s +0.0001` | Flow rate value |
| `P+dm³ 5127.599` | Direct Partial Totalizer |
| `P-dm³ 0.254` | Reverse Partial Totalizer |
| `NO ALARMS` | n°Alarm |

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# ACCESS TO THE CONVERTER

## Meaning of flags

| FLAG | DESCRIPTION | FLAG | DESCRIPTION |
|---|---|---|---|
| ∅ | EMPTY PIPE | | MIN FLOW ALARM |
| | FILE UPLOAD | | MAX FLOW ALARM |
| | FILE DOWNLOAD | | VIDEO TERMINAL CONNECTED |
| | BATTERY RECHARGE (FLASHING) LOW BATTERY (FIXED) | | FLOW RATE OVERFLOW |
| | FLOW RATE SIMULATION (FLASHING) | | PULSE 1 OVERFLOW |
| | CALIBRATION (FLASHING) | | PULSE 2 OVERFLOW |
| | GENERIC ALARM (FLASHING) | | POWERED DEVICE WITH ONE CHARGERS BATTERY (MID-DIRECTIVE) |
| | GENERAL ALARM ONLY ON PHYSICAL DISPLAY (FLASHING) | | |
| | SIGNAL ERROR | | |
| | EXCITATION ERROR | | |
| 2 | 2G NETWORK CONNECTION | | MODEM IN NETWORK SEARCH / TOTAL ABSENCE OF SIGNAL |
| 3 | 3G/4G NETWORK CONNECTION | | |

## LED interpretation

L1
L2

LED 1 CPU communication
LED 2 CPU measures

Red LED: Alarm signal
Blue LED: Communication activated
Green LED: System working correctly
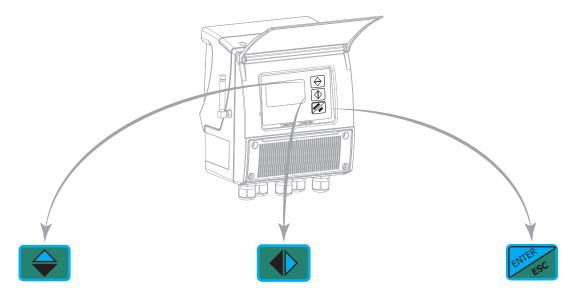
## ACCESS TO THE CONFIGURATION MENU

The configuration can be done in two different ways:

1) By keypad of converter

2) By MCP interface (Virtual display of instrument)

**NOTE:** An external power source is required for programming. (USB connection or power supply if the device is foreseen).

### Access Via Keypad



**SHORT PRESSING (< 1 SECOND):**

Increases the numeric figure or the parameter selected by the cursor returns to the previous subject on the menu

**LONG PRESSING (> 1 SECOND):**

Decreases the numeric figure or the parameter selected by the cursor. Proceeds to the next subject on the menu.

**SHORT PRESSING (< 1 SECOND):**

Moves/positions the cursor rightward on the input field. Proceeds to the following subject of the menu. Change the display of the process data

**LONG PRESSING (> 1 SECOND):**

Moves/positions the cursor leftward on the input field. Returns to the previous subject on the menu

**SHORT PRESSING (< 1 SECOND):**

Enter /leave the selected function enables the main menu for the instrument configuration Cancels the selected function under progress

**LONG PRESSING (> 1 SECOND):**

Leaves the current menu Enables the totalizer reset request (when enabled) Confirms the selected function.

### Access Via Keypad (converter is connected to an external energy source)

**ATTENTION!** THIS FUNCTION LEADS TO AN HIGH ENERGY CONSUMPTION

To activate this function press the button "Enter" for >10 seconds. When the keypad becomes active, the following sentence will be shown on the display:
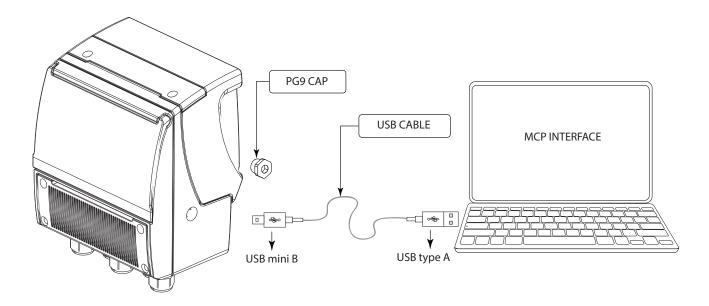
**"Programming active. Attention: high power consumption"**

With this option activated it's allowed use the converter as if it is connected to an external power supply.
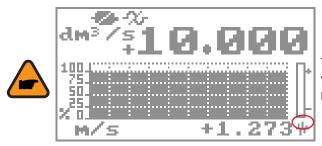
## Access via mcp interface (virtual display)

MCP is a Windows® software that allows to set all the converter functions and personalize the menu. The MCP program is required for the blind version of the converter. To use MCP interface consult the relevant user manual.



## FLOW RATE VISUALIZATION



This symbol appears (red color on the virtual display) only when the overall noise is over 2.5% of flow rate.

MV255 allows you to view the flow in 5 digits; this means that the maximum flow displayed on the display is equal to 99999 (regardless of the position of the decimal point). The minimum displayable value is instead limited to the number 0.0025. The unit of measurement that can be represented depends on the capacity / diameter of the sensor: the units allowed are those that, once the instrument's full-scale value is set, can be represented with a numeric field whose maximum value does not exceed 99999.

Example for DN 300:

❑ Full scale value: 3m / s

❑ Allowed units of measure (examples): l / s (216.00); m3 / h (777.60); m3 / s (0.2160) ...

❑ Measurement units NOT allowed (examples): l / h (777600)
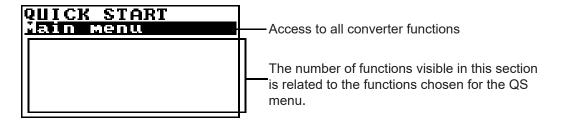
**Flow rate alert**



Symbol that is activated when there is a dynamic variation of the flow measurement. It indicates that the measurement shown in the display is stabilizing.

## QUICK START MENU

The QUICK START MENU allows the user immediate access to some of the most frequently used functions; through the MCP software it is possible to customize this menu, in order to make it suitable for the specific application.



Access to all converter functions

The number of functions visible in this section is related to the functions chosen for the QS menu.

Pressing the enter button from the display pages, access to the Quick Start menu is immediate. If you press the enter button to access the Main menu directly, the Quick Start may have been disabled by the function POS "9.10" pag. 54.
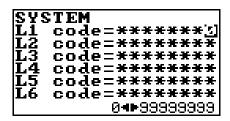
# CONVERTER ACCESS CODE

Access to instrument programming is regulated by six access levels. All functions are assigned to a specific access code and the functions are then grouped according to a logical criterion INSERT FUNCTION.

Access Code Set : Menu 13 System

The codes can be set from the instrument keyboard or via the MCP interface. Depending on the access level set, the menu functions will be displayed (see "MENU 13 - system" pag. 96. These access levels interact with the function POS "13.10" pag. 55 which enables its use.

```
SYSTEM
L1 code=********'.
L2 code=********
L3 code=********
L4 code=********
L5 code=********
L6 code=********
      0◄►99999999
```

## Restricted Access Set: Menu 13 System

Restart access = ON: Access allowed only to functions of a specific level (POS "13.10" pag. 55 ).

```
SYSTEM
L1 code=********
L2 code=********
L3 code=********
L4 code=********
L5 code=********
L6 code=********
Restr.access=OFF
```

THE VALUES THAT CAN BE SET FOR THE FUNCTION. "ACCESS RIST" ARE ON / OFF.

Example: If the operator has an access level code 3, after entering it, it can only modify the functions provided for an access level 3.

Access to restaurants = OFF: After entering the access code of a certain level, it allows you to modify the functions of the selected level and the functions with the lowest access level. Example: If the operator has the level 3 code, after having entered it, he will be able to modify all the functions of level 1,2,3.

* WARNING: take careful note of the customized code, since there is no way for the user to retrieve

or reset it if lost. Factory preset access codes:
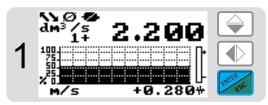
- ❏ L1: 10000000

- ❏ L2: 20000000

- ❏ L3: 30000000

- ❏ L4: 40000000

The following example shows how to change the Full scale by Quick Start menu; the second illustrates how to change the function by the Main menu.

**EXAMPLE: modifying the full scale value from 4dm³/s to 5dm³/s,**
**from the "Quick start menu"**



**1** Press the ENTER button to access the Quick Start menu



**2** Select this function in the list to be edited



**3** Press the ENTER button to select the function.



**4** Select the value to be changed



**5** Change the value



**6** Confirm the new value



**7** Long Push
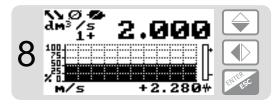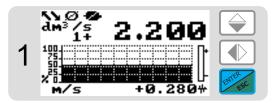


**8** Main Page

**EXAMPLE: modifying the full scale value from 4dm³/s to 5dm³/s, from the "Main Menu" (quick start menu enabled)**

**1**
ø
dm³/s  2.200
1+
100
75
50
25
% 0
m/s        +0.280

Press the ENTER button to access the menu                Quick Start

**2**
ACCESS CODE
Code:     ********
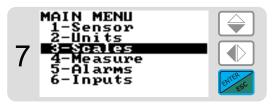
Press arrow keys to select the cell in which to insert the number of the access code.

**3**
ACCESS CODE
Code:     ********
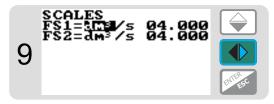
Press ENTER button to confirm value.

**4**
QUICK START
S.model=      000
Main menu

Select "Main Menu"
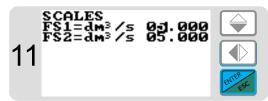
**5**
QUICK START
S.model=      000
Main menu

Press the ENTER button to access the Main Menu

**6**
MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs

Select function

**7**
MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs
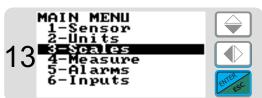
Press the ENTER button to access the"Scale Menu"

**8**
SCALES
FS1=dm³/s 04.000
FS2=dm³/s 04.000

Press the ENTER button to access the "Fs1"

**9**
SCALES
FS1=dm³/s 04.000
FS2=dm³/s 04.000

Select the value to be changed

**10**
SCALES
FS1=dm³/s 04.000
FS2=dm³/s 04.000

Change the value

**11**
SCALES
FS1=dm³/s 05.000
FS2=dm³/s 05.000

Press the ENTER button Confirm the new value
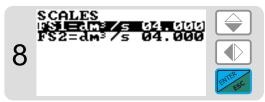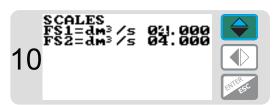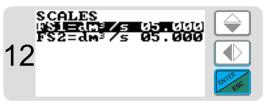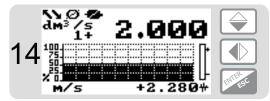
**12**
SCALES
FS1=dm³/s 05.000
FS2=dm³/s 05.000

Press Esc

**13**
MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs

Press Esc

**14**
ø
dm³/s  2.000
1+
100
75
50
25
% 0
m/s        +2.280

Main page

ISOIL
INDUSTRIA

# FUNCTIONS MENU

The main menu is selected from the Quick start menu by pressing the key and entering the [ENTER/ESC] access code; enter the access code if required. Note: some function here below are displayed only with other functions active, or with optional modules.

## SENSOR

```
MAIN MENU
1-Sensor
2-Units
3-Scales
4-
5-
6-
7-
8-      SENSOR
9-
10-  S.model          0
11-  Lining      UNSPEC.
12-  S.type     FULLBORE
13-  U.type       METRIC
     Diam.         00700
     KA         +00.9637
     KA-          -44904
     KZ           -18852
     KD         +00.4014
     Ins.position      0
     KP dynamic      OFF
     Ki            10000
     Kp            10000
     KC           100000
     C.Curr.     mA025.0
     C.Reg. PB      ms03
     C.Reg.DK    stp 005
     C.R.time       ms03
     E.P.Detect       ON
     Z max     Kohm 0500
     S.err.delay      10
     Sens.verify     OFF
     KL      00.+000000
     Zero point cal.
```

| | |
|---|---|
| 1.1 | Sensors model |
| 1.2 | Flow sensor lining material type |
| 1.3 | Type of sensor: fullbore or insertion |
| 1.4 | Type of measure units for sensor parameter: metric or imperial |
| 1.5 | Sensor's nominal/real diameter DN (0-2500) |
| 1.6 | Sensor coefficient KZ (zero point) |
| 1.7 | Calibration data of sensor for negative flow |
| 1.8 | Sensor coefficient KZ (zero point) |
| 1.9 | Sensor coefficient KD |
| 1.10 | Insertion position |
| 1.11 | KP dynamic, coefficient for insertion |
| 1.12 | Sensor coefficient Ki |
| 1.13 | Sensor coefficient Kp |
| 1.14 | Sensor coefficient KC |
| 1.15 | Sensor excitation current |
| 1.16 | Current regulator proportional band |
| 1.17 | Current regulator derivation constant |
| 1.18 | Measure sampling frequency |
| 1.19 | Enables the empty pipe detection feature |
| 1.20 | Empty pipe detection threshold |
| 1.21 | Signal error delay (n. sample) |
| 1.22 | Automatic sensor verify enable |
| 1.23 | Linearization coefficient |
| 1.24 | Pipe hydraulic zero calibration |

## UNITS

```
MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-
6-
7-       UNITS
8-
9-   Diam.            mm
10-  S.cable           m
11-  FR.unit      METRIC
12-  Pls1 u.      METRIC
13-  Pls2 u.      METRIC
     T+ unit      METRIC
     T+ unit        (m3)
     T+ D.P.           4
     P+ unit      METRIC
     P+ unit        (m3)
     P+ D.P.           4
     T- unit      METRIC
     T- unit        (m3)
     T- D.P.           4
     P- unit      METRIC
     P- unit        (m3)
     P- D.P.           4
     Temp.unit        °C
     Mass units       ON
     Sg        (kg/dm3)
     AIN1 m.u.  1,107MCPI
     AIN2 m.u.  1,107MCPI
```

| | |
|---|---|
| 2.1 | Nominal diameter measure unit |
| 2.2 | Cable length on separate version |
| 2.3 | Flow rate type measure unit: metric or imperial |
| 2.4 | Pulse 1 type measure unit: metric or not metric |
| 2.5 | Pulse 2 type measure unit: metric or not metric |
| 2.6 | Total direct totalizer measure unit type: metric or imperial |
| 2.7 | Total direct totalizer measure unit |
| 2.8 | Total direct totalizer decimal point position |
| 2.9 | Partial direct totalizer measure unit type: metric or not metric |
| 2.10 | Partial direct totalizer measure unit |
| 2.11 | Partial direct totalizer decimal point position |
| 2.12 | Total reverse totalizer measure unit type: metric or not metric |
| 2.13 | Total reverse totalizer measure unit |
| 2.14 | Total reverse totalizer decimal point position |
| 2.15 | Partial reverse totalizer measure unit type: metric or not metric |
| 2.16 | Partial reverse totalizer measure unit |
| 2.17 | Partial reverse totalizer decimal point position |
| 2.18 | Temperature measure |
| 2.19 | Enable/disable the selection of mass units on full scale set |
| 2.20 | Specific gravity coefficient |
| 2.21 | Unit of measurement for analogue input 1 |
| 2.22 | Unit of measurement for analogue input 2 |

## SCALES

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
```

```
SCALES
 FS1          dm3/s 5.00
 Pls1         dm3 0.15
 Tpls1            (ms)
 Pls2         dm3 0.15
 Tpls2        15:(ms)
 AIN1         1,107:MCPI
 AIN2         1,107:MCPI
```

| | |
|---|---|
| 3.1 | Full scale flow rate 1 |
| 3.2 | Full scale flow rate 2 |
| 3.3 | Duration of the pulse generated on channel 1 |
| 3.4 | Pulse value on channel 2 |
| 3.5 | Duration of the pulse generated on channel 2 |
| 3.6 | Analog input scale 1 |
| 3.7 | Analog input scale 2 |

## MEASURE

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
 6-Inputs
 7-Outputs
```

```
MEASURE
 Filt.bypass        ON
 Cut-off       00.0(%)
 Cal.verify         ON
 H.imm.inp.         ON
```

| | |
|---|---|
| 4.1 | Measure filter bypass |
| 4.2 | Measure cut-off threshold |
| 4.3 | Automatic calibration verify |
| 4.4 | High immunity inputs |

## ALARMS

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
 6-Inputs
 7-Outputs
 8-
```

```
ALARMS
 Max+     dm3/s      OFF
 Max-     dm3/s      OFF
 Min+     dm3/s      OFF
 Min-     dm3/s      OFF
 Ohyst            XXXXX
 A1Mx                ()
 A1Mn                ()
 Ai1H     HPa       0.00
 A2Mx                ()
 A2Mn                ()
 Ai2H     HPa       0.00
```

| | |
|---|---|
| 5.1 | Max.pos.flow r.alarm threshold MAX+ |
| 5.2 | Max.neg.flow r.alarm threshold MAX- |
| 5.3 | Min.pos.flow r.alarm threshold MIN+ |
| 5.4 | Min.neg.flow r.alarm threshold MIN- |
| 5.5 | Hysterisis on f.rate alarm threshold |
| 5.6 | MAX alarm threshold for analog input 1 |
| 5.7 | MIN alarm threshold for analog input 1 |
| 5.8 | AIN1 MIN alarm threshold |
| 5.9 | MAX alarm threshold for analog input 2 |
| 5.10 | MIN alarm threshold for analog input 2 |
| 5.11 | Hysterisis on a. in.2 al. thr |

## INPUTS

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
 6-Inputs
 7-Outputs
```

| INPUTS | | | |
|---|---|---|---|
| T+ reset | OFF | 6.1 | Total direct (positive) flow totalizer reset enable |
| P+ reset | OFF | 6.2 | Partial direct (positive) flow totalizer reset enable |
| T- reset | OFF | 6.3 | Total reverse (negative) flow totalizer reset enable |
| P- reset | OFF | 6.4 | Partial reverse (negative) flow totalizer reset enable |
| Count lock | OFF | 6.5 | Totalizer counting lock command |
| Meas.lock | OFF | 6.6 | Measure zero lock command |
| Calibration | OFF | 6.7 | Calibration external command |
| Sys.v.detect | ON | 6.8 | System violation detect |
| D.In2 | SYS.VIOL. | 6.9 | Digital input 2 function |
| D.In3 | OFF | 6.10 | Digital input 3 function |

## OUTPUTS

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
 6-Inputs
 7-Outputs
 8-Communication
 9-Display
10-Data logger
```

| OUTPUTS | | | |
|---|---|---|---|
| Out1 | F.R.SIGN | 7.1 | Output 1 function selection |
| Out1 inv. | ON | 7.2 | Output 1 inverted status |
| Out1 pls. | ON | 7.3 | Output 1 pulsed status |
| Out2 | AIN1 MX/MN | 7.4 | Output 2 function selection |
| Out2 inv. | ON | 7.5 | Output 2 inverted status |
| Out2 pls. | ON | 7.6 | Output 2 pulsed status |
| Out3 | MAX.AL+ | 7.7 | Output 3 function selection |
| Out3 inv. | ON | 7.8 | Output 3 inverted status |
| Out3 pls. | ON | 7.9 | Output 3 pulsed status |
| Out4 | MAX.AL+ | 7.10 | Output 4 function selection |
| Out4 inv. | ON | 7.11 | Output 4 inverted status |
| Out4 pls. | ON | 7.12 | Output 4 pulsed status |
| Out mA1 | 4-20 +/- | 7.13 | Analog current output 1 range |
| A1S | dm3/s | 7.14 | Full scale value for analog out1 |

## COMMUN.

| COMMUNICATIONS | | |
|---|---|---|
| Comm.proc.abort | 8.1 | Communication process abort |
| Send status | 8.2 | Send device status information |
| Send DL format | 8.3 | Send data logger fields format |
| Send ST format | 8.4 | Send s.test data fields format] |
| Send proc.data | 8.5 | Send instantaneous process data |
| Send events | 8.6 | Send last system logged events |
| Send alarms | 8.7 | Send system alarms information |
| Send l.data | 8.8 | Send last logged process data |
| Send s.test | 8.9 | Send last sensor test data |
| Send config. | 8.10 | Send parameters config.data |
| Send fn.enable | 8.11 | Send functions enable status |
| Send qs.list | 8.12 | Send quick start func.list] |
| RTC sync.req. | 8.13 | Request a RTC synchronization |

```
MAIN MENU
 1-Sensor
 2-Units
 3-Scales
 4-Measure
 5-Alarms
 6-Inputs
 7-Outputs
 8-Communication
 9-Display
10-Data logger
11-
12-
13-
```

**COMMUN.**

| | | | |
|---|---|---|---|
| RTC sync.req. | | 8.13 | Request a RTC synchronization |
| Check m.box | | 8.14 | Check mail box for new mails |
| FTP download | ON | 8.15 | FTP download execute command |
| Mail send | ON | 8.16 | Mail send function enable |
| Mail rec. | ON | 8.17 | Mail receive function enable |
| FTP upload | ON | 8.18 | FTP upload function enable |
| FTP download | ON | 8.19 | FTP download function enable |
| Rmt.op.acl | 1 | 8.20 | Remote operations access level |
| File compr. | ON | 8.21 | File compression enable status |
| ZIP password | XXXXXXXX | 8.22 | Compressed archive password |
| Conn.test | ON | 8.23 | Connection test enable |
| Auto Ev.snd | ON | 8.24 | Automatic events send on alarms |
| Access p.name | XXXXXXXX | 8.25 | Access point name |
| Auth.type | OFF | 8.26 | Access point authentication type |
| User name | XXXXXXXX | 8.27 | Access point user name |
| User password | XXXXXXXX | 8.28 | Access point password |
| SMTP User | XXXXXXXX | 8.29 | User name for SMTP service |
| SMTP psw. | XXXXXXXX | 8.30 | Password for SMTP email service |
| POP3 User | XXXXXXXX | 8.31 | User name for POP3 service |
| POP3 psw. | XXXXXXXX | 8.32 | Password for POP3 email service |
| FTP User | XXXXXXXX | 8.33 | User name for FTP service |
| FTP password | XXXXXXXX | 8.34 | Password for FTP service |
| Min.sig.thr | ON | 8.35 | Min.antenna signal threshold |
| Primary DNS | 000.000.000 | 8.36 | Primary Domain Name Server |
| Secondary DNS | 000.000.000 | 8.37 | Secondary Domain Name Server |
| Retries | 3 | 8.38 | Max.number of session retries |
| Instr.ID | XXXXXXXX | 8.39 | Instrument identifier string |
| HELO string | XXXXXXXX | 8.40 | HELO identification string |
| Sender addr. | XXXXXXXX | 8.41 | Email address of sender |
| Receiver 1 | XXXXXXXX | 8.42 | Email address of receiver 1 |
| Receiver 2 | XXXXXXXX | 8.43 | Email address of receiver 2 |
| SMTP server | XXXXXXXX | 8.44 | SMTP mail send server name |
| SMTP sl | OFF | 8.45 | SMTP secure connection layer |
| SMTP port | 25 | 8.46 | SMTP mail send server port num. |
| POP3 server | XXXXXXXX | 8.47 | POP3 mail receive server name |
| POP3 sl | SSL/TLS | 8.48 | POP3 Secure connection layer |
| POP3 port | 995 | 8.49 | POP3 mail receive serv.port num. |
| FTP server | XXXXXXXX | 8.50 | FTP server name or address |
| FTP port | 21 | 8.51 | FTP server port number |
| FTP secure | ON | 8.52 | FTP secure connection enable |
| FTP data | XXXXXXXXXX | 8.53 | FTP root directory for data |
| FTP events | XXXXXXXXXX | 8.54 | FTP root directory for events |
| FTP commands | XXXXXXXXXX | 8.55 | FTP root directory for commands |
| Cert.check | ON | 8.56 | Server identity certif.check |
| NTP server | XXXXXXXXXX | 8.57 | NTP time server name |
| T.ref | YYYY/MM/DD | 8.58 | Data send time reference |
| InMsTm | 0:00 | 8.59 | Incoming message check time |
| ProcST | 0:00 | 8.60 | Process data send time |
| LogDST | 0:00 | 8.61 | Logger data send time |
| S.Compl.file | ON | 8.62 | Send only complete file |
| Alarm time | 0:00 | 8.63 | Alarm minimum send time interval |
| SMS f.en | ON | 8.64 | SMS functions global enable |
| Auth.number | 1234 | 8.65 | Authorized incoming phone number |
| Mess.recv.1 | 1234 | 8.66 | Short messages receiver 1 |
| Mess.recv.2 | 1234 | 8.67 | Short messages receiver 2 |
| Mess.recv.3 | 1234 | 8.68 | Short messages receiver 3 |

## DISPLAY

**DISPLAY**

| | | | |
|---|---|---|---|
| Language | EN | 9.1 | Language for all messages |
| Disp.time | s | 9.2 | Display/keyboard inactivity time |
| D.rate | | 9.3 | Display refresh rate |
| Disp.Fn. | 1 | 9.4 | Display function number |
| Disp.lock | OFF | 9.5 | Display function selection lock |
| Part.tot. | ON | 9.6 | Partial totalizers enable |
| Neg.tot. | ON | 9.7 | Negative totalizers enable |
| Net tot. | ON | 9.8 | Net totalizers enable |
| Disp.date | ON | 9.9 | Time and date display enable |
| Quick start | OFF | 9.10 | Quick start menu enable |

```
9-Display
10-Data logger
11-Functions
12-Diagnostic
13-System
```

## DATA LOGGER

**DATA LOGGER**

| | | | |
|---|---|---|---|
| D.logger en. | ON | 10.1 | Data logger enabling |
| Meas.units | ON | 10.2 | Measure unit recording enable |
| Field separ. | ; | 10.3 | Field separator character |
| Decim.separ. | . | 10.4 | Decimal separator character |
| Interv. | 0:01:00 | 10.5 | Sampling interval |
| Log T+ | OFF | 10.6 | Totalizer Total Positive Enable T+ |
| Log P+ | OFF | 10.7 | Totalizer Partial Positive Enable P+ |
| Log T- | OFF | 10.8 | Totalizer Total Negative Enable T- |
| Log P- | OFF | 10.9 | Totalizer Partial Net Enable P- |
| Log TN | OFF | 10.10 | Totalizer Total Net Enable |
| Log PN] | OFF | 10.11 | Totalizer Partial Net Enable |
| Log Q(UM) | OFF | 10.12 | Flow rate in Technical Units Enable |
| Log Q(%) | OFF | 10.13 | Flow rate in Percentage Enable |
| Log AL.EV | OFF | 10.14 | Alarm Events Enable |
| Log ADM | OFF | 10.15 | Additional Measures Enable |
| Log STR | OFF | 10.16 | Sensor Test Results Enable |
| Log BTS | OFF | 10.17 | Board TemperatureS Enable |
| Log IBV | OFF | 10.18 | Internal Board Voltages |
| Log EDC | OFF | 10.19 | Electrodes DC Voltages Enable |
| Log EAC | OFF | 10.20 | Electrodes AC voltages Enable |
| Log EIZ | OFF | 10.21 | Electrodes Source Impedance Enable |
| Log SCV | OFF | 10.22 | Sensor Coils Values Enable |

```
7-Outputs
8-Communication
9-Display
10-Data logger
11-Functions
12-Diagnostic
13-System
```

## FUNCTION

**FUNCTION**

| | | | |
|---|---|---|---|
| T+ reset | ON | 11.1 | Volume Totalizer Total Positive Reset |
| P+ reset | ON | 11.2 | Volume Totalizer Partial Positive Reset |
| T- reset | ; | 11.3 | Volume Totalizer Total Negative Reset |
| P- reset | . | 11.4 | Volume Totalizer Partial Negative Reset |
| Load Sens.f.def | 0:01:00 | 11.5 | Load Factory Default Sensor Data |
| Load Conv.f.def | OFF | 11.6 | Load Factory Default Converter Data |
| Save Sens.f.def | OFF | 11.7 | Save Factory Default Sensor Data |
| Save Conv.f.def | OFF | 11.8 | Save Factory Default Converter Data |
| Calibration | OFF | 11.9 | CALibration Immediate Command |

```
7-Outputs
8-Communication
9-Display
10-Data logger
11-Functions
12-Diagnostic
13-System
```

**DIAGNOSTIC**

| DIAGNOSTIC | | | |
|---|---|---|---|
| Self test | | 12.1 | Auto test Immediate Command |
| Display test | | 12.2 | Execute bit pattern test display |
| Verif.Sens.verify | | 12.3 | Sensor Verify Command |
| Flow sim. | OFF | 12.4 | Measure Simulation Enable |
| Diag.sys.val. | | 12.5 | Diagnostic system values |
| Display measures | | 12.6 | Diagnostic Measure VaLues |
| Disp.comm.vars | | 12.7 | Diagnostic Communication VaLues |
| SMS test | | 12.8 | Short Message Test |
| SMTP conn test | | 12.9 | SMTP Connection Test |
| POP3 conn.test | | 12.10 | POP3 Connection Test |
| FTP conn.test | | 12.11 | FTP Connection Test |
| Display graphs | | 12.12 | Oscilloscope function |
| SD card info | | 12.13 | SD memory Status |
| Firmware info | | 12.14 | Model and Software Version |
| S/N | 0 | 12.15 | Serial Number |
| WT | 000:00:00:00 | 12.16 | Total Working Time |
| TC | 0 | 12.17 | Total Measure Cycles |

MA
1
2
3
4
5
6
7
8
9
10-Data logger
11-Functions
12-Diagnostic
13-System

**SYSTEM**

| SYSTEM | | | |
|---|---|---|---|
| Dayl.saving | ON | 13.1 | Daylight Saving Time Enable |
| Time zone | +00.00 | 13.2 | Time zone |
| Date/time | ///00:00:00 | 13.3 | Date and Time |
| L1 code | XXXXXXXX | 13.4 | Level 1 Access CoDe |
| L2 code | XXXXXXXX | 13.5 | Level 2 Access CoDe |
| L3 code | XXXXXXXX | 13.6 | Level 3 Access CoDe |
| L4 code | XXXXXXXX | 13.7 | Level 4 Access CoDe |
| L5 code | XXXXXXXX | 13.8 | Level 5 Access CoDe |
| L6 code | XXXXXXXX | 13.9 | Level 6 Access CoDe |
| Restr.access | OFF | 13.10 | ReStricted Access Rule Enable |
| Device IP addr | 63015504 | 13.11 | Device IP Address |
| Client IP addr | 11.012.012 | 13.12 | Client IP Address |
| Network mask | 255.255.254 | 13.13 | Network MaSk |
| KT | 0.97882 | 13.14 | Coefficient KT |
| KS | 100.000 | 13.15 | Coefficient KS |
| KR | 100.000 | 13.16 | Coefficient KR |
| DAC1 4mA | 2460 | 13.17 | Current output 1 Calibration Point 1 |
| DAC1 20mA | 11050 | 13.18 | Current output 1 Calibration Point 2 |
| AIN1 SS | 0 | 13.19 | Analog input 1 Calibration Point 1 |
| AIN1 FS | 20000 | 13.20 | Analog input 1 Calibration Point 2 |
| AIN2 SS | 0 | 13.21 | Analog input 2 Calibration Point 1 |
| AIN2 FS | 20000 | 13.22 | Analog input 2 Calibration Point 2 |
| Stand-by | | 13.23 | System StandbY |
| FW update | | 13.24 | Firmware update |

MA
1
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7-Outputs
8-Communication
9-Display
10-Data logger
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12-Diagnostic
13-System

**SYSTEM**

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# FUNCTIONS DESCRIPTION
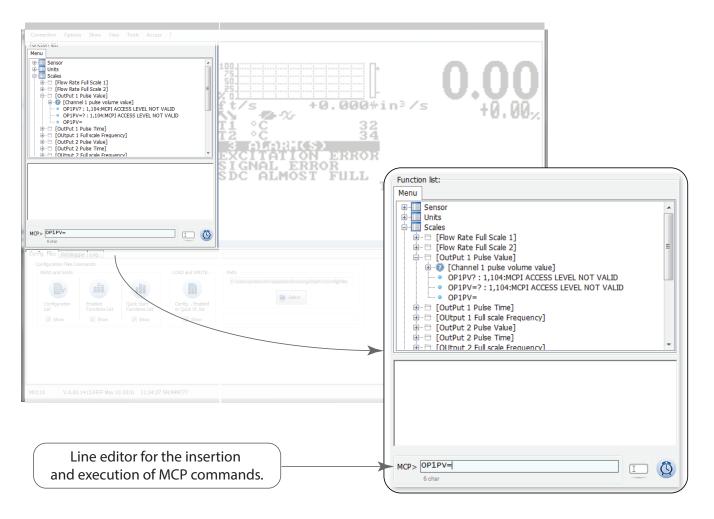
Here below the explanation on how the rows of menu are described:

Menu visualized on the converter (from 1 to 13)

## MENU 1 - SENSOR

| (POS. 1.1) Sensor Model | [S. model xxx] | AL4 | [SMODL] |

Synthetic description of the function

Convert request

Access level

MCP Command

The following picture describes where to find the name of the MCP functions in MCP-software. More info see MCP manual.



Line editor for the insertion and execution of MCP commands.

# MENU 1 – SENSOR

| | | | |
|---|---|---|---|
| **(POS. 1.1) Sensor MODeL** | **[S.model xxx]** | **AL4** | **[SMODL]** |

Enter the first two characters of the serial number of the sensor as on the sensor label.

| | | | |
|---|---|---|---|
| **(POS. 1.2) LIning MAterial Type** | **[Lining= Unspec.]** | **AL4** | **[LIMAT]** |

Flow sensor lining material type. (PFA; PU-TDI; ALON; PEEK; HR; PP; PA-11; PTFE-HT; PTFE).

| | | | |
|---|---|---|---|
| **(POS. 1.3) Sensor TYPE** | **[S. type= FULL BORE]** | **AL4** | **[STYPE]** |

Select the type of full-bore sensor or insertion. This function appears only if the sensor is not present in the standard sensor table parameters.

| | | | |
|---|---|---|---|
| **(POS. 1.4) Sensor Units TYPe** | **[U.type= METRIC]** | **AL4** | **[SUTYP]** |

Select type of measure unit of sensor's parameter. Values metric or imperial (inch).

| | | | |
|---|---|---|---|
| **(POS. 1.5) Pipe DIaMeter Value** | **[Diam.= mm xxx]** | **AL4** | **[PDIMV]** |

Select the nominal diameter of the sensor (0-2500). ND is written on the sensor label.

| | | | |
|---|---|---|---|
| **(POS. 1.6) CoeFFicient KA** | **[KA= + xx.xxx]** | **AL4** | **[CFFKA]** |

KA factor: calibration coefficient.

| | | | |
|---|---|---|---|
| **(POS. 1.7) CoeFFicient KA Negative** | **[KA= - xx.xxx]** | **AL4** | **[CFKAN]** |

KA factor: calibration coefficient for negative flow. This function is showed only if at least 1 negative KL value is set.

| | | | |
|---|---|---|---|
| **(POS. 1.8) CoeFFicient KZ** | **[KZ= +/- xxxxx]** | **AL4** | **[CFFKZ]** |

Sensor zero calibration factor.

| | | | |
|---|---|---|---|
| **(POS. 1.9) CoeFFicient KD** | **[KD= +/- xxxxx]** | **AL4** | **[CFFKD]** |

Calibration Dynamic Factor.

| | | | |
|---|---|---|---|
| **(POS. 1.10) Sensor Insertion POSition** | **[Ins.position= x]** | **AL4** | **[SIPOS]** |

Parameter that refers to the position of the insertion sensor. This function is activated when the function "1.3" pag. 50 is set to "insertion". See the insertion sensor manual for more details.

| | | | |
|---|---|---|---|
| **(POS. 1.11) Sensor Insertion Dynamic KP** | **[KP dynamic = ON/OFF]** | **AL4** | **[SIDKP]** |

KP dynamic coefficient. This function is activated when the function "1.3" pag. 50 is set to "insertion". See the insertion sensor manual for more details.

| | | | |
|---|---|---|---|
| **(POS. 1.12) CoeFFicient Ki** | **[Ki= +/- xx.xxx]** | **AL4** | **[CFFKI]** |

This function is activated when the function "1.3" pag. 50 is set to "insertion". See the insertion sensor manual for more details.

| | | | |
|---|---|---|---|
| **(POS. 1.13) CoeFFicient Kp** | **[Kp= +/- xxxxx]** | **AL4** | **[CFFKP]** |

This function is activated when the function "1.3" pag. 50 is set to "insertion". See the insertion sensor manual for more details.

| *(POS. 1.14) CoeFFicient KC* | [KC= +/- xx.xxx] | AL4 | [CFFKC] |
|---|---|---|---|

Calibration Factor. This function is activated if the sensor model is NOT present on the sensors table standard parameters

| *(POS. 1.15) Coils EXCitation Current* | [C.curr.= mA xxx.x] | AL4 | [CEXCC] |
|---|---|---|---|

Excitation coils current. This function is activated if the sensor model is NOT present on the sensors table standard parameters.

| *(POS. 1.16) Current Regulator PRop. Band* | [C.Reg.PB=xxx] | AL4 | [CRPRB] |
|---|---|---|---|

Proportional band of coils current regulator.This function is activated if the sensor model is NOT present on the sensors table standard parameters

| *(POS.1.17) Coils Regulator DERivative constant* | [C.Reg.DK=xxx] | AL4 | [CRDER] |
|---|---|---|---|

Derivative constant of coils current regulator. This function is activated if the sensor model is NOT present on the sensors table standard parameters

| *(POS. 1.18) Coils Current Rise TiMe* | [C.R.time] | AL4 | [CCRTM] |
|---|---|---|---|

Coils current rise time.

| *(POS. 1.19) Empty Pipe Detection ENable* | [E.P.Detect= ON] | AL3 | [EPDEN] |
|---|---|---|---|

Enables the empty pipe detection function. This function is useful to keep the meter lock to zero when the pipe become empty.

| *(POS. 1.20) Empty Pipe Detection THreshold* | [Z max= Kohm xxxx] | AL4 | [EPDTH] |
|---|---|---|---|

Empty tube detection threshold value. This function is activated if the function is enabled POS "1.19" pag. 50

| *(POS. 1.21) Signal Error ALarm Time* | [S.err.delay=m xxx] | AL4 | [SEALT] |
|---|---|---|---|

Delay before generating error. This function is useful to prevent unexpected lock to zero of measure caused by sporadic events (empty pipe, excitation error, signal error).

| *(POS. 1.22) Automatic Sensor VeriFy Enable* | [Sens. verify= OFF] | AL3 | [ASVFE] |
|---|---|---|---|

Enable the Automatic sensor verification (see BIV optional function).

| *(POS. 1.23) CoeFFicient KL* | [KL=XX +/- XXXXXXXXX] | AL4 | [SETKL] |
|---|---|---|---|

Flow linearization coefficient, reserved to the service. This command is only showed if SMODL = 000.

| *(POS. 1.24) SET KJ value* | [Zero point cal] | AL4 | [SETKJ] |
|---|---|---|---|

This function appears only when the conditions set by the values assigned to the DYNRT and DYNST functions are met, in detail:

❑ The flow rate is stable below the value assigned to the DYNRT function.

❑ At least the value assigned to the DYNST function must have elapsed since the last significant change in flow rate above the DYNRT value.

When the above conditions are met, the zero point calibration function appears on the display.

ALL OF THESE FUNCTIONS ARE RESTRICTED TO SERVICE, so the values assigned to these functions cannot be set.

# MENU 1 – SENSOR: ONLY MCP FUNCTIONS

| | | | |
|---|---|---|---|
| *Sensor Coils TiMe A* | [MCP ONLY] | AL4 | [SCTMA] |

Reference sensor coil time A

| | | | |
|---|---|---|---|
| *Sensor Coils TiMe B* | [MCP ONLY] | AL4 | [SCTMB] |

Reference sensor coil time B

| | | | |
|---|---|---|---|
| *Sensor Coils RESistance* | [MCP ONLY] | AL4 | [SCRES] |

Reference sensor coil resistance

| | | | |
|---|---|---|---|
| *Sensor E1 Reference Resistance* | [MCP ONLY] | AL4 | [SE1RR] |

Resistance value of E1 electrodes

| | | | |
|---|---|---|---|
| *Sensor E2 Reference Resistance* | [MCP ONLY] | AL4 | [SE2RR] |

Resistance value E2 electrodes

| | | | |
|---|---|---|---|
| *Sensor Coils Temperature ReFerence* | [MCP ONLY] | AL4 | [SCTRF] |

Sensor data reference temperature. Temperature measured on the coils of the sensor at the time of saving the instrument reference data for B.I.V. function The temperature value in degrees Celsius, which owns the sensor.

**Note:** the temperature must be estimated on the basis of the place of the sensor installation.

| | | | |
|---|---|---|---|
| *Automatic Sensor VeriFy Enable* | [MCP ONLY] | AL3 | [ASVFE] |

Enables the BIV functioning (see MCS manual)

| | | | |
|---|---|---|---|
| *SET KL values* | [MCP ONLY] | AL4 | [SETKL] |

Linearization measure coefficients

| | | | |
|---|---|---|---|
| *SET TK values* | [MCP ONLY] | AL4 | [SETTK] |

Temperature coefficients

| | | | |
|---|---|---|---|
| *SET KJ values* | [MCP ONLY] | AL4 | [SETKJ] |

Value of manual zeroing

MAN_MV255_IT_EN_IS_R16_1.06.XXXX

# MENU 2 – UNITS

**WARNING:** The totalizer value is updated and changed depending on the setting of unit value.The scale change may cause accuracy loss depending of rounding up. For example, if T +=0,234 liters with 3 decimals, it become T +=0.001 m³ losing 0.234 liters in rounding up.

<div style="writing-mode: vertical">The manufacturer guarantees only English text available on our web site www.isoil.com</div>

| *(POS. 2.1) Sensor DIameter Unit of Measure* | **[Diam.= mm]** | **AL2** | **[SDIUM]** |
|---|---|---|---|

Sensor diameter unit of measure (mm or inch)

| *(POS. 2.2) Sensor CAble length Unit of Measure* | **[S.Cable= m]** | **AL2** | **[SCAUM]** |
|---|---|---|---|

Sensor cable length for separate version. Select m or foot.

| *(POS. 2.3) Flow Rate Unit of Measure Type* | **[FR. UNIT= METRIC]** | **AL2** | **[FRMUT]** |
|---|---|---|---|

Flow rate type measure unit. Select metric or not metric (Imperial units)

| *(POS. 2.4) PuLse 1 Unit of measure Type* | **[PL1 unit= METRIC]** | **AL2** | **[PL1UT]** |
|---|---|---|---|

Impulse unit of measure 1: metric or non-metric (English and American units). This works if you function POS. "7.3" pag. 52 is set to the pulse value. Furthermore the value of this function manages the full scale values of the function "3.2" pag. 51

| *(POS. 2.5) PuLse 2 Unit of measure Type* | **[PL2 unit= METRIC]** | **AL2** | **[PL2UT]** |
|---|---|---|---|

Pulse unit of measure 2: metric or non-metric (English and American units). This works if you function POS. "7.6" pag. 52 is set to the pulse value. Furthermore the value of this function manages the full scale values of the function "3.4" pag. 51.

| *(POS. 2.6) Totalizer Total Positive Unit of measure Type* | **[T+ unit= METRIC]** | **AL2** | **[TTPUT]** |
|---|---|---|---|

This function sets the type of unit of measurement of the totalizer: metric or non-metric (English and American units).

| *(POS. 2.7) Totalizer Total Positive Unit of Measure* | **[U.M.T+= dm³]** | **AL2** | **[TTPUM]** |
|---|---|---|---|

This function sets the unit of measurement for the total direct totalizer. The choice of its values depends on the choice of the unit of measurement of the function POS. "2.6" pag. 50.

| *(POS. 2.8) Totalizer Total Positive Decimal Point position* | **[T+ D.P.= x]** | *AL2* | **[TTPDP]** |
|---|---|---|---|

Setting total direct totalizer decimal point position. Example: T+D.P.= 3 visualized value T+dm³ 0.000 / T+D.P.= 2 visualized value T+dm³ 0.00

| *(POS. 2.9)Totalizer Partial Positive Unit of measure Type* | **[P+ unit=  METRIC]** | **AL2** | **[TPPUT]** |
|---|---|---|---|

This function sets the type of unit of measurement of the partial totalizer: metric or non-metric (English and American units).

| *(POS. 2.10) Totalizer Partial Positive Unit of Measure* | **[P+ unit=  dm³]** | **AL2** | **[TPPUM]** |
|---|---|---|---|

This function sets the unit of measurement for the total total totalizer. The choice of its values depends on the choice of the unit of measurement of the function POS. "2.9" pag. 50

| **(POS. 2.11) Totalizer Partial Positive Decimal Point position** | **[N.d.P+= x]** | *AL2* | **[TPPDP]** |
|---|---|---|---|

Setting partial direct totalizer decimal point position. Example: P+D.P.= 3 visualized value P+dm³ 0.000 / P+D.P.= 2 visualized value P+dm³ 0.00

| **(POS. 2.12) Totalizer Total Negative Unit of measure Type** | **[T- unit= METRIC]** | **AL2** | **[TTNUT]** |
|---|---|---|---|

This function sets the type of unit of measurement of the total inverse totalizer: metric or non-metric (English and American units).

| **(POS. 2.13) Totalizer Total Negative Unit of measure Type** | **[T- unit= dm³]** | **AL2** | **[TTNUM]** |
|---|---|---|---|

This function sets the unit of measurement for the total inverse totalizer. The choice of its values depends on the choice of the unit of measurement of the function POS. "2.12" pag. 50.

| **(POS. 2.14) Totalizer Total Negative Decimal Point position** | **[T- D.P.= x]** | **AL2** | **[TTNDP]** |
|---|---|---|---|

Setting total reverse totalizer decimal point position. Example: T- D.P.= 3 visualized value T- dm³ 0.000; T- D.P.= 2 visualized value T- dm³ 0.00.

| **(POS. 2.15) Totalizer Partial Negative Unit of Measure** | **[P- unit= METRIC]** | **AL2** | **[TPNUT]** |
|---|---|---|---|

This function sets the type of unit of measurement of the inverse partial totalizer: metric or non-metric (English and American units).

| **(POS. 2.16) Totalizer Partial Negative Unit of Measure** | **[P- unit= dm³]** | **AL2** | **[TPNUM]** |
|---|---|---|---|

This function sets the unit of measurement for the inverse partial totalizer. The choice of its values depends on the choice of the unit of measurement of the function POS. "2.15" pag. 50

| **(POS. 2.17) Totalizer Partial Negative Decimal Point position** | **[P- D.P.= x]** | **AL2** | **[TPNDP]** |
|---|---|---|---|

Setting partial reverse totalizer decimal point position. Example: P- D.P.= 3 visualized value P-dm³ 0.000; P- D.P.= 2 visualized value P-dm³ 0.00.

| **(POS. 2.18) TeMPerature Unit of Measure** | **[Temp. unit= C°]** | **AL2** | **[TMPUT]** |
|---|---|---|---|

Setting temperature measure unit.

| **(POS. 2.19) MaSS Units Enable** | **[Mass units= ON/OFF]** | **AL2** | **[MSSUE]** |
|---|---|---|---|

Enable or Disable the selection of mass unit of full scale set.

| **(POS. 2.20) Volume to Mass Specific Gravity Coefficient** | **[Sg= Kg/dm³ x.xxxx]** | **AL2** | **[VMSGC]** |
|---|---|---|---|

Specific weight setting. This function is activated when the function is enabled POS."2.19" pag. 50.

| **(POS. 2.21) ANalog Input 1 measure Unit** | **[AIN1 m.u. ]** | **AL2** | **[AIN1U]** |
|---|---|---|---|

Analog Input 1 measure Unit

| **(POS. 2.22) ANalog Input 2 measure Unit** | **[AIN2 m.u.]** | *AL2* | **[AIN2U]** |
|---|---|---|---|

Analog Input 2 measure Unit

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# MENU 3 SCALE

| *(POS. 3.1) Flow Rate Full Scale 1* | **[FS1= l/s xxxx.x]]** | **AL4** | **[FRFS1]** |
|---|---|---|---|

The full scale is used to indicate the maximum flow rate of the meter. The scale must be chosen carefully, since its value is used for many other parameters. There are three input fields for this parameter, from left to right:

1) unit of measure 2) unit of time 3) numerical value

The selection is done by positioning the cursor over the field to be modified. To change the type of measurement (metric, British or American, mass or volume) see functions POS "2.3" pag. 50, POS "2.20" pag. 50.
The value of Fs1-2 also depends on the value of the nominal diameter set by the function POS "2.10" pag. 50 .The following tables shown the units of measure available and the conversion factor by comparison with 1dm3 and 1kg. The converter accepts any kind of combination of units of measure satisfying both the following conditions:

❑ Numeric field value 99999

❑ 1/25 fsmax ≤ numeric field value ≤ fsmax.

Where fsmax is the maximum full scale value corresponding to the sensor, equal to a 10m/s liquid speed. The measure units are shown as appear on the display. The Imperial units units are diversified by using capital and small characters.

| METRIC | |
|---|---|
| cm³ | Cubic centimeter |
| ml | Milliliter |
| l | Liter |
| dm³ | Cubic decimeter |
| dal | Decaliter |
| hl | Hectoliter |
| m³ | Cubic meter |
| ML | Mega Liter |

| NON METRIC | |
|---|---|
| in³ | Cubic inch |
| Gal | American gallon |
| GAL | Imperial gallon |
| ft³ | Cubic foot |
| bbl | Standard barrel |
| BBL | Oil barrel |
| yd³ | Cubic yard |
| kgl | KAmerican Gallon |
| KGL | K British Gallon |
| IGL | Imperial Gallon |
| IKG | Imperial K Gallon |
| IGL | Acre foot |
| MGL | Mega Gallon |
| IMG | Imperial Mega Gallon |

| MASS UNIT NOT METRIC | |
|---|---|
| Oz | Ounce |
| Lb | Pound |
| Ton | Short tons |

| MASS UNIT METRIC | |
|---|---|
| g | Gram |
| Kg | Kilogram |
| t | Ton |

When a measure mass unit is set, the specific gravity function is automatically enabled by the system. Please, note that the mass measure is heavily affected by the temperature. With certain liquids this may cause significant measurement errors. The following measure of time units can be selected: s = second, m = minute, h = hour, d = day .

## NOTES FOR USING THE MCP INTERFACE

The command FRFS1 =? and command FRS2 = ?, edited by MCP software, return a list of only the unit compatible with the nominal diameter set. If the sensor is insertion type and the diameter is zero, the only possible unit is m/s if the flow rate were chosen metric units, else f/s for the unit of measurement non metric.

| (POS.3.2-3.4) OutPut 1-2 Pulse Value | [Pls1-Pls2= dm³ x.xxxxx] | AL2 | [OP1PV-OP2PV] |
|---|---|---|---|

Vps1 and Vps2 is activated when the pulse values on channel 1 and 2 are set by the following functions POS "7.1" pag. 52; POS "7.4" pag. 52

This function allows the user to reset the generation of a pulse when a defined amount of liquid has passed through the sensor.

To set the parameter, complete the 2 fields, from left to right: 1) unit of measurement 2) numerical value and the selection is made by positioning the cursor in the field to be modified. To change the type of unit (metric, British or American, mass or volume) see the function POS "2.4" pag. 50; POS "2.5" pag. 50. The value Vps1 and Vps2 depends on the nominal diameter that can be set by the function POS "1.5" pag. 50 and the available units of measurement are those that can be set and described in the function POS "3.1" pag. 51.

| (POS.3.3-3.5) OutPut 1-2 Pulse Time | [Tpls1-2= ms x.xxxxx] | AL2 | [OP1PT-OP2PT] |
|---|---|---|---|

Output 1 and output 2 pulse duration. Tmps1 and Tmps2 is activated when the pulse values on channel 1 and 2 are set by the following functions POS "7.1" pag. 52 and POS"7.4" pag. 52

. The user must set the corresponding duration of the pulse to be outputed. This value is expressed in milliseconds and has to be between 5 and 99 ms. When the high frequency output is present, then the minimum value can type of device is connected to the converter, the user must verify that the set pulse duration is compatible with the external device processing such pulses. If, for example, and electromechanical pulse counter is connected, a minimum pulse time of 5 milliseconds can be set.

**ATTENTION:** The converter can not detect problems that may occur; firstly, the pulse is too long the coils may burn out, secondly, if the pulse is too short, the counter may not be able to function, causing damage of the output.

| (POS.3.6) ANalog Input 1 Scale | [AIN1] | AL6 | [AIN1S] |
|---|---|---|---|

Analog input 1 sensor's scale

| (POS.3.7) ANalog Input 2 Scale | [AIN2] | AL6 | [AIN2S] |
|---|---|---|---|

Analog input 2 sensor's scale .

# MENU 4 MEASURE

| (POS. 4.1) Measure Filter BYPass | [Filt.bypass= ON/OFF] | AL3 | [MFBYP] |
|---|---|---|---|

This function modifies the standard behaviour of the filtering system. It can take the following values:

❑ **"OFF":** SMART adaptive filtering mode, with continuous measure evaluation analysis (default mode, standard use)

❑ **"1":** When the absolute value of the flow rate is greater than a minimum threshold (0.1 - 0.25% of 10 m/s f.s) the measure value is given without any filtering action. It permits to have the fastest possible response from the meter. Bypassing the filter implies that the obtained measure is more noisy than usual. This function may be useful for systems that needs to react to flow rate changes with the maximum speed and they don't care about unstable flow rate readings. Selecting an appropriate volume unit for pulses and totalizers (as big as possible) can minimize or even null the noise in long term evaluation.

❑ **"2":** The measure value is always filtered with the longest delay and strongest filtering action. It can be used when the level of native noise or instability on the measure is really high, preventing any smart filtering action. In this case the system will be really slow to react to flow step changes, but still capable of accurate readings.

| *(POS. 4.2) Measure Filter CUt-off Threshold* | **[Cut-off=XX.X%]** | **AL3** | **[MFCUT]** |
|---|---|---|---|

Setting the low flow cutoff threshold. This function is useful to avoid that flows close to zero, due to the electrical noises from tiny movements of liquid (due for example to vibrations of the pipe) which cause an increasing of the totalizers. The allowed range for this function is 0-25% of full scale set. For most applications a value between 0.5 and 1% is recommended.

| *(POS. 4.3) Auto CAlibration Verify Enable* | **[Cal.verify=ON/OFF]** | **AL3** | **[ACAVE]** |
|---|---|---|---|

This function enables an automatic verification of board's coefficients. As the converter performs continuously a large number of tests, we recommend to use this function only in presence of wide range of temperature. Instead it is NOT recommended to use it when the instrument is used in metering applications (batch).

| *(POS. 4.4) High Immunity INPuts* | **[H.imm.inp.]** | **AL4** | **[HIINP]** |
|---|---|---|---|

The HIINP function (INPut High Immunity filter) introduces a hardware filter to be used ONLY IN CASE OF ABSOLUTE NECESSITY, when the measure is absolutely unstable or it is NOT possible to make the measure, and every possible attempt to reduce or eliminate the noise do not give a positive result, with particular attention of instrument ground connection. When this function is activated (HIINP = ON) the measure will be influenced by an unavoidable error estimated around 1%..

## MENU 4 – MEASURE: ONLY MCP FUNCTIONS

| *Measure Sampling TiMe* | **[MCP ONLY]** | **AL4** | **[MSTME]** |
|---|---|---|---|

This function allows to program the sampling interval within these values:

0:'01(s)'|1:'02(s)'|2:'03(s)'|3:'04(s)'|4:'05(s)'|5:'06(s)'|6:'10(s)'|7:'12(s)'|8:'15(s)'

default value=8:'15(s)'

| *Measure Filter Cut-off Threshold 2* | **[MCP ONLY]** | **AL6** | **[MFCT2]** |
|---|---|---|---|

Setting the low flow cutoff threshold, it is similar to the function in 4.2. The value of this function is NOT visible on diplay but only with MCP command.

| *PRessure CUt-off Threshold* | **[MCP ONLY]** | **AL3** | **[PRCUT]** |
|---|---|---|---|

Pressure cut-off threshold

| *Low Power cycle SIMulation* | **[LP Cycle sim.=ON/OFF]** | **AL6** | **[LPSIM]** |
|---|---|---|---|

Low power measurement cycle simulation.

| *DYNamic Sample Analysis* | **[MCP ONLY]** | **AL6** | **[DYNSA]** |
|---|---|---|---|

Reserved to the service

| *DYNamic Sample Time* | **[MCP ONLY]** | **AL6** | **[DYNST]** |
|---|---|---|---|

Reserved to the service

| *DYNamic Range Threshold* | **[MCP ONLY]** | **AL6** | **[DYNRT]** |
|---|---|---|---|

Reserved to the service

# MENU 5 ALARMS

| *(POS. 5.1) Flow Rate Alarm maX Positive* | **[Max+=XXXXX]** | **AL3** | **[FRAXP]** |
|---|---|---|---|

Maximum value alarm set for direct flow rate set. When the flow rate value exceeds such a threshold, then an alarm message is generated. The value of this parameter is expressed in technical units and can be set from 0 to frmax, with resolution 1/250 of frmax.Setting this parameter to OFF disables the alarm start.

| *(POS. 5.2) Flow Rate Alarm maX Negative* | **[Max-=XXXXX]** | **AL3** | **[FRAXN]** |
|---|---|---|---|

Maximum value alarm set for reverse flow rate set. When the flow rate value exceeds such a threshold, then an alarm message is generated. The value of this parameter is expressed in technical units and can be set from 0 to frmax, with resolution 1/250 of frmax.Setting this parameter to OFF disables the alarm start.

| *(POS. 5.3) Flow Rate Alarm miN Positive* | **[Min+=XXXXX]** | **AL3** | **[FRANP]** |
|---|---|---|---|

Minimum value alarm set for reverse flow rate set. When the flow rate value falls below such a threshold, then an alarm message is generated. The value of this parameter is expressed in technical units and can be set from 0 to frmax, with resolution 1/250 of frmax.Setting this parameter to OFF disables the alarm start.

| *(POS. 5.4) Flow Rate Alarm miN Negative* | **[Min-=XXXXX]** | **AL3** | **[FRANN]** |
|---|---|---|---|

Minimum value alarm set for reverse flow rate set. When the flow rate value falls below such a threshold, then an alarm message is generated. The value of this parameter is expressed in technical units and can be set from 0 to frmax, with resolution 1/250 of frmax.Setting this parameter to OFF disables the alarm start.

| *(POS. 5.5) Alarm Thresholds HYSteresis* | **[Hysteresis=XXXXX]** | **AL3** | **[ATHYS]** |
|---|---|---|---|

Hysteresis threshold set for minimum and maximum flow rate alarms. The value of this parameter is expressed in technical units and can be set from 0 to 1/250 of the fsmax at 10 m / s..

## GENERAL NOTE FOR ALARM THRESHOLDS ( POS 5.5-5.6-5.7-5.8-5.9 )

To set the alarm threshold the system calculates a technical units value using the data entered as an alarm value and as reference the full scale of the corresponding analog channel. If the calculated technical units value is close to zero, the function changes to the "OFF" value.

% Value set internally = (100 x value set on the display) / full scale value

Therefore make sure that the value entered is sufficient not to fall back into the condition for which the function switches to the "OFF" value.

| *(POS. 5.6) Analog Input 1 alarm MaX* | **[A1Mx=XXXXXX]** | **AL3** | **[AI1MX]** |
|---|---|---|---|

MAX analog input 1 alarm threshold. Set this parameter to zero to disable the alarm start.

| *(POS. 5.7) Analog Input 1 alarm MiN* | **[A1Mn=XXXXXX]** | **AL3** | **[AI1MN]** |
|---|---|---|---|

Alarm threshold MIN analog input 1. Set this parameter to zero to disable the start of the alarm.

| *(POS. 5.8) Analog Input 1 HYsterisis* | **[In1H=xxx]** | **AL3** | **[HI1HY]** |
|---|---|---|---|

Analog Input 1 hysterisis value

| *(POS. 5.9) Analog Input 2 alarm MaX* | **[A2Mx=XXXXXX]** | **AL3** | **[AI2MX]** |
|---|---|---|---|

MAX alarm input analogue threshold 2. Set this parameter to zero to disable the start of the alarm.

| *(POS. 5.8) Analog Input 2 alarm MiN* | **[A2Mx=XXXXXX]** | **AL3** | **[AI2MN]** |
|---|---|---|---|

Alarm threshold MIN analogue input 2. Set this parameter to zero to disable the start of the alarm.

| *(POS. 5.11) Analog Input 2 HYsterisis* | **[In2H=xxx]** | **AL3** | **[HI2HY]** |
|---|---|---|---|

 Analog Input 2 hysterisis value

| *(POS. 5.10) ConFiguration Access Alarm Enable* | **[Cfg.ac.al= ON/OFF]** | **AL3** | **[CFAAE]** |
|---|---|---|---|

Configuration access alarm. Alarm used to protect the device from any tampering with hardware or access to the unauthorized system.

| *(POS. 5.11) Power Supply Loss Alarm Enable* | **[P.S. off. al= ON/OFF]** | **AL3** | **[PSLAE]** |
|---|---|---|---|

Power supply off state alarm. This function activates an alarm in the absence of mains power.

## MENU 6 INPUTS

| (POS. 6.1-2) Volume Totalizer Total/Partial Positive reset Enable | [T/P+/RESET=ON/OFF] | AL3 | [VTTPE][VTPPE] |

Enable positive totalizer count reset. When one of these functions is enabled (ON), the relative direct totalizer + can be reset through the input.

| (POS. 6.3-4) Volume Totalizer Total/Partial Negative reset Enable | [T/P-/RESET=ON/OFF] | AL3 | [VTTNE][VTPNE] |

Enable positive totalizer count reset. When one of these functions is enabled (ON), the relative inverse totaliser - can be reset through the input.

| (POS. 6.5) Totalizers Count Lock Input Enable | [Count lock= ON/OFF] | AL3 | [TCLIE] |

Totalizers counting lock command enable. When this function is active, applying a voltage on the on/off input terminals the system stops the totalizers no matter which is the flow rate.

| (POS. 6.6) MeaSure Lock Input Enable | [Meas.lock=ON/OFF] | AL3 | [MSLIE] |

When this function is active (ON), applying a voltage on the on input terminals, the measurement is stopped, the meter will display zero flow.

| (POS. 6.7) CALibration Input Enable | [Calibration=ON/OFF] | AL3 | [CALIE] |

When this function is active, applying a voltage on the on/off input terminals the meter performs a autozero calibration cycle. **ATTENTION:** If the voltage pulse is less than 1 sec., the meter performs a calibration cycle to compensate possible thermal drifts. If the voltage pulse is more 1 sec, the meter performs a zero calibration measure. To perform the calibration it is absolutely necessary for the sensor to be full of liquid and that the liquid is perfectly still. Even very small movement of the liquid may affect the result of the calibration, and, consequently, the accuracy of the system.

| (POS. 6.8) SYStem Violation Detect | [sys.v.detect =ON/OFF] | AL3 | [SYSVD] |

Enable alarm related to system violation.

| (POS. 6.9) Digital INput 2 Function | [D.In2=All./Vi.sist/OFF] | AL3 | [DIN2F] |

Input 2 function selection. The values that can be set are: system violation, flooding and OFF.

| (POS. 6.10) Digital Input 3 Function | [D.In3=All./Vi.sist/OFF] | AL3 | [DIN3F] |

Input 3 function selection. The values that can be set are: system violation, flooding and OFF

| (POS. 6.11) Digital INputs Power Supply | [D.in p.sup.=ON/OFF] | AL3 | [DINPS] |

Digital auxiliary input power supply.

# MENU 7 OUTPUTS

The values to be associated with outputs 1/2/3/4 relating to functions 7.1 / 7.4 / 7.7 / 7.10 are listed below:

- ❑ **OFF:** DISABLE

- ❑ **MAX AL. +:** MAX DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MIN AL. +:** MIN DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MAX/MIN+:** MAX/MIN DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MAX AL.-:** MAX INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MIN AL.-:** MAX INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MAX/MIN- :** MAX/MIN INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **MAX/MIN+/-:** MAX/MIN DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)

- ❑ **P.EMPTY:** EMPTY PIPE ALLARM OUTPUT (ENERGIZED = AL. OFF)

- ❑ **HARDW AL.SYSTEM ALARM:** IT IS ACTIVATED WHEN ONE OR MORE OF THE FOLLOWING CONDITIONS OCCUR: coil excitation error, flow measurement acquisition error (critical signal or acquisition conditions), auxiliary measurement acquisition error. if they are installed (temperature, pressure, etc.)

- ❑ **OVERFLOW:** OUT OF RANGE ALLARM OUTPUT (ENERGIZED = FLOWRATE OK)

- ❑ **ALL ALARMS:** SUM OF ALL ALARMS POSSIBLE

- ❑ **EXT. COMM:** THE OUTPUT CAN ASSUME A STATUS DEPENDENT ON AN EXTERNAL COMMAND (via MCP, MODBUS, etc.)

- ❑ **BATT. LOW:** REPORT WHEN THE BATTERIES ARE ALMOST EMPTY

- ❑ **FLOW RATE SIGN.:** FLOW DIRECTION (ENERGIZED WHEN FLOW IS NEGATIVE)

- ❑ **IAN1 MAX:** MAXIMUM VALUE OF ANALOGUE INPUT 1 (function linked to the values set in the function "3.6" pag. 49)

- ❑ **IAN1 MIN:** MINIMUM VALUE OF ANALOGUE INPUT 1 (function linked to the values set in the function "3.6" pag. 51)

- ❑ **IAN1 MX / MN:** MAXIMUM AND MINIMUM VALUE OF ANALOGUE INPUT 1 (function linked to the values set in the function "3.6" pag. 51)

- ❑ **AIN2 MAX:** MAXIMUM VALUE OF ANALOGUE INPUT 2 (function linked to the values set in the function "3.7" pag. 51 )

- ❑ **AIN2 MIN:** MINIMUM VALUE OF ANALOGUE INPUT 2 (function linked to the values set in the function "3.7" pag. 51 )

- ❑ **AIN2 MX / MN:** MAXIMUM AND MINIMUM VALUE OF ANALOGUE INPUT 2 (function linked to the values set in the function "3.7" pag. 51 ))

- ❑ **PULSES.+:** PULSE POSITIVE FLOW RATE

- ❑ **PULSES.-:** PULSE NEGATIVE FLOW RATE

- ❑ **PULSES+/-:** PULSE NEGATIVE/POSITIVE FLOW RATE

| *(POS. 7.1) OUTput 1 Function* | [Out1= XXXXX] | AL3 | [OUT1F] |
|---|---|---|---|

Assigned function output 1. The values that can be set are described in the introduction to the MENU 7 OUTPUTS description.

| *(POS. 7.2) OUtput 1 INVerted status* | [Out1 inv.= OFF/ON] | AL3 | [O1INV] |
|---|---|---|---|

Output 1 Inverted status
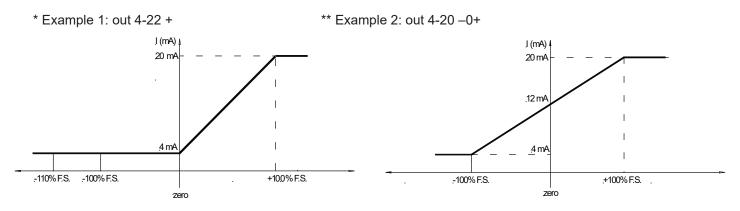
| *(POS. 7.3) OUtput 1 PuLsed Status* | **[Out1 inv.= OFF/ON]** | **AL3** | **[O1PLS]** |
|---|---|---|---|

Output 1 PuLsed Status

| *(POS. 7.4) OUTput 2 Function* | **[Out2= XXXXX]** | **AL3** | **[OUT2F]** |
|---|---|---|---|

Assigned function output 2. The values that can be set are described in the introduction to the MENU 7 OUTPUTS description.

| *(POS. 7.5) OUtput 2 Inverted status* | **[Out2 inv.= OFF/ON]** | **AL3** | **[O2INV]** |
|---|---|---|---|

OUtput 2 INVerted status.

| *(POS. 7.6) OUtput 2 PuLsed Status* | **[Out2 pls.= OFF/ON]** | **AL3** | **[O2PLS]** |
|---|---|---|---|

Output 2 impulsive operation

| *(POS. 7.7) OUTput 3 Function* | **[Out3= XXXXX]** | **AL3** | **[OUT3F]** |
|---|---|---|---|

Assigned function output 3. The values that can be set are described in the introduction to the MENU 7 OUTPUTS description.

| *(POS. 7.8) OUtput 3 Inverted status* | **[Out3 inv.= OFF/ON]** | **AL3** | **[O3INV]** |
|---|---|---|---|

OUtput 3 INVerted status.

| *(POS. 7.9) OUtput 3 PuLsed Status* | **[Out3 pls.= OFF/ON]** | **AL3** | **[O3PLS]** |
|---|---|---|---|

Output 3 impulsive operation

| *(POS. 7.10) Output 4 Function* | **[Out4= XXXXX]** | **AL3** | **[OUT4F]** |
|---|---|---|---|

Assigned function output 4. The values that can be set are described in the introduction to the MENU 7 OUTPUTS description.

| *(POS. 7.11) Output 4 Inverted status* | **[Out4 inv.= OFF/ON]** | **AL3** | **[O4INV]** |
|---|---|---|---|

OUtput 4 Inverted status.

| *(POS. 7.12) OUtput 4 PuLsed Status* | **[Out4 pls.= OFF/ON]** | **AL3** | **[O4PLS]** |
|---|---|---|---|

Output 4 impulsive operation

| *(POS. 7.13) Analog Out. 1 ConFig.* | **[Out mA1= XXXXX]** | **AL3** | **[AO1CF]** |
|---|---|---|---|

Choice of the measuring range to be associated with the current output 1. There are three modification fields:

❑ Scale zero: 4 or 0mA

❑ Full scale: 20 or 22mA

❑ Field: + = positive, - = negative, blank = both, -0+ = central zero scale

The values corresponding to the scale points are shown in the following chart:

ISOIL
INDUSTRIA

| CURRENT VALUES IN mA ASSOCIATE TO THE % FULL SCALE VALUE | | | | | |
|---|---|---|---|---|---|
| **POSSIBLE FIELD** | **REVERSE FLOW VALUE** | | **ZERO** | **DIRECT FLOW VALUE** | |
| | **≤-110%** | **-100%** | **0%** | **+100%** | **≥+110%** |
| Out.mA = 4 ÷ 20 + | 4 | 4 | 4 | 20 | 20 |
| Out.mA = 4 ÷ 20 - | 20 | 20 | 4 | 4 | 4 |
| Out.mA = 4 ÷ 20 | 20 | 20 | 4 | 20 | 20 |
| **Out.mA = 4 ÷ 20 –0+ | 4 | 4 | 12 | 20 | 20 |

* Example 1: out 4-22 +          ** Example 2: out 4-20 –0+



| (POS. 7.14) Analog Output 1 Full Scale | [A1S= xx/x  x.xxxx] | *AL3* | [AO1FS] |

It allows to set the full scale value for analog output 1 independently from the main scale of the instrument.

## MENU 8 COMMUNICATION

For further information on the commands of the 8 communication menu, consult the MV255-3G-4G manual.

| *(POS. 8.1) communication process ABORT* | **[Comm.proc.abort]** | **AL3** | **[ABORT]** |
|---|---|---|---|

Immediate termination of the ongoing communication operation.

| *(POS. 8.2) Send Status INFormation* | **[Send status]** | **AL3** | **[SSINF]** |
|---|---|---|---|

Sending information on the status of the device: with this command an e-mail message is sent (or sent via FTP) to the e-mail address set containing the system status not as an attached file but as an e-mail text.

| *(POS. 8.3) Send Data Logger Fields Format* | **[Send DL format]** | **AL3** | **[SDLFF]** |
|---|---|---|---|

Sending format of process data fields collected in the data logger. With this command an e-mail message is sent (or sent via FTP) containing as attachment a CSV file whose fields represent the format with which the process data collected in the data logger will be formatted. Each field can consist of a mnemonic code, the equal symbol and an identifier that expresses the format of the numeric field.

Examples:

❑ RNUM = 5.0: number of records, data format = 5 integers

❑ DATE = yyyy / mm / dd: date expressed in year / month / day

❑ TIME = hh: mm: ss: time expressed in hours: minutes: seconds

❑ U = <measurement unit>: unit of measurement used

❑ TOT_T + = 9.x: total positive totalizer value expressed with numeric field up to 9 digits, of which x decimals

For further details, a list of mnemonic codes can be found in the manual relating to the 3G/4G communication of the MV255 product.

| *(POS. 8.4) Send Sensor Test data Fields Format* | **[Send ST format]** | **AL3** | **[SSTFF]** |
|---|---|---|---|

Sending format fields of sensor analysis data collected in the data logger. This command sends an e-mail message (or sent via FTP) containing a CSV file as an attachment whose fields represent the format in which the analysis data relating to the sensor test system (BIV) collected in the date will be formatted logger. Each field can consist of a mnemonic code, the equal symbol and an identifier that expresses the format of the numeric field.

Examples:

❑ RNUM = 5.0: number of records, data format = 5 integers

❑ DATE = yyyy / mm / dd: date expressed in year / month / day

❑ TIME = hh: mm: ss: time expressed in hours: minutes: seconds

❑ U = <measurement unit>: unit of measurement used

❑ ST_CODE = x4.0: code of the sensor test result, in hexadecimal format, without decimals (x in front of the number indicates hexadecimal format, 0 after the point indicates the number of decimal places, in this case zero)

For further details, a list of mnemonic codes can be found in the manual relating to the 3G/4G communication of the MV255 product.

| (POS. 8.5) Send Instantaneous PRocess Data | [Send proc.data] | AL3 | [SIPRD] |
|---|---|---|---|

Send instant process data. With this command an e-mail message is sent (or sent via FTP) containing a CSV file with the process data measured as the message is sent as an attachment. The format of the data and the fields are the same as those used for the data logger.

| (POS. 8.6) Send Last EVenTs | [Send events] | AL3 | [SLEVT] |
|---|---|---|---|

Sending last system events (MCP = SLEVT): with this command an e-mail message is sent (or sent via FTP) containing a text file (.TXT) with the list of system events as an attachment.

| (POS. 8.7) Send ALaRMs | [Send ALaRMs] | AL3 | [SALRM] |
|---|---|---|---|

Sending alarm status (MCP = SALRM): with this command an e-mail message is sent (or sent via FTP) containing the alarm status as an attachment. The file format is described in the following example:

2018/06 / 06-18: 12: 00 ALARMS STATUS INTERVAL = 10m REL.TIME = 00: 10: 00

[AL.N.] [DESCRIPTION] [STATUS] [COUNT]

21 BATTERY 2 LOW OFF 1

In the first field there is the date and time. INTERVAL = xx specifies the time interval in which the system processes and examines the alarm situation. REL.TIME = hh: mm: ss indicates the time relative to the alarm analysis interval (this time goes from zero to the maximum value of the interval).

[AL.N.] indicates the alarm number

[DESCRIPTION] indicates a brief description of the alarm

[STATUS] indicates the current status of the alarm

[COUNT] indicates how many times that specific alarm has been activated and then deactivated in the alarm analysis time interval

| (POS. 8.8) Send Last LOGged data | [Send l.data] | AL3 | [SLLOG] |
|---|---|---|---|

Send the process data present in the data logger. With this command an e-mail message is sent (or sent via FTP) containing as an attachment the last data collected by the data logger from the last request to send or from the start of the day (from 00:00:00).

| (POS. 8.9) Send Last Sensor Test Data | [Send s.test] | AL3 | [SLSTD] |
|---|---|---|---|

Sending of sensor test analysis data (BIV). With this command an e-mail message is sent (or sent via FTP) containing as attachment the latest sensor test analysis data (BIV) from the last request to send or from the start of the day (from 00:00: 00).

| (POS. 8.10)Send Parameters ConFiGuration | [Send config.] | AL3 | [SPCFG] |
|---|---|---|---|

Sending configuration parameters. This command sends an e-mail message containing the list of instrument configuration parameters as an attachment.

| (POS. 8.11) Send FuNctions Enable Status | [Send fn.enable] | AL3 | [SFNES] |
|---|---|---|---|

Sending of the list of functions and of the relative enabling status for each of them. With this command an e-mail message is sent containing the list of instrument configuration functions and the enabling status of each of them as an attachment, or sent via FTP.

| (POS. 8.12) Send Quick Start Functions List | [Send qs.list] | AL3 | [SQSFL] |

Sending the list of functions entered in the "quick start" menu. This command sends an e-mail message containing the list of functions included in the "quick start" menu as an attachment.

| (POS. 8.13) Request RTC Synchronization | [RTC sync.req.] | AL3 | [RRTCS] |

Clock synchronization request. With this command MV 255 synchronizes its internal clock by connecting to the set time reference server.

| (POS. 8.14) Check Mail BOX | [Check m.box] | AL3 | [CMBOX] |

Request to read new e-mail. With this command MV255 proceeds to search for new emails in the configured box.

| (POS. 8.15) FTP DownLoad Command | [FTP download] | AL3 | [FTDLC] |

FTP Download command. Request to read command file from the FTP server. This command makes a connection to the configured FTP server and the reading of the "MANIFEST.TXT" file.

| (POS. 8.16) Mail SENd Enable | [Mail send] | AL3 | [MSNDE] |

General enabling of e-mail sending functions.

| (POS. 8.17) Mail RECeive Enable | [Mail rec.] | AL3 | [MRECE] |

General enabling of email reception. This command enables the functions of receiving email.

| (POS. 8.18) FTP UPload enable | [FTP upload] | AL3 | [FTPUP] |

Enabling of the data sending functions. This enables the sending of data (process, logger, events, etc.) from the client to the server.

| (POS. 8.19) FTP DowNload enable | [FTP download] | AL3 | [FTPDN] |

Enabling of data reception functions. This enables the reception of any commands or data files from the server to the client.

| (POS. 8.20) ReMoTe operations ACcess level | [Rmt.op.acl] | AL6 | [RMTAC] |

Remote operating level access. The predisposition functions or the commands present in the body of the emails or in the attached files will be executed with the access level specified by the parameter MCP RMTAC. By default, the access level is 4. It is always possible to raise the access level for a command that you want to execute with greater relevance, or a group of commands, putting ACODE = xxxxxxxx before the command you want to execute through the MCP interface .

| (POS. 8.21) File CoMPression Enable | [File compr.] | AL3 | [FCMPE] |

Compression of attached files. This function allows the compression of all the attachments to be sent by e-mail, reducing dimensions and transmission times up to 1% of the original, or using a hundredth of the time and volume of the original data. Moreover this system allows the sending of several files within the same compressed archive, saving further connection time. The format used for compression has the extension ".ZIP".

| (POS. 8.22) Compressed File PaSsWord | [ZIP password] | AL3 | [CFPSW] |

Password protection for files sent in compressed format. When using compressed files, the archive created can be protected with a password. The same password must be entered when the archive is opened. In this way a further layer of data protection is realized.

| **(POS. 8.23) CoNnection TeSt Enable** | **[Conn.test]** | **AL3** | **[CNTSE]** |
|---|---|---|---|

Connection test. By activating this function, MV255 performs a test of the connection created to determine if all the necessary conditions are in place to guarantee the correct transit of the data. This function allows a considerable saving of time, energy and traffic as if the connection is not suitable, it is terminated and recreated within a few seconds, instead of starting transmission over an unstable connection that would result in long timeouts and retransmissions. In any case, this function does not guarantee the successful completion of all operations, but considerably reduces the possibility of connection failure.

| **(POS. 8.24) Automatic EVents Send Enable** | **[Auto Ev.snd]** | **AL3** | **[AEVSE]** |
|---|---|---|---|

Automatic sending of events file in case of alarms. Activating this function, if during the process data sending interval of the data logger alarms or system errors have occurred, MV255 will automatically send the event file together with the data logger data.

| **(POS. 8.25) Access Point NAMe** | **[Access p.name]** | **AL3** | **[APNAM]** |
|---|---|---|---|

Access Point Name, name of the access point on the network. It must be provided by the connection service provider.

| **(POS. 8.26) Access Point AUthentication Type** | **[Auth.type]** | **AL3** | **[APAUT]** |
|---|---|---|---|

Type of network access authentication: none, PAP or CHAP. It must comply with the requirements of the connection service provider.

| **(POS. 8.27) Access Point USeR** | **[User name]** | **AL3** | **[APUSR]** |
|---|---|---|---|

User name for network access: to be used if requested by the provider.

| **(POS. 8.28) Access Point PaSsWord** | **[User password]** | **AL3** | **[APPSW]** |
|---|---|---|---|

Password for network access: to be used if requested by the provider

| **(POS. 8.29) Smtp service User NAMe** | **[SMTP User]** | **AL3** | **[SUNAM]** |
|---|---|---|---|

User name for authentication on remote server. This parameter is not necessary if MV255 is itself the mail server (direct sending to the recipient, not recommended).

| **(POS. 8.30) Smtp service User PaSsWord** | **[SMTP psw.]** | **AL3** | **[SUPSW]** |
|---|---|---|---|

Password for authentication on remote server. This parameter is not necessary if MV255 is itself the mail server (direct sending to the recipient, not recommended).

| **(POS. 8.31) Pop3 service User name** | **[POP3 User]** | **AL3** | **[PUNAM]** |
|---|---|---|---|

User name for authentication on the remote server.

| **(POS. 8.32) Pop3 service User PaSsWord** | **[POP3 psw.]** | **AL3** | **[PUPSW]** |
|---|---|---|---|

Password for authentication on the remote server.

| **(POS. 8.33) Ftp service User NAMe** | **[ FTP User]** | **AL3** | **[FUNAM]** |
|---|---|---|---|

User name for connection with FTP protocol.

| **(POS. 8.34) Ftp service User PaSsWord** | **[FTP password]** | **AL3** | **[FUPSW]** |
|---|---|---|---|

Password for connection with FTP protocol.

| **(POS. 8.35) Min.Antenna Signal Level thresh.Enable** | **[Min.sig.thr]** | **AL3** | **[MASLE]** |

Antenna signal level test. By setting this function to "ON", the instrument will start communication only if the signal received at the antenna is the minimum possible to guarantee a reliable connection. The level considered acceptable is the result of an elaboration that takes into account several parameters and network conditions, therefore this condition is of the ON / OFF type and cannot be modulated with a numerical value.

| **(POS. 8.36) Primary DNS Server** | **[Primary DNS]** | **AL3** | **[PDNSS]** |

IP address of the primary DNS server. If it is not specified (000.000.000.000) the system will use the one provided by the provider, otherwise it will use the one specified.

| **(POS. 8.37) Secondary DNS Server** | **[Secondary DNS]** | **AL3** | **[SDNSS]** |

IP address of the secondary DNS server. If it is not specified (000.000.000.000) the system will use the one provided by the provider, otherwise it will use the one specified.

| **(POS. 8.38) MAX number of ReTries** | **[Retries]** | **AL3** | **[MAXRT]** |

Maximum number of attempts for data transmission. Expected attempts from 1 to 9.

| **(POS. 8.39) INstrument IDentifier String** | **[Instr.ID]** | **AL3** | **[INIDS]** |

Instrument identification string. This string appears along with the sender's name in the e-mail message and allows easy identification of the instrument that sent the message. The string is completed by the serial number of the card and is also shown in the body of the mail message with the item "Instrument ID:".

| **(POS. 8.40) HELO String** | **[HELO string]** | **AL3** | **[HELOS]** |

Client domain name (HELO string, MCP = HELOS). This parameter is necessary to specify the name of the domain to be submitted to the e-mail server during the connection. The name should be FQDN (fully qualified domain name), although it can almost never coincide with the real IP address because this is usually dynamically assigned for wireless networks. Maximum number of characters that can be entered is 32 including numbers and symbols.

| **(POS. 8.41) EMail SeNDer address** | **[Sender addr.]** | **AL3** | **[EMSND]** |

Sender email address. Maximum number of characters that can be entered is 48 including numbers and symbols.

| **(POS. 8.42) EMail REceiver address 1** | **[Receiver 1]** | **AL3** | **[EMRE1]** |

Recipient address 1 is mandatory and the maximum number of characters that can be entered is 48 including numbers and symbols.

| **(POS. 8.43) EMail REceiver address 2** | **[Receiver 2]** | **AL3** | **[EMRE2]** |

Recipient address 2 is not mandatory and can be omitted or if set, it allows to send mail to a second recipient other than the recipient 1. The use of this second address for example can be to perform data back-up or control functions . The secondary address can only be set if a remote SMTP server is used and not if MV255 is the server itself. Maximum number of characters that can be entered is 48 including numbers and symbols.

| (POS. 8.44) EMail SerVer Name | [SMTP server] | AL3 | [EMSVN] |

Name or address of the SMTP server that will send the mail. If you specify a FQDN (fully qualified domain name) in this field, MV255 will request the resolution of the name in IP address to the DNS servers set. If instead you set an IP address directly, you will avoid this step, but at the cost of less flexibility and adaptability of the system. For public servers like Google or Yahoo, the direct IP address is strongly discouraged and often doesn't work at all. If the server name or address is not set, MV255 will switch to stand-alone server mode, sending the mail directly to the recipient. Maximum number of characters that can be entered is 32 including numbers and symbols. The connection to the SMTP server must be checked and set according to the provider used.

| (POS. 8.45) Smtp Secure Connection MoDe | [SMTP sl] | AL3 | [SSCMD] |

Secure connection protocol SMTP (Simple Mail Transfer Protocol). This parameter must be set as required by the remote server. There are 3 possible ways: "OFF", unsecured connection (strongly discouraged); "IF AVAILABLE", (if available) if the remote server supports secure connection, this will be used, otherwise not (option mostly used, also by Google); "SSL / TLS", mandatory use of secure connection, if the remote server does not support it, the connection cannot be established.

| (POS. 8.46) EMail SerVer Port Number | [SMTP port] | AL3 | [EMSVP] |

Communication port. This parameter is mandatory and specifies the port number to be used for the connection. For unprotected connections or connections that can be protected at the server's discretion, the standard ports are 25 and 587 (rarely used). For connections that are protected at source (SSCMD = "SSL / TLS"), the standard port is 465. The system automatically sets the most correct port according to the type of connection desired, however it is always possible to change its value in case of different conditions.

| (POS. 8.47) POP3 SeRVer name | [POP3 server] | AL3 | [P3SRV] |

Server name or address. You can specify a fully qualified domain name (FQDN) or directly an IP address. Specifying an IP address directly saves a few hundred milliseconds of connection for the effective resolution of the name in the address, to the detriment of the flexibility of the system and with the risk of unstable or otherwise unsecured operation if public service providers were to be used. Maximum number of characters that can be entered is 32 including numbers and symbols.

| (POS. 8.48) Pop3 Secure Connection MoDe | [POP3 sl] | AL3 | [PSCMD] |

Secure connection protocol for POP3. Three types of values can be specified: "OFF" (unprotected protocol, not recommended and now almost abandoned); "IF AVAILABLE", secure connection used if available; "SSL / TLS", mandatory secure connection (most common protocol, also used by Google).

| (POS. 8.49) POP3 Server Port Number | [POP3 port] | AL3 | [P3SPN] |

Connection port for receiving mail. The connection port is set automatically when you choose the secure connection method, however you can then change it if necessary. The standard values are "110" for unsafe connections and safe ones if available, while it is "995" for secure "SSL / TLS" connections.

| (POS. 8.50) FTP Server Name | [FTP server] | AL3 | [FTPSN] |

IP address or name of the FTP server. Maximum number of characters that can be entered is 32 including numbers and symbols.

**(POS. 8.51) FTP SerVer Port number**      **[FTP port]**      AL3      **[FTPSP]**

Server port number. The standard value is 21 but can be changed for greater security if you have complete control of the server.

**(POS. 8.52) FTP server Secure connection Enable**      **[FTP sl]**      AL3      **[FTPSE]**

Use of a secure connection using SSL. With this option the client will negotiate a secure connection with the server.

**(POS. 8.53) FTp UPload Path**      **[FTP data]**      AL3      **[FTUPP]**

Root directory of the FTP server where the data sent to the server will be stored. With this function it is possible to specify the name of the directory where the data sent by the meter will be stored.

**(POS. 8.54) FTp UPload Events path**      **[FTP events]]**      AL3      **[FTUPE]**

FTP server root directory where events and alarms generated by the meter will be stored.

**(POS. 8.55) FTp DowNload Path**      **[FTP commands]**      AL3      **[FTDNP]**

Root directory of the FTP server where the commands and firmware update files will be read.

**(POS. 8.56) Secure Connection Server Certificate Check**      **[Cert.check]**      AL3      **[SCSCC]**

Validate server certificate identity. When this parameter is active, in the case of a protected connection the meter checks that the identity provided by the server corresponds to that described in the certificate received. It is advisable to always leave this parameter active, as it is a guarantee that the server you are contacting is really the one requested.

**(POS. 8.57) TiMe SeRVer name**      **[NTP server]**      AL3      **[TMSRV]**

Server name or IP address for time and date synchronization. In this field you can specify the FQDN or IP address used to synchronize the time and date of the meter. For this parameter the same rules apply as for the servers related to sending and receiving electronic mail.

Notes on date and time synchronization:

Synchronization occurs simultaneously and simultaneously with the sending of the data logger process data and uses the standard NTP protocol on UDP port 123. Configure this service correctly using one of the many available providers.

**(POS. 8.58) Data Send Time ReFerence**      **[T.ref]**      AL3      **[DSTRF]**

Time reference for sending the process data collected in the data logger. This function allows the insertion of a date to be used as a time reference for sending data. The system will send all the data present in the data logger starting from the date entered. The date is updated each time the data is sent when the operation is successful (confirmation of receipt of the mail message by the server). If the transmission cannot take place after all the transmission attempts envisaged have been exhausted, the system abandons the session and tries again at the next scheduled time interval. The maximum time interval between the current date and the start date for sending data cannot exceed 8 days. Therefore, in the event of communications being restored following an interruption, it will be possible to receive the data of the last 8 days at the most.

| *(POS. 8.59) MeSsages ChecK Time* | **[InMsTm]** | **AL3** | **[MSCKT]** |
|---|---|---|---|

Search interval for new messages. Specify the search interval for new messages with this function. When the specified time is reached, MV255 will exit the rest state and search for new messages. If e-mail is received, the latter will also be searched in addition to text messages. If the SMS management and the reception of e-mail messages are disabled, this function is no longer available on the menu.

| *(POS. 8.60) PRocess Data Send Time* | **[ProcST]** | **AL3** | **[PRDST]** |
|---|---|---|---|

Interval for sending instant process data. Specify the interval for sending process data via e-mail with this function.

| *(POS. 8.61) LoGger Data Send Time* | **[LogDST]** | **AL3** | **[LGDST]** |
|---|---|---|---|

Interval for sending process data collected by the data logger. Specify the interval for sending the process data collected by the data logger via e-mail with this function.

| *(POS. 8.62) Data Logger Send Complete File* | **[S.Compl.file]** | **AL3** | **[DLSCF]** |
|---|---|---|---|

Sending complete data logger files. By activating this function and preparing the sending of data every 24 hours, the data present in the data logger will only be sent completely on a daily basis (data collected from 00.00 to 23.59), regardless of the time chosen for sending . Obviously if there are still no complete data at the time of sending, this will not take place. Example: sending time 03.00: all the data collected the previous day will be sent from 00.00 to 23.59. It is enabled only if the function "8.61" pag. 53 is set to 24h.

| *(POS. 8.63) ALarm Minimum Send Time* | **[Alarm time]** | **AL3** | **[ALMST]** |
|---|---|---|---|

Analysis interval and minimum time for sending alarms. This function specifies the time interval for analyzing the alarms and also the minimum time for sending. MV255 analyzes the status of the alarms in real time but to reduce the number of messages in the event of a very frequent repetitive situation, the messages are grouped and sent with a minimum guaranteed timing. When the first alarm occurs, MV255 will immediately send a signaling message. Subsequently, even if further alarms should occur, MV255 will analyze the situation but will not send further messages until the end of the specified minimum time interval. A new message will then be sent only if the alarm situation has changed during the analysis time interval.

| *(POS. 8.64) SMS Functions Enable* | **[SMS f.en]** | **AL3** | **[SMSFE]** |
|---|---|---|---|

Global SMS management enablement. Enable this function to receive or send SMS.

| *(POS. 8.65) Authorized INcoming Phone Number* | **[N.autor.]** | **AL3** | **[AINPN]** |
|---|---|---|---|

Number authorized to receive SMS. Set a number to be used as a filter key for SMS reception. The sender's number is compared with the key entered and consequently the receipt of the message can be authorized or refused. For example:

❑ AINPN = + 39: all numbers with the international prefix "+39" will be enabled for reception

❑ AINPN = + 39348: all numbers with the international prefix "+39" and the telephone prefix "348" will be enabled for reception

❑ AINPN = + 39348123: all numbers with the international prefix "+39", telephone operator prefix "348" starting with "123" will be enabled for reception.

❑ AINPN = + 393481234567: only one specific telephone number will be enabled for reception.

❑ AINPN =: all numbers are enabled for reception

| *(POS. 8.66) Short Message Send Destination 1* | **[Mess.recv.1]** | **AL3** | **[SMSD1]** |
|---|---|---|---|

Destination of messages 1. Destination 1 receives any message generated by the system. Maximum number of characters that can be entered is 20 including numbers and symbols.

| *(POS. 8.67) Short Message Send Destination 2* | **[Mess.recv.2]** | **AL3** | **[SMSD2]** |
|---|---|---|---|

Destination of messages 2. The destination 2 receives only the alarm relating to the flooding of the installation (it is activated if enabled, see the alarm menu). Maximum number of characters that can be entered is 20 including numbers and symbols.

| *(POS. 8.68) Short Message Send Destination 3* | **[Mess.recv.3]** | **AL3** | **[SMSD3]** |
|---|---|---|---|

Destination of messages 3. Destination 3 only receives the alarm relating to tampering with the installation (it is activated if enabled, see alarm menu). Maximum number of characters that can be entered is 20 including numbers and symbols.

## MENU 8 – COMMUNICATION: ONLY MCP FUNCTIONS

| *Send Expressly Requested FiLe* | **[MCP ONLY]** | **AL3** | **[SERFL]** |
|---|---|---|---|

Sending a specific file. With this function it is possible to specify a file that you want to receive from MV255. This file will be sent as an e-mail attachment or sent via FTP.

Usage: SERFL = <file name>. The file name must be indicated complete with the path, as in the following example: SERFL yyyy = \ MM \ gg \ EVENTS.TXT

| *FallBack 2G Enable* | **[MCP ONLY]** | **AL4** | **[FB2GE]** |
|---|---|---|---|

The FB2GE (FallBack to 2G Enable) function is used to enable the 2G band on the 3G/4G modem when the 3G/4G signal is not available. By default the 2G band is deactivated on the 3G/4G modem. Switching to the 2G network is to be understood as a last resort in case of poor or no connection and where 3G/4G is not available.

ATTENTION: the 2G radio band can consume up to 5 TIMES the energy needed for 3G/4G, furthermore, given the limited transmission capacity, the time required to send data can be considerably increased, with additional energy consumption.

| *ML255 ComPatibility Enable* | **[MCP ONLY]** | **AL4** | **[MLCPE]** |
|---|---|---|---|

Compatible data formatting for ML series converters.

## MENU 9 DISPLAY

| *(POS. 9.1) Layout LANGuage* | **[Language]** | **AL1** | **[LLANG]** |
|---|---|---|---|

Choice of the language. There are 8 languages available: GB = English, IT = Italian, TR = Turkish, PL = Polish, DE = German, FR = French, PT = Portuguese, ES = Spanish.

| *(POS. 9.2) KeyBoard TiMeout Time* | **[Disp.time]** | **AL1** | **[KBTMT]** |
|---|---|---|---|

This function set dispay/keyboard inactivity. The set values are from 020 to 255 second.

| *(POS. 9.3) DISplay Refresh Frequency* | **[F.Display]** | **AL2** | **[DISRF]** |
|---|---|---|---|

Visualizzazione frequenza aggiornamento

| *(POS. 9.4) DISplay Function Number* | **[Disp.fn.]** | **AL2** | **[DISFN]** |
|---|---|---|---|

This function sets the display of the page making it visible when you start the display. For each display page is associated with a number that corresponds to the position.

| *(POS. 9.5) Display function LOcK Enable* | **[Disp.lock]** | **AL2** | **[DLOKE]** |
|---|---|---|---|

This function blocks the scrolling of the pages displayed and selected by the function POS "9.3" pag. 54.

| *(POS. 9.6) Partial TOTalizers Enable* | **[Part.tot.]** | **AL2** | **[PTOTE]** |
|---|---|---|---|

This function enables the display of partial totalizer in visualization pages.

| *(POS. 9.7) NEGative value Totalizers Enable* | **[Neg.tot.]** | **AL2** | **[NEGTE]** |
|---|---|---|---|

This function enables the display of negative totalizer in visualization pages.

| *(POS. 9.8) Net Value ToTalizers Enable* | **[Net tot.]** | **AL2** | **[NVTTE]** |
|---|---|---|---|

This function enables the display of net totalizer in visualization pages.

| *(POS. 9.9) Date And Time Display Enable* | **[Disp.date]** | **AL2** | **[DATDE]** |
|---|---|---|---|

This function enables the display of date and time in visualization pages.

| *(POS. 9.10) Quick STart Menu Enable* | **[Quick start]** | **AL2** | **[QSTME]** |
|---|---|---|---|

This function enables the quick start menu.

## MENU 10 DATA LOGGER

| (POS. 10.1) Data LOGger Enable | [D.logger en.=ON/OFF] | AL3 | [DLOGE] |
|---|---|---|---|

This function enables data loger.

**The following functions are activated by [D.loger en= ON]**

| (POS. 10.2) Data Logger Units of Measure Enable | [Meas.units= ON] | AL3 | [DLUME] |
|---|---|---|---|

Enables the registration of the units of measurement set in the device.

| (POS. 10.3) Data Logger Field Separator Character | [Field separ.= , ;] | AL3 | [DLFSC] |
|---|---|---|---|

This function sets the separation character between the recorded data.

| (POS. 10.4) Data Logger Decimal Separator Character | [Decim.separ.= .] | AL3 | [DLDSC] |
|---|---|---|---|

This function sets the separator character between the value of the num. value of the recorded data.

| (POS. 10.5) Data LoGger Sample Interval | [Interv.=  xx:xx:xx] | AL3 | [DLGSI] |
|---|---|---|---|

This function sets the data logging frequency. [interval = Hours: Minutes: seconds]

| (POS. 10.6) Data logger Totalizer Total Positive Enable | [Log T+= ON] | AL3 | [DTTPE] |
|---|---|---|---|

Enables recording of total positive totalizer values.

| (POS. 10.7) Data logger Totalizer Partial Positive Enable | [Log P+= ON] | AL3 | [DTPPE] |
|---|---|---|---|

Enables recording of positive partial totalizer values.

| (POS. 10.8) Data logger Totalizer Total Negative Enable | [Log T-= ON] | AL3 | [DTTNE] |
|---|---|---|---|

Enables recording of total negative totalizer values.

| (POS. 10.9) Data logger Totalizer Partial Negative Enable | [Log P-= ON] | AL3 | [DTPNE] |
|---|---|---|---|

Enables recording of negative partial totalizer values.

| (POS. 10.10) Data Logger totalizer Total Net Enable | [Log TN= ON] | AL3 | [DLTNE] |
|---|---|---|---|

Enables recording of total totalizer net values.

| (POS. 10.11) Data Logger totalizer Partial Net Enable | [Log PN= ON] | AL3 | [DLPNE] |
|---|---|---|---|

Enables the recording of the net partial totalizer values.

| (POS. 10.12) Data logger Flow rate in Technical Units Enable | [Log Q(UM)= ON] | AL3 | [DFTUE] |
|---|---|---|---|

Ability to record the flow rate in a set unit of measurement.

| (POS. 10.13) Data logger Flow rate in PerCentage Enable | [Log Q(%)= ON] | AL3 | [DFPCE] |
|---|---|---|---|

Ability to record the flow rate as a percentage of the set full scale value

| (POS. 10.14) Data logger ALarm Events Enable | [Log AL.EV= ON] | AL3 | [DALEE] |
|---|---|---|---|

Enables recording of events and alarms.

| (POS. 10.15) Data logger ADditional Measures Enable | [Log ADM= ON] | AL6 | [DADME] |
|---|---|---|---|

It allows to log the additional analog measurements, as for example pressure and temperature.
This option is valid only with analog inputs enabled and the module installed.

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| | | | |
|---|---|---|---|
| *(POS. 10.16) Data logger Sensor Test Results Enable* | **[Log STR= ON]** | **AL6** | **[DSTRE]** |

Enable logging of sensor test results.

| | | | |
|---|---|---|---|
| *(POS. 10.17) Data logger Board TemperatureS Enable* | **[Log BTS= ON]** | **AL6** | **[DBTSE]** |

Enable logging of board temperature.

| | | | |
|---|---|---|---|
| *(POS. 10.18) Data logger Internal Board Voltages* | **[Log IBV= ON]** | **AL6** | **[DIBVE]** |

Enable logging of internal board voltage.

| | | | |
|---|---|---|---|
| *(POS. 10.19) Data logger Electrodes DC Voltages Enable* | **[Log EDC= ON]** | **AL6** | **[DEDVE]** |

Enable logging of electrodes DC voltage.

| | | | |
|---|---|---|---|
| *(POS. 10.20) Data logger Electrodes AC voltages Enable* | **[Log AEC= ON]** | **AL6** | **[DEAVE]** |

Enable logging of electrodes AC voltage.

| | | | |
|---|---|---|---|
| *(POS. 10.21) Data logger Electrodes Source Impedance Enable* | **[Log EIZ= ON]** | **AL6** | **[DESIE]** |

Enable logging of electrodes impedance.

| | | | |
|---|---|---|---|
| *(POS. 10.22) Data logger Sensor Coils Values Enable* | **[Log SCV= ON]** | **AL6** | **[DSCVE]** |

Enable logging of sensor coils value.

## MENU 10 – DATA LOGGER: ONLY MCP FUNCTIONS

| | | | |
|---|---|---|---|
| *LoG All Information Enable* | **[MCP ONLY]** | **AL6** | **[LGAIE]** |

Enable logging of all instrument events. This function enables the recording of all data for which registration is required. Activating this function, the system records in detail each operation with the consequence that the file produced by the logger will be large and will incisively reduce the space in the SD memory. It is advisable to activate this function only if necessary (for example to identify communication problems with SMTP or FTP servers).

| | | | |
|---|---|---|---|
| *Data Logger FieLds Format* | **[MCP ONLY]** | **AL0** | **[DLFLF]** |

Data logger fields format

| | | | |
|---|---|---|---|
| *Sensor Test data FieLds Format* | **[MCP ONLY]** | **AL0** | **[STFLF]** |

Format sensor test data fields

| | | | |
|---|---|---|---|
| *Data Logger Instantaneous Process Data* | **[MCP ONLY]** | **AL0** | **[DLIPD]** |
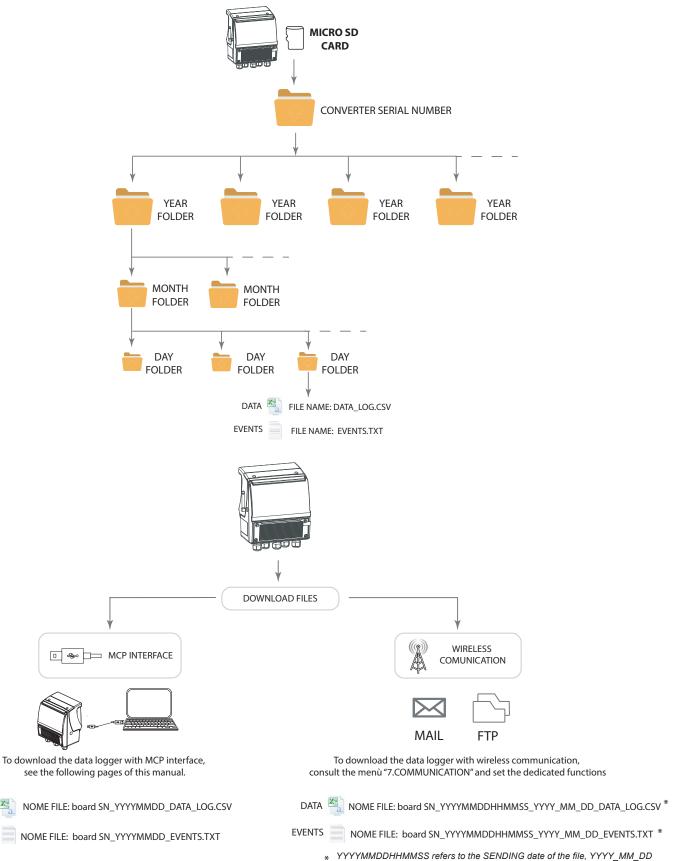
Read instantaneous values of process data.

# DATA MANAGEMENT MEASURES AND EVENTS

The data collected by the data logger are stored on a micro SD card. Their organization is based on a tree structure and the system saves day by day, in two separate files, events and data loggers. Data can be downloaded via the MCP interface or via mail and / or FTP protocol.

**Note:** The number of processed data depends on the sampling interval set and the number of variables enabled for registration.

**MICRO SD CARD**

CONVERTER SERIAL NUMBER

YEAR FOLDER   YEAR FOLDER   YEAR FOLDER   YEAR FOLDER

MONTH FOLDER   MONTH FOLDER

DAY FOLDER   DAY FOLDER   DAY FOLDER

DATA   FILE NAME: DATA_LOG.CSV

EVENTS   FILE NAME: EVENTS.TXT

DOWNLOAD FILES

MCP INTERFACE

WIRELESS COMUNICATION

MAIL   FTP

To download the data logger with MCP interface, see the following pages of this manual.

To download the data logger with wireless communication, consult the menù "7.COMMUNICATION" and set the dedicated functions

DATA   NOME FILE: board SN_YYYYMMDD_DATA_LOG.CSV

EVENTS   NOME FILE: board SN_YYYYMMDD_EVENTS.TXT

DATA   NOME FILE: board SN_YYYYMMDDHHMMSS_YYYY_MM_DD_DATA_LOG.CSV *

EVENTS   NOME FILE: board SN_YYYYMMDDHHMMSS_YYYY_MM_DD_EVENTS.TXT *

*   *YYYYMMDDHHMMSS refers to the SENDING date of the file, YYYY_MM_DD refers to the CREATION date of the file*
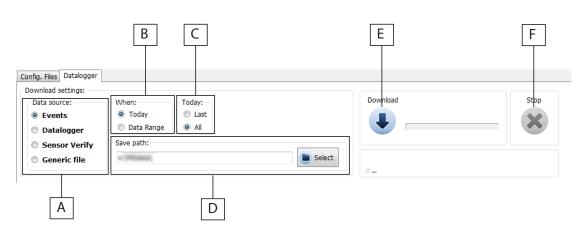
# USING DATA LOGGER BY MCP INTERFACE

The data collected by the data logger are stored on a micro SD card. Their organization is based on a tree structure and the system saves day by day, in two separate files, events and data loggers. Data can be downloaded via the MCP interface, as shown in the following examples. **Note:** The number of processed data depends on the sampling interval set and the number of variables enabled for registration.

## MCP INTERFACE



Select the "data logger" tab as shown below to access the file download interface.



**A=Data source**

❑ Events:  Download system events (Sample Line 2016/09 / 14-01: 00: 00.000 -W0216- [1] ALARMS still active)

❑ Data logger: Download and save the recorded data through the data logger function.

❑ Sensor Verify: Download sensor verification data (if BIV is active).

❑ Generic file: Download a specific file contained in the SD card.

**B=When**

Indicates the reference period to download the data.

❑ Today: current day file download

❑ Data range: selection of the download period.

**C=Today**

(divides today's day into different download frames)

❑ Last: download only the latest data collected AFTER the last data download

❑ All: download the data of the whole current day of the file

**D=Save path:**

❑ This option allows you to save the files in the desired folder on your PC
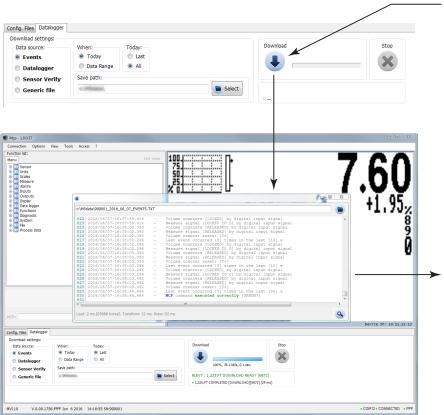
**E=Download:**

❑ Button to start the download process

**F=Stop:**

❑ Button to stop the download process

**Example: Download Events**



To download all the events of the current day in a specific folder, set the below parameters as follows:
**Data source:** Events
**When:** Today
**Today:** All
**Save path:** C: / .....
The parameters are set then click the Download button.



Once the download is completed, a window containing the list of today's events appears. The file is saved in the specified folder in .txt format .

**Note:** The fields are at a fixed position, regardless of whether the previous fields are active or not. Inactive fields are empty (delimited by the separator but do not contain data).

| | Field | Values | Description |
|---|---|---|---|
| A | N° RECORDS | n° / n° / n° | **N°NUM:** record number. Display progressively the number of records recorded. |
| B | DATE | dd/mm/yy / dd/mm/yy / dd/mm/yy | **DATE:** Display of the recording date for each record. |
| C | HOUR | 00:00:00 / 00:00:00 / 00:00:00 | **TIME:** Displaying the recording time for each record. |
| D | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Total positive totalizer value:** Form Fields when the send flag is active on the totalizer T+. |
| E | T+ | 0 / 0 / 0 | |
| F | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Partial positive totalizer value:** Form Fields when the send flag is active on the totalizer P+. |
| G | P+ | 0 / 0 / 0 | |
| H | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Total negative totalizer value:** Form Fields when the send flag is active on the totalizer T-. |
| I | T- | 0 / 0 / 0 | |
| J | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Partial negative totalizer value:** Form Fields when the send flag is active on the totalizer P-. |
| K | P- | 0 / 0 / 0 | |
| L | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Total net totalizer value:** Form Fields when the send flag is active on the totalizer TN. |
| M | TN | 0 / 0 / 0 | |
| N | UM | $dm^3$ / $dm^3$ / $dm^3$ | **Partial net totalizer value:** Form Fields when the send flag is active on the totalizer PN |
| O | NP | 0 / 0 / 0 | |
| P | U.M | dm3/s / dm3/s / dm3/s | **Flow rate:** Form Fields present when the send flag is on the flow in units of measurement. |
| Q | F. RATE | 0 / 0 / 0 | |
| R | Value | % / % / % | **Flow rate %:** value of the flow expressed in percent of the full scale. Fields present when the percentage flow send flag is active. |
| S | F.RATE % | 0 / 0 / 0 | |
| T | ALARMS | AL / AL / AL | **ALARMS:** value of the number of active alarms. Fields present when the alarm sending flag is active (only N. of total alarms present). |
| U | N° ALARMS | 0 (0x0000000000000001) / 4 (0x0000000001420080) / 5 (0x0000000001430080) | |
| V | UM | mA / mA / mA | **Loss of current measured during insulation test:** available value when recording the sensor test data is active. |
| W | CPTI | 0 / 0 / 0 | |
| X | UM | ms / ms / ms | **Time rise A:** Available value when recording the sensor test data is active. |
| Y | T. RISE A | 0 / 0 / 0 | |

| Code | Label | Val 1 | Val 2 | Val 3 | Description |
|---|---|---|---|---|---|
| Z | UM | ms | ms | ms | |
| AA | T. RISE B | 0 | 0 | | **Time rise B:** Available value when recording the sensor test data is active. |
| AB | ERROR | ERR | ERR | ERR | |
| AC | N° | 0 | 0 | 0 | **Sensor test error code:** Available value when recording the sensor test data is active. |
| AD | U.M | > | > | | |
| AE | E1V | 0 | 0 | 0 | **Voltage measured on electrode E1:** Form fields when is active the recording of data on the input voltage (diagnostic value). |
| AF | U.M | > | > | | |
| AG | E2V | 0.023 | 0.023 | 0.023 | **Voltage measured on electrode E2:** Form fields when is active the recording of data on the input voltage (diagnostic value). |
| AH | U.M | > | > | | |
| AI | Value | 0 | 0 | 0 | **Differential voltage between the two electrodes VD=E1-E2:** Form fields when is active the recording of data on the input voltage (diagnostic value) |
| AJ | U.M | > | > | | |
| AK | Value | 0 | 0 | 0 | **Common mode voltage in the electrodes VC=E1+E2/2:** Form fields when is active the recording of data on the input voltage (diagnostic value). |
| AL | U.M | > | > | | |
| AM | Value | 0 | 0 | 0 | **Noise at low frequency measured on the electrodes**: Form fields when is active the recording of data on the input signal noise levels (diagnostic value). |
| AN | U.M | > | > | | |
| AO | Value | 0 | 0 | 0 | **Differential low frequency noise measured on the electrodes**: Form fields when is active the recording of data on the input signal noise levels (diagnostic values). |
| AP | U.M | mV | mV | mV | |
| AQ | Value | 0 | 0 | 0 | **Low-frequency noise measured input ADC:** Form fields when is active the recording of data on the input signal noise levels (diagnostic values). |
| AR | U.M | mV | mV | mV | |
| AS | Value | 0 | 0 | 0 | **High frequency noise measured input ADC**: Form fields when is active the recording of data on the input signal noise levels (diagnostic values). |
| AT | U.M | kohm | kohm | kohm | |
| AU | E1R | 0 | 0 | 0 | **Measured equivalent resistance on the electrode 1:** Form fields when is active the recording of data on the electrode resistance measurements (diagnostic values). |
| AV | U.M | kohm | kohm | kohm | |
| AW | E2R | 0 | 0 | 0 | **Measured equivalent resistance on the electrode 2:** Form fields when is active the recording of data on the electrode resistance measurements (diagnostic values). |
| AX | U.M | mA | mA | mA | |
| AY | EXC.CURR. | 0 | 0 | 0 | **Coils excitation current:** Form fields when is active the recording of data related to the sensor excitation circuit measures (diagnostic value) |
| AZ | U.M | ohm | ohm | ohm | |
| BA | R.COILS | 0 | 0 | 0 | **Measured resistance of the excitation circuit (coil + cable):** Form fields when is active the recording of data relative to the sensor excitation circuit measures (diagnostic values). |

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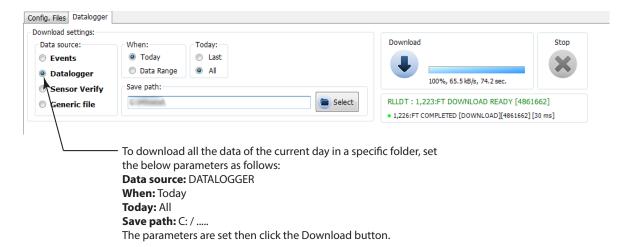
| Field | Abbr. | Val 1 | Val 2 | Val 3 | Description |
|---|---|---|---|---|---|
| BB | U.M | C° | C° | C° | **Temperature measured on the sensor coils (indirect measurement):** Form fields when the data transmission flag is active relative to the sensor excitation circuit measures (diagnostic values). |
| BC | T.COILS | 0 | 0 | 0 | |
| BD | UM | KPa | KPa | KPa | **A_IN1**: value of analog input 1. |
| BE | A_IN1 | 0 | 0 | 0 | |
| BF | UM | KPa | KPa | KPa | **A_IN2**: value of analog input 2 |
| BG | A_IN2 | 0 | 0 | 0 | |
| BH | U.M | C° | C° | C° | **CPU temperature:** Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic value). |
| BI | TCPU | 0 | 0 | 0 | |
| BJ | UM | > | > | > | **Not avaiable value** |
| BK | UM | 0 | 0 | 0 | |
| BL | U.M | > | > | > | **Positive supply voltage of analog circuits:** Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values). |
| BM | Value | 0 | 0 | 0 | |
| BN | U.M | > | > | > | **Negative supply voltage of the analog circuits:** Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values). |
| BO | Value | 0 | 0 | 0 | |
| BP | U.M | / | / | / | **Not avaiable value** |
| BQ | U.M | 0 | 0 | 0 | |
| BR | U.M | / | / | / | **Not avaiable value** |
| BS | U.M | 0 | 0 | 0 | |
| BT | UM | > | > | > | **Unit of measurement (V) and battery voltage value** |
| BU | Value | 0 | 0 | 0 | |
| BV | Value | % | % | % | **% Battery charge:** Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values). |
| BW | BATT % | 0 | 0 | 0 | |
| BX | HEX | 0x8A97 | 0xD1D8 | 0x3754 | **Checksum** |

## Example: Download Data Logger
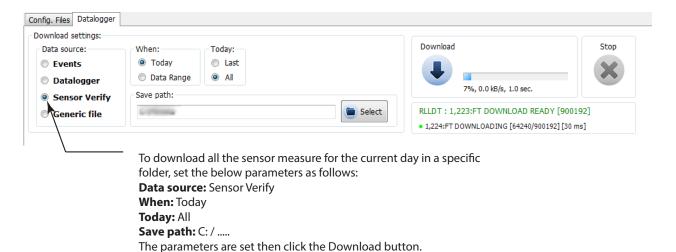
Note: it is recommended the date synchronization between converter and PC to perform correctly the events and logger reading operations.



To download all the data of the current day in a specific folder, set the below parameters as follows:

**Data source:** DATALOGGER
**When:** Today
**Today:** All
**Save path:** C: / .....

The parameters are set then click the Download button.

The following is the formatting of the data of the files downloaded from the download data logger setting in a file in .CSV format. The access level to download this type of file is the 5th diagnostic level..

## Example: Sensor Verify

To make the control measures of the state of the sensor and the related automatic verification files is necessary that the BIV function (Built-In-Verificator) is turned on (optional). If the BIV is enabled, the instrument automatically tests the sensor operating parameters every hour and records the data on the "STESTLOG.CSV" file; it is possible to do a manual check using the "sens.verify" command on the "Diagnostic" menu or through the MCP "SVERC" command



To download all the sensor measure for the current day in a specific folder, set the below parameters as follows:

**Data source:** Sensor Verify
**When:** Today
**Today:** All
**Save path:** C: / .....

The parameters are set then click the Download button.

MAN_MV255_IT_EN_IS_R16_1.06.XXXX
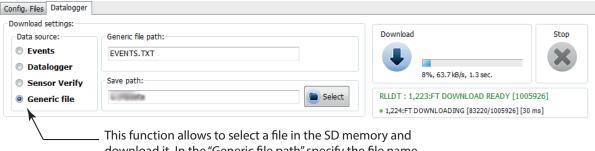
**Example download generic file**



This function allows to select a file in the SD memory and download it. In the "Generic file path" specify the file name contained in the SD and indicate "Save path" where to save the file. Set these values to proceed with the download by clicking the "download".

MAN_MV255_IT_EN_IS_R16_1.06.XXXX

## MENU 11 – FUNCTION

The following functions are activated by first pressing the "ENTER" and then the "ESC" when the screen appears "confirm" to start the function.

| *(POS. 11.1) Volume Totalizer Total Positive Reset* | **[T+ RESET]** | **AL3** | **[VTTPR]** |
|---|---|---|---|

Reset total direct totalizer for direct flow rate

| *(POS. 11.2) Volume Totalizer Partial Positive Reset* | **[P+ RESET]** | **AL3** | **[VTPPR]** |
|---|---|---|---|

Reset total partial totalizer for direct flow rate

| *(POS. 11.3) Volume Totalizer Total Negative Reset* | **[T- RESET]** | **AL3** | **[VTTNR]** |
|---|---|---|---|

Reset total reverse totalizer for direct flow rate.

| *(POS. 11.4) Volume Totalizer Partial Negative Reset* | **[P- RESET]** | **AL3** | **[VTPNR]** |
|---|---|---|---|

Reset partial reverse totalizer for direct flow rate

| *(POS. 11.5) Load Factory Default Sensor Data* | **[Load sens.f.def]** | **AL3** | **[LFDSD]** |
|---|---|---|---|

This function loads the factory data of the sensor. To save the factory data see function (11.7).

| *(POS. 11.6) Load Factory Default Converter Data* | **[Load conv.f.def]** | **AL3** | **[LFDCD]** |
|---|---|---|---|

This function loads the factory data of the converter. To save the data, see function (11.8).

| *(POS. 11.7) Save Factory Default Sensor Data* | **[Save sens.f.def]** | **AL6** | **[SFDSD]** |
|---|---|---|---|

This function saves the factory data of the sensor.

| *(POS. 11.8) Save Factory Default Converter Data* | **[Save conv.f.def]** | **AL6** | **[SFDCD]** |
|---|---|---|---|

This function saves the factory data of the converter.

| *(POS. 11.9) CALibration Immediate Command* | **[Calibration]** | **AL5** | **[CALIC]** |
|---|---|---|---|

Activation of the function adjusts the board calibration parameters. Pressing the ENTER key briefly while the function is displayed will display the message: "Execute?" Press and hold the Enter key to proceed. Press any other key to cancel the operation. NOTE: If a valid sensor data table is present, the calibration starts automatically even when one of the following parameters is modified:

SENSOR DIAMETER -> Menu Sensor1 / SENSOR MODEL -> Menu Sensor1

S. FREQ. -> Menu Sensor1 / EXC CURRENT -> Menu Sensor1

To check the calibration status, active or inactive, enter the command MCP "CALIC?" And check as follows: CALIC = 1 calibration in progress / CALIC = 0 calibration completed

## MENU 11 – FUNCTION: ONLY MCP FUNCTIONS

| *Save sensor reference data* | **[MCP ONLY]** | **AL4** | **[SRFDS]** |
|---|---|---|---|

Save conv.f.def= ON, saving sensor reference data.
Used for the function "meter data" pag. 106.

| *Input ReFerence Data Save* | **[MCP ONLY]** | **AL4** | **[IRFDS]** |
|---|---|---|---|

Save el.input reference data

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# MENU 12 – DIAGNOSTIC

| (POS. 12.1) AutoTeSt Immediate Command | [Self test] | AL3 | [ATSIC] |
|---|---|---|---|

Self-test function. This function stops the normal functions of the counter and performs a complete test cycle on the input, measurement and excitation circuits. To Activate this function, after having selected it, press the "enter" button and the question "Confirm?" Press "ESC" to automatically start the test or any other button to cancel the operation. At the end of the operation the converter restarts and restores the screen to the initial display page. This function is performed automatically when the device is turned on.

| (POS. 12.2) Test display | [Test display] | AL1 | NO MCP COMMAND |
|---|---|---|---|

This function allows you to test the graphic display of the converter. During the execution of this function, 4 screens are displayed in sequence to test the correct operation of the device.

| (POS. 12.3) Sensor VERify Command | [ Sens. verify ] | AL3 | [SVERC] |
|---|---|---|---|

Diagnostic function and sensor verification, allows to do a sensor test (if BIV enabled).

| (POS. 12.4) Measure SIMulation ENable | [Flow sim=ON] | AL3 | [MSIEN] |
|---|---|---|---|

Enabling the flow simulation function. By activating this function it is possible to simulate a flow. With this system it is possible to test the outputs of the meter and the instruments connected to it. After enabling the flow rate, this symbol appears on the display '▲▼' and the simulation can be:

❑ Set: pressing the "Enter" key from one of the display pages, to set the% flow rate value, and pressing "Enter" again to confirm the value.

❑ Ended: by pressing the "Esc" key on the page where the simulated value is set.

| (POS. 12.5) Diagnostic System VaLueS | [Val.diag.sist.] | AL5 | [DSVLS] |
|---|---|---|---|

This function shows the values of CPU temperatures and total measure cycle
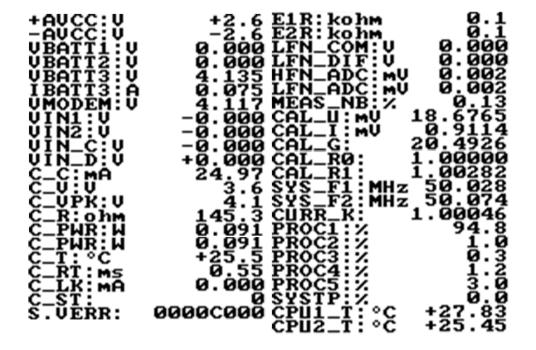
| (POS. 12.6) Diagnostic Measure VaLueS | [Display measures] | AL5 | [DMVLS] |
|---|---|---|---|

This function shows the values of various internal parameters (diagnostic purpose reserved for the service).

```
+AVCC:V        +2.6    E1R:kohm      0.1
-AVCC:V        -2.6    E2R:kohm      0.1
VBATT1:V      0.000    LFN_COM:V     0.000
VBATT2:V      0.000    LFN_DIF:V     0.000
VBATT3:V      4.135    HFN_ADC:mV    0.002
IBATT3:A      0.075    LFN_ADC:mV    0.002
VMODEM:V      4.117    MEAS_NB:%     0.13
VIN1:V       -0.000    CAL_U:mV     18.6765
VIN2:V       -0.000    CAL_I:mV      0.9114
VIN_C:V      -0.000    CAL_G:       20.4926
VIN_D:V      +0.000    CAL_R0:       1.00000
C_C:mA       24.97     CAL_R1:       1.00282
C_V:V          3.6     SYS_F1:MHz   50.028
C_VPK:V        4.1     SYS_F2:MHz   50.074
C_R:ohm      145.3     CURR_K:       1.00046
C_PWR:W       0.091    PROC1:%      94.8
C_PWR:W       0.091    PROC2:%       1.0
C_T:°C       +25.5     PROC3:%       0.3
C_RT:ms       0.55     PROC4:%       1.2
C_LK:mA       0.000    PROC5:%       3.0
C_ST:             0    SYSTP:%       0.0
S.VERR:    0000C000    CPU1_T:°C   +27.83
                       CPU2_T:°C   +25.45
```

| (POS. 12.7) Diagnostic Communication VaLueS | [Val.diag.comm.] | AL5 | [DCVLS] |
|---|---|---|---|

This function shows the values of various internal specific communication parameters (diagnostic purpose reserved for the service).

```
PPP1_STATUS:        NETW    E_TSPLAYR: 0
PPP2_STATUS:        DEAD    E_PPPFRM1: 0
MCPI_S:        ESTABLISH    E_IP_HDR1: 0
RxCNT:          50906397    E_IP_HDR2: 0
TxCNT:         799361398    E_IP_HDR3: 0
RETRANSM.:             0    E_IP_HDR4: 0
BROADCAST:           680    E_IP_HDR5: 0
E_SR_LINK:             0    E_IP_HDR6: 0
E_BFOVERR:             0    E_IP_HDR7: 0
E_TSPLAYR:             0    E_IP_HDR9: 0
E_PPPFRM1:             0    E_TCPHDR1: 9
E_IP_HDR1:             0    E_TCPHDR2: 0
E_IP_HDR2:             0    E_UDPHDR1: 0
E_IP_HDR3:             0    E_UDPHDR2: 0
E_IP_HDR4:             0    E_UDPHDR3: 0
E_IP_HDR5:             0    E_ICMPHDR: 0
```

The following are the statuses for the PPP and MCPI link for the device connection.


Status of the PPP link:

❑    "UNDT" = undetermined.

❑    "DEAD" = PPP link not active.

❑    "LCP"    = phase of LCP, transition phase.

❑    "AUTH" = transition phase.

❑    "IPCP"  = IP address assignment.

❑    "NETW"= established network (normal persistent condition when the connection is active).

❑    "TERM" = termination request, transition phase.


MCPI link status:

❑    "CLOSED" = closed socket

❑    "ACCEPT" = Waiting for new connection

❑    "ESTABLISH" = established link

❑    "CLS_WAIT" = waiting for closure

❑    "LAST_ACK" = LASK ACK sent

❑    "FIN_WAIT" = (See the RFC TCP / IP documentation)

❑    "TIME_WAIT" = (See the RFC TCP / IP documentation)

| (POS. 12.8) Short Message Test | [SMS test] | AL3 | [SMSTS] |

Test sending SMS to all recipients (Autotest Immediate Command). This function allows for each set of SMS recipients to send a test message containing the model and software version installed on the device. (the same string that is received with the function POS "12.13" pag. 55 ). This is also a way to also know the telephone number that the wireless operator has assigned to the SIM card mounted on MV255.

| (POS. 12.9) SMtP Connection Test | [SMTP conn test] | AL3 | [SMPCT] |

Test SMTP connection. With this function it is possible to make a test connection to the SMTP server used for sending e-mail. The test does not send any messages and is limited to verifying that the server, the port, the username and the password set are all correct.

| (POS. 12.10) POP3 Connection Test | [POP3 conn.test] | AL3 | [POPCT] |

POP3 connection test. With this function it is possible to check whether the parameters entered as server name, server port, user name and password are correct. The test does not download any messages from the POP3 server.

| (POS. 12.11) FTP Connection Test | [FTP conn.test] | AL3 | [FTPCT] |

FTP connection test (MCP FTPCT). With this function it is possible to check whether the parameters entered as server name, server port, user name and password are correct. The test does not transfer data.

| (POS. 12.12) Oscilloscope function | [Display graphs] | AL5 | [OSCOP] |
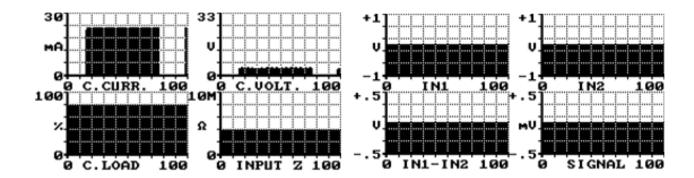
This function displays the input graphs. The MCP command allows you to see the data on the graph in numeric format, as a list of values. Typing OSCOP = 1 allows you to view the numeric values of the graph in position 1. The measurement charts provided are 8.

❑ Z=impedance

❑ C. current=Coils current

❑ C. volt=Coils voltage

❑ C.load: Coils load

❑ Input 1= E1

❑ Input 2=E2

❑ SIGNAL=analog to digital converter.

❑ Input 1-Input 2
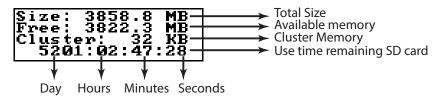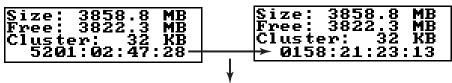
| *(POS. 12.13) SD memory status* | **[SD card info]** | **AL0** | **[SDSTA]** |

This function indicates the status of the SD card as shown in the following figure.



```
Size: 3858.8 MB ——————→ Total Size
Free: 3822.3 MB ——————→ Available memory
Cluster:   32 KB ——————→ Cluster Memory
     5201:02:47:28 ——————→ Use time remaining SD card
```

Day   Hours   Minutes   Seconds

The statistical calculation is performed whenever the SDSTA command is invoked or when accessed from the display. The statistical data is updated AUTOMATICALLY every day (24 hours) or manually each time the function is called up on the display or the SDSTA command is sent. However, since a minimum time of one hour is required for detection, the data will not be recalculated before this time interval.



```
Size: 3858.8 MB        Size: 3858.8 MB
Free: 3822.3 MB        Free: 3822.3 MB
Cluster:   32 KB       Cluster:   32 KB
     5201:02:47:28 ——→      0158:21:23:13
```

Minimum time of 1 hour for the new data update

The SD card must be replaced only by the service. The use of commercial cards could disable some functionality of the instrument.

| *(POS. 12.14) Model and software version* | **[Firmware info]** | **AL0** | **[MODSV]** |

Version / revision firmware information.



```
MV255
V.A.00.0000.FFFF
 MMM 00 0000
00:00:00
```

| *(POS. 12.15) Serial number* | **[S/N=XXXXXX]** | **AL0** | **[SRNUM]** |

Displays the serial number of the instrument board. (read only)

| *(POS. 12.16) Total working time* | **[WT= xxxx: xx: xx: xx]** | **AL0** | **[TWKTM]** |

View Total working time instrument. (read only)

| *(POS. 12.17) Total measure cycles* | **[TC= xxxxxxxxxx]** | **AL0** | **[TMCYC]** |

Total number of cycles measured on battery. (read only)

## MENU 12 DIAGNOSTIC: ONLY MCP FUNCTIONS

| *Diagnostic function* | **[MCP ONLY]** | **AL6** | **[DIAGF]** |

Diagnostic functions code.

| *Coil current mean real value* | **[MCP ONLY]** | **AL6** | **[CCMRV]** |

Real average excitation current value.

| *Analog input 1 Start Scale Cal.* | **[MCP ONLY]** | **AL6** | **[A1SSC]** |

Calibration of the analog input 1 start scale.

| *Analog input 1 Full Scale Cal.* | **[MCP ONLY]** | **AL6** | **[A1FSC]** |

End of scale analogue input calibration 1.

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| Analog input 2 Start Scale Cal. | | [MCP ONLY] | AL6 | [A2SSC] |
|---|---|---|---|---|

Calibration of the analog input 2 start scale.

| Analog input 2 Full Scale Cal. | | [MCP ONLY] | AL6 | [A2FSC] |
|---|---|---|---|---|

End of scale analogue input calibration 2

## MENU 13 – SYSTEM

| (POS. 13.1) Daylight Saving Time Enable | [Dayl.saving= ON/OFF] | AL2 | [DYSTE] |
|---|---|---|---|

Daylight saving time change.

| (POS. 13.2) Time zone | [Time zone= h+xx.xx] | AL2 | [TZONE] |
|---|---|---|---|

Set the difference between GMT and the local time where the instrument is installed. Set the time zone before the system date and time setting as this function, if set after the system date and time, will in turn change the newly set date and time.

| (POS. 13.3) Date and Time | [xxxx/xx/xx-xx:xx] | AL2 | [DTIME] |
|---|---|---|---|

Setting the system date and time.

| (POS. 13.4) Access level n°1 code | [L1 code] | AL1 | [L1ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled POS "13.10" pag. 55.

| (POS. 13.5) Access level n°2 code | [L2 code] | AL2 | [L2ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled OS "13.10" pag. 55.

| (POS. 13.6) Access level n°3 code | [L3 code] | AL3 | [L3ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled POS "13.10" pag. 55.

| (POS. 13.7) Access level n°4 code | [L4 code] | AL4 | [L4ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled POS "13.10" pag. 55.

| (POS. 13.8) Access level n°5 code | [L5 code] | AL5 | [L5ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled POS "13.10" pag. 55.

| (POS. 13.9) Access level n°6 code | [L6 code] | AL6 | [L6ACD] |
|---|---|---|---|

This function enables or disables the functions of the main menu for each access level code. Each level unlocks the functionality of the lower level if the function is enabled POS "13.10" pag. 55.

| (POS. 13.10) Restricted access level | [Restr.access=ON/OFF] | AL2 | [RSARE] |
|---|---|---|---|

If Active this command allows you to view only the functions of the access level entered.

Example: RSARE = ON; Known access level L3; only the functions that operate with access level 3 will be displayed and the other functions will not be displayed.

If this command is set to OFF, the functions with the entered access code and the functions with the access code lower than the one just entered will be displayed.
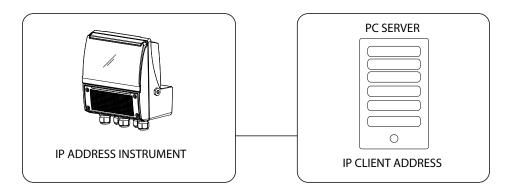
## IP ADDRESS SETTING (13.11–12–13)

| (POS. 13.11) Device IP address | [XXX.XXX.XXX.XXX] | AL3 | [DIPAD] |
|---|---|---|---|

Device IP network edress

| (POS. 13.12) Client IP address | [XXX.XXX.XXX.XXX] | AL3 | [CIPAD] |
|---|---|---|---|

Client IP network adress

| (POS. 13.13) Network mask | [XXX.XXX.XXX.XXX] | AL3 | [NETMS] |
|---|---|---|---|
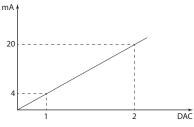
Network mask.

Caution: Changes to the functions of the points 13.11-13.12-13.13 are enabled after the drive device restart(see function POS"12.1" pag. 53).



IP ADDRESS INSTRUMENT    PC SERVER    IP CLIENT ADDRESS

| (POS. 13.14) Coefficient KT | [KF=X.XXXXX] | AL3 | [CFFKT] |
|---|---|---|---|

Gain correction coefficient (calculated automatically).

| (POS. 13.15) Coefficient KS | [KS=X.XXXXX] | AL3 | [CFFKS] |
|---|---|---|---|

Correction coefficient constant instrumental.

| (POS. 13.16) Coefficient KR | [KR=X.XXXXX] | AL5 | [CFFKR] |
|---|---|---|---|

Correction coefficient constant instrumental.

## DIGITAL ANALOG CONVERTER (Correction Parameters)



The diagram shows how the DAC4-20mA parameters are setup. The DAC1 value corresponds to 4 mA corresponding to a zero flow rate, while the value of 20mA corresponds to a 100% of the flow rate.

| (POS. 13.17) Cal. DAC 4mA u.an .1 | [DAC1 4mA =XXXXX] | AL5 | [C1CP1] |
|---|---|---|---|

DAC1 out 4mA calibration point. (current output 1 calibration point 1)

| (POS. 13.18) Cal. DAC 20mA u.an .1 | [DAC1 20mA=XXXXX] | AL5 | [C1CP2] |
|---|---|---|---|

DAC1 out 20mA calibration point. (current output 2 calibration point 1)

| (POS. 13.19) Analog input 1 start scale cal. | [AIN1 SS= ± xxxxx] | AL5 | [A1CP1] |
|---|---|---|---|

Analog Input Scale Start Calculation 1. Range of settable values are from 0 to 32767.

| (POS. 13.20) Analog input 1 full scale cal. | [AIN1 FS= ± xxxxx] | AL5 | [A1CP2] |
|---|---|---|---|

End of scale analogue input calculation 1. Range of settable values are from 0 to 32767.

| (POS. 13.21) Analog input 2 start scale cal. | [AIN2 SS= ± xxxxx] | AL5 | [A2CP1] |
|---|---|---|---|

Analog input 2 start scale calculation. Settable value range is from 0 to 32767.

| (POS. 13.22) Analog input 2 full scale cal. | [AIN2 FS= ± xxxxx] | AL5 | [A2CP2] |
|---|---|---|---|

End of scale analogue input calculation 2. Range of settable values are from 0 to 32767.

| (POS. 13.23) System stand-by mode activation | [Stand-by] | AL3 | [SSTBY] |
|---|---|---|---|

Enable the converter standby state. It is enabled by selecting rechargeable battery in hw config.

| (POS. 13.24) Firmware update | [FW update] | AL4 | [FWUPD] |
|---|---|---|---|

Enable firmware update. The firmware can be upload to the SD card (name.file).
MCP interface is activated by the command FWUPD = name.file
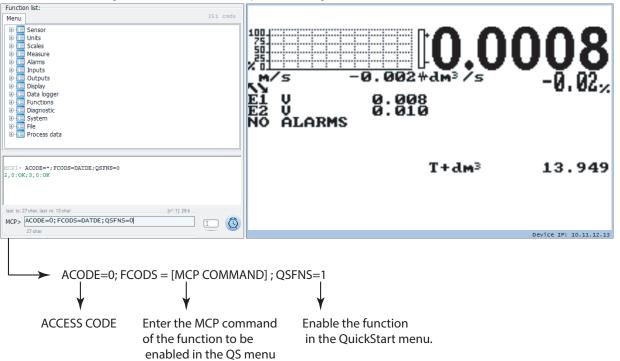
## MENU 13 – SYSTEM: ONLY MCP FUNCTIONS

| Unique Identity KEY | [MCP ONLY] | AL0 | [UIKEY] |
|---|---|---|---|

Device Unique Identity key.

| Hardware set. | [MCP ONLY] | AL0 | [HWSET] |
|---|---|---|---|

Device hardware configuration.

| Device hardware code | [MCP ONLY] | AL0 | [HWCOD] |
|---|---|---|---|

Device hardware code.

| Firmware CRC-32 value | [MCP ONLY] | AL6 | [FWCRC] |
|---|---|---|---|

FirmWare CRC

| ISOCalmaster Reference | [MCP ONLY] | AL6 | [ISOCR] |
|---|---|---|---|

Measure given by system verification with IsocalMASTER

| Calibr. Exec. status Memory | [MCP ONLY] | AL6 | [CALXM] |
|---|---|---|---|

Calibration Execution status Memory. This function checks the instrument's internal calibration status.

❑  CALXM=1 instrument calibrated correctly

❑  CALXM=0 Invalid calibration / Calibration not completed (invalid calibration (if the function is zero, start the calibration function, MCP CALIC command).

| RTC Real time clock | [MCP ONLY] | AL2 | [RTCAC] |
|---|---|---|---|

This function is used for correcting the internal clock. To set the time of the instrument with the MCP program, press the button 🕒 .

| Function code Selection | [MCP ONLY] | AL0 | [FCODS] |
|---|---|---|---|

Select the function code.

| Function Enable State Selection | [MCP ONLY] | AL6 | [FNESS] |
|---|---|---|---|

Select the enable state of function.

| All Functions State Selection | [MCP ONLY] | AL6 | [AFNSS] |
|---|---|---|---|

Select enable state of ALL function.

| | | | |
|---|---|---|---|
| ***Quick Start FuNction Selection*** | **[MCP ONLY]** | **AL6** | **[QSFNS]** |

Select function for quick start menu.

| | | | |
|---|---|---|---|
| ***Quick Start All Functions Selection*** | **[MCP ONLY]** | **AL6** | **[QSAFS]** |

Select ALL function converter for quick start menu.

| | | | |
|---|---|---|---|
| ***Quick start function status List*** | **[MCP ONLY]** | **AL6** | **[QSLST]** |

List quick start group functions.

| | | | |
|---|---|---|---|
| ***Function enable status List*** | **[MCP ONLY]** | **AL6** | **[FSLST]** |

List enable status of functions

| | | | |
|---|---|---|---|
| ***Analog input 1 Start Scale Cal.*** | **[MCP ONLY]** | **AL6** | **[A1SSC]** |

Calibration of the analog input 1 start scale.

| | | | |
|---|---|---|---|
| ***Analog input 1 Full Scale Cal.*** | **[MCP ONLY]** | **AL6** | **[A1FSC]** |

End of scale analogue input calibration 1.

| | | | |
|---|---|---|---|
| ***Analog input 2 Start Scale Cal.*** | **[MCP ONLY]** | **AL6** | **[A2SSC]** |

Calibration of the analog input 2 start scale.

| | | | |
|---|---|---|---|
| ***Analog input 2 Full Scale Cal.*** | **[MCP ONLY]** | **AL6** | **[A2FSC]** |

End of scale analogue input calibration 2.

| | | | |
|---|---|---|---|
| ***Access CODE*** | **[MCP ONLY]** | **AL0** | **[ACODE]** |

Entry of access code through MCP console. Example of adding functions to the Quick start menu via MCP.



ACODE=0; FCODS = [MCP COMMAND] ; QSFNS=1

ACCESS CODE     Enter the MCP command of the function to be enabled in the QS menu     Enable the function in the QuickStart menu.

| **LINK Terminate** | [MCP ONLY] | AL0 | [LTERM] |
|---|---|---|---|

Terminate the PPP data link

| **MCPI session QUIT** | [MCP ONLY] | AL0 | [MQUIT] |
|---|---|---|---|

Quit the MCPI connection

| **Functions LIST** | [MCP ONLY] | AL0 | [FLIST] |
|---|---|---|---|

View list of all available converter functions.

| **Functions LISt Compact** | [MCP ONLY] | AL0 | [FLISC] |
|---|---|---|---|

View compact list of all available converter functions.

| **Functions Menu SELection** | [MCP ONLY] | AL0 | [FMSEL] |
|---|---|---|---|

Select menu for functions list

| **Configuration list** | [MCP ONLY] | AL0 | [CFLST] |
|---|---|---|---|

Configuration parameter list. The list with the status / values of the converter parameter.

| **Hidden functions list** | [MCP ONLY] | AL0 | [HFLST] |
|---|---|---|---|

Hidden functions list

| **Volume Totalizer Total Positive Set** | [MCP ONLY] | AL4 | [VTTPS] |
|---|---|---|---|

Set the value of the total positive totalizer T +.

| **Volume Totalizer Partial Positive Set** | [MCP ONLY] | AL4 | [VTPPS] |
|---|---|---|---|

Set the value of the positive partial totalizer P +.

| | | | |
|---|---|---|---|
| *Volume Totalizer Total Negative Set* | [MCP ONLY] | AL4 | [VTTNS] |

Set the value of the total negative totalizer T-.

| | | | |
|---|---|---|---|
| *Volume Totalizer Partial Negative Set* | [MCP ONLY] | AL4 | [VTPNS] |

Set the value of the negative partial totalizer P-.

| | | | |
|---|---|---|---|
| *Volume Total Positive Overflow Set* | [MCP ONLY] | AL4 | [VTPOS] |

Set overflow values for total positive totalisers T +.

| | | | |
|---|---|---|---|
| *Volume Partial Positive Overflow Set* | [MCP ONLY] | AL4 | [VPPOS] |

Sets the overflow values for P + positive partial totalizers.

| | | | |
|---|---|---|---|
| *Volume Total Negative Overflow Set* | [MCP ONLY] | AL4 | [VTNOS] |

Set overflow values for total negative totalisers T-.

| | | | |
|---|---|---|---|
| *Volume Partial Negative Overflow Set* | [MCP ONLY] | AL4 | [VPNOS] |

Set overflow values for negative partial totalizers T-

| | | | |
|---|---|---|---|
| *CPU MaX.recorded temperature* | [MCP ONLY] | AL6 | [CPUMX] |

Maximum CPU temperature recorded.

| | | | |
|---|---|---|---|
| *CPU MiN.recorded temperature* | [MCP ONLY] | AL6 | [CPUMN] |

Minimum recorded CPU temperature.

| | | | |
|---|---|---|---|
| *Calibration GAin Register 0* | [MCP ONLY] | AL6 | [CGAR0] |

Calibration gain register 0

| | | | |
|---|---|---|---|
| *Calibration GAin Register 1* | [MCP ONLY] | AL6 | [CGAR1] |

Calibration gain register 1

| | | | |
|---|---|---|---|
| *Calibration gain register C* | [MCP ONLY] | AL6 | [CGARC] |

Calibration gain register C

## MENU 14 – FILE (ONLY MCP)

| | | | |
|---|---|---|---|
| *(POS. 14.1) File Transfer ABoRt* | [MCP ONLY] | AL2 | [FTABR] |
| Abort the current File Transfer | | | |
| *(POS. 14.2) File Transfer STAte* | [MCP ONLY] | AL0 | [FTSTA] |
| Show file transfer status | | | |
| *(POS. 14.3) Read Last EVenTs* | [MCP ONLY] | AL2 | [RLEVT] |
| Read the latest system events | | | |
| *(POS. 14.4) Read All EVenTs* | [MCP ONLY] | AL2 | [RAEVT] |
| Read all current system events. | | | |
| *(POS. 14.5) Read Last Logged DaTa* | [MCP ONLY] | AL2 | [RLLDT] |
| Read the latest logged data. | | | |
| *(POS. 14.6) Read All Logged DaTa* | [MCP ONLY] | AL2 | [RALDT] |
| Read all current logged data. | | | |
| *(POS. 14.7) Read Last Sensor Verify Data* | [MCP ONLY] | AL2 | [RLSVD] |
| Read the latest sensor ver. data. | | | |
| *(POS. 14.8) Read All Sensor Verify Data* | [MCP ONLY] | AL2 | [RASVD] |
| Read all sensor verify data. | | | |
| *(POS. 14.9) File SEND* | [MCP ONLY] | AL2 | [FSEND] |
| Set file name for read operation. | | | |
| *(POS. 14.10) File ReCeiVE* | [MCP ONLY] | AL5 | [FRCVE] |
| Set file name for write operation. | | | |
| *(POS. 14.11) File ReCeive APpend mode* | [MCP ONLY] | AL2 | [FRCAP] |
| Set file name for write-append. | | | |
| *(POS. 14.12) File OFFSet position* | [MCP ONLY] | AL2 | [FOFFS] |
| Set file offset position. | | | |
| *(POS. 14.13) ConFiGuration file WRite* | [MCP ONLY] | AL2 | [CFGWR] |
| Save the configuration to a file | | | |
| *(POS. 14.14) ConFiGuration file ReaD* | [MCP ONLY] | AL2 | [CFGRD] |
| Read the configuration from file. | | | |
| *(POS. 14.15) FuNCtion list file WRite* | [MCP ONLY] | AL2 | [FNCWR] |
| Save the functions list to file. | | | |
| *(POS. 14.16) Function Enable Status WRite* | [MCP ONLY] | AL6 | [FESWR] |
| Save function enable status to file | | | |

| (POS. 14.17) Quick Start function Status WRite | [MCP ONLY] | AL6 | [QSSWR] |
|---|---|---|---|

Save quick start function enable.

## MENU 15 – PROCESS DATA (ONLY MCP)

| (POS. 15.1) OUTput 1 Set | [MCP ONLY] | AL0 | [OUT1S] |
|---|---|---|---|

Set value for digital output 1.

| (POS. 15.2) OUTput 2 Set | [MCP ONLY] | AL0 | [OUT2S] |
|---|---|---|---|

Set value for digital output 2.

| (POS. 15.3) OUTput 3 Set | [MCP ONLY] | AL0 | [OUT3S] |
|---|---|---|---|

Set value for digital output 3.

| (POS. 15.4) OUTput 4 Set | [MCP ONLY] | AL0 | [OUT4S] |
|---|---|---|---|

Set value for digital output 4.

| (POS. 15.5) Digital INput 1 Status | [MCP ONLY] | AL0 | [DIN1S] |
|---|---|---|---|

Digital input 1 status read.

| (POS. 15.6) Digital INput 2 Status | [MCP ONLY] | AL0 | [DIN2S] |
|---|---|---|---|

Digital input 2 status read.

| (POS. 15.7) Digital INput 3 Status | [MCP ONLY] | AL0 | [DIN3S] |
|---|---|---|---|

Digital input 3 status read.

| (POS. 15.8) Flow Rate Full Scale in chosen Units | [MCP ONLY] | AL0 | [FRFSU] |
|---|---|---|---|

Flow Rate Full Scale in chosen Units.

| (POS. 15.9) Flow Rate Value PerCentage | [MCP ONLY] | AL0 | [FRVPC] |
|---|---|---|---|

Flow Rate Value PerCentage.

| (POS. 15.10) KL TeST | [MCP ONLY] | AL0 | [KLTST] |
|---|---|---|---|

KL test.

| (POS. 15.11) Flow Rate Value Percentage without cut-off | [MCP ONLY] | AL0 | [FRVPX] |
|---|---|---|---|

Flow Rate Value Percentage without cut-off.

| (POS. 15.12) Flow Rate Value Binary without cut-off | [MCP ONLY] | AL0 | [FRVBX] |
|---|---|---|---|

Flow Rate Value Binary without cut-off.

| (POS. 15.13) Flow Rate Value Technical Unit | [MCP ONLY] | AL0 | [FRVTU] |
|---|---|---|---|

Flow Rate Value Technical Unit.

| (POS. 15.14) Volume Totalizer Total Positive Value | [MCP ONLY] | AL0 | [VTTPV] |
|---|---|---|---|

Volume Totalizer Total Positive Value.

| (POS. 15.15) Analog input 1 Value Technical Unit | [MCP ONLY] | AL0 | [A2VTU] |
|---|---|---|---|

Analog input 1 value in technical units

| | | | |
|---|---|---|---|
| *(POS. 15.16) Analog input 2 Value Technical Unit* | **[MCP ONLY]** | **AL0** | **[VTTPV]** |

Analog input 2 value in technical units

| | | | |
|---|---|---|---|
| *(POS. 15.17) Volume Totalizer Partial Positive Value* | **[MCP ONLY]** | **AL0** | **[VTPPV]** |

Volume Totalizer Partial Positive Value.

| | | | |
|---|---|---|---|
| *(POS. 15.18) Volume Totalizer Total Negative Value* | **[MCP ONLY]** | **AL0** | **[VTTNV]** |

Volume Totalizer Total Negative Value.

| | | | |
|---|---|---|---|
| *(POS. 15.19) Volume Totalizer Partial Negative Value* | **[MCP ONLY]** | **AL0** | **[VTPNV]** |

Volume Totalizer Partial Negative Value.

| | | | |
|---|---|---|---|
| *(POS. 15.20) Volume Totalizer Total Positive Overflow* | **[MCP ONLY]** | **AL0** | **[VTTPO]** |

Volume Totalizer Total Positive Overflow.

| | | | |
|---|---|---|---|
| *(POS. 15.21) Volume Totalizer Partial Positive Overflow* | **[MCP ONLY]** | **AL0** | **[VTPPO]** |

Volume Totalizer Partial Positive Overflow.

| | | | |
|---|---|---|---|
| *(POS. 15.23) Volume Totalizer Total Negative Overflows* | **[MCP ONLY]** | **AL0** | **[VTTNO]** |

Volume Totalizer Total Negative Overflow.

| | | | |
|---|---|---|---|
| *(POS. 15.24) Volume Totalizer Partial Negative Overflow* | **[MCP ONLY]** | **AL0** | **[VTPNO]** |

Volume Totalizer Partial Negative Overflow.

| | | | |
|---|---|---|---|
| *(POS. 15.25) Volume Totalizers ALL* | **[MCP ONLY]** | **AL0** | **[VTALL]** |

Volume Totalizers all.

| | | | |
|---|---|---|---|
| *(POS. 15.26) Board TeMPeratures* | **[MCP ONLY]** | **AL0** | **[BTMPS]** |

Board Temperatures.

| | | | |
|---|---|---|---|
| *(POS. 15.27) CPU TemPerature* | **[MCP ONLY]** | **AL0** | **[CPUTP]** |

CPU Temperature.

| | | | |
|---|---|---|---|
| *(POS. 15.28) Sensor CoiLs TemPerature* | **[MCP ONLY]** | **AL0** | **[SCLTP]** |

Sensor coils temperature.

| | | | |
|---|---|---|---|
| *(POS. 15.29) LiQuid VELocity* | **[MCP ONLY]** | **AL0** | **[LQVEL]** |

Liquid velocity.

| | | | |
|---|---|---|---|
| *(POS. 15.30) AVeraGe process data Samples Number* | **[MCP ONLY]** | **AL0** | **[AVGSN]** |

Average process data samples number.

| *(POS. 15.31) ALARM status* | **[MCP ONLY]** | **AL0** | **[ALARM]** |

Alarm status.

| *(POS. 15.32) Sensor TeSt Result Code* | **[MCP ONLY]** | **AL0** | **[STSRC]** |

Sensor Test Result Code

| *(POS. 15.33) Main PoWeR Status* | **[MCP ONLY]** | **AL0** | **[MPWRS]** |

Main Power Status

| *(POS. 15.34) equivalent INput RESistance* | **[MCP ONLY]** | **AL0** | **[INRES]** |

Input resistance

| *(POS. 15.35) INput VoLtageS* | **[MCP ONLY]** | **AL0** | **[INVLS]** |

Input voltages

| *(POS. 15.36) Sensor TaBLe Version* | **[MCP ONLY]** | **AL0** | **[STBLV]** |

Sensor table version

| *(POS. 15.37) MoDeM STatus* | **[MCP ONLY]** | **AL0** | **[MDMST]** |

Operating status of the modem

| *(POS. 15.38) SEQuence NumBer* | **[MCP ONLY]** | **AL0** | **[SEQNB]** |

Sequence number. The SEQNB command allows you to specify a sequence number to be used when querying the meter (additional verification procedure). The same number that is set with SEQNB = number is retransmitted as a response by the converter. This function, together with the process commands used to read the variables (capacity, volumes, etc.) allows to keep synchronized the received values with the requests made. In this way it is possible to verify the temporal sequence with which the messages are received by the meter.

Example:

Request: SEQNB=1;FRVPC?

Request: 1;%,12.345678

Request: SEQNB=2;FRVPC?

Request: 2;%,11.456778

Request: SEQNB=3;FRVPC?

Request: 3;%,10.983228

Request: SEQNB=4;FRVPC?

..

..            <= Sequence 4 is missing, error

..

Request: SEQNB=5;FRVPC?

Return: 5;%,10.992783

The example shows how SEQNB can help identify exactly what message was lost. In this case the requests are all the same (apart from the SEQNB number), but with different requests, SEQNB can be a verification tool.

ISOIL
INDUSTRIA
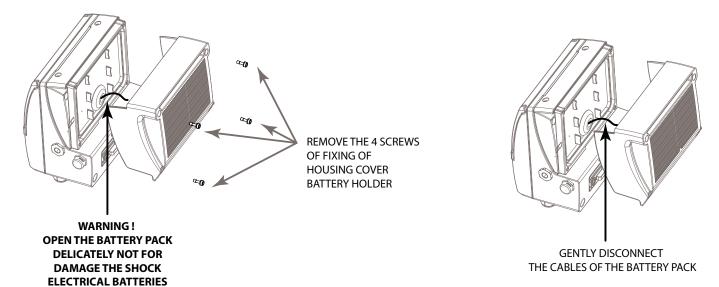
# METER DATA

This function allows the import of data from one converter to another up to level 4 included. The hardware configurations and the corresponding calibration values are not restored. The "data import" procedure can be performed one time only, since the directory, according to the board's SERIAL NUMBER, will be renamed.

OPERATING PROCEDURE TO CHANGE THE CONVERTER BOARD
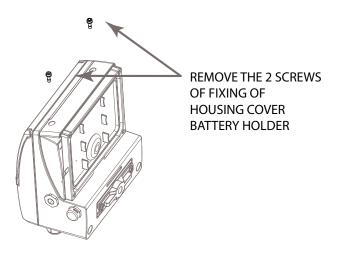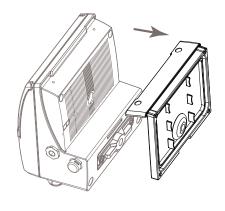
Remove the 4 screws (see "power supply converter" pag. 20 ) to be able to remove the battery case. Attention to the internal wiring of the instrument.

REMOVE THE 4 SCREWS
OF FIXING OF
HOUSING COVER
BATTERY HOLDER

**WARNING !
OPEN THE BATTERY PACK
DELICATELY NOT FOR
DAMAGE THE SHOCK
ELECTRICAL BATTERIES**

GENTLY DISCONNECT
THE CABLES OF THE BATTERY PACK

Remove the 2 screws (see "MV255 CONSTRUCTION" pag. 17) to be able to remove the battery case cover. Attention to the internal wiring of the instrument
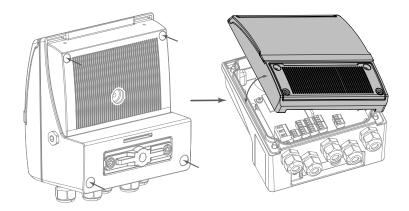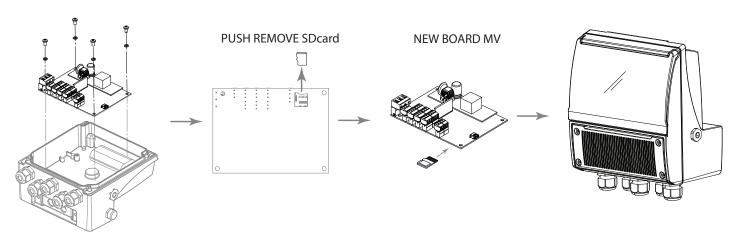
REMOVE THE 2 SCREWS
OF FIXING OF
HOUSING COVER
BATTERY HOLDER

Remove the 4 screws (see "MV255 CONSTRUCTION" pag. 17) to remove the MV255 card. Attention to the board wiring.



Remove the 4 screws (see "MV255 CONSTRUCTION" pag. 17) to remove the MV255 card. Attention to the board wiring. Remove the SD card and insert it into the new card.

PUSH REMOVE SDcard          NEW BOARD MV



Once the card is assembled to the converter, perform the following procedures:

❑ Connect the internal wiring to the board without directly connecting the batteries (see diagrams "power supply converter" pag. 20 ).

❑ Assemble the MV housing cover  (see "torques" pag. 16).

❑ Assemble the battery case cover (see "torques" pag. 16).

❑ Connect the batteries of the housing to the cable / wiring to the board.

❑ Assemble the battery case with the 4 screws removed (see "torques" pag. 16).

❑ Correctly assembled the converter start the function ("11.8" pag. 55) to restore data.

# B.I.V. (BUILT-IN VERIFICATOR)

BIV, abbreviation for Built In Verificator, is available as option for MV255 converters and must be enabled by the manufacturer. It is also necessary that the SD card is activated to store saved data. The analysis of collected data performed by a dedicated IsoBIV software running on another device (PC).

The simplicity of test procedures minimize the risk of handling errors; maximum safety and reliability thanks to the traceable factory calibration and internal references complement the safety by design principle with minimal failure rates

IsoBIV allows to create and print a report as validation of device functionality/measure error.

## Operation and Conditions of Use.

The system is based on periodic measurements performed every hour or using a manual command (MCP command = SVERC). The sensor parameters are measured and compared with previously measured and stored reference values. Each time the system performs a series of measurements on the sensor and records them in a file called "STESTLOG. CSV", which resides in the main directory of the SD memory of the converter.

The sensor test can also be carried out without the active BIV system, but in this case only the presence of isolation losses and the overall good functioning of the sensor such the coil resistance, the excitation current and the rising times of the current within the generic limits that guarantee operation. Instead if BIV is active, the measurements are deeper and the measured values are tested by comparing them with a set of characteristic sensor parameters measured at the time of installation.

## Saving Reference Values (Characteristic Parameters)

After sensor installation, the parameters that will be used as reference for the BIV system and the IsoBIV data analysis software must to be measured.

The characteristic values of the coil circuits are saved in the converter memory at the factory before to ship the instrument. For the reference measure of the electrodes circuits, there is a specific function that perform the measures of voltage and resistance at the installation site. This function is managed ONLY by the IsoBIV program, which through a simple wizard will set the converter to perform the measures in the specific measurement point where the meter is installed.

To activate BIV, these functions must be verified:

❏ **[ASVFE=1] :** It enable the sensor's automatic test every hour. The ASVFE function in Menu 1 with access level 3 can be also activated using the instrument's display.
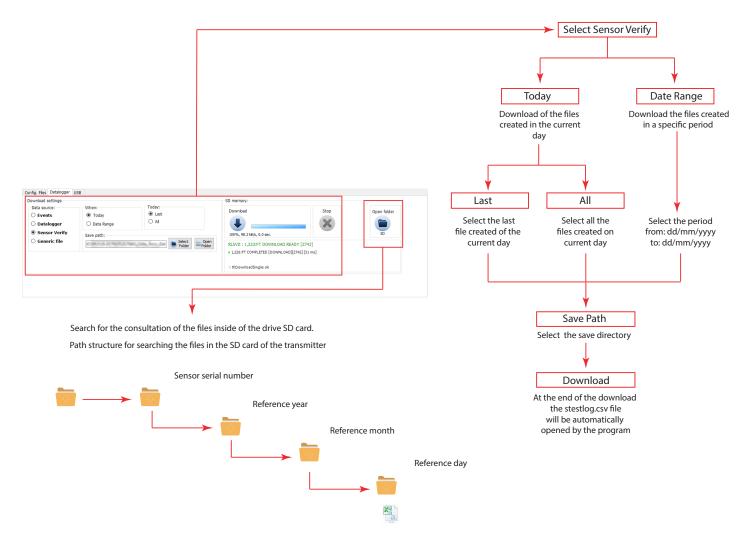
This feature can be enabled even if the SD card is not installed and if the BIV function is not active; in such a case the sensor file is NOT created and any alarms will be generated either if the data deviation from the reference data is outside the sensor's limits. Practically, in the absence of the necessary hardware permissions, this function is useful to test the insulation of the coils.

## Opening and reading manually the files STESTLOG.CSV

The list below describes the steps for saving and reading STESTLOG.CSV file.

❑ Start the MPC program [Mcp] for opening the converter menu interface.

❑ Follow these steps:



Select Sensor Verify

Today
Download of the files created in the current day

Date Range
Download the files created in a specific period

Last
Select the last file created of the current day

All
Select all the files created on current day

Select the period from: dd/mm/yyyy to: dd/mm/yyyy

Save Path
Select the save directory

Download
At the end of the download the stestlog.csv file will be automatically opened by the program

Search for the consultation of the files inside of the drive SD card.

Path structure for searching the files in the SD card of the transmitter

Sensor serial number

Reference year

Reference month

Reference day

❑ Reading and meaning of the STESTLOG.CSV file

(#): the units of measurement are recorded only if the specific function of the DATA LOGGER is active. Otherwise the field is empty.

(*): the temperature values can be expressed in degrees F or C, depending on the configuration of the converter.

| Column | Header / sample values | Meaning |
|---|---|---|
| A | 0, 1, 2, 3, 4, 5, 6 | Registration number |
| B | DATA; dd/mm/yy | Date |
| C | ORA; 00:00:00 | hours |
| D | 0 | Error code in hexadecimal format (0 = no error) |
| E | | The temperature unit (degrees F or C) (#) (*) |
| F | 28 | CPU temperature |
| G | | The unit of voltage CPU (V) (#) |
| H | +0.000 | Voltage measured on the electrode E1 |
| I | | The unit of voltage E1 (V) (#) |
| J | +0.000 | Reference voltage electrode E2 |
| K | | The unit of voltage E2 (V) (#) |
| L | +0.000 | Differential voltage E1-E2 |
| M | | The unit of voltage (V) (#) |
| N | +0.000 | Common mode voltage (E1 + E2) / 2 |
| O | | The unit of resistance (ohm) (#) |
| P | 0.0 | Resistance measured between E1 and the common |
| Q | | The unit of resistance (ohm) (#) |
| R | 0.0 | Resistance measured between E2 and the common |
| S | | The unit of voltage (V) (#) |
| T | +0.000 | Common mode noise at low frequency |

| Code | Value | Description |
|---|---|---|
| AQ | hex | Raw checksum |
| AP | 0.000 0.000 0.000 0.000 0.000 0.000 | Rise time current phase B |
| AO | | Unit of measure of time (ms) (#) |
| AN | 0.000 0.000 0.000 0.000 0.000 0.000 | Rise time current phase A |
| AM | | Unit of measure of time (ms) (#) |
| AL | 0.000 0.000 0.000 0.000 0.000 0.000 | The coil leakage current (insulation fault) |
| AK | | The unit of current (mA) (#) |
| AJ | 0.000 0.000 0.000 0.000 0.000 0.000 | Temperature of the sensor coils |
| AI | | The temperature unit (degrees F or C) (#) (*) |
| AH | 0.000 0.000 0.000 0.000 0.000 0.000 | Measurement of the sensor coil resistance |
| AG | | The unit of resistance (ohm) (#) |
| AF | 0.000 0.000 0.000 0.000 0.000 0.000 | Excitation current of the coils |
| AE | | The unit of current (mA) (#) |
| AD | +0.000 +0.000 +0.000 +0.000 +0.000 +0.000 | Negative supply voltage analog circuits |
| AC | | The unit of voltage (V) (#) |
| AB | +0.000 +0.000 +0.000 +0.000 +0.000 +0.000 | Analog circuitry positive supply voltage |
| AA | | The unit of voltage (V) (#) |
| Z | +0.000 +0.000 +0.000 +0.000 +0.000 +0.000 | Mode ADC noise high frequency differential |
| Y | | The unit of voltage (mV) (#) |
| X | +0.000 +0.000 +0.000 +0.000 +0.000 +0.000 | Mode ADC noise at low frequency differential |
| W | | The unit of voltage (mV) (#) |
| V | +0.000 +0.000 +0.000 +0.000 +0.000 +0.000 | Differential mode noise at low frequency |
| U | 0 (0x0000000000000001) 4 (0x0000000001420080) 5 (0x0000000001430080) 4 (0x0000000000410080) 3 (0x0000000000410000) 2 (0x0000000000410000) 3 (0x0000000001410000) | Presence of alarm and descriptive hexadecimal code |

The manufacturer guarantees only English text available on our web site www.isoil.com

## Standard and internal check to the instrument limits

The measured data are compared with the reference values previously stored. The variation of different variable measured,shall be within the following range:
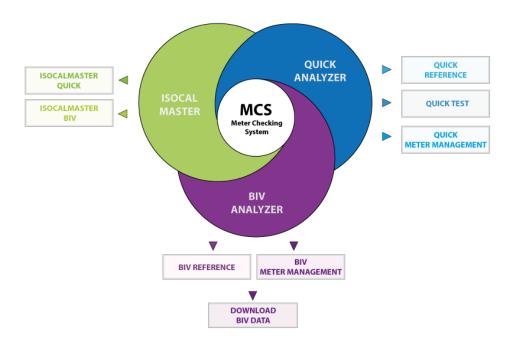
- ❑ Coil temperature (using resistance reading): within limits compatible with the lining material

- ❑ Current up times: change% detected resistance coils + 10% (tolerance range)

- ❑ Resistance between electrodes and common: between 0.3 and 3.0 times the reference early strength

- ❑ Leakage current (insulation test): less than 0.1 mA

If the values deviate beyond these limits it is generated and displayed a coded alarm.
The alarm remains active and visible on the display until next test (max. 1 hour).

## MCS SOFTWARE

Meter Checking System (MCS) Is a modular system that provides diagnostic activities. The system is made up of multiple components: the enabled functions depend on the connected instrument.



## MCS for MV255

When a MV255 is connected to MCS is possible to use all the system MCS sections.
For the section BIV analyzer (purple section) it's necessary to have selected the BIV option in order phase.
For the section IsocalMaster (green section) It's necessary to connect an IsocalMaster device.
See the MCS software manual for more information.

MAN_MV255_IT_EN_IS_R16_1.06.XXXX

# ALARM MESSAGES (CAUSES AND ACTIONS TO BE TAKEN)

Alarm coding table with added bit-code values that appear on the data logger. The codes can be added when there are several alarms simultaneously. The codes are in HEX format, so for calculations on sums (which are arithmetic ORs) you need to use HEX mathematics and not decimal.a. Example 1: 10H (16 decimal) + 20H (32 decimal) = 30H (48 decimal).

b. Example 2: 10H (16 decimal) + 4H (4 decimal) = 14H (20 decimal)

| CODE | BITCODE DATA LOGGER (HEXADECIMAL) | ALARM DESCRIPTION | CAUSE/SOLUTIONS |
|---|---|---|---|
| 00 | 0000000000000001 | PCB is not inizializated | Contact the service |
| 01 | 0000000000000002 | F-RAM error | Try to restart. If the error persists, please contact the service |
| 02 | 0000000000000004 | SD-card error | Try to restart. f the error persists, contact the service |
| 03 | 0000000000000008 | The SD-card isalmost full | Plan to replace the SD-card as soon as possible |
| 04 | 0000000000000010 | The SD-card is full | Replace the SD-card |
| 05 | 0000000000000020 | Power Primary absent | This alarm condition can be configured by the user. Evaluate whether this condition is normal or unexpected |
| 06 | 0000000000000040 | Communication error between s. | Try to restart. If the error persists Contact the service |
| 07 | 0000000000000080 | Low baterries level | Replace the batteries or charge the batteries if they are rechargeable. |
| 08 | 0000000000000100 | ISOCALMASTER connected | ISOCALMASTER module inserted and correctly recognized |
| 19 | 0000000000080000 | Internal voltage error | Contact the service |
| 22 | 0000000000400000 | Excitation error | Sensor not connected correctly, broken or incorrect wiring, faulty connections or incorrect sensor piloting parameters. |
| 23 | 0000000000800000 | Signal error | Critical measurement conditions, lack of valid earth connection, presence of persistent electrical disturbances or incorrect or interrupted wiring / connections with the sensor. |
| 24 | 0000000001000000 | Empty tube | The sensor is empty. Check the presence of liquid in the connected piping, check the correct setting of the maximum allowable resistance on the electrodes. |
| 25 | 0000000002000000 | Max flow alarm + | Check the process conditions and the MAX + alarm threshold set |
| 26 | 0000000004000000 | Max flow alarm - | Check the process conditions and the MAX - alarm threshold set |
| 27 | 0000000008000000 | Min flow alarm + | Check the process conditions and the set MIN + alarm threshold |
| 28 | 0000000010000000 | Min flow alarm - | Check the process conditions and the set MIN - alarm threshold |
| 29 | 0000000020000000 | Flow rate > F.sclae + | Check the process conditions and the full scale value set |
| 30 | 0000000040000000 | Flow rate < F.sclae + | Check the process conditions and the full scale value set |

| 31 | 0000000080000000 | Pulse output 1 out of range | Check process conditions and set values for pulse unit 1 and pulse duration 1 |
|----|------------------|-----------------------------|-------------------------------------------------------------------------------|
| 32 | 0000000100000000 | Pulse output 2 out of range | Check process conditions and set values for pulse unit 2 and pulse duration 2 |
| 33 | 0000000200000000 | Calibration error | Make sure that the sensor is connected correctly and that the sensor type matches the one set. If the error persists, contact the service |
| 34 | 0000000400000000 | Sensor error | The sensor test has failed. Examine the code reported in the event logger or diagnostic values page to determine possible causes. ATTENTION: the error condition persists until the next test is performed or until the instrument is restarted. |
| 35 | 0000000800000000 | Configuration login failed | An attempt was made to access the configuration parameters with an incorrect password. This alarm condition can be configured by the user. |
| 36 | 0000001000000000 | Configuration access detected | Access to configuration parameters was detected. This could be a legitimate or unexpected operation. The alarm condition can be configured by the user. |
| 37 | 0000002000000000 | System violation | A system integrity violation was detected. This alarm is detected by means of a switch connected to a digital input of the instrument specifically configured for this use |
| 38 | 0000004000000000 | Flooding | A system flood condition has been detected. This alarm is detected by a switch connected to a digital input of the instrument specially configured for this use |
| 39 | 0000008000000000 | Analog input 1 error | The signal or sensor connected to the optional analog input 1 are incorrect or not configured correctly. Check the relative wiring and that the sensor type is correct / functioning. |
| 40 | 0000010000000000 | Analog input 1 out of range | The signal deriving from the sensor connected to the optional analogue input 1 is too large for the configured measurement scale. Review the configuration parameters and check that the sensor is connected correctly. |
| 41 | 0000020000000000 | Misura ingresso analogico 1 maggiore soglia MAX | Check the process conditions and the threshold set as the maximum signal alarm for the optional analog input 1 |
| 42 | 0000040000000000 | Misura ingresso analogico 1 minore soglia MIN | Check the process conditions and the threshold set as a minimum signal alarm for the optional analog input 1 |
| 43 | 0000080000000000 | Analog input 2 error | The signal or sensor connected to the optional analogue input 2 is incorrect or not configured correctly. Check the relative wiring and that the sensor type is correct / functioning. |
| 44 | 0000100000000000 | Analog input 2 out of range | The signal deriving from the sensor connected to the optional analogue input 2 is too large for the configured measurement scale. Review the configuration parameters and check that the sensor is connected correctly. |

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| 45 | 0000200000000000 | Misura ingresso analogico 2 maggiore soglia MAX | Check the process conditions and the threshold set as the maximum signal alarm for the optional analog input 2 |
|---|---|---|---|
| 46 | 0000400000000000 | Misura ingresso analogico 2 minore soglia MIN | Check the process conditions and the threshold set as a minimum signal alarm for the optional analog input 2 |
| 47 | 0000800000000000 | System protection error | The system has detected a protection error related to the MID parameters.Contact the service |
| 48 | 0001000000000000 | System restarted | Evaluate whether the reboot was expected. Otherwise consult the event logger to determine the causes. |
| 49 | 0002000000000000 | Invalid time / date | Set the time and date |
| 50 | 0004000000000000 | CPU frequency error | Contact the service |
| 51 | 0008000000000000 | Temperature out of range for battery charge | The rechargeable battery cannot be recharged because the detected temperature is outside the allowed limits. Check the operating conditions. |
| 52 | 0010000000000000 | Battery voltage rechargeable too high | The rechargeable battery voltage is higher than the allowable limits. Turn off the appliance immediately, disconnect the battery and contact the service. |
| 53 | 0020000000000000 | Charge current too high | The charging current of the rechargeable battery is beyond the allowable limits. Turn off the device immediately, disconnect the battery and contact the service. |
| 54 | 0040000000000000 | Secondary voltage supply error | The power supply voltage is insufficient (probable case with solar panel in poor lighting conditions). If, on the other hand, the power supply voltage is within the expected limits and the alarm persists, contact the service. |
| 55 | 0080000000000000 | Configuration login failed | An attempt was made to access the configuration parameters with an incorrect password. This alarm condition can be configured by the user. |
| 56 | 0100000000000000 | Configuration access detected | Access to configuration parameters was detected. This could be a legitimate or unexpected operation. The alarm condition can be configured by the user. |

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# ERROR CODE TEST SYSTEM OF SENSOR

The codes are in hexadecimal format, the meaning is given for each bit. There are several possible error simultaneous combinations (more bits active) then that will give the combined numerical codes.

| CODE | ANOMALIES DESCRIPTION | ACTION TO TAKE |
|------|----------------------|----------------|
| 0000 | NO ERROR | --- |
| 0001 | SENSOR TEST INSULATION: Generator power too low. | Contact the service |
| 0002 | SENSOR TEST INSULATION: Generator power too high. | |
| 0004 | SENSOR TEST INSULATION: Phase 1 generator voltage too low. | |
| 0008 | SENSOR TEST INSULATION: Phase 1 generator voltage too high. | |
| 0010 | SENSOR TEST INSULATION: Phase 1 terminal voltage coils 1 too low. | |
| 0020 | SENSOR TEST INSULATION: Phase 1 terminal voltage coils 2 too low. | |
| 0040 | SENSOR TEST INSULATION: Phase 2 generator voltage too low. | |
| 0080 | SENSOR TEST INSULATION: Phase 2 generator voltage too high. | |
| 0100 | SENSOR TEST INSULATION: Phase 2 terminal voltage coils 1 too low. | |
| 0200 | SENSOR TEST INSULATION: Phase 2 terminal voltage coils 2 too low. | |
| 0400 | SENSOR TEST INSULATION: Insulation loss, leakage current out of tolerance. | To verify: - wiring between converter sensor, - conditions of use, - set parameters. If the problem persists, contact the service |
| 0800 | TEST TEMPERATURE (RESISTANCE) COILS: Temperature (resistance) out of tolerance. | |
| 1000 | TEST TIME GETTING ON CURRENT PHASE (A): Value out of tolerance. | |
| 2000 | TEST TIME GETTING ON CURRENT PHASE (B): Value out of tolerance. | |
| 4000 | TEST RESISTANCE INPUTS ELECTRODES: Input value 1 out of tolerance. | |
| 8000 | TEST RESISTANCE INPUTS ELECTRODES: Input value 1 out of tolerance | |
| 10000 | Excitation error during the test | The sensor test failed because an excitation error was present. Check the sensor wiring and the parameters set, in particular check that the type of sensor is set correctly. |
| 20000 | Invalid reference values | The reference values used to check the measurements detected on the sensor are not valid. Perform the procedure for storing reference values correctly. |
| 40000 | Empty tube | The tube is empty and therefore it is not possible to check the values measured on the electrodes. Check the installation conditions and the parameters related to the recognition of the empty pipe condition (maximum resistance threshold on the electrodes). |

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At the end of its lifetime, this product shall be disposed of in full compliance with the environmental regulations of the state in which it is located.

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# MANUAL REVIEWS

| REVIEW | DATE | DESCRIPTION |
|---|---|---|
| 255_EN_IT_R0_1.00.0 | 13/02/2019 | First edition |
| 255_EN_IT_R1_1.00.0 | 04/06/2019 | Added information on converter delivery conditions |
| 255_EN_IT_R2_1.00.0 | 26/09/2019 | ADD note battery specification battery option B-C |
| 255_EN_IT_R3_1.02.0 | 24/06/2020 | Software update, Netw. frequency function and new display pages added |
| MAN_MV255_IT_EN_R04_1.05.XXXX | 21/01/2022 | Firmware update, graphics update, MODBUS section moved to a separate manual |
| MAN_MV255_IT_EN_R05_1.05.XXXX | 19/05/2022 | Corrections on Alarms menu |
| MAN_MV255_IT_EN_R06_1.05.XXXX | 04/08/2022 | Changes on alarms table |
| MAN_MV255_IT_EN_R07_1.05.XXXX | 20/09/2022 | Correct drawing and description added in the "output connections" section |
| MAN_MV255_IT_EN_R08_1.05.XXXX | 18/10/2022 | Corrections to download datalogger table |
| MAN_MV255_IT_EN_R09_1.05.XXXX | 18/01/2023 | Corrections on battery power supply section and on descriptions of some functions |
| MAN_MV255_IT_EN_R10_1.06.XXXX | 16/02/2023 | Update of visualization pages |
| MAN_MV255_IT_EN_R11_1.06.XXXX | 15/06/2023 | Adedd measurement tollerance and note on galvanic insulation |
| MAN_MV255_IT_EN_R12_1.06.XXXX | 24/10/2023 | Added information about OUT 4_20 mA and about turning the instrument on and off |
| MAN_MV255_IT_EN_R13_1.06.XXXX | 07/11/2023 | Added notes about external power supply |
| MAN_MV255_IT_EN_R14_1.06.XXXX | 14/12/2023 | Added notes about download data |
| MAN_MV255_IT_EN_R15_1.06.XXXX | 29/07/2024 | Added MCS section |
| MAN_MV255_IT_EN_R16_1.06.XXXX | 16/06/2025 | Updated section on Modbus and use of 4-20 mA output |

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