

# ISOMAG

*The friendly magmeter*

## DATA SHEET

### MV145




CE

ISOIL   
INDUSTRIA

# INDEX

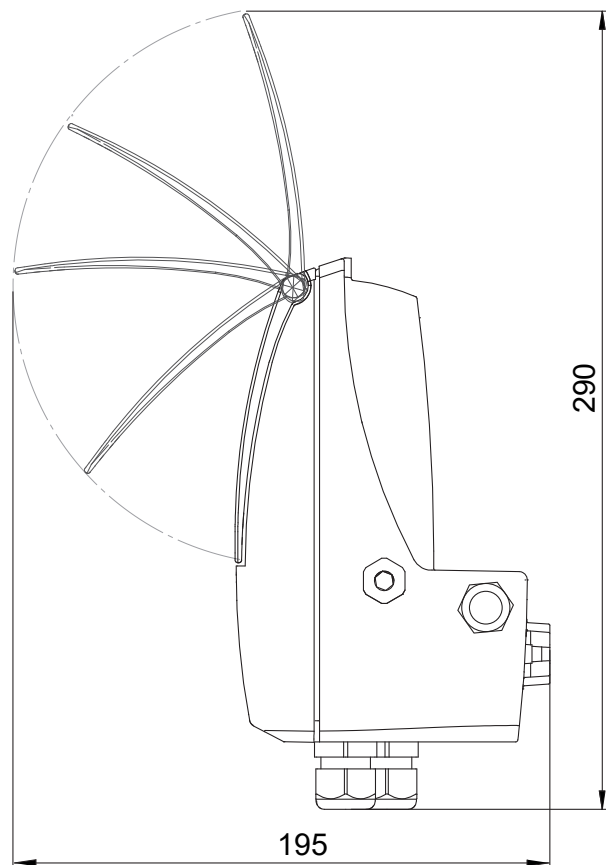
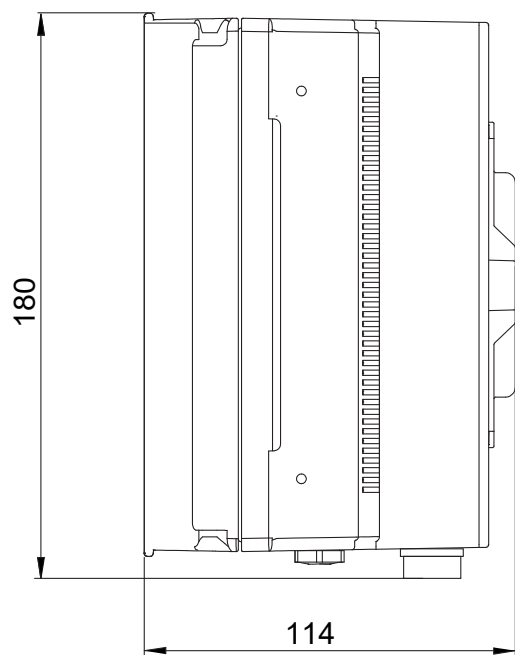
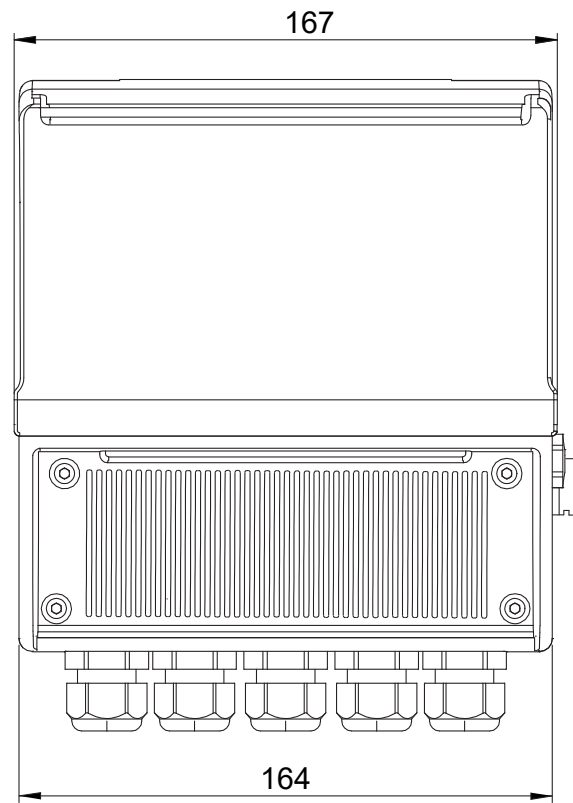
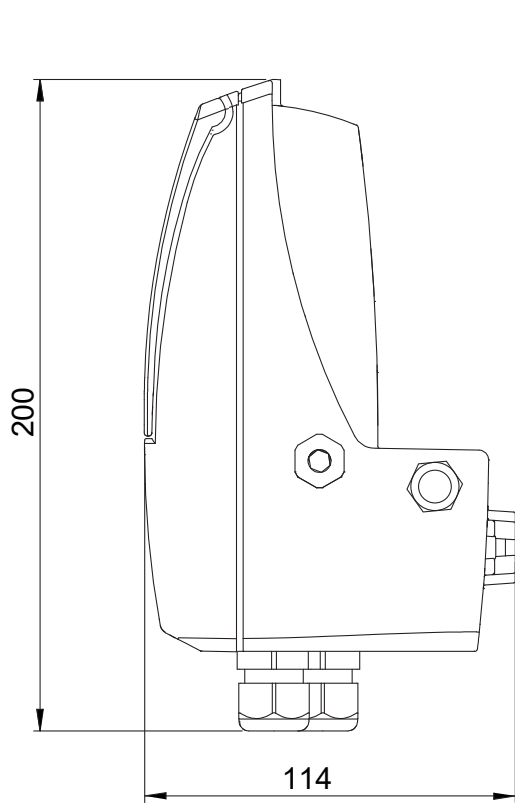
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## TECHNICAL DATA

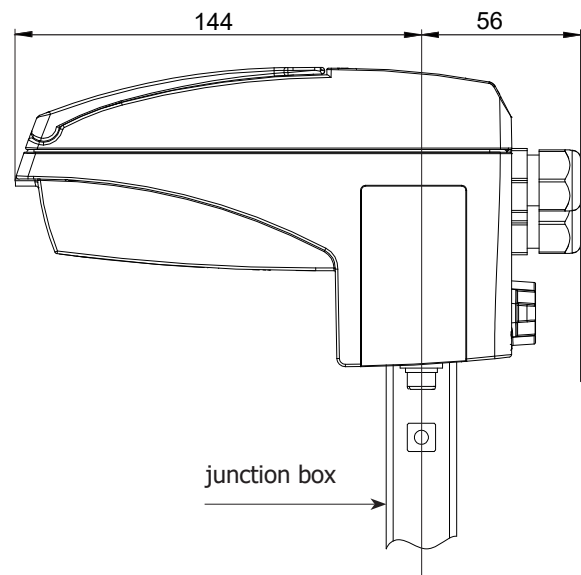
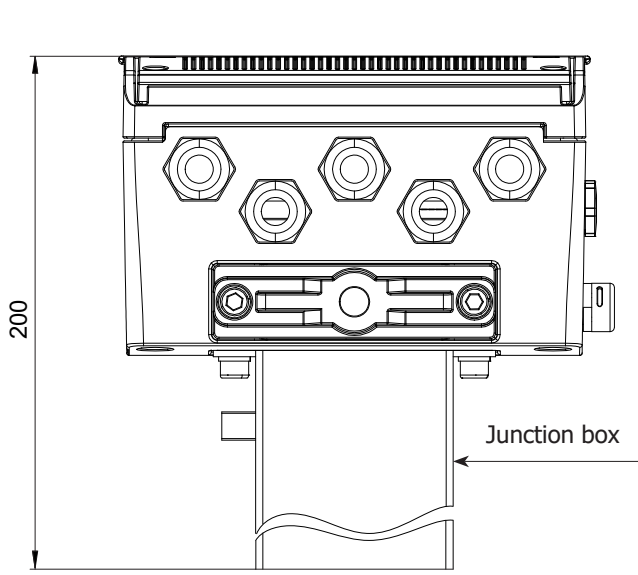
<b>OVERALL FEATURES</b>	
<b>Suitable For</b>	<input type="checkbox"/> All the ISOMAG® sensors
<b>Minimum conductivity</b>	<input type="checkbox"/> 5 µS/cm
<b>Altitude</b>	<input type="checkbox"/> -200 m up to 4000 m
<b>Ambient Temperature</b>	<input type="checkbox"/> -20... +60°C / -4... +140 °F - Aluminium housing <input type="checkbox"/> -10... +50°C / -4... +104 °F - Reinforced Nylon
<b>Humidity Range</b>	<input type="checkbox"/> 0÷100%
<b>STANDARD FEATURES</b>	
<b>Version</b>	<input type="checkbox"/> Compact <input type="checkbox"/> Separate
<b>Housing materials</b>	<input type="checkbox"/> Painted Aluminium die casting Or Nylon reinforced with 15% of fiber glass
<b>Protection Rate</b>	<input type="checkbox"/> IP 67
<b>Power Supply/Consumption</b>	<input type="checkbox"/> Network/ Primary Lithium Batteries / Alkaline Batteries (50mW ... 4W)
<b>Cable Gland</b>	<input type="checkbox"/> N° 5 cable gland PG 11
<b>Full scale value</b>	<input type="checkbox"/> 0,4...10m/s
<b>Dig. Input</b>	<input type="checkbox"/> N°1 , programmable function (i.e. Totalizer reset)
<b>Data Storage</b>	<input type="checkbox"/> F-Ram
<b>Galvanic Isolation</b>	<input type="checkbox"/> All analog / digital inputs / outputs are galvanically isolated (500V)
<b>Programming Plug In</b>	<input type="checkbox"/> PC connection via USB (A / USB MINI B type cable must be used)
<b>Bidirectional</b>	<input type="checkbox"/> Yes
<b>Diagnostic Funct.</b>	<input type="checkbox"/> Yes
<b>Empty Pipe Detect.</b>	<input type="checkbox"/> Yes
<b>CE Certification</b>	<input type="checkbox"/> Yes
<b>OPTIONAL FEATURES (CHECK HOW TO ORDER, AT LAST PAGE, FOR MORE DETAILS)</b>	
<b>Protection Rate</b>	<input type="checkbox"/> IP 68 (Aluminium)
<b>Conn. Sensor Cable</b>	<input type="checkbox"/> CABLE C015-C016
<b>LCD Display</b>	<input type="checkbox"/> 128x64 pixel backlit graphic display (Main power version only), with 3 keys for programming
<b>Outputs: Pulses/ Alarm</b>	<input type="checkbox"/> N°2...4 DIGITAL OUTPUT, Max 50 Hz, 100mA, 30 V (AC/DC) <input type="checkbox"/> N°1...3 DIGITAL INPUT
<b>Analog Output</b>	<input type="checkbox"/> N ° 1 Analog Output 4 ... 20 mA
<b>Data logger</b>	<input type="checkbox"/> MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) <input type="checkbox"/> MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV (Built In Verificator) <input type="checkbox"/> MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + Meter Data (Real Time Converter & Sensor Data on SD Memory) <input type="checkbox"/> MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV + Meter Data
<b>Communication Gateway</b>	<input type="checkbox"/> RS 485
<b>Data Logger</b>	<input type="checkbox"/> MicroSD Memory Card 4...32 GBytes
<b>Protocols</b>	<input type="checkbox"/> ModBus RTU (speed range setting bps: 4800 /9600 / 19200/ 22800/ 38400/ 57600)
<b>MID Certifications</b>	<input type="checkbox"/> MI-001 
<b>ACCURACY</b>	
<b>Measurements tolerance</b>	<input type="checkbox"/> Flow rate (volume) = ±0,1% v.l. <input type="checkbox"/> Out 4/20 mA = ± 0,2 % v.l. <input type="checkbox"/> Frequency Out = ± 0,2% v.l.
<b>Accuracy (Whole System Converter+Sensor)</b>	<input type="checkbox"/> See table below

# OVERALL DIMENSIONS

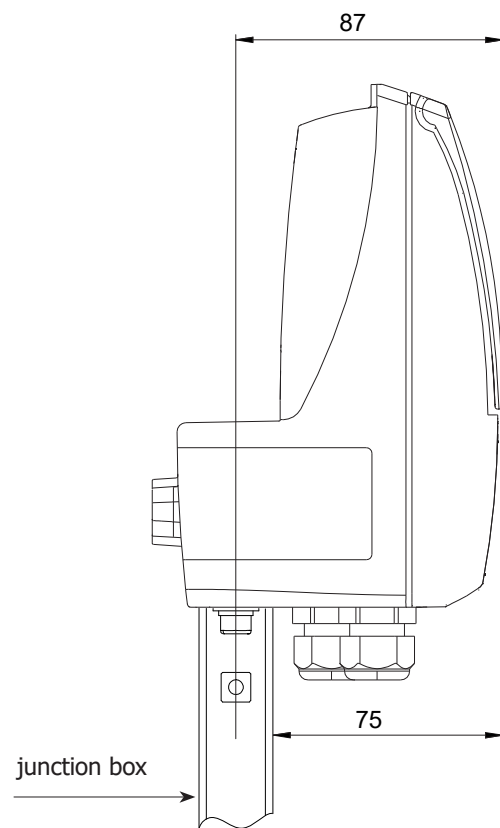
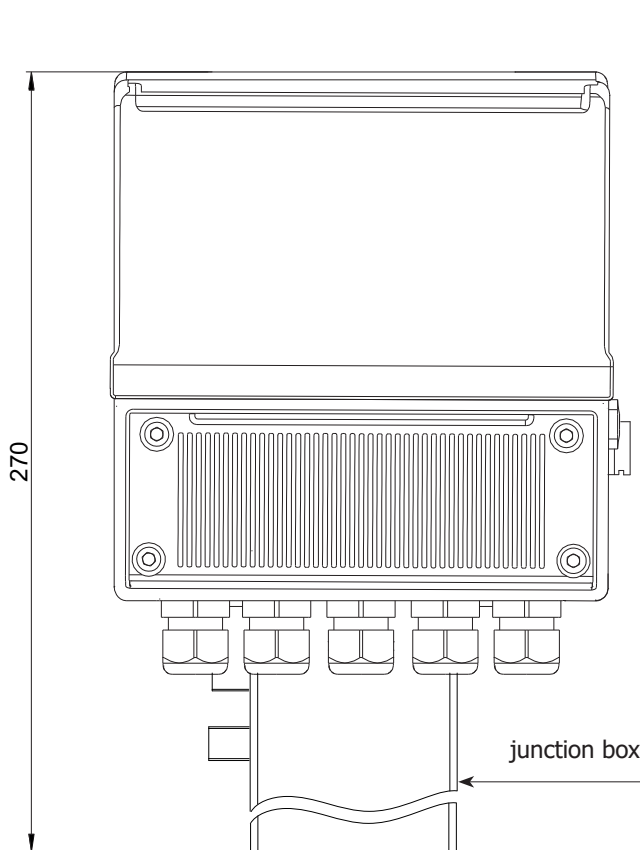
Without battery pack



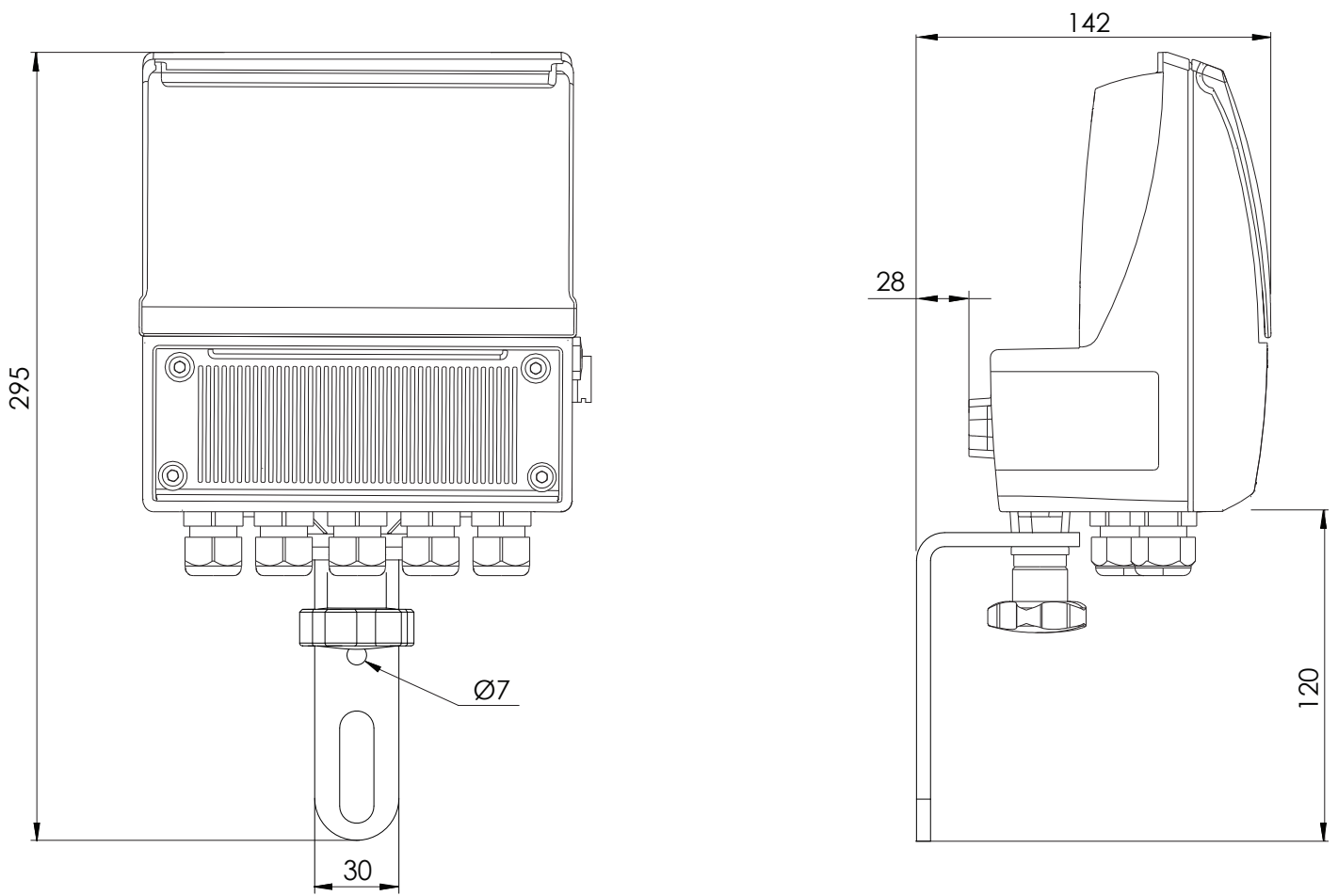
**Horizontal compact version**



**Vertical compact version**

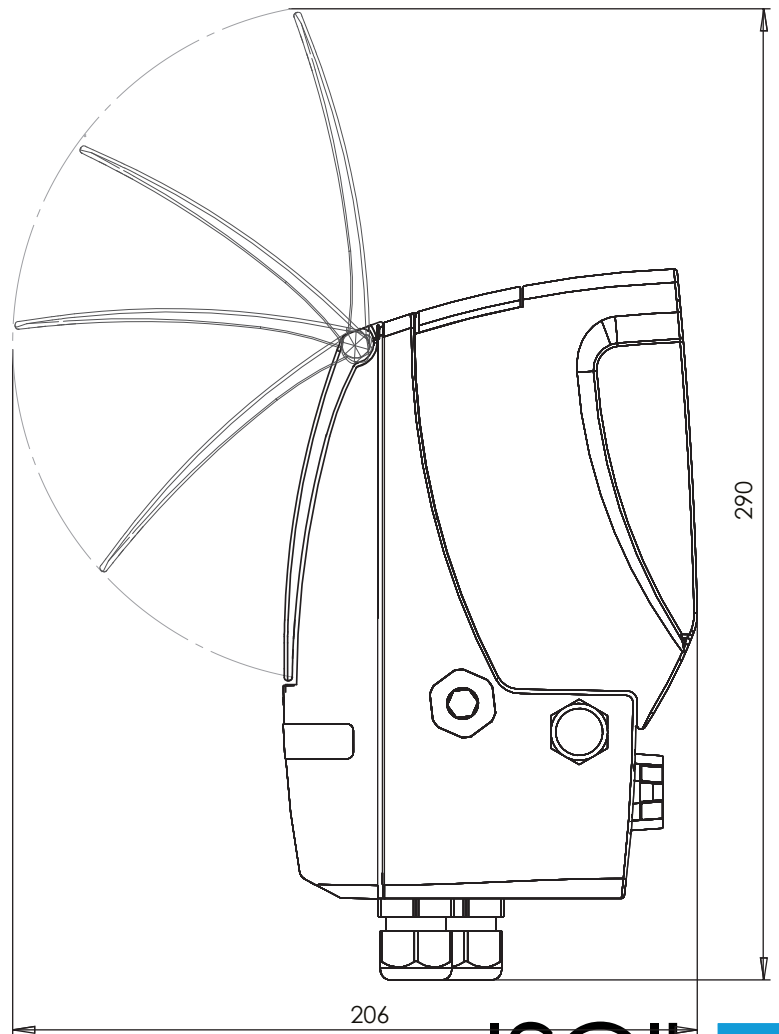
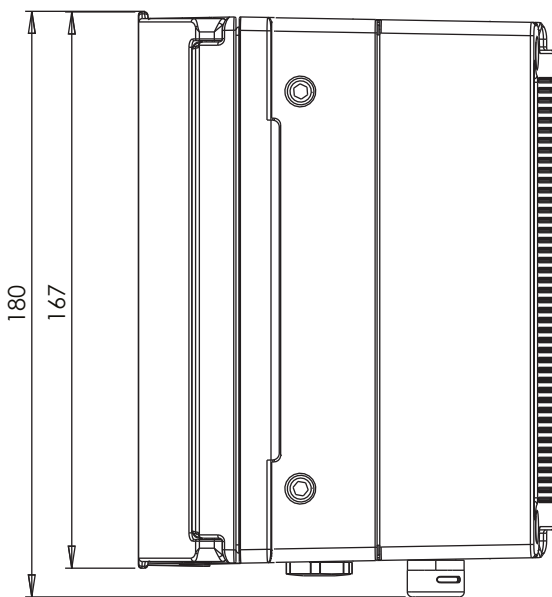
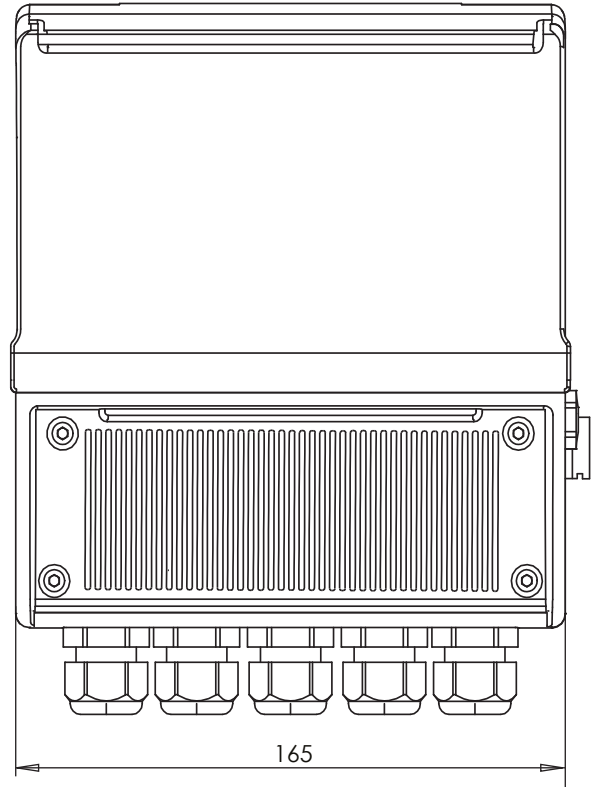
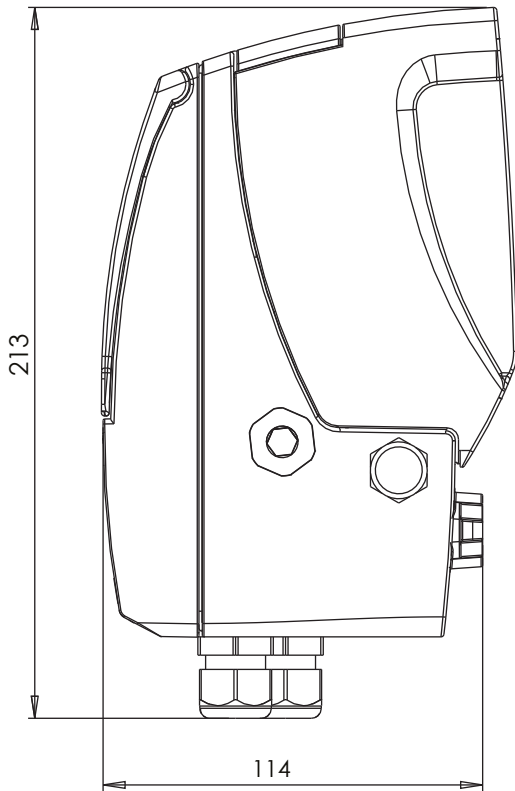


## Separate (wall) version

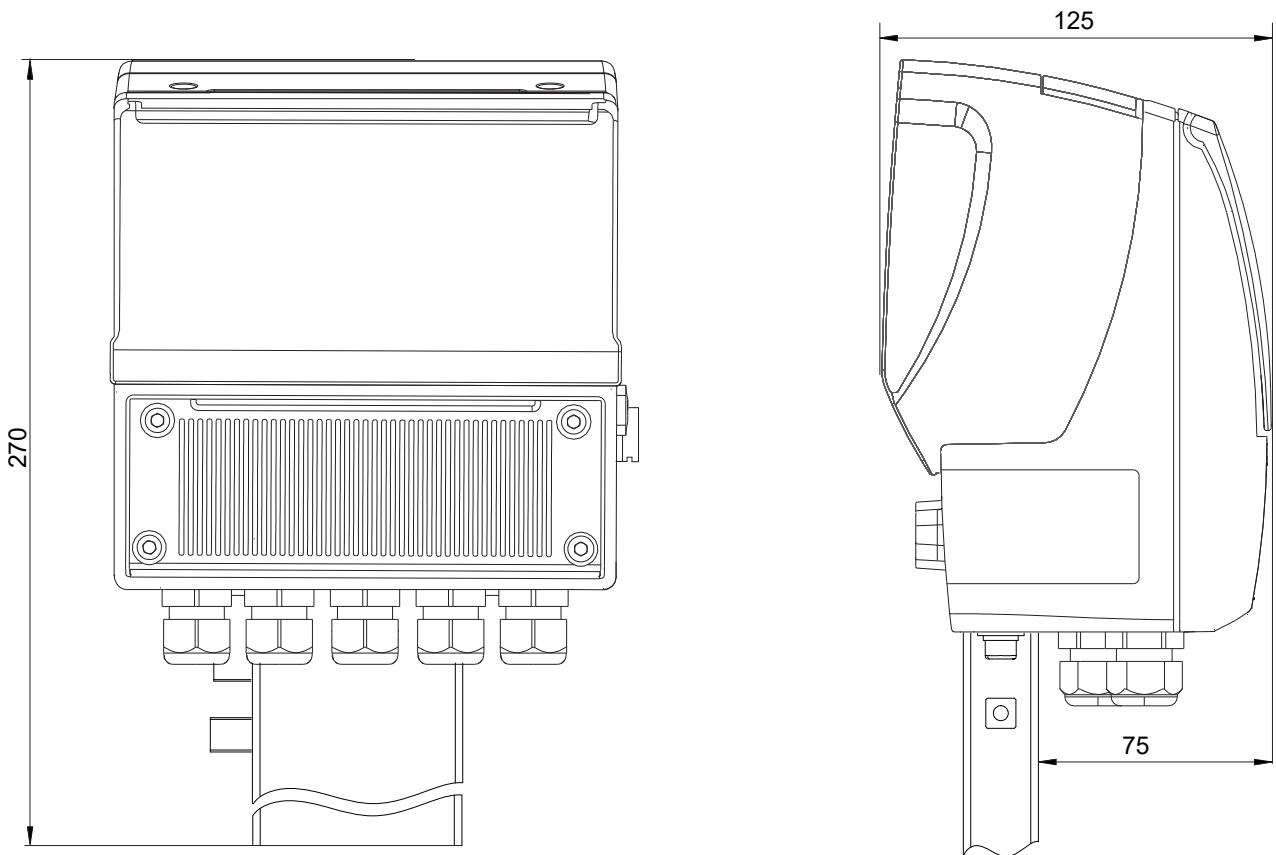


# OVERALL DIMENSIONS

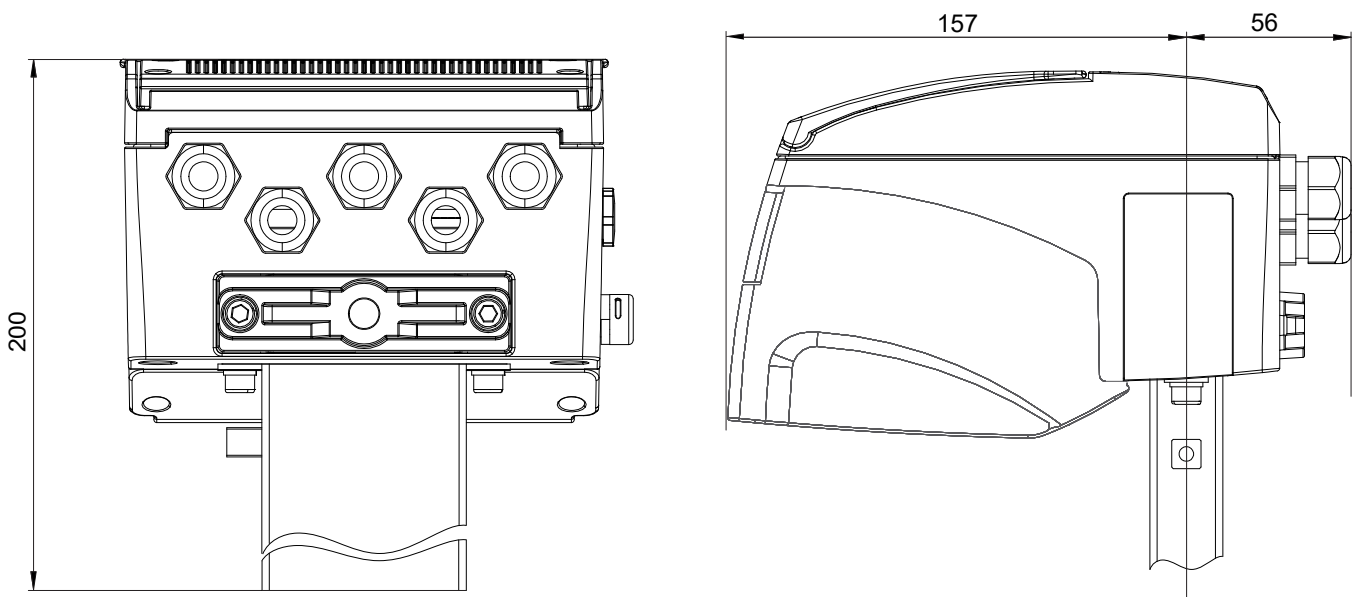
With battery pack



**Horizontal compact version**

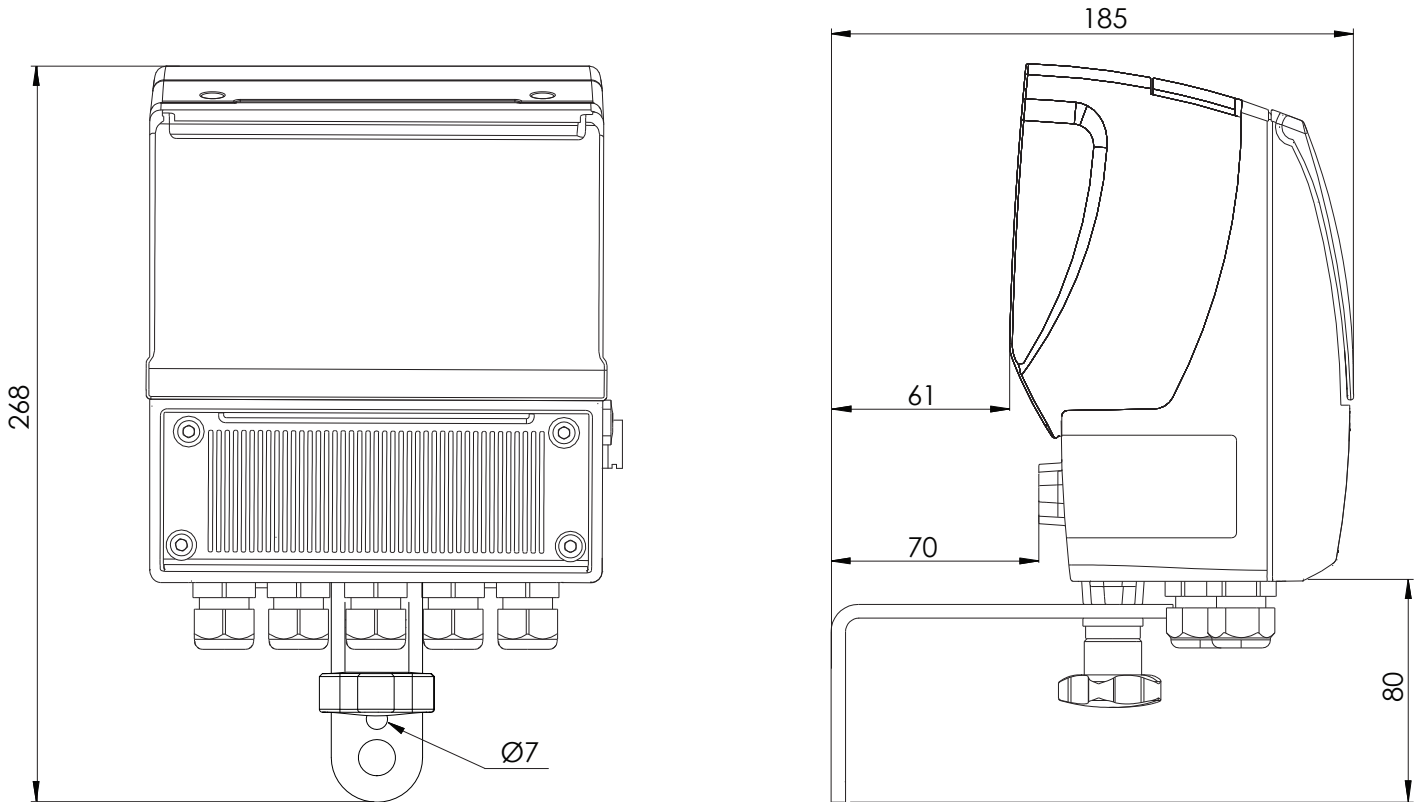


**Vertical compact version**



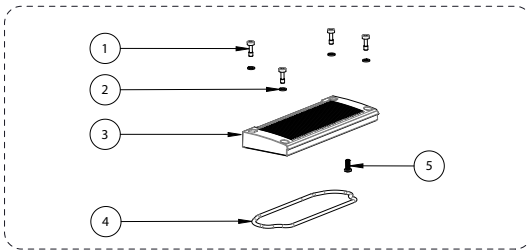


Separate (wall) version

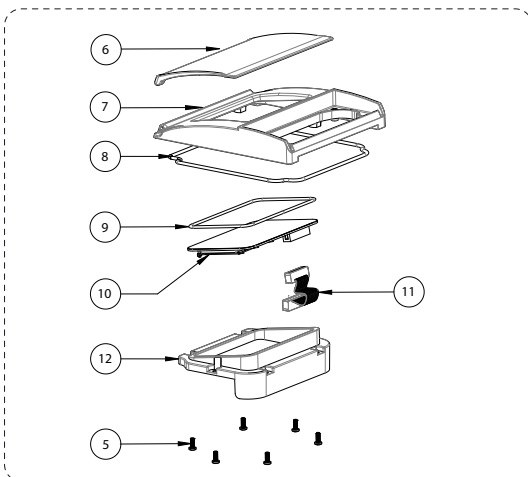


# MV145 EXPLODED LAYOUT

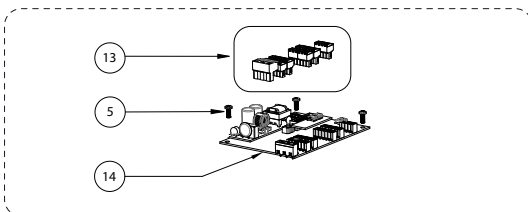
## TERMINAL BLOCK COVER



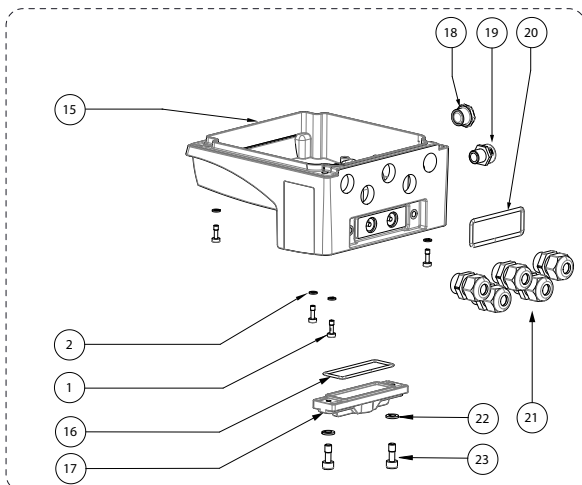
## MAIN HOUSING COVER



## PCB MV145

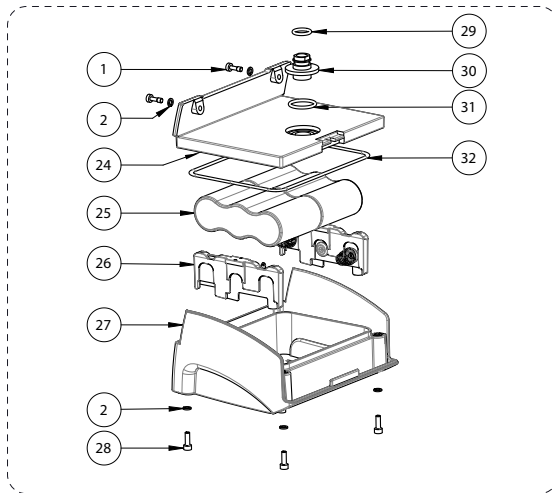


## MAIN HOUSING



POS.	DESCRIPTION	
	PA6 VERSION	ALUMINIUM VERSION
1	SCREW M4x12	SCREW M5x12
2	GROWER WASHER Ø4	GROWER WASHER Ø5
3	TERMINAL BLOCK COVER	TERMINAL BLOCK COVER
4	O-RING-4400	
5	SELF-TAPPING SCREW 4x10	TRILOBULAR SCREW 4x10
6	PROTECTION COVER	
7	HOUSING COVER	HOUSING COVER
8	ORING-4700	
9	ORING-117x3	
10	DISPLAY	
11	FLAT CABLE	
12	PA6 FIXING DISPLAY FRAME	
13	TERMINAL BLOCK SOLID WIRE: 26-16 AWG / 0.129-1.31 mm <sup>2</sup> STRANDED WIRE: 26-16 AWG / 0.129-1.31 mm <sup>2</sup> TORQUE: 3.0 Lb.In / 0.34 Nm	
14	PCB MV145	
15	MAIN HOUSING	MAIN HOUSING
16	O-RING-155	
17	PA6 VERSION CAP	
18	PG9 CAP	
19	ANTICONDESE CAP	
20	O-RING-155	
21	PG11 CABLE GLAND CABLE DIAMETER: Ø5-Ø10mm	
22	GROWER WASHER Ø6	
23	SCREW M6x16	

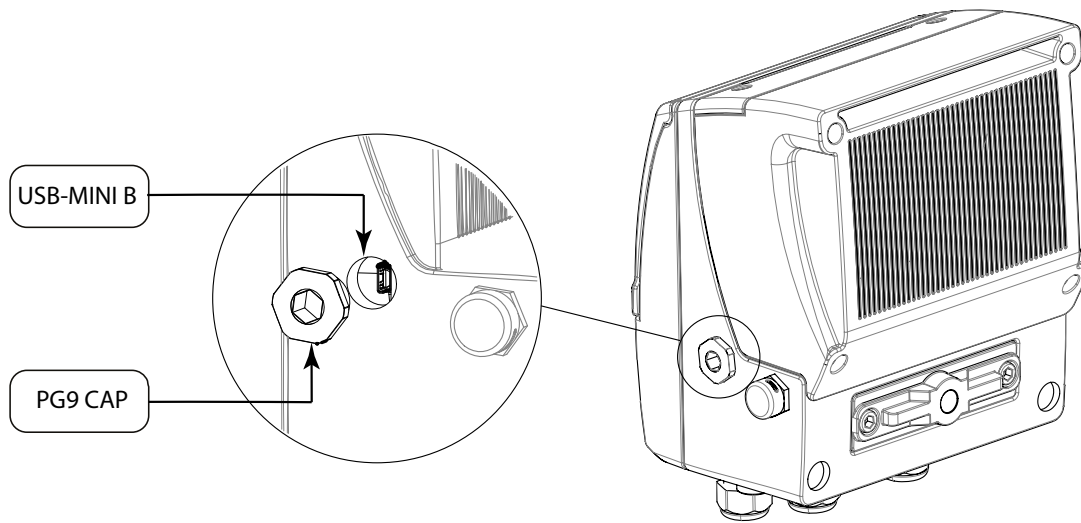
**BATTERIES HOUSING**



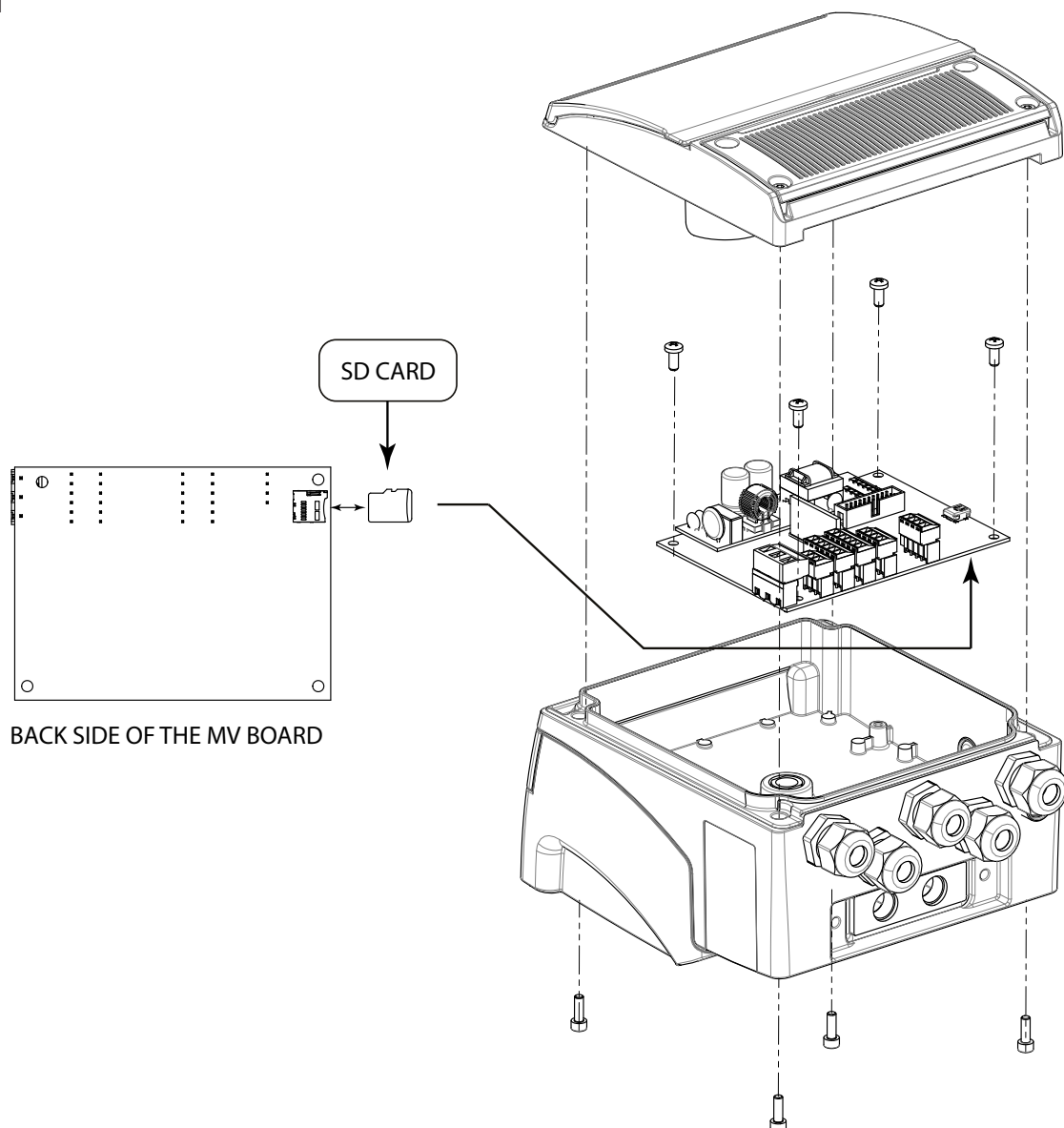
POS.	DESCRIPTION	
	<i>PA6 VERSION</i>	<i>ALUMINIUM VERSION</i>
24	PA6 BATTERY HOUSE COVER	
25	LITHIUM OR ALKALINE BATTERY	
26	CONTACTS FRAME FOR ALKALINE BATTERY	
27	PA6 BATTERY HOUSE	
28	SCREW M4X12	
29	O-RING 3050	
30	SEAL BUSH	
31	O-RING 3081	
32	O-RING 4575	

# CONVERTER ACCESS

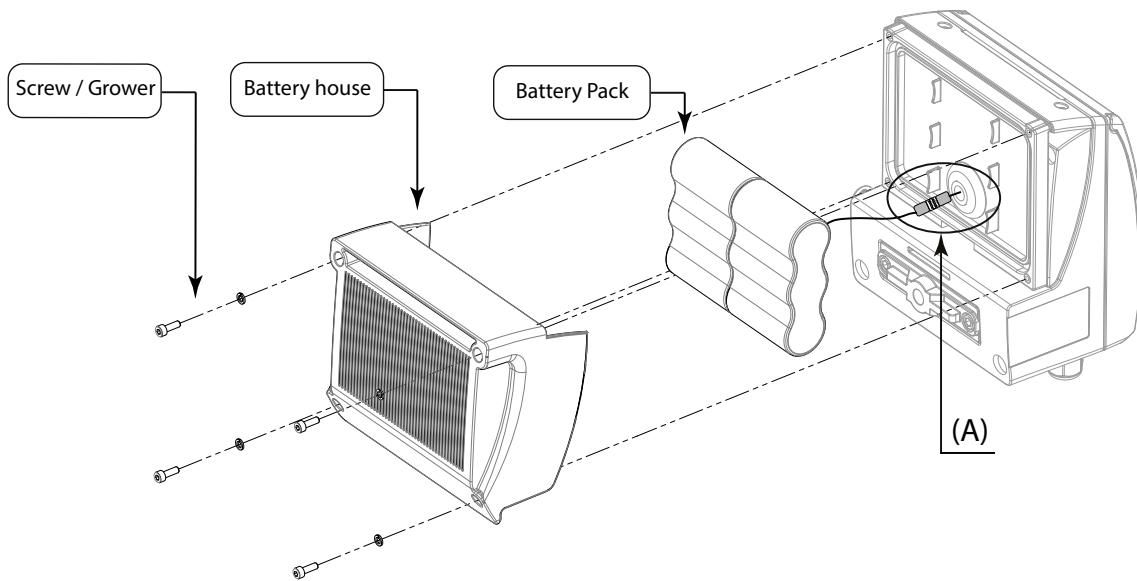
## USB Connection



## SD Card

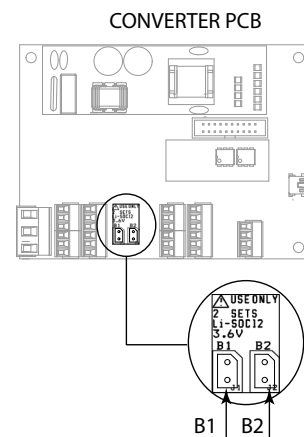
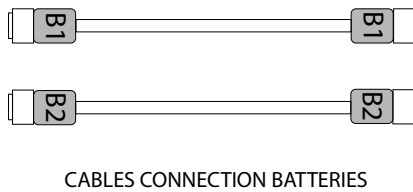
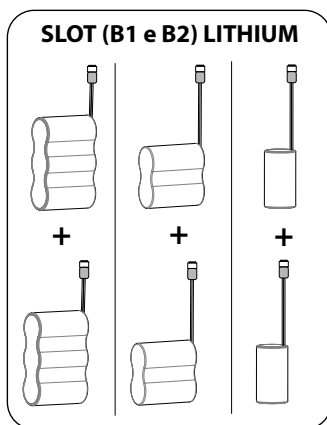


# BATTERY POWER SUPPLY

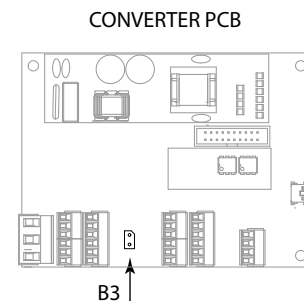
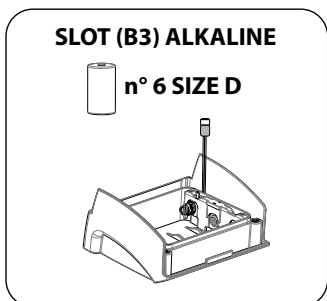


DETAIL (A) BATTERY CONNECTIONS CONVERTER PCB

## LITHIUM BATTERIES

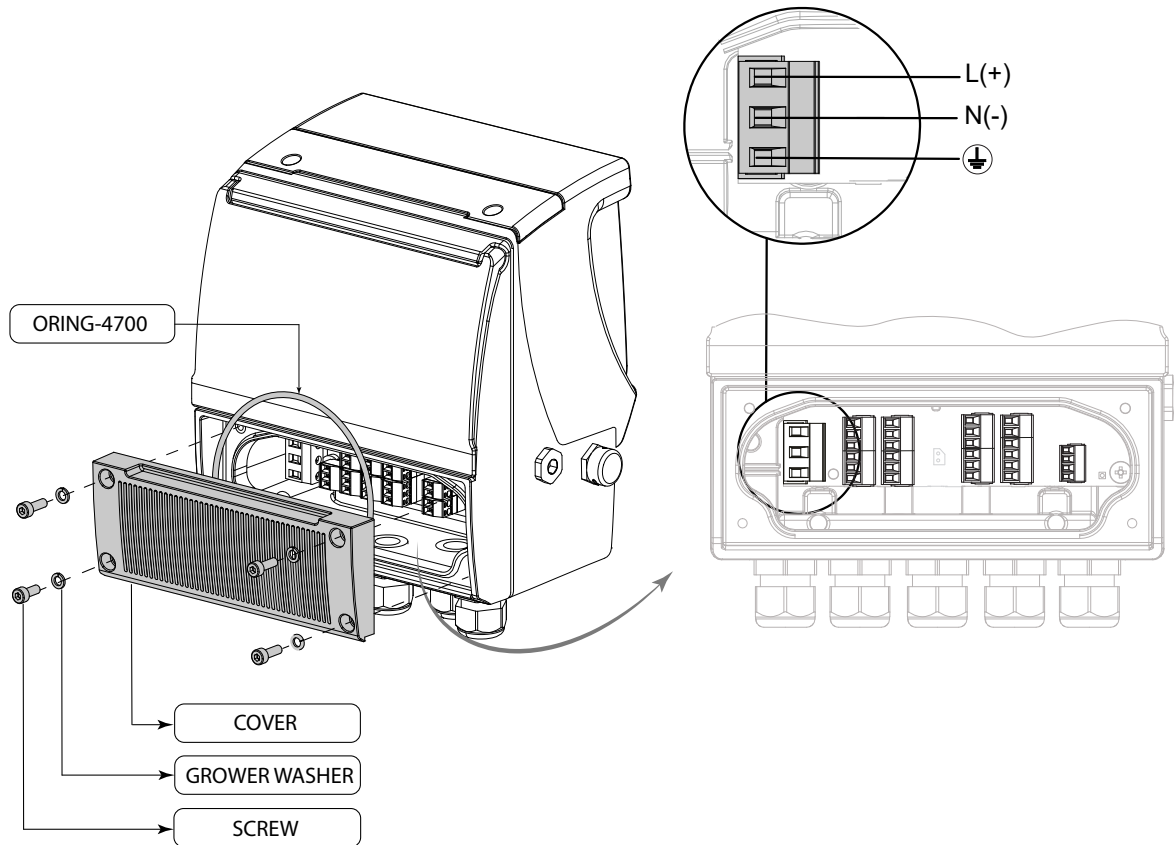


## ALKALINE BATTERIES



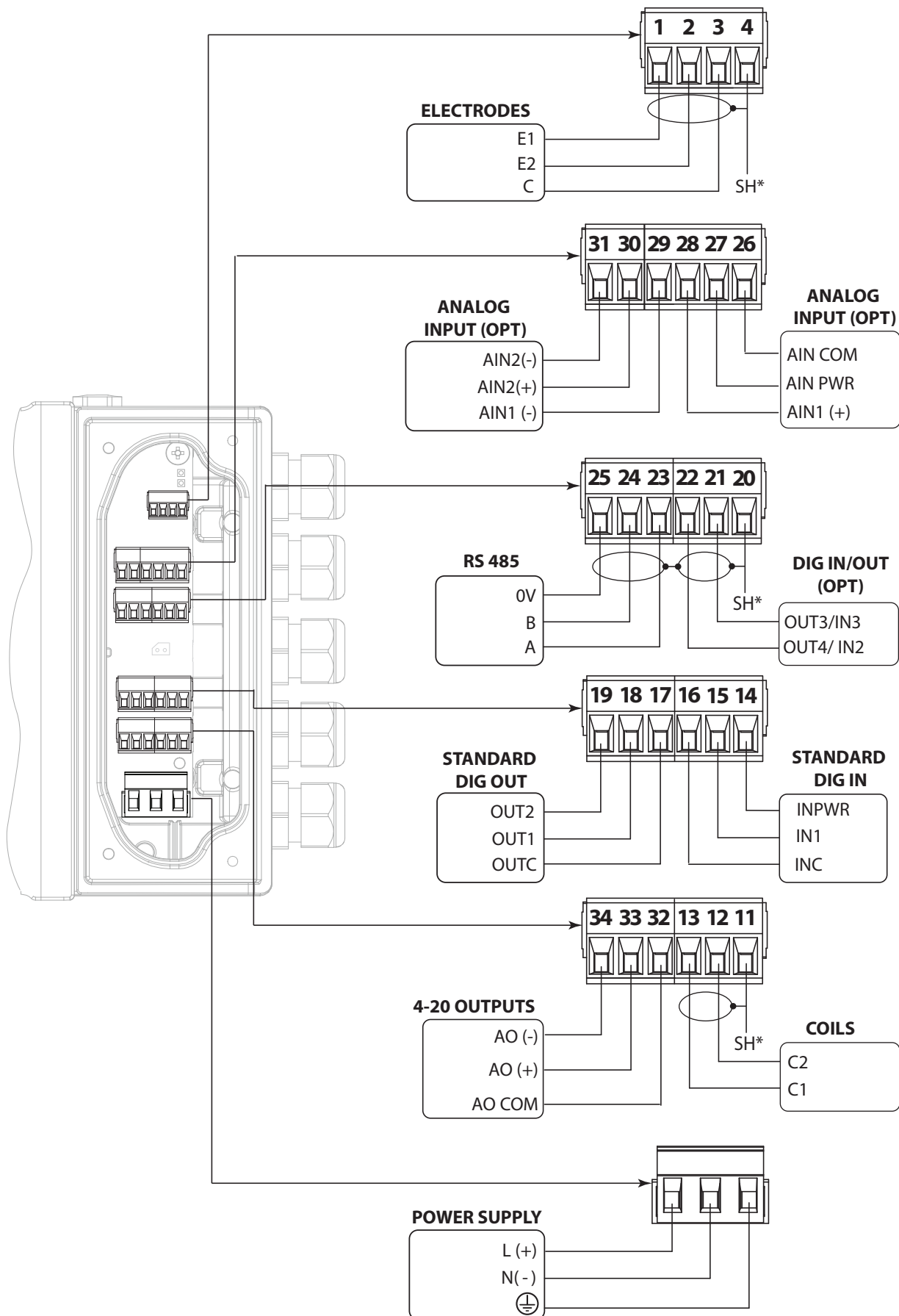
- The maximum number of batteries allowed in the various configurations is 6 size D batteries
- Alkaline batteries can also be purchased separately from third parties
- Lithium batteries are supplied exclusively by the manufacturer and can not be purchased separately from third parties. Furthermore, they are subject to special transport regulations based on the "Dangerous Goods Regulations, UN3090 and UN 3091". Special documentation is required to observe the regulations.

## MAIN POWER SUPPLY



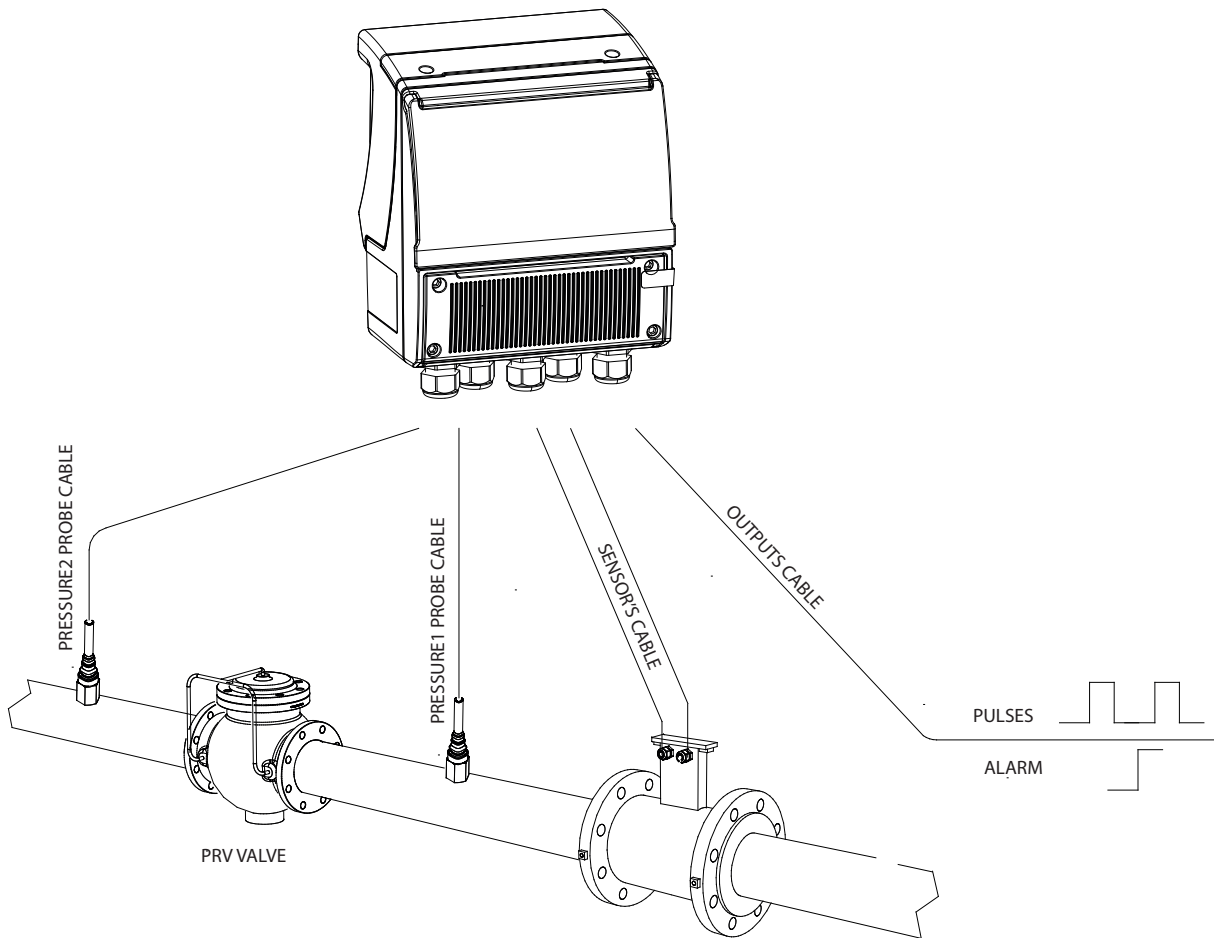
- The connections are made with approved cables with flame retardant properties, whose section varies from  $0.25\text{mm}^2$  to  $2.50\text{mm}^2$ , based on distance / power.
- The wiring can be checked by unscrewing the 4 screws on the terminal cover.
- When the lid is raised, the terminal block is visible. The terminal block shows the wired connection of the converter to external devices, sensor included.

# ELECTRICAL CONNECTIONS

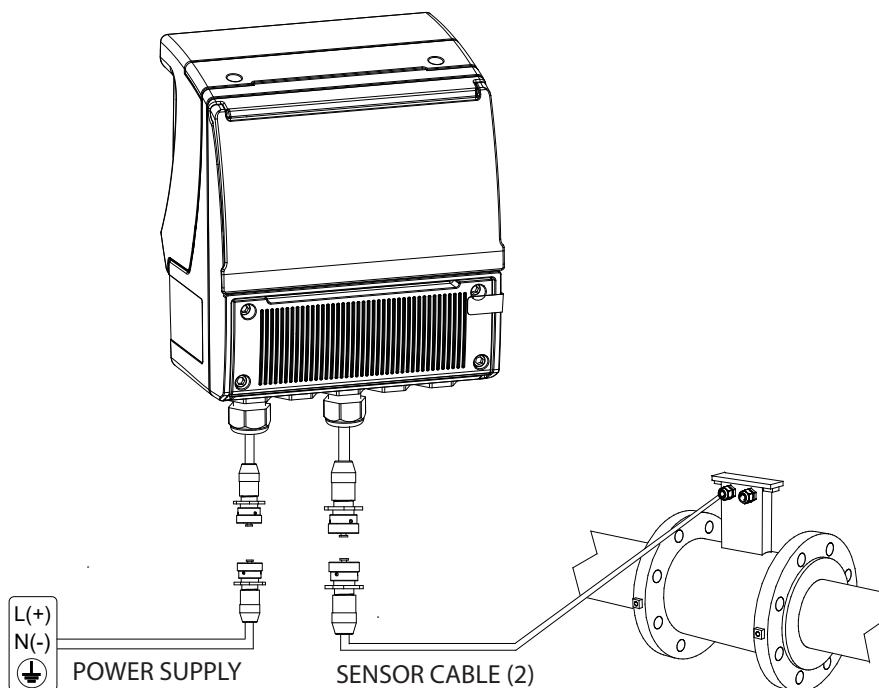


# FUNCTIONS MENU

Pressure and temperature probes



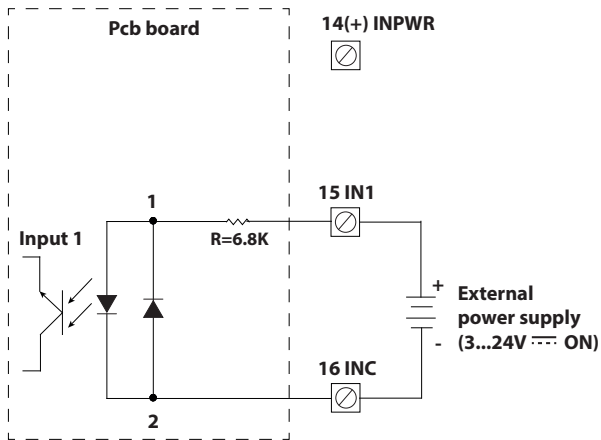
## IP68 connection (example installation)





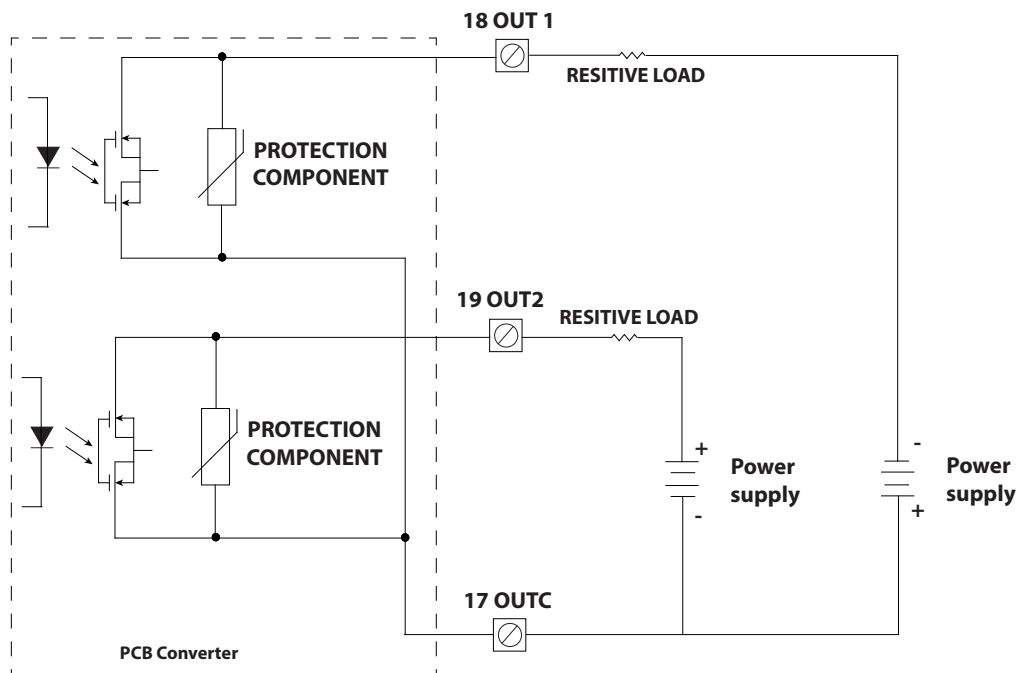
## DIGITAL INPUTS

On / Off Input  
(External power supply)



## DIGITAL OUTPUTS

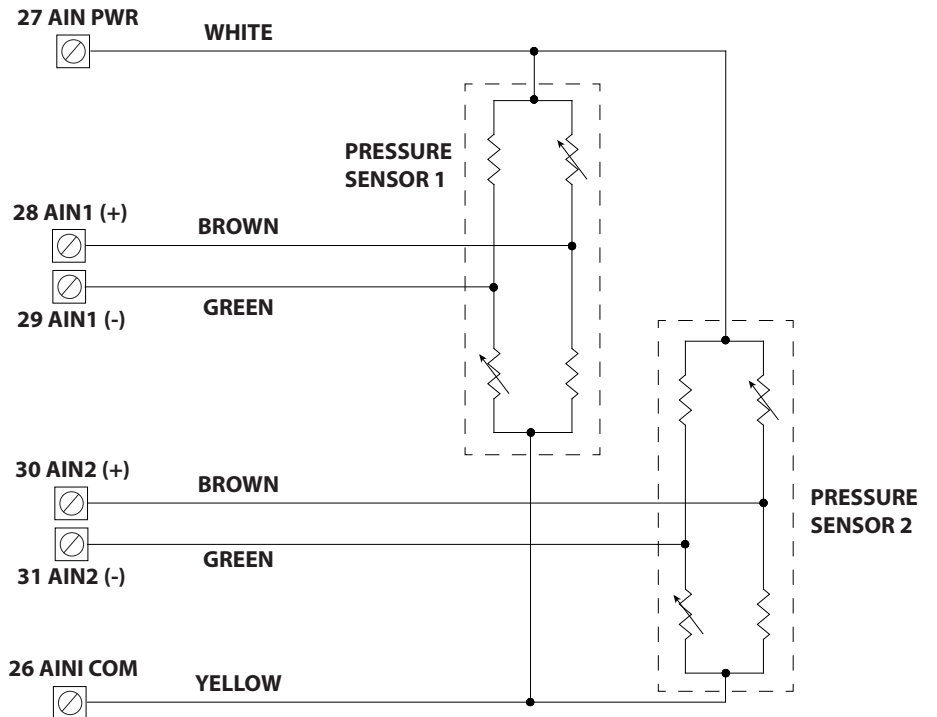
**NOTE:** the outputs are NOT polarized, so you can adopt schemes for connection to positive or common negative, as in the following electrical scheme.



# AUXILIARY MODULE ANALOG INPUTS

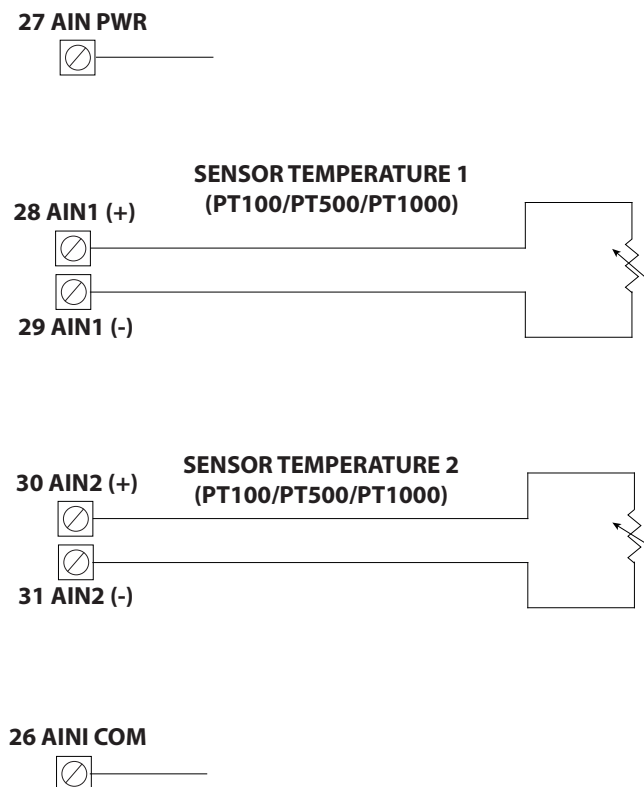
**NOTE:** Two different types of sensors can be connected, for example a pressure sensor connected to input 1 and a temperature sensor connected to input 2, or contrary.

## Connection of Pressure sensors



## Connection of temperature sensors

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.



## 4÷20 mA OUTPUTS

Digital input / output terminal block of the add-on module. (22-OUT4 22-IN2, 21-OUT3 21-IN3, GND):

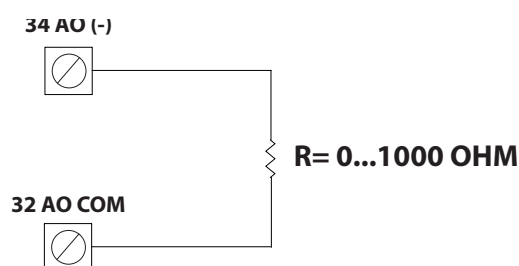
Passive mode: power is supplied from an external source.

- Connect the POSITIVE of the external source to the AO + terminal
- Connect the LOAD to the AO- terminal

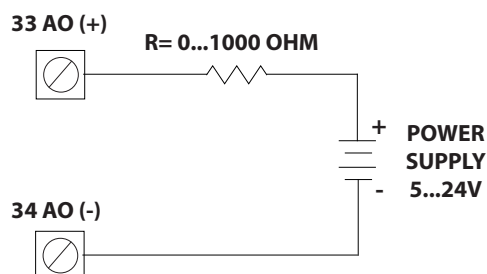
Active mode: power is supplied from the board power supply (if fitted).

- Connect the LOAD to the AO- terminal
- Connect the RETURN to the AOC terminal.

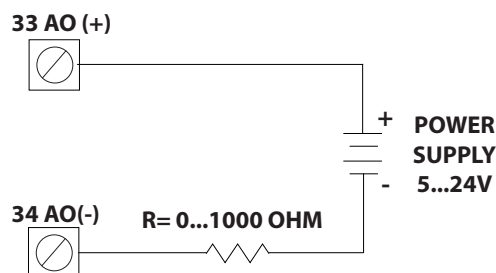
### Active Connection



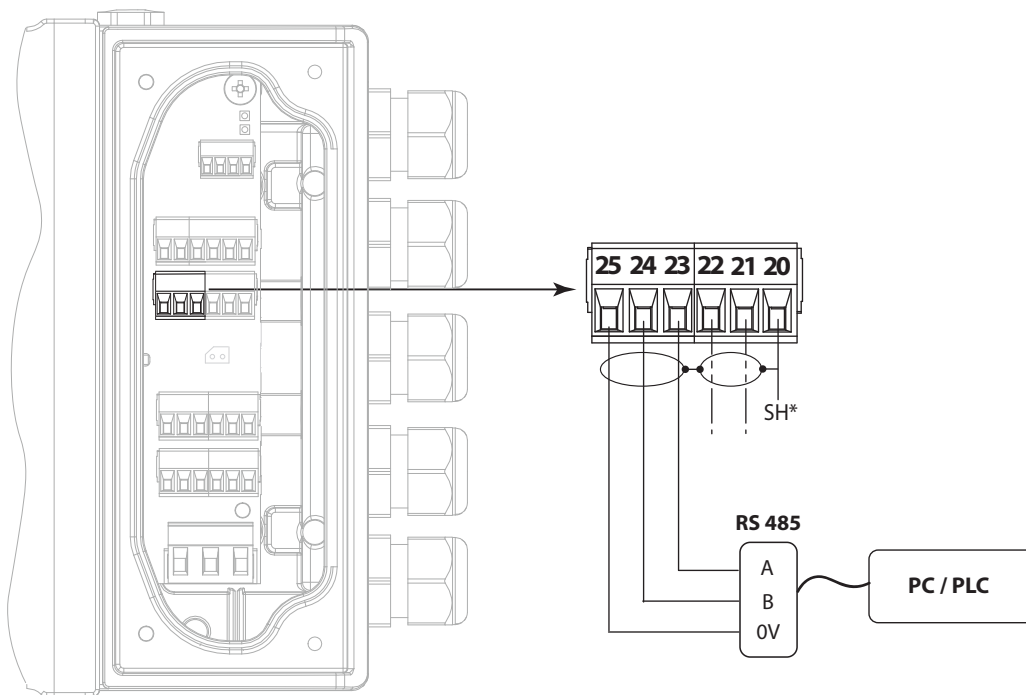
### Passive Connection 1



### Passive Connection 2



## MODBUS (RS485)



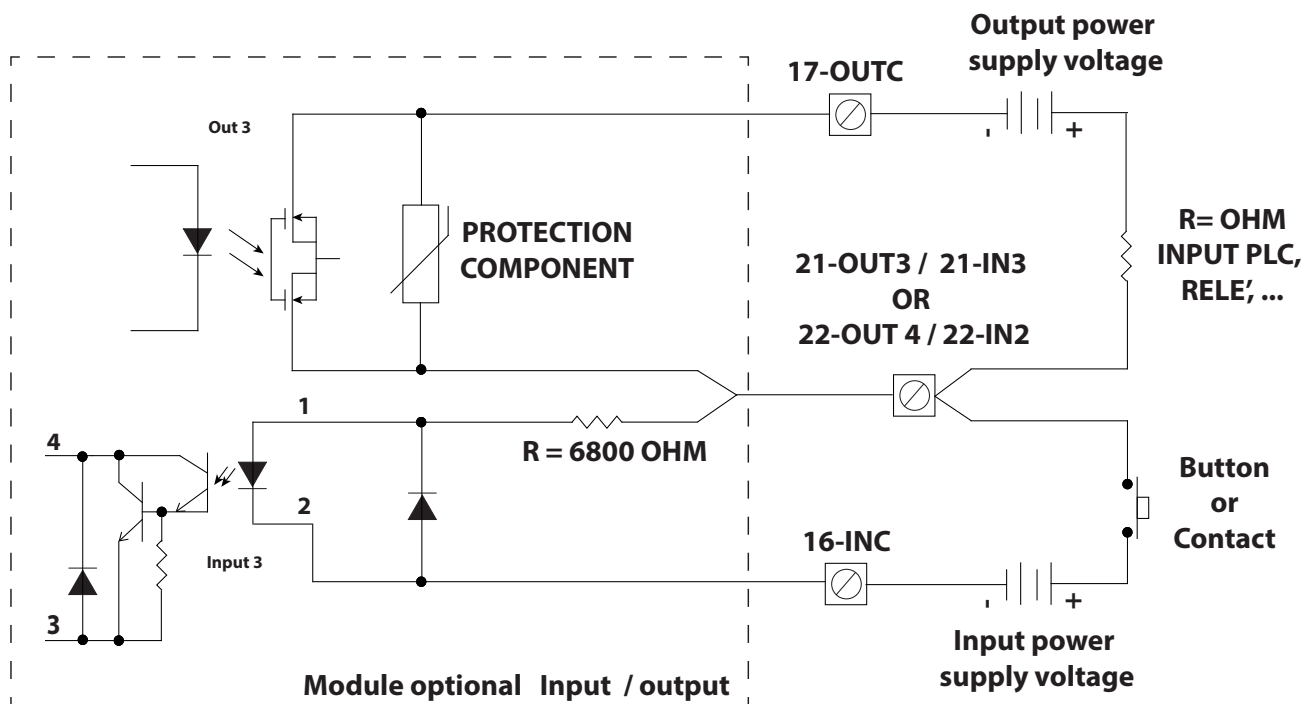
## AUXILIARY MODULE DIGITAL INPUTS/ OUTPUTS

Digital inputs / outputs terminal block of the add-on module (22-OUT4 22-IN2, 21-OUT3 21-IN3, GND):

- 21-OUT3 21-IN3: digital output OUT 3 / digital input INPUT 3
- 22-OUT4 22-IN2: digital output OUT 4 / digital input INPUT 2
- GND: terminal connected to the protective earth (chassis) for connecting cable screens

### NOTE:

- The digital outputs OUT4 and OUT3 use the 17-OUTC terminal as common.
- The digital inputs IN2 and IN3 use the 16-INC terminal as common.
- The digital output OUT4 and the digital input IN2 as well as the digital output OUT3 and the digital input IN3 share the same terminal but have different common, so the input and output circuits can be realized independently on the other hand, as indicated in the following diagram for OUT3 / IN3 (OUT4 / IN2 are equivalent).



# FUNCTIONS MENU

## SENSOR

MAIN MENU	
1	Sensor
2	Units
3	SENSORS
4	S.model
5	Lining
6	S.type
7	U.type
8	Diam.
9	KA
10	KA-
11	KZ
12	KD
13	Ins.position
	HP dynamic
	Ki
	Kp
	KC
	S.timeI
	Reg.C.T
	C.R.time
	E.P.Detect
	Z max
	S.err.delay
	Sens.verify
	KL
	Zero point cal.

- 1.1 Sensors model: Enter the first two characters of the serial number of the sensor
- 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	UNITS
5	Diam.
6	S.cable
7	FR.unit
8	Pls1 u.
9	Pls2 u.
10	T+ unit
11	T+ unit
12	T+ D.P.
13	P+ unit
	P+ unit
	P+ D.P.
	T- unit
	T- unit
	T- D.P.
	P- unit
	P- unit
	P- D.P.
	Temp.unit
	Mass units
	Sg
	AIN1 m.u.
	AIN2 m.u.

- 1.1 Nominal diameter measure unit
- 1.2 Cable length on separate version
- 1.3 Flow rate type measure unit: metric or imperial
- 1.4 Pulse 1 type measure unit: metric or not metric
- 1.5 Pulse 2 type measure unit: metric or not metric
- 1.6 Total direct totalizer measure unit type: metric or imperial
- 1.7 Total direct totalizer measure unit
- 1.8 Total direct totalizer decimal point position
- 1.9 Partial direct totalizer measure unit type: metric or not metric
- 1.10 Partial direct totalizer measure unit
- 1.11 Partial direct totalizer decimal point position
- 1.12 Total reverse totalizer measure unit type: metric or not metric
- 1.13 Total reverse totalizer measure unit
- 1.14 Total reverse totalizer decimal point position
- 1.15 Partial reverse totalizer measure unit type: metric or not metric
- 1.16 Partial reverse totalizer measure unit
- 1.17 Partial reverse totalizer decimal point position
- 1.18 Temperature measure
- 1.19 Enable/disable the selection of mass units on full scale set
- 1.20 Specific gravity coefficient
- 1.21 Unit of measurement for analogue input 1
- 1.22 Unit of measurement for analogue input 2

## SCALES

MAIN MENU		
1	Sensor	
2	Units	
3	Scales	
4	Measure	
5	Alarms	
6	Inputs	
7	ALARMS	
8	Max+	dm3/s
9	Max-	dm3/s
10	Min+	dm3/s
11	Min-	dm3/s
12	A1Mx	()
13	A1Mn	()
	A2Mx	()
	A2Mn	()
	Hysteresis	%
	U.all HZ	%
	Cfg.ac.al	ON
	All. alimen.	ON

- 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	ALARMS	
8	Max+	dm3/s
9	Max-	dm3/s
10	Min+	dm3/s
11	Min-	dm3/s
12	A1Mx	()
13	A1Mn	()
	A2Mx	()
	A2Mn	()
	Hysteresis	%
	U.all HZ	%
	Cfg.ac.al	ON
	All. alimen.	ON

- 4.1 Measure power profile
- 4.2 Measure filter bypass
- 4.3 Measure cut-off threshold
- 4.4 Low power m.cycle simulation
- 4.5 Automatic calibration verify
- 4.6 High immunity inputs

## ALARMS

MAIN MENU		
1	Sensor	
2	Units	
3	Scales	
4	Measure	
5	Alarms	
6	Inputs	
7	ALARMS	
8	Max+	dm3/s
9	Max-	dm3/s
10	Min+	dm3/s
11	Min-	dm3/s
12	A1Mx	()
13	A1Mn	()
	A2Mx	()
	A2Mn	()
	Hysteresis	%
	U.all HZ	%
	Cfg.ac.al	ON
	All. alimen.	ON

- 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 MAX alarm threshold for analog input 1
- 5.6 MIN alarm threshold for analog input 1
- 5.7 MAX alarm threshold for analog input 2
- 5.8 MIN alarm threshold for analog input 2
- 5.9 Hysteresis on alarm thresholds
- 5.10 Output frequency value in alarm
- 5.11 Configuration Access Alarm Enable
- 5.12 Power Supply Loss Alarm Enable

INPUTS

MAIN MENU	
1-Sensor	
2-Units	
3-Scales	
4-Measure	
5-Alarms	
<b>6-Inputs</b>	
7-Outputs	

INPUTS	
8-T+ reset	OFF
9-P+ reset	OFF
10-T- reset	OFF
11-P- reset	OFF
12-Count lock	OFF
13-Meas.lock	OFF
Calibration	OFF
Sys.v.detect	ON
D.In2	SYS.VIOL.
D.In3	OFF

- 6.1 Total direct (positive) flow totalizer reset enable
- 6.2 Partial direct (positive) flow totalizer reset enable
- 6.3 Total reverse (negative) flow totalizer reset enable
- 6.4 Partial reverse (negative) flow totalizer reset enable
- 6.5 Totalizer counting lock command
- 6.6 Measure zero lock command
- 6.7 Calibration external command
- 6.8 System violation detect
- 6.9 Digital input 2 function
- 6.10 Digital input 3 function

OUTPUTS

OUTPUTS	
Out1	F.R.SIGN
Out1 inv.	ON
Out1 pls.	ON
Out2	AIN1 MH/MH
Out2 inv.	ON
Out2 pls.	ON
Out3	MAX.AL+
Out3 inv.	ON
Out3 pls.	ON
Out4	MAX.AL+
Out4 inv.	ON
Out4 pls.	ON
Out mA1	Apr-20
AIS	dm3/s

- 7.1 Output 1 function selection
- 7.2 Output 1 inverted status
- 7.3 Output 1 pulsed status
- 7.4 Output 2 function selection
- 7.5 Output 2 inverted status
- 7.6 Output 2 pulsed status
- 7.7 Output 3 function selection
- 7.8 Output 3 inverted status
- 7.9 Output 3 pulsed status
- 7.10 Output 4 function selection
- 7.11 Output 4 inverted status
- 7.12 Output 4 pulsed status
- 7.13 Analog current output 1 range
- 7.14 Full scale value for analog out1

MAIN MENU	
1-Sensor	
2-Units	
3-Scales	
4-Measure	
5-Alarms	
6-Inputs	
<b>7-Outputs</b>	
8-Communications	
9-Display	
10-Data logger	
11-Functions	
12-Diagnostic	
13-System	

COMMUNIC.

COMMUNICATIONS	
1-Dev. Addr.	1
2-Speed	bps22800
3-Parity	NO
4-Delay	ms 00
5-C.timeout	2

MAIN MENU	
1-Sensor	
2-Units	
3-Scales	
4-Measure	
5-Alarms	
6-Inputs	
7-Outputs	
<b>8-Communications</b>	
9-Display	
10-Data logger	
11-Functions	
12-Diagnostic	
13-System	

- 8.1 Device communication address number
- 8.2 MODBUS link speed
- 8.3 MODBUS link parity
- 8.4 MODBUS reply delay
- 8.5 Max.delay between chars (frame)



## DISPLAY

DISPLAY		
	Language	EN
	Disp.time	s
	Disp.Fn.	1
1	Disp.lock	OFF
2	Part.tot.	ON
3	Neg.tot.	ON
4	Net tot.	ON
5	Disp.date	ON
6	Quick start	OFF
8	Communications	
9	Display	
10	Data logger	
11	Functions	
12	Diagnostic	
13	System	

- 9.1 Choice of the language
- 9.2 Display/keyboard inactivity time
- 9.3 Display function number
- 9.4 Display function selection lock
- 9.5 Partial totalizer enable
- 9.6 Negative totalizer enable
- 9.7 Net totalizer enable
- 9.8 Time and date display enable
- 9.9 Quick start menu visualization

## DATA LOGGER

DATA LOGGER		
	D.logger en.	ON
	Meas.units	ON
	Field separ.	;
	Decim.separ.	.
	Interv.	0:01:00
	Log T+	OFF
	Log P+	OFF
	Log T-	OFF
	Log P-	OFF
	Log TN	OFF
	Log PNI	OFF
	Log Q(UM)	OFF
	Log Q(%)	OFF
	Log AL.EU	OFF
	Log ADM	OFF
1	Log STR	OFF
2	Log BTS	OFF
3	Log IBV	OFF
4	Log EDC	OFF
5	Log EAC	OFF
6	Log EIZ	OFF
7	Log SCU	OFF
9	Display	
10	Data logger	
11	Functions	
12	Diagnostic	
13	System	

- 10.1 Data logger enabling
- 10.2 Measure unit recording enable
- 10.3 Field separator character
- 10.4 Decimal separator character
- 10.5 Sampling interval
- 10.6 Totalizer Total Positive Enable T+
- 10.7 Totalizer Partial Positive Enable P+
- 10.8 Totalizer Total Negative Enable T-
- 10.9 Totalizer Partial Net Enable P-
- 10.10 Totalizer Total Net Enable
- 10.11 Totalizer Partial Net Enable
- 10.12 Flow rate in Technical Units Enable
- 10.13 Flow rate in Percentage Enable
- 10.14 Alarm Events Enable
- 10.15 Additional Measures Enable
- 10.16 Sensor Test Results Enable
- 10.17 Board TemperatureS Enable
- 10.18 Internal Board Voltages
- 10.19 Electrodes DC Voltages Enable
- 10.20 Electrodes AC voltages Enable
- 10.21 Electrodes Source Impedance Enable
- 10.22 Sensor Coils Values Enable

## FUNCTION

FUNCTION		
	T+ reset	ON
	P+ reset	ON
	T- reset	;
	P- reset	.
	Load Sens.F.def	0:01:00
	Load Conv.F.def	OFF
	Save Sens.F.def	OFF
	Save Conv.F.def	OFF
	Calibration	OFF
10	Data logger	
11	Functions	
12	Diagnostic	
13	System	

- 11.1 Vector fluid vol. part. reset function
- 11.2 Hot water vol. partial reset function
- 11.3 Cold water vol. partial reset function
- 11.4 Aux input partial reset function
- 11.5 Heating energy partial reset function
- 11.6 Cooling energy Partial reset function
- 11.7 Vector fluid vol. total reset function
- 11.8 Hot water vol. total reset function
- 11.9 Cold water vol. total reset function

DIAGNOSTIC

DIAGNOSTIC	
Self test	
Sens.verify	
Flow sim.	OFF
Display measures	
Disp.comm.vars	
SMS test	
SMTP conn test	
POP3 conn.test	
FTP conn.test	
Display graphs	
SD card info	
Firmware info	
S/N	0
WT	000:00:00:00
TC	0

12 - Diagnostic
13 - System

- 12.1 Auto test Immediate Command
- 12.2 Sensor Verify Command
- 12.3 Measure Simulation Enable
- 12.4 Diagnostic Measure VaLues
- 12.5 Diagnostic Communication VaLues
- 12.6 Short Message Test
- 12.7 SMTP Connection Test
- 12.8 POP3 Connection Test
- 12.9 FTP Connection Test
- 12.10 Oscilloscope function
- 12.11 SD memory Status
- 12.12 Model and Software Version
- 12.13 Serial Number
- 12.14 Total Working Time
- 12.15 Total Measure Cycles

SYSTEM

SYSTEM	
Dayl.saving	ON
Time zone	+00.00
Date/time	///00:00:00
L1 code	XXXXXXXX
L2 code	XXXXXXXX
L3 code	XXXXXXXX
L4 code	XXXXXXXX
L5 code	XXXXXXXX
L6 code	XXXXXXXX
Restr.access	OFF
Device IP addr	63015504
Client IP addr	11.012.012
Network mask	255.255.254
KT	0.97882
KS	100.000
KR	100.000
DAC1 4mA	2460
DAC1 20mA	11050
AIN1 SS	0
AIN1 FS	20000
AIN2 SS	0
AIN2 FS	20000
Stand-by	
FW update	

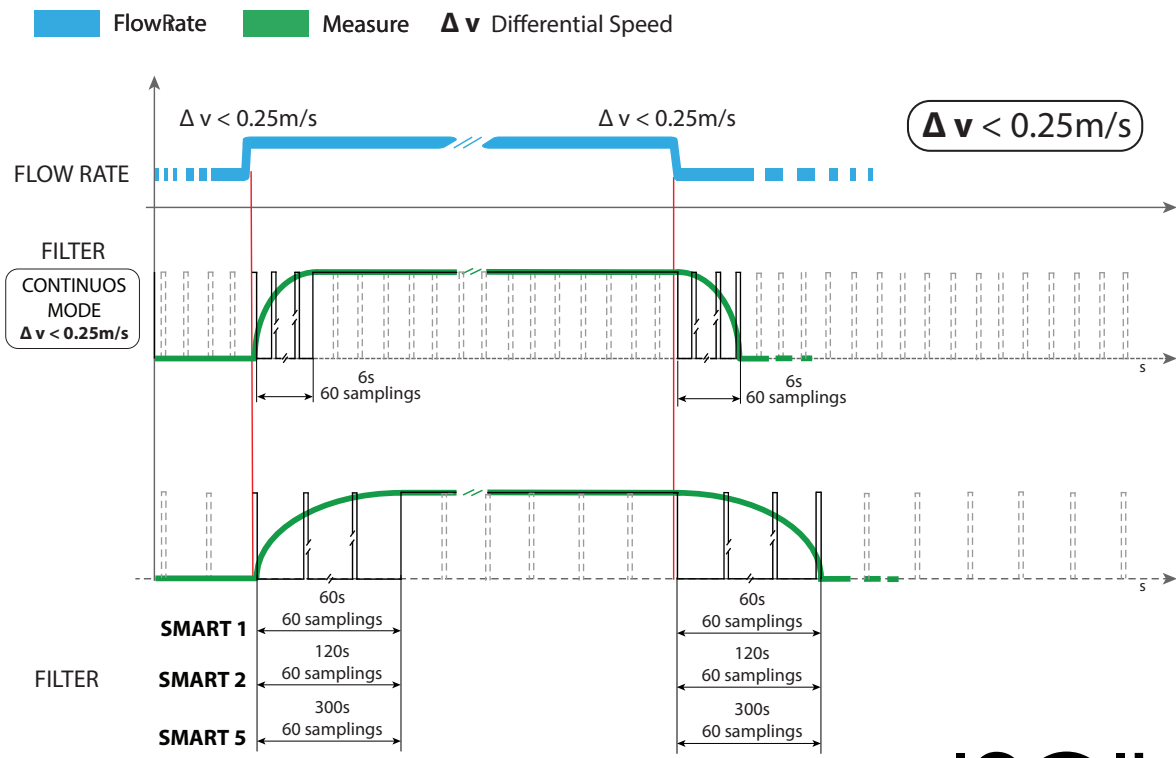
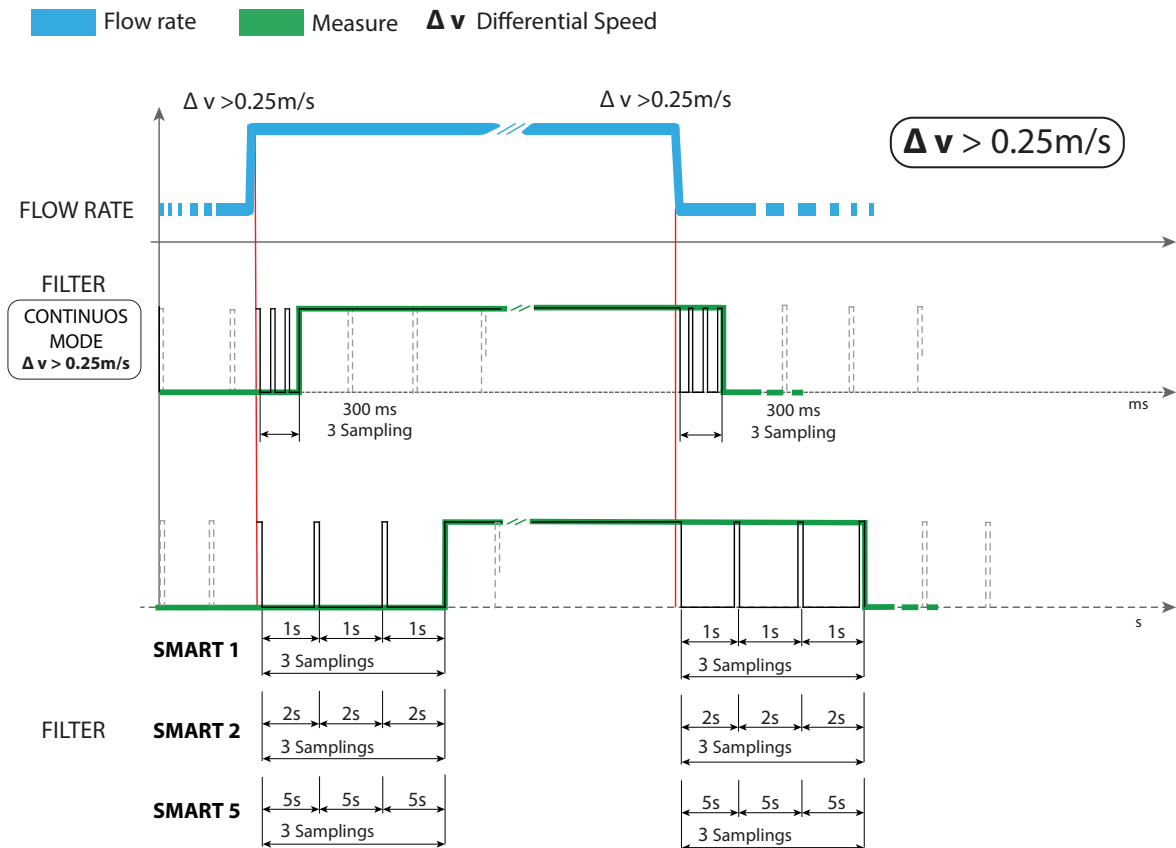
12 - Diagnostic
13 - System

- 13.1 Daylight Saving Time Enable
- 13.2 Time zone
- 13.3 Date and Time
- 13.4 Level 1 Access CoDe
- 13.5 Level 2 Access CoDe
- 13.6 Level 3 Access CoDe
- 13.7 Level 4 Access CoDe
- 13.8 Level 5 Access CoDe
- 13.9 Level 6 Access CoDe
- 13.10 ReStricted Access Rule Enable
- 13.11 Device IP Address
- 13.12 Client IP Address
- 13.13 Network MaSk
- 13.14 Coefficient KT
- 13.15 Coefficient KS
- 13.16 Coefficient KR
- 13.17 Current output 1 Calibration Point 1
- 13.18 Current output 1 Calibration Point 2
- 13.19 Analog input 1 Calibration Point 1
- 13.20 Analog input 1 Calibration Point 2
- 13.21 Analog input 2 Calibration Point 1
- 13.22 Analog input 2 Calibration Point 2
- 13.23 System Standby
- 13.24 Firmware update

# MEASUREMENT SETTINGS

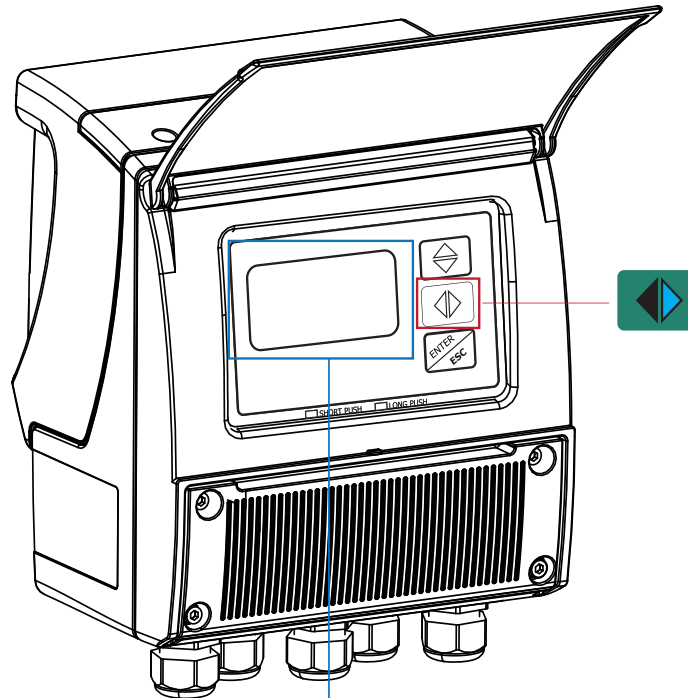
MV145 can be programmed to acquire the measurement in four different ways:

- SMART1: sampling at 1 second
- SMART2: sampling at 2 second
- SMART5: sampling at 5 seconds
- CONT. PWR: Continuous power sampling less than 1 second.



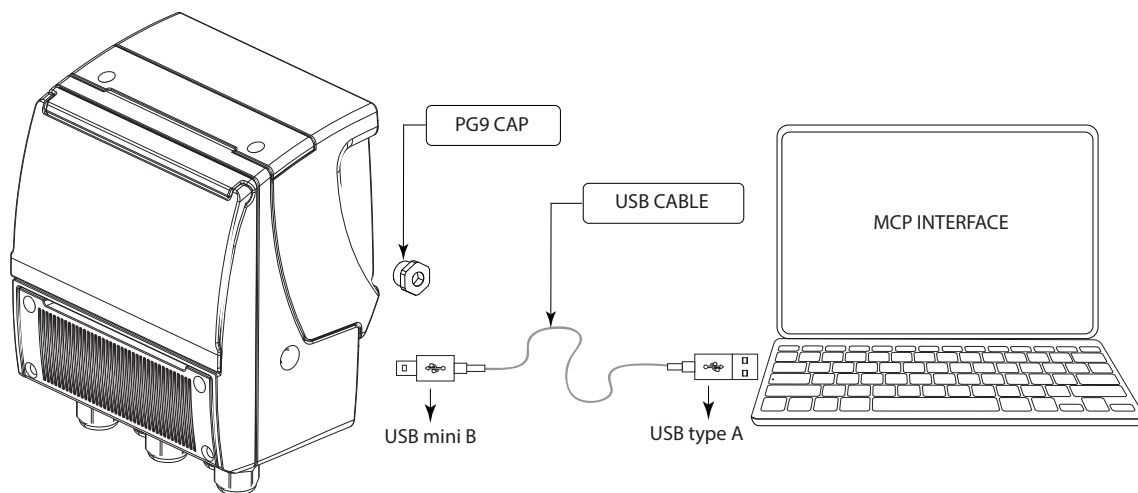
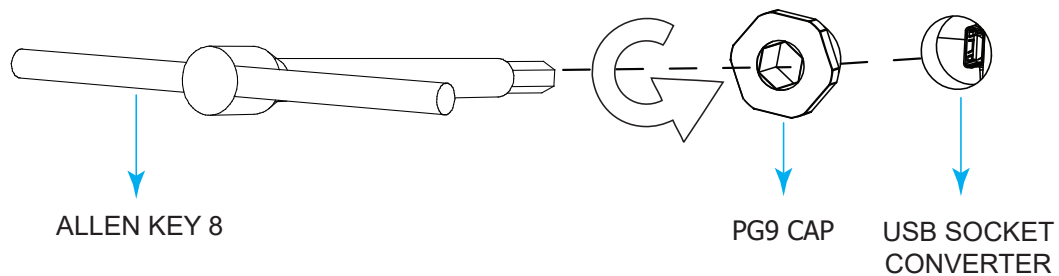
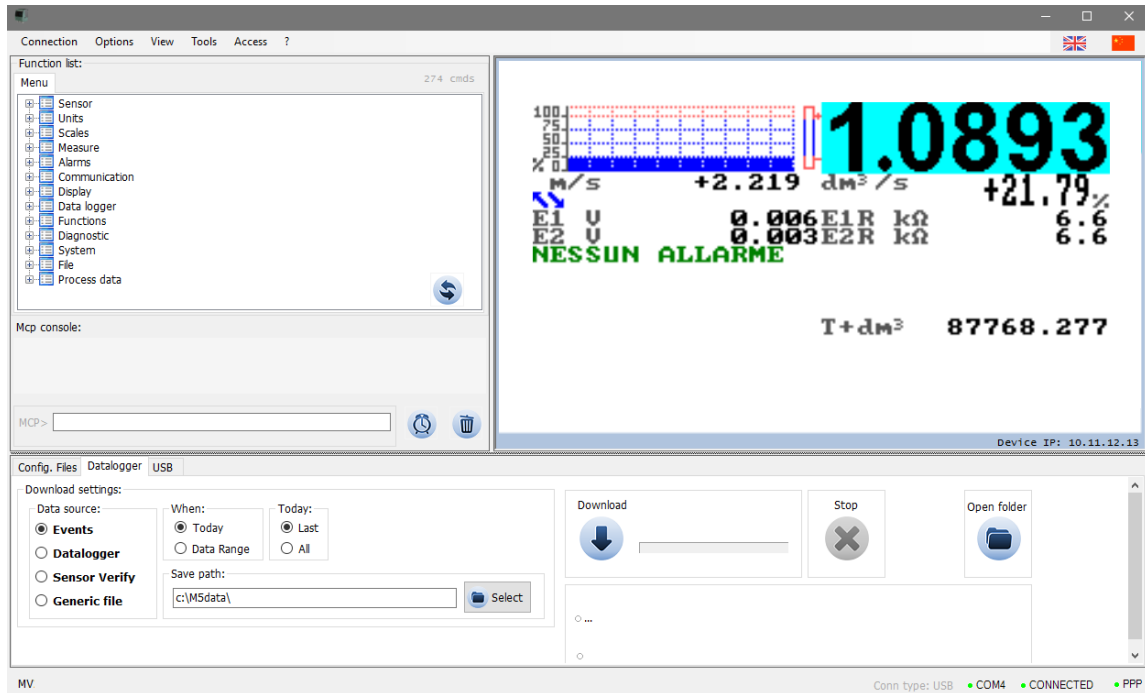
# MAIN PAGES VISUALIZATION

Possible views by simply pressing the button



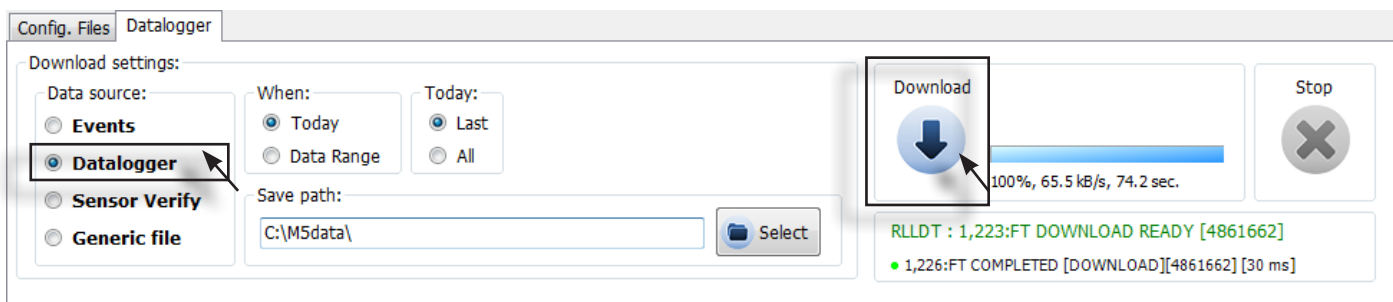

# USER INTERFACE

Besides the keyboard, the converter can be programmed by MCP INTERFACE: a real time interface between converter and PC.



# DATA LOGGER

Data is stored on micro SD card; the recorded data or the events, can be easily downloaded by the MCP INTERFACE, pressing the relevant key as shown below.

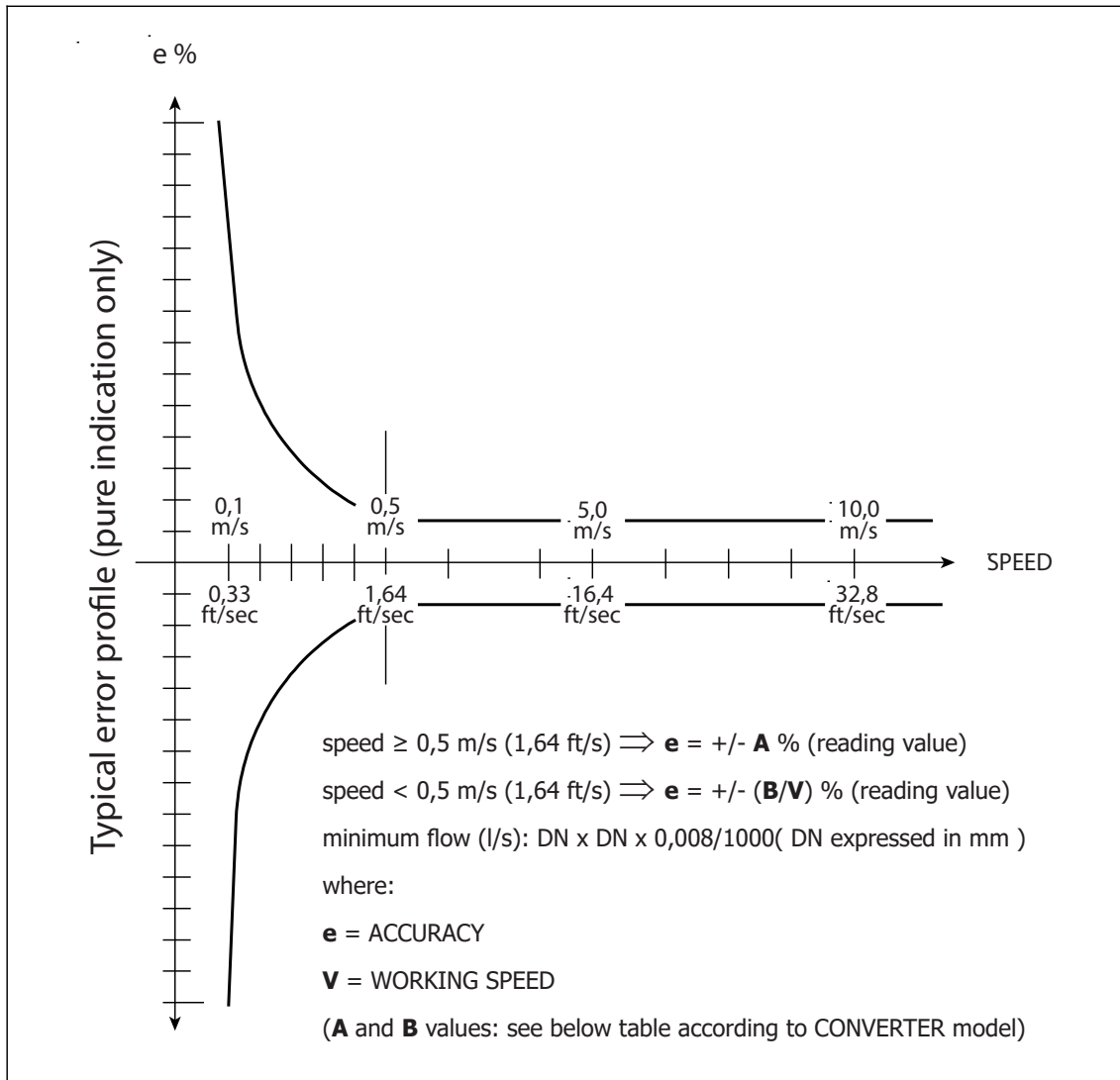


**Note:** to record correctly the data, the date and time shall be properly set.

## Example of extrapolation of the data logger file:

<b>N°Record.</b> View progressively the number of registered records.	1 NRECORD
<b>Date.</b> The recording date viewing for each record.	2 DATE
<b>Hours.</b> Time recording viewing for each record.	3 CHRA
<b>Total positive totalizer value.</b> Form Fields when the send flag is active on the totalizer T+.	4 UIM T+
<b>Partial positive totalizer value.</b> Form Fields when the send flag is active on the totalizer P-.	5 UIM P-
<b>Total negative totalizer value.</b> Form Fields when the send flag is active on the totalizer T-.	6 UIM T-
<b>Partial negative totalizer value.</b> Form Fields when the send flag is active on the totalizer P-.	7 UIM P-
<b>Total net totalizer value.</b> Form Fields when the send flag is active on the totalizer TN.	8 UIM TN
<b>Partial net totalizer value.</b> Form Fields when the send flag is active on the totalizer PN	9 UIM PN
<b>Flow rate.</b> Form Fields present when the send flag is on the flow in units of measurement.	10 UIM FLOWRATE
<b>Flow rate %.</b> Form fields present when the flag of alarm recording is active (only N ° of present total alarms)	11 UIM FLOWRATE%
<b>N ° active alarms.</b> Form fields present when the flag of alarm recording is active (only N ° of present total alarms)	12 UIM NACTIVEALARM
<b>Loss of current measured during insulation test.</b> Available value when recording the sensor test data is active.	13 UIM CPIT
<b>Time rise A.</b> Available value when recording the sensor test data is active.	14 UIM TCRISA
<b>Time rise B.</b> Available value when recording the sensor test data is active.	15 UIM TCRISB
<b>Sensor test error code.</b> Available value when recording the sensor test data is active.	16 UIM CETS

# ACCURACY



## Fullbore Sensor

MS501/MS600/MS1000/MS2410/MS2500			MS5000		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
0,4*	0,2**	0,66**	2	1	3,28

\* = 0,2 ( special )

\*\*= 0,1(m/s) ; 0,33(ft/s) - special

## Insertion sensor

See Sensor DATA SHEET.

### Reference conditions below and as per internal testing procedures:

- Constant flow rate during the test
- Pressure: >30 Kpa
- Flow condition : fully developed flow profile
- Zero stability +/- 0,005 %

## MI-001 OIML R49 CLASS1: MV145

The **MS2500** sensor's diameters listed below, coupled with **MV145**, are certified according to European Directive 2014/32/EU category MI-001 (OIML R49)

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,32	0,20	<b>80</b>
32	1 ¼	25	0,50	0,31	
40	1 ½	40	0,80	0,50	
50	2	63	1,3	0,79	
65	2 ½	100	2	1,25	
80	3	160	3,2	2	
100	4	250	5,0	3,13	
125	5	400	8,0	5,0	
150	6	630	13	7,88	
200	8	1000	20	12,50	
250	10	1600***	32	20	
300	12	2500**	50	31,25	
350	14	2500**	50	31,25	
400	16	4000**	80	50	
450	18	4000**	80	50	
500	20	6300	126	78,75	
600	24	10000	200	125	
700	28	10000	200	125	
800	32	16000*	320	200	
900	36	16000*	320	200	
1000	42	25000*	500	312,5	

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,26	0,16	<b>100</b>
32	1 ¼	25	0,40	0,25	
40	1 ½	40	0,64	0,40	
50	2	63	1,0	0,63	
65	2 ½	100	1,6	1,00	
80	3	160	2,6	1,60	
100	4	250	4,0	2,50	
125	5	400	6,4	4,00	
150	6	630	10	6,30	
200	8	1000	16	10,00	

(\*) : Calibration flowrate 14000 m3/h - as for max rig flowrate L8

(\*\*) : Calibration flowrate 1400 m3/h - as for max test rig flowrate L7

(\*\*\*) Calibration flowrate 1100 m3/h - as for max test rig flowrate L6



## MI-001 OIML R49 CLASS2: MV145

The **MS2500** sensor's diameters listed below, coupled with **MV145**, are certified according to European Directive 2014/32/EU category MI-001 (OIML R49)

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,16	0,10	<b>160</b>
32	1 ¼	25	0,25	0,16	
40	1 ½	40	0,40	0,25	
50	2	63	0,63	0,39	
65	2 ½	100	1,0	0,63	
80	3	160	1,6	1,0	
100	4	250	2,5	1,6	
125	5	400	4,0	2,5	
150	6	630	6,3	3,9	
200	8	1000	10	6,3	
250	10	1600***	16	10	
300	12	2500**	25	16	
350	14	2500**	25	16	
400	16	4000**	40	25	
450	18	4000**	40	25	
500	20	6300	63	39	
600	24	10000	100	63	
700	28	10000	100	63	
800	32	16000*	160	100	
900	36	16000*	160	100	
1000	42	25000*	250	156	

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,10	0,06	<b>250</b>
32	1 ¼	25	0,16	0,10	
40	1 ½	40	0,26	0,16	
50	2	63	0,40	0,25	
65	2 ½	100	0,64	0,40	
80	3	160	1,0	0,64	
100	4	250	1,6	1,0	
125	5	400	2,6	1,6	
150	6	630	4,0	2,5	
200	8	1000	6,4	4,0	
250	10	1600***	10	6,4	
300	12	2500**	16	10	
350	14	2500**	16	10	
400	16	4000**	26	16	
450	18	4000**	26	16	
500	20	6300	40	25	
600	24	10000	64	40	
700	28	10000	54	40	
800	32	16000*	102	64	
900	36	16000*	102	64	
1000	42	25000*	160	100	

(\*) : Calibration flowrate 14000 m3/h - as for max rig flowrate L8

(\*\*) : Calibration flowrate 1400 m3/h - as for max test rig flowrate L7

(\*\*\*) Calibration flowrate 1100 m3/h - as for max test rig flowrate L6

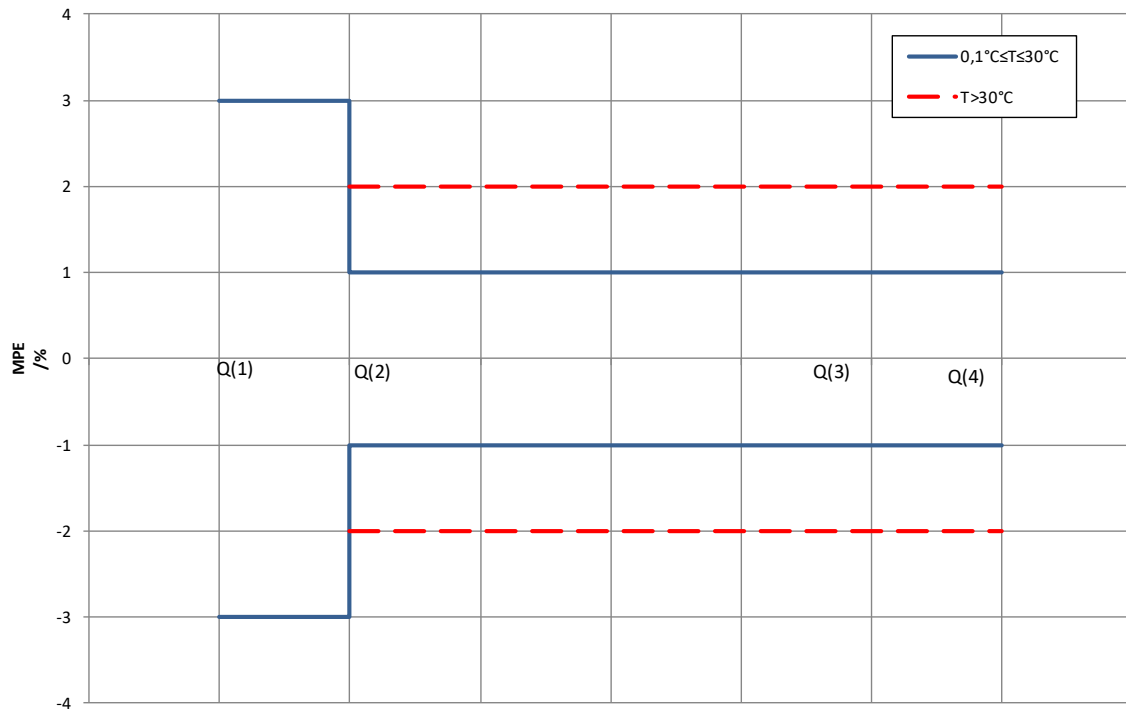
SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,06	0,04	<b>400</b>
32	1 ¼	25	0,10	0,063	
40	1 ½	40	0,16	0,10	
50	2	63	0,25	0,16	
65	2 ½	100	0,40	0,25	
80	3	160	0,64	0,40	
100	4	250	1,0	0,63	
125	5	400	1,6	1,0	
150	6	630	2,5	1,6	
200	8	1000	4,0	2,5	
250	10	1600***	6,4	4,0	
300	12	2500**	10	6,3	
350	14	2500**	10	6,3	
400	16	4000**	16	10	
450	18	4000**	16	10	
500	20	6300	25	16	
600	24	10000	40	25	
700	28	10000	40	25	
800	32	16000*	64	40	
900	36	16000*	64	40	
1000	42	25000*	100	63	

(\*) : Calibration flowrate 14000 m3/h - as for max rig flowrate L8

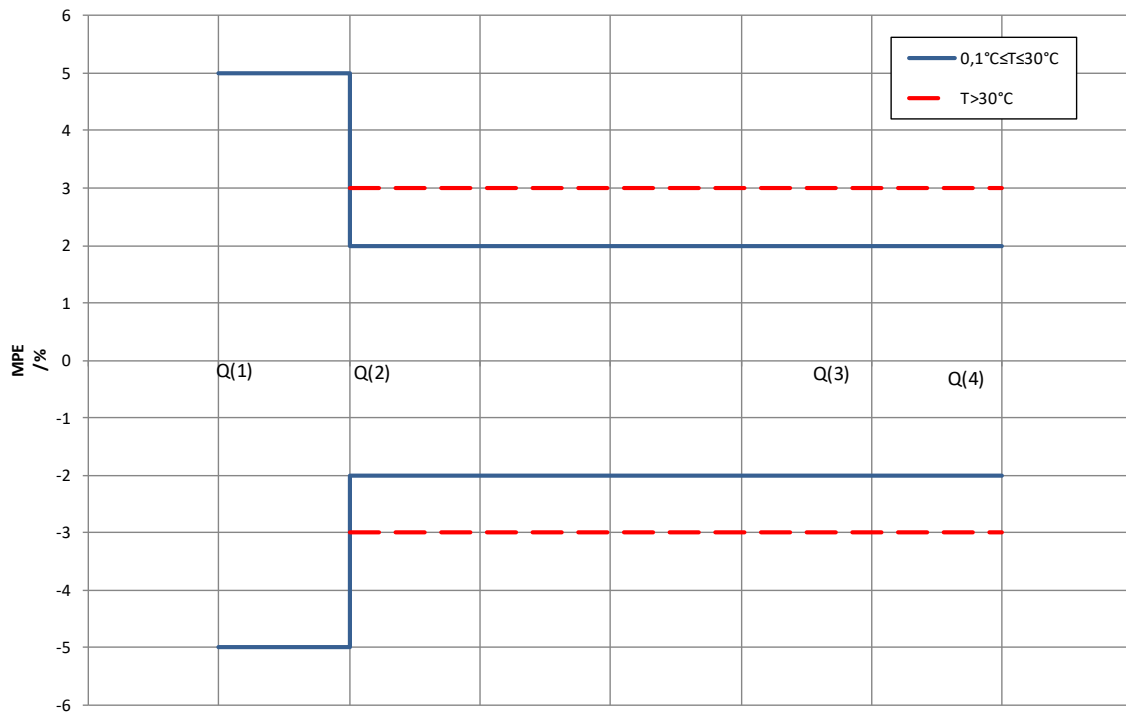
(\*\*) : Calibration flowrate 1400 m3/h - as for max test rig flowrate L7

(\*\*\*) Calibration flowrate 1100 m3/h - as for max test rig flowrate L6

**MPE - MI 001 - OIML R49 ACCURACY CLASS 1**  
(OIML R 49-1:2013 (E) - ISO4064-1:2017)



**MPE - MI 001 - OIML R49 ACCURACY CLASS 2**  
(OIML R 49-1:2013 (E) - ISO4064-1:2017)



# HOW TO ORDER

CODE\EXAMPLE	CODE\DESCRIPTION	
<b>Display</b>		
B	A	Blind version (without display and programming keys, USB cable type A / USB Mini B is Required for programming)
	B	Graphic LCD WSTN - B/W-matrix points 128 x 64, 8 line/16 characters and 3 programming keys (mandatory for MI001)
<b>Housing material</b>		
0	0	Nylon PA6 with fiber glass, (IP67 only)
	1	Painted aluminium die casting
<b>Version / Protection rate</b>		
A	A	Compact version with sensor MS - IP67
	B	Separate version for wall monting, complete with Aluminium mounting accessories, (use C015/C016 cable max length 20 m) - IP67
	C	Compact version with display visible from the top -IP67
	D	Compact version - IP68 1,5 meters - ONLY aluminium housing
	E	Compact version with display visible from the top - IP68 1,5 meters - ONLY aluminium housing
	F	Separate version with sensor MS - IP68 1,5 meters - ONLY aluminium housing
<b>Main Power supply</b>		
0	0	Without Main Power Supply
	1	Power supply : 100 ... 240 VAC- 45/66 Hz
	2	Power supply : 12...48 VDC
<b>Batteries</b>		
A	A	2 Lithium thionyl chloride batteries (n° 1 on slot 1 - n° 1 on slot 2)
	B	4 Lithium thionyl chloride batteries (n° 2 on slot 1 - n° 2 on slot 2)
	C	6 Lithium thionyl chloride batteries (n° 3 on slot 1 - n° 3 on slot 2)
	D	6 Alkaline or NiMh batteries SIZE D (on slot 3)
	E	Board set for Lithium (slot 1-2) (Batteries NOT Supplied)
	F	Board set for Alkaline (slot 3) (Batteries NOT Supplied)
<b>Analog Input/Output</b>		
A	0	Without Analog Input/Output
	1	N° 1 Input for n° 1 pressure sensor (pressure sensor to be ordered separately)
	2	N° 2 Inputs for n° 2 pressure sensors (pressure sensors to be ordered separately)
	3	N° 1 Input for n° 1 PT 100/500/1000 THERMAL PROBE (probe to be ordered separately)
	4	N° 2 Inputs for n° 2 PT 100/500/1000 THERMAL PROBE (probes to be ordered separately)
	5	N° 1 Analog Output (4/20 mA) - Active or Passive (by wiring) if the Main Power is SELECTED ; ONLY PASSIVE if powered by BATTERIES
	6	Option 1 + 5
	7	Option 2 + 5
	8	Option 3 + 5
	9	Option 4 + 5
<b>Digital Input/Output</b>		
0	A	Without Digital Input/Output
	B	N° 2 ON/OFF output (max 50 Hz - max 100 mA ) + N° 1 ON/OFF input
	C	N° 4 ON/OFF output (max 50 Hz - max 100 mA ) + N° 3 ON/OFF input
<b>Communication Gateway</b>		
0	0	Without Gateway
	1	RS485 NOT insulated - Modbus
	2	Others

CODE\EXAMPLE	CODE\DESCRIPTION	
<b>Data Logger</b>		
A	A	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock)
	B	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV (Built In Verificator)
	C	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + Meter Data (Real Time Converter & Sensor Data on SD Memory)
	D	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV + Meter Data
<b>Special Features</b>		
0	0	None
	1	WITH ANTICONDENSE CAP
<b>Connectors for POWER SUPPLY and CABLES FROM SENSOR ( Separate Version) (Maximum 5 connectors including IN/OUT connectors)</b>		
A	A	NO CONNECTORS
	B	POWER SUPPLY (n° 1 connector)
	C	SEPARATE VERSION (n° 2 connectors)
	D	POWER SUPPLY (n° 1 connector)+ SEPARATE VERSION (n° 2 connectors)
<b>Connectors for INPUTS/OUTPUTS (Maximum 5 connectors including connectors for Power Supply and cables from sensor) (other combinations on request)</b>		
0	0	NO CONNECTORS
	1	n.1 Pressure or n.1 Temperature (n.1 connector)
	2	n.2 Pressure or n.2 Temperature (n. 2 connector)
	3	n.2 Digital Outputs - n.1 Digital Input (n.1 connector)
	4	n.2 Digital Outputs - n.1 Digital Input + RS485 (n.1 connector)
	5	n.2 Digital Outputs - n.1 Digital Input (n.1 connector) + n.1 Pressure or n.1 Temperature (n.1 connector)
	6	n.2 Digital Outputs + n.1 Output 4-20 mA (n.1 connector)
	7	n.2 Digital Outputs (n.1 connector) n.1 Output 4-20 mA + RS485 (n.1 connector) (NOT ALLOWED OPTIONS "CONNETECTOR ON INPUTS/OUTPUTS")
	8	n. 1 Modbus over RS485 (n.1 connector) (NOT ALLOWED OPTIONS "CONNETECTOR ON INPUTS/OUTPUTS")
	9	n. 1 Modbus over RS485 (n.1 connector) +n.1 Pressure or n.1 Temperature (n.1 connector)
<b>MID APPROVAL</b>		
A	A	NONE
	B	MI-001/OIMLR49-CLASS 1
	C	MI-001/OIMLR49-CLASS 2

Complete code  
example for  
order

→ **MV145-B0A0A0A0A0A**

**ISOIL INDUSTRIA S.p.A.**

<b>HEAD OFFICE</b>	<b>SERVICE</b>
Via Fratelli Gracchi, 27 20092 Cinisello Balsamo (MI) Tel +39 02 66027.1 Fax +39 02 6123202 sales@isoil.it	isomagservice@isoil.it

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