



# ISOMAG

*The friendly magmeter*

## DATA SHEET

### MV110




CE

ISOIL   
INDUSTRIA

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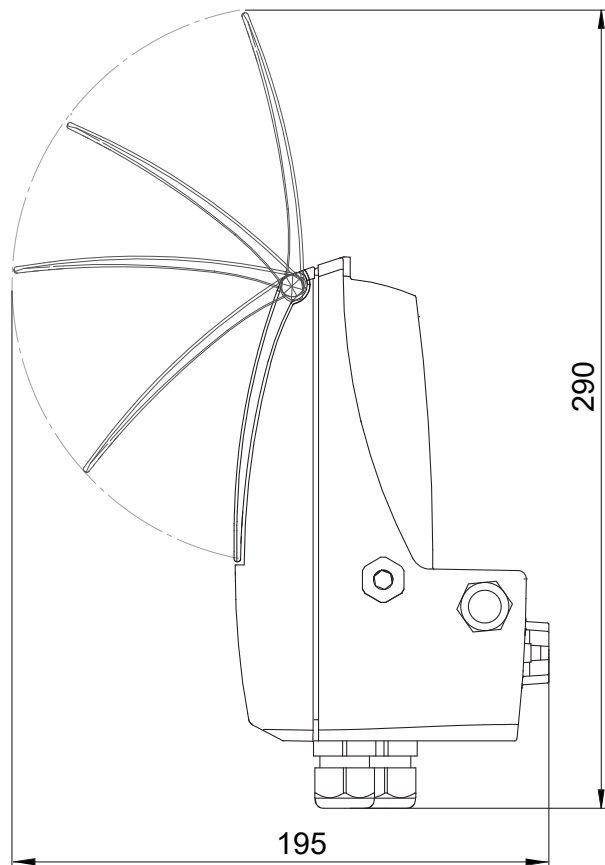
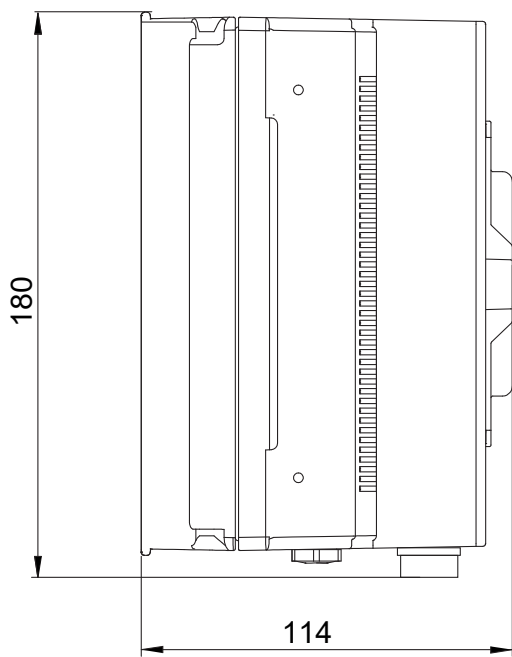
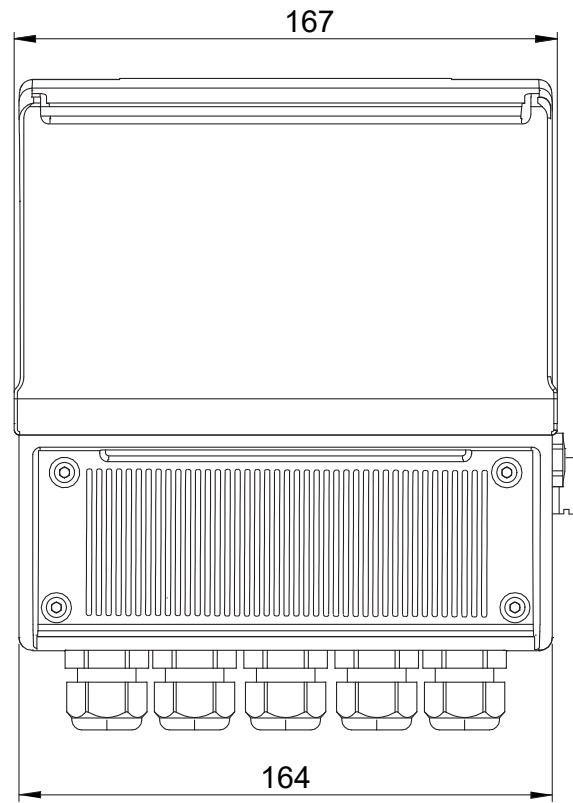
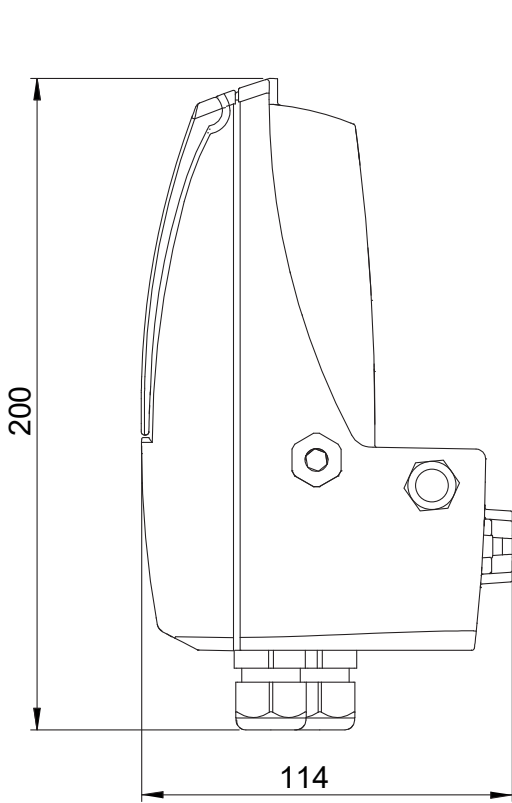
# TECHNICAL DATA

<b>OVERALL FEATURES</b>	
<b>Suitable For</b>	<input type="checkbox"/> All the ISOMAG® sensors up to the DN 1000
<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 / +14...+122 °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 <input type="checkbox"/> Nylon reinforced with 15% of fiber glass <input type="checkbox"/> AISI304 Stainless Steel
<b>Protection Rate</b>	<input type="checkbox"/> IP 67
<b>Power Supply/Consumption</b>	<input type="checkbox"/> 5W – 44-66 Hz
<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"/> Values storing system in case of power failure
<b>Galvanic Isolation</b>	<input type="checkbox"/> All the inputs/outputs are galvanically isolated from power supply up to 250 V
<b>Programming Plug In</b>	<input type="checkbox"/> USB port for the connection to PC (USB cable type A/USB MINI B is required for the programming)
<b>Bi-Directional</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</b> <i>(CHECK HOW TO ORDER, AT LAST PAGE, FOR MORE DETAILS)</i>	
<b>Protection Rate</b>	<input type="checkbox"/> IP 68
<b>Conn. Sensor Cable</b>	<input type="checkbox"/> CABLE C014 for separate version
<b>LCD Display</b>	<input type="checkbox"/> Graphic display 128x64 pixels back light, 3 programming keys
<b>Power Supply/Consumption</b>	<input type="checkbox"/> Power supply : 24 ... 36 VAC/VDC 0...45/66 Hz <input type="checkbox"/> Power supply : 12...48 VDC <input type="checkbox"/> Power supply : 100 ... 240 VAC 44/66 Hz + 1 Rechargeable Battery <input type="checkbox"/> Power supply : 24 ... 36 VAC/VDC 0...44/66 Hz + 1 Rechargeable Battery <input type="checkbox"/> Power supply : 12...48 VDC + 1 Rechargeable Battery
<b>Outputs: Pulses/Frequence/Alarms</b>	<input type="checkbox"/> N°1 digital Output , 1250 Hz, 100mA, 30 Vdc <input type="checkbox"/> N°2 digital Outputs , 1250 Hz, 100mA, 30 Vdc
<b>Analog Output</b>	<input type="checkbox"/> n° 1 Analogue output 0/4...20/22 mA (Hart optional) <input type="checkbox"/> n° 2 Analogue outputs 0/4...20/22 mA (Hart optional over Out.1)
<b>Communication Gateway</b>	<input type="checkbox"/> RS 485 <input type="checkbox"/> Wi-Fi (for programming)
<b>Data Logger</b>	<input type="checkbox"/> MicroSD Memory Card 4...32 GBytes
<b>Protocols</b>	<input type="checkbox"/> Modbus over RS 485 <input type="checkbox"/> HART (Available on analog output n° 1) <input type="checkbox"/> MeterBus
<b>MID Certifications</b>	<input type="checkbox"/> MI-001  <input type="checkbox"/> MI-004
<b>ACCURACY</b>	
<b>Measurements tolerance</b>	<input type="checkbox"/> Flow rate (volume) = ±0,05% c.r <input type="checkbox"/> Out 4/20 mA = ± 0,08 % c.r <input type="checkbox"/> Frequency Out = ± 0,08% c.r
<b>Accuracy (Whole System Converter+Sensor)</b>	<input type="checkbox"/> See table below



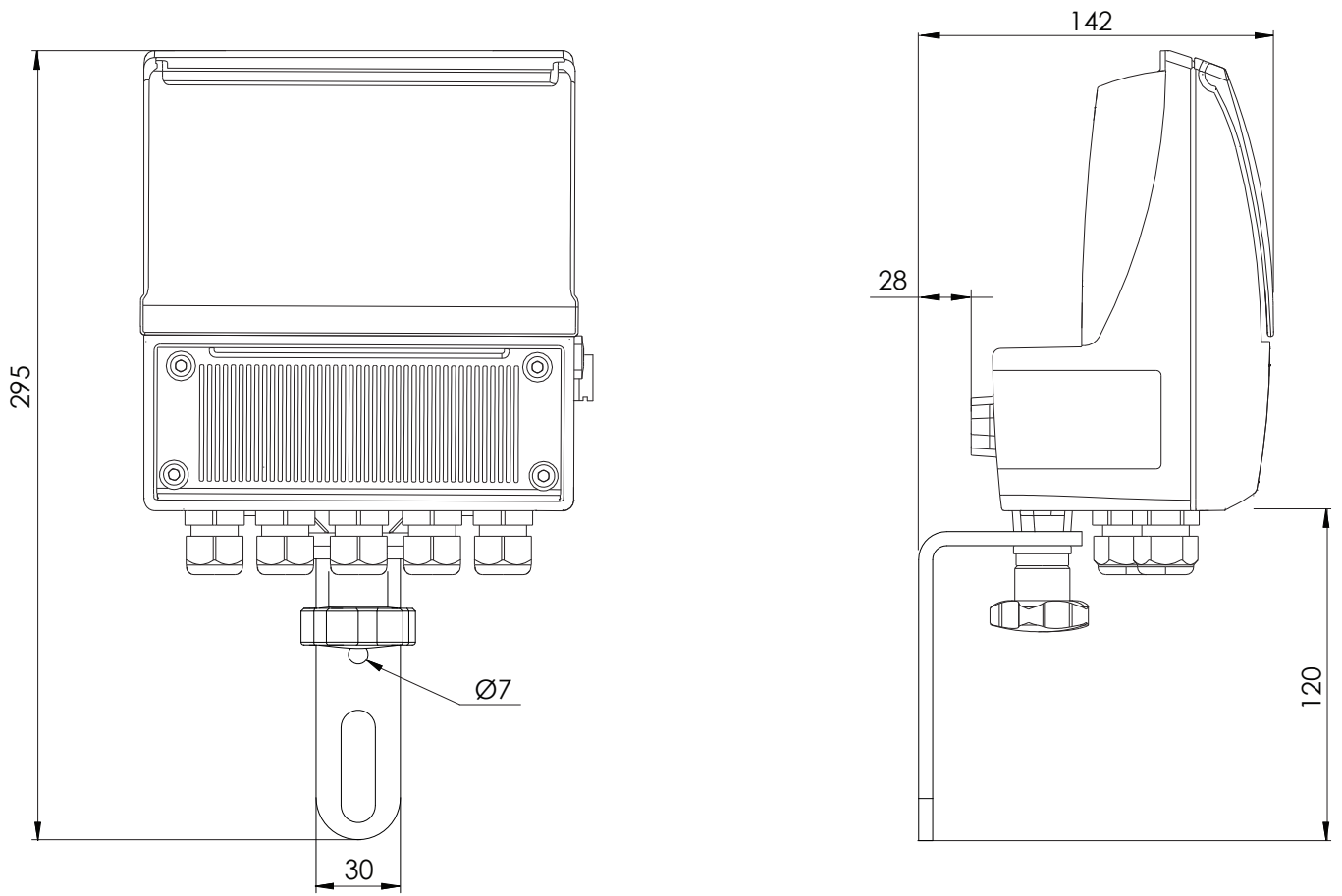
# OVERALL DIMENSIONS

Compact version



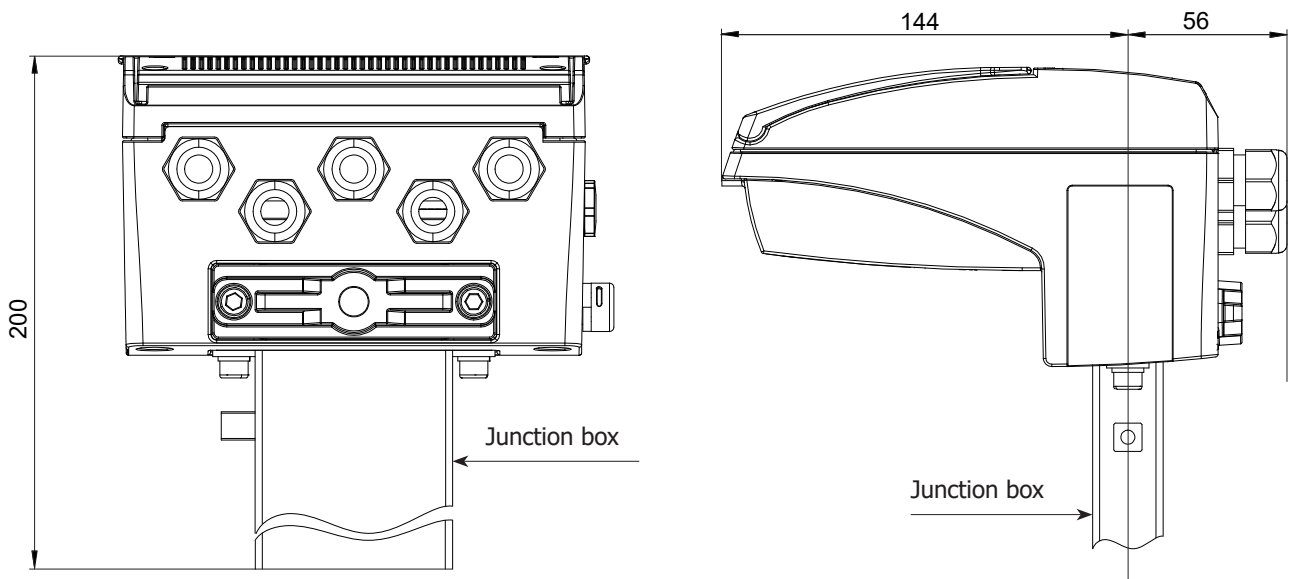
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Separate (wall) version

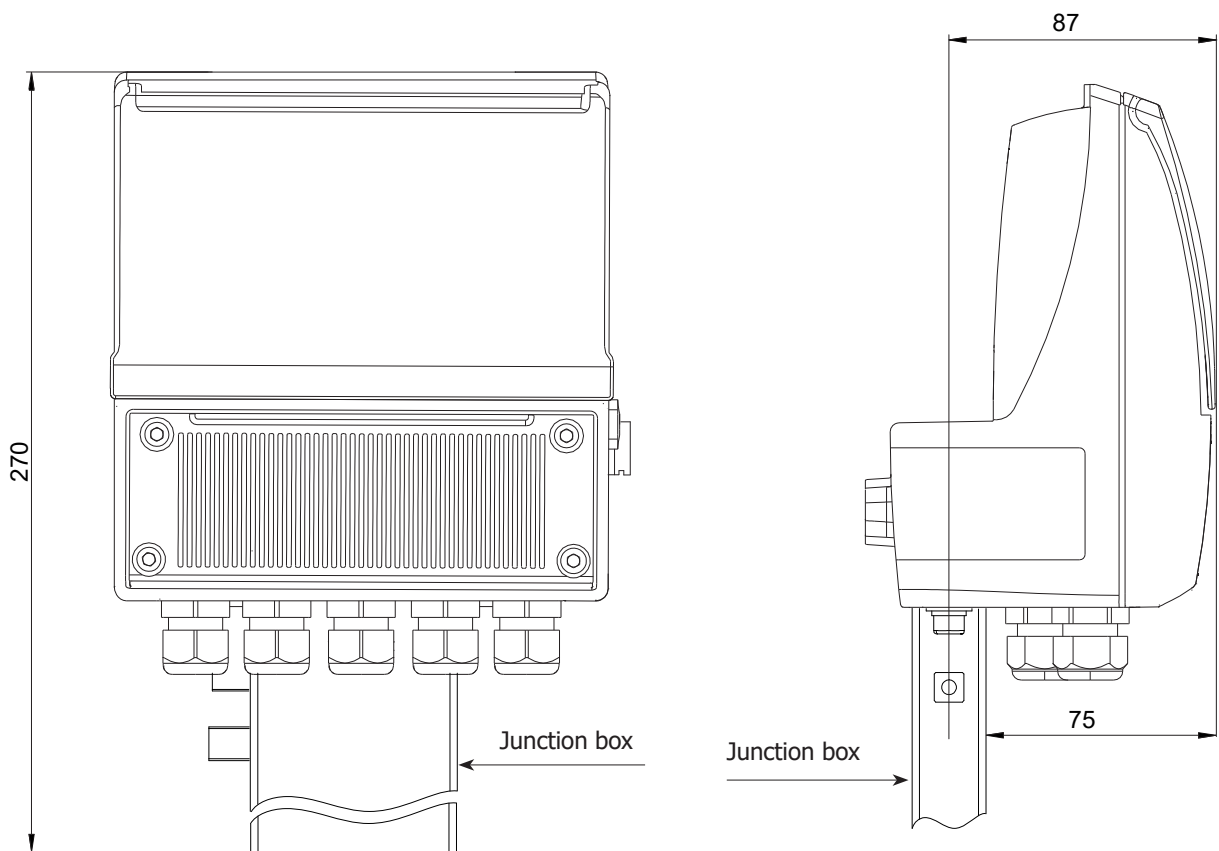


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Horizontal version

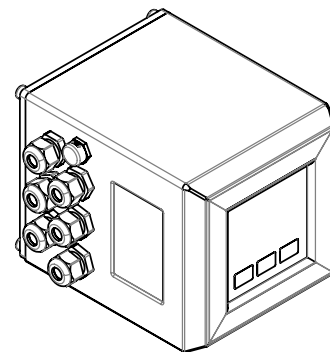
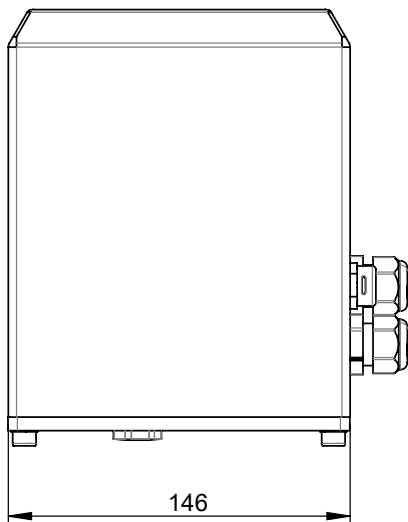
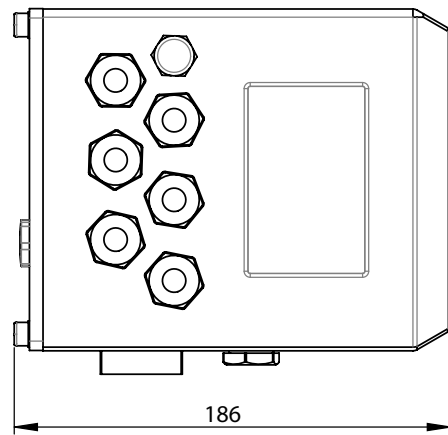
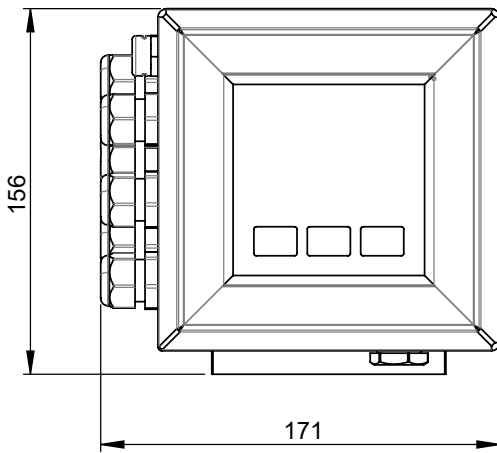


Vertical version



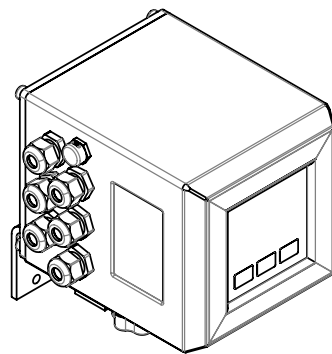
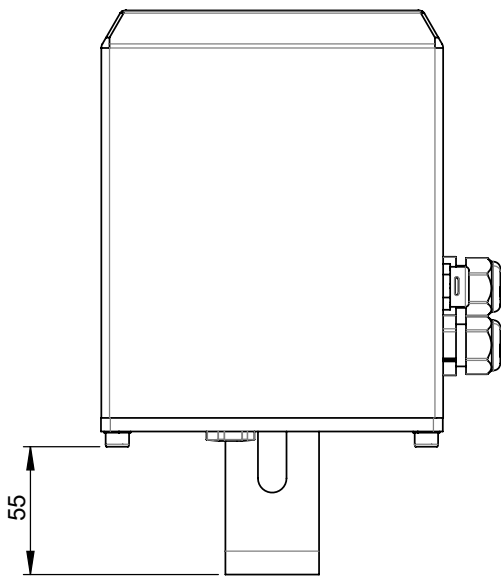
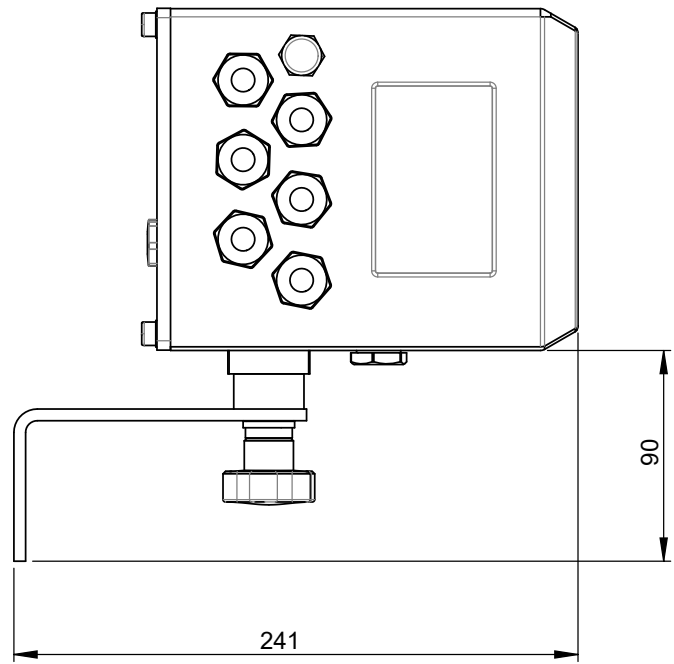
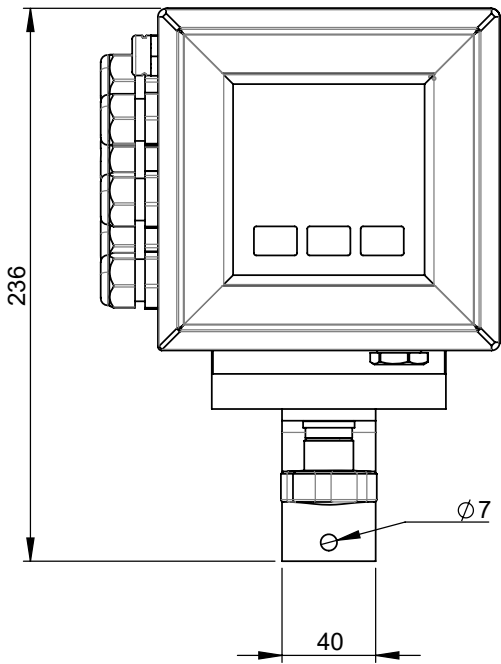
**OVERALL DIMENSIONS (STAINLESS STEEL VERSION)**

**Compact Version**



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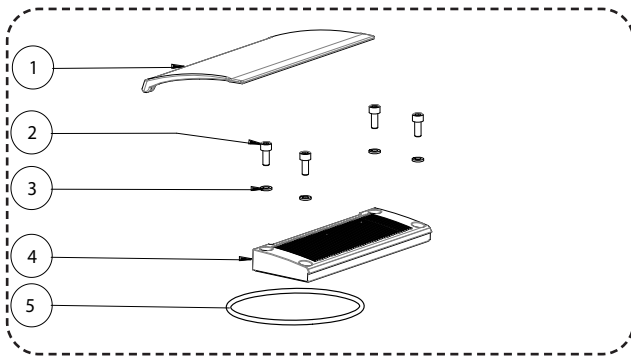
Separate Version



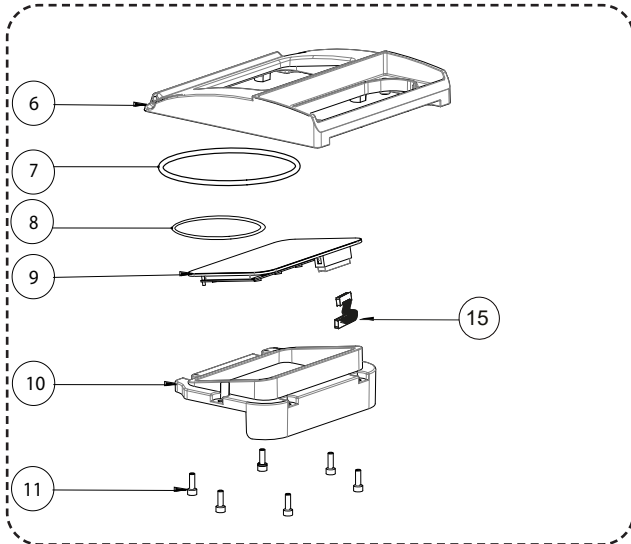


# MV110 EXPLODED LAYOUT

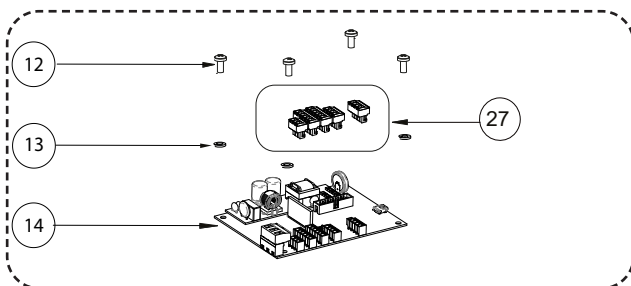
## Terminal block cover



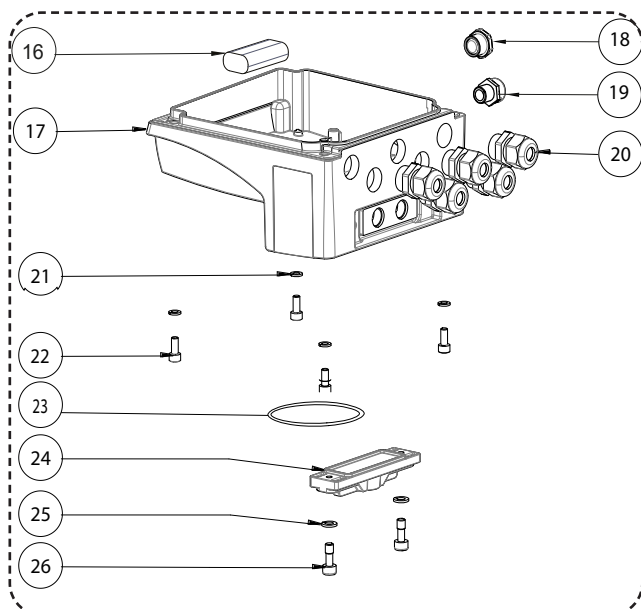
## Main housing cover



## PCB MV210



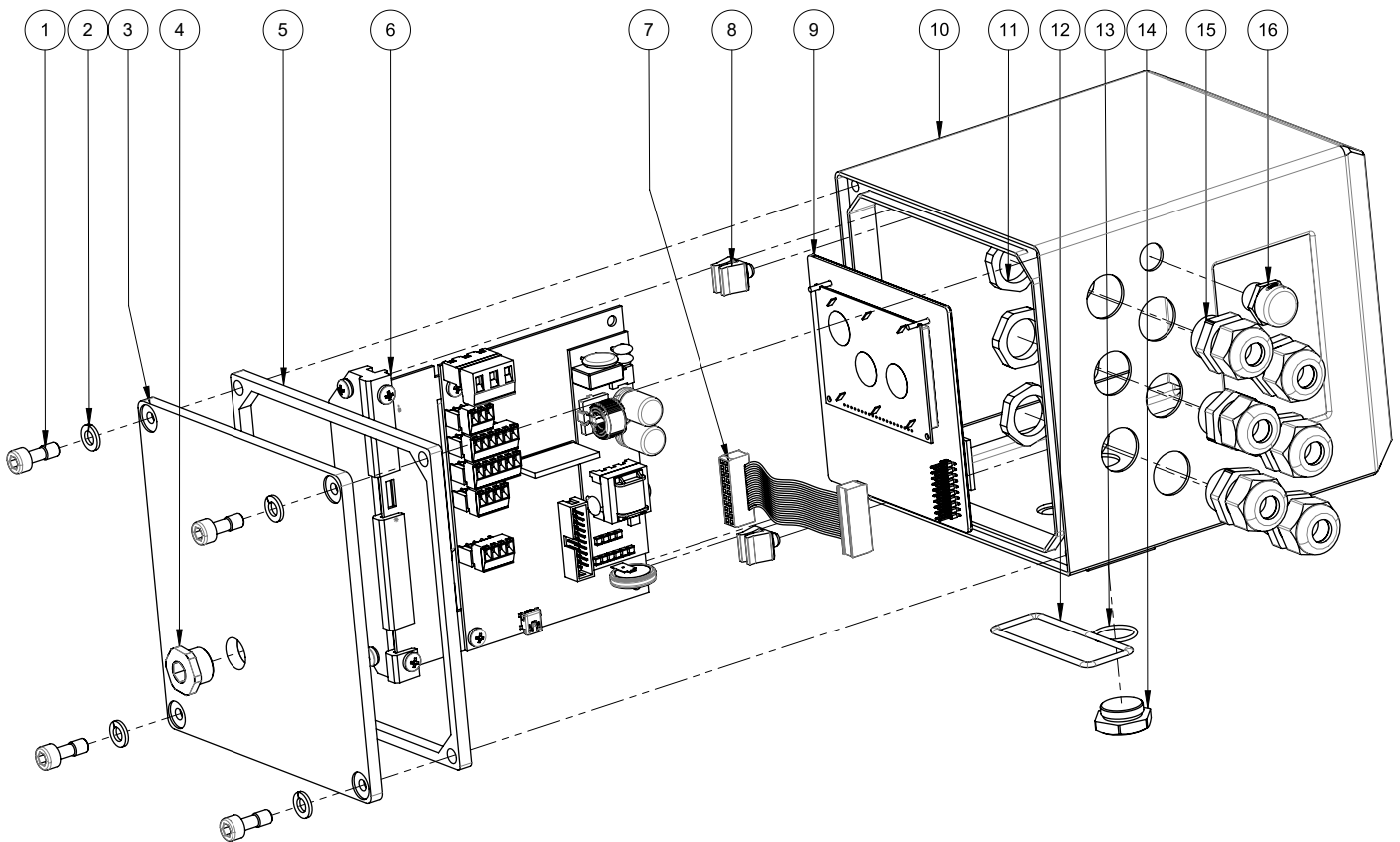
## Main housing



POS.	DESCRIPTION	
	PA6 VERSION	ALLUMINIUM VERSION
1	PROTECTION COVER	
2	VITE M4x12	VITE M5x12
3	GROWER Ø4	GROWER Ø5
4	TERMINAL COVER	TERMINAL COVER
5	O-RING-4400	
6	HOUSING COVER	HOUSING COVER
7	O-RING-4700 (HOUSING COVER)	
8	O-RING-117x3 (DISPLAY)	
9	DISPLAY	
10	FIXING DISPLAY FRAME (MATERIAL PA06)	
11	SELF-TAPPING SCREW 4x10	TRILOBO SCREW 4x10
12	SELF-TAPPING SCREW 4x10	TRILOBO SCREW 4x10
13	GROWER Ø4	SPRING WASHER Ø4
14	PCB MV210	
15	FLAT CABLE	
16	LITHIUM BATTERY	
17	PA6 MAIN HOUSING	ALUMINIUM MAIN HOUSING
18	PG9 CAP	
19	ANTICONDESE CAP	
20	PG11 CABLE GLAND CABLE DIAMETER: Ø5-Ø10mm	
21	GROWER Ø4	SPRING WASHER Ø5
22	SCREW M4x12	SCREW M5x12
23	O-RING-155	
24	VERSION CAP (MATERIAL PA06)	
25	GROWER Ø6	
26	SCREW M6x16	
27	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	

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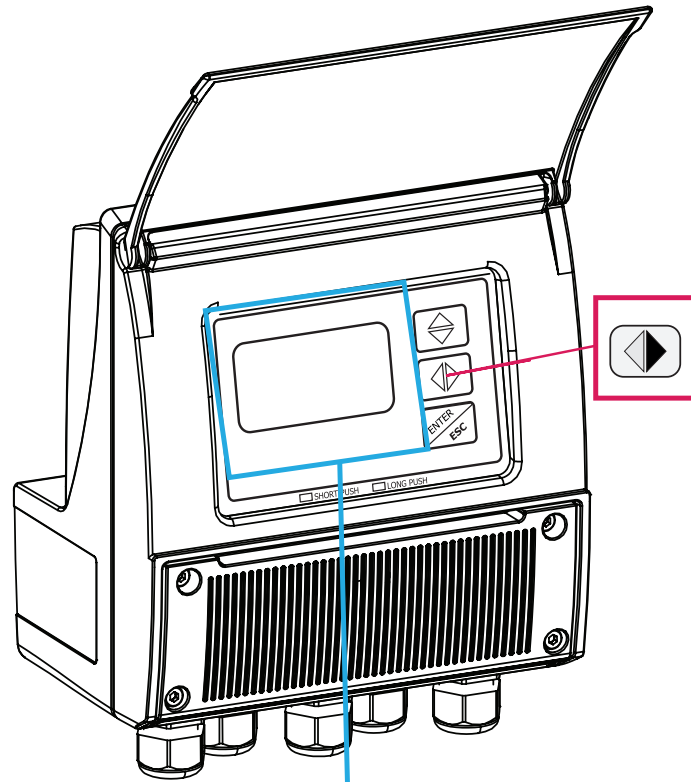
## MV110 CONSTRUCTION (STAINLESS STEEL VERSION)



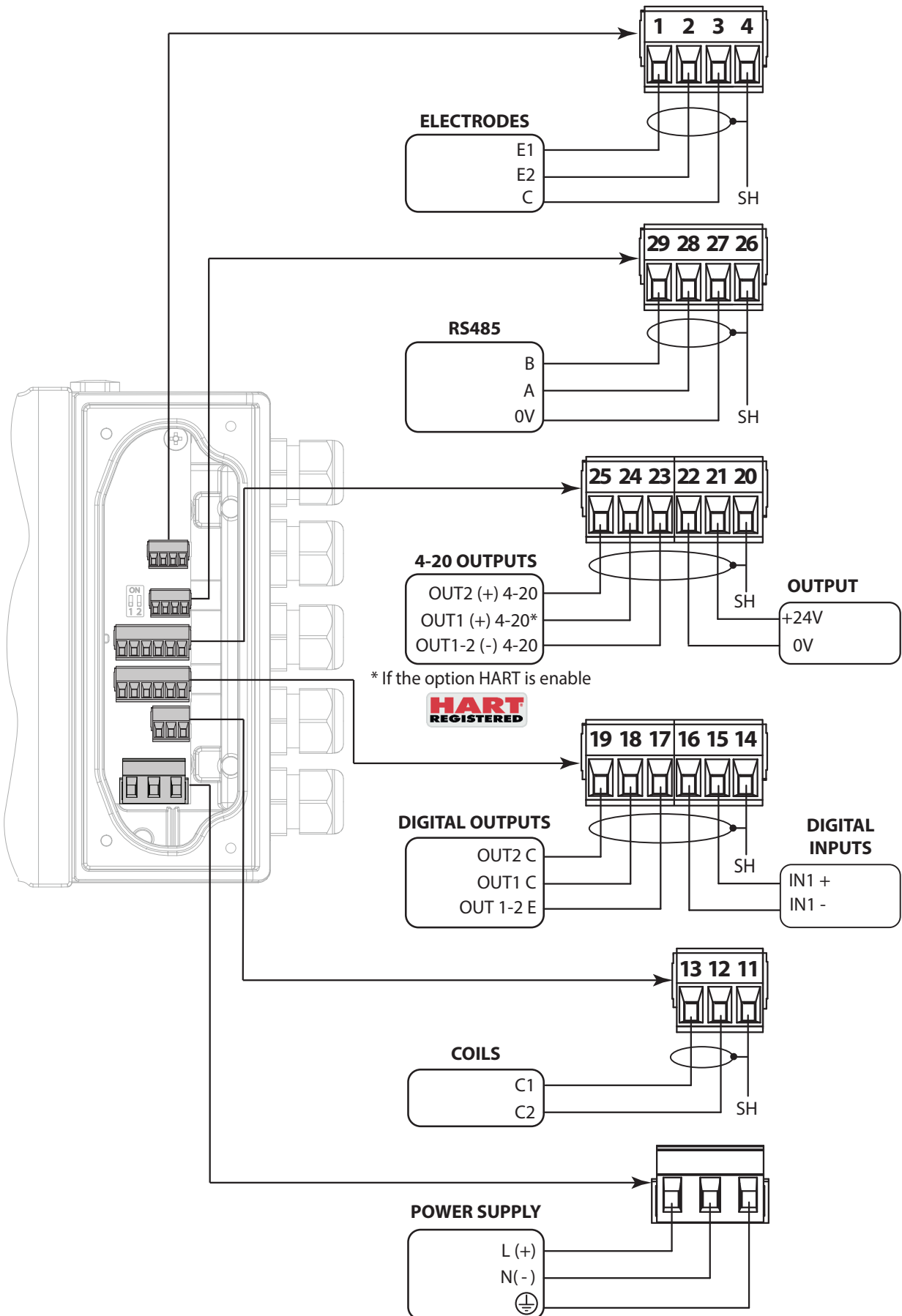
POS.	DESCRIPTION
1	SCREW M6X16
2	GROWER Ø 6
3	POLISHED COVER
4	PG9 CAP IP68
5	GASKET FOR Stainless steel HOUSING
6	BOARD FRAME M3C
7	FLAT CABLE
8	BOARD FIXING CLIPS
9	DISPLAY/BLIND
10	POLISHED Stainless steel HOUSING
11	PG11 NUT
12	FLAT GASKET O-RING 155
13	O-RING ORM 0160-15 Ø16X1.5
14	Stainless steel CAP M18X0.75
15	PG11 CABLE GLANDS
16	ANTICONDENSATION CAP

# MAIN PAGES VISUALISATION

Different visualization possibilities by simply pressing of a key.



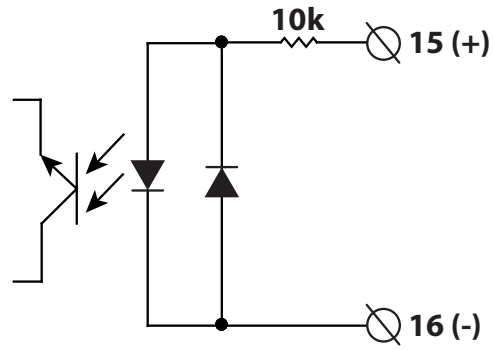
# ELECTRICAL CONNECTIONS



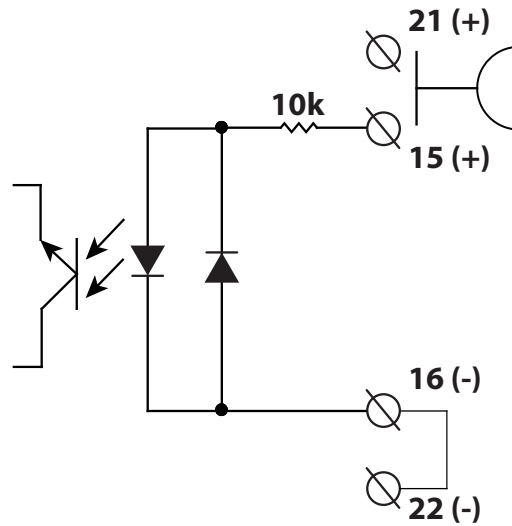
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## DIGITAL INPUT

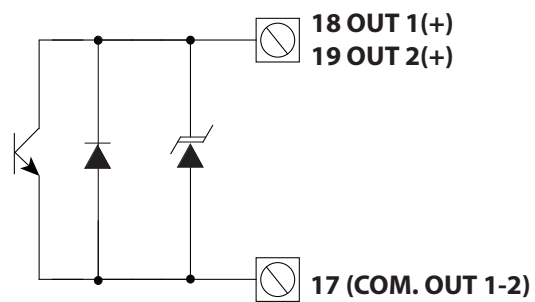
on/off input  
(external power supply)



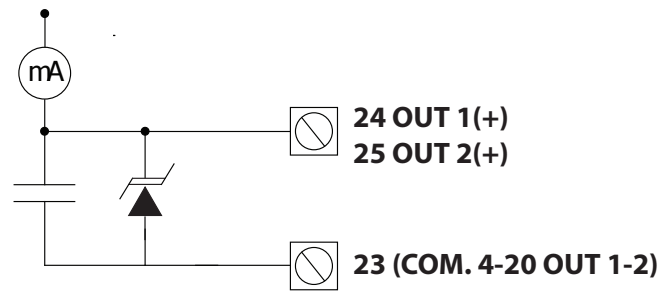
on/off input  
(internal power supply)



## DIGITAL OUTPUTS



## ANALOG OUTPUTS



# FUNCTIONS MENU

## SENSOR

```

MAIN MENU
1-Sensor
-----
1-SENSOR
-----
SENSOR
S. model =                0
Lining =                  UNSPEC.
S. type =                 FULL BORE
u. type =                 METRIC
Diam mm                   00025.0
KA =                      +00.9637
KA- =                    -04.4904
KZ =                      +0000000
KD =                      +0000000
Ins. position =          0
KP Dinamic =             OFF
Ki =                      01.8727
Kp =                      01.0000
Kc =                      1.0000
C.curr =                  025.0
C.Reg.PB =                 004
C.Reg.DH =                 008
S. Freq. = Hz             50
Preamplif. =             OFF
E.P Detect =              ON
R max = kohm              0500
El. Cleaning =           OFF
S. cable =                m   000
S. err. delay =           010
Sens. verify =           OFF
Zeropoint cal.
KL                        00.00000000
    
```

- 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 Insert ND of sensor (0-2500)
- 1.6 Calibration data of sensor visualized on sensor's label
- 1.7 Sensor coefficient KZ (zero point)
- 1.8 Sensor coefficient KD
- 1.9 Insertion position
- 1.10 KP dynamic, coefficient for insertion
- 1.11 Sensor coefficient Ki
- 1.12 Sensor coefficient Kp
- 1.13 Sensor coefficient Kc
- 1.14 CW volume total. decimal point position
- 1.15 Current regulator proportional band
- 1.16 Current regulator derivation constant
- 1.17 Measure sampling frequency
- 1.18 Enables the preamplifier
- 1.19 Enables the empty pipe detection feature
- 1.20 Empty pipe detection threshold
- 1.21 Electrode cleaning
- 1.22 Sensor connecting cable length
- 1.23 Signal error delay (n. sample)
- 1.24 Automatic sensor verify enable
- 1.25 Pipe hydraulic zero calibration
- 1.27 Coefficient KL values

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## UNITS

```

MAIN MENU
1-Sensor
-----
2-Units
-----
UNITS
Diam.                    mm
S.cable                   m
FR.unit                   METRIC
PI1 unit                  METRIC
PI2 unit                  METRIC
T+ unit                   METRIC
T+ unit                   g
T+ D.P                    3
P+ unit                   METRIC
P+ unit                   g
P+ D.P                    3
T- unit                   METRIC
T- unit                   g
T- D.P                    3
P- unit                   METRIC
P- unit                   g
P- D.P                    3
Temp.unit                 °C
Mass units                ON
Sg=kg/dm3                 1.0000
    
```

- 2.1 Nominal diameter measure unit
- 2.2 Cable length on separate version
- 2.3 Flowrate type measure unit: metric or not metric
- 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 not metric
- 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 unit
- 2.19 Enable/disable the selection of mass units on full scale set
- 2.20 Specific gravity coefficient

## SCALES

```

MAIN MENU
1-Sensor
2-Units
3- Scales
4-Measure
5-ALARMS
6-Inputs
7-
8-
9-
10-
11-
12-
13-
    
```

SCALES	
FS1 g/s	4908.7
FS2 g/s	4908.7
Pls1=g	1000.00
Tpls1=ms	0050.0
Pls2=g	1000.00
Tpls2=g	0050.0
Frq1=Hz	1000.00
Frq2=Hz	1000.00

3.1	Full scale flow rate 1
3.2	Full scale flow rate 2
3.3	Pulse value on channel 1
3.4	Duration of the pulse generated on channel 1
3.5	Pulse value on channel 2
3.6	Duration of the pulse generated on channel 2
3.7	Full scale frequency for channel 1 (0.1Hz-1000.0Hz)
3.8	Full scale frequency for channel 2 (0.1Hz-1000.0Hz)

## MEASURES

```

MAIN MENU
1-Sensor
2-Units
3- Scales
4- Measure
5-ALARMS
6-Inputs
7-
8-
9-
10-
11-
12-
13-
    
```

MEASURES	
Damping	SMART
Cut-off= %	00.1
DT Min.	ON
T1HC enable	ON
T1HC	OFF

4.1	Measure filter
4.2	Low flow zero threshold: 0-25% of full scale value
4.3	Automatic calibration verify
4.4	Automatic change of measurement range
4.5	High immunity inputs

## ALARMS

```

MAIN MENU
1-Sensor
2-Units
3- Scales
4-Measure
5-ALARMS
6-Inputs
7-
8-
9-
10-
11-
12-
13-
    
```

ALARMS	
Max+ = dm3/s	OFF
Max- = dm3/s	OFF
Min+ = dm3/s	OFF
Min- = dm3/s	OFF
Hysteresis=%	03
mA v.alarm=%	000
Hz v.alarm=%	000

5.1	Maximum value alarm set for direct flow rate
5.2	Maximum value alarm set for reverse flow rate
5.3	Minimum value alarm set for direct flow rate
5.4	Minimum value alarm set for reverse flow rate
5.5	Hysteresis threshold set for the minimum and maximum flow rate alarms
5.6	Current output value in case of failure
5.7	Frequency output value in case of alarms

## INPUTS

```

MAIN MENU
1-Sensor
2-Units
3- Scales
4-Measure
5-ALARMS
6-Inputs
7-
8-
9-
10-
11-
12-
13-
    
```

INPUTS	
T+ reset	OFF
P+ reset	OFF
T- reset	OFF
P- reset	OFF
Count lock	OFF
Meas.lock	OFF
Calibration	OFF
Range change	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	Range change external command



OUTPUTS

```

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

OUTPUTS	
11	Out1 PULSES+
12	Out2 PULSES-
13	Out mA1 4_22 +/-
	Out mA2 4_22 +/-
	A1S 4.9087
	A2S 4.9087

7.1	Output 1 functions
7.2	Output 2 functions
7.3	Choice of the function and the range of current output n.1
7.4	Choice of the function and the range of current output n.2
7.5	Full Scale value for analog out1
7.6	Full Scale value for analog out2

COMM.

```

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

COMMUNICATION	
1	HART pr. 05
	HART O. C. ON
	Dev. Addr 001
	Speed=bps 9600
	Parity= NO
	Delay=ms 00
	C. timeout 2
	MBUS ID = 220483
	MBUS Dev.T = 7

8.1	HART packet byte preambles
8.2	HART bus output control
8.3	Device communication address number
8.4	MODBUS link speed
8.5	MODBUS link parity
8.6	MODBUS reply delay
8.7	Maximum delay between chars (frames)
8.8	MeterBus Id.Number (Second.Add.)
8.9	MeterBus Device Type (Media)



DISPLAY

```

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

DISPLAY	
11	Language EN
12	Contrast 5
13	Disp.time=s 020
	D.rate=Hz 5
	Disp. Fn. 1
	Disp. Fnk ON
	Part. Tot ON
	Neg. Tot. ON
	Net tot. ON
	Disp.date ON
	Quick start ON

9.1	Choice of the language
9.2	Display contrast
9.3	Display/keyboard inactivity time
9.4	Display updating frequency: 1-2-5-10 Hz
9.5	Display function number
9.6	Display function selection lock
9.7	Partial totalizer enable
9.8	Negative totalizer enable
9.9	Net totalizer enable
9.10	Time and date display enable
9.11	Quick start menu visualization

## DATA LOGGER

### DATA LOGGER

D.logger en.	ON	10.1	Data logger enabling
Meas. units	ON	10.2	Measure units recording enable
Field separat.	;	10.3	Field separator character
Decimal separ.	.	10.4	Decimal separator character
Interv.	01:01:00	10.5	Sampling interval
Log T+	ON	10.6	Enable logging of total direct totalizer
Log P+	ON	10.7	Enable logging of partial direct totalizer
Log T-	ON	10.8	Enable logging of total reverse totalizer
Log P-	ON	10.9	Enable logging of partial reverse totalizer
Log TN	ON	10.10	Enable logging of total net totalizer
Log PN	ON	10.11	Enable logging of partial net totalizer
Log Q (UM)	ON	10.12	Enable logging of flow rate in measure unit
Log Q (%)	ON	10.13	Enable logging of flow rate in percentage
Log AL.EV	ON	10.14	Enable logging of alarm events
Log STR	ON	10.15	Enable logging of sensor test results
Log BTS	ON	10.16	Enable logging of board temperature
Log IBV	ON	10.17	Enable logging of internal board voltage
Log EDC	ON	10.18	Enable logging of electrodes DC voltage
Log EAC	ON	10.19	Enable logging of electrodes AC voltage
Log EIZ	ON	10.20	Enable logging of electrodes impedance
Log SCU	ON	10.21	Enable logging of sensor coils value

```

MA 1
0-Display
1-Data logger
2-Functions
3-Diagnostic
4-System
5-Communication
6-Display
7-Data logger
8-Functions
9-Diagnostic
10-System
11-Communication
12-Display
13-Data logger
14-Functions
15-Diagnostic
16-System
17-Communication
18-Display
19-Data logger
20-Functions
21-Diagnostic
22-System
23-Communication
24-Display
25-Data logger
26-Functions
27-Diagnostic
28-System
29-Communication
30-Display
31-Data logger
32-Functions
33-Diagnostic
34-System
35-Communication
36-Display
37-Data logger
38-Functions
39-Diagnostic
40-System
41-Communication
42-Display
43-Data logger
44-Functions
45-Diagnostic
46-System
47-Communication
48-Display
49-Data logger
50-Functions
51-Diagnostic
52-System
53-Communication
54-Display
55-Data logger
56-Functions
57-Diagnostic
58-System
59-Communication
60-Display
61-Data logger
62-Functions
63-Diagnostic
64-System
65-Communication
66-Display
67-Data logger
68-Functions
69-Diagnostic
70-System
71-Communication
72-Display
73-Data logger
74-Functions
75-Diagnostic
76-System
77-Communication
78-Display
79-Data logger
80-Functions
81-Diagnostic
82-System
83-Communication
84-Display
85-Data logger
86-Functions
87-Diagnostic
88-System
89-Communication
90-Display
91-Data logger
92-Functions
93-Diagnostic
94-System
95-Communication
96-Display
97-Data logger
98-Functions
99-Diagnostic
100-System

```

## FUNCTIONS

### FUNCTIONS

T+ reset		11.1	Execute immediate reset of total direct totalizer
P+ reset		11.2	Execute immediate reset of partial direct totalizer
T- reset		11.3	Execute immediate reset of total reverse totalizer
P- reset		11.4	Execute immediate reset of partial reverse totalizer
Load Sens. F. def		11.5	Load sensor factory default
Load Conv. F. def		11.6	Load converter factory default
Save Sens. F. def		11.7	Save sensor factory default values
Save Conv. F. def		11.8	Save converter factory default values
Calibration		11.9	Execute immediate internal circuit calibration

```

MA 1
0-Display
1-Data logger
2-Functions
3-Diagnostic
4-System
5-Communication
6-Display
7-Data logger
8-Functions
9-Diagnostic
10-System
11-Communication
12-Display
13-Data logger
14-Functions
15-Diagnostic
16-System
17-Communication
18-Display
19-Data logger
20-Functions
21-Diagnostic
22-System
23-Communication
24-Display
25-Data logger
26-Functions
27-Diagnostic
28-System
29-Communication
30-Display
31-Data logger
32-Functions
33-Diagnostic
34-System
35-Communication
36-Display
37-Data logger
38-Functions
39-Diagnostic
40-System
41-Communication
42-Display
43-Data logger
44-Functions
45-Diagnostic
46-System
47-Communication
48-Display
49-Data logger
50-Functions
51-Diagnostic
52-System
53-Communication
54-Display
55-Data logger
56-Functions
57-Diagnostic
58-System
59-Communication
60-Display
61-Data logger
62-Functions
63-Diagnostic
64-System
65-Communication
66-Display
67-Data logger
68-Functions
69-Diagnostic
70-System
71-Communication
72-Display
73-Data logger
74-Functions
75-Diagnostic
76-System
77-Communication
78-Display
79-Data logger
80-Functions
81-Diagnostic
82-System
83-Communication
84-Display
85-Data logger
86-Functions
87-Diagnostic
88-System
89-Communication
90-Display
91-Data logger
92-Functions
93-Diagnostic
94-System
95-Communication
96-Display
97-Data logger
98-Functions
99-Diagnostic
100-System

```

## DIAGNOSTIC

### DIAGNOSTIC

Self test		12.1	Self test diagnostic function
Test display		12.2	Function tests physical display
Sens. verify		12.3	Sensor verify diagnostic function
Flow sim. =	ON	12.4	Flow rate simulation enabling
Display measures		12.5	Display internal measured value
Disp. Comm. Vars		12.6	Display comm. diagnostic values
Display graphs		12.7	Display measure as graphs
Gen. sens. set		12.8	Generic sensor parameters set
SD card info		12.9	Sd card status informations
Firmware info		12.10	Firmware version/revision
S/N=	999001	12.11	Board serial number
WT=	0002:21:00 : 22	12.12	Total working time

```

MA 1
0-Display
1-Data logger
2-Functions
3-Diagnostic
4-System
5-Communication
6-Display
7-Data logger
8-Functions
9-Diagnostic
10-System
11-Communication
12-Display
13-Data logger
14-Functions
15-Diagnostic
16-System
17-Communication
18-Display
19-Data logger
20-Functions
21-Diagnostic
22-System
23-Communication
24-Display
25-Data logger
26-Functions
27-Diagnostic
28-System
29-Communication
30-Display
31-Data logger
32-Functions
33-Diagnostic
34-System
35-Communication
36-Display
37-Data logger
38-Functions
39-Diagnostic
40-System
41-Communication
42-Display
43-Data logger
44-Functions
45-Diagnostic
46-System
47-Communication
48-Display
49-Data logger
50-Functions
51-Diagnostic
52-System
53-Communication
54-Display
55-Data logger
56-Functions
57-Diagnostic
58-System
59-Communication
60-Display
61-Data logger
62-Functions
63-Diagnostic
64-System
65-Communication
66-Display
67-Data logger
68-Functions
69-Diagnostic
70-System
71-Communication
72-Display
73-Data logger
74-Functions
75-Diagnostic
76-System
77-Communication
78-Display
79-Data logger
80-Functions
81-Diagnostic
82-System
83-Communication
84-Display
85-Data logger
86-Functions
87-Diagnostic
88-System
89-Communication
90-Display
91-Data logger
92-Functions
93-Diagnostic
94-System
95-Communication
96-Display
97-Data logger
98-Functions
99-Diagnostic
100-System

```

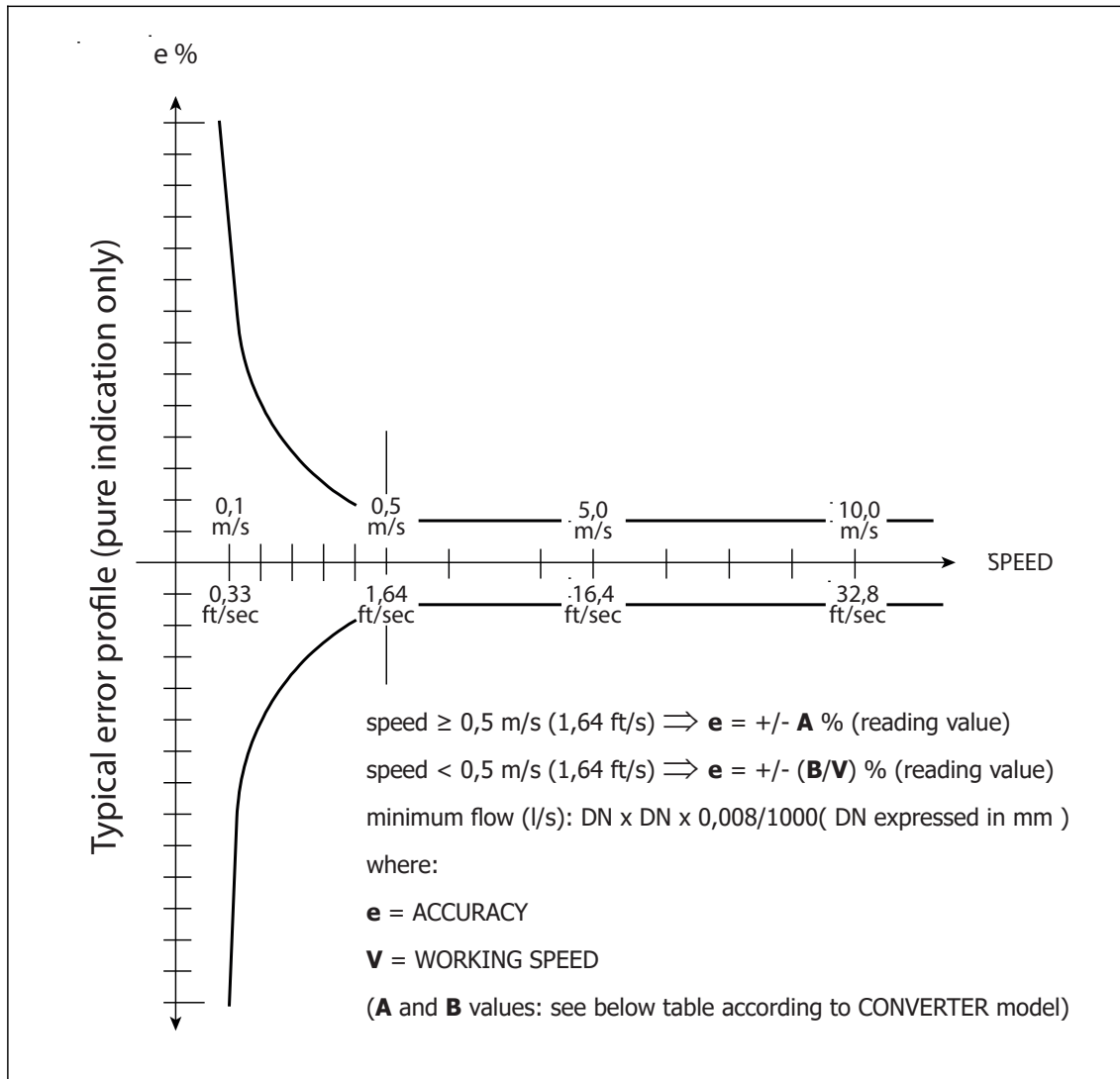
SYSTEM

```

SYSTEM
Dayl. Saving =          ON
Time zone =           h+01.00
2016/04/04-16:07
L1 code =             *****
L2 code =             *****
L3 code =             *****
L4 code =             *****
L5 code =             *****
L6 code =             *****
Restr. Access=        ON
010.011.012.013
010.011.012.014
255.255.255.000
HT                    0.96469
HS                    1.00000
HR                    1.00000
DAC1                  (°C)
DAC1                  (°C)
DAC2                  661
DAC2                  3327
Stand-by              3453
FW update             14718
13.1 Daylight saving time change
13.2 Localized time zone
13.3 System date and time
13.4 Access level 1 code
13.5 Access level 2 code
13.6 Access level 3 code
13.7 Access level 4 code
13.8 Access level 5 code
13.9 Access level 6 code
13.10 Restricted access level
13.11 Device IP network address
13.12 Client IP network address
13.13 Network mask
13.14 Calibration coefficient KT
13.15 Calibration coefficient KF
13.16 Calibration coefficient KR
13.17 DAC1 out 4mA calibration point
13.18 DAC1 out 20mA calibration point
13.19 DAC2 out 4mA calibration point
13.20 DAC2 out 20mA calibration point
13.21 Stand-by
13.22 firmware update

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

## ACCURACY



### Full bore Sensor

MS501/MS1000/MS2410/MS2500			MS600			MS5000		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
0,8*	0,4**	1,31**	0,8*	0,4**	1,31**	2	1	3,28

\* = 0,4 ( special )

\*\*= 0,2(m/s) ; 0,66(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  $\pm 0,005 \%$

## MI-001 OIML R49 CLASS1: MV110

The **MS2500** sensor's diameters listed below, coupled with **MV110** comply with the European directive: DIRECTIVE 2014/32/EU (MID) ANNEX III (MI-001) AND 2015/13/EU- OIML R49

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	1,01	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	10,1	6,30	
200	8	1000	16	10,00	
250	10	1600***	26	16,0	
300	12	2500**	40	25	
350	14	2500**	40	25	
400	16	4000**	64	40	
450	18	4000**	64	40	
500	20	6300	101	63	
600	24	10000	160	100	
700	28	10000	160	100	
800	32	16000*	256	160	
900	36	16000*	256	160	
1000	42	25000*	400	250	

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,10	0,064	<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

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

## MI-001 OIML R49 CLASS 2: MV110

The **MS2500** sensor's diameters listed below, coupled with **MV110** comply with the European directive: DIRECTIVE 2014/32/EU (MID) ANNEX III (MI-001) AND 2015/13/EU- OIML R49

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,16	0,10	160
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	15,625	
350	14	2500**	25	15,625	
400	16	4000**	40	25	
450	18	4000**	40	25	
500	20	6300	63	39,375	
600	24	10000	100	62,5	
700	28	10000	100	62,5	
800	32	16000*	160	100	
900	36	16000*	160	100	
1000	42	25000*	250	156,25	

SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,10	0,06	250
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

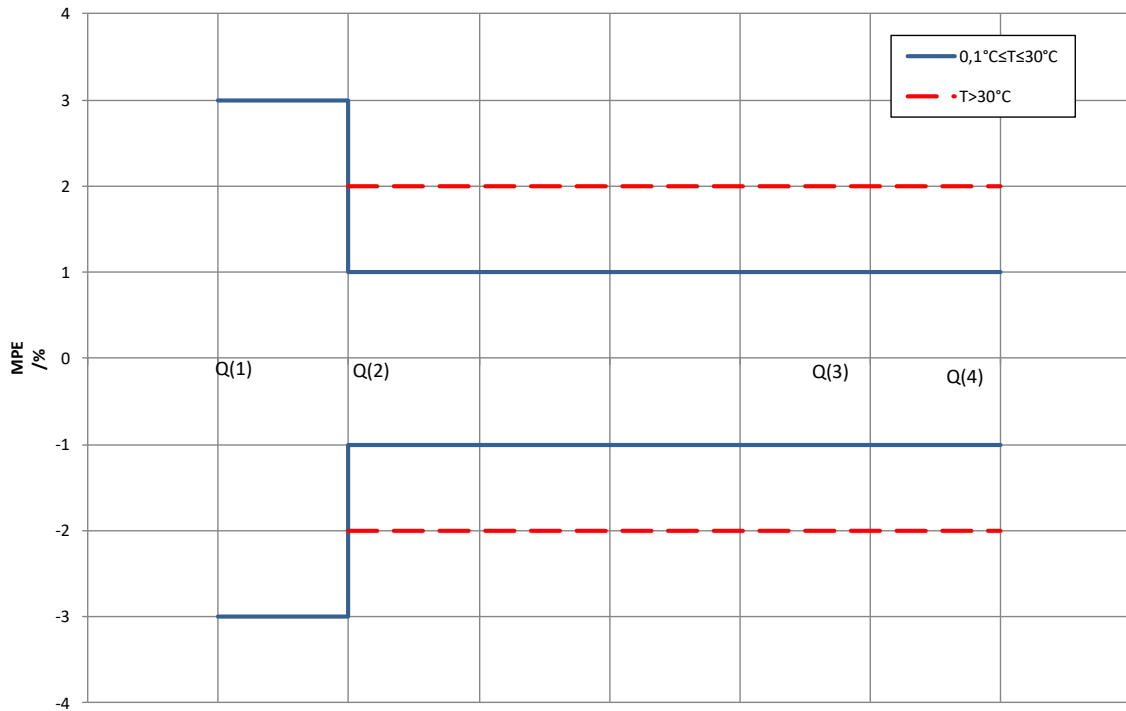
SIZE		Q3	Q2	Q1	R
mm	inch	m3/h			Q3/Q1
25	1	16	0,06	0,04	<b>400</b>
32	1 ¼	25	0,10	0,06	
40	1 ½	40	0,16	0,10	
50	2	63	0,25	0,16	
65	2 ½	100	0,40	0,25	
80	3	160	0,64	0,40	
100	4	250	1,0	0,63	
125	5	400	1,6	1,0	
150	6	630	2,5	1,6	
200	8	1000	4,0	2,5	
250	10	1600***	6,4	4,0	
300	12	2500**	10	6,3	
350	14	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

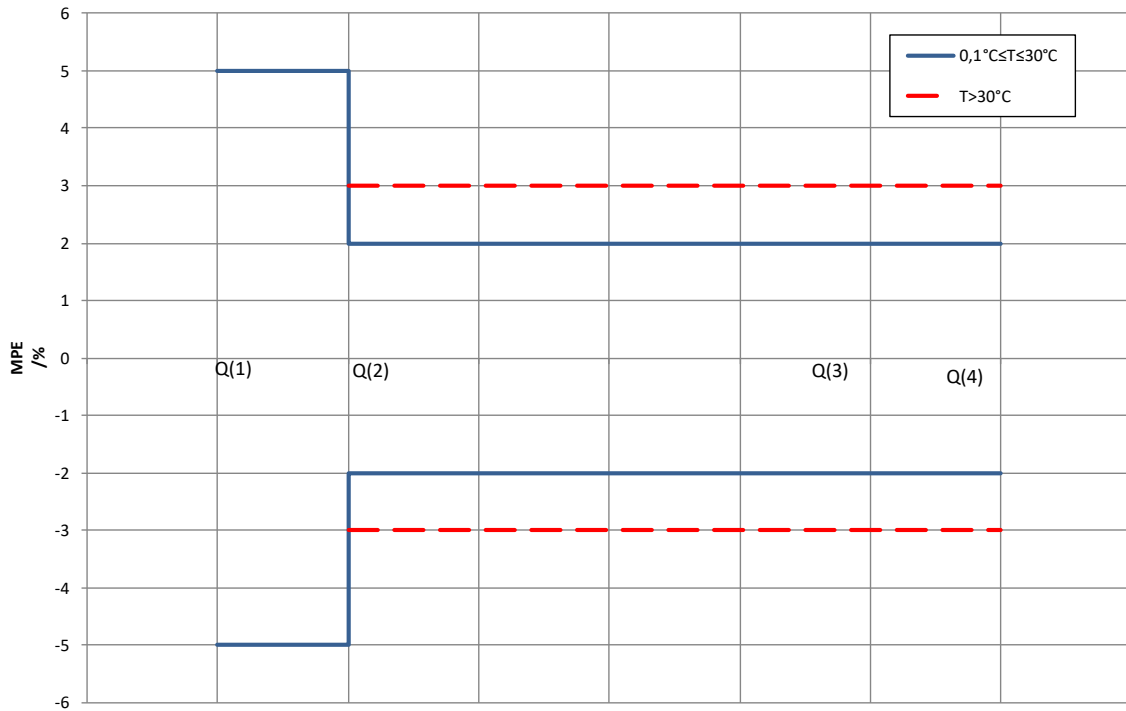
(\*\*) : Calibration flowrate 1400 m3/h - as for max test rig flowrate L7

(\*\*\*) 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 )





## MI-004 OIML R75 CLASS1: MV110

The **MS2500** sensor's diameters listed below, coupled with **MV110** comply with the European directive: DIRECTIVE 2014/32/EU (MID) ANNEX VI (MI-004) - OIML R75

SIZE		$q_p$ (10m/s)	$q_s$	0,1 $q_p$	$q_i$	MC
mm	inch	m3/h				$q_p/q_i$
25	1	16	16	1,6	0,16	100
32	1 ¼	25	25	2,5	0,25	
40	1 ½	40	40	4	0,40	
50	2	63	63	6,3	0,63	
65	2 ½	100	100	10	1,00	
80	3	160	160	16	1,60	
100	4	250	250	25	2,50	
125	5	400	400	40	4,0	
150	6	630	630	63	6,3	
200	8	1000	1000	100	10	
250	20	160	1600*	160	16	80
300	31	250	2500*	250	25	
350	31	250	2500*	250	25	
400	50	400	4000*	400	40	

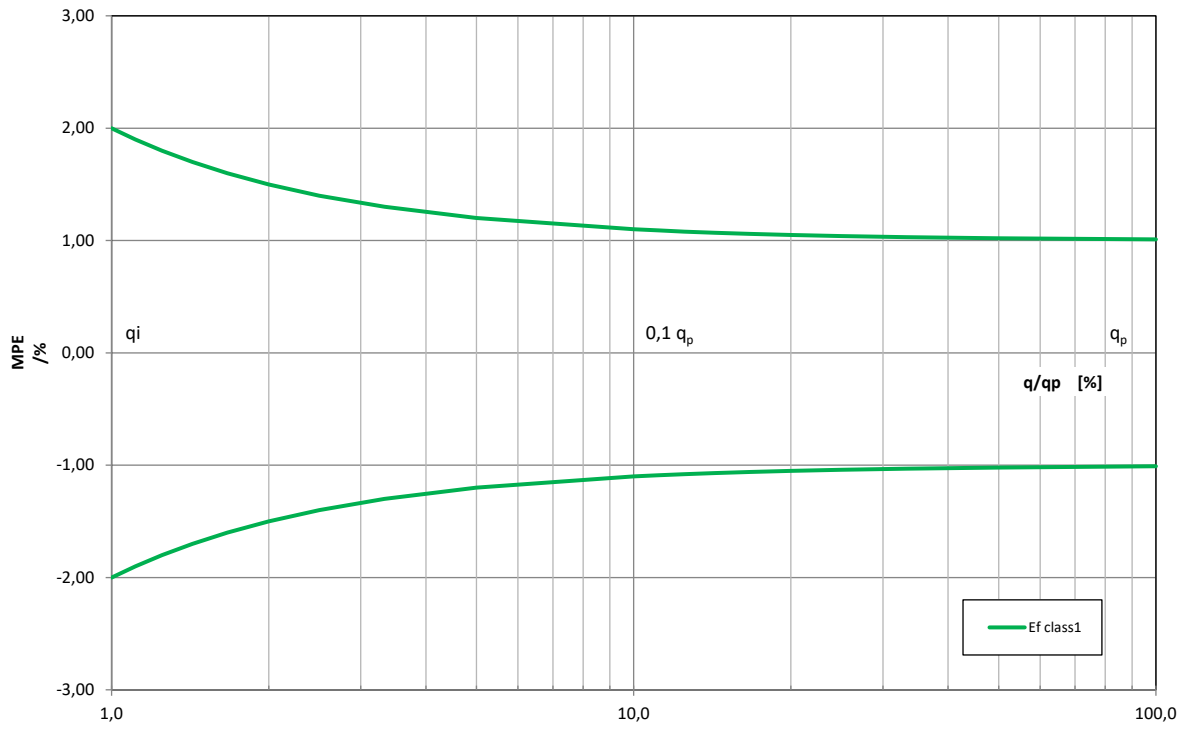
SIZE		$q_p$ (10m/s)	$q_s$	0,1 $q_p$	$q_i$	MC
mm	inch	m3/h				$q_p/q_i$
25	1	10	16	1	0,2	50
32	1 ¼	16	25	1,6	0,32	
40	1 ½	25	40	2,5	0,5	
50	2	40	63	4	0,8	
65	2 ½	63	100	6,3	1,26	
80	3	100	160	10	2	
100	4	160	250	16	3,2	
125	5	250	400	25	5	
150	6	400	630	40	8	
200	8	630	1000	63	12,6	
250	10	1000	1600	100	20	
300	12	1600*	2500	160	32	
350	14	2500*	2500	250	50	
400	16	2500*	4000	250	50	

SIZE		$q_p$ (10m/s)	$q_s$	0,1 $q_p$	$q_i$	MC
mm	inch	m3/h				$q_p/q_i$
25	1	10	16	1	0,4	25
32	1 ¼	16	25	1,6	0,64	
40	1 ½	25	40	2,5	1	
50	2	40	63	4	1,6	
65	2 ½	63	100	6,3	2,52	
80	3	100	160	10	4	
100	4	160	250	16	6,4	
125	5	250	400	25	10	
150	6	400	630	40	16	
200	8	630	1000	63	25,2	
250	10	1000	1600	100	40	
300	12	1600*	2500	160	64	
350	14	2500*	2500	250	100	
400	16	2500*	4000	250	100	

SIZE		$q_p$ (10m/s)	$q_s$	0,1 $q_p$	$q_i$	MC
mm	inch	m3/h				$q_p/q_i$
25	1	10	16	1	1	10
32	1 ¼	16	25	1,6	1,6	
40	1 ½	25	40	2,5	2,5	
50	2	40	63	4	4	
65	2 ½	63	100	6,3	6,3	
80	3	100	160	10	10	
100	4	160	250	16	16	
125	5	250	400	25	25	
150	6	400	630	40	40	
200	8	630	1000	63	63	
250	10	1000	1600	100	100	
300	12	1600*	2500	160	160	
350	14	2500*	2500	250	250	
400	16	2500*	4000	250	250	

(\*) : Flow rates reduced to the limits of the system

**MI 004 - MPE - ACCURACY CLASS 1**  
(UNI EN 1434-1:2016)



The manufacturer guarantees only English text available on our web site [www.isoil.com](http://www.isoil.com)

## HOW TO ORDER

CODE EXAMPLE	CODE/DESCRIPTION	
Display		
A	A	Blind version (without display and programming keys, cable USB type A/USB MINI B is REQUIRED TO PROGRAMMING)
	B	Graphic LCD WSTN - B/W - back light display, point matrix 128 x 64, 8 line/16 characters and 3 programming keys (mandatory for MI001)
Housing material / Protection rate		
0	0	Nylon PA6 with fiber glass, protection rate IP 67
	1	Painted aluminum die casting, protection rate IP67
	2	Painted aluminum die casting, protection rate IP68 1,5 meters under water, Compact Version, n° 1 IP 68 MIL connector for power supply (CONNECTORS SUPPLIED: MALE + FEMALE)
	3	Painted aluminum die casting, protection rate IP68 1,5 meters under water, Compact Version, Complete of n° 1 of 10 poles IP68 MIL connector (outputs connections to be specified) and n° 1 IP 68 MIL connector for power supply (CONNECTORS SUPPLIED: MALE + FEMALE)
	4	Painted aluminum die casting, protection rate IP68 1,5 meters under water, Separate Version, Complete of n° 1 IP 68 MIL connectors for cable from the sensor and n° 1 IP 68 MIL connector for power supply (CONNECTORS SUPPLIED: MALE + FEMALE)
	5	Painted aluminum die casting, protection rate IP68 1,5 meters under water, Separate Version, Complete of n° 1 IP 68 MIL connectors for cable from the sensor, n° 1 of 10 poles IP68 MIL connector (outputs connections to be specified) and n° 1 IP 68 MIL connector for power supply (CONNECTORS SUPPLIED: MALE + FEMALE)
	6	AISI304 Stainless Steel housing, protection rate IP67 ( DISPLAY NOT ROTABLE ) - NO CONNECTORS AVAILABLE
	7	Painted aluminum die casting, ONLY COMPACT, protection rate IP68 (NO CONNECTORS)
Version		
A	A	Compact version with sensor MS.... (liquid maximum temperature 100 °C)
	B	Separate version ( CABLE C014 ) for wall mounting, complete with mounting accessories in Aluminum
	C	Compact version with display visible from the top
	D	Separate version ( CABLE C014 ) for wall mounting, complete with mounting accessories in AISI 304
Power supply		
1	1	Power supply : 100 ... 240 VAC 44/66 Hz (NOT FOR MI001)
	2	Power supply : 24 ... 36 VAC/VDC 0...44/66 Hz (NOT FOR MI001)
	3	Power supply : 12...48 VDC (NOT FOR MI001)
	4	Power supply : 100 ... 240 VAC 44/66 Hz + 1 Rechargeable back-up Battery ( the use of battery supports only the measure UP TO 30 days; all the outputs are set to OFF) (NOT FOR MI001)
	5	Power supply : 24 ... 36 VAC/VDC 0...44/66 Hz + 1 Rechargeable back-up Battery ( the use of battery supports only the measure UP TO 30 days; all the outputs are set to OFF) (NOT FOR MI001)
	6	Power supply : 12...48 VDC + 1 Rechargeable back-up Battery ( the use of battery supports only the measure UP TO 30 days; all the outputs are set to OFF) (NOT FOR MI001)
	7	Power supply : 100 ... 240 VAC 44/66 Hz + n° 1 SETTINGS FOR Rechargeable back-up Battery ( the Rechargeable Battery is NOT included) (NOT FOR MI001)
	8	Power supply : 24 ... 36 VAC/VDC 0...44/66 Hz + n° 1 SETTINGS FOR Rechargeable back-up Battery ( the Rechargeable Battery is NOT included) (NOT FOR MI001)
	9	Power supply : 12...48 VDC + n° 1 SETTINGS FOR Rechargeable back-up Battery ( the Rechargeable Battery is NOT included) (NOT FOR MI001)
	a	Power supply : 100 ... 240 VAC 44/66 Hz + 1 Pack of n° 2 SUPERCAP ( the use of it supports only the measure UP TO 3 minutes; all the outputs are set to OFF) Suitable for MI001
	b	Power supply : 24 ... 36 VAC/VDC 0...44/66 Hz + 1 Pack of n° 2 SUPERCAP ( the use of battery supports only the measure UP TO 3 minutes; all the outputs are set to OFF) Suitable for MI0011
	c	Power supply : 12...48 VDC + 1 Pack of n° 2 SUPERCAP ( the use of battery supports only the measure UP TO 3 minutes; all the outputs are set to OFF) Suitable for MI001
	Analogue output	
A	A	Without Analogue output
	B	n° 1 Analogue output 0/4...20/22 mA (Hart optional)
	C	n° 2 Analogue outputs 0/4...20/22 mA (Hart optional over Out.1)

Digital Input/Output		
0	0	With Digital Input only
	1	With n° 1 PROGRAMMABLE Digital Output/n°1 Digital Input (mandatory for MI004)
	2	With n° 2 PROGRAMMABLE Digital output/n°1 Digital Input
Communication Gateway		
A	A	Without Gateway
	B	RS485 port - Protocol MODBUS required
	C	Hart ( 4/20 mA/ Analog OUT n° 1 is required)
	D	Wi-Fi (for programming)
	E	M-Bus Module
	Z	Others
Protocols		
0	0	Without Protocol
	1	Modbus (over RS485) requires RS485 port
Accuracy		
A	A	Standard accuracy 0,8 %
	B	Special accuracy 0,4 %
	C	Special accuracy (to be defined)
Data Logger		
0	0	Without Data Logger
	1	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock)
	2	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV (Built In Vericator)
	3	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + Meter Data (Real Time Converter & Sensor Data on SD Memory)
	4	MicroSD Memory 4 GB : Data Logger + RTC (Real Time Clock) + BIV + Meter Data
Special Features		
A	A	NONE
	B	WITH ANTICONDENSE CAP
	C	n° 5 CABLE GLAND 1/2" NPT - Nickel plated brass CODE 1.609.1200.70 ( CABLE 6 - 12 mm )
	D	n° 5 HOLES FOR CABLE GLAND 1/2" NPT (WITHOUT CABLE GLAND)
MID Approval		
0	0	NONE
	1	MI-001/OIMLR49-CLASS 1 (Pover Supply Code shall be a or b or c)
	2	MI-001/OIMLR49-CLASS 2 (Pover Supply Code shall be a or b or c)
	3	MI-004-CLASS 1
	4	MI-004-CLASS 2
	5	PTB K 7.2-CLASS 2

Complete code  
example for  
order

**MV110-A0A1A0A0A0A0**

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

<b>HEAD OFFICE</b>	<b>SERVICE</b>
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