

HIGH PERFORMANCE CONVERTER

ISOMAG TM

The friendly magmeter

ML 210



GRAPHIC DISPLAY CONVERTER

Warranty conditions are available on this website:
www.isomag.eu only in English version

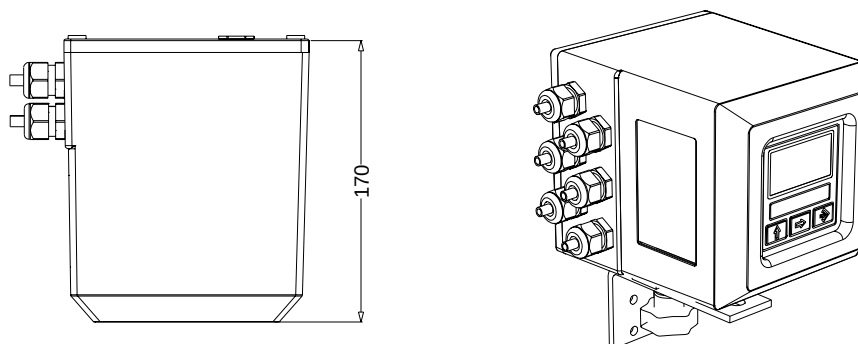
ISOIL 
INDUSTRIA
The solutions that count

TECHNICAL DATA

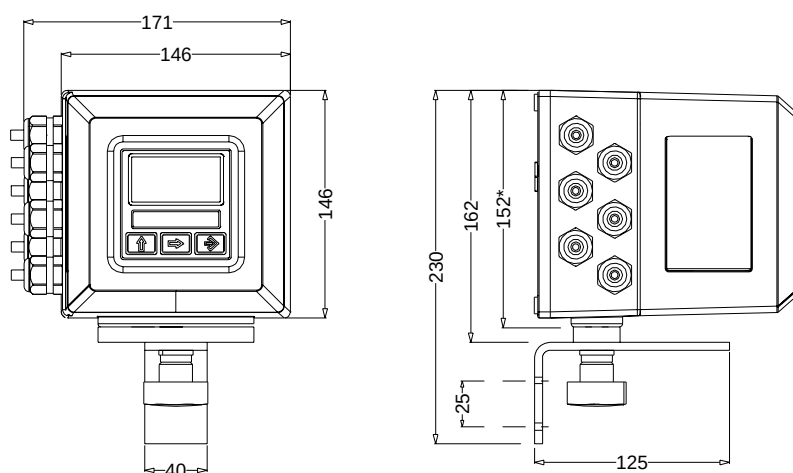
Suitable For	☐ All the ISOMAG sensors
Minimum conductivity	☐ 5 $\mu\text{S}/\text{cm}$
Housing materials	☐ Wall/Compact: Painted Aluminium die casting (OPT. AISI304)
Dimensions	☐ See Drawing
Protection Rate	☐ IP 67 / IP 68 (OPTIONAL)
Conn. Sensor Cable/Cable Gland	☐ CABLE C015 - C016 / N° 6 CABLE GLAND PG 11
Ambient Temperature	☐ -20... +60°C / -4... +140 °F
LCD Display	☐ Graphic display 128x64 pixels with back light
Keyboard	☐ 3 membrane keys
Pulses/Frequency Outputs	☐ N°2 , 1250 Hz, 100mA, 40 Vdc (12,5 KHz Opt.)
Current Output	☐ N°1 , 0/4...20mA – RL=1000 Ω (+1 Opt.)
Dig. Input / Alarm Output	☐ Programmable function
Data Logger	☐ 32 values + 64 alarm events
Bi-Directional	☐ Yes
Dual Range	☐ Yes
Full scale value	☐ 0,4...10m/s
Communication port	☐ RS 485 (RS232 Opt.)
Protocols	☐ ETP (Standard) - Profibus DP/HART/Modbus (opt.)
Diagnostic Funct.	☐ Yes
Empty Pipe Detect.	☐ Yes
Galvanic Isolation	☐ All the inputs/outputs are galvanically isolated from power supply up to 500 V
Data Storage	☐ Eeprom values storing system in case of power failure
Programming Plug In	☐ Protected plug in for the connection to PC or hand terminal
Batch Function	☐ Yes
CE Certification	☐ Yes
Measurements tolerance	☐ Flow rate (volume) = $\pm 0,05\%$ v.l. ☐ Out 4/20 mA = $\pm 0,08\%$ v.l. ☐ Frequency Out = $\pm 0,08\%$ v.l.
Repeatability	☐ Better than $\pm 0,1\%$
Accuracy	☐ See table below
Altitude	☐ -200 m up to 6000 m
Humidity Range	☐ 0÷100% (IP 67)
Power Supply/Consumption	☐ 90÷265 Vac(25VA) – 45÷66 Hz; 18÷63Vdc/15÷45 Vac-45÷66Hz (23 VA) ; 10÷35 Vdc (21W)

OVERALL DIMENSIONS

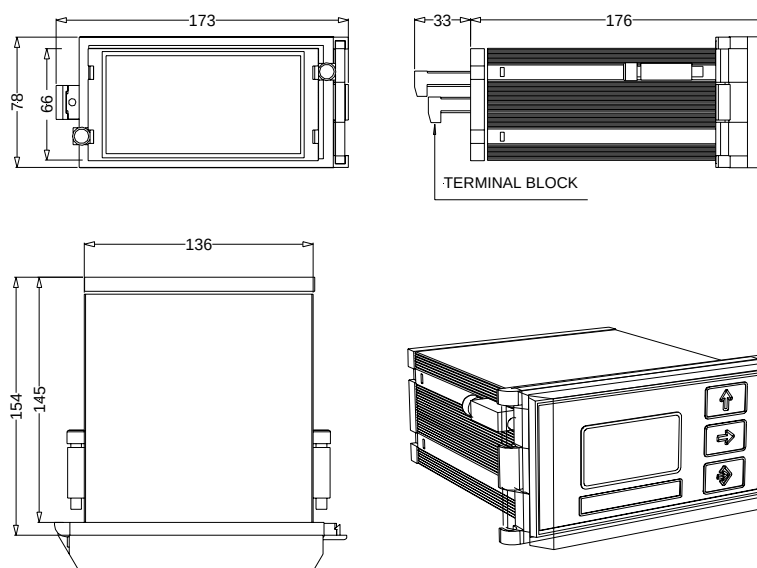
COMPACT VERSION



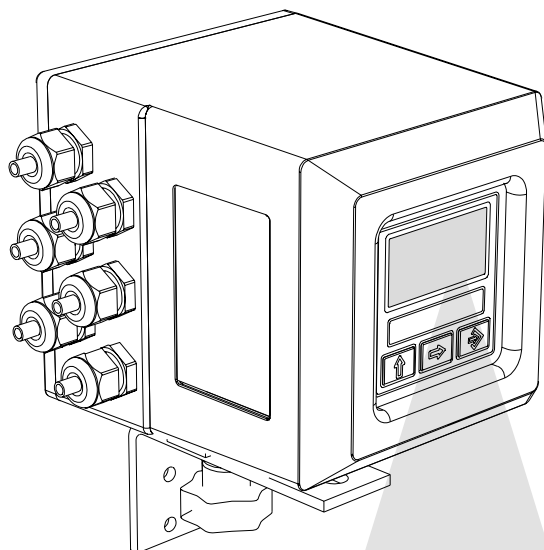
SEPARATE VERSION



PANEL MOUNTING VERSION



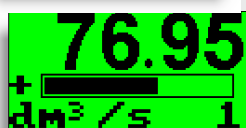
VISUALIZATION PAGES



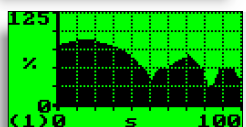
Flowrate and totalizes visualization



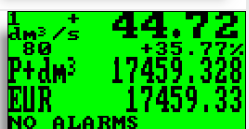
Flowrate, speed values and graph



Flowrate value and Full scale %



Flowrate graph

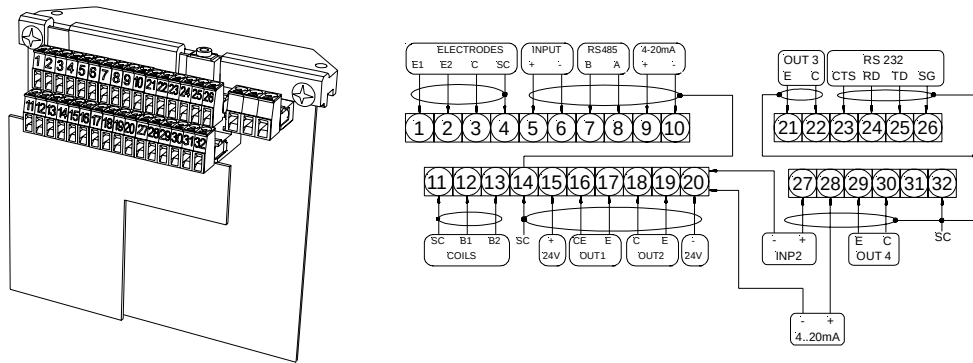


Flowrate value with currency function enabled

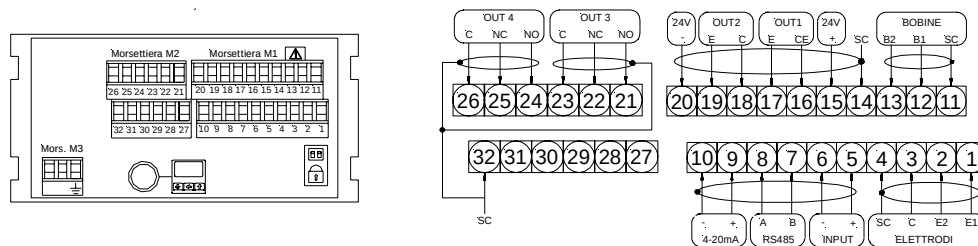
Different visualisation possibilities with the simple press of a key

ELECTRICAL CONNECTIONS

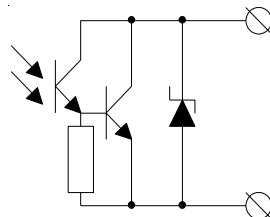
TERMINAL BLOCK: COMPACT/SEPARATE VERSION



TERMINAL BLOCK: PANEL MOUNTING VERSION

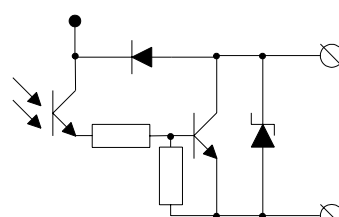


ON/OFF STANDARD OUT

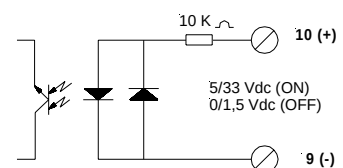
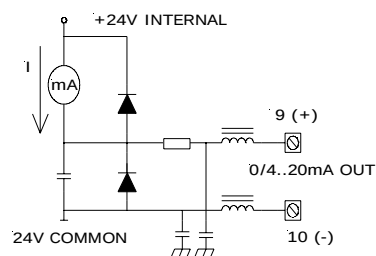


OUT 4/20 mA

ON/OFF HIGH FREQUENCY



ON/OFF INPUT



FUNCTIONS (Note : all page number references are to the operating manual)

MAIN MENU 1-Sensor

```

1-SENSOR
ND=mm 00032
KA= +01.0080
Sens.type= 000
Ins.position= 0
KL=+101 +02.1500
RL=-101 +02.1500
Cable len.=m 000
E.P.detect= OFF
E.p.thr.= 250
Autozero cal.
  
```

- 1.1 Insert ND of sensor (0-3000mm)
- 1.2 Sensor calibration data, visualized on sensor's label
- 1.3 Type of sensor: Enter the first two characters of the serial number of the sensor
- 1.4 Position for insertion sensors: 0=1/8DN, 1=1/2DN, 2=7/8DN
- 1.5 Factory parameters
- 1.6 Length of the cable connecting the sensor to the converter
- 1.7 Enables the empty pipe detection feature
- 1.8 Value of empty pipe sensibility detection
- 1.9* Enables the automatic zero calibration system

MAIN MENU 1-Sensor 2-Scales

```

2-SCALES
Fs1=dm³/s 5.0000
Fs2=dm³/s 8.1920
Tot.MU=dm³ 1.000
Pls1=dm³ 1.000000
Pls2=dm³ 1.000000
Tpls1=ms 0050.00
Tpls2=ms 0050.00
Frg1=Hz 1000.00
Frg2=Hz 1000.00
Mass units= ON
Sg=kg/dm³ 01.0000
  
```

- 2.1* Full scale value set for range N.1
- 2.2* Full scale value set for range N.2
- 2.3* Unit of measure and number of decimal totalizes
- 2.4* Pulse value on channel 1
- 2.5* Pulse value on channel 2
- 2.6* Duration of the pulse generated on channel 1
- 2.7* Duration of the pulse generated on channel 2
- 2.8 Full scale freq. for channel 1 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
- 2.9 Full scale freq. for channel 2 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
- 2.10 Enable/disable the selection of mass units on full scale set
- 2.11 Specific gravity set in kg/dm³

MAIN MENU 1-Sensor 2-Scales 3-Measure

```

3-MEASURE
Tconst=s 0001.0
Filter=s 0.1
Skip thr=% 010
Peak thr=% 125
Cut-off=% 05.0
Autocal.= OFF
Autorange= OFF
E.saving= OFF
  
```

- 3.1* Time constant
- 3.2 Filter on the power supply: 0.1s="ready" measure; 0.5s=filter of noise on the liquid
- 3.3* Acceleration threshold
- 3.4* Anomalous signal pick cut off threshold
- 3.5 Low flow zero threshold: 0-25% of full scale value
- 3.6 Enable every hour an internal cycle of calibration. Measurement stopped for 8-15 sec.
- 3.7* Automatic change of scale
- 3.8* Energy saving mode

MAIN MENU 1-Sensor 2-Scales 3-Measure 4-Alarms

```

4-ALARMS
Max thr+=% 000
Max thr-=% 000
Min thr+=% 000
Min thr-=% 000
Hyst.=% 03
E.p.thr.= 075
mA v.fault=% 000
Hz v.fault=% 125
Timeout=s 00.0
  
```

- 4.1 Maximum value alarm set for direct flow rate
- 4.2 Maximum value alarm set for reverse flow rate
- 4.3 Minimum value alarm set for direct flow rate
- 4.4 Minimum value alarm set for reverse flow rate
- 4.5 Hysteresis threshold set for the minimum and maximum flow rate alarms
- 4.6 Empty pipe detection threshold. It's automatically set by the function 1.9
- 4.7* Current output value in case of failure
- 4.8* Frequency output value in case of failure
- 4.9* Batch safety timer

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

```

5-INPUTS
T+ RESET= ON
P+ RESET= ON
T- RESET= OFF
P- RESET= ON
Puls.reset= OFF
Count lock= ON
Calibration= OFF
Range change= OFF
Batch= OFF
Inp.2= OFF
  
```

- 5.1* Total direct (positive) flow totalise reset enable
- 5.2* Partial direct (positive) flow totalise reset enable
- 5.3* Total reverse (negative) flow totalise reset enable
- 5.4* Partial reverse (negative) flow totalise reset enable
- 5.5 Reset totalise of pulse from digital input (see page 15)
- 5.6 Totalise counting lock command (see page 15)
- 5.7* Autozero calibration external command
- 5.8 Range change external command (vedi funzione 3.7)
- 5.9 Batch start/stop external command (see batch functions)
- 5.10* Functions assigned to input 2

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

```

6-OUTPUTS
Out1= #1 IMP+
Out2= SIGN
Out3= OFF
Out4= #2 IMP+
Duty cycle1=% 50
Out mA1=4÷22
Out mA2=4÷22
  
```

- 6.1* Output 1 functions
- 6.2* Output 2 functions
- 6.3* Output 3 functions
- 6.4* Output 4 functions
- 6.5* Duty cycle value for pulses/frequency output
- 6.6* Choice of the function and the range of current output n.1
- 6.7* Choice of the function and the range of current output n.2

```

7- COMMUNICATION
IF2 prot.= DPP
RS232 prot.= DPP
Address= 000
RS485 bps= 19200
RS232 bps= 4800
Printer= OFF
Print batch= OFF
Print data= OFF
Print events=OFF
Rem. addr.= 000
Remote u.conn.

```

- 7.1 Choice of the communication protocol for the IF2 device
- 7.2 Choice of the communication protocol for the RS232 port
- 7.3 Address value of converter (range 0 - 255)
- 7.4 Speed of the RS485 output (possible choices: 2400, 9600, 19200, 38400 bps)
- 7.5 Speed of the RS232 output (possible choices: 2400, 9600, 19200, 38400 bps)
- 7.6 Print function enable (optional; see manual MI200)
- 7.7 Print of the performed batch
- 7.8 Print of data at preset intervals
- 7.9 Print of the data process on regular intervals
- 7.10 Address of a further converter connected like a terminal
- 7.11 Start remote connection to the terminal. Connection interrupted after 10sec. of inactivity

```

8-DISPLAY
Language=          EN
D.rate=Hz          1
Contrast=          7
P.totaliz.=        ON
Date/time=         OFF
Quick start=       OFF
Tot.modif.=        OFF
Net total.=        OFF
Reset video=       OFF
Currency=          ON
Curr.decim.=       2
EUR/dm³ = 1.000000
EUR/dm³ + 1.000000

```

- 8.1 Choice of the language: EN= English, IT=italian, FR= French, SP= Spanish
- 8.2 Updating frequency on the display: 1-2-5-10 Hz
- 8.3* Display contrast
- 8.4 Partial totalizer visualization (with batch enable the function is always on)
- 8.5 Date and time visualization with data logger enable
- 8.6 Quick start menu visualization
- 8.7 Enable the change value of the totalises (see function 5.1-5.4)
- 8.8* Enable the page of net totalizer (difference between direct and reverse. see page 22)
- 8.9 Reset the processor of the display (useful in case of particular badly operations of the display)
- 8.10 Visualizes the values of the partial totalise in the unit of selected currency
- 8.11 Choice of the numbers of decimals for the visualization currency value: From 0 to 3
- 8.12*Value of conversion/currency for direct totalizer
- 8.13*Value of conversion/currency for reverse totalizer

```

8-Display
9-Data logger
10-Diagnostic
11-Internal data
9-DATA LOGGER
1992/05/10 15:03
Acquisition=ON
Interval=h 24
Display data
Display events
Disp.min/max
Clear data
Clear events
Reset min/max

```

- 9.1* Date and time set
- 9.2 Automatic data logger enable
- 9.3 Interval time for the data logging function: 1, 2, 3, 6, 8, 12, 24, 48 hours
- 9.4 Displaying of the data stored in the data logger
- 9.5 Displaying of the last 64 alarms stored in the data logger
- 9.6 Visualization function of minimum and maximum peak of flow rate
- 9.7 Logged data cancel function
- 9.8 Reset all alarm events
- 9.9 Reset all minimum and maximum peak of flow rate stored

```

10-DIAGNOSTIC
Calibration
Self test
Simulation= OFF

```

- 10.2 Automatic data logger enable
10.3 Interval time for the data logging function: 1, 2, 3, 6, 8, 12, 24, 48 hours
10.4 Displaying of the data stored in the data logger

```

11-INTERNAL DATA
L2 keycode=000000
Lock level= 3
Load fact.pres.
Load user pres.
Save user pres.
Hours= 0000777
Ign.cal.err= OFF
KS= +1.0000

```

- | | |
|------|---|
| 11.1 | Level 2 access code enter |
| 11.2 | Block level function can be set from 0 to 3 |
| 11.3 | Load factory data pre-set |
| 11.4 | Load user data saved |
| 11.5 | Save user data |
| 11.6 | Visualisation of the total operation hours of the converter (function not editable) |
| 11.7 | Ignore the calibration error during the switch on test |
| 11.8 | K ₅ Coefficient |

Menu 12: Menu visualized only with batch active

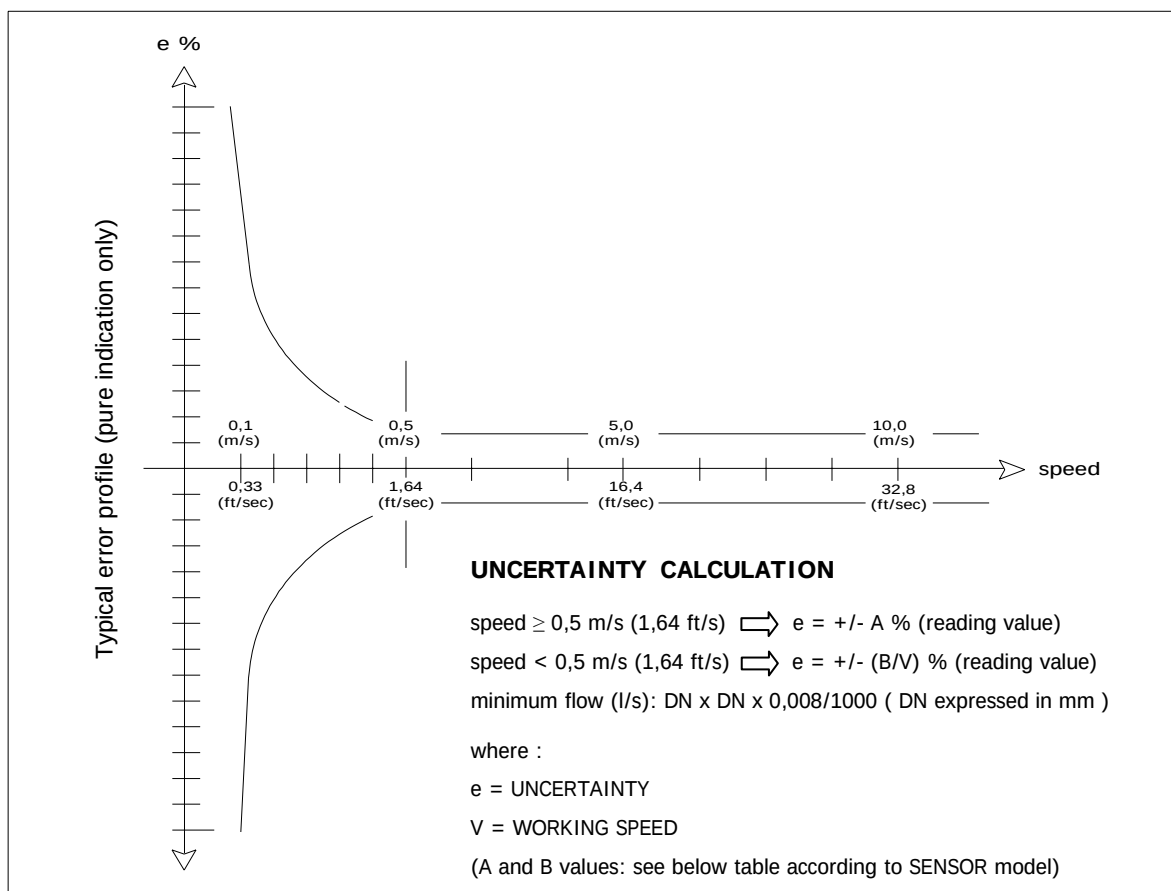
```

12-BATCH
N.samples=      000
Diff.thr=%     010
U.com=dm³      00.000
U.pre=dm³      00.000
Auto batch=    OFF
BM auto sel=    OFF
Cons.mode=      OFF
5-Display
9-Data logger
10-Diagnostic
11-Internal data
12-Batch

```

- 12.1* Number of batch cycles to define the value of compensation. Value 0=OFF
- 12.2* % limit of compensation threshold
- 12.3* Compensation value
- 12.4* Prebatch value
- 12.5* Auto-batch
- 12.6* Automatic selection of batch formula
- 12.7* Static consent of batch

ACCURACY TABLE



FULL BORE SENSORS

MS501/MS1000/MS2410/MS2500			MS 600			MS5000		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
0,2	0,1	0,33	0,4	0,2	0,66	2	1	3,28

INSERTION SENSORS

MS3770			MS3800		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
2	1	3,28	2	1	3,28

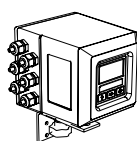
Reference conditions :

- ☐ Constant flow rate during the test
- ☐ Pressure: >30 Kpa
- ☐ Flow condition : fully developed flow profile
- ☐ Zero stability $\pm 0,005$ %

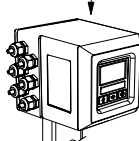
HOW TO ORDER

ML 210	Display
A	Blind version without display and keyboard
B	Graphic LCD WSTN back light display execution, point matrix 128 x 64, 8 line each of 16 characters and 3 programming keys
Housing material - Protection rate	
0	Painted aluminum die casting (painted RAL6028) ,protection rate IP67
1	Aisi 304 Electro-polish
2	NORYL UL 94 V-0 black (ONLY "F" VERSION) IP 54
3	NORYL UL 94 V-0 BLACK (ONLY "F" VERSION)+TRANSPARENT FRONTAL COVER IP 65
4	Painted aluminum die casting , protection rate IPXX , presett for CUSTOMER CABLE GLAND (Total Dim. Max available 105 x 52 mm)
Version	
A	Compact version with sensor MS.... (liquid maximum temperature 100 °C)
B	Separate version for wall monting, complete with mounting accessories in Carbon Steel (painted RAL6028)
D	Separate version (CABLE C015-C016 OR C014 with preamp.) for wall monting, complete with mounting accessories in AISI304
F	Separate version (CABLE C015-C016 OR C014 with preamp.) for FRONT PANEL mounting according DIN 43700(72x144) complete with mounting accessories; AVAILABLE ONLY FOR HOUSING MATERIALS OPTIONS 2 AND 3 (SEE ABOVE)
Power supply	
1	Power supply : 90 ... 265 V 45/66 Hz
2	Power supply : 18...63 V dc / 15...45 V ac - 45...66 Hz
3	Power supply : 10 ... 35 V dc
9	Power supply : other
Analogue output	
A	Without Analogue output 0/4...20/22 mA
B	Analogue output 0/4...20/22 mA
Serial Interface	
1	Without Serial Interface
2	RS485 Serial Interface
3	Modbus protocol over RS485 Serial Interface
Additional module	
A	Without additional module
C	ME200; n. 2 additional ON / OFF programmable output
D	ME201; n. 2 additional ON / OFF programmable output (one of them at 10 KHz frequency)
E	ME202; additional 0/4...20 mA + n.2 ON / OFF programmable output
F	ME203; n. 1 RS232 serial interface + n.2 additional ON / OFF programmable output , 2A - 60 Vca, 60W 125 VA)
G	ME204; n. 1 RS232 serial interface + additional 0/4...20 mA + n.2 ON / OFF program. output Vca, 60W 125 VA)
P	ME205; n. 2 relè output (each with 1 NO contact + 1 NC contact, 2A - 60 Vca, 60W 125 VA)
T	ME207; n. 2 relè output (each with 1 NO contact + 1 NC contact, 2A - 250 Vca, 60W 125 VA)
H	ME 100 : Profibus DP module
M	ME 220 : d. logger r. t. c. ; 128K record : F.R. ;tot.+/-; date/time)
N	ME 221 : d. logger r. t. c. ; 128 Krecord : F.R.;tot.+/-; date/time ; n° 1 RS 232
O	ME 222 : d. logger r. t. c. ; 128K record : F.R.;tot.+/-; date/time ; n° 1 RS 232 , n° 1 RS 485+1 A.I.
Q	ME 200 + ME 220
R	ME 201 + ME 220
S	ME 202 + ME 220
U	ME 203 + ME 220
V	ME 204 + ME 220
B	ME 206 + ME 220
K	ME 207 + ME 220
X	ME 200 + ME 221
Y	ME 201 + ME 221
W	ME 202 + ME 221
L	HART PROTOCOL OUT
Z	Other
Special Features	
0	ANY
1	WITH ANTICONDENSE CAP

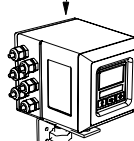
ML 210 B 0 A 1 B 2 A 0 CODE EXAMPLE FOR ORDER



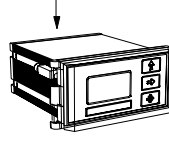
ML 210



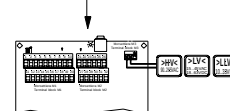
COMPACT VERSION



SEPARATE VERSION



PANEL VERSION



PCB BOARD

The manufacturer reserves the right to make design improvements without notice.