

ISOMAG ™

The friendly magmeter

ML 211

HEATING COUNTER



MEASURING OF 5 VARIABLES: CAPACITY, ENERGY, INPUT TEMPERATURE, OUTPUT TEMPERATURE, ΔT ;
N° 2 INPUTS ADDED FROM PT 100 (FROM PT 500 OR PT 1000 IF REQUIRED); BIDIRECTIONAL MEASURE (FOR CALORIES or FRIGORIES);
2 ENERGY TOTALIZERS

FLOAB
FLÖDESPRODUKTER AB

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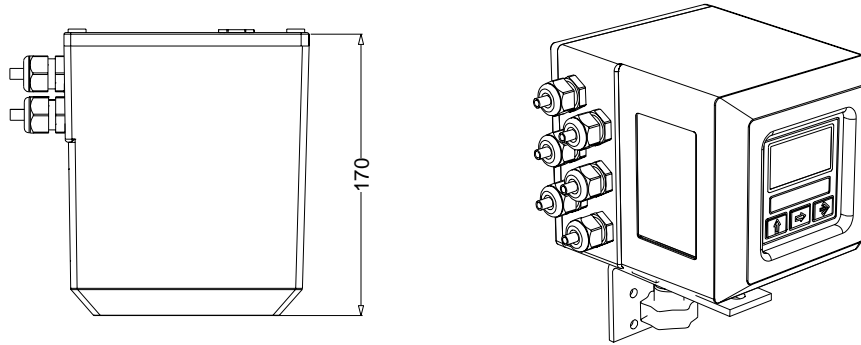
Telefon: 08-798 98 50 Fax: 08-570 231 96 Hemsida: www.floab.se e-post: info@floab.se

TECHNICAL DATA

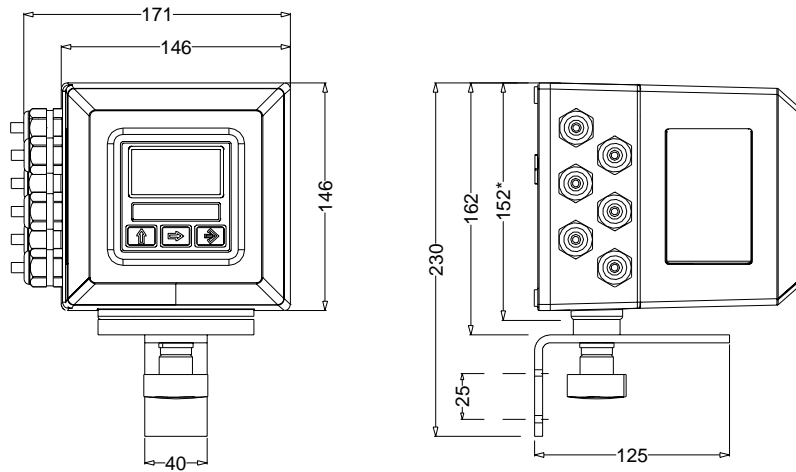
Suitable For	<input type="checkbox"/> All the ISOMAG sensors		
Minimum conductivity	<input type="checkbox"/> 5 μ S/cm		
Housing materials	<input type="checkbox"/> Wall/Compact: Painted Aluminium die casting (OPT. AISI304)		
Dimensions	<input type="checkbox"/> See Drawing		
Protection Rate	<input type="checkbox"/> IP 67 / IP 68 (OPTIONAL)		
Conn. Sensor Cable/Cable Gland	<input type="checkbox"/> CABLE C015 - C016 / N° 6 CABLE GLAND PG 11		
Ambient Temperature	<input type="checkbox"/> -20... +60°C / -4... +140 °F		
LCD Display	<input type="checkbox"/> Graphic display 128x64 pixels with back light		
Keyboard	<input type="checkbox"/> 3 membrane keys		
Pulses/Frequency Outputs	<input type="checkbox"/> N°2 , 1250 Hz, 100mA, 40 Vdc (12,5 KHz Opt.)		
Current Output	<input type="checkbox"/> N°1 , 0/4...20mA – RL=1000 Ω (+1 Opt.)		
Dig. Input / Alarm Output	<input type="checkbox"/> Programmable function		
Data Logger	<input type="checkbox"/> 32 values + 64 alarm events		
Bi-Directional	<input type="checkbox"/> Yes		
Dual Range	<input type="checkbox"/> Yes		
Full scale value	<input type="checkbox"/> 0,4...10m/s		
Communication port	<input type="checkbox"/> RS 485 (RS232 Opt.)		
Protocols	<input type="checkbox"/> ETP (Standard) - Modbus over RS485 (opt.)		
Diagnostic Funct.	<input type="checkbox"/> Yes		
Empty Pipe Detect.	<input type="checkbox"/> Yes		
Galvanic Isolation	<input type="checkbox"/> All the inputs/outputs are galvanically isolated from power supply up to 500 V		
Temperature sensors	<input type="checkbox"/> PT100 4 wire (PT500/PT1000 opt.)		
CE certification	<input type="checkbox"/> Instrument with CE certificate <input type="checkbox"/> Class I, IP 67, category of installation II		
Measurements tolerance	<input type="checkbox"/> Flow rate (volume) = $\pm 0,05\%$ v.l. <input type="checkbox"/> Power (energy) = $\pm 0,05\%$ v.l. <input type="checkbox"/> Out 4/20 mA = $\pm 0,08\%$ v.l. <input type="checkbox"/> Frequency Out = $\pm 0,08\%$ v.l.		
Repeatability	<input type="checkbox"/> Better than 0,01%		
Altitude	<input type="checkbox"/> From -200 m a 6000 m		
Humidity Range	<input type="checkbox"/> 0÷100% (IP 67)		
Power supply	<input type="checkbox"/> 90÷265 Vac – 45÷60 Hz; 10÷63Vdc/15÷45 Vac-45÷66Hz; 10÷25 Vdc		
MAX Consumption	25VA	23VA	21W
Algorithm of calculus	<input type="checkbox"/> EN1434 - Energy <input type="checkbox"/> EN 60751 - Temperature		

OVERALL DIMENSIONS

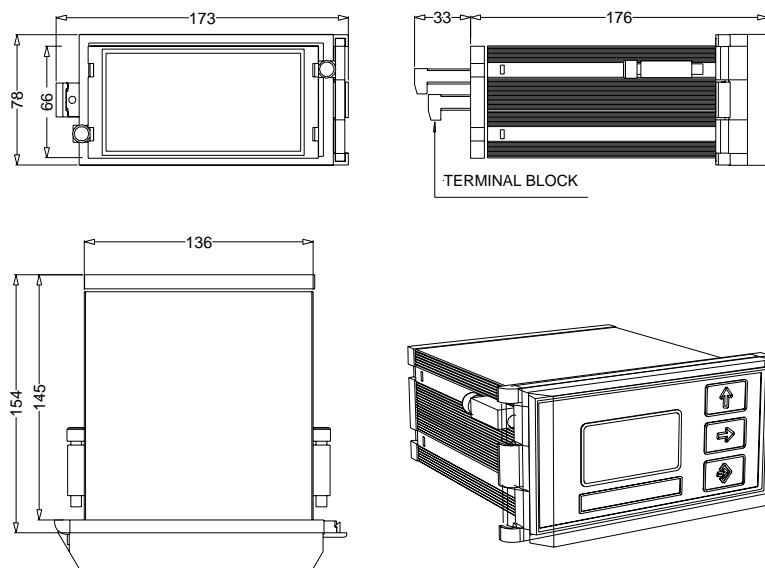
COMPACT VERSION



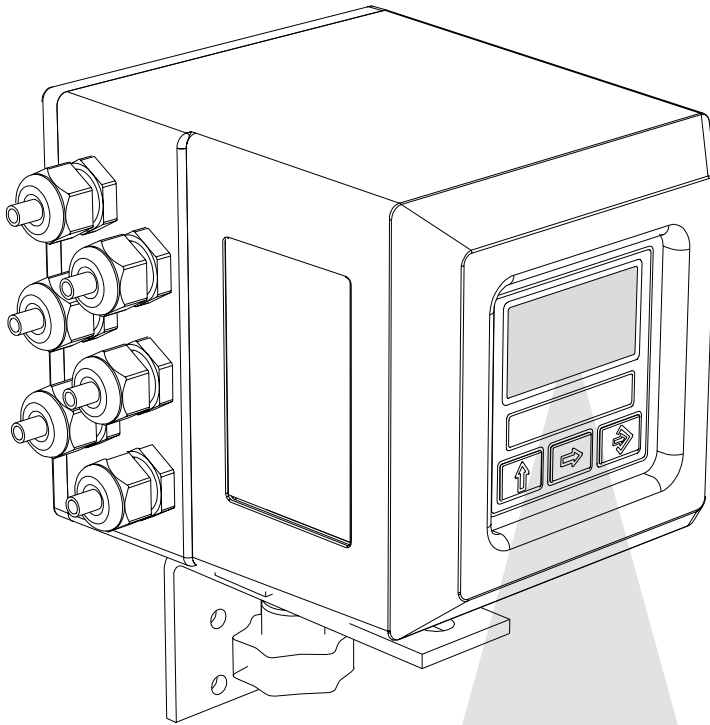
SEPARATE VERSION



PANEL MOUNTED VERSION



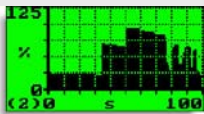
VISUALIZATION PAGE



Flowrate, speed values and graph



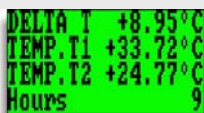
Thermal energy : full scale and graph



Flowrate graph



Thermal energy value with a currency function enabled

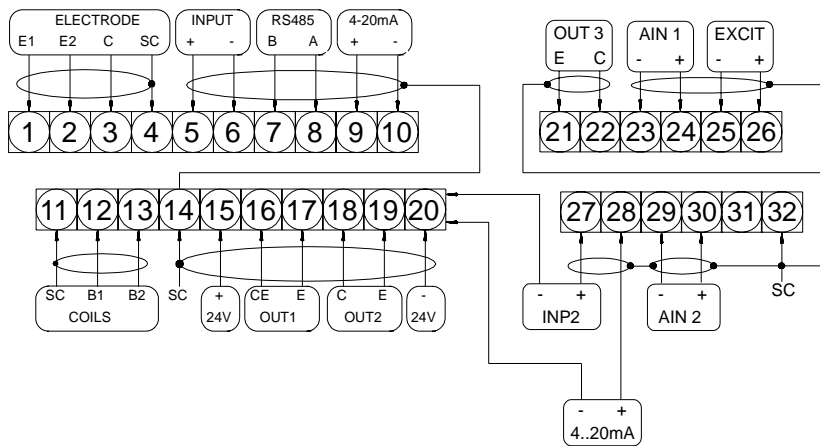
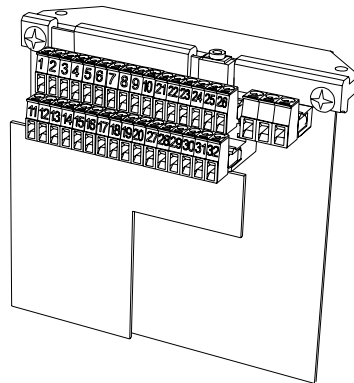


Temperature values

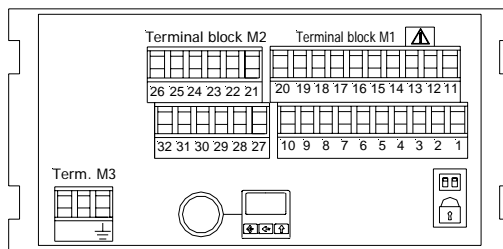
Different visualisation possibilities with the simple press of a key

ELECTRICAL CONNECTIONS

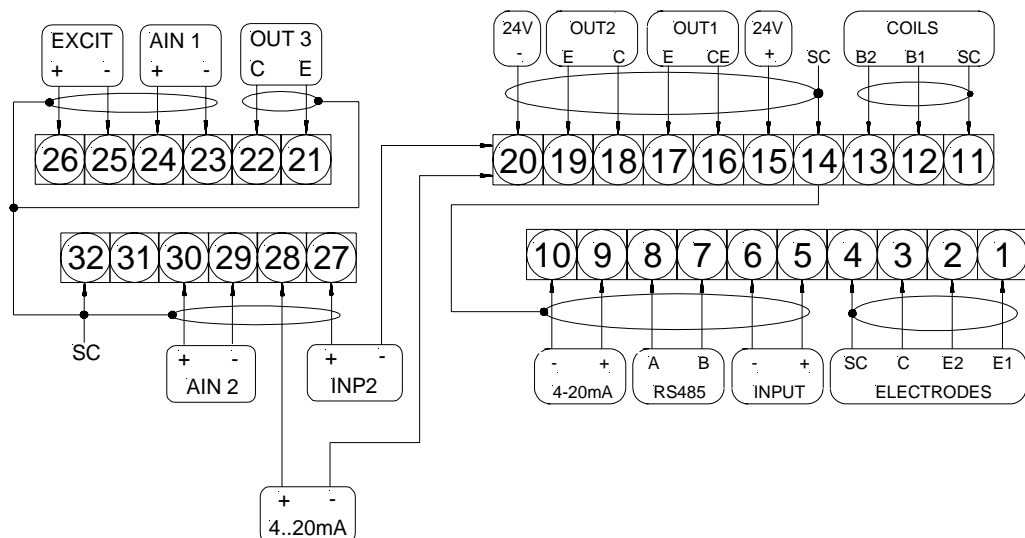
TERMINAL BLOCK: COMPACT/SEPARATE VERSION



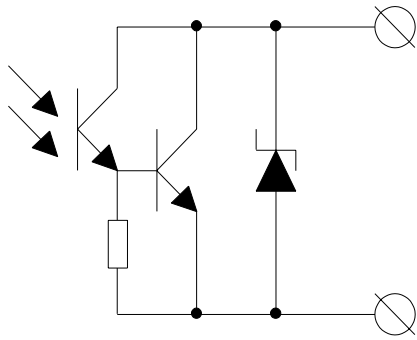
TERMINAL BLOCK: PANEL VERSION



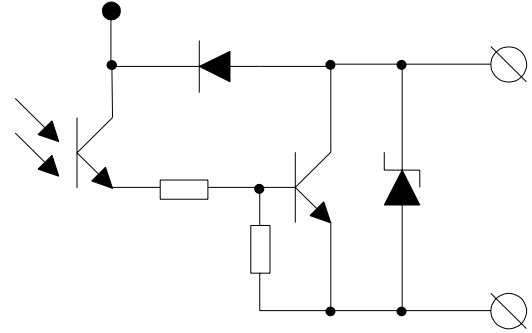
LEGEND:
 SC: Cable shield
 C: COLLECTOR of the on/off out
 E: EMITTER of the on/off output
 AIN1: Input of temp. probe n. 1
 AIN2: Input of temp. probe n. 2
 EXCIT: Power supply for temp. probes



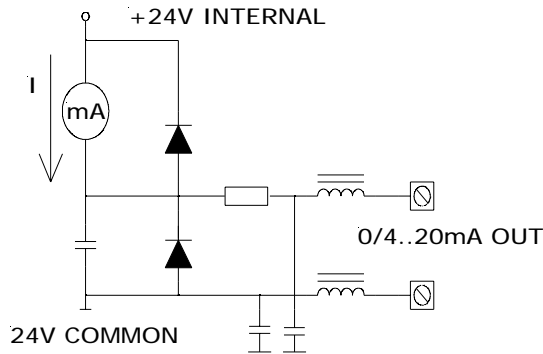
ON/OFF STANDARD OUTPUT



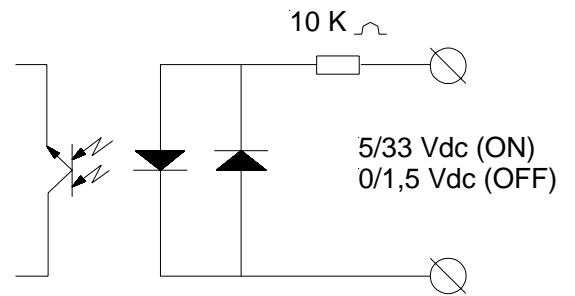
ON/OFF HIGH FREQUENCY OUTPUT (OPT.)



STANDARD ANALOGICAL OUTPUT

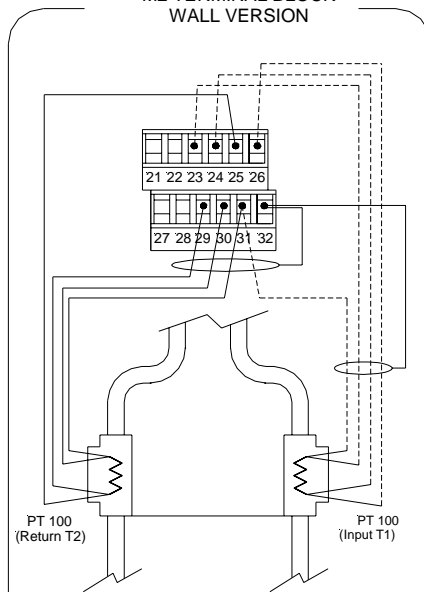


STANDARD DIGITAL INPUT



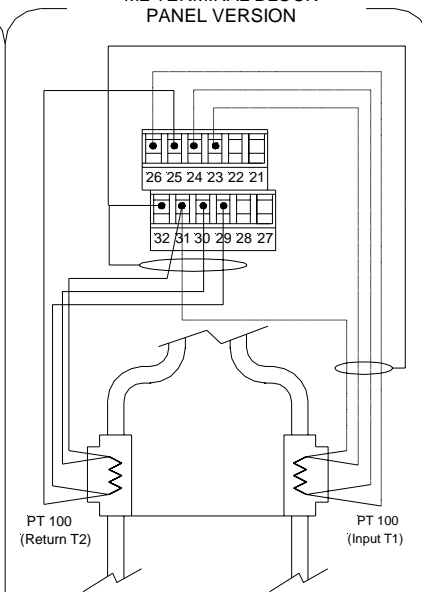
TEMPERATURE PROBES CONNECTIONS

M2 TERMINAL BLOCK WALL VERSION



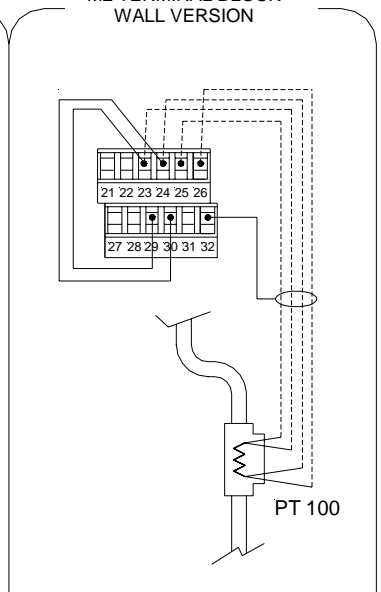
SCHEMA 1: N° 2 TEMPERATURE PROBES

M2 TERMINAL BLOCK PANEL VERSION



SCHEMA 2: N° 2 TEMPERATURE PROBES

M2 TERMINAL BLOCK WALL VERSION



SCHEMA 3: N° 2 TEMPERATURE PROBES (MASS MEASUREMENT)

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
KL=-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
3-Measure
2-SCALES
Fs1=dm³/s 5.0000
Fs2=kW 20.0000
Tot.MU=dm³ 1.000
En.MU=kWh 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
FsDeltaT=°C 100
F.s.Temp=°C 120
Pres.T1=bar 02.0
Pres.T2=bar 02.0
Mass.units=
T.range<0= ON
    
```

- 2.1* Full scale value set for range N.1
- 2.2* Full scale value set for for thermal power
- 2.3* Unit of measure and number of decimal totalizes
- 2.4* Unit of measure and number of thermal energy
- 2.5* Pulse value on channel 1
- 2.6* Pulse value on channel 2
- 2.7* Duration of the pulse generated on channel 1
- 2.8* Duration of the pulse generated on channel 2
- 2.9 Full scale freq. for channel 1 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
- 2.10 Full scale freq. for channel 2 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
- 2.11 Full scale value setting of delta T in °C or °F (0°C * / +250°C - +32°F / +482°F)
- 2.12 Full scale value setting temperature in °C or °F (0°C * / +250°C - +32°F / 442°F)
- 2.13* Value of pressure in T1 point
- 2.14* Value of pressure in T2 point
- 2.15 Enable/disable the selection of mass units on full scale set
- 2.16 To work at temperature < 0°C

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
3-MEASURE
Iconst=s 0001.0
Filter=s 0.1
Skip thr=% 010
Peak thr=% 125
Cut-off=% 05.0
DT min.=°C 01.0
Meas.side= 12
Autocal.= 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* Cut-off off delta T
- 3.7* Point of sensor position
- 3.8 Enable every hour an internal cycle of calibration. The measure it's stopped for 8-15 sec.
- 3.9* Energy saving

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-ALARMS
5-Inputs
4-ALARMS
Max thr=% 000
Min thr=% 000
Pwr max=% 000
Pwr min=% 000
DT max=% 000
DT min=% 000
T1 max=% 000
T1 min=% 000
T2 max=% 000
T2 min=% 000
Hyst.=% 03
mA v.fault=% 000
    
```

- 4.1 Maximum flow rate alarm. Express in % of full scale. Value =0: alarm disabled
- 4.2 Minimum flow rate alarm. Express in % of full scale. Value =0: alarm disabled
- 4.3 Maximum power alarm. Express in % of full scale. Value =0: alarm disabled
- 4.4 Minimum power alarm. Express in % of full scale. Value =0: alarm disabled
- 4.5 Maximum delta T alarm. Value =0: alarm disabled
- 4.6 Minimum delta T alarm. Value =0: alarm disabled
- 4.7 Maximum temperature on point T1 Value =0: alarm disabled
- 4.8 Minimum temperature on point T1 =0: alarm disabled
- 4.9 Maximum temperature on point T2. Value =0: alarm disabled
- 4.10 Minimum temperature on point T2. Value =0: alarm disabled
- 4.11 Hysteresis threshold set for the minimum and maximum flow rate alarms
- 4.12* Current output value in case of failure

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-ALARMS
5-Inputs
6-Outputs
5-INPUTS
T+ RESET= ON
P+ RESET= ON
T- RESET= OFF
P- RESET= ON
Count lock= ON
Calibration= 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 Totalise counting lock command (see page 12)
- 5.6* Autozero calibration external command
- 5.7* Functions assigned to input 2

<pre> 6-Outputs 7-Communication 8-Display 6-OUTPUTS Out1= #1 IMP+ Out2= SIGN Out3= OFF Duty cycle1=% 50 Duty cycle2=% 50 Out mA1=4:22 Out mA2=4:22 Out mA2= FLOW </pre>	<p>6.1* Output 1 functions 6.2* Output 2 functions 6.3* Output 3 functions 6.4* Duty cycle value for pulses/frequency output 6.5* Choice of the function and the range of current output n.1 6.6* Variable to assign at the current output 1 6.7* Choice of the function and the range of current output n.2 6.8* Variable to assign at the current output 2</p>
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<pre> 6-Outputs 7-Communication 8-Display 7-COMMUNICATION IF2 prot.= DPP RS232 prot.= DPP Address= 000 RS485 bps= 19200 RS232 bps= 4800 A.delay=ms 20 Rem.addr.= 000 Remote u.conn. </pre>	<p>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 Instrument answer delay 7.7 Address of a further converter connected like a terminal 7.8 Start remote connection to the terminal. Connection interrupted after 10sec. of inactivity</p>
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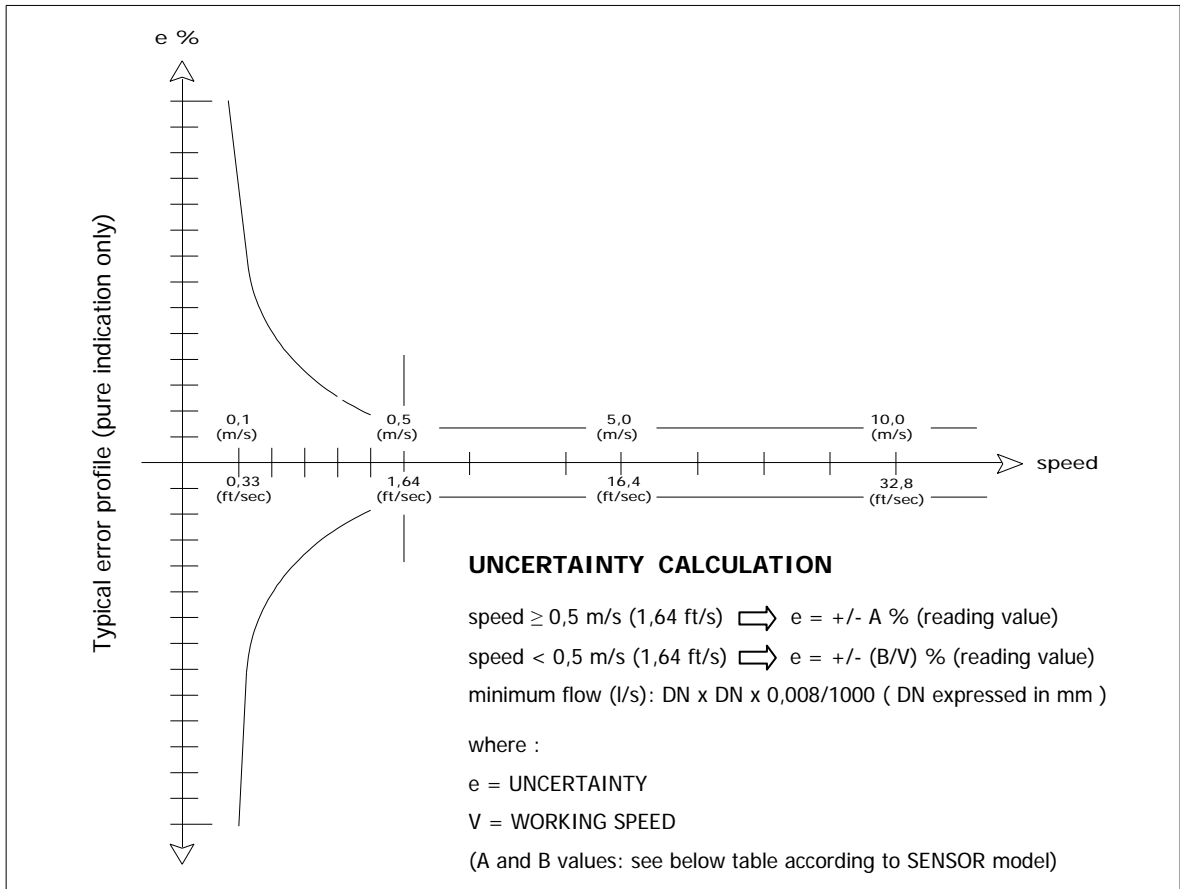
<pre> 8-DISPLAY Language= EN D.rate=Hz 1 Contrast= 7 Date/time= OFF Quick start= OFF Tot.modif.= OFF Reset video= OFF Currency= ON Curr.decim.= 2 EUR/dm³= + 1.00000 EUR/dm³= - 1.00000 7-Communication 8-Display 9-Data logger 10-Diagnostic 11-Internal data </pre>	<p>8.1 Choice of the language: En= English, It=italian, Fr= French, Sp= Spanish 8.2 Updating frequency on the display: 1-2-5-10 Hz 8.3* Display contrast 8.4 Date and time visualization with data logger enable 8.5 Quick start menu visualization 8.6 Enable the change value of the totalises (see function 5.1-5.4) 8.7 Reset the processor of the display (useful in case of particular badly operations of the display) 8.8 Enable currency function 8.9 Choice of the numbers of decimals for the visualization currency value: From 0 to 3T2. Value =0: alarm disabled 8.10*Value of conversion/currency for direct totalizer 8.11*Value of conversion/currency for reverse totalizer</p>
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<pre> 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 8-Display 9-Data logger 10-Diagnostic 11-Internal data </pre>	<p>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</p>
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<pre> 10-DIAGNOSTIC Calibration Self test Simulation= OFF 8-Display 9-Data logger 10-Diagnostic 11-Internal data </pre>	<p>10.1* Enable the calibration of the converter 10.2* Converter autotest 10.3* Flow rate simulation enabling</p>
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<pre> 11-INTERNAL DATA L2 keycode=00000 Lock level= 3 Load fact.pres. Load user pres. Save user pres. Hours= 000077 Ign.cal.err= OFF Ks= +1.0000 DT null DT null res 10-Diagnostic 11-Internal data </pre>	<p>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 Ks Coefficient 11.9 Delete the offset between T1 and T2 11.10 Annul the previous function</p>
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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

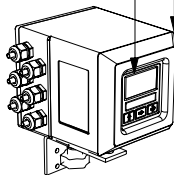
Reference conditions :

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

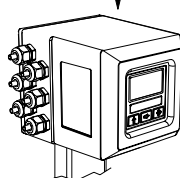
HOW TO ORDER

ML 211	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
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)
F	Separate version for front panel mounting according DIN 43700, complete with mounting accessories, dimensions 72 x 144 mm
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	
2	RS485 Serial Interface
3	Modbus protocol over RS485
Additional module	
H	ME210; n. 2 Pt100 input+ 1 ON/OFF INPUT
I	ME211; n. 2 Pt100 input + additional 0/4...20 mA output+ 1 ON/OFF INPUT
L	ME212; n. 2 Pt100 input + add. 0/4...20 mA out+1 ON/OFF INPUT+ n. 1 ON/OFF OUT
P	ME210 + ME 220
Q	ME211 + ME 220
R	ME212 + ME 220
S	ME210 + ME 221
Special Features	
0	NONE
1	WITH ANTICONDENSING CAP

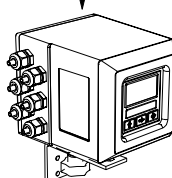
ML 211 B 0 A 1 B 2 A 0 EXAMPLE OF CODE ORDER



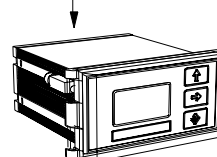
ML 211



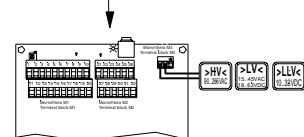
COMPACT VERSION



SEPARATE VERSION



PANEL VERSION



PCB BOARD

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

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