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

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

ISOIL INDUSTRIA
The solutions that count

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TECHNICAL DATA

OVERALL FEATURES	
Suitable For	❑ **All the ISOMAG sensors**
Minimum conductivity	❑ **5 µS/cm**
Altitude	❑ **-200 m up to 2000 m**
Ambient Temperature	❑ **-20... +60°C / -4... +140 °F**
Humidity Range	❑ **0÷100% (IP 67)**

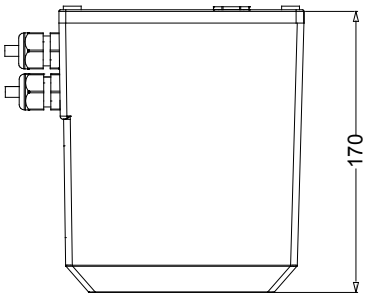
STANDARD FEATURES	
Housing materials	❑ **Wall/Compact: Painted Aluminium die casting** ❑ **Panel version: NORYL UL 94 V-0 black**
Protection Rate	❑ **IP 67**
Power Supply/Consumption	❑ **100-240 V~ (25VA) – 44-66 Hz**
Cable Gland	❑ **N° 6 CABLE GLAND PG 11**
Data Logger	❑ **32 values + 64 alarm events**
Full scale value	❑ **0,4...10m/s**
Digital Outputs	❑ **N° 2 N°2 , 1250 Hz, 100mA, 40 Vdc**
Current Output	❑ **N°1 , 0/4...20mA – RL=1000Ω**
Protocols	❑ **ETP**
Dig. Input	❑ **N°1 , programmable function**
Galvanic Isolation	❑ **All the inputs/outputs are galvanically isolated from power supply up to 500 V**
Programming Plug In	❑ **Protected plug in for the connection to PC or hand terminal**
Bi-Directional	❑ **Yes**
Dual Range	❑ **Yes**
Diagnostic Funct.	❑ **Yes**
Empty Pipe Detect.	❑ **Yes**
CE Certification	❑ **Yes**

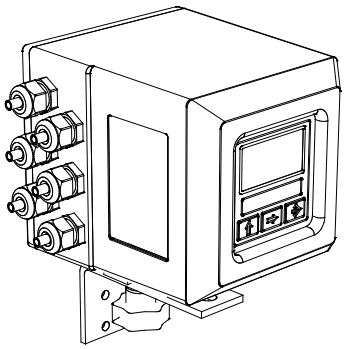
OPTIONAL FEATURES (CHECK HOW TO ORDER, AT LAST PAGE, FOR MORE DETAILS)	
Housing materials	❑ **Wall/Compact: AISI304**
Version	❑ **Compact** ❑ **Separate**
Protection Rate	❑ **IP 68**
Conn. Sensor Cable	❑ **CABLE C015 - C016 for separate version**
LCD Display	❑ **Graphic display 128x64 pixels back light,3 membrane keys**
Power Supply/Consumption	❑ **18-45V~ (25 VA) 44-66Hz** ❑ **18-45 V ⎓ (20W);** ❑ **10-35V ⎓ (20W)**
Pulses/ Alarm Outputs	❑ **N°2 , 1250 Hz, 100mA, 40 Vdc** ❑ **Relais**
Current Output	❑ **N°2 , 0/4...20mA – RL=1000Ω**
Communication port	❑ **RS 485**
Protocols	❑ **Modbus over RS485**
Temperature sensors	❑ **PT100 4 wire (PT500/PT1000 opt.)**

ACCURACY	
Measurements tolerance	❑ **Flow rate (volume) = ±0,05% v.l.** ❑ **Power (energy) = ±0,05% v.l.** ❑ **Out 4/20 mA = ± 0,08 % v.l.** ❑ **Frequency Out = ± 0,08% v.l.**
Repeatability	❑ **Better than 0,01%**
Accuracy (whole system converter+sensor)	❑ **See table below**
Algorithm of calculus	❑ **EN1434 - Energy** ❑ **EN 60751 - Temperature**

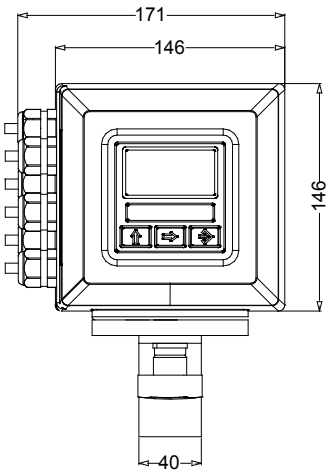
OVERALL DIMENSIONS

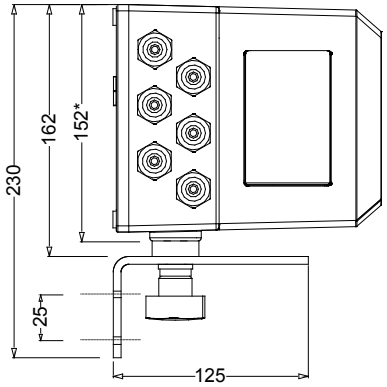
COMPACT VERSION



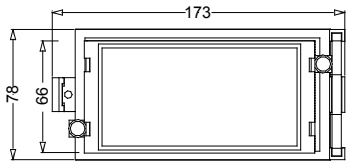


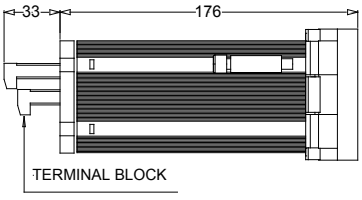
SEPARATE VERSION

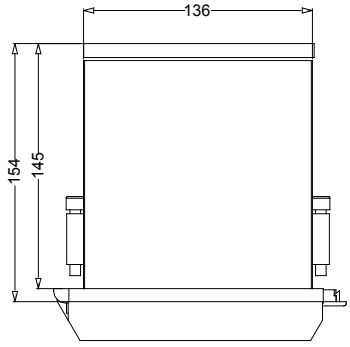


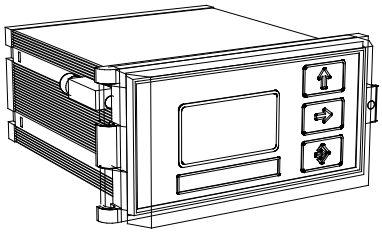


PANEL MOUNTED VERSION

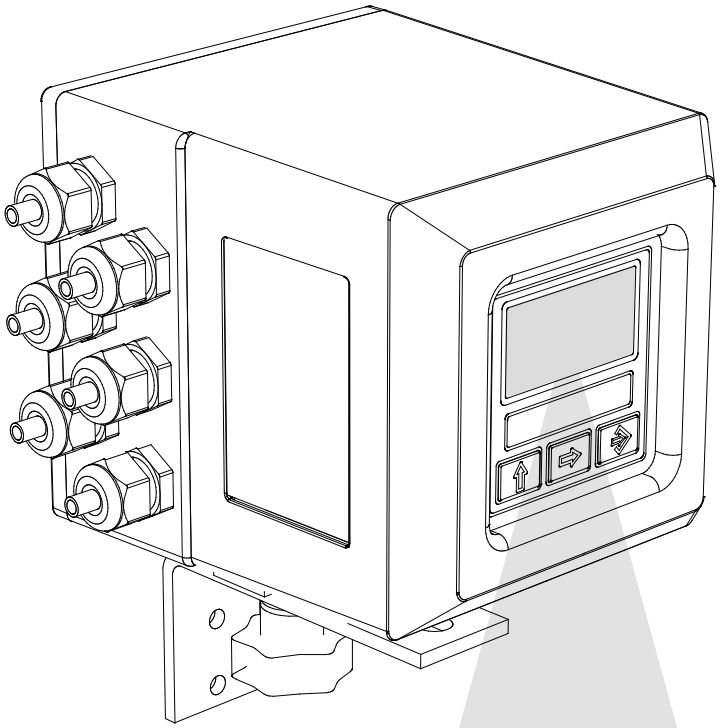


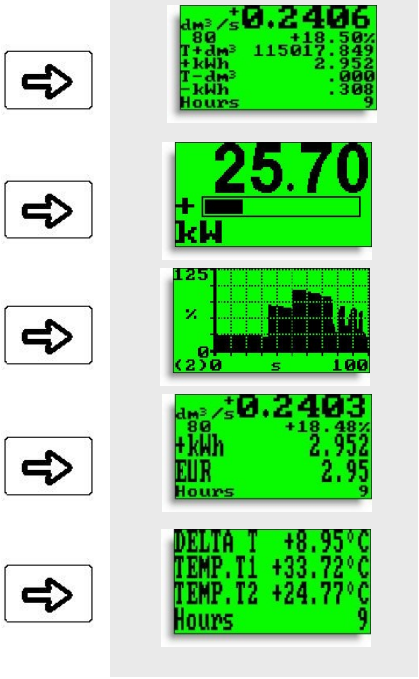






VISUALIZATION PAGE





Flowrate, speed values and graph

Thermal energy : full scale and graph

Flowrate graph

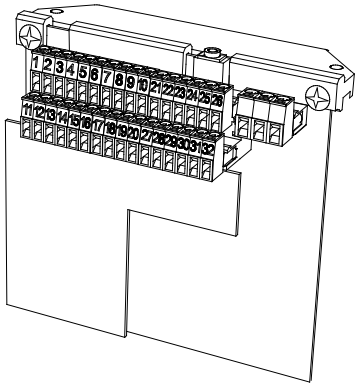
Thermal energy value with a currency function enabled

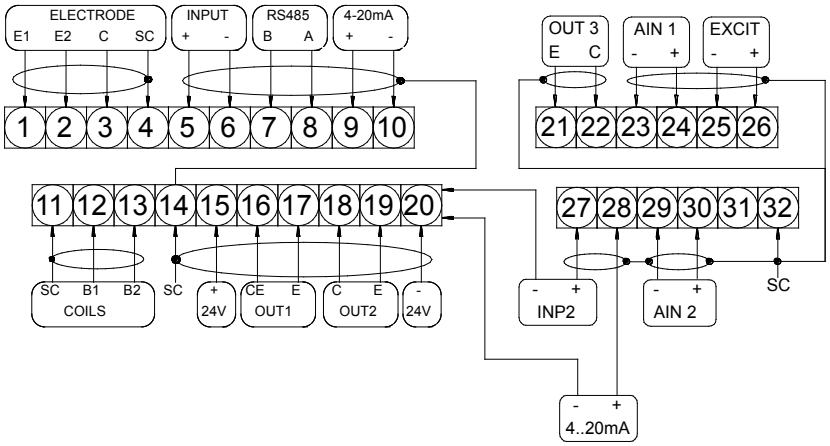
Temperature values

Different visualisation possibilities with the simple press of a key

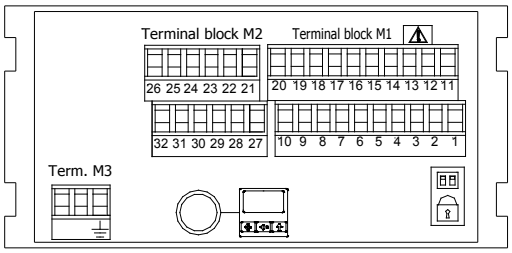
ELECTRICAL CONNECTIONS

TERMINAL BLOCK: COMPACT/SEPARATE VERSION

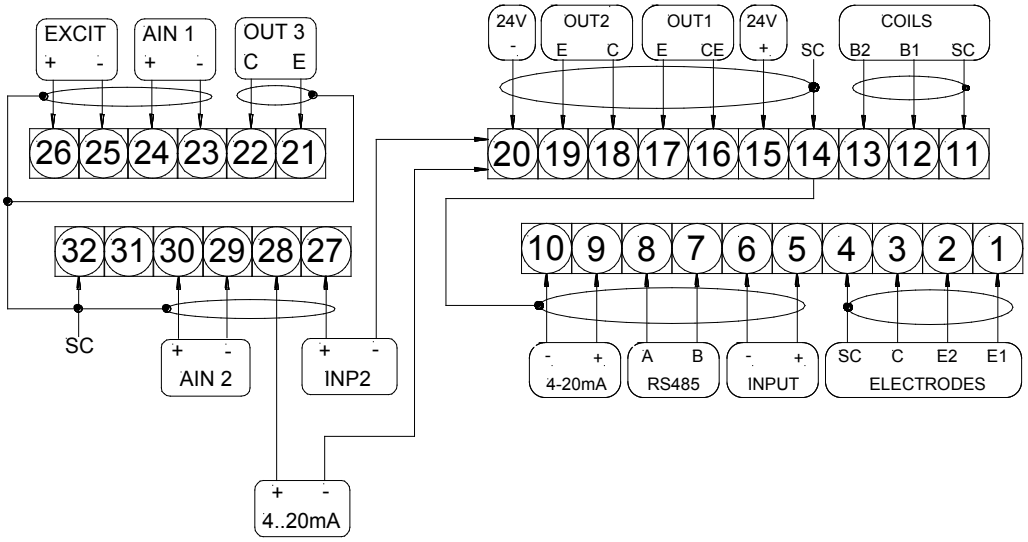




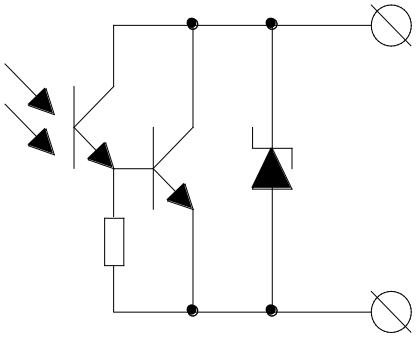
TERMINAL BLOCK: PANEL VERSION



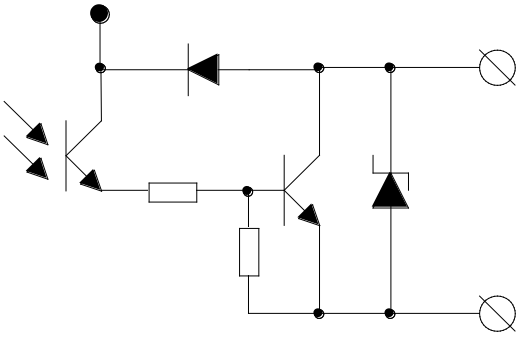
LEGEND:
SC: Cable shield
C: COLLECTOR of the on/off out
E: EMITTER of the on/off output
AIN1: Input of temp. probe n. 1
AIN2: Input of temp. probe n. 2
EXCIT: Power supply for temp. probes



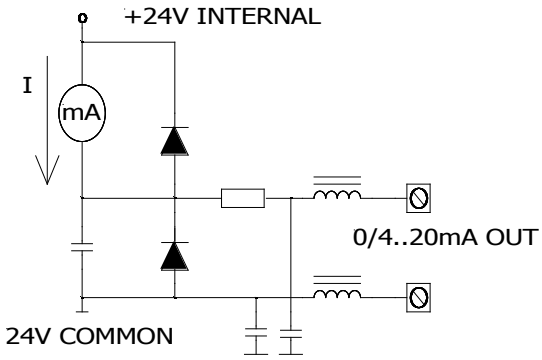
ON/OFF STANDARD OUTPUT



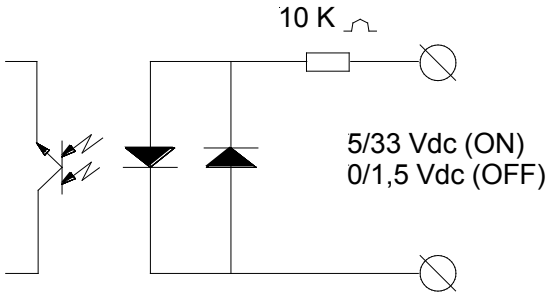
ON/OFF HIGH FREQUENCY OUTPUT (OPT.)



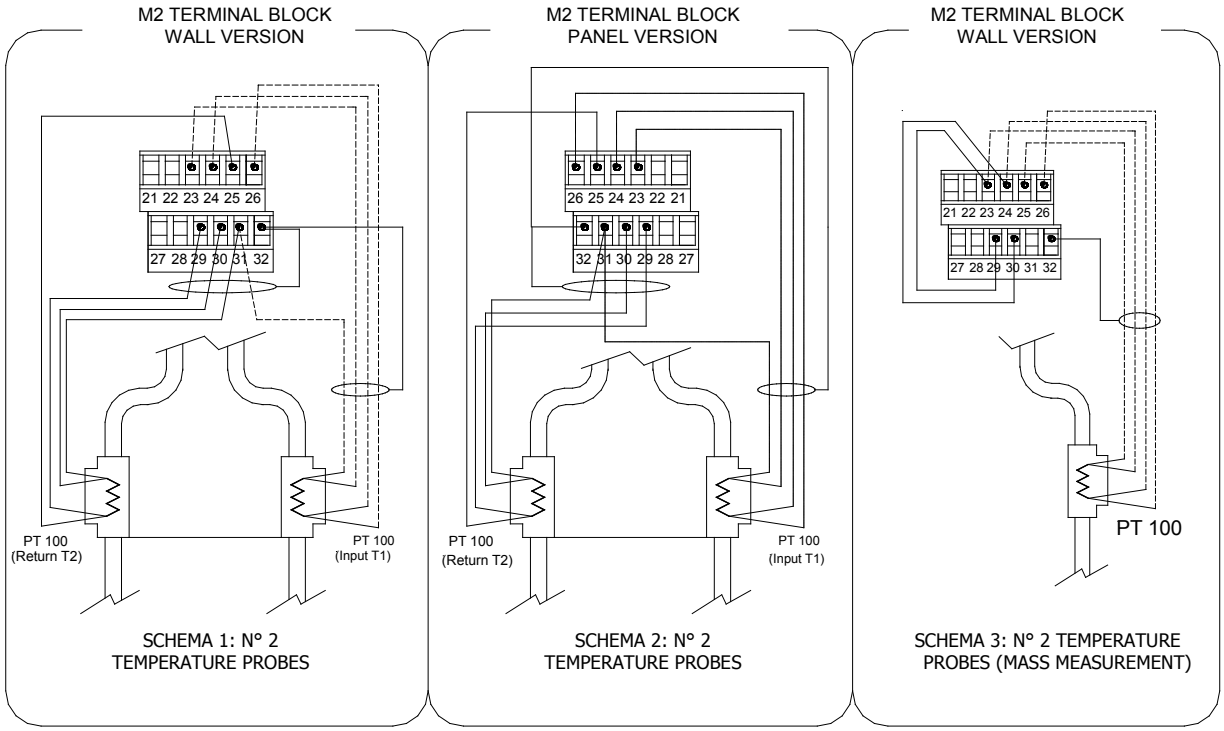
STANDARD ANALOGICAL OUTPUT



STANDARD DIGITAL INPUT

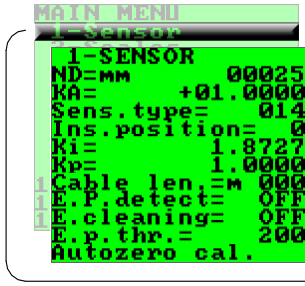


TERMPERATURE PROBES CONNECTIONS

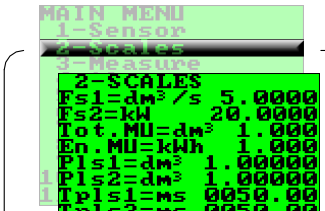


FUNCTION

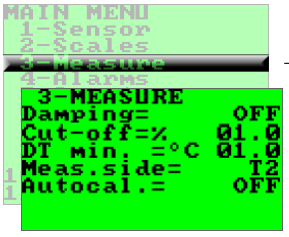
(Note : all page number references are to the operating manual)



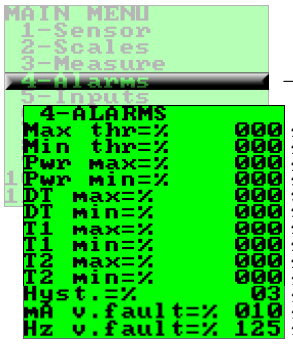
1.1 Insert ND of sensor (0-3000 mm)
1.2 Sensor calibration data, visualized on sensor's label
1.3 Type of sensor: Enter the first two characters of the serial number of the sensor
1.4 Position for insertion sensors: 0=1/8DN, 1=1/2DN, 2=7/8DN
1.5 Factory parameters
1.6 Length of the cable connecting the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



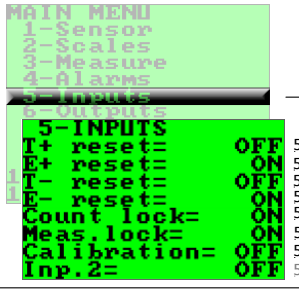
2.1* Full scale value set for range N.1
2.2* Full scale value set for for termal power
2.3* Unit of measure and number of decimal totalizes
2.4* Unit of measure and number of thermal energy
2.5* Pulse value on channel 1
2.6* Pulse value on channel 2
2.7* Duration of the pulse generated on channel 1
2.8* 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
2.16 To work at temperature < of 0°C
2.15 Enable/disable the selection of mass units on full scale set



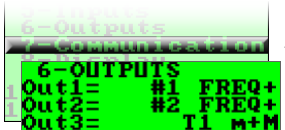
3.1* Measure filter
3.2 Low flow zero threshold: 0-25% of full scale value
3.3* Cut-off off delta T
3.4* Point of sensor position
3.5 Enable every hour an internal cycle of calibration. The measure it's stopped for 8-15 sec.



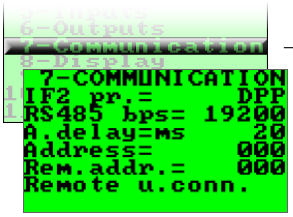
4.1 Maximum flow rate alarm. Express in % of full scale. Value =0: alarm disabled
4.2 Minimum flow rate alarm. Express in % of full scale. Value =0: alarm disabled
4.3 Maximum power alarm. Express in % of full scale. Value =0: alarm disabled
4.4 Minimum power alarm. Express in % of full scale. Value =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
4.13*Frequency output value in case of failure



5.1* Total direct (positive) flow totalise reset enable
5.2* Partial direct (positive) flow totalizer energy reset enable
5.3* Total reverse (negative) flow totalise reset enable
5.4* Partial reverse (negative) flow totalise energy reset enable
5.5 Totalizers counting lock command (see page 12)
5.6* Block measures command
5.7* Autozero calibration external command
5.8* Functions assigned to input 2

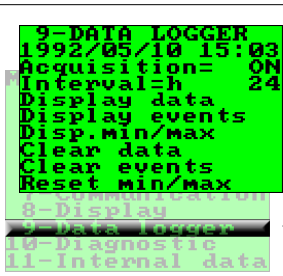


6.1* Output 1 functions
6.2* Output 2 functions
6.3* Output 3 functions
6.4* Choice of the function and the range of current output n.1
6.5* Variable to assign at the current output 1
6.6* Choice of the function and the range of current output n.2
6.7* Variable to assign at the current output 2

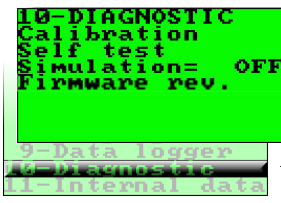


7.1 Choice of the communication protocol for the IF2 device
7.2 Speed of the RS485 output (possible choices: 2400, 9600, 19200, 38400 bps)
7.3 Instrument answer delay
7.4 Address value of converter (range 0 - 255)
7.5 Address of a further converter connected like a terminal
7.6 Start remote connection to the terminal. Connection interrupted after 10sec. of inactivity

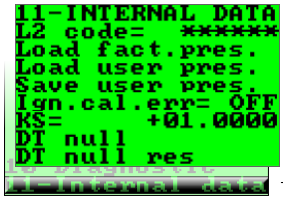
8.1 Choice of the language: E= English, I=italian, F= French, S= Spanish
8.2 Updating frequency on the display: 1-2-5-10 Hz
8.3* Display contrast
8.4 Date and time visualization with data logger enable
8.5 Quick start menu visualization
8.6 Enable currency function
8.7 Choice of the numbers of decimals for the visualization currency value: From 0 to 3.
8.8* Value of conversion/currency for direct totalizer
8.9* Value of conversion/currency for reverse totalizer
8.10 Reset the processor of the display (useful in case of particular badly operations of the display)
8.11 Total direct (positive) Volume totalizer reset
8.12 Total direct (positive) Energy totalizer reset
8.13 Total direct (negative) Volume totalizer reset
8.14 Total direct (negative) Energy totalizer reset



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

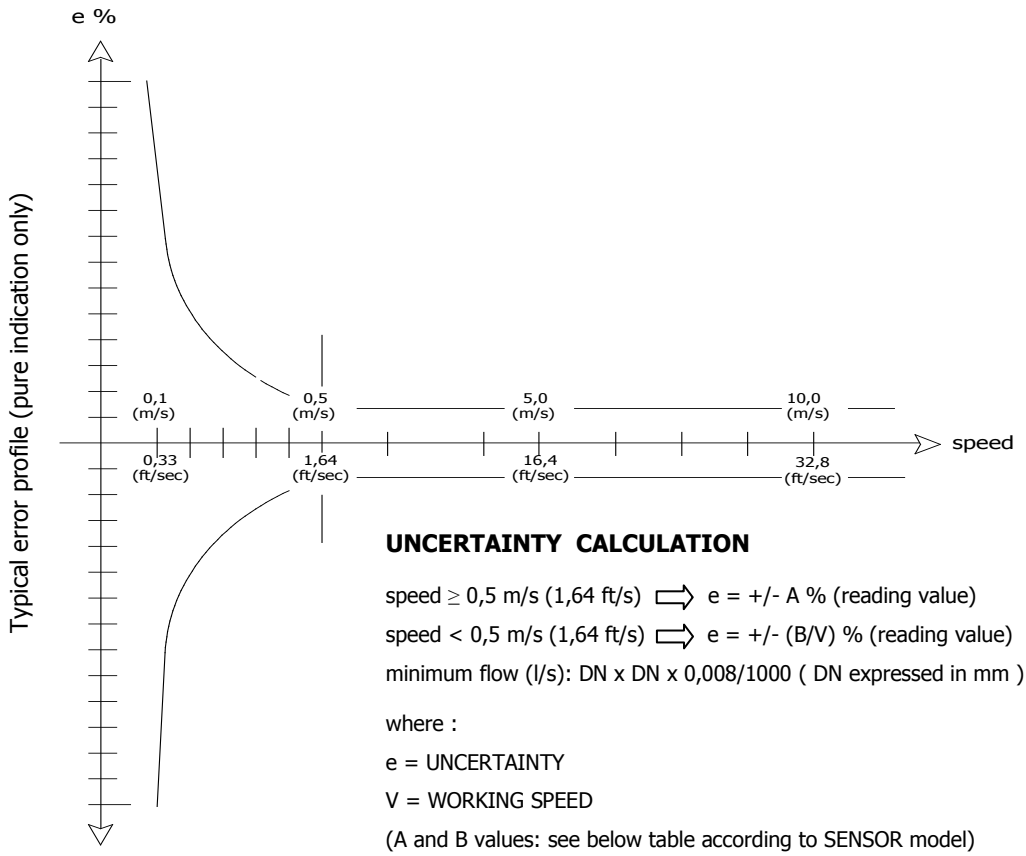


10.1* Enable the calibration of the converter
10.2* Converter autotest
10.3* Flow rate simulation enabling
10.4 Firmware revision/version



11.1 Level 2 access code enter
11.2 Load factory data pre-set
11.3 Load user data saved
11.4 Save user data
11.5 Ignore the calibration error during the switch on test
11.6 Ks Coefficient
11.7 Delete the offset beetwen T1 an T2
11.8 Annul the previous function

ACCURACY TABLE



UNCERTAINTY CALCULATION

speed ≥ 0,5 m/s (1,64 ft/s) ⇨ e = +/- A % (reading value)

speed < 0,5 m/s (1,64 ft/s) ⇨ e = +/- (B/V) % (reading value)

minimum flow (l/s): DN x DN x 0,008/1000 (DN expressed in mm)

where :

e = UNCERTAINTY

V = WORKING SPEED

(A and B values: see below table according to SENSOR model)

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

See MS 3770 / MS 3800 DATA SHEET

Reference conditions :

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

HOW TO ORDER

CODE EXAMPLE		*Display*
B	**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	**0**	Painted aluminum die casting
	1	AISI304 Stainless Steel housing, protection rate IP67 **(DISPLAY NOT ROTABLE)**
	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	**A**	Compact version with sensor MS.... (liquid maximum temperature 100 °C)
	B	Separate version for wall monting, complete with mounting accessories in **Aluminum** (painted RAL6028)
	D	Separate version for wall monting, complete with mounting accessories in **AISI304**
	F	Separate version for front panel mounting according DIN 43700, complete with mounting accessories, dimensions 72 x 144 mm
Power supply		
1	**1**	Power supply : 100 ... 240 V 44-66 Hz
	2	Power supply : 15...45 VAC-DC / 44-66 Hz
	3	Power supply : 12 ... 35 V dc
	9	Power supply : other
Analogue output		
B	**B**	Analogue output 0/4...20/22 mA
Serial Interface		
2	**2**	RS485 Serial Interface
	3	Modbus protocol over RS 485 interface
Additional module		
H	**H**	ME210; n. 2 Pt100 input+ 1 ON/OFF INPUT **(Minimun Option required)**
	I	ME211; n. 2 Pt100 input + additional 0/4...20 mA output+ 1 ON/OFF INPUT
	L	ME212; n. 2 Pt100 input + additional 0/4...20 mA output + 1 ON/OFF INPUT+ n. 1 ON/OFF OUT (programmable function)
	P	ME210 +ME 220 : data logger real time clock ; 2 Mbyte (up to 172.800 record :flow rate;volume+/-; date/time)
	Q	ME211 +ME 220 : data logger real time clock ; 2 Mbyte (up to 172.800 record :flow rate;volume+/-; date/time)
	R	ME212 + ME 220 : data logger real time clock ; 2 Mbyte (up to 172.800 record :flow rate;volume+/-; date/time)
	S	ME210 + ME 221 : data logger real time clock ; 2 Mbyte (up to 172.800 record :flow rate;volume+/-; date/time) ; n° 1 communication port : n° 1 RS 232 ;
	Z	Other
Special Features		
0	**0**	NONE
	1	WITH ANTICONDENSE CAP

ML211-B0A1B2H0 (Complete code example for order)

Due to the constant technical development and improvements of its products, the manufacturer reserves the right to make changes and / or modify the information contained in this document without notice. Information contained herein is not binding.

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