ISOMAG™

The friendly magmeter

ML4-F1

HIGH SAMPLING RATE CONVERTER

(UP TO 400 SAMPLES/SECOND)

Official Isoil dealer in The Netherlands:

UFM

ISOIL INDUSTRIA

- Version 2025 -

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TECHNICAL DATA

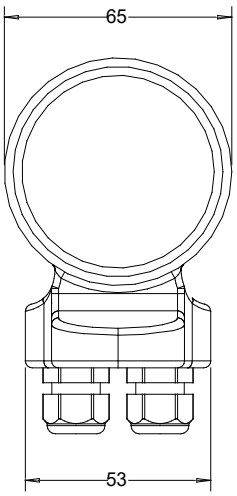
OVERALL FEATURES	
Suitable For	❑ **All the ISOMAG sensors**
Minimum conductivity	❑ **5 μS/cm**
Altitude	❑ **-200 m up to 2000 m**
Ambient Temperature	❑ **-20... +60°C / -4... +140 °F (max 40°C 104°F with liquid > 60 °C 140°F)**
Liquid temperature	❑ **Max 100°C 212°F (130°C 266°F for 30 min ; no time limits if converter off)**
Humidity Range	❑ **0÷100% (IP 67)**

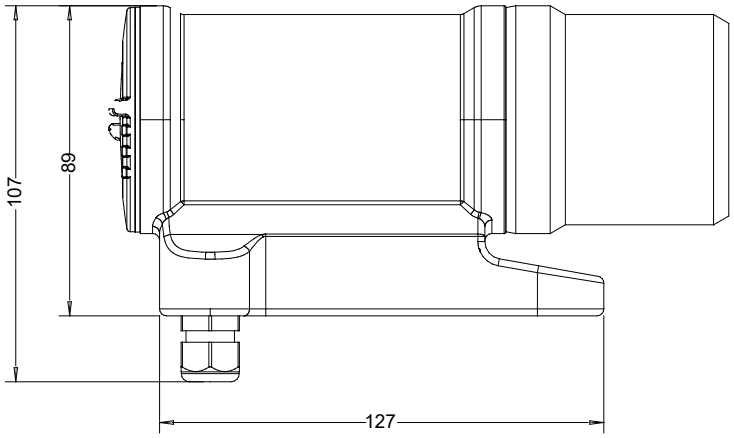
STANDARD FEATURES	
Housing materials	❑ **Stainless steel AISI 304**
Protection Rate	❑ **IP 67**
Power Supply	❑ **18-30 V ⎓**
Cable Gland	❑ **N° 2 CABLE GLAND PG 9**
Full scale value	❑ **0,4...10m/s**
Protocols	❑ **ETP**
Galvanic Isolation	❑ **All the inputs/outputs are galvanically isolated from power supply**
Programming Plug In	❑ **Protected plug in for connection to PC**
Data Storage	❑ **Eeprom stored measuring values on power failure**
Bi-Directional	❑ **Yes**
Diagnostic Funct.	❑ **Yes**
Empty Pipe Detect.	❑ **Yes**
Batch Function	❑ **Yes, also with auto-preset**
CE Certification	❑ **Yes**

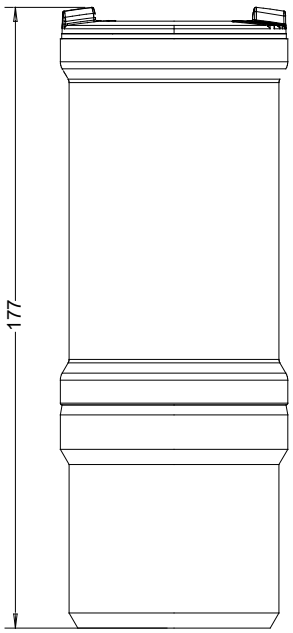
OPTIONAL FEATURES *(CHECK HOW TO ORDER, AT LAST PAGE, FOR MORE DETAILS)*	
Power Supply	❑ **20-30 V ⎓ with 4/20 mA**
Pulses/ Alarm Outputs	❑ **N°2 , 1250 Hz, 100mA, 40 V ⎓**
Digital Input/Outputs	❑ **N° 5 O.C. freely Programmable function (as input or output, see pag. 5 for details)**
Current Output	❑ **(OPTIONAL) 4…20mA – RL 500Ω passive (p.s. 20-30 VDC)**
Communication interface	❑ **RS485/PROFIBUS DP**
Protocols	❑ **ETP/Profibus DP**

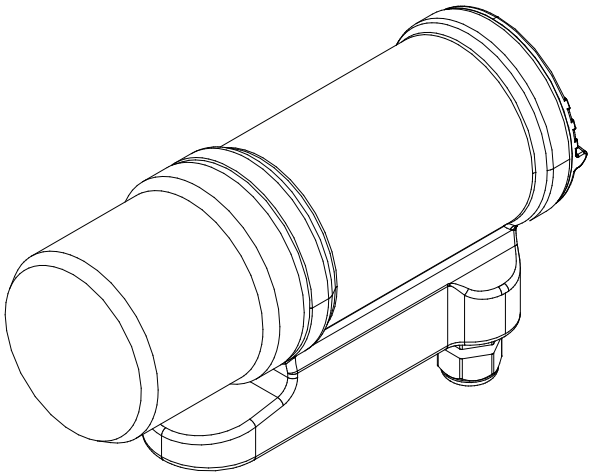
ACCURACY	
Measurement Tolerance	❑ **Flow rate (volume) = ±0,05% r.v.** ❑ **Out 4/20 mA = ± 0,5 % r.v.** ❑ **Frequency Out = ± 0,08% r.v.**
Repeatability	❑ **Better than 0,01%**
Accuracy (whole system converter+sensor)	❑ **See table below**

OVERALL DIMENSIONS

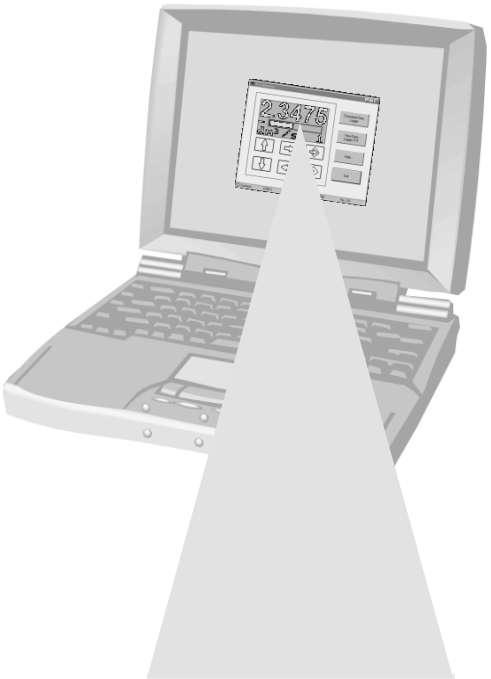


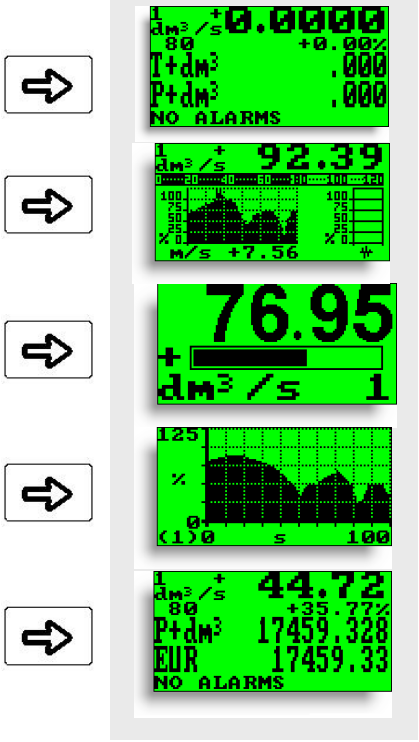






VISUALIZATION PAGES





Flowrate and totalizers visualization

Flowrate, speed values and graph

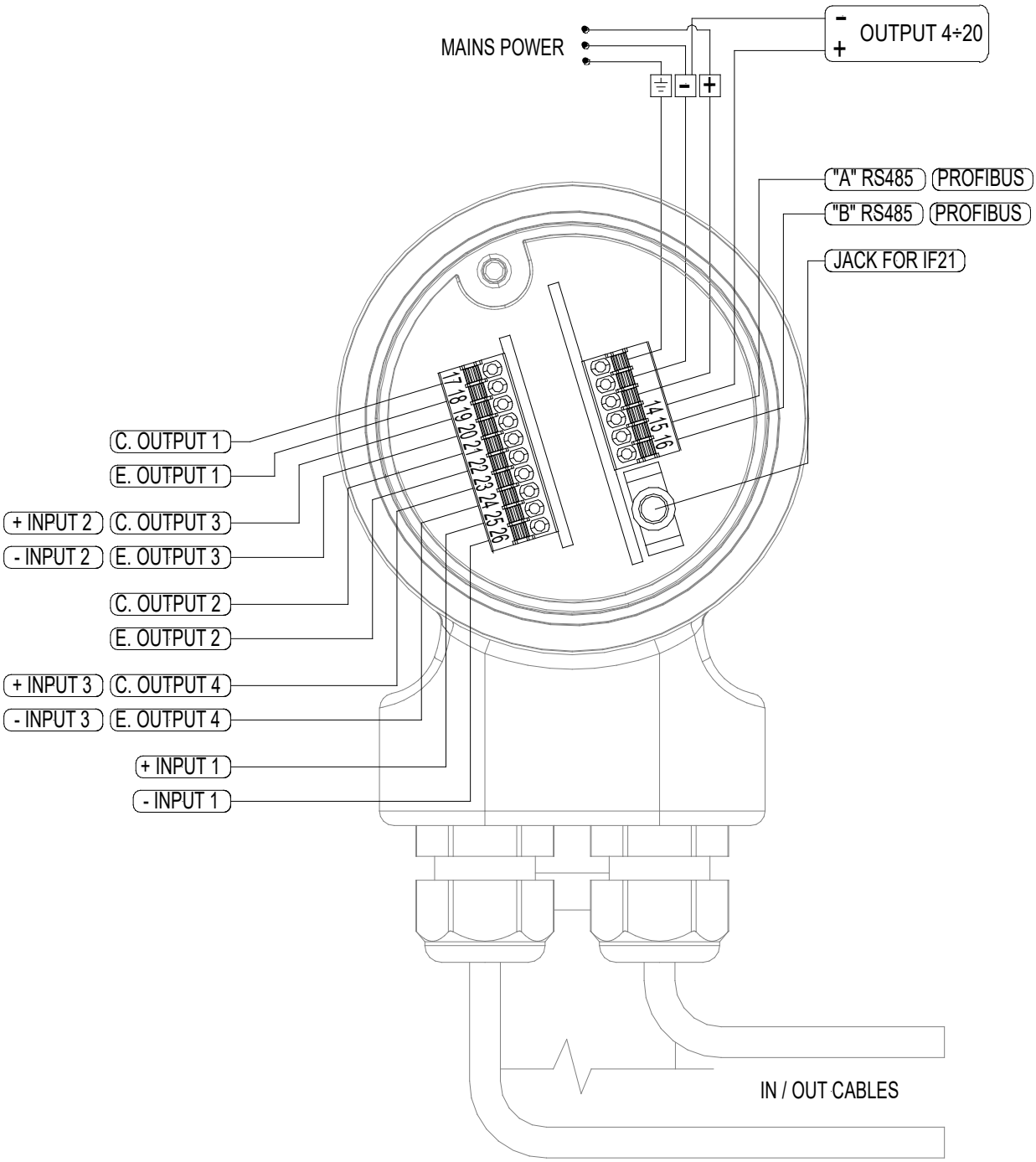
Flowrate value and Full scale %

Flowrate graph

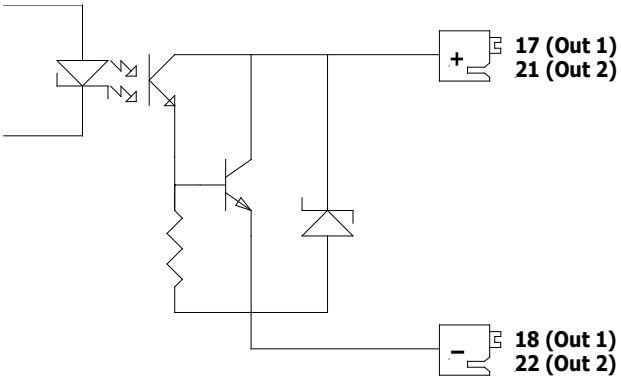
Flowrate value with currency function enabled

Different visualisation possibilities with the simple press of a key

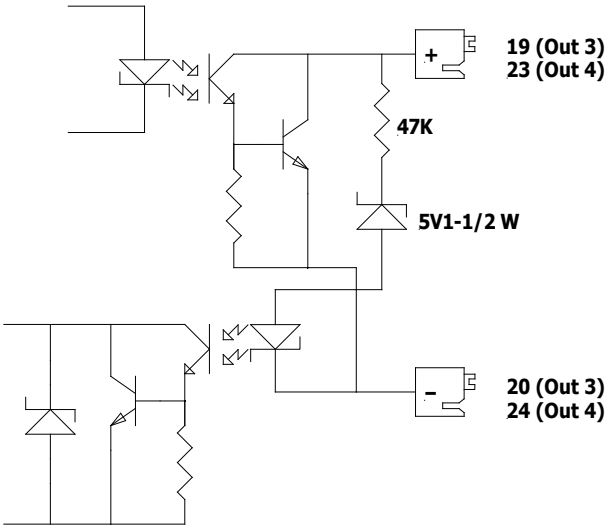
ELECTRICAL CONNECTIONS



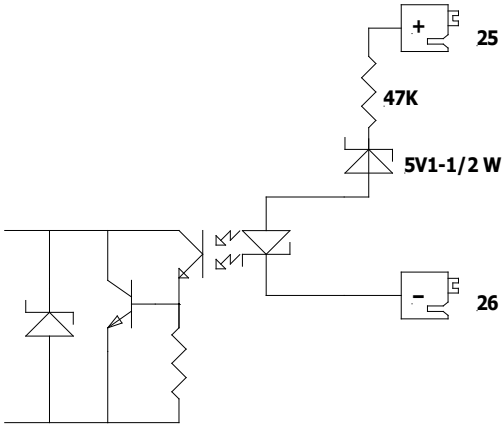
OUTPUT 1/2



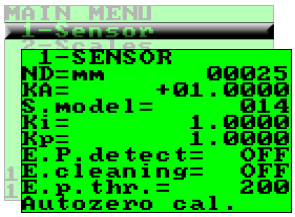
PROGRAMMABLE INPUT/OUTPUT



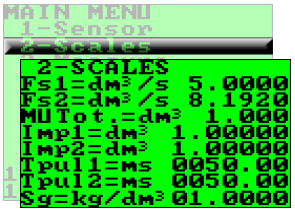
INPUT



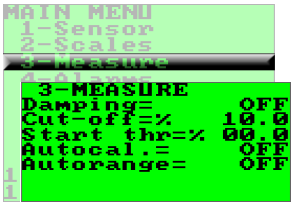
FUNCTIONS



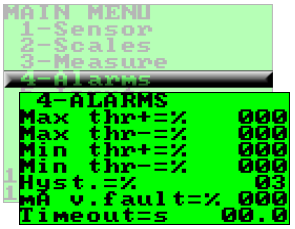
1.1 Insert the Nominal Diameter of the sensor (0-3000mm)
1.2 Calibration data of sensor visualized on sensor label
1.3 Sensor model: enter the first two characters of the sensor serial number
1.4 Factory parameters
1.5 Enables the empty pipe detection feature
1.6* Electrodes cleaning
1.7* Value of empty pipe sensibility detection
1.8* Enables the automatic zero calibration system



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 output 1
2.5* Pulse value on output 2
2.6* Duration of the pulse generated on output 1
2.7* Duration of the pulse generated on output 2
2.8 Specific gravity set in kg/dm³ (enable only if FS1 or FS2 are weigh/time)



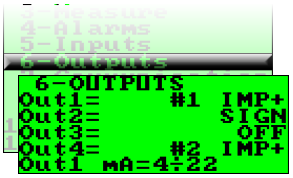
3.2* Measure filter
3.1 Low flow zero threshold: 0-25% of full scale value
3.4 Only for service purposes
3.5 Enable every hour an internal cycle of calibration. The measure is stopped for 8-15 sec.
3.6* Automatic change of scale



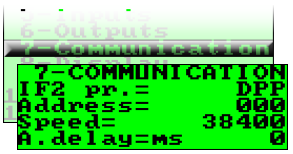
4.1 Maximum value alarm set for direct flow rate
4.2 Maximum value alarm set for reverse flow rate
4.3 Minimum value alarm set for direct flow rate
4.4 Minimum value alarm set for reverse flow rate
4.5 Hysteresis threshold set for the minimum and maximum flow rate alarms
4.6* Current output value in case of failure
4.7* Batch safety timer

5.1* Total direct (positive) flow totalizer reset enable
5.2* Partial direct (positive) flow totalizer reset enable
5.3 Reset totalizer of pulse from digital input (see page 13)
5.4 Totalizer counting lock command (see page 13)
5.5* Block measures command
5.6* Autozero calibration external command
5.7 Range change external command (see pos. 3.5)
5.8 Batch start/stop external command (see batch functions)
5.9* Functions assigned to input 2 (automatically disabled if OUT3 is enabled)
5.10* Functions assigned to input 3 (automatically disabled if OUT4 is enabled)

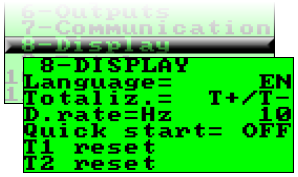
Functions assigned on input 1



6.1* Output 1 functions
6.2* Output 2 functions
6.3* Output 2 functions
6.4* Output 4 functions
6.5* Choice of the function and the range of current output n.1

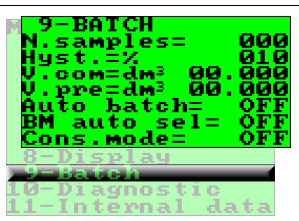


7.1 Choice of the communication protocol for the IF2 device
7.2 Address value of the converter
7.3 Speed of the RS485 output (possible choices: 4800, 9600, 19200, 38400 bps)
7.4 Instrument answer delay

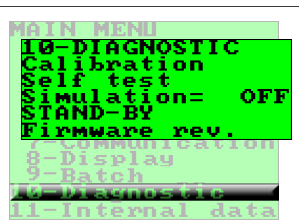


8.1 Choice of the language: EN= English, IT=italian, FR= French, SP= Spanish
8.2 Display totilizer mode
8.3 Updating frequency on the display: 1-2-5-10 Hz
8.4 Quick start menu visualization
8.5* Volume totalizer 1 reset
8.6* Volume totalizer 2 reset

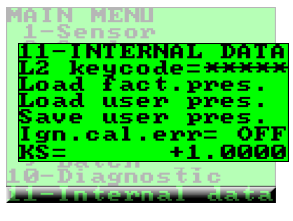
Menu 9 visualized only IF batch is active



9.1* Number of batch cycles to be done to define the value of compensation.
9.2* % limit of compensation threshold
9.3* Compensation value
9.4* Prebatch value
9.5* Auto-batch
9.6* Automatic selection of batch formula
9.7* Static consent of batch



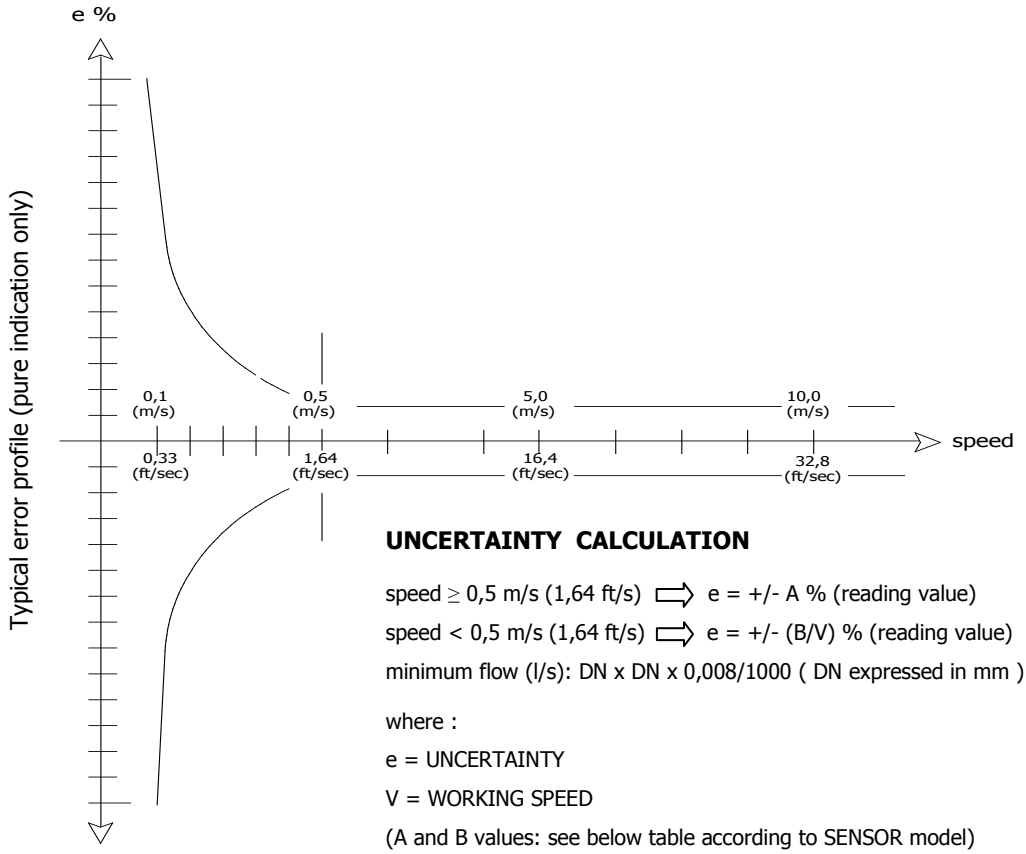
10.1* Enable the calibration of the converter
10.2* Converter autotest
10.3* Flow rate simulation enabling
10.4 Stand-by of converter to reduce the consumption during service operation
10.5 Firmware revision/version



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 (only for service purposes)

Note : all page number references are to the operating manual

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

Display		
A	**A**	Blind execution (without display and programming keys)
Housing material / Protection rate		
1	**1**	AISI304 Stainless Steel housing, protection rate IP67
Version		
A	**A**	Compact version with sensor MS.... Max LIQUID T=100°C - 212°F (130°C - 266°F for 30 min ; no time limits if converter off)
Analogue output		
0	**0**	Without Analogue output
	1	Analogue output 4...20/22 mA (passive)
Additional module		
A	**A**	Without additional module
	B	**ME35** : Profibus DP
	C	**ME36** : RS485 serial interface module
	D	**ME35 :** Profibus DP , **complete with 2 connectors : 1 for Profibus connection and 1 for Power Supply + IN/OUT conn**
	E	**M12 Male connector for Power Supply and output**
	F	**ME36:** RS 485 , **complete with 2 connectors: n° 1 for RS 485 connection and 1 for Power Supply + IN/OUT conn**
	G	**ME35 :** Profibus DP , **complete with 3 connectors : n° 2 for Profibus connection (Male+Female) and n° 1 for Power Supply + IN/OUT conn**

ML4-F1-A1A0A (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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