

# ISOMAG ™

*The friendly magmeter*

FAST SAMPLING CONVERTER

## ML4-F1



HIGH SAMPLING RATE CONVERTER  
(UP TO 400 SAMPLES/SECOND)

## **FLOAB**

FLÖDESPRODUKTER AB

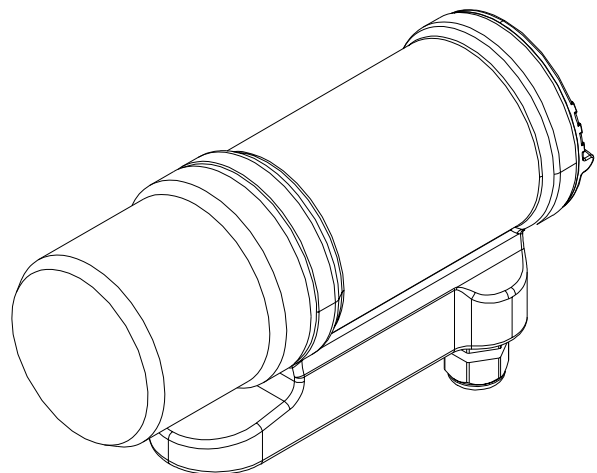
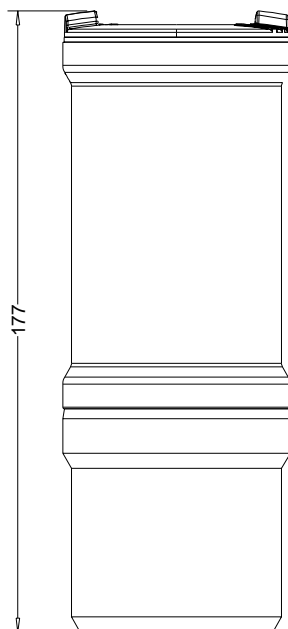
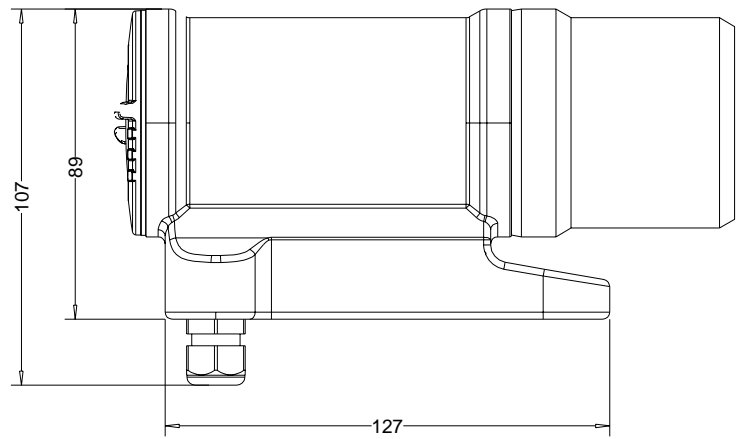
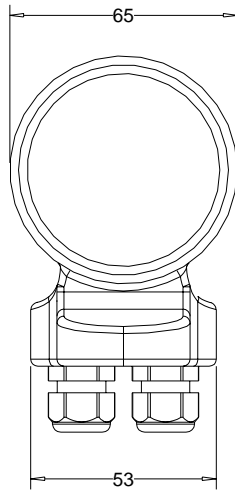
**FLOAB Flödesprodukter AB**

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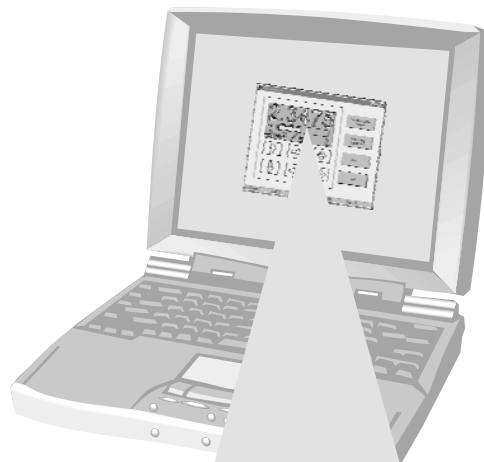
## TECHNICAL DATA

Housing material	<input type="checkbox"/> Stainless steel AISI 304
Minimum conductivity	<input type="checkbox"/> 5 $\mu$ S/cm
Protection Rating	<input type="checkbox"/> IP 67
Cable Gland	<input type="checkbox"/> N° 2 PG 9
Amb. Temperature	<input type="checkbox"/> - 20... +60°C ( max 40°C with liquid > 60 °C)
Liquid temperature	<input type="checkbox"/> Max 100°C ( 130 °C for 30 min ; no time limits if converter off )
Pulse/Frequency Output	<input type="checkbox"/> 1250 Hz / 100mA, 40 Vdc
Digital Input/Outputs	<input type="checkbox"/> N° 5 O.C. freely Programmable function ( as input or output, see pag. 5 for details )
Current Output	<input type="checkbox"/> (OPTIONAL) 4...20mA – RL 500 $\Omega$ passive (p.s. 20-30 VDC)
Communication interface	<input type="checkbox"/> RS485/PROFIBUS DP ( Optional )
Bi-Directional	<input type="checkbox"/> Yes
Full scale value	<input type="checkbox"/> 0,4...10m/s
Diagnostic Funct.	<input type="checkbox"/> Yes
Empty Pipe Detect.	<input type="checkbox"/> Yes
Galvanic Isolation	<input type="checkbox"/> All the inputs/outputs are galvanically insulated from power supply
Data Storage	<input type="checkbox"/> Eeprom stored measuring values on power failure
Programming Plug In	<input type="checkbox"/> Protected plug in for connection to PC
Batch Function	<input type="checkbox"/> Yes, also with auto-preset
CE Certification	<input type="checkbox"/> Instrument with CE certificate
Measurement Tolerance	<input type="checkbox"/> Flow rate (volume) = $\pm 0,05\%$ r.v. <input type="checkbox"/> Out 4/20 mA = $\pm 0,5\%$ r.v. <input type="checkbox"/> Frequency Out = $\pm 0,08\%$ r.v.
Repeatability	<input type="checkbox"/> Better than 0,01%
Power Supply	<input type="checkbox"/> 18 ... 30 VDC ( 20 .... 30 VDC with 4/20 mA option )

## OVERALL DIMENSIONS



## VISUALIZATION PAGES



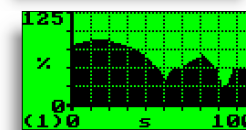
Flowrate and totalizers visualization



Flowrate, speed values and graph



Flowrate value and Full scale %



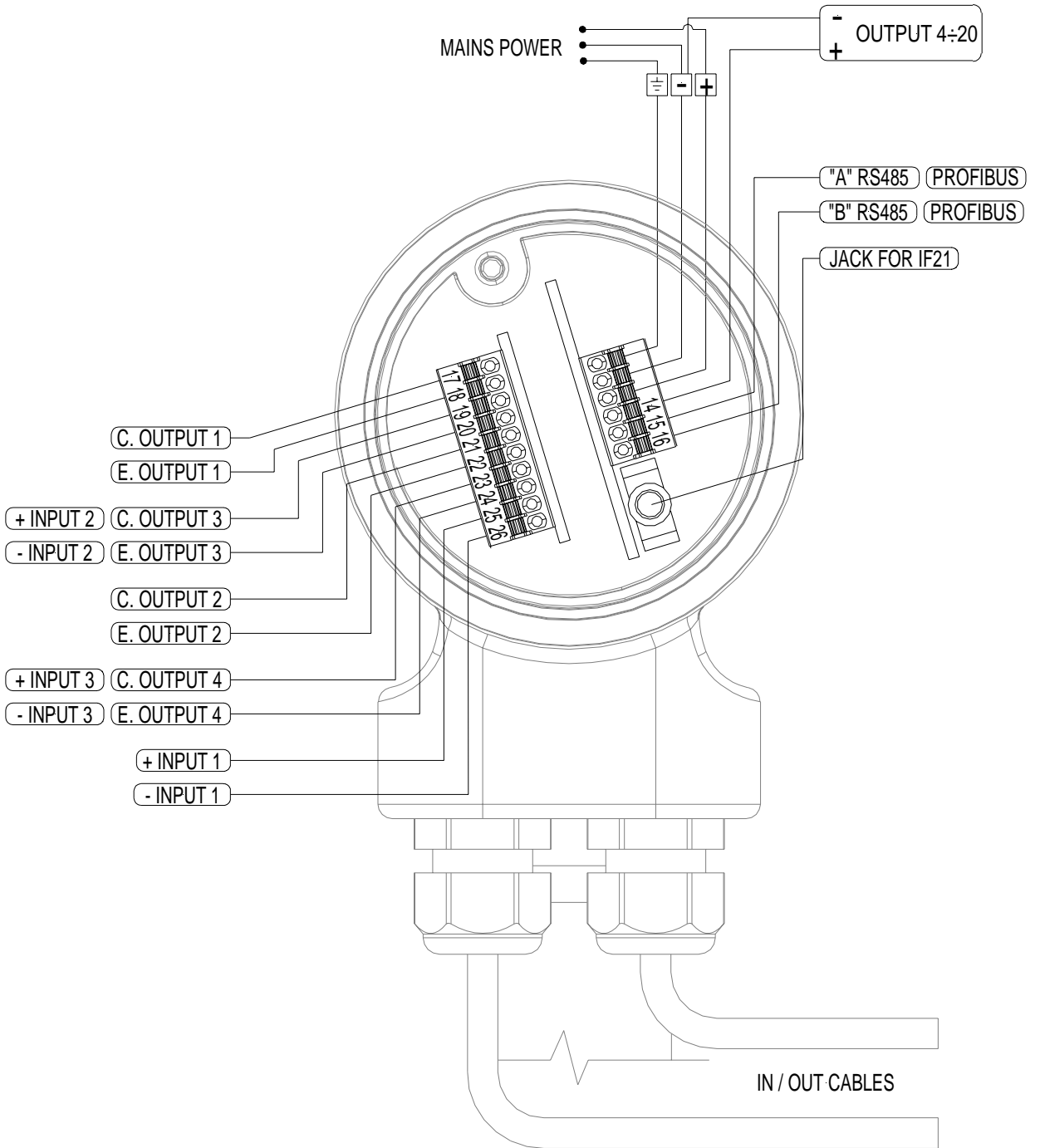
Flowrate graph



Flowrate value with currency function enabled

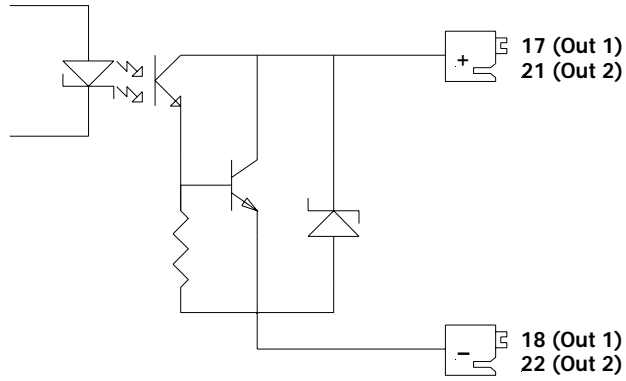
Different visualisation possibilities with the simple press of a key

# ELECTRICAL CONNECTIONS

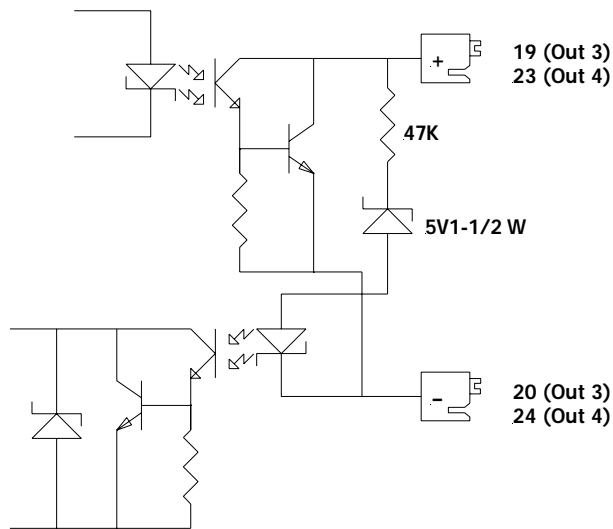


# ELECTRICAL CONNECTIONS

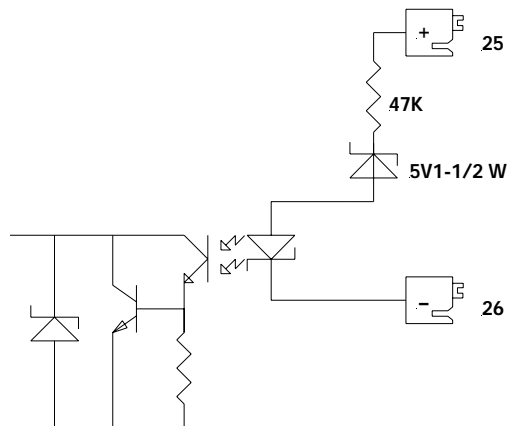
## OUTPUT 1/2



## PROGRAMMABLE INPUT/OUTPUT



## INPUT



# FUNCTIONS

```

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
E.P.detect= OFF
E.p.thr.= 200
Autozero cal.
    
```

- 1.1 Insert ND of sensor (0-3000)
- 1.2 Calibration data of sensor visualized on sensor's label
- 1.3 Sensor model : first two digits of sensor's serial number
- 1.4 Position for insertion sensors: 0=1/8DN, 1=1/2DN, 2=7/8DN
- 1.5 Factory parameter
- 1.6 Enables the empty pipe detection feature
- 1.7 Value of empty pipe sensibility detection ( Increasing number to reduce the sensibility)
- 1.8\* Enables the automatic calibration procedure of the empty pipe detection

```

MAIN MENU
1-Sensor
2-Scales
2-SCALES
Fs1=dm³/s 5.0000
Fs2=dm³/s 8.1920
MUTot.=dm³ 1.000
Imp1=dm³ 1.00000
Impul1=ms 0050.00
Imp2=dm³ 1.00000
Impul2=ms 0050.00
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 output 1
- 2.5\* Duration of the pulse generated on output 1
- 2.6\* Pulse value on output 2
- 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)

```

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
Autocal.= OFF
Autorange= 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. The measure it's stopped for 8-15 sec.
- 3.7\* Automatic change of scale

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-ALARMS
Max thr+=% 000
Max thr-=% 000
Min thr+=% 000
Min thr-=% 000
Hyst.=% 03
E.p.thr.= 075
MA v.fault=% 000
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 1.6
- 4.7\* Current output value in case of failure
- 4.8\* Batch safety timer

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-ALARMS
5-INPUTS
T1 reset= OFF
T2 reset= ON
Puls.reset= OFF
Count lock= ON
Calibration= OFF
Range change=OFF
Batch= OFF
Inp. 2= OFF
Inp. 3= OFF
    
```

- 5.1\* Total direct (positive) flow totalise reset enable
- 5.2\* Partial direct (positive) flow totalise reset enable
- 5.3 Reset totalise of pulse from digital input (see page 13)
- 5.4 Totalise counting lock command (see page 13)
- 5.5\* Autozero calibration external command
- 5.6 Range change external command (se pos. 3.7)
- 5.7 Batch start/stop external command (see batch functions)
- 5.8\* Functions assigned to input 2 (automatically disabled if OUT3 it's enabled)
- 5.9\* Functions assigned to input 3 (automatically disabled if OUT4 it's enabled)

Functions assigned  
On input 1

```

6-Outputs
Out1=#1 IMP+
Out2=#1 SIGN
Out3=#1 OFF
Out4=#2 IMP+
Duty cy.1=% 00
Duty cy.2=% 00
Out1 mA=4:22
    
```

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

```

7-Communication
IF2 prot.= DPP
RS232 prot.= DPP
Address= 000
RS485 bps= 19200
    
```

- 7.1 Choice of IF2 protocol
- 7.2 Choice of RS232 protocol
- 7.3 Address value of converter
- 7.4 Speed of RS 485 port

```

8-Display
Language= EN
Totaliz.= I+/T-
D.rate=Hz 10
Quick start= OFF
    
```

- 8.1 Choice of the language: En= English, It=italian, Fr= French, Sp= Spanish
- 8.2 Partial totalizer visualization (with batch enable the function is always on)
- 8.3 Updating frequency on the display: 1-2-5-10 Hz
- 8.4 Quick start menu visualization

### Menu 9: Menu visualized only IF batch is active

```

9-BATCH
N.samples= 000
Hyst.=% 010
V.com=dm³ 00.000
V.pre=dm³ 00.000
Auto batch= OFF
BM auto sel= OFF
Cons.mode= OFF
    
```

- 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-DIAGNOSTIC
Calibration
Self test
Simulation= OFF
STAND-BY
    
```

- 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

```

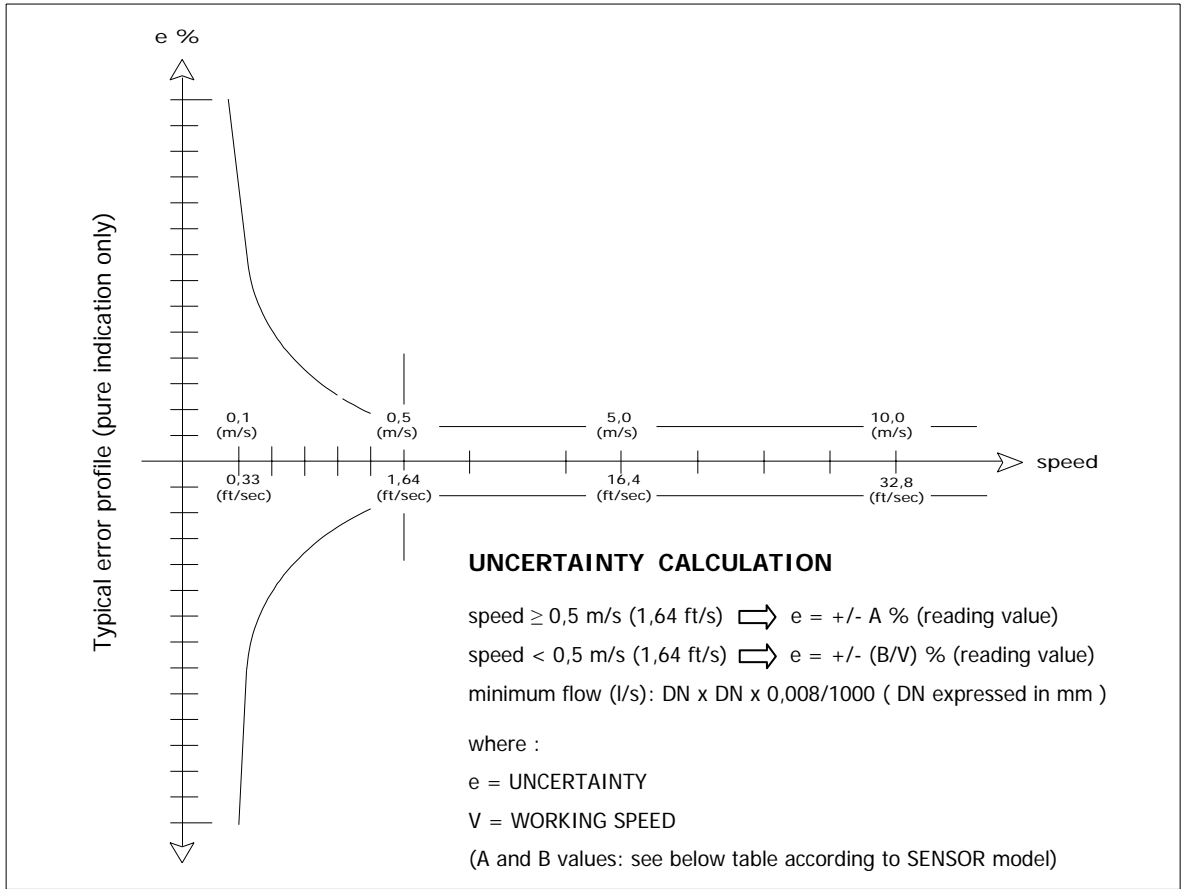
11-INTERNAL DATA
L2 keycode=00000
Load fact.pres.
Load user pres.
Save user pres.
Hours= 0000??
Ign.cal.err= OFF
KS= +1.0000
    
```

- 11.1 Level 2 access code enter
- 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

Note : all page number references are to the operating manual



# 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

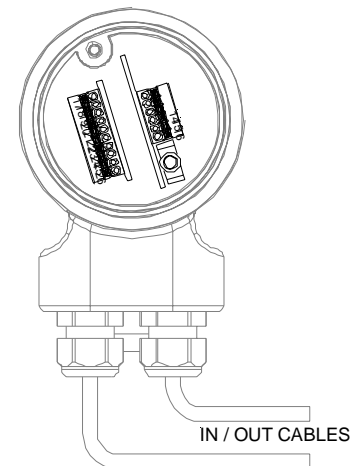
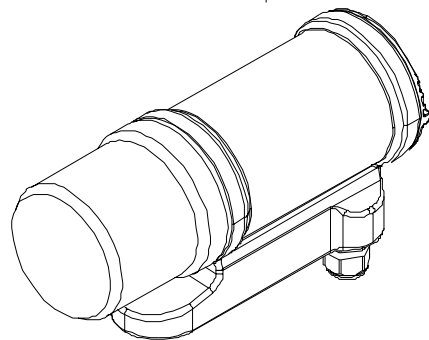
Reference conditions :

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

## HOW TO ORDER

<b>ML4F1</b>	<b>Display</b>
<b>A</b>	Blind execution (without display and programming keys)
<b>Housing material - Protection rate</b>	
<b>1</b>	AISI304 Stainless Steel housing, protection rate IP67
<b>Version</b>	
<b>A</b>	Compact version with sensor MS... (liquid maximum temperature 100/130°C)
<b>Analogue output</b>	
<b>0</b>	Without Analogue output
<b>1</b>	Analogue output 4...20/22 mA ( passive )
<b>Additional module</b>	
<b>A</b>	Without additional module
<b>B</b>	ME35 : Profibus DP
<b>C</b>	ME36 : RS485 serial interface module
<b>D</b>	ME35 : Profibus DP , complete with 2 connectors : 1 for Profibus connection and 1 for Power Supply + IN/OUT conn
<b>E</b>	M12 Male connector for Power Supply and output
<b>F</b>	ME36: RS 485 , complete with 2 connectors: n° 1 for RS 485 connection and 1 for Power Supply + IN/OUT conn

ML4F1 A 1 A 0 A Example of code for order



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

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