THE MOST ACCURATE BATTERY POWERED SYSTEM

ISOMAG™

The friendly magmeter

FLOWIZ™

(ML 252)

CONVERTER WITH BATTERY SUPPLY

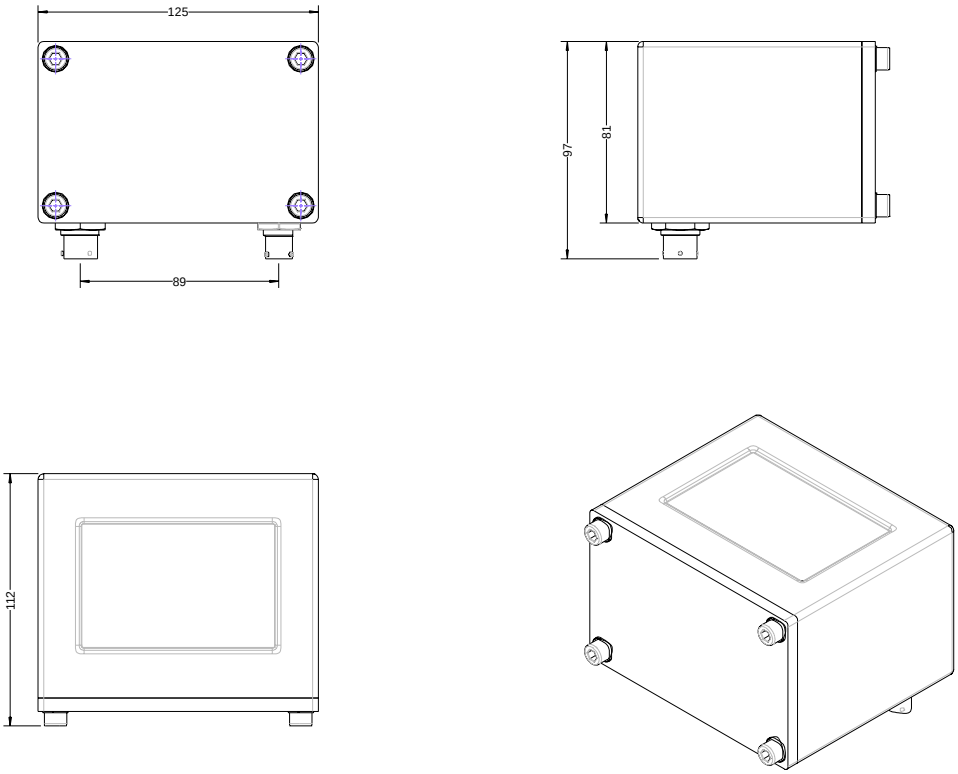
Warranty conditions are available on this website:
www.isomag.eu only in English version

ISOIL INDUSTRIA
The solutions that count

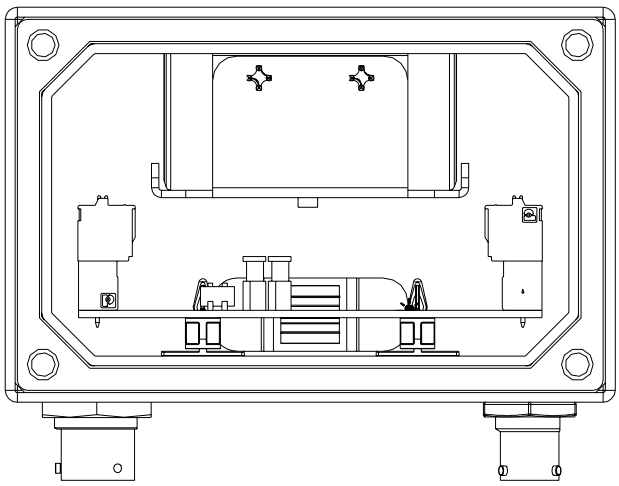
TECHNICAL DATA

Suitable for	❑ All the ISOMAG sensors
Minimum conductivity	❑ 5 µS/cm
Housing materials	❑ AISI304
Dimensions	❑ See Drawing
Protection rate	❑ IP 68
Electrical connections	❑ Connectors IP 68
Ambient temperature	❑ -20...+60°C
Additional Modules	❑ n°2 On/Off out + n°1 On/Off input, RS232 Serial Communication,
Data Logger	❑ Two Sets (1 Mbit). ▪ 8192 records collected at intervals of 1, 5, 10,30 min. ▪ 256 records collected at the Measure Sample Rate ▪ Note: both sets of records contain Date/Time reference, Flow Rate,Positive and Negative volumes ❑ Recording of the last 64 alarm Events
Bi-directional	❑ Yes
Full Scale value	❑ 0,4...10 m/s
Diagnostic functions	❑ Yes
Empty Pipe Detection	❑ Yes
Galvanic Isolation	❑ all the digital Inputs/Outputs are galvanically isolated from Power Supply ; the RS232 is NOT insulated
Data storage	❑ EEprom, battery backup RAM
Programming plug in	❑ Protected plug in for connection to PC (IF2)
CE certification	❑ Instrument with CE certificate
Accuracy	❑ See table below
Power Supply (see details on Page 5)	❑ Standard: n°1 Lithium Battery size D not rechargeable, Life Time 2 Years using 15s Sampling Rate, 1 month with Continuous Sampling ❑ Optional: n° 1 Lithium batteries (up to 10 years)

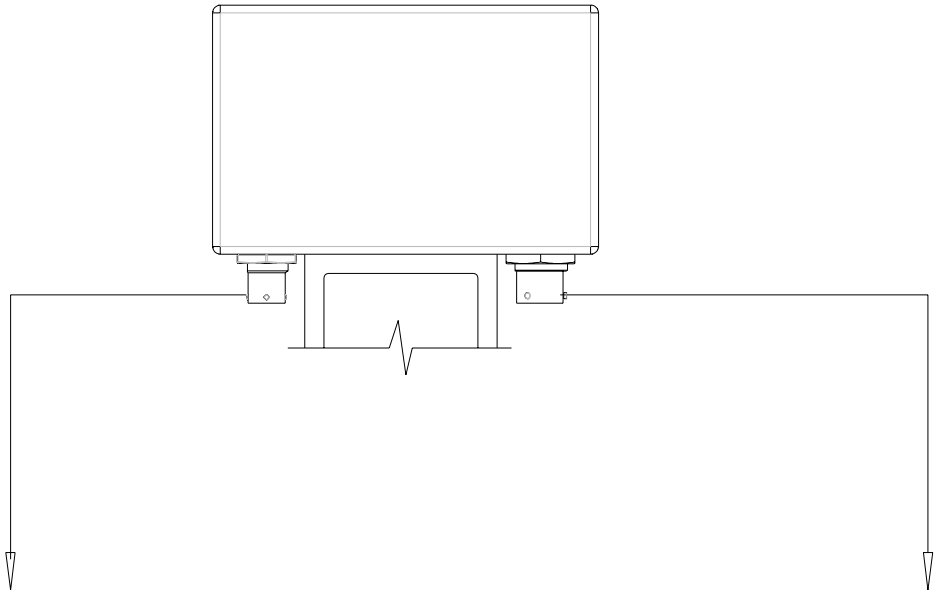
OVERALL DIMENSIONS



INTERNAL VIEW

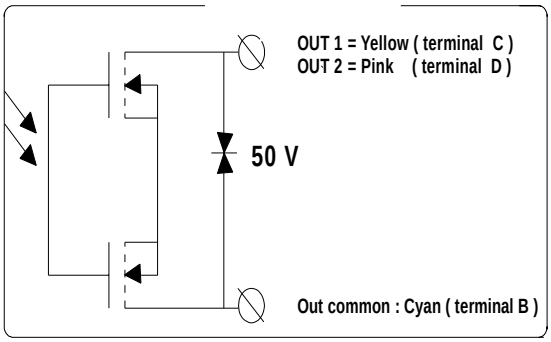


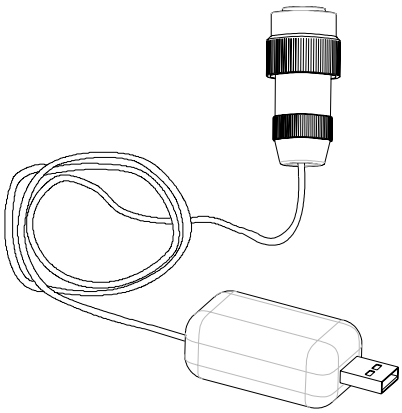
ELECTRICAL CONNECTIONS



4 POLES IP68 MIL CONNECTOR (DIGITAL OUT)

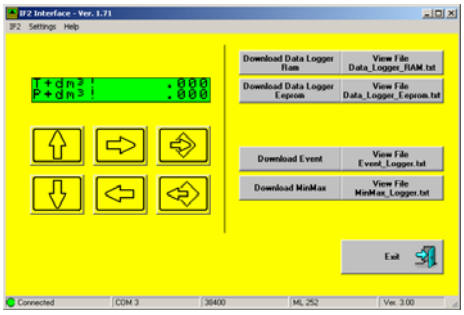
6 POLES IP68 MIL CONNECTOR (IF22/RS232)





Technical characteristics

- ❑ Opto-insulated output (Opto- MOS)
- ❑ Maximum switching voltage: 40 Vdc
- ❑ Maximum switching current: 100mA
- ❑ Maximum Ron = 70 Ohm
- ❑ Maximum switching frequency (loadRL=240Ω, VOUT=24Vdc): 32 Hz
- ❑ Insulation from other secondary circuits: 500 Vdc



FUNCTIONS

```
MAIN MENU
 1-Sensor
```

```
 1-SENSOR
ND=mm        00025
KA=       +00.9900
Sens.type=     000
Ins.position=    0
KL=+[0] +00.0000
KL=-[0] +00.0000
E.P.detect=    OFF
E.P.thr.=      100
Autozero cal.
Autozero res.
```

1.1 Insert ND of sensor (0-3000)
1.2 Calibration data of sensor visualized on sensor's label
1.3 Sensors model: 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 parameter
1.6 Enables the empty pipe detection function
1.7 Value of empty pipe sensibility detection
1.8* Enables the automatic zero calibration system
1.9 Reset the preceding value

```
MAIN MENU
 2-Scales
```

```
 2-SCALES
Fs1=dm³/s 05.000
Fs2=dm³/s 05.000
Tot.MU=dm³  1.000
Pls1=dm³ 01.0000
Pls2=dm³ 01.0000
Tpus1=s      0.01
Tpus2=s      0.01
```

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

```
MAIN MENU
 3-Measure
```

```
 3-MEASURE
Tconst=s   0001.0
Cut-off=%    01.0
Autocal.=     OFF
Autorange=    OFF
E.saving=     OFF
S.time=s      003
Max.saving=   OFF
```

3.1* Time constant
3.2 Low flow zero threshold: 0-25% of full scale value
3.3 Enable every hour an internal cycle of calibration. The measure it's stopped for 8-15 sec.
3.4* Automatic change of scale
3.5* Energy saving
3.6 Interval of time among a measure and the other (see page 6)
3.7 Amplifiers switch-off to save more energy

```
MAIN MENU
 4-Alarms
```

```
 4-ALARMS
Max thr+=%    000
Max thr-=%    000
Min thr+=%    000
Min thr-=%    000
Hyst.=%        03
E.P.thr.=     075
```

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

```
MAIN MENU
 6-Outputs
```

```
 6-OUTPUTS
Out1=         IMP1
Out2=          OFF
```

6.1* Output 1 functions
6.2* Output 2 functions

```
MAIN MENU
 7-Communication
```

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

7.1 Choice of the communication protocol for the IF2 device
7.2 Address value of converter (range 0 - 255)
7.3 Speed of the RS232 output (possible choices: 2400, 9600, 19200, 38400 bps)
7.4 Choice of the communication protocol for the RS232 port

```
MAIN MENU
 8-Display
```

```
 8-DISPLAY
Language=       EN
T+ reset
P+ reset
T- reset
P- reset
D.time=s       060
Quick start=   OFF
Net total.=    OFF
Currency=      OFF
Curr.decim.=     2
EUR/dm³+ 01.0000
EUR/dm³- 01.0000
```

8.1 Choice of the language: En= English, It=italian, Fr= French, Sp= Spanish
8.2* Total direct (positive) flow totalise reset from keyboard
8.3* Partial direct (positive) flow totalise reset from keyboard
8.4* Total reverse (negative) flow totalise reset enable from keyboard
8.5* Partial reverse (negative) flow totalise reset enable from keyboard
8.6 Time for switch off display (shown with function 3.7 enabled)
8.7 Visualization of "Quick start menu"
8.8 Enable the page of net totalizer (difference between direct and reverse)
8.9 Visualizes the values of the partial totalise in the unit of selected currency
8.10 Choice of the numbers of decimals for the visualization currency value: From 0 to 3
8.11* Value of conversion/currency for direct totalizer
8.12* Value of conversion/currency for reverse totalizer

```
MAIN MENU
 9-Data logger
```

```
 9-DATA LOGGER
Acquisition=    ON
Interval=m       1
1992/01/06 23:14
Disp.dyn.data
Display data
Display events
Disp.min/max
Clear dyn.data
Clear data
Clear events
Reset min/max
```

9.1* Automatic data logger enable
9.2* Interval time for the data logging function: 1, 2, 3, 5, 15, 30, 60 minutes
9.3* Date and time set
9.4* Display dynamic data
9.5 Displaying of the data stored in the data logger
9.6 Displaying of the last 64 alarms stored in the data logger
9.7 Visualization function of minimum and maximum peak of flow rate
9.8 Logged dynamic data cancel function
9.9 Logged data cancel function
9.10 Reset all alarm events
9.11 Reset all minimum and maximum peak of flow rate stored

```
MAIN MENU
10-Diagnostic
```

```
10-DIAGNOSTIC
Calibration
Self test
Simulation=    OFF
Stand-by
```

10.1* Enable the calibration of the converter
10.2* Converter auto-test
10.3* Flow rate simulation enabling
10.4* Stand-by function

```
MAIN MENU
11-Internal data
```

```
11-INTERNAL DATA
L2 keycode=00000
Load fact.pres.
Load user pres.
Save user pres.
Hours=      000015
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 Ks Coefficient

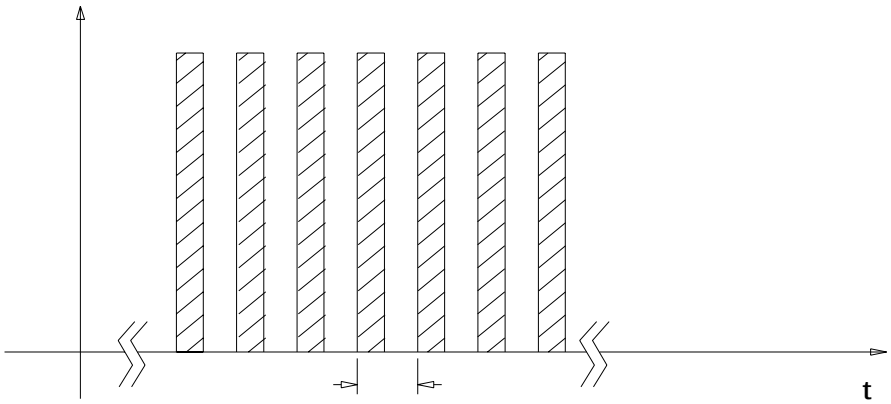
Note : all page number references are to the operating manual .

MEASURE / SAMPLING FREQUENCY

The ML 252 converter can measure in two different modes:

CONTINUOUS SAMPLING

In this mode the converter measures according to the classic mag meter scheme; the system consumption, for any sensor diameter, is 0,1 W; the battery life is 1 month with 1 battery ; 1 month * N (N = number of additional battery). The system accuracy is defined according to this operation mode.

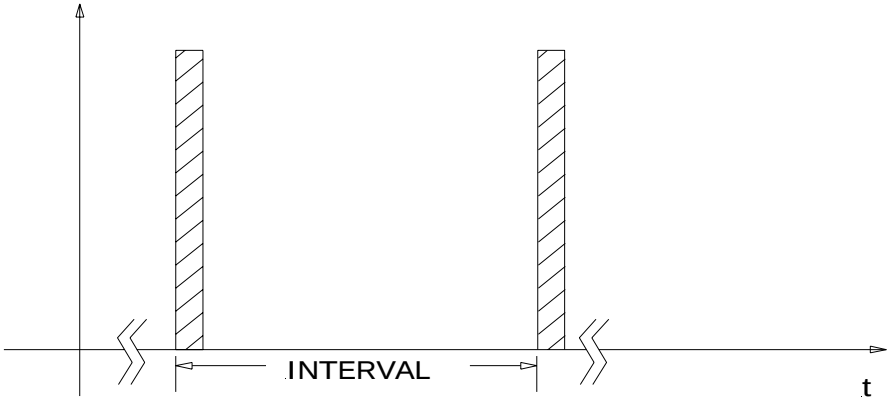


SAMPLING AT PROGRAMMED INTERVAL

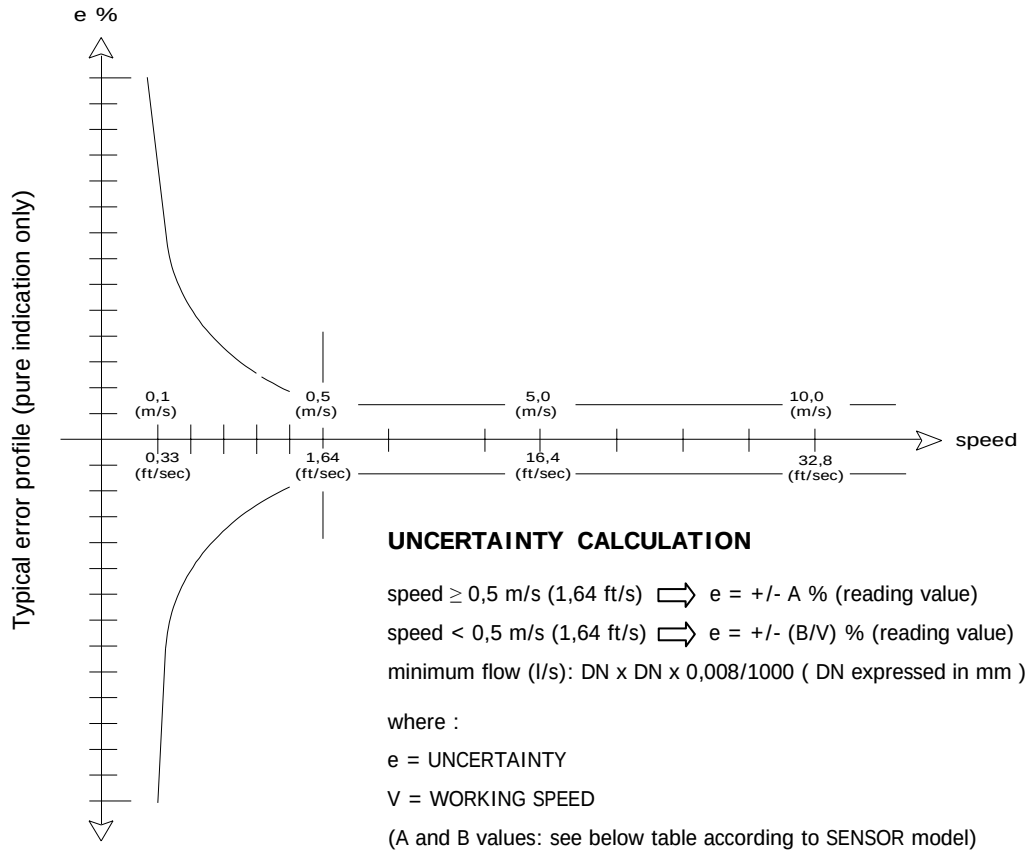
The mode to sample at intervals allows for large battery power savings; the consumption is the following:

Sampling time (s)	Battery life - n° 1 battery (years)	Battery life – " N " batteries (years)
1	0,7	0,7 * N
2	1.3	1.3 * N
5	2.1	2.1 * N
10	2.7	2.7 * N
15	3.0	3.0 * N

Regardless of the number of batteries, the maximum operating time is limited to 10 years



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			MS2500			MS5000		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
0,5	0,25	0,82	0,5	0,25	0,82	0,5	0,25	0,82	2	0,25	0,82

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 252	Display
A	Blind version without display and keyboard
Housing material - Protection rate	
1	Stainless Steel AISI 304 , protection rate IP67
Version	
A	Compact version with sensor MS.... (liquid maximum temperature 100 °C)
Power supply	
1	Power supply : n° 1 Lithium Battery
2	Power supply : n° 2 Lithium Battery
Additional module	
A	Without additional module
B	ME 42 : n. 1 input ON / OFF + 2 out ON/OFF
C	ME 43 : RS 232 communication port
D	ME 46 :option of module ME42+ME43 (DIGITAL IN/OUT+RS 232)

ML 252	A	1	A	1	B

EXAMPLE OF CODE FOR ORDER

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

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