

THE MOST ACCURATE BATTERY POWERED SYSTEM

ISOMAG TM

The friendly magmeter

FLOWIZ TM

(ML 255)



Electromagnetic converter powered by batteries and universal power supply. Optional built in modules for GPRS transmission and pressure measurement.

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

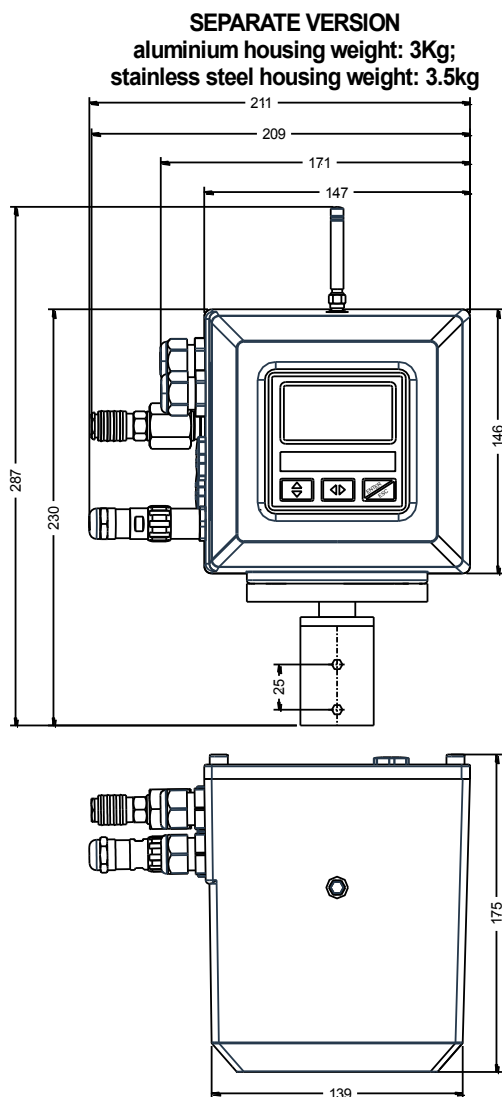
OVERALL FEATURES	
Suitable For	☐ ISOMAG sensors
Minimum conductivity	☐ 5 μS/cm
Version	☐ Compact ☐ Separate
Power consumption	☐ 0.08W With Batteries; Average 0.2W/Max 3 W With Universal Power
Altitude	☐ -200 m up to 2000 m
Ambient Temperature	☐ -20... +60°C / -4... +140 °F
Humidity Range	☐ 0÷100% (IP 67)
Accuracy	☐ See Table

STANDARD FEATURES	
Housing materials	☐ Painted Aluminium die casting
Protection Rate	☐ IP 67
Power Supply	☐ Mixed System Batteries and main Power Supply; n° 1 Size D Not Rechargeable Lithium Battery +Universal Power Supply :12-60V--- / 100÷240V~
Data Logger	☐ MicroSD Memory Card 2 GBytes
Data storage	☐ F-Ram
Protocols	☐ ETP
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 (IF2X interface)
Bi-Directional	☐ Yes
Dual Range	☐ Yes
Diagnostic Funct.	☐ Yes
Empty Pipe Detect.	☐ Yes
CE Certification	☐ Yes

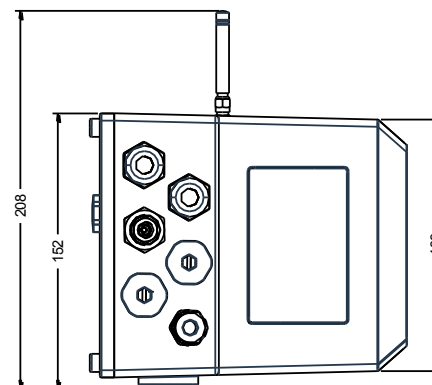
OPTIONAL FEATURES (CHECK FOR MORE DETAILS 'HOW TO ORDER' ON LAST PAGE)	
Housing materials	☐ AISI304
Protection Rate	☐ IP 68
Sensor-Converter Connection Cable	☐ CABLE C015 - C016 (for separate version)
Wires connections	☐ IP 68 Connectors
LCD Display	☐ Graphic display WSTM 128x64 pixels, 3 membrane keys
Power Supply	☐ Up to 6 1 Size D Not Rechargeable Lithium Battery
Pulses/Alarm Outputs	☐ N°2 , 50 Hz, 100mA, 40 Vdc
Digital Input	☐ N°1 On/Off Input
Additional Modules	☐ GSM /GPRS (SMS/CSD System)
Communication port	☐ RS232 (DPP/HTP protocols)
Additional measure	☐ UP to 2 Pressure Sensors ☐ ONE Temperature Sensor Note: for temperature measure Two Wires PT500 must be used ; check for possible combinations of the above.

ACCURACY	
Measurements tolerance	☐ Flow rate (volume) = $\pm 0,1\%$ v.l.
Accuracy (whole system converter+sensor)	☐ See table

OVERALL DIMENSIONS



COMPACT VERSION
aluminium housing weight: 2.5Kg;
stainless steel housing weight: 3kg



CABLEGLAND PG11

PRESSURE PROBE

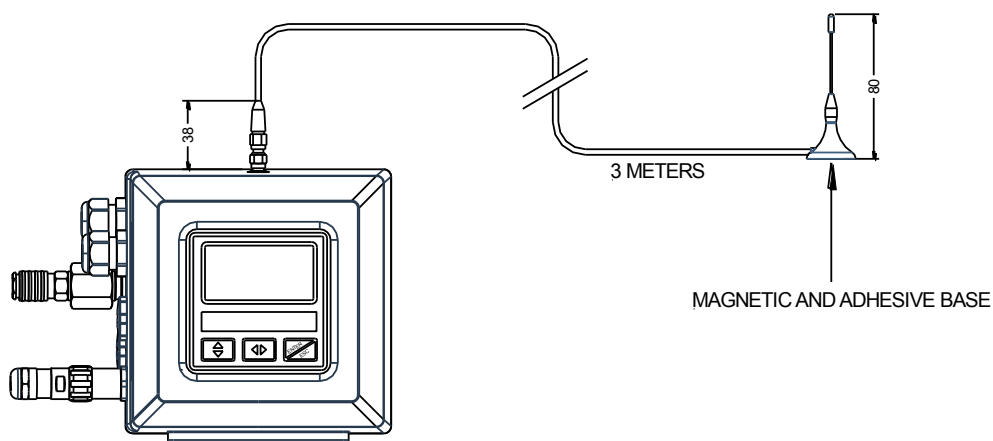
PG11 CAP

QUICK CONNECTOR

LAYOUT AND QUANTITY IN ACCORDING
TO ORDER CODE

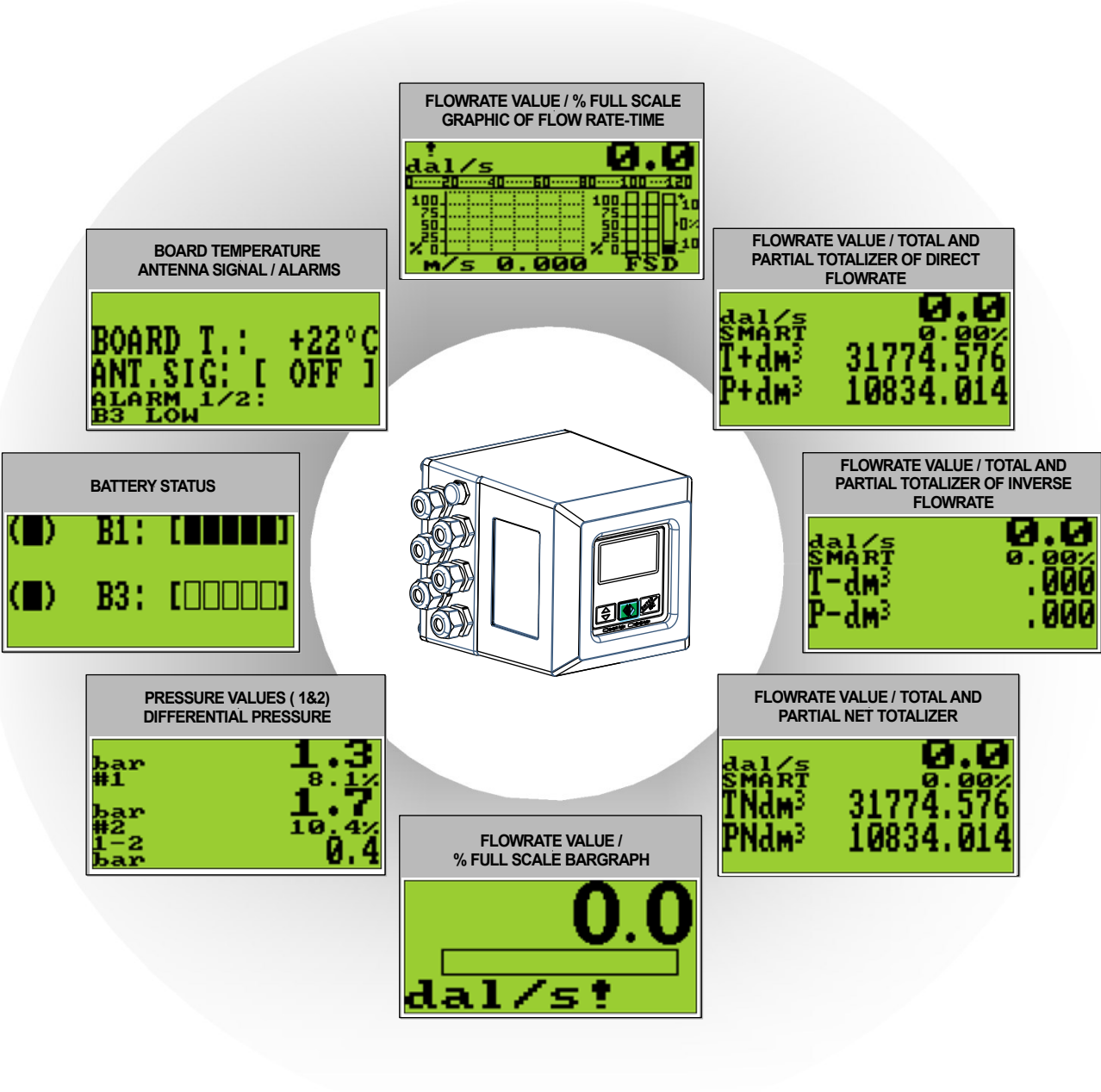
Weights refer to the converter without battery (each battery weights 0.1kg),
which can be provided with 6 batteries maximum and without display, blind configuration.

VERSION WITH 3 METERS CABLE ANTENNA

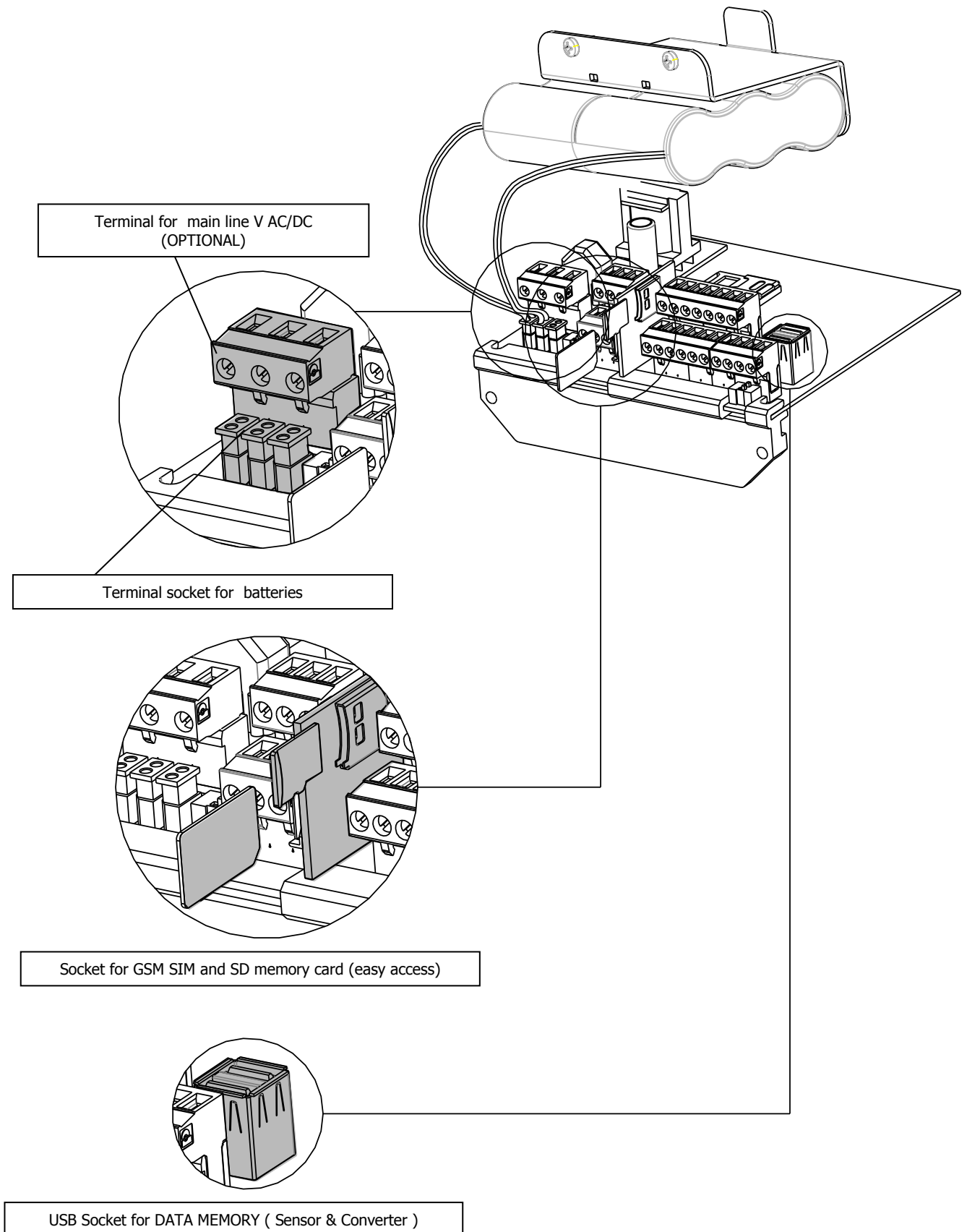


VISUALIZATION PAGES

Different visualization possibilities by simply pressing a key

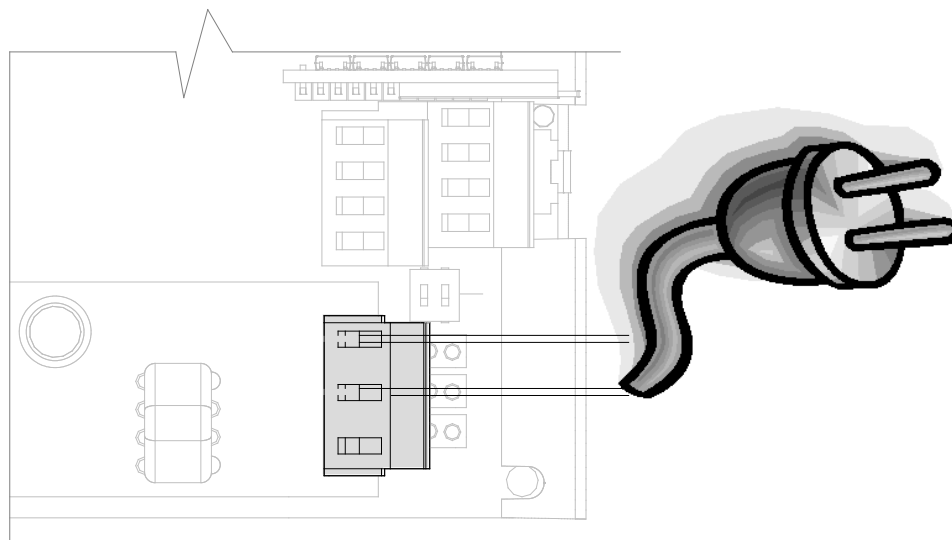


PCB LAYOUT



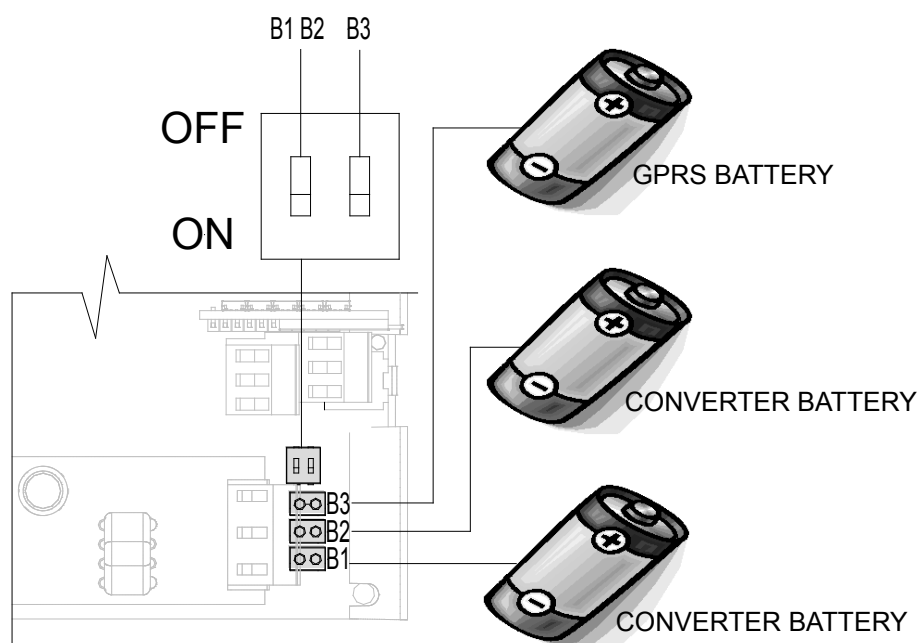
POWER SUPPLY

BY MAIN VOLTAGE



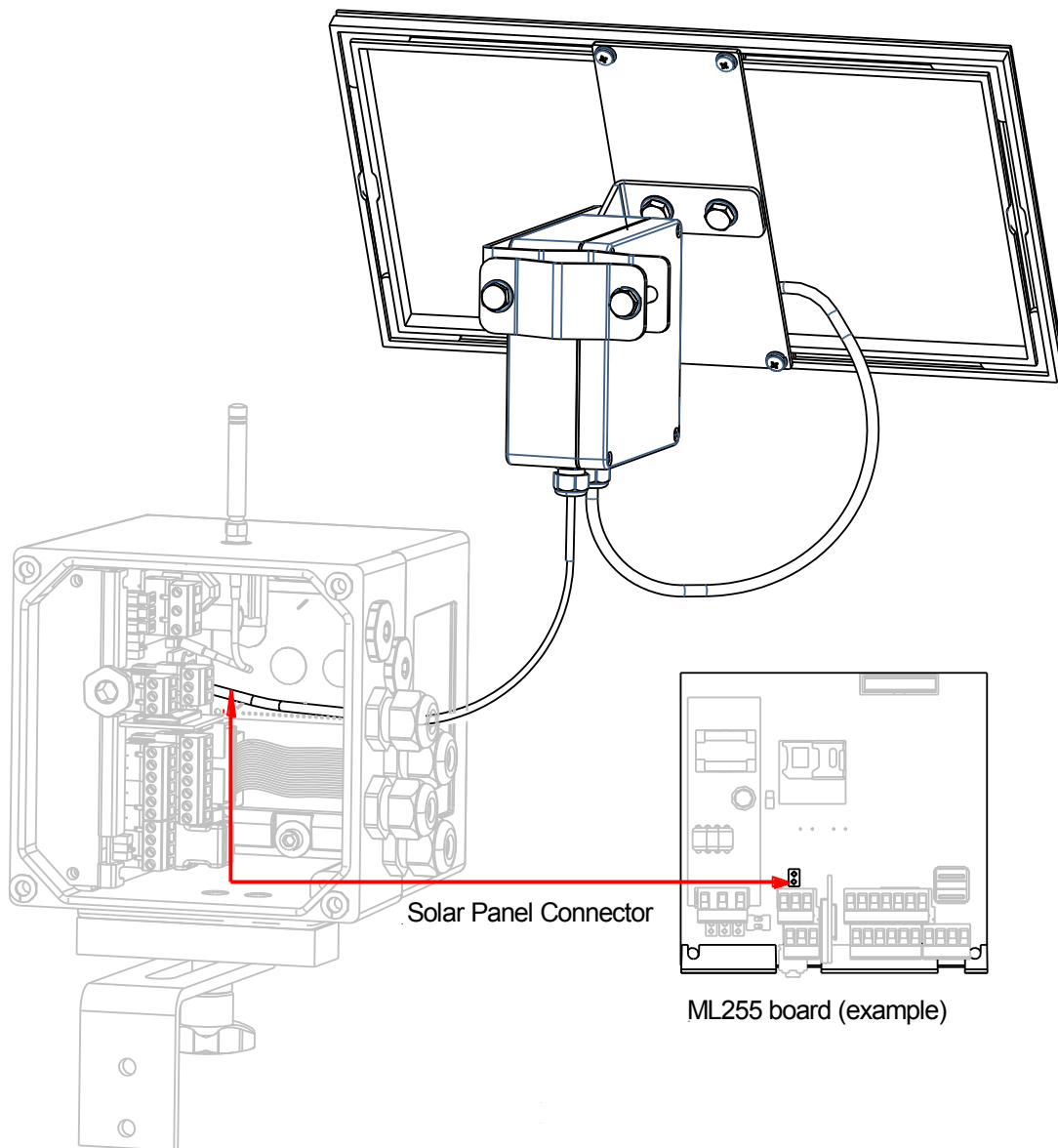
Auto detection of the power source: when main power supply is ON, batteries are excluded and the system always works at the maximum sampling rate (continuous sampling)

BY BATTERIES



Note : Lithium batteries are subject to special transportation regulations according to "Regulation of Dangerous Goods, UN3090 and UN 3091". Special documentation is required to observe there regulations.

BY SOLAR PANEL (APL MODULE)



The APL module allows to power up the instruments of Flowiz family through a photovoltaic module. The system is composed by :

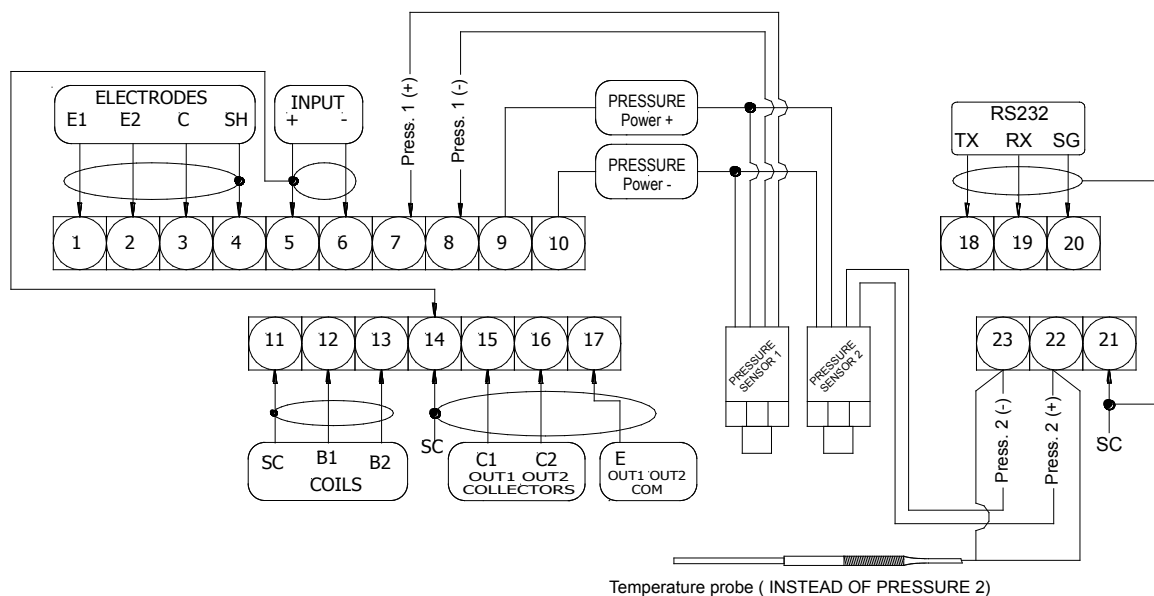
- One photovoltaic panel that converts directly sunlight into electrical energy
- One electronic circuit that use the energy supplied by the module for charging the battery
- One rechargeable battery already mounted inside the APL's electronic housing

Once the APL cable is connected to the Flowiz connector, it detect the presence of module and automatically switch in "CONTINUOUS" mode, whatever is the measure profile set; this solution allows accurate measurements (flow/ pressure) even if they varies continuously. Moreover, if the instrument is equipped with GPRS module, the APL allows to keep the modem continuously connected to the network, getting a "almost real time" device.

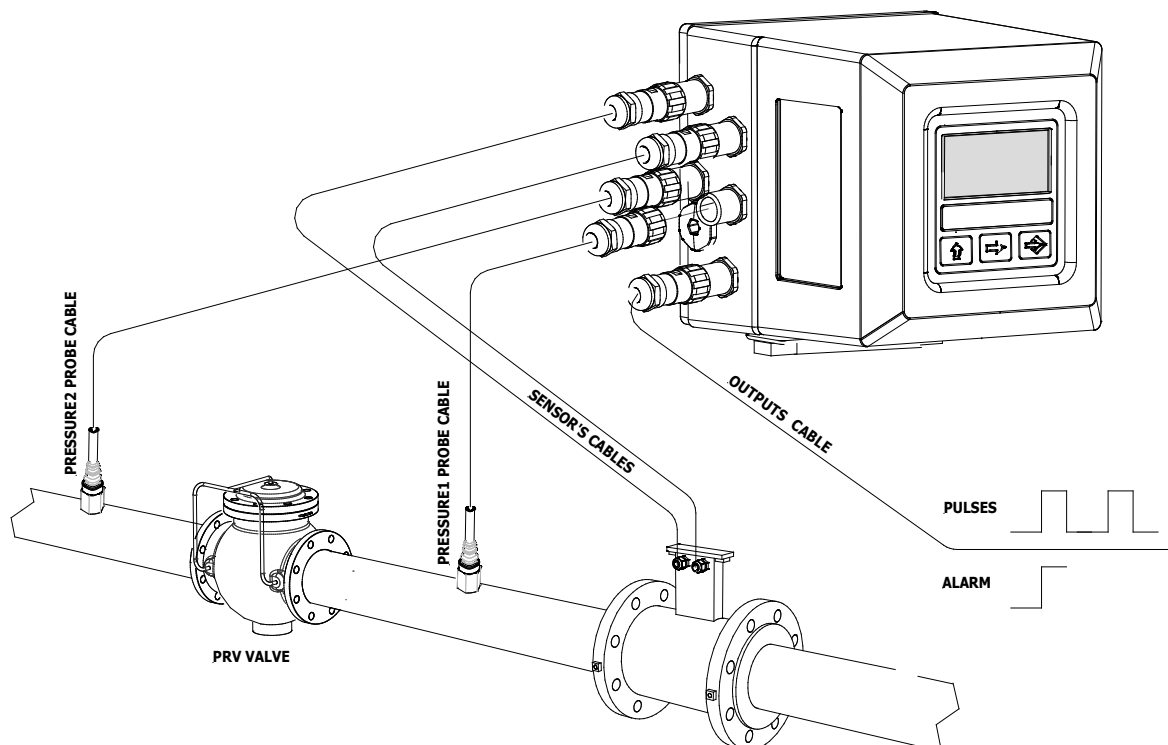
See **APL manual** for installation of solar panel and **Power Tool** software to estimate solar panel charge

ELECTRICAL CONNECTIONS

TERMINAL BLOCK: COMPACT/SEPARATE VERSION

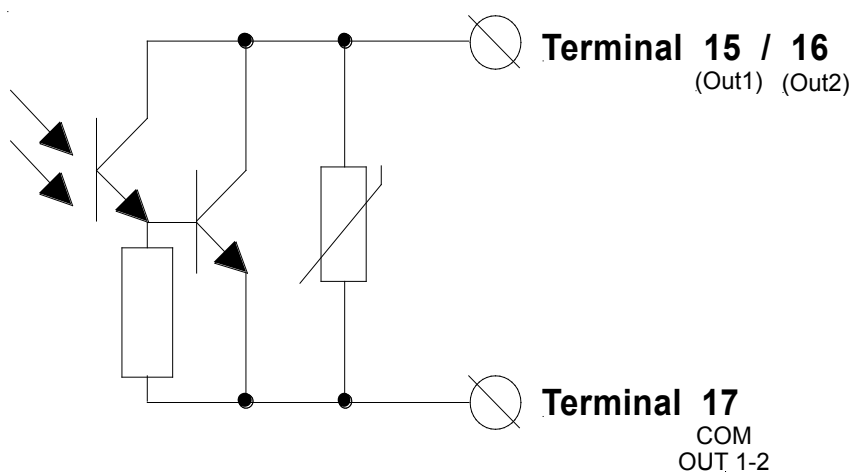


IP 68 VERSION : CONNECTION WITH IP 68 CONNECTORS

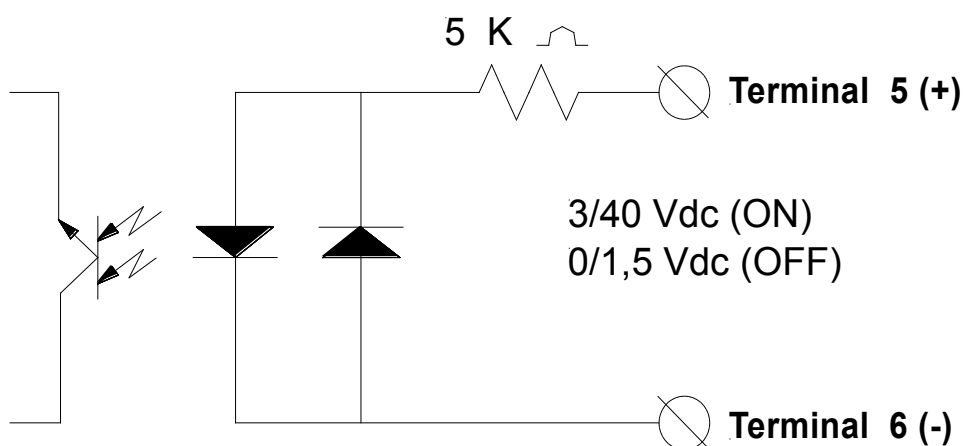


DIGITAL INPUT / OUTPUT

ON/OFF OUTPUT



ON/OFF INPUT



FUNCTION'S LIST

```

MAIN MENU
1-Sensor
1-SENSOR
ND=mm 00025
KA= +01.0000
Sens.type= 000
Ins.position= 0
Ki= 1.0000
Kp= 1.0000
E.P.detect= ON
E.p.thr.= 100
Zero cal.
Zero res.

```

- 1.1 Insert sensor ND (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=1/8ND, 1=1/2ND, 2=7/8ND
- 1.5 Automatic setting according to ID (insertion meter only)
- 1.6 Automatic setting according to ID (insertion meter only)
- 1.7 Enables the empty pipe detection function
- 1.8 Value of empty pipe sensibility detection
- 1.9* Enables the automatic zero calibration system
- 1.10 Reset the preceding value

```

MAIN MENU
1-Sensor
2-Scales
2-SCALES
Fs =dal/s 1800.0
Pls1=dm³ 1.00000
Tpls1=ms 0010.0
Pls2=dm³ 1.00000
Tpls2=ms 0010.0
Fs.ps=bar 16.0
Temp.u.meas.= °C
Tot1MU=dm³ 1.000

```

- 2.1* Full scale value measure set for flowrate
- 2.2* Pulse value on channel 1
- 2.3* Duration of the pulse generated on channel 1
- 2.4* Pulse value on channel 2
- 2.5* Duration of the pulse generated on channel 2
- 2.6 Full scale value set for pressure measure
- 2.7 Unit of measure of temperature
- 2.8* Unit of measure and number of decimal totalizes

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
3-MEASURE
Cut-off=% 00.0
Prof.= SMART
Damping= ON

```

- 3.1 Low flow zero threshold: 0-25% of full scale value
- 3.2 Consumption profiles (SMART, AVERAGE, MAX LIFE, CONT. PWR) see page 10
- 3.4 Damping profile : it allow to set a preset damping function over the measure

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-Alarms
4-ALARMS
Al.max+=% 000
Al.min+=% 000
Al.max-=% 000
Al.min-=% 000
Al.maxP1=% 000
Al.minP1=% 000
Al.maxP2=% 000
Al.minP2=% 000
Al.maxDP=% 000
Al.minDP=% 000
Hyst.=% 03

```

- 4.1 Maximum value alarm set for direct flow rate
- 4.2 Minimum value alarm set for direct flow rate
- 4.3 Maximum value alarm set for reverse flow rate
- 4.4 Minimum value alarm set for reverse flow rate
- 4.5 Maximum value alarm set for pressure 1
- 4.6 Minimum value alarm set for pressure 1
- 4.7 Maximum value alarm set for pressure 2
- 4.6 Minimum value alarm set for pressure 2
- 4.7 Maximum value alarm set for differential pressure
- 4.8 Minimum value alarm set for differential pressure
- 4.9 Hysteresis threshold set for the minimum and maximum flow rate alarms

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-Alarms
5-Inputs
5-INPUTS
T+ reset= OFF
P+ reset= ON
T- reset= OFF
P- reset= OFF
Count lock= ON
Calibration= OFF
Alarm= OFF
Wake-up= 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
- 5.6 Totalise counting lock command
- 5.7* Autozero calibration external command
- 5.8 Alarm from external signal (i.e. flooding/intrusion/..)
- 5.8* Auto- switch on command

```

MAIN MENU
1-Sensor
2-Scales
3-Measure
4-Alarms
5-Inputs
6-Outputs
6-OUTPUTS
Out1= OFF
Out2= PLS
Pwr src= OFF

```

- 6.1* Output 1
- 6.5* Output 2
- 6.6 Power supply of pressure probes

```

5-Outputs
6-Outputs
7-Communication
8-Display
1 7-COMMUNICATION
IF2 prot.= DPP
RS232 prot.= DPP
Address= 000
RS232 bps= 4800
Min. ant. s.= % 10
Send DL= mail
Send DL= PERIODIC
Send DL= HOURLY
Time = 00a00h59m
Send PD= OFF
Send AL= OFF
Chk SMS= OFF
Ck mail= OFF
Clock s= OFF
Send events= OFF
Send ST.data= ON
Roaming= OFF
Send DL= OFF
Send events
Send config.
Clock s
Ck mail
Chk SMS
Send ST.data

```

- 7.1 Choice of the IF2 communication protocol
- 7.2 Choice of the RS232 communication protocol*
- 7.3 Address RS232 port*
- 7.4 RS232 port speed*
- 7.5 Minimum antenna signal strength to send e-mail*
- 7.6 Choice of how to send data logger*
- 7.7 Choice of when send data logger*
- 7.8 Interval of data logger sending if 7.7 is set on "PERIODIC"
- 7.9 Interval of sending DATA LOGGER*
- 7.10 Enables send Process data*
- 7.11 Enables send Alarm*
- 7.12 Enables check INCOMING SMS*
- 7.13 Enables check INCOMING E-MAIL*
- 7.14 Enables clock synchronization with a specified server via the HTTP protocol*
- 7.15 Enables send EVENTS*
- 7.16 Enable send sensor test in automatic mode*
- 7.17 Roaming enable*
- 7.18 Send Data Logger, instant command*
- 7.19 Send EVENTS, instant command*
- 7.20 Send configuration through e-mail immediately*
- 7.21 Clock synchronization, immediately, with a specified server via the HTTP protocol*
- 7.22 Check INCOMING E-MAIL, instant command*
- 7.23 Check INCOMING SMS, instant command*
- 7.24 Send sensor test in manual mode*

* (Communication function group only) = see wireless specific manual supplied for more details

```

5-Inputs
6-Outputs
7-Communication
8-Display
1 8-DISPLAY
Language= EN
D. time= s 060
Quick start= OFF
Disp. lock= OFF
T+ reset
P+ reset
T- reset
P- reset

```

- 8.1 Choice of the language: EN= English, IT=Italian, FR= French, SP= Spanish
- 8.2 Time for switch off display (shown with function 3.7 enabled)
- 8.3 Visualization of "Quick start menu"
- 8.4 lock of DISPLAY in ONE SPECIFIC visualization page
- 8.5* Total direct (positive) flow totalizer reset from keyboard
- 8.6* Partial direct (positive) flow totalizer reset from keyboard
- 8.7* Total reverse (negative) flow totalizer reset enable from keyboard
- 8.8* Partial reverse (negative) flow totalizer reset enable from keyboard

```

6-Outputs
7-Communication
8-Display
9-Data logger
1 9-DATA LOGGER
2011/05/02 10:12
T. zone= h +00.0
Acquisition= ON
Comp. mode= OFF
Double int.= ON
int. 1= 00h00m01s
int. 2= 00h00m01s
int. 3= HOURLY
T. ON= 00d00h00m
T. OFF= 00d00h00m
Log T+= OFF
Log P+= OFF
Log T-= OFF
Log P-= OFF
Log NT= OFF
Log NP= OFF
Log Q= OFF
Log P1= OFF
Log P2= OFF
Log DP= OFF
Log TEMP= OFF
Log STAT= OFF
M. units= OFF
% values= OFF
Separator= ,

```

- 9.1 Date and time set
- 9.2 Set of Time Zone (Against GMT -12 to +12 hours)
- 9.3* Automatic data logger enable
- 9.4 Data formatted like ML250 (see ML250 manual)
- 9.5 Choice of single (off) or double (on) logging interval
- 9.6 Interval time 1 for the data logging function
- 9.7 Interval time 2 for the data logging function
- 9.8 Interval period 2 for the data logging function
- 9.9 Interval 2, start logging time
- 9.10 Interval 2, stop logging time
- 9.11 Enables the logging of direct total totalizer
- 9.12 Enables the logging of direct partial totalizer
- 9.13 Enables the logging of reverse total totalizer
- 9.14 Enables the logging of reverse partial totalizer
- 9.15 Enables the logging of net total totalizer
- 9.16 Enables the logging of net partial totalizer
- 9.17 Enables the logging of flow rate
- 9.18 Enables the logging of pressure 1
- 9.19 Enables the logging of pressure 2
- 9.20 Enables the logging of differential pressure
- 9.21 Enables the logging of temperature
- 9.22 Enables the logging of statistical data (ant, signal, batt. status, board temp,...)
- 9.23 Enables the sending of measure units (technical units)
- 9.24 Enables the sending of measure units (%)
- 9.25 Symbol used as separator on CSV files

```

6-Outputs
7-Communication
8-Display
9-Data logger
10-Diagnostic
1 10-DIAGNOSTIC
Sensor test
Self test
Simulation= OFF
Stand-by
Gprs test
Read SDC info
Firmware rev.

```

- 10.1 Perform a sensor test (SENSOR MUST BE CONNECTED)
- 10.2* Converter auto-test
- 10.3* Flow rate simulation enabling
- 10.4* Stand-by function
- 10.5 Test of GPRS connections
- 10.6 SD card status/info
- 10.7 Firmware revision/version

```

7-Communication
8-Display
9-Data logger
10-Diagnostic
11-Internal data
1 11-INTERNAL DATA
L2 code= *****
Load fact.data
B2= 0
RS= +1.0000

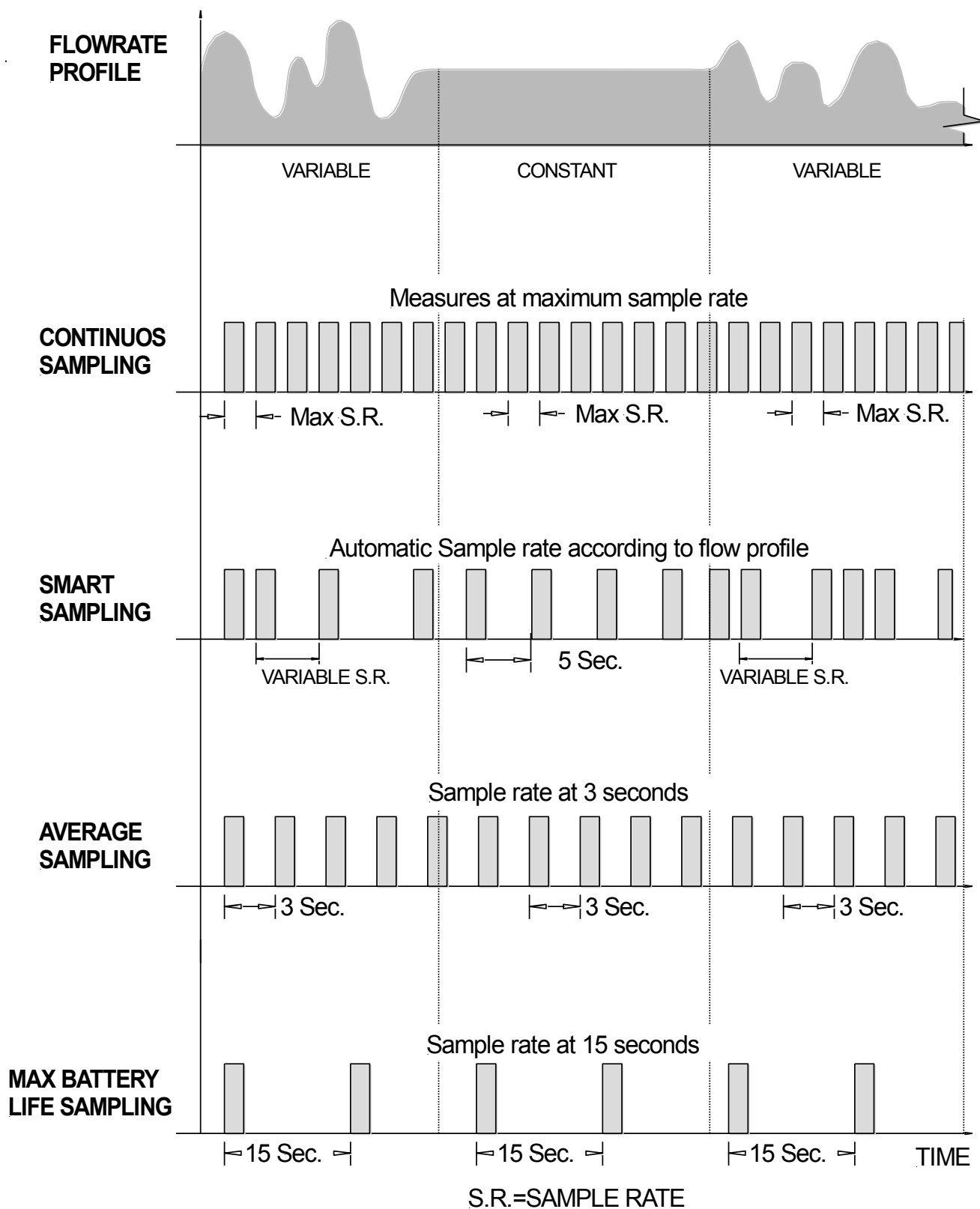
```

- 11.1 Level 2 access code enter
- 11.2 Load factory data pre-set
- 11.3 Enable the B2 batteries SLOT (1/2/3 according to the number of batteries pack)*
- 11.4 Ks Coefficient

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

MEASURE / SAMPLE FREQUENCY

ML 255 can be programmed to measure in four different modes:



BATTERIES CONSUMPTION

Battery consumption depends on the setting of the following elements: main board, sampling profiles, sensor diameter, modem network conditions, frequency of data sending, amount of collected data, interfaces activity (display, modem, etc.).



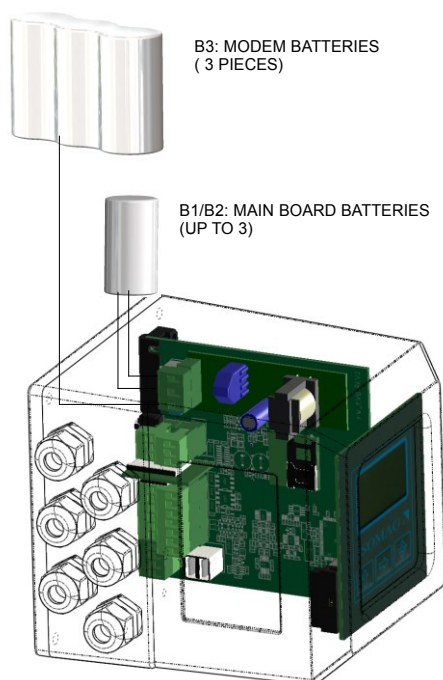
LOW CONSUMPTION



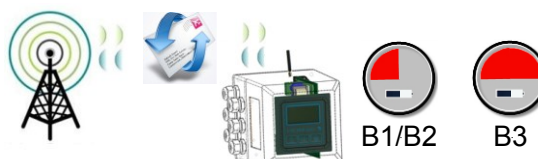
MEDIUM CONSUMPTION



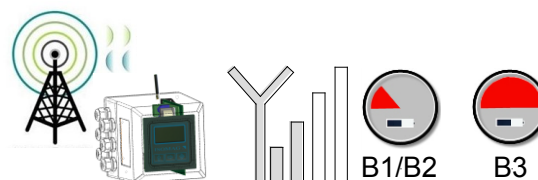
HIGH CONSUMPTION



FREQUENCY OF DATA DELIVERY AND AMOUNT OF DATA COLLECTED



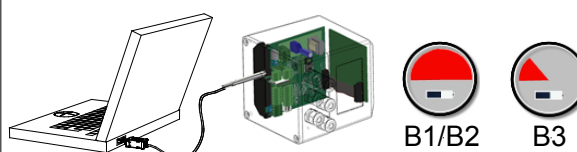
POOR NETWORK COVERAGE



DISPLAY ACTIVITIES



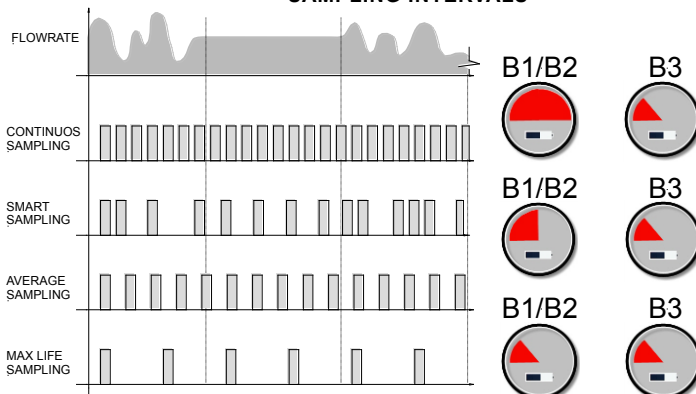
INTERFACE ACTIVITIES AND STORAGE DATA



MAIN BOARD AND MODEM IN STANDBY

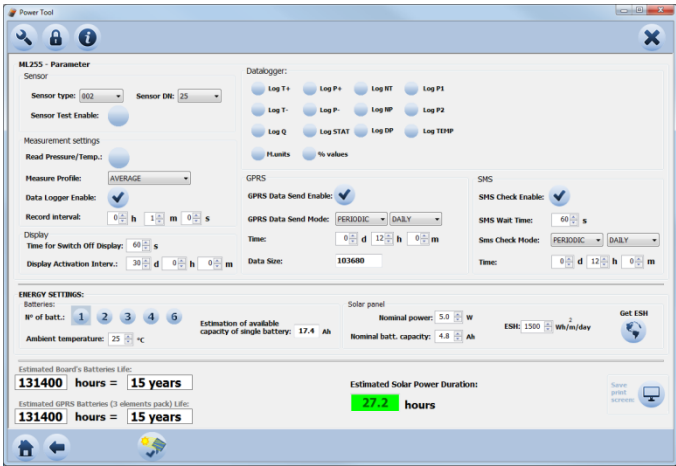


SAMPLING INTERVALS



BATTERIES LIFE

POWER TOOL SOFTWARE



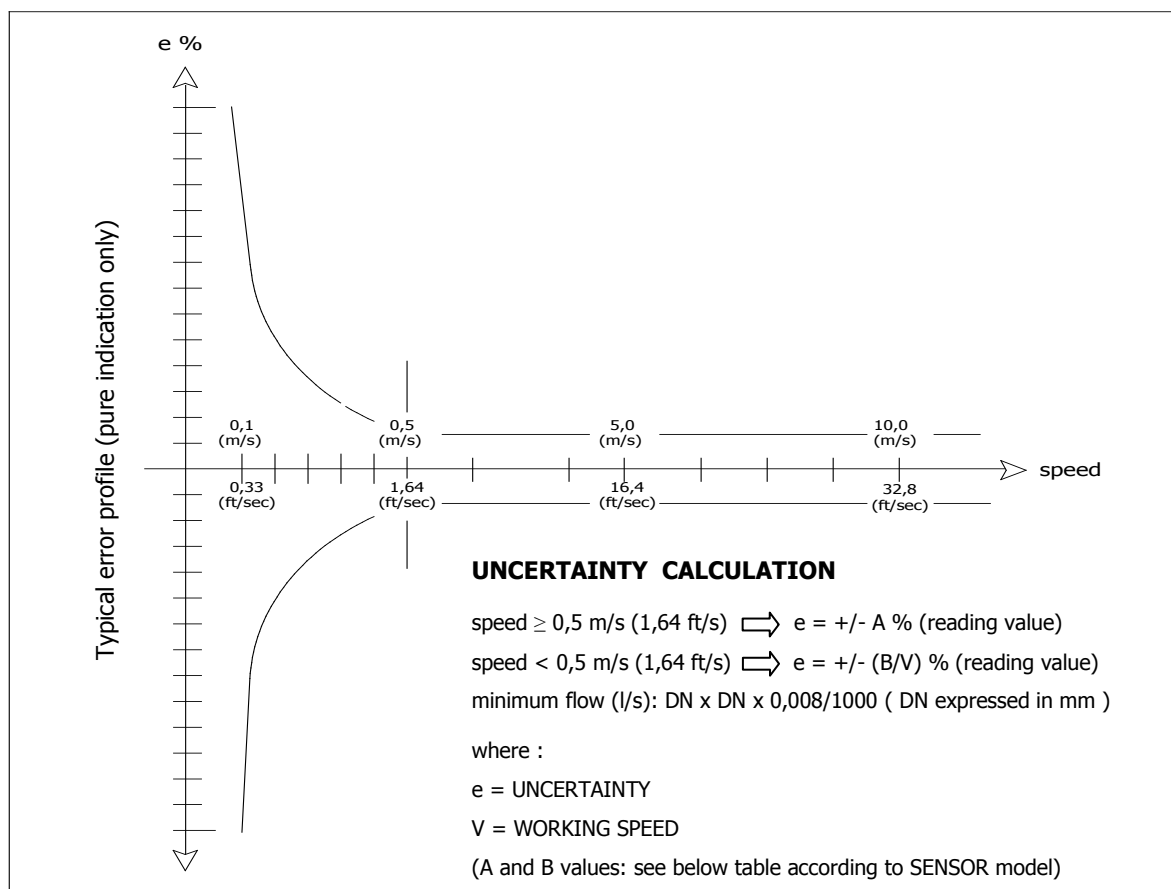
Power tool is a software which allows to evaluate the converter battery life. The estimation is done with an easy guided procedure

Low power consumption: a number of design strategies have been employed to achieve exceptionally low power consumption. However, the length of time between battery changes depends on a number of data transmission per day, GPRS signal strength and the frequency of sampling and logging.



NOTE: the Customer is solely responsible for ensuring that there is sufficient GPRS/GSM mobile network coverage for each device, and that neither the reseller nor ISOIL shall have any liability in the event of a reduction or cessation of such coverage.

ACCURACY TABLE



FULL BORE SENSORS

MS501/MS1000/MS2500			MS5000		
A	B(m/s)	B(ft/s)	A	B(m/s)	B(ft/s)
0,4	0,20*	0,66	2,0	1,0	3,28

INSERTION SENSORS

See MS 3770 / MS 3800 DATA SHEET

Reference conditions below and as per internal testing procedures:

- ☐ Constant flow rate during the test
- ☐ Pressure: >30 Kpa
- ☐ Flow condition : fully developed flow profile
- ☐ Zero stability $\pm 0,005$ %

* Special accuracy on request

HOW TO ORDER

CODE EXAMPLE	DISPLAY
B	B Graphic LCD WSTN 128 x 64, 8 line each of 16 characters and 3 programming keys
HOUSING MATERIAL / PROTECTION RATE	
0	0 Painted aluminum die casting , protection rate IP 67 - MODULE AVAILABLE : 3-4-5-7-8-a-b
	1 AISI304 Stainless Steel housing, protection rate IP67 (DISPLAY NOT ROTABLE) MODULE AVAILABLE : 3-4-5-7-8-a-b
	5 AISI304 Stainless Steel housing, protection rate IP68 1,5 meters under water (ONLY FOR COMPACT VERSION ,DISPLAY NOT ROTABLE) - MODULE AVAILABLE : 7-9-a-b-c-d
	6 Painted aluminium die casting IP 68 1,5 meters under water (ONLY FOR COMPACT VERSION ,DISPLAY NOT ROTABLE) - MODULE AVAILABLE : 7-9-a-b-c-d
	7 Painted aluminium die casting IP 68 1,5 meters under water (ONLY FOR SEPARATE VERSION ,DISPLAY NOT ROTABLE) - MODULE AVAILABLE : 7-9-a-b-c-d, COMPLETE WITH 2 CONNECTORS IP 68 FOR CABLE C015/C016
	8 AISI 304 - IP 68 1,5 meters under water (SEPARATE VERSION ONLY, NO ROTATABLE DISPLAY) - AVAILABLE MODULES:7-9-b-c-d, COMPLETE WITH 2 CONNECTORS IP 68 FOR CABLE C015/C016
VERSION	
A	A Compact version with sensor MS
	B Separate version for wall mounting, complete with mounting accessories in Aluminium (painted RAL6028) , max lenght of C015/C016 = 20 m
	D Separate version for wall mounting, complete with mounting accessories in AISI304 , max lenght of C015/C016 = 20 m
POWER SUPPLY	
1	0 n° 1 LITHIUM BATTERY - WITHOUT UNIVERSAL POWER SUPPLY
	1 n° 1 LITHIUM BATTERY- WITH UNIVERSAL POWER SUPPLY
	2 n° 4 LITHIUM BATTERY (1 + 1 OF 3 ELEMENTS PACK NECESSARY FOR GPRS) - WITH UNIVERSAL POWER SUPPLY
	4 n° 6 LITHIUM BATTERY (N° 2 X 3 ELEMENTS PACK) - WITHOUT UNIVERSAL POWER SUPPLY
	5 N° 3 LITHIUM BATTERY (N° 1 OF 3 ELEMENTS PACK) - WITHOUT UNIVERSAL POWER SUPPLY
	6 n° 4 LITHIUM BATTERY (1 + 1 OF 3 ELEMENTS PACK NECESSARY FOR GPRS) - WITHOUT UNIVERSAL POWER SUPPLY
	7 WITHOUT BATTERY WITH UNIVERSAL POWER SUPPLY
	8 WITHOUT BATTERY WITHOUT UNIVERSAL POWER SUPPLY
	9 n° 6 LITHIUM BATTERY (N° 2 X 3 ELEMENTS PACK) - WITH UNIVERSAL POWER SUPPLY
	a n° 2 LITHIUM BATTERY (1+1) - WITHOUT UNIVERSAL POWER SUPPLY
	b n° 5 LITHIUM BATTERY (1+1 +1 OF 3 ELEMENTS PACK) - WITHOUT UNIVERSAL POWER SUPPLY
	c n° 5 LITHIUM BATTERIES (1+ 1 + 1 PACK OF 3) SUITABLE FOR GPRS - WITH UNIVERSAL POWER SUPPLY
INPUT	
A	A without input
	C Input for n° 1 pressure probe (pressure sensor to be ordered separately)
	D Input for n° 1 pressure sensor complete with IP 68 connector (pressure sensor to be ordered separately)
	E Input for n° 2 pressure probe (pressure sensor to be ordered separately)
	F Input for n° 2 pressure sensor complete with IP 68 connector (pressure sensor to be ordered separately)
	G Input for PT 500 THERMAL PROBE (two wire, to be ordered separately)
	H Option C + G
ADDITIONAL MODULES	
1	1 NONE
	3 N° 2 on/off out (max 50 Hz - max 100 mA) + N° 1 Digital Input
	4 RS232 Serial Port
	5 GPRS module (Complete with software) WITH ANTENNA ON THE HOUSING
	7 GPRS module (Complete with software) WITH 3 METERS CABLE ANTENNA (SUGGESTED FOR IP68 VERSION)
	8 Options 3 + 4: Digital IN/OUT + RS 232
	9 Options c + 4: Digital IN/OUT + RS 232 complete with IP 68 connector *
	a Options 3 + 5: Digital IN/OUT + GPRS module (Complete with software) WITH ANTENNA ON THE HOUSING
	b Options c + 7: Digital IN/OUT + GPRS module (Complete with software) WITH 3 METERS CABLE ANTENNA (SUGGESTED FOR IP 68 VERSION) - Complete with IP68 connector *
	c N° 2 on/off outs (max 50 Hz - max 100 mA) + N° 1 Digital Input with IP68 connector *
	e Options c + 5: Digital IN/OUT + GPRS module (Complete with software) WITH ANTENNA ON THE HOUSING - Complete with IP68 connector *
	f Options 3 + 7: Digital IN/OUT + GPRS module (Complete with software) WITH 3 METERS CABLE ANTENNA (SUGGESTED FOR IP 68 VERSION)
	g Digital IN/OUT + RS 232 complete with 2 x 4 poles MIL-C-26482 connectors (Male + female, one for I/O + one for RS232)
	z NONE
SPECIAL FEATURES	
A	A NONE
	B WITH ANTICONDENSE CAP
	C Connector for IP68 out connection (One piece , 10 contacts)
DAT MEMORY	
0	0 NONE
	1 Sensor data memory
	2 Converter data memory
	3 Converter & Sensor data memory



ML255-B0A1A1A0 (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.