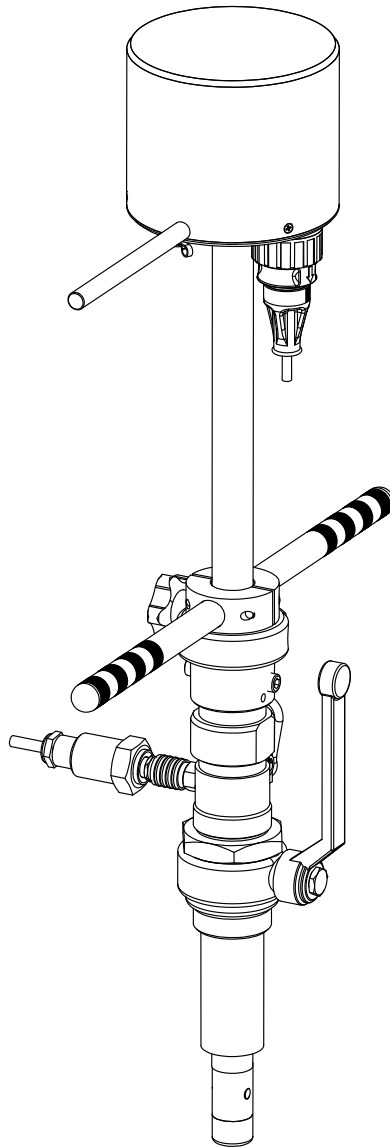




ISOMAG

The friendly magmeter

OPERATING AND MAINTENANCE MANUAL



CS3820

CE

ISOIL

INDUSTRIA



Release number: **3820_IT_EN_R2_1.00.0000**

The characters of file name in bold type indicate the software version which the manual refers to; it is visualized at the instrument start up, or by specific function on DIAGNOSTIC menu.

The reproduction of this manual and any supplied software is strictly forbidden.



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INTRODUCTION

- ❑ These operating instructions and description of device functions are provided as part of the scope of supply.
- ❑ They could be modified without prior notice. The improper use, possible tampering of the instrument or parts of it and substitutions of any components not original, renders the warranty automatically void.
- ❑ The flow meter realizes a measure with liquids of conductivity greater than $5\mu\text{S}/\text{cm}$ in closed conduits.

SAFETY INFORMATION

Any use other than described in this manual affects the protection provided by the manufacturer and compromises the safety of people and the entire measuring system and is, therefore, not permitted. The manufacturer is not liable for damaged caused by improper or non-designated use.

- ❑ Transport the measuring device to the measuring point in the original packaging. Do not remove covers or caps until immediately before installation. In case of cartons packaging it is possible to place one above the other but no more than three cartons. In case of wooden packaging do not place one above the other.
- ❑ Disposal of this product or parts of it must be carried out according to the local public or private waste collection service regulations.
- ❑ The converter must only be installed, connected and maintained by qualified and authorized specialists (e.g. electrical technicians) in full compliance with the instructions in this Operating Instruction, the applicable norms, legal regulations and certificates (depending on the application).

- ❑ The specialists must have read and understood these Operating Instructions and must follow the instructions it contains. The Operating Instructions provide detailed information about the device. If you are unclear on anything in these Operating Instructions, you must call the ISOIL service department.
- ❑ The converter should only be installed after have verified technical data provided in these operating instructions and on the data plate.
- ❑ Specialists must take care during installation and use personal protective equipment as provided by any related security plan or risk assessment.
- ❑ Never mount or wire the converter while it is connected to the power supply and avoid any liquid contact with the instrument's internal components. To connect remove the terminals from the terminal block.
- ❑ Before connecting the power supply check the functionality of the safety equipment.
- ❑ Repairs may only be performed if a genuine spare parts kit is available and this repair work is expressly permitted.
- ❑ For the cleaning of the device use only a damp cloth, and for the maintenance/repairs contact the service center (for details see the last page).

Before starting up the equipment please verify the following:

- ❑ Power supply voltage must correspond to that specified on the data plate
- ❑ Electric connections must be completed as described
- ❑ Ground (earth) connections must be completed as specified

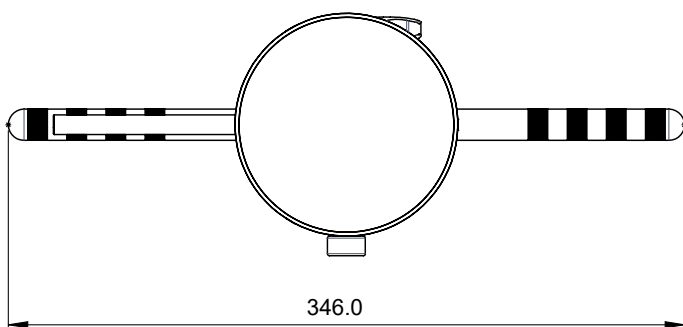
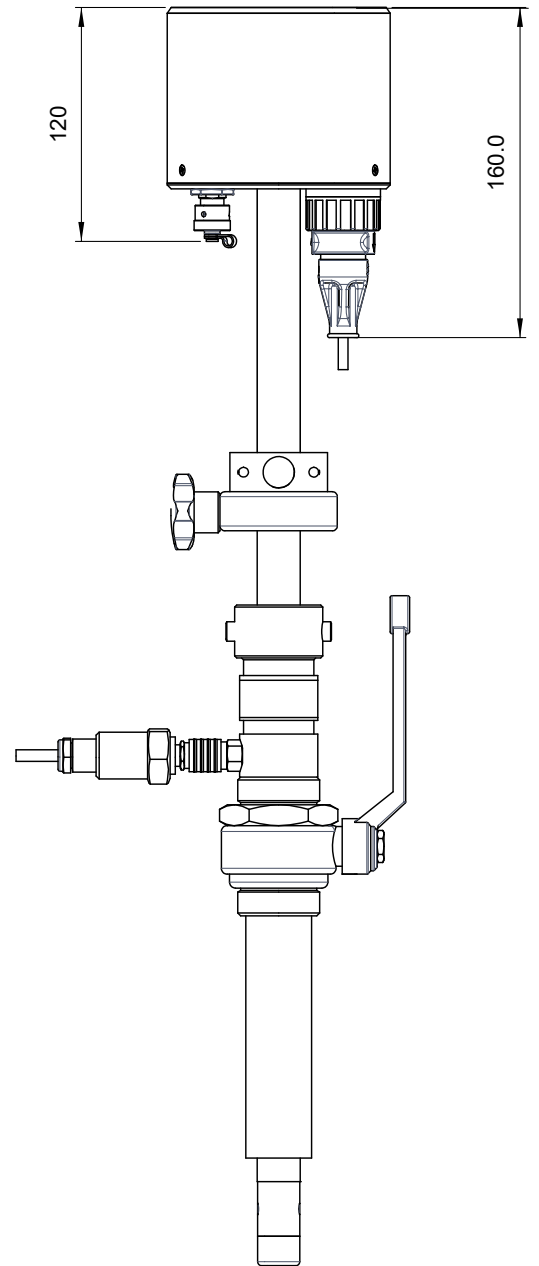
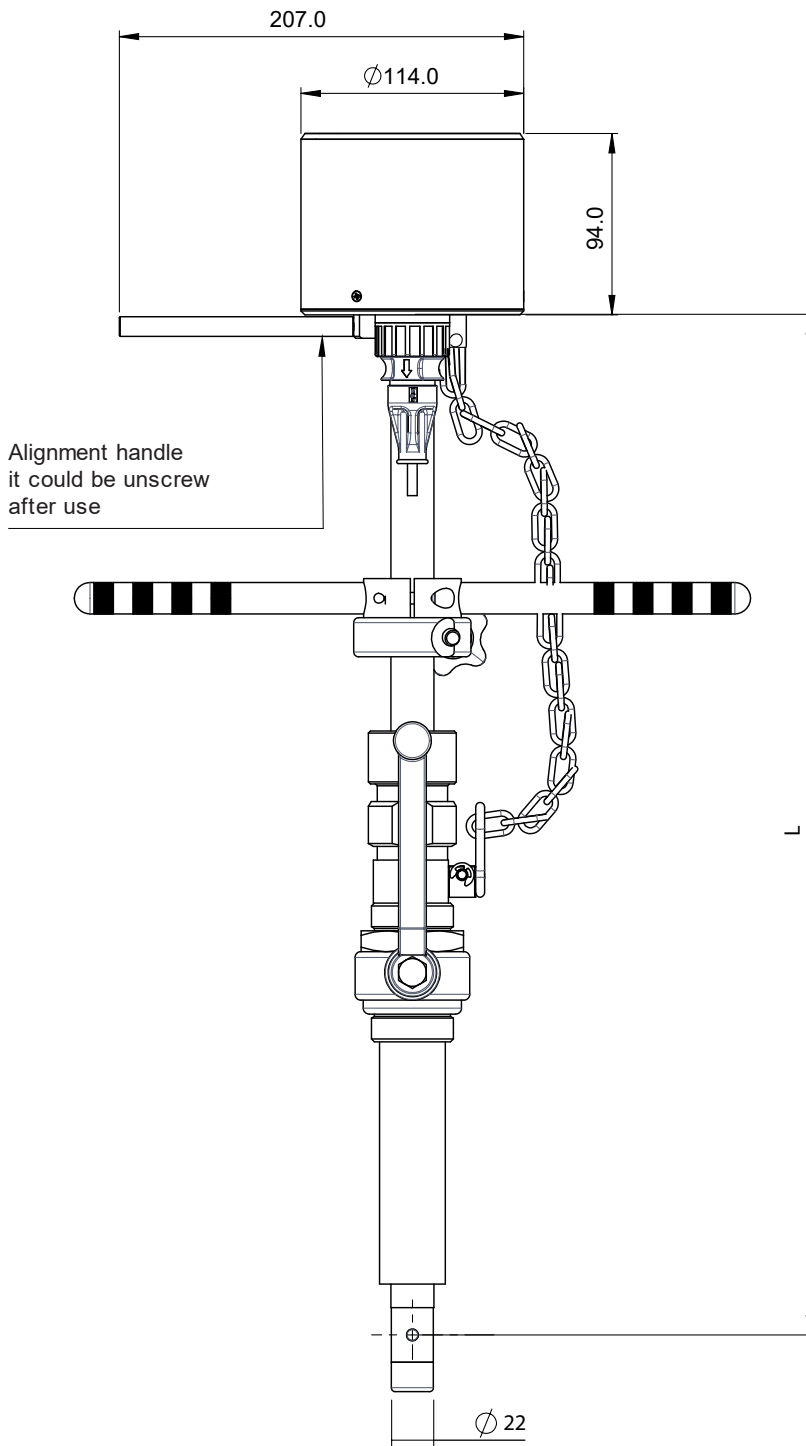
Verify periodically (every 3-4 months):

- ❑ The power supply cables integrity, wiring and other connected electrical parts
- ❑ The converter housing integrity
- ❑ The suitable tightness of the sealing elements
- ❑ The mechanical fixing of the converter to the pipe or wall stand

SAFETY CONVENTION

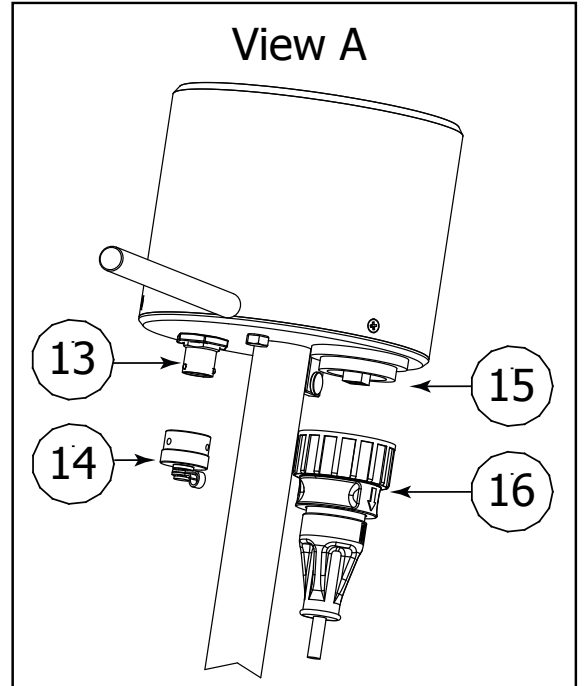
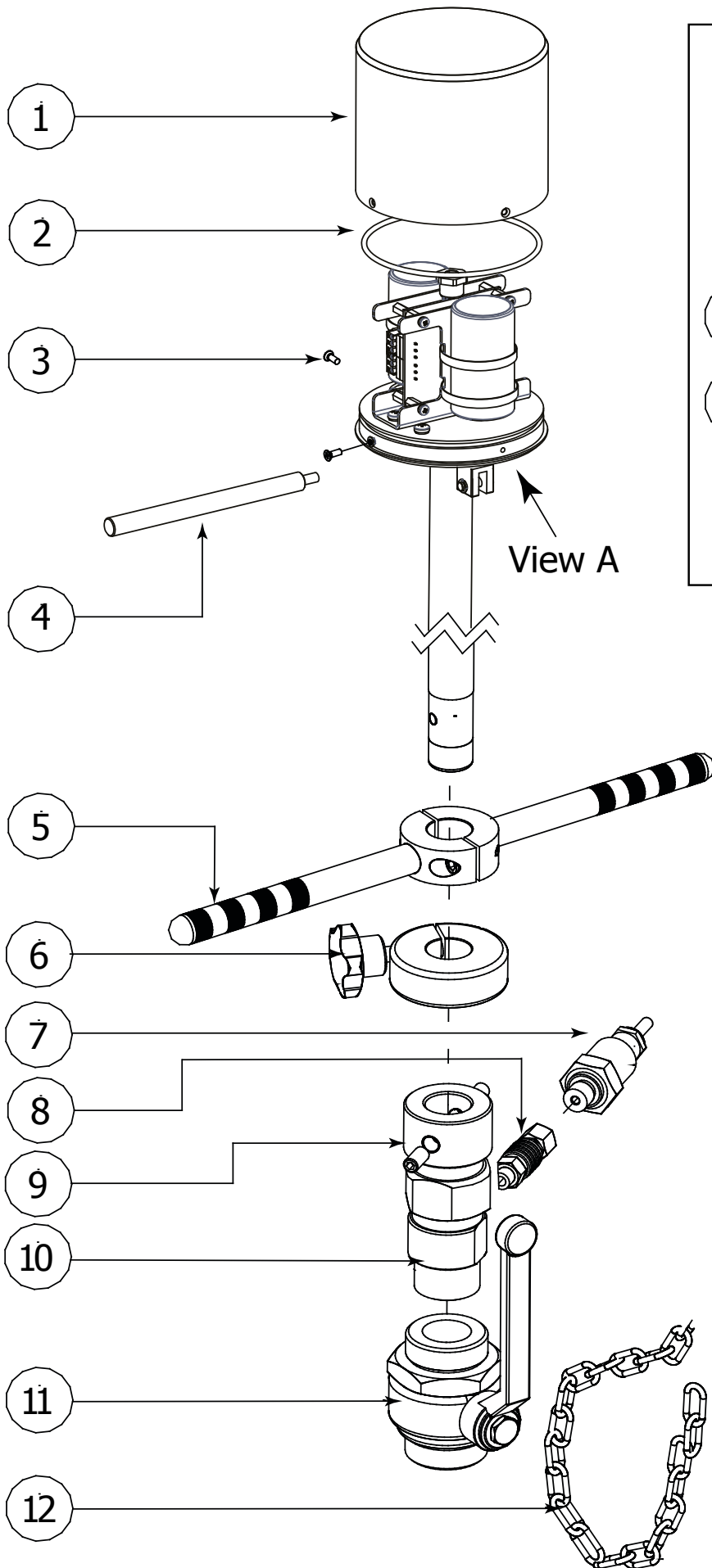
 DANGER ELECTRIC SHOCK	 WARNING	 PRECAUTIONS	 ATTENTION
--	--	---	--

OVERALL DIMENSIONS



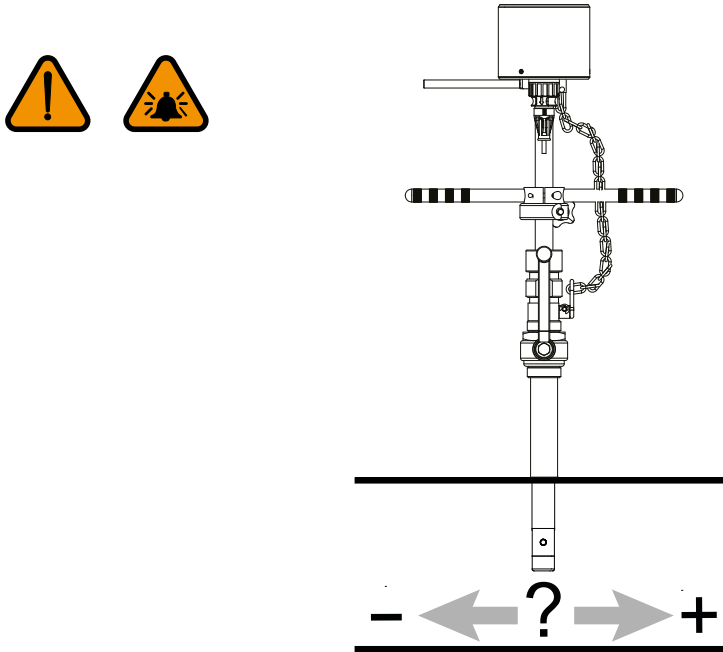
SIZE	L
0	510
1	660
2	860
3	1060
4	1360
5	2360

CS3820 LAYOUT




POS.	DESCRIPTION
1	POLISHED COVER
2	ORING 3500
3	STAINLESS SCREW M3x8
4	ALIGNMENT HANDLE
5	PUSH HANDLE
6	FIXING KNOB
7	PRESSURE SENSOR
8	QUICK CONN.
9	GRUB SCREW M10X12
10	1" JACKET
11	1" VALVE
12	SAFETY CHAIN
13	CONN. 62GB-57A-08-04PN (METAL)
14	CAP 62GB-814-08 (METAL)
13	CONN. UTS7-8E4P (PLASTIC UL94-V0)
14	CAP. UTS8DCGR (PLASTIC UL94-V0)
15	CONN. PAN USB CONNECTOR PX0843-B
16	USB CONNECTOR IP68 PX0840_B_3M00

GENERAL INFORMATION THE SENSOR



Before install the sensor locate the direction of the liquid in the piping
 The sign of the flow rate is positive, when the flow direction it's from - to + as printed on the tag plate.
 If after the installation, for plant request becomes necessary reverse the sign of the flow, it's enough reverse the sign of the coefficient KA.

OPERATIVE TEMPERATURES

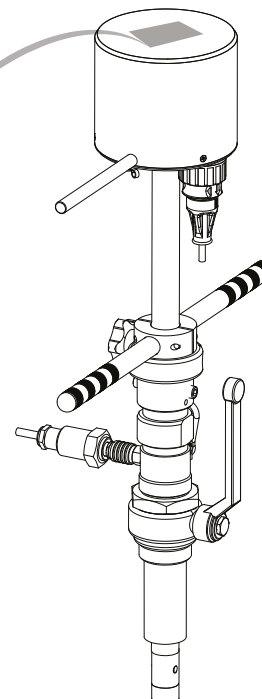


	Liquid Temp.		Ambient Temp.	
	Min.	Max	Min.	Max
° C	-20	150	-10	60
° F	-4	302	14	140

DATA PLATE

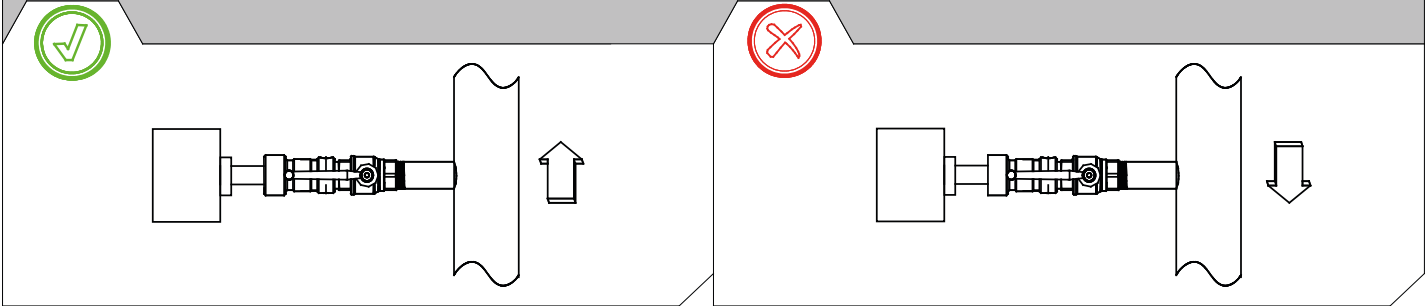
The instrument label contain the following information:

- MODEL:** Convert Model
- S/N:** Serial Number of the converter
- SUPPLY:** Main power supply
- POWER:** Maximum power consumption
- IP:** Protection grade
- T:** Operation temperature
- COUPLING:** Serial number of sensor coupled
- ITEM:** Free for user

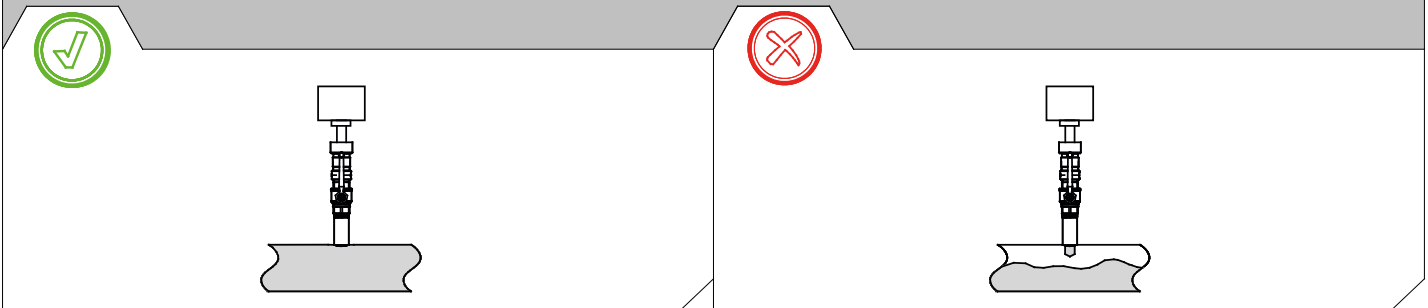


SHREWDNESS AND PRECAUTIONS

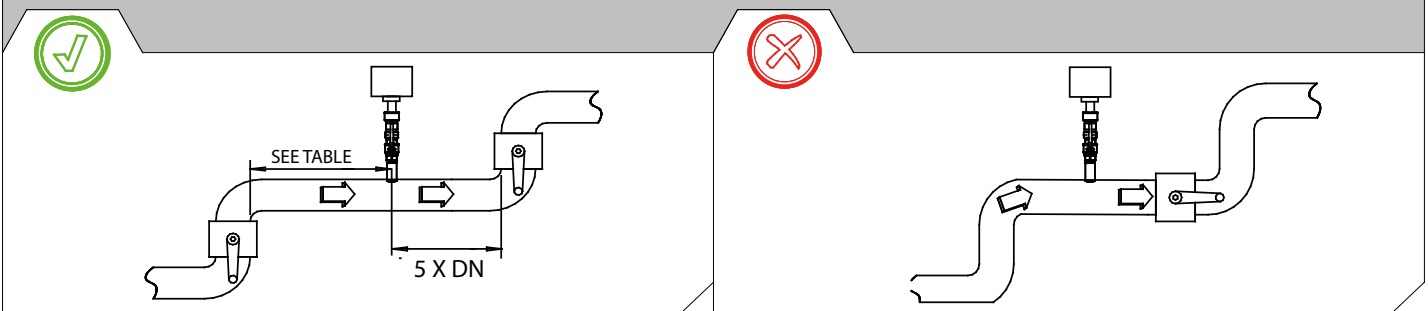
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



Install the sensor away from bends and hydraulic accessories



Disturbance upstream from the measuring point	Min upstream straight length expressed in multiples of the diameter of the conduit.	
	Valid for a measurement at the point of mean axial velocity	Valid for a measurement on the axis of the pipe
90° elbow or t-bend	50	25
Several 90° coplanar bends	50	25
Several 90° non-coplanar bends	80	50
Total angle convergent from 18° to 36°	30	10
Total angle divergent from 14° to 28°	55	25
Fully opened butterfly valve	45	25
Fully opened cap valve	30	15

INSTALLATION IN PRESSURIZED PIPE

1) Define and block on Z value the reference ring (pic. 1)

AVAILABLE INSERTION DEEP	
Insertion	"Z" VALUE
1/8D	$Z=L-(X+S+1/8D+92)$
1/2D	$Z=L-(X+S+1/2D+92)$
7/8D	$Z=L-(X+S+7/8D+92)$

N.B.: for other dimensions see complete layout on next page

2) Weld to the pipeline the Ø 1" hose-coupling.
WARNING: "X" dimension max 140 mm with 1" valve (pic.2)

3) Screw the 1" valve to the 1" hose (pic.2)

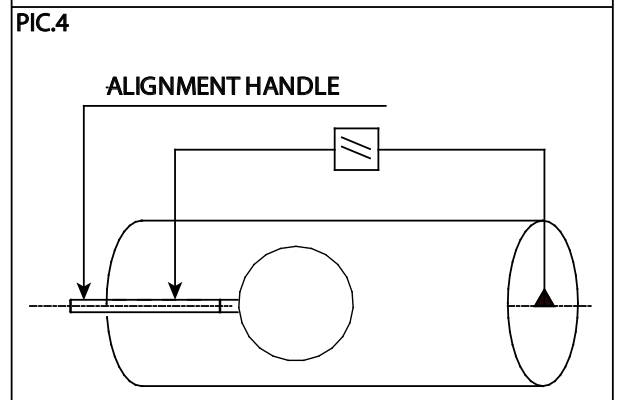
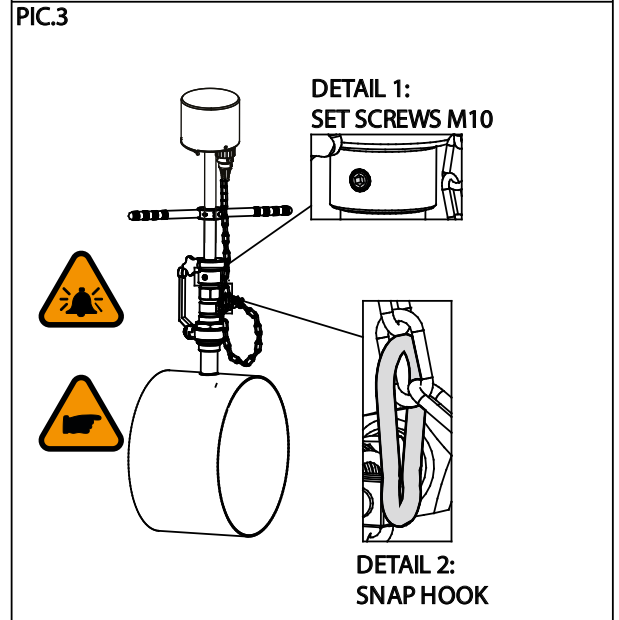
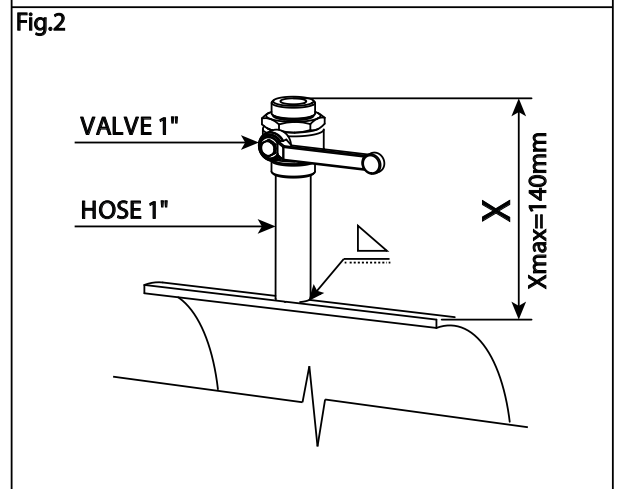
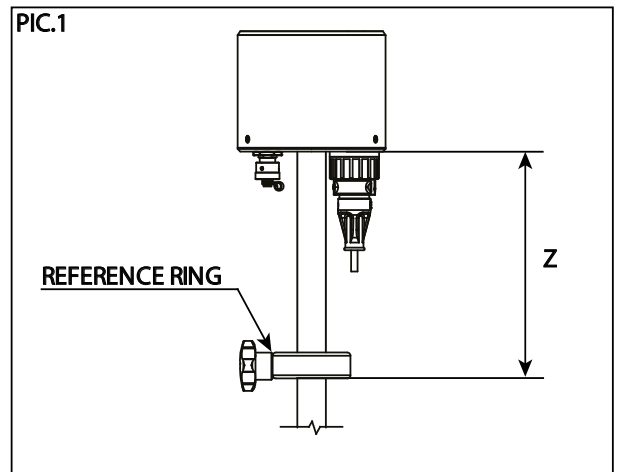
4) Screw the 1" sensor jacket to the 1" valve

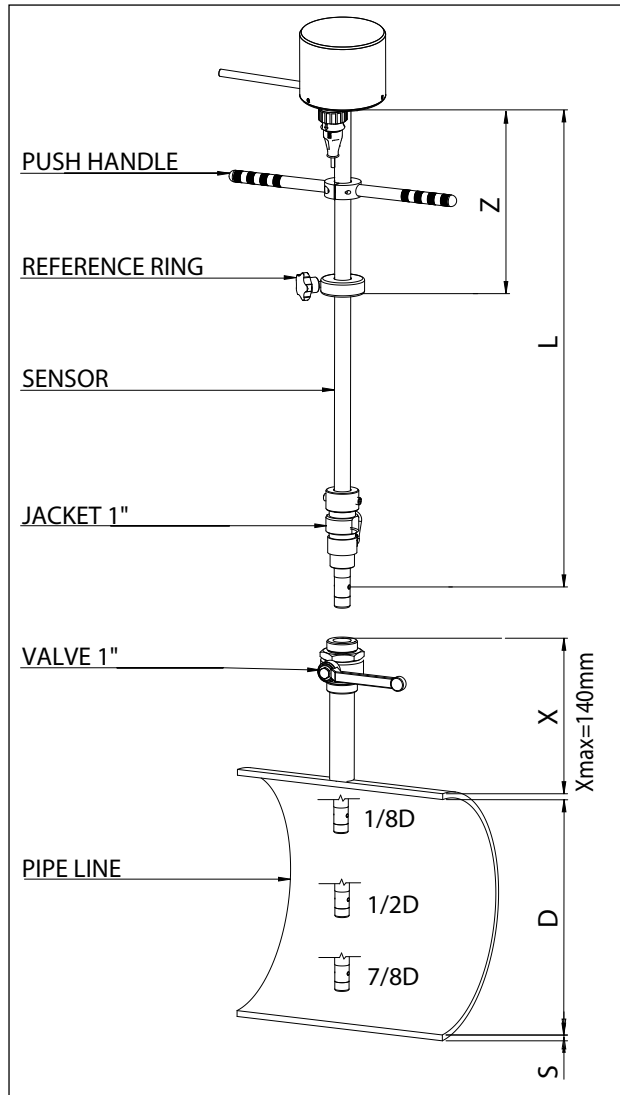
5) Open slowly the valve

6) Push the sensor up to the reference ring touch the sensor jacket ("Z" dimension) (pic. 1)

7) clip the excess chain length to the snap hook (pic. 3)

8) Verify the lineup: the alignment handle MUST be aligned with the pipe axis (pic. 4) and tighten the 2 M10 screw bolts (pic.3)





SIZE	L	MAX DEPTH
SIZE 0	510	150 (X<140)
SIZE 1	660	300 (X<140)
SIZE 2	860	500 (X<140)
SIZE 3	1060	700 (X<140)
SIZE 4	1360	1000 (X<140)
SIZE 5	2360	2000 (X<140)

CONVERTER SETTING

Insertion position of Sensor Head [check MENU SENSOR]

POSITIONS: 0 (1/8D) - 1(1/2D) - 2 (7/8D) ⇔ the coefficients **Kp** and **Ki** are calculated automatically by the converter.

POSITION: 3 ⇔ **Kp** and **Ki** = **1** (default); relevant values of these coefficients must be calculated through the real speed profile on the installation point (use PROFILING software)



Tightening the 2 x M10 screw bolts without fixing the chain could cause the sensor's violent ejection from the pipe.



WARNING FOR YOUR SAFETY: do not remove or modify the lock chain



To determine Z value, the formula considers the jacket sensor screwed up to 3/4 of the total thread length

TECHNICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS

Classification of the instrument: class I, IP 68, category of installation II



Power supply version	Power supply voltage	Power supply frequency	Max power	Max Current
LITIUM BATTERY	3,6 V – 16,5 A/h	-	-	-

INPUT / OUTPUT ISOLATION



- Input/output are insulated up to 500V
- Port RS 232 is not insulated

ENVIRONMENTAL CONDITIONS OF USE



- The instrument can be installed inside or outside buildings
- Altitude: from -200 a 6000 m (from -656 to 19685 feet)
- Humidity range: 0÷100% (IP 68)
- Line voltage range: (see table on technical characteristics)

OPERATING TEMPERATURE

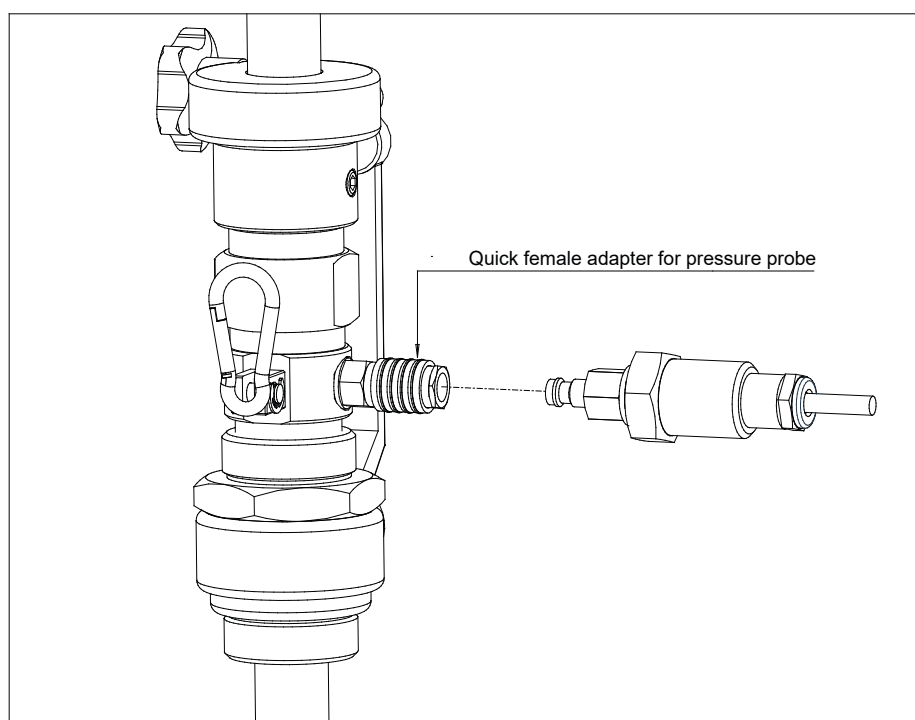


CONVERTER AMBIENT TEMPERATURE			
Min.		Max	
°C	°F	°C	°F
-10*	-14*	50	122



* For discontinuous use, the installation of heating resistance is necessary.

CS3820: PRESSURE SENSOR INSTALLATION



Plug the pressure sensor in to the quick connector.

MAXIMUM ALLOWED SPEED

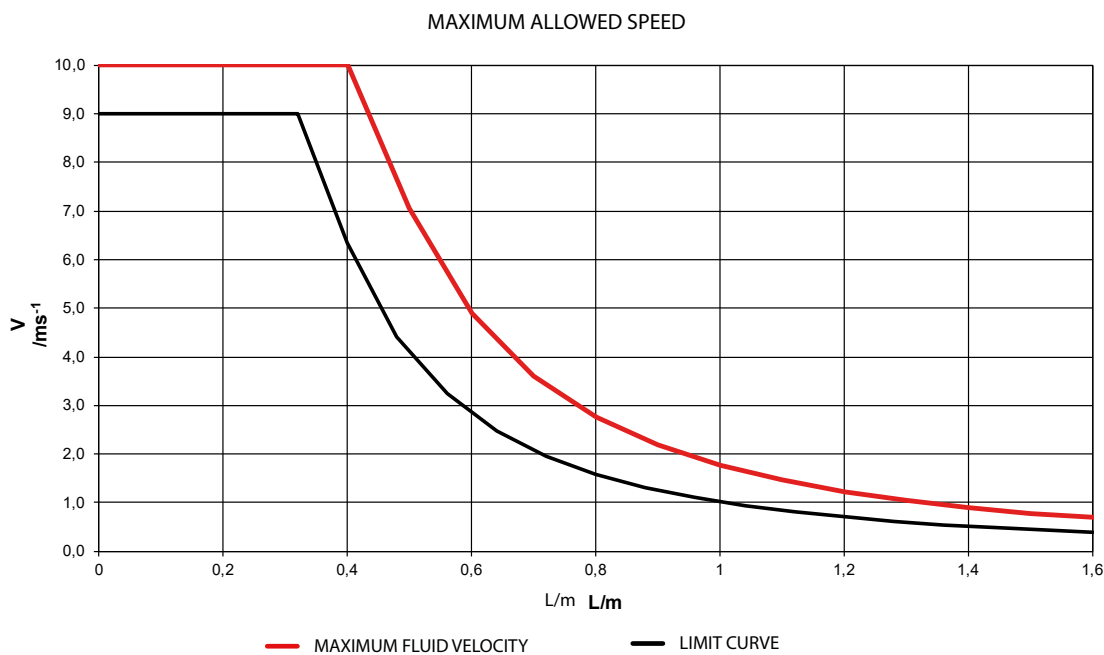
WARNING! The insertion and extraction operations of the insertion instruments are operations that can be dangerous when working with the pressure tube.

The pressure inside the tube apply a significant force on the probe that can be ejected violently, creating dangerous situations for the operators. However, the protection chain provided by the instrument does not allow it to completely escape from the cylinder linear.

It is recommended to perform the insertion or extraction operations of the insertion instrument in safe conditions, if possible with not in pressure pipe or at least reduced pressure pipe.

The extraction operations can be dangerous as well as for the risk connected to the ejection forces of the probe, also due to the possible leakage of liquid from the piping caused by incorrect operation or defect in the shut-off valve. The following are the indicative values of expulsion force at different pressure values:

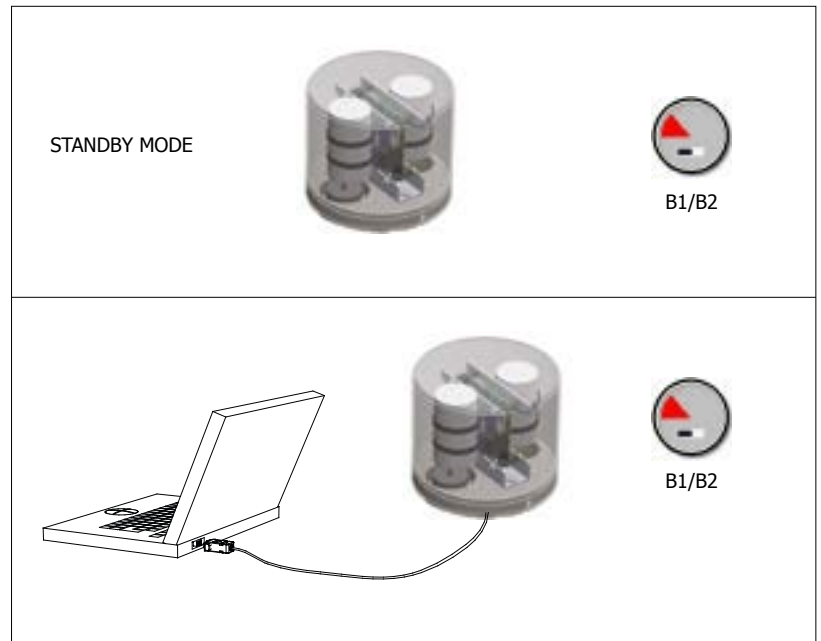
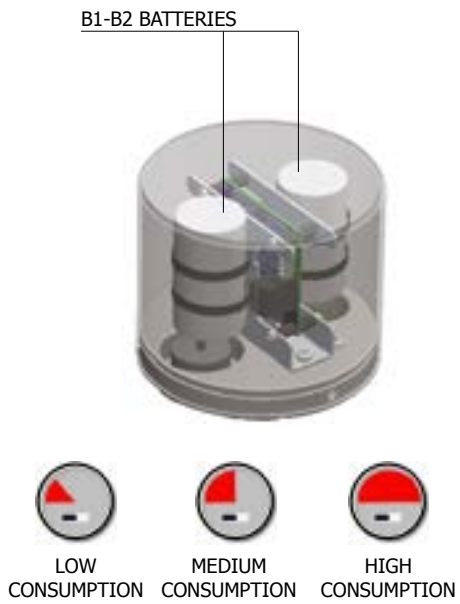
INTERNAL PRESSURE PIPE [bar]	EXPULSION FORCE [kg]
6	30
10	50
16	80
25	125



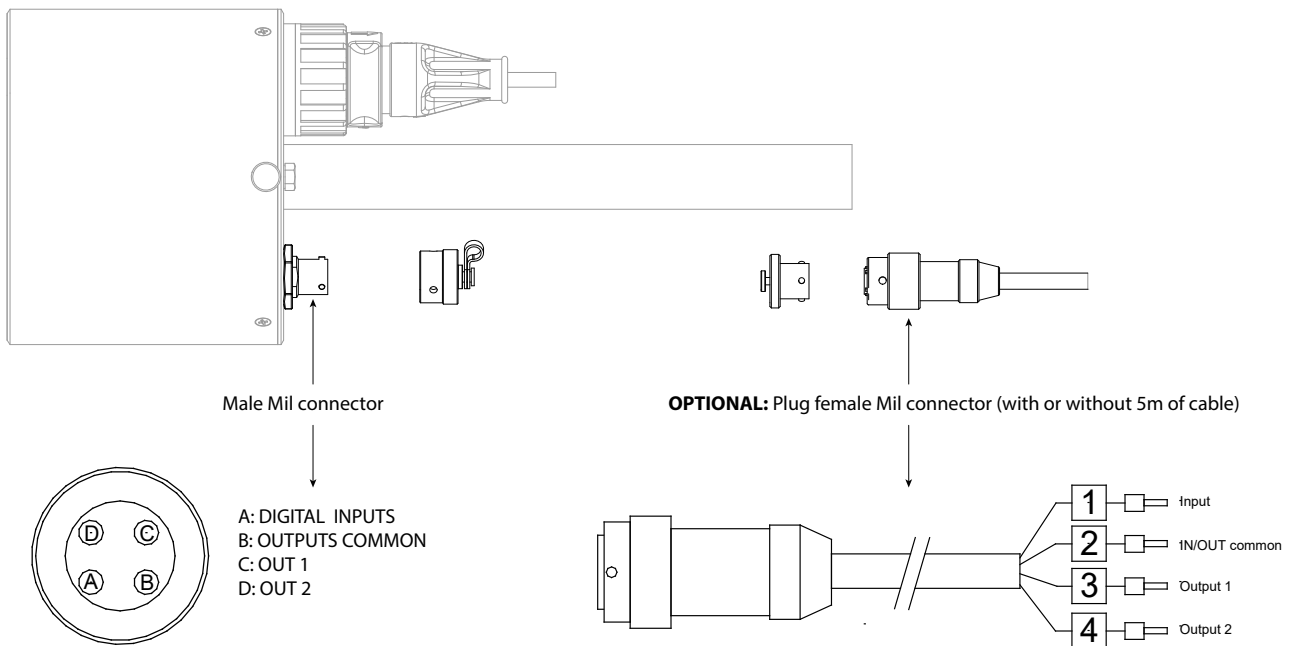
INSERTION DEPTH	MAXIMUM FLUID VELOCITY
L	V
m	ms-1
0.10	10.0
0.20	10.0
0.30	10.0
0.40	10.0
0.50	7.06
0.60	4.91
0.70	3.60
0.80	2.76
0.90	2.18
1.00	1.77
1.10	1.46
1.20	1.23
1.30	1.04
1.40	0.90
1.50	0.78
1.60	0.69

MEASURE CONSUMPTIONS

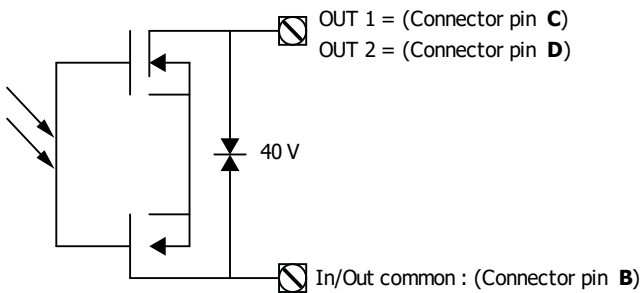
The batteries consumption depends from the setting of the measure profile (sampling interval) and the frequency of the digital outputs.



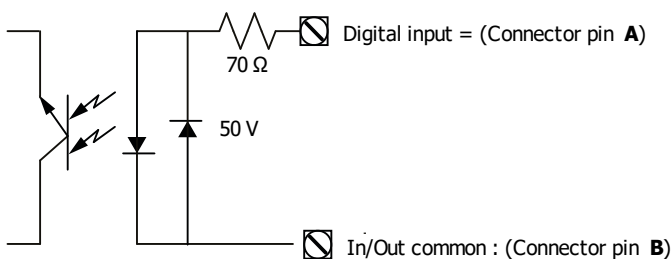
ELECTRICAL CONNECTIONS INPUT/ OUTPUT



ELECTRICAL DIAGRAM OUTPUTS



INPUT ELECTRICAL DIAGRAM



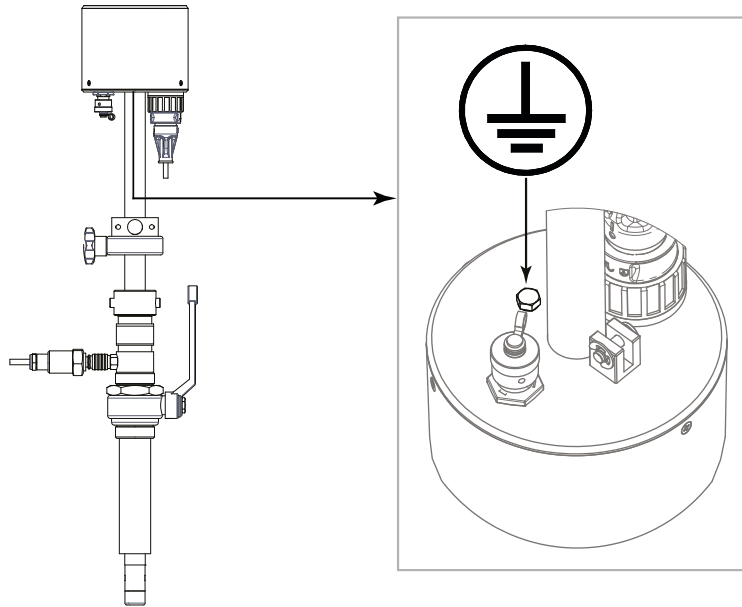
INPUT / OUTPUT CHARACTERISTICS

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

GROUNDING CONNECTION

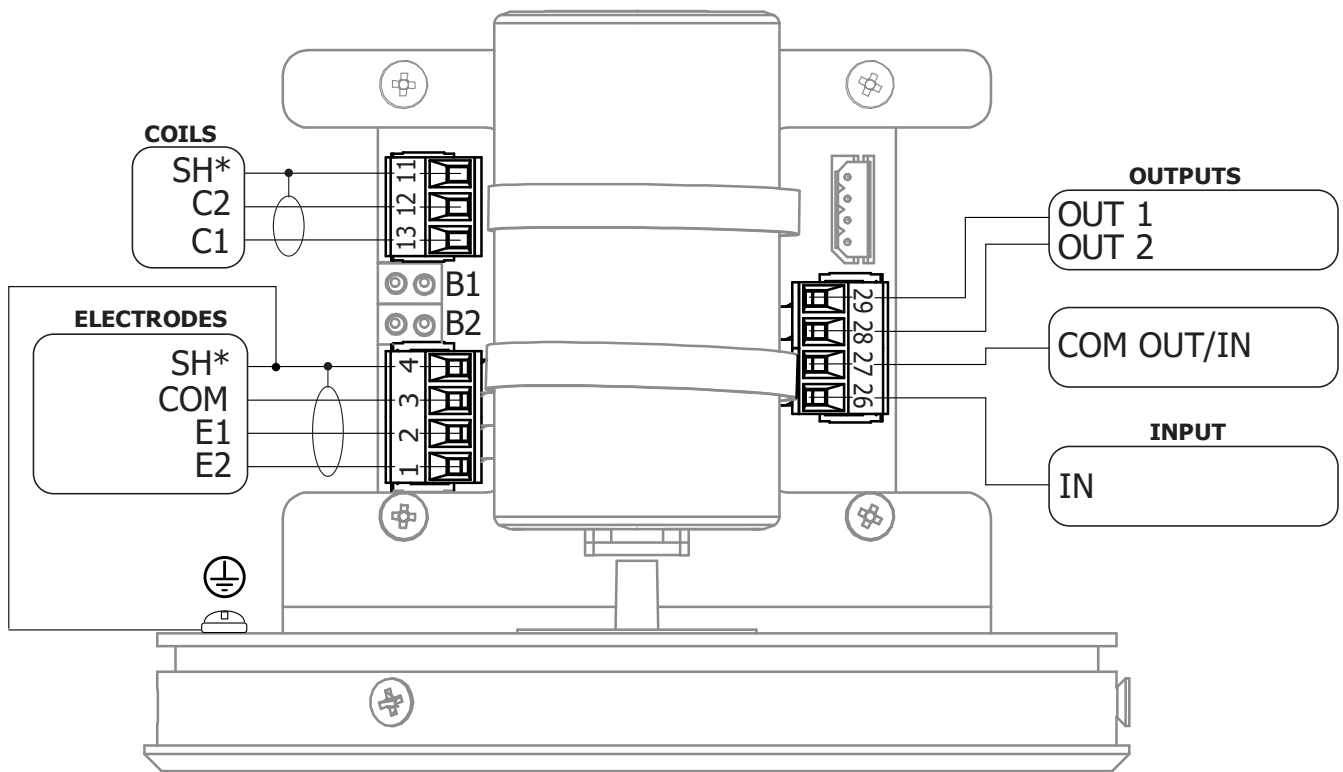


For correct operation of the meter is **NECESSARY** that the sensor and the liquid are equipotential, so **ALWAYS** connect the sensor and converter to ground. For grounding with cathode protection pipe contact the manufacturer.

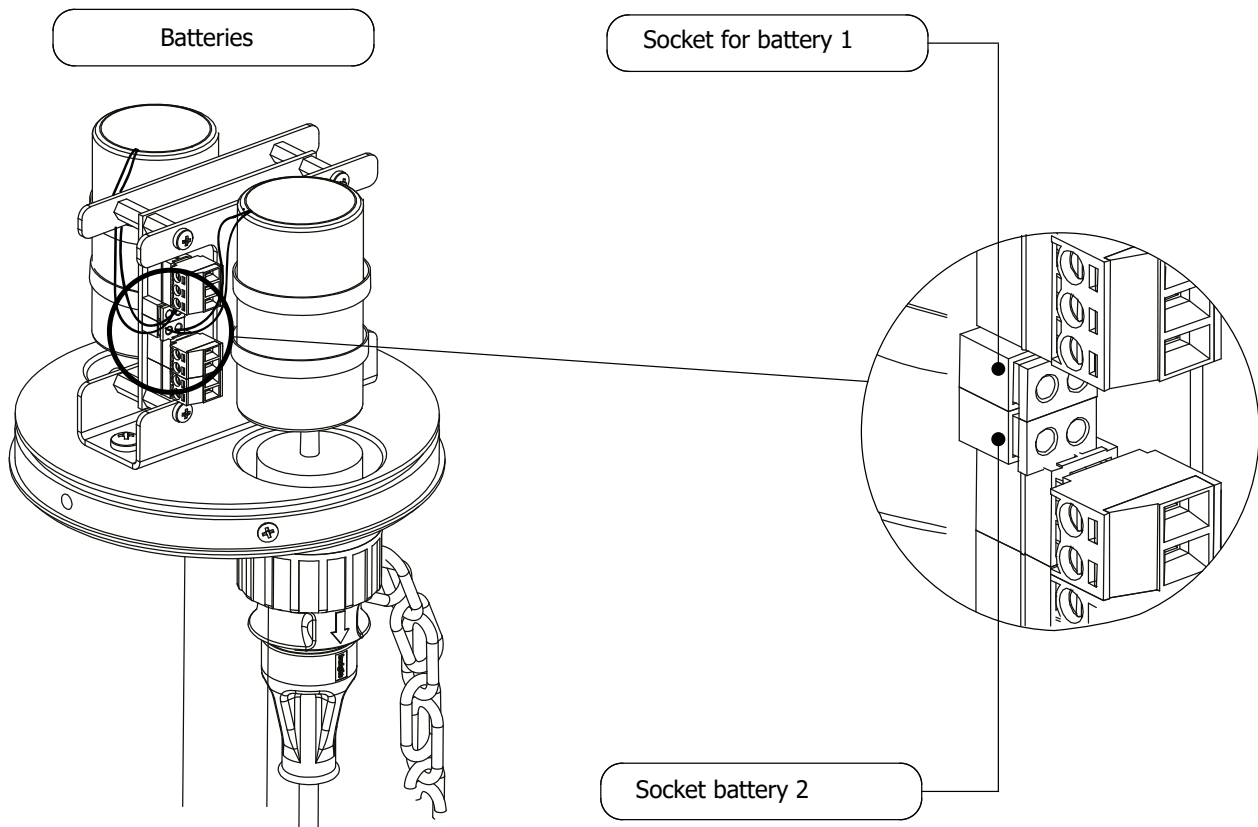


ELECTRICAL CONNECTIONS

***SH = SHIELD OF CABLE INTERNALLY CONNECTED TO GROUND.**



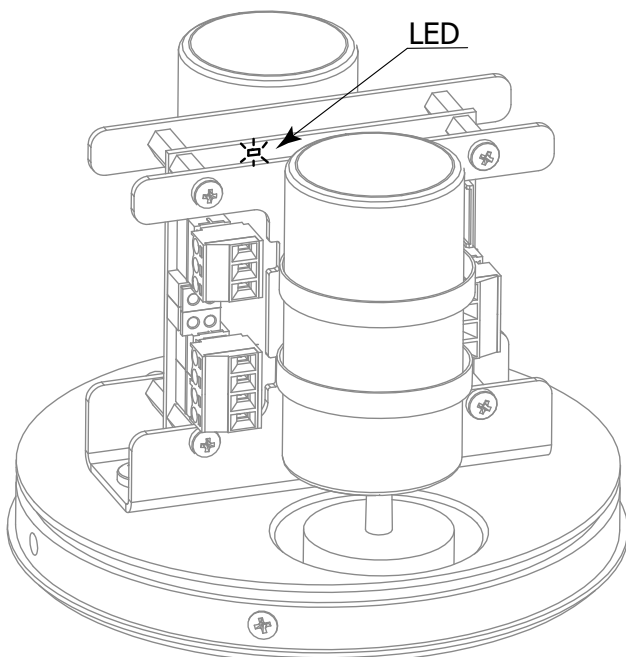
BATTERY CONNECTIONS



MEANING OF FLAGS

FLAG	DESCRIPTION	FLAG	DESCRIPTION
	EMPTY PIPE		MIN FLOW ALARM
	FILE UPLOAD		MAX FLOW ALARM
	FILE DOWNLOAD		VIDEO TERMINAL CONNECTED
	LOW BATTERY		FLOW RATE OVERFLOW
	LOW BATTERY		PULSE 1 OVERFLOW
	FLOW RATE SIMULATION (FLASHING)		PULSE 2 OVERFLOW
	CALIBRATION (FLASHING)		GENERAL ALARM ONLY ON PHYSICAL DISPLAY (FLASHING)
	GENERIC ALARM (FLASHING)		EXCITATION ERROR
	SIGNAL ERROR		

MEANING OF LED COLORS

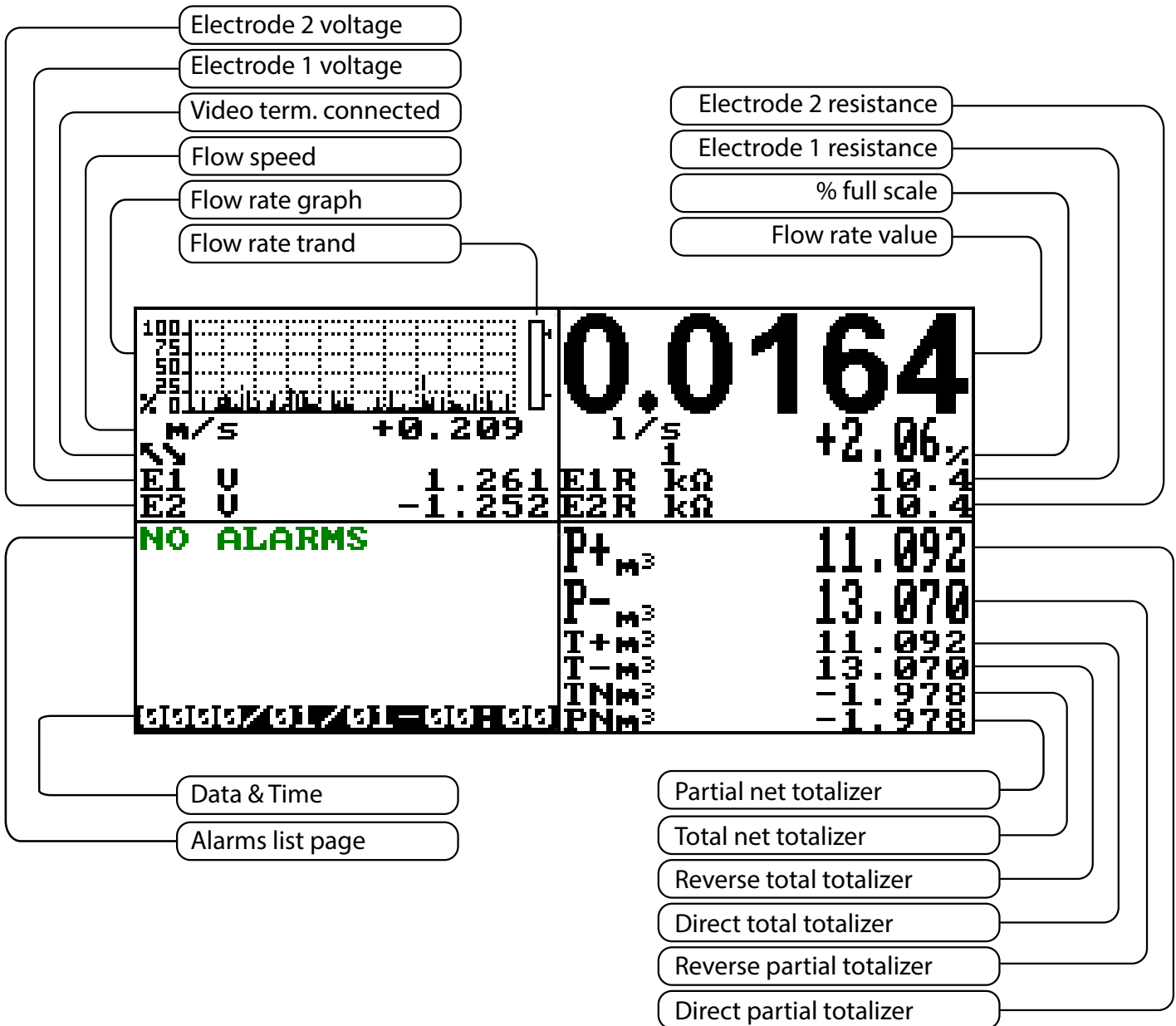


LED Red: Alarm signal
LED Blue: Usb communication enable
LED Green: Functioning system correctly

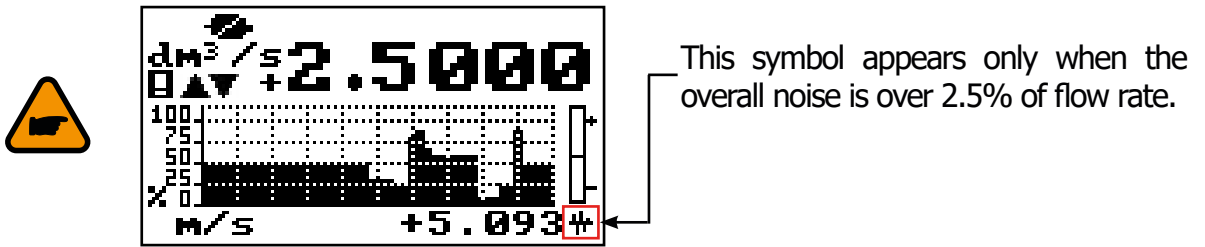
START VISUALIZATION PAGES



The visualization pages can be change according to instrument's setup.



FLOW RATE VISUALIZATION



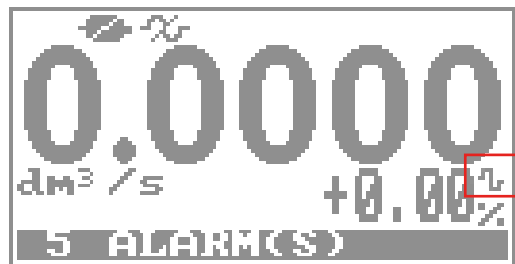
This symbol appears only when the overall noise is over 2.5% of flow rate.

The converter of the meter can show a 5 digits display for flow rate units; this mean the maximum flow rate value that can be represented on the display is 99999 (no matter the positioning of the decimal point). The minimum is 0.0025. The representable measure unit depends on sensor flow rate and diameter; the permitted units are those, that permits the instrument full scale value not exceeding 99999.

Example for DN 300, full scale value: 3m/s:

- PERMITTED measure unit** (example): l/s (216.00); m3/h (777.60); m3/s (0.2160)
- NOT PERMITTED measure unit** (example): l/h (777600)

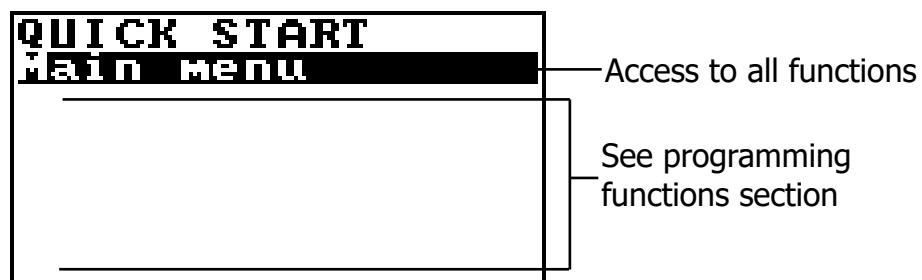
FLOW RATE ALERT



This FLAG becomes active when there is a flow variation (flow rate not stable).

QUICK START MENU

The QUICK START MENU allows to user immediate access to some of the most commonly used functions; through MCP software it possible customize this menu to make it suitable for the specific application.



The user has immediate access to the Quick Start menu when the converter is powered up by pressing the Enter key. If access to the quick start menu does not occur, then it could be disabled using the function "9.7 Quick start menu enable" page 25 .

CONVERTER ACCESS CODE

The access for programming the instrument is regulated by six access levels logically grouped. Every level is protected by a different code.

- Access Level 1-2-3-4 Freely programmable by user

ACCESS CODE SET : MENU 13 SYSTEM

```

SYSTEM
Data saving= ON
Time zone=h+01.00
2016/04/04-16:07
L1 code=*****
L2 code=*****
L3 code=*****
L4 code=*****
L5 code=*****
L6 code=*****
Restr.access= ON
Tc 0.964
010.011.012.013
010.011.012.014
255.255.255.000
KT= 0.96469
KS= 1.00000
KR= 1.00000
Stand-by
FW update
13-System

```

```

SYSTEM
L1 code=*****
L2 code=*****
L3 code=*****
L4 code=*****
L5 code=*****
L6 code=*****
049999999

```

Depending on the level of access different display functions will be visible. (See section "FUNCTIONS DESCRIPTION" page 27)
These access levels interact with the "Restricted access"

RESTRICTED ACCESS SET : MENU 13 SYSTEM

```

SYSTEM
L1 code=*****
L2 code=*****
L3 code=*****
L4 code=*****
L5 code=*****
L6 code=*****
Restr.access=OFF

```

Settable Values

ON

OFF

Restrict = ON: Access permitted only to functions provided for a specific level;

Example: If the operator has a code of access level 3, after having set it, he can change only the functions with level 3 access.

Restrict = OFF: It enables to change functions for the selected level and ALL the functions with lower access level.

Example: If the operator has the code of level 3, after having set it, he can change all the functions at level 3 and those at lower levels.

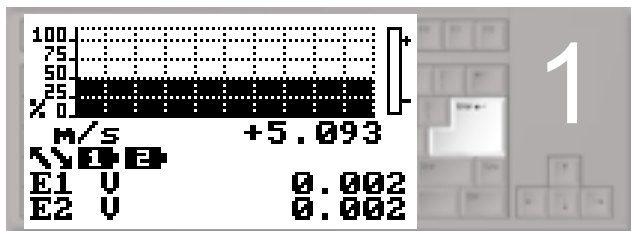
* **WARNING:** take careful note of the customized code, since there is no way for the user to retrieve or reset it if lost.

Factory preset access codes:

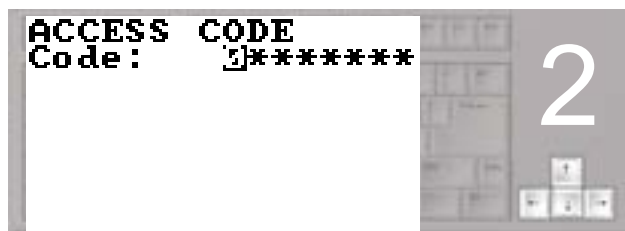
- L1: 1000000
- L2: 2000000
- L3: 3000000
- L4: 4000000

The following example shows how to change the Full scale by Quick Start menu; the second illustrates how to change the function by the Main menu.

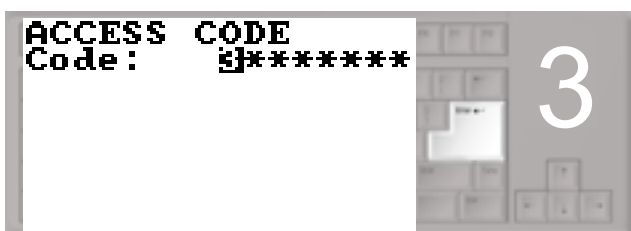
EXAMPLE: modifying the full scale value from 0.4L/s to 0.5L/s, from the "Quick start menu"



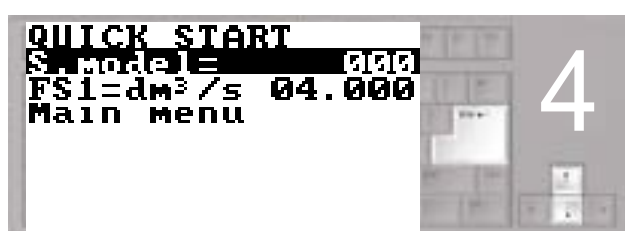
Press enter key to access in the "Quick Start menu"



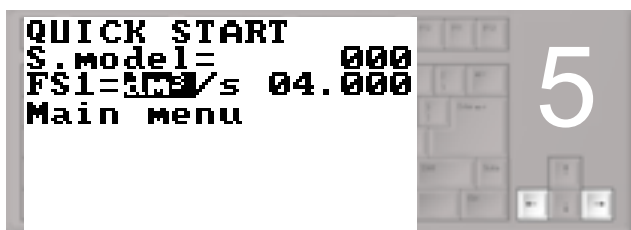
Use the right-left arrow keys to select the character and the up-down arrow key to assign the numeric value of the access code



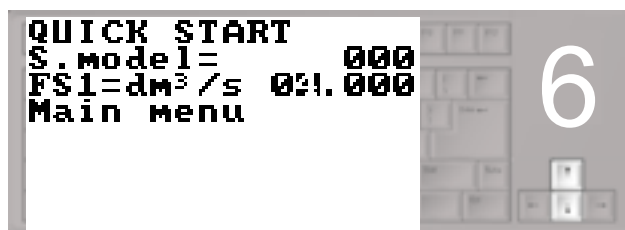
Press the enter key to confirm the access code



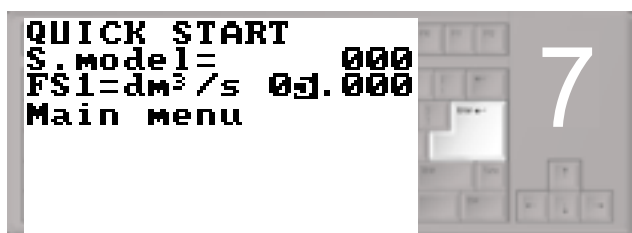
Select the FS1 function with the arrow keys Press the enter key modify the function



Press the indicated arrow keys to select the character



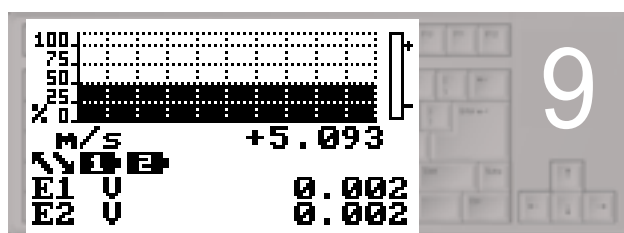
Press the arrow keys indicated to change the value



Press the enter button to confirm the changed value

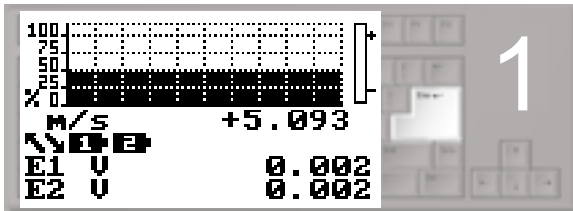


Press the esc key to exit from to the "quick start menu" and return to the main page

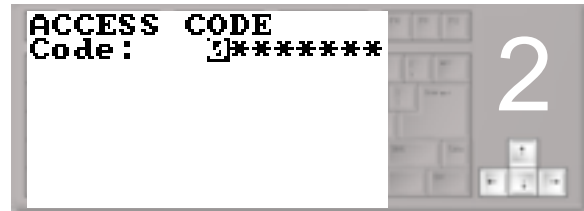


Main Page

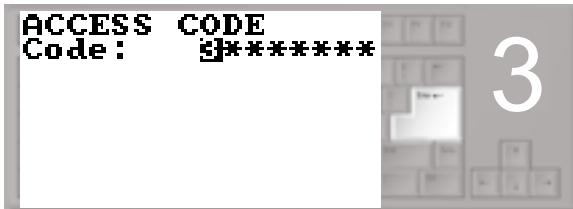
EXAMPLE: modifying the full scale value from 0.4l/s to 0.5l/s, from the "Main Menu" (quick start menu enabled)



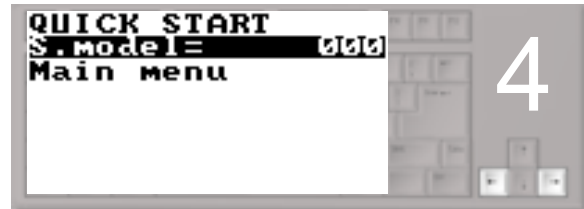
Press enter key to access in the "Quick Start menu"



Use the right-left arrow keys to select the character and the up-down arrow key to assign the numeric value of the access code



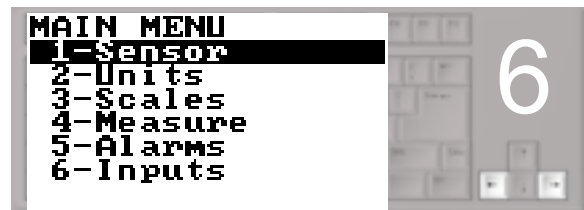
Press the enter key to confirm the access code



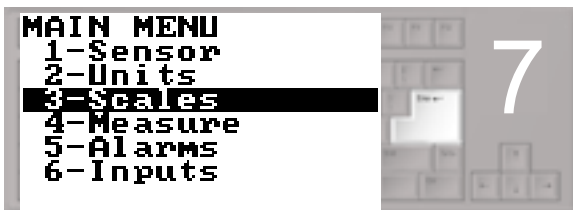
Select the Main Menu function with the arrow keys



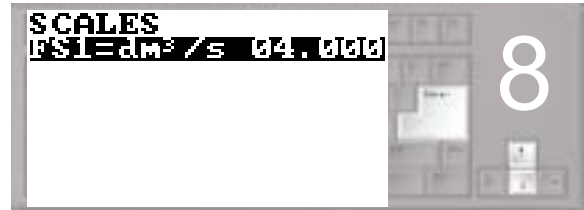
Press the enter key to access the main menu



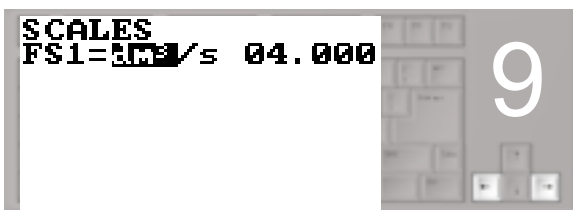
Select menu 3 with the arrow keys



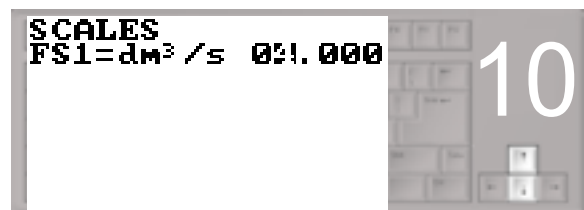
Press the enter key to access menu 3



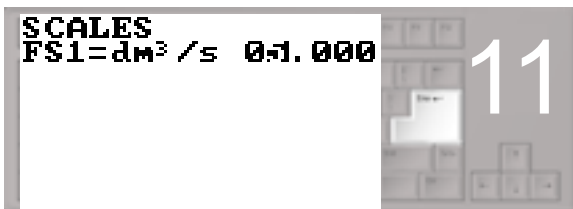
Select the FS1 function with the arrow keys
Press the enter key to confirm



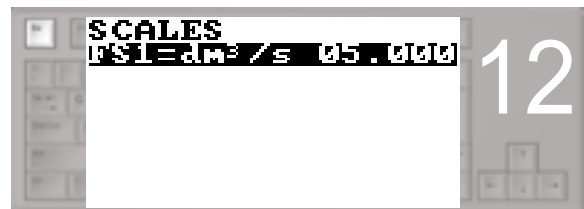
Press the indicated arrow keys to select the character



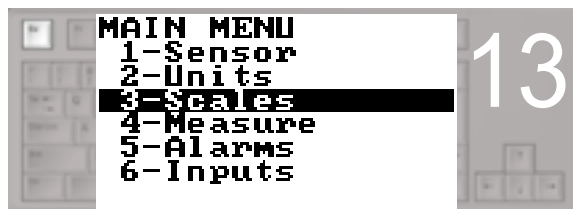
Press the indicated arrow keys to change the value



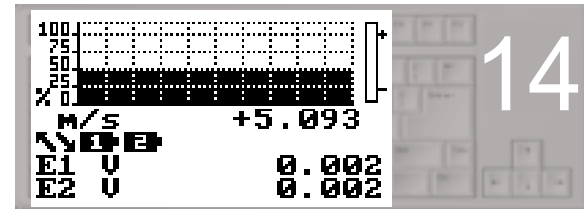
Press the enter key to confirm the changed value



Press the esc key to exit the "quick start menu"



Press the esc key to exit the menu and return to the main page



Main Page

FUNCTIONS MENU

The main menu is selected from the Quick start menu by pressing enter in your key board and entering the access code. Note: Functions in grey here below are displayed only with other functions active, or with optional modules.

MAIN MENU	
1-Sensor	
SENSOR	
S.model= 004	1.1 Sensors model: Enter the first two characters of the serial number of the probe
Lining= UNSPEC.	1.2 Flow sensor lining material type
S.type= FULL BORE	1.3 Type of sensor: fullbore or insertion
U.type= METRIC	1.4 Type of measure units for sensor parameter: metric or imperial
Diam.=mm 700	1.5 Insert ND of sensor (0-2500)
KA= +04.4914	1.6 Calibration data of sensor
KA-= -04.4904	1.7 Calibration data of sensor for negative flow
KZ= +0018852	1.8 Sensor coefficient KZ (zero point)
KD= +0000852	1.9 Sensor coefficient KZ (zero point)
Ins.position= 0	1.10 Insertion position
KP dynamic= OFF	1.11 KP dynamic, coefficient for insertion
Ki= +01.0000	1.12 Sensor coefficient Ki factory parameters
Kp= +01.0000	1.13 Sensor coefficient Kp factory parameters
KC= 1.00000	1.14 Sensor coefficient KC factory parameters
C.Curr.=mA 025.0	1.15 Sensor excitation current
S.time 000	1.16 Measure sampling time
Reg.CT 000	1.17 Current regulator charge time
C.R.time 000	1.18 Coils current rise time
E.P.Detect= ON	1.19 Enables the empty pipe detection feature
Z max=kohm 0500	1.20 Maximum input impedance thresh.
S.err.delay= 010	1.21 Signal error delay (n. sample)
Sens.verify= OFF	1.22 Automatic sensor verify
KL= 00.000000000	1.23 Linearization coefficient
Zero point cal.	1.24 Enable zero point calibration

MAIN MENU	
1-Sensor	
2-Units	
UNITS	
Diam.= MM	2.1 Nominal diameter measure unit
S.cable= M	2.2 Cable length on separate version
FR.unit= METRIC	2.3 Flowrate type measure unit: metric or not metric
Pl1 unit= METRIC	2.4 Pulse1 Flowrate type measure unit: metric or not metric
Pl2 unit= METRIC	2.5 Pulse2 Flowrate type measure unit: metric or not metric
T+ unit= METRIC	2.6 Total direct totalizer measure unit type: metric or not metric
T+ unit= g	2.7 Total direct totalizer measure unit
T+ D.P.= 3	2.8 Total direct totalizer decimal point position
P+ unit= METRIC	2.9 Partial direct totalizer measure unit type: metric or not metric
P+ unit= g	2.10 Partial direct totalizer measure unit
P+ D.P.= 3	2.11 Partial direct totalizer decimal point position
T- unit= METRIC	2.12 Total reverse totalizer measure unit type: metric or not metric
T- unit= g	2.13 Total reverse totalizer measure unit
T- D.P.= 3	2.14 Total reverse totalizer decimal point position
P- unit= METRIC	2.15 Partial reverse totalizer measure unit type: metric or not metric
P- unit= g	2.16 Partial reverse totalizer measure unit
P- D.P.= 3	2.17 Partial reverse totalizer decimal point position
Temp.unit= °C	2.18 Temperature measure unit
Mass units= ON	2.19 Mass unit enabling
Sg=kg/dm³ 1.0000	2.20 Specific gravity coefficient

MAIN MENU	
1-Sensor	
2-Units	
3-Scales	
SCALES	
FS= 1.00000	3.1 Full scale flow rate
Pls1=dm³ 1.00000	3.2 Pulse value on channel 1
Tpls1=ms 0000.4	3.3 Duration of the pulse generated on channel 1
Pls2=dm³ 1.00000	3.4 Pulse value on channel 2
Tpls2=ms 0000.4	3.5 Duration of the pulse generated on channel 2
12-Diagnostic	
13-System	

MAIN MENU	
1-Sensor	
2-Units	
3-Scales	
4-Measure	
MEASURE	
Cont.profil= SMART1	4.1 Consumption profiles: CONT. PWR - SMART1 - SMART2 - SMART5
Cut-off=% 00.0	4.2 Low flow zero threshold: 0-25% of full scale value
LP Cycle sim.= OFF	4.3 Low power Measure Cycle Simulation
Cal.verify= OFF	4.4 Automatic calibration verify enable
12-Diagnostic	
13-System	

```

MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs
7-Outputs
8-Display
9-Data logger
10-Functions
11-Diagnostic
13-System

ALARMS
Max.thr+=% 000
Max.thr-=% 000
Min.thr+=% 000
Min.thr-=% 000
Hysteresis=% 03
    
```

- 5.1 Maximum value alarm set for direct flow rate
- 5.2 Maximum value alarm set for reverse flow rate
- 5.3 Minimum value alarm set for direct flow rate
- 5.4 Minimum value alarm set for reverse flow rate
- 5.5 Hysteresis threshold set for the minimum and maximum flow rate alarms

```

MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs
7-Outputs
8-Display
9-Data logger
10-Functions
11-Diagnostic
13-System

INPUTS
I+ reset= OFF
P+ reset= OFF
T- reset= OFF
P- reset= OFF
Count lock= OFF
Meas. lock= OFF
Calibration= OFF
    
```

- 6.1 Total direct (positive) flow totalizer reset enable
- 6.2 Partial direct (positive) flow totalizer reset enable
- 6.3 Total reverse (negative) flow totalizer reset enable
- 6.4 Partial reverse (negative) flow totalizer reset enable
- 6.5 Totalizer counting lock command
- 6.6 Measure zero lock command
- 6.7 Calibration external command

```

MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs
7-Outputs
8-Display
9-Data logger
10-Functions
11-Diagnostic
13-System

OUTPUTS
Out1= OFF
Out2= OFF
    
```

- 7.1 Output 1 functions
- 7.2 Output 2 functions

```

MAIN MENU
1-Sensor
2-Units
3-Scales
4-Measure
5-Alarms
6-Inputs
7-Outputs
8-Display
9-Data logger
10-Functions
11-Diagnostic
13-System

DISPLAY
Language= EN
Disp.time=s 060
Part.tot.= ON
Neg.tot.= ON
Net.tot.= ON
Disp.date= ON
Quick start= OFF
    
```

- 9.1 Choice of the language: E= English, I=italian, F= French, S= Spanish
- 9.2 Display/keyboard inactivity time
- 9.3 Partial totalizer enable
- 9.4 Negative totalizer enable
- 9.5 Net totalizer enable
- 9.6 Time and date display enable
- 9.7 Quick start menu enable


```

DATA LOGGER
Data logger en.= ON
Meas. units= ON
Field separ.= :
Decim separ.= .
Interv.= 01:01:00
Log T+= ON
Log P+= ON
Log T-= ON
Log P-= ON
Log TN= ON
Log PN= ON
Log Q(UM)= ON
Log Q(%)= ON
Log AL, EU= ON
Log STR= ON
Log BTS= ON
Log IBU= ON
Log EDC= ON
Log EAC= ON
Log EIZ= ON
Log SCU= ON

10-Data logger
11-Functions
12-Diagnostic
13-System
    
```

- 10.1 Data logger enable
- 10.2 Measure unit recording enable
- 10.3 Field separator character
- 10.4 Decimal separator character
- 10.5 Sampling interval
- 10.6 Enable logging of total direct totalizer
- 10.7 Enable logging of partial direct totalizer
- 10.8 Enable logging of total reverse totalizer
- 10.9 Enable logging of partial reverse totalizer
- 10.10 Enable logging of total net totalizer
- 10.11 Enable logging of partial net totalizer
- 10.12 Enable logging of flow rate in measure unit
- 10.13 Enable logging of flow rate in percentage
- 10.14 Enable logging of alarm events
- 10.15 Enable logging of sensor test results
- 10.16 Enable logging of board temperature
- 10.17 Enable logging of internal board voltage
- 10.18 Enable logging of electrodes DC voltage
- 10.19 Enable logging of electrodes AC voltage
- 10.20 Enable logging of electrodes impedance
- 10.21 Enable logging of sensor coils value

```

FUNCTIONS
T+ reset
P+ reset
T- reset
P- reset
Load Sens.f.def
Load Conv.f.def
Save Sens.f.def
Save Conv.f.def
Calibration

11-Functions
12-Diagnostic
13-System
    
```

- 11.1 Execute immediate reset of total direct totalizer
- 11.2 Execute immediate reset of partial direct totalizer
- 11.3 Execute immediate reset of total reverse totalizer
- 11.4 Execute immediate reset of partial reverse totalizer
- 11.5 Load sensor factory default
- 11.6 Load converter factory default
- 11.7 Save sensor factory default values
- 11.8 Save converter factory default values
- 11.9 Execute immediate internal circuit calibration

```

DIAGNOSTIC
Self test
Sens.verify
Flow sim.= ON
Display measures
Disp.comm.vars
SD card info
Firmware info
S/N= 999001
WT=0002:21:00:22

12-Diagnostic
13-System
    
```

- 12.1 Self test diagnostic function
- 12.2 Sensor verify diagnostic function
- 12.3 Flow rate simulation enable
- 12.4 Display internal measured value
- 12.5 Display communication diagnostic values
- 12.6 Sd card status informations
- 12.7 Firmware version/revision
- 12.8 Board serial number
- 12.9 Total working time

```

SYSTEM
Dayl.saving= ON
Time zone=h+01.00
2016/04/04-16:07
L1 code=*****
L2 code=*****
L3 code=*****
L4 code=*****
L5 code=*****
L6 code=*****
Restr.access= ON
Tc 0.964
010.011.012.013
010.011.012.014
255.255.255.000
KT= 0.96469
KS= 1.00000
KR= 1.00000
Stand-by
FW update

13-System
    
```

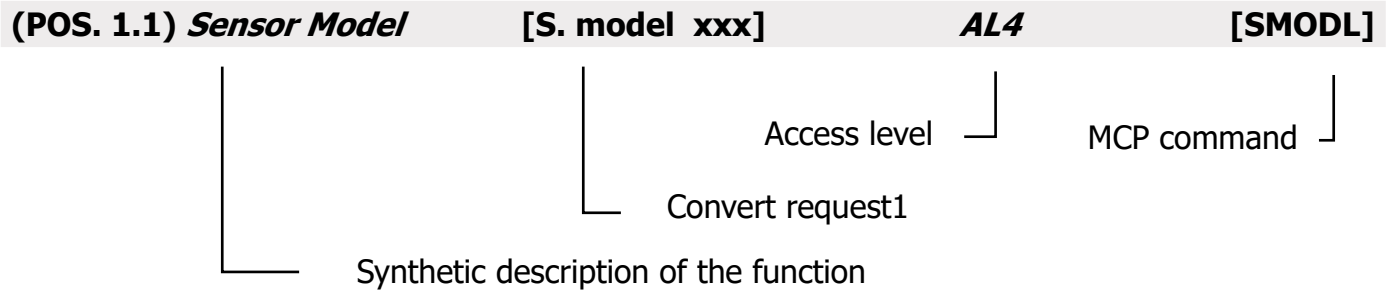
- 13.1 Daylight saving time change
- 13.2 Localized time zone
- 13.3 System date and time
- 13.4 Access level 1 code
- 13.5 Access level 2 code
- 13.6 Access level 3 code
- 13.7 Access level 4 code
- 13.8 Access level 5 code
- 13.9 Access level 6 code
- 13.10 Restricted access level
- 13.11 Total Measure CYCles
- 13.12 Device IP network address
- 13.13 Client IP network address
- 13.14 Network mask
- 13.15 Calibration coefficient KT
- 13.16 Calibration coefficient KF
- 13.17 Calibration coefficient KR
- 13.18 Stand-by
- 13.19 firmware update

FUNCTIONS DESCRIPTION



Here below the explanation on how the rows of menu are described.

Menu visualized on the converter (from 1 to 13)
MENU 1 - SENSOR



The following picture describes where to find the name of the MCP functions in MCP-software. More info see MCP manual.

The screenshot shows the MCP software interface. On the left, a 'Function list' window displays a tree structure of menu items: Sensor, Units, Scales, [Flow Rate Full Scale 1], [Flow Rate Full Scale 2], [Output 1 Pulse Value], [Channel 1 pulse volume value], [Output 1 Pulse Time], [Output 1 Full scale Frequency], [Output 2 Pulse Value], [Output 2 Pulse Time], and [Output 2 Full scale Frequency]. The 'Channel 1 pulse volume value' item is expanded, showing sub-items: OP1PV7 : 1,104:MCP ACCESS LEVEL NOT VALID, OP1PV=7 : 1,104:MCP ACCESS LEVEL NOT VALID, and OP1PV=.

At the bottom of the interface, a 'Line editor for the insertion and execution of MCP commands.' is shown with the command 'MCP> OP1PV=' entered. An arrow points from this text box to the line editor.

MENU 1 - SENSOR

(POS. 1.1) <i>Sensor model</i>	[S. model xxx]	AL4	[SMODL]
Enter the first two characters of the serial number of the sensor as on the sensor label.			
(POS. 1.2) <i>Lining Type</i>	[Lining= UNSPEC.]	AL4	[LIMAT]
Flow sensor lining material type. (PFA; PU-TDI; ALON; PEEK; HR; PP; PA-11; PTFE-HT; PTFE)			
(POS. 1.3) <i>Type of sensor</i>	[S. type= FULL BORE]	AL4	[STYPE]
Select the sensor type of full-bore or insertion.			
(POS. 1.4) <i>Unit type</i>	[U.type= METRIC]	AL4	[SUTYP]
Select type of measure unit of sensor's parameter. Values metric or imperial (inch).			
(POS. 1.5) <i>Diameter</i>	[Diam.= mm xxx]	AL4	[PDIMV]
Select the nominal diameter of the sensor (0-2500). ND is written on the sensor label.			
(POS. 1.6) <i>KA</i>	[KA= +/- xx.xxx]	AL4	[CFFKA]
KA factor: coefficient of calibration which is located on the sensor label			
(POS. 1.7) <i>KA -</i>	[KA= - xx.xxx]	AL4	[CFKAN]
KA factor: calibration coefficient for negative flow. This function is showed only if at least 1 negative KL value is set.			
(POS. 1.8) <i>KZ</i>	[KZ= +/- xxxxx]	AL4	[CFFKZ]
Calibration Factor. KZ is located on the sensor label.			
(POS. 1.9) <i>KD</i>	[KD= +/- xxxxx]	AL4	[CFFKD]
Calibration Dinamik Factor. KD is located on the sensor label.			
(POS. 1.10) <i>Insertion position</i>	[Ins.position= x]	AL4	[SIPOS]
This function is active with POS.1.3 on "Insertion". See the insertion sensor manual for more details			
(POS. 1.11) <i>KP dynamic</i>	[KP dynamic= ON/OFF]	AL4	[SIPOS]
This function is active with POS.1.3 see page 20 set on insertion. See manual of insertion sensor for more details			
(POS. 1.12) <i>Ki</i>	[Ki= +/- xx.xxx]	AL4	[CFFKI]
This function is active with POS. see page 24 set on insertion. See manual of insertion sensor for more details			
(POS. 1.13) <i>Kp</i>	[Kp dynamic= +/- xxxxx]	AL4	[SIDKP]
This function is active with POS. see page 24 set on insertion. See manual of insertion sensor for more details.			

(POS. 1.14) <i>KC</i>	[KC= +/- xx.xxx]	AL4	[CFFKC]
Calibration Factor. This function is activated if the sensor model is NOT present on the sensors table standard parameters			
(POS. 1.15) <i>Coils Ex.Current</i>	[C.Curr.= mA xxx.x]	AL4	[CEXCC]
Excitation coils current. This function is activated if the sensor model is NOT present on the sensors table standard parameters.			
(POS. 1.16) <i>Sampling time</i>	[S.Time= xxx]	AL4	[MSPTM]
Measure sampling time.			
(POS. 1.17) <i>Current charge time</i>	[Reg.C.T= xxx]	AL4	[CRCTM]
Current regulator charge time.			
(POS. 1.18) <i>Coils Current</i>	[C.R.time= xxx]	AL4	[CCRTM]
Coils current rise time.			
(POS. 1.19) <i>Empty Pipe Detection</i>	[E.P.Detect= ON]	AL4	[EPDEN]
Enables the empty pipe detection function. This function is useful to keep the meter lock to zero when the pipe become empty.			
(POS. 1.20) <i>Empty pipe thr.</i>	[R max= Kohm xxxx]	AL4	[EPDTH]
Maximum resistance value at the inputs (electrodes) determine the empty pipe condition. This feature is enabled only if the function 1.17 Empty Pipe Detection is ON.			
(POS. 1.21) <i>Signal error delay</i>	[S.err.delay=m xxx]	AL4	[SEALT]
Delay before generating error. This function is useful to prevent unexpected lock to zero of measure caused by sporadic events (empty pipe, excitation error, signal error)			
(POS. 1.22) <i>Sensor verify</i>	[Sens. verify= OFF]	AL3	[ASVFE]
Enable the Automatic sensor verification.			
(POS. 1.23) <i>Coefficient KL</i>	[KL=XX +/- XXXXXXXXXX]	AL4	[SETKL]
Linearization coefficient for negative flow, reserved to the service. This command is only showed if SMODL = 000.			
(POS. 1.24) <i>Zero point calibration</i>	[Zero point cal.]		
This feature appears only when the process conditions are as follow:			
<ul style="list-style-type: none"> • measure filters recommended (Damping) set to SMART 2 second / 5 second • stable flow rate and lower than 0.1% of the absolute scale (10 m/s) • It must have elapsed at least 10 minutes after the last significant change of flow rate 			
When the above conditions are met, the zero point calibration function will appears on the display, press the "Enter / ESC" and automatically the procedure will start.			
NOTICE: Be sure that the the sensor is completely full of liquid and perfectly still. Even subtle movements of the fluid can cause significant errors, therefore proceed with great care.			

MENU 1 - SENSOR: ONLY MCP FUNCTIONS

<i>Sensor Coils Time A</i>	[MCP ONLY]	AL4	[SCTMA]
Reference sensor coil time A			
<i>Sensor Coils Time B</i>	[MCP ONLY]	AL4	[SCTMB]
Reference sensor coil time B			
<i>Sensor Coils Resistance</i>	[MCP ONLY]	AL4	[SCRES]
Reference sensor coil resistance			
<i>Resistance E1</i>	[MCP ONLY]	AL4	[SE1RR]
Resistance value of E1 electrodes			
<i>Resistance E2</i>	[MCP ONLY]	AL4	[SE2RR]
Resistance value E2 electrodes			
<i>Sensor Coils Temperature Reference</i>	[MCP ONLY]	AL4	[SCTRF]
Reference temp.for Sensor's data (Required for BIV function)			

MENU 2 - UNITS

WARNING: The totalizer value is updated and changed depending on the setting of unit value. The scale change may cause accuracy loss depending of rounding up. For example, if T +=0,234 liters with 3 decimals, it become T +=0.001 m³ losing 0.234 liters in rounding up.

(POS. 2.1) Diameter	[Diam.= mm]	AL2	[SDIUM]
Sensor diameter unit of measure (mm or inch)			
(POS. 2.2) S.cable length unit of m. type	[S.Cable= m]	AL2	[SCAUM]
Sensor cable length for separate version. Select m or foot.			
(POS. 2.3) Flow rate unit of m. type	[FR unit= METRIC]	AL2	[FRMUT]
Flow rate type measure unit. Select metric or not metric			
(POS. 2.4) Pulse 1 unit of m. type	[PL1 unit= METRIC]	AL2	[PL1UT]
This function is active with POS."7.1* Output 1 functions" page 21 enable. This function changes the choice of measure unit POS."3.2 Pulse value on channel 1" page 20 Pulse 1 type measure unit: metric or not metric			
(POS. 2.5) Pulse 2 unit of m. type	[PL2 unit= METRIC]	AL2	[PL2UT]
This function is active with POS."7.2* Output 2 functions" page 21 enable. This function changes the choice of measure unit POS. see page 20 Pulse 2 type measure unit: metric or not metric			
(POS. 2.6) Totalizer direct unit of m. type	[T+ unit= METRIC]	AL2	[TTPUT]
Setting total direct totalizer measure unit type: metric or not metric (Imperial units). This function changes the values measure unit on POS."2.7 Total direct totalizer measure unit" page 20.			
(POS. 2.7) Totalizer direct unit of measure	[T+ unit= dm³]	AL2	[TTPUM]
Setting total direct totalizer measure unit. This function visualized on visualization pages.			
(POS. 2.8) Totalizer direct Deci.Point pos.	[T+ D.P.= x]	AL2	[TTPDP]
Setting total direct totalizer decimal point position. Example: T+D.P.= 3 visualized value T+dm ³ 0.000 / T+D.P.= 2 visualized value T+dm ³ 0.00			
(POS. 2.9) Total. Part. direct unit of m. type	[P+ unit= METRIC]	AL2	[TPPUT]
This function is active with POS."9.3* Partial totalizer enable" page 21 enable. Setting partial direct totalizer measure unit type: metric or not metric (Imperial units). This function changes the values measure unit on POS. "2.10 Partial direct totalizer measure unit" page 20 . It is visualized on visualization pages.			
(POS. 2.10) Total. Part. direct unit of measure	[P+ unit= dm³]	AL2	[TPPUM]
Setting partial direct totalizer measure unit. This function visualized on visualization pages.			

(POS. 2.11) Total. Part direct Dec. Point pos. [P+ D.P.= x] **AL2** [TPPDP]

Setting partial direct totalizer decimal point position.

Example: P+D.P.= 3 visualized value P+dm³ 0.000 / P+D.P.= 2 visualized value P+dm³ 0.00

(POS. 2.12) Total. T reverse unit of m. type [T- unit= METRIC] **AL2** [TTNUT]

This function is active with POS."9.4 Abilitazione totalizzatori negativi" page 23, enabled.

Setting total reverse totalizer measure unit type: metric or not metric (Imperial units).

This function changes the values measure unit on POS."2.13 Total reverse totalizer measure unit" page 24.

It is visualized on visualization pages.

(POS. 2.13) Total. T reverse unit of meas. [T- unit= dm³] **AL2** [TTNUM]

Setting total reverse totalizer measure unit.

This function visualized on visualization pages.

(POS. 2.14) Total. T reverse Dec.Point Pos. [T- D.P.= x] **AL2** [TTNDP]

Setting total reverse totalizer decimal point position.

Example: T- D.P.= 3 visualized value T- dm³ 0.000
T- D.P.= 2 visualized value T- dm³ 0.00

(POS. 2.15) Total. Part reverse unit of m. type [P- unit= METRIC] **AL2** [TPNUT]

This function is active with POS."9.5* Net totalizer enable" page 21, enable.

Setting partial reverse totalizer measure unit type: metric or not metric (Imperial units).

This function changes the values measure unit on POS."2.16 Partial reverse totalizer measure unit" page 20

It is visualized on visualization pages.

(POS. 2.16) Total. Part reverse unit of measure [P- unit= dm³] **AL2** [TPNUM]

Setting partial reverse totalizer measure unit.

This function visualized on visualization pages.

(POS. 2.17) Tot Part. reverse Dec. Point Pos. [P- D.P.= x] **AL2** [TPNDP]

Setting partial reverse totalizer decimal point position.

Example: P- D.P.= 3 visualized value P-dm³ 0.000
P- D.P.= 2 visualized value P-dm³ 0.00

(POS. 2.18) Temperature unit of measure [Temp. unit= C°] **AL2** [TMPUT]

Setting temperature measure unit.

(POS. 2.19) Mass units enable [Mass units= dm³] **AL2** [MSSUE]

Enable or Disable the selection of mass unit of full scale set.

(POS. 2.20) Specific Gravity coeffic. [Sg= Kg/dm³ x.xxxx] **AL2** [VMSGC]

Setting specific gravity coefficient.

This Function is active with POS."2.19 Mass unit enabling" page 20, enable.

MENU 3 - SCALE

(POS. 3.1) Flow Rate Full Scale 1**[FS1= l/s xxxx.x]****AL2****[FRFS1]**

The full scale is used to indicate to the maximum meter's flow rate; a volume per time is required. The full scale should be chosen carefully as it's parameters are used for several other parameters. There are three fields to fill in order to set this parameter, from left to right: 1) measure unit, 2) time unit of measure and 3) numeric value. The selection is made by positioning the cursor on the field to modify. To change the type unit of measure (metric, Imperial units, mass or volume) see POS."2.3 Flowrate type measure unit: metric or not metric" page 24 and POS."2.19 Mass unit enabling" page 24-"2.20 Specific gravity coefficient" page 24. The value of Fs1 depend nominal diameter POS. see page 24. The following tables shown the units of measure available and the conversion factor by comparison with 1dm³ and 1kg. The converter accepts any kind of combination of units of measure satisfying both the following conditions:

- Numeric field value 99999
- $1/25 \text{ fsmax} \leq \text{numeric field value} \leq \text{fsmax}$.

Where fsmax is the maximum full scale value corresponding to the sensor, equal to a 10m/s liquid speed. The measure units are shown as appear on the display. The Imperial units units are diversified by using capital and small characters.

METRIC	
cm³	Cubic centimeter
ml	Milliliter
l	Liter
dm³	Cubic decimeter
dal	Decalitre
hl	Hectolitre
m³	Cubic meter
ML	Mega Liter

NOT METRIC	
in³	Cubic inch
Gal	American gallon
GAL	British gallon
ft³	Cubic foot
bbf	Standard barrel
BBL	Oil barrel
yd³	Cubic yard
kgf	KAmerican gallon
KGL	KBritish gallon
IGL	Imperial gallon
IKG	Imperial K gallon
Aft	Acre foot
MGL	Mega gallon
IMG	Imperial mega gallon

MASS UNIT NOT METRIC	
Oz	Ounce
Lb	Pound
Ton	Short tons

MASS UNIT METRIC	
g	Gram
kg	Kilogram
t	Ton

When a measure mass unit is set, the specific gravity function is automatically enabled by the system. Please, note that the mass measure is heavily affected by the temperature. With certain liquids this may cause significant measurement errors. The following measure of time units can be selected: **s** = second, **m** = minute, **h** = hour, **d** = day .

NOTES FOR USING THE MCP INTERFACE

The command FRFS1 =? , edited by MCP software, return a list of only the unit compatible with the nominal diameter set. If the sensor is insertion type and the diameter is zero, the only possible unit is m/s if the flow rate were chosen metric units, else f/s for the unit of measurement non metric.

(POS. 3.2-3.4) Output *Pulse 1-2* [Pls1-2= dm³ x.xxxxx] AL2 [OP1PV-OP2PV]

Pls1 and Pls2 is active with POS."7.1 Output 1 functions" page 25-"7.2 Output 2 functions" page 25, enable and setting pulse value on channel 1 and channel 2.

This function allows the user to set a signal (a pulse) to be given from the converter when a defined amount of liquid has passed through the sensor.

To set the parameter, complete the 2 fields, from left to right: 1)measure unit, 2) numeric value.

The selection is performed by positioning the cursor in the field to be modified.

To change the unit type (metric, British or American, mass or volume) see POS."2.4 Pulse1 Flowrate type measure unit: metric or not metric" page 24 - "2.5 Pulse2 Flowrate type measure unit: metric or not

metric" page 24, POS."2.19 Mass unit enabling" page 24 - "2.20 Specific gravity coefficient" page

24. The value of Pls1-2 depends on nominal diameter POS."1.5 Insert ND of sensor (0-2500)" page 24.

Only those units described (POS."3.1 Full scale flow rate" page 24) above are available to be selected.

(POS. 3.3-3.5) *Output1-2 Pulse Time* [Tpls1-2= ms x.xxxxx] AL2 [OP1PT OP2PT]

Tpls1 and Tpls2 is active with POS."7.1 Output 1 functions" page 25-"7.2 Output 2 functions" page 25 enable. Setting duration of the pulse generated on channel 1 and 2.

With the liquid volume to generate the pulse value set by the user. The user must set the corresponding duration of the pulse to be outputted. This value is expressed in milliseconds and has to be between 0.4 and 9999.99. When the high frequency output is present, then the minimum value can type of device is connected to the converter, the user must verify that the set pulse duration is compatible with the external device processing such pulses. If, for example, an electromechanical pulse counter is connected, a minimum pulse time of 0.04 milliseconds can be set.

ATTENTION: The converter can not detect problems that may occur; firstly, the pulse is too long the coils may burn out, secondly, if the pulse is too short, the counter may not be able to function, causing damage of the output.

MENU 4 - MEASURE

(POS. 4.1) Measure

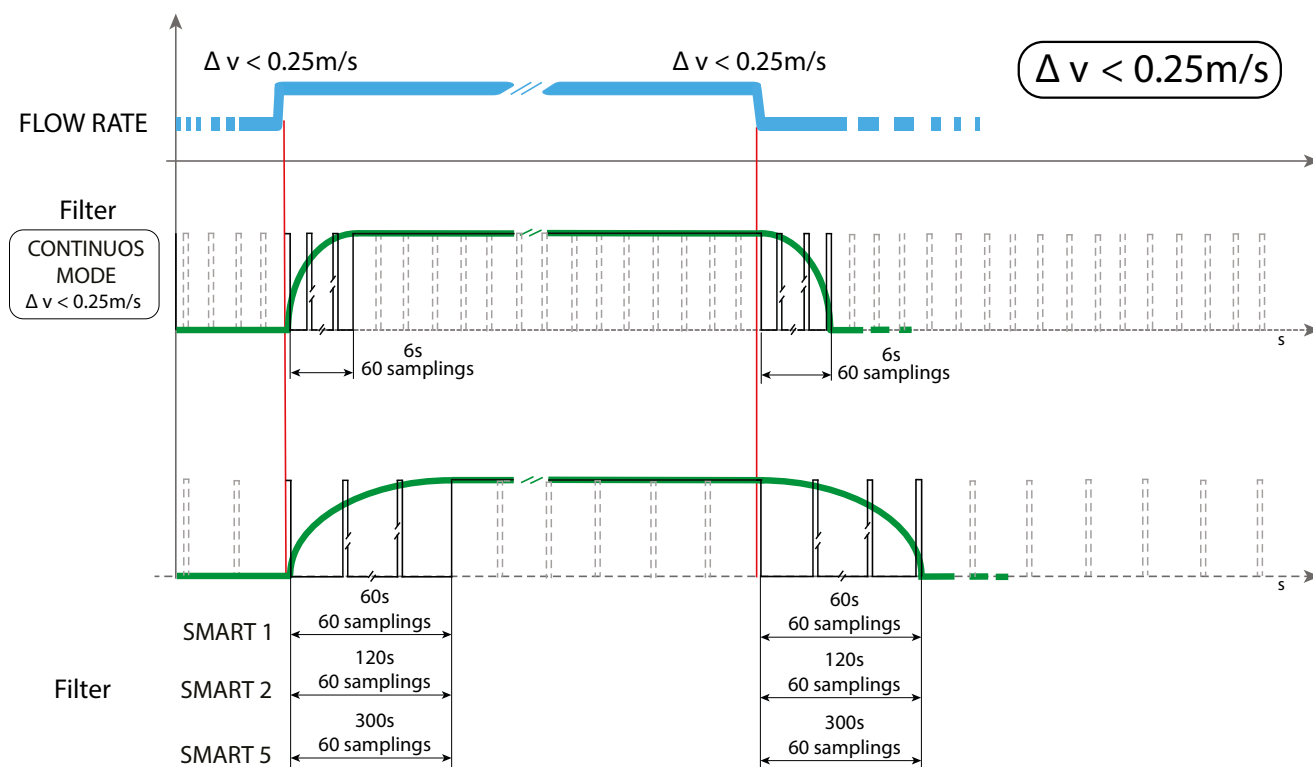
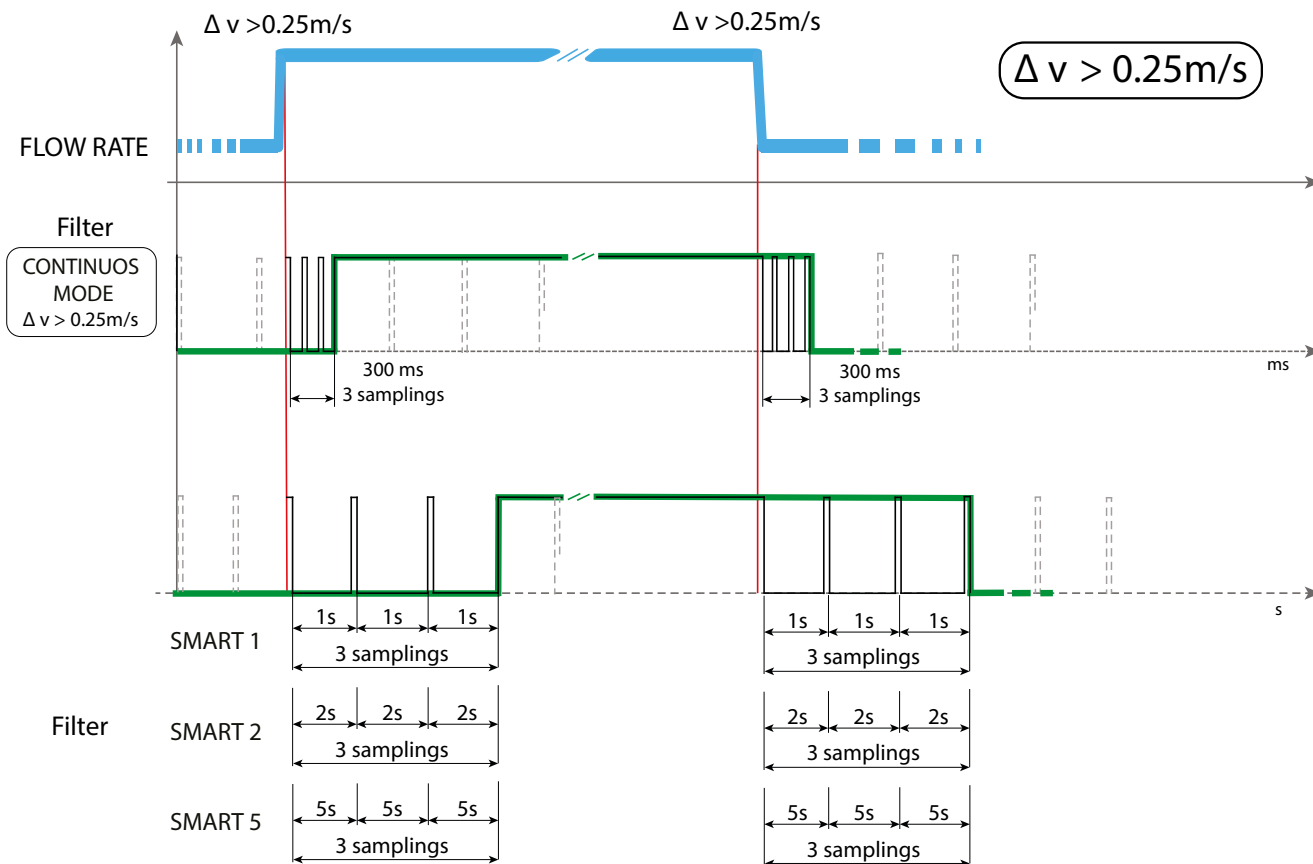
[M. Prof.=C.PWR/SMART1/2/5]

AL3

[MFDMP]

This section of manual is important because the correct setting of the filters allows to get a proper instrument's behaviour according to the specific requirements of use.

FlowRate Measure Δv Differential Speed



(POS. 4.2) <i>Cut-off threshold</i>	[Cut-off=% xxx]	AL3	[MFCUT]
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Setting the low flow cutoff threshold. This function is useful to avoid that flows close to zero, due to the electrical noises from tiny movements of liquid (due for example to vibrations of the pipe) which cause an increasing of the totalizers. The allowed range for this function is 0-25% of full scale set. For most applications a value between 0.5 and 1% is recommended.

(POS. 4.3) <i>LP Cyclesim</i>	[LP Cycle Sim.=ON/OFF]	AL6	[LPSIM]
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Enable the Misure profile selected in the funtion POS. 4.1 see page 24) with external power supply (ex. USB connected)

(POS. 4.4) <i>Automatic Cal. Verify</i>	[Cal.verify=ON/OFF]	AL3	[ACAVE]
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This function enables an automatic verification of board's coefficients. As the converter performs continuously a large number of tests, we recommend to use this function only in presence of wide range of temperature. Instead it is NOT recommended to use it when the instrument is used in metering applications (batch).

MENU 4 - MEASURE: ONLY MCP FUNCTIONS

<i>Measure Filter Cut-off Threshold 2</i>	[MCP ONLY]	AL3	[MFCT2]
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Setting the low flow cutoff threshold, it is similar to the function in 4.2.

<i>High immunity INPUTS</i>	[MCP ONLY]	AL4	[HIINP]
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The HIINP function (INPut High Immunity filter) introduces a hardware filter to be used ONLY IN CASE OF ABSOLUTE NECESSITY, when the measure is absolutely unstable or it is NOT possible to make the measure, and every possible attempt to reduce or eliminate the noise do not give a positive result, with particular attention of instrument ground connection. When this function is activated (HIINP = ON) the measure will be influenced by an unavoidable error estimated around 1%.

<i>Dynamic sample analysis</i>	[MCP ONLY]	AL4	[DINSA]
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Reserved to the service

<i>Dynamic sample time</i>	[MCP ONLY]	AL4	[DYNST]
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Reserved to the service

MENU 5 - ALARMS

(POS. 5.1) *Maximum direct flow rate threshold* [Max. thr+=% XXX] AL3 [FRAXP]

Maximum value alarm set for direct flow rate set. When the flow rate value exceeds such a threshold, then an alarm message is generated. The value of this parameter is expressed as percentage of the full scale value and may be set from 0 to 125%. Setting this parameter to zero disables the alarm generation.

(POS. 5.2) *Maximum reverse flow rate threshold* [Max. thr-=% XXX] AL3 [FRAXN]

Maximum value alarm set for reverse flow rate set. When the flow rate value exceeds such a threshold, then an alarm message is generated. The value of this parameter is expressed as percentage of the full scale value and may be set from 0 to 125%. Setting this parameter to zero disables the alarm generation.

(POS. 5.3) *Minimum direct flow rate threshold* [Min. thr+=% XXX] AL3 [FRANP]

Minimum value alarm set for reverse flow rate set. When the flow rate value falls below such a threshold, then an alarm message is generated. The value of this parameter is expressed as percentage of the full scale value and may be set from 0 to 125%. Setting this parameter to zero disables the alarm generation.

(POS. 5.4) *Minimum reverse flow rate threshold* [Min. thr-=% XXX] AL3 [FRANN]

Minimum value alarm set for reverse flow rate set. When the flow rate value falls below such a threshold, then an alarm message is generated. The value of this parameter is expressed as percentage of the full scale value and may be set from 0 to 125%. Setting this parameter to zero disables the alarm generation.

(POS. 5.5) *Alarm thresholds Hysteresis* [Hysteresis=% XX] AL3 [ATHYS]

Hysteresis threshold set for the minimum and maximum flow rate alarms. The value of this parameter is expressed as percentage of the full scale value and may be set from 0 to 25%.

MENU 6 - INPUTS

(POS.6.1-2) *T.direct(pos.)flowtot./part reset enable* [T/P+/RESET=ON/OFF] AL3 [VTTPE] [VTPPE]

When one of this function is enabled, the related totalizer + may be reset through the on/off input.

(POS.6.3-4) *T.direct(neg.)flowtot./part reset enable* [T/P-/RESET=ON/OFF] AL3 [VTTNE] [VTPNE]

When one of this function is enabled, the related totalizer - may be reset through the on/off input.

(POS. 6.5) *Totalizers counting lock command* [COUNT LOCK= ON/OFF] AL3 [TCLIE]

Totalizers counting lock command enable. When this function is active, applying a voltage on the on/off input terminals the system stops the totalizers no matter which is the flow rate.

(POS. 6.6) *Measure zero lock input enable* [Meas.lock=ON/OFF] AL3 [MSLIE]

When this function is active (ON), applying a voltage on the on input terminals, the measurement is stopped, the meter will display zero flow.

(POS. 6.7) *Calibration Func. input enable* [Calibration=ON/OFF] AL3 [CALIE]

When this function is active, applying a voltage on the on/off input terminals the meter performs a autozero calibration cycle. ATTENTION: If the voltage pulse is less than 1 sec., the meter performs a calibration cycle to compensate possible thermal drifts. If the voltage pulse is more 1 sec, the meter performs a zero calibration measure. To perform the calibration it is absolutely necessary for the sensor to be full of liquid and that the liquid is perfectly still. Even very small movement of the liquid may affect the result of the calibration, and, consequently, the accuracy of the system.

MENU 7 - OUTPUTS

(POS. 7.1) Output 1 function selection [Out1=XXXXXX] **AL3 [OUT1F]**

Function choice corresponding to digital Output 1. The functions are listed in the table below.

(POS. 7.2) Output 2 function selection [Out2=XXXXXX] **AL3 [OUT2F]**

Function choice corresponding to digital Output 2. The functions are listed in the table below.

FUNCTIONS FOR OUTPUTS 1 AND 2

- OFF:** DISABLE
- MAX AL. +:** MAX DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- MIN AL. +:** MIN DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- MAX AL.-:** MAX INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- MIN AL.-:** MIN INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- MAX/MIN-:** MAX/MIN INVERSE FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- MAX/MIN+/-:** MAX/MIN DIRECT FLOW RATE OUTPUT (ENERGIZED = AL. OFF)
- P.EMPTY:** EMPTY PIPE ALLARM OUTPUT (ENERGIZED = AL. OFF)
- AL.SYSTEM:** SUM OF ALL ALARMS "energized interrupted " AND "error input signal "
- OVERFLOW:** OUT OF RANGE ALLARM OUTPUT (ENERGIZED = FLOWRATE OK)
- ALL ALARMS:** SUM OF ALL ALARMS POSSIBLE
- MANUAL:** OUTPUT MAY TAKE A STATE EMPLOYEE FROM AN EXTERNAL CONTROL (MCP,MODBUS, ecc)
- FLOW RATE SIGN.:** FLOW DIRECTION (ENERGIZED WHEN FLOW IS NEGATIVE)
- SCALE:** INDICATION SCALE
- PULSES.+:** PULSE POSITIVE FLOW RATE
- PULSES.-:** PULSE NEGATIVE FLOW RATE
- PULSES+/-:** PULSE NEGATIVE/POSITIVE FLOW RATE

MENU 9 - DISPLAY

(POS. 9.1) *Language for all msn* **[Language= ITA/EN]** **AL1** **[LLANG]**

Choice of the language. There are 2 languages available: **EN** = english, **IT** = Italian.

(POS. 9.2) *KeyBoard Timeout Time* **[Disp. time=s xxx]** **AL1** **[KBTMT]**

This function set display/keyboard inactivity. The set values are from 020 to 255 second.

(POS. 9.3) *Partial totalizer* **[Part. tot= ON]** **AL2** **[PTOTE]**

This function enables the display of partial totalizer in visualization pages

(POS. 9.4) *Negative totalizer* **[Neg. tot= ON]** **AL2** **[NEGTE]**

This function enables the display of negative totalizer in visualization pages

(POS. 9.5) *Net totalizer* **[Net. tot= ON]** **AL2** **[NVTTE]**

This function enables the display of net totalizer in visualization pages

(POS. 9.6) *Date and Time* **[Disp.Date= ON]** **AL2** **[DATDE]**

This function enables the display of date and time in visualization pages

(POS. 9.7) *Quick start menu* **[Quick start= ON]** **AL2** **[QSTME]**

This function enables the quick start menu.

MENU 10 - DATA LOGGER

(POS. 10.1) Data logger enable	[D.logger en= /OFF]	AL3	[DLOGE]
This function enables data logger.			
The following functions are activated by [D.loger en= ON]			
(POS. 10.2) Unite of Measure	[Meas. units= ON]	AL3	[DLUME]
Measure unit recording enable			
(POS. 10.3) Field separator character	[Field separ.= ;]	AL3	[DLFSC]
This function will set the separator character between data logger data.			
(POS. 10.4) Decimal Separator Char.	[Decim.separ.= .]	AL3	[DLDSC]
This function will set the separator character between data logger number value.			
(POS. 10.5) Sample Interval	[Interv.= xx:xx:xx]	AL3	[DLGSI]
Sampling interval. This function set the log frequency. [Interv.= Hours : Minutes: Seconds]			
(POS. 10.6) Totalizer Total positive	[Log T+= ON]	AL3	[DTTPE]
Enable logging of total direct totalizer.			
(POS. 10.7) Totalizer Partial positive	[Log P+= ON]	AL3	[DTPPE]
Enable logging of partial direct totalizer.			
(POS. 10.8) Totalizer Total Negative	[Log T-= ON]	AL3	[DTTNE]
Enable logging of total reverse totalizer			
(POS. 10.9) Totalizer Partial Negative	[Log P-= ON]	AL3	[DTPNE]
Enable logging of partial reverse totalizer			
(POS. 10.10) Totalizer Total Net	[Log TN= ON]	AL3	[DLTNE]
Enable logging of total net totalizer			
(POS. 10.11) Totalizer Partial Net	[Log PN= ON]	AL3	[DLPNE]
Enable logging of partial net totalizer			
(POS. 10.12) Log Flow rate in measure unit	[Log Q(UM)= ON]	AL3	[DFTUE]
Enable logging of flow rate in measure unit			
(POS. 10.13) Log Flow rate in percentage	[Log Q(%)= ON]	AL3	[DFPCE]
Enable recording of the flow rate as a percentage of full scale value set.			
(POS. 10.14) Alarm events	[Log AL.EV= ON]	AL3	[DALEE]
Enable logging of alarm events			

(POS. 10.15) <i>Sensor test result</i>	[Log STR= ON]	AL6	[DSTRE]
Enable logging of sensor test results			
(POS. 10.16) <i>Board temperatures</i>	[Log BTS= ON]	AL6	[DBTSE]
Enable logging of board temperature			
(POS. 10.17) <i>Internal board voltages</i>	[Log IBV= ON]	AL6	[DIBVE]
Enable logging of internal board voltage			
(POS. 10.18) <i>Electrodes DC voltages</i>	[Log EDC= ON]	AL6	[DEDVE]
Enable logging of electrodes DC voltage			
(POS. 10.19) <i>Electrodes AC voltages</i>	[Log AEC= ON]	AL6	[DEAVE]
Enable logging of electrodes AC voltage			
(POS. 10.20) <i>Electrodes source impedance</i>	[Log EIZ= ON]	AL6	[DESIE]
Enable logging of electrodes impedance			
(POS. 10.21) <i>Sensor coils values</i>	[Log SCV= ON]	AL6	[DSCVE]
Enable logging of sensor coils value			

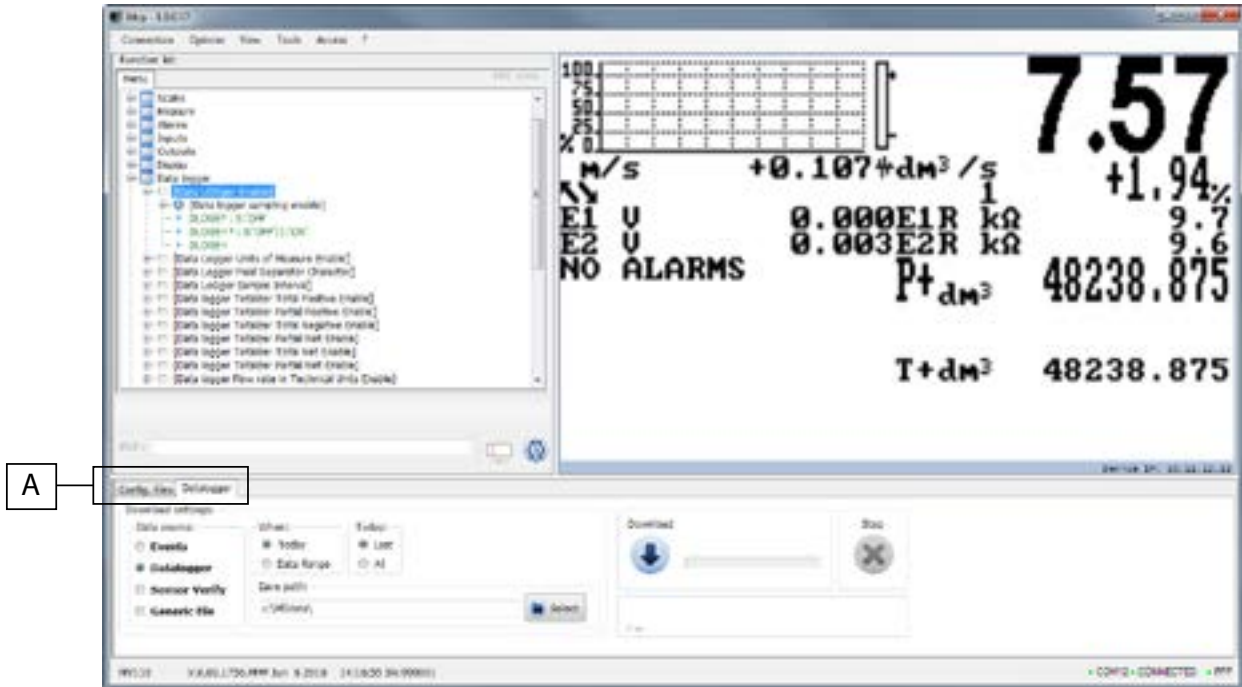
MENU 10 - DATA LOGGER: ONLY MCP FUNCTIONS

<i>LoG All Information Enable</i>	[MCP ONLY]	AL6	[LGAIE]
Log all events information. This function save in the event file all MCP commands.			

USING DATA LOGGER BY MCP INTERFACE

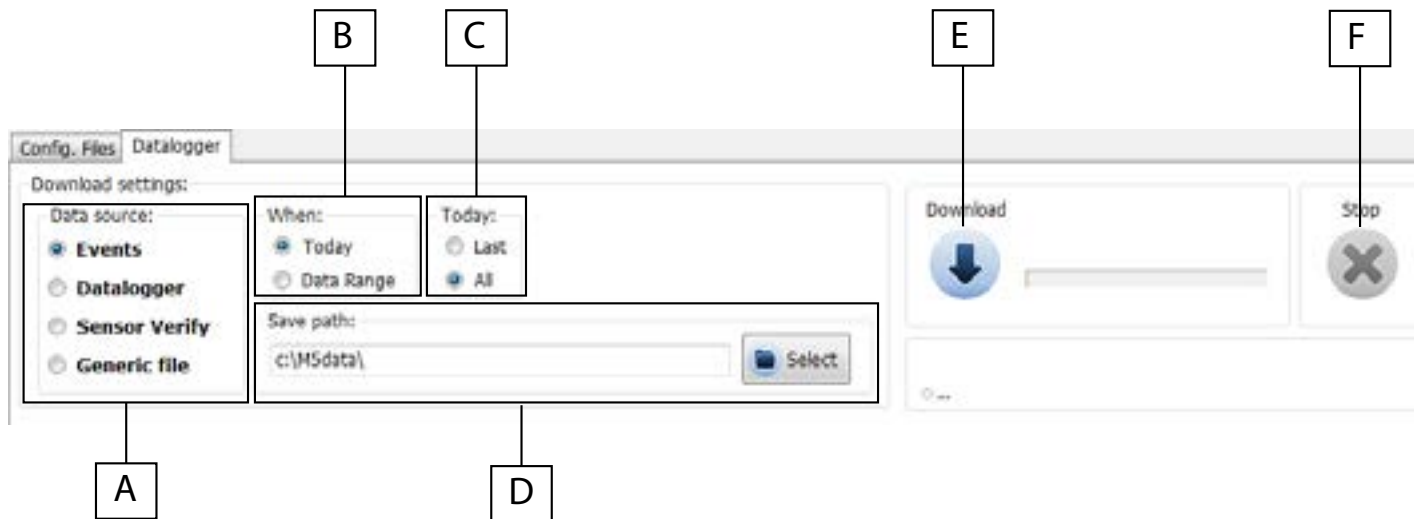
Data are stored on micro SD card; the organization is based on "tree-structure": the system create a daily folder where it save events and data logger . The data can be downloaded by MCP interface.

MCP INTERFACE



Click tab-control data logger to view files.

The sampling data backup depends on the value set by the POS function 10.4 page 25.



A=Data source

Events: Save the file system events (Example F-RAM hardware data [WORKING AREA] [SUCCESSFULLY LOADED])

Data logger: Save files of the enabled data logger function.

Sensor Verify: data logged by BIV function

Generic file:

B=When

Today; It indicates the download file for the current day

Data range; this option allows you to select the date range for download.

C=Today

Last; this option allows to download the latest files, recorded after the last download

All; this option allows the download of all the current day of the file

D=Save path:

This option allows you to save files to the folder on your PC

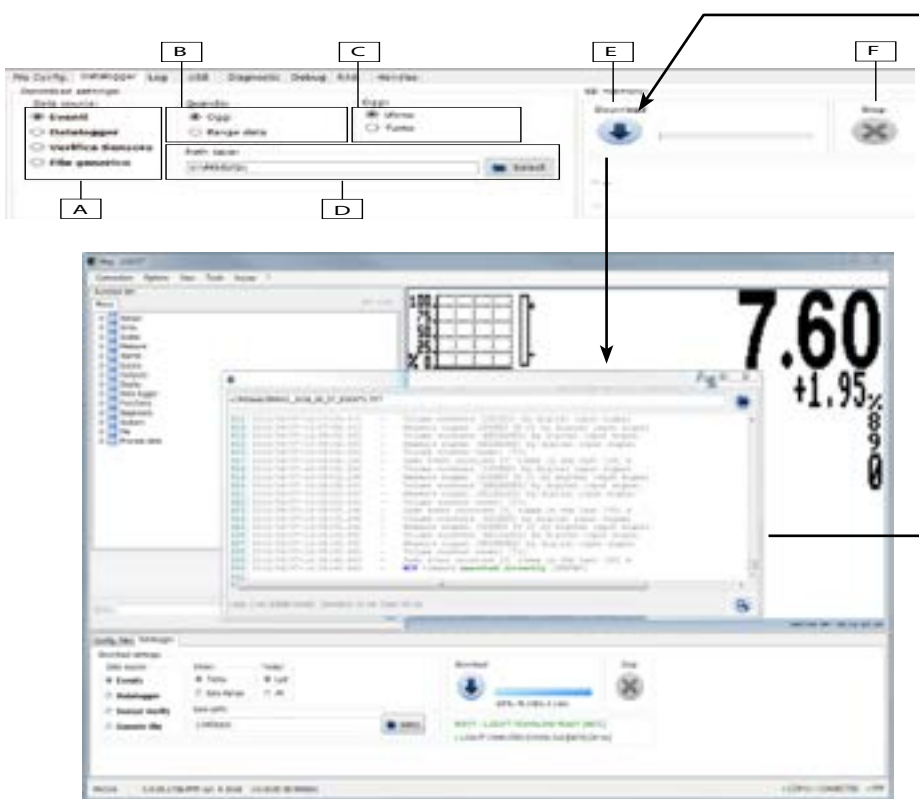
E=Download:

Button to start the download process

F=Stop:

Button to stop the download process

Example: Download Events



To download all the events of the current day in a specific folder, set the below parameters as follows:

- Data source: Events
- When: Today
- Today: All
- Save path: C: /

The parameters are set then click the Download button.

Once the download is completed, a window containing the list of today's events appears. The file is saved in the specified folder in .txt format .

Example: Download Data Logger

Note: it is recommended the date synchronization between converter and PC to perform correctly the events and logger reading operations.



To download all the data of the current day in a specific folder, set the below parameters as follows:

Data source: DATALOGGER

When: Today

















Today: All

Save path: C: /























The parameters are set then click the Download button.

View downloaded files setting download data logger.

Note: The fields are in a fixed position, regardless if the above fields are active or not. The disabled fields are empty (delimited by the separator but without data).

N°Record. View progressively the number of registered records.	
Date. The recording date viewing for each record.	
Hours. Time recording viewing for each record.	
Total positive totalizer value. Form Fields when the send flag is active on the totalizer T+.	
Partial positive totalizer value. Form Fields when the send flag is active on the totalizer P-.	
Total negative totalizer value. Form Fields when the send flag is active on the totalizer T-.	
Partial negative totalizer value. Form Fields when the send flag is active on the totalizer P-.	
Total net totalizer value. Form Fields when the send flag is active on the totalizer TN.	
Partial net totalizer value. Form Fields when the send flag is active on the totalizer PN	
Flow rate. Form Fields present when the send flag is on the flow in units of measurement.	
Flow rate %. Form fields present when the flag of alarm recording is active (only N ° of present total alarms)	
N ° active alarms. Form fields present when the flag of alarm recording is active (only N ° of present total alarms)	
Loss of current measured during insulation test. Available value when recording the sensor test data is active.	
Time rise A. Available value when recording the sensor test data is active.	
Time rise B. Available value when recording the sensor test data is active.	
Sensor test error code. Available value when recording the sensor test data is active.	

Visualization of downloaded file. Access Level 5 (diagnostic level) is required in order to download this type of file.

<p>Voltage measured on electrode E1. Form fields when is active the recording of data on the input voltage (diagnostic value).</p>	
<p>Voltage measured on electrode E2. Form fields when is active the recording of data on the input voltage (diagnostic value).</p>	
<p>Differential voltage between the two electrodes. Form fields when is active the recording of data on the input voltage (diagnostic value)</p>	
<p>Common mode voltage in the electrodes. Form fields when is active the recording of data on the input voltage (diagnostic value).</p>	
<p>Noise at low frequency measured on the electrodes. Form fields when is active the recording of data on the input signal noise levels (diagnostic value).</p>	
<p>Differential low frequency noise measured on the electrodes. Form fields when is active the recording of data on the input signal noise levels (diagnostic values).</p>	
<p>Low-frequency noise measured input ADC. Form fields when is active the recording of data on the input signal noise levels (diagnostic values).</p>	
<p>High frequency noise measured input ADC. Form fields when is active the recording of data on the input signal noise levels (diagnostic values).</p>	
<p>Measured equivalent resistance on the electrode 1. Form fields when is active the recording of data on the electrode resistance measurements (diagnostic values).</p>	
<p>Measured equivalent resistance on the electrode 2. Form fields when is active the recording of data on the electrode resistance measurements (diagnostic values).</p>	
<p>Coils excitation current. Form fields when is active the recording of data related to the sensor excitation circuit measures (diagnostic value)</p>	
<p>Measured resistance of the excitation circuit (coil + cable). Form fields when is active the recording of data relative to the sensor excitation circuit measures (diagnostic values).</p>	
<p>Temperature measured on the sensor coils (indirect measurement). Form fields when the data transmission flag is active relative to the sensor excitation circuit measures (diagnostic values).</p>	
<p>Temperature T1 (sheet sensor 1). Form fields when the data transmission flag on board the internal temperature measurement is active (diagnostic values).</p>	
<p>Temperature T2 (sheet sensor 2). Form fields when the data transmission flag on board the internal temperature measurement is active (diagnostic values).</p>	
<p>CPU temperature. Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic value).</p>	
<p>Primary power supply of CPU. Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic value).</p>	
<p>Positive supply voltage of analog circuits. Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values).</p>	
<p>Negative supply voltage of the analog circuits. Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values).</p>	
<p>Voltage measured on the battery B1 (NOT rechargeable battery). Fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values).</p>	
<p>Voltage measured on the battery B2 (or rechargeable battery). Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values).</p>	
<p>% Battery charge. Form fields when the data on the card's internal power supply voltage measurements flag is ON (diagnostic values).</p>	

Example: Sensor Verify

The function "Sensor Verify" creates the "STESTLOG.CSV" file, according to the following conditions:

- 1) Activate the SDC / RTC option in group "HW Config" (by factory see the order code)
- 2) Activate the "BIV" in the group "PRODUCT CODE" (by factory see the order code)
- 3) Activate the "Sens.verify" function in the "Sensor" menu

Activated such conditions, the converter will perform every hour a measure of sensor's parameters and record a line of the file "STESTLOG.CSV"; it is possible even a manual verification by the command "sens.verify" on the menu "Diagnostic" or through the MCP command "SVERC".



To download all the sensor measure for the current day in a specific folder, set the below parameters as follows:

Data source: Sensor Verify

When: Today

Today: All

Save path: C: /

The parameters are set then click the Download button.

Example: Generic File



This function allows to select a file in the SD memory and download it. In the "Generic file path" specify the file name contained in the SD and indicate "Save path" where to save the file. Set these values to proceed with the download by clicking the "download".

MENU 11 - FUNCTION

The following functions are activated by first pressing the "ENTER" and then the "ESC" when the screen appears "confirm" to start the function.

(POS. 11.1) Totalizer Total Positive reset [T+ RESET= ON] AL3 [VTTPR]

Reset total direct totalizer for direct flow rate (+)

(POS. 11.2) Totalizer Par. Positive reset [P+ RESET= ON] AL3 [VTPPR]

Reset total partial totalizer for direct flow rate (+)

(POS. 11.3) Totalizer Total Neg. reset [T- RESET= ON] AL3 [VTTNR]

Reset total reverse totalizer for direct flow rate (-)

(POS. 11.4) Totalizer Partial Neg. reset [P- RESET= ON] AL3 [VTPNR]

Reset partial reverse totalizer for direct flow rate (-)

(POS. 11.5) Load factory default sensor [Load sens.f.def= ON] AL3 [LFDSD]

This function resets the parameters of the sensor factory default. To Load the saved files see function (11.7).

(POS. 11.6) Load factory default converter [Load conv.f.def= ON] AL3 [LFDSD]

This function resets the parameters of the converter factory default. o Load the saved files see function (11.8).

(POS. 11.7) Save sensor factory default [Save sens.f.def= ON] AL6 [SFDSD]

This function save the parameters of the sensor factory default.

(POS. 11.8) Save convert factory default [Save conv.f.def= ON] AL6 [SFDSD]

This function loads the data from a converter to another. It is activated when performing the procedure see "meter data" page61.

(POS. 11.9) Calibration Immediate [Calibration] AL5 [CALIC]

Perform manually a board's calibration. Press Enter and the message " EXECUTE?" will be visualized on the display then press long the key Enter to proceed. Press any other key to delete the operation.

If the sensor table is valid, the calibration is performed also when one of the following parameter has been change:

1. SENSOR DIAMETER -> Menu Sensor1
2. SENSOR MODEL -> Menu Sensor1
3. Exc. CURRENT -> Menu Sensor1
4. S. Freq. -> Menu Sensor1

To check the calibration status, active or inactive, type the command MCP Calic? and check as follows:

- CALIC = 1 calibration in progress
- CALIC = 0 calibration terminated

MENU 11 - FUNCTION: ONLY MCP FUNCTIONS

Save sensor reference data [MCP ONLY] AL4 [SRFDS]

Save conv.f.def= ON. "meter data" page 61

MENU 12 - DIAGNOSTIC

(POS. 12.1) Self Test Diagnostic [Self Test] AL3 [ATSIC]

Meter auto-test function. This function stops the normal functions of the meter and performs a complete test cycle on the measure input circuits and on the excitation generator. To activate this function, after select it, push key Enter, at the question: "CONFIRM EXEC.?" Long Push the same key to start auto-test, or any other key for delete operation. At the end of operation the converter will revert to one of the initial visualization pages. This function is automatically performed when switching on the device. This function restarts the converter.

(POS. 12.2) Sensor verify [Sens. verify] AL3 [SVERC]

This function perform a manual sensor verification (if BIV is active)

(POS. 12.3) Flow rate simulation [Flow sim=ON] AL3 [MSIEN]

Flow rate simulation enabling. With this function it is possible to generate an internal signal that simulates the flow rate, allowing the outputs and all the connected instruments test. After enabling it, a '▲' appears in the top left of the screen and the flow rate simulation can be:

- set: by pushing the key Enter from one of visualization pages, to set the required % flow rate (Fl. rate=%) and the same key to confirm the value;
- finished: by pushing the key Enter from visualization pages and then by long pushing the same key.

(POS. 12.4) Diagnostic measures [Display measures] AL5 DMVLS

This Function shows the values of the various internal parameters as listed below :

```

VCPU:V          5.01  LFN_COM:U      0.0000
UPS:U           5.41  LFN_DIF:U      0.0000
UI5R:U          4.53  I5FN_ADC:UV    0.0000
IAUCC:U         10.1  LFN_PDC:UV     0.0001
-AUCC:U         -9.9  MEAS_NR:UV     0
UBATT:U         0.000  CAL_I:UV       16.503
IBATT:A        -0.000  CAL_U:UV       16.503
OINI:U         -0.071  CAL_O:UV       16.503
UINZ:U         -8.665  CAL_C:UV       16.503
UIN_C:U        -8.668  CAL_O:UV       16.503
UIN_D:U        -0.006  CAL_C:UV       16.503
C-C:MN         25.66  CAL_R0:UV      1.00000000
C-U:U          25.66  CAL_R1:UV      1.00000000
C-UPK:U        25.66  CAL_R2:UV      1.00000000
C-R:U          201.0  CAL_R3:UV      1.00000000
C-FAN:W        0.126  SVS_F:MHz      0.00000000
C-T:°C         -  CURE_K:UV      40.4
C-RI:ms        0.00  PROC1:%         7.3
C-LK:MN        0.000  PROC2:%         3.8
C-ST:          1  PROC3:%         29.0
S-VER,RSLT:    0000  PROC4:%         12.6
E1R:kΩ         0.0  PROC5:%         +33.12
E2R:kΩ         0.0  CPU_T:°C
    
```

(POS. 12.5) Disp, comm. Diagnostic values [Disp. comm. vars] AL5 DCVLS

Create a list of diagnostic values on the instrument communication.

```

PPP_STATUS:    NETW E_IP_HDR5:      3
MCPI_S: ESTABLISH E_IP_HDR6:      0
RxCNT: 1477149 E_IP_HDR7:      0
TxCNT: 6515456 E_IP_HDR8:      0
E-SR_LINK:     0 E_IP_HDR9:      0
E-PORTLEN:    0 E_ICPHDR1:     0
E-NETLAYER:   0 E_ICPHDR2:     0
E-TSPLAYR:    0 E_UDPHDR1:     0
E-ARPHDR1:    0 E_UDPHDR2:     0
E-ORPHDR2:    0 E_UDPHDR3:     0
E-IP_HDR1:    0 E_ICMPHDR:     0
E-IP_HDR2:    0
E-IP_HDR3:    0
    
```


Following are the states for the PPP link and MCPI to connect the device.

PPP link status:

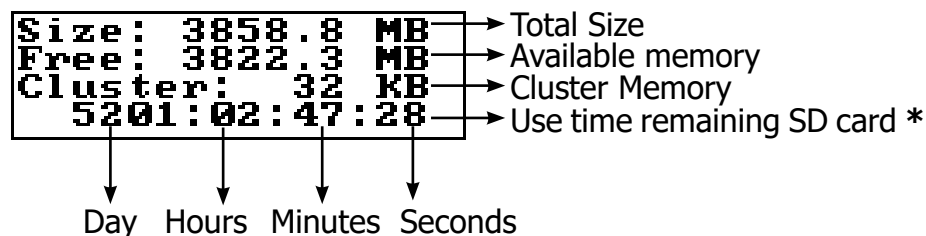
- "UNDT" = undetermined
- "DEAD" = dead, link down, persistent condition
- "LCP" = LCP phase, transition condition
- "AUTH" = Authentication phase, transition condition
- "IPCP" = IP and DNS addressess assign phase, transition condition
- "NETW" = network established (normal persistent condition when the link is UP)
- "TERM" = link termination request, transition condition

MCPI link status:

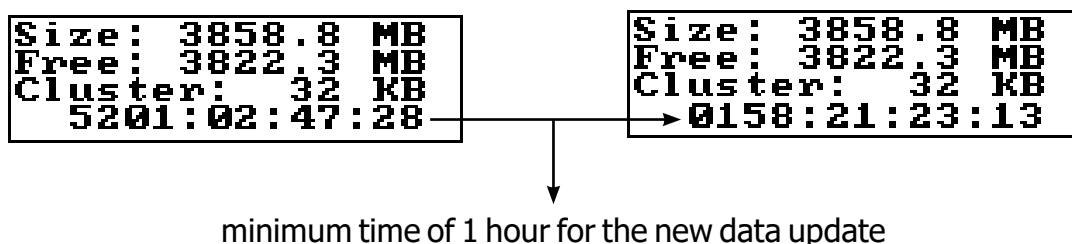
- "CLOSED" = socket closed
- "ACCEPT" = socket awaiting for new connection
- "ESTABLISH" = link established
- "CLS_WAIT" = waiting for closure
- "LAST_ACK" = lask ACK sent
- "FIN_WAIT" = (see TCP/IP RFC documentation)
- "TIME_WAIT" = (see TCP/IP RFC documentation)

(POS. 12.6) SD card status info. [SD card info] ALO SDSTA

This function shows the status of the SD card as shown in the following figure.



The statistical calculation is performed every time the command SDSTA is invoked. The statistical data are updated AUTOMATICALLY every day (24 hours) or manually each time the function is called to display or send the SDSTA command. However, given that for the detection is necessary a minimum of one hour, the data will not be recomputed before this time interval.



The SD card must be replaced only by the service. The use of commercial cards could disable some functionality of the instrument.

(POS. 12.7) Firmware info	[Firmware info]	AL0	MODSV
----------------------------------	------------------------	------------	--------------

Firmware info version/revision

```

MU110
U.0.00.1403.FFFF
Apr 22 2016
12:35:47

```

(POS. 12.8) Board Serial Number	[S/N= xxxxxx]	AL0	[SRNUM?]
--	------------------------	------------	-----------------

View Board serial number. (read only)

(POS. 12.9) Working Time	[WT= xxxx: xx: xx: xx]	AL0	[TWKTM?]
---------------------------------	---------------------------------	------------	-----------------

View Total working time instrument. (read only)

MENU 12 - DIAGNOSTIC: ONLY MCP FUNCTIONS

Diagnostic Function	[MCP ONLY]	AL6	[DIAGF]
----------------------------	-------------------	------------	----------------

This command enable set diagnostic Function.

Coil current Mean	[MCP ONLY]	AL6	[CCMRV]
--------------------------	-------------------	------------	----------------

This command enable coil current mean real value.

MENU 13 - SYSTEM

(POS. 13.1) Daylight saving time	[Dayl. Saving= ON]	AL2	[DYSTE]
---	---------------------------	------------	----------------

Daylight saving time change.

(POS. 13.2) Time zone	[Time zone=h+xx.xx]	AL2	[TZONE]
------------------------------	----------------------------	------------	----------------

Set time for geographic area

(POS. 13.3) Date and Time	[xxxx/xx/xx-xx:xx]	AL2	[DTIME]
----------------------------------	---------------------------	------------	----------------

Set to system date and time

(POS. 13.4-5-6-7-8-9) Access level n° code	[Ln xxxxxxxx]	---	[L1ACD]-> [L6ACD]
---	----------------------	------------	-----------------------------

This function enables or disables, for each access level code, the main menu functions.

Each level unlocks the functionality of the lower level. (Function 13.10 Restricted access level see page 26)

L1 code= ***** Access level value code 1 L4 code= ***** Access level value code 4

L2 code= ***** Access level value code 2 L5 code= ***** Access level value code 5

L3 code= ***** Access level value code 3 L6 code= ***** Access level value code 6

(POS. 13.10) Restricted access level	[Restr. access= ON]	AL6	[RSARE]
---	----------------------------	------------	----------------

Enable Or disable access level code. If active displays only the functions related to the level entered access.

(POS. 13.11) Total Measure	[TC= XXX]	AL6	[TMCYC]
-----------------------------------	------------------	------------	----------------

Total measure cycle.

IP ADDRESS SETTING (13.12-13-14)

(POS. 13.12) Device IP address	[XXX.XXX.XXX.XXX]	AL3	[DIPAD]
---------------------------------------	--------------------------	------------	----------------

Device IP network address

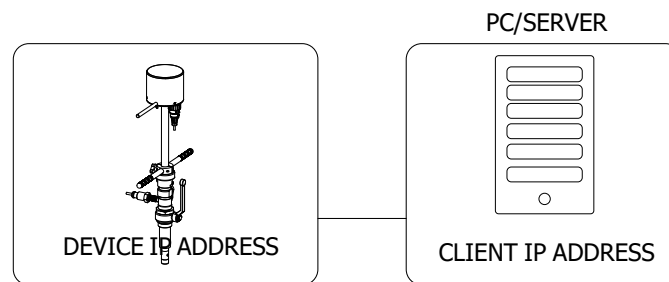
(POS. 13.13) Client IP address	[XXX.XXX.XXX.XXX]	AL3	[CIPAD]
---------------------------------------	--------------------------	------------	----------------

Client IP network address

(POS. 13.14) Network mask	[XXX.XXX.XXX.XXX]	AL3	[NETMS]
----------------------------------	--------------------------	------------	----------------

Network mask.

Caution: Changes to the functions of the points 13.12-13.13-13.14 are enabled after the drive device restart (see function 12.1 Self test for restart converter).



(POS. 13.15) Coefficient KT	[KF=X.XXXXX]	AL6	[CFFKT]
------------------------------------	---------------------	------------	----------------

Gain correction coefficient (calculated automatically)

(POS. 13.16) Coefficient KS	[KF=X.XXXXX]	AL5	[CFFKS]
------------------------------------	---------------------	------------	----------------

Correction coefficient constant instrumental

(POS. 13.17) Coefficient KR	[KR=X.XXXXX]	AL5	[CFFKR]
------------------------------------	---------------------	------------	----------------

Correction coefficient constant instrumental

(POS. 13.18) Stand-BY	[STAND-BY]	AL3	[SSTBY]
------------------------------	-------------------	------------	----------------

Enable the converter standby state. It is enable by selecting chargeable battery in hw confing.

(POS. 13.19) Firmware Update	[FW update]	AL4	[FWUPD]
-------------------------------------	--------------------	------------	----------------

Enable firmware update. The firmware can be upload to the SD card (name.file).
MCP interface is activated by the command FWUPD = name.file

MENU 13 - SYSTEM: ONLY MCP FUNCTIONS

Unique Identity KEY	[MCP ONLY]	AL0	[UIKEY]
Device Unique Identity key			
HardWare SET	[MCP ONLY]	AL0	[HWSET]
Device hardware configuration			
HardWare CODE	[MCP ONLY]	AL0	[HWCOD]
Device hardware code			
Calibr. Exec. status Memory	[MCP ONLY]	AL6	[CALXM]
Calibration Execution status Memory. This function checks the instrument's internal calibration status. CALXM=1 valid calibration in execution. CALXM=0 invalid calibration (If the function is zero, start the calibration function [MCP command CALIC])			
RTC Adjustment coefficient	[MCP ONLY]	AL0	[RTCAC]
RTC is used to set a correction factor for the internal clock. For setting the correction date and time with MCP press 			
Function CODE Selection	[MCP ONLY]	AL0	[FCODS]
Select the function code			
FuNction Enable State Selection	[MCP ONLY]	AL6	[FNESS]
Select the enable state of function			
All FuNctions State Selection	[MCP ONLY]	AL6	[AFNSS]
Select enable state of ALL function			
Quick Start FuNction Selection	[MCP ONLY]	AL6	[QSFNS]
Select function for quick start menu			
Quick Start All Functions Selection	[MCP ONLY]	AL6	[QSAFS]
Select ALL function converter for quick start menu.			
Quick start function Status LiST	[MCP ONLY]	AL6	[QSLST]
List quick start group functions			
Function enable Status LiST	[MCP ONLY]	AL6	[FSLST]
List enable status of functions			

<i>Volume Totalizer Total Negative Set</i>	[MCP ONLY]	AL4	[VTTNS]
Totaliz.T- value set			
<i>Volume Totalizer Partial Negative Set</i>	[MCP ONLY]	AL4	[VTPNS]
Totaliz.P- value set			
<i>Volume Total Positive Overflow Set</i>	[MCP ONLY]	AL4	[VTPOS]
Totaliz.T+ overflow value set			
<i>Volume Partial Positive Overflow Set</i>	[MCP ONLY]	AL4	[VPPOS]
Totaliz.P+ overflow value set			
<i>Volume Total Negative Overflow Set</i>	[MCP ONLY]	AL4	[VTNOS]
Totaliz.T- overflow value set			
<i>Volume Partial Negative Overflow Set</i>	[MCP ONLY]	AL4	[VPNOS]
Totaliz.P- overflow value set			
<i>CPU MaX.recorded temperature</i>	[MCP ONLY]	AL6	[CPUMX]
CPU max.recorded temperature			
<i>CPU MiN.recorded temperature</i>	[MCP ONLY]	AL6	[CPUMN]
CPU min.recorded temperature			
<i>Calibration GAin Register 0</i>	[MCP ONLY]	AL6	[CGAR0]
Calibration gain register 0			
<i>Calibration GAin Register 1</i>	[MCP ONLY]	AL6	[CGAR1]
Calibration gain register 1			
<i>Calibration GAin Register C</i>	[MCP ONLY]	AL6	[CGARC]
Calibration gain register C			

MENU 14 - FILE (ONLY MCP)

<i>File Transfer ABoRt</i>	[MCP ONLY]	AL2	[FTABR]
Abort the current File Transfer			
<i>File Transfer STAtE</i>	[MCP ONLY]	AL0	[FTSTA]
Show the File Transfer state			
<i>Read Last EVenTs</i>	[MCP ONLY]	AL2	[RLEVt]
Read the latest system events			
<i>Read All EVenTs</i>	[MCP ONLY]	AL2	[RAEVt]
Read all current system events			
<i>Read Last Logged DaTa</i>	[MCP ONLY]	AL2	[RLLDt]
Read the latest logged data			
<i>Read All Logged DaTa</i>	[MCP ONLY]	AL2	[RALDt]
Read all current logged data			
<i>Read Last Sensor Verify Data</i>	[MCP ONLY]	AL2	[RLSVD]
Read the latest sensor ver. data			
<i>Read All Sensor Verify Data</i>	[MCP ONLY]	AL2	[RASVD]
Read all sensor verify data			
<i>File SEND</i>	[MCP ONLY]	AL2	[FSEND]
Set file name for read operation			
<i>File ReCeIVE</i>	[MCP ONLY]	AL5	[FRCVE]
Set file name for write operation			
<i>File ReCeive APPend mode</i>	[MCP ONLY]	AL5	[FRCAP]
Set file name for write-append			
<i>File OFFSet position</i>	[MCP ONLY]	AL2	[FOFFS]
Set file offset position			
<i>ConFiGuration file WRite</i>	[MCP ONLY]	AL2	[CFGWR]
Save the configuration to a file			
<i>ConFiGuration file ReAd</i>	[MCP ONLY]	AL2	[CFGRD]
Read the configuration from file			

<i>FuNction list file WRite</i>	[MCP ONLY]	AL2	[FNCWR]
Save the functions list to file			
<i>Function Enable Status WRite</i>	[MCP ONLY]	AL6	[FESWR]
Save function enable status to file			
<i>Quick Start function Status WRite</i>	[MCP ONLY]	AL6	[QSSWR]
Save quick start function enable.			

MENU 15 - PROCESS DATA (ONLY MCP)

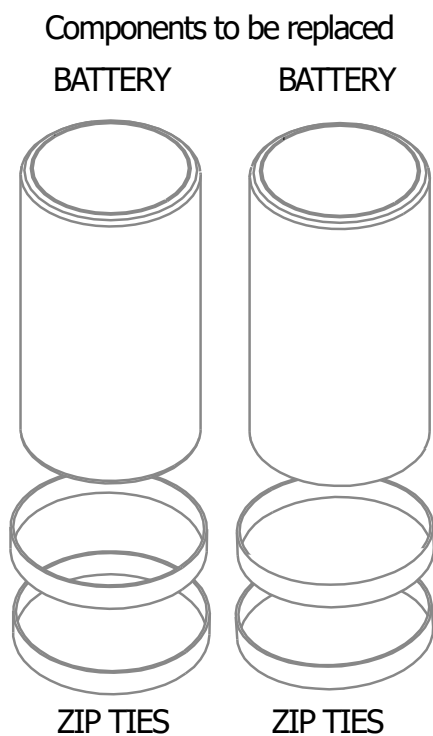
<i>OUTput 1 Set</i>	[MCP ONLY]	AL0	[OUT1S]
Set value for digital output 1			
<i>OUTput 2 Set</i>	[MCP ONLY]	AL0	[OUT2S]
Set value for digital output 2			
<i>Digital INput 1 Status</i>	[MCP ONLY]	AL0	[DIN1S]
Digital input 1 status read			
<i>Flow Rate Full Scale in chosen Units</i>	[MCP ONLY]	AL0	[FRFSU]
F.rate f.scale in chosen units			
<i>Flow Rate Scale Range Numeber</i>	[MCP ONLY]	AL0	[FRSRN]
Full scale active range			
<i>Flow Rate Value PerCentage</i>	[MCP ONLY]	AL0	[FRVPC]
Flow rate value in percentage			
<i>Flow Rate Value Percentage without cut-off</i>	[MCP ONLY]	AL0	[FRVPX]
F.rate in perc.without cut-off			
<i>Flow Rate Value Binary without cut-off</i>	[MCP ONLY]	AL0	[FRVBX]
F.rate in binary.without cut-off			
<i>Flow Rate Value Technical Unit</i>	[MCP ONLY]	AL0	[FRVTU]
F.rate value in unit of measure			
<i>Volume Totalizer Total Positive Value</i>	[MCP ONLY]	AL0	[VTTPV]
Totaliz.T+ read value			
<i>Volume Totalizer Partial Positive Value</i>	[MCP ONLY]	AL0	[VTPPV]
Totaliz.P+ read value			

<i>Volume Totalizer Total Negative Value</i>	[MCP ONLY]	ALO	[VTTNV]
Totaliz.T- read value			
<i>Volume Totalizer Partial Negative Value</i>	[MCP ONLY]	ALO	[VTPNV]
Totaliz.P- read value			
<i>Volume Totalizer Total Positive Overflow</i>	[MCP ONLY]	ALO	[VTTPO]
Totaliz.T+ number of overflows			
<i>Volume Totalizer Partial Positive Overflow</i>	[MCP ONLY]	ALO	[VTPPO]
Totaliz.P+ number of overflows			
<i>Volume Totalizer Total Negative Overflow</i>	[MCP ONLY]	ALO	[VTTNO]
Totaliz.T- number of overflows			
<i>Volume Totalizer Partial Negative Overflow</i>	[MCP ONLY]	ALO	[VTPNO]
Totaliz.P- number of overflows			
<i>Board TeMPeratures</i>	[MCP ONLY]	ALO	[BTMPS]
Board temperatures			
<i>CPU temperature</i>	[MCP ONLY]	ALO	[CPUTP]
CPU temperature			
<i>Sensor CoiLs TemPerature</i>	[MCP ONLY]	ALO	[SCLTP]
sensor's coils temperature			
<i>LiQuid VELOCITY</i>	[MCP ONLY]	ALO	[LQVEL]
Liquid velocity			
<i>AVerAGe process data Samples Number</i>	[MCP ONLY]	ALO	[AVGSN]
N.of samples for averaged values			
<i>ALARM status</i>	[MCP ONLY]	ALO	[ALARM]
Active alarm(s) status			
<i>Sensor TeSt Result Code</i>	[MCP ONLY]	ALO	[STSRC]
Sensor test result code			
<i>Main power status</i>	[MCP ONLY]	ALO	[MPWRS]
Status of main power supply			
<i>INput RESistance</i>	[MCP ONLY]	ALO	[INRES]
Equivalent Input resistance			

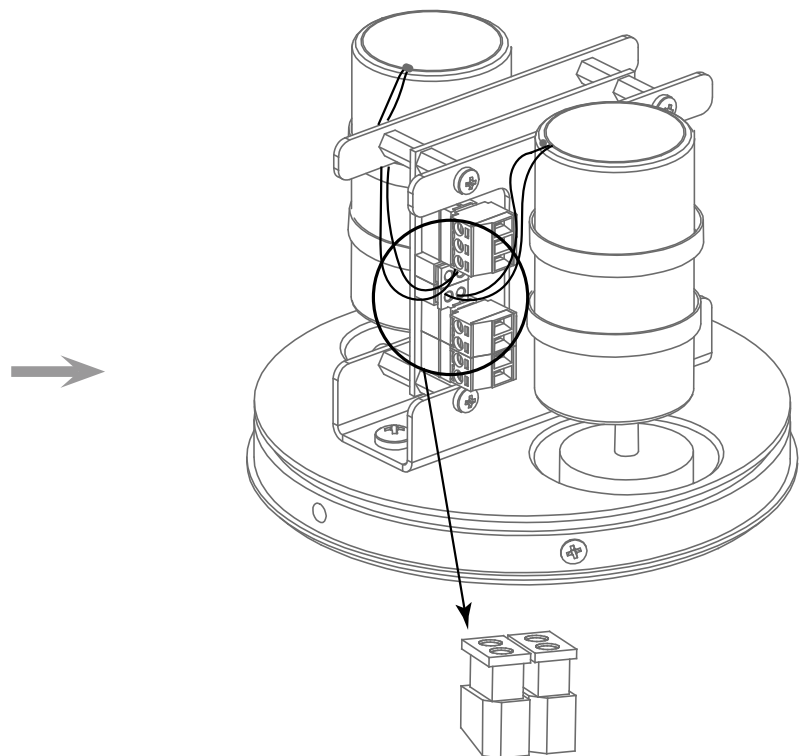
<i>INput VoltageS</i>	[MCP ONLY]	ALO	[INVLS]
Electrodes input voltages			
<i>System Battery Voltage1</i>	[MCP ONLY]	ALO	[SBVL1]
View battery voltage1			
<i>System Battery Voltage2</i>	[MCP ONLY]	ALO	[SBVL2]
View battery voltage2			
<i>System Battery Charge Status</i>	[MCP ONLY]	ALO	[SBCHS?]
View system battery charge status			
<i>SEquence Number</i>	[MCP ONLY]	ALO	[SEQNB]
Sequence number			

BATTERY REPLACEMENT

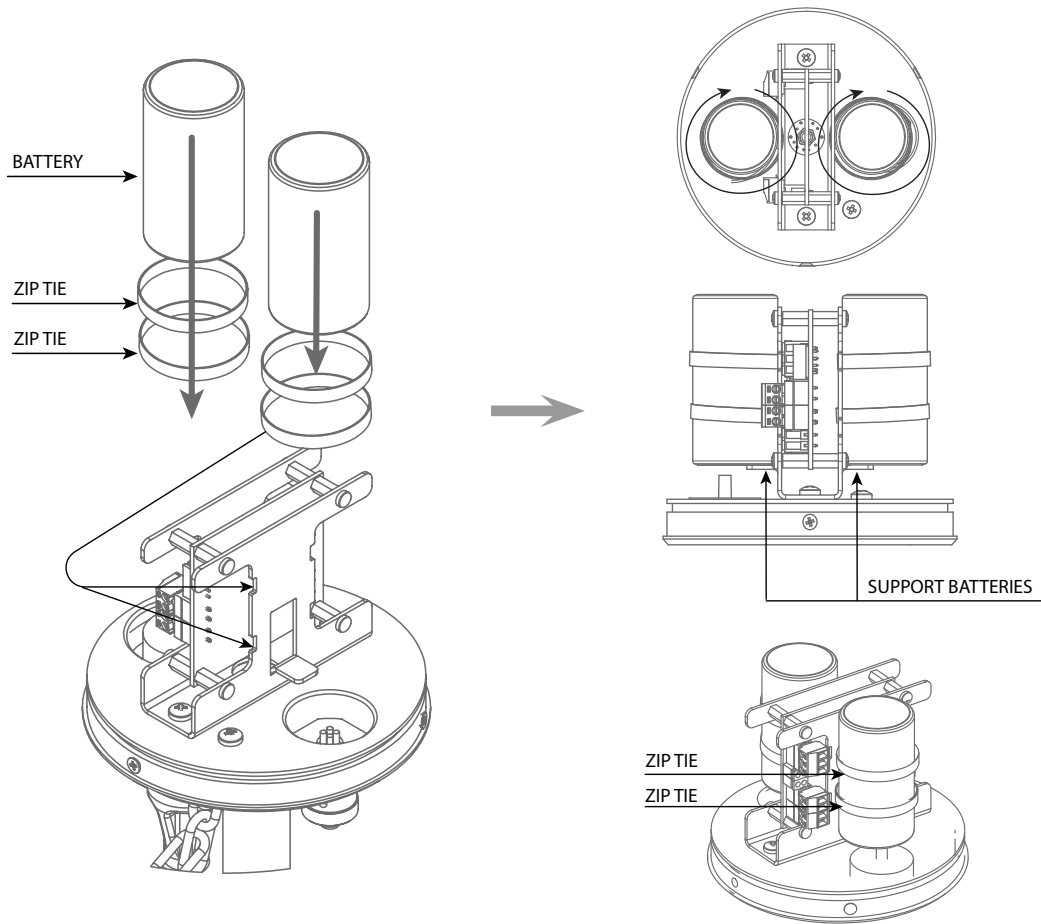
The following is listed the procedure for replacing batteries flowmeter CS3820.



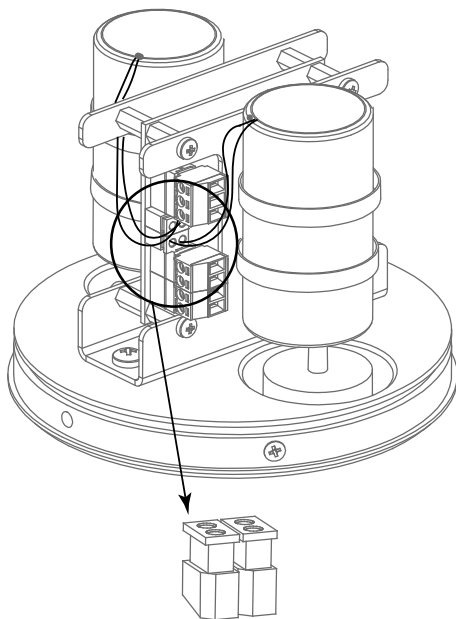
Disconnect the batteries to be replaced.
Remove the zip ties and the batteries



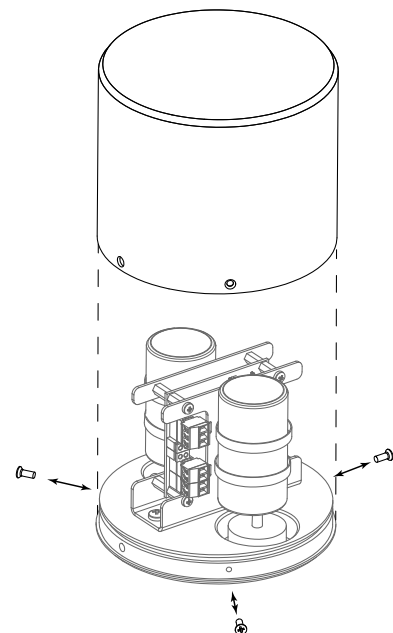
BATTERIES ASSEMBLY



Connect the batteries.



Close the cover of the flow meter.



METER DATA

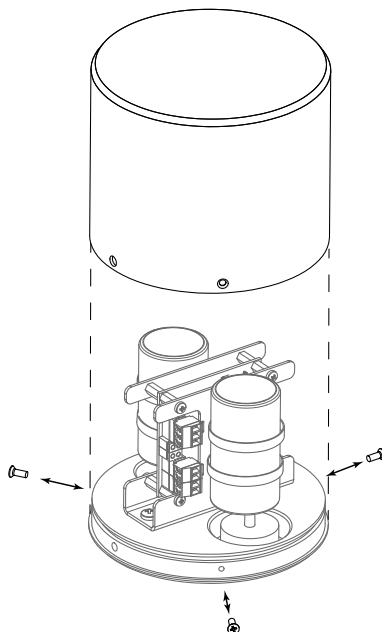
This function allows the import of data from one converter to another up to level 4 included. The hardware configurations and the corresponding calibration values are not restored. The "data import" procedure can be performed **only one time** for each board converter because the directory will be renamed in according to the board's SERIAL NUMBER.

OPERATING PROCEDURE TO CHANGE THE CONVERTER BOARD

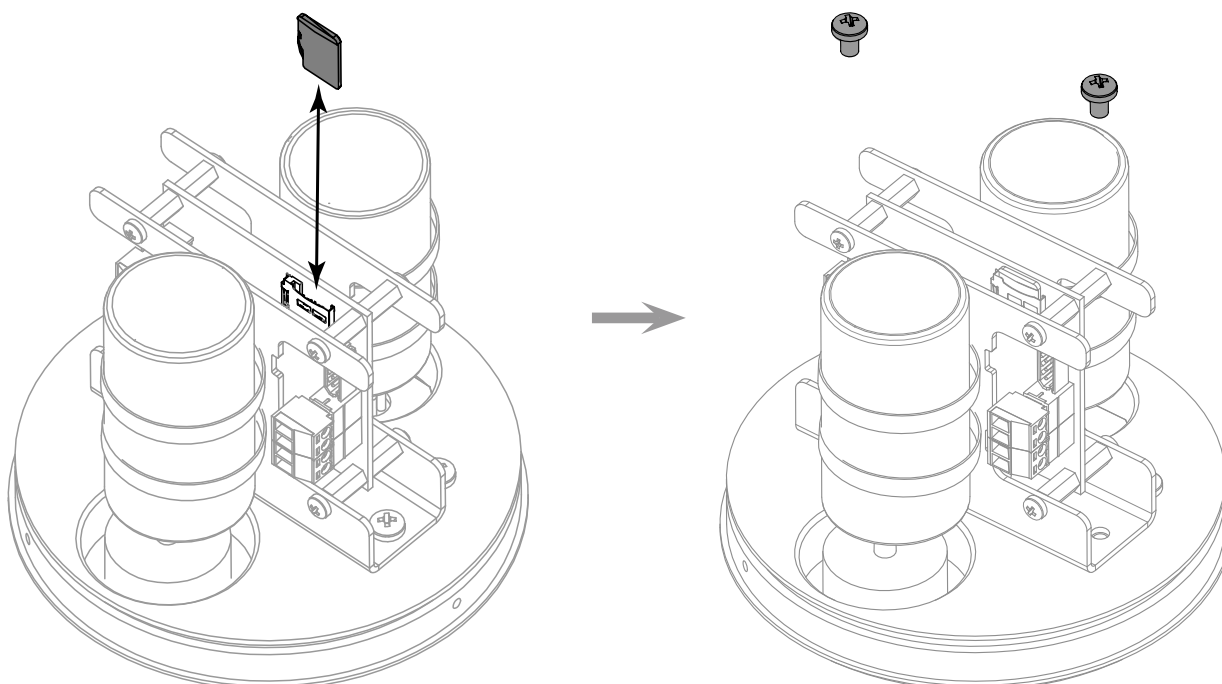
Remove the 3 screws (see "CS3820 construction" page6) to remove the cover.



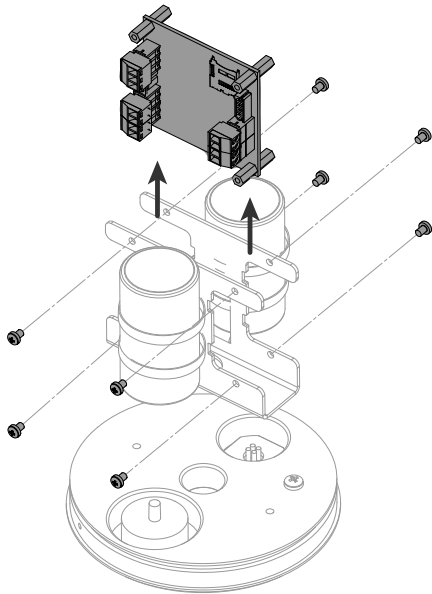
Unplug the batteries connectors from pcb



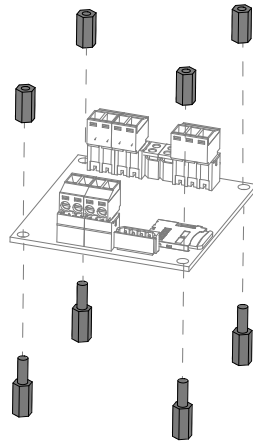
Disconnect any cable from terminal block
Remove the SD card (Push to remove)
Remove the 2 screws of the board support



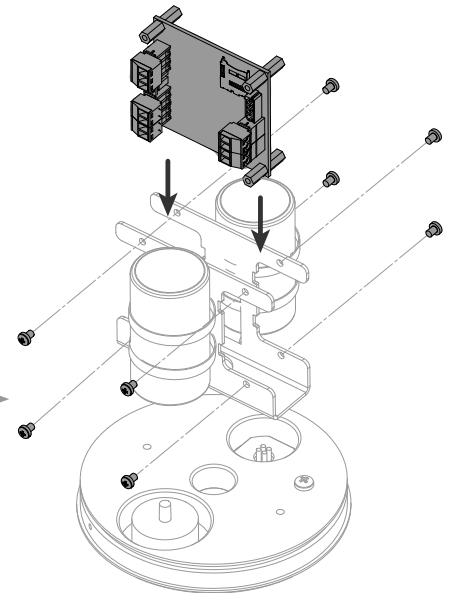
Remove the 8 screws to be able to remove the PCB from the support board.



Replace the spacers from old board to the new board.



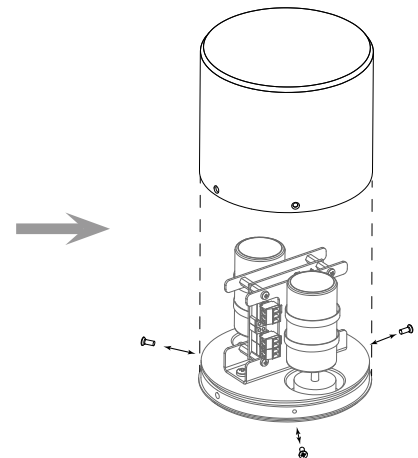
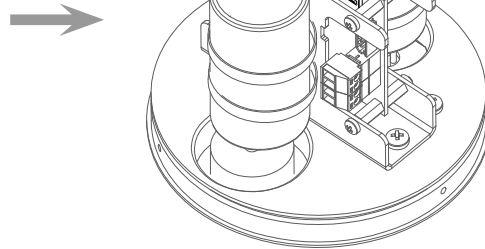
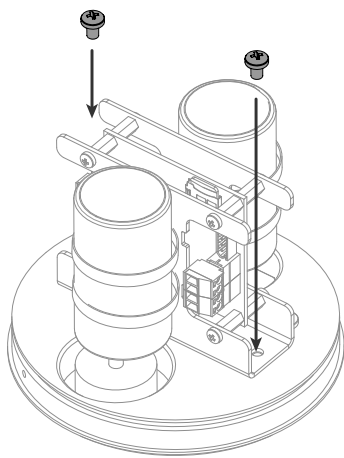
Insert new board



Fix the 2 screw of the board support
 Insert in the new board the SD card earlier removed.
 Connect the cables to the terminals block
 Assemble the cover and fixit with the 3 screws



Attention: not damage the cables



Turn on the converter and enable [Save Conv. F. def.] function to restore data.
 To view the functions connect the device to the MCP program.

```

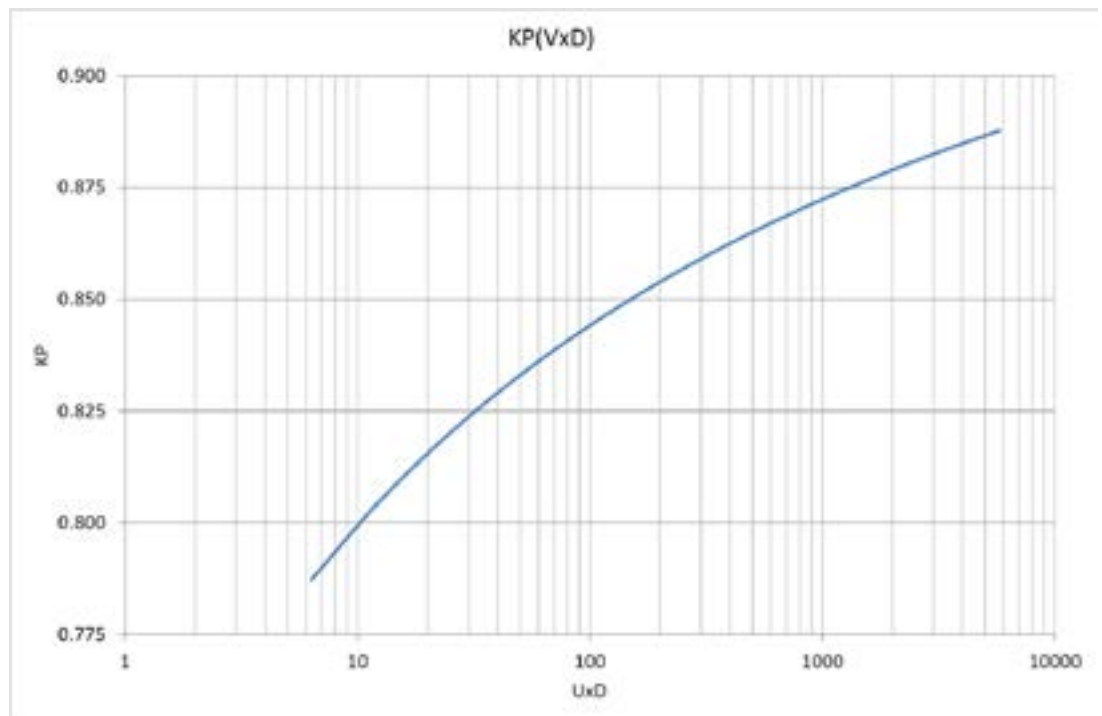
FUNCTIONS
M1+ reset
M1+ reset
M1- reset
M1- reset
M1- reset
M1- reset
Load Sens.f.def
Load Conv.f.def
Save Sens.f.def
Save Conv.f.def
Calibration
11-Functions
12-Diagnostic
13-System
    
```

View function "11.8 Save converter factory default values" page26.

VELOCITY K-FACTOR SETUP (KP, KI)

Flow rate equation: $Q=KA \times \mathbf{KP} \times \mathbf{KI} \times V \times A$, $V=$ Velocity $A=$ inner Area				
CONVERTER OPERATION MODE	SENS. POSITION	INSTALLATION AT	KP	KI
AUTO	0	D/8	1	KI EQUATION
	1	D/2	KP (see table)	
	2	7/8D	1	
MANUAL	3	FLOATING	1 (EDITABLE)	1(EDITABLE)

Kp Profile factor	
(VxD)	Kp (D/2)
6	0,787
12	0,805
24	0,820
48	0,832
95	0,843
188	0,853
371	0,862
736	0,869
1461	0,876
2902	0,882
5767	0,888
V	ms-1
D	mm



Y: insertion depth /mm
D: pipe inside diameter /mm
d: sensor diameter d=22mm

$$Ki(y, D, d) = 1 + \frac{2d}{\pi D} + 0,5 \left(1 - \frac{2y}{D}\right) \left(\frac{2d}{\pi D}\right)^{0,5}$$

ERROR CODE TEST SYSTEM OF SENSOR

The codes are in hexadecimal format, the meaning is given for each bit. There are several possible error simultaneous combinations (more bits active) then that will give the combined numerical codes.

CODE	ANOMALIES DESCRIPTION	ACTION TO TAKE	
0000	NO ERROR	---	
0001	SENSOR TEST INSULATION: Generator power too low	Contact the service	
0002	SENSOR TEST INSULATION: Generator power too high		
0004	SENSOR TEST INSULATION: Phase 1 generator voltage too low		
0008	SENSOR TEST INSULATION: Phase 1 generator voltage too high		
0010	SENSOR TEST INSULATION: Phase 1 terminal voltage coils 1 too low		
0020	SENSOR TEST INSULATION: Phase 1 terminal voltage coils 2 too low		
0040	SENSOR TEST INSULATION: Phase 2 generator voltage too low		
0080	SENSOR TEST INSULATION: Phase 2 generator voltage too high		
0100	SENSOR TEST INSULATION: Phase 2 terminal voltage coils 1 too low		
0200	SENSOR TEST INSULATION: Phase 2 terminal voltage coils 2 too low		
0400	SENSOR TEST INSULATION: Insulation loss, leakage current out of tolerance		Check: <input type="checkbox"/> wiring between sensor converter <input type="checkbox"/> conditions of use <input type="checkbox"/> set parameters If the problem persists contact the service
0800	TEST TEMPERATURE (RESISTANCE) COILS: Temperature (resistance) out of tolerance		
1000	TEST TIME GETTING ON CURRENT PHASE (A): Value out of tolerance		
2000	TEST TIME GETTING ON CURRENT PHASE (B): Value out of tolerance		
4000	TEST RESISTANCE INPUTS ELECTRODES: Input value 1 out of tolerance		
8000	TEST RESISTANCE INPUTS ELECTRODES: Input value 1 out of tolerance		

ALARM MESSAGES (CAUSES AND ACTIONS TO BE TAKEN)

MESSAGGIO	CAUSE	ACTION TO TAKE
NO ALARMS	All works regularly	---
[000] SYSTEM RESTART	---	---
[001] INTERNAL PS FAIL	Internal supply voltage error	Contact the service
[002] CLOCK NOT SET	System Clock not set	Set the system clock from the converter menu 13 (see also MCP function).
[003] SD CARD FAILURE	SD card not found or unreadable	check and/or replace SD card
[005] F-RAM ERROR	Error writing / reading Flash-RAM	Contact the service
[006] EXCITATION ERROR	The excitation of the sensor coils resulting from cable is interrupted	Check the connecting cables to the sensor.
[007] SIGNAL ERROR	The measure is strongly effected by external noise or the cable connecting the converter to the sensor is broken.	Check the status of the cables connecting the sensor, the grounding connections of the devices and the possible presence of noise sources.
[008] PIPE EMPTY	The measuring pipe is empty or the detection system has not been properly calibrated.	Check whether the pipe is empty or repeat the empty pipe calibration procedure.
[009] FLOW>MAX+	The flow rate is higher than the maximum positive threshold set.	Check the maximum positive flow rate threshold set and the process conditions.
[010] FLOW>MAX-	The flow rate is higher than the maximum negative threshold set.	Check the maximum negative flow rate threshold set and the process conditions.
[011] FLOW<MIN+	The flow rate is lower than the minimum positive threshold set.	Check the minimum positive flow rate threshold set and the process conditions.
[012] FLOW<MIN-	The flow rate is lower than the minimum negative threshold set.	Check the minimum negative flow rate threshold set and the process conditions.
[013] FLOW>FULL SCALE+	The flow rate is higher than the full scale positive value set on the instrument.	Check the full scale positive value set on the instrument and the process conditions.
[014] FLOW>FULL SCALE-	The flow rate is higher than the full scale negative value set on the instrument.	Check the full scale negative value set on the instrument and the process conditions.
[015] PULSE1>RANGE	The pulse generation output 1 of the device is saturated and cannot generate the sufficient number of impulses.	Set a bigger unit of volume or, if the connected counting device allows it, reduce the pulse duration value.
[016] PULSE2>RANGE	The pulse generation output 2 of the device is saturated and cannot generate the sufficient number of impulses.	Set a bigger unit of volume or, if the connected counting device allows it, reduce the pulse duration value.
[017] CALIBR.ERROR	Calibration Error	Contact the service
[018] SYSTEM FREQ.ERR	System Freq. Error	Contact the service
[019] B.DATA NOT INIT	Uninitialized data system	Contact the service
[020] FL.SENSOR ERROR	Flow rate sensor error	Contact the service
[021] BATTERY LOW	battery depleted	Contact the service to Replace the battery
[022] BATTERY V>MAX	Battery voltage> max. Allowed	Contact the service to Replace the battery
[023] BATTERY I>MAX	Battery charge current> max. allowed	Contact the service to Replace the battery
[024] MAIN PS V.ERR	Main supply voltage (+ 5V) out of tolerance.	Contact the service
[025] USB VOLTAGE ERR	Voltage of USB connection out of tolerance.	Contact the service
[026] SDC ALMOST FULL	SD card space <500 MB.	For more information see function "12.6 Sd card status informations" page26.
[027] SDC FULL	SD card out of memory	Memory Full. You can not save logger. Contact the service to replace the SD memory.
[028] BATT.TEMP.CRIT	The battery can not be charged. The temperature is out of range (detected temperature <0 C° or temperature >50°)	Wait for the normal temperature reset. View Environmental Use Conditions

At the end of its lifetime, this product shall be disposed of in full compliance with the environmental regulations of the state in which it is located.

MANUAL REVIEWS

REVIEW	DATE	DESCRIPTION
CS3820_EN_NL_R0_1.00.0000	13/12/2017	First edition
CS3820_EN_NL_R1_1.00.0000	31/01/2019	Maximum speed allowed notes added
CS3820_EN_NL_R2_1.00.0000	19/02/2019	Plug mil connector added

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http://www.isoil.com/u_vendita.asp



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