The information in this manual has been reviewed and is believed to be entirely reliable. No responsibility, however, is assumed for inaccuracies. The material in this manual is for information purposes only and is subject to change without notice.

"26/06/2006 Rev.2"

WARRANTY

The electromagnetic inductive flowmeters object of this manual are manufactured by ASA Srl with top quality materials and are warranted for a period of one year from shipping date (unless otherwise agreed on order transmission), provided that they are used in accordance with the limits indicated in all sale documents and technical bulletins, as per the instructions listed in this manual. Products that during such period do not operate properly and show mechanic or functional defects will be, at our option, repaired or replaced, at no charge for customer. Repairs are normally warranted for 90 days or the balance of the original warrant, whichever is longer.

The warranty includes all initial and latent components defects, random failures and all undeterminable internal causes which do not depend on bad usage. In any case, ASA shall not be liable for any indirect or consequential damages due to use, misuse or not-use of its instruments.

The warranty excludes all damages caused by the customer, such as improper electrical hook-up, converter or measuring tube damages caused by defective mounting, usage in areas higher than protection class the instrument is to be installed in, use with not suitable fluid etc..

The manufacturer reserves the right to judge whether repair is to be effected under warranty or not after accurate check of the returned goods to ASA factory.

The warranty is valid for goods rendered ex our warehouse in Grumello del Monte (BG). In order to avail oneself of warranty, it shall be reported on documentation our invoice number or your PO number. Shipment is always at customer care and charge unless otherwise agreed. All the expenses borne, in case of freight collect, will be debited in our repair invoice, unless otherwise agreed.
Export charges, foreign shipping methods and carriers are meant to be at customer's end.

ATTENTION
WE SUGGEST TO USERS TO CAREFULLY FOLLOW THE INSTRUCTIONS HEREBELOW

All instruments are designed and tested in order to respect all safety requirements so far established, and they are perfectly functioning when leave the factory.
A dangerous situation can be present if the meter is not used for the purpose it is designed for or if it is misused.
We suggest to users and skilled staff to carefully follow instructions reported on this bulletin during installation, start-up and maintenance phases on plants, paying particular attention to the following instructions.

BE CAREFULL
When a remote version EM flow meter is used, only sensor and converter labelled with the same serial number can be coupled together. Failing this advice, it can cause measuring errors.

ELECTRIC SHOCK DANGERS
On removing the converter housing lid, protection against accidental contact is no more present: switch off current before estracting the converter from its housing.
Do not wire or install the meter if already powered.
Do grounding electrical connections of tube and converter before powering the meter.

DANGER FOR OUTFLOWING FLUID FROM THE MEASURING TUBE
During installation of the flowmeter on the plant, user has to pay particular attention not to tight and lock the flanges with strength higher than maximum pressure resistance of the inner coating (i.e. 40 bar for PTFE). Failing this instructions, it could cause the deformation or the crack of the inner lining material causing leakage and instrument malfunction.
In order to avoid out-flowing of fluid it is necessary to centre the metering tube on the pipe, using suitable flanges and following instructions reported on the "USE and MAINTENANCE" manual – page 6.

USAGE
We strongly suggest as follows:
- to use the a.m. flowmeter fully respecting the technical data specification;
- to keep to the declared limits of working temperature, pressure and degree of protection;
- to respect fluid compatibility for construction used materials.

Failing temperature limits, it could cause structural modification of inner lining coating (PTFE or Hard Rubber) and as consequence a damage on instruments itself, besides a probable damage of electronic board components for incorporate version.
Failing pressure limits, it could cause fluid leakage between electrodes and inner lining coating or out-flowing of fluid from measuring tube with consequential damage of the instrument.
If customers use the meter with fluids not suitable with construction materials, corrosion or passivation phenomena could occur on electrodes with consequent irreparable damage – first case – and malfunctioning – second case.

ASA technical department can suggest during bid phase the best construction materials for electrodes and coating according to the kind of required application and fluid compatibility.

INDEX

I GOODS RECEPTION

Soon after receipt of goods, check that packing does not show any damage incurrent during the conveyance.
If packing is damaged, open it immediately and control whether instruments were affected.
In case of damage, address your complaints to the forwarder and send a copy of your report to:

asa S.r.l.
Sesto San Giovanni MI
ITALY
Fax 0039-02-2482558

II Return of goods.

In case of return of goods, user must attach to the shipment a document in which any damage and bad functioning is described or any requested modification, he wants to be effected, are reported.

It is compulsory to state whether the returned meter was used to measure corrosive, toxic or dangerous fluids.

In this case wash wetted parts accurately before sending the item; this is meant to ensure personnel safety.

Provide strong packing, paying particular attention to electric converter and all other accessories, such as feeders and displays. Shipment is at customer care and cost unless otherwise agreed.

All returned goods **shall be sent** to our factory address:

asa S.r.l.
via Silvio Pellico, 8
Grumello del Monte Bg
ITALY
Fax 0039-035-832211

III COMPATIBILITY WITH CE MARK

The electromagnetic inductive flowmeters here described are in full conformity with electromagnetic compatibility required by 89/366/EC laws and contents.

CE

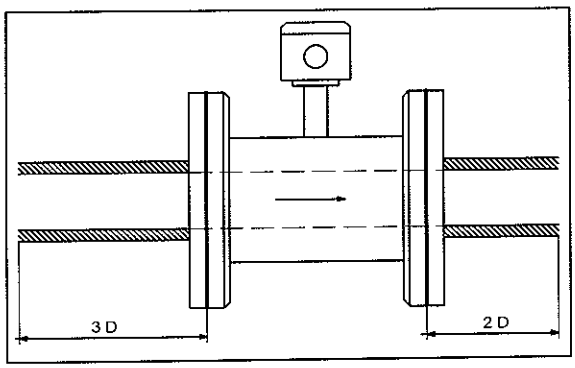
EN 50081-2 (06/94)	Issuing law - Industrial environment
EN 61000-6-2 (02/00)	Immunity - Industrial environment
EN 61010-1 (11/01)	Safety

Follow the below listed indications to ensure such compliance:

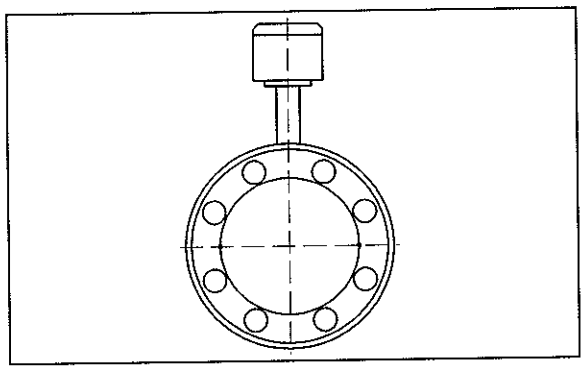
- In case of remote converter, use special cable provided with double shielding supplied by ASA.
- Use shielding cables for outlet and inlet signals connections, effecting shield grounding only on receiver side, not on converter side.

1 METERING TUBE MOUNTING

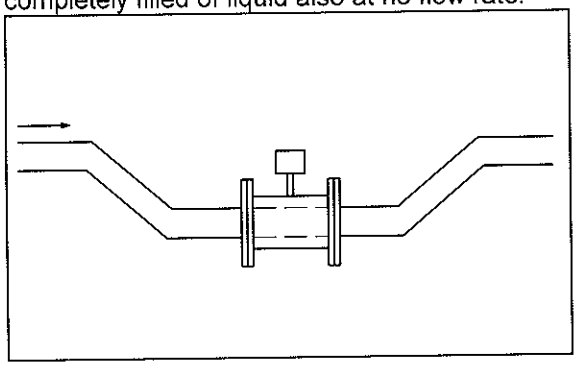
Arrange a rectilinear stretch of pipe with the same magmeter diameter and a length of at least 3 inlet diameters (ISO 6817) and 2 outlet diameters.



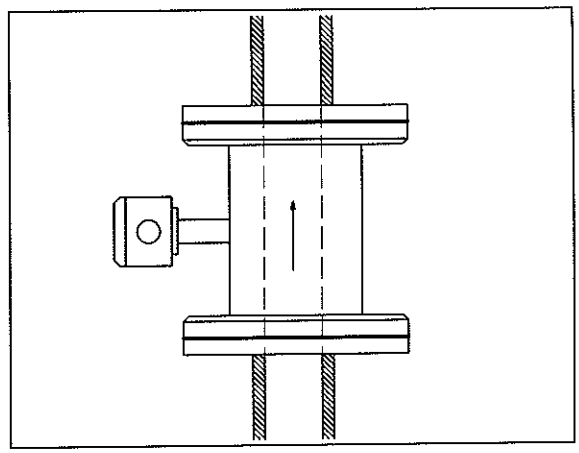
If magmeter is mounted on a horizontal pipe, converter has to be placed on the upper side of the meter, so as to keep electrodes in horizontal inclination.



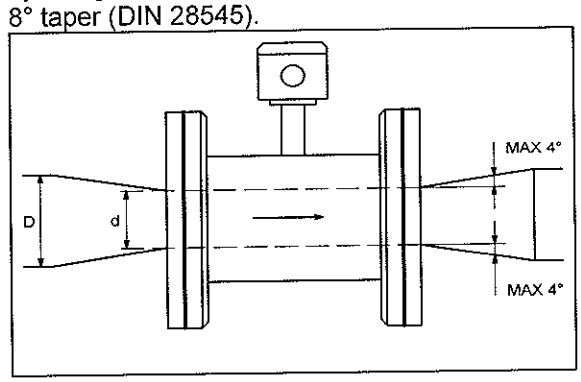
The plant is to be built in such a way that metering tube is lower than main pipe, remaining completely filled of liquid also at no flow rate.



In case of vertical mounting, liquid must flow from bottom to top, so as to keep the tube constantly filled.



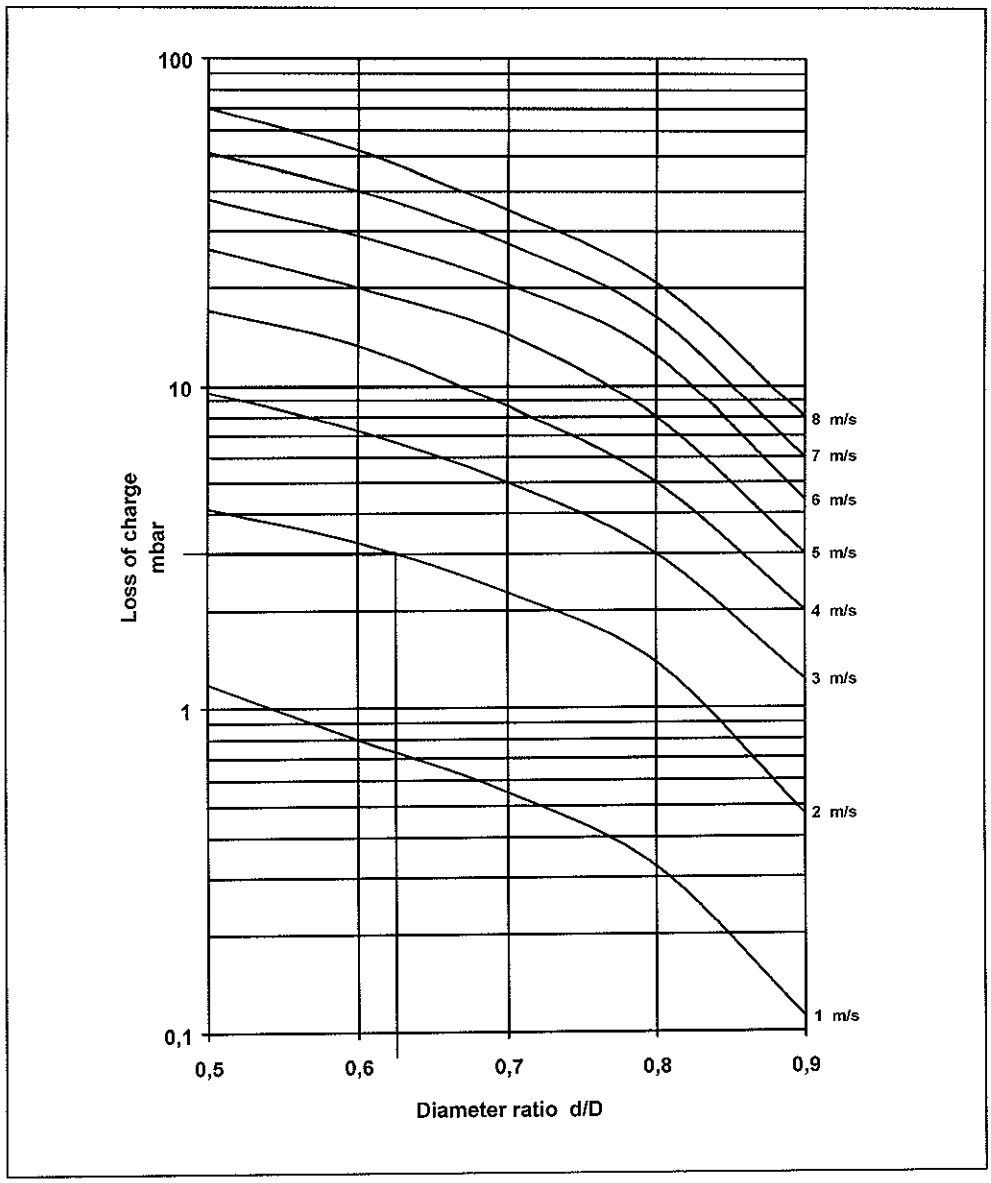
Any eventual diameter change must be effected by using two reduction cones with no more than 8° taper (DIN 28545).



The Loss of charge for this reductions for liquids similar to water (Density 1 gr/cc and viscosity 1 cp) can be calculated as follows:

1. Calculate the d/D ratio.
2. Read the Loss of charge on the following diagram in function of fluid velocity and d/D ratio.

PRESSURE LOSS - DIAGRAM



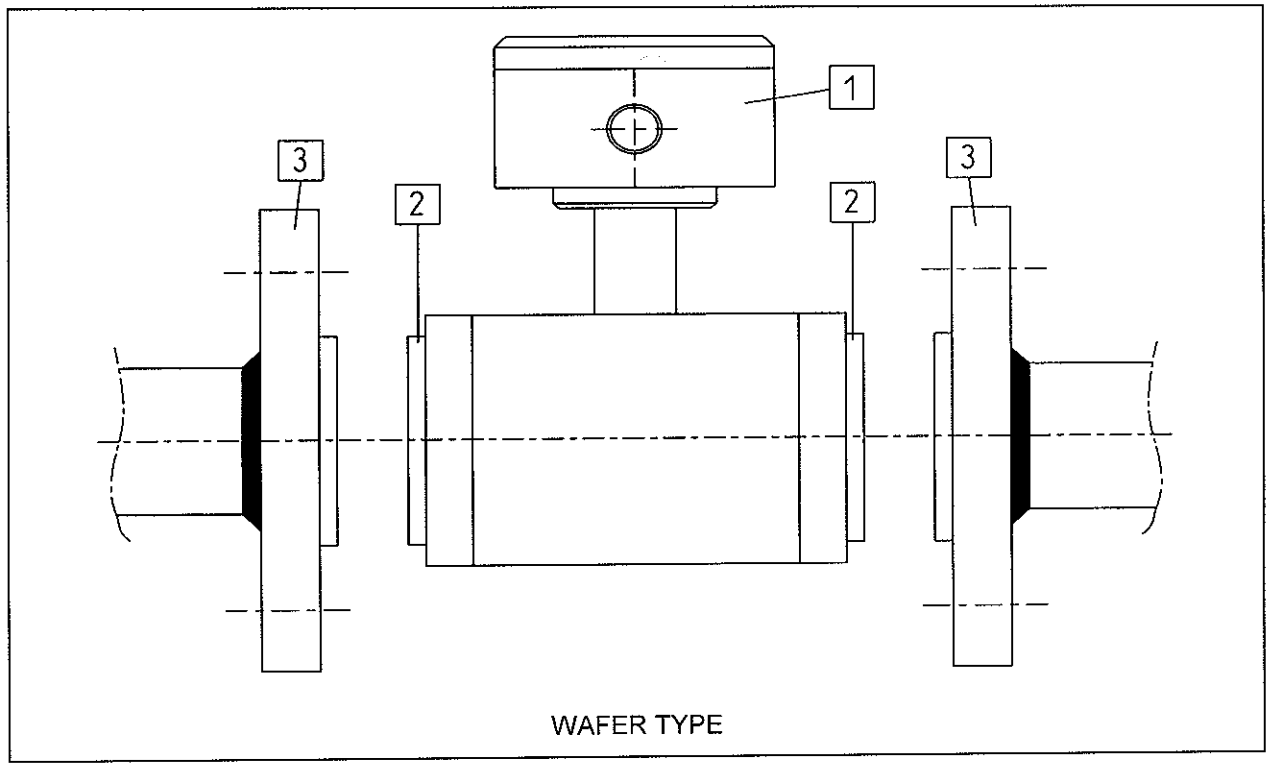
Example:

- Pipe diameter D = 80 mm
- Meter diameter d = 50 mm
- d/D ratio = 0,62
- Flow velocity = 2 m/sec
- As from a.m. diagram, the Loss of Charge is approximately 3 mbar.

If the Loss of Charge is too high: increase the pressure or select a larger diameter.

WARNING:

Follow the below listed instructions for counterflanges (3) and wafer mounting of electromagnetic flowmeters model "AW6":



WAFER TYPE

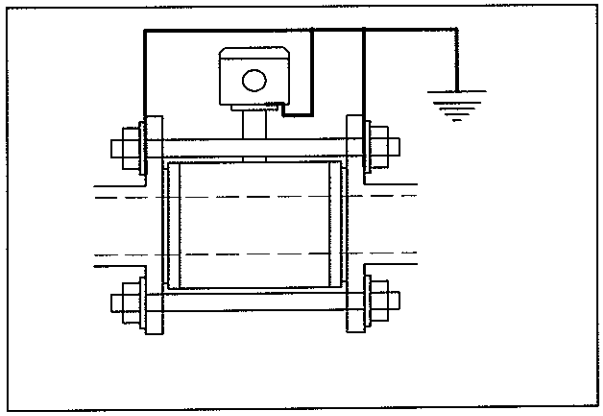
- The counterflanges (3)→ must be flat or provided with step in accordance with UNI, DIN or ANSI standards.
- Any further conterflanges modification intended to improve tightness or centering must be avoided.
- Measuring tube centering must be effected by skilled personnel. Make sure that meter body (1) is equally distant from at least 4 reference marks, such as tie rods or four orthogonal points on flanges edges.
- **No further tightening seal is required.**
- Tightness is ensured by PTFE ↑ internal lining (2).
- Make sure that grounding rings have the same internal diameter as meter's and that they're mounted properly so as to avoid any vortex creation.
- In case of grounding rings mounted between meter and flanges put a flat seal between ring and flange only. Tightness on meter side is ensured by PTFE.
- Tighten tie rods considering that max resistive pressure of PTFE lining is 40 bar (Kg/cm^2). A tightening effect at a pressure higher than the one indicated deforms PTFE and may affect both tightness and meter functioning.

Model "AF6" flanged e/m flowmeters.

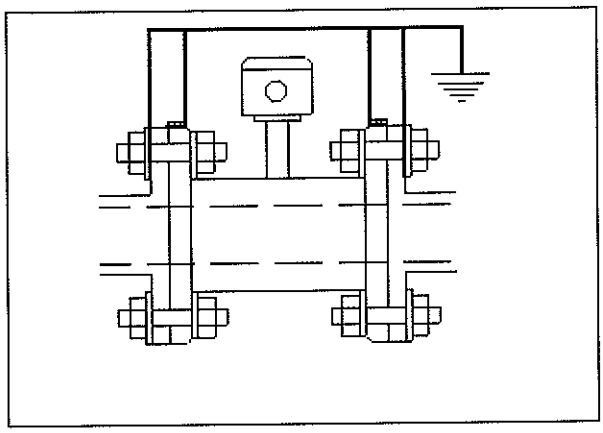
Mounting instructions are the same except for the following:

- Meters with hard rubber lining (standard material for diameters from 6" - 150 mm to 40" - 1000 mm) require seals to be mounted between flanges and counterflanges.
- Put grounding rings between two seals.

In order to ensure good working conditions, both magmeter and fluid must be kept on earth potential.
Magmeter is kept on ground by a copper conductor (6 mm^2 minimum section) connected to the proper screw, which is placed either on flange or on junction box depending on the model.

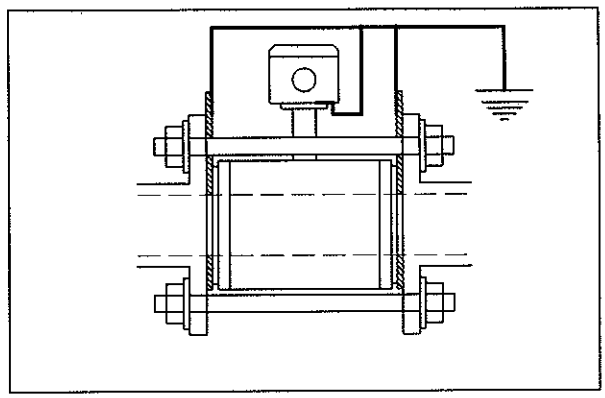


WAFER TYPE



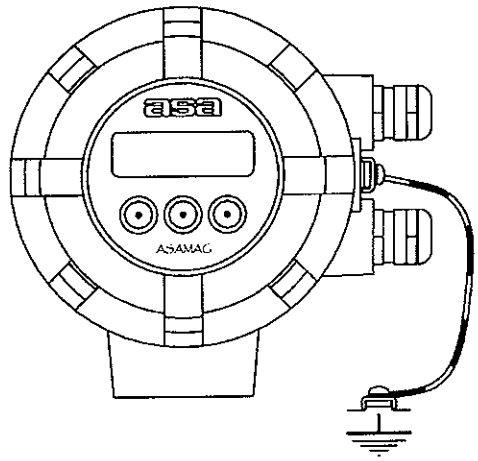
FLANGED TYPE

Grounding of liquid is generally assured by pipes, usually made of metallic material, whose ends have to be connected to the metering tube through a copper conductor.
In case of pipes covered with insulating material, grounding must be effected using 2 metallic rings (3 mm. minimum thickness) to be connected together and to metering tube earthing by a copper conductor.

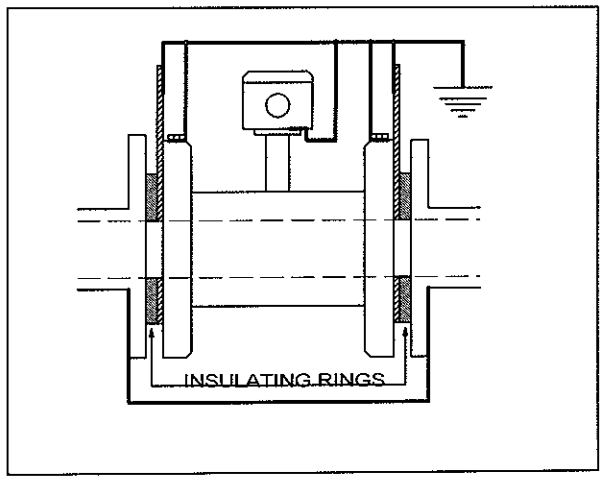


GROUNDING CONNECTION WITH GROUNDING RINGS

Grounding of converter must be effected through the correct screw.



When the E/M flowmeter is mounted on a pipe provided with cathodic protection, special care must be taken so as to avoid any influence of cathodic current on accuracy and measure stability.
In order to make sure that measuring tube is electrically insulated on both pipeline sides, mount two insulating rings between flanges and counter flanges.
Then put flanges bolts into insulating sockets and insert insulating rings on contact with the two pipeline stretches.
Provide electrical connections between such stretches to ensure cathodic protection continuity.
Effect grounding operations, of metering tube only, according to following layout.

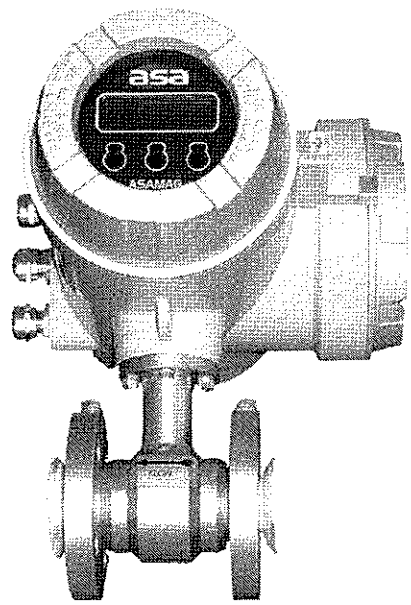


GROUNDING CONNECTION ON PIPE WITH CATHODIC PROTECTION

2 CONVERTER MOUNTING

Check that serial number stenciled on metering tube corresponds to the one written on the converter metallic nameplate.

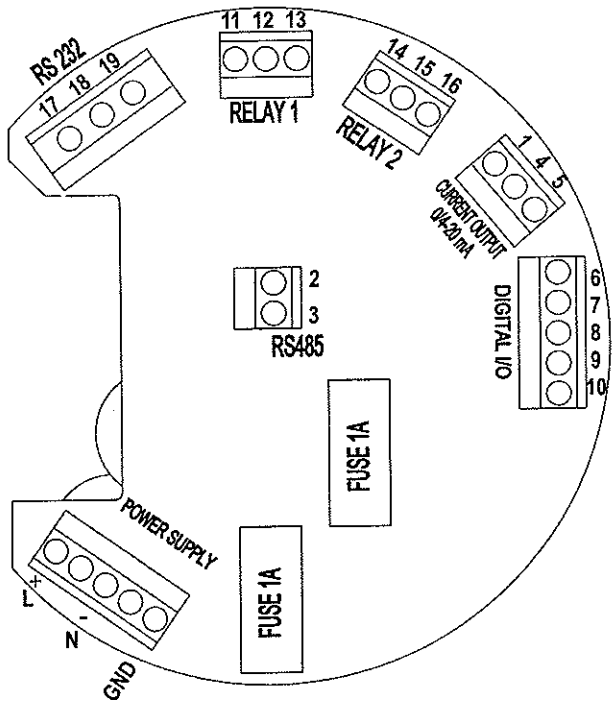
Display is a graphic backlighted LCD. It is horizontal (standard) and can be mounted tilted by 90° in order to make it easier to be read with installation on vertical pipe.



2.1 Electrical Connection

Electrical connection between metering tube and converter must be effected using **one single shielding cable supplied by ASA.**
Connecting cable must be single-stretch without junctions.
Maximum length for remote wiring is 200 m. when conductivity is over 5 μS/cm.
Converter housing is equipped with M20X1,5 glands.

Electrical Terminals



Power supply range:
110- 220V version: 90-250Vac 50-60 Hz

24V version
20-55 Vdc
17-45 Vac (50-60Hz)

Converter range temperature: -10°C +75°C

Power consumption:
10W @110Vac
11,5W @230Vac
11W @ 24Vdc
Fuses 1A 250V delayed

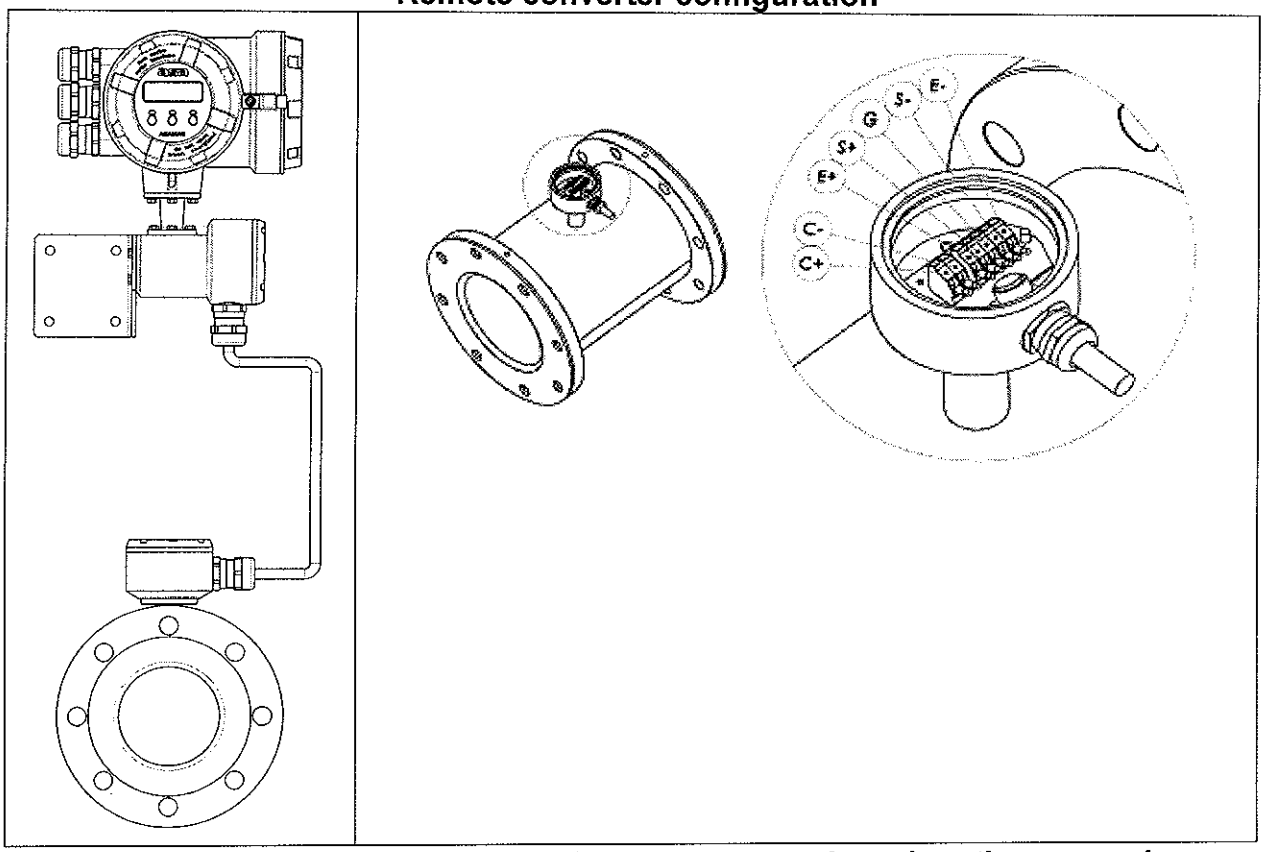
Relay 1 and Relay 2:
Switching voltage (Vdc): 0-1000
Switching current (A): 0-1,5

Current output 0/4-20mA (Hart)			Pulse output NPN open collector ON/OFF INPUT					RELAY 1			RELAY 2	
1	4	5	6	7	8	9	10	11	12	13	14	15
GND	OUT	+24V	Common	OUT1	OUT2	IN1	IN2	NO	Common	NC	NO	Commc

SERIAL OUTPUT RS232			SERIAL OUTPUT RS485	
17	18	19	2	3
RX	GND	TX	+	-

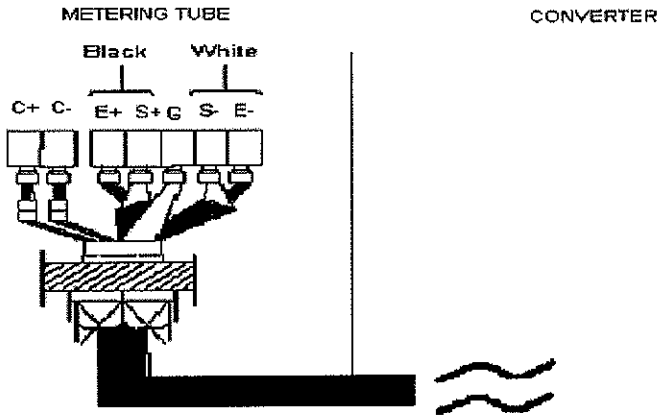
Remote converter version is provided with the meter not electrically connected to electronical board.

Remote converter configuration



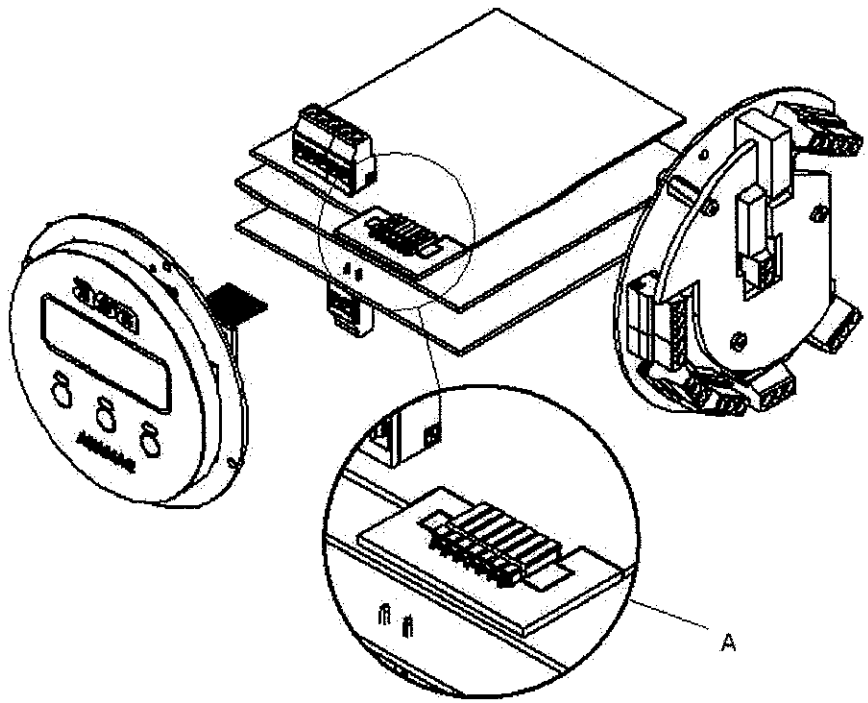
Electrical connections reference on the connector pc board on the measuring tube:

Terminal:
+ ⇒ C+
- ⇒ C-
1 ⇒ E +
2 ⇒ S +
3 ⇒ G
4 ⇒ S -
5 ⇒ E -



NOTE: To maintain the protection rating please observe the following instructions

CAUTION!!

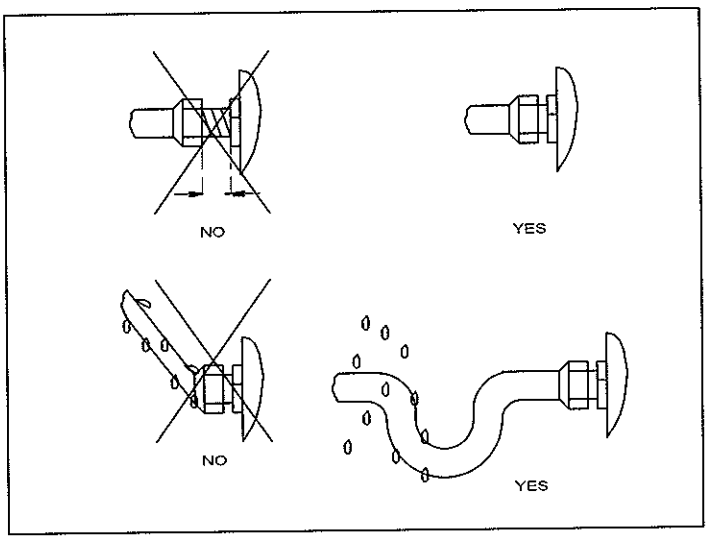


ALL THE TUBE CALIBRATING DATA ARE MEMORIZED (TUBE SIZE, DIAMETER, CALIBRATING POINTS ETC....) IN A LITTLE PC BOARD (A) WHICH IS DIRECTLY CONNECTED TO THE TUBE AND FIXED TO ELECTRONIC HOUSE.
DO NOT REMOVE THIS LITTLE PC BOARD AND DO NOT CHANGE IT WITH ANOTHER OF ANOTHER ASAMAG.

IN CASE OF RETURN OF ELECTRONIC FOR NEW CALIBRATION, REPAIRING OR RELACEMENT WE RECOMMEND TO SEND US THE COMPLETE ELECTRONIC WITH THE LITTLE PCBOARD (A).

WE RECOMMEND NOT TO LOOSE THIS LITTLE PC BOARD AND NOT TO FORGET TO ASSEMBLE THIS LITTLE PC BOARD WITH THE ELECTRONICS.

- Retighten the screws of the converter cover after connection.
- Tighten the cable entry glands. If necessary use sealing compound
- Securely close up unuser cable entries with screw caps



NOTE: check cable gland which shall be perfectly tight.

When **IP 67 or IP 68** protection degree of metering tube is required, junction box mounted on it is wholly resin-covered so as to avoid dump infiltration which would prevent magmeter from working well. Such process is carried out by the manufacturer before delivery.
It is therefore compulsory to indicate the exact connecting cable length as it is not possible to substitute or lengthen it.

2.2 Input/Output Signals

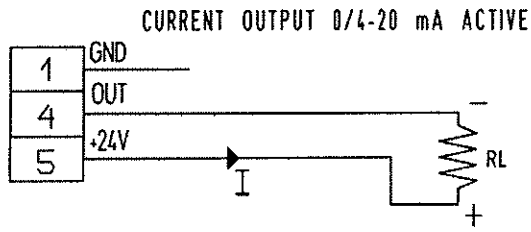


fig. 1

CURRENT OUTPUT CONNECTIONS – ACTIVE CONFIGURATION
RL max load=1200 Ω WITHOUT HART COMMUNICATION
Set 4-20mA and RL≥250 Ω WITH HART COMMUNICATION
See 4.2 Available functions
ASAMAG MENU pag.21
Main menu: 0/4-20mA output, PID
See fig. 1

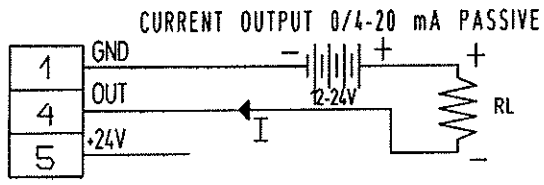


fig. 2

CURRENT OUTPUT CONNECTIONS – PASSIVE CONFIGURATION
RL max load=1200 Ω WITHOUT HART COMMUNICATION
Set 4-20mA and RL≥250 Ω WITH HART COMMUNICATION
See 4.2 Available functions
ASAMAG MENU pag.21
Main menu: 0/4-20mA output
See fig. 2

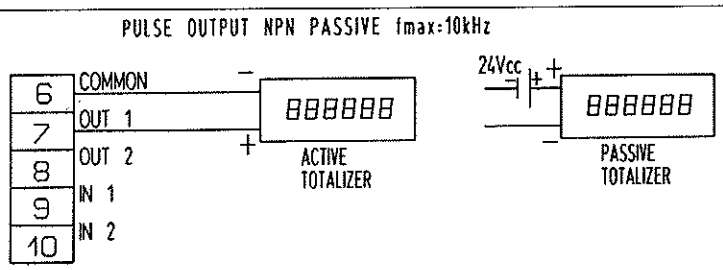
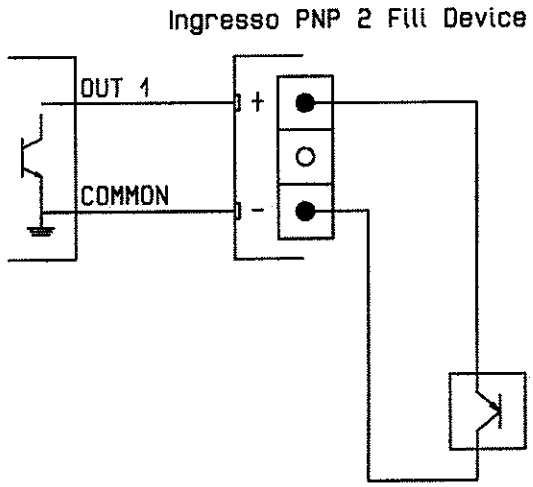


Fig. 3

PULSE OUTPUT NPN PASSIVE CONNECTIONS
See 4.2 Available functions
ASAMAG MENU pag.19
Main menu: output pulse
CAUTION!
THE TOTALIZER MUST HAVE A PULL UP RESISTOR R pull up>= 470 Ω
See Fig. 3



CABLING CONFIGURATION OF OUT1 WORKING WITH A PNP INPUT 2 WIRES DEVICE
Fig. 4

PULSE OUTPUT CAN WORK CONNECTING OUT 1 TO A PNP INPUT 2 WIRES DEVICE USING THIS CONFIGURATION

See Fig. 4

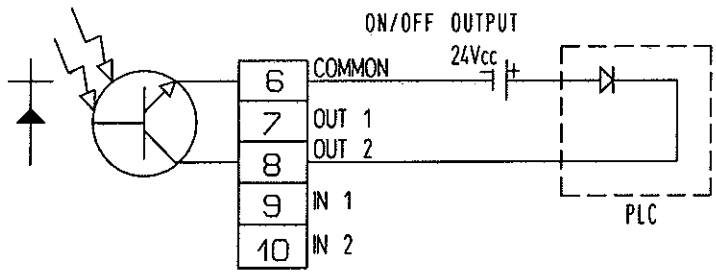


Fig. 5

OPEN COLLECTOR PASSIVE OUTPUT
Such open collector must bear an external circuit connection. This output is closed and active only if the digital output Relay is active and has the same functions of relay menù. OUT2 works with relay 2.
CAUTION!
THE PLC MUST HAVE A PULL UP RESISTOR R pull up>= 470 Ω

See fig. 5

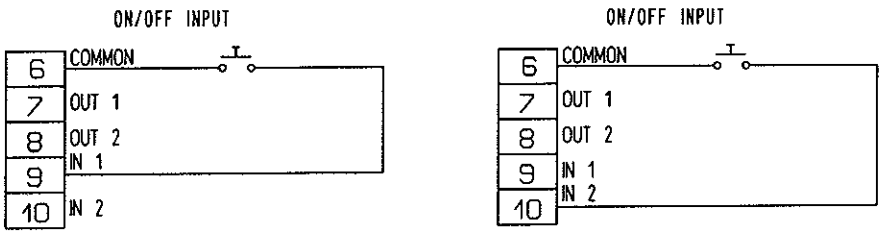


Fig. 6

INPUT ON/OFF
See 4.2 Available functions - ASAMAG MENU pag.21
Main menu:
- **Configuration** 10. In function Digital Input IN1 IN2 (stop, autozero, preset)
- **Batching**
IN1 terminal shortcircuited with GND
It works as central key (start, stop, cont)
IN2 terminal shortcircuited with GND
It works as right key (reset cnt, reset stopped batching)
See fig. 6

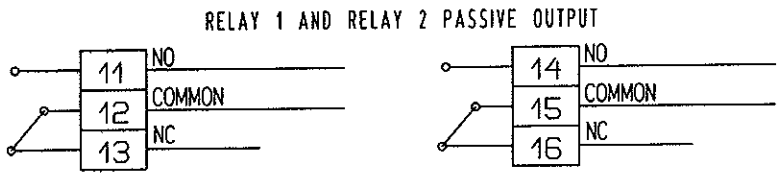


Fig. 7

DIGITAL OUTPUT RELAY 1 AND RELAY 2 PASSIVE
See 4.2 Available functions - ASAMAG MENU pag.21
Main menu:
- **Relays 2 Outputs** for system errors,flow alarm, totalizer alarm,flow direction
- **Batching**
Batching configuration using digital inputs:
Relay1 SET
Relay2 PRESET
See fig. 7

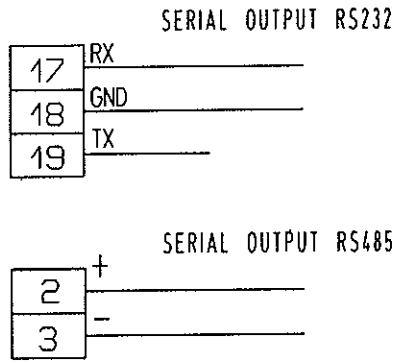


Fig. 8

SERIAL OUTPUT RS 232 AND RS485
See 4.2 Available functions - ASAMAG MENU pag.21
Main menu: **Serial output**
See fig. 8

ASA provides on request a serial interface on which using RS232 and a PC magmeter reading, parameters can be viewed, or can be modified. This interface can be used also with RS485 with the use of a RS 485-RS232 converter.

CAUTION!
WE RECOMMEND TO RESPECT THE VALUES AND THE POLARITY OF POWER SUPPLY IN ORDER TO AVOID ANY ELECTRONIC DAMAGE

3 DIMENSIONS and FEATURES

3.0 Connections and Size

CATEGORY	Connections: DN mm			Internal Diameter mm	Serial Code
	AF6	AW6	AD5 / AS5 / AT6		
2300	15	15	25	4	0
2400	15	15	25	6	1
2500	/	/	/	/	/
2600	15	15	25	15	2
2700	20	20	25	20	3
2800	25	25	25	25	4
2900	32	32	32	32	5
3000	40	40	40	40	6
3100	50	50	50	50	7
3200	65	NA	65	65	8
3300	80	80	80	80	9
3400	100	100	100	100	10
3500	125			125	11
3600	150			150	12
3800	200			200	13
4000	250			250	14
4200	300			300	15
4400	350			350	16
4600	400			400	17
4800	450			450	18
5000	500			500	19
5400	600			600	20
5800	700			700	21
6200	800			800	22
6600	900			900	23
7000	1000			1000	24

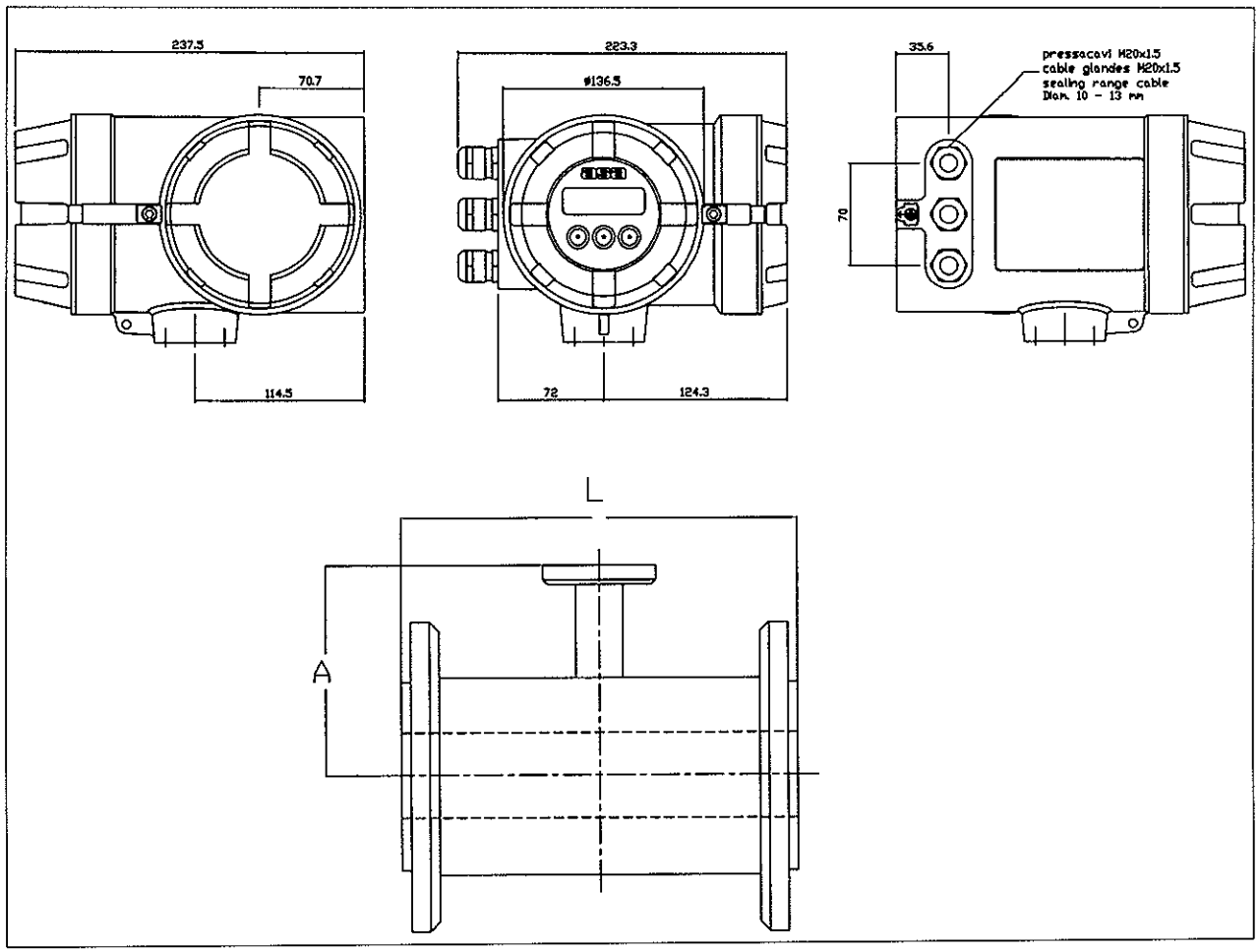
3.1 FLOW RANGE

Categ.	Flowrate Vs. fluid speed								
	@ 0,3 m/s (minimum)			@ 2 m/s (nominal)			@ 12 m/s (maximum)		
	m3/h	l/min	l/sec	m3/h	l/min	l/sec	m3/h	l/min	l/sec
2300	0,013	0,217	0,003617	0,09	1,5	0,025	0,454	7,566667	0,126
2400	0,03	0,5	0,008333	0,2	4	0,06	1,2	20	0,333
2500									
2600	0,18	3	0,05	1,2	20	0,33	7,2	120	2
2700	0,375	6,25	0,104167	2,5	40	0,7	15	250	4,167
2800	0,54	9	0,15	3,6	60	1	21,6	360	6
2900	0,9	15	0,25	6	100	1,7	36	600	10
3000	1,35	22,5	0,375	9	150	2,5	54	900	15
3100	2,25	37,5	0,625	15	250	4,2	90	1500	25
3200	3,6	60	1	24	400	6,8	144	2400	40
3300	5,4	90	1,5	36	600	10	216	3600	60
3400	9	150	2,5	60	1000	16	360	6000	100
3500	13,5	225	3,75	90	1500	25,2	540	9000	150
3600	18	300	5	120	2000	33	720	12000	200
3800	36	600	10	240	4000	64	1440	24000	400
4000	54	900	15	360	6000	100	2160	36000	600
4200	72	1200	20	480	8000	135	2880	48000	800
4400	105	1750	29,16667	700	11670	195	4200	70000	1166,667
4600	135	2250	37,5	900	15000	250	5400	90000	1500
4800	180	3000	50	1200	19320	320	7200	120000	2000
5000	225	3750	62,5	1500	25000	420	9000	150000	2500
5400	300	5000	83,33333	2000	33330	560	12000	200000	3333,333
5800	450	7500	125	3000	50000	835	18000	300000	5000
6200	540	9000	150	3600	60000	1000	21600	360000	6000
6600	675	11250	187,5	4500	76400	1280	27000	450000	7500
7000	900	15000	250	6000	100000	1670	36000	600000	10000

Reported value are indicative

3.2 Dimensions and Drawings

SERIE AF6
FLANGED CONNECTIONS (in agreement with UNI EN 1092-1)

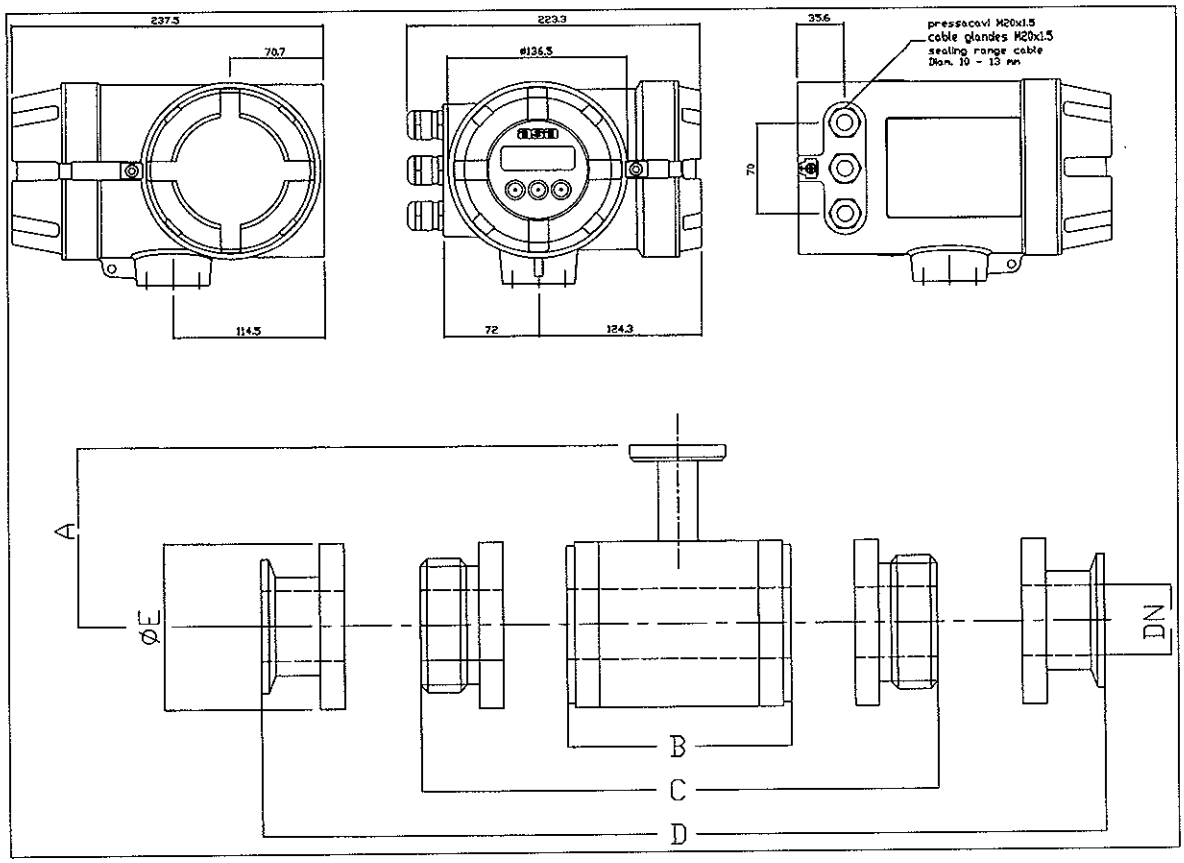


DN	A	L1	L2	PN
15	67	100	200	10-40
20	71	100	200	10-40
25	75	100	200	10-40
32	80	120	200	10-16
40	82	120	200	10-16
50	90	140	200	10-16
65	100	160	200	10-16
80	107	160	200	16
100	119	160	250	16
125	130	200	250	16

DN	A	L1		L2
		PN10	PN16	
150	147	300	300	300
200	166	300	300	350
250	194	300	300	450
300	219	300	300	500
350	249	350	650	-
400	274	400	412	600
450	300	450	466	-
500	325	500	516	800
600	380	600	616	1000
700	437	700	716	-
800	488	800	816	1200
900	540	900	916	-
1000	595	1000	1012	-

SERIES AW6 AD5 AS5 AT6

CONNECTIONS WAFER DIN SMS TRICLAMP



DN	A	ΦE	Type AW B	Type AD AS C	Tipo AT D
15	70	54	70	170	150
20	71	57	70	170	150
25	78	67	70	150	150
32	83	77	90	170	170
40	85	84	90	170	170
50	95	100	100	180	180
65	105	120	-	210	210
80	110	132	120	210	210
100	125	158	140	225	225

3.3 Materials

In the reported table are listed the construction materials which the magnetic ASA meter can be built of.

	AF6	AW6 – AD5 – AS5 – AT6
External Housing	Epoxi painted carbon steel (*)	Inox AISI 304
Measuring Tube	Inox AISI 304	Inox AISI 304
Inner Lining	▪ PTFE (within DN 125; over O.R.) ▪ EBANITE (over DN125) ▪ DIFLEX on request	▪ PTFE ▪ DIFLEX on request
Electrodes	▪ AISI 316 ▪ Hastelloy C ▪ Monel ▪ Titanium ▪ Tantalum	▪ AISI 316 ▪ Hastelloy C ▪ Monel ▪ Titanium ▪ Tantalum
Elettronic Housing	▪ Painted aluminium ▪ AISI 304	▪ Painted aluminium ▪ AISI 304
Junction box on measuring tube	▪ Painted aluminium ▪ AISI 304	▪ Painted aluminium ▪ AISI 304

(*) Epoxi painted, RAL 7001
O.R = On request

3.4 Meccanical features

	PTFE	Hard Rubber	DIFLEX
Fluid temperature (Incorporated converter)	-10 ... +75°C		
Fluid temperature (remote converter) (#)	-30 ... +130°C (140°C)	-10 ... +80°C	-30 ... +150°C (160°C)
Working pressure	Depend on flange (max 40 bar)	Depend on flange (max 64 bar)	Depend on flange (max 40 bar)
Measuring Tube protection (§)	IP67	IP67	IP67
Converter protection (ç)	IP67	IP67	IP67

(#) Reported data are for a continuous working. Temperatures between brackets can be kept only for 30 minutes.
(§) With remote execution it is possible protection IP68 O.R.
(ç) IP68 O.R.

4 OPERATING PANEL

It is the main communication means between user and converter, enabling the user to select a series of functions.

Panel is composed of:

- Graphic backlighted LCD Display. It is horizontal (standard) and can be mounted with a tilted of 90° in order to make reading easier when installed on vertical pipe.
- optical screen with three Programming Keys

CAUTION!!!!
AT STARTUP OF THE INSTRUMENT, THE OPTICAL KEYS MUST BE LET FEW SECONDS TO CALIBRATE AUTOMATICALLY WITH AMBIENT LIGHT, THEREFORE IT IS RECOMMENDED TO KEEP EVERYONE AT DISTANCE FROM DISPLAY - ABOUT HALF A METER.

DO NOT INSTALL THE INSTRUMENT WITH THE DISPLAY DIRECTLY EXPOSED TO THE SOLAR BEAMS BECAUSE LCD CAN HAVE DAMAGE DUE TO THE OVERHEATING.
KEEP THE OPERATING PANEL AT DISTANCE (AT LEAST HALF A METER) FROM DIRECT SOURCES OF LIGHT (LIGHT BULBS, NEON, ETC).

PROGRAMMING KEYS ARE EQUIPPED BY AN AUTOMATIC LOCK THAT SWITCHES AFTER 5 MINUTES OF INACTIVITY. WHEN THE KEYS ARE IN LOCK STATE, PRESSING AT FREE CHOICE ONE OF THE KEYS; THE THREE SIGNAL LEDS WILL LIGHT SIMULTANEOUSLY. IN ORDER TO ACTIVATE THE KEYBOARD, PRESS IN SEQUENCE FIRST THE LEFT KEY, AND THEN THE RIGHT KEY.

4.0 PROGRAMMING PROCEDURE

Function setting by keyboard

It's possible to run the information on the first line of the display function by pressing the right hand key
It's possible to enter the menu functions pressing the left or the central key
In order to configure the programmable parameters you have to press the left or the central keys.

4.1 MEANING OF THE PROGRAMMING KEYS

1. ACTIVE — Pressing this key you can enter the function you need
2. 🕮 — This key allow to bypass from one function to another
3. EXIT — This key allows to leave the programme menu
4. ▲ — This key allows a increasing regulation of programme parameters
5. ▼ — This key allows a decreasing regulation of programme parameters
6. ► — This key allows to select the icon you need among the different alternatives
7. 🖬 — This key allows memorizing the selected programme configurations
8.  — This key allows the selected programme configuration not to be memorized

4.2 Available functions

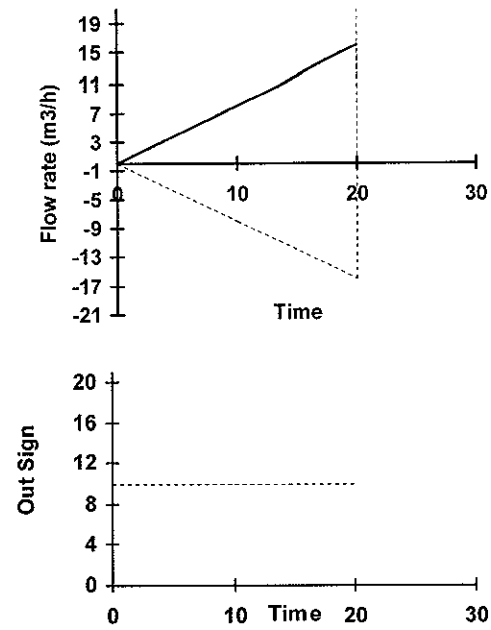
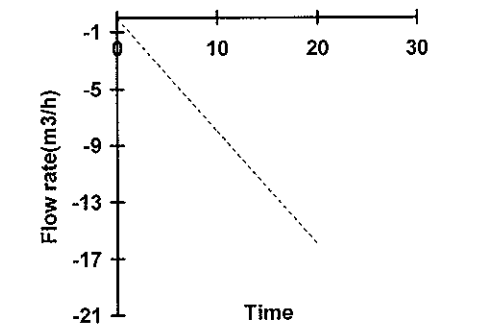
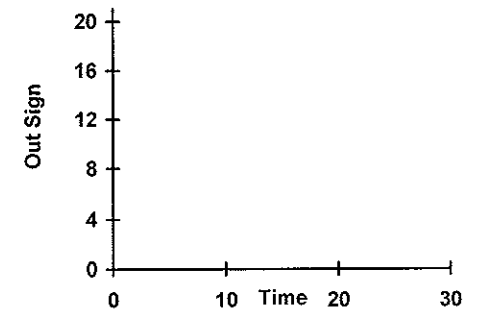
ASAMAG MENU

Main menu functions are the following:

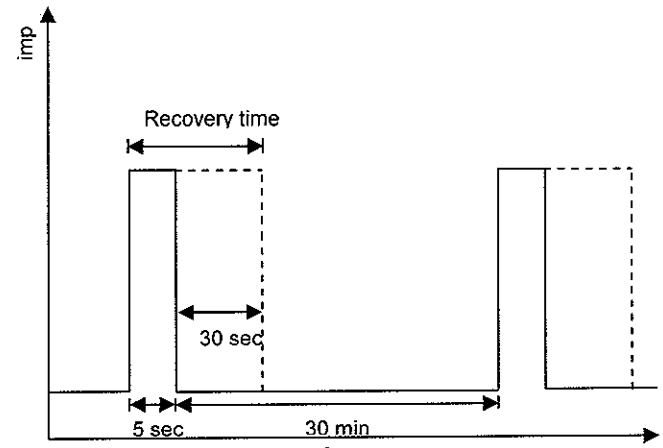
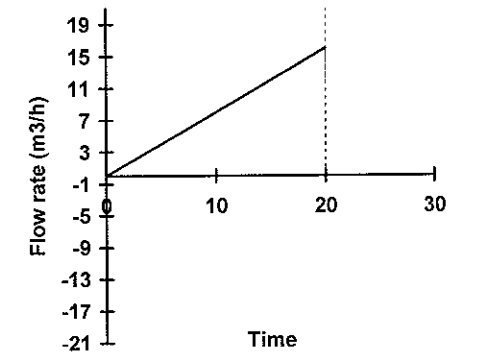
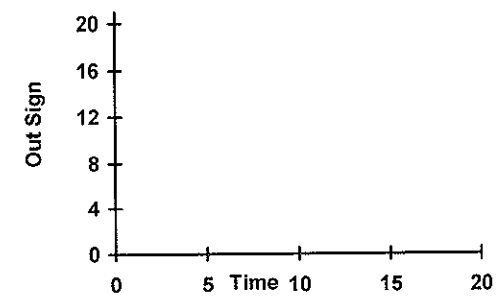
Display → Configuration → 0/4-20mA output → Internal counter
↓
Output pulses → Relays → Serial port → PID → Batching → Sensor
↑

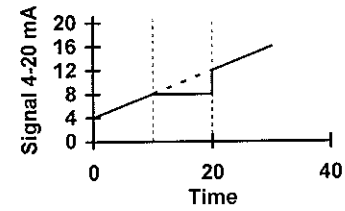
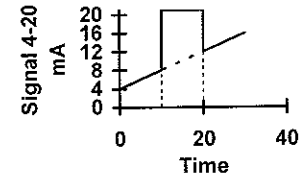
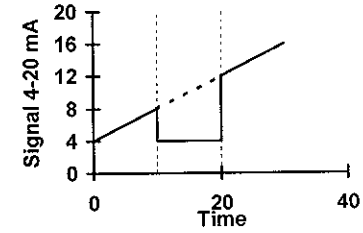
Main menu	First submenu	Second submenu	Function Descriction
Display	1. Line1 With this function the variable is defined which should be displayed on the upper display line during normal operation	DIF. TOTAL	Display shows instantaneously the difference between direct and reverse pulses totalization.
		FLOW RATE	represents the *instant flow rate* expressed in technical units.
		FLOW RATE %	indicates the *instant flow rate percentage* compared to the flow span
		Graf bar for Q%	A graph bar diagram reports the percentage instant flow rate respect to the flow span
		Graph%	allows visualization of percentage instant flow rate (y axis) with time (x axis)
		Graph time base (90 sec- 90 days)	allows to set the time axis as you like It is active only if the Graph% is selected
		TOTAL	It visualizes the *direct pulses totalization* Totalization is reset to value selected by TOTALIZATION PRESET (see 10In Function Digital input- PRESET) by pressing the central key for a time longer than 3 seconds
		REV. TOTAL	is the reverse totalization of pulses. Totalization is reset to value selected by TOTALIZATION PRESET (see 10In Function Digital input- PRESET) by pressing the central key for a time longer than 3 seconds
	2. Line2 With this function the variable is defined which should be displayed on the lower display line during normal operation	DIF. TOTAL	a/b
		FLOW RATE	a/b
		FLOW RATE %	a/b
		Output 0/4-20mA	allows selection of a current signal proportional to the instant flow rate
		TOTAL	a/b
		REV. TOTAL	a/b
		DIAGNOSTICS	indicates if ASAMAG is working well or if there are some errors.
	3. Language	Italian	
		English	
		Svensk	
	4. FILTER (s) From 0s to 100s	Selecting a time costant determines whether the display reacts quickly (small time constant) or slowly (long time constant) to actual changing flow. It represents a constant of time (expressed in seconds) used to filter the metering signal. Allows to program the time delay between flow variation and display indication. The output 0/4mA-20mA has another filter. Using this regulation you can select the filter for displaying the totalizer	

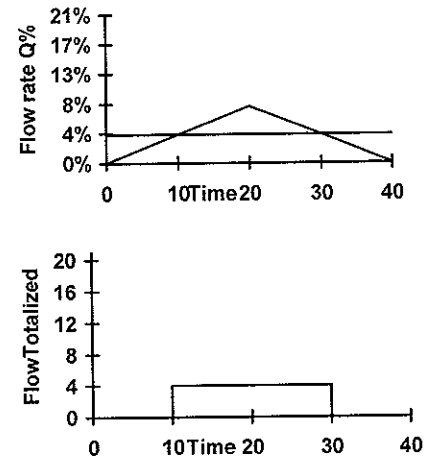
<table>
<tr><th>Main menu</th><th>First submenu</th><th>Second submenu</th><th>Function Description</th></tr>
<tr><td rowspan="11">Configuration</td><td rowspan="2">1.
Enable key</td><td>Active</td><td>This function allows to select password for the next function.</td></tr>
<tr><td>Inhibit</td><td></td></tr>
<tr><td>2.
Password</td><td colspan="2">Setting 100.0 all the information are active and the characteristic sensor data may not be alterated. A change to the sensor data affects a number of functions of the whole measuring system.</td></tr>
<tr><td>3.
Flow unit</td><td colspan="2">m3/h, Usgal/s, Usgal/min, Usgal/h, Ukgal/s, Ukgal/min, Ukgal/h, bbl/min, bbl/h, bbl/day, cc/s, cc/min, g/s, g/min, Kg/s, Kg/min, Kg/h, t/s, t/min, t/h, lb/s, lb/min, lb/h, l/s, l/min, l/h, hl/min, hl/h, m3/s, m3/min</td></tr>
<tr><td>4.
Flow Density
(from 0 to10
Kg/dm3)</td><td colspan="2">This parameter is related to visualization function of instant flow rate only if flow unit is espressed in g, Kg, t. lb.
For totalization in g, Kg, t, lb a similar function can be found in the “totalization menu”
If you change this value ASAMAG modifies automatically the Flow rate in compliance with the selected flow unit</td></tr>
<tr><td>5.
Gallons/barrel</td><td colspan="2">31Usgal, 31,5Usgal, 42Usgal, 55Usgal, 36Ukgal, 42Ukgal</td></tr>
<tr><td>6.
Flow span</td><td colspan="2">If you change System units ASAMAG modifies automatically the flow span</td></tr>
<tr><td rowspan="2">7.
Flow direction</td><td>Normal</td><td rowspan="2">It allows setting the flow direction.
NORMAL refers to the direction shown by the arrow on the metering tube.
In function of selected options the magmeter will work as follow:
<table>
<tr><th>Option</th><th>NORMAL</th><th>REVERSE</th></tr>
<tr><td>Arrow on metering tube</td><td colspan="2">Left to right</td></tr>
<tr><td>Fluid direction</td><td colspan="2">Left to right</td></tr>
<tr><td>Instant flow indications showed in function Display-FLOW RATE</td><td>1500 l/h (for example)</td><td>1500 l/h (for example)</td></tr>
<tr><td>Totalization showed in function Display-TOTAL</td><td>Increase</td><td>Stopped</td></tr>
<tr><td>Reverse totalization showed in function Display-REV. TOTAL</td><td>Stopped</td><td>Increase</td></tr>
</table>
In case of NORMAL function if the flow direction is opposite to the tube arrow in line1 you’ll see the information selected and in line2 you’ll read “reverse flow”</td></tr>
<tr><td>Reverse</td></tr>
</table>

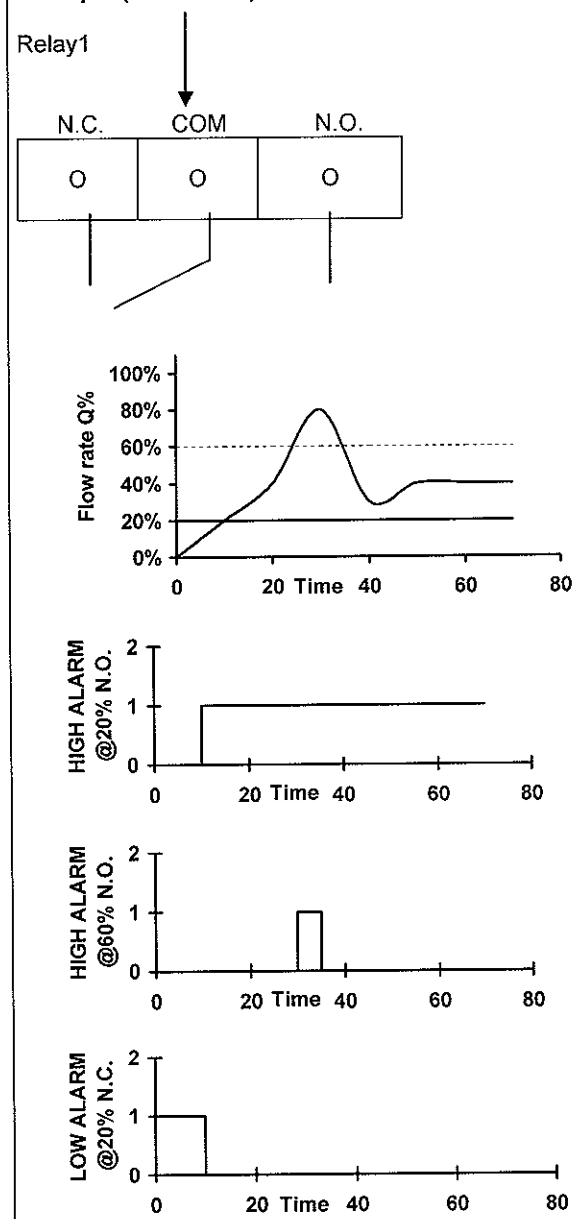
Main menu	First submenu	Second submenu	Function Description
Configuration	8. bi-dir output	Active	Allows to have output signals when we have negative flow rate too. 
		Inhibit	When we have a negative flow rate all the outputs are at low value, as if there were no flow rate.  

Main menu	First submenu	Second submenu		Function Description
Configuration	9. Empty pipe	Active		Without fluid in the tube the error message "Empty tube" will be displayed During the empty tube period the flow rate value is inaccurate. Ensure that tube is totally filled with liquid This error occurs for these causes: • Presence of air in the pipe. • Low conductivity of fluid • ASAMAG isn't grounding or is not grounded correctly • The cable has lost insulation and continuity • cable not correctly connected **CAUTION!** **be informed that empty tube detection is inhibited** **1. when cleaning electrode cycle function is activated,.** **2. when Batching cycle is activated.**
		Inhibit		Without fluid in the tube the error message "Empty tube" will be NOT displayed **CAUTION!** **We suggest to inhibit this function where the pipe will be never empty.**
	10. ECF (Electrode Cleaning Function) (ON REQUEST) **CAUTION!!** **Be informed that empty tube detection is inhibited. when ECF is activated.** **We suggest to inhibit ECF function during Batching cycles**	Active	Cycle duration	**This function is available only if ASAMAG is manufactured with ECF option (on request).** Allows to set cleaning cycle time period. Range: from 30 minutes to 7200 minutes (5 days) Default value: 30 minutes
			Pulse duration	**This function is available only if ASAMAG is manufactured with ECF option (on request).** Allows to set cleaning pulse time duration Range: from 0,1 seconds to 20 seconds Default value: 5 seconds
			Recovery time	**This function is available only if ASAMAG is manufactured with ECF option (on request).** In order to reset steady condition it is necessary to program a recovery time during that ASAMAG displays the last measured value before cleaning pulse. Range: from 1 second to 500 seconds Default value: 30 seconds
		Inhibit		**This function is available only if ASAMAG is manufactured with ECF option (on request).** Default configuration
		ATTENTION! **This function is usefull in looping plans or where process fluid causes deposit on elettrodes, thus avoiding electrodes screening signal.** **We introduced this function in order to meet customer requests, allowing periodic cleaning cycle of the tube without removing the tube from the pipe, even through, we recommend doing this, when possible, al least once a year.** **If process fluid is dark water we suggest activating the elettrical cleaning cycle once every month for a week, while in normal applications we suggest activating the elettrical cleaning cycle once every 6th month for a week.**		

Main menu	First submenu	Second submenu	Function Description
Configuration	10. ECF (Electrode Cleaning Function) (ON REQUEST)	 **Fig. 9 : example of ECF one cycle**	
	11. In Function Digital input **IN1 e IN2**	Off	Off status – Digital input disable
		Stop	During all shortcircuit time we get: Totalization stops. **CONNECTOR DG I/O:** **IN1 or IN2 terminal shortcircuited with GND**
		Autozero	Authomatic research of zero for Magmeter start. This procedure must be carried out with totally filled tube, without flow rate and grounding should be effected with the utmost care.
	11. In Function Digital input **IN1 e IN2**	Preset	Totalization is reset to value selected by COUNTERS PRESET and kept constant all shortcircuit time long. **Totalization is reset to value selected by:** • **pressing the central key for a time longer than 3 seconds** • **using CONNECTOR DG I/O:** **IN1 or IN2 terminal shortcircuited with GND**
	12. Zero position	Active	All the outputs are at low status and the flow rate will be displayed **This function can be ativated during plant START UP of during washing cycles.**  
		inhibit	

Main menu	First submenu	Second submenu	Function Description
Configuration	13. Default memory	**Using this procedure all the programmed information will be lost and ASAMAG will be configured with default parameters (DN 50). We DO NOT recommend using this procedure** By pressing the right key twice save icon is blinking, by pressing the left key confirmation screen will be available. You can choose to confirm or not Default memory procedure.	
0/4-20mA output	1. Output	0-20mA	NOTE! The 0-20mA current output can only be selected if the Hart protocol is inactivated.
		4-20mA	
	2 . 0/4-20mA filter (s)	Selecting a time costant determines whether the output reacts quickly (small time constant) or slowly (large time constant) to wodely changing flow.	
	3. Output alarm	HOLD Current does not have any variation and keeps last measured value until error cause is removed.	ERROR 
		HIGH Current runs to 21 mA and maintains this value until error cause is removed.	ERROR 
		LOW Current goes to lower limit: 0mA or 4mA and maintains this status until error cause is removed.	ERROR 
	4. Test	Active	You can verify the actual corrent level of 0/4-20mA output
		inhibit	
	5. Output value	You can select the value of 0/4-20mA output to verify	
	6. Generate error	Active	Among the detectable errors there is the possibility for the instrument to detect the lack of signal 0/4-20mA, if output function has been set as active. This error will be displayed only if: • percentage flow rate is >= 25% • the output alarm is high or hold mode On the second raw "4-20 mA open" will be displayed
		inhibit	This function allows not to visualize the error for missing 0/4-20mA output, if the user willingly disconnects the output.

Main menu	First submenu	Second submenu	Function Description
Counter **Internal counter** (direct tot, reverse Tot)	1. Tot pulse unit	Usgal, Ukgal, bbl, cc, g, Kg, t, lb, l, hl, m3	Selection effected determines the unit of measure for totalizer pulses. NOTE! The internal counter has a frequency of 1 pulse/unit of measure
	2. Density (Kg/dm3)		See Configuration menu 4. Flow density
	3. Pulse low cut(%)		This function gives the possibility to select block of totalization pulses. Block is active when fluid flow percentage goes below the value set in this function
	4. Preset		Allows selection of a value from which totalization will restart by pressing the central key for a time longer than 3 seconds or by digital input.
Output pulses 1 NPN open collector output O1	1. Unit pulse out	Usgal, Ukgal, bbl, cc, g, Kg, t, lb, l, hl, m3	Selection effected determines the unit of measure for output pulses.
	2. Density	(Kg/dm3)	See Configuration menu 4. Flow density
	3. Pulse value	0.000÷ 11.500	
	4. Output pulse low cut(%)		This function gives the possibility to select block of outlet pulses. Block is active when fluid flow percentage goes below the value set in this function. 
	5. Actual Frequency	This function allows to see frequency value on OUT1 terminal. Frequency value can be verified connecting a frequency meter between the OUT1 and the GND terminal of CONNECTOR DG I/O.	
	6. test	Active If active the function Output Value is displayed	Activing this function forces the output pulse frequency to 1000 Hz in order to verify the correct value using esternal counters. Range: 0-1000 Hz
		Force out	
		inhibit	

Main menu	First submenu	Second submenu	Function Description
Relays **2 outputs**	**1 Relay1** **Relay2**	Off Flow alarm Tot Alarm Flow direction Errors	If you have configurated the 2 relays, you can use them for indicating: 1. system errors 2. flow alarm 3. totalizer alarm 4. flow direction **Example (flow alarm)** 
	2Flow Alarm 1 (%)		The relays switch over as soon as the actual flow rate is above or below a defined switch point (%)
	3Flow Alarm 2 (%)		

Main menu	First submenu	Second submenu	Function Description
	4Tot Alarm 1 (0000000)		The relays switch over as soon as the totalizer is above the programmed point
	5Tot Alarm 2 (0000000)		
Serial Output	1ID Station (0÷99)		
	2Type	RS482	
		RS232	Default configuration
	3Baud Rate	1200	Options available for communication speed Default value
		2400	
		4800	
		9600	
PID	1Able	Active	Proportional (%)
			Integrate (%)
			Derivate (%)
			Control Zone (%)
			Direction | Direct/Reverse
			K parameter
			PID baud
			Time Reset
			High Limit It allows not to open a valve complitely. This function allows to select a value over witch the out can't go
			Low Limit It allows not to close a valve complitely. This function allows to select a value under witch the out can't go
			Auto/manual
		inhibit	

Example
PID_ABLE_ACTIVE

WINDOW

Out -.--- FLOW VALUE AT REAL TIME
SP FLOW VALUE TO REACH
OUT----- 0-4/20mA in %

	▲	▼
This key allows to return to the programme menu	This key allows to increase SPAN value	This key allows to decrease SPAN value

Batching	1 Able **CAUTION!** **be informed that empty tube detection is inhibited when Batching function is activated** **We suggest to inhibit ECF function during Batching cycles.**	Active	Set (relay1): This function is used to set the required batching Set unit = totalizer unit
			Preset (relay2): This function is used to set a Volum < set point, after reaching it the second ralay switches, making baching slower
			Compensation quantity: In this function a compensation quantity is defined. This quantity compensates for a consistent error in baching amounts due to plant operation. This can be caused, e.g. due to after running of a pump or the closing time of a valve. The compensation quantity is determined by the operator of the plant. This value can be positive or negative and is added to the batching out.
			Max batching time: Set the maximum filling period according to which Relays are to switch, e.g. for safety reasons in case of a plant failure If Max batching time = 0 s this function is inhibit
			Batching cycle: Set the number of batchings you want to make.
		inhibit	

Example
BATCHING CONFIGURATION USING DIGITAL INPUTS

This command Is used to make batching by digital input:
CONNECTOR DG I/O:
IN1 terminal shortcircuited with GND: (IT WORKS AS CENTRAL KEY)
1st START pulse
2nd STOP pulse
3rd CONT pulse: continue batching (if batching was cut off bifore the end of batching cycle)
IN2 terminal shortcircuited with GND: (IT WORKS AS RIGHT KEY)
Case IN1 =STOP reset the out value, reset the batching cut off .
Case END of batching cycle (out=0) or case Batching on working (out≠0): reset the counter with the performed n° of batching (CNT=0)

BATCHING FUNTION USING KEYBOARD

BATCHING_ABLE_ACTIVE

1° WINDOW

Out -.--- TOTALIZATION VALUE AT REAL TIME
SP Batching volume
Cnt------ Batching counter

🕮	START	2 bottles → 0
This key allows to return to the programme menu	This key allows to start the batching and after pressing it the second window will be displayed	This key allows to reset the batching counter (Cnt)

2° WINDOW

Pressing the START key the batching starts and the configuration becomes as the following:

Out -.--- TOTALIZATION VALUE AT REAL TIME
SP Batching volume
Cnt------ Batching counter

🕮	STOP	2 bottles → 0
This key allows to return to the programme menu	This key allows to stop the batching and after pressing it the 3° window will be displayed.	This key allows to reset the batching counter (Cnt)

3° WINDOW

Out -.--- TOTALIZATION VALUE AT REAL TIME
SP Batching volume
Cnt------ Batching counter

🕮	CONT	RESET
This key allows to return to the programme menu	This key allows to continue the stopped batching and after pressing it the 2° window will be displayed	This key allows to reset the stopped batching and after pressing it the 1° window will be displayed

Main menu	First submenu	Second submenu	Function Descriction
Sensor	1 Diameter		This function allows to see the DN
	2 Autozero		This function is used for zero regulation
	3 Error list		This function displays a cycled list of errors that have been occurring.
	4 Error History		This function allows to list memorized errors that have occurred throughout the magmeter life cycle.
	5 Serial number		This function allows to see S.N.
	6 Electronics number		This function allows to see E.N.
	7 SW version		This function allows to see SW version
	8 TAG		This function allows to see and modify TAG number

4.3 OPERATION WITH THE HART PROTOCOL

Besides local operation, ASAMAG can also be configurated for working with Hart protocol, on request. For this purpose it is possible to use a Hart communicator with universal handheld terminal or a personal computer with specific software for Hart FSK 1200 bps Bell – 202 (e.g. SIMATIC PDM Siemens).

In INSTRUMENT DATA it is possibile to see:

PV= primary variable: Flow
SV= secondary variable: %
TV= third variable: Totalizer
QV= fourth variable: Revers totalizer

and other parameters or measuring values like the current loop (4-20mA).

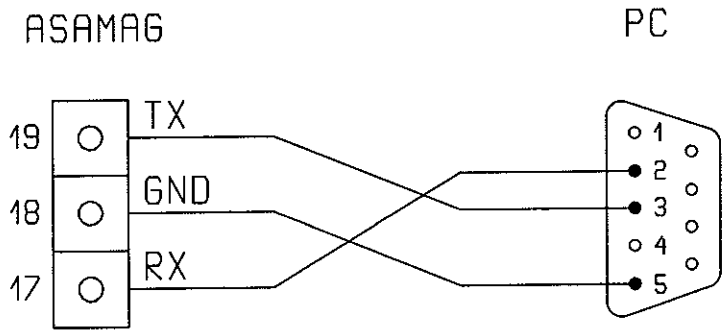
CAUTION!!!
When Hart communication is activated we recommend NOT to use RS 232 and 485 serial interface

4.4 SERIAL PORT

Communication protocol: RS485 half duplex
1 start bit
8 data bit
1 stop bit
no parity
no TIME-OUT on communication

Communication rate: 1200/2400/4800/9600 baud

Electrical connections on RS232 connector



ASA provides on request a serial interface on which using RS232 and a PC magmeter reading, parameters can be viewed, or can be modified. This interface can be used also with RS485 with the use of a RS 485-RS232 converter.

CAUTION!!!
When RS 232 and 485 serial interface is used we recommend NOT to activate Hart communication

5. DIAGNOSTICS

5.0 ELECTRICAL CONNECTION CHECK

Perform the following check after completing electrical installation of the measuring device:

DEVICE CONDITIONS AND SPECIFICATIONS	Notres
Are cables or device damaged (visual inspection)?	-
ELECTRICAL CONNECTION	
Does the supply voltage match the specifications on the nameplate?	Power supply range: **110- 220V version:** 90-250Vac 50-60 Hz **24V version** 20-55 Vdc 17-45 Vac (50-60Hz)
DO THE CABLES COMPLY WITH THE SPECIFICATIONS?	**SEE MANUAL** **1. METERING TUBE MOUNTING** **2.1ELECTRICAL CONNECTION** **2.2Input/Output Signals**
Do the cables have adeguate strain relief?	
Cables correctly segregated be type? Without loop and crossovers?	
Are the power – supply and signal cables correctly connected?	
Are all screw terminals firmly tightened?	
Have grounding been correctly implemented?	
Are all cable entries installed, firmly tightened and correctly sealed?	
Are all housing covers installed and firmly tightened	

5.1 TROUBLE SHOOTING

We can consider two types of failure alarms, one due to problems causing ASAMAG not to work, and some that are caused by a bad configuration of parameters.
Every function and subfunction has its own diagnostics in order to know the possible cause of the error.
The errors that don't permit ASAMAG to work correctly in all its functions are displayed on the screen, whilst the errors causing the incorrect working at periferics, auxiliary indications (e.g. . 0/4-20mA) are displayed in the second line, the reading of the flow rate appears in the first line of the display.

During standard working such function shows the word "GOOD" on lower line.

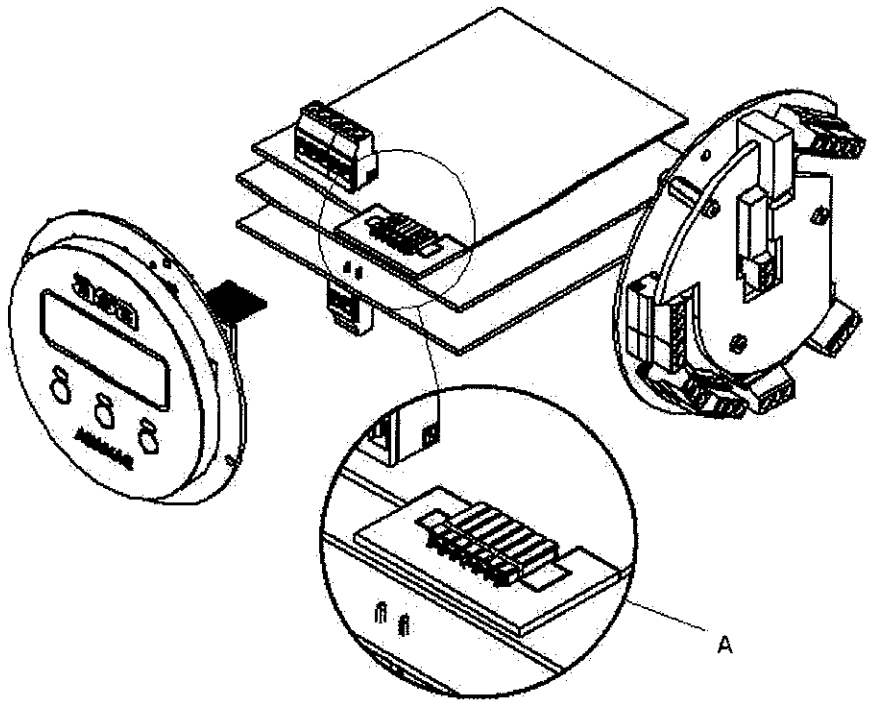
The errors causing the malfunctioning of ASAMAG in all its functions (The converter doesn't display any measuring information)	**Possible causes**	**What to do**
No display visible and no output signals present	1. Power cable not correctly connected. Supply is not switched to correct voltage in accordance with the instrument range limit 3. Electronic failure	1.check the power supply: **110- 220V version:** 90-250Vac 50-60 Hz **24V version** 20-55 Vdc 17-45 Vac (50-60Hz) 2. check the power line fuse: 1A, 250V fast version 3. Send the pc board to ASA
No display visible, but output signals are present	1. Display cable not correctly connected. 2. Electronic failure	1. check whether the connector of the display is correctly plugged into the CPU board 2. Send the pc board to ASA
Empty tube	Presence of air in the pipe.	Get rid of air in the pipe.
	Low conductivity of fluid	Increase conductivity of the fluid.
	ASAMAG isn't grounding or is not grounded correctly	Verify grounding of tube and electronic housing (see page 5)

Empty tube	The cable has lost insulation and continuity	Verify electrical continuity on electrodes (Verify cable.)
	cable not correctly connected	Verify the connections in compliance with cabling schedule
Short coil	Short circuit on coil conductors	(see the following procedure) Measurement tube has to be replaced Send the tube to ASA
	Short circuit on coil terminal cable due to humidity or water on connections (for the remote version)	The cable has to be replaced.
	Electronic failure	Send the pc board to ASA
Open coil	coil conductors open	(see the following procedure) Measurement tube has to be replaced Send the tube to ASA
	Coil connector on the pc board not correctly connected	Verify the connections in compliance with cabling schedule
	There are some interruptions between coils and connection cables	Verify the integrity of the cable
	Electronic failure	Send the pc board to ASA
Signal overflow(>105%)	Max flow >105% of flow span programmed	Increase flow span in compliance with plant process parameters
	Electronic failure	Send the pc board to ASA
Errors causing the incorrect working at periferic, auxiliary indications (e.g. . 0/4-20mA). Alarm messages will be displayed on second line	**Possible causes**	**What to do**
mA test active	Customers display mA testing alarms	This test has to be inhibited
Out Pulse test active	Customers display Out Pulse test	This test has to be inhibited
0/4-20mA open	0/4-20mA cables not correctly connected	Verify the connections
0/4-20mA is always high (> 20mA) or low	Verify that mA test isn't active. In this case mA indicates selected value	This test has to be inhibited
	cable not correctly connected	Verify the connections in compliance with cabling schedule
	Bad connections caused internal failure	Send the pc board to ASA

	internal failure	Send the pc board to ASA
Out Pulse frequency value is always 1 K Hz.	Verify that out pulse test isn't active.	This test has to be inhibited
All the outputs are at low status and the flow rate will be displayed	Zero position function is activated	This test has to be inhibited
Batching Tmax exceeded	The maximum time for a batching cycle has been exceeded	1. Identify the cause for exceeding the time provided, e.g. a possible plant error (defective or blocked valve) 2. It may be necessary to increase the maximum batching time.
VEL. Span exceeded	The flow span selected exceeds the maximum admissible velocity of 12 m/sec.	Select the proper flow rate in compliance to flow span schedule
VEL. span too low	The flow span, selected, is lower than minimum admissible velocity of 0,3 m/sec.	Select the proper flow rate in compliance to flow span schedule
Imp.F.S.>10KHz	The frequency for internal totalizer, selected exceeds the maximum admissible value.	Verify and insert correct parameters
Inverse Flow	The tube has been installed without respecting the direction shown by the arrow on the metering tube.	Install the tube respecting the direction shown by the arrow on the metering tube.
		Program the reverse flow direction
Measurement and zero are not stable	Low conductivity of fluid	Increase conductivity of the fluid.
	ASAMAG isn't grounding or has grounded incorrectly	Verify grounding of tube and electronic housing (see page 5)
	The cable has lost insulation and continuity	Verify electrical continuity on electrodes (Verify cable.)
	The tube is not totally filled with liquid	Verify the pipe
Periferics error	Bad connections caused internal failure	Send pc board to ASA
	internal failure	Send pc board to ASA
Low and fixed flow rate	Electronic failure	Send the pc board to ASA

5.2 Guided diagnostic

CAUTION!!



ALL THE TUBE CALIBRATING DATA ARE MEMORIZED (TUBE SIZE, DIAMETER, CALIBRATING POINTS ETC....) IN A LITTLE PC BOARD (A) WHICH IS DIRECTLY CONNECTED TO THE TUBE AND FIXED TO ELECTRONIC HOUSE.
DO NOT REMOVE THIS LITTLE PC BOARD AND DO NOT CHANGE IT WITH ANOTHER OF ANOTHER ASAMAG.

IN CASE OF RETURN OF ELECTRONIC FOR NEW CALIBRATION, REPAIRING OR RELACEMENT WE RECOMMEND TO SEND US THE COMPLETE ELECTRONIC WITH THE LITTLE PCBOARD (A).

WE RECOMMEND NOT TO LOOSE THIS LITTLE PC BOARD AND NOT TO FORGET TO ASSEMBLE THIS LITTLE PC BOARD WITH THE ELECTRONICS.

PROBLEM SOLVING
Difficulties to be encountered may be manifold.
Mag-meter may function badly both for hydraulic and electrical problems.
Find here below a list of the would-be causes, which could generate default messages on the flow meter and some suggestions for correct diagnoses and solutions.

MECHANICAL INSTALLATION ANALYSIS
User shall first verify where and how the mag-meter is installed and to what it is connected.
Please make sure that:

- Measuring tube is mounted correctly (see instruction manual).
- Tube is completely filled with liquid.
- Liquid has minimum required conductivity degree (5 µS/cm).
- Pipe is metallic or made of insulating material.
- Grounding has been effected correctly.
- Cable glands are correctly connected. Power supply and signal cables must be dimensioned adequately according to the existing cable glands. Unused cable glands shall be closed with the proper caps.
- Installation of the measuring tube and the electric converter are in accordance with the protection degree declared on the plate (i.e.: an instrument whose protection degree is IP 65 can not be mounted in a well where flooding may occur).

CONVERTER IS NOT SWITCHED ON
Check that supply is switched to correct voltage in accordance with the instrument range limit.
Check protection fuse integrity.
[Replace PC-Board.]

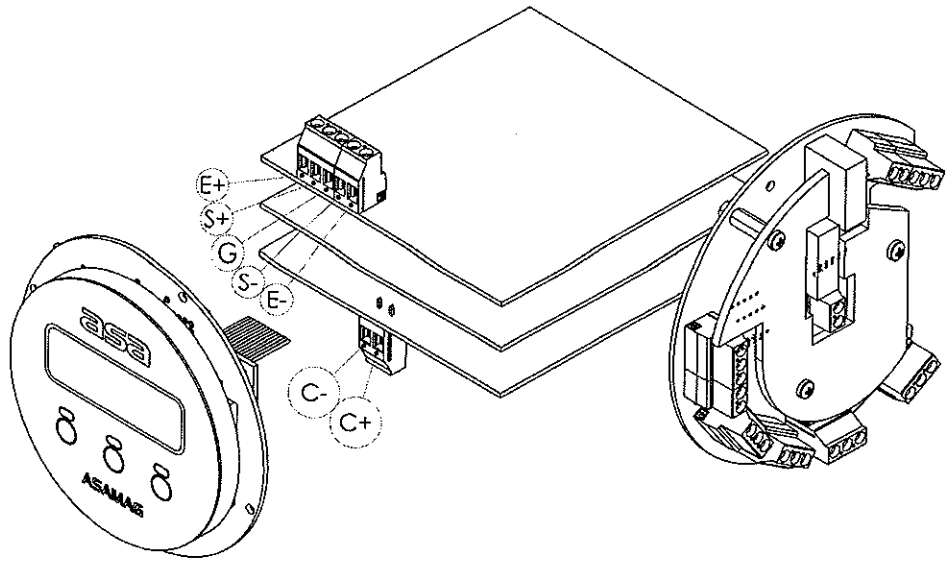


Fig. 10: Electronic terminals

CONVERTER SHOWS "EMPTY TUBE"

Possible causes are:

- Presence of air in the pipe
- Low conductivity of fluid
- ASAMAG isn't grounding or is not grounded correctly
- Lost of insulation and continuity to the cable
- The cable is not correctly connected
- The tube and the pipe is effectively empty.

1. Ensure that tube is totally filled with liquid, conductivity is the one required (> 5 µS/cm) and no flow moving.
2. verify magmeter grounding has been made correctly.
3. Switch off electronics and disconnect electrode cables from the converter (also in case of integral converter).
4. On the board: short-circuit "E+", "E-" and "G" terminals (see fig. 10), switch on the converter and verify whether error is still present.
    a. If the alarm **is not** present:
        1. **electronics has no problem.** Switch off power and continuity between E+ E- and G of the tube and E+ E- and G of the cable has to be verified (see pag.11). If there are some problems of continuity **the cable has to be changed.**
        2. Switch off power and verify the impedence between tube electrodes using a tester. The maximum impedence value available is >> 20M oHm. If the reading is "OPEN LINE" **the tube has some failures**.
    b. If the alarm **is still** present **replace the converter**.

[Replace PC-board.]
[Replace cables if present]
[Replace measuring tube]

CONVERTER SHOWS "COIL SHORT"

Possible causes are:
Short circuit on coil conductors
Short circuit on coil terminal cable due to humidity or water on connections (for the remote version)
Electronic failure

1. Switch off the electronics, remove cable connections (for the remote version) or coil terminals from electronic (for the incorporate version) (see fig.10 and pag.11)
   Check that coil resistance is approx 120 oHm (at 20°C)

REMEMBER TO USE THE MAGNETIC IN THE TEMPERATURE RANGE, AS DESCRIBED IN 3.4MECCANICAL FEATURES.

If measuring tube temperature isn't in the declared range, ASA doesn't assure a proper functionality.
This value can range between 110 and 156 ohm.
If resistance values are lower measurement tube has to be replaced

2. Switch off the electronics, remove cable connections from tube and from electronics, verify cable continuity between C+ and C-. In case of short circuit the cable coil has to be replaced (only for the remote version).
3. Switch off the electronics , remove coil terminals from electronic (see fig.10)
   Verify continuity between C+ and C- pins on electronics. In case of short circuit the pc board has to be replace

If tube and cable have no problem and the alarm is still present the pc board has internal failure and has to be replaced.
[Replace cables if present.]
[Replace measuring tube.]
[Replace PC-board.]

CONVERTER SHOWS "COIL OPEN"
Possible causes are:
- Coil connector on the pc board is not correctly connected
- coil conductors open
- There are some interruptions between coils and connection cables
- Electronic failure

1. Verify the connections in compliance with cabling schedule
2. Switch off the electronics, remove cable connections (for the remote version, see pag.11) or coil terminals from electronic (for the incorporate version, see fig. 10).
   Check that coil resistance is of about 120 oHm (at 20°C)

SUCH VALUE CAN BE COMPRISED BETWEEN 110 AND 156 OHM.

REMEMBER TO USE THE MAGNETIC IN THE TEMPERATURE RANGE, AS DESCRIBED IN 3.4MECCANICAL FEATURES.

If measuring tube temperature isn't in the declared range, ASA doesn't assure a proper functionality.
This value can range between 110 and 156 ohm.
If resistance values are more higher (M oHm or O.L.) measurement tube has be replaced.

3. Check that there is no interruption between coils and connecting cables. **Replace cable**
4. If tube and cable have no problem and the alarm is still present the pc board has internal failure and has to be replaced.

[Replace measuring tube.]
[Replace cables if present.]
[Replace PC-board.]

EITHER MEASUREMENT OR ZERO POINT ARE NOT STABLE
Check that such error does not depend on the flow. Stop the flow and verify zero stability. Verify that no turbulence occurs at certain flow values. Verify the tube is totally filled with liquid.
Check fluid conductivity. Ensure that conductivity is at the value required (> 5 μS/cm).
Check correctness of grounding.
Check cable connections to the converter and to PC-board.
Verify that there are neither junctions nor extensions on electrode cable.
Verify electrical continuity on electrodes (Verify cable.)
Make sure that neither inverter nor other appliances cause disturbances.

MEASUREMENT IS INACCURATE
Check tube diameter, full scale and flow unit.
Verify the tube is totally filled with liquid.
Check fluid conductivity measurement: if it is below 5 μS/cm the error will be evident.
Make sure that there is no lack of insulation or dampness in the converter housing and/or in the junction box on measuring tube.

RESET PROCEDURE
RESET PROCEDURE SHOULD ONLY BE USED IN EXTREME CASES (SEE TROUBLE SHOOTING, WHEN THE POSSIBLE CAUSE OF FAILURE IS INTERNAL FAILURE BEFORE SENDING THE PC BOARD TO ASA)
Enter configuration menu 13 Default memory.
Using this procedure all the programmed information will be lost and ASAMAG will be configured with default parameters (DN 50). **We DO NOT recommend using this procedure**

6. APPENDIX
6.0 Modules

	PROCEDURE FOR RETURN OF GOODS TO BE REPAIRED	Month ..... Year .....

ASA S.r.l.
Via T. Tasso, 29 20099 Sesto San Giovanni (MI)
Tel. 02 26221432 - Fax. 02 2482558
E-Mail saleservice@asaspa.com

CERTIFICATA SECONDO
CERTIFIED ACCORDING TO
UNI EN ISO 9001 : 2000
Certificato Nr. 50 100 1465

To all ASA's customer

ASA Quality System policy, always oriented towards customer satisfaction in order to optimise technical assistance offered to our customers, implies also to fill in every part of the present paper from customer itself.

SEND QUOTATION TO: _____FAX N°_____

ATTN. : MR _____

POS	MODEL	SERIAL N°	PERSON TO CONTACT	TEL/FAX
POS	**FAILURE DECLARED :** **FLUID TYPE:**			

This form is to be filled in and attached to the items sent for repair to:
ASA S.r.l. Via Silvio Pellico, 8 - 24064 - Grumello del Monte (BG) Italy

N.B. All items sent for repair without being accompanied by this document will be rejected.

SERVICE DEPARTMENTS

Mod. 38B/2 01/06