

SITRANS F M

Electromagnetic flowmeters

Transmitter type MAG 6000 Industry & MAG 6000 Industry (Ex d)

sensor type MAG 1100 / MAG 1100 F / MAG 1100 Ex / MAG 1100 F Ex /

MAG 5100 W / MAG 3100 / MAG 3100 Ex



Technical Documentation (handbooks, instructions, manuals etc.) on the complete product range SITRANS F can be found on the internet/intranet on the following links:

www.siemens.com/flowdocumentation

Order no.: A5E02083319


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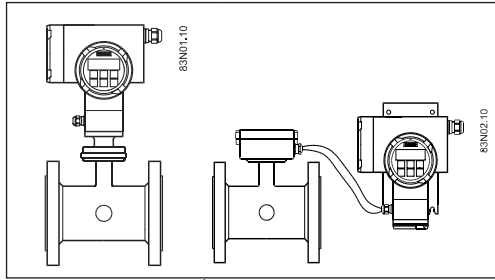
1. Introduction

 For safety reasons it is important that the following points, especially the points marked with a warning sign, are read and understood before the system is being installed:

- Installation, connection, commissioning and service must be carried out by persons who are qualified and authorized to do so.
- It is very important that the same people have read and understood the instructions and directions provided in this manual and that they follow the instructions and directions before putting the equipment into use!
- People who are authorized and trained by the owner of the equipment may operate the equipment.
- The installation must ensure that the measuring system is correctly connected and is in accordance with the connection diagram. The transmitter has to be earthed by means of 4 mm² potential equalising conductor.
- In applications where the operating pressure or media can be hazardous in the event of a pipe failure, we recommend that special precautions are taken during the installation of the sensor, such as sensor location, guarding or the use of a pressure relief valve.
- Siemens Flow Instruments can provide assistance with the selection of sensor parts in contact with the media. However, the full responsibility for the selection rests with the customer and Siemens Flow Instruments can take no responsibility for any failure due to material incompatibility.
- Equipment used in hazardous areas must be Ex-approved and marked  .
It is required that the "Special Conditions for Safe Use" provided in the manual and in the Ex certificate must be followed!
- Installation of the equipment must comply with national regulations.
Example EN 60079-14 for the European Community.
- Repair and service can be done by approved Siemens Flow Instruments personnel only.

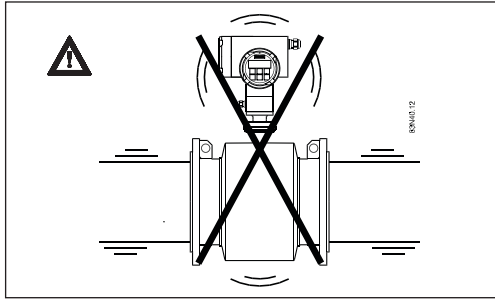
2. Installation

2.1 Installation of transmitter



Installation of transmitter can be remote or compact mounted.

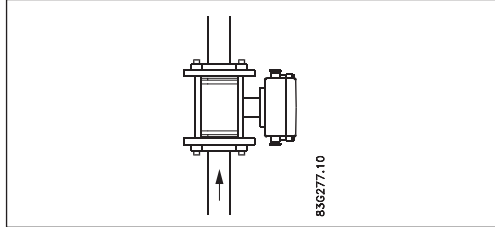
2.2 Installation of sensor



Vibrations

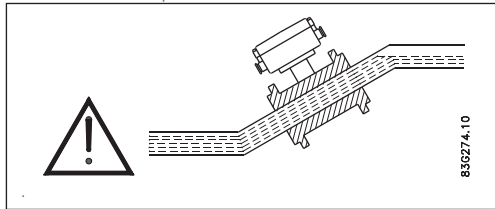
Strong vibrations should be avoided. In applications with strong vibrations, we recommend remote mounting of both the MAG 6000 I and the MAG 6000 I Ex d transmitter.

Hazardous area

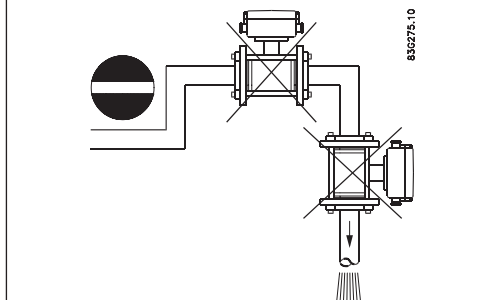


Category 2 equipment

Both the Ex sensor and the MAG 6000 I Ex transmitter, in remote or compact configurations, may be mounted in Ex zone 1 or 2.

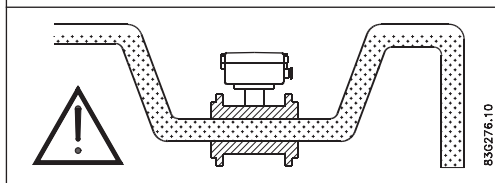


The sensor must always be completely full with liquid.

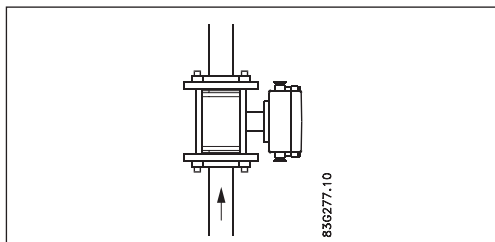


Therefore avoid:

- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet



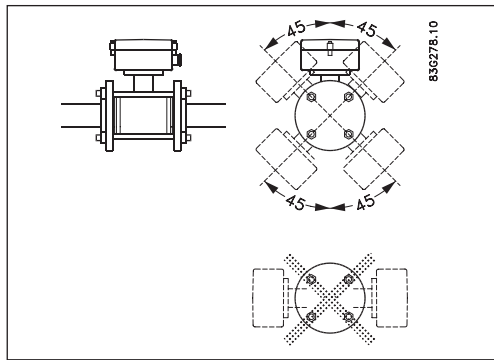
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-tube.



Installation in vertical pipes

Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.

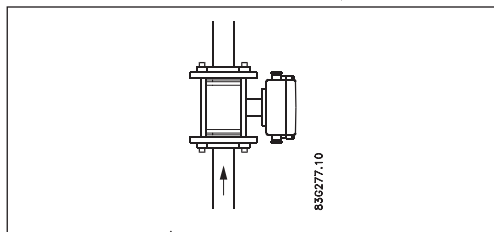
2.2 Installation of sensor
(continued)



Installation in horizontal pipes

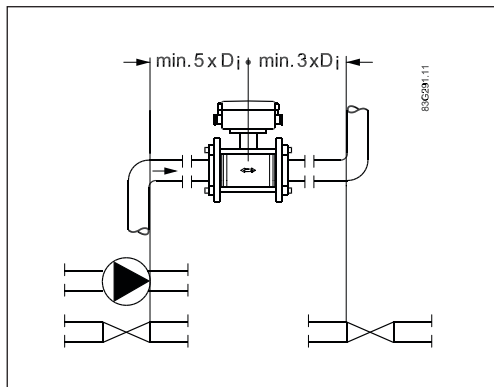
The sensor must be mounted as shown in the upper figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.

If using empty pipe detection the sensor can be tilted 45°, as shown in the upper figure.



Measuring abrasive liquids and liquids containing particles

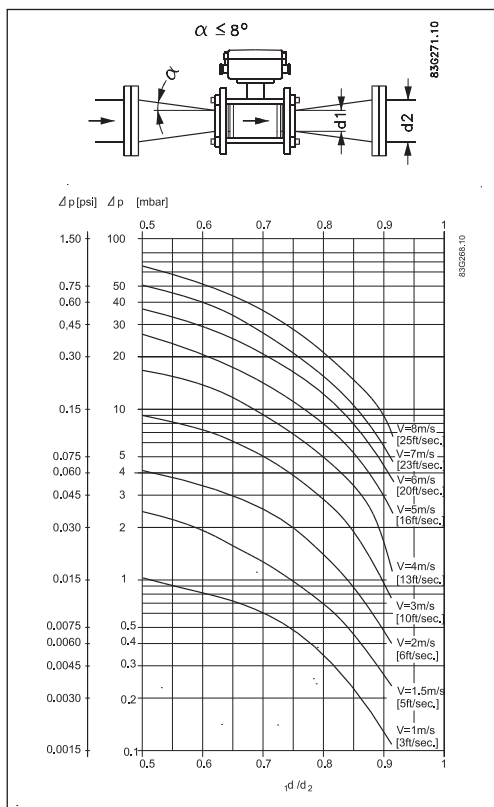
Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.



Inlet and outlet conditions

To achieve accurate flow measurement it is essential to have straight lengths of inlet and outlet pipes and a certain distance between pumps and valves.

It is also important to centre the flowmeter in relation to pipe flanges and gaskets.



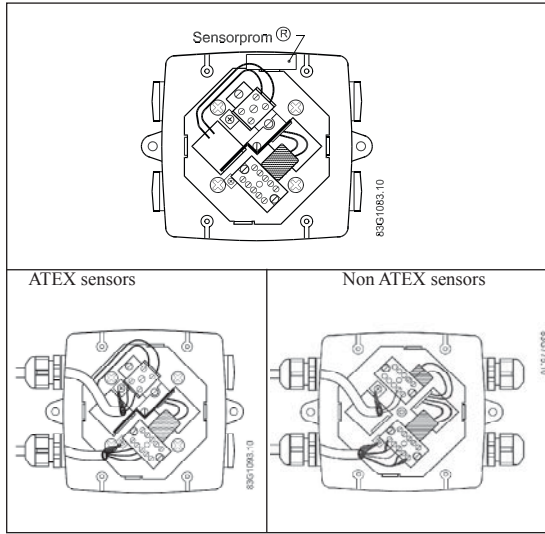
Installation in large pipes/pressure drop

The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at 8° the following pressure drop curve applies. The curves are applicable to water.

Example:

A flow velocity of 3 m/s (V) in a sensor with a diameter reduction from DN 100 to DN 80 ($d_1/d_2 = 0.8$) gives a pressure drop of 2.9 mbar.

2.3.1 Remote installation -
At the sensor



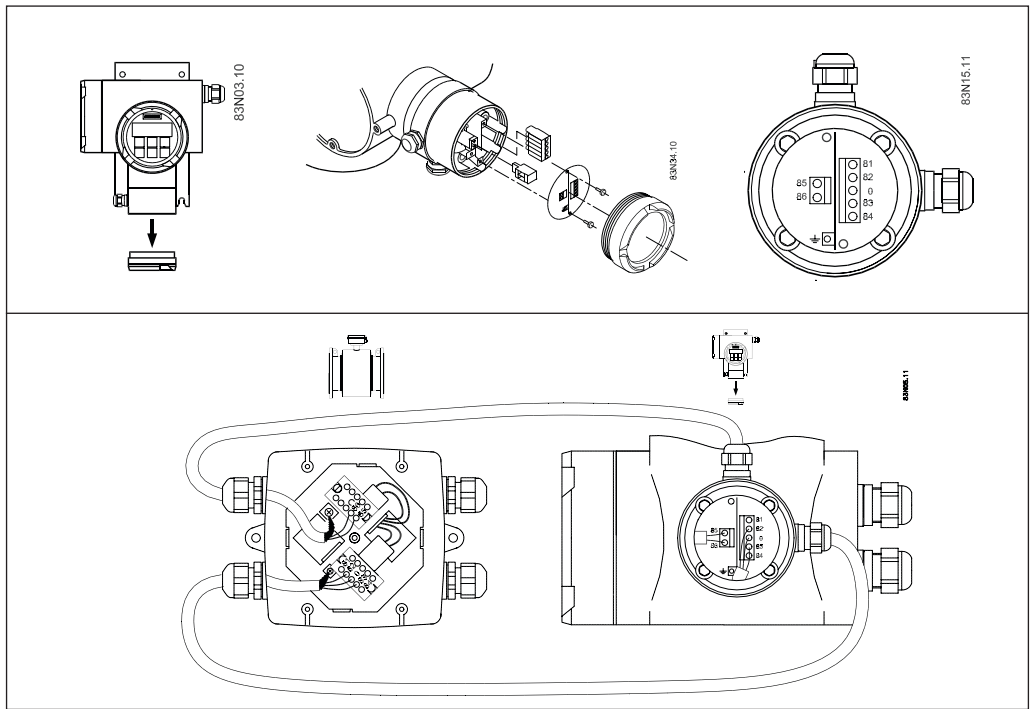
Remove the SENSORPROM unit from the sensor and mount it in the terminal block in the transmitter.

Fit and connect the electrode and coil cables as shown in "Electrical connections". The unscreened cable ends must be kept as short as possible. Wire insulation must extend to within 0,5mm of the conductor clamps in the coil terminal block. Stray conductors are not permitted. The electrode cable and the coil cable must be kept separate to prevent interference. Tighten the cable glands well to obtain optimum sealing.

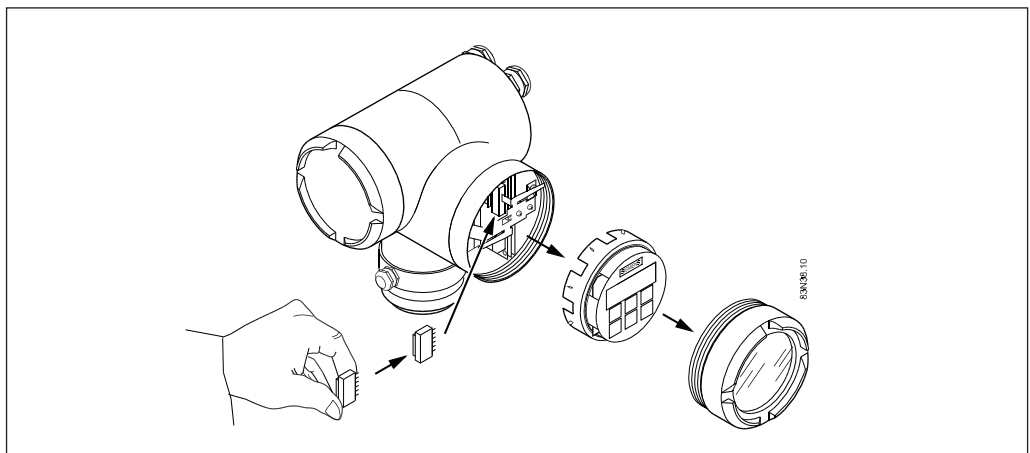
2.3.2 Remote installation -
Transmitter



No power up with open lid -
Do **not** open lid while power on



Fit the SENSORPROM memory unit in the transmitter.
The SENSORPROM unit is supplied with the sensor in the terminal box.



2.4 Ex survey according to Directive 94/9/EC (ATEX)

as an example:

II 2G Ex d IIC T3-T6

Directive 94/9/EC (ATEX)

Instrument groups _____

I	Applies to instruments used in underground mining operations, as well as their above ground operations, which can be endangered by mine gas and/or flammable dusts.
II	Applies to instruments used in the remaining areas which can be endangered by a potentially explosive atmosphere.

Instrument category _____

Labelling with gases	Labelling with dusts	Definition
1G (0)	1D (20)	Instruments of this category are for use in areas where ignitable atmospheres, caused by a mixture of air and gasses, vapours or mists or by dust/air mixtures, can exist all of the time or for long periods of time or else frequently.
2G (1)	2D (21)	Instruments of this category are for use in areas where ignitable atmospheres caused, by a mixture of air and gasses, vapours or mists or by dust/air mixtures, can exist some of the time.
3G (2)	3D (22)	Instruments of this category are for use in areas where ignitable atmospheres, caused by a mixture of air and gasses, vapours or mists or by dust/air mixtures, are not likely to exist. However, if they do occur then in all probability, only seldom or for short periods of time.

(The figures in brackets refer to IEC)

EN/IEC 60079-10

Explosion protected electrical equipment = Ex _____

Type of protection _____

Ex protection labelling in square brackets refers to "Associated electrical equipment"

o Oil encapsulated	i Intrinsic safety (ia, ib)
p Pressurized apparatus	n Non-incentive equipment
q Powder filling	m Encapsulation
d Flameproof enclosure	s Special protection
e Increased safety	

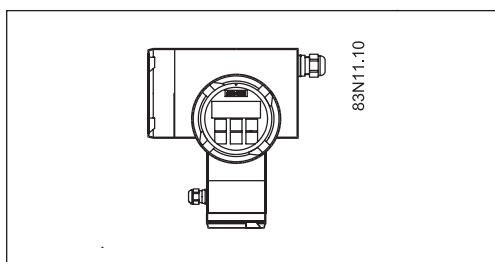
Explosion groups _____

Gases and vapours (es)	Minimum ignition energy [mJ]	EN/(examples)
• Ammonia	-	IIA
• Acetone, aircraft fuel, benzine, crude oil, diesel oil, ethane, ethanoic acid, ether, gasolines, heating oil, hexane, methane, propane	0.18	IIA
• Ethylene, isoprene, town gas	0.06	IIB
• Acetylene, carbon disulphide, hydrogen	0.02	IIC

Ignition temperature _____

Maximum surface temperature	EN / IEC	
450°C	842°F	T1
300°C	572°F	T2
200°C	392°F	T3
135°C	275°F	T4
100°C	212°F	T5
85°C	185°F	T6

2.5 Overview and intrinsically safe data

**Specifications:**

Supply: 115-230 V or 24 V

Ambient temperature:

MAG 6000 I: -20 to 60°C

MAG 6000 I Ex d: -10 to 60°C

Enclosure: IP67/NEMA 4X

2.5.1 Transmitter data
MAG 6000 I (Ex d)**SENSOR INTERFACE**

DN 2 - 2000 mm

Certificate: Sira 05ATEX2072X**Ex** II 2(1)(2) G D**Remote version:** II 2(1)(2) GD T85°C**Compact version:** II 2(1) GD T85°C**Remote version:** Ex de [ia] ia [ib] IIC T6**Compact version:** Ex de [ia] [ib] IIC T3-T6**Electrode**

81,82,83,84

	IIB	IIC
U_o	30 V	30 V
I_o	6.1 mA	6.1 mA
C_o	66 nF	560 nF
L_o	0.96 H	0.96 H
P_o	45.5 mW	45.5 mW

! Coil terminal 85, 86 are "e" terminals.

User I/O INTERFACE

Passive current (31-32)		Active current (31-32)		Relay (44, 45, 46)		Freq./pulse (56, 57)		Profi (FISCO) (95, 96)		Dig. input (77, 78)		
	IIB/IIC		IIB	IIC		IIB/IIC		IIB/IIC		IIB/IIC		
U_i	30 V	U_o	30 V	30 V	U_i	30 V	U_i	28 V	U_i	17.5 V	U_i	30 V
I_i	100 mA	I_o	87.8 mA	87.8 mA	I_i	200 mA	I_i	100 mA	I_i	380 mA	I_i	
C_i	16.5 nF	C_o	560 nF	66 nF	C_i	0	C_i	12 nF	C_i	0	C_i	0
L_i	36 μ H	L_o	18.41 mH	4.57 mH	L_i	0	L_i	36 μ H	L_i	0	L_i	0
		P_o	0.66 W	0.66 W								

MAG 1100, MAG 1100 F & MAG 3100
EEx ia IIB T3...T6



Category 2 equipment
 Sensors may be installed in zone 1 and zone 2.

Sensors intrinsically safe data
 See table below.

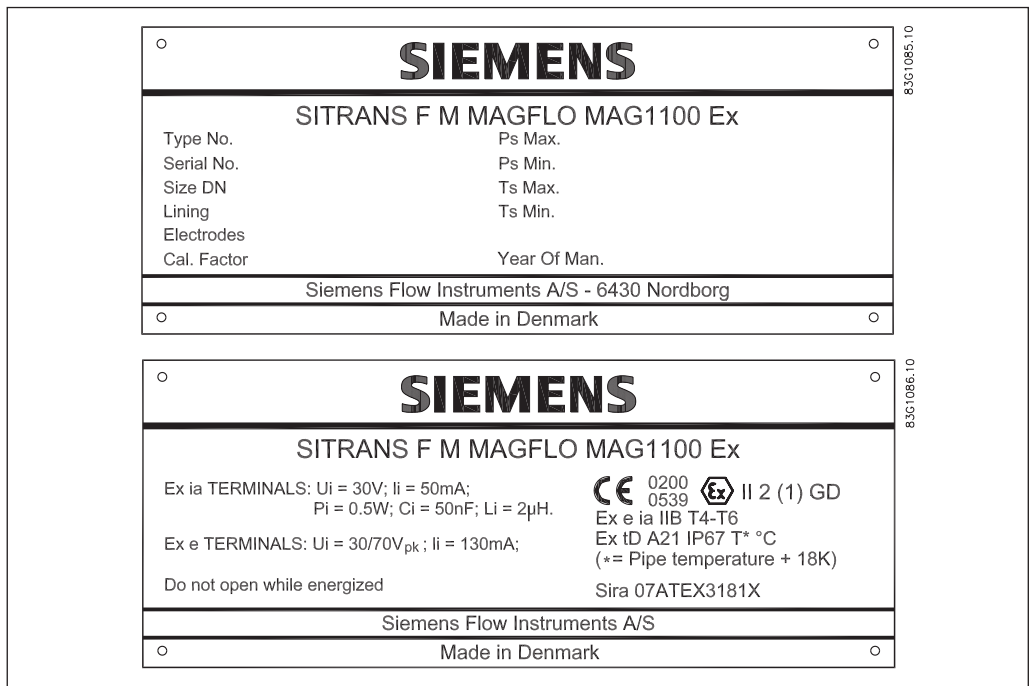
All MAG 1100 Ex and MAG 3100 Ex sensors have the following ratings and input parameters:

IS data sensor
MAG 1100 DN 2 - 100
MAG 1100 F DN 10 - 100
MAG 3100 DN 15 - 2000

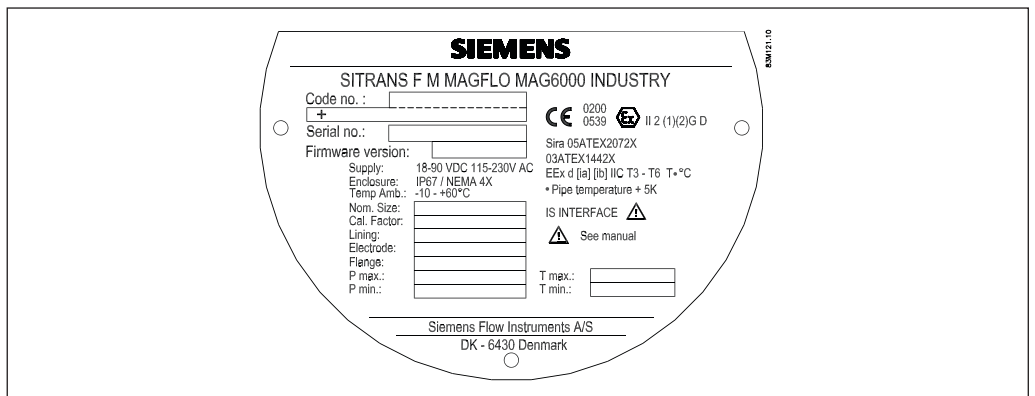
Terminals	85-86 coil	82-83 electrode
MAG sensor		
U _i	-	30 V
I _i	-	50 mA
P _i	-	0.5 W
L _i	-	20 μH
C _i	-	50 nF

2.6 Device identification

Example label, sensor remote MAG 1100 Ex

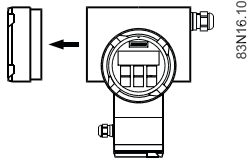


Example label, transmitter type MAG 6000 I (Ex d) compact

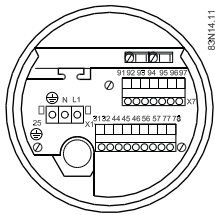


ENGLISH

3.1 Transmitter type
MAG 6000 I and
MAG 6000 I Ex d

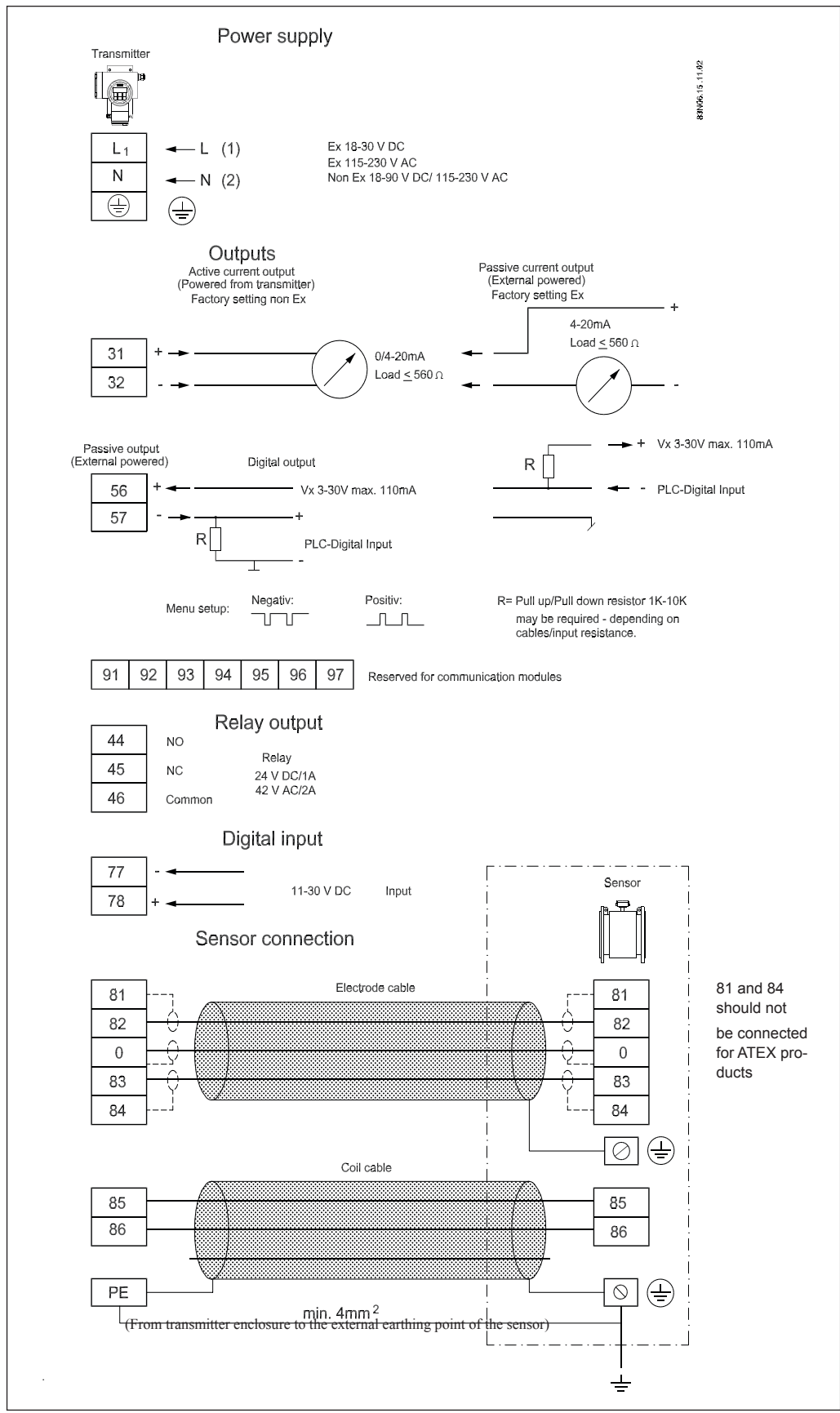


83N16.10

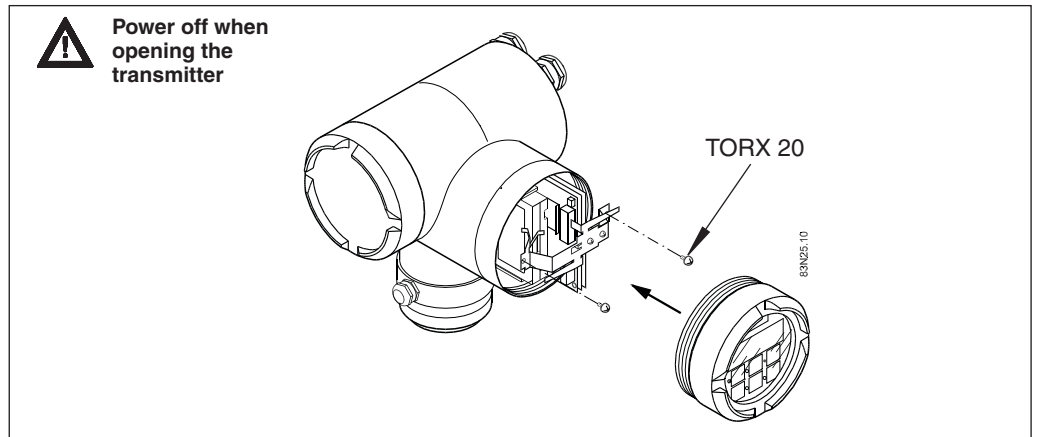


83N14.11

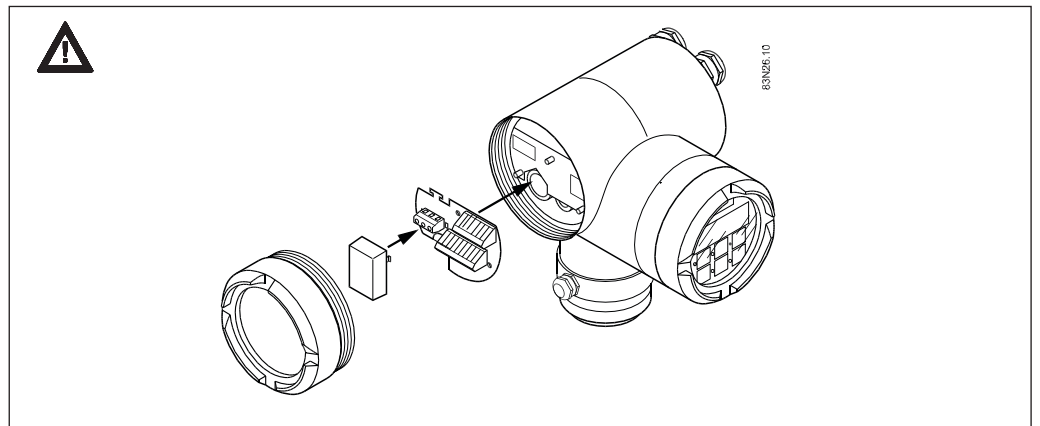
For Ex intrinsically safe specifications, refer to section 2.5



⚠ Potential Hazards Grounding
The mains protective earth wire must be connected to the PE terminal in accordance with the diagram (class 1 power supply).



When reassembling the unit, make sure that the 2 screws are properly tightened in order to ensure a correct assembly and a proper ground connection.



Cover/insulate the power supply terminals with the plastic cover (to secure sufficient insulation).

Installation



- 1) Mains supply 115 to 230 V AC from building installation Class II. A switch or circuit-breaker (max. 15 A) shall be included in the building installation. It must be in close proximity to the equipment and within easy reach of the OPERATOR, and it shall be marked as the disconnecting device for the equipment.
- 2) **The mains protective earth wire must be connected to the PE \oplus terminal, if the earth wire is not connected, personnel can be exposed to 115V/230V.**
Required cable min. AGW16 or 1.5 \square Cu wire.

For field wiring installation **National Installation Code** shall be met of the country, where the flowmeters are installed.

Main voltage terminals must be out of reach for OPERATOR to avoid any hazards!

Intrinsically safe terminals!

It is an absolute requirement that the wires/terminals of the intrinsically safe circuits **cannot** get into contact with the wires of the other cables. The distance between cables/wires therefore must be at least 50 mm or otherwise protected.

It is recommended to fasten the cables/wires in a way that they, even in case of an error, **cannot** get into contact with each other. Make the wire ends as short as possible.

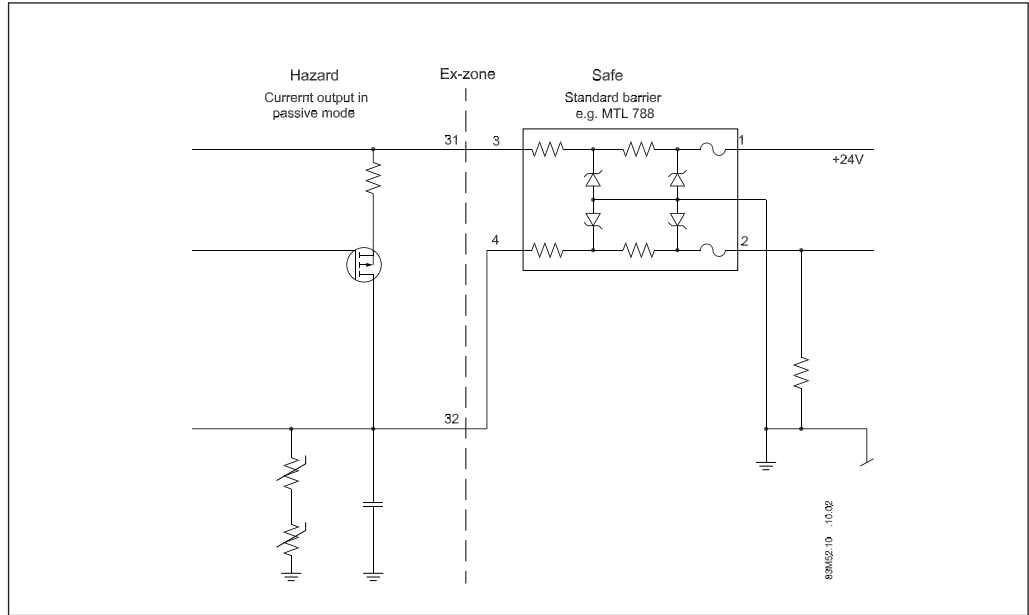
Digital output

If the internal resistance of the loads exceeds 10K Ω , it is recommended to connect an external 1-10 K Ω load resistor in parallel to the load.

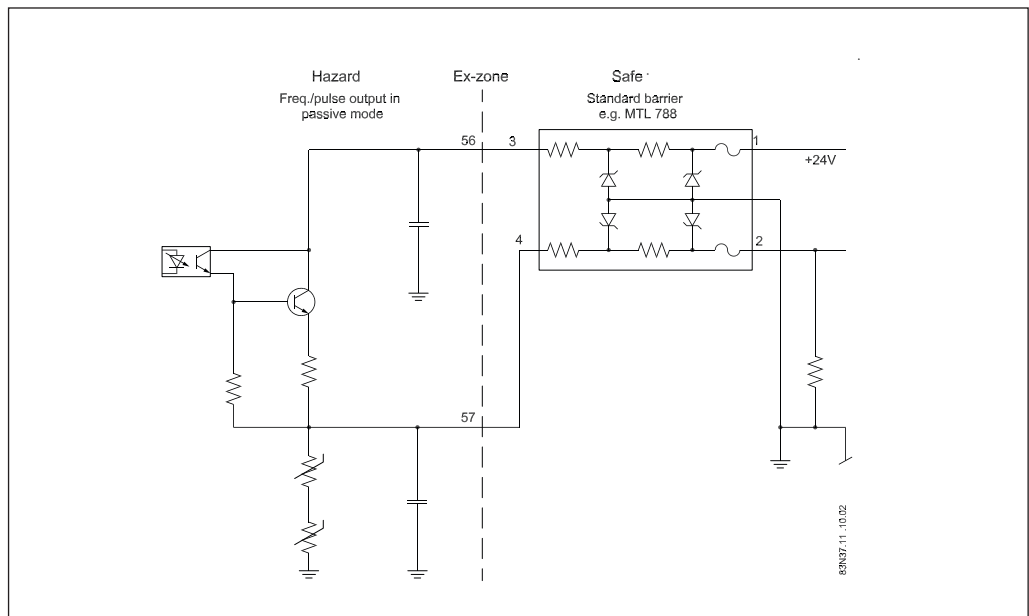
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3.2 Installation examples

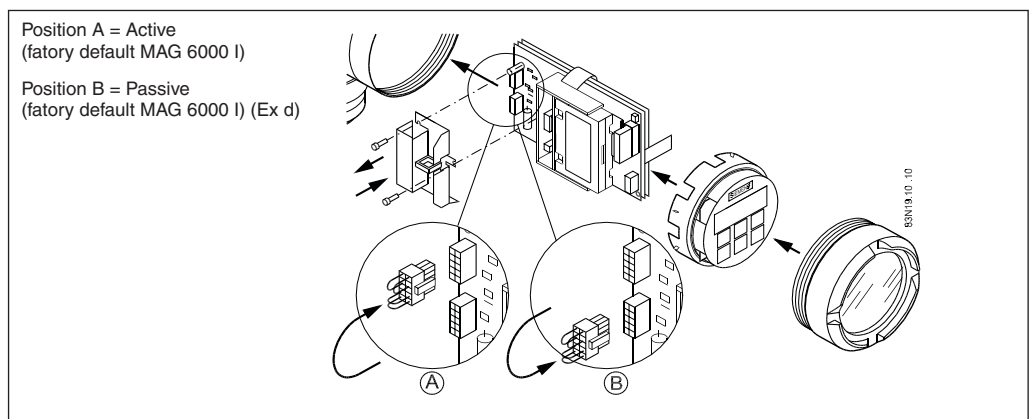
Current output in passive mode



Frequency/pulse output in passive mode

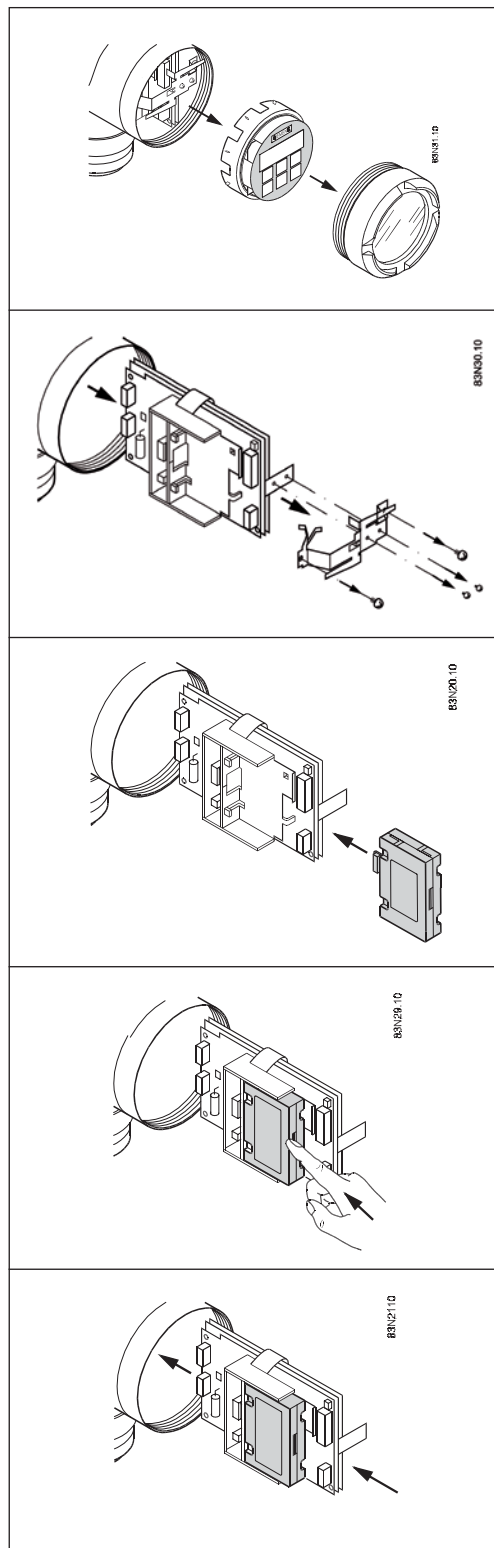


Active/passive current output



At the MAG 6000 I the current output terminal 31, 32 can be switch between active mode (transmitter powered) to passive mode default (external powered).

3.2.1 Add-on communication module

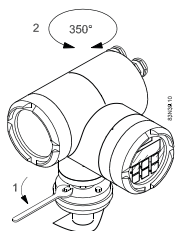


1. Open transmitter.
2. Remove electronic insert.
3. Unpack the module and fit into module holder.
4. Press the add-on module in the direction shown, until it stops and is firmly seated in position.
5. Re-insert the complete transmitter module in reverse order.

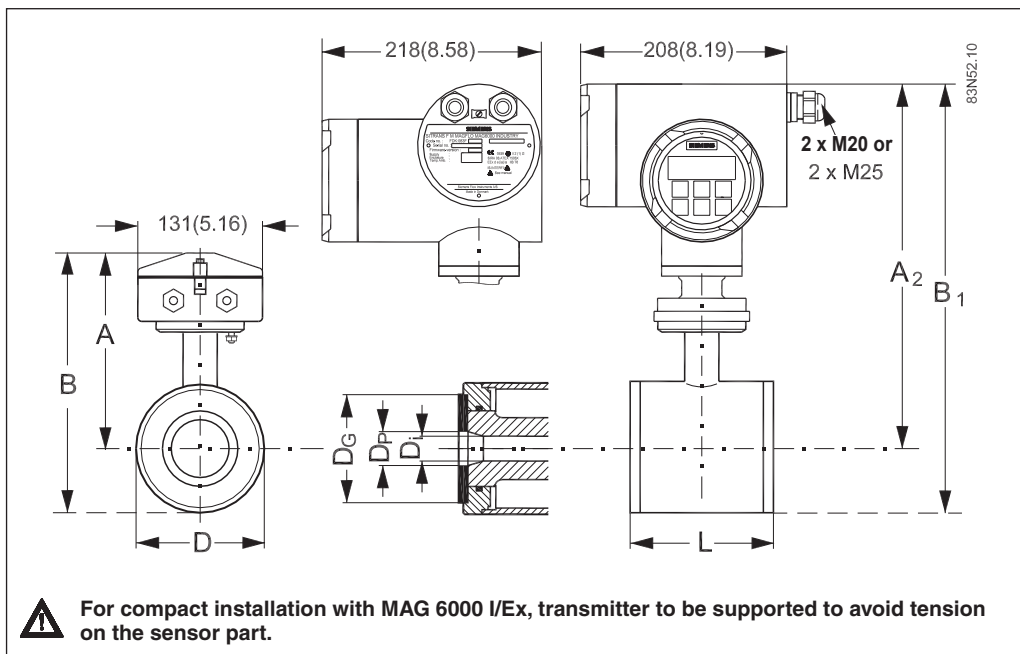
4. Technical data

4.1.1 Dimensions and weight

4.1.1.1 MAG 1100 standard & Ex



MAG 1100 / MAG 6000 I or MAG 1100 Ex / MAG 6000 I Ex d



Size	A ¹⁾	B ¹⁾	A ₂	B ₁	D	D ²⁾	D ₁ (PFA)	D _p	D _G	Weight ³⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
2	161	186	315	340	48.7	2		17.3	34	2.2
3	161	186	315	340	48.7	3		17.3	34	2.2
6	161	186	315	340	48.7	6		17.3	34	2.2
10	161	186	315	340	48.7	10	10	13.6	34	2.2
15	161	186	315	340	48.7	15	16	17.3	40	2.2
25	169	201	323	354	63.5	25	26	28.5	56	2.7
40	179	221	329	375	84.0	40	38	43.4	75	3.4
50	188	239	333	393	101.6	50	50	54.5	90	4.2
65	198	258	342	412	120.9	65	66	68.0	112	5.5
80	204	270	351	424	133.0	80	81	82.5	124	7.0
100	217	296	370	450	159.0	100	100	107.1	145	10.0

Size	A ¹⁾	B ¹⁾	A ₂	B ₁	D	D ²⁾	D ₁ (PFA)	D _p	D _G	Weight ³⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
1/12	6.34	7.33	12.40	13.39	1.92	0.08		0.68	1.34	4.8
1/8	6.34	7.33	12.40	13.39	1.92	0.12		0.68	1.34	4.8
1/4	6.34	7.33	12.40	13.39	1.92	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.40	13.39	1.92	0.39	0.39	0.53	1.34	4.8
1/2	6.34	7.33	12.40	13.39	1.92	0.39	0.63	0.68	1.57	4.8
1	6.66	7.92	12.72	13.94	2.50	0.98	1.02	1.12	2.20	4.9
1 1/2	7.05	8.70	13.11	14.76	3.31	1.57	1.50	1.71	2.95	7.5
2	7.40	9.41	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
2 1/2	7.80	10.16	13.82	16.22	4.76	2.56	2.60	2.68	4.41	12
3	8.03	10.63	14.06	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.54	11.65	14.57	17.72	6.26	3.94	3.94	4.22	5.91	22

¹⁾ 14,5 mm/0.57" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (390 °F) version)

²⁾ DN 2 (1/12") and 3 (1/8"): Zirconium oxide (ZrO₂), DN 6 ...100 (1/4" ... 4"): Ceramic (Al₂O₃)

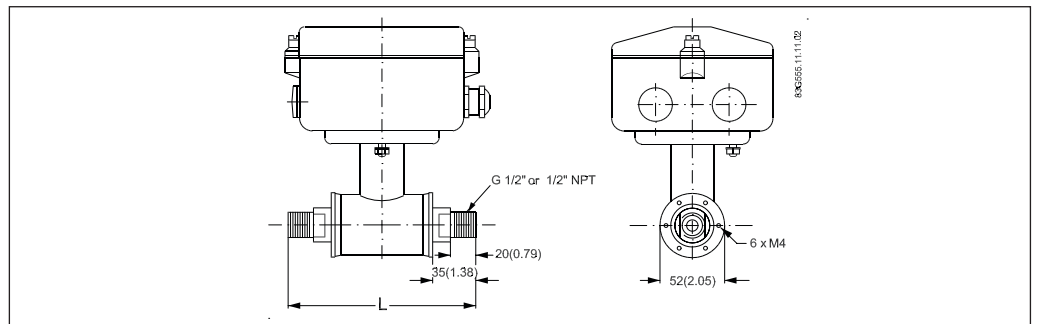
³⁾ With MAG 6000 I/MAG 6000 I Ex the weight is increased with 5.5 kg (12.1 lbs)

The total build-in length "L" [mm]/[inch] before assembling depends on the gasket selected.

Size		EPDM		Graphite		PTFE (Teflon)		Without gasket		Earthing ring	
DN	Inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
2-10 ¹⁾	1/12-3/8	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	1/2	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	1 1/2	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	2 1/2	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

1) Mounting between two flanges

Sensor MAG 1100 DN 2...10 (1/12" ...3/8") with adapters



The MAG 1100 DN 2, 3, 6 and 10 (1/12", 1/8", 1/4" and 3/8") are prepared for assembly with the 1/2" pipe connections. The length "L" varies dependent on the gasket choice.

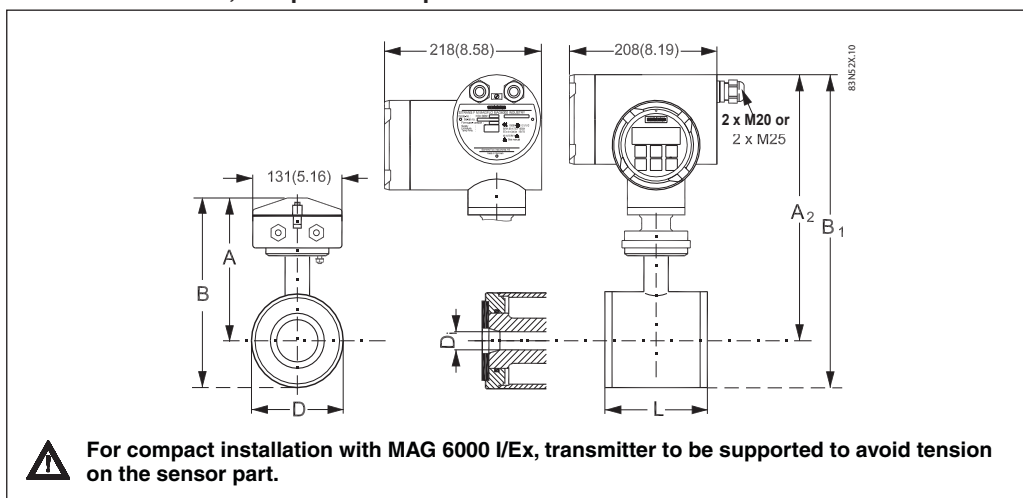
Without gasket		EPDM		Graphite		Teflon	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1

Important note:

For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.

4.1.1.2 MAG 1100 F
standard & Ex

MAG 1100 F / 6000 I, compact and separate



Size	L	A ¹⁾	A ₂	B ¹⁾	B ₁	D (Al ₂ O ₃)	D _i (PFA)	D _i	Weight ²⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
10	64	161	312	193.7	344.7	64.0	10	10	2.2
15	64	161	312	193.7	344.7	64.0	15	16	2.2
25	79	169	320	207.5	359.0	77.5	25	26	2.7
40	94	179	330	228.0	379.0	91.0	40	38	3.4
50	104	188	339	247.7	398.7	119.0	50	50	4.2
65	131	197.5	348	262.6	413.6	130.0	65	66	5.5
80	156	204	354	281.0	432.0	155.0	80	81	7.0
100	186	217	367	308.0	459.0	183.0	100	100	10.0

Size	L	A ¹⁾	A ₂	B ¹⁾	B ₁	D (Al ₂ O ₃)	D _i (PFA)	D _i	Weight ²⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
3/8	2.52	6.34	12.28	7.62	13.57	2.52	0.39	0.39	4.8
1/2	2.52	6.34	12.28	7.62	13.57	2.52	0.59	0.63	4.8
1	3.11	6.66	12.60	8.17	14.13	3.05	0.98	1.02	4.9
1 1/2	3.70	7.05	12.99	8.98	14.92	3.58	1.57	1.50	7.5
2	4.09	7.40	13.35	9.75	15.70	4.68	1.97	1.97	9.2
2 1/2	5.16	7.78	13.70	10.34	16.28	5.12	2.56	2.60	12.0
3	6.14	8.03	13.94	11.06	17.01	6.10	3.15	3.19	15.0
4	7.32	8.54	14.45	12.13	18.07	7.20	3.94	3.94	22.0

¹⁾ 14.5 mm/0.57" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (390 °F) version)

²⁾ With transmitter type MAG 6000 I installed, weight is increased by approx. 5.5 kg (12.1 lb).

4.1.2 Sensor MAG 1100/
MAG 1100 F

Version	MAG 1100 /MAG 1100 Ex	MAG 1100 F/MAG 1100 F Ex
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency	DN 2...65 (1/12" ... 2 1/2"): 12.5 Hz DN 80, 100 (3", 4"): 6.25 Hz	DN 10...65 (1/4"...2 1/2"): 12.5 Hz DN 80...100 (3", 4"): 6.25 Hz
Process connection		
Nominal size		
• MAG 1100 (Ceramic)	DN 2...DN 100 (1/12"...4")	DN 10...DN 100 (3/8"...4")
• MAG 1100 (PFA)	DN 10...DN 100 (3/8"...4")	DN 10...DN 100 (3/8"...4")
Mating flanges	EN 1092-1 (DIN 2501), ANSI B16.5 class 150 and 300 or equivalent Option: DN 2...10 (1/12"...3/8"): G 1/2"/NPT 1/2" pipe connection adapters	Hygienic adapters available for: • Direct welding onto pipe • Clamp fitting • Threaded fitting
Rated operating conditions		
<u>Ambient conditions</u>		
Ambient temperature		
• Sensor	-40...+100°C (-40...+210°F)	-40...+100°C (-40...+210°F)
• Compact transmitter MAG 5000/6000	-20...+50°C (-4...+120°F)	-20...+50°C (-4...+120°F)
• Compact transmitter MAG 6000 I	-20...+60°C (-4...+140°F)	-20...+60°C (-4...+140°F)
• Compact transmitter MAG 6000 I Ex d	-10...+60°C (+14...+140°F)	-10...+60°C (+14...+140°F)
<u>Temperature of medium</u>		
• MAG 1100 (Ceramic)	-20...+150°C (-4...+300°F)	-20...+150°C (-4...+300°F) Suitable for steam sterilization
• MAG 1100 (PFA)	-30...+130°C (-20...+270°F) Suitable for steam sterilization at 150°C (300°F)	-30...+130°C (-20...+270°F) Suitable for steam sterilization at 150°C (300°F)
<u>Temperature shock</u>		
• MAG 1100 (Ceramic)	DN 2, 3 (1/12", 1/8") No limitations DN 6, 10, 15, 25: Max. ΔT ≤ 80°C/min (1/4", 3/8", 1/2", 1": Max. ΔT ≤ 80 K/min) DN 40, 50, 65: Max. ΔT ≤ 70°C/min (1 1/2", 2", 2 1/2": Max. ΔT ≤ 70 K/min) DN 80, 100: Max. ΔT ≤ 60°C/min (3", 4": Max. ΔT ≤ 60 K/min)	DN 10, 15, 25: Max. ΔT ≤ 80°C/min (3/8", 1/2", 1"): Max. ΔT ≤ 80 K/min DN 40, 50, 65: Max. ΔT ≤ 70°C/min (1 1/2", 2", 2 1/2"): Max. ΔT ≤ 70 K/min DN 80, 100: Max. ΔT ≤ 60°C/min (3", 4": Max. ΔT ≤ 60 K/min)
• MAG 1100 (PFA)	Max. ± 100°C (210°F) momentarily	Max. ± 100°C (210°F) momentarily
<u>Operating pressure</u>		
• MAG 1100 (Ceramic)	DN 2...65: 40 bar (1/12"...2 1/2": 580 psi) DN 80: 37.5 bar (3": 540 psi) DN 100: 30 bar (4": 435 psi) Vacuum: 1x10 ⁻⁶ bar (1.5x10 ⁻⁵ psi)	DN 10...65: 40 bar (3/8"...2 1/2": 580 psi) DN 80: 37.5 bar (3": 540 psi) DN 100: 30 bar (4": 435 psi) Vacuum: 1x10 ⁻⁶ bar (1.5x10 ⁻⁵ psi)
• MAG 1100 (PFA)	20 bar (290 psi) Vacuum: 0.02 bar (0.3 psi)	20 bar (290 psi) Vacuum: 0.02 bar <u>abs</u> (0.3 psi <u>abs</u>)
<u>Mechanical load</u>		
to EN 60068-2-36	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36	18 ... 1000 Hz random in x, y, z, directions for 2 hours according
6000 mounted transmitter:	Sensor: 3.17 grms Sensor with compact MAG 5000/ 3.17 grms	Sensor: 3.17 grms Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 grms
MAG 6000 I, transmitter to be	Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 grms For compact installation with the supported to avoid tension on sensor part	Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 grms For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part

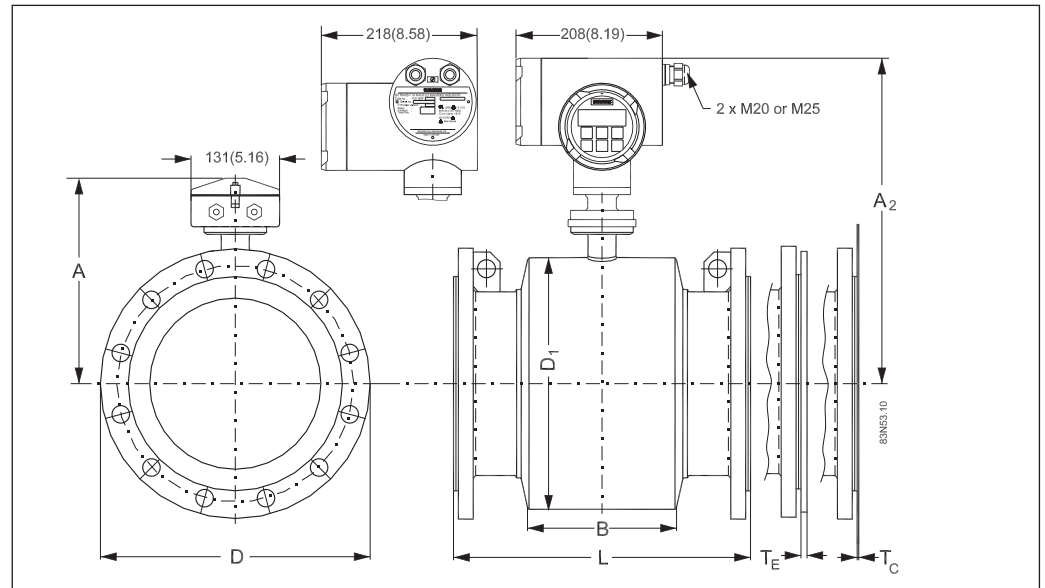
4.1.2 Sensor MAG 1100/
MAG 1100 F (continued)

Version	AG 1100 /MAG 1100 Ex	MAG 1100 F/MAG 1100 F Ex
Enclosure rating Standard 1 mH ₂ O for 30 min	IP67 to EN 60529 (NEMA 4X/6), 1 mH ₂ O for 30 min	IP67 to EN 60529 (NEMA 4X/6),
Option on sensor (no ATEX)	IP68 to EN 60529 (NEMA 6P), 10 mH ₂ O cont.	IP68 to EN 60529 (NEMA 6P), 10 mH ₂ O cont.
EMC	89/336EEC	89/336EEC
Design		
Weight	See dimensional drawings	See dimensional drawings
Material		
Enclosure - MAG 1100	Stainless steel AISI 316L (1.4404)	Stainless steel AISI 316L (1.4404)
Terminal box - Standard (no ATEX)	Fibre glass reinforced polyamide (no ATEX)	Fibre glass reinforced polyamide
- Option (standard for HT and ATEX)	Stainless steel AISI 316 (1.4436)	Stainless steel AISI 316 (1.4436)
Fixing studs	Stainless steel AISI 304 (1.4301), Number and size to EN 1092-1:2001	
Gaskets - Standard - Option	EPDM (max. 150°C, PN 40) (max. 300°F, 600 psi) Graphite (max. 200°C, PN 40) (max. 390°F, 600 psi) PTFE (max. 130°C, PN 25) (max. 270°F, 300 psi)	MAG 1100 F (Ceramic): FKM/FPM with stainless steel insert (AISI 304) (-20 ... +150°C (-4 ... +302°F)) EPDM (-20 ... +150°C(-4 ... +302°F)) MAG 1100 F (PFA) EPDM (-20 ... +150°C(-4 ... +302°F)) NBR (-20 ... +100°C (-4 ... +212°F))
Pipe connection adapters: DN 2, 3, 6 and 10 (1/12", 1/8", 1/4", 3/8")	- Stainless steel, AISI 316 - Hastelloy - PVDF	
Liner • MAG 1100 (Ceramic) oxide (ZrO ₂)	DN 2, 3 (1/12", 1/8"): Zirconium DN 6 ... 100 (1/4" ... 4"): Aluminium oxide Al ₂ O ₃	Aluminium oxide Al ₂ O ₃
• MAG 1100 (PFA)	Reinforced PFA (no ATEX)	Reinforced PFA (no ATEX)
Electrodes • MAG 1100 (Ceramic)	DN 10 ...100 (3/8" ... 4") : Platinum with gold / Titanium brazing alloy DN 2 ... 6 (1/12" ... 1/4"): Platinum	Platinum with gold / Titanium brazing alloy
• MAG 1100 (PFA)	DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276 DN 25 ... 100 (1" ... 4"): Hastelloy C22	DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276 DN 25 ... 100 (1" ... 4"): Hastelloy C22
Cable entries 2 x M20 or 2x1/2" NPT or 4 x 1/2" NPT	<i>Remote installation:</i> 2 x M20 or 2x1/2" NPT <i>Compact installation</i> - MAG 5000/MAG 6000: 4 x M20 or 4 x 1/2" NPT MAG 6000 I: 2 x M25 (for supply/ output) - MAG 6000 I Ex d: 2 x M20 (for supply/output)	<i>Remote installation:</i> <i>Compact installation</i> - MAG 5000/MAG 6000: 4 x M20 - MAG 6000 I: 2 x M25 (for supply/ output) - MAG 6000 I Ex d: 2 x M20 (for supply/output)
Certificates and approvals		
Conforms to	PED – 97/23EC	PED – 97/23/EC and CRN (PFA) FDA
Ex approvals • MAG 1100 (Ceramic) - ATEX sensor or Com- pact with MAG 6000 I Ex - Sensor with/without MAG 5000/6000/6000 I	ATEX 2G D sensor Ex d e ia IIB T4 - T6 FM/CSA Class 1 div 2	EHEDG "approved design" ATEX 2G D sensor Ex d e ia IIB T4 - T6 FM/CSA Class 1 div 2

4.2.1 Dimensions and weight MAG 3100 and MAG 3100 Ex



MAG 3100 and MAG 3100 Ex



DN	A ¹⁾	A ₂	B	D ₁	L ²⁾								AS 2129 E, AS 4087 PN 16-21-35	AWWA C-207 Class D	T _C ³⁾	T _E ³⁾	Weight ⁴⁾
					EN 1092-1-2001						ANSI 16.5						
					PN 6, 10	PN 16/ PN 16 non PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300					
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	
15	187	335	59	104	200	200	200	200	-	-	200	200	200	-	-	6	4
25	187	335	59	104	200	200	200	200	-	260	200	200	200	-	1.2	6	5
40	197	345	82	124	200	200	200	200	-	280	200	200	200	-	1.2	6	8
50	205	353	72	139	200	200	200	200	276	300	200	200	200	-	1.2	6	9
65	212	360	72	154	200	200	200	200	320	350	200	272	200	-	1.2	6	11
80	222	370	72	174	200	200	272	272	323	340	272	272	200 ⁵⁾	-	1.2	6	12
100	242	390	85	214	250	250	250	250	380	400	250	310	250	-	1.2	6	16
125	255	403	85	239	250	250	250	250	420	450	250	335	250	-	1.2	6	19
150	276	424	85	282	300	300	300	300	415	450	300	300	300	-	1.2	6	27
200	304	452	137	338	350	350	350	350	480	530	350	350	350	-	1.2	8	40
250	332	480	137	393	450	450	450	450	550	620	450	450	450	-	1.2	8	60
300	357	505	137	444	500	500	500	500	600	680	500	500	500	-	1.6	8	80
350	362	510	270	451	550	550	550	550	-	-	550	550	550	-	1.6	8	110
400	387	535	270	502	600	600	600	600	-	-	600	600	600	-	1.6	10	125
450	418	566	310	563	600	600	600	600	-	-	600	640	600	-	1.6	10	175
500	443	591	350	614	600	600	625	680	-	-	600	730	600 ⁶⁾	-	1.6	10	200
600	494	642	430	715	600	600	750	800	-	-	600	860	600 ⁷⁾	-	1.6	10	287
700	544	692	500	816	700	700	-	-	-	-	-	-	700	700	2.0	-	330
750	571	719	556	869	-	-	-	-	-	-	-	-	750	950	2.0	-	360
800	606	754	560	927	800	800	-	-	-	-	-	-	800	800	2.0	-	450
900	653	801	630	1032	900	900	-	-	-	-	-	-	900	900	2.0	-	530
1000	704	903	670	1136	1000	1000	-	-	-	-	-	-	1000	1000	2.0	-	660
1100	755	903	770	1238	-	-	-	-	-	-	-	-	1100	1400	2.0	-	1140
1200	810	958	792	1348	1200	1200	-	-	-	-	-	-	1200	1200	2.0	-	1180
1400	925	1073	1000	1675	1400	1400	-	-	-	-	-	-	-	1400	2.0	-	1600
1500	972	1120	1020	1672	-	-	-	-	-	-	-	-	-	1500	3.0	-	2460
1600	1025	1173	1130	1915	1600	1600	-	-	-	-	-	-	-	1600	3.0	-	2140
1800	1123	1271	1250	1974	1800	1800	-	-	-	-	-	-	-	1800	3.0	-	2930
2000	1223	1371	1375	2174	2000	2000	-	-	-	-	-	-	-	2000	3.0	-	3665

¹⁾ 14.5 mm/0.57" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (390 °F) version)

²⁾ When earthing flanges are used, the thickness of the earthing flange must be added to the build-in length

³⁾ T_C = Type C grounding ring, T_E = Type E grounding ring (Included and factory mounted on high temperature 180 °C (356 °F) PTFE sensor)

⁴⁾ Weights are approx. (for PN 16) without transmitter

⁵⁾ PN 35 DN 80 = 272 mm

⁶⁾ PN 35 DN 500 = 680 mm

⁷⁾ PN 35 DN 600 = 750 mm

- not available

D = Outside diameter of flange, see flange tables

DN	A ¹⁾	A ₂	B	D ₁	L ²⁾								AS 2129 E, AS 4087 PN 16-21-35	AWWA C-207 Class D	T _C ³⁾	T _E ³⁾	Weight ⁴⁾
					EN 1092-1-2001						ANSI 16.5						
					PN 6, 10	PN 16/ PN 16 non PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300					
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
½	7.36	13.19	2.32	4.09	7.87	7.87	7.87	7.87	-	-	7.87	7.87	-	7.87	-	0.24	11
1	7.36	13.19	2.32	4.09	7.87	7.87	7.87	7.87	-	10.24	7.87	7.87	-	7.87	0.05	0.24	13
1½	7.76	13.58	3.23	4.88	7.87	7.87	7.87	7.87	-	11.02	7.87	7.87	-	7.87	0.05	0.24	17
2	8.07	13.89	2.83	5.47	7.87	7.87	7.87	7.87	10.87	11.81	7.87	7.87	-	7.87	0.05	0.24	28
2½	8.35	14.17	2.83	6.06	7.87	7.87	7.87	7.87	12.60	13.78	7.87	10.71	-	7.87	0.05	0.24	30
3	8.74	14.57	2.83	6.85	7.87	7.87	10.71	10.71	12.72	13.39	10.71	10.71	-	7.87 ⁵⁾	0.05	0.24	33
4	9.53	15.35	3.35	8.43	9.84	9.84	9.84	9.84	14.96	15.75	9.84	12.20	-	9.84	0.05	0.24	44
5	10.04	15.86	3.35	9.41	9.84	9.84	9.84	9.84	16.54	17.72	9.84	13.10	-	9.84	0.05	0.24	55
6	10.87	16.69	5.39	11.10	11.81	11.81	11.81	11.81	16.34	17.72	11.81	11.81	-	11.81	0.05	0.24	66
8	11.97	17.79	5.39	13.31	13.78	13.78	13.78	13.78	18.90	20.87	13.78	13.78	-	13.78	0.05	0.31	110
10	13.07	18.90	5.39	15.47	17.72	17.72	17.72	17.72	21.65	24.41	17.72	17.72	-	17.72	0.05	0.31	155
12	14.05	19.88	5.39	17.48	19.69	19.69	19.69	19.69	23.62	26.77	19.69	19.69	-	19.69	0.06	0.31	176
14	14.25	20.08	10.63	17.76	21.65	21.65	21.65	21.65	27.56	31.50	21.65	21.65	-	21.65	0.06	0.31	242
16	15.24	21.06	10.63	19.76	23.62	23.62	23.62	23.62	29.53	-	23.62	23.62	-	23.62	0.06	0.39	275
18	16.45	22.28	12.20	22.16	23.62	23.62	23.62	23.62	-	-	23.62	25.20	-	23.62	0.06	0.39	385
20	17.44	23.27	13.78	24.17	19.69	19.69	24.61	26.77	-	-	19.69	28.70	-	24.61 ⁶⁾	0.06	0.39	335
24	19.45	25.27	16.93	28.15	23.62	23.62	29.53	29.53	-	-	23.62	33.80	-	29.53 ⁷⁾	0.06	0.39	630
28	21.42	27.24	19.69	32.13	27.56	27.56	-	-	-	-	-	-	27.56	34.45	0.08	-	725
30	22.48	28.31	21.89	34.21	-	-	-	-	-	-	-	-	29.52	-	0.08	-	830
32	23.86	29.68	22.05	36.50	31.50	31.50	-	-	-	-	-	-	31.50	31.50	0.08	-	990
36	25.71	31.53	24.80	40.63	35.43	35.43	-	-	-	-	-	-	35.43	35.43	0.08	-	1160
40	27.72	35.55	26.38	44.72	39.37	39.37	-	-	-	-	-	-	39.37	39.37	0.08	-	1453
42	27.72	35.55	26.38	44.72	39.37	39.37	-	-	-	-	-	-	39.37	-	0.08	-	1453
44	29.72	35.55	30.31	48.74	-	-	-	-	-	-	-	-	43.31	43.31	0.08	-	-
48	31.89	37.71	31.18	53.07	47.24	47.24	-	-	-	-	-	-	47.24	47.24	0.08	-	2592
54	36.42	42.24	39.37	65.94	55.12	55.12	-	-	-	-	-	-	55.12	-	0.12	-	2940
60	38.27	44.09	40.15	65.83	-	-	-	-	-	-	-	-	59.06	-	0.12	-	3422
66	40.35	46.18	44.49	75.39	63.00	63.00	-	-	-	-	-	-	63.00	-	0.12	-	3904
72	44.21	50.04	49.21	77.72	70.87	70.87	-	-	-	-	-	-	70.87	-	0.12	-	4846
78	48.15	53.97	54.13	85.59	78.74	78.74	-	-	-	-	-	-	78.74	-	0.12	-	6806

1) 13 mm/0.5" shorter when the ANSI terminal box is used (Ex or high temperature 200 °C (390 °F) version)

2) When earthing flanges are used, the thickness of the earthing flange must be added to the build-in length

3) T_C = Type C grounding ring, T_E = Type E grounding ring (Included and factory mounted on high temperature 180 °C (356 °F) PTFE sensor)

4) Weights are for ANSI 150 without transmitter

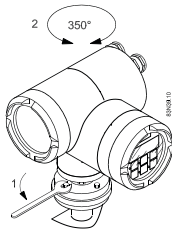
5) PN 35 DN 80 = 10.70 inch

6) PN 35 DN 500 = 26.77 inch

7) PN 35 DN 600 = 29.53 inch

- not available

D = Outside diameter of flange, see flange tables

4.2.2 Sensor MAG 3100 /
MAG 3100 Ex

Version	MAG 3100 / MAG 3100 Ex	MAG 3100 HT / Mag 3100 HT Ex High temperature	MAG 3100 P / MAG 3100 P Ex
Nominal size	DN 15...DN 2000 (½" ... 78")	DN 15...DN 300 (½" ... 12")	DN 15...DN 300 (½" ... 12")
Measuring principle	Electromagnetic induction		
Excitation frequency	DN 15...65 (½" ... 2½") : 12.5 Hz	DN 15...65 (½" ... 2½") : 12.5 Hz	DN 15...65 (½" ... 2½") : 12.5 Hz
	DN 80...150 (3" ... 6") : 6.25 Hz	DN 80...150 (3" ... 6") : 6.25 Hz	DN 80...150 (3" ... 6") : 6.25 Hz
	DN 200...1200 (8" ... 48") : 3.125 Hz	DN 200...300 (8" ... 12") : 3.125 Hz	DN 200...300 (8" ... 12") : 3.125 Hz
	DN 1400...2000 (54" ... 78") : 1.5625 Hz		
Process connection			
Flanges	EN 1092-1, raised face (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions)	1092-1, raised face (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions)	EN 1092-1, raised face (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions)
	DN 65...2000 (2½" ... 48") : PN 6 (87 psi)	DN 15...300 (½" ... 12") : PN 40 (580 psi)	DN 15...50 (½" ... 2") : PN 40 (580 psi)
	DN 200...2000 (8" ... 48") : PN 10 (145 psi)	DN 65...300 (2½" ... 12") : PN 16 (232 psi)	DN 65...300 (2½" ... 12") : PN 16 (232 psi)
	DN 65...2000 (2½" ... 78") : PN 16 (232 psi)	DN 200...300 (8" ... 12") : PN 10 (145 psi)	DN 200...300 (8" ... 12") : PN 10 (145 psi)
	DN 200...600 (8" ... 24") : PN 25 (362 psi)	DN 200...300 (8" ... 12") : PN 25 (362 psi)	
	DN 15...600 (½" ... 24") : PN 40 (580 psi)		
	DN 50...300 (2" ... 12") : PN 63 (913 psi)		
	DN 25...300 (1" ... 12") : PN 100 (1450 psi)		
	ANSI B16.5 (~BS 1560), raised face	ANSI B16.5 (~BS 1560), raised face	ANSI B16.5 (~BS 1560), raised face
	½" ... 24" : Class 150 (20 bar (290 psi))	½" ... 12" : Class 150 (20 bar (290 psi))	½" ... 12" : Class 150 (20 bar (290 psi))
	½" ... 24" : Class 300 (50 bar (725 psi))	½" ... 12" : Class 300 (50 bar (725 psi))	
	AWWA C-207, flat face 28" ... 78" : Class D (10 bar)		
	AS 2129, raised face ½" ... 48" : Table E	AS 2129, raised face ½" ... 12" : Table E	
	AS 4087, raised face:	AS 4087, raised face:	
	PN 16 (DN 50...1200, 16 bar (232 psi))	PN 16 (DN 50...300, 16 bar (232 psi))	
	PN 21 (DN 50...600, 21 bar (304 psi))	PN 21 (DN 50...300, 21 bar (304 psi))	
	PN 35 (DN 50...600, 35 bar (508 psi))	PN 35 (DN 50...300, 35 bar (508 psi))	
Other flanges and pressure ratings on request	Other flanges and pressure ratings on request		

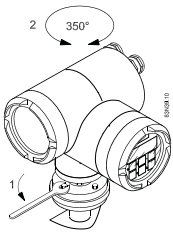
Version	MAG 3100	MAG 3100 HT (High Temperature)	MAG 3100 P
Rated operation conditions			
Ambient temperature (conditions also dependent on liner characteristics)			di-
• Sensor	-40...+100 °C (-40... + 212 °F)	-40...+100 °C (-40... + 212 °F)	-40...+100 °C (-40... + 212 °F)
• With compact transmitter MAG 6000 I	-20...+60 °C (-4...+140 °F)	-20...+60 °C (-4...+140 °F)	-20...+60 °C (-4...+140 °F)
• With compact transmitter MAG 6000 I Ex d	-10...+60 °C (14...+140 °F)	-10...+60 °C (14...+140 °F)	-10...+60 °C (14...+140 °F)
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	Neoprene 0.01...100 bar (0.15...1450 psi) EPDM 0.01...40 bar (0.15...580 psi)	PTFE Teflon (DN 15...300 (½"...12") (130/180°C (266 °F/356°F)): 0.3...50 bar (4...725 psi) (180°C (356°F) PTFE has factory mounted grounding SS rings type E & SS terminal box) PFA (DN 25...100 (1"...4")): 0.01...50 bar (0.15...725 psi)	PTFE Teflon (DN 15...300 (½"...12")): 0.3...40 bar (4...580 psi)
	Linatex® 0.01...40 bar (0.15...580 psi)		PFA (DN 25...100 (1"...4")): 0.01...50 bar (0.15...725 psi)
	Ebonite 0.01...100 bar (0.15...1450 psi)		
	PTFE (DN ≤ 300, 0.3 ... 50 bar/ ≤ 12", 24 ... 725 psi) PTFE (350 ≤ DN ≤ 600, 0.3 ... 40 bar/14" ≤ DN ≤ 24", 24 ... 580 psi)		
	PFA (DN 25...100 (1"...4")): 0.01...50 bar (0.15...725 psi)		
Enclosure rating	IP67/NEMA 4X/6 to EN 60529, 1mH ₂ O for 30 min	IP67/NEMA 4X/6 to EN 60529, 1mH ₂ O for 30 min	IP67/NEMA 4X/6 to EN 60529, 1mH ₂ O for 30 min
Pressure drop at 3 m/s	As straight pipe		
Test pressure	1.5 x PN (where applicable)		
Mechanical load	18...1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36	18...1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36	18...1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36
	Sensor with compact MAG 6000 I / I Ex mounted transmitter: 1.14 grms	Sensor with compact MAG 6000 I / I Ex mounted transmitter: 1.14 grms	Sensor with compact MAG 6000 I / I Ex mounted transmitter: 1.14 grms
Temperature of medium Liner: (For temperature restrictions on ATEX sensors please refer to Certificates)	Neoprene 0...+70 °C (32...158 °F)	PTFE -20...+130 °C (-4...+266 °F)	PTFE -20...+130 °C (-4...+266 °F)
	EPDM -10...+70 °C (14...158 °F)	PTFE -20 ... +180 °C (-4 ... +356 °F)	PFA -20...+150 °C (-4...+300 °F)
	Linatex® (rubber) -40...+70 °C (-40...+158 °F) (for temperatures below -20°C (15°F) AISI 304 or 316 flanges must be used)	Factory mounted grounding rings type E and SS terminal box. Can only be used with remote transmitter. PFA -20...+150 °C (-4...+300 °F)	
	Ebonite 0 ...95 °C (32...203 °F)		
	PTFE -20...+100 °C (-4...+212 °F)		
	PFA -20 ...+100 °C (-4...+212°F)		
EMC	89/336 ECC	89/336 ECC	89/336 ECC

¹⁾ Up to medium temperature of 150°C (300°F). For medium temperature of 150 to 180°C (300 to 356°F) -20 to +50°C (-4 to +122°F)

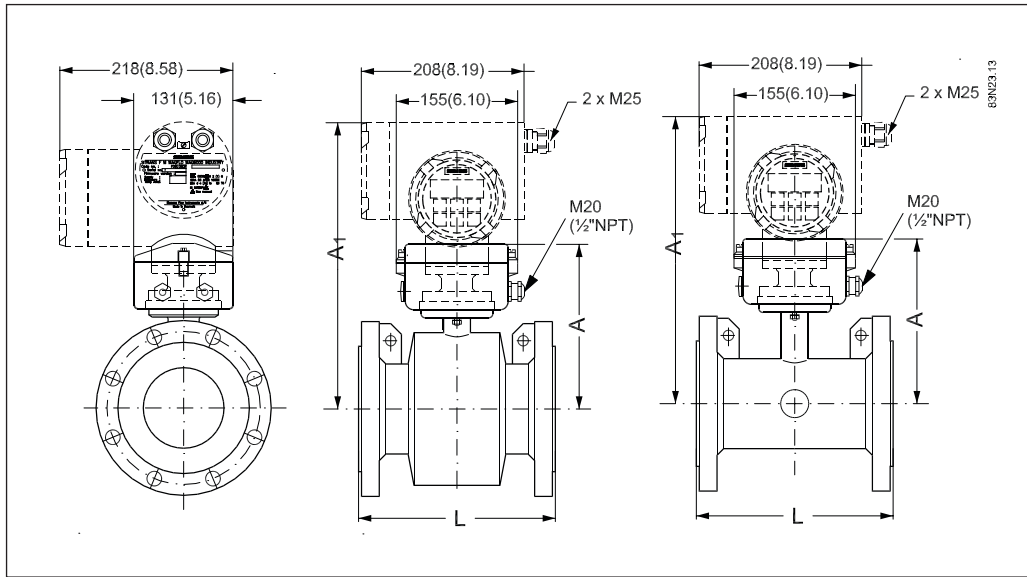
Version	MAG 3100	MAG 3100 HT (High Temperature)	MAG 3100 P
Design			
Weight	See dimensional drawings		
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 304 (1.4301) flanges and carbon steel housing, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 316 L (1.4404) flanges and housing, polished	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 304 (1.4301) flanges and carbon steel housing, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 316 L (1.4404) flanges and housing, polished	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 µm)
Measuring pipe material	AISI 304 (1.4301)	AISI 304 (1.4301)	AISI 304 (1.4301)
Electrode material	AISI 316 Ti (1.4571)	AISI 316 Ti (1.4571)	Hastelloy C276 (PFA C22)
	Hastelloy C276 (PFA C22)	Hastelloy C276 (PFA C22)	
	Platinum/Iridium	Platinum/Iridium	
	Titanium	Titanium	
Grounding electrode material	Tantalum	Tantalum	
	Material as measuring electrodes: Exceptions - see ordering data	No grounding electrodes	No grounding electrodes
Terminal box (remote version only)	<i>Standard:</i> Fibre glass reinforced <i>Option:</i> Stainless steel AISI 316 (1.4436) <i>Ex ATEX:</i> Stainless steel AISI 316 (1.4436)	Stainless steel AISI 316 (1.4436) <i>Ex ATEX:</i> Stainless steel AISI 316 (1.4436)	<i>Standard:</i> Fibre glass reinforced <i>Option:</i> Stainless steel AISI 316 (1.4436) <i>Ex ATEX:</i> Stainless steel AISI 316 (1.4436)
Cable entries 2 x M25 (for supply/	MAG 6000 I: 2 x M20 or output)	Remote installation: 2 x M25 (for supply/ 2 x ½" NPT	MAG 6000 I: output)
	MAG 6000 I Ex d: 2 x M20 (for supply/ output)		MAG 6000 I Ex d: 2 x M20 (for supply/ output)
Certificates and approvals			
Conforms to	PED – 97/23 EC, CRN	PED – 97/23 EC, CRN	PED – 97/23 EC, CRN
Material certificate EN 10204 3.1	On request	On request	Pipe and flange certificate available as option
Ex approvals	ATEX 2G D sensor DN 15...300: EEx d e ia IIC T4 - T6	ATEX 2G D sensor DN 15...300: EEx d e ia IIC T3 - T6	ATEX 2G D sensor DN 15...300: EEx d e ia IIC T3 - T6
	DN 350...2000 EEx e ia IIC T4 - T6		
	Non ATEX sensor FM Class 1 Div 2 CSA Class 1, Div 2	Non ATEX sensor FM Class 1 Div 2 CSA Class 1, Div 2	Non ATEX sensor FM Class 1 Div 2 CSA Class 1, Div 2
	Drinking water approvals	EPDM lining: WRAS (WRc, BS6920 cold water, GB) ACS listed (F) DVGW W270 (D) Belgaqua (B)	

• PTFE -20 ... +180 °C

4.2.3 Dimensions and weight MAG 5100 W



MAG 5100 W, compact/separate



Nominal size		A		A ₁		L									
						PN 10		PN 16		PN 40		Class 150 / AWWA		AS	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
25	1"	187	7.4	340	13.4	N/A	N/A	N/A	N/A	200	7.9	200	7.9	200	7.87
40	1½"	197	7.8	350	13.8	N/A	N/A	N/A	N/A	200	7.9	200	7.9	200	7.87
50	2"	188	7.4	341	13.4	N/A	N/A	200	7.9	N/A	N/A	200	7.9	200	7.87
65	2½"	194	7.6	347	13.7	N/A	N/A	200	7.9	N/A	N/A	200	7.9	200	7.8
80	3"	200	7.9	353	13.9	N/A	N/A	200	7.9	N/A	N/A	200	7.9	200	7.87
100	4"	207	8.1	360	14.2	N/A	N/A	250	9.8	N/A	N/A	250	9.8	250	9.84
125	5"	217	8.5	370	14.6	N/A	N/A	250	9.8	N/A	N/A	250	9.8	250	9.84
150	6"	232	9.1	385	15.2	N/A	N/A	300	11.8	N/A	N/A	300	11.8	300	11.81
200	8"	257	10.1	410	16.1	350	13.8	350	13.8	N/A	N/A	350	13.8	350	13.78
250	10"	284	11.2	437	17.2	450	17.7	450	17.7	N/A	N/A	450	17.7	450	17.72
300	12"	310	12.2	463	18.2	500	19.7	500	19.7	N/A	N/A	500	19.7	500	19.69
350	14"	382	15.0	535	21.1	550	21.7	550	21.7	N/A	N/A	550	21.7	550	21.65
400	16"	407	16.0	560	22.1	600	23.6	600	23.6	N/A	N/A	600	23.6	600	23.62
450	18"	438	17.2	591	23.3	600	23.6	600	23.6	N/A	N/A	600	23.6	600	23.62
500	20"	463	18.2	616	24.3	600	23.6	600	23.6	N/A	N/A	600	23.6	600	23.62
600	24"	514	20.2	667	26.3	600	23.6	600	23.6	N/A	N/A	600	23.6	600	23.62
700	28"	564	22.2	717	28.2	700	27.6	700	27.6	N/A	N/A	700	27.6	700	27.6
750	30"	591	23.3	744	29.3	N/A	N/A	N/A	N/A	N/A	N/A	750	29.5	750	-
800	32"	616	24.3	779	30.7	800	31.5	800	31.5	N/A	N/A	800	31.5	800	31.5
900	36"	663	26.1	826	32.5	900	35.4	900	35.4	N/A	N/A	900	35.4	900	35.4
1000	40"	714	28.1	877	34.5	1000	39.4	1000	39.4	N/A	N/A	1000	39.4	1000	39.4
	42"	714	28.1	877	34.5	N/A	N/A	N/A	N/A	N/A	N/A	1000	39.4	-	-
1100	44"	765	30.1	928	36.5	N/A	N/A	N/A	N/A	N/A	N/A	1100	43.3	-	-
1200	48"	820	32.3	983	38.7	1200	47.2	1200	47.2	N/A	N/A	1200	47.2	1200	47.2

New dimension from DN 350 to DN 1200

Sensor with these old build-in dimensions are discontinued

350	14"	362	14.3	515	20.3	550	21.7	550	21.7	N/A	N/A	550	21.7	N/A	N/A
400	16"	387	15.2	540	21.3	600	23.6	600	23.6	N/A	N/A	600	23.6	N/A	N/A
450	18"	418	16.5	571	22.5	600	23.6	600	23.6	N/A	N/A	600	23.6	N/A	N/A
500	20"	443	17.4	596	23.5	625	24.6	625	24.6	N/A	N/A	680	26.8	N/A	N/A
600	24"	494	19.4	647	25.5	750	29.5	750	29.5	N/A	N/A	820	32.3	N/A	N/A
700	28"	544	21.4	697	27.4	875	34.4	875	34.4	N/A	N/A	N/A	N/A	875	34.4
750	30"	571	22.5	724	28.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	937	36.9
800	32"	606	23.9	759	29.9	1000	39.4	1000	39.4	N/A	N/A	N/A	N/A	1000	39.4
900	36"	653	25.7	806	31.7	1125	44.3	1125	44.3	N/A	N/A	N/A	N/A	1125	44.3
1000	40"	704	27.7	857	33.7	1250	49.2	1250	49.2	N/A	N/A	N/A	N/A	1250	49.2
	42"	704	27.7	857	33.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1250	49.2
1100	44"	755	29.7	908	35.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1375	54.1
1200	48"	810	31.9	963	37.9	1500	59.1	1500	59.1	N/A	N/A	N/A	N/A	1500	59.1




Weight

Nominal size		PN 10		PN 16		PN 40		Class 150/ AWWA		AS	
[mm]	[inch]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
25	1	-	-	-	-	4	9	4	9	4	9
40	1½	-	-	-	-	7	15	6	13	7	15
50	2	-	-	9	20	-	-	8	20	9	20
65	2½	-	-	10.7	24	-	-	11	24	10.7	24
80	3	-	-	11.6	26	-	-	13	28	11.6	26
100	4	-	-	15.2	33	-	-	19	41	15.2	33
125	5	-	-	20.4	45	-	-	24	52	20.4	45
150	6	-	-	26	57	-	-	29	64	26	57
200	8	48	106	48	106	-	-	56	124	48	106
250	10	64	141	69	152	-	-	79	174	69	152
300	12	76	167	86	189	-	-	110	243	86	189
350	14	104	229	125	274	-	-	139	307	115	254
400	16	119	263	143	314	-	-	159	351	125	277
450	18	136	299	173	381	-	-	182	400	141	311
500	20	163	359	223	491	-	-	225	495	189	418
600	24	236	519	338	744	-	-	320	704	301	664
700	28	270	595	314	692	-	-	273	602	320	704
750	30	-	-	-	-	-	-	329	725	-	-
800	32	346	763	396	873	-	-	365	804	428	944
900	36	432	951	474	1043	-	-	495	1089	619	1362
1000	40	513	1130	600	1321	-	-	583	1282	636	1399
	42	-	-	-	-	-	-	687	1512	-	-
	44	-	-	-	-	-	-	763	1680	-	-
1200	48	643	1415	885	1948	-	-	861	1896	813	1789

- not available

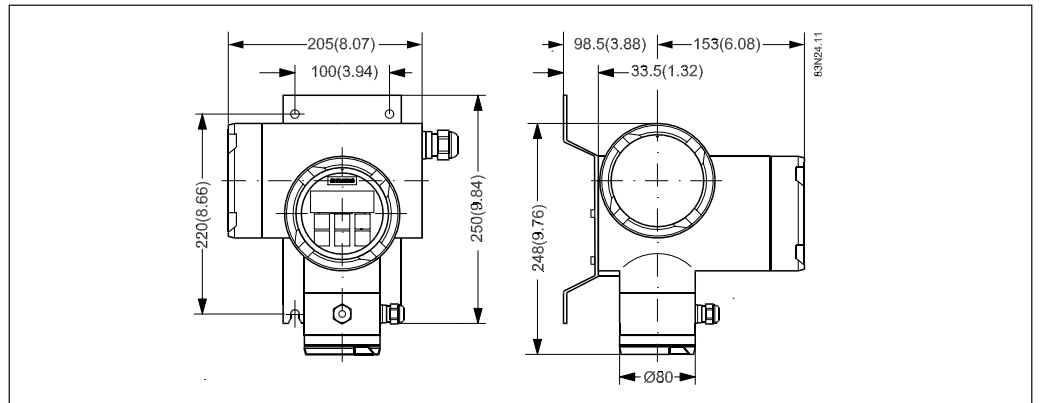
With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lbs), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).

4.2.4 Sensor MAG 5100 W

			
Type	Sensor with flanges		
Design	Full bore sensor	Coned bore sensor	Full bore sensor
Nominal size	DN 25 ... 40 (1" ... 1½")	DN 50 ... 300 (2" ... 12")	DN 350 ... 1200 (14" ... 48")
Liner	NBR or EPDM	NBR or EPDM	NBR or EPDM
Medium temperature	-10 to 70°C (14 to 160°F)		
Ambient temperature	Sensor with compact MAG 6000 I transmitter -20 ... +60 °C (-4 ... +140 °F)		
Operating pressure	0.01 ... 40 bar (0.15 ... 580 psi)	0.03 ... 20 bar (0.44 ... 290 psi)	0.01 ... 16 bar (0.15 ... 232 psi)
Excitation frequency	12.5 Hz	DN 50 ... 65 (2" ... 2½"): 12.5 Hz	DN 350 ... DN 450 (14" ... 18"): 3.125 Hz
		DN 80 ... 150 (3" ... 6"): 6.25 Hz	DN 500... 1200 (20" ... 48"): 1.5625 Hz
		DN 200 ... 300 (8" ... 12"): 3.125 Hz	
Enclosure rating <i>Standard</i>	IP 67 to EN 60529 1 m w.g. for 30 minutes		
<i>Option</i>	IP 68 to EN 60529 10 m w.g. continuously		
Cable entries	4 M20 / ½"NPT		
Mechanical load	18 ... 1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36		
Test pressure	Sensor with compact MAG 6000 I 1.14 g _{rms} 1.5 × nominal pressure		
Flanges			
EN 1092-1 <i>Standard</i>	PN 40	DN 50 ... 300 (2" ... 12"): PN 16	PN 10
<i>Option</i>		DN 200 ... 300 (8" ... 12"): PN 10	
		DN 200 ... 300 (8" ... 12"): PN 16	PN 16
ANSI B16.5 <i>Standard</i>	Class 150 lb	Class 150 lb	14"-24": Class 150 lb
AWWA C-207 <i>Standard</i>			28"-48": Class D
AS 4087 <i>Standard</i>		PN 16 (DN 50 ... 1200 (2" ... 48"))	
		(14 bar (232 psi))	
Pressure drop at 3 m/sec.	As straight pipe	Max. 25 mbar (0.25 psi)	As straight pipe
Electrodes	Hastelloy C276		
PE/grounding electrodes	<i>Standard</i>		Hastelloy C276
Measuring pipe/meter body	AISI 304 (1.4301)	AISI 304 (1.4301)	
Flanges		Carbon steel	
Housing		Carbon steel	
Approvals	CSA/FM Class 1, Div 2		
Drinking water approvals			
<i>EPDM</i>	WRAS (WRc, BS6920 cold water, GB) NSF/ANSI Standard 61 (Cold water, US) ACS listed (F) DVGW W270 (D) Belgaqua (B)		
<i>NBR</i>	MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes) NSF/ANSI Standard 61 (Cold water, US)		
Approvals	PED (All EN1092-1 flanges conforms to PED) – 97/23 EC ¹⁾ CRN		

¹⁾ For sizes greater than 600 mm PED conformity is available as a cost added option, the basic unit will only carry the LVD (Low Voltage Directive) and EMC approval.

4.3 Transmitter type MAG 6000 I Accuracy 0.20% or 0.40%



Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	DC 11...30 V, $R_i = 4.4 \text{ k}\Omega$
• Activation time	50 ms
• Current	$I_{DC} 11 \text{ V} = 2.5 \text{ mA}$, $I_{DC} 30 \text{ V} = 7 \text{ mA}$
Output	
Current output	
• Signal range	0...20 mA or 4...20 mA (active/passive)
• Load	$< 560 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
Frequency	0 ... 10 kHz, 50% duty cycle (uni-/bidirectional)
Time constant	0.1 ... 30 s, adjustable
Pulse (passive)	3 ... 30 V DC, max 110 mA (30 mA Ex version), $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (powered from connected equipment)
Time constant	0.1 ... 30 s, adjustable
Relay output	
Time constant	Changeover relay, same as current output
Load	42 V AC/2 A, 24 V DC/1A
Low flow cut off	0...9.9% of maximum flow
Galvanic isolation	All inputs and outputs are galvanic isolated
Max. measuring error	
MAG 6000 I/MAG 6000 I Ex d	0.20% or 0.40% of rate
Rated operation conditions	
Ambient temperature	
• Operation	
- MAG 6000 I	-20 ... +60°C (-4 ... +140°F)
- MAG 6000 I Ex	-10 ... +60°C (+14 ... +140°F)
• Storage	-40 ... +70°C (-40 ... +158°F)
Mechanical load	18...1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36 Transmitter: 1.14 grms
Degree of protection	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
EMC performance	EN 61326
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Keypad	Capacitive touch keypad with LED light for feedback indication
Time constant	Time constant as current output time constant

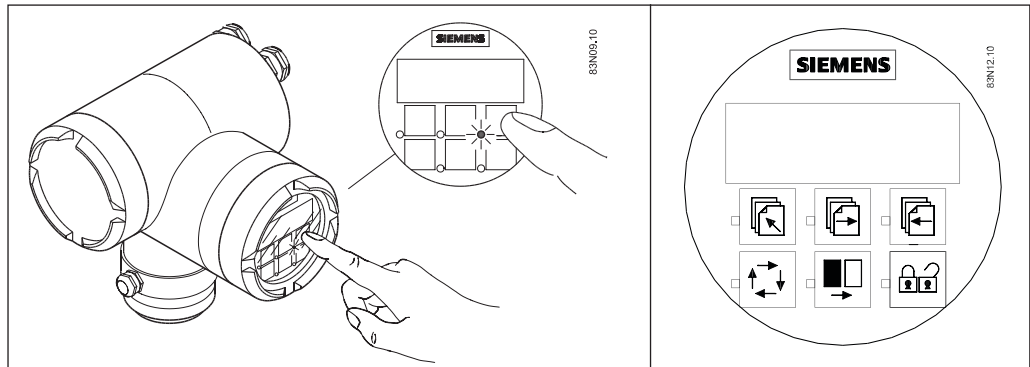
Design	
Enclosure material	Die cast aluminium, painted
• Wall mounting	Wall mounting bracket enclosed for remote version
Dimensional drawings	See dimensional drawings
Weight	See dimensional drawings
Power supply	Non Ex d: 18...90 V DC; 115...230 V AC; 50...60 Hz
	Ex d: 18...30 V DC
	Ex d: 115...230 V AC; 50...60 Hz
Power consumption	230 V AC: 21.5 VA
	24 V DC: 12 W, $I_N \leq 380$ mA, $I_{ST} \leq 1$ A (3 ms)
Certificates and approvals	
MAG 6000 I	CE
	C-tick
	FM Class 1, div 2
	FM Class 1, Zone 2
	CSA Class 1, div 2
	CSA Class 1, Zone 2
MAG 6000 I Ex (to be used with ATEX 2G D sensors)	SIRA 03 ATEX 2072X
	EX II 2 (1) (2) G D
	EEx d e [ia] ia [ib] ib IIC, T6
Cable entries	Remote installation
	MAG 6000 I: 2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½" NPT (for supply/output) and 2 x M16 (for sensor connection)
	MAG 6000 I Ex ATEX 2G D: 2 x M20 (for supply/output) and 2 x M16 (for sensor connection)
Communication	
Non ATEX versions	HART, MODBUS RTU/RS 485, PROFIBUS PA, PROFIBUS DP add-on modules
ATEX 2G D	HART, PROFIBUS PA available as integrated version

4.4 Output characteristics
MAG 6000 I /
MAG 6000 I Ex

Output characteristics 0-20 mA	Bidirectional mode		Unidirectional mode	
4-20 mA				
Frequency				
Pulse output				
Relay	Power down		Active	
Error relay	No error		Error	
Limit switch or direction switch				
	Low flow (Reverse flow)		Intermediate flow	
	High flow (Forward flow)		High flow/ Low flow	
Batch on digital output				
Batch on relay	Hold		Batch	

5. Commissioning







5.1 Keypad and display layout



With the capacitive touch keypad operation is achieved without any open lids. An LED light gives a feedback.

Keypad

The keypad is used to set the flowmeter. The function of the keys is as follows:

- TOP UP KEY**  This key (hold 2 sec.) is used to switch between operator menu and setup menu. In the transmitter setup menu, a short press will cause a return to the previous menu.
- FORWARD KEY**  This key is used to step forward through the menus. It is the only key normally used by the operator.
- BACKWARD KEY**  This key is used to step backward through the menus.
- CHANGE KEY**  This key changes the settings or numerical values.
- SELECT KEY**  This key selects the figures to be changed.
- LOCK/UNLOCK KEY**  This key allows the operator to change settings and gives access to submenus.

Display

The display is alphanumerical and indicates flow values, flowmeter settings and error messages. The upper line is for primary flow readings and will always show either flow rate, totalizer 1 or totalizer 2. The line is divided into 3 fields.













- S: Sign field
- P: Primary field for numerical value
- U: Unit field

The centre line is the title line (T) with individual information according to the selected operator or setup menu.





The lowest line is the subtitle line (ST) which either will add information to the title line or keep individual information independent of the title line.

F: The alarm field.  **Two flashing triangles will appear by a fault condition.**

M: The mode field. The symbols indicate the following.

 Communication mode	 Basic settings	 Operator active
 Service mode	 Output	 Operator inactive
 Operator menu	 External input	
 Product identity	 Sensor characteristics	
 Language mode	 Reset mode	

L: The lock field. Indicates the function of the lock key.

 Ready for change	 Access to submenu
 Value locked	 RESET MODE: Zero setting of totalizers and initialization of setting

5.2 Menu build-up

The menu structure of a specific transmitter type is shown in a menu overview map. Details of how a specific parameter is set is shown in a menu detail map for the specific parameter. A detail map is valid for each type of transmitter if not indicated otherwise. The menu structure is valid for the title and subtitle line only. The upper line is for primary readings only and will always be active with either flowrate, totalizer 1 or totalizer 2.

The menu is built up in two parts. An **operator menu** and a **setup menu**.

Operator menu

The operator menu is for daily operation. The operator menu is customised in the operator menu setup. The transmitter always starts in operator menu No. 1. The page forward and page backward keys are used to step through the operator menus.

Setup menu

The setup menu is for commissioning and service only.

Access to the setup menu is gained by pressing the top up key for 2 seconds. The setup menu operates in two modes:

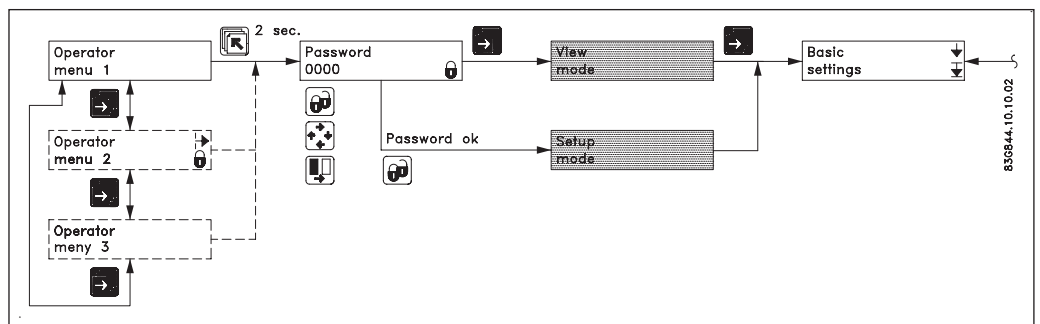
- View mode
- Setup mode

View mode is a read only mode. The pre-selected settings can only be scanned.

Setup mode is a read and write mode. The pre-selected settings can be scanned and changed. Access to the setup mode is password protected. The factory set password is 1000.

Access to a submenu in the set up menu is gained by the lock key. A short press on a top up key will bring you back to the previous menu. A long press (2 sec.) on the top up key will exit the setup menu and bring you back to operator menu No. 1.

5.2.1 Password



The SETUP MENU can be operated in two different modes:

VIEW MODE (Read only)

CHANGE MODE (Read and write mode)

Access to view mode is always gained by pressing the forward key when in the password menu.

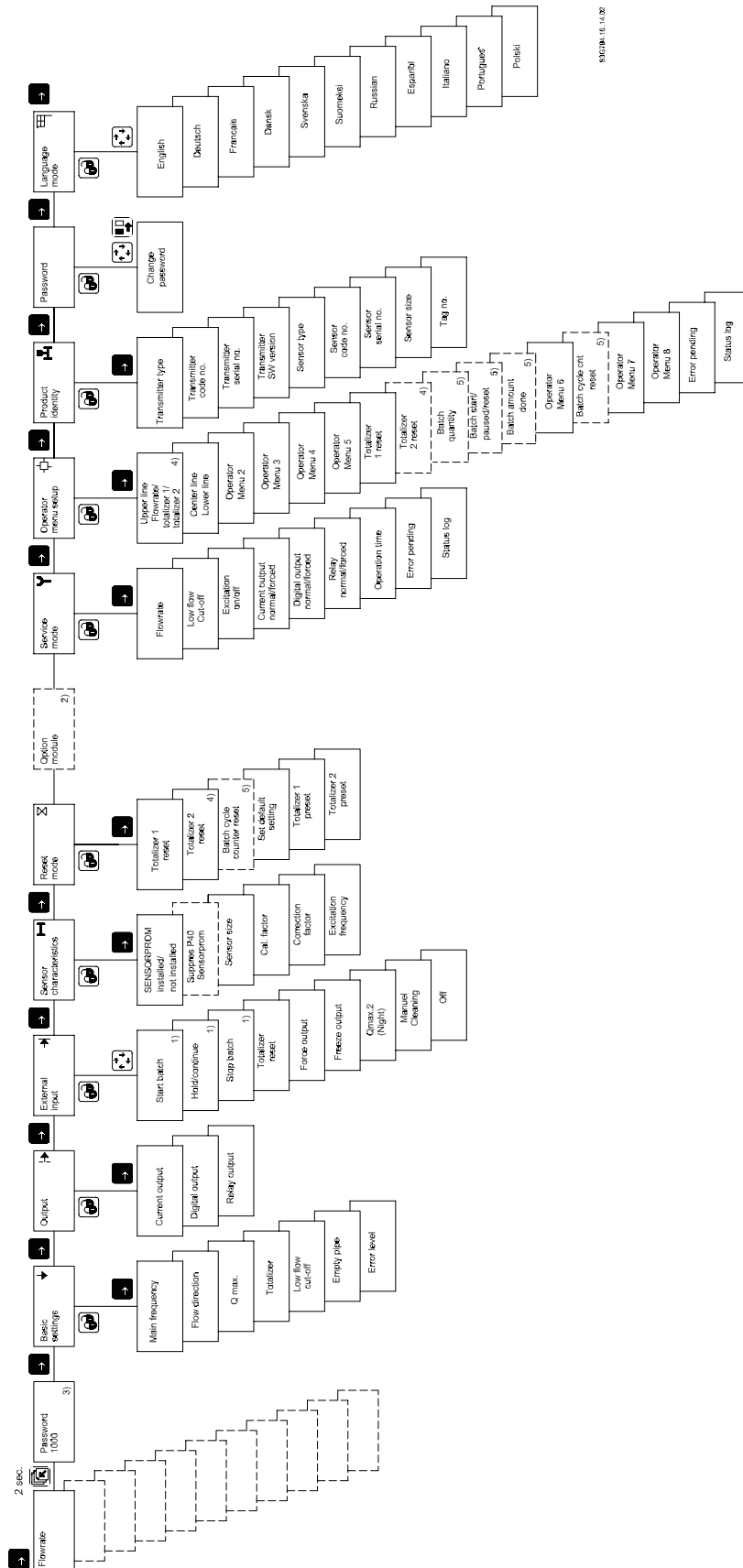
Access to change mode is password protected. The password is factory set to 1000, but can be changed to any value between 1 and 9999 in the change password menu.

The factory setting of 1000 can be re-established as follows:

- Switch off power supply
- Press the TOP UP key and switch on the power supply
- Release the key after ROM and RAM tests are completed

The user code is now reset to 1000.

5.3 MAG 6000 I & MAG 6000 I Ex d



SI100M15.1.4.02

5.4 Basic settings

Main frequency
To select the main power supply frequency corresponding to the country in which the flowmeter is installed. (US = 60 Hz)

Flow direction
Select the correct flow direction in the pipe

$Q_{max.}$
Sets the measuring range, the analog outputs and the frequency output. Value, decimal point, unit and time can be set individually (setting is dimension dependent).

$Q_{max.2}$
Sets the measuring range, the analog outputs and the frequency output. Value, decimal point, unit and time can be set individually (setting is dimension dependent). Only visible when it has been chosen as external digital input.



Totalizers
To set unit and decimal point.



Low flow cut off
To set a % of selected $Q_{max.}$. To filter noise in the installation. Influences display and all outputs.

Error level
To select which error level, the flowmeter will detect an error.

Empty pipe cut off
Set on - the alarm will indicate when sensor is running empty. All readings, display and outputs will indicate zero.

Comma for flow rate, totalizer 1 and totalizer 2 can be individually positioned.

- open the respective window.
- ensure that the cursor is positioned below the comma. Use the SELECT KEY 
- move the comma to the requested position. Use the CHANGE KEY 

Units are changed by means of the CHANGE KEY  with the cursor placed below the unit selected. Select units (cursor moved) by means of the SELECT KEY 

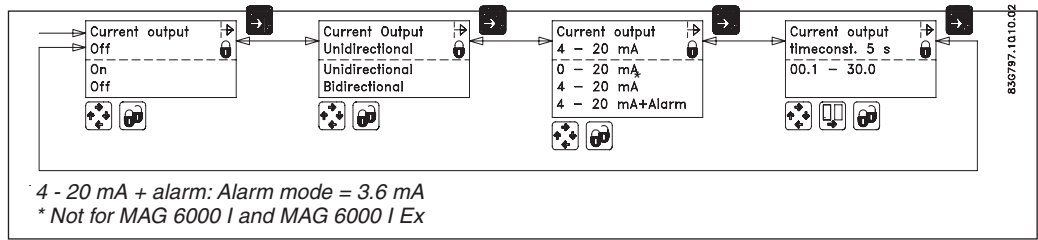
Totalizer 2 is not visible when batch is selected as digital output.

$Q_{max. 2}$ - is only visible when it has been chosen as external input.

ENGLISH

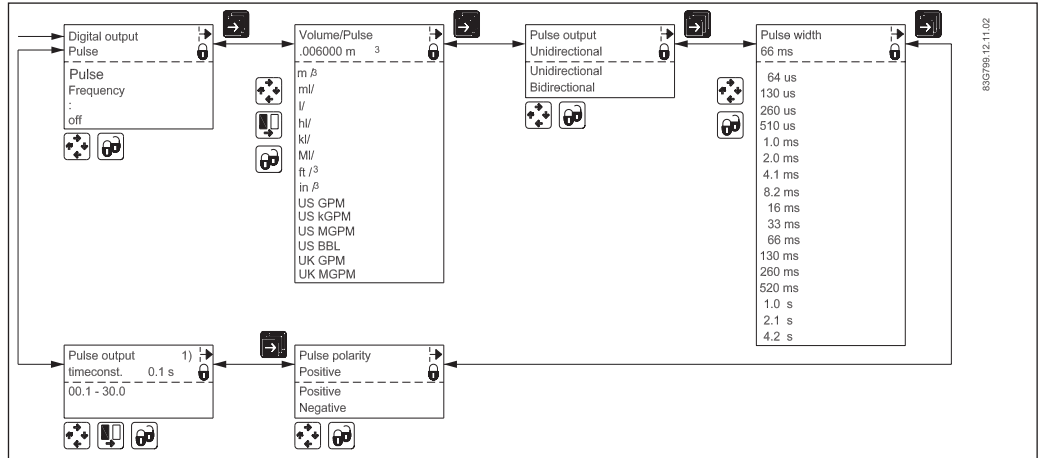
5.4.1
Outputs

**Current output
Proportional to flowrate
(Terminal 31 and 32)**

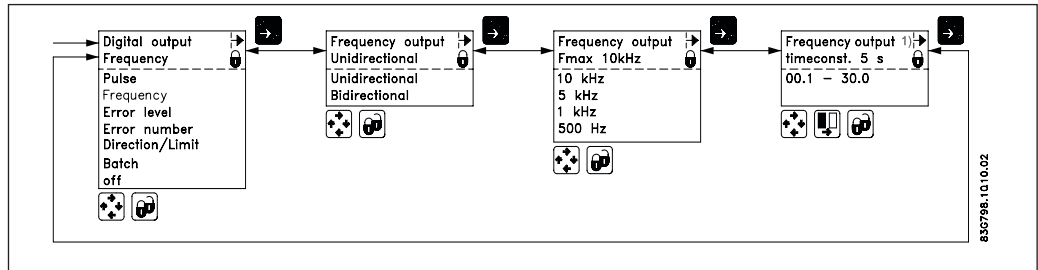


The current output must be set off when not used.

**Digital output
Pulse/volume
(Terminal 56, 57)**

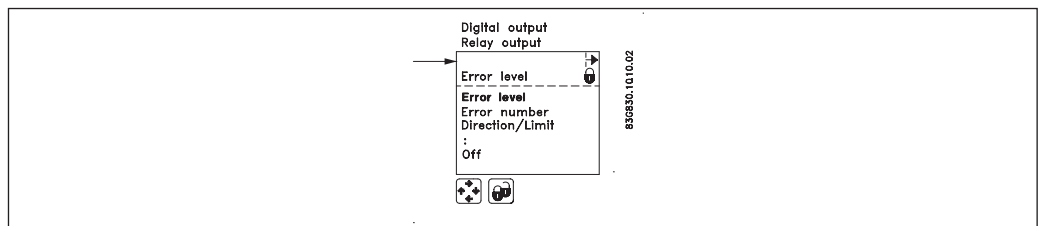


**Digital output
Frequency
Proportional to flowrate
(Terminal 56, 57)**

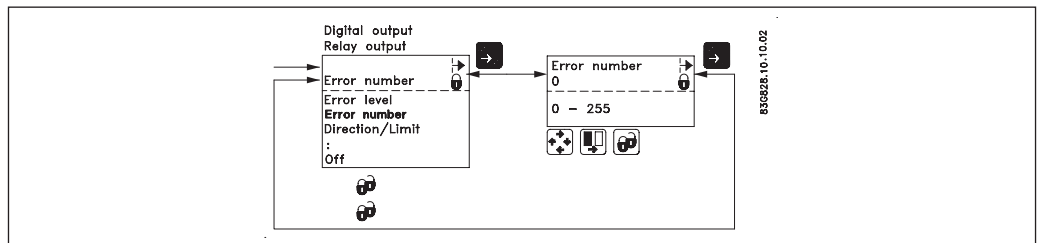


5.4.2
Digital and relay outputs

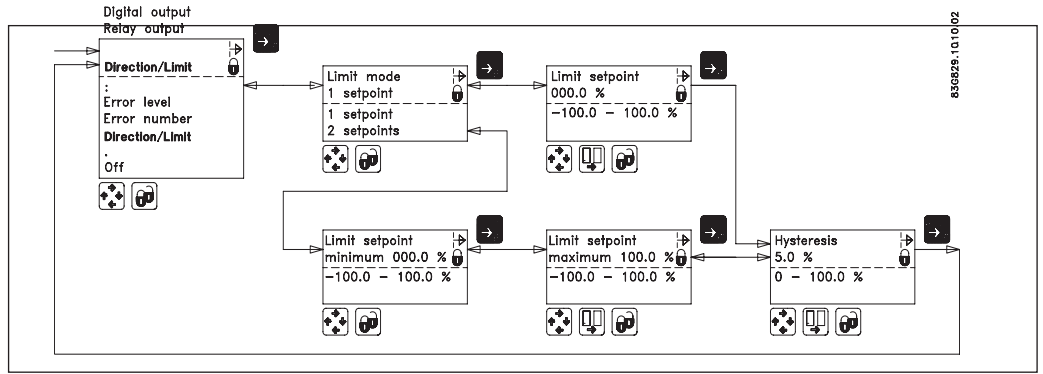
Error level



Error number



Limit/direction

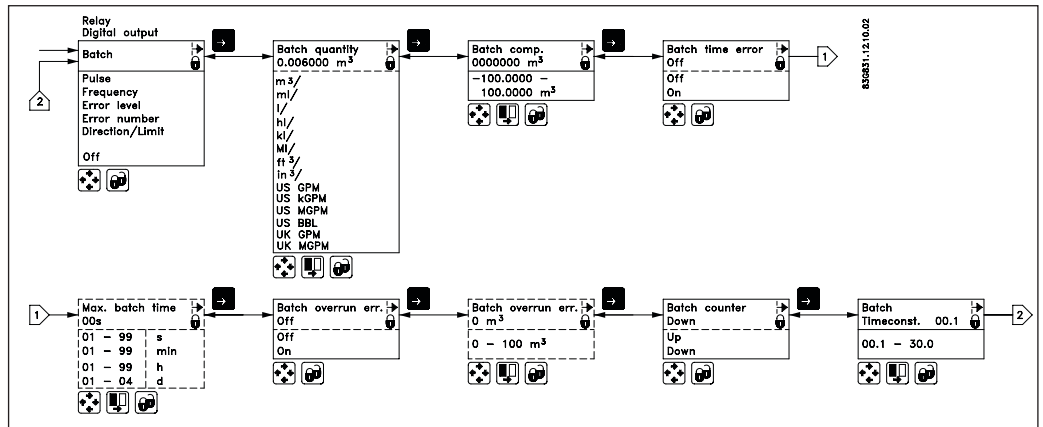


Limit switches are available for both digital as well as relay output.

Direction mode: 1 set point at 0% flow; hysteresis 5%.

If 2 set points must activate 2 separate outputs, a single set point has to be selected individually for digital as well as relay outputs.

Batch



Note

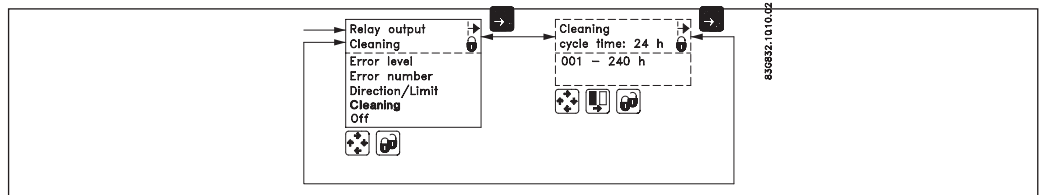
When batch function is on relay - the pulse/frequency output is not possible.

5.4.3

Relay outputs

Cleaning

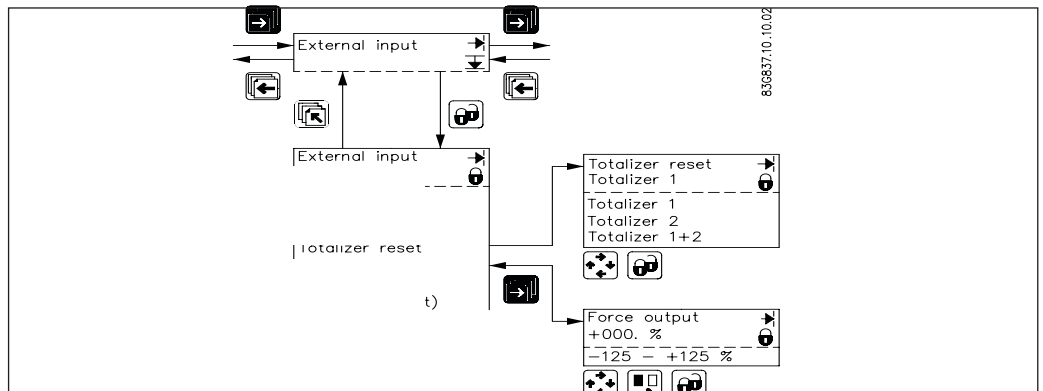
! Cleaning not possible with MAG 6000 I or MAG 6000 I Ex d



The relay output must always be used to operate the cleaning unit when a cleaning unit has been installed together with the transmitter. The relay output cannot be used for other purposes.

5.4.4

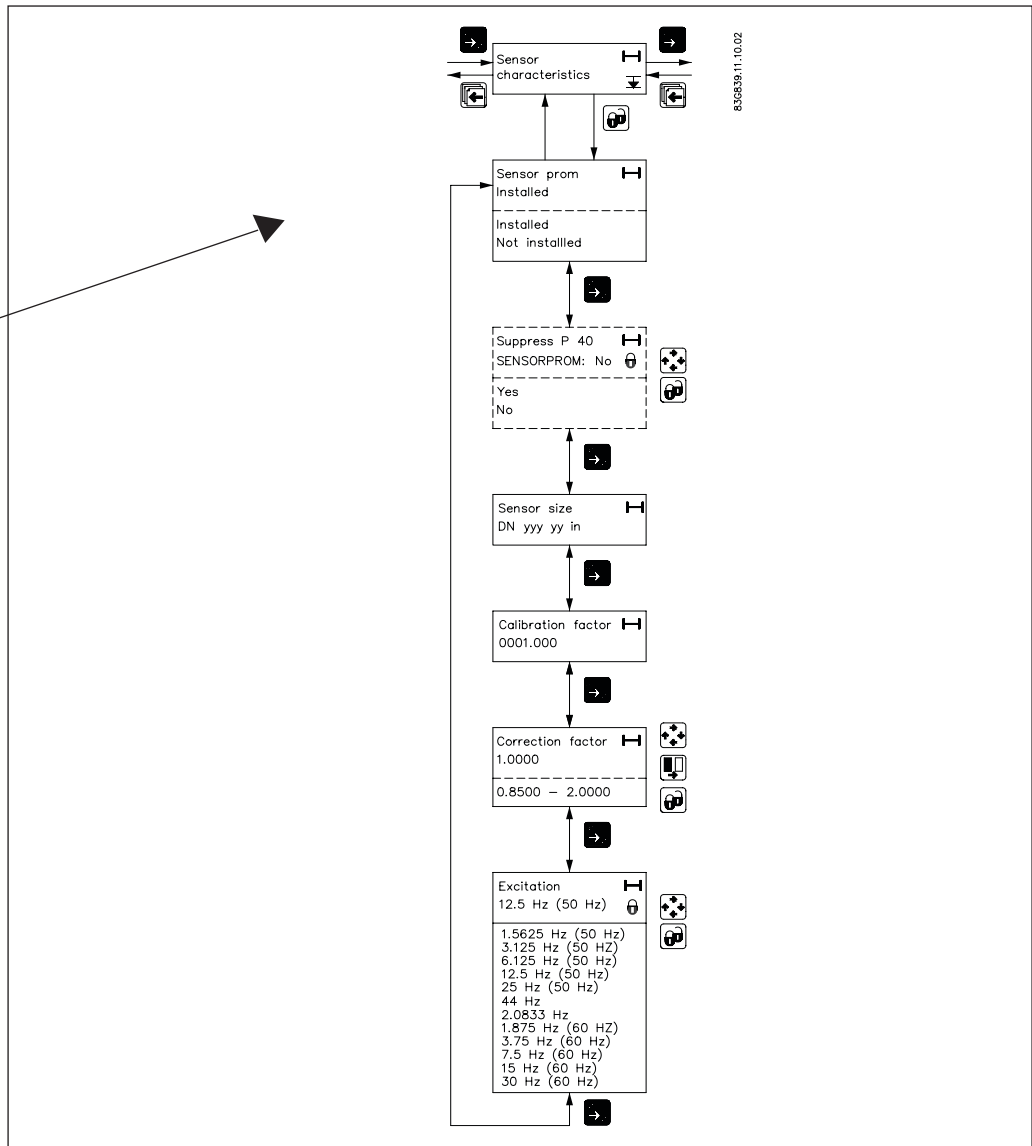
External input



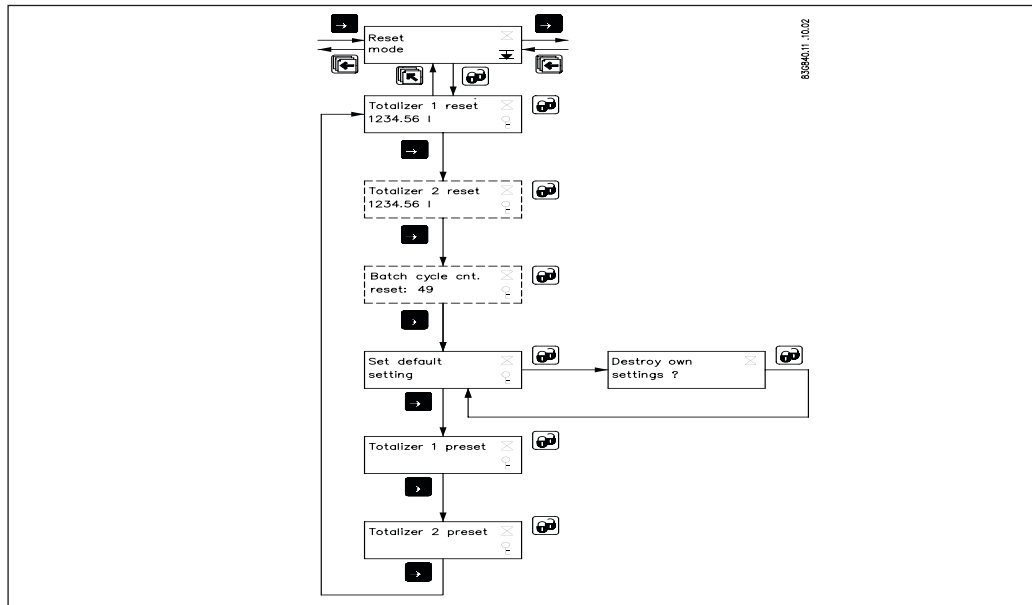
ENGLISH

5.4.5
Sensor characteristics

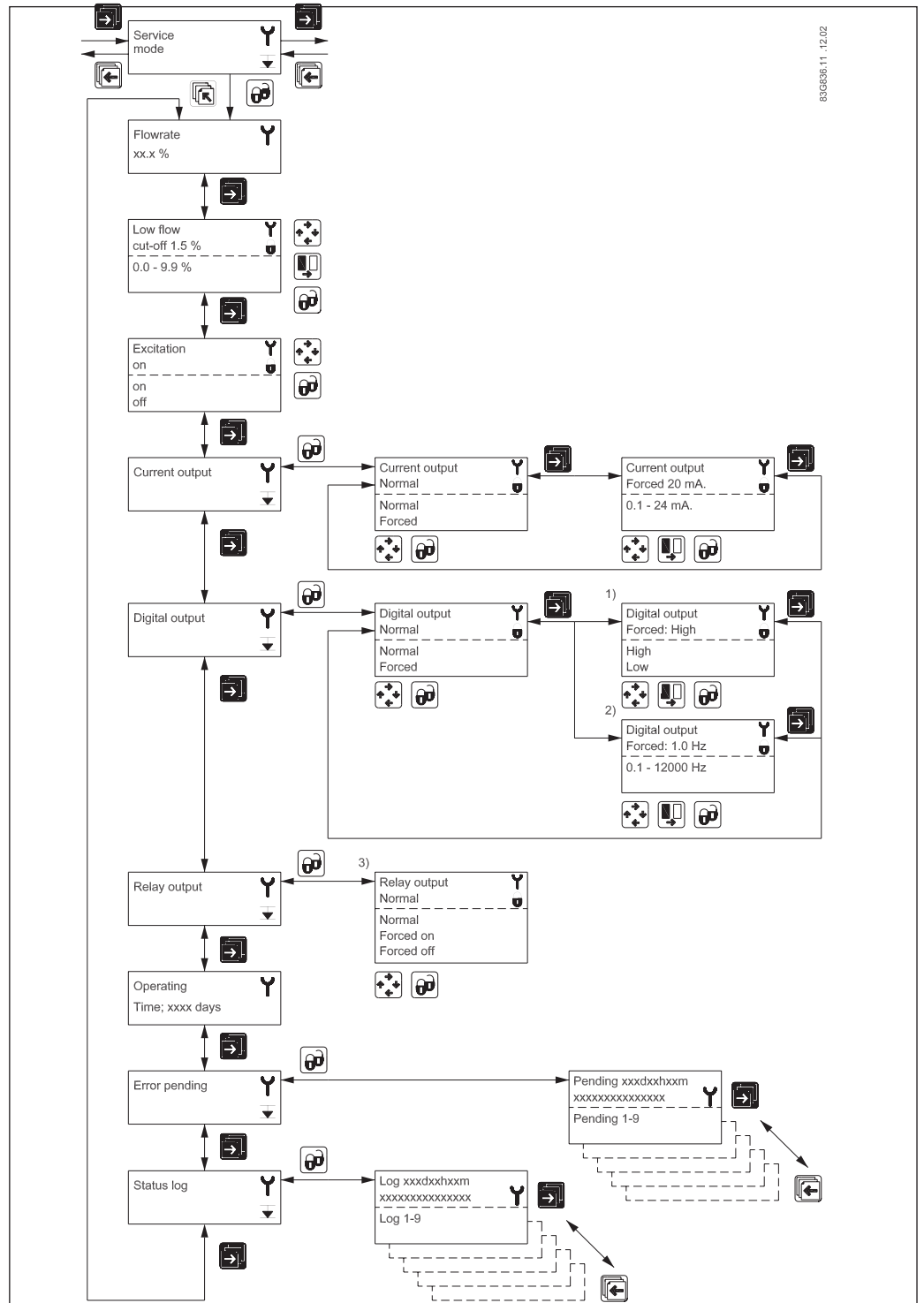
If "SENSORPROM not installed" is shown, refer to chapter 6 (depending on type of mounting configuration).



5.4.6
Reset mode



5.4.7 Service mode



All previous settings are reinitialized when service mode is exited using the top up key.

The error system

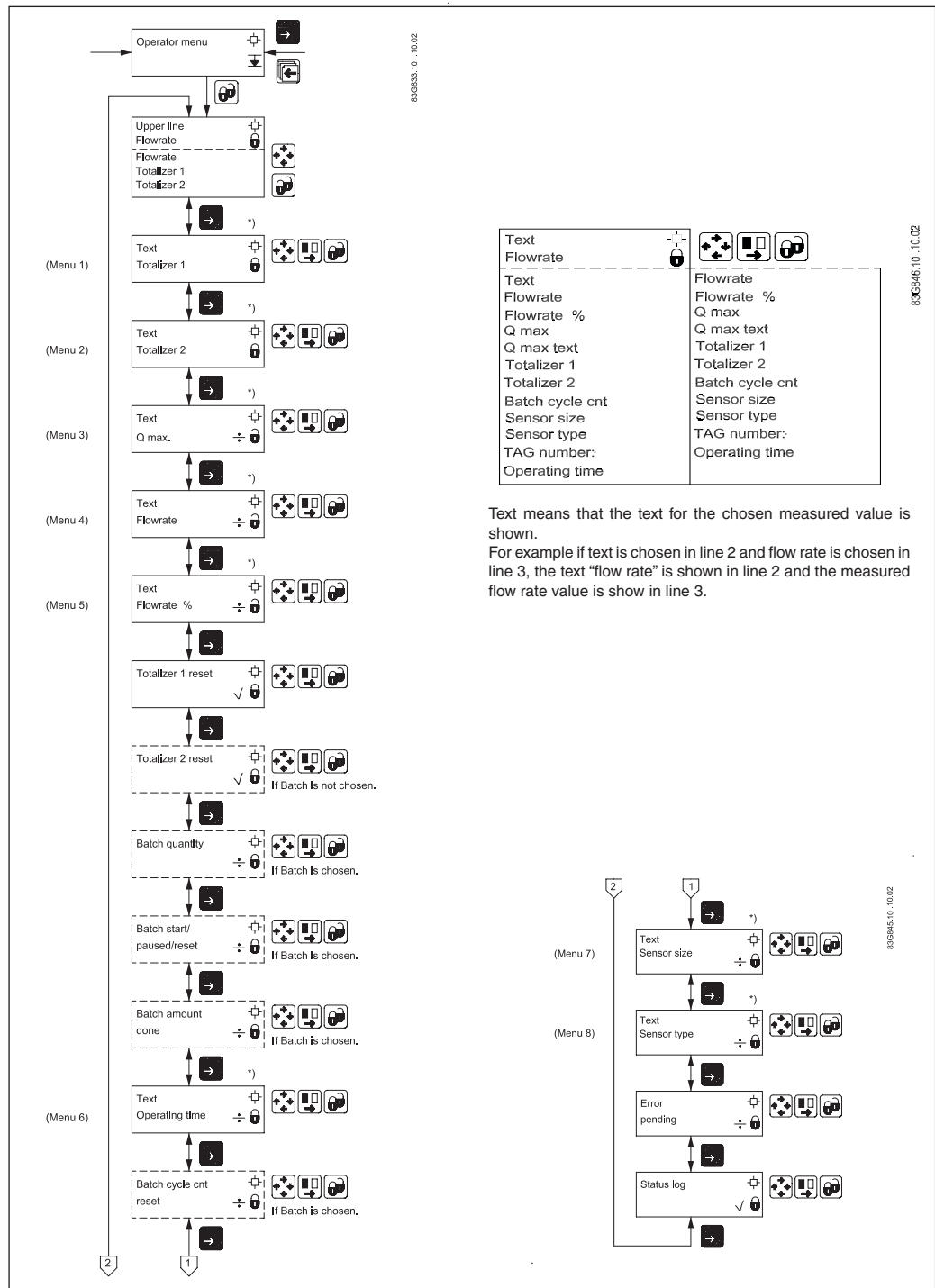
The error system is divided into an error pending list and a status log list. Time is gained as days, minutes and hours since the error has occurred.

The first 9 standing errors are stored in error pending. When an error is removed it is removed from error pending.

The latest 9 errors are stored in the status log. When an error is removed it is still kept in status log. Errors in status log is stored for 180 days.

Error pending and status log are accessible when enabled in the operator menu.

5.4.8 Operator menu setup



The upper line is always active and can never be deselected.

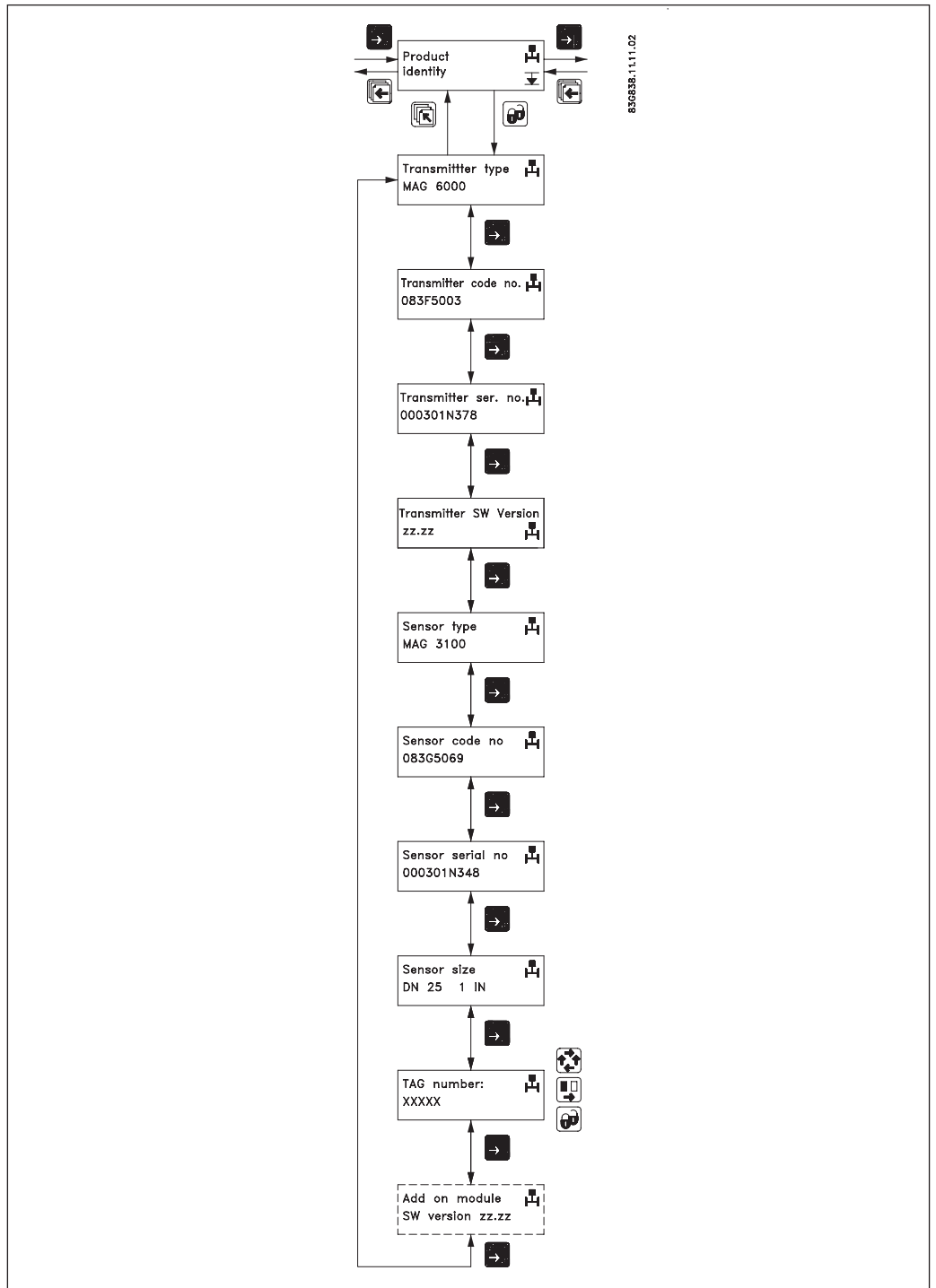
The two lower lines are for individual operator information. Information which the operator can scroll through with the forward key.

- A closed lock key in the operator menu setup, means that the menu is enabled when viewing the operator menu.
- An open lock key symbol, means that the menu is not available in the operator menu.

The middle line can either be used as a heading “Text line” for the lower line, or as a flow reading. A flow reading can be individually selected for each menu.

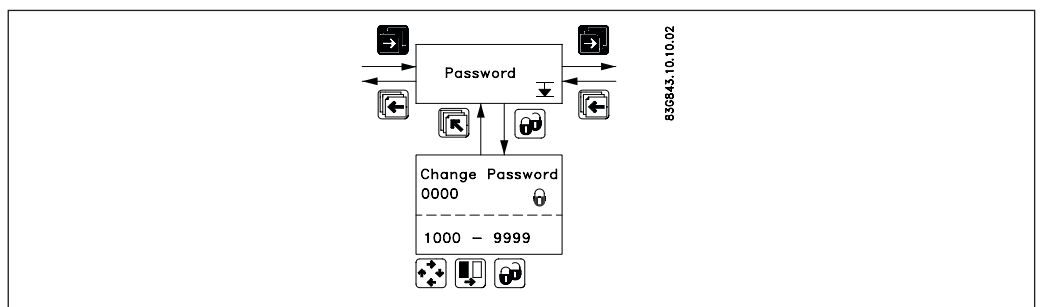
The lower line may be used for an additional flow reading to the reading already available in the upper line.

5.4.9
Product identity

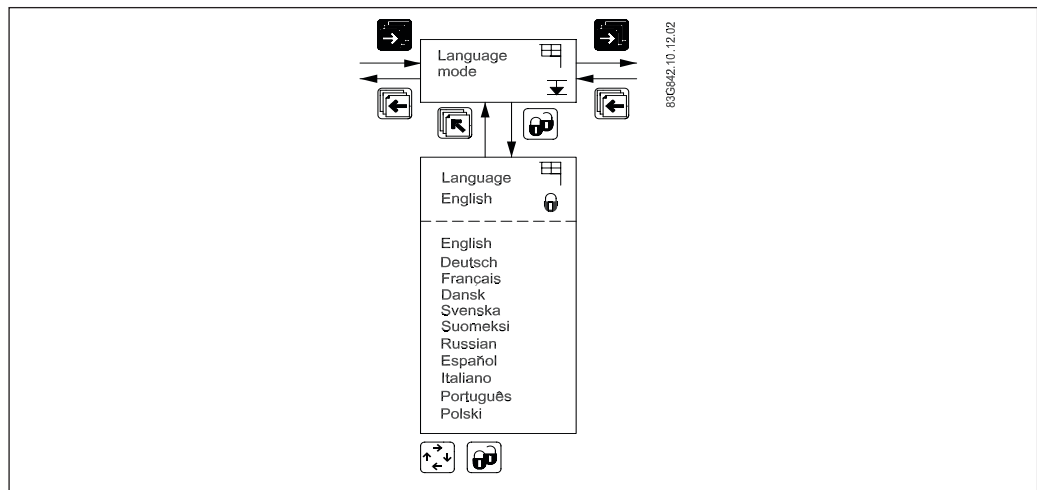


Software version of add-on module is only available if the add-on module has been installed.

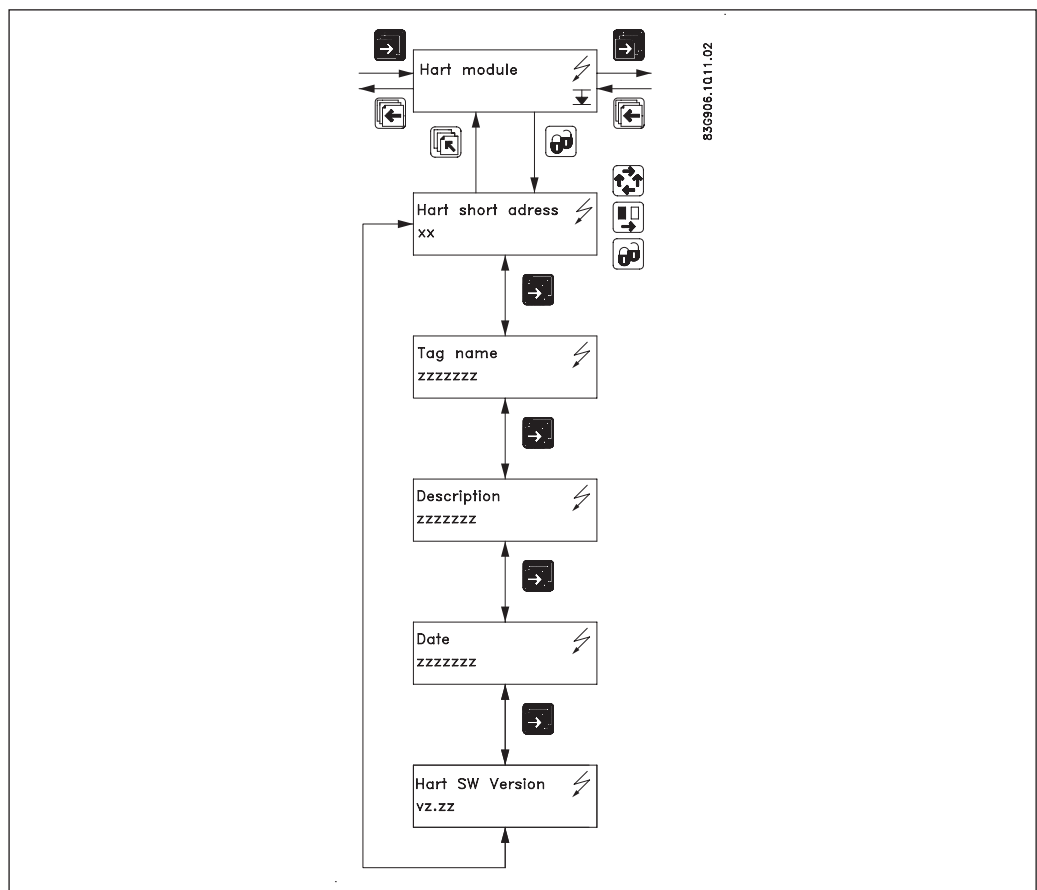
5.4.10
Change password



5.4.11
Language mode



5.4.12
HART® communication



5.5
Settings available

The transmitter is delivered with factory settings ready to measure the actual flow.

Parameter	Factory settings	Settings available
Password		
Default value	1000	
Password	1000	1000 - 9999
Basic settings		
Flow direction	Positive	Positive, negative
Q_{max}	Dim. dependent	Dim. dependent
- Volume units	Dim. dependent	m ³ , ml, l, kl, hl, MI, ft ³ , in ³ , USG, USkG, USMG, UKG, UKMG, USBBL
-	Time units	Dim. dependent Sec., min., hour, day
Totalizer 1	Forward	Forward, reverse, net
- Totalizer 1 units	Dim. dependent	m ³ , ml, l, kl, hl, MI, ft ³ , in ³ , USG, USkG, USMG, UKG, UKMG, USBBL
Totalizer 2	Reverse	Forward, reverse, net
- Totalizer 2 units	Dim. dependent	m ³ , ml, l, kl, hl, MI, ft ³ , in ³ , USG, USkG, USMG, UKG, UKMG, USBBL
Low flow cut-off	1.5 %	0 - 9.9 %
Empty pipe	Off	Off, on
Error level	Warning	Fatal, permanent, warning
Output		
Current output	Off	On/off, uni-/bidirectional, 0/4 - 20 mA
- Time constant	5 s	0.1 - 30 s
Digital output	Pulse	Error, direction/limit, batch, frequency, pulse, error no., off
Relay output	Error	Error, direction/limit, cleaning, error No., off
Direction/limit switch	Off	1 set point/2 set points, -100 - 100%
- Hysteresis	5%	0.0 - 100%
Batch	Off	
- Batch quantity	0	Dim. dependent
- Batch compensation	0	-100 - 100 m ³
- Batch counter	Down	Up/down
-	Time constant	0.1 s 0.1 - 30 s
Frequency	Off	500 Hz, 1 kHz, 5 kHz, 10 kHz
- Time constant	5 s	0.1 - 30 s
Pulse	On	
- Pulse polarity	Positive	Positive/negative
- Pulse width	66 ms	64 μ s, 130 μ s, 260 μ s, 510 μ s, 1.0 ms, 2.0 ms, 4.1 ms, 8.2 ms, 16 ms, 33 ms, 66 ms, 130 ms, 260 ms, 520 ms, 1.0 s, 2.1 s, 4.2 s.
- Volume/pulse	Dim. dependent	Dim. dependent
-	Time constant	0.1 s 0.1 - 30 s
External input		
External input	Off	Batch, reset totalizer, freeze output, forced output, off
- Batch		Start, hold/continue, stop, Q_{max} , 2
Sensor characteristics		
Correction factor	1	0.85 - 2.00
Language		
	English	English, German, French, Danish, Swedish, Finnish, Spanish, Russian, Italian, Portuguese and Polish
Operator menu		
Primary field	Flow rate	Flow rate, Totalizer 1, Totalizer 2
Title/subtitle line	Flow rate	Flow rate, Flow rate %, Q_{max} , Totalizer 1, Totalizer 2, Totalizer 1 reset, Totalizer 2 reset, Batch start/paused/stop, Batch cycle counter, Batch cycle counter reset, Sensor size, Sensor type, Error pending, Status log, Tag No.

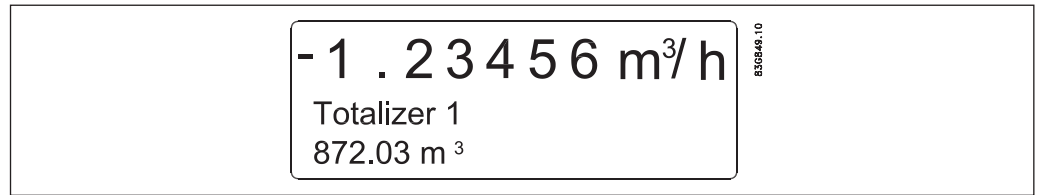
5.5.1 Dimension dependent factory settings

DN		fac.set.	Q _{max.}				unit	Volume/ pulse	Pulse unit	Totalizer unit
mm	[inches]		MAG 5100 W		MAG 1100, 3100					
			min.	max.	min.	max.				
2	1/12	30	-	-	3.9	156.7	l/h	1	l	l
3	1/8	70	-	-	6.4	254.5	l/h	1	l	l
6	1/4	300	-	-	25.5	1017	l/h	1	l	l
10	3/8	900	-	-	70.7	2827	l/h	1	l	l
15	1/2	2000	-	-	159.1	6361	l/h	1	l	l
25	1	5000	442.0	17671	442.0	17671	l/h	10	l	l
40	1 1/2	12	1.2	45	1.2	45	m ³ /h	10	l	l
50	2	20	1.6	63	1.8	70	m ³ /h	10	l	l
65	2 1/2	30	2.5	100	3.0	119	m ³ /h	100	l	l
80	3	50	4.0	160	4.6	180	m ³ /h	100	l	l
100	4	120	6.3	250	7.1	282	m ³ /h	100	l	l
125	5	180	10.0	400	11.1	441	m ³ /h	100	l	m ³
150	6	250	15.7	629	16.0	636	m ³ /h	100	l	m ³
200	8	400	24.9	997	28.3	1130	m ³ /h	1	m ³	m ³
250	10	700	40.0	1600	44.2	1767	m ³ /h	1	m ³	m ³
300	12	1000	62.5	2500	63.7	2544	m ³ /h	1	m ³	m ³
350	14	1200	86.6	3463	86.6	3463	m ³ /h	1	m ³	m ³
400	16	1800	113.1	4523	113.1	4523	m ³ /h	1	m ³	m ³
450	18	2000	143.2	5725	143.2	5725	m ³ /h	1	m ³	m ³
500	20	3000	176.8	7068	176.8	7068	m ³ /h	1	m ³	m ³
600	24	4000	254.5	10178	254.5	10178	m ³ /h	10	m ³	m ³
700	28	5000	346.4	13854	346.4	13854	m ³ /h	10	m ³	m ³
750	30	6000	397.7	15904	397.7	15904	m ³ /h	10	m ³	m ³
800	32	7000	452.4	18095	452.4	18095	m ³ /h	10	m ³	m ³
900	36	9000	573.0	22902	573.0	22902	m ³ /h	10	m ³	m ³
1000	40	12000	707.0	28274	707.0	28274	m ³ /h	10	m ³	m ³
1100	44	14000	855.3	34211	855.3	34211	m ³ /h	10	m ³	m ³
1200	48	15000	1018.0	40715	1018.0	40715	m ³ /h	10	m ³	m ³
1400	54	25000	-	-	1385.5	55417	m ³ /h	10	m ³	m ³
1500	60	30000	-	-	1590.5	63617	m ³ /h	10	m ³	m ³
1600	66	35000	-	-	1809.6	72382	m ³ /h	10	m ³	m ³
1800	72	40000	-	-	2290.3	91608	m ³ /h	10	m ³	m ³
2000	78	45000	-	-	2827.5	113097	m ³ /h	10	m ³	m ³

5.5.2 Dimension dependent batch and pulse output settings

	Volume/pulse or batch quantity	
	min.	max.
DN 2	3.6 µl	0.09 m ³
DN 3	5.9 µl	0.15 m ³
DN 6	24 µl	0.62 m ³
DN 10	65 µl	1.72 m ³
DN 15	147 µl	3.86 m ³
DN 25	409 µl	10.7 m ³
DN 40	1.05 ml	27.5 m ³
DN 50	1.64 ml	42.9 m ³
DN 65	2.77 ml	72.5 m ³
DN 80	4.19 ml	110 m ³
DN 100	6.54 ml	172 m ³
DN 125	10.2 ml	268 m ³
DN 150	14.7 ml	386 m ³
DN 200	26.2 ml	686 m ³
DN 250	40.9 ml	1072 m ³
DN 300	58.9 ml	1544 m ³
DN 350	80.2 ml	2102 m ³
DN 400	105 ml	2745 m ³
DN 450	133 ml	3474 m ³
DN 500	164 ml	4289 m ³
DN 600	236 ml	6177 m ³
DN 700	321 ml	8407 m ³
DN 800	419 ml	10981 m ³
DN 900	530 ml	13897 m ³
DN 1000	654 ml	17157 m ³
DN 1200	942 ml	24706 m ³
DN 2000	2.62 l	68629 m ³

5.6 Flow rate



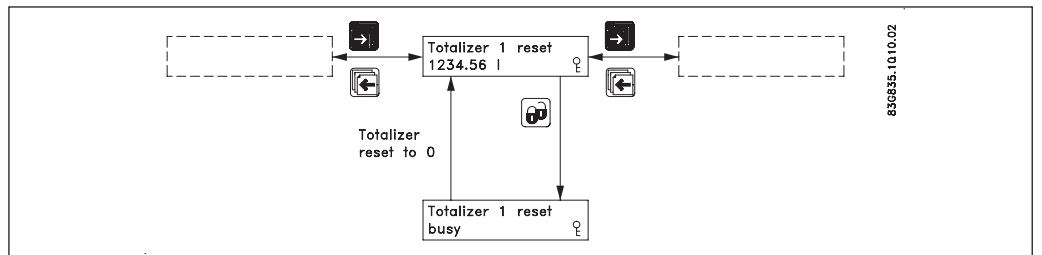
The 1st display line is always active and shows the value enabled in the operator menu setup.

- Flow rate
- Totalizer 1
- Totalizer 2

The 2nd and 3rd display lines are individually set in the operator menu. The page forward key steps through the enabled settings.

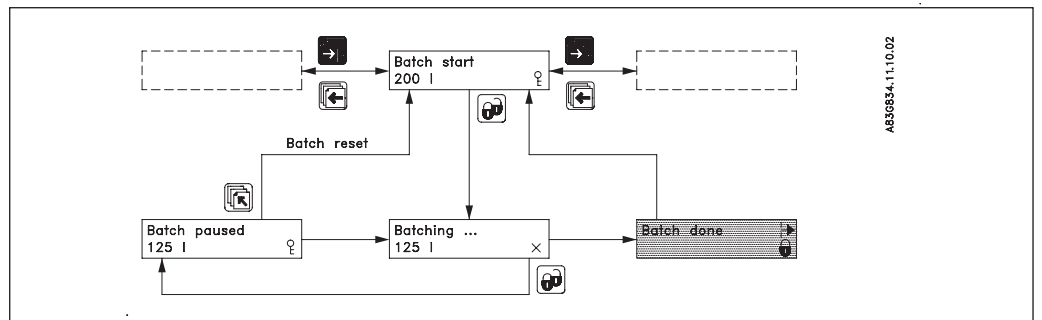
- Flow rate
- Totalizer
- Totalizer reset
- Batch control
- Batch cycle counter
- Batch cycle counter reset
- Pipe size
- Sensor type
- Pending errors
- Status log
- Tag No.

5.6.1 Totalizer



A totalizer is reset by pressing the lock key when the corresponding totalizer reset window is open.

5.6.2 Batch



A batch can be started, paused or stopped from the operator menu, in addition to the externally operated batch control. The batch is controlled using the lock and the top up keys.

The lock key:

- Starts the batch
- Holds the batch (pause) when pressed during batching
- Restarts the batch to continue when pressed during a pause.

The top up key resets a batch completely during a pause.

Batch cycle counter

The accumulated number of performed batches can be viewed when enabled in the operator menu setup.

Batch cycle counter reset

The batch cycle counter is reset by pressing the lock key in the "batch cycle cnt reset" menu.

5.6.3
List of error numbers

Note
Some error codes are not available in MAG 6000 I / MAG 6000 I Ex d

Error No.	Error text Remedy text	#Comment	Outputs status	Input status
1	I1 - Power on OK	Power on has happened	Active	Active
2	I2 - Add-on module Applied	A new module has been applied to the system	Active	Active
3	I3 - Add-on module Install	An add-on module is defect or has been removed. This can be an internal add-on module	Active	Active
4	I4 - Param. corrected OK	A less vital parameter in the transmitter has been replaced by its default value	Active	Active
20	W20 - Totalizer 1 Reset manually	During initialisation the check of the saved totalizer value has failed. It is not possible to rely on the saved totalizer value anymore. The totalizer value must be reset manually in order to rely on future readings	Active	Active
20	W20 - Totalizer 2 Reset manually	During initialisation the check of the saved totalizer value has failed. It is not possible to rely on the saved totalizer value anymore. The totalizer value must be reset manually in order to rely on future readings	Active	Active
21	W21 - Pulse overflow Adj. pulse settings	Actual flow is too big compared with pulse width and volume/pulse	Reduced pulse width	Active
22	W22 - Batch timeout Check installation	Duration of batching has exceeded a predefined max. time	Batch output on zero	Active
23	W23 - Batch overrun Check installation	Batch volume has exceeded a predefined maximum overrun volume	Batch output on zero	Active
24	W24 - Batch neg. flow Check flow direction	Negative flow direction during batch	Active	Active
30	W30 - Overflow Adj. Q _{max}	Flow is above Q _{max} settings	Max. 120 %	Active
31	W31 - Empty pipe	Pipe is empty	Zero	Active
40	P40 - SENSORPROM Insert/change	SENSORPROM unit not installed	Active	Active
41	P41 - Parameter range Switch off and on	A parameter is out of range. The parameter could not be replaced by its default value. The error will disappear at the next power-on	Active	Active
42	P42 - Current output Check cables	Current loop is disconnected or the loop resistance is too big	Active	Active
43	P43 - Internal error Switch off and on	Too many errors occurred at the same time Some errors are not detected correctly	Active	Active
44	P44 - CT SENSORPROM	SENSORPROM unit has been used as CT version	Active	Active
60	F60 - CAN comm. error Transmitter/AOM	CAN bus communication error. An add-on module, the display module or the transmitter is defect	Zero	Inactive
61	F61 - SENSORPROM error Replace	It is not possible to rely on the data in SENSORPROM unit anymore	Active	Active
62	F62 - SENSORPROM ID Replace	The SENSORPROM unit ID does not comply with the product ID. The SENSORPROM unit is from another type of product MASSFLO, SONOFLO etc.	Zero	Inactive
63	F63 - SENSORPROM Replace	It is not possible to read from the SENSORPROM unit anymore.	Active	Active
70	F70 - Coil current Check cables	Coil excitation has failed	Active	Active
71	F71 - Internal error Replace transmitter	Internal conversion error in ASIC	Active	Active

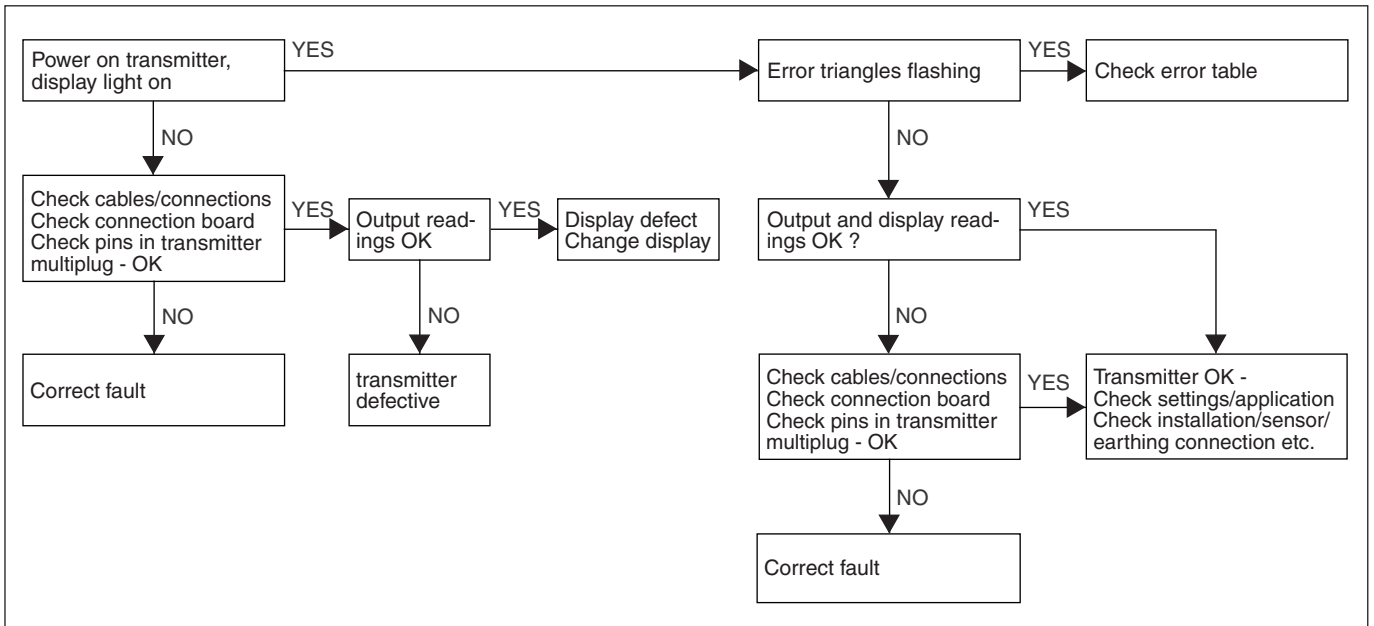
6. Service

Often problems with unstable/wrong measurements occur due to insufficient/wrong earthing or potential equalization. Please check this connection. If OK, the SITRANS F M MAGFLO transmitter can be checked as described in the handbook.

6.1 Transmitter check list

When checking SITRANS F M MAGFLO installations for malfunction the easiest method to check the transmitter is to replace it with another MAG 6000 I electronic insert with a similar power supply.

If no spare electronic insert is available - then check transmitter according to check table.



6.2 Trouble shooting MAG transmitter

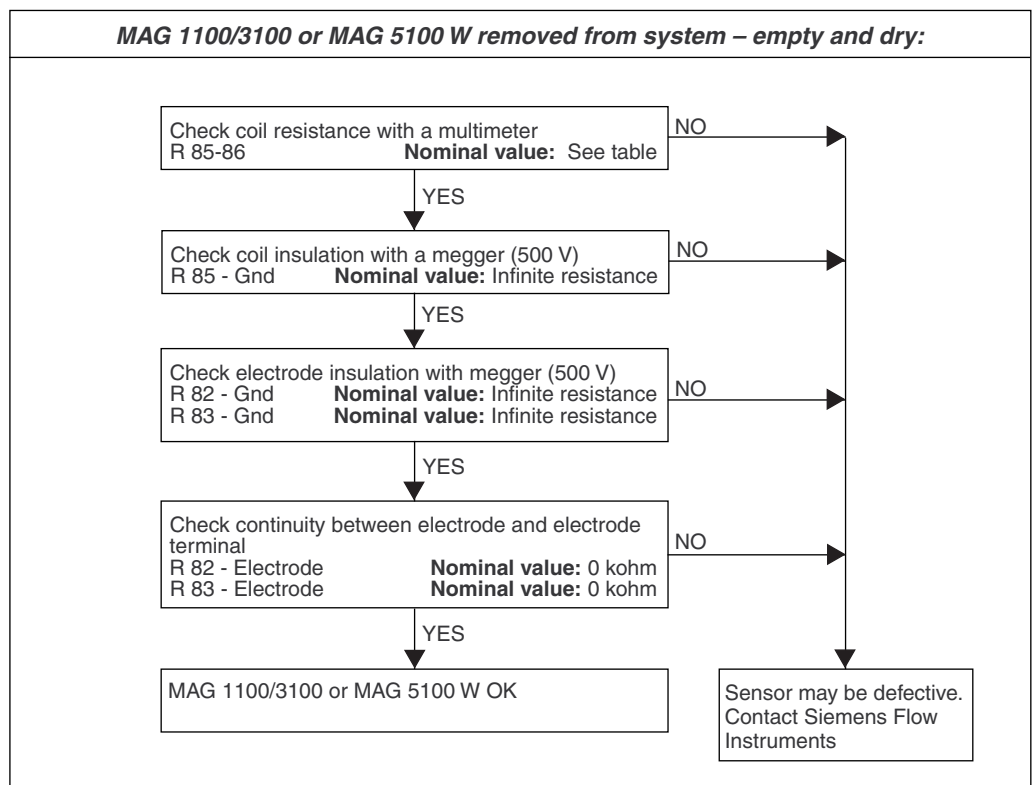
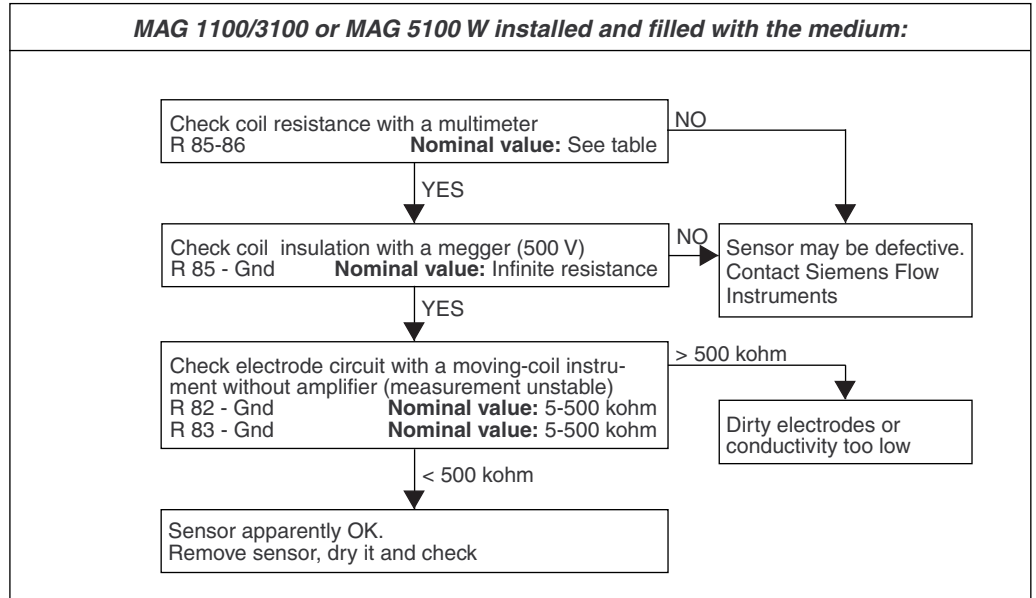
Symptom	Output signals	Error code	Cause	Remedy	
No display reading	Minimum		1. No power supply	Power supply Check MAG 6000 I for bended pins on the connector	
			2. MAG 6000 I defective	Replace MAG 6000 I	
No flow signal	Minimum		1. Current output disabled	Turn on current output	
			2. Digital output disabled	Turn on digital output	
			3. Reverse flow direction	Change direction	
	F70	W31	Incorrect or no coil current	Check cables/connections	
			Measuring pipe empty	Ensure that the measuring pipe is full	
F60		Internal error	Replace MAG 6000 I		
Undefined	P41	Initializing error	Switch off MAG 6000 I, wait 5 s and switch on again		
Indicates flow with no flow in pipe	Undefined		Measuring pipe empty	Select empty pipe cut-off	
			Empty pipe cut-off is OFF	Ensure that the measuring pipe is full	
			Electrode connection missing/ electrode cable is insufficiently screened	Ensure that electrode cable is connected and sufficiently screened	
Unstable flow signal	Unstable		1. Pulsating flow	Increase time constant	
			2. Conductivity of medium too low	Use special electrode cable	
			3. Electrical noise potential between medium and sensor	Ensure sufficient potential equalization	
			4. Air bubbles in medium	Ensure medium does not contain air bubbles	
			5. High concentration of particles or fibres	Increase time constant	
Measuring error	Undefined		Incorrect installation	Check installation	
			P40	No SENSORPROM unit	Install SENSORPROM unit
			P44	CT SENSORPROM unit	Replace SENSORPROM unit or reset SENSORPROM unit with MAG CT transmitter
			F61	Deficient SENSORPROM unit	Replace SENSORPROM unit
			F62	Wrong type of SENSORPROM unit	Replace SENSORPROM unit
			F63	Deficient SENSORPROM unit	Replace SENSORPROM unit
	Maximum	W30	F71	Loss of internal data	Replace MAG 6000 I
			W21	Flow exceeds 100% of Q_{max}	Check Q_{max} . (Basic Settings)
			Pulse overflow	Change volume/pulse	
			• Volume/pulse too small	Change pulse width	
			• Pulse width too large		
Measuring approx. 50%			Missing one electrode connection	Check cables	
Loss of totalizer data	OK	W20	Initializing error	Reset totalizer manually	
##### Signs in display	OK		Totalizer roll over	Reset totalizer or increase totalizer unit	

6.3
Check list MAG sensor

ATTENTION!

If there is leakage from MAG 1100/3100 or MAG 5100 W and the unit has been used to measure inflammable/explosive liquids, there might be a risk of explosion when checking with a megger.

Disconnect all leads to MAG 1100/3100 or MAG 5100 W



6.4
Coil resistance

DN	Coil resistance					
	MAG 1100		MAG 3100		MAG 5100 W ²⁾	
	Resistance	Tolerance	Resistance	Tolerance	Resistance	Tolerance
2	104 Ω	+/- 5	104			
3	104 Ω	+/- 5	104			
6	99 Ω	+/- 17	104			
10	99 Ω	+/- 17	104			
15 ¹⁾	91 Ω	+/- 9	104			
25	91 Ω	+/- 17	104	+/- 2	104	+/- 10
40	91 Ω	+/- 9	92	+/- 2	92	+/- 10
50	91 Ω	+/- 9	92	+/- 2	119.4	+/- 10
65	99 Ω	+/- 17	100	+/- 2	127	+/- 10
80	91 Ω	+/- 17	94	+/- 2	126	+/- 10
100	91 Ω	+/- 9	92	+/- 2	125	+/- 10
125			92	+/- 2	126	+/- 10
150			94	+/- 2	116	+/- 10
200			90	+/- 2	109	+/- 10
250			92	+/- 2	104	+/- 10
300			100	+/- 2	108	+/- 10
350			112	+/- 2	100	+/- 6
400			100	+/- 4	100	+/- 6
450			108	+/- 4	100	+/- 6
500			122	+/- 4	100	+/- 6
600			115	+/- 4	98	+/- 6
700			128	+/- 4	98	+/- 6
750			133			
800			128	+/- 4	98	+/- 6
900			131	+/- 4	98	+/- 6
1000			131	+/- 4	88	+/- 6
1100			126			
1200			130	+/- 4	88	+/- 6
1400			130			
1500			124			
1600			133			
1800			133			
2000			147			

¹⁾ On MAG 1100 DN 15 produced as from May 1999 the coil resistance must be 86 ohm, +8/-4 ohm.

²⁾ DN350-1200 for 7ME652 only.

All resistance values are at 20 °C.

The resistance changes proportionally 0.4% / °C.

7. Ordering

7. Ordering



Please use online PIA Selector to get latest updates.

PIA selector link: _

www.pia-selector.automation.siemens.com

8.1 EC-declaration of conformity

Please note the following certificates are incomplete for the full version please refer to <http://siemens.com/flow>



EC Declaration of Conformity EG-Konformitätserklärung



No. 083R3101-01

Manufacturer:

Hersteller:

Siemens Flow Instruments A/S

Address:

Nordborgvej 81, DK-6430 Nordborg

Anschrift:

Denmark

Product description:

Flow transmitter / Durchfluß meßumformer

Produktbezeichnung

SITRANS F M

Type/Typ MAG6000I (and Ex versions), with option modules, used with sensors MAG1100, MAG1100Ex, MAG3100, MAG3100Ex

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:

2004/108/EC EMC	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC. <i>Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit und zur Aufhebung der Richtlinie 89/336/EWG.</i>
2006/95/EC LVD	Directive of the European Parliament and of the Council on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits. <i>Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.</i>
94/9/EC ATEX	Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres. <i>Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.</i>
97/23/EC PED	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment. <i>Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Druckgeräte</i>
2004/22/EC MID	Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment intended for Legal Metrological Measuring systems. <i>Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte zur bestimmungsgemäßen Verwendung in Legale Metrologische Messsysteme.</i>

Annex A is integral part of this declaration.

Anhang A ist integraler Bestandteil dieser Erklärung.

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitsweise der mitgelieferten Produktdokumentation sind zu beachten.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme

Managing Board: Peter Loeschner, Chairman, President and Chief Executive Officer, Heinrich Hiesinger, Joe Kaiser, Rudi Lamprecht,

Eduardo Montes, Juergen Radomski, Erich R. Reinhardt, Hermann Requardt, Uriel J. Sharef, Peter Y. Solmsen, Klaus Wucherer

Registered offices: Berlin and Munich; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684

WEEE-Reg.-Nr. DE 23691322

SIEMENS**EG-Konformitätserklärung
EC Declaration of Conformity**

No. 083R3101-01 03

Nordborg, 10.01.2008

Siemens Flow Instruments A/S

Jen Parkum, R&D

Name, function
Name, Funktionsignatur
Unterschrift

Ove Kirk Andersen, Quality

Name, function
Name, Funktionsignatur
Unterschrift

Anhang A ist integraler Bestandteil dieser Erklärung

Annex A is integral part of this declaration Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.

Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

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Annex A to the EC Declaration of Conformity Anhang A zur EG-Konformitätserklärung

No. 083R3101-01

Product description: Flow transmitter / Durchfluß meßumformer
 Produktbezeichnung: SITRANS F M
 Type/Typ: MAG6000I (and Ex versions), with option modules, used with sensors MAG1100, MAG1100Ex, MAG3100, MAG3100Ex

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):
 Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen (variantenabhängig):

Direktive Richtlinie	Standard / Reference number Norm / Referenznummer	Edition Ausgabedatum	MAG	MAG	MAG	MAG	MAG	MAG	MAG	MAG
			6000 I	1100	1100Ex	3100	3100Ex	3100PFA	3100PTFE	
2006/95/EC	EN61010-1	2001	x	x	x	x	x	x	x	x
2004/108/EC	EN 61326-1 *	2006	x	x	x	x	x	x	x	x
2004/108/EC	EN 61326-2-5	2006	x	x	x	x	x	x	x	x
94/9/EC	EN 50014 + A1 and A2	1997	x							
94/9/EC	EN 50018 + A1	2000	x							
94/9/EC	EN 50019	2000	x							
94/9/EC	EN 50020	2002	x							
94/9/EC	EN 50281-1-1	1998	x							
94/9/EC	EN 1127-1	1998			x					
94/9/EC	EN 60079-0	2006			x	x				
94/9/EC	EN 60079-1	2004				x				
94/9/EC	EN 60079-7	2007			x	x				
94/9/EC	EN 60079-11	2007			x	x				
94/9/EC	EN 61241-0	2006			x	x				
94/9/EC	EN 61241-1	2004			x	x				
97/23/EC	Modul H	2001		x	x					
97/23/EC	Modul B	2001								x
97/23/EC	Modul E1	2001					x	x	x	

* all environments included

Certificates Zertifikate	MAG	MAG	MAG	MAG	MAG	MAG	MAG
	6000 I	1100	1100Ex	3100	3100Ex	3100PFA	3100PTFE
SIRA 07 ATEX 1182X			x				
SIRA 07 ATEX 3181X			x				
SIRA 05 ATEX 2072X	x						
SIRA 03 ATEX 3339X					x		
FORCE DK 0200-4.853/03		x	x				
BSI CE 67317							x
BSI CE 58993				x	x	x	x

Inspection / Surveillance:

Kontrolle / Überwachung:

Directive Richtlinie		Notified Body Product Quality Assurance Benannte Stelle Qualitätssicherung Produktion	No.:
94/9/EC	ATEX	SIRA Certification Service	(Stonehouse, UK) 0518
94/9/EC	ATEX	UL International Demko	(Nordborg, DK) 0539
27/23/EC	PED	British Standards Institution	(Stonehouse, UK) 0086
27/23/EC	PED	FORCE - Dantest CERT	(Nordborg, DK) 0200
2004/22/EC	MID	FORCE - Dantest CERT	0200



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 07ATEX3181X** Issue: **1**

4 Equipment: **SITRANS F M MAGFLO MAG1100Ex DN2 to DN100**

5 Applicant: **Siemens Flow Instruments A/S**

6 Address: Nordborgvej 81
Nordborg 6430
Denmark

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2006	EN 60079-7:2007	EN 60079-11:2007
EN 61241-0:2006	EN 61241-1:2004	EN 1127:1998

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

Remote version:



II 2(1) GD	Ta = -20°C to +60°C (with process temperatures equal to or less than +150°C)
Ex e ia IIB T3-T6	Ta = -20°C to +50°C (with process temperatures equal to or less than +180°C)
Ex tD A21 IP67 T*°C	(* pipe temperature +18 K)

Compact Configuration (This marking is shown on the transmitter label, the flowmeter is not separately marked):



II 2(1)(2) GD	Ta = -10°C to +60°C (with process temperatures equal to or less than +150°C)
Ex d [ia] [ib] ia IIB T3-T6	Ta = -10°C to +50°C (with process temperatures equal to or less than +180°C)
Ex tD A21 IP67 T*°C	(* pipe temperature +18 K, but not less than 85°C)

Note: Siemens label will mark "Ta: (Refer to user instructions)".

Project Number 52A16937
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C. Ellaby
Certification Officer

Form 9400 Issue 1

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 07ATEX3181X
Issue 1

13 DESCRIPTION OF EQUIPMENT

Each of the MAG1100Ex Flowmeters comprises two concentric cylindrical tubes with welded end caps. The outer tube is stainless steel and the inner is ceramic. The end caps are machined such as to allow mounting into process pipe work, the process fluid passing through the inner ceramic tube. 'O' ring seals are fitted between the tubes to prevent the ingress of process fluid. The enclosure contains energising coils with sensing electrodes.

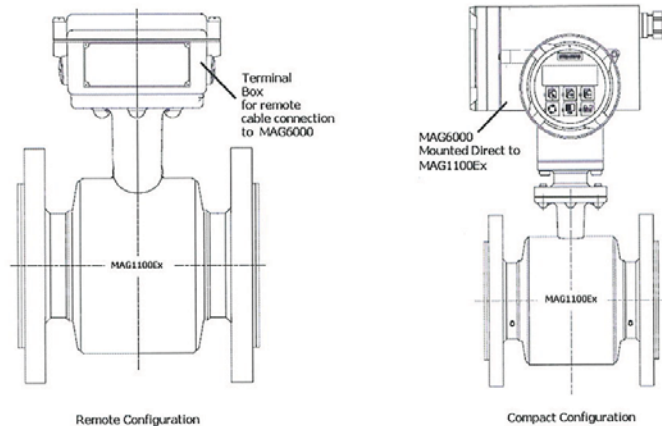
Cables enter the enclosure via an extension on the body and through a silicone compression seal. The seal is compressed by means of a central threaded element and is retained by a clip arrangement. A terminal box is mounted on the extension to enable termination of the intrinsically safe and increased safety 'e' cabling. The whole Flowmeter is considered Ex 'd' up to the terminal box (up to internal flameproof 'silicone compression seal') at which point the field and factory wiring is considered protected by Ex 'ia' and Ex 'e' protection principles.

Design Variations/Options

The SITRANS F M MAGFLO MAG1100Ex Flowmeters are available in size ranges (pipe bore):

- DN2 to DN6 (Zirconium Ceramic)
- DN6 to DN100 (Alumina Ceramic)

Additionally the MAG1100Ex is either configured as a Remote or Compact type sensor. The Remote version has the MAG1100Ex Flowsensor installed independently with cable connections made via the terminal box to the MAG6000 transmitter located in a separate location. The Compact type configuration has the MAG6000 (Sira 05ATEX2072X) mounted directly to the MAG1100Ex Sensor in place of the terminal box. The diagram below shows the two configuration types.



Note: The diagram above is representative of a MAG1100 Flowsensor and is only presented to depict the configuration of either the terminal box or MAG6000Ex to the Flowsensor.

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Form 9400 Issue1

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com

**SCHEDULE****EC TYPE-EXAMINATION CERTIFICATE**

Sira 07ATEX3181X
Issue 1

The parameters for the SITRANS F M MAGFLO MAG1100Ex Flowmeter are as follows:

Remote version:

Terminals 0, 81, 82,83,84 (Ex ia)	Ui = 30 V Ii = 50 mA	Pi = 0.5 W Ci = 50 nF Li = 2 μH
Terminals 85, 86 (Ex e)	Ui = 30/70 V _{pk} Ii = 130 mA	

Compact version:

Refer to certificate number Sira 05ATEX2072X.

Variation 1 - This variation introduced the following changes:

- i. The ambient temperature specification relative to process temperatures was reviewed; this is the result of the upper process temperature limit being raised from 150°C up to a maximum of 180°C. The special condition for safe use appertaining to the temperature limits, temperature classes and maximum surface temperatures for dust are also modified and the marking has been amended so that the user/installer is advised to refer to the instructions for this information.

14 **DESCRIPTIVE DOCUMENTS**14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report no.	Comment
0	1 October 2007	R52A16937A	The release of the prime certificate.
1	5 February 2008	R52A17771A	The introduction of Variation 1.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

15.1 The surface temperature of the equipment depends on the temperature of the process fluid.

Maximum process fluid temperature	Temperature class (for gases)
67°C	T6 (85°C)
82°C	T5 (100°C)
117°C	T4 (135°C)
180°C ¹	T3 (200°C)

¹ The maximum ambient temperature allowed at this process temperature is +50°C. Process temperatures up to and including 150°C may have a maximum ambient temperature of +60°C.

For dust protection, the surface temperature is equal to the process fluid temperature +18 K when configured in the Remote version and process fluid temperature +18 K but not less than +85°C in the compact configuration.

15.2 In operation, the output is earthed through the conductive medium being measured and therefore potential equalisation is necessary throughout the hazardous area. The apparatus housing shall be connected to the potential equalising conductor in the hazardous area.

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Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 07ATEX3181X
Issue 1

- 15.3 The external connections to the Ex 'e' Terminals of the Remote version shall comply with the following:
- 15.3.1 The wire conductors shall have a cross-sectional area between 0.5 mm² and 4 mm².
- 15.3.2 No more than one single or multiple strand wire conductor shall normally be connected to each of the terminals. If multiple conductors are required, these shall be joined in a suitable manner, e.g. two conductors into a single insulated crimped boot lace ferrule.
- 15.3.3 The insulation on the wire conductors shall extend to within 1mm of the metal of the terminal throat.
- 15.3.4 The terminal screws shall be tightened down with a torque between 0.5 Nm and 0.7 Nm.
- 15.3.5 The terminals shall never be exposed to temperatures outside of the range -50°C to +130°C; in addition, they shall only be installed and wired with cable in an ambient temperature of -10°C to +80°C. Furthermore, in the event of there being a process temperatures of +180°C in conjunction with an upper ambient temperature of +50°C the terminal strips should not be installed or wired with cable.

- 15.4 The terminal box shall not be opened when an explosive gas or dust atmosphere may be present.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 CONDITIONS OF CERTIFICATION

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 Each enclosure, including cast pedestal when fitted, shall be subjected to a routine pressure test of 8.85 bar for at least 10 s as required by clause 16.1 of EN 60079-1:2004. There shall be no damage or permanent deformation as a result of the tests.
- 17.4 When used in 'Compact' configuration, the conditions imposed by certificate Sira 05ATEX2072X apply to the assembly.
- 17.5 Dielectric strength test required as per Clause 7.1 of EN 60079-7:2007
- 17.6 The Remote Version of the equipment, as supplied, shall only be connected to another item of certified Ex ia associated apparatus or Ex e equipment (e.g. an electro-magnetic transmitter).
- 17.7 This certificate relies on the following previously certified products. When used as part of the SITRANS F M MAGFLO MAG3100 Ex Flowsensor, the key attributes are listed in the table below and shall still be maintained by their original certificate.

Product	Certificate number	Key attributes
Weidmuller BK2/E terminal	Sira 01ATEX3247U	EEx e II

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com

Certificate Annexe

Certificate Number: Sira 07ATEX3181X
Equipment: SITRANS F M MAGFLO MAG1100Ex
 DN2 to DN100
Applicant: Siemens Flow Instruments A/S



Issue 0

Number	Sheet	Rev.	Date	Description
083A0280	1 of 1	5	28 Sep 07 (Sira stamp)	Skilt Plate
A5E01263820A	1 of 1	1	28 Sep 07	Appro. label MAG1100 DN2-100
A5E01263812A	1 of 1	1	28 Sep 07	Appro. label MAG6000I + MAG1100
A5E01409195A	1 of 1	1	28 Sep 07	Terminal box DN6-DN100 certification drawing MAG1100Ex sensors
A5E01409379A	1 of 1	1	28 Sep 07	Terminal box DN2-DN6 (Zirconium) certification drawing MAG1100Ex sensors
A5E01409438A	1 of 1	1	28 Sep 07	Certification drawing MAG1100 Ex DN2 to DN6 ZrO2
A5E01409518A	1 of 1	1	28 Sep 07	Certification drawing MAG1100 Ex DN6 to DN100 AI oxide
A5E01409569A	1 of 1	1	28 Sep 07	Certification drawing MAG1100 Ex food
A5E01409614A	1 of 1	1	28 Sep 07	Certification DRG for MAG1100Ex DN2-DN100 with MAG6000 Industry (SIRA)

Issue 1

Number	Sheet	Rev.	Date	Description
A5E01263820A	1 of 1	03	04 Feb 08 (Sira stamp)	Appro. Label MAG1100 DN2-100
A5E01263812A	1 of 1	02	04 Feb 08	Appro. Label MAG6000I + MAG1100

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Form 9400 Issue 1

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 03ATEX3339X** Issue: **7**

4 Equipment: **SITRANS F M MAGFLO MAG3100 Ex**

5 Applicant: **Siemens Flow Instruments**

6 Address: Magflo house
Ebley Road
Stonehouse
Gloucestershire GL10 2LU
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 (A1 and A2) EN 50019:2000 EN 50020:2002 EN 50281-1-1:1998

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:



II 2 G D
EEx e ia IIC T3 to T6

'Compact' arrangement marked 'MAG6000 INDUSTRY'



II 2(1)(2) GD T85°C
EEx de [ia] ia [ib] IIC T3-T6 (Ta -10°C to +60°C)

Project Number 52A17771
C. Index 13

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C Ellaby
Certification Officer



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX3339X
Issue 7

13 DESCRIPTION OF EQUIPMENT

The SITRANS F M MAGFLO MAG3100 Ex flowsensor comprises a pair of increased safety windings and intrinsically safe magnetic sensing circuit electrodes that are mounted on a pipe body. The size range covered is DN350 to DN2000. The windings are rated at 30 V d.c. and the sensing circuit is rated at 9.3 V, 40 mA.

The pipe body is fitted with clips, which secure the increased safety windings, and pipe flanges for installation to the process pipework. Two diametrically opposed tubes are welded to the sides of the pipe and these contain intrinsically safe electrodes that pass through the wall of the pipe into the bore. An outer casing manufactured from steel encloses the windings and wiring, but the diametrically opposed tubes pass through this outer casing and the open ends are sealed by tamperproof plugs. The interior of the tubes is filled with gel encapsulant.

The increased safety windings are manufactured from self-bonding insulated copper winding wire and are connected in series. The connection leads from the windings and the electrodes are taken back to a junction box which is mounted on a tube welded to the outer casing. The leads pass through the tube and enter the rear of the enclosure where they are terminated on terminal blocks. The junction box meets IP67 ingress protection.

The sensing circuit leads are screened, with a single core, with the screens terminated on an earth terminal near the intrinsically safe terminal block.

Additional earthing electrodes fitted through the wall of the pipe may be provided. The earthing electrodes are fitted into holes in the sensor tube and are secured by a continuous weld. Alternatively the electrodes may be screwed in and Loctite applied to the threads to seal them.

Variation 1 - This variation introduced the following changes:

- i. The Special Condition For Safe Use, clause 15.3 in the original certificate, was deleted as the equipment cannot be used with a flow of metallic powder.
- ii. The replacement of drawing 083A0274 with drawing 083A0284, this reflects changes to the rating of the intrinsically safe sensing circuit as follows:

$$U_i = 30 \text{ V} \qquad L_i = 2 \mu\text{H}$$

Variation 2 - This variation introduced the following changes:

- i. The correction of a ferrule specification drawing.

Variation 3 - This variation introduced the following changes:

- i. The introduction of a strengthening sleeve welded over the existing pedestal.

Variation 4 - This variation introduced the following changes:

- i. The removal of the terminal box and the fitting of interface components, this allows the Sitrans F M Magflo MAG6000 industry transmitter, Certificate Number Sira 05ATEX2072X, to be mounted directly onto the flowmeter, this combined transmitter/sensor arrangement being designated the 'Compact' arrangement and being marked 'MAG6000 INDUSTRY'; see clause 12 for applicable marking.
- ii. The introduction of an alternative method of joining the coil wire to the leads.
- iii. The use of an alternative terminal box base plate and intrinsically safe separation shield was permitted.
- iv. The use of alternative cable glands into the terminal box was permitted.
- v. The use of an alternative electrode pin through the existing glass ferrule was permitted.

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.com

Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX3339X
Issue 7

Variation 5 - This variation introduced the following changes:

- i. The fabricated pedestal was substituted by a cast steel version.

Variation 6 - This variation introduced the following changes:

- i. The terminal box arrangement used on the MAG3100 (DN15 – DN300) under Sira certificate 07ATEX1182X may be used on this version of the MAG3100, sizes DN350 to DN2000; new drawing A5E01211109A refers.
- ii. The label material was changed from "adhesive backed polyester, temp range -20 to +140 Deg C" to "MP50 Metallised Polyester, Permanent Adhesive Backed" (to bring into line with other label materials), in addition, tolerance +/-2 mm was added to dimensions.
- iii. A reference to Sira 07ATEX1182X was included on Drawing 083Z3042.

Variation 7 - This variation introduced the following changes:

- i. The modification of the mounting arrangement for the divider separating the Ex 'e' and the Ex 'ia' terminals.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	29 August 2003	R52V10518A	The release of the prime certificate.
1	25 May 2004	R53V11823V	The introduction of Variation 1.
2	4 April 2005	R51V13265A	The introduction of Variation 2.
3	13 March 2007	R51A16396A	The introduction of Variation 3.
4	16 August 2007	R51M15493A	The introduction of Variation 4.
5	16 July 2007	R51M16470A	The introduction of Variation 5.
6	7 December 2007	R52A17346A	This Issue covers the following changes: <ul style="list-style-type: none"> All previously issued certification was rationalised into a single certificate, Issue 6, Issues 0 to 5 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. The introduction of Variation 6.
7	29 January 2008	R52A17771A	This Issue covers the following changes: <ul style="list-style-type: none"> The introduction of Variation 7. Special Condition for Safe Use, clause 15.3, was removed, refer to Variation 1. The Certificate History was corrected and clarified. The marking in clause 12 was extended to include that associated with the compact in Variation 4.

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX3339X
Issue 7

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

15.1 The surface temperature of the equipment depends on the temperature of the process fluid:

Process fluid temperature	Temperature class (for gases)
<75°C	T6
<90°C	T5
<125°C	T4
<190°C	T3

For dust protection, the surface temperature is equal to the process fluid temperature plus 5°C.

15.2 In operation, the output is earthed through the conductive medium being measured and therefore potential equalisation is necessary throughout the hazardous area. The apparatus housing shall be connected to the potential equalising conductor in the hazardous area.

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 This certificate relies on the following previously certified products. When used as part of the SITRANS F M MAGFLO MAG3100 Ex flowsensor, the key attributes listed in the table below shall still be maintained by their original certificate.

Product	Certificate number	Key attributes
Weidmuller BK2/E terminal	Sira 01ATEX3247U	EEx e II
Hawke type PET5 Pillar earth terminal	BAS 01ATEX2247U	EEx e II

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com

Certificate Annexe

Certificate Number: Sira 03ATEX3339X
Equipment: SITRANS F M MAGFLO MAG3100 Ex
Applicant: Siemens Flow Instruments

**Issue 0**

Drawing	Sheet	Rev.	Date	Title
083A0275	1 of 1	2	11 Aug 03	Data label MAG 3100Ex Flowsensor
083A0266	1 of 1	4	11 Aug 03	Intrinsically Safe Electrode Terminals Label MAG3100Ex Flowsensor
083A0274	1 of 1	3	12 Aug 03	Certification Label DN350 to DN2000 MAG3100Ex Sensors
083A0245	1 of 1	4	12 Aug 03	Safety Label MAG3100Ex Flowsensor
083C0233	1 of 1	7	12 Aug 03	Internal Wiring Diagram EEx e ia DN350-DN2000 incl MAG3100Ex Sensors
083Z0151	1 of 1	4	12 Aug 03	Ferrule Glass Seal Assy. MAG3100Ex flowsensor
083Z9542	1 of 1	6	28 Apr 03	Coil winding DN350 – DN2000 MAG3100Ex sensors
083Z9544	1 of 1	4	12 Aug 03	Terminal Box DN350-DN2000 Certification Drawing Mag3100Ex Sensors
083Z9545	1 of 1	4	12 Aug 03	Certification Drawing EEx e ia IIC Specification MAG3100Ex DN350-DN2000
083Z9546	1 of 1	4	12 Aug 03	Certification Drawing Coil and Electrode Assembly MAG3100Ex DN350-DN2000
083Z9555	1 of 1	2	12 Aug 03	Certification Drawing Fixing Earthing Electrode MAG3100Ex DN350-DN2000
083R0208	1 of 1	3	12 Aug 03	Joining Coil Wire to Flying Lead MAG3100Ex Flowsensor

Issue 1

Drawing	Sheet	Rev.	Date	Description
083A0284	1 of 1	1	04 May 04	Certification Label

Issue 2

Drawing	Sheet	Rev.	Date	Description
083Z0151	1 of 1	5	27 Nov 03	Ferrule Glass Seal Assy. MAG3100Ex Flowsensor

Issue 3

Drawing	Sheet	Rev.	Date	Description
083R1633	1 of 1	3	(Sira stamp) 13 Mar 07	Pedestal Support Sleeve MAG3100 / MAG3100EX

Issue 4

Drawing	Sheet	Rev.	Date	Description
083Z9610	1 of 1	01	29 Sep 06	MAG3100Ex 'Compact' – < DN350
083Z9609	1 of 1	02	10 Aug 06	MAG3100Ex 'Compact' – >DN 350
083Z9544	1 of 1	05	09 Aug 06	Modified Terminal Box Arrangement
083Z3042	1 of 1	03	09 Aug 06	Modified Electrode Arrangement
083R0207	1 of 1	02	01 May 03	Coil Wire Jointing Method
A5E00713575A	1 of 1	05	07 Aug 07	Amalgamated Label Drawing

Issue 5

Drawing	Sheet	Rev.	Date	Description
083Z9545	1 of 1	05	25 Sep 06	Certification Drawing EEx e ia IIC Specification MAG3100Ex DN350-DN2000
083Z9609	1 of 1	03	13 Feb 07	MAG3100Ex 'Compact' – >DN 350
083Z9610	1 of 1	03	09 Feb 07	MAG3100Ex 'Compact' – DN15-2000

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com

Certificate Annexe

Certificate Number: Sira 03ATEX3339X
Equipment: SITRANS F M MAGFLO MAG3100 Ex
Applicant: Siemens Flow Instruments

**Issue 6**

Drawing	Sheet	Rev.	Date	Description
A5E01211109A	1 of 1	01	05 Sep 07	Terminal Box DN15-DN2000 Certification Drawing MAG3100Ex Sensors
083A0245	1 of 1	05	06 Oct 05	MP50 metalised polyester permanent adhesive backed.
083Z3042	1 of 1	04	12 Sep 07	Ferrule/Glass Seal Assy MAG3100 Flowsensor.
083Z9546	1 of 1	05	30 Nov 07	Certification Drawing Coil & Electrode Assembly MAG3100Ex DN350 – DN2000

Issue 7

Drawing	Sheet	Rev.	Date	Description
A5E01211109A	1 of 1	03	28 Jan 08	Terminal Box DN15-DN2000 Certification Drawing MAG3100Ex Sensors

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Rake Lane, Eccleston, Chester, CH4 9JN, England

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 Fax: +44 (0) 1244 681330
 Email: info@siracertification.com
 Web: www.siracertification.com



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 05ATEX2072X

4 Equipment: SITRANS F M MAGFLO6000 INDUSTRY Compact and Remote Version

5 Applicant: Siemens Flow Instruments A/S

6 Address: Norborgvej
6430 Nordborg
Denmark
DK-6400

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R52A14179A.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 + A1 and A2
EN 50018:2000 + A1
EN 50019:2000
EN 50020:2002
EN 50281-1-1:1998

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

Compact Version:

II 2(1)(2) GD T85°C
EEx d [ia] [ib] IIC T6 (Ta -10°C to +60°C)

Remote Version:

II 2(1)(2) GD T85°C
EEx de [ia] ia [ib] IIC T6 (Ta -10°C to +60°C)

Project Number 52A14179
Date 2 December 2005
Latest issue 17 May 2007
C. Index 12

C Ellaby
Certification Officer

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Rake Lane, Eccleston, Chester, CH4 9JN, England

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Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 05ATEX2072X

Re-issued 17 May 2007 to re-assess the certificate contents..

13 DESCRIPTION OF EQUIPMENT

The equipment is a transmitter that is intended to be used with an associated electro-magnetic flowmeter (the certification of which is not covered by this certificate). There are two versions of the transmitter, a compact version, intended to be directly attached to the flowmeter, and a remote version, intended to be located separate from a flowmeter and connected to it via cabling.

The transmitter consists of an enclosure comprising a main flameproof (EEx d) chamber and a flameproof (EEx d) terminal chamber. In addition the remote version of the transmitter has a separate second intrinsically safe (EEx ib)/ increased safety (EEx e) terminal chamber containing terminal blocks intended for the connection of the cabling to the flowmeter.

The main flameproof chamber contains an assembly of two printed circuit boards mounted on top of each other, an optional 'HART' interface module, a Profibus printed circuit board assembly, and a display/capacitive touch screen sensor switch module.

The flameproof terminal chamber contains a terminal printed circuit board assembly fitted with terminals intended for external mains supply and data interface connections. External wiring connections are made via separate flameproof cable glands mounted in the wall of the enclosure, one for the mains supply cable and the other for the data interface cable

The intrinsically safe/increased safety chamber of the remote version of the transmitter contains a terminal assembly comprising a certified increased safety (EEx e) terminal block and a separate 'plug in' terminal block intended for the intrinsic safety connections, both these terminal blocks being for external wiring connections to the separate flowmeter.

The compact version of the transmitter has 'flying leads' for direct connection to the flowmeter.

Date 2 December 2005

Latest issue 17 May 2007

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Rake Lane, Ecclestone, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.com

Web: www.siracertification.com



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 05ATEX2072X

The parameters for the transmitter are as follows:

Compact Version

Supply - Terminals L1 and N

24 V rated version: $U_m = 30\text{ V}$
230 V rated version: $U_m = 250\text{ V}$

Current Output - Terminals 31 and 32
(*'ia'* circuits)

$U_i = 30\text{ V}$
 $I_i = 100\text{ mA}$
 $C_i = 16.5\text{ nF}$
 $L_i = 36\text{ }\mu\text{H}$

*Passive mode configuration (I-OUT
PASSIVE) (see Special Conditions for
Safe Use):*

$U_o = 30\text{ V}$
 $I_o = 87.8\text{ mA}$
 $P_o = 0.66\text{ W}$
 $C_o(\text{IIB}) = 560\text{ nF}$
 $C_o(\text{IIC}) = 66\text{ nF}$
 $L_o(\text{IIB}) = 18.41\text{ mH}$
 $L_o(\text{IIC}) = 4.57\text{ mH}$

*Active mode configuration (I-OUT
ACTIVE) (see Special Conditions for Safe
Use):*

Relay Output - Terminals 44, 45 and 46
(*'ia'* circuits)

$U_i = 30\text{ V}$
 $I_i = 200\text{ mA}$
 $C_i = 0$
 $L_i = 0$

Frequency/pulse output – Terminals 56
and 57
(*'ia'* circuits)

$U_i = 28\text{ V}$
 $I_i = 100\text{ mA}$
 $C_i = 12\text{ nF}$
 $L_i = 36\text{ }\mu\text{H}$

Digital input – Terminals 77 and 78
(*'ia'* circuits)

$U_i = 30\text{ V}$
 $C_i = 0$
 $L_i = 0$

Profibus (FISCO) – Terminals 91/95,
93/96
(*'ib'* circuits)

$U_i = 17.5\text{ V}$
 $I_i = 380\text{ mA}$
 $P_i = 5.32\text{ W}$
 $C_i = 0$
 $L_i = 0$

Terminals 92 and 94

No connection permitted

Date 2 December 2005
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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 05ATEX2072X

Remote Version

Supply - Terminals L1 and N

24 V rated version: $U_m = 30\text{ V}$ 230 V rated version: $U_m = 250\text{ V}$ Current output (I-OUT) - Terminals 31 and 32
(*'ia'* circuits)
 $U_i = 30\text{ V}$
 $I_i = 100\text{ mA}$
 $C_i = 16.5\text{ nF}$
 $L_i = 36\text{ }\mu\text{H}$
*Passive mode configuration (I-OUT
 PASSIVE) (see special conditions for
 safe use):*
 $U_o = 30\text{ V}$
 $I_o = 87.8\text{ mA}$
 $P_o = 0.66\text{ W}$
 $C_o = 560\text{ nF}$
 $L_o = 18.41\text{ mH}$
*Active mode configuration (I-OUT
 ACTIVE) (see special conditions for
 safe use):*
Relay output - Terminals 44, 45 and 46
(*'ia'* circuits)
 $U_i = 30\text{ V}$
 $I_i = 200\text{ mA}$
 $C_i = 0$
 $L_i = 0$
Frequency/pulse output – Terminals 56 and 57
(*'ia'* circuits)
 $U_i = 28\text{ V}$
 $I_i = 100\text{ mA}$
 $C_i = 12\text{ nF}$
 $L_i = 36\text{ }\mu\text{H}$
Digital input – Terminals 77 and 78
(*'ia'* circuits)
 $U_i = 30\text{ V}$
 $C_i = 0$
 $L_i = 0$
Sensor electrode input – Terminals 0, 81, 82, 83
and 84
(*'ia'* circuits)
 $U_o = 30\text{ V}$
 $I_o = 6.1\text{ mA}$
 $P_o = 45.5\text{ mW}$
 $C_o(\text{IIB}) = 560\text{ nF}$
 $C_o(\text{IIC}) = 66\text{ nF}$
 $L_o(\text{IIB}) = 1\text{ H}$
 $L_o(\text{IIC}) = 0.96\text{ H}$

Sensor coil driver output – Terminals 85 and 86

Not applicable. These are 'Ex e' terminals

Profibus (FISCO) – Terminals 91/95, 93/96
(*'ib'* circuits)
 $U_i = 17.5\text{ V}$
 $I_i = 380\text{ mA}$
 $P_i = 5.32\text{ W}$
 $C_i = 0$
 $L_i = 0$

Terminals 92 and 94

No connection permitted

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.comWeb: www.siracertification.com

**SCHEDULE****EC TYPE-EXAMINATION CERTIFICATE**

Sira 05ATEX2072X

14 **DESCRIPTIVE DOCUMENTS**

14.1 Drawing

Number	Sheet	Rev.	Date	Description
083H4244	1 of 1	-	16 Sep 04	Power Supply Opto-Isolator
085R4038	1 to 9	03	12 Apr 07	Modifications and Critical Component Parts List
A5E00713575A	1 of 1	04	09 May 07	Certification Label
A5E00706109A	1 of 1	01	03 Nov 05	I-Out Active/Passive Label
A5E00693781A	1 of 1	02	11 May 07	ia/e Terminal Assembly
085U4426	1 of 1	02	29 Nov 05	Circuit Inductance
A5E00706235A	1 of 1	03	02 Dec 05	Board Interconnections
A5E00704948B (085U3119)	1 of 2	Issue - Rev 02	01 Nov 05	24V STAC Assembly Details – Top Side
A5E00704948B (085U3119)	2 of 2	Issue - Rev 02	01 Nov 05	24V STAC Assembly Details – Bottom Side
A5E00704948A (085U3119)	1 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	2 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	3 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	4 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	5 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	6 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	7 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	8 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	9 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	10 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704948A (085U3119)	11 of 11	Issue - Rev 02	01 Nov 05	24V STAC Circuit
A5E00704951B (085U3120)	1 of 2	Issue - Rev. 02	01 Nov 05	230V/IIB STAC Assembly Details – Top Side
A5E00704951B (085U3120)	2 of 2	Issue - Rev. 02	01 Nov 05	230V STAC Assembly Details – Bottom Side

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.comWeb: www.siracertification.com

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Sira 05ATEX2072X

Number	Sheet	Rev.	Date	Description
A5E00704951A (085U3120)	1 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	2 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	3 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	4 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	5 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	6 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	7 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	8 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	9 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	10 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
A5E00704951A (085U3120)	11 of 11	Issue - Rev 02	07 Nov 05	230V STAC Circuit
085U3308	B1	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Drill Ident – Top Side
085U3308	DT	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Legend – Top Side
085U3308	CT	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Solder Mask – Top Side
085U3308	ST	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Solder Paste – Top Side
085U3308	AT	Issue 05 Rev. 00	09 Mar 05	STAC PCB - CU Pattern – Top Side
085U3308	A3	Issue 05 Rev. 00	09 Mar 05	STAC PCB - CU Pattern – Inner Layer
085U3308	A2	Issue 05 Rev. 00	09 Mar 05	STAC PCB - CU Pattern – Inner Layer
085U3308	AB	Issue 05 Rev. 00	09 Mar 05	STAC PCB - CU Pattern – Bottom Side
085U3308	CB	Issue 05 Rev. 00	09 Mar 05	STAC PCB - CU Mask – Bottom Side
085U3308	DB	Issue 05 Rev. 00	09 Mar 05	STAC PCB - Legend – Bottom Side

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

**SCHEDULE****EC TYPE-EXAMINATION CERTIFICATE**

Sira 05ATEX2072X

Number	Sheet	Rev.	Date	Description
085U3308	VB	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Via Plug – Bottom Side
085U3308	2b	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Assembly – Bottom Side
085U3308	HB	Issue 05 Rev. 00	09 Mar 05	STAC PCB – Peelable Mask – Bottom Side
085U3304	1 of 1	Rev. 02	26 Mar 04	Transformer T200 – 24V version - Details
085U3311	1 of 1	-	30 Mar 04	Transformer T200 – 230V version - Details
085U3305	1 of 1	01	28 Mar 07	Transformer T301 - Details
085U3306	1 of 1	01	28 Mar 07	Transformer T120 - Details
085U3102	1 of 2	Issue - Rev. 01	03 Nov 05	Hart Module - Assembly Details – Top Side
085U3102	2 of 2	Issue - Rev. 01	03 Nov 05	Hart Module - Assembly Details – Bottom Side
085C4417	1 of 3	01	3 Nov 05	Hart Module - Circuit
085C4417	2 of 3	01	3 Nov 05	Hart Module - Circuit
085C4417	3 of 3	01	3 Nov 05	Hart Module - Circuit
085U3309	F1	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – Panel Ident
085U3309	B1	Issue 03 Rev. 00	03 May 05	Hart Module PCB – Drill Ident – Top Side
085U3309	CT	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – Solder Mask – Top Side
085U3309	ST	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – Solder Paste – Top Side
085U3309	AT	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – CU Pattern – Top Side
085U3309	A2	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – CU Pattern - Inner Layer
085U3309	A3	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – CU Pattern - Inner Layer
085U3309	AB	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – CU Pattern – Bottom Side
085U3309	SB	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – Solder Paste – Bottom Side
085U3309	CB	Issue 03 Rev. 00	23 Apr 05	Hart Module PCB – Solder Mask – Bottom Side
085U3364	1 of 13	Issue 04 Rev. 01	06 Jan 05	I-0 Terminal P.C.B. – Drawing List
085U3364	2 of 13	Issue 04 Rev. 01	06 Jan 05	I-0 Terminal P.C.B. – CU Pattern Top Layer

Date 2 December 2005

Latest issue 17 May 2007

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Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.comWeb: www.siracertification.com

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Number	Sheet	Rev.	Date	Description
085U3364	3 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – CU Pattern – Bottom Layer
085U3364	4 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – CU Pattern – Inner Layer 1
085U3364	5 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – CU Pattern – Inner Layer 2
085U3364	6 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Solder Mask – Top Layer
085U3364	7 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Solder Mask – Bottom Layer
085U3364	8 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Solder Paste – Bottom Layer
085U3364	9 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Silk Screen – Top Layer
085U3364	10 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Silk Screen – Bottom Layer
085U3364	11 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Assembly – Top Layer
085U3364	12 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Assembly – Bottom layer
085U3364	13 of 13	Issue 04 Rev. 01	06 Jan 05	I-O Terminal P.C.B. – Drill Drawing
085C4422	1 of 2	Issue 03 Rev. 00	26 Nov 04	I-O Terminal P.C.B. – Circuit Diagram - Front Sheet
085C4422	2 of 2	Issue 03 Rev. 00	09 Sep 04	I-O Terminal P.C.B. – Circuit Diagram
085U3140	1 of 1	i1042 001 476	05 Jul 06	Electrode / Coil Wires Remote Ex
085U3323	1 of 1	i1042 001 356	08 Dec 04	Pedestal pipe Ex Industrial Enclosure
083G0793	1 of 1	-	24 May 06	Screw
083G0798	1 of 1	23867 001 013	22 Apr 94	Seal Ring
085U9003	1 of 1	5	16 Feb 07	General arrangement
A5E00136759A	1 of 1	2	28 Mar 06	USD Housing Machined
A5E00785490A	1 of 1	1	29 Mar 06	Housing
C79451-A3488- C9	1 of 1	3	10 May 06	Cap
C79451-A3488- C44	1 of 1	2	18 Oct 01	Security fastener
C79451-A3488- B1	1 of 1	1	10 Jun 97	Window assembly
C79451-A3488-C112	1 of 1	4	11 Dec 00	Flameproof bushing
A5E00866447A	1 of 1	3	01 May 07	Flange
A5E00090112	1 of 1	3	26 Feb 03	Connector, adapter
A5E00080428	1 of 1	2	14 Jun 06	Cap

14.2 Report number R52A14179A

Date 2 December 2005

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

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- 15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)
- 15.1 The equipment can be supplied with its Current Output (Terminals 31 and 32) configured in either an Active Mode (I-OUT ACTIVE) or a Passive Mode (I-OUT PASSIVE), the configured mode of any particular transmitter being marked on a label fitted to the inside of the mains supply/data interface terminal chamber lid. The user shall refer to this label to determine the configured mode of a particular transmitter to determine which one of the two sets of parameters specified for the Current Output is applicable. The mode of a transmitter is not user configurable.
- 15.2 The external connections to Terminals 85 and 86 shall comply with the following:
- 15.2.1 The wire conductors shall have a cross-sectional area between 0.5mm² and 2.5mm².
- 15.2.2 No more than one single or multiple strand wire conductor shall normally be connected to each of the terminals. If multiple conductors are required, these shall be joined in a suitable manner, e.g. two conductors into a single insulated crimped boot lace ferrule.
- 15.2.3 The insulation on the wire conductors shall extend to within 1mm of the metal of the terminal throat.
- 15.2.4 The terminal screws shall be tightened down with a torque between 0.4 Nm and 0.45Nm.
- 15.3 The equipment shall not be opened when an explosive gas or dust atmosphere may be present.
- 16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)
- The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in report number R52A14179A.
- 17 **CONDITIONS OF CERTIFICATION**
- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 The manufacturer shall conduct a routine hydrostatic overpressure test at 28.2 bar on each enclosure manufactured.
- 17.4 The manufacturer shall use an elastomeric sealing ring for the internal cable entry device that has a minimum uncompressed axial height of 5mm.
- 17.5 The compression screw for the internal cable entry device with elastomeric sealing shall be tightened to a torque of 3 Nm.
- 17.6 Transformer T200 in this equipment shall be subjected to a routine test voltage of 2500V r.m.s. between primary and secondary windings and between feedback and secondary windings. There shall be no breakdown of insulation as required by clause 11.2 of EN 50020:2002.
- 17.7 The equipment shall be subjected to a routine test voltage of 500V r.m.s. between Terminals 0, 31, 32, 44, 45, 46, 56, 57, 77, 78, 81, 82, 83, 84, 95 and 96 and the enclosure/earth in accordance with clause

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10.6 of EN 50020:2002. There shall be no breakdown of insulation as required by clause 6.4.12 of EN 50020:2002.

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Tel: +44 (0) 1244 670900
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- 17.8 The equipment shall be subjected to a routine test voltage of 1500V r.m.s. between Terminals 0, 31, 32, 44, 45, 46, 56, 57, 77, 78, 81, 82, 83, 84, 95 and 96 and Terminals L1 and N in accordance with clause 10.6 of EN 50020:2002. There shall be no breakdown of insulation as required by clause 6.4.12 of EN 50020:2002.
- 17.9 The Compact Version of the equipment, as supplied, shall only be connected and mounted to another item of certified Ex d or Ex e equipment (e.g. an electro-magnetic flowmeter). This 'other equipment' shall be certified for such an arrangement i.e. the associated certificate shall cover the mounting and connection of the SITRANS F M MAGFLO6000 INDUSTRY. Supply of the Compact Version of the equipment in isolation is not permitted.
- 17.10 The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of the products.

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are always welcomed.

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