



Quick Guide



ACCUMAG

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Distributed By



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Content

CHAPTER 1, SAFETY INSTRUCTIONS	1
1.1 Instructions for transportation and handling of batteries	1
CHAPTER 2, INSTALLATION	3
2.1 Scope of delivery	3
2.2 Device description	3
2.3 Nameplate	5
2.4 Transport	5
2.5 Pre-Installation Requirements	6
2.6 Installation conditions	6
2.6.1 General requirements	6
2.6.2 Inlet and outlet	7
2.6.3 Vibration	8
2.6.4 Mounting position and flange deviation	8
2.6.5 T-section	9
2.6.6 Magnetic field	9
2.6.7 Open discharge	10
2.6.8 Bends	10
2.6.9 Control valve	11
2.6.10 Air venting and vacuum forces	12
2.6.11 Pump	12
2.6.12 IP68	13
2.7 Torques and pressures	14
2.8 Mounting of the field housing, remote version	16
2.8.1 Pipe mounting	16
2.8.2 Wall mounting	16
2.9 Mounting of the IP68 version	17
CHAPTER 3, ELECTRICAL CONNECTIONS	19
3.1 Safety Instructions	19
3.2 Grounding	20
3.3 Connection of the signal cable	21
3.3.1 IP 67 housing (field version)	21
3.4 Connection of the output cable	23
3.4.1 IP67 housing (compact and field versions)	23
3.4.2 IP68 housing (compact version)	25
CHAPTER 4, START-UP	27
4.1 Connecting the battery	27
4.2 Replacing the battery	28
4.3 Βαττερψ τυπεσ	30

CHAPTER 5, OPERATION	31
5.1 Display and operating elements	31
CHAPTER 6, SERVICE	33
6.1 Spare parts availability	33
6.2 Availability of services	33
CHAPTER 7, TECHNICAL DATA	35
7.1 Dimensions and weights	35

1 Safety Instructions

1.1 Instructions for transportation and handling of batteries



The used lithium batteries are primary power sources with high energy content. If mistreated, they may present a potential risk.

Note: The manufacturer assumes no liability for customer failure.

Please observe the following instructions:

- Transport only in special packaging with special labels and transportation documents.
- Do not short-circuit, recharge, overcharge or connect with false polarity.
- Do not expose to temperature beyond the specified temperature range or incinerate the battery.
- Do not crush, puncture or open cells or disassemble battery packs.
- Do not weld or solder to the body of the battery.
- Do not expose contents of battery to water.
- Remove the battery from device before returning to the manufacturer for service or warranty reasons.
- Dispose of battery packs in accordance with local regulations; where possible, recycle used batteries.

2 Installation

2.1 Scope of delivery

Do a check of the packing list to make sure that you have all the elements given in the order.

Inspect the cartons carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

The device will arrive in two cartons. One carton contains the converter and one carton contains the sensor.

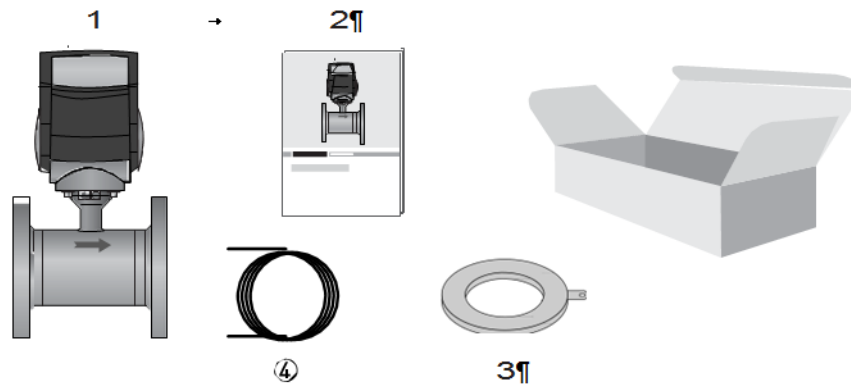


Figure 2-1: Scope of delivery

1. Ordered signal converter
2. Product documentation
3. Grounding rings (optional for DN350...600)
4. Cable (remote versions only)

Note: Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with applicable occupational health and safety directives.

2.2 Device description

Electromagnetic flow meters are designed exclusively to measure the flow and conductivity of electrically conductive, liquid media.

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

The following versions are available:

- Compact version (the signal converter is mounted directly on the measuring sensor) in aluminium (IP67) or polycarbonate (IP68) housing.
- Remote version (measuring sensor with connection box and a signal converter in a remote (field) housing).

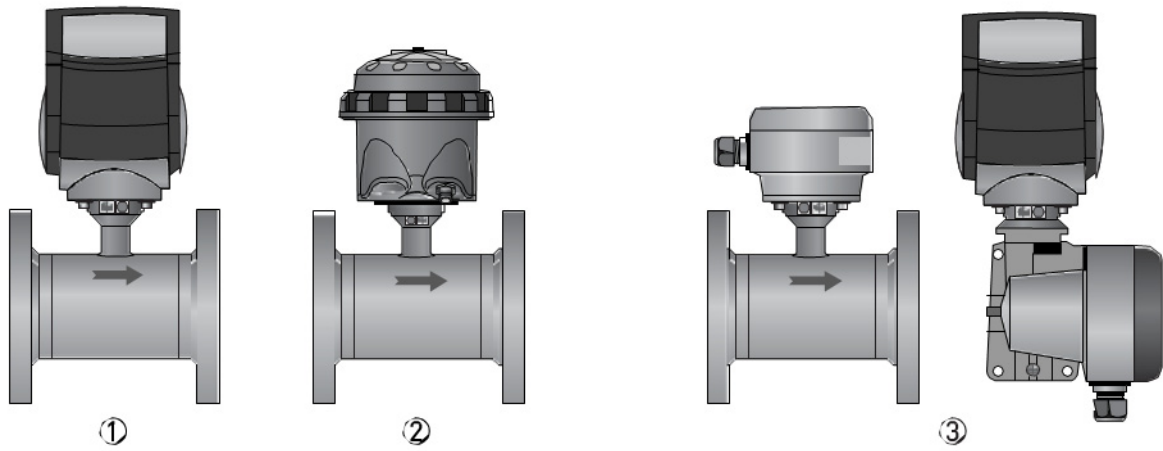


Figure 2-2: Device Versions

1. Compact version (aluminium housing, IP 67)
2. Compact version (polycarbonate housing, IP 68)
3. Remote version

2.3 Nameplate

Check the device nameplate to ensure that the device is delivered according to your order. Additional information (i.e. correct supply voltage) can be found in the documentation of the signal converter.

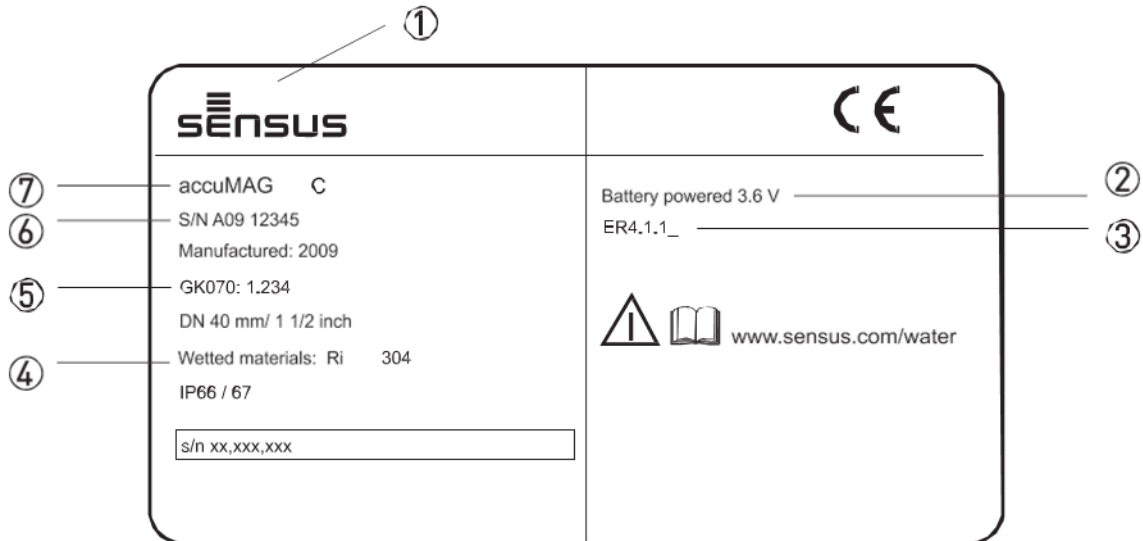


Figure 2-3: Example for nameplate

1. Manufacturer
2. Voltage information
3. Electronic Revision number
4. Material of wetted parts
5. Meter constant
6. Serial number
7. Device type

2.4 Transport

Signal converter

- No special requirements.

Compact version

- Do not lift the device by the signal converter housing.
- Do not use lifting chains.
- To transport flange devices, use lifting straps. Wrap these around both process connections.

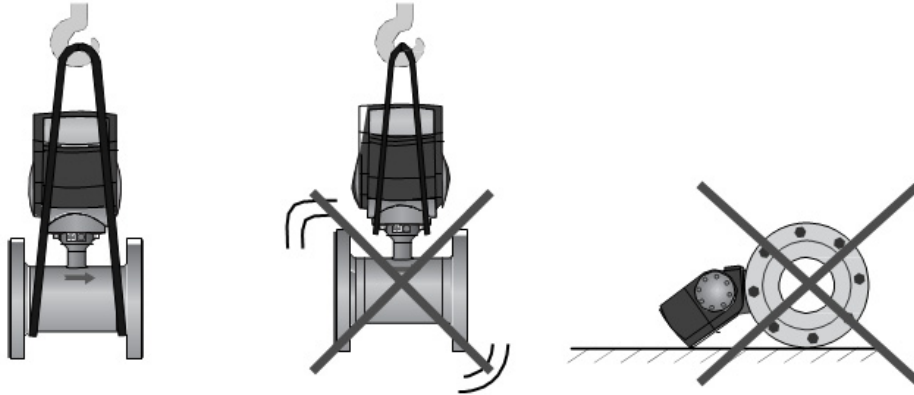


Figure 2-4: Transport

2.5 Pre-Installation Requirements

Make sure that you have all necessary tools available:

- Allen key (4 mm)
- Small screwdriver
- Wrench for cable glands
- Wrench for wall mounting bracket (remote version only)
- Torque wrench for installing flow meter in pipeline

2.6 Installation conditions

2.6.1 General requirements

The following precautions must be taken to ensure reliable installation.

- Make sure that there is adequate space to the sides.
- Protect the signal converter from direct sunlight and install a sun shade if necessary.
- Signal converters installed in control cabinets require adequate cooling, e.g. by fan or heat exchanger.
- Do not expose the signal converter to intense vibration. The flow meters are tested for a vibration level in accordance with IEC 68-2-64.

2.6.2 Inlet and outlet

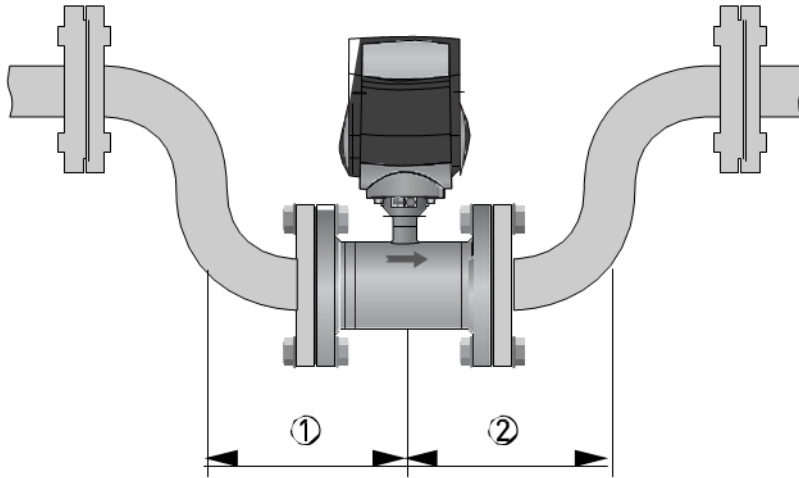


Figure 2-5: DN25...300

1. Inlet: ≥ 0 DN
2. Outlet: ≥ 0 DN

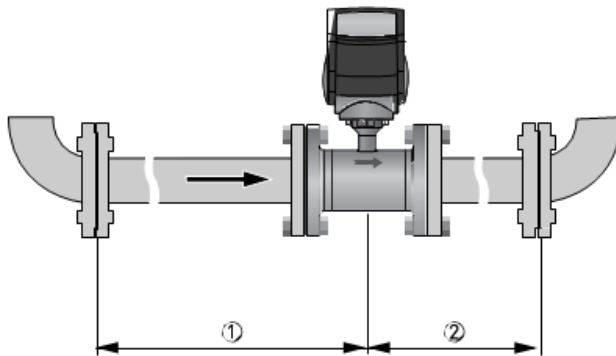


Figure 2-6: DN350...600

1. Inlet: ≥ 5 DN
2. Outlet ≥ 2 DN

2.6.3 Vibration

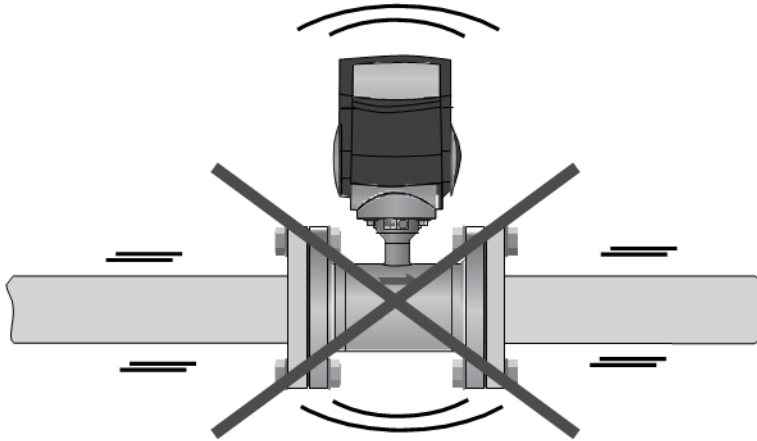


Figure 2-7: Avoid vibrations

2.6.4 Mounting position and flange deviation

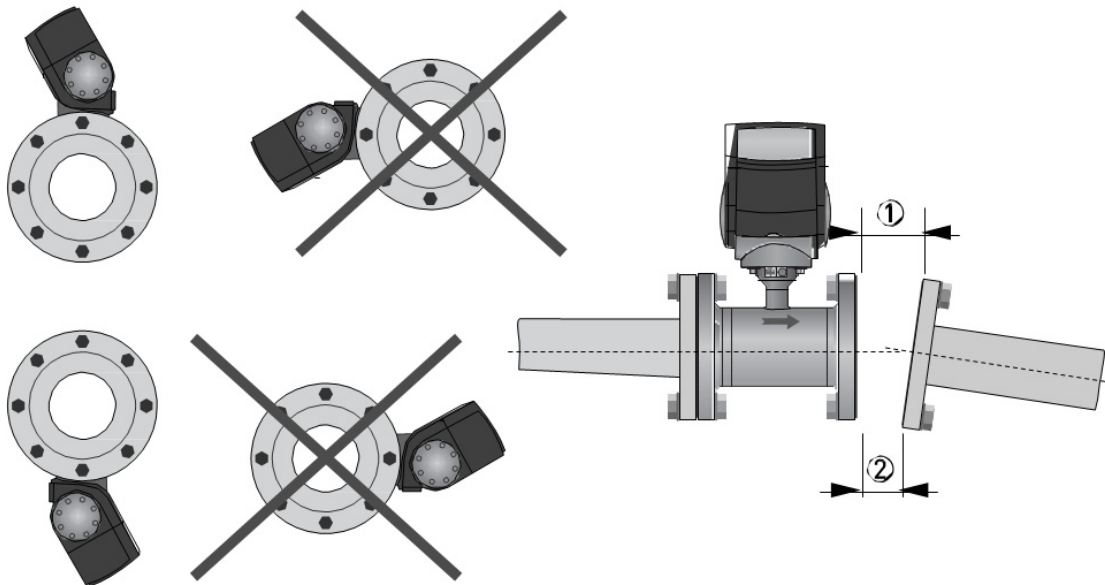


Figure 2-8: Mounting position and flange deviation

1. L_{\max}
 2. L_{\min}
- Mount sensor either with converter aligned upwards or downwards.
 - Install sensor in line with the pipe axis.
 - Pipe flange faces must be parallel to each other.

CAUTION!

Max. permissible deviation of pipe flange faces: $L_{\max} - L_{\min} \leq 0.5 \text{ mm} / 0.02''$.

2.6.5 T-section

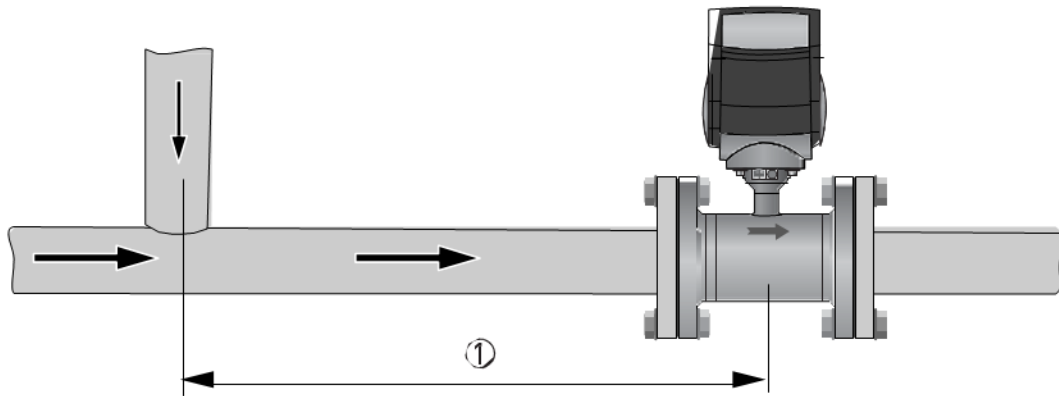


Figure 2-9: Distance after T-sections

1. DN25...300: $\geq 0 \text{ DN}$
2. DN350...600: $\geq 10 \text{ DN}$

2.6.6 Magnetic field

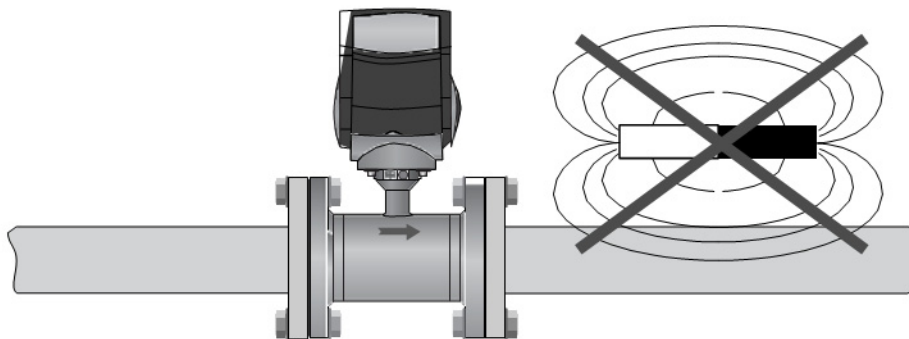


Figure 2-10: Avoid magnetic fields

2.6.7 Open discharge

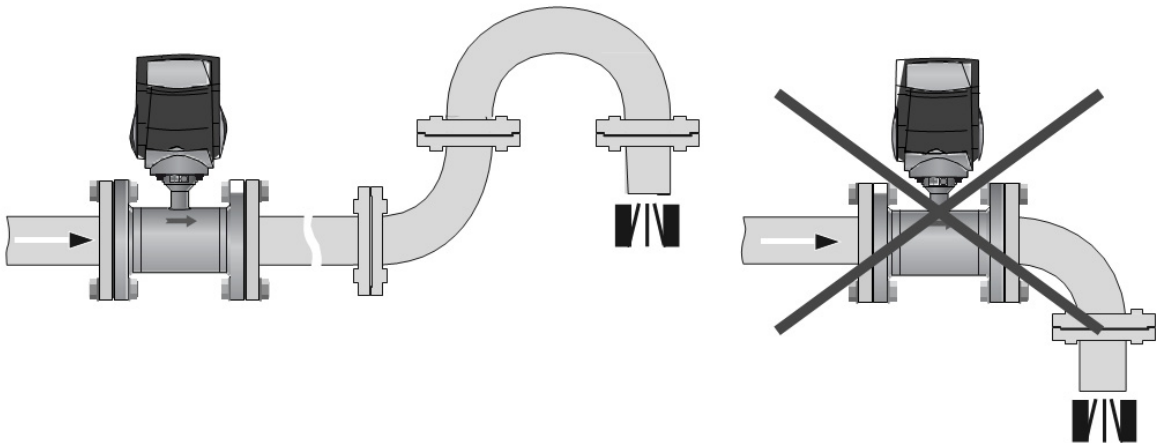


Figure 2-11: Installation before an open discharge

2.6.8 Bends

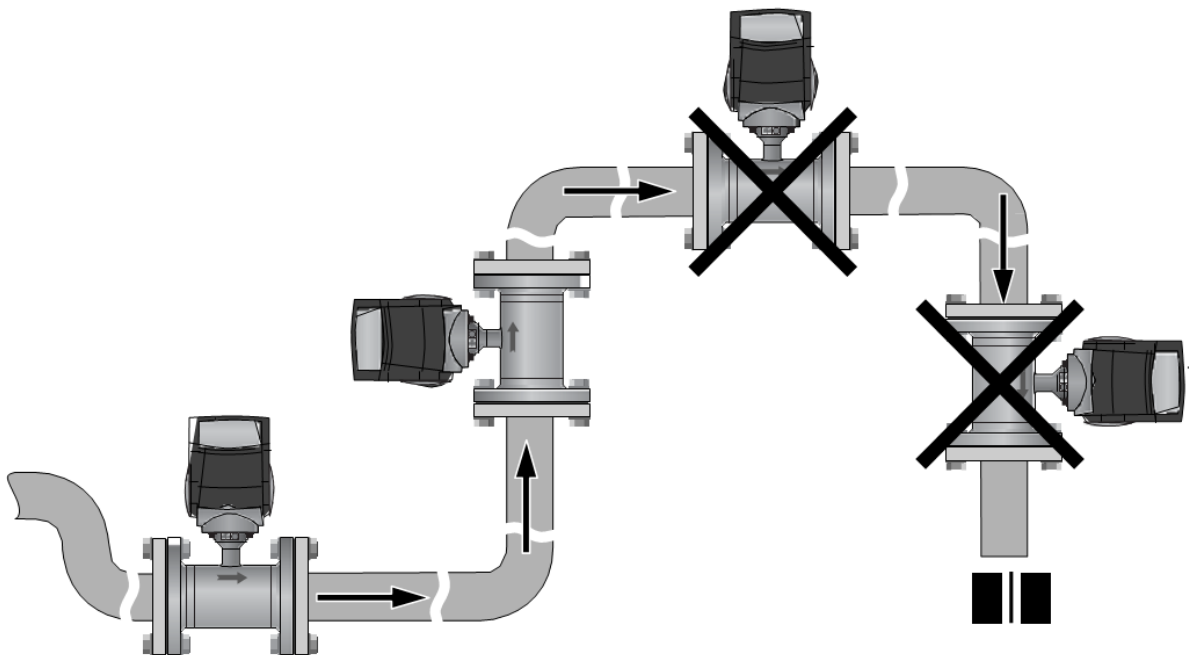


Figure 2-12: Installation in bending pipes

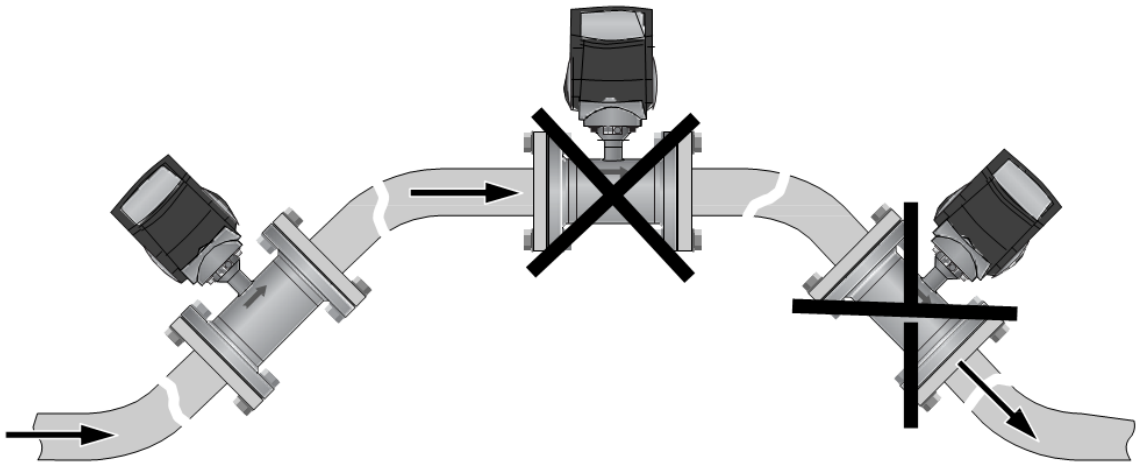


Figure 2-13: Installation in bending pipes

2.6.9 Control valve

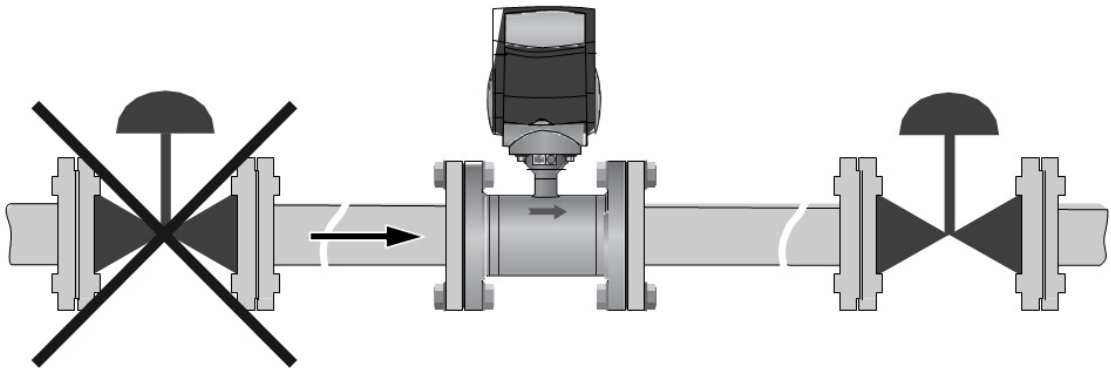


Figure 2-14: Recommended installation: before control valve

2.6.10 Air venting and vacuum forces

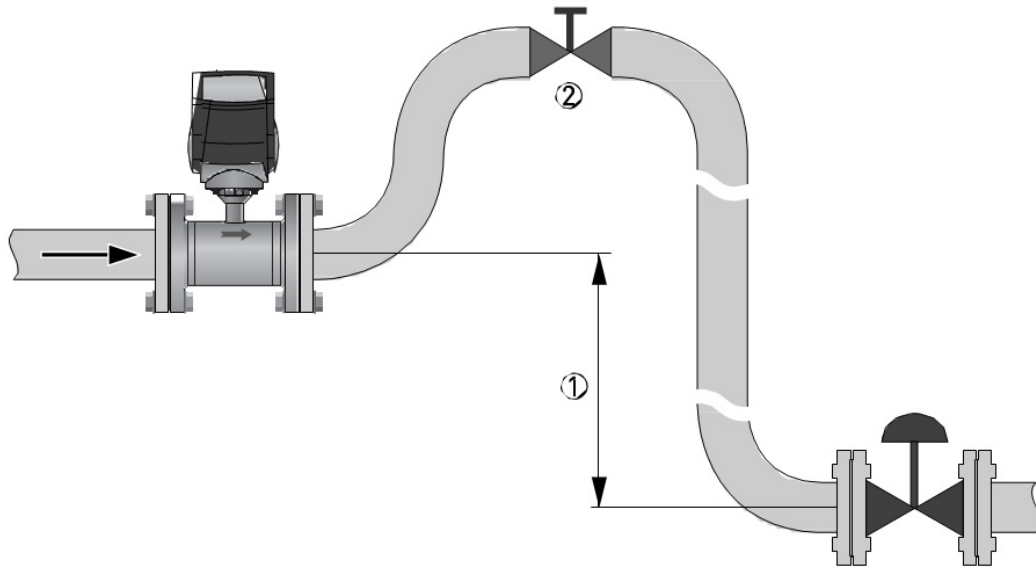


Figure 2-15: Air Venting

1. ≥ 5 m
2. Air ventilation point

2.6.11 Pump

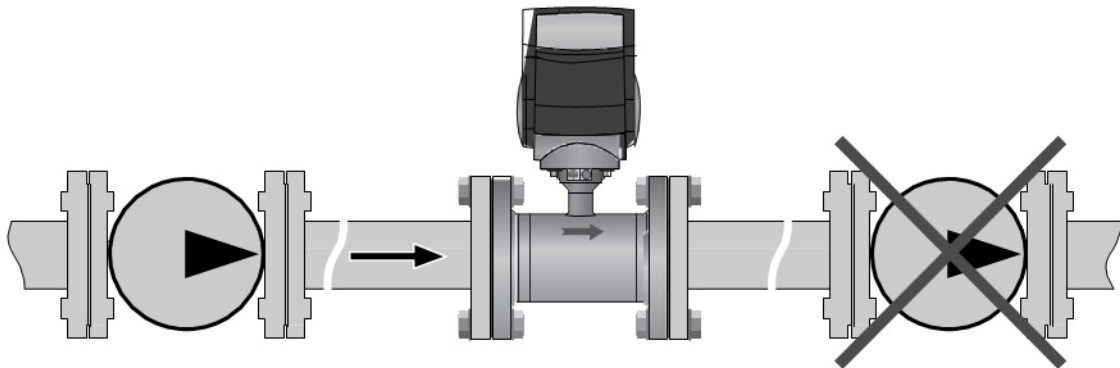


Figure 2-16: Recommended installation: after pump

2.6.12 IP68

The accuMag 3000 flow sensor is rated IP68 (NEMA 4X/6P). It is suitable for submersion in flooded measurement chambers and for subsurface installation.

The compact accuMag 070 signal converter is available in:

- an aluminium housing suitable for IP66/67, NEMA 4/4X/6
- a polycarbonate housing suitable for IP68, NEMA 4/4X/6.

This version is suitable for periodic submersion in flooded measurement chambers. The output cable has IP68 rated (military) connectors.

In case of continuous or long term submersion it is advised to select the field (remote) version (IP66/67). Submersion under water is possible down to a depth of 5 meters.

The remote accuMag 070 signal converter is available in:

- an aluminium housing suitable for IP66/67, NEMA 4/4X/6.

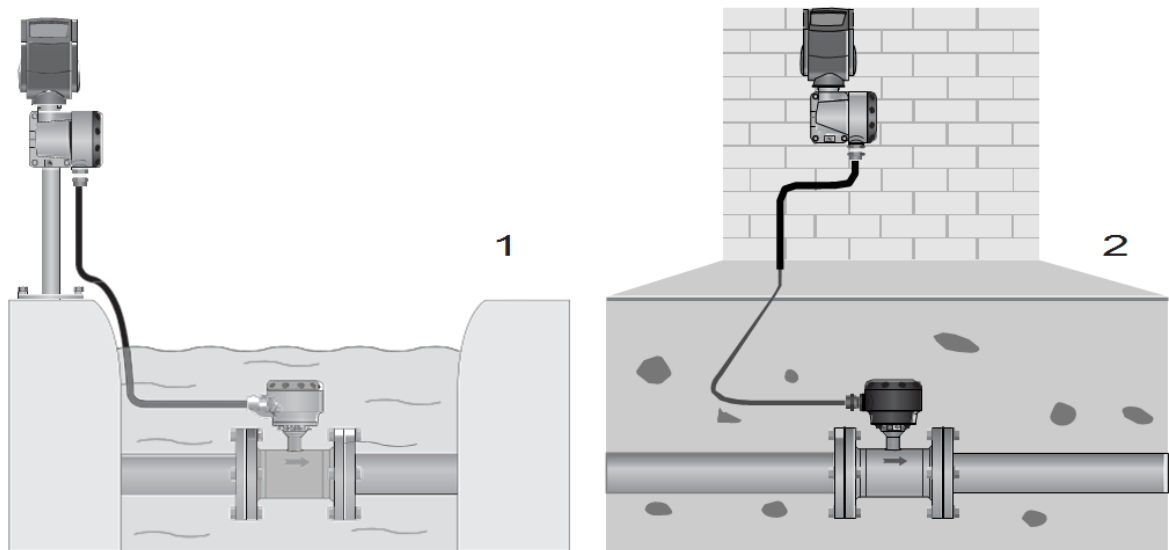


Figure 2-17: IP68 versions

1. Submersible
2. Buried

2.7 Torques and pressures

Here you find the maximum pressure and torques for the flow meter. All values are theoretical and calculated for optimum conditions and use with carbon steel flanges.

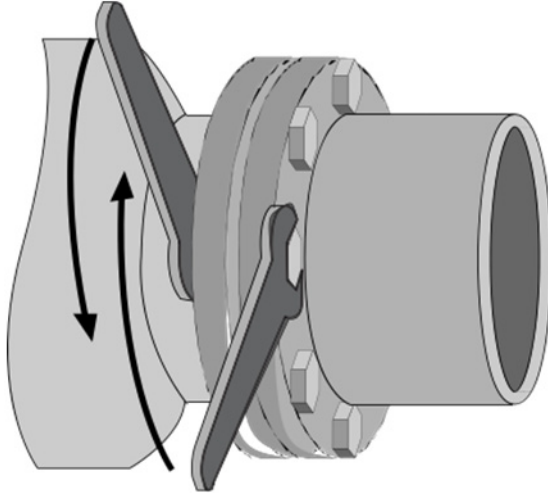


Figure 2-18: Tightening of bolts

Tightening of bolts

- Step 1: Apply approx. 50% of max. torque given in table.
- Step 2: Apply approx. 80% of max. torque given in table.
- Step 3: Apply 100% of max. torque given in table.

Table 2-1: Torque Values

Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm]	
			Rilsan®	Hard Rubber
25	PN 16	4 x M 12	6	-
40	PN 16	4 x M 16	36	-
50	PN 16	4 x M 16	50	-
65	PN 16	4 x M 16	50	-
80	PN 16	8 x M 16	35	-
100	PN 16	8 x M 16	35	-
125	PN 16	8 x M 16	40	-
150	PN 10 / PN 16	8 x M 20	45	-
200	PN 10	12 x M 20	45	-

Table 2-1: Torque Values

Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm]	
			Rilsan®	Hard Rubber
250	PN 10	12 x M 20	65	-
300	PN 10	12 x M 20	76	-
350	PN 10	16 x M 20	-	75
400	PN 10	16 x M 24	-	104
450	PN 10	20 x M 24	-	93
500	PN 10	20 x M 24	-	107
600	PN 10	20 x M 27	-	138

Table 2-2: Torque Values

Nominal size [inches]	Flange class [lb]	Bolts	Max. torque [lbs.ft]	
			Rilsan®	Hard Rubber
1	150	4 x 1/2"	6	-
1½	150	4 x 1/2"	15	-
2	150	4 x 5/8"	25	-
3	150	4 x 5/8"	45	-
4	150	8 x 5/8"	35	-
5	150	8 x 3/4"	45	-
6	150	8 x 3/4"	55	-
8	150	8 x 3/4"	70	-
10	150	12 x 7/8"	116	-
12	150	12 x 7/8"	144	-
14	150	12 x 1"	-	93
16	150	16 x 1"	-	91
18	150	16 x 1 1/8"	-	143
20	150	20 x 1 1/8"	-	127
24	150	20 x 1 1/4"	-	180

2.8 Mounting of the field housing, remote version

Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

2.8.1 Pipe mounting

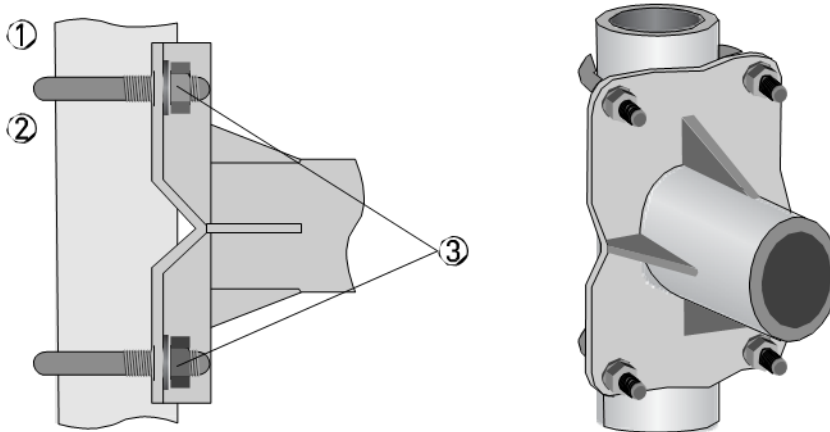


Figure 2-19: Pipe mounting of the field housing

1. Fix the signal converter to the pipe.
2. Fasten the signal converter using standard U-bolts and washers.
3. Tighten the nuts.

2.8.2 Wall mounting

No special requirements.

2.9 Mounting of the IP68 version

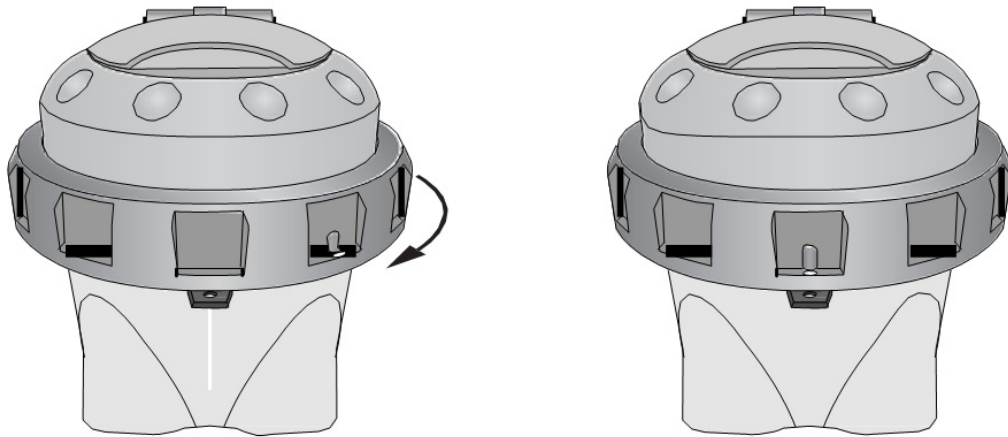


Figure 2-20: Closing of IP68 housing

1. Before closing the case of the converter, ensure that all surfaces in contact with the seals are clean.
2. Position the upper part of the case and tighten the lock ring.
3. Use the wrench to tighten the ring as shown.

3 Electrical Connections

3.1 Safety Instructions

 **CAUTION!**

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

 **CAUTION!**

Observe the national regulations for electrical installations!

 **CAUTION!**

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Grounding

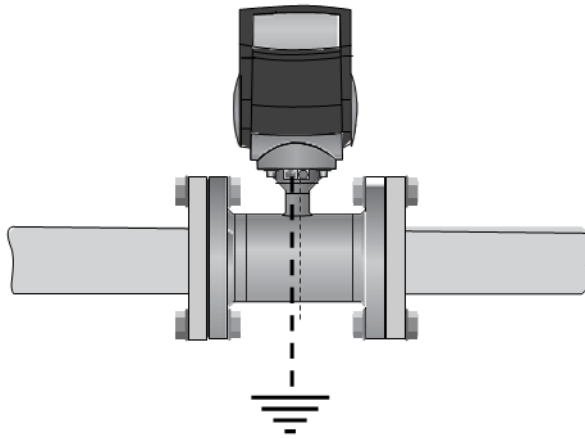


Figure 3-1: Grounding

! CAUTION!

DN25...300: grounding without grounding rings. The flow sensor is equipped with a reference electrode.

! CAUTION!

DN350...600: apply grounding rings if required. For example in case of metal pipes with internal coating and non-conductive pipelines.

3.3 Connection of the signal cable

3.3.1 IP 67 housing (field version)



CAUTION!

To ensure smooth functioning, always use the signal cables included in the delivery.

The signal cable is only used for remote versions. The standard cable includes both electrode and field current leads.

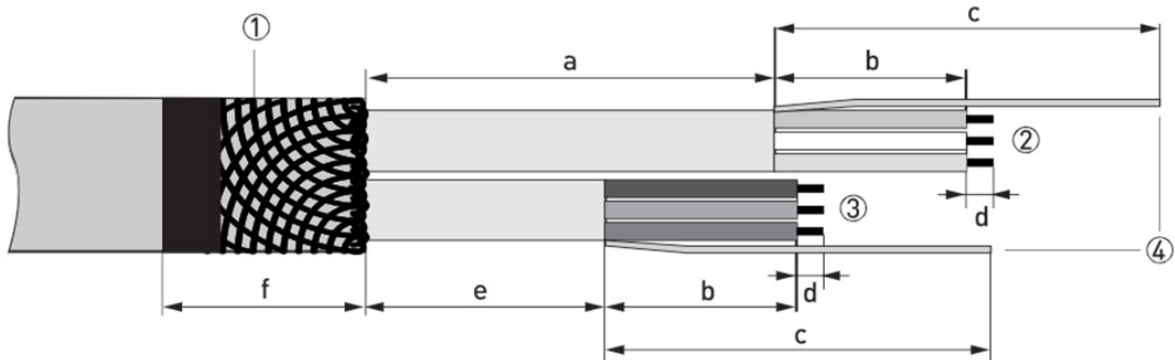


Figure 3-2: Preparation of standard cable (both sides)

1. 1 Shielding
2. 2 Blue + green + yellow cable, used for field current (terminals 7, 8, 9)
3. 3 Brown + white + violet cable, used for electrode signals (terminals 1, 2, 3)
4. 4 Drain wires

Table 3-1: Dimensions of cable

	a	b	c	d	e	f
mm	75	35	70	5	45	30
inch	3.0	1.4	2.8	0.2	1.8	1.2

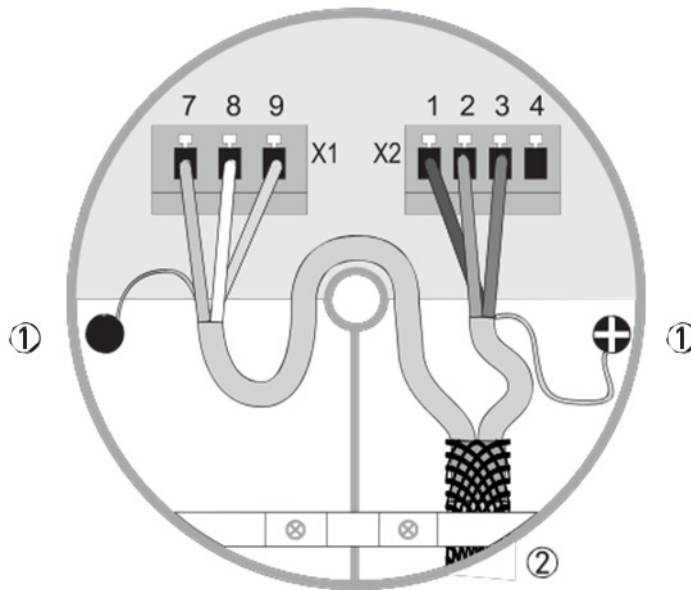


Figure 3-3: Cable connection at sensor side, standard cable

1. 1 Connect drain wires under screw
2. 2 Connect shielding under clamp

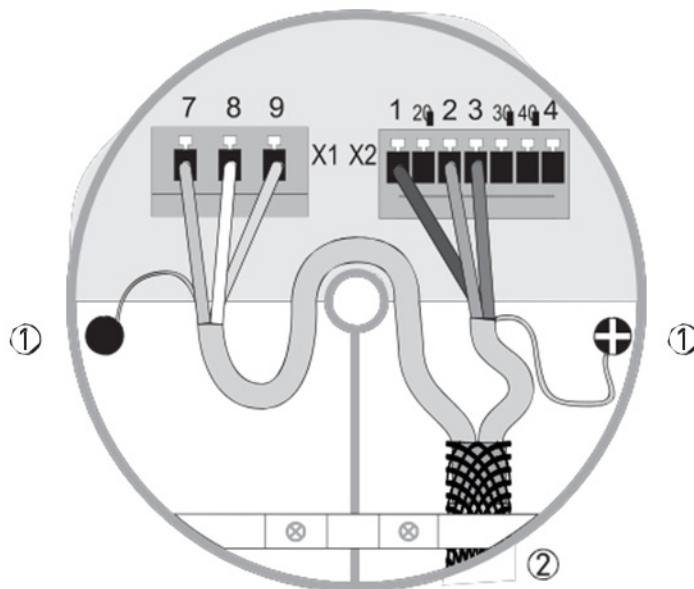


Figure 3-4: Cable connection at converter side, standard cable

1. Connect drain wires under screw
2. Connect shielding under clamp
 - a. Prepare appropriate cable lengths as shown.
 - b. Connect the wires as shown in the following table.

Table 3-2: Wire Color Definitions

Wire color	Terminal	Function
Brown	1	Reference electrode
White	2	Standard electrode signal
Violet	3	Standard electrode signal
Blue	7	Field current
Green	8	Field current
Yellow	9	No function
Drain wires	Screws	Shielding

3.4 Connection of the output cable

3.4.1 IP67 housing (compact and field versions)

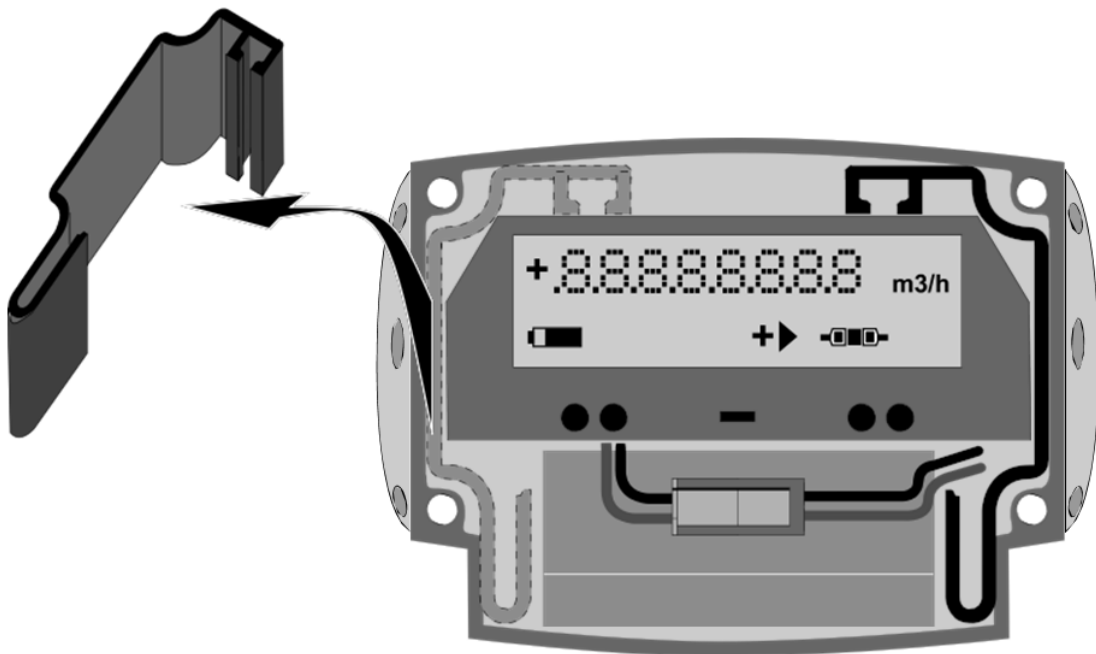


Figure 3-5: Removing side cap

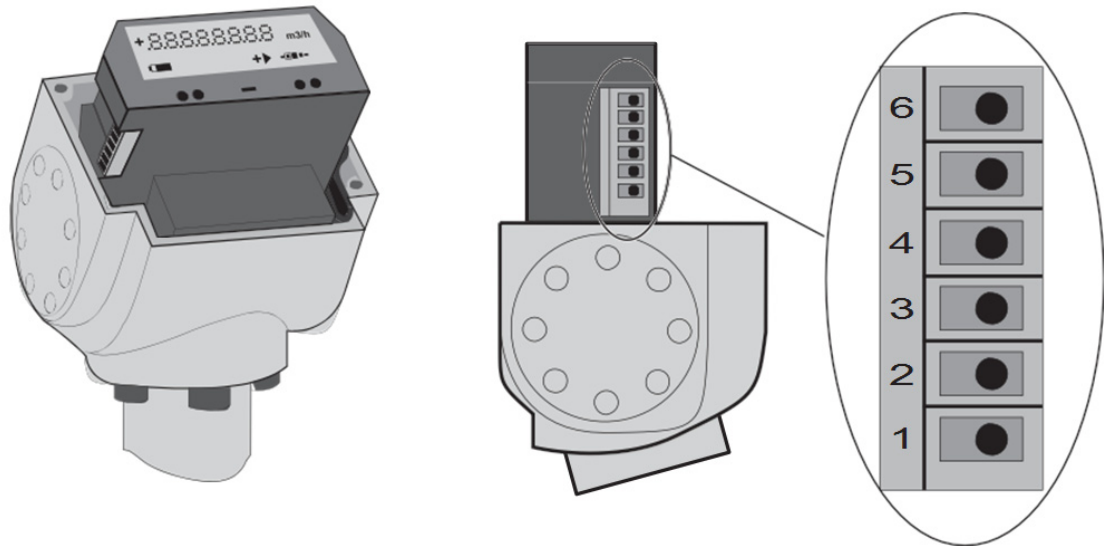


Figure 3-6: Terminal assignment

1. Status output 1 or pulse output C
2. Status output 2
3. Not used
4. Common ground
5. Pulse output A
6. Pulse output B

Electrical values

- Pulse output passive:
 $f \leq 100 \text{ Hz}$; $I \leq 10 \text{ mA}$; $U: 2.7 \dots 24 \text{ VDC}$ ($P \leq 100 \text{ mW}$)
- Status output passive:
 $I \leq 10 \text{ mA}$; $U: 2.7 \dots 24 \text{ VDC}$ ($P \leq 100 \text{ mW}$)

3.4.2 IP68 housing (compact version)

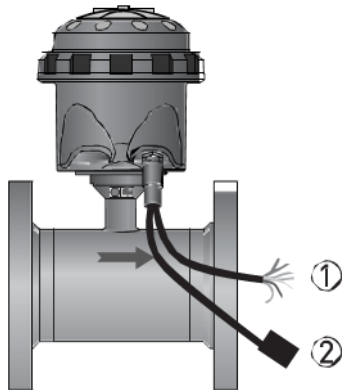


Figure 3-7: Output cable at IP68 compact version

1. Color coded leads of output cable
2. AMR module

Table 3-3: Wire connections and functions

Wire color	Contact on connector	Function
Yellow	A	Status output 1
White	G	Status output 2
Blue	H	Ground
Brown	B	Pulse output A
Green	F	Pulse output B

Electrical values

- Pulse output passive:
 $f \leq 100 \text{ Hz}$; $I \leq 10 \text{ mA}$; $U: 2.7 \dots 24 \text{ VDC}$ ($P \leq 100 \text{ mW}$)
- Status output passive:
 $I \leq 10 \text{ mA}$; $U: 2.7 \dots 24 \text{ VDC}$ ($P \leq 100 \text{ mW}$)

4 Start-up

4.1 Connecting the battery

! CAUTION!

Please connect the battery before first use. Each converter is always delivered with a disconnected battery.

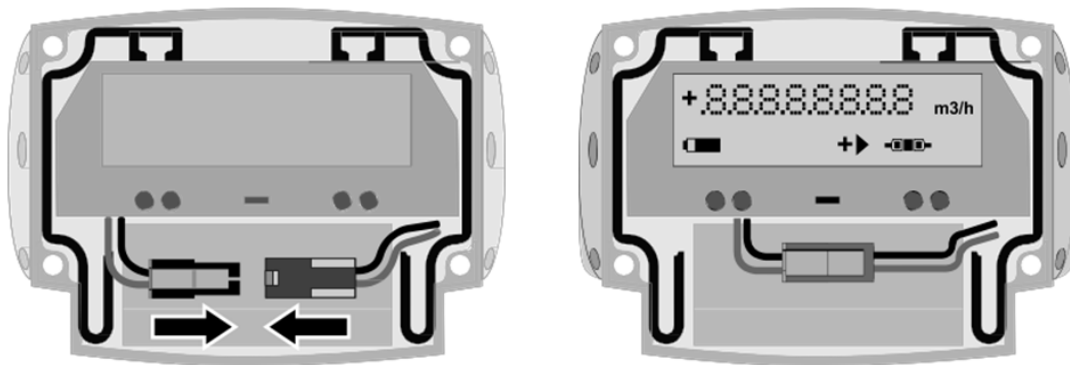


Figure 4-1: Connecting the battery

1. Remove the protective cap and loosen the 4 Allen bolts (4mm) (IP67 housing).
2. Remove the cover.
3. Fasten the battery connector to the internal connector in the converter.
4. Verify the display lights up.
5. Replace the cover.

! CAUTION!

Make sure that the battery cable is not jammed by the cover.

6. Tighten the 4 bolts and replace the protective cap

The instrument now operates with default settings. For configuration of these settings, please refer to the handbook of the signal converter.

4.2 Replacing the battery

⚠ CAUTION!

Please connect the battery before first use. Each converter is always delivered with a disconnected battery.

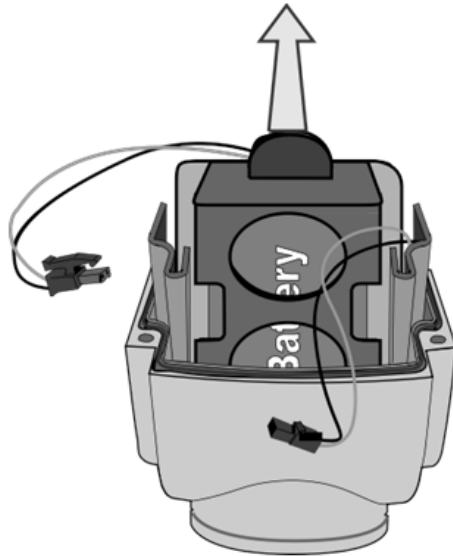


Figure 4-2: Connecting the battery

1. Remove the protective cap.
2. Loosen the 4 Allen bolts (4mm).
3. Remove the cover.
4. Disconnect the connector of the battery.
5. Remove the battery holder by pulling it upwards.
6. Remove the battery from the holder.
7. Insert the new battery in the holder.
8. Replace the holder.
9. Fasten the battery connector to the internal connector in the converter.
10. Verify the display lights up.
11. Replace the cover.

**CAUTION!**

Make sure that the battery cable is not jammed by the cover.

12. Tighten the 4 bolts and replace the protective cap.
13. Enter the programming mode:
 - a. Hold the ▼ and ► key for 5 seconds.
 - b. The display flashes.
14. Press the ► key to enter the menu.
15. Scroll through the available positions with the ▼ key to position 74 and check the battery capacity (important for battery life indication):
 - - internal single pack battery: 19 Ah
 - - internal dual pack battery: 38 Ah
 - - External battery pack: 76 Ah
16. Go to position 75 and enter “1” (reset battery counter).

Battery capacity symbol on the display should be “full.”
17. Hold the ▼ key for 3 seconds to confirm the new value and go back to the measuring mode.
18. Replace the blue protective cap.

The instrument now operates with default settings. For configuration of these settings, please refer to the handbook of the signal converter.

4.3 Battery types

Two interchangeable types of batteries with different capacities are available.

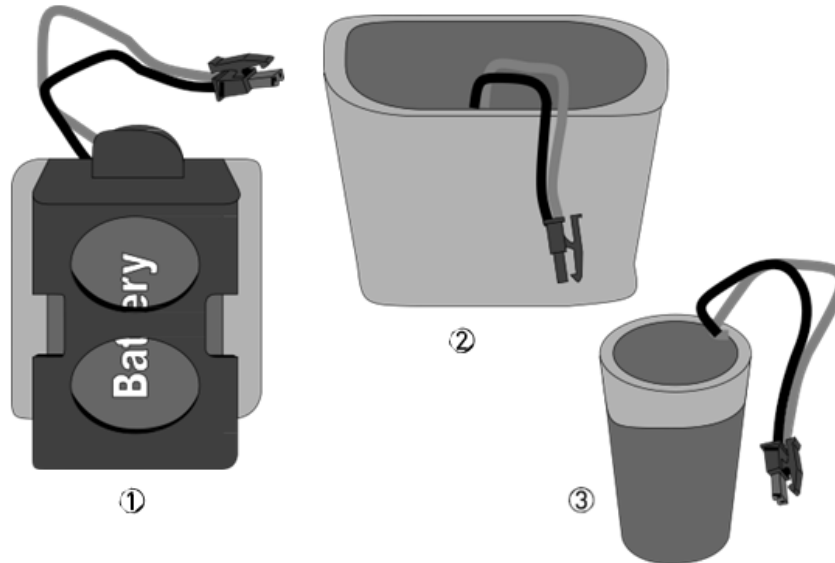


Figure 4-3: Batteries with cable and connector

1. Battery in holder
2. Dual pack battery
3. Single pack battery

5 Operation

5.1 Display and operating elements

The signal converter has a display and two optical keys. The optical keys can be used to cycle the display and to access the menu.

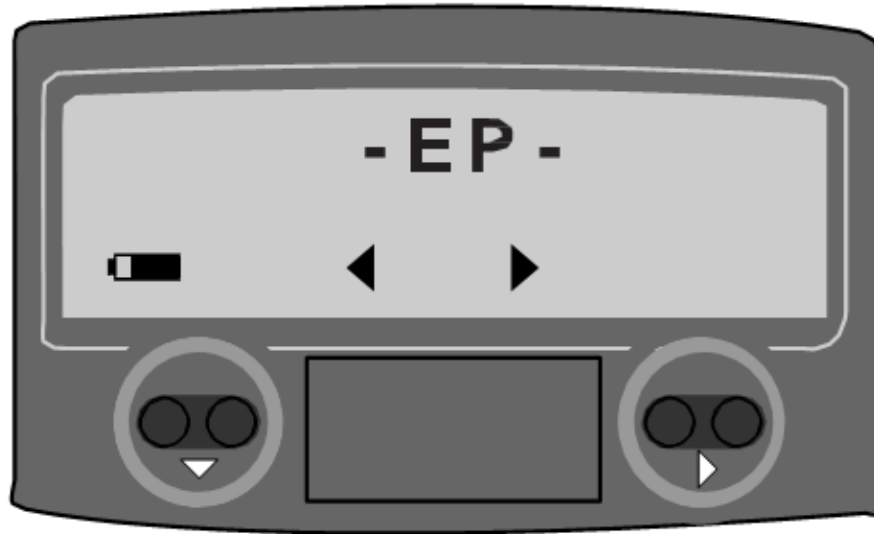


Figure 5-1: Display in Empty Pipe situation (if menu 31 is set to "1")

6 Service

6.1 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are subject to wear and tear under normal operating conditions.

6.2 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.

For more information, please contact your local representative.

7 Technical Data

7.1 Dimensions and weights

Table 7-1: Dimensions and weights

Part	Illustration	Dimensions
Remote flow sensor		a = 77 mm / 3.1"
		b = 139 mm / 5.5" ¹
		c = 106 mm / 4.2"
		Total height = H + a
Remote version in aluminium housing (IP67)		b = 132 mm / 5.2"
		c = 235 mm / 9.3"
		H = 310 mm / 12.2"
		Weight = 3.3 kg / 7.3 lb
Compact version in aluminium housing (IP67)		a = 170 mm / 6.7"
		b = 132 mm / 5.2"
		c = 140 mm / 5.5"
		Total height = H + a
Compact version in polycarbonate housing (IP68)		a = 159 mm / 6.3"
		b = 161 mm / 6.3"
		Total height = H + a

¹The value may vary depending on the used cable glands

- All data given in the following tables are based on standard versions of the sensor only.
- Especially for smaller nominal sizes of the sensor, the converter can be bigger than the sensor.
- Note that for other pressure ratings than mentioned, the dimensions may be different.
- For full information on converter dimensions see relevant documentation

Table 7-2: EN 1092-1

Nominal size DN [mm]	Dimensions [mm]			Approx weight [kg]
	L	H	W	
25	150	150.5	115	5
40	150	165.5	150	5.7
50	200	186	165	13
65	200	200	185	11
80	200	209	200	17
100	250	237	220	17
125	250	266	250	21
150	300	300	285	29
200	350	361	340	36
250	400	408	395	50
300	500	458	445	60
350	500	510	505	80
400	600	568	565	103
450	600	618	615	113
500	600	671	670	132
600	600	781	780	167

Table 7-3: ASME B16.5 / 150 lb

Nominal size [inches]	Dimensions [inches]			Approx weight [lb]
	L	H	W	
1	5.91	5.83	4.33	18
1½	5.91	6	4.92	21
2	7.87	7.05	5.98	34
3	7.87	8.03	7.50	42
4	9.84	9.49	9.00	56
5	9.84	10.55	10.00	65
6	11.81	11.69	11.00	80

Table 7-3: ASME B16.5 / 150 lb

Nominal size [inches]	Dimensions [inches]			Approx weight [lb]
	L	H	W	
8	13.78	14.25	13.50	100
10	15.75	16.30	16.00	148
12	19.69	18.78	19.00	212
14	27.56	20.67	21.00	289
16	31.50	22.95	23.50	369
18	31.50	24.72	25.00	415
20	31.50	26.97	27.50	497
24	31.50	31.38	32.00	680

