

R series

Electromagnetic flowmeter reduced-bore flow sensors



R series
electromagnetic
flow sensors

Introduction

ABB's reduced-bore FER electromagnetic flowmeter sensors are available with either an AquaMaster 3 or a WaterMaster transmitter.

AquaMaster 3 and WaterMaster are a range of high performance electromagnetic flowmeters for the measurement of electrically conductive fluids and are supplied as factory-configured and calibrated systems.

This User Guide provides end-user details for installation and connection.

The smart solution for
remote applications

Measurement made easy

For more information

Further publications are available for free download from www.abb.com/flow or by scanning this code:



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MODBUS Tables Supplement
WaterMaster
Electromagnetic flowmeter

[COI/FEX100/MOD/TBL-EN](#)

IMPORTANT NOTE

For devices manufactured before February 2022, kindly refer to earlier revision of the user guide (Revision F) -

[OI/FER100/FER200-EN Revision F](#)

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1 Safety

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

1.1 Electrical Safety

This equipment complies with the requirements of CEI/IEC 61010-1:2010 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use' and complies with US NEC 500 and Occupational Safety & Health Administration.

If the equipment is used in a manner NOT specified by the Company, the protection provided by the equipment may be impaired.

1.2 Symbols

One or more of the following symbols may appear on the equipment labelling:

	Warning – Refer to the manual for instructions		Direct current supply only
	Caution – Risk of electric shock		Alternating current supply only
	Protective earth (ground) terminal		Both direct and alternating current supply
	Earth (ground) terminal		The equipment is protected through double insulation

1.3 Product Recycling Information ((European customers only))

	ABB is committed to ensuring that the risk of any environmental damage or pollution caused by any of its products is minimized as far as possible. The European Waste Electrical and Electronic Equipment (WEEE) Directive that initially came into force on August 13 2005 aims to reduce the waste arising from electrical and electronic equipment; and improve the environmental performance of all those involved in the life cycle of electrical and electronic equipment. In conformity with European local and national regulations, electrical equipment marked with the above symbol may not be disposed of in European public disposal systems after 12 August 2005.
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Note. For return for recycling, please contact the equipment manufacturer or supplier for instructions on how to return end-of-life equipment for proper disposal.

1.4 Health & Safety

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

- The relevant sections of these instructions must be read carefully before proceeding.
- Warning labels on containers and packages must be observed.
- Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
- Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and / or temperature.
- Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
- When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company contact details on the back cover, together with servicing and spares information.

Warning.

- Installation and maintenance must be carried out only by suitably trained personnel.
- Read all relevant sections of this manual before selecting a location.
- The safety requirements of this equipment, any associated equipment and the local environment must be taken into consideration during installation.
- Install and use this equipment in accordance with relevant national and local standards.

1.5 Information on ROHS Directive 2015/863 (RoHS 3)



ABB, Industrial Automation, Measurement & Analytics, UK, fully supports the objectives of the ROHS 3 directive. All in-scope products placed on the market by IAMA UK on and following the 22nd of July 2019 and without any specific exemption, will be compliant to the ROHS 3 directive, 2015/863.

2 Mechanical Installation

2.1 Unpacking

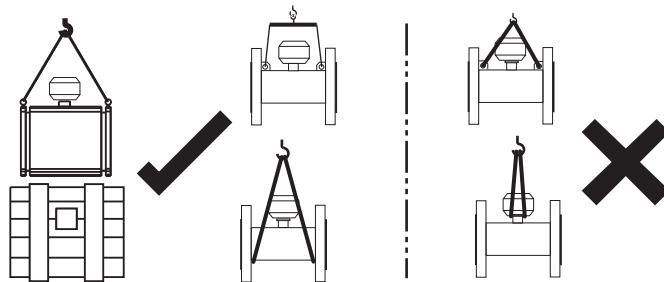


Fig. 2.1 Unpacking

Caution. Visually inspect equipment for damage before installing. Do not install damaged or faulty equipment.

2.2 Installation Conditions

Caution. Do NOT exceed the maximum working pressure marked on the equipment.

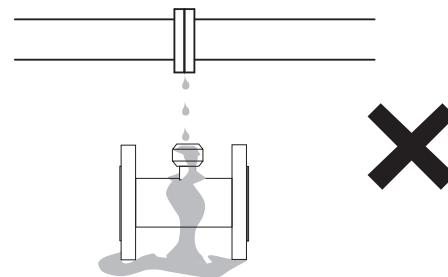


Fig. 2.2 Spillage

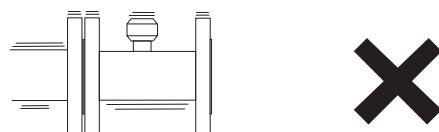


Fig. 2.3 Vibration

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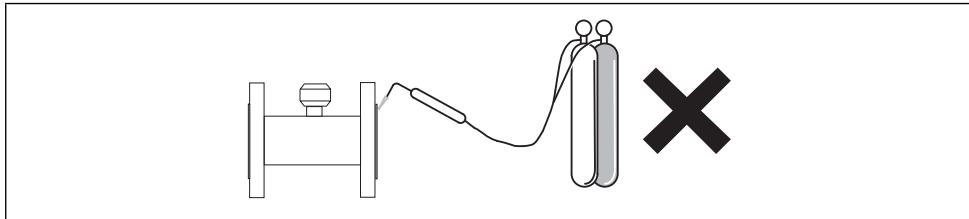


Fig. 2.4 Localized Heat

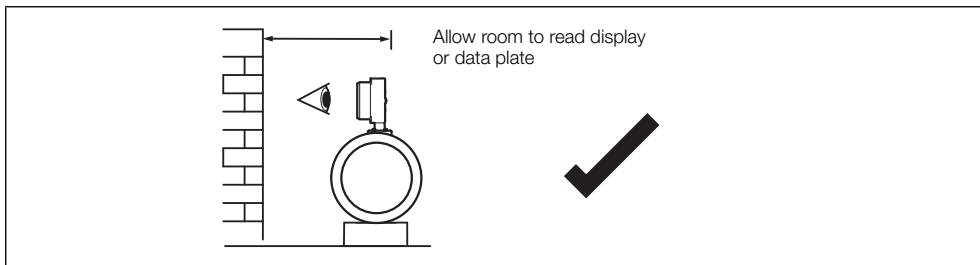


Fig. 2.5 Siting

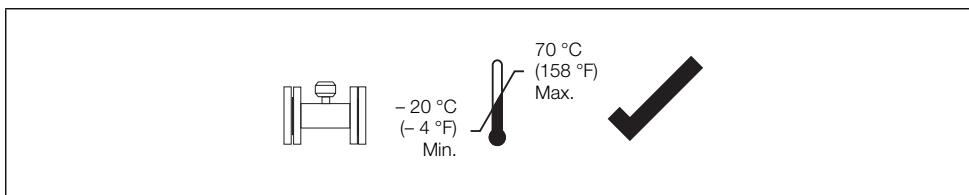


Fig. 2.6 Within Temperature Limits

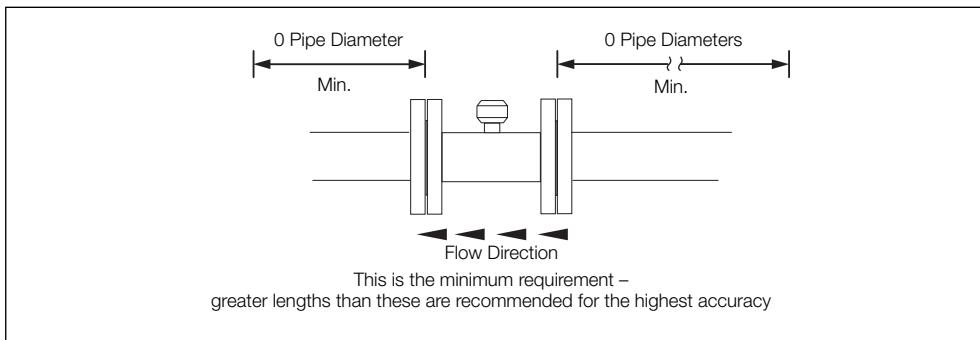


Fig. 2.7 Straight Pipe Requirements

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Electromagnetic flowmeter

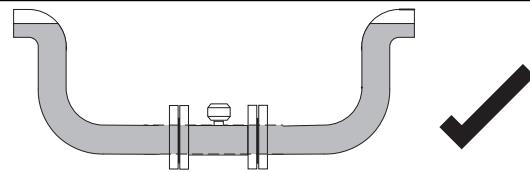


Fig. 2.8 Fluid Level

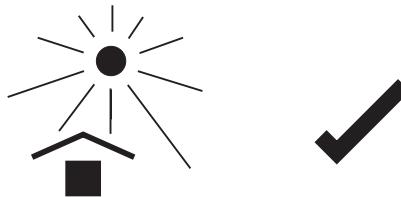


Fig. 2.9 Shade

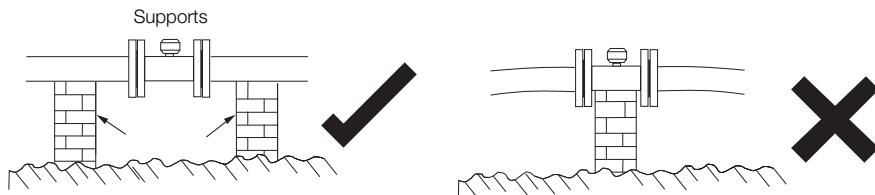


Fig. 2.10 Above Ground

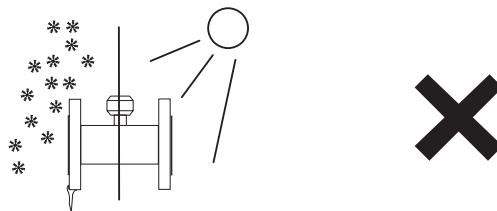


Fig. 2.11 Temperature Difference

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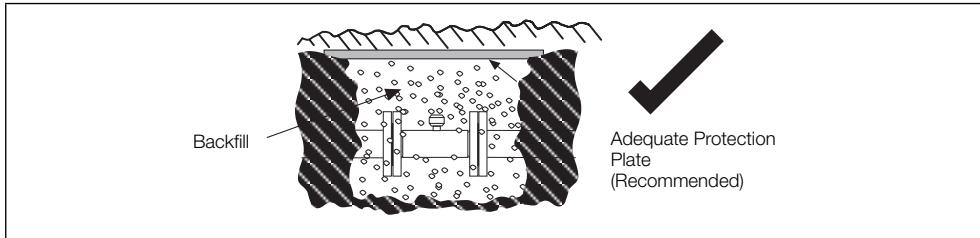


Fig. 2.12 Underground

Note. For further details when burying flow sensors contact the ABB Service Organization.

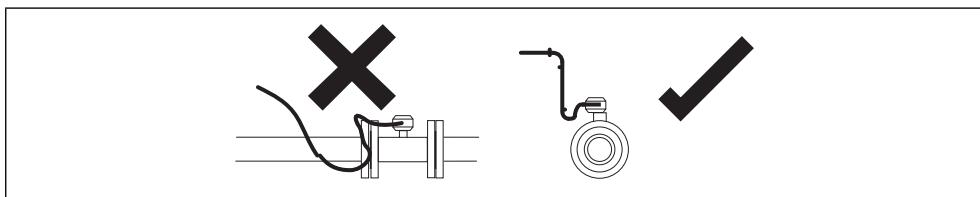


Fig. 2.13 Cable Routing

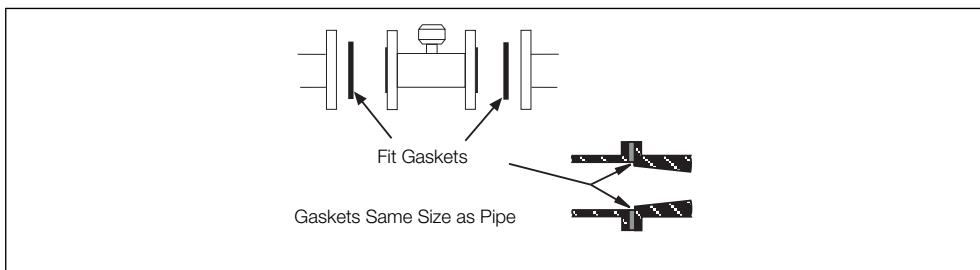


Fig. 2.14 Gasket Fitting

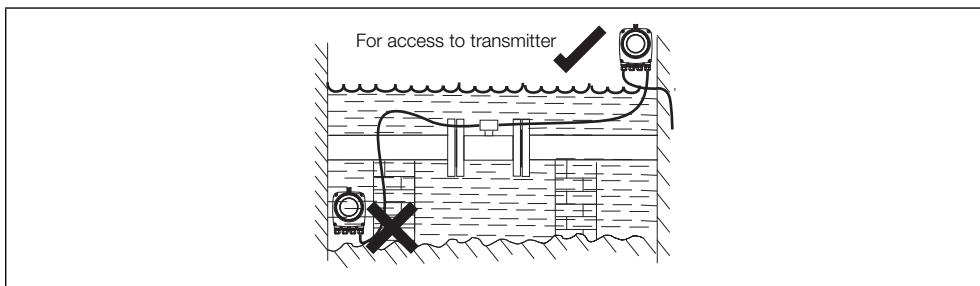


Fig. 2.15 Access to Transmitter

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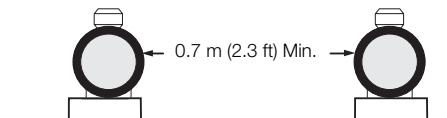


Fig. 2.16 Separation of Sensors

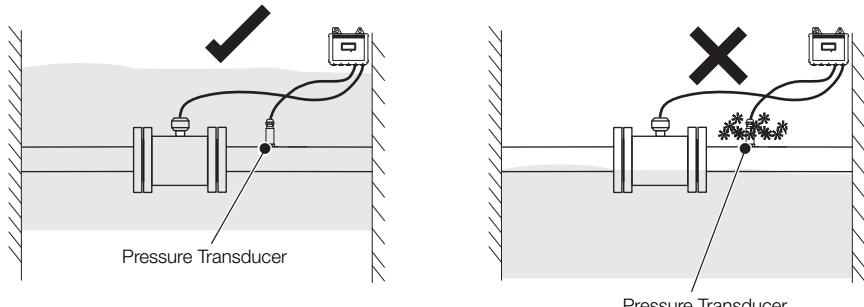


Fig. 2.17 Separation of Sensors

3 Electrical Installation

3.1 Grounding

Caution. For safety reasons and optimum performance, the flowmeter, pipelines and medium must be bonded and grounded correctly according to regulations. Do not ground cathodically-protected pipelines to an external earth.

Note.

- Connect the transmitter ground connection to the flowmeter body ground
 - see Figs. 3.5 (page 11) and 3.6 (page 11).
- The flow sensor must not be connected to a ground spike.
- For bonding connections use $\geq 4 \text{ mm}^2$ ($<10\text{AWG}$) cable.

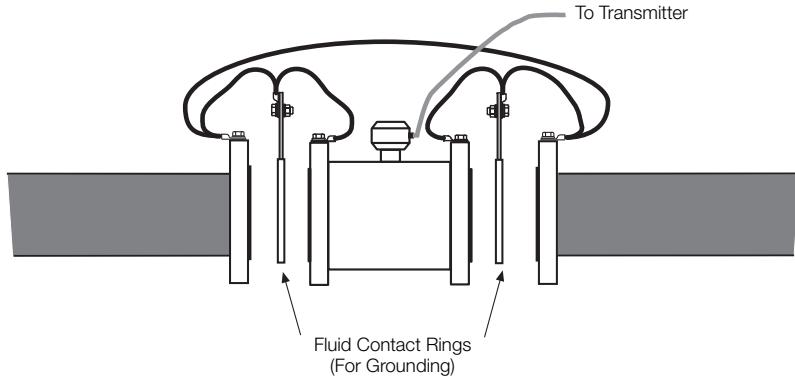


Fig. 3.1 Cross Bonding – All Flanged Pipes

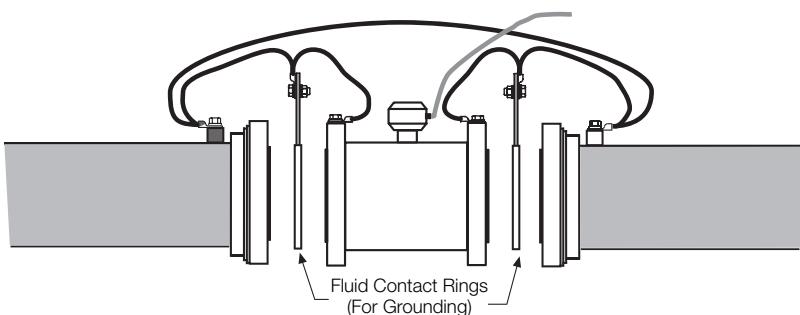


Fig. 3.2 Cross Bonding – Flange Adapter

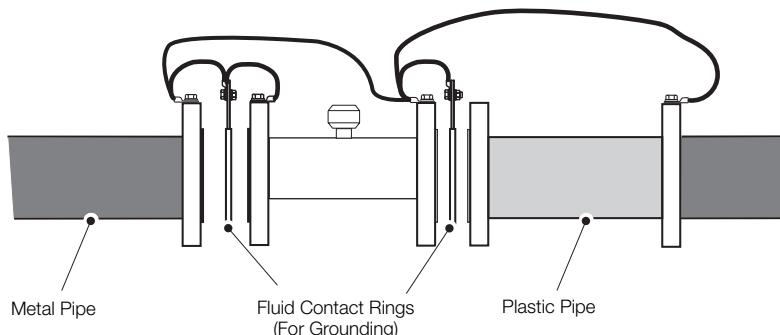


Fig. 3.3 Cross Bonding – Plastic Pipe Insert

Note. The grounding arrangement shown in Fig. 3.4 is applicable only to:

- cathodic protected installations
- installations where E_2 and E_3 are different to E_1

Caution. Incorrect installation will result in fault currents flowing through the meter resulting in unstable readings.

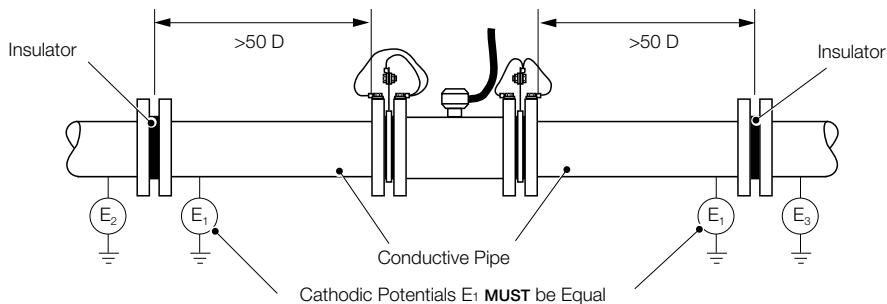


Fig. 3.4 Cathodic Protected Installations with Different Cathodic Potential Generators

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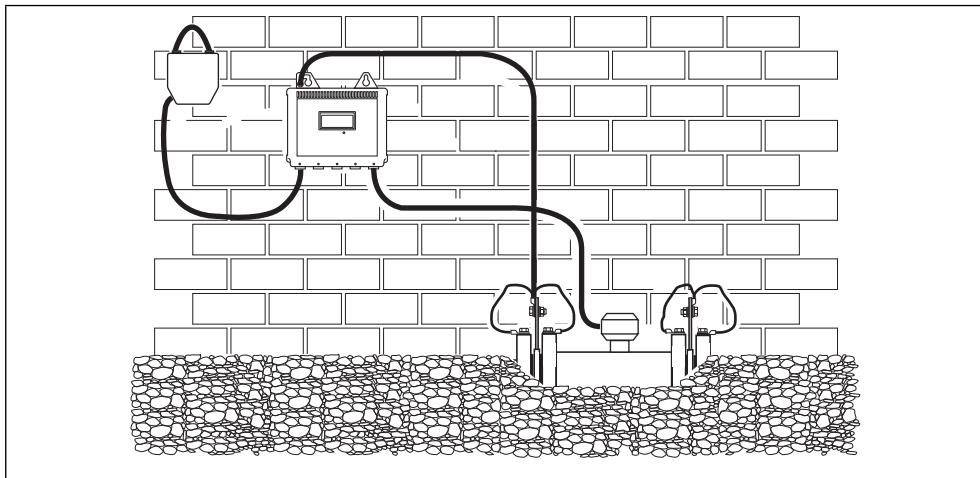


Fig. 3.5 AquaMaster 3 Transmitter Mounted in a Chamber (Battery Version Shown)

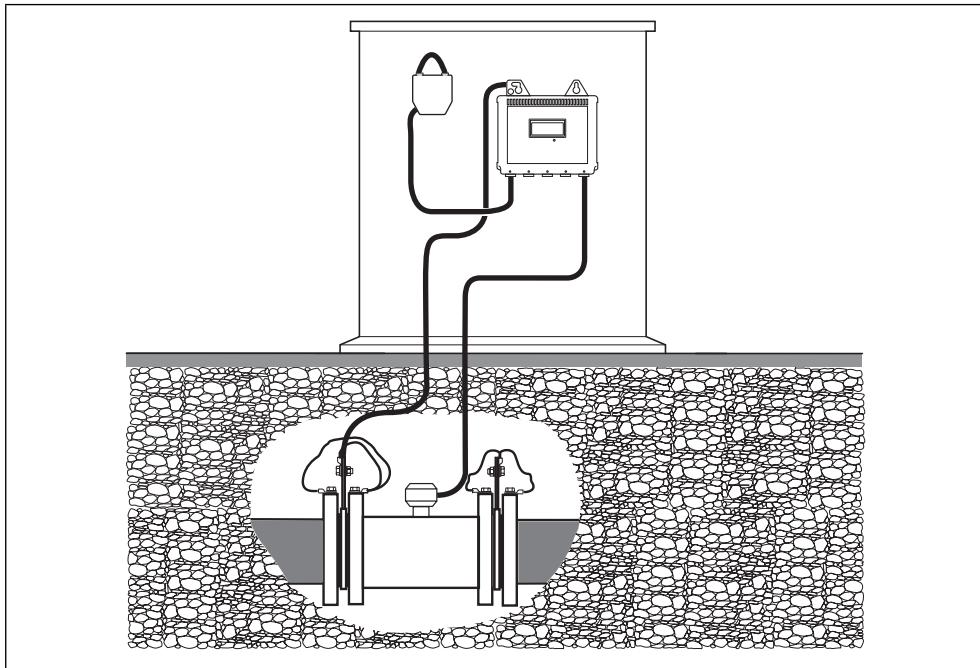


Fig. 3.6 AquaMaster 3 Transmitter Mounted in a Cabinet (Battery Version Shown)

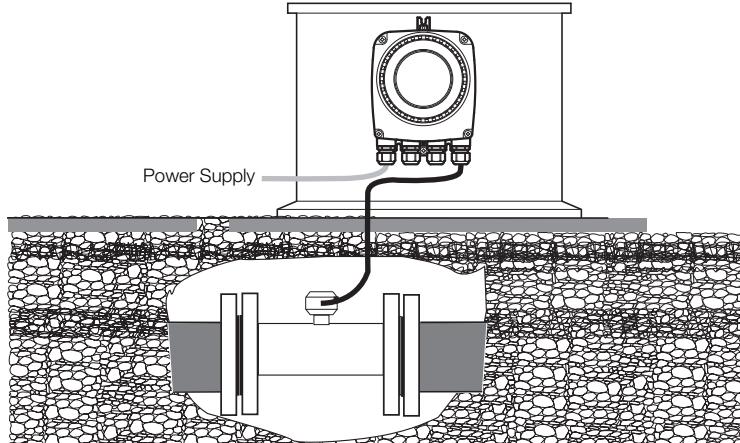


Fig. 3.7 WaterMaster Remote Transmitter Mounted in a Roadside Cabinet

3.2 Cable Preparation (Remote Transmitter Only)

Caution. Maintain Environmental Protection at all times – see section 3.3, page 14.

To prepare the cable for connection at the transmitter and sensor terminal blocks:

1. Remove the outer cable insulation and Mylar® wrap.
2. Ensure the drain wire is sleeved.
3. Cut the cable connection wires to the lengths shown.

3.2.1 Sensor Cable Connections (Remote WaterMaster Transmitter Only)

Caution.

- Make connections only as shown.
- Twist the screen wire of D1 / TFE + D2 with the outer screen drain wire and sleeve them green / yellow.
- Ensure the seal and mating surfaces are clean to maintain environmental rating.
- Conduit connections must provide cable entry sealing.
- Ensure cable glands are tightened after wiring. Do not overtighten the plastic cable glands to avoid destroying their sealing properties. Initially, tighten finger-tight, then a further 1/2 to 3/4 turn using a suitable spanner or wrench.

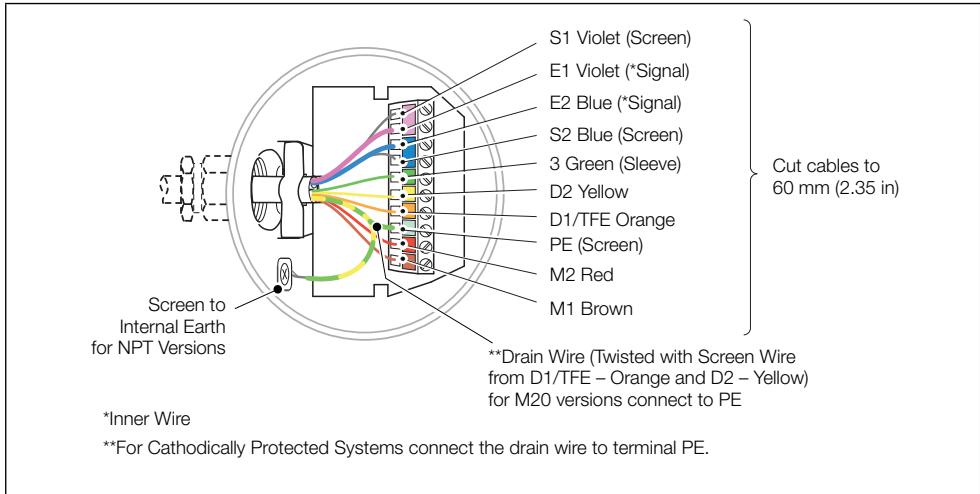


Fig. 3.8 Sensor Cable Connections – WaterMaster Transmitter

3.2.2 Sensor Cable Connections (Remote AquaMaster 3 Transmitter Only)

Caution.

- Twist the three screen wires together and sleeve them.
- Keep cable pairs twisted.
- Make connections only as shown.
- Maintain Environmental Protection at all times.
- Conduit connections must provide cable entry sealing.

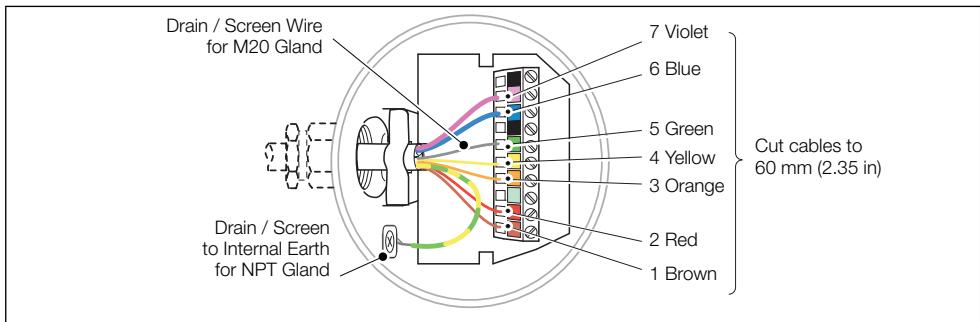


Fig. 3.9 Sensor Cable Connections – AquaMaster 3 Transmitter

3.3 Environmental Protection



Fig. 3.10 Potting the Sensor Terminal Box

Warning.

- Potting materials are toxic. Read the manufacturers' instructions carefully before preparing the potting material and use suitable safety precautions.
- Power up and check all connections before potting.
- The remote sensor terminal box connections must be potted immediately on completion to prevent the ingress of moisture.
- Do not overfill or allow the potting material to come into contact with 'O' rings or grooves.
- Do not let potting material enter conduit (if used).

4 Accessories / Spares Kits – AquaMaster 3

Common

MRBX9969 Close-coupled mounting kit

WABC2010 Sensor cable assembly 0.5 m (1.6 ft.), for integral / close-coupled

WABC2010/01 Sensor cable assembly 1 m (3.3 ft.), for remote

WABC2010/05 Sensor cable assembly 5 m (16.4 ft.), for remote

WABC2010/10 Sensor cable assembly 10 m (32.8 ft.), for remote

WABC2010/20 Sensor cable assembly 20 m (65.6 ft.), for remote

WABC2010/30 Sensor cable assembly 30 m (98.4 ft.), for remote

WABC2010/40 Sensor cable assembly 40 m (131.2 ft.), for remote

WABC2010/50 Sensor cable assembly 50 m (164.0 ft.), for remote

WABC2010/60 Sensor cable assembly 60 m (196.8 ft.), for remote

WABC2010/70 Sensor cable assembly 70 m (229.6 ft.), for remote

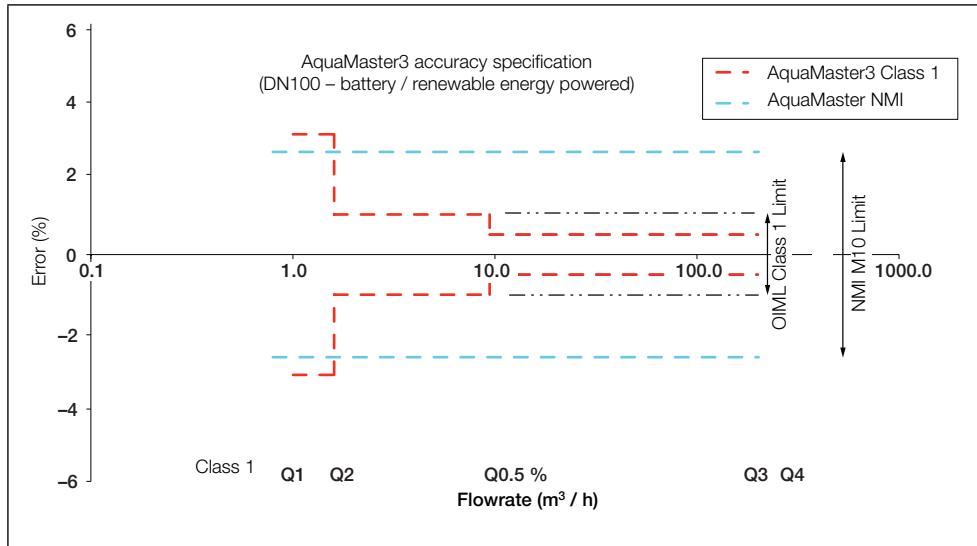
WABC2010/80 Sensor cable assembly 80 m (262.4 ft.), for remote

Adapter Cable / Upgrade Kits

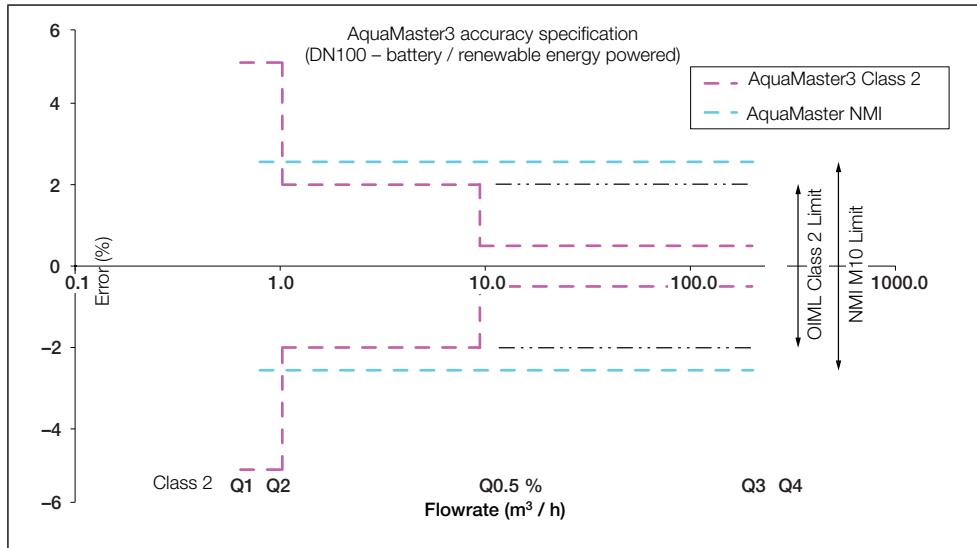
WABC2035 Sensor adapter kit (M16 Plastic to MIL)

5 Specification

AquaMaster3 specification to OIML R49 Class 1



AquaMaster3 specification to OIML R49 Class 2



R Series

Electromagnetic flowmeter

Battery- or renewable energy-powered reduced-bore meters (FER) – flow performance

Size		Q ₄			Q ₃			Q _(0.5%)			Class 2 specification			Class 1 specification		
mm	in.	m ³ / h (Ugal / min)	R	Q ₂	Q ₁	R	Q ₂	Q ₁	R							
15	1/2	5.0 (22.01)	4.0 (17.61)	0.24 (1.05)	0.026 (0.110)	0.016 (0.070)	250	0.04 (0.176)	0.025 (0.11)	160						
20	3/4	7.9 (34.8)	6.3 (27.74)	0.37 (1.62)	0.04 (0.176)	0.025 (0.110)	250	0.063 (0.277)	0.04 (0.176)	160						
25	1	12.5 (55)	10 (44)	0.6 (2.64)	0.064 (0.281)	0.04 (0.176)	250	0.1 (0.44)	0.063 (0.277)	160						
40*	1 1/2	31 (138)	25 (110)	1.5 (6.6)	0.16 (0.704)	0.1 (0.44)	250	0.25 (1.10)	0.16 (0.704)	160						
50*	2	50 (220)	40 (176)	2.4 (10.56)	0.26 (1.14)	0.16 (0.70)	250	0.4 (1.76)	0.25 (1.10)	160						
65	2 1/2	79 (347)	63 (277)	3.7 (16.29)	0.40 (1.76)	0.25 (1.10)	250	0.63 (2.77)	0.4 (1.76)	160						
80*	3	125 (550)	100 (440)	5.9 (25.97)	0.64 (2.82)	0.4 (1.76)	250	1.0 (4.40)	0.63 (2.77)	160						
100*	4	200 (880)	160 (704)	9.4 (41.38)	1.0 (4.4)	0.64 (2.82)	250	1.6 (7.04)	1.0 (4.40)	160						
125	5	200 (880)	160 (704)	9.4 (41.38)	1.0 (4.4)	0.64 (2.82)	250	1.6 (7.04)	1.0 (4.40)	160						
150*	6	500 (2200)	400 (1760)	23.5 (103.46)	2.56 (11.27)	1.6 (7.04)	250	4.0 (17.61)	2.5 (11.01)	160						
200*	8	788 (3470)	630 (2770)	37 (162.90)	4.0 (17.61)	2.5 (11.01)	250	6.3 (27.74)	3.9 (17.17)	160						
250*	10	1250 (5500)	1000 (4400)	60 (260)	6.4 (28.18)	4.0 (17.61)	250	10 (44)	6.3 (27.74)	160						
300*	12	2000 (8810)	1600 (7045)	90 (400)	10.2 (44.91)	6.4 (28.18)	250	16 (70.44)	10 (44)	160						
350	14	2000 (8810)	1600 (7045)	110 (484.3)	16 (70.44)	10 (44.02)	160	41 (180.5)	25 (110)	63						
375	15	2000 (8810)	1600 (7045)	110 (484.3)	16 (70.44)	10 (44.02)	160	41 (180.5)	25 (110)	63						
400	16	3125 (13760)	2500 (11007)	170 (750)	25 (110)	15.6 (68.68)	160	63 (277.4)	40 (176)	63						
450	18	3125 (13760)	2500 (11007)	170 (750)	25 (110)	15.6 (68.68)	160	63 (277.4)	40 (176)	63						
500	20	5000 (22014)	4000 (17610)	270 (1190)	40 (176)	25 (110)	160	100 (440)	63.5 (279)	63						
600	24	7875 (34670)	6300 (27740)	420 (1850)	63 (277)	39 (172)	160	160 (704)	100 (440)	63						

* OIML R49 version available to Class 1 and Class 2

Note. OIML R49-1 allows Class 1 only for meters with Q₃ ≥ 100 m³ / h. Meters outside this range were tested to Class 1 accuracy and passed.

UL Fire Service approved meters

Size	UL low flow GPM	UL high flow GPM	Pressure drop (psi)
2	6	235	≤ 10
2 1/2	6.5	280	≤ 9
3	6	465	≤ 7
4	10	630	≤ 6
6	20	1780	≤ 4
8	20	3345	≤ 8
10	45	4450	≤ 6
12	85	5245	≤ 2

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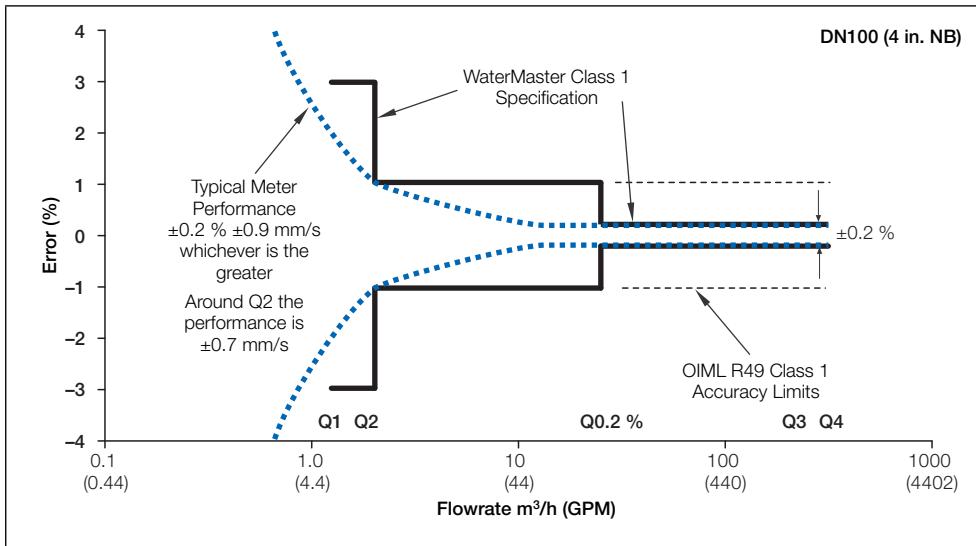
AC-powered reduced-bore meters (FER) – flow performance

				Class 2 specification			Class 1 specification			R
Size		Q ₄	Q ₃	Q _(0.25%)	Q ₂	Q ₁	R	Q ₂	Q ₁	
mm	in.	m ³ / h (Ugal / min)		m ³ / h (Ugal / min)	m ³ / h (Ugal / min)					
15	1/2	5 (22)	4 (18)	0.11 (0.48)	0.010 (0.044)	0.006 (0.026)	630	0.016 (0.070)	0.010 (0.04)	400
20	3/4	7.9 (35)	6.3 (27.74)	0.18 (0.79)	0.016 (0.070)	0.010 (0.044)	630	0.025 (0.11)	0.016 (0.070)	400
25	1	12.5 (55)	10 (44)	0.29 (1.27)	0.025 (0.11)	0.016 (0.070)	630	0.04 (0.176)	0.025 (0.11)	400
40*	1 1/2	31 (138)	25 (110)	1.5 (6.6)	0.063 (0.28)	0.040 (0.176)	630	0.1 (0.44)	0.063 (0.28)	400
50*	2	50 (220)	40 (176)	1.5 (6.6)	0.1 (0.44)	0.063 (0.277)	630	0.16 (0.70)	0.1 (0.44)	400
65	2 1/2	79 (247)	63 (277)	3 (13.2)	0.16 (0.7)	0.1 (0.44)	630	0.25 (1.10)	0.16 (0.70)	400
80*	3	125 (550)	100 (440)	3 (13.2)	0.3 (1.32)	0.16 (0.70)	630	0.4 (1.76)	0.25 (1.10)	400
100*	4	200 (880)	160 (704)	4.6 (20.25)	0.41 (1.8)	0.25 (1.10)	630	0.64 (2.82)	0.4 (1.76)	400
125	5	200 (880)	160 (704)	4.6 (20.25)	0.41 (1.8)	0.25 (1.10)	630	0.64 (2.82)	0.4 (1.76)	400
150*	6	500 (2200)	400 (1760)	11.4 (50.19)	1.0 (4.40)	0.63 (2.77)	630	1.6 (7.04)	1.0 (4.40)	400
200*	8	788 (3470)	630 (2774)	18 (79.25)	1.6 (7.04)	1.0 (4.40)	630	2.5 (11.01)	1.6 (7.04)	400
250*	10	1250 (5504)	1000 (4400)	29 (127.7)	2.5 (11.01)	1.6 (7.04)	630	4.0 (17.61)	2.5 (11.01)	400
300*	12	2000 (8806)	1600 (7045)	46 (202)	4.1 (18.05)	2.5 (11.01)	630	6.4 (28.18)	4.0 (17.61)	400
350	14	2000 (8806)	1600 (7045)	80 (352)	6.4 (28.18)	4.0 (17.61)	400	12.8 (56.35)	8.0 (35.22)	200
375	15	2000 (8806)	1600 (7045)	80 (352)	6.4 (28.18)	4.0 (17.61)	400	12.8 (56.35)	8.0 (35.22)	200
400	16	3125 (13760)	2500 (11007)	125 (550)	10 (44)	6.3 (27.74)	400	20 (88.06)	12.5 (55.04)	200
450	18	3125 (13760)	2500 (11007)	125 (550)	10 (44)	6.3 (27.74)	400	20 (88.06)	12.5 (55.04)	200
500	20	5000 (22014)	4000 (17610)	200 (880)	16 (70.45)	10 (44)	400	32 (140.9)	20 (88.05)	200
600	24	7875 (34670)	6300 (27740)	315 (1387)	25.2 (110.9)	15.8 (69.56)	400	50.4 (221.9)	31.5 (138.7)	200

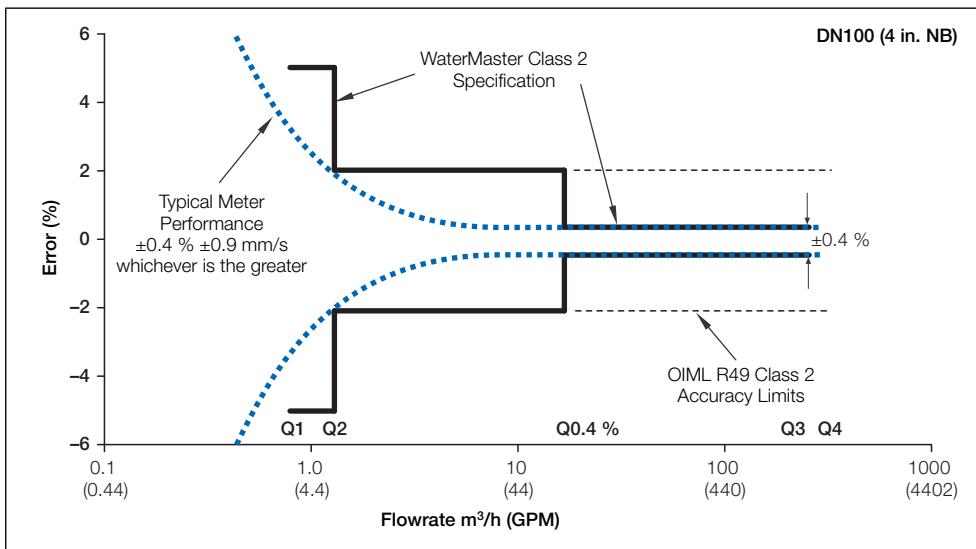
* OIML R49 version available to Class 1 and Class 2

Note. OIML R49–1 allow Class 1 only for meters with Q₃ ≥ 100 m³ / h. Meters outside this range were tested to Class 1 accuracy and passed.

WaterMaster specification to OIML R49 Class 1



WaterMaster specification to OIML R49 Class 2



Although OIML R49 does not define the flow accuracy below Q1, WaterMaster continues to measure flow at lower flow rates down to a cutoff velocity of $\pm 5 \text{ mm/s}$ ($\pm 0.2 \text{ in./s}$). The accuracy between cutoff and Q1 is typically $\pm 0.9 \text{ mm/s}$ ($\pm 0.04 \text{ in./s}$).

R Series

Electromagnetic flowmeter

WaterMaster reduced-bore meter (FER) flow performance – m³/h (gal/min)

		Class 2 specification					Class 1 specification				
Size		Q ₄	Q ₃	Q _{0.4 %}	Q ₂	Q ₁	R	Q _{0.2 %}	Q ₂	Q ₁	R
mm	in.	m ³ / h (Ugal / min)		m ³ / h (Ugal / min)	m ³ / h (Ugal / min)	m ³ / h (Ugal / min)					
40	1 1/2	31 (138)	25 (110)	0.83 (1.05)	0.063 (0.28)	0.04 (0.18)	630	1.7 (7.48)	0.1 (0.44)	0.063 (0.28)	400
50	2	50 (220)	40 (176)	1.0 (4.40)	0.1 (0.44)	0.063 (0.28)	630	2.0 (8.8)	0.16 (0.7)	0.1 (0.44)	400
65	2 1/2	79 (347)	63 (277)	1.6 (7.04)	0.16 (0.7)	0.1 (0.44)	630	3.2 (10.56)	0.25 (1.1)	0.16 (0.7)	400
80	3	125 (550)	100 (440)	2.0 (8.80)	0.25 (1.1)	0.16 (0.7)	630	4.0 (17.6)	0.4 (1.76)	0.25 (1.1)	400
100	4	200 (880)	160 (704)	3.2 (10.56)	0.41 (1.8)	0.25 (1.1)	630	6.4 (28)	0.64 (2.8)	0.4 (1.76)	400
125	5	200 (880)	160 (704)	3.2 (10.56)	0.41 (1.8)	0.25 (1.1)	630	6.4 (28)	0.64 (2.8)	0.4 (1.76)	400
150	6	500 (2200)	400 (1760)	8.0 (35.20)	1.0 (4.4)	0.63 (2.77)	630	16 (70.4)	1.6 (7)	1.0 (4.4)	400
200	8	788 (3470)	630 (2770)	13.0 (57.2)	1.6 (7.04)	1.0 (4.4)	630	25 (110)	2.5 (11)	1.6 (7)	400
250	10	1250 (5500)	1000 (4400)	20 (88)	2.5 (11.01)	1.6 (7)	630	40 (176)	4.0 (17.6)	2.5 (11)	400
300	12	2000 (8810)	1600 (7045)	32 (140.8)	4.1 (18.05)	2.5 (11)	630	64 (281.6)	6.4 (28)	4.0 (17.6)	200
350	14	2000 (8810)	1600 (7045)	32 (140.8)	6.4 (28.18)	4.0 (17.6)	400	64 (281.6)	12.8 (56)	8.0 (35.2)	200
375	15	2000 (8810)	1600 (7045)	32 (140.8)	6.4 (28.18)	4.0 (17.6)	400	64 (281.6)	12.8 (56)	8.0 (35.2)	200
400	16	3125 (13760)	2500 (11007)	50 (220)	10 (44)	6.3 (27.7)	400	100 (440)	20 (88)	12.5 (55)	200
450	18	3125 (13760)	2500 (11007)	50 (220)	10 (44)	6.3 (27.7)	400	100 (440)	20 (88)	12.5 (55)	200
500	20	5000 (22014)	4000 (17610)	80 (352)	16 (70.45)	10 (44)	400	160 (70.4)	32 (141)	20 (88)	200
600	24	7875 (34670)	6300 (27740)	126 (554.4)	25.2 (110.9)	15.8 (70)	400	252 (1108)	50.4 (222)	31.5 (138.7)	200

R Series

Electromagnetic flowmeter

Specification – Reduced Bore Sensors

Wetted parts

Screw-end meters

Brass and stainless steel 316L and super-austenitic steel

Flanged meters

Electrodes – stainless steel 316L

Potable water approvals

WRAS Listed	NSF Approved	ACS	AS / NZS 4020	Lining material
✓	✗	✓ (DN40 to 600 only)	✓	Elastomer

Pressure limitations

As flange rating

PN25 Max Process Temp 50 °C (122 °F)

PN40 Max Process Temp 40 °C (104 °F)

OIML / MID Approved Meters 16 bar (232 psi)

UL Fire Service approved meters 285 psi

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Environmental protection (FER sensor only)

IP rating

IP68 (NEMA 6) to 10 m (33 ft.) **Note.** Not sizes DN15 to DN25 (1/2 – 1 in. NB)

IP67 (NEMA 4X) to 10 m (33 ft.) – DN15 to DN25 (1/2 – 1 in. NB)

Non-wetted parts

Flange material

Carbon steel DN40 to DN600 (1½ to 24 in. NB)

Cable gland material

Plastic, brass

Terminal box material

Polycarbonate

Paint specification

Housing body and flange

Carbon steel or SG iron coated with light grey 2-pack epoxy (RAL9002)

- Primer – Interpon PZ660 zinc-based system,
70 microns thick
- Top coat – Interpon 610 light grey polyester
powder coating (RAL 9002), up to 150 microns thick
- As a special requirement – 2-pack epoxy primer /
finish @ 300µm DFT

Transmitter mounting

Integral or remote

R Series

Electromagnetic flowmeter

Sensor cable

WaterMaster

Standard cable and armored cable
Maximum length 200 m (660 ft.)

AquaMaster3

Standard cable only
Maximum length 200 m (660 ft.)

Temperature limitations

Ambient temperature

Remote transmitter:
–20 to 70 °C (–4 to 158 °F)

Close-coupled or integral transmitter:
–20 to 60 °C (–4 to 140 °F)

Process temperature

Non-approved:
–6 to 70 °C (21 to 158 °F)
OIIML R49 T50 approval:
0.1 to 50 °C (32 to 122 °F)

Conductivity

>50 µS/cm (AquaMaster3)
>20 µS/cm (WaterMaster)

Electrical connections

20 mm glands (WaterMaster or AquaMaster3)
1½ in. NPT (WaterMaster)
20 mm armored glands (WaterMaster)

End connections

Thread-end connections
15 mm – ISO 228 G ¾ in. B ¾ in. NPSM,
40 bar (580 psi)
20 mm – ISO 228 G 1 in. B 1 in. NPSM,
40 bar (580 psi)
25 mm – ISO 228 G 1¼ in. B 1¼ in. NPSM,
40 bar (580 psi)

40 to 300 mm (1.5 to 12 in.) flanged
EN1092-1 / ISO 7005 – PN10, PN16

ANSI B16.5 Class 150
AS 2129 Tables C, D, E and F
AS 4087 PN14, PN16, PN21
JIS to BS2210, 10k

350 to 600 mm (14 to 24 in.) flanged
EN1092-1 / ISO 7005 – PN10, PN16

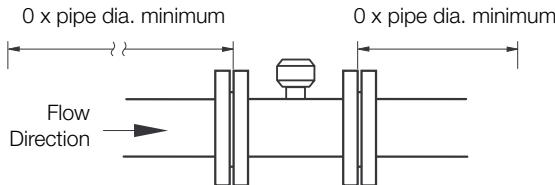
AS 4087 PN14, PN16, PN21
AS 2129 Tables C, D
JIS to B2210 5k and 10k

Potential equalizing rings

Use of 2 required

Pipe conditions**Minimum upstream and downstream pipe**

0 D

**Pressure loss**

Flow Rate	Pressure loss in bar (psi)
Q_3	<0.63 (9.1)
$Q_3 / 2$	<0.16 (2.3)

OIML R49 calibration (AquaMaster FER DN40 to DN300 only)**Size range and flow specification**

See specification tables, page 17 & 18
(WaterMaster, page 20 (AquaMaster3))

Accuracy class

1 and 2

Pressure loss class

< 0.63 bar

Orientation

Any

R Series

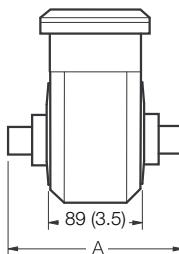
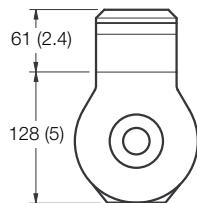
Electromagnetic flowmeter

Sensor Specification (Nominal Dimensions)

15 to 25 mm (1/2 to 1 in.) – Screw Ends (for AquaMaster3 Transmitters Only)

Meter Size		Dimensions mm (in.)		Approx. Weight	
mm	in.	A	Connection	kg	lb
15	1/2	119 (4.7)	G 3/4 in. B or 3/4 in. NPSM	2.5	5
20	3/4	127 (5)	G 1 in. B or 1 in. NPSM	2.5	5
25	1	127 (5)	G 1 1/4 in. B or 1 1/4 in. NPSM	2.5	5

Dimensions in. mm (in.)



R Series

Electromagnetic flowmeter

FER – DN40 to 300 (1½ to 12 in. NB)

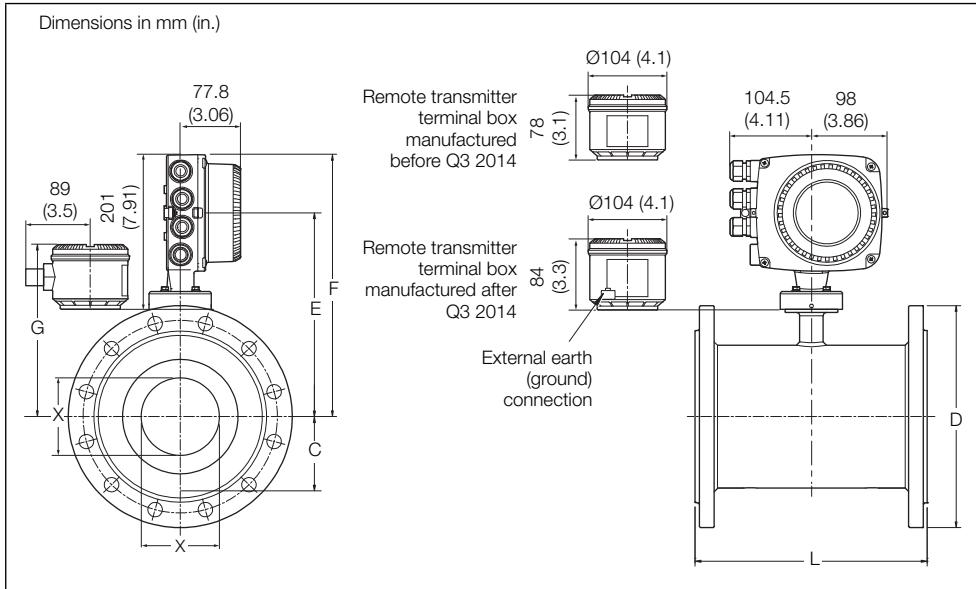


Fig. 5.1 DN40 to 300 (1½ to 12 in. NB) (FER)

DN	Process connection type	Dimensions in mm (in.)						Approx. weight in kg (lb)	
		D	L	F	E	G	X	Integral	Remote
DN40 (1½ in.)	EN1092-1 PN10, 16, 25, 40	150 (5.91)	200 (7.87)	260 (10.24)	185 (7.28)	137 (5.39)	23.5 (0.93)	13.4 (29.5)	12.4 (27.3)
	ASME B16.5 CLASS 150								
	AS2129 TABLE D, E, F								
DN50 (2 in.)	EN1092-1 PN10, 16, 25, 40	165 (6.50)	200 (7.87)	261 (10.28)	186 (7.32)	138 (5.43)	29 (1.14)	14.75 (32.45)	13.75 (30.25)
	ASME B16.5 CLASS 150								
DN80 (3 in.)	EN1092-1 PN10, 16, 25, 40	200 (7.87)	200 (7.87)	280 (11.04)	205.5 (8.09)	157.5 (6.2)	47 (1.85)	21.2 (46.64)	20.2 (44.4)
	ASME B16.5 CLASS 150								
	AS4087 PN16, 21								
	AS2129 TABLE D, E, F								
DN100 (4 in.)	EN1092-1 PN10, 16, 25, 40	225 (8.86)	250 (9.84)	300.5 (11.83)	225.5 (8.88)	177.5 (6.98)	64 (2.52)	27.3 (60)	26.3 (58)
	ASME B16.5 CLASS 150								
	AS4087 PN16								
DN150 (6 in.)	EN1092-1 PN10, 16, 25, 40	300 (11.81)	300 (11.81)	333.5 (13.13)	258.5 (10.18)	210.5 (8.29)	100.2 (3.94)	27.3 (60)	26.3 (58)
	ASME B16.5 CLASS 150								
	AS4087 PN16								
DN200 (8 in.)	EN1092-1 PN10, 16	375 (11.76)	350 (13.78)	358.7 (14.12)	283.7 (11.17)	235.7 (9.28)	126.7 (5.00)	68 (150)	67 (147.4)
	ASME B16.5 CLASS 150								
	AS2129 TABLE C, D, E, F								
	AS4087 PN14, 16, 21								

Table 5.1 DN40 to 200 (1½ to 8 in.) (FER) cast iron sensor dimensions / weights

R Series

Electromagnetic flowmeter

DN	Process connection type	Dimensions in mm (in.)						Approx. weight in kg (lb)	
		D	L	F	C	E	G	X	Integral
DN40 (1½ in.)	EN1092-1 PN10, 16, 25, 40	150 (5.91)	200 (7.87)	260 (10.24)	30.4 (1.20)	185 (7.28)	138 (5.43)	23.5 (0.93)	13 (29)
	ASME B16.5 CLASS 150	127 (5.00)							11 (24)
	JIS 10K	140 (5.51)							
	AS2129 TABLE C D E	135 (5.31)							
	AS2129 TABLE F	140 (5.51)							
	AS4087 PN14	135 (5.31)							
DN50 (2 in.)	EN1092-1 PN10, 16, 25, 40	165 (6.50)	200 (7.87)	270 (10.63)	38.3 (1.51)	195 (7.68)	146 (5.75)	29 (1.14)	14 (31)
	ASME B16.5 CLASS 150	152.4							12 (27)
	JIS 10K	155 (6.10)							
	AS4087 PN21	165 (6.50)							
	AS2129 TABLE F	165 (6.50)							
	AS2129 TABLE C D E	150 (5.91)							
DN65 (2½ in.)	EN1092-1 PN10, 16, 25, 40	185 (7.28)	200 (7.87)	275 (10.83)	45.2 (1.78)	200 (7.87)	152 (5.98)	37 (1.46)	15 (33)
	ASME B16.5 CLASS 150	178 (7.00)							13 (29)
	JIS 10K	175 (6.89)							
	AS2129 TABLE C D E	165 (6.50)							
	AS2129 TABLE F	185 (7.28)							
	AS4087 PN14, 16	165 (6.50)							
DN80 (3 in.)	EN1092-1 PN10, 16, 25, 40	200 (7.87)	200 (7.87)	280 (11.02)	51.5 (2.03)	205 (8.07)	156 (6.14)	47 (1.85)	20 (44)
	ASME B16.5 CLASS 150	190 (7.48)							18 (40)
	JIS 10K	185 (7.28)							
	AS2129 TABLE C D E	185 (7.28)							
	AS4087 PN14, 16	185 (7.28)							
	AS2129 TABLE F	205 (8.07)							
DN100 (4 in.)	EN1092-1 PN10, 16	220 (8.66)	250 (9.84)	320 (12.60)	63.75 (2.51)	245 (9.65)	196.8 (7.75)	64 (2.52)	27 (59)
	EN1092-1 PN25, 40	235 (9.25)							25 (55)
	ASME B16.5 CLASS 150	228.6							
	JIS 7.5K	238 (9.37)							
	JIS 10K	210 (8.27)							
	AS2129 TABLE C D	215 (8.46)							
DN125 (5 in.)	AS4087 PN14, 16	215 (8.46)	250 (9.84)	320 (12.60)	63.75 (2.51)	245 (9.65)	197 (7.76)	64 (2.52)	27 (59)
	AS4087 PN21	230 (9.06)							25 (55)
	EN1092-1 PN10, 16	250 (9.84)							
	EN1092-1 PN25, 40	270							
	ASME B16.5 CLASS 150	254							
	JIS 10K	250 (9.84)							
DN150 (6 in.)	AS2129 TABLE C D	255							
	EN1092 PN10, 16	285	300 (11.81)	340 (13.39)	84.4 (3.32)	265 (10.43)	217 (8.54)	100.2 (3.94)	33 (72)
	EN1092 PN25, 40	300							31 (68)
	ASME B16.5 CLASS 150	279							
	JIS 7.5k	290							
	JIS 10K	280							
DN200 (8 in.)	AS2129 TABLE C D	280	350 (13.78)	365 (14.37)	109.8 (4.32)	290 (11.42)	243 (9.57)	126.7 (4.99)	50 (110)
	AS4087 PN14, 16	280							48 (106)
	AS4087 PN21	305							
	EN1092-1 PN10, 16	340							
	EN1092-1 PN25, 40	360							
	ASME B16.5 CLASS 150	345							
	JIS 7.5K	342							
	JIS 10K	330							
	AS2129 TABLE C D	335							
	AS4087 PN14, 16	335							
	AS4087 PN21	370							

Table 5.2 DN40 to 300 (1½ to 12 in. NB) (FER) dimensions / weights

R Series
Electromagnetic flowmeter

DN	Process connection type	Dimensions in mm (in.)							Approx. weight in kg (lb)	
		D	L	F	C	E	G	X	Integral	Remote
DN250 (10 in.)	EN1092-1 PN10	395	450 (17.72)	389 (15.31)	136.8 (5.39)	313 (12.33)	268 (10.55)	153.5 (6.04)	77 (169)	75 (165)
	EN1092-1 PN16	405								
	EN1092-1 PN25	425								
	ASME B16.5 CLASS 150	405								
	JIS 7.5K	400								
	JIS 10K	400								
	AS2129 TABLE C D	405								
	AS4087 PN14, 16	405								
	AS4087 PN21	430								
DN300 (12 in.)	EN1092-1 PN10	445	500 (19.69)	414 (16.30)	162.2 (6.39)	338.6 (13.33)	294 (1157)	203.5 (8.01)	114 (251)	112 (247)
	EN1092-1 PN16	460								
	EN1092-1 PN25	485								
	ASME B16.5 CLASS 150	485								
	JIS 10K	445								
	AS2129 TABLE C D	455								
	AS4087 PN14, 16	455								
	AS4087 PN21	490								

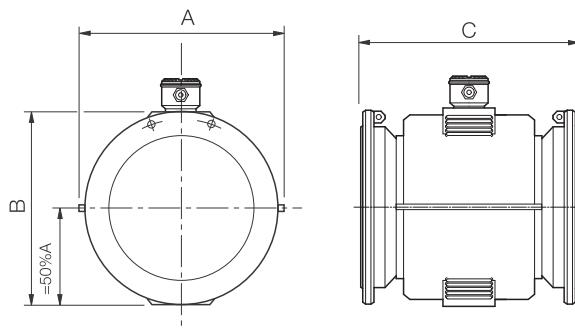
Table 5.2 DN40 to 300 (1½ to 12 in. NB) (FER) dimensions / weights (Continued)

R Series

Electromagnetic flowmeter

350 to 600 mm (14 to 24 in.) – Flanged (for WaterMaster and AquaMaster3 Transmitters)

Meter Size		Dimensions mm (in.)			Approx. Weight	
mm	in.	A	B	C	kg	lb
350	14	513 (20.2)	520 (20.5)	550 (21.7)	100	220
400	16	570 (22.4)	576 (22.7)	600 (23.6)	115	253
450	18	632 (24.9)	627 (24.7)	698 (27.5)	160	352
500	20	686 (27.0)	679 (26.7)	768 (30.2)	217	455
600	24	772 (30.4)	770 (30.3)	918 (36.1)	315	693



DS/FER200/FEF200/FEV200-EN Rev. S
DS/WM-EN Rev. Y

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