Brent Adler®
INNOVATIVE CONTROL

ELECTROMAGNETIC FLOWMETER

Engineered for Safe & Efficient Conductive Fluid Measurement

Model EMF-212

ELECTROMAGNETIC FLOWMETER

EFM-212

MAGMAN-Series

Infrared Touch Control

Industry-specific design for the water and waste water industries in diameters from 15mm (1/2 in.) to 600mm (24in.)

Wide flow range with ±0.25% accuracy

Extended low-flow capability to ensure measurement of minimal night flows

Low purchase and life costs

Submersible and buriable sensor

— inherently suitable for use in flooded environments
Eliminates chambers and promotes very low installation costs

Designed, manufactured and calibrated to internationally accepted standards

— ISO 9001/NAMAS/NIST/NATA/GOST
Ensures reliable, maintenance-free operation

Three internal totalizers:
Forward, reverse and net
Forward & reverse flowrates and comprehensive range of outputs:
current, pulse, data and Modbus/HART

— single package satisfying all user display requirements
Ensures compatibility with user's control system requirements

ELECTROMAGNETIC FLOWMETER
MAGMAN-Series, Model: EFM-212

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Introduction

Setting the Standard

The MagMan range, available in sizes 15mm to 600mm (1/2 in. to 24 in.), is designed specifically for use on the many diverse applications encountered in the water and waste-water industry.

The specification, features and user benefits offered by this range are based on ABB's worldwide experience in this industry and they are all targeted specifically to the industry's requirements.

Flow Performance

MagMan has an extended operating flow range with ±0.25% accuracy over the majority of this extended range in both forward and reverse flow directions as standard.

Emphasis is placed on the low-flow region which is particularly important for the water industry. MagMan Lowflow sets new standards for low-flow capability and enables accurate measurement of previously unmetered night flows.

Submersible and Buriable

All MagMan sensors have a rugged, robust construction to ensure a long, maintenance-free life under the arduous conditions experienced in the Water and Waste Industry. The sensors are, as standard, inherently submersible (IP68, NEMA 6P), thus ensuring suitability for installation in chambers and metering pits which are liable to flooding.

A unique feature of the MagMan Lowflow sensors is that all sizes are buriable. Installation merely involves excavating to the underground pipe, fitting the sensor, cabling back to the transmitter and then backfilling the hole. No metering chambers or pits are required and the overall low-cost installation is simple and fast.

Comprehensive Features

A wide range of features and user benefits are built into MagMan as standard:

- bi-directional flow
- liquid sensing
- comprehensive test mode
- universal switch mode power supply
  (options are available for AC and DC supplies)
- self-diagnostics
- programmable multiple alarm capability

Assured Quality

MagMan is designed and manufactured in accordance with international quality procedures (ISO 9001) and all flowmeters are calibrated on nationally-traceable calibration rigs to provide the end-user with complete assurance of both quality and performance of the meter.

Fully Featured Transmitters

MagMan is offered with integral or remote transmitters, each being available with a choice of display, configuration and communication options to suit the application. Standard features include forward, reverse and net flow totalizers, flow rate, alarm monitoring and automatic self-diagnostics to ensure integrity. All data and values are in customer-defined units of measurement. System compatibility is assured with a choice of current, pulse, serial data and Smart HART communications.

MagMan operating parameters may be set via local keypads, remote configurators or computers as appropriate. The software features multi-level password protection capability to prevent inadvertent programs or settings changes. Data is stored in non-volatile memory for greater than 10-year retention.

In the non-keypad variant, display data can only be changed using a magnetic wand. No operational parameters can be changed without the use of configurators and appropriate passwords.

New Performances Standards for Flow Measurement

Widest flow range, optimum accuracy and long term stable calibration mean that MagMan Low Flow sets new performance standards in the water industry.

This unique low flow rate capability enables previously un-recordable minimal night flow rates to be metered; particularly important for bulk revenue and district metering applications.

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Specification

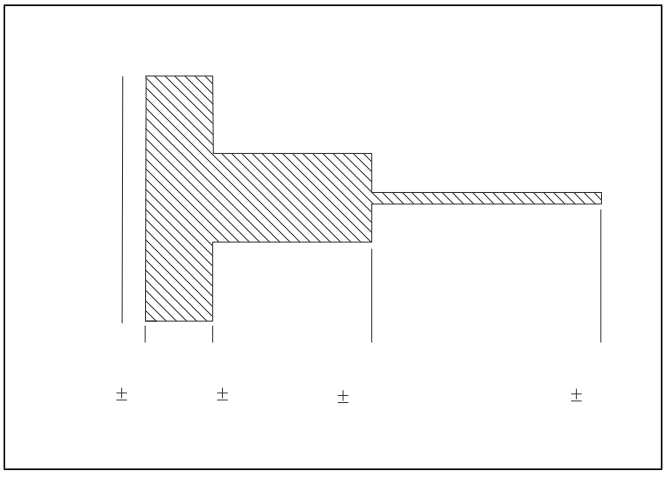
Specification – Sensor

Sizes, Accuracies and Flow Rates
(under reference conditions)

Sizes DN		Max.Flow ±0.25%*	Min. Flow ±0.25%*	Transition Flow ±2.0%	Min Flow ±5.00%
mm	in				
15	1/2	3	0.08	0.009	0.004
20	3/4	5	0.13	0.015	0.006
25	1	7	0.18	0.021	0.009
40	1 1/2	20	0.50	0.06	0.025
50	2	30	0.75	0.09	0.038
65	2 1/2	50	1.25	0.15	0.063
80	3	80	2.0	0.24	0.10
100	4	120	3.0	0.36	0.15
150	6	300	7.5	0.90	0.38
200	8	500	12.5	1.50	0.63
250	10	800	20	2.40	1.00
300	12	1200	30	3.60	1.50
350	14	1600	40	6.40	2.80
400	16	2000	50	8.00	3.50
450	18	2600	66	10.40	4.60
500	20	3000	76	12.00	5.30
600	24	5000	125	20.00	8.80

* Accuracy for sizes 15, 20 and 25 is ±0.35%

Flow Ranges



Accuracy (under forward flow reference conditions)
as 'Flow Rate' table, plus the following:

Analog output
Additional <±0.01mA

Temperature effect

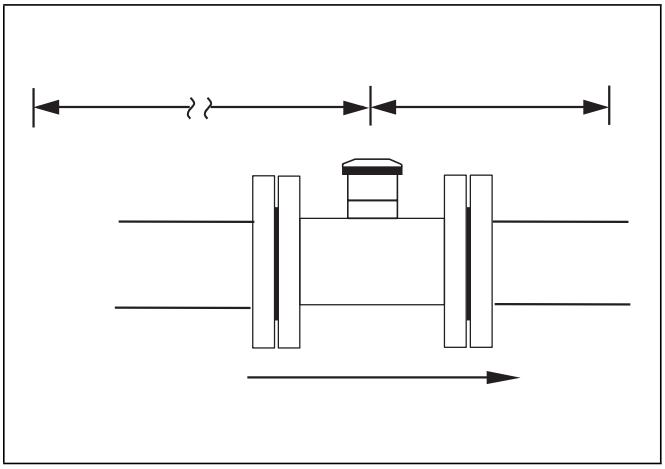
Transmitter
<±0.08% of reading/10°C

Analog output – Additional
<±0.08% of reading/10°C

Power supply variation
Negligible

Pressure effect
<0.15% over the operating range of the equipment

Pipe conditions



Pressure Loss

At Meter Maximum Flow	0.3 bar
At 50% of Meter Maximum Flow	0.075 bar

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Wetted Materials

Screw End Meters

Brass, PPS and stainless steel 316L electrodes.

Flanged Meters

Lining

15 to 25mm – PPS

40 to 80mm – POMC

100 to 600mm – Elastomer (UKWFBS listed)

Electrodes – Stainless steel 316

Pressure Limitations

As flange rating

Screw end meters – 50 bar

Conductivity

>5µS cm^{-1}

Transmitter/Sensor Separation

<100m (328 ft)

Power consumption

<20VA

Environmental Protection (when installed, remote sensor only)

Rating: IP68/NEMA 6P to 10m (33 ft) depth

Buriable: To 5m (16 ft) depth

End Connections

Sizes ≤25mm (1 in.) male screw thread:

15mm – G 3/4 in. B3/4 in. NPSM

20mm – G 1 in B1 in NPSM

25mm – G 11/4 in. B11/4 in. NPSM

Sizes ≥40mm (11/2 in.) flanged to mate with:

ANSI B16-5 Class 150 (≤300mm only)

BS4504/IS07005 – PN16, PN10

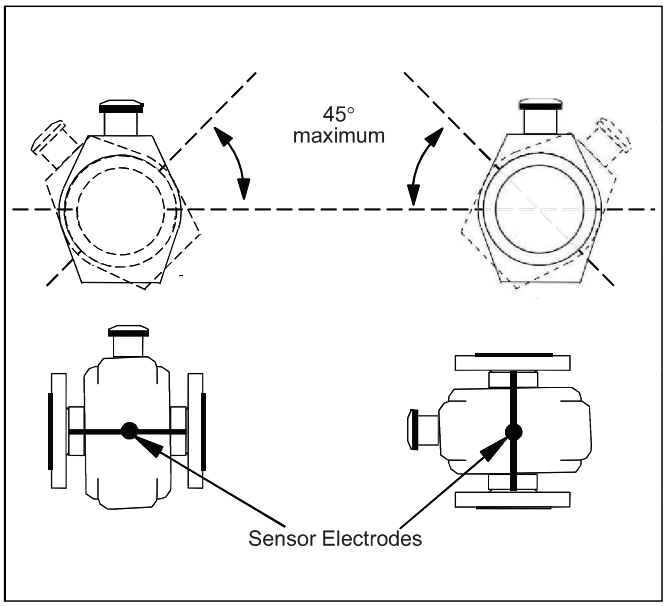
AS4087/14

AS2129 Table 'C' & 'D'

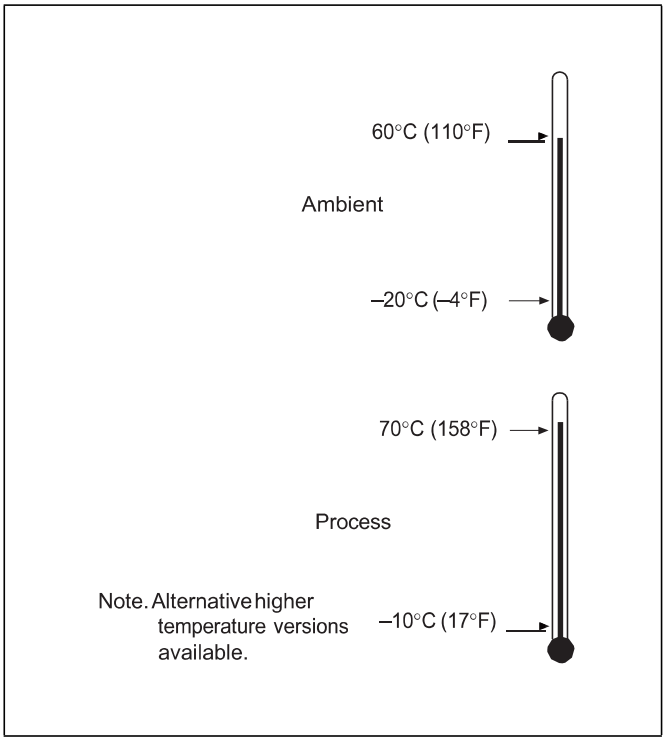
BS10/AS2129 Table 'D' & 'E'

JIS to B2210, 5k, 10k

Mounting



Temperature Ranges



ELECTROMAGNETIC FLOWMETER
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Sensor Sizes

15 to 25mm (1/2 to 1 in.) – Screw Ends

Meter Size		Dimensions* mm (in.)	Connection	Approx. Weight	
mm	in	A		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

*Nominal dimensions

40 to 300mm (11/2 to 12 in.) – Flanged

Meter Size		Dimensions* mm (in.)		Approx. Weight		Max. End Loading	
mm	in	A**	B	kg	lb	kN	lb
40	1 1/2	176 (7)	200 (7.9)	11	24	–	–
50	2	176 (7)	200 (7.9)	12	27	–	–
65	2 1/2	219 (8.6)	200 (7.9)	13	29	–	–
80	3	219 (8.6)	200 (7.9)	18	40	–	–
100	4	230.5 (9.8)	250 (9.8)	15	33	100	23000
150	6	281 (11.8)	300 (11.8)	31	68	190	43000
200	8	402 (15.8)	350 (13.8)	48	106	270	61000
250	10	440 (17.3)	450 (17.7)	75	165	390	89000
300	12	480 (18.9)	500 (19.7)	112	247	540	123000

*Nominal dimensions

**Dimensions are approximate and varying depending on flange type

350 to 600mm (14 to 24 in.) – Flanged

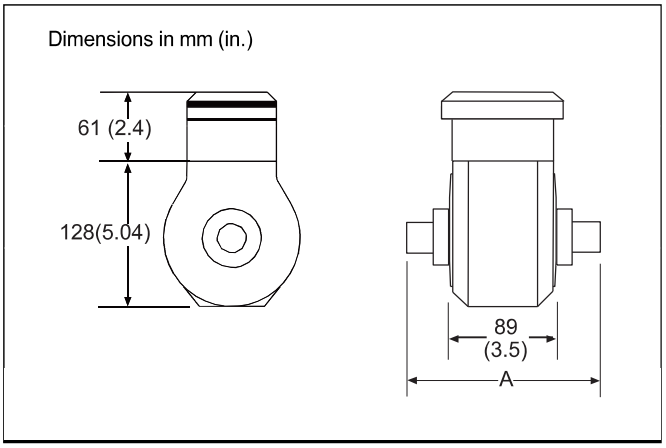
Meter Size		Dimensions* mm (in.)			Approx. Weight	
mm	in	A**	B	C	kg	lb
350	14	513 (20.2)	520 (20.5)	550 (21.7)	100	220
400	16	570 (22.4)	576 (22.7)	600 (23.6)	115	253
450	18	632 (24.9)	627 (24.7)	698 (27.5)	160	352
500	20	686 (27.0)	679 (26.7)	768 (30.2)	217	455
600	24	772 (30.4)	770 (30.3)	918 (36.1)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

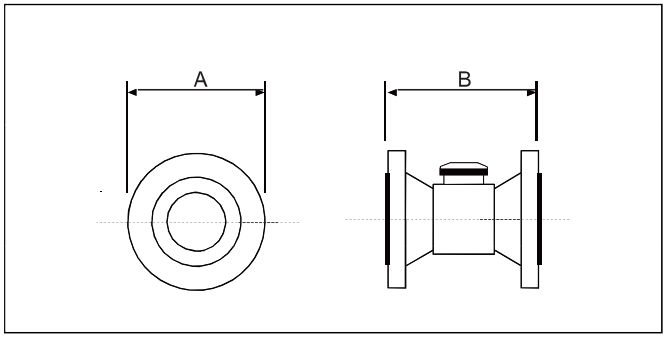
*Nominal dimensions

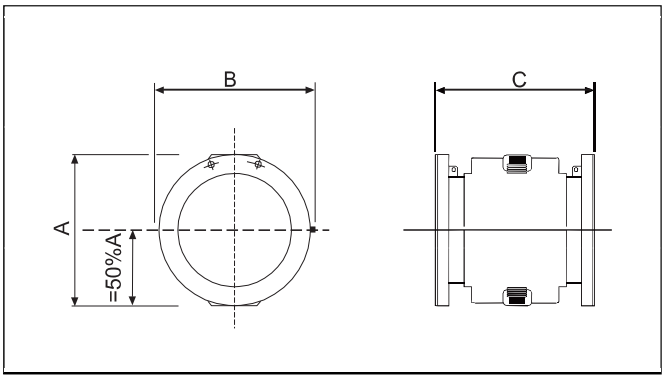
**Dimensions are approximate and varying depending on flange type

Note. See page 8 for Terminal Box and Transmitter dimensions.

Remote Transmitter Mounting Option Dimensions







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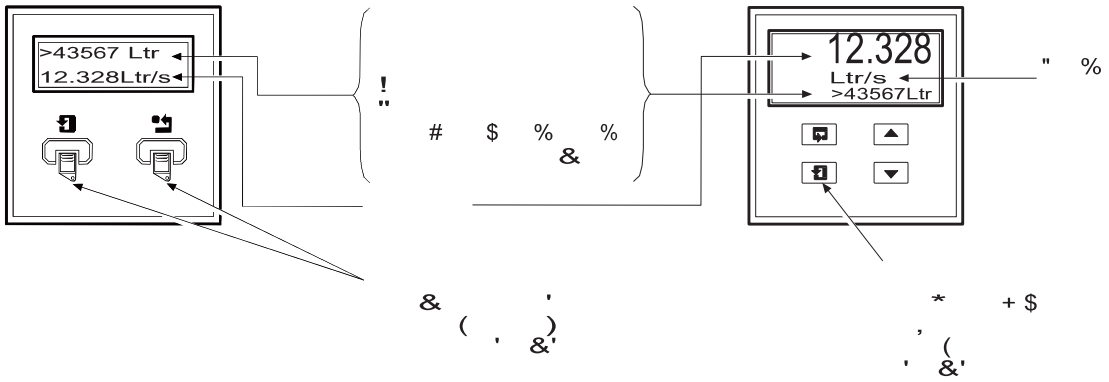
Specification – Transmitter

Display (optional)

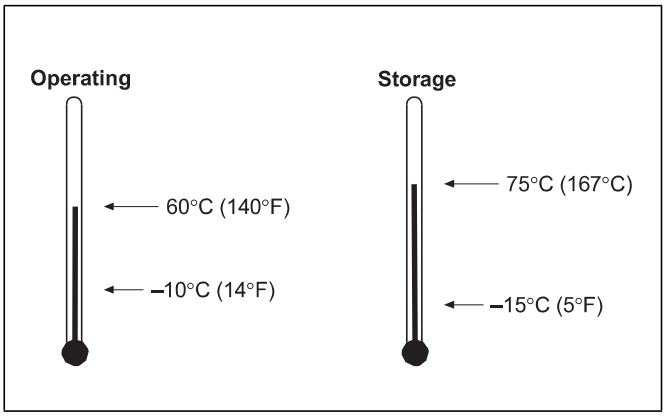


Programming Options

- Local hand-held configurator
- Integral keypad
- HART/MODBUS

Fully configurable	A choice of engineering parameters in engineering units e.g. flowrate, flow units, all outputs etc.
Liquid sensing	Ensures units read zero on empty pipe
Interchangeability	Transmitter/sensor can be changed without affecting performance
Self diagnostics	Ensures transmitter and sensor integrity
Test mode	Powerful commissioning aid. Exercises all outputs and displays, even without a connected sensor
Language	English, French, German, Spanish, Italian, Dutch, plus others on application

Temperature Ranges



Power Supply *

Voltage Type	Voltage Range (V)	Frequency (Hz)	VA
AC	95 to 250 nominal	47 to 440	< 20
DC	11 to 40 maximum	–	< 20

*Power supply fully isolated

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Environmental protection

IP65/NEMA4

EMC Specification

Conforms to –

EMC Directive 89/336/EEC to 10 V/m

Enclosure

Glass loaded polypropylene, polycarbonate window
UL VO rated

Electrical connections

20 mm glands, or accepts

1/2 in. NPT connections

Sensor Cable

Standard Remote/Integrated Display
Type: EMF-212
Infrared Touch Panel

Outputs/Inputs

Galvanic separation to 50V DC between analog, pulse/alarm and earth/ground

Common

mA →	< 21mA, ≤ 16V.
Forward / Reverse	< 800Hz, < 35V open collector square wave, or fixed pulse width < 2.5s, ≤ 250mA.
Choice of 9 alarms	< 35V, > 250mA open collector.
←	Contact closure or logic input.

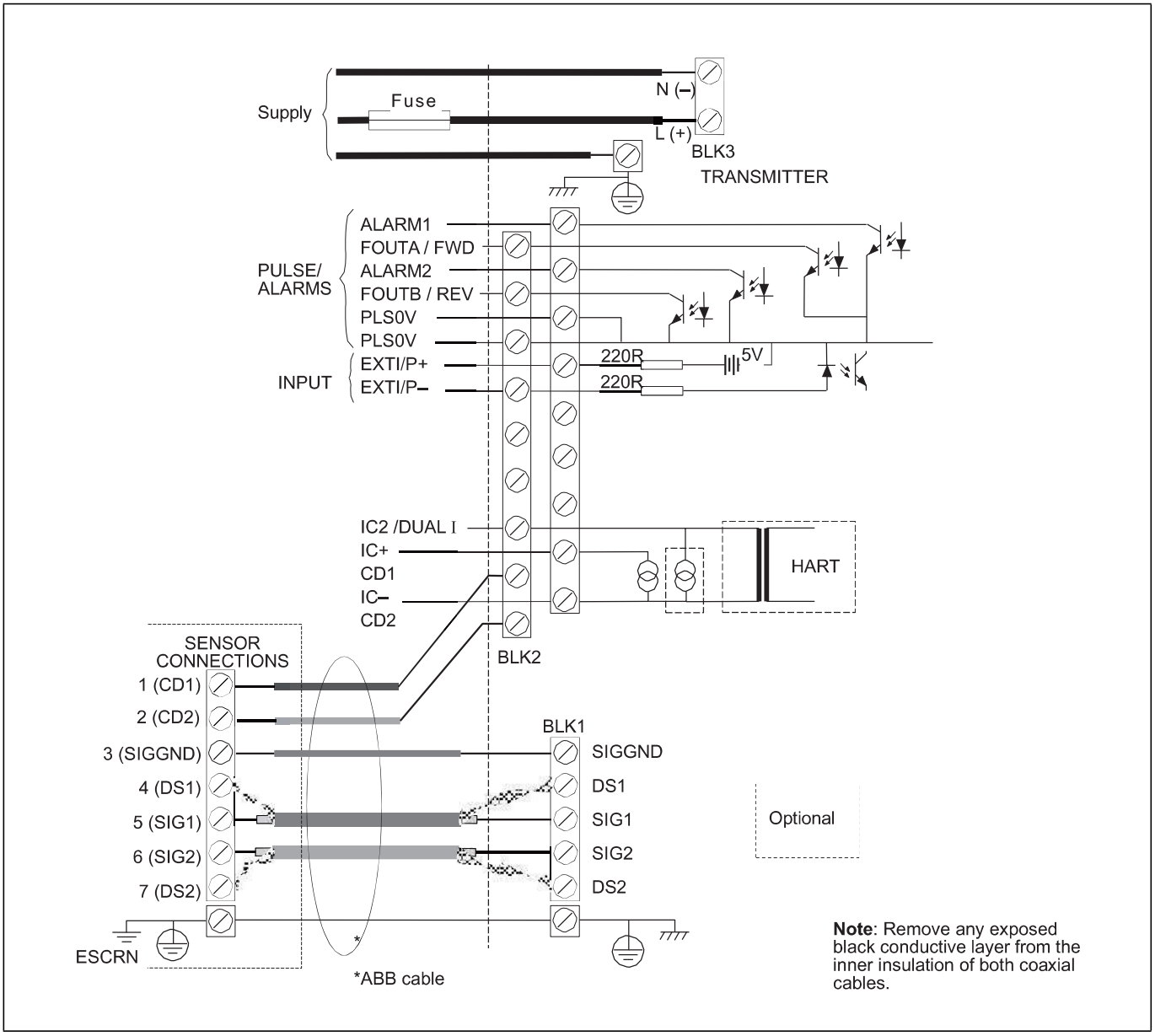
Totalizer reset
Dual range selection
Output hold
Drive to zero

RS232 (local only) ↔ 9-pin D-connector (PC compatible).

Optional (For Blind & 2-line display units)

↔ HART

Electrical Connections



Ordering Information

ELECTROMAGNETIC FLOWMETER **EFM-212** Brent Adler®

	1 to 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Flowmeter Design/type	EMF -212	X	X	XX X	X	X	X	X	X	X	X	X	X	X	X
Flowmeter Sensor, Full bore, Advance Magnetic field system															
Sensor Structure.															
Integrated Process transmitter/Onsite Monitoring Display		C													
Remote wall mounted Process Transmitter/Monitoring Display		R													
Sensor Coil Body															
Encapsulated Bolted ABS with electroplated measuring Tube & flange			A												
Fully Welded carbon steel shell with powder coating			B												
Flow Sensor diameter/Size.															
Encapsulated Bolted ABS Type (range from DN25 to DN200 only)	Add as per size														
Full Welded Type (Range DN25 to DN900)	Add as per size														
Full Welded Type (Above 900-Customised)	Add as required														
Electrode Material															
Stainless Steel					S										
Titanium					T										
Hastelloy Alloy C					H										
Others					O										
Accuracy type															
Standard Accuracy 0.5%						1									
Improved Accuracy 0.3%						2									
Liner Material/Elastomers															
Hard Rubber							A								
PTFE							B								
Polypropylene							C								
Polyurethane							D								
Power Supply															
100-230VAC/50Hz								1							
100-230VAC/60Hz								2							
24VDC (16-30VDC)								3							
Signal output															
Analogue out put 4-20mA + pulse									A						
No output									B						
Communication															
No Communication										1					
Modbus RS485										2					
HART										3					
Signal cable															
No cable											A				
10 Mtrs.											B				
20 Mtrs.											C				
30 Mtrs.											D				
50 mtrs.											E				
80 Mtrs.											F				
100 Mtrs.											G				
Ingress Protection Class															

Class IP65												1			
Class IP66												2			
Class IP67												3			
Class IP68												4			
Explosion Protection Certification															
General purpose (non Explosion proof)													A		
Certification of Class ExdIICT6Gb													B		
Others													C		
Process Connection Type															
Flanged DIN PN16														1	
Flanged DIN PN25														2	
Flanged ANSI CL-150														3	
Flanged ANSI CL-300														4	
Others														5	
Grounding Accessories.															
Standard (No Grounding ring)															A
02 Grounding rings															B
Others															C

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Doc; No: FMEM-Issue-2

Contact us

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