MagMaster

Electromagnetic Flowmeter

– Hygienic/Sanitary

Specification DataFile

- **Unrivalled, fully traceable flow performance, ±0.2% accuracy. Operable flow range: 1000 : 1**
  – ensures precise revenue measurement; superior process control

- **Approved hygienic/sanitary design with choice of connections**
  – allows clean-in-place and total flexibility of installation

- **Designed and manufactured to internationally accepted standards ISO 9001, 3A, FDA system**
  – ensures reliable, maintenance-free operation

- **Fully-featured transmitter with comprehensive display and output options, including HART**
  – allows easy integration into other systems and clear operator interface

- **Corrosion free polypropylene transmitter enclosure IP65/NEMA4X**
  – suitable for all brewing, food, pharmaceutical and dairy environments

MagMaster – bringing unsurpassed flowmetering performance to the brewery, dairy, pharmaceutical and food processing industries.

Introduction

Setting the Standard

MagMaster – the high performance flowmeter from ABB Instrumentation – is now available in a hygienic/sanitary version for food processing and pharmaceutical applications. MagMaster is designed for use in dairies, breweries, pharmaceutical and liquid food processing markets and it takes hygienic/sanitary flowmetering to new levels of capability and performance. The new range brings to these industries a proven level of performance which is unsurpassed in electromagnetic flow measurement.

Unrivalled Performance

MagMaster provides reliable measurement from high capacity down to virtually zero flow rates. Its potential operating flow range of 1000:1 enables previously unregistered minimal flows to be metered with an accuracy of ±0.2% of reading or ±0.001 m s^{-1} (0.0033 ft s^{-1}) (whichever is the greater). Users can now achieve more precise revenue measurement and superior process control.

Hygienic/sanitary Design

MagMaster's wide temperature, hygienic/sanitary design eliminates germ traps and is suitable for CIP (Clean-in-Place) using chemical cleansers, hot water and steam rinses. All external crevices have been eliminated from the sensor to ensure easy and effective hose-down.

Flowmeters, Transmitter and Couplings

Fully Approved to International Standards

MagMaster conforms to a wide range of national and international standards to meet hygienic/sanitary requirements for measurement and food processing legislation. Approvals include: 3A licensed, FDA system, FM and CSA general purpose. The meter's PTFE lining is approved and its housing is designed to be compatible with a hygienic/sanitary environment.

Flexible Installation

The new range is available in sizes from 20 mm (0.75 in) to 80 mm (3 in) – the latter size also being available with 100 mm (4 in) mating couplings. The standard installation connections are tri-clamp, ISO 2852 or DIN 11851 male screw connectors.

Tough in Service

The new range of meters is extremely robust and can withstand the stresses of being installed in a tanker and also accommodates the widely differing operating conditions encountered in liquid food and pharmaceutical applications.

Fully Featured Transmitters

There is a choice between the 'Industry Reference' MagMaster transmitter and the hygienic/sanitary version. The hygienic/sanitary version minimizes germ traps, thus facilitating cleaning. The local communication connector is omitted and a hygienic/sanitary terminal cover is fitted to the front of the unit. The transmitter is tamper-proof thus ensuring integrity of measurement.

Easy-to-Use – Simple to Interface

Both transmitters feature the option of a display which provides three internal totalizers covering forward, reverse and nett flow in a wide range of volumetric units. Flowrate display in forward and reverse directions in volumetric flowrate units is also provided. The display option, together with the wide choice of outputs – analog, pulse, serial data, Hart, etc. – ensures compatibility with both the user's display and control system requirements. Installation of the system is simplified by the universal power supply (available for a.c. or d.c. supplies) which enables the system to be used over very wide ranges of voltage with no manual voltage selection being required.

Maintaining the Standard

MagMaster 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.

General Specification

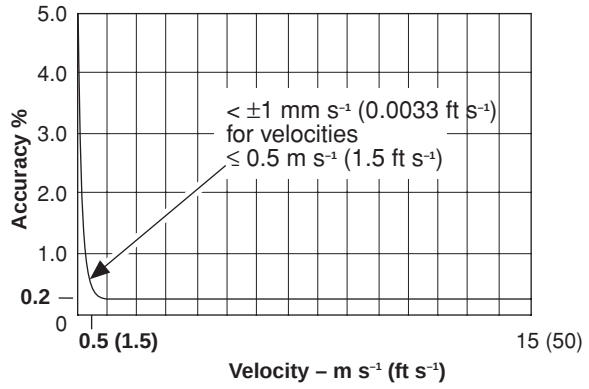
Sizes

Size		Flow Range			
mm	in	†Minimum		Maximum	
		$m^3 h^{-1}$	US g min^{-1}	$m^3 h^{-1}$	US g min^{-1}
*20	*0.75	0.0113	0.05	17	75
25	1	0.0177	0.08	27	115
40	1.5	0.0452	0.20	68	300
50	2	0.0707	0.30	107	450
65	2.5	0.1194	0.53	179	790
80	3	0.1809	0.80	271	1194
100‡	4‡	0.1809	0.80	271	1194

*DIN only.
† For accuracy see graph below.
‡ 100 mm/4 in couplings with 80 mm/3 in sensor

Transmitter/Sensor Separation < 100 m (328 ft)

Accuracy (under reference conditions)



Analog output Additional < ±0.008 mA

Temperature effect

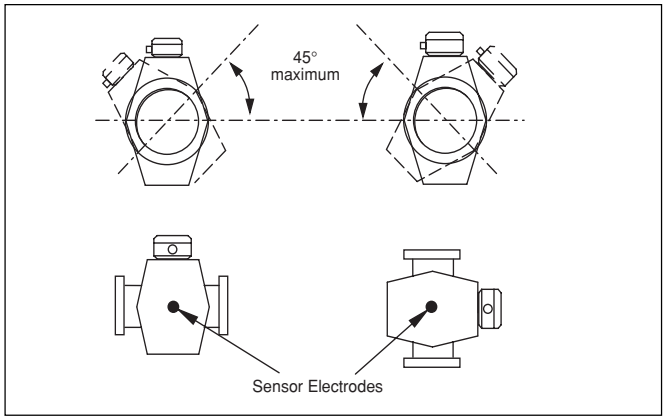
Transmitter < ±0.08% of reading/10°C
Analog output – Additional <±0.08% of reading/10°C

Sensor < ±0.02% of rate/10°C

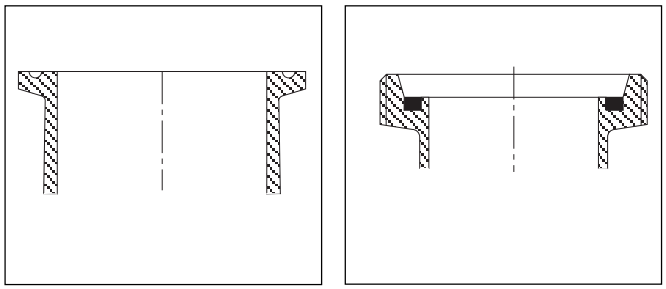
Repeatability and Reproducibility < ±0.05% or < ±0.25 mm s^{-1}, whichever is the greater

Power supply variation Negligible

Mounting

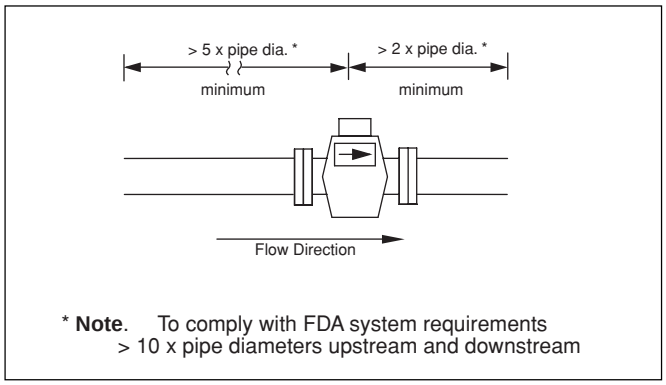


Connections



Tri-clamp ISO 2852 DIN 11851.

Straight pipe requirements



* **Note**. To comply with FDA system requirements
> 10 x pipe diameters upstream and downstream

Power consumption < 20 VA

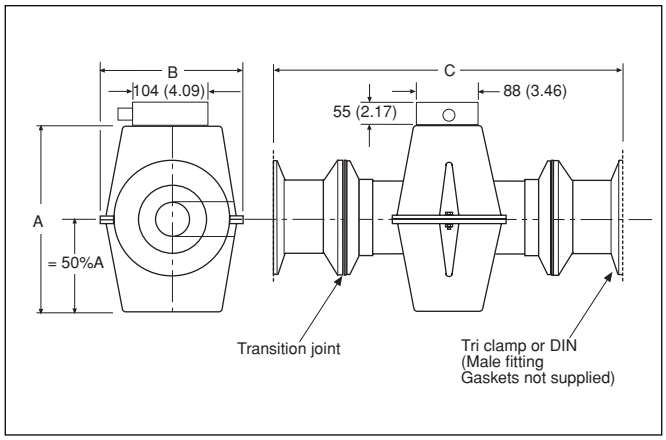
Conductivity ≥ 5 µS cm^{-1}

Sensor Specification

Sizes

Size mm (in)	Dimensions – mm (in)			Approx. Weight	
	A	B	C	kg	lb
20 (0.75)	174 (6.85)	122 (4.80)	285 (11.22)	7	15
25 (1)	174 (6.85)	122 (4.80)	285 (11.22)	7	15
40 (1.5)	210 (8.27)	128 (5.04)	284 (11.18)	9	20
50 (2)	210 (8.27)	128 (5.04)	284 (11.18)	10	22
65 (2.5)	280 (11.02)	122 (4.80)	312 (12.28)	13	29
80 (3)	280 (11.02)	122 (4.80)	312 (12.28)	13	29
100 (4) *	280 (11.02)	122 (4.80)	392 (15.43)	14	31

* 100 mm/4 in couplings with 80 mm/3 in sensor



Environmental Protection (when installed) IP65/NEMA 4X

Approvals/Licenses 3A
FDA system
FM/CSA applied for

Materials

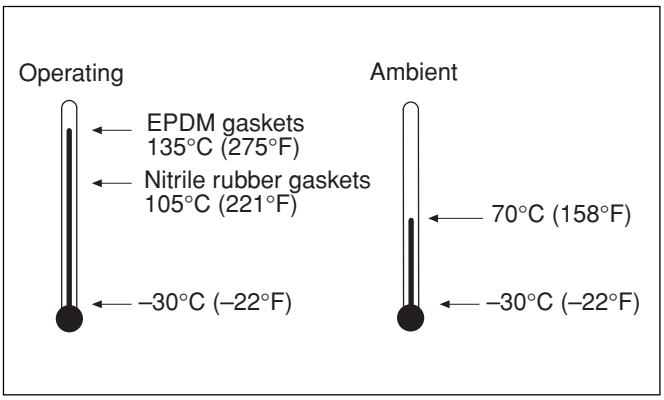
Item	Material
Metering tube & fittings	Stainless steel 316
Lining	PTFE (complies with FDA system and 3A regulations)
Gaskets (Transition joints)	Nitrile rubber:105°C (221°F)
	EPDM: 135°C (275°F)
Electrodes	Stainless steel 316
	Hastelloy 'C'
Sensor & terminal box housings	White nylon-coated aluminium

Pressure Limitations

Size mm (in.)	Pressure – bar (lb/in2)	
	Minimum*	Maximum
20 to 65 (0.75 to 2.5)	0.25 (3.75)	17 (250)
80 (3) 100 (4)	0.25 (3.75)	17 (250)

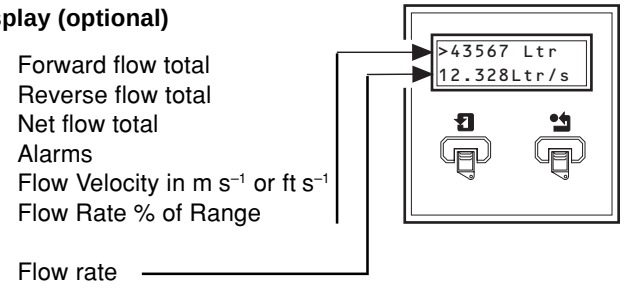
*Absolute

Temperature Ranges



Transmitter Specification

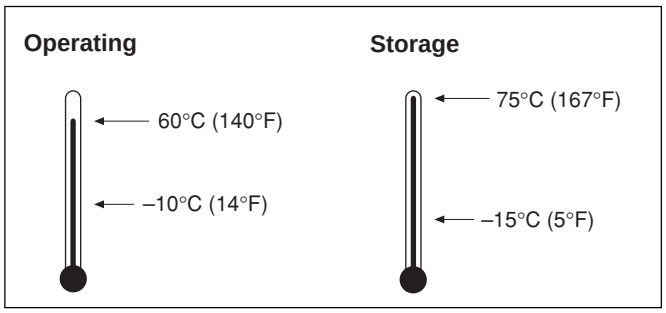
Display (optional)



Power Supply

Voltage Type	Voltage Range (V) Absolute rating	Frequency (Hz)	VA
a.c.	85 to 265	47 to 440	<2 0
d.c.	11 to 40	–	<2 0

Temperature Ranges



Environmental protection IP65/NEMA 4X

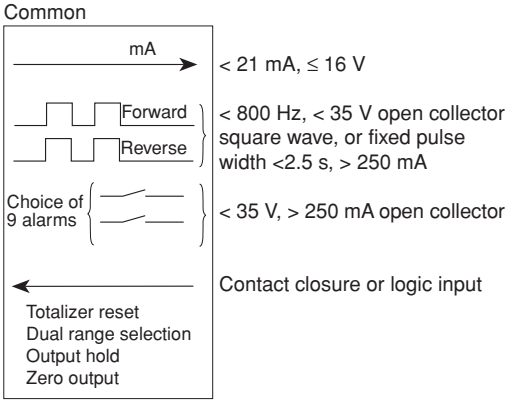
Approvals Electrical safety – BS4743 Class 1 (IEC 348)
FM and CSA applied for

EMC Specification Conforms to –
EMC Directive 89/336/EEC

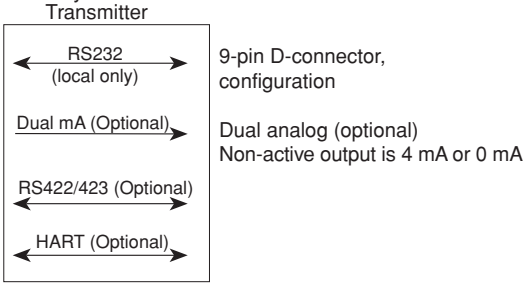
Enclosure Glass loaded polypropylene, polycarbonate window, polycarbonate terminal cover (Hygienic/sanitary version)

Electrical connections 20 mm plastic glands, or accepts ½ in NPT connectors. (Face seals required)

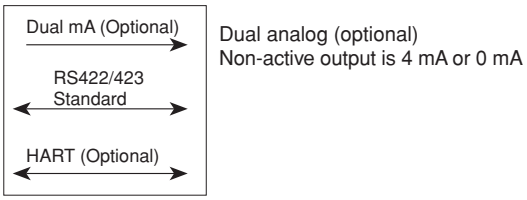
Common



"Industry Reference" Transmitter



Hygienic/Sanitary Transmitter

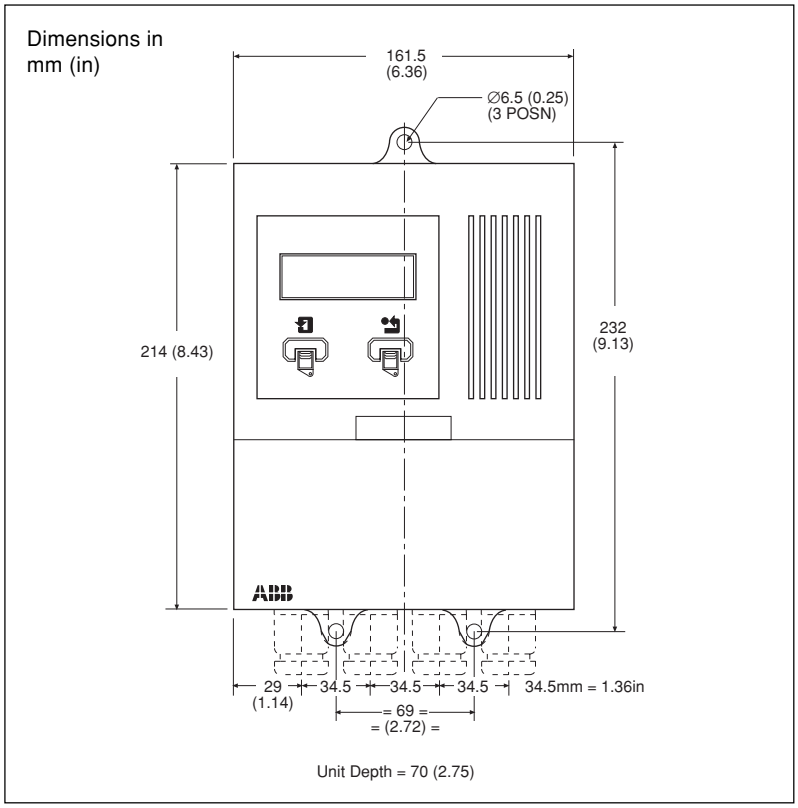


Outputs/Inputs
Galvanic separation to 50 V d.c. between analog, pulse/alarm and earth/ground

Sensor Ordering Information

Sensor	MF/E	XXX	X	A	X	1	X	1	XX	X
Calibrated Bore										
20mm (0.75 in). DIN ONLY.		200								
25mm (1 in)		250								
40mm (1.5 in)		400								
50mm (2 in)		500								
65mm (2.5 in)		650								
80mm (3 in)		800								
100mm (4 in)		109								
End Connections										
Hygienic, ISO 2852 (Tri-clamp/Clover)			G							
Hygienic, DIN 11851			H							
Electrodes										
316 stainless steel					1					
Hastelloy ‘C’					2					
Gasket Material										
Nitrile rubber							A			
EPDM							B			
Cable Length										
No cable									00	
10m (33 ft)									10	
20m (66 ft)									20	
30m (98 ft)									30	
40m (131 ft)									40	
50m (164 ft)									50	
User specified length in metres									X0	
Glanding										
20 mm plastic conduit entry										1
0.5 in NPT										4

Transmitter Overall Dimensions



Transmitter Ordering Information

Transmitter	X	E	X	X	X	X	X	1	X	X
Glanding										
20 mm plastic gland	1									
0.5 in NPT connection	4									
Transmitter Type										
"Industry Reference" MagMaster			R							
Hygienic MagMaster			S							
Power Supply										
95 V to 24 0Va.c.				1						
12 V to 35 Vd.c.				3						
Display										
Blind					0					
2-line high integrity display					3					
3-line display with keypad					4					
Output Options		Tx Type								
Standard		R				0				
Dual current		R				1				
HART communications *		R				2				
RS423/422 serial communications		R				4				
RS423/422 serial communications + dual current		R				5				
Standard			S			6				
Dual current			S			7				
HART communication			S			8				
Transmitter Build										
Standard								1		
FM, CSA General Approval								3		
Language										
English									1	
French									2	
German									3	
Spanish									4	
Italian									5	
Dutch									6	
Labels Factory allocated										

* Only available on UK versions

How to Order

Sensor Model MFE 400GA11A1304

- 40mm bore
- Hygienic/sanitary ISO2852 (Tri-clamp/Clover)
- 316 Stainless steel
- Nitrile rubber gasket
- 30 m cable length
- 0.5 in NPT connection

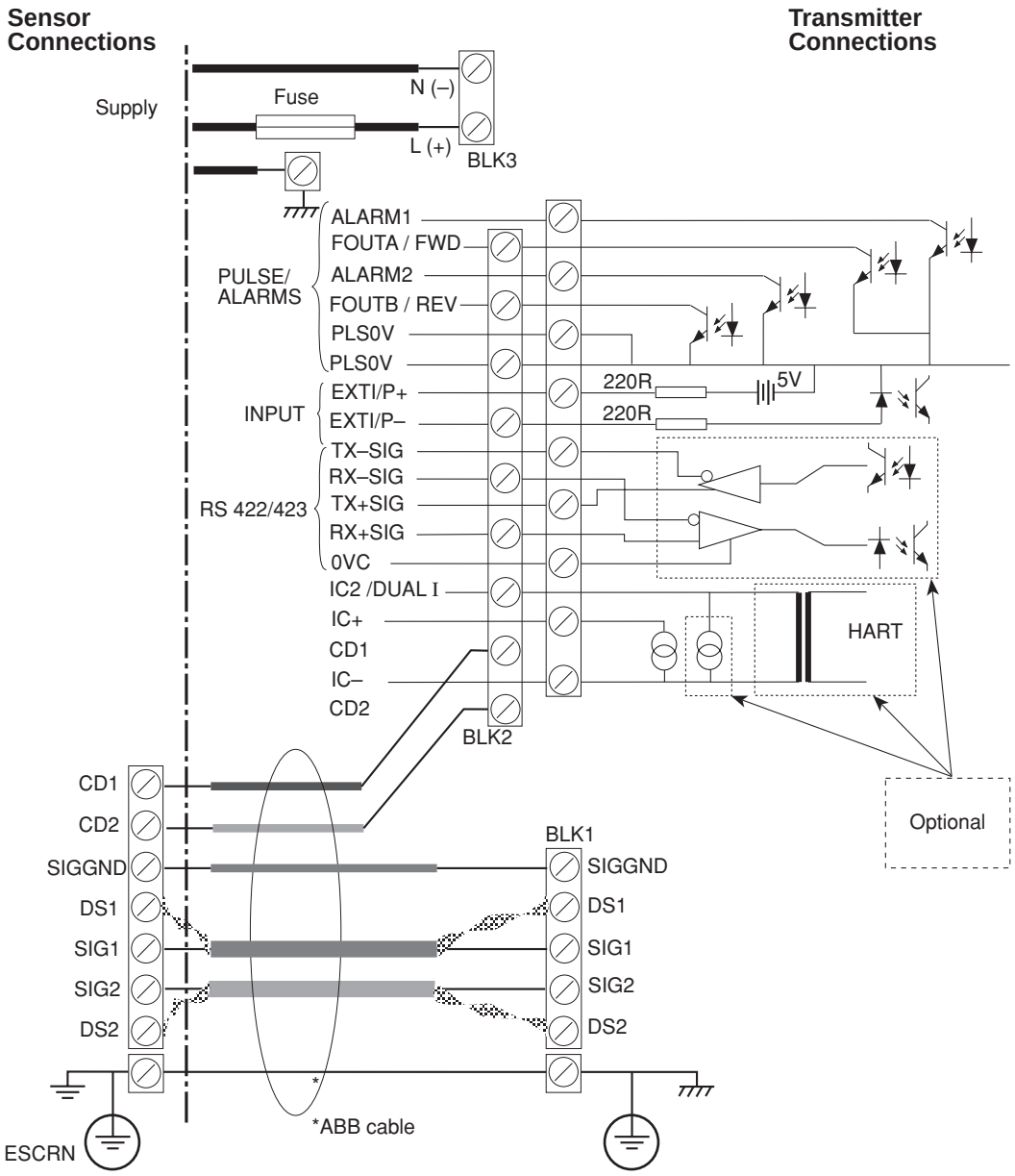
Transmitter Model 4ES1061111

- 0.5 in NPT connection
- MagMaster Hygienic/Sanitary
- 95 V to 240 Va.c.supply
- No display
- Standard
- English language

Features

User re-programmable	Local hand-held configurator programming e.g. Psion 3, etc.
Fully configurable	A choice of engineering parameters in engineering units, e.g. flowrate, flow units, all outputs, etc.
Empty pipe sensing	Ensures units read zero on empty pipe.
Interchangeability	Transmitter 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.
Multi-lingual	Displays, programming and prompts available in English, French, German, Spanish and Italian – other languages on application.

Connection Information



Note. Remove any exposed black conductive layer from the inner insulation of both coaxial cables.

Printed in UK (11.00)

SS/MAG/HS Issue 6

ABB Automation Ltd
Oldends Lane, Stonehouse
Gloucestershire, GL10 3TA
UK
Tel: +44 (0)1453-826-661
Fax: +44 (0)1453-827-856

ABB Automation Inc
125 E. County Line Road
Warminster, PA 18974
USA
Tel: +1 215-674-6000
Fax: +1 215-674-7183

ABB has Sales & Customer Support expertise in over 100 countries worldwide

www.abb.com