Foxboro®
by Schneider Electric

PSS 1-6F9 A

9100A Series Magnetic Flowtubes with Ebonite Liners
1 to 78 in (25 to 2000 mm) Nominal Flowtube Sizes



The Foxboro® brand 9100A Series Magnetic Flowtube, together with an IMT25 Magnetic Flow Transmitter, combine to form a Magnetic Flowmeter with pulsed dc excitation. It is designed for use with conductive fluids in general purpose, and waste and water applications. The transmitter converts the low level, high impedance signal from the lined flowtube to a scaled transmission signal, either 4 to 20 mA, digital, or pulse output, that is proportional to volumetric flow rate.

FEATURES

- Field-Proven Electrode Seal Design
- Ebonite Liner
- Enclosure meets IEC IP67 and NEMA Type 4X; Upgradeable to IEC IP68
- Withstands Temporary Flooding before, during, and after Installation; Can be upgraded on Site to withstand Continuous Flooding
- Each Flowtube has Built-in Grounding (Earthing) Electrodes
- ANSI/NSF 61 (US) Certified
- Large Selection of Flowtube Sizes and Flanges
- Unidirectional or Bidirectional Flow
- Optional Liner Protector offered for Processes with High Velocity and Abrasive Fluids
- Conforms to Applicable European Union Directives (Product Marked with CE Logo)

SUPERIOR REPUTATION FOR DEPENDABILITY AND QUALITY

Foxboro magnetic flow measurement systems were introduced to the process industries in 1954 and these systems have demonstrated the broadest and most time-proven application expertise with tens of thousands of successful small and large size flowtube installations.

INTELLIGENT PATH TO MAG FLOW SYSTEMS

The merging of the latest technology in flowtube design, in conjunction with the Intelligent IMT25 Magnetic Flow Transmitter, provides the waste and water industries with a significant advancement in conductive liquid flow measurement. In addition to 4 to 20 mA and pulse output signals, remote digital communication is provided using HART protocol.

PULSED DC FLOWTUBES USED WITH REMOTE MOUNTED TRANSMITTERS

The 9100A Series Magnetic Flowtubes are calibrated for use with pulsed dc coil excitation. The Intelligent I/A Series® IMT25 Magnetic Flow Transmitter is offered for use with these flowtubes. This transmitter may be remote mounted on a pipe or to a flat surface for distances up to 1000 ft (300 m) away from the flowtube.

LARGE SELECTION OF FLOWTUBE SIZES

Flowtubes are offered with a selection of sizes from 1 to 78 in or from DN 25 to DN 2000. Consistent with the size selected, ANSI Class 150, PN 6, PN 10, PN 16, PN 40, and AWWA(1) C-207 Class D flanges are provided as end connections.

WEATHERPROOF AND CORROSION RESISTANT CONSTRUCTION - SUBMERSIBLE FLOWTUBES

These flowtubes are designed to operate in harsh outdoor environments. The enclosure is weatherproof as defined by IEC IP67, and provides the watertight and corrosion resistant protection of NEMA Type 4X. The standard IEC IP67 flowtube can also withstand submersion at a 1.5 m (5 ft) depth for a period up to 72 hours. This depth can be increased to 10 m (33 ft) and continuous flooding by using a field submersion kit. Refer to the Optional Selections section.

EXCELLENT ZERO STABILITY

Excellent zero stability is inherent in the design. The mechanical design and electronic package feature accurately located and securely mounted coil and electrode assemblies, spring-loaded electrodes, optimized field characterization, and power-driven screens (shields) on the signal leads. All of these features ensure the ultimate in long-term stability, signal integrity, and accurate measurement.

STRAIGHT-THROUGH TUBE DESIGN

The straight-through, unobstructed tube design makes these flowtubes ideal for waste water and sludge fluids where a minimal pressure drop is required. This means lower fluid movement costs.

GROUNDING (EARTHING) ELECTRODES

The flowtube design incorporates built-in grounding electrodes as standard. This means that these flowtubes can be installed in metallic, nonmetallic, or lined pipelines without the need for grounding rings.

LINER PROTECTION

Optional liner protection is offered using grounding rings on the upstream side of the flowtube to mechanically protect the liner from high velocity and very abrasive fluids.

1. AWWA = American Water Works Association.

COMPACT FLOWTUBE

The 9100A flowtube has a compact design that provides face-to-face overall lengths in each size that conform to recommended flowtube dimensions contained in ISO/DIS 13359.

LOW POWER CONSUMPTION

All Flowmeter configurations are designed to consume less than 24 W of power at reference voltage and frequency.

FLOWTUBE CALIBRATION

All flowtubes are wet calibrated to verify their specified accuracy. The calibration facilities have been accredited to the EN 45001 standards.

CE COMPLIANCE

These flowtubes conform to the applicable European Community Standards when used in conjunction with the IMT25 Magnetic Flow Transmitter.

OPERATING CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Condition Limits
Ambient Temperature	20 ±2°C (68 ±3°F)	–20 and +100°C (–4 and +212°F)
Process Temperature	20 ±2°C (68 ±3°F)	with Ebonite Liner: 0 and 95°C (32 and 203°F)
Process Pressure	3 bar gauge (43 psig)	with Ebonite Liner: Full Vacuum and Flange Rating
Vibration	Negligible	0 and 32 m/s^2 (0 and 3.2 “g”) from 18 to 1000 Hz in all directions

PERFORMANCE SPECIFICATIONS

The Model 9100A Flowtube is used with I/A Series Magnetic Flow Transmitters to form a magnetic flow system. System performance specifications are listed in the following Magnetic Flow Transmitter PSS.

PSS 1-6F5 A IMT25 Magnetic Flow Transmitter with HART Communication Protocol

FUNCTIONAL SPECIFICATIONS

Nominal Flowtube Sizes

1 to 78 in (DN 25 to DN 2000). Refer to Model Code section for a complete listing of flowtube sizes.

End Connections

ANSI, AWWA, and BS 4504 (EN 1092-1) flanges. Refer to Model Code section for a listing of flange types and ratings available with each flowtube size.

Process Fluid Conductivity

The minimum process fluid conductivity required is 5 µS/cm. For empty pipe detection, the minimum process fluid conductivity is 20 µS/cm. Refer to TI 027-072 for conductivities of various process liquids. Also see Table 1.

Signal Cable Length

The maximum allowable cable length is a function of the cable type, process fluid conductivity, and whether the cables are in the same or separate conduits. Standard magnetic flow system accuracy is maintained when the installations are in accordance with Table 1.

Ebonite Liner

An Ebonite liner is the best choice when used with clean, mildly corrosive, or mildly abrasive fluids. It is not recommended when used with severe corrosive or severe abrasive fluids. Generally, Ebonite is selected for general purpose, sewage, drinking water, and district heating applications.

Flowtube Process Pressure-Temperature Limits

The maximum pressure limit of the flowtube is equal to the pressure limit of the flanges selected. The flowtube temperature limit depends on the liner material. See Figure 1 for Pressure-Temperature limits of the 9100A Series Flowtubes.

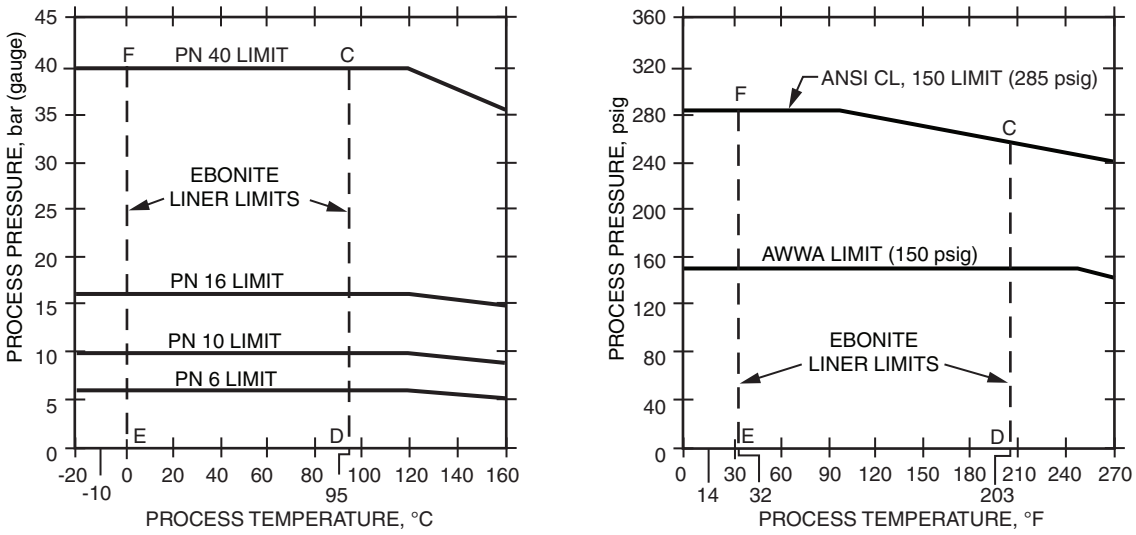
The shaded area beneath each flange curve represents the flowtube pressure-temperature limits for each flange type with the selected liner. The vertical dashed lines represent the temperature limits of the Ebonite liners. Also, as shown in Figure 1, for AWWA C207 Class D flanges, the pressure rating is 150 psig within the temperature limits of the liner.

Table 1. Conductivities of Various Process Liquids (a)

Maximum Cable Length	Minimum Fluid Conductivity	Signal and Coil Drive Cables
300 m (1000 ft)	5 µS/cm	Signal and coil drive cables in separate conduit. Signal Cable to be Part No. R0101ZS (feet) or B4017TE (meters).
225 m (700 ft)	5 µS/cm	Signal and coil drive cables in same conduit. Signal Cable to be Part No. R0101ZS (feet) or B4017TE (meters).
150 m (500 ft)	20 µS/cm	Signal cable may be in same conduit as coil drive cable. Signal cable to be good quality twisted shielded pair, preferable no smaller than 1.0 mm^2 (or 18 AWG) for mechanical considerations (Belden 8760 or 9318, Alpha 5610/1801 or 5611/1801, or equivalent).

a. Values in table are fluid conductivity minimums, and maximum distance between transmitter and flowtube. Refer to TI 027-072 for conductivities of various process liquids.

Figure 1. Flowtube Process Pressure-Temperature Limits with Various Liners, and ANSI/EN 1092-1/AWWA Flanges



Flow Velocity (Figures 2 and 3)

MINIMUM VELOCITY FLOW RANGE

0 to 1.65 ft/s (0 to 0.50 m/s)

MAXIMUM VELOCITY FLOW RANGE

0 to 33 ft/s (0 to 10 m/s)

RECOMMENDED OPERATING VELOCITY

General Liquids

3 to 15 ft/s (0.9 to 4.6 m/s)

Erosive Slurries

3 to 6 ft/s (0.9 to 1.8 m/s)

Liquids that Coat Flowtube Surface

6 to 15 ft/s (1.8 to 4.6 m/s)

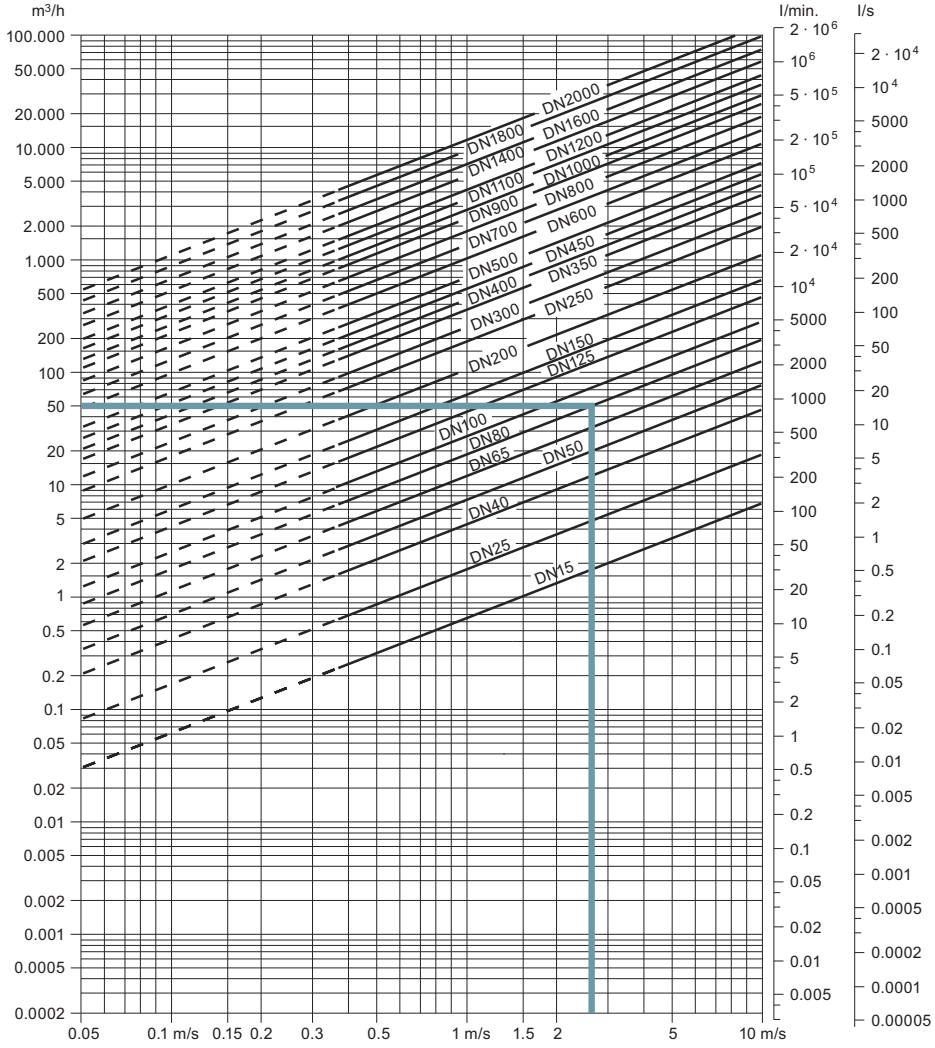
Flow Rate

Figure 2 and Figure 3 show the relationship between volume flow rate, flow velocity, and flowtube size in metric and U.S. Customary units. Also see Table 2 for unit conversion factors, and Table 3 for upper range values.

Table 2. Unit Conversion Factors

To Convert:	Multiply by:	To Obtain:
m^3/h	16.67	L/min
m^3/h	0.2778	L/s
m^3h	4.403	U.S. gpm
L/min	0.06	m^3/h
L/min	0.0167	L/s
L/s	3.60	m^3/h
L/s	60.0	L/min
U.S. gpm	0.8327	IMP gpm
U.S. gpm	8.021	ft^3/h
U.S. gpm	0.2271	m^3h
U.S. gpm	60.0	U.S. gph
U.S. gph	0.0167	U.S. gpm
IMP gpm	1.201	U.S. gpm
ft^3/h	0.1247	U.S. gpm

Figure 2. Flowtube Sizing Curves in Metric Units - Also See Table 2



Sizing table (DN15 … DN 2000)

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension DN.

Guidelines for selection of sensor

Min. measuring range: 0 to 0.25 m/s

Max. measuring range: 0 to 10 m/s

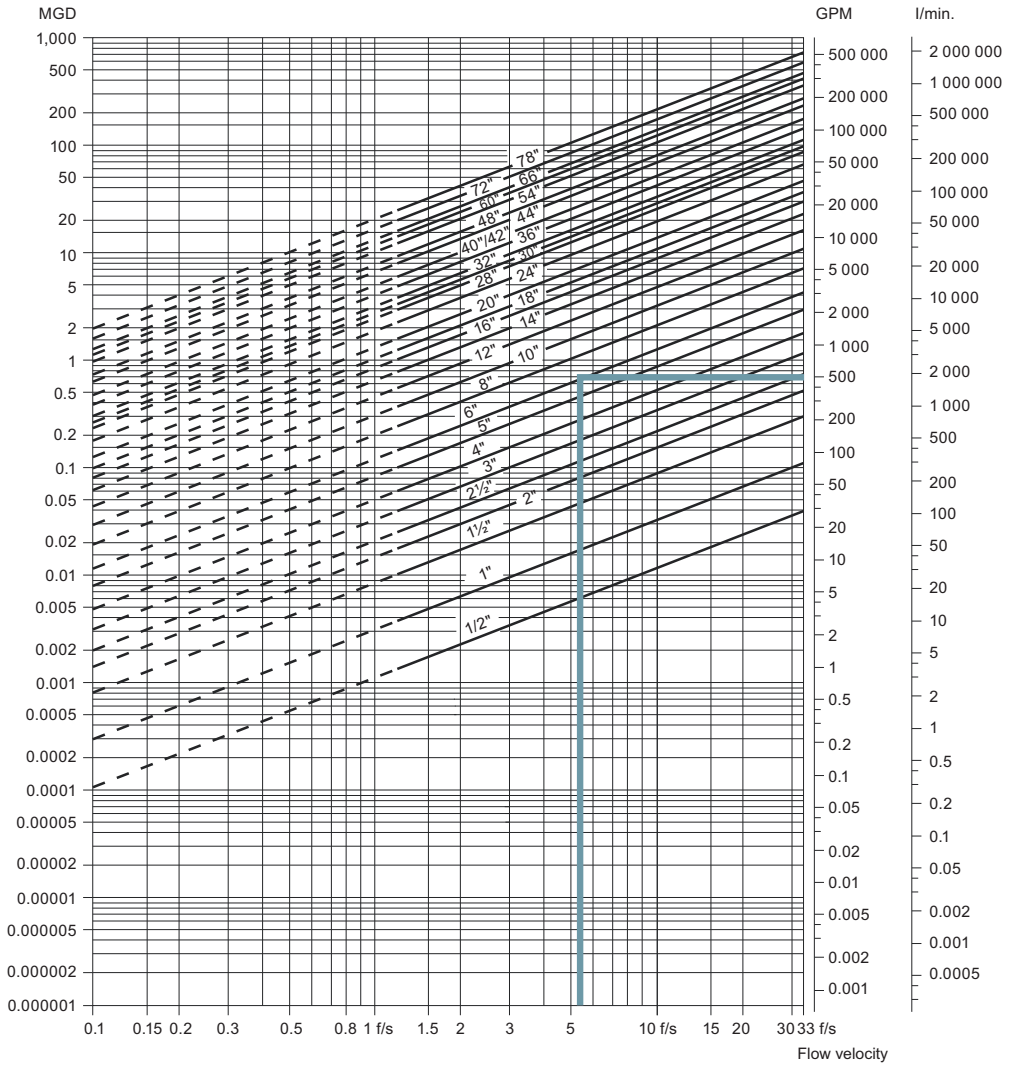
Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 1 to 3 m/s.

Example:

Flow quantity of 50 m ^{3}/h and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

Flow velocity calculation formula	Units
v = 1273.24 · Q / DN ^{2} or	v : [m/s], Q : [l/s], DN : [mm]
v = 353.68 · Q / DN ^{2}	v : [m/s], Q : [m ^{3}/h], DN : [mm]

Figure 3. Flowtube Sizing Curves in U.S. Customary Units - Also See Table 2



Sizing table ($^{1}/_{2}$ " … 78")

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension size.

Guidelines for selection of sensor

Min. measuring range: 0 to 0.8 ft/s

Max. measuring range: 0 to 33 ft/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

Example:

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

Flow velocity calculation formula	Units
$v = 0.408 \cdot Q / (\text{Pipe I.D.})^2$ or	v : [ft/s], Q : [GPM], Pipe I.D. : [inch]
$v = 283.67 \cdot Q / (\text{Pipe I.D.})^2$	v : [ft/s], Q : [MGD], Pipe I.D. : [inch]

Table 3. Upper Range Values (URVs)

Flowtube Size		Metric Units (a)		U.S. Customary Units (a)	
DN Flange Size	Inch Flange Size	Minimum URV	Maximum URV	Minimum URV	Maximum URV
DN 25	1 in	0.80 m^3/h	16 m^3/h	3.5 U.S. gpm	70 U.S. gpm
DN 40	1 1/2 in	2.1 m^3/h	42 m^3/h	9.0 U.S. gpm	180 U.S. gpm
DN 50	2 in	2.9 m^3/h	58 m^3/h	12.5 U.S. gpm	250 U.S. gpm
DN 65	2 1/2 in	5.0 m^3/h	100 m^3/h	22 U.S. gpm	440 U.S. gpm
DN 80	3 in	7.1 m^3/h	142 m^3/h	31 U.S. gpm	625 U.S. gpm
DN 100	4 in	12.0 m^3/h	250 m^3/h	55 U.S. gpm	1,100 U.S. gpm
DN 125	5 in	19.3 m^3/h	385 m^3/h	85 U.S. gpm	1,700 U.S. gpm
DN 150	6 in	27.7 m^3/h	554 m^3/h	122 U.S. gpm	2,440 U.S. gpm
DN 200	8 in	58.0 m^3/h	1,160 m^3/h	255 U.S. gpm	5,100 U.S. gpm
DN 250	10 in	93.0 m^3/h	1,860 m^3/h	410 U.S. gpm	8,200 U.S. gpm
DN 300	12 in	133 m^3/h	2,660 m^3/h	585 U.S. gpm	11,700 U.S. gpm
DN 350	14 in	165 m^3/h	3,300 m^3/h	730 U.S. gpm	14,600 U.S. gpm
DN 400	16 in	220 m^3/h	4,400 m^3/h	960 U.S. gpm	19,200 U.S. gpm
DN 450	18 in	280 m^3/h	5,600 m^3/h	1,200 U.S. gpm	24,000 U.S. gpm
DN 500	20 in	340 m^3/h	6,800 m^3/h	1,500 U.S. gpm	30,000 U.S. gpm
DN 600	24 in	490 m^3/h	9,800 m^3/h	2,150 U.S. gpm	43,000 U.S. gpm
DN 700	28 in	690 m^3/h	13,800 m^3/h	3,000 U.S. gpm	60,000 U.S. gpm
–	30 in	–	–	3,400 U.S. gpm	68,000 U.S. gpm
DN 800	32 in	900 m^3/h	18,000 m^3/h	3,900 U.S. gpm	78,000 U.S. gpm
DN 900	36 in	1,150 m^3/h	23,000 m^3/h	5,000 U.S. gpm	100,000 U.S. gpm
DN 1000	40 in	1,400 m^3/h	28,000 m^3/h	6,200 U.S. gpm	124,000 U.S. gpm
–	42 in	–	–	6,800 U.S. gpm	136,000 U.S. gpm
–	44 in	–	–	7,500 U.S. gpm	150,000 U.S. gpm
DN 1200	48 in	2,050 m^3/h	41,000 m^3/h	9,000 U.S. gpm	180,000 U.S. gpm
DN 1400	54 in	2,800 m^3/h	56,000 m^3/h	12,000 U.S. gpm	240,000 U.S. gpm
–	60 in	–	–	14,000 U.S. gpm	280,000 U.S. gpm
DN 1600	66 in	4,000 m^3/h	80,000 m^3/h	17,500 U.S. gpm	350,000 U.S. gpm
DN 1800	72 in	4,800 m^3/h	96,000 m^3/h	21,000 U.S. gpm	420,000 U.S. gpm
DN 2000	78 in	5,600 m^3/h	112,000 m^3/h	25,000 U.S. gpm	500,000 U.S. gpm

a. See Table 2 for unit conversions.

PHYSICAL SPECIFICATIONS

Flowtube Enclosure (Including Terminal Box)

The overall flowtube enclosure construction meets IEC IP67 and provides the environmental protection of NEMA Type 4X. When used with an optional submersion kit, the enclosure meets IP68 and NEMA Type 6. See “OPTIONAL SELECTIONS AND ACCESSORIES” section.

Housing Material

Carbon steel with corrosion-resistant, two component coating.

Flowtube Material

AISI Type 304 ss

Flange Material

Carbon Steel with corrosion resistant, two component coating.

Terminal Box Enclosure Material

Fiberglass reinforced polyamide, or aluminum, as specified.

Process Wetted Materials

Flowtube Liner

Ebonite

Electrodes

Hastelloy C-276

Flange Gaskets

Provided by user

Installation Requirements

During measurement, the flowtube must remain full with the process fluid to achieve the stated performance. Installation in a vertical pipe with flow going upward is ideal. For horizontal installations, position the flowtube so that the electrodes are in a horizontal plane. The minimum upstream straight pipe length recommended is five pipe diameters, and the minimum downstream straight pipe length recommended is three pipe diameters. The pipe length is measured outward from the center of the flowtube. Refer to the applicable installation instructions for more details.

Electrical Connections

Four 1/2 NPT holes with cable glands for cable entry are provided on the plastic terminal box, and two 1/2 NPT holes for conduit are provided on the aluminum terminal box. Separate screw type terminals within the terminal box are provided for electrode and coil cable terminations. Refer to “DIMENSIONS - NOMINAL”.

Approximate Mass

Refer to Table 4.

Dimensions-Nominal

Refer to “DIMENSIONS - NOMINAL”.

Table 4. Approximate Mass

Nominal Flowtube Size		Approximate Mass (a)	
DN Flange Size	Inch Flange Size	kg	lb
DN 25	1 in	5	11
DN 40	1 1/2 in	8	18
DN 50	2 in	9	20
DN 65	2 1/2 in	11	24
DN 80	3 in	12	26
DN 100	4 in	16	35
DN 125	5 in	19	42
DN 150	6 in	27	60
DN 200	8 in	40	88
DN 250	10 in	60	132
DN 300	12 in	80	176
DN 350	14 in	110	243
DN 400	16 in	125	276
DN 450	18 in	175	386
DN 500	20 in	200	441
DN 600	24 in	287	633
DN 700	28 in	330	728
DN 750	30 in	360	794
DN 800	32 in	450	992
DN 900	36 in	530	1168
DN 1000	40 in	660	1455
DN 1100	44 in	1140	2513
DN 1200	48 in	1180	2601
DN 1400	56 in	1600	3527
DN 1500	50 in	2460	5423
DN 1600	64 in	2140	4718
DN 1800	72 in	2930	6460
DN 2000	78 in	3665	8080

a. Approximate Mass includes the plastic terminal box.

ELECTRICAL SAFETY SPECIFICATIONS

Flowtubes have been designed to meet electrical safety descriptions listed below. For detailed information, or status of testing laboratory approvals or certifications, contact Global Customer Support.

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
FM/CSA nonincendive Class I, Division 2, Groups A, B, C, and D hazardous locations.	Temperature Class T4; Ta = 100°C.	N

OPTIONAL SELECTIONS AND ACCESSORIES

Submersion Kit to IEC IP68

The standard flowtube enclosure meets IEC IP67 and may be immersed in water. A submersion kit option is offered to field upgrade the protection from IEC IP67 to IEC IP68. The table below compares the standard submersion protection, and improved protection using the optional submersion kit. Specify Part Number 085U0220 for the optional IP68 Submersion Kit.

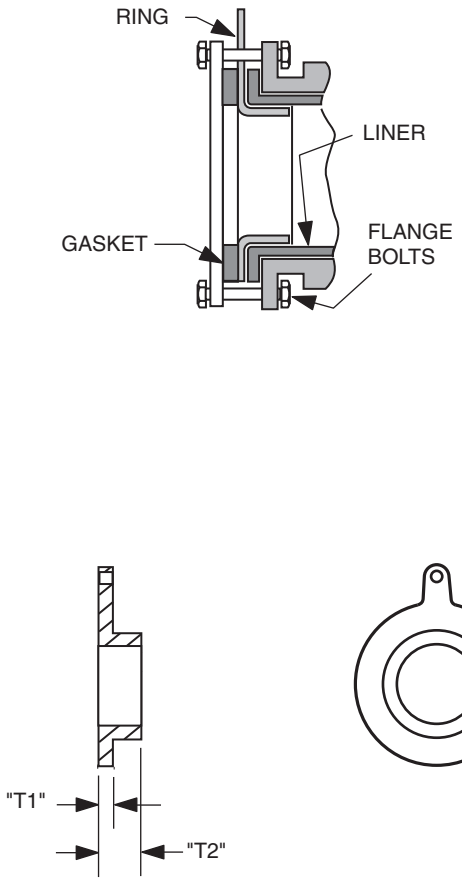
Designation	Submersion Depth	Submersion Duration
IP67; NEMA 4X (Standard)	1.5 m Water (5 ft Water)	72 hours
IP68; NEMA 6 (Optional)	10 m Water (33 ft Water)	Continuous

Liner Protection

Grounding rings are offered for the protection of the flowtube liner to protect the liner against high velocity and/or very abrasive fluids. A Type C 304 ss ring can be used with Ebonite lined flowtubes. The 9100A flowtube does not require grounding rings to provide accurate flow measurements when equipped with an Ebonite liner. See Table 5 for ring specifications and Table 6 for ring part numbers, as required for liner protection.

Table 5. Type C Liner Protection Ring Information (a)

Flowtube Size		Type C Liner Protection Ring - 304 ss						
		Dim. T1		Dim. T2		Approx. Mass		
DN	Inch	mm	in	mm	in	kg	lb	Liner Protection Ring Configuration
DN 25	1 in	1.2	0.047	15	0.59	0.03	0.07	
DN 40	1 1/2 in	1.2	0.047	15	0.59	0.08	0.18	
DN 50	2 in	1.2	0.047	15	0.59	0.12	0.26	
DN 65	2 1/2 in	1.2	0.047	15	0.59	0.16	0.35	
DN 80	3 in	1.2	0.047	15	0.59	0.20	0.44	
DN 100	4 in	1.2	0.047	15	0.59	0.25	0.55	
DN 125	5 in	1.2	0.047	15	0.59	0.29	0.64	
DN 150	6 in	1.2	0.047	15	0.59	0.33	0.73	
DN 200	8 in	1.2	0.047	15	0.59	0.37	0.81	
DN 250	10 in	1.2	0.047	15	0.59	0.4	0.88	
DN 300	12 in	1.6	0.063	20	0.79	0.6	1.3	
DN 350	14 in	1.6	0.063	20	0.79	1.0	2.2	
DN 400	16 in	1.6	0.063	20	0.79	1.4	3.1	
DN 450	18 in	1.6	0.063	20	0.79	1.8	4.0	
DN 500	20 in	1.6	0.063	20	0.79	2.2	4.8	
DN 600	24 in	1.6	0.063	20	0.79	2.6	5.7	
DN 700	28 in	2.0	0.079	25	0.98	3.0	6.6	
–	30 in	2.0	0.079	25	0.98	3.3	7.3	
DN 800	32 in	2.0	0.079	25	0.98	3.7	8.1	
DN 900	36 in	2.0	0.079	25	0.98	4.0	8.8	
DN 1000	40 in	2.0	0.079	25	0.98	4.4	9.7	
–	42 in	2.0	0.079	25	0.98	4.5	10.0	
–	44 in	2.0	0.079	25	0.98	4.7	10.3	
DN 1200	48 in	2.0	0.079	25	0.98	5.0	11.0	
DN 1400	54 in	3.0	0.12	40	1.6	9.0	20	
–	60 in	3.0	0.12	40	1.6	10.0	24	
DN 1600	66 in	3.0	0.12	40	1.6	12.5	28	
DN 1800	72 in	3.0	0.12	40	1.6	14.3	32	
DN 2000	78 in	3.0	0.12	40	1.6	16	35	



a. Type C 304 ss ring is used with Ebonite lined flowtubes for liner protection. Rings are not needed for fluid reference ground since the flowtube includes grounding electrodes.

Table 6. Ring Part Numbers

Nominal Flowtube Size		Part Number for Liner Protection Ring for Each Flange Type - 304 ss					
		EN1092 PN 6	EN1092 PN 10	EN1092 PN 16	EN1092 PN 40	ANSI Cl. 150	AWWA C-207
DN 25	1 in	–	–	–	083N8361	083N8361	–
DN 40	1 1/2 in	–	–	–	083N8362	083N8362	–
DN 50	2 in	–	–	–	083N8344	083N8344	–
DN 65	2 1/2 in	–	–	083N8345	–	083N8345	–
DN 80	3 in	–	–	083N8347	–	083N8347	–
DN 100	4 in	–	–	083N8025	–	083N8025	–
DN 125	5 in	–	–	083N8071	–	083N8071	–
DN 150	6 in	–	–	083N8008	–	083N8008	–
DN 200	8 in	–	083N8011	083N8011	–	083N8011	–
DN 250	10 in	–	083N8013	083N8013	–	083N8013	–
DN 300	12 in	–	083N8012	083N8012	–	083N8012	–
DN 350	14 in	–	083N8039	083N8039	–	083N8039	–
DN 400	16 in	–	083N8100	083N8100	–	083N8100	–
DN 450	18 in	–	083N8103	083N8104	–	083N8104	–
DN 500	20 in	–	083N8107	083N8108	–	083N8107	–
DN 600	24 in	–	083N8111	083N8112	–	083N8113	–
DN 700	28 in	–	083N8294	083N8294	–	–	(a)
–	30 in	–	–	–	–	–	(a)
DN 800	32 in	–	083N8304	083N8304	–	–	(a)
DN 900	36 in	–	083N8307	083N8307	–	–	(a)
DN 1000	40 in	–	083N8310	083N8310	–	–	(a)
–	42 in	–	–	–	–	–	(a)
–	44 in	–	–	–	–	–	(a)
DN 1200	48 in	–	083N8313	083N8313	–	–	(a)
DN 1400	54 in	083N8349	083N8353	083N8357	–	–	(a)
–	60 in	–	–	–	–	–	(a)
DN 1600	66 in	083N8350	083N8354	083N8358	–	–	(a)
DN 1800	72 in	083N8351	083N8355	083N8359	–	–	(a)
DN 2000	78 in	083N8352	083N8356	083N8360	–	–	(a)

a. Contact Global Customer Support.

MODEL CODE - 9100A SERIES MAGNETIC FLOWTUBE

Description		Model
9100A Series Magnetic Flowtube		
Nominal Flowtube Size (a)		
DN Flowmeter Size	**Inch Flowmeter Size**	
DN 25	1 in	9101A
DN 40	1 1/2 in	911HA
DN 50	2 in	9102A
DN 65	2 1/2 in	912HA
DN 80	3 in	9103A
DN 100	4 in	9104A
DN 125	5 in	9105A
DN 150	6 in	9106A
DN 200	8 in	9108A
DN 250	10 in	9110A
DN 300	12 in	9112A
DN 350	14 in	9114A
DN 400	16 in	9116A
DN 450	18 in	9118A
DN 500	20 in	9120A
DN 600	24 in	9124A
DN 700	28 in	9128A
–	30 in	9130A
DN 800	32 in	9132A
DN 900	36 in	9136A
DN 1000	40 in	9140A
–	42 in (42 inch AWWA Flange on a 40 inch Tube)	9142A
–	44 in	9144A
DN 1200	48 in	9148A
DN 1400	54 in (54 inch AWWA Flange on a 56 inch Tube)	9154A
–	60 in	9160A
DN 1600	66 in (66 inch AWWA Flange on a 64 inch Tube)	9166A
DN 1800	72 in	9172A
DN 2000	78 in (78 inch AWWA Flange on a 80 inch Tube)	9178A
Tube Construction		
AISI Type 304 Stainless Steel Tube (304 ss)		–SI
End Connections		
ANSI Class 150, Carbon Steel Flange - 1 to 24 in Line Sizes		CA
AWWA C-207, Class D, Carbon Steel Flange - 28 to 78 in Line Sizes		WC
EN 1092-1, PN 6 (DN1400-2000) Carbon Steel		CZ
EN 1092-1, PN 10 (DN200-2000) Carbon Steel		CX
EN 1092-1, PN 16 (DN65-1200) Carbon Steel		CE
EN 1092-1, PN 40 (DN25-50) Carbon Steel		CG
Liner Material		
Ebonite		-B
Electrodes		
Hastelloy C-276 - Fluid Reference Electrode Included		H
Coil Drive		
Pulsed dc		J

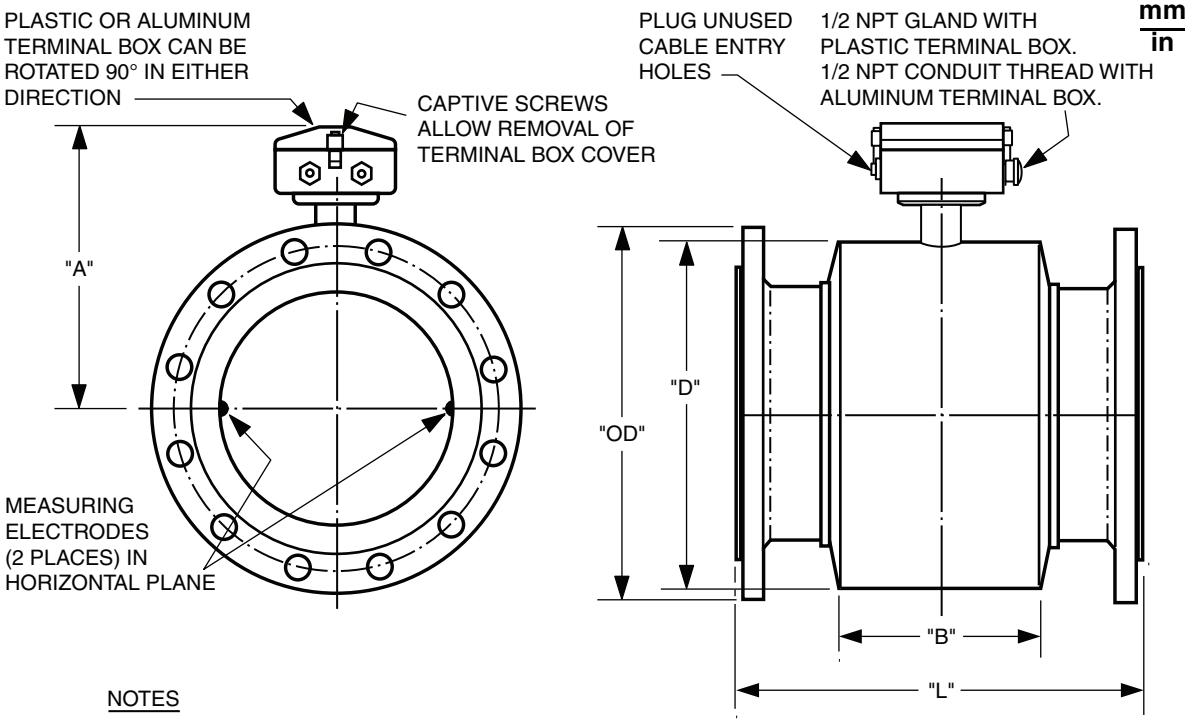
MODEL CODE - 9100A SERIES MAGNETIC FLOWTUBE (CONTINUED)

Description	Model
Housing Construction/Transmitter Mounting	
Coated Carbon Steel Housing with Aluminum Terminal Box – Terminal Box has two 1/2 NPT Conduit Threads – Remote Mounted Transmitter	–G
Coated Carbon Steel Housing with Polyamide Terminal Box – Terminal Box has four 1/2 NPT Threads with Cable Glands – Remote Mounted Transmitter	–F
Coated Carbon Steel Housing with Polyamide Terminal Box, M20 Conduit	–V
Electrical Safety (Also see Electrical Safety Specifications section)	
FM/CSA, Nonincendive, Class I, Division 2	N
Example: 9116A-SICA-BHJ-GN	

a. See “End Connections” selections further in Code to determine ANSI, AWWA, and BS (EN 1092-1) flanges applicable to each flowtube size.

DIMENSIONS - NOMINAL

mm
in



NOTES

1. SEE TABLE THAT FOLLOWS FOR FLOWTUBE DIMENSIONS. FLANGE "OD" AND NUMBER OF FLANGE BOLT HOLES ARE PER THE APPLICABLE FLANGE STANDARDS.

2. IN THE FIGURES ABOVE, THE PLASTIC TERMINAL BOX IS SHOWN. THE ALUMINUM TERMINAL BOX HAS A SLIGHTLY DIFFERENT CONFIGURATION AND SIZE.

3. THE PLASTIC TERMINAL BOX IS PROVIDED WITH FOUR 1/2 NPT THREADED HOLES WITH CABLE GLANDS. THE ALUMINUM TERMINAL BOX IS PROVIDED WITH TWO 1/2 NPT THREADED HOLES FOR CONDUIT.

4. THE BUILT-IN GROUNDING (EARTHING) ELECTRODES ARE NOT SHOWN. THEY ARE LOCATED BELOW THE MEASURING ELECTRODES SHOWN IN THE FIGURE ABOVE.

DIMENSIONS - NOMINAL

Flowtube Size		Nominal Dimensions											
								Dimension L for Flange Type (b)					
DN	Inch	Dim. A (a)		Dim. B		Dim. D		PN 6 (c)	PN 10 (d)	PN 16 (e)	PN 40 (f)	ANSI Class 150 (g)	AWWA (h)
mm	in	mm	in	mm	in	mm	in	mm	mm	mm	mm	in	in
DN 25	1	187	7.4	59	2.3	104	4.1	–	–	–	200	7.9	–
DN 40	1 1/2	197	7.8	82	3.2	124	4.9	–	–	–	200	7.9	–
DN 50	2	205	8.1	72	2.8	139	5.5	–	–	–	200	7.9	–
DN 65	2 1/2	212	8.3	72	2.8	154	6.1	200	200	200	200	7.9	–
DN 80	3	222	8.7	72	2.8	174	6.9	200	200	200	200	7.9	–
DN 100	4	242	9.5	85	3.3	214	8.4	250	250	250	250	9.84	–
DN 125	5	255	10.0	85	3.3	239	9.4	250	250	250	250	9.84	–
DN 150	6	276	10.9	85	3.3	282	11.1	300	300	300	300	11.81	–
DN 200	8	304	12.0	137	5.4	338	13.3	350	350	350	350	13.8	–
DN 250	10	332	13.1	157	6.2	393	15.5	450	450	450	450	17.7	–
DN 300	12	357	14.1	157	6.2	444	17.5	500	500	500	500	19.7	–
DN 350	14	362	14.3	270	10.6	451	17.8	550	550	550	550	21.7	–
DN 400	16	387	15.2	270	10.6	502	19.8	600	600	600	600	23.6	–
DN 450	18	418	16.5	310	12.2	563	22.2	600	600	600	–	23.6	–
DN 500	20	443	17.4	350	13.8	614	24.2	600	600	600	680	23.6	–
DN 600	24	494	19.4	430	16.9	715	28.1	600	600	600	800	23.6	–
DN 700	28	544	21.4	500	19.7	816	32.1	700	700	875	–	–	27.6
–	30	571	22.5	556	21.9	869	34.2	–	–	–	–	–	29.5
DN 800	32	606	23.9	560	22.0	927	36.5	800	800	1000	–	–	31.5
DN 900	36	653	25.7	630	24.8	1032	40.6	900	900	1125	–	–	35.4
DN 1000	40	704	27.7	670	26.4	1136	44.7	1000	1000	1250	–	–	39.4
DN 1100	44	755	29.7	770	30.3	1238	48.7	–	–	–	–	–	43.3
DN 1200	48	810	31.9	792	31.2	1348	53.1	1200	1200	1500	–	–	47.2
DN 1400	54	925	36.4	1000	39.4	1675	65.9	1400	1400	–	–	–	55.1
DN 1500	60	972	38.3	1020	40.2	1672	65.8	1500	1500	–	–	–	59.1
DN 1600	66	1025	40.4	1130	44.5	1915	75.4	1600	1600	–	–	–	63.0
DN 1800	72	1123	44.2	1250	49.2	1974	77.7	1800	1800	–	–	–	70.9
DN 2000	78	1223	48.1	1375	54.1	2174	85.6	2000	2000	–	–	–	78.7

a. Dimension "A" is for a flowtube with the plastic terminal box. This dimension is reduced by approximately 30 mm (1.2 in) when the aluminum terminal box is used.

b. Underlined length dimensions (Dimension "L") comply with ISO/DIS Standard 13359.

c. Model code option 91xxx-xxCZ-xxx-xx

d. Model code option 91xxx-xxCX-xxx-xx

e. Model code option 91xxx-xxCE-xxx-xx

f. Model code option 91xxx-xxCG-xxx-xx

g. Model code option 91xxx-xxCA-xxx-xx

h. Model code option 91xxx-xxWC-xxx-xx

NOTES

NOTES

ORDERING INSTRUCTIONS

1. Model Number
2. Operating Flow Range (also see Figure 2, Figure 3, and Table 2)
3. Process Temperature and Pressure Range. Specify minimum, normal, and maximum values.
4. Process Fluid Composition and Conductivity (also see Table 3)
5. Options or Accessories - See Options and Accessories section for description and ordering instructions.
6. User Tag Data

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