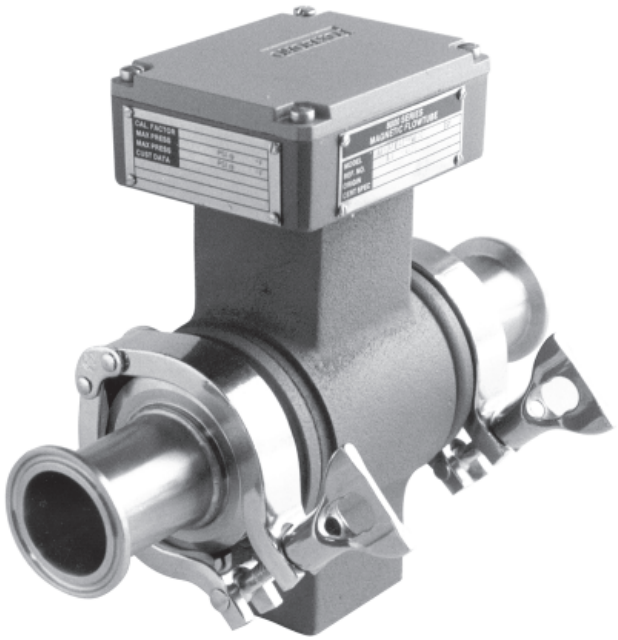
Foxboro
by Schneider Electric

PSS 1-6F2 C

Model 8000A Ceramic-Lined 15 to 80 mm (1/2 to 3 in) Sizes



The Model 8000A Sanitary Magnetic Flowtube together with a Model IMT25 Intelligent Magnetic Flow Transmitter, combine to form an easy-to-use, versatile Sanitary Magnetic Flowmeter. The flowmeter is an economical microprocessor-based magnetic flow system for use with most common everyday conductive liquids used in sanitary process applications. The transmitter converts the low level, high impedance signal from ceramic lined flowtubes to a standard scaled transmission signal, either 4 to 20 mA, digital, or pulse output, that is directly proportional to the volumetric flow rate.

SUPERIOR REPUTATION FOR DEPENDABILITY AND QUALITY

Foxboro introduced magnetic flow measurement systems to the process industries in 1954 and has demonstrated the broadest and most time-proven application expertise with tens of thousands of successful installations.

AN INTELLIGENT PATH TO SANITARY MAGNETIC FLOW SYSTEMS

The merging of the latest technology in flowtube design and a microprocessor-based transmitter provides the process industries a significant advancement in sanitary liquid flow measurement.

This flowmeter provides a high or low rate pulse output and a 4 to 20 mA dc signal; and also full digital communications with FoxCom™, HART, or FOUNDATION Fieldbus Communication protocols.

SANITARY METERING TUBE

The metering tube basically consists of a ductile iron housing with ceramic lining, or a low copper aluminum alloy with ptfe lining. All materials are consistent with U.S. Food and Drug Administration regulations for food contact service. The assembled flowtube complies with 3-A Sanitary Standards for flowmeters used with milk and milk products.

CLEAN-IN-PLACE AND QUICK-DISCONNECT CONSTRUCTION

The ptfe-lined or polished ceramic-lined flowtube and crevice-free construction provide CIP operation. The quick-disconnect sanitary end connections permit ease of flowtube installation and removal from line.

A VARIETY OF APPLICATIONS

The flowtube is unaffected by changes in process liquid density and viscosity. It is ideally suited for many food applications. Proven high performance with dairy products such as milk and ice cream mixes, as well as other products such as beer, soft drinks, coffee, molasses, and corn syrup. Processed products such as catsup and other viscous, sticky, or otherwise difficult-to-measure liquids are easily measured.

LOW POWER CONSUMPTION

All Flowmeter configurations are designed to consume less than 15 W (30 VA maximum) of power at reference voltage and frequency.

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.

USED WITH PULSED DC SUPPLY

The 8000A Flowtubes are calibrated for use with pulsed dc coil excitation. The Foxboro Model IMT25 Intelligent Magnetic Flow Transmitter is used with these flowtubes.

FLOWTUBE CALIBRATION

All flowtubes are wet calibrated to verify their specified accuracy with traceability to the National Institute of Science and Technology (NIST), and corresponding organizations outside the U.S.A.

FLOWTUBE CONFIGURATIONS

These ceramic-lined flowtubes have platinum electrodes, and sanitary, quick-disconnect Tri-Clamp type couplings are attached to a wafer body flowtube. The flowtubes are offered in 15 through80mm (1/2 through 3 in) sizes and are used with transmitters that mount remotely to a pipe or surface.

FlowExpertPro™

FlowExpertPro is a program primarily used to size Foxboro flowmeters. It also ensures that the user has selected the proper flowmeter type for his application. This meter selection tool is provided as a free web site to all users, without the need for registration. In addition to flowmeter selection and sizing, FlowExpertPro includes the following features:

- Incorporates a large library of the physical properties of typical process fluids.
- Displays results in tabular or graphic format.
- Allows user to save, print, or E-mail results.
- Provides reference to applicable flowmeter PSSs and other related flowmeter documentation.

The program calculates minimum and maximum flow rates, rangeability, pressure loss, and Reynolds Number, using established flow equations. It also allows for material and flange selection, and provides ANSI or metric flange recommendations for predicted flow pressure and temperature. You are invited to visit www.FlowExpertPro.com to access this program, or contact Global Customer Support for further information, and technical support.

WEATHERPROOF AND CORROSION RESISTANT CONSTRUCTION

These Flowtubes are designed to operate in harsh outdoor or in-plant environments. The enclosure has dusttight and weatherproof rating of IP66 as defined by IEC 60529, and provides the watertight and corrosion resistant rating of NEMA Type 4X.

PED QUALIFICATION

This product is qualified for SEP (Standard Engineering Practice) Category 1 with Group 2 fluids (nonhazardous).

OPERATING CONDITIONS

Influence	Reference Operating Conditions	Normal Operations Condition Limits	Operative Limits
Ambient Temperature	23 ±2°C (73 ±3°F)	–20 and +70°C (–4 and +158°F)	–30 and +70°C (–22 and +158°F)
Process Temperature	Refer to Table 1 and Table 2		

PERFORMANCE SPECIFICATIONS

(Combined Flowtube and Transmitter System under Reference Operating Conditions)

Flowmeter System	Refer to
8000A Flowtube with IMT25 Transmitter (FoxCom and HART)	PSS 1-6F5 A
8000A Flowtube with IMT25 Transmitter (FOUNDATION Fieldbus)	PSS 1-6F5 B

FUNCTIONAL SPECIFICATIONS

Process, Pressure and Temperature Limits

(Table 1, Table 2, and Figure 1)

Table 1. 3-A compliant Process Pressure and Temperature Limits

Flowtube Size	Process, Pressure and Temperature Limits (a)	Gasket Material
15 to 50 mm (0.5 to 2.0 in)	Full Vacuum to 3100 kPa from –40 to +38°C (Full Vacuum to 450 psi from –40 to +100°F)	BUNA-N or VITON
	Decreasing to 2070 kPa at 49°C (to 300 psi at 120°F)	BUNA-N
	Decreasing to 1035 kPa at 149°C (to 150 psi at 300°F)	VITON
80 mm (3 in)	Full Vacuum to 2410 kPa from –40 to +38°C (Full Vacuum to 350 psi from –40 and +100°F)	BUNA-N or VITON
	Decreasing to 1724 kPa at 49°C (to 250 psi at 120°F)	BUNA-N
	Decreasing to 862 kPa at 149°C (to 125 psi at 300°F)	VITON

(a) Maximum allowable step change in temperature between process and ceramic is an increase of 125°C (225°F), and a decrease in temperature of 75°C (135°F). Low temperature limit for Viton is –29°C (–20°F).

Table 2: FDA Approved Process, Pressure and Temperature Limits

Flowtube Model Code	Process, Pressure and Temperature Limits (a)	Gasket Material
800HA-SCR through 8002A-SCR	Full Vacuum to 3100 kPa from –40 to +38°C (Full Vacuum to 450 psi from –40 to +100°F)	BUNA-N or VITON
	Decreasing to 2070 kPa at 99°C (to 300 psi at 210°F)	BUNA-N
	Decreasing to 1035 kPa at 177°C (to 150 psi at 350°F)	VITON
8003A-SCR	Full Vacuum to 2410 kPa from –40 to +38°C (Full Vacuum to 350 psi from –40 and +100°F)	BUNA-N or VITON
	Decreasing to 1724 kPa at 99°C (to 250 psi at 210°F)	BUNA-N
	Decreasing to 862 kPa at 177°C (to 125 psi at 350°F)	VITON

Minimum and Maximum Upper Range Values

See Table 3. In this table, the minimum upper range value (URV) is not the lowest flow rate that the flowtube can measure; it is the lowest flow rate which can correspond to the 20 mA signal. For example: for the 15 mm (0.5 in), the minimum range is 0 to 1.0 U.S. gpm, and this will generate 4 to 20mA.

Signal and Coil Driver Cable

Two conductor (number 22 AWG standard wire), multiscreened (multishielded) cable with two driven screens (shields). The maximum allowable cable length between flowtube and transmitter is 300m(1000 ft). See OPTIONAL FEATURES AND ACCESSORIES section for ordering instructions.

Table 3. Flow Rate Upper Range Values (URV's)

Flowtube Size			
mm	in	L/m	U.S. gpm
15	0.5	4.0 and 80	1.0 and 20
25	1.0	14 and 280	3.5 and 73
40	1.5	34 and 680	9 and 170
50	2	51 and 1000	13 and 250
80	3	125 and 2500	31 and 625

Polished Ceramic Lining

The ceramic lining is polished to provide a crevice-free process surface. The ceramic also provides excellent corrosion and abrasion resistance and is suitable for high pressure, high temperature, or vacuum service applications.

Process Fluid Conductivity

The minimum process fluid conductivity required is 5 μS/cm. Refer to TI 27-072 for conductivities of various process liquids.

Power Consumption

Less than 15 W (30 VA) at reference voltage and frequency.

PRODUCT SAFETY SPECIFICATIONS

Electrical Classification

Testing Laboratory, Types of Protection and Area Classification	Conditions of Certification	Electrical Certification Code
FM approved for use in general purpose (ordinary) locations.	——	FGZ

PHYSICAL SPECIFICATIONS

HOUSING CONSTRUCTION

These flowtubes are offered with a selection of the following housing construction depending on the Model selected: a Weatherproof construction housing and an Accidental Submergence construction housing. See paragraphs below.

Weatherproof Construction Housing

This housing is designed for harsh in-plant or outdoor environments. It has the dustflight and weatherproof rating of IP65 as defined by IEC60529, and provides the watertight and corrosion-resistant rating of NEMA 4X. Select Housing Code -G.

Accidental Submergence Construction Housing

Available with 8000A Series flowtubes only. This housing is factory sealed to allow 48 hours of operation after being accidentally submerged in a maximum depth of 9 m (30 ft) of water. A field kit is provided to the customer for final sealing after site installation. Select using Flowtube Housing Code C.

Mounting Position

The flowtube can be mounted at any position without degrading performance. The only requirement is that the flowtube be completely full with the process liquid during measurement, and the electrodes be in the horizontal plane.

Enclosure Finish

High-build epoxy paint.

Materials

FLOWTUBE HOUSING

Ductile iron

JUNCTION BOX

Cast aluminum

FLOWTUBE LINER

Ceramic (99.5% aluminum oxide) with Process-wetted Surface polished to a 25 Ra micrometer finish.

ELECTRODES

Platinum

GASKETS

White BUNA-N is standard (not recommended with steam). VITON is optional.

Table 4. Approximate Mass

Flowtube Size		Approximate Mass	
mm	in	kg	lb
15	1/2	2.6	5.7
25	1	3.4	7.6
40	1 1/2	4.0	8.9
50	2	5.2	11.4
80	3	7.8	17.1

OPTIONAL FEATURES AND ACCESSORIES

Option -G: Cable Glands

Used to provide rain tight, strain relieved entrance for 6.8 to 12.2 mm (0.27 to 0.48 in) diameter cable. External 1/2 NPT threads into internal 1/2 NPT thread on flowtube cable entry surface. Body and seal nut are nylon, and compression gland is neoprene. Select Model Code option "–G".

Option V: Viton Gasket

Generally selected in place of the Buna-N gasket for higher temperatures and steam cleaning applications. Select Model Code Option “–V”.

Signal Cable

Two-core (two-conductor), multiscreened (multishielded) cable with two driven screens (shields). Maximum length is 300 m (1000 ft). Specify Part Number R0101ZS and length required in feet, or Part Number B4017TE and length required in meters. Unless otherwise specified, a minimum continuous length of 75 m or 250 ft shall be supplied.

MODEL CODE

8000A Series Sanitary Magnetic Flowtubes

Description	Model
Sanitary Magnetic Flowtube, 1/2 in flowtube Size, 1 in Nominal Line Size	800HA
Sanitary Magnetic Flowtube, 1 in flowtube Size, 1 in Nominal Line Size	8001A
Sanitary Magnetic Flowtube, 1 1/2 in flowtube Size, 1 1/2 in Nominal Line Size	801HA
Sanitary Magnetic Flowtube, 2 in flowtube Size, 2 in Nominal Line Size	8002A
Sanitary Magnetic Flowtube, 3 in flowtube Size, 3 in Nominal Line Size	8003A
Tube Construction/End Connection	
Sanitary with Tri-Clamp Type Coupling	–S
Lining Material	
Ceramic (Alumina Oxide)	C
Transmitter Mounting	
Remote (Pipe or Surface) Mounting	R
Electrodes	
Platinum	–P
Coil Drive/Supply	
Pulsed dc	J
Housing Construction	
General Purpose NEMA 4X and IP65 rated Housing	G
Accidental Submergence (a)	H
Electrical Classifications (also see Product Safety Specifications section)	
FM, Ordinary Locations	FGZ
FM, Class I, Division 2, NI	FNA
Optional Selections	
Cable Glands (for Nonconduit Applications) (b)	–G
VITON Gasket (c)	–V
Examples: 8003A–SCR–PJGCGZ–GV	

(a) Sealed for accidental operation under water up to 9 m (30 ft) deep for 48 hours. Supplied with a field sealing kit for final sealing by user after installation.

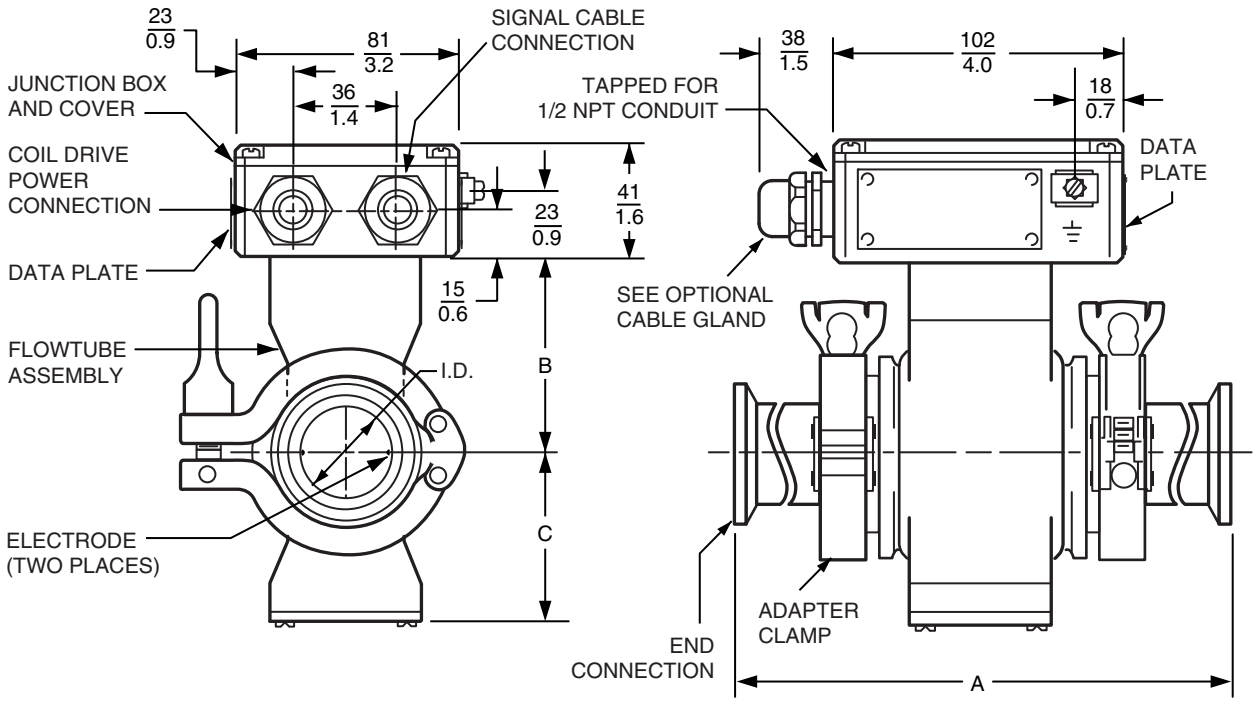
(b) When "–G" is selected, the cable glands are assembled to the flowtube junction box. Cable glands are typically used for nonconduit applications.

(c) 3-A compliant VITON gasket is recommended with steam processes, or if process temperature exceeds 49°C (120°F).

DIMENSIONS—NOMINAL

mm
in

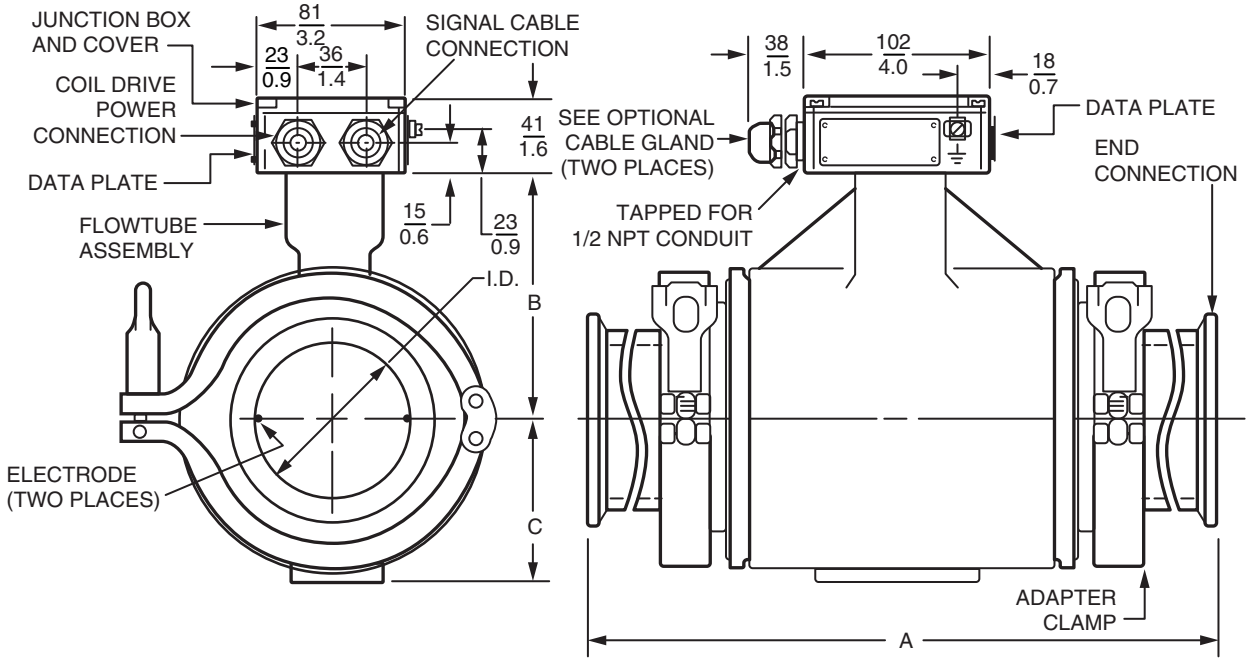
800HA-SCR TO 801HA-SCR CERAMIC-LINED SANITARY FLOWTUBES



FLOWTUBE MODEL	FLOWTUBE SIZE		NOMINAL DIMENSIONS				TRI-CLAMP END CONN. LINE SIZE	APPROXIMATE MASS	
	mm	in	A	B	C	I.D.		kg	lb
800HA-SCR	15	1/2	229 9.0	61 2.4	56 2.2	12.7 0.50	1-inch LINE SIZE	2.6	5.7
8001A-SCR	25	1	229 9.0	69 2.7	64 2.5	21.6 0.85	1-inch LINE SIZE	3.4	7.6
801HA-SCR	40	1 1/2	239 9.4	84 3.3	74 2.9	33.8 1.33	1 1/2-inch LINE SIZE	4.0	8.9

mm
in

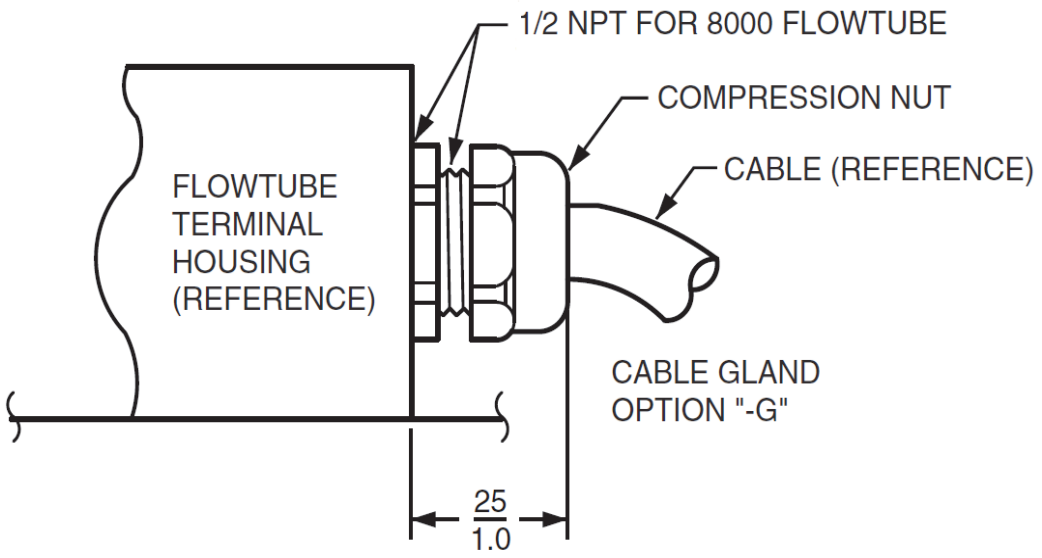
8002A-SCR TO 8003A-SCR CERAMIC-LINED SANITARY FLOWTUBES



FLOWTUBE MODEL	FLOWTUBE SIZE		NOMINAL DIMENSIONS				TRI-CLAMP END CONN. LINE SIZE	APPROXIMATE MASS	
	mm	in	A	B	C	I.D.		kg	lb
8002A-SCR	50	2	262 10.3	91 3.6	61 2.4	45.0 1.77	2-inch LINE SIZE	5.2	11.4
8003A-SCR	80	3	356 14.0	107 4.2	76 3.0	70.6 2.78	3-inch LINE SIZE	7.8	17.1

mm
in

OPTIONAL CABLE GLAND FOR NONCONDUIT APPLICATIONS



ORDERING INSTRUCTIONS

1. Model Number.
2. Flow Rate and Engineering Units Required – Value specified must be within minimum and maximum upper range values listed in Table 3.
3. Operating Temperature - Normal and Maximum.
4. Operating Pressure - Normal and Maximum.
5. Process Composition and Conductivity.
6. Options and Accessories not included in Model Code.
7. Signal Cable Length.
8. User Tag Data.

OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording. For a list of these offerings, visit our web site at:

www.fielddevices.foxboro.com

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