User's Manual

ADMAG SE

Models SE100DJ/EJ, SE200DJ/EJ and SE300DJ/EJ Magnetic Flow Tube

IM 1E10D0-01E

YOKOGAWA ◆
Yokogawa Electric Corporation

IM 1E10D0-01E
8th Edition

Contents

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1. INTRODUCTION

This instrument has been already adjusted at the factory before shipment.

To ensure correct use of the instrument, please read this manual thoroughly and fully understand how to operate the instrument before operating it.

■ Regarding This Manual

- This manual should be passed on to the end user.
- Before use, read this manual thoroughly to comprehend its contents.
- The contents of this manual may be changed without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of merchantability and suitability for a particular purpose.
- All reasonable effort has been made to ensure the accuracy of the contents of this manual. However, if any errors are found, please inform Yokogawa.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.

■ Safety Precautions

- The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. YOKOGAWA Electric Corporation assumes no liability for the customer's failure to comply with these requirements. If this instrument is used in a manner not specified in this manual, the protection provided by this instrument may be impaired.

The following safety symbol marks are used in this manual and instrument;

WARNING

A WARNING sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.

CAUTION

A CAUTION sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

IMPORTANT

A IMPORTANT sign denotes an attention to avoid leading to damage to instrument or system failure.

NOTE

A NOTE sign denotes a information for essential understanding of the operation and features.

⏚ Protective grounding terminal.

⏚ Function grounding terminal. This terminal should not be used as a "Protective grounding terminal".

~ Alternating current.

⎓ Direct current.

■ Warranty

- The guaranteed term of this instrument is described in the quotation. We repair the damages that occurred during the guaranteed term for free.
- Please contact with our sales office when this instrument is damaged.
- If the instrument has trouble, please inform us model code, serial number, and concrete substances or situations. It is preferable to be attached a outline or data.
- We decide after the examination if free repair is available or not.
- Please consent to the followings for causes of damages that are not available as free repair, even if it occured during the guaranteed term.

A: Unsuitable or insufficient maintenance by the customer.
B: The handling, using, or storage that ignore the design and specifications of the instrument.
C: Unsuitable location that ignore the description in this manual.
D: Remaking or repair by a person except whom we entrust.
E: Unsuitable removing after delivered.
F: A natural disaster (ex. a fire, earthquake, storm and flood, thunderbolt) and external causes.

■ For Safety Using

For safety using the instrument, please give attention mentioned below.

⚠ WARNING

(1) Installation
- The instrument must be installed by expert engineer or skilled personnel. The procedures described about INSTALLATION are not permitted for operators.
- The Magnetic Flow Tube is a heavy instrument. Please give attention to prevent that persons are injured by carrying or installing. It is preferable for carrying the instrument to use a cart and be done by two or more persons.
- In case of high process temperature, care should be taken not to burn yourself because the surface of body and case reach a high temperature.
- When removing the instrument from hazardous processes, avoid contact with the fluid and the interior of the flow tube.
- All installation shall comply with local installation requirement and local electrical code.

(2) Wiring
- The instrument must be installed by expert engineer or skilled personnel. The procedures described about WIRING are not permitted for operators.
- Please confirm voltages between the power supply and the instrument before connecting the power cables. And also, please confirm that the cables are not powered before connecting.
- The protective grounding must be connected to the terminal ⏚ in order to avoid personal shock hazard.

(3) Operation
- Wait 10 min. after power is turned off, before opening the covers.

(4) Maintenance
- Please do not carry out except being written to a maintenance descriptions. When these procedures are needed, please contact to nearest YOKOGAWA office.
- Care should be taken to prevent the build up of drift, dust or other material on the display glass and data plate. In case of its maintenance, soft and dry cloth is used.

(5) Explosion Protected Type Instrument
- For explosion proof type instrument, the description in Chapter 6 “EXPLOSION PROTECTED TYPE INSTRUMENT” is prior to the other description in this user's manual.
- Only trained persons use this instrument in the industiral location.
- The protective grounding ⏚ must be connected to a suitable IS grounding system.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(6) The Instrument in Compliance with PED
- For the instrument in compliance with PED, the description in Chapter 7 “PRESSURE EQUIPMENT DIRECTIVE” is prior to the other description in this User’s Manual.

2. HANDLING PRECAUTIONS

This instrument has been already tested thoroughly at the factory. When the instrument is delivered, please check externals and make sure that no damage occurred during transportation.

In this chapter, handling precautions are described. Please read this chapter thoroughly at first. And please refer to the relative matter about other ones.

If you have any problems or questions, please make contact with Yokogawa sales office.

2.1 Checking Model and Specifications

The model and specifications are shown on the Data Plate. Please confirm the specifications between the instrument that was delivered and the purchase order (refer to the chapter 5. Outline).

Please let us know Model and Serial No. when making contact with Yokogawa sales office.

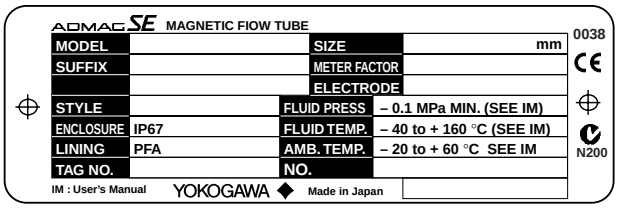

Figure 2.1 Data Plate

2.2 Accessories

When the instrument is delivered, please make sure that the following accessories are in the package.

- Centering device 1-set (for wafer type)
- Hexagonal wrench 1-piece (for special screw of terminal cover)

2.3 Storage Precautions

In case the instrument is expected to be stored over a long term, please give attention to the followings;

- The instrument should be stored in its original packing condition.
- The storage location should be selected according to the following conditions:
  1) The location where it is not exposed to rain or water.
  2) The location where there is few vibration or shock.
  3) Temperature and humidity should be:
     Temperature: –40 to 70˚C (–40 to 158˚F)
     Humidity: 5 to 80% RH (no condensation)
     Preferable ambient temperature and humidity are 25˚C(77˚F) and about 65% RH.

2.4 Installation Location Precautions

Please select the installation location considering the following items to ensure long term stable operation of the flow tube.

- Ambient Temperature:
  Please avoid to install the instrument at the location where temperature changes continuously. If the location receives radiant heat from the plant, provide heat insulation or improve ventilation.
- Atmospheric Condition:
  Please avoid to install the instrument in an corrosive atmosphere. In case of installing in the corrosive atmosphere, please keep ventilating sufficiently and prevent rain from entering the conduit.
- Vibration or shock:
  Please avoid to install the instrument at the location where there is heavy vibration or shock.

2.5 Terminal Box Reorientation Precautions

Please do not change the terminal box orientation at the customer's site. If the terminal box reorientation is required, please contact Yokogawa office or service center.

3. INSTALLATION

WARNING

This instrument must be installed by expert engineer or skilled personnel. The procedures described in this chapter are not permitted for operators.

3.1 Piping Design Precautions

IMPORTANT

Please design the correct piping referring to the followings to prevent damage for flow tube and to keep correct measuring.

(1) Location

IMPORTANT

Please install the flow tube to the location where it is not exposed to direct sunlight and ambient temperature is –20 to + 60°C (–4 to 140°F)*.

* The minimum temperature is –10°C (14°F) in case of the 40mm or larger sizes with the carbon steel flange connection or wafer connection.

(2) Noise Rejection

IMPORTANT

The instrument should be installed away from large electrical motors, transformers and other power sources in order to avoid interference with the measurement.

(3) Length of Straight Run

To keep accurate measuring, JIS B7554 “Electro Magnetic Flow Tubes” explains about upstream piping condition of Magnetic Flow Tubes.

We recommend to our customers about the piping conditions shown in Figure 3.1.1 based on JIS B7554 and our piping condition test data.

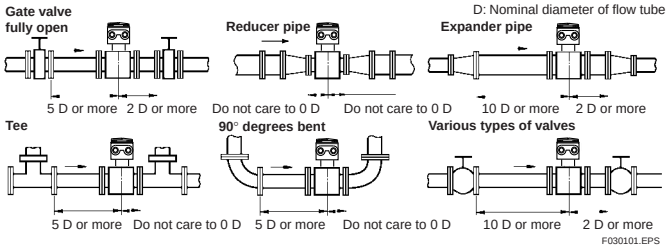

Figure 3.1.1 Minimum Length of Required Straight Run

NOTE

1. Nothing must be inserted or installed in the metering pipe that may interfere with the magnetic field, induced signal voltages, and flow velocity distribution.
2. These straight runs may not be required on the downstream side of flowmeter. However, if the downstream valve or other fittings cause channeling on the upstream side, provide a straight run of 2 D to 3 D on the downstream side.

(4) Liquid Conductivity

IMPORTANT

Please avoid to install the flow tube at location where liquid conductivity is likely to be non-uniform. Because it is possible to have bad influences to the flow indication by non-uniform conductivity when a chemical liquid is injected from upstream side close to the flow tube. When this occurs, it is recommended that chemical application ports are installed on the downstream side of the flow tube. In case chemicals must be added upstream side, please keep the pipe length enough so that liquid is properly mixed.

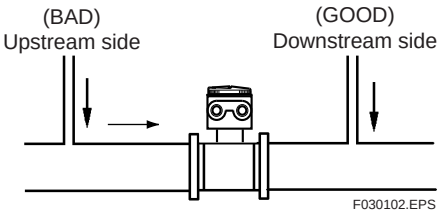

Figure 3.1.2 Chemical Injection

(5) Liquid Sealing Compound

IMPORTANT

Please give attention in using Liquid Sealing Compound to the piping, because it brings bad influences to measurement by flowing out and cover the surfaces of electrode and earth-ring.

(6) Service Area

Please select the location where there is enough area to service installing, wiring, overhaul, etc.

(7) Bypass Line

It is recommended to install the Bypass Line to facilitate maintenance and zero adjustment.

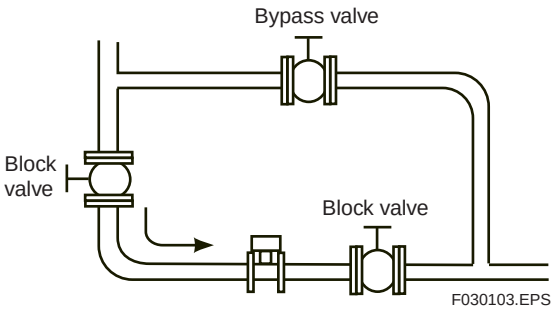

Figure 3.1.3 Bypass Line

(8) Supporting the Flow Tube

CAUTION

Please avoid to support only the flow tube, but fix pipes at first and support the flow tube by pipes to protect the flow tube from forces caused by vibration, shock, expansion and contraction through piping.

(9) Piping Condition

IMPORTANT

The piping should be designed so that a full pipe is maintained at all times to prevent loss of signal and erroneous readings.

Please design the piping that a fluid is always filled in the pipes. The Vertical Mounting is effective for fluids that is easily separate or slurry settles within pipes.

In this case, please flow a fluid from bottom to up.

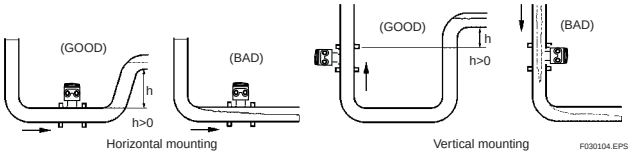

Figure 3.1.4 Filling the Pipe with Liquid

(10) No Air Bubbles

IMPORTANT

Please give attention to prevent bad influences or measuring errors from air bubbles that gathers inside measuring pipes.

In case the fluid includes air bubbles, please design the piping that prevent to gather air bubbles. In case valves are installed upstream of the flow tube, it is possible that a valve causes air bubbles, please install the flow tube upstream side of a valve.

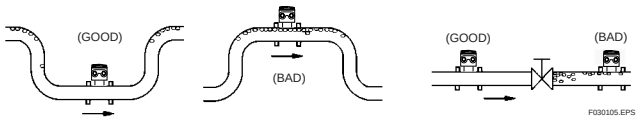

Figure 3.1.5 Avoiding Air Bubbles

(11) Mounting Direction

IMPORTANT

When the electrodes are vertical to ground, the electrode is covered with air bubbles at upper side or slurry at downside, and it may cause the measuring errors.
Please be sure to mount the terminal box upper side of piping to prevent water penetration into terminal box.

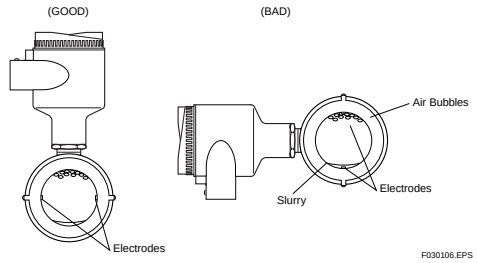

Figure 3.1.6 Mounting Direction

(12) Grounding

IMPORTANT

Improper grounding can have an adverse affect on the flow measurement. Please ensure that the instrument is properly grounded.

The electromotive force of the magnetic flow tube is minute and it is easy to be affected by noise. And also that reference electric potential is the same as the measuring fluid potential. Therefore, the reference electric potential (terminal potential) of the Flow Tube and the Converter/Amplifier also need to be the same as the measuring fluid. And moreover, that the potential must be the same with ground.

Please be sure to ground according to Figure 3.1.7.

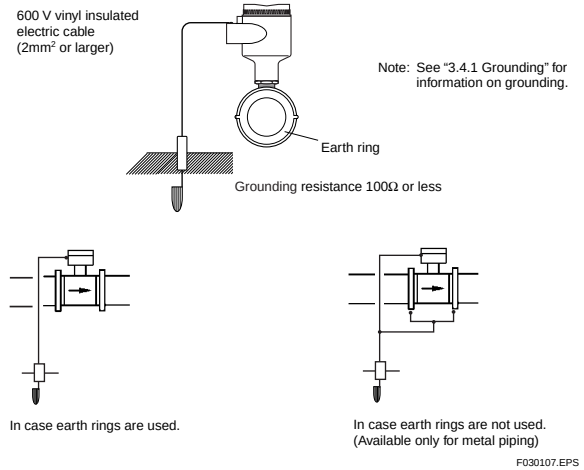

Figure 3.1.7 Grounding

3.2 Handling Precautions

WARNING

The Magnetic Flow tube is a heavy instrument. Please be careful to prevent persons from injuring when it is handled.

3.2.1 General Precautions

(1) Precaution for Carrying

The Magnetic Flow Tube is packed tightly. When it is unpacked, please give attention to prevent damages to the flow tube. And to prevent the accident during carry to the installing location, please carry it near the location keeping packed as it delivered.

CAUTION

In case the Magnetic Flow Tube without eye-bolt lifts up, please refer to Figure 3.2.1. Please never lift up by using a bar through the flow tube. It damages liner severely.

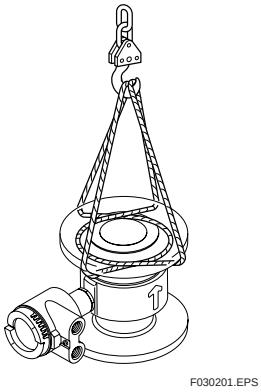

Figure 3.2.1 Vertical Lifting Sling Rigging Method

(2) Precaution for Shock

CAUTION

Care should be taken not to drop the flow tube or subject it to excessive shock. This may lead to liner damage which will cause inaccurate readings.

(3) Flange Protection Covers

IMPORTANT

Please keep the protection cover (ex. corrugated paper or anything possible to protect) attached with flange except when mounting to the pipe.

(4) Terminal Box Cover

IMPORTANT

Please never leave the terminal box cover open until wiring to prevent insulation deterioration.

NOTE

The terminal box cover is locked by special screw. In case of opening the terminal box cover, please use the Hexagonal Wrench attached.

CAUTION

Be sure to lock the cover with the special screw using the Hexagonal Wrench attached after tightening the terminal box cover.

(5) Long-term Non-use

IMPORTANT

It is not preferable to leave the flow tube for long term non-use after installation.
In case the flow tube is compelled to do that, please take care of the flow tube by the followings.

- Confirmation of Sealing Condition for the Flow Tube
  Please confirm the sealing conditions of the terminal box screw and wiring ports.
  In case of the Conduit Piping, please provide the drain plugs or waterproof glands to it to prevent that moisture or water penetrates into the flow tube through the conduit.
- Regular Inspections
  Please inspect the sealing condition (as above mentioned) and inside of the terminal box. And when it is suspect that water penetration into the inside flow tube (ex. rain fall), please inspect when it happened.

3.2.2 Flow Tube Piping

CAUTION

Mis-aligned or slanted piping can lead to leakage and damage to flanges.

- Please correct mis-alignment or slanted piping and improper distance between mounting flanges before install the flow tube. (Please refer to Figure 3.2.2)
- Inside a pipeline which is newly installed, some foreign substances (such as welding scrap or wood chips) may exist. Please remove them by flushing piping before mounting the flow tube.

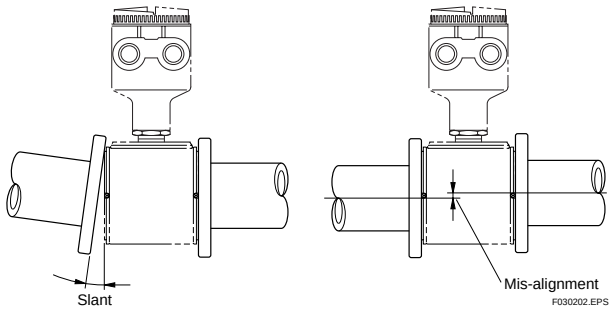

Figure 3.2.2 Slant and Mis-alignment of Flow Tube Piping

3.3 Mounting

3.3.1 Nominal Diameter 15mm (0.5˝) to 40mm (1.5˝) Wafer Type

IMPORTANT

Please use appropriate bolts and nuts according to process connection. In case stud type of through bolts are used, be sure outside diameter of a shank is smaller than a thread ridge's one. Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity. In case of optional code/FRG, please use rubber gasket or others which has equal elasticity. Be sure the inner diameter of the gasket does not protrude to inner piping. (Refer to Table 3.3.6)

(1) Mounting Direction

Please mount the Magnetic Flow Tube matching the flow direction of the fluid to be measured with the direction of the arrow mark on the flow tube.

IMPORTANT

If it is impossible to match the direction, please never remodel by changing direction of the terminal box. In case the measuring fluid flows against the arrow direction, please refer to the section "Reversing Flow Direction" in the Instruction Manual of SE14 Magnetic Flow Converter.

(2) Mounting Centering Devices

To keep concentricity of the Flow Tube with pipes, please mount centering devices on the Mini-Flanges of the Flow Tube. Please give attention to the nominal diameter and flange rating of the centering devices.

(3) Positioning Flow Tube

Please pass two through-bolts to adjacent holes of both flanges and mount the Flow Tube, and pass other through-bolts to other holes. (Refer to Figure 3.3.1) In case stud type of through-bolts are used, position them coming in contact centering devices with thread of bolts.

(4) Tightening Nuts

Please tighten the bolts according to Torque Values in Table 3.3.1. In case of PVC piping, please select optional code /FRG, use rubber gasket and tighten with the torque value in Table 3.3.2.

⚠ CAUTION

As the lining material is Fluorocarbon PFA, it is possible that nuts may loose by its character as time passes. Please tighten the nuts regularly. Please be sure to tighten the bolts following prescribed torque values. Please tighten the flange bolts diagonally with the same torque values, step by step up to the prescribed torque value.

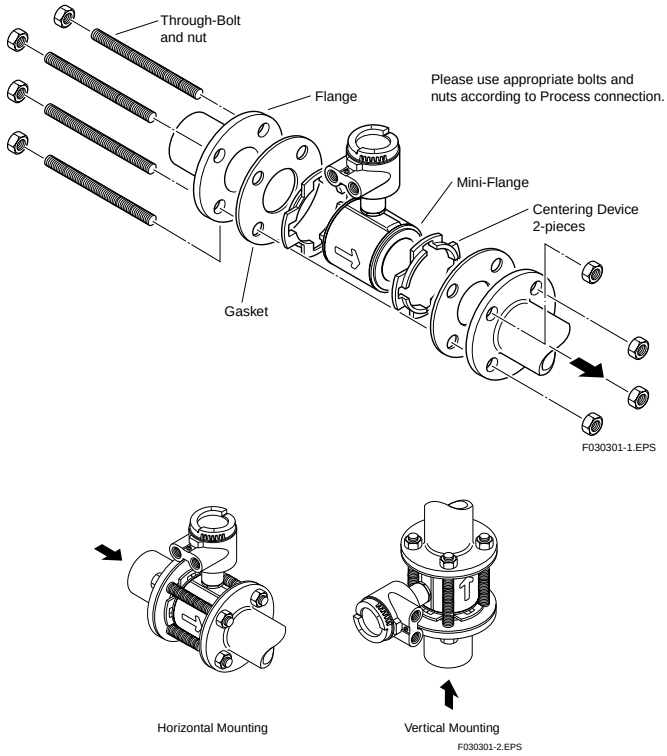

Figure 3.3.1 Mounting Procedure (Size: 15 mm(0.5") to 40 mm(1.5")

Table 3.3.1 Tightening Torque Values for Metal Piping in N-m{kgf-cm}[in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN40
15(0.5)	4.5 - 6.5 {46 - 66} [40 - 58]	4.5 - 6.5 {46 - 66} [40 - 58]	5.0 - 7.0 {51 - 71} [44 - 62]	5.0 - 7.0 {51 - 71} [44 - 62]	5.0 - 6.5 {51 - 66} [44 - 58]
25(1)	14.5 - 19.0 {148 - 194} [128 - 168]	14.5 - 19.0 {148 - 194} [128 - 168]	12.0 - 15.0 {122 - 153} [106 - 133]	14.5 - 19.0 {148 - 194} [128 - 168]	12.5 - 14.0 {128 - 143} [111 - 124]
40(1.5)	26.0 - 31.0 {265 - 316} [230 - 274]	26.0 - 31.0 {265 - 316} [230 - 274]	22.0 - 25.0 {224 - 255} [195 - 221]	30.0 - 37.0 {311 - 377} [270 - 327]	28.5 - 31.0 {291 - 316} [252 - 274]

*Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity.

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Table 3.3.2 Tightening Torque Values for PVC Piping in N-m{kgf-cm}[in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN40
15(0.5)	1.3 {13} [12]		1.3 {13} [12]		1.3 {13} [12]
25(1)	3.5 {36} [31]		2.8 {29} [25]		2.7 {28} [24]
40(1.5)	5.7 {58} [50]		4.6 {47} [41]		5.7 {58} [50]

*Please select optional code /FRG and use rubber gasket or others which has equal elasticity.

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3.3.2 Nominal Diameter 50 mm(2˝) to 200 mm(8˝) Wafer Type

IMPORTANT

Please use appropriate bolts and nuts according to process connection. In case stud type of through bolts are used, be sure outside diameter of a shank is smaller than a thread ridge's one. Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity. In case of optional code/FRG, please use rubber gasket or others which has equal elasticity. Be sure the inner diameter of the gasket does not protrude to inner piping. (Refer to Table 3.3.6)

(1) Mounting Direction

Please mount the Magnetic Flow Tube matching the flow direction of the fluid to be measured with the direction of the arrow mark on the flow tube.

IMPORTANT

If it is impossible to match the direction, please never remodel to change direction of the terminal box. In case the measuring fluid flows against the arrow direction, please refer to the section "Reversing Flow Direction" in the Instruction Manual of SE14 Magnetic Flow Converter.

(2) Mounting Centering Devices

To keep concentricity between the Flow Tube and pipes, centering devices must be used. Pass two through-bolts through the four centering devices (two for each) and lower adjacent holes of both flanges. (Refer to Figure 3.3.2)

Please give attention to the nominal size and flange ratings of the centering devices. (Refer to Table 3.3.5)

(3) Positioning Flow Tube

Position the Flow Tube coming in contact four centering devices with Mini-Flanges. At this time, pay attention to avoid four centering devices come in contact with Housing. In case stud type of through-bolts are used, position them coming in contact four centering devices with thread of the bolts. (Refer to Figure 3.3.2) After positioning the Flow Tube, pass remaining through-bolts to remaining holes.

(4) Tightening Nuts

Please tighten the bolts according to Torque Values in Table 3.3.3. In case of PVC piping, please select optional code/FRG, use rubber gasket and tighten with the torque value in Table 3.3.4.

CAUTION

As the lining material is Fluorocarbon PFA, it is possible that nuts loose by its character as time passes. Please tighten the nuts regularly. Please be sure to tighten the bolts following prescribed torque values. Please tighten the flange bolts diagonally with the same torque values, step by step up to the prescribed torque value.

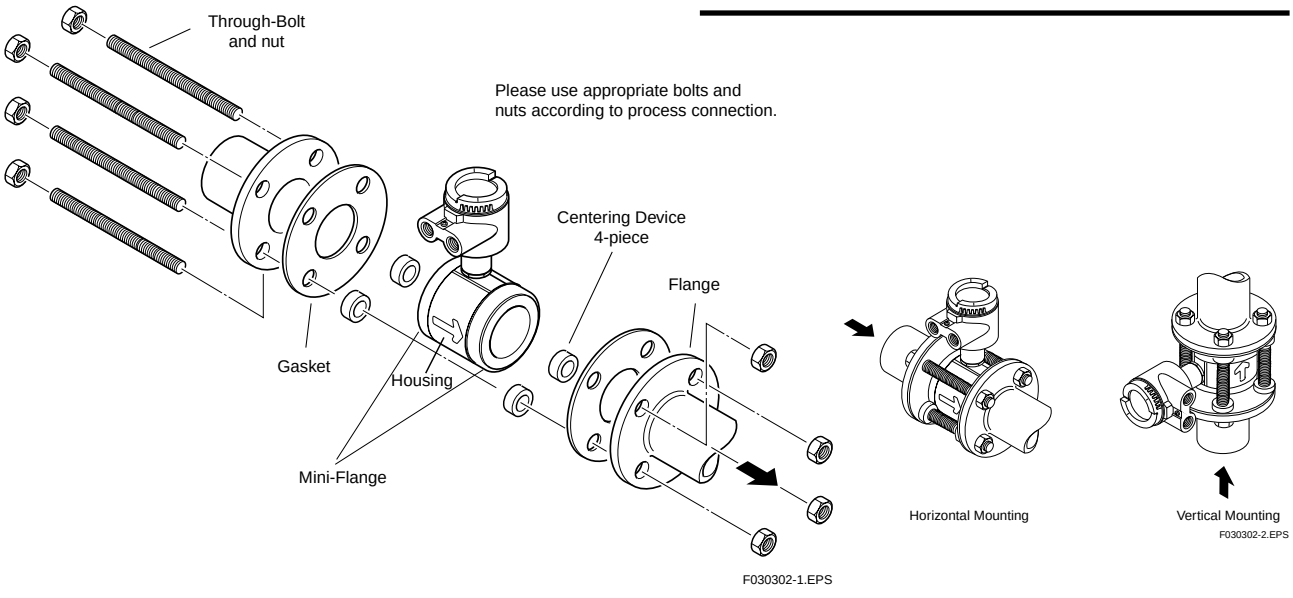

Figure 3.3.2 Mounting Procedure

Table 3.3.3 Tightening Torque Values for Metal Piping in N-m{kgf-cm}[in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN10	DIN PN16	DIN PN40
50(2)	35.0 - 39.5 {357 - 403} [310 - 350]	16.5 - 19.5 {168 - 199} [146 - 173]	35.0 - 39.5 {357 - 403} [310 - 350]	16.5 - 19.5 {168 - 199} [146 - 173]			39.0 - 39.5 {398 - 403} [345 - 350]
80(3)	27.5 - 32.5 {281 - 332} [243 - 288]	33.0 - 41.0 {337 - 418} [292 - 363]	60.0 - 65.5 {612 - 668} [531 - 580]	32.0 - 39.0 {326 - 398} [283 - 345]		27.5 - 32.5 {281 - 332} [243 - 288]	
100(4)	40.0 - 42.5 {408 - 434} [354 - 376]	48.0 - 53.5 {490 - 546} [425 - 473]	40.5 - 42.5 {413 - 434} [358 - 376]	47.0 - 51.0 {479 - 520} [416 - 451]		40.0 - 42.5 {408 - 434} [354 - 376]	
150(6)	65.0 - 94.0 {663 - 959} [575 - 832]	43.0 - 68.0 {439 - 694} [381 - 602]	68.0 - 100.0 {694 - 1020} [602 - 885]	41.0 - 60.0 {418 - 612} [363 - 531]		65.0 - 94.0 {663 - 959} [575 - 832]	
200(8)	57.0 - 84.0 {581 - 857} [504 - 743]	61.0 - 92.0 {622 - 938} [540 - 814]	69.0 - 101.0 {704 - 1030} [611 - 894]	65.0 - 93.0 {663 - 949} [575 - 823]	94.0 - 125.0 {959 - 1275} [832 - 1106]	58.0 - 84.0 {592 - 857} [513 - 743]	
250(8)	98.0 - 128.0 {996 - 1307} [867 - 1133]		89.0 - 130.0 {909 - 1329} [788 - 1150]		57.0 - 84.0 {581 - 857} [504 - 743]		
300(8)	85.0 - 108.0 {871 - 1098} [752 -956]		106.0 - 146.0 {1083 -1489} [938 - 1292]		108.0 - 131.0 {1103 - 1339} [956 - 1159]		

*Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity.

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Table 3.3.4 Tightening Torque Values for PVC Piping in N-m{kgf-cm}[in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN10	DIN PN16	DIN PN40	JIS G3451 F12(75M)
50(2)	8.2 {84} [73]		8.2 {84} [73]				8.2 {84} [73]	
80(3)	6.2 {63} [55]		12.4 {127} [110]			6.2 {63} [55]		12.3 {126} [109]
100(4)	8 {82} [71]		8.1 {83} [72]			8 {82} [71]		16.1 {164} [142]
150(6)	19.8 {202} [175]		18.9 {193} [167]			19.8 {202} [175]		21.6 {220} [191]
200(8)	17.5 {179} [155]		25.1 {256} [222]		26.2 {267} [232]	17.5 {179} [155]		28.7 {293} [254]

*Please select optional code /FRG and use rubber gasket or others which has equal elasticity.

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Table 3.3.5 Centering Device Identification

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN10	DIN PN16	DN40
50(2)	B	B	B	F	-	-	F
80(3)	B	F	F	C	-	G	-
100(4)	B	F	C	H	-	F	-
150(6)	K	L	K	M	-	K	-
200(8)	K	L	L	M	K	K	-
250(10)	C	-	K	-	C	-	-
300(12)	C	-	K	-	C	-	-

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*Each Centering Device is engraved a character as identification.

Table 3.3.6 Earth Ring Inside Diameter

Unit:mm(inch)

Size	Earth Ring Inside Diameter
15(0.5)	15(0.59)
25(1)	28(1.10)
40(1.5)	41(1.61)
50(2)	53(2.09)
80(3)	81(3.19)
100(4)	102(4.02)
150(6)	146.1(5.75)
200(8)	193.6(7.62)
250(10)	wafer:243.7(9.6), flange:239.1(9.41)
300(12)	wafer:294.7(11.6), flange:291.3(11.47)
350(14)	323.4(12.73)
400(16)	373.5(14.70)

* Please ensure that the I.D. of the gasket does not protrude into the I.D. of the earth ring inside diameter.
(This dimension is also applied to when no earth ring is used.)

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3.3.3 Nominal Diameter 15 mm (0.5˝) to 400 mm (16˝) Flange Type

IMPORTANT

Please use appropriate bolts and nuts according to process connection. Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity. In case of optional code/FRG, please use rubber gasket or others which has equal elasticity. Be sure the inner diameter of the gasket does not protrude to inner piping.(Refer to Table 3.3.6)

(1) Mounting Direction

Please mount the Magnetic Flow Tube matching the flow direction of the fluid to be measured with the direction of the arrow mark on the flow tube.

IMPORTANT

If it is impossible to match the direction, please never remodel to change direction of the terminal box. In case the measuring fluid flows against the arrow direction, please refer to the section “Reversing Flow Direction” in the Instruction Manual of SE14 Magnetic Flow Converter.

(2) Tightening Nuts

Please tighten the bolts according to Torque Values in Table 3.3.7. In case of PVC piping, please select optional code/FRG, use rubber gasket and tighten with the torque value in Table 3.3.8.

CAUTION

As the lining material is Fluorocarbon PFA, it is possible that bolts loose by its character as time passes. Please tighten the nuts regularly. Please be sure to tighten the bolts following prescribed torque values. Please tighten the flange bolts diagonally with the same torque values, step by step up to the prescribed torque value.

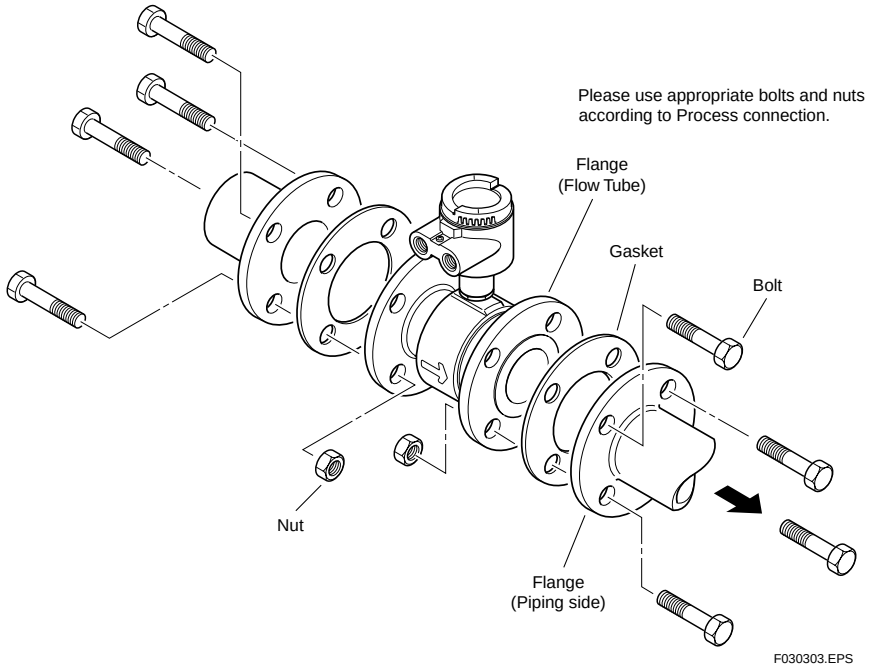

Figure 3.3.3 Mounting Procedure (Size: 15 mm (0.5") to 400 mm (16"))

Table 3.3.7 Tightening Torque Values for Metal Piping in N-m{kgf-cm} [in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN10	DIN PN16	DIN PN40	JIS F12(75M)
15(0.5)	4.5 - 6.5 {46 - 66} [40 - 58]	4.5 - 6.5 {46 - 66} [40 - 58]	4.5 - 7.0 {46 - 71} [40 - 62]	4.5 - 7.0 {46 - 71} [40 - 62]			4.5 - 6.5 {46 - 66} [40 - 58]	
25(1)	13.5 - 19.0 {138 - 194} [119 - 168]	13.5 - 19.0 {138 - 194} [119 - 168]	11.5 - 15.0 {117 - 153} [102 - 133]	14.0 - 19.0 {143 - 194} [124 - 168]			11.5 - 14.0 {117 - 143} [102 - 124]	
40(1.5)	24.0 - 31.0 {245 - 316} [212 - 274]	24.0 - 31.0 {245 - 316} [212 - 274]	20.0 - 25.0 {204 - 255} [177 - 221]	28.0 - 37.0 {286 - 377} [248 - 327]			25.5 - 31.0 {260 - 316} [226 - 274]	
50(2)	31.0 - 39.5 {316 - 403} [274 - 350]	15.0 - 19.5 {153 - 199} [133 - 173]	32.0 - 39.5 {326 - 403} [283 - 350]	15.0 - 19.5 {153 - 199} [133 - 173]			34.5 - 39.5 {352 - 403} [305 - 350]	
80(3)	23.5 - 32.5 {240 - 332} [208 - 288]	28.5 - 41.0 {291 - 418} [252 - 363]	53.5 - 65.5 {546 - 668} [473 - 580]	28.5 - 39.0 {291 - 398} [252 - 345]		23.5 - 32.5 {240 - 332} [208 - 288]		51.0 - 65.5 {520 - 668} [451 - 580]
100(4)	32.5 - 42.5 {332 - 434} [288 - 376]	40.0 - 53.5 {408 - 546} [354 - 473]	34.5 - 42.5 {352 - 434} [305 - 376]	40.0 - 51.0 {408 - 520} [354 - 451]		33.0 - 42.5 {337 - 434} [292 - 376]		72.0 - 85.0 {734 - 867} [637 - 752]
150(6)	65.0 - 94.0 {663 - 959} [575 - 832]	43.0 - 68.0 {439 - 694} [381 - 602]	68.0 - 100.0 {694 - 1020} [602 - 885]	41.0 - 60.0 {418 - 612} [363 - 531]		65.0 - 94.0 {663 - 959} [575 - 832]		68.0 - 100.0 {694 - 1020} [602 - 885]
200(8)	57.0 - 84.0 {581 - 857} [504 - 743]	61.0 - 92.0 {622 - 938} [540 - 814]	69.0 - 101.0 {704 - 1030} [611 - 894]	65.0 - 93.0 {663 - 949} [575 - 823]	94.0 - 125.0 {959 - 1275} [832 - 1106]	58.0 - 84.0 {592 - 857} [513 - 743]		69.0 - 101.0 {704 - 1030} [611 - 894]
250(10)	141.8 - 174 {1450 - 1780} [1261 - 1548]	153.1 - 182.8 {1570 - 1870} [1365 - 1625]	144.7 - 177 {1480 - 1810} [1286 - 1573]	125.1 - 151.5 {1280 - 1550} [1112 - 1347]	135.9 - 164.3 {1390 - 1680} [1208 - 1460]	153.5 - 175 {1570 - 1790} [1365 - 1556]		214.1 - 270.9 {2190 - 2770} [1904 - 2408]
300(12)	113.4 - 138.8 {1160 - 1420} [1008 - 1235]	124.2 - 145.7 {1270 - 1490} [1104 - 1295]	163.6 - 187.7 {1670 - 1920} [1452 - 1669]	153.5 - 180.9 {1570 - 1850} [1365 - 1608]	154.5 - 199.5 {1580 - 2040} [1373 - 1773]	175 - 213.2 {1790 - 2180} [1556 - 1896]		189.7 - 249.3 {1940 - 2550} [1686 - 2217]
350(14)	157.4 - 183.8 {1610 - 1880} [1399 - 1634]		245- 284.5 {2510 - 2910} [2182 - 2530]		151.5 - 192.6 {1550 - 1970} [1347 - 1712]			273.8 - 325.6 {2800 - 3330} [2434 - 2895]
400(16)	242.5 - 261.1 {2480 - 2670} [2156 - 2321]		252.3 - 275.7 {2580 - 2820} [2243 - 2452]		247.4 - 331.5 {2530 - 3390} [2199 - 2947]			312.9 - 395 {3200 - 4050} [2782 - 3521]

*Please use compressed non-asbestos fiber gasket, PTFE gasket or the gasket which has equal elasticity.

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Table 3.3.8 Tightening Torque Values for PVC Piping in N-m{kgf-cm} [in-lbf]

Size mm(inch)	JIS 10K	JIS 20K	ANSI 150	ANSI 300	DIN PN10	DIN PN16	DIN PN40	JIS G3451 F12(75M)
15(0.5)	1.3 {13} [12]		1.3 {13} [12]				1.3 {13} [12]	
25(1)	3.5 {36} [31]		2.8 {29} [25]				2.7 {28} [24]	
40(1.5)	5.7 {58} [50]		4.6 {47} [41]				5.7 {58} [50]	
50(2)	8.2 {84} [73]		8.2 {84} [73]				8.2 {84} [73]	
80(3)	6.2 {63} [55]		12.4 {127} [110]			6.2 {63} [55]		12.3 {126} [109]
100(4)	8 {82} [71]		8.1 {83} [72]			8 {82} [71]		16.1 {164} [142]
150(6)	19.6 {200} [173]		18.8 {192} [166]			19.6 {200} [173]		21.6 {220} [191]
200(8)	17.5 {179} [155]		25.1 {256} [222]		26.2 {267} [232]	17.5 {179} [155]		28.7 {293} [254]

*Please select optional code /FRG and use rubber gasket or others which has equal elasticity.

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3.4 Wiring Precautions

This section is described wiring only for flow tube side. Please see "Wiring" in SE14 Magnetic Flow Converter Instruction Manual for converter side.

CAUTION

Confirm that all connections are corrected before applying power to the instrument. Improper wiring may damage the flow tube or converter.

NOTE

The terminal box cover is locked by special screw. In case of opening the terminal box cover, please use the Hexagonal Wrench attached.

CAUTION

Be sure to lock the cover with the special screw using the Hexagonal Wrench attached after tightening the terminal box cover.

3.4.1 Grounding

CAUTION

Please be sure to connect function grounding of ADMAG SE with cable of 2mm^2 or larger cross section in order to prevent the influence of external noise. And further connect the grounding wire to the ⏚ mark (100Ω or less).

3.4.2 General Precautions

Please give attention to the followings in wiring.

CAUTION

- Please pay attention to avoid the cable is bended excessively.
- Please do not connect cables outdoors in case of rain to prevent damages from dew formation and to keep insulation inside the terminal box of the flow tube.
- Please do not splice the cable between a flow tube and a converter if it is too short. Please replace the short cable with the cable which is appropriate length wholly.
- The all cable ends are to be provided with round crimp-on terminal.
- The signal cables must be routed in separate steel conduit tubes or flexible tubes.
- Please keep conduit or flexible tube water-tight using sealing tape.
- Please ground each of a flow tube and a converter separately.
- Please cover each shield of the signal cable with PVC tube or PVC tape to avoid contacting between two shields; shield and case.
- When waterproof glands or union equipped waterproof glands are used, the glands must be properly tightened to keep the box watertight.
- Please be sure to fully tighten the terminal box cover before the power is turned on.
- Please be sure to turn off the power before opening the terminal box cover.

3.4.3 Cable Types

(1) Dedicated Signal Cable(AM011)

The flow signal is transmitted via this dedicated cable. The cable is constructed with double shielding over the two conductors, and used heat-resistant vinyl as the outer jacket material.

Finished diameter: 10.5 mm (0.413in.)
Maximum length: 300 m (984 ft.)
Maximum temperature: 80°C (176°F)

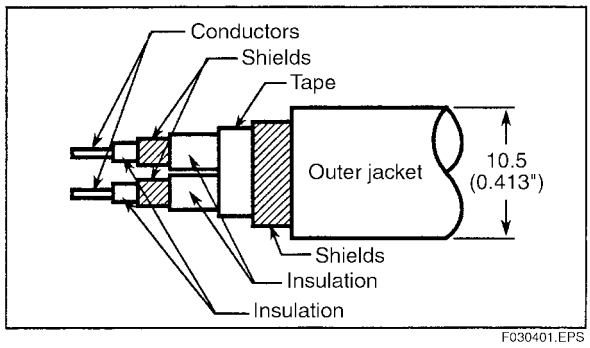


Figure 3.4.1 Dedicated Signal Cable AM011

IMPORTANT

If the cable is longer than required, cut off any extra length, rather coiling it up, and terminate the conductors as shown in Figure 3.4.2. Avoid using intermediate terminal boards to extend the cable length, or this will interrupt the shielding.

CAUTION

Since A, B, SA, SB, and C all operate at different electrical potentials, securely insulate them from each other so they do not touch.
The shields must not be allowed to touch each other or to touch the case.
Cover each shield with vinyl tube or wrap in vinyl tape.

NOTE

Conductors A and B carry the signal from the electrodes, and C is at the potentials of the liquid it self (signal common) . Shields SA and SB are kept at the same potentials as the individual electrodes (these are actively driven shields). This is done to reduce the effect of the distributed capacitance of the cable at long cable length. Note that, since the signals from the individual electrodes are impedance converted inside the converter, errors will result if they come in contact with any other component. Great care must be taken in the cable end treatment.

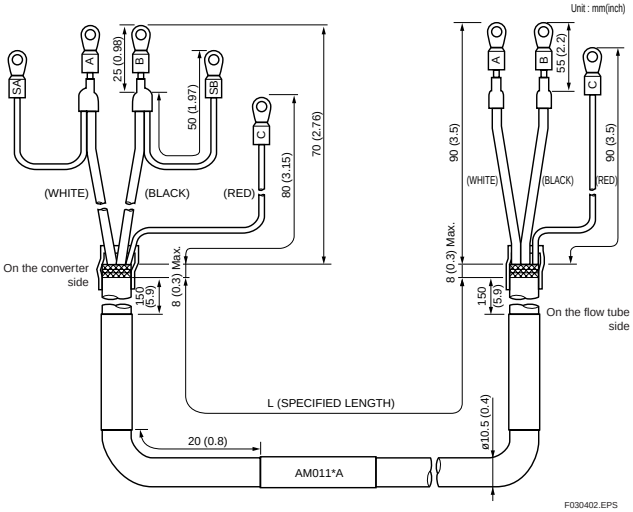


Figure 3.4.2 Treatment of Dedicated Signal Cable

(2) Excitation Cable

Please use Polyvinyl chloride insulated and sheathed control cables (JIS C3401) or Polyvinyl chloride insulated and sheathed portable power cables (JIS C3312) or equivalents.

Outer Diameter

- 6.5 to 12mm in diameter (10.5 to 11.5 mm for waterproof gland / ECG, /ECU)

Nominal Cross Section

- Single wire; 0.5 to 2.5mm^2 , Stranded wire; 0.5 to 2.5mm^2

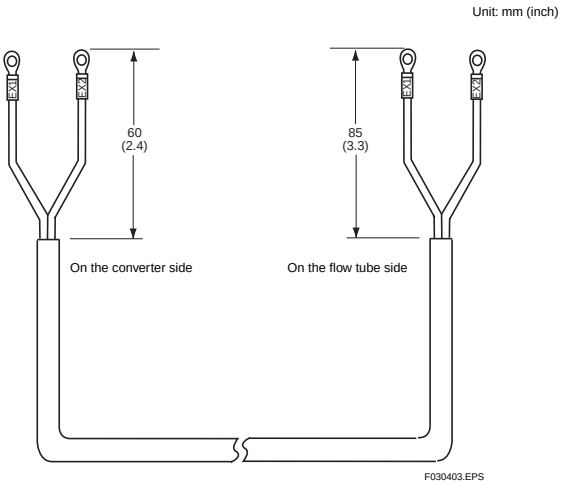
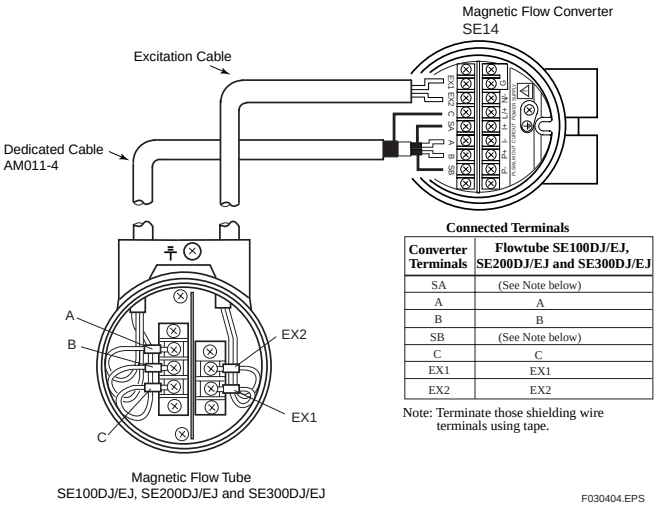


Figure 3.4.3 End Treatment of Excitation Cable

3.4.4 Connnection to SE14 Magnetic Flow Converter

Flow Tube Model SE100DJ/EJ, SE200DJ/EJ and SE300DJ/EJ

Connect the flow tube and converter in the following method.



Connected Terminals

Converter Terminals	Flowtube SE100DJ/EJ, SE200DJ/EJ and SE300DJ/EJ
SA	(See Note below)
A	A
B	B
SB	(See Note below)
C	C
EX1	EX1
EX2	EX2

Note: Terminate those shielding wire terminals using tape.

Figure 3.4.4 Connection

3.4.5 Wiring Ports

Please select the most suitable standard of wiring procedure for the wiring ports by customer's own.

A : Using the Waterproof Gland

IMPORTANT

To prevent water or condensate from entering the converter housing, waterproof glands are recommended. Do not over-tighten the glands or damage to the cables may result. Tightness of the gland can be checked by confirming that the cable is held firmly in place.

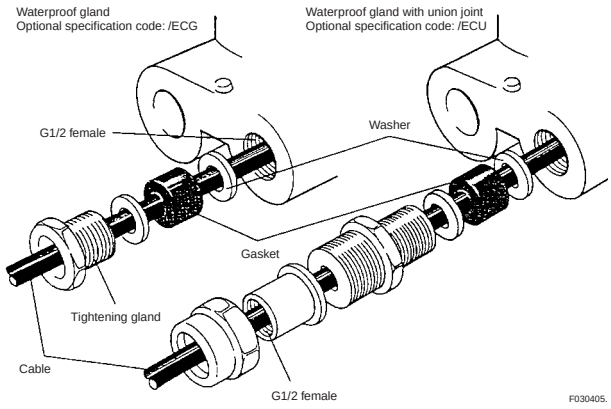


Figure 3.4.5 Waterproof Gland

B : Insulation Check

After wiring is completed, check insulation of the following terminals together with the wiring under the condition of the converter side wiring terminals disconnected.

Between terminal EX1 and terminal A, B, C
Between terminal C and terminal A, B
Between terminal A and terminal B
Between terminal EX1 and ground
Between terminal EX2 and ground

All insulation measurements must be performed with a 500V megger. Insulation resistances must be 100MΩ or more each.

IMPORTANT

Be sure to disconnect the cables at the terminal of the converter when checking insulation.

C : Conduit Wiring

In case of conduit wiring, please use the waterproof gland to prevent water flowing through the conduit pipe into the wiring connection.

Please slope the conduit pipe down, and install a drain valve at the low end of the vertical pipe.

Please open the drain valve regularly.

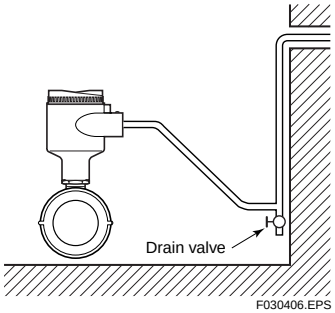


Figure 3.4.6 Conduit Wiring

4. MAINTENANCE

WARNING

This instrument must be repaired or maintenance-serviced by expert engineer or skilled personnel. The procedures described in this chapter are not permitted for operators.

Regular maintenance and inspection should be carried out to fully utilize all functions and to obtain maximum performance from the magnetic flowmeter.

4.1 Regular Inspection Items

(1) Inspection of moisture-proofing inside the terminal box: Once/year

(2) Refastening of piping joint screws: About twice/year

(3) Inspection of electrodes and lining (in case of adhesive and/or abrasive fluid, etc.)

Determine the period of regular inspection as necessary.

4.2 Trouble Shooting

Since the ADMAG SE magnetic flowmeter has “self diagnostic functions”, if a failure occurs, it is displayed on the SE14 magnetic flow converter. Please refer to Instruction Manual of SE14 magnetic flow converter.

IMPORTANT

Be sure to disconnect the cables at the terminals of the flow tube when checking.

(1) Excitation Coil Check

Check that the resistance between terminals EX1 and EX2 in the terminal box is 150 Ω or less with a multimeter. If it is not, coils may be broken down, and replacement or repair of the flow tube is needed.

(2) Insulation Resistance Check

Check the insulation resistances in accordance with the tables below. If one of them falls below the value in the tables, replacement or repair of the flow tube is needed.

Coil Circuit

Checking is possible even if the pipe is filled with fluid.

Test Terminals	Test Voltage	Specification
Between Terminals EX1 and C	500 V DC	1MΩ or more

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Signal Circuit

Be sure to empty and dry the pipe inside, and release wiring connection of converter side before checking.

Test Terminals	Test Voltage	Specification
Between Terminals A and C Between Terminals B and C	500 V DC	100MΩ or more for each

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5. OUTLINE

■ STANDARD SPECIFICATIONS

Protection: IP67, NEMA 4X, JIS C0920 water tight type

Size in mm (inch):
15 (0.5), 25 (1), 40 (1.5), 50 (2), 80 (3), 100 (4), 150 (6), 200 (8), 250 (10), 300 (12), 350 (14), 400 (16)

Coating:

Terminal Box:
Polyurethane corrosion-resistant coating,
Deep sea moss green (Munsell 0.6Y3.1/2.0)
- Terminal box is coated for all type

Body:
Polyurethane corrosion-resistant coating,
Deep sea moss green (Munsell 0.6Y3.1/2.0)
- All sizes of carbon steel flange type
- 150 and 200 mm of wafer type

No coating
- 15 to 100mm of stainless steel flange type
- 15 to 100mm of wafer type

Flow Tube Material:

Size 15 to 100mm (0.5 to 4 in.)
- Housing : Stainless steel (15mm:SCS11, 25 to100mm:SUS304)
- Mini-flange for wafer conn. : Stainless steel (SUS430)
- Flange : Carbon steel (SS400) or stainless steel (SUS304)
- Pipe : Stainless steel (15 to 25mm:SCS13, 40 to 100mm: SUS304)
- Terminal box : Aluminum alloy

Size 150 to 400mm (6 to 16 in.)
- Housing : Carbon steel (SS400)
- Mini-flange for wafer conn. : Carbon steel (SS400)
- Flange : Carbon steel (SS400) or stainless steel (SUS304)
- Pipe : Stainless steel (SUS304)
- Terminal box : Aluminum alloy

Wetted Part Material :
- Lining : Fluorocarbon PFA
- Elecctrode : Stainless steel (SUS316L), Hastelloy C (equivalent to Hastelloy C-276) Titanium, Tantalum, Platinum-Iridium, Tungsten Carbide.
- Earth Ring :
  - Size 15 to 200mm Stainless steel (SUS316), Hastelloy C (equivalent to Hastelloy C-276), Titanium, PFA lining + Earth electrode*.
    *Earth Electrode: Tantalum, Platinum-Iridium.
  - Size 250, 300mm Stainless steel(SUS316), Hastelloy C (equivalent to Hastelloy C-276), Titanium
  - Size 350, 400mm Stainless steel (SUS316)

Note : Hastelloy is a registered trademark of Haynes International Inc.

Gasket :
- VALQUA#4010 ; Fluoro rubber, viton (between flow tube body and earth ring; for optional code/FRG)
- Non-asbestos joint sheet sheathed with fluoro resin PTFE (between earth ring and process flange; for optional code /BSF)

*** Other gaskets between flow tube and earth ring;**
- VALQUA#4010(Mixing#RCD970) ; Alkari resistance gasket for PVC piping(Fluoro rubber)
- VALQUA#4010(Mixing#RCD470) ; Acid resistance gasket for PVC piping(Fluoro rubber)

Contact YOKOGAWA office. (Refer to TI 1E6A0-06E)

Electrode Construction: External insertion type.

Electrical Connection:
ANSI 1/2NPT female, DIN Pg13.5 female, ISO M20 X 1.5 female, JIS G1/2 female.

■ STANDARD pERFORMANCE

Accuracy :

Size in mm (inch)	Span in m/s (ft/s)	Accuracy
15 to 400 (0.5 to 16)	0.3 to 1 (1 to 3)	0.5% of span
	1 to 10 (3 to 33)	0.25% of span (at indications below 50% of span)
		0.5% of rate (at indications 50% of span or more)

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Repeatability: 0.1% of flowrate(minimum 1mm/s)

Maximum Power Consumption: 11W (incl.converter)

Insulation Resistance:
- 100MW between excitation terminal(EX1) and signal terminals(A, B and C) at 500V DC.
- 100MW between common terminal(C) and signal terminals(A and B) at 500V DC.
- 100MW between signal terminal (A) and signal terminal(B) at 500V DC.

Withstand Voltage:
- 1000V AC between excitation terminals (EX1 and EX2) and ground terminal(G) for 1 minute.
- 500V AC between signal terminals(A and B) and ground terminal(G) for 1 minute.(for /KF2, /FF1)
- 2000V AC between signal terminals(A and B) and excitation terminals(EX1 and EX2) for 1 minute. (for /KF2, /FF1)

⚠ CAUTION

When performing the Voltage Breakdown Test, Insulation Resistance Test or any unpowered electrical test, wait 10 seconds after the power supply is turned off before removing the housing cover. Be sure to remove the Short Bar at terminal “G”. After testing, return the Short Bar to its correct position. Screw tightening torque should be 1.18N-m(0.88ft-lb)or more, because the G-terminal is thought as a protective grounding and should conform to the Safety Requirements.

Safety Requirement Standard:
IEC1010, EN61010

EMC Conformity Standard:
EN61326
EN61000-3-2, EN61000-3-3
AS/NZS 2064

■NORMAL OPERATING CONDITIONS

Ambient Temperature: -20 to 60 °C (-4 to 140 °F)
Note : The minimum temperature is -10 °C (14°F) in case of the 40 mm or larger sizes with the carbon steel flange connection or wafer connection.

Ambient Humidity: 5 to 95%RH (no condensation)

Altitude at installation side: Max.2000m above sea level

Installation category based on IEC1010: II(See Note)

Pollution level based on IEC1010: 2(See Note)
Note: • The "Installation category" implies the regulation for impulse withstand voltage. It is also called the "Overvoltage category"."II" applies to electrical equipment.
• "Pollution level" describes the degree to which a solid, liquid or gas which deteriorates dielectric strength is adhering. "2" applies to a normal indoor atmosphere.

Fuse: 2A 250V (Time-Lag type)

Fluid Conductivity: 5μS/cm or larger
*In case that size 250 or 300mm is used for high conductivity fluid (ex. caustic soda, seawater), please use the flange type.

Measurable Flow Rate Range:

SI Units (Size : mm, Flowrate : m³/h)

Size	MIN. Range @0.3m/s	MAX. Range @10m/s
15	0.1909	6.361
25	0.5302	17.671
40	1.3572	45.23
50	2.1206	70.68
80	5.429	180.95
100	8.483	282.74
150	19.086	636.1
200	33.93	1,130.9
250	53.02	1,767.1
300	76.35	2,544.6
350	103.91	3,463
400	135.72	4,523

English Units (Size : inch, Flowrate : GPM)

Size	MIN. Range @1.0ft/s	MAX. Range @33ft/s
0.5	0.6024	20.078
1	2.4095	80.31
1.5	5.422	180.70
2	9.638	321.2
3	21.685	722.8
4	38.56	1,285.0
6	86.74	2,891.3
8	154.21	5140
10	240.95	8031
12	347.0	11,565
14	472.3	15,741
16	616.9	20,560

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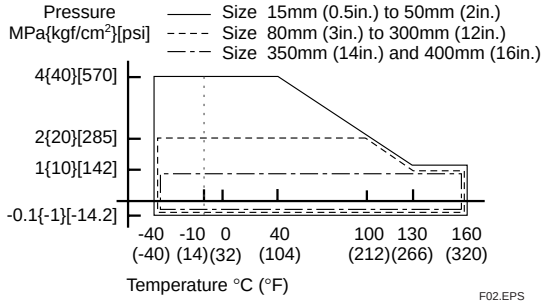
Fluid Temperature and Pressure :



F02.EPS

Note 1: This limits show maximum allowable fluid pressure for Flow Tube itself. Further fluid pressure should also be limitted according to flange rating.
Note 2 : The minimum temperature is -10 °C (14°F) in case of the 40 mm or larger sizes with the carbon steel flange connection or wafer connection.

■ ACCESSORIES

Centering device 1 set (in case of wafer type)
Hexagonal wrench
(for special screw of Terminal cover) 1

■ TERMINAL CONNECTION

Terminal Symbols	Description
A B C	Flow signal output Common
EX1 EX2	Excitation current input
⏚	Function grounding (Outside of the Terminal box)

T04.EPS

■ MODEL AND SUFFIX CODE

Magnetic Flow Tube : SE100DJ/EJ and SE200DJ/EJ

Model	Suffix code	Description
SE115	·····	Nominal Size 15mm (1/2in.)
SE202	·····	Nominal Size 25mm (1in.)
SE204	·····	Nominal Size 40mm (1 1/2in.)
SE205	·····	Nominal Size 50mm (2in.)
SE208	·····	Nominal Size 80mm (3in.)
SE210	·····	Nominal Size 100mm (4in.)
SE215	·····	Nominal Size 150mm (6in.)
SE220	·····	Nominal Size 200mm (8in.)
Construction	D ·····	Remote Type for General Purpose
	E ·····	Remote Type for Explosion Proof
Aux. Code	J ·····	Always J
Lining	-A ·····	Fluorocarbon PFA
Process connection	B1S ·····	ANSI 150 Wafer
	B2S ·····	ANSI 300 Wafer
	E1S ·····	DIN PN10 Wafer Only for 200mm
	E2S ·····	DIN PN16 Wafer Only for 80 to 200mm
	E4S ·····	DIN PN40 Wafer Only for 15 to 50mm
	K1S ·····	JIS10K Wafer
	K2S ·····	JIS20K Wafer
	A1C ·····	ANSI 150 Flange Carbon Steel (SS400)
	A2C ·····	ANSI 300 Flange Carbon Steel (SS400)
	D1C ·····	DIN PN10 Flange Carbon Steel (SS400), Only for 200mm (Note 1)
	D2C ·····	DIN PN16 Flange Carbon Steel (SS400), Only for 80 to 200mm (Note 1)
	D4C ·····	DIN PN40 Flange Carbon Steel (SS400), Only for 15 to 50mm (Note 1)
	J1C ·····	JIS 10K Flange Carbon Steel (SS400)
	J2C ·····	JIS 20K Flange Carbon Steel (SS400)
	G1C ·····	JIS F12 Flange Carbon Steel (SS400), Only for 80 to 200mm
	A1S ·····	ANSI 150 Flange Stainless Steel (SUS304)
	A2S ·····	ANSI 300 Flange Stainless Steel (SUS304)
	D1S ·····	DIN PN10 Flange Stainless Steel (SUS304), Only for 200mm (Note 1)
	D2S ·····	DIN PN16 Flange Stainless Steel (SUS304), Only for 80 to 200mm (Note 1)
	D4S ·····	DIN PN40 Flange Stainless Steel (SUS304), Only for 15 to 50mm (Note 1)
	J1S ·····	JIS 10K Flange Stainless Steel (SUS304)
	J2S ·····	JIS 20K Flange Stainless Steel (SUS304)
	G1S ·····	JIS F12 Flange Stainless Steel (SUS304), Only for 80 to 200mm
Electrode material	-L ·····	Stainless Steel (SUS316L)
	-P ·····	Platinum-iridium
	-H ·····	Hastelloy C-276 Equivalent
	-T ·····	Tantalum
	-V ·····	Titanium
	-W ·····	Tungsten Carbide
Earth ring and earth electrode material	N ·····	Non Earth Ring
	S ·····	Stainless Steel (SUS316)
	P ·····	Platinum-iridium Electrode
	H ·····	HastelloyC-276 Equivalent
	T ·····	Tantalum Electrode
	V ·····	Titanium
Electrical connection (Refer to Note2)	0 ·····	JIS G1/2 Female
	2 ·····	ANSI 1/2NPT Female
	3 ·····	DIN Pg13.5 Female
	4 ·····	ISO M20X1.5 Female
Optional code	/ □	

Note 1: Select PN40 when PN10, PN16, PN25 is required for 15 to 50mm, and select PN16 when PN10 is required for 80 to 150mm, because of same mating dimensions.

Note 2: Only ANSI1/2NPT electrical connection is available for FM or CSA explosion proof type. JIS G1/2 electrical connection is not available for any explosion proof type.

T07.EPS

Magnetic Flow Tube : SE300DJ

Model	Suffix code	Description
SE325 SE330 SE335 SE340	····· ····· ····· ·····	Nominal Size 250mm (10in.) Nominal Size 300mm (12in.) Nominal Size 350mm (14in.) Nominal Size 400mm (16in.)
Construc-tion	D ·····	Remote Type for General Purpose
Aux. Code	J ·····	Always J
Lining	-A·····	Fluorocarbon PFA
Process connection	B1C ····· E1C ····· K1C ····· H1C ····· J1C ····· J2C ····· A1C ····· A2C ····· D1C ····· D2C ····· G1C ····· J1S ····· J2S ····· A1S ····· A2S ····· D1S ····· D2S ····· G1S ·····	ANSI 150 Wafer Only for size 250 and 300mm (10 and12in.) DIN PN10 Wafer Only for size 250 and 300mm (10 and12in.) JIS 10K Wafer Only for size 250 and 300mm (10 and12in.) JIS F12 Wafer Only for size 250 and 300mm (10 and12in.) JIS 10K Flange Carbon Steel (SS400) JIS 20K Flange Carbon Steel (SS400), Only for size 250 and 300mm (10 and12in.) ANSI 150 Flange Carbon Steel (SS400) ANSI 300 Flange Carbon Steel (SS400), Only for size 250 and 300mm (10 and12in.) DIN PN10 Flange Carbon Steel (SS400) DIN PN16 Flange Carbon Steel (SS400), Only for size 250 and 300mm (10 and12in.) JIS F12 Flange Carbon Steel (SS400) JIS 10K Flange Stainless Steel (SUS304) JIS 20K Flange Stainless Steel (SUS304), Only for size 250 and 300mm (10 and12in.) ANSI 150 Flange Stainless Steel (SUS304) ANSI 300 Flange Stainless Steel (SUS304), Only for size 250 and 300mm (10 and12in.) DIN PN10 Flange Stainless Steel (SUS304) DIN PN16 Flange Stainless Steel (SUS304), Only for size 250 and 300mm (10 and12in.) JIS F12 Flange Stainless Steel (SUS304)
Electrode material	-L ····· -P ····· -H····· -T····· -V····· -W·····	Stainless Steel (SUS316L) Platinum-iridium Only for flange type Hastelloy C Equivalent Only for flange type Tantalum Only for flange type Titanium Only for flange type Tungsten Carbide
Earth ring material	N ····· S ····· H ····· V ·····	Non Earth Ring Stainless Steel (SUS316) Hastelloy C Equivalent Only for flange type Titanium Only for flange type
Electrical connection	0 ····· 2 ····· 3 ····· 4 ·····	JIS G1/2 Female ANSI 1/2NPT Female DIN Pg13.5 Female ISO M20X1.5 Female
Optional code	/□	

T08.EPS

Optional Specification

Item	Specification	Code
Stainless Steel Bolt & Nut Assembly	Bolts (SUS304), nuts(SUS403) and non-asbestos PTFE-wrapped gaskets assembly for Wafer Type. Available with 15 to 200mm(0.5 to 8in.)	/BSF
Paint color change	Munsell code; N1.5, Black	/P1
	Munsell code; 7.5BG4/1.5, Jade Green	/P2
	Munsell code; Metallic Silver	/P7
Epoxy Coating	Coating is changed to Epoxy coating.	**/X1**
High Anti-corrosion Coating	Coating is changed to three-layer coating(Urethane coating on two-layer Epoxy coating)	/X2
Oil-Prohibited use	Degreased cleansing treatment.	/K1
Oil-Prohibited use with Dehydrating Treatment	Degreased cleansing treatment ; Packing with desiccant	/K5
Material Certificate	Reproduced material certificate for pipe, electrode, earth ring, mini-flange (for wafer type) and flange (for flange type). (Refer to Note)	/M01
Hydrostatic Test Certificate	Test pressure depends on process connection. (Test duration 10 minutes)	/T01
FM Approval (only for size 15 to 200mm)	FM Explosion proof	/FF1
CENELEC ATEX (KEMA) (only for size 15 to 200mm)	ATEX Explosion proof EEx dm [ia] IIC T6...T3 ; Group II Category 2 G	/KF2
CSA Certification (only for size 15 to 200mm)	CSA Explosion Proof	/CF1
SAA Certification (only for size 15 to 200mm)	SAA Explosion Proof Exdm ia IIC T6...T3	/SF1
Calibration Certificate	Level 2: Declaration and Calibration Equipment List	/L2
	Level 3: Declaration and Primary Standard List	/L3
	Level 4: Declaration and YOKOGAWA Measuring Instruments Control System	/L4
Gasket for PVC pipe (only for size 15 to 200mm)	Gaskets are attached between earth ring and flow tube.	/FRG
Waterproof Gland	Waterproof glands are attached to all wiring ports. For JIS G1/2 only om only.	/ECG
Waterproof Gland with Union Joint	Waterproof glands (union joint) are attached to all wiring ports. For JIS G1/2 only.	/ECU
DHC use (for size 100 to 400mm)	Condensation proof for District Heating and Cooling use. Terminal box; urethane resin potting. Wired 30m signal cable at factory.	/DHC
GOST Certificate	Calibration Certificate for GOST (Only for products produced at YMF)	/GOS

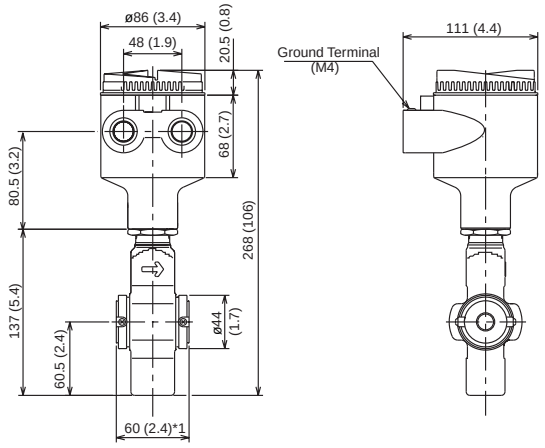
T09.EPS

■ EXTERNAL DIMENSIONS

Magnetic Flow Tube

15mm (0.5in) Wafer Type

Unit : mm (inch)



*1 When no earth ring is selected the face to face length is shorter by approx. 1.6mm (0.06in).

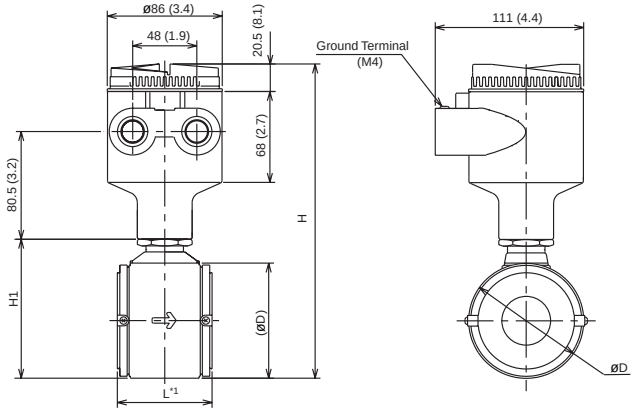
The face to face length is longer by approx. 22mm (0.87in) for earth ring(P,T).

The face to face length is longer by approx. 8.4mm(0.33in) for optional code /FRG.

Weight 1.9 kg (4.2 lb)

SD1d.eps

25mm (1in) to 100mm (4in) Wafer Type



*1 When no earth ring is selected the face to face length is shorter by approx. 1.6mm (0.06in).

The face to face length is longer by approx. 22mm (0.87in) for earth ring (P,T).

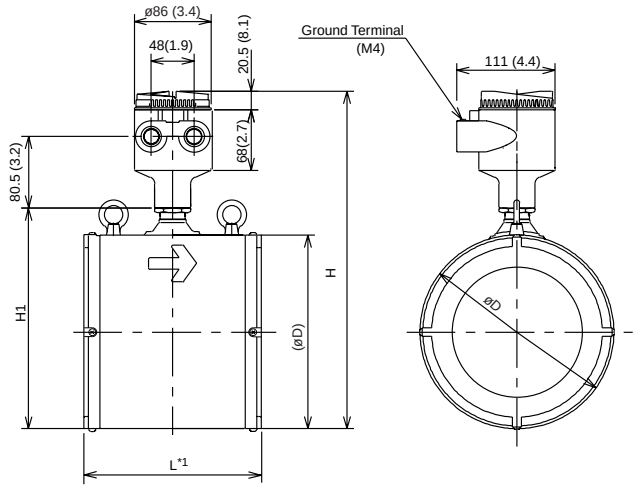
The face to face length is longer by approx. 8.4mm(0.33in) for optional code /FRG.

Unit : mm (Approx. inch)

Model		SE202DJ SE202EJ	SE204DJ SE204EJ	SE205DJ SE205EJ	SE208DJ SE208EJ	SE210DJ SE210EJ
Nominal Size		25 (1)	40 (1.5)	50 (2)	80 (3)	100 (4)
Lining		Fluorocarbon PFA				
Face to face length	L*1	60 (2.4)	70 (2.8)	80 (3.1)	120 (4.7)	150 (5.9)
Outside diameter	øD	67.5 (2.7)	86 (3.4)	99 (3.9)	129 (5.1)	155 (6.1)
Height	H	215 (8.5)	235 (9.3)	260 (10.2)	282 (11.1)	313 (12.3)
	H1	84 (3.3)	104 (4.1)	129 (5.1)	151 (5.9)	182 (7.2)
Weight kg (lb)		1.9 (4.2)	2.5 (5.5)	2.9 (6.5)	5.1 (11.3)	6.7 (14.7)

SD2d.eps

150mm (6in), 200mm (8in) Wafer Type



*1 When no earth ring is selected the face to face length is shorter by approx. 2mm (0.08in).

The face to face length is longer by approx. 32mm (1.3in) for earth ring(P,T).

The face to face length is longer by approx. 10.0mm(0.40in) for optional code /FRG.

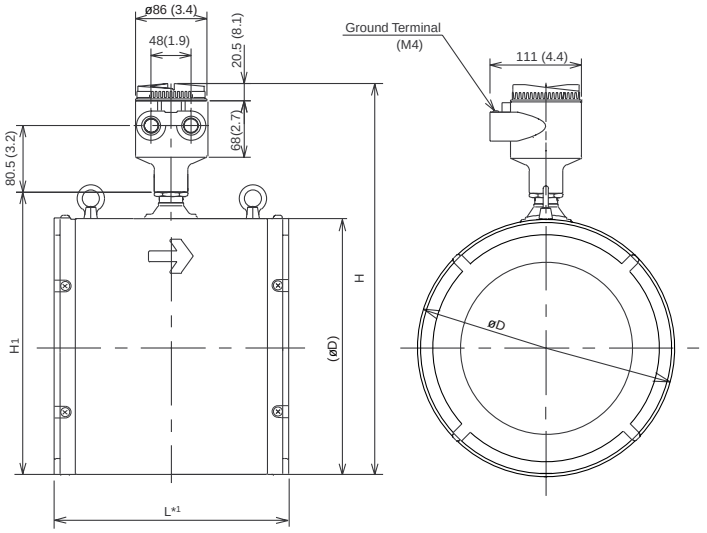
Unit : mm (Approx. inch)

Model		SE215DJ SE215EJ	SE220DJ SE220EJ
Nominal Size		150 (6)	200 (8)
Lining		Fluorocarbon PFA	
Height	H	379 (14.9)	429 (16.9)
	H1	248 (9.8)	298 (11.7)
Outside diameter	øD	218 (8.6)	268 (10.6)
Face to face length	L*1	200 (7.9)	250 (9.8)
Weight kg (lb)		14.5 (32.0)	22.5 (49.5)

SD3d.eps

250 and 300mm (10 and 12in) Wafer Type

Unit : mm (inch)



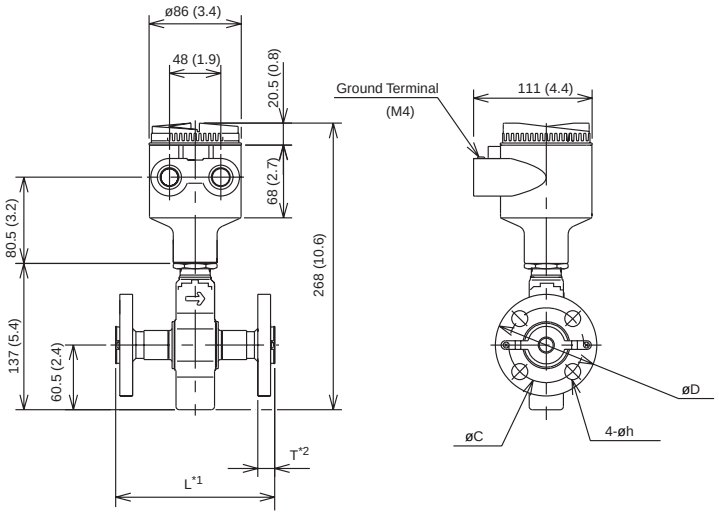
Unit : mm (Approx. inch)

Model		SE325DJ	SE330DJ
Nominal Size		250 (10)	300 (12)
Lining		Fluorocarbon PFA	
Height	H	471 (18.5)	519 (20.4)
	H1	340 (13.4)	388 (15.3)
Outside diameter	øD	310 (12.2)	358 (14.1)
Face to face length	L*1	300 (11.8)	350 (13.8)
Weight kg (lb)		39 (86.0)	48.3 (106.5)

*1 : When no earth ring is selected, the face to face length is shorter by approx. 2mm (0.08in).

SD3-2.eps

15mm (0.5in)) Flange Type



*1 When no earth ring is selected the face to face length is shorter by approx. 1.6mm (0.06in).
The face to face length is longer by approx. 22mm (0.87in) for earth ring(P,T).
The face to face length is longer by approx. 8.4mm (0.33in) for optional code/FRG.

*2 The thickness(T) is longer by approx. 4.2mm (0.17in) for optional code/FRG.

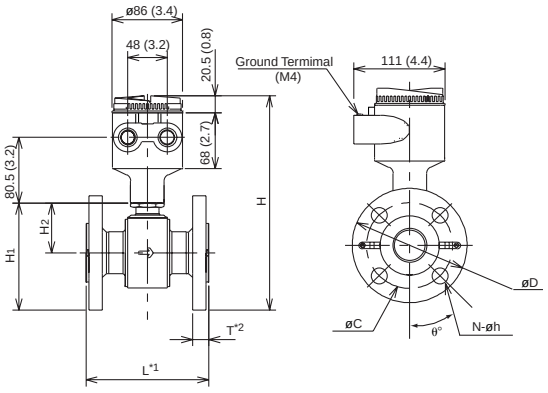
Unit : mm (Approx. inch)

Model		SE115DJ , SE115EJ				
Nominal size		15 (0.5)				
Flange Type		J1□	J2□	A1□	A2□	D4□
Lining		Fluorocarbon PFA				
Face to face length	L*1	200 (7.9)				
Flange outside dia	øD	95 (3.7)	95 (3.7)	88.9 (3.5)	95.3 (3.8)	95 (3.7)
Thickness (Except P,T Earthring)	T*2	15.8 (0.6)	17.8 (0.7)	15 (0.6)	18 (0.7)	19.8 (0.8)
Thickness (P,T Earthring)	T*2	26.8 (1.1)	28.8 (1.1)	26 (1.0)	29 (1.1)	30.8 (1.2)
Pitch circle dia.	øC	70 (2.8)	70 (2.8)	60.5 (2.4)	66.5 (2.6)	65 (2.6)
Dia. of holes	øh	15 (0.6)	15 (0.6)	15.7 (0.6)	15.7 (0.6)	14 (0.6)
Weight kg (lb)		3.5 (7.7)	3.6 (8.0)	3.2 (7.1)	3.6 (8.0)	3.1 (6.9)

SD4d.eps

25mm (1in) to 50mm (2in) Flange Type

Unit : mm
(Approx, inch)



Model		SE202DJ,SE202EJ					SE204DJ,SE204EJ					SE205DJ,SE205EJ				
Nominal Size		25 (1)					40 (1.5)					50 (2)				
Flange Type		J1□	J2□	A1□	A2□	D4□	J1□	J2□	A1□	A2□	D4□	J1□	J2□	A1□	A2□	D4□
Lining		Fluorocarbon PFA					Fluorocarbon PFA					Fluorocarbon PFA				
Height	H	244 (9.6)		236 (9.3)	244 (9.6)	239 (9.6)	262 (10.3)		256 (10.1)	270 (10.6)	267 (10.5)	288 (13.0)		287 (11.3)	293 (11.5)	293 (11.5)
	H1	113 (4.4)		105 (4.1)	113 (4.4)	108 (4.3)	131 (5.2)		125 (4.9)	139 (5.5)	136 (5.4)	157 (6.2)		156 (6.1)	162 (6.4)	162 (6.4)
	H2	51 (2.0)					61 (2.4)					80 (3.1)				
Face to face length	L*1	200 (7.9)					200 (7.9)					200 (7.9)				
Flange outside dia.	øD	125 (4.9)		108 (4.3)	124 (4.9)	115 (4.5)	140 (5.5)		127 (5.0)	155.4 (6.1)	150 (5.9)	155 (6.1)		152.4 (6.0)	165.1 (6.5)	165 (6.5)
Pitch circle dia.	øC	90 (3.5)		79.2 (3.1)	88.9 (3.5)	85 (3.3)	105 (4.1)		98.6 (3.9)	114.3 (4.5)	110 (4.3)	120 (4.7)		120.7 (4.8)	127 (5.0)	125 (4.9)
Bolt hole pitch	θ°	45	45	45	45	45	45	45	45	45	45	45	22.5	45	22.5	45
Thickness (Except P,T Earth ring)	T*2	17 (0.7)	19 (0.7)	17.2 (0.7)	20.5 (0.8)	21 (0.8)	19 (0.7)	21 (0.8)	20.5 (0.8)	23.6 (0.9)	21 (0.8)	19 (0.7)	21 (0.8)	22.1 (0.9)	25.4 (1.0)	23 (0.9)
Thickness (P,T Earth ring)	T*2	28 (1.1)	30 (1.1)	28.2 (1.1)	31.5 (1.2)	32 (1.3)	30 (1.1)	32 (1.3)	31.5 (1.2)	34.6 (1.4)	32 (1.3)	30 (1.1)	32 (1.3)	33.1 (1.3)	36.4 (1.4)	34 (1.3)
Dia. of holes	øh	19 (0.7)		15.7 (0.6)	19.1 (0.8)	14 (0.6)	19 (0.7)		15.7 (0.6)	22.4 (0.9)	18 (0.7)	19 (0.7)		19.1 (0.7)	19.1 (0.7)	18 (0.7)
Number of holes	N	4					4					4	8	4	4	
Weight kg (lb)		4.3 (9.4)	4.6 (10.1)	3.6 (7.8)	4.8 (10.5)	4.6 (10.1)	6.3 (13.9)	6.6 (14.5)	5.9 (13.0)	8.2 (18.1)	7.9 (17.4)	7.7 (17.0)	7.8 (17.3)	8.2 (18.1)	9.8 (21.7)	9.6 (21.2)

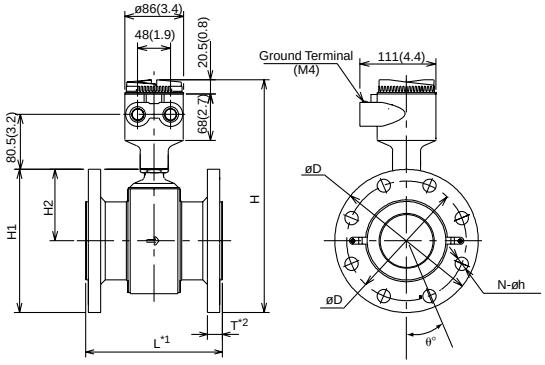
*1 When no earth ring is selected the face to face length is shorter by approx. 1.6mm (0.06in).
The face to face length is longer by approx. 22mm (0.87in) for earth ring(P,T).
The face to face length is longer by approx. 8.4mm (0.33in) for optional code/FRG.

*2 The thickness(T) is longer by approx. 4.2mm (0.17in) for optional code/FRG.

SD5d.EPS

80mm (3in) , 100mm (4in) Flange Type

Unit : mm (inch)



*1 When no earth ring is selected the face to face length is shorter by approx. 1.6mm (0.06 in).

The face to face length is longer by approx. 22mm (0.87in) for earth ring(P,T).

The face to face length is longer by approx. 8.4mm (0.33in) for optional code/FRG.

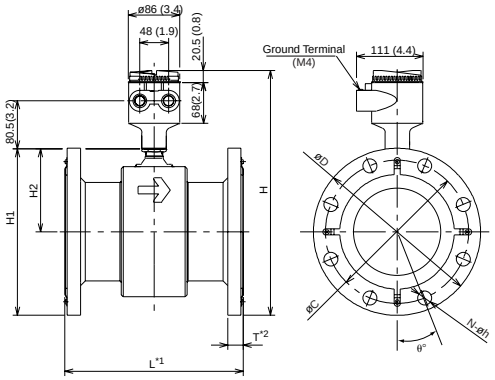
*2 The thickness(T) is longer by approx. 4.2mm(0.17in) for optional code/FRG.

Unit : mm (Approx. inch)

Model		SE208DJ , SE208EJ						SE210DJ , SE210EJ					
Nominal Size		80 (3)						100 (4)					
Flange Type		J1□	J2□	A1□	A2□	D2□	G1□	J1□	J2□	A1□	A2□	D2□	G1□
Lining		Fluorocarbon PFA						Fluorocarbon PFA					
Height	H	310 (12.2)	318 (12.5)	313 (12.3)	323 (12.7)	318 (12.5)	323 (12.7)	341 (13.4)	348 (13.7)	350 (13.8)	363 (14.3)	346 (13.6)	359 (14.1)
	H1	179 (7.0)	187 (7.4)	182 (7.2)	192 (7.6)	187 (7.4)	192 (7.5)	210 (8.3)	217 (8.5)	219 (8.6)	232 (9.1)	215 (8.5)	224 (8.8)
	H2	87 (3.4)						105 (4.1)					
Face to face length	L*1	200 (7.9)						250 (9.8)					
Flange outside dia.	øD	185 (7.3)	200 (7.9)	190.5 (7.5)	209.6 (8.3)	200 (7.9)	211 (8.3)	210 (8.3)	225 (8.6)	228.6 (9.0)	254 (1.0)	220 (8.7)	238 (9.4)
Pitch circle dia.	øC	150 (5.9)	160 (6.3)	152.4 (6.0)	168.1 (6.6)	160 (6.3)	168 (6.6)	175 (6.9)	185 (7.3)	190.5 (7.5)	200.2 (7.9)	180 (7.1)	195 (7.7)
Bolt hole pitch	θ°	22.5	22.5	45	22.5	22.5	45	22.5	22.5	22.5	22.5	22.5	45
Thickness (Except P,T Earth ring)	T*2	21.8 (0.9)	25.8 (1.0)	27.7 (1.1)	32.2 (1.3)	23.8 (0.9)	21.8 (0.9)	21.8 (0.9)	27.8 (1.1)	27.7 (1.1)	34.8 (1.4)	23.8 (0.9)	21.8 (0.9)
Thickness (P , T Earth ring)	T*2	32.8 (1.3)	36.8 (1.4)	38.7 (1.5)	43.2 (1.7)	34.8 (1.4)	32.8 (1.3)	32.8 (1.3)	38.8 (1.5)	37.7 (1.5)	45.8 (1.8)	34.8 (1.4)	32.8 (1.3)
Dia. of holes	øh	19 (0.7)	23 (0.9)	19.1 (0.8)	22.4 (0.9)	18 (0.7)	19 (0.7)	19 (0.7)	23 (0.9)	19.1 (0.8)	22.4 (0.9)	18 (0.7)	19 (0.7)
Number of holes	N	8	8	4	8	8	4	8					4
Weight kg (lb)		10.2 (22.5)	14.1 (31.1)	14.8 (32.7)	16.1 (35.5)	12.1 (26.7)	12.5 (27.6)	11.8 (25.9)	15.7 (34.5)	16.4 (36.0)	22.9 (50.4)	13.7 (30.1)	24.1 (53.0)

SD6d.eps

150mm (6in), 200mm (8in) Flange Type



*1 When no earth ring is selected the face to face length is shorter by approx. 2mm (0.08in).

The face to face length is longer by approx. 32mm (1.3in) for earth ring(P,T).

The face to face length is longer by approx. 10.0mm (0.40in) for optional code/FRG.

*2 The thickness(T) is longer by approx. 5.0mm (0.20in) for optional code/FRG.

Unit : mm (Approx : inch)

Model			SE215DJ , SE215EJ						SE220DJ , SE220EJ						
Nominal Size			150 (6)						200 (8)						
Flange Type			J1□	J2□	A1□	A2□	D2□	G1□	J1□	J2□	A1□	A2□	D1□	D2□	G1□
Lining			Fluorocarbon PFA						Fluorocarbon PFA						
Face to face length (ISO)		L*1	300 (11.8)						350 (13.8)						
Height		H	410 (16.1)	422.5 (16.6)	409.7 (16.1)	428.7 (16.9)	412.5 (16.2)	415 (16.3)	460 (18.1)	470 (18.5)	466.4 (18.4)	485.5 (19.1)	465 (18.3)	465 (18.3)	466 (18.3)
		H1	279 (11.0)	291.5 (11.5)	278.7 (11.0)	297.8 (11.7)	281.5 (11.1)	284 (11.2)	329 (12.6)	339 (13.3)	335.5 (13.2)	354.5 (14.0)	334 (13.1)	334 (13.1)	335 (13.2)
		H2	139 (5.5)						164 (6.5)						
Outside diameter		øD	280 (11.0)	305 (12.0)	279.4 (11.0)	317.5 (14.8)	285 (11.2)	290 (11.0)	330 (13.0)	350 (13.8)	342.9 (13.5)	381 (15.0)	340 (13.4)	340 (13.4)	342 (13.5)
Pitch circle dia.		øC	240 (9.4)	260 (10.2)	241.3 (9.5)	269.7 (10.6)	240 (9.4)	247 (9.7)	290 (1.1)	305 (12.0)	298.4 (11.7)	330.2 (13.0)	295 (11.6)	295 (11.6)	299 (11.8)
Bolt hole pitch		θ°	22.5	15	22.5	15	22.5	30	15	15	22.5	15	22.5	15	22.5
Thickness (Except P,T Earth ring)		T*2	27 (1.1)	33 (1.3)	30.4 (1.2)	41.5 (1.6)	27 (1.1)	27 (1.1)	27 (1.1)	35 (1.4)	49.4 (1.9)	46.1 (1.8)	29 (1.1)	29 (1.1)	29 (1.1)
Thickness (P,T Earth ring)		T*2	43 (1.7)	49 (1.9)	46.4 (1.8)	57.5 (2.3)	43 (1.7)	43 (1.7)	43 (1.7)	51 (2.0)	52.4 (2.1)	62.1 (2.4)	45 (1.8)	45 (1.8)	45 (1.8)
Dia. of holes		øh	23 (0.9)	25 (1.0)	22.3 (0.9)	22.3 (0.9)	22 (0.9)	19 (0.7)	23 (0.9)	25 (1.0)	22.3 (0.9)	25.4 (1.0)	22 (0.9)	22 (0.9)	19 (0.7)
Number of holes		N	8	12	8	12	8	6	12	12	8	12	8	12	8
Weight	kg (lb)		26.4 (58.3)	33.4 (73.7)	28.4 (62.7)	43.4 (95.7)	28.4 (62.7)	27.4 (60.5)	37.3 (82.1)	47.3 (114.2)	44.3 (104.2)	66.3 (146.1)	41.3 (90.9)	42.3 (93.1)	43.3 (95.3)

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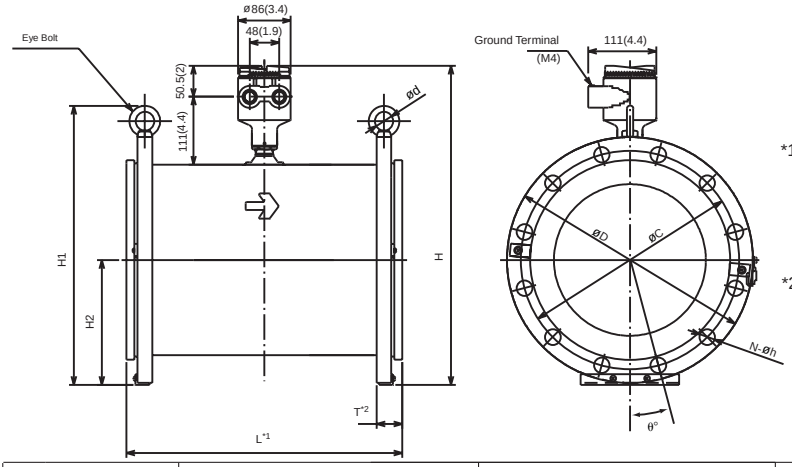
250mm (10in), 300mm (12in), 350mm (14in), 400mm (16in) Flange Type

Unit : mm (inch)



*1 When no earth ring is selected
the face to face length is shorter by approx.
26mm (1.02 inch) for 250mm(10 inch),
6mm (0.23 inch) for 300mm (12 inch),
10mm (0.4 inch) for 350mm (14 inch)
and 400mm (16 inch).

*2 When no earth ring is selected
the thickness (T) is shorter by approx.
13mm (0.51 inch) for 250mm(10 inch),
3mm (0.11 inch) for 300mm (12 inch),
5mm (0.20 inch) for 350mm (14 inch)
and 400mm (16 inch).

Unit : mm
(approx : inch)

Model		SE325							SE330							SE335				SE340			
Nominal Size		250(10)							300(12)							350(14)				400(16)			
Flange Type		A1□	A2□	D1□	D2□	G1□	J1□	J2□	A1□	A2□	D1□	D2□	G1□	J1□	J2□	A1□	D1□	G1□	J1□	A1□	D1□	G1□	J1□
Lining		Fluorocarbon PFA							Fluorocarbon PFA							Fluorocarbon PFA				Fluorocarbon PFA			
Height	H	522.4 (20.6)	541.5 (21.3)	516.7 (20.3)	521.7 (20.5)	524.2 (20.6)	519.2 (20.4)	534.2 (21)	584.7 (23)	603.6 (23.7)	565.7 (22.3)	573.2 (22.5)	575.2 (22.6)	565.7 (22.3)	583.2 (22.9)	630.9 (24.8)	616.7 (24.3)	629.2 (24.8)	609.2 (24)	690.2 (27.2)	674.2 (26.5)	682.7 (26.8)	671.7 (26.4)
	H1	460.6 (18.1)	498.7 (19.6)	449.2 (17.7)	459.2 (18.1)	464.2 (18.3)	454.2 (17.8)	484.2 (19.1)	537.1 (21)	574.9 (22.6)	499.2 (19.6)	514.2 (20.2)	518.2 (20.4)	499.2 (19.6)	534.2 (21)	596.6 (23.5)	568.2 (22.4)	593.2 (23.4)	553.2 (21.8)	660.1 (26)	628.2 (24.7)	645.2 (25.4)	623.2 (24.5)
	H2	206.4 (8.1)	225.45 (8.9)	200.7 (7.9)	205.7 (8.1)	208.2 (8.2)	203.2 (8.0)	218.2 (8.6)	244.7 (9.6)	263.6 (10.3)	225.7 (8.9)	233.2 (9.2)	235.2 (9.3)	225.7 (8.9)	243.2 (9.6)	269.9 (10.6)	255.7 (10.1)	268.2 (10.6)	248.2 (9.8)	301.65 (11.9)	285.7 (11.2)	294.2 (11.6)	283.2 (11.1)
Eye bolt SIZE/ød		M12 / 30							M12 / 30							M16 / 35				M16 / 35			
Face to face length (ISO)	L*1	450 (17.7)							500 (20)							550 (21.7)				600 (23.6)			
Outside diameter	øD	406.4 (16)	444.5 (17.5)	395 (15.5)	405 (16)	410 (16.1)	400 (15.7)	430 (16.9)	482.9 (19)	520.7 (20)	445 (17.5)	460 (18)	464 (18.2)	445 (17.5)	480 (18.9)	533.4 (21)	505 (19.9)	530 (20.8)	490 (19.2)	596.9 (23.5)	565 (22.2)	582 (22.9)	560 (22)
Thickness	T*2	48.5 (1.9)	66 (2.6)	44 (1.7)	44 (1.7)	42 (1.7)	42 (1.7)	52 (2)	40 (1.6)	59 (2.3)	34 (1.3)	36 (1.4)	34 (1.3)	34 (1.3)	44 (1.7)	45 (1.8)	34 (1.3)	36 (1.4)	36 (1.4)	47 (1.8)	34 (1.3)	36 (1.4)	38 (1.5)
Pitch circle dia.	øC	361.9 (14.2)	387.3 (15.2)	350 (13.8)	355 (14)	360 (14.2)	355 (14)	380 (15)	431.8 (17)	450.8 (18)	400 (16)	410 (16)	414 (16.3)	400 (15.7)	430 (16.9)	476.2 (18.7)	460 (18.1)	472 (18.6)	445 (17.5)	539.7 (21.2)	515 (20.3)	524 (20.6)	510 (20.1)
Bolt hole pitch	θ°	15	11.25	15	15	22.5	15	15	15	11.25	15	15	18	11.25	11.25	15	11.25	18	11.25	11.25	11.25	15	11.25
Dia. of holes	øh	25.4 (1)	28.4 (1.1)	22 (0.9)	26 (1)	23 (0.9)	25 (1)	27 (1.1)	25.4 (1)	31.7 (1.2)	22 (0.9)	26 (1)	23 (0.9)	25 (1)	27 (1.1)	28.4 (1.2)	22 (0.9)	25 (1)	25 (1)	28.4 (1.1)	26 (1)	25 (1)	27 (1.1)
Number of holes	N	12	16	12	12	8	12	12	12	16	12	12	10	16	16	12	16	10	12	16	16	12	16
Weight	kg (lb)	76 (167.6)	81 (178.6)	70 (154.4)	71 (156.6)	70 (154.4)	70 (154.4)	73 (161)	96 (211.7)	104 (229.3)	87 (191.8)	88 (194)	87 (191.8)	87 (191.8)	91 (200.7)	123 (271.2)	107 (235.9)	107 (235.9)	107 (235.9)	158 (348.4)	135 (297.7)	135 (297.7)	135 (297.7)

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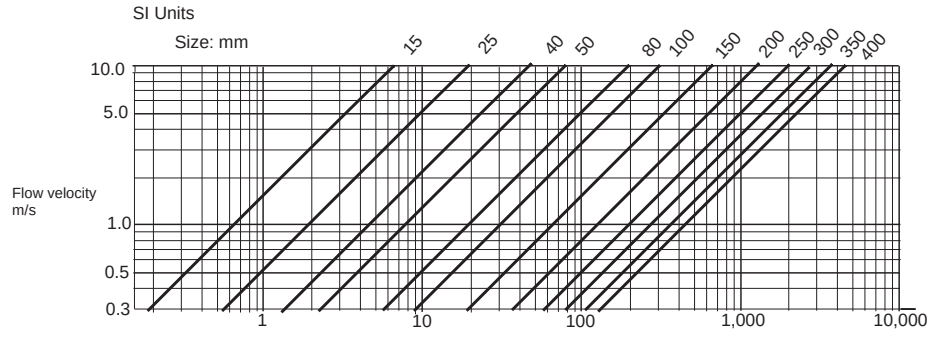
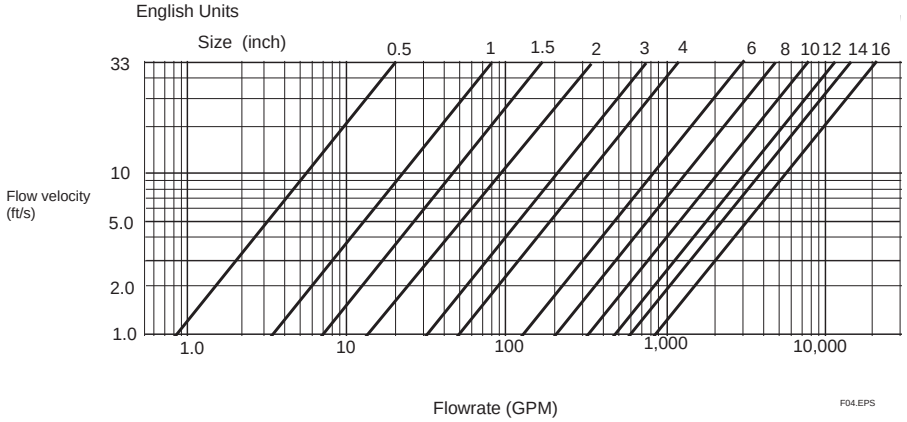
■ SIZING DATA





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6. EXPLOSION PROTECTED TYPE INSTRUMENT

In this section, further requirements and differences for explosion proof type instrument are described. For explosion proof type instrument, the description in this chapter is prior to other description in this User's Manual.

NOTE

The terminal box cover and display cover is locked by special screw. In case of opening the cover, please use the Hexagonal Wrench attached.

CAUTION

Be sure to lock the cover with the special screw using the Hexagonal Wrench attached after tightening the cover.

6.1 CENELEC ATEX(KEMA)

WARNING

Only trained persons use this instrument in industrial locations.

(1) Technical Data

No. KEMA 98ATEX3230
Type of Protection : EEx dm[ia]IIC T6...T3 Group II Category 2 G
Electrode Circuit Um : 250V ac/dc
Excitation Circuit : 41Vmax. 6/6.25Hz

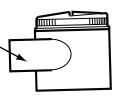
Temp. Class	T6	T5	T4	T3
Process Temp	70	85	120	150°C

Enclosure : IP67

(2) Electrical Connection

The type of electrical connection is stamped near the electrical connection port according to the following codes.

Screw Size	Marking
ISO M20x1.5 female	⚠ M
ANSI 1/2NPT female	⚠ A
DIN Pg13.5 female	⚠ D



(3) Installation

WARNING

- All wiring shall comply with local installation requirements and local electrical code.
- In hazadous locations, the cable entry devices shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is flameproof certified.)

(4) Operation

WARNING

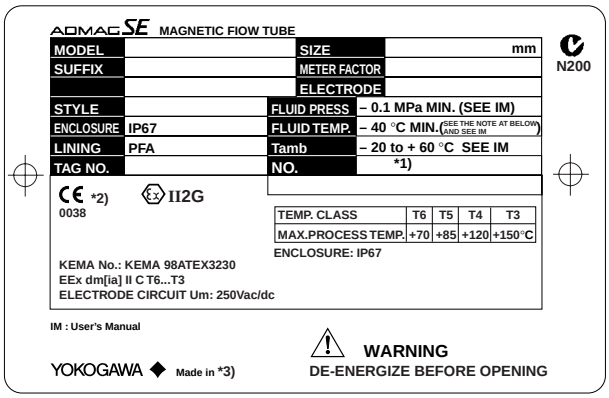
- Wait 10min. after power is turned off, before opening the covers.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(5) Maintenance and Repair

WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the certification.

(6) Data Plate



MODEL : Specified model code
SUFFIX : Suffix codes of the model code
STYLE : Specified style code

ENCLOSURE : Enclosure protection number
LININGL : Material of liner
TAG NO. : Tag number
SIZE : Nominal size of apparatus
METER FACTOR : Sensor constant number of apparatus
ELECTRODE : Material of electrodes
FLUIDPRESS : Fluid pressure of apparatus
FLUIDTEMP. : Fluid temperature of apparatus
Tamb : Ambient temperature
No. : Manufacturing serial number
CE : CE marking
ExII 2G : Group II Catergory 2 Gas atmosphere
KEMA No. : KEMA 98ATEX3230 : Certificate number
EExdem[ia]IICT6...T3 : Protection type and temp. class
ELECTRODE CIRCUIT Um : Voltage of electrode circuit
IM : User's Manual

⚠ **WARNING** : Warning to apparatus
YOKOGAWA ◆ TOKYO 180-8750 JAPAN :
Name and address of manufacturer

*1) The third figure from the last shows the last one figure of the year of production. For example, the year of production of the product engraved as follows is year 1998.

No. F261GA091 813
↑
Produced in 1998

*2) The identification number of the notified body : 0344

*3) The product-producing country

6.2 FM

(1) Technical Data

Explosionproof for Class I Division 1 Groups A, B, C & D. Dust-ignitionproof for Class II/III Division 1 Groups E, F & G. Intrinsically safe (electrode) for Class I Division 1 Groups A, B, C & D
Electrode circuit Vmax : 250V ac/dc

Temperature Code	Maximum Ambient Temperature	Maximum Process Temperature	Minimum Process Temperature
T6	+60˚C	+70˚C	-40˚C
T5	+60˚C	+85˚C	-40˚C
T4	+60˚C	+120˚C	-40˚C
T3	+60˚C	+150˚C	-40˚C

Enclosure : NEMA 4X
Ambient Temperature : -20 to +60°C
Maximum Working Pressure : 4MPa(SE115E to SE205E), 2MPa(SE208E to SE220E)
Flange rating should be also considered.

(2) Wiring

⚠ **WARNING**

- All wiring shall comply with national electrical code ANSI/NFPA 70 and local electrical code.
- There is no need of conduit seal for both of Division 1 and Division 2 hazardous locations because this product is sealed at factory.

(3) Operation

⚠ **WARNING**

- OPEN CIRCUIT BEFORE REMOVING COVER. INSTALL IN ACCORDANCE WITH THE INSTRUCTION MANNUAL IM1E10D0-01E.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(4) Maintenance and Repair

⚠ **WARNING**

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the approval of Factory Mutual Research Corporation.

6.3 CSA

(1) Technical Data

Class I, Groups B, C and D; Class II, Groups E, F and G; Class III; Encl Type 4X
Electrodes: Intringically Safe, Ex ia, Class I, Groups A, B, C and D
When installed in Class I, Division 2 locations - Seals No Required.
Electrode Circuit Vmax : 250V ac/dc

Temperature Code	Maximum Ambient Temperature	Maximum Process Temperature	Minimum Process Temperature
T6	+60˚C	+70˚C	-40˚C
T5	+60˚C	+85˚C	-40˚C
T4	+60˚C	+120˚C	-40˚C
T3	+60˚C	+150˚C	-40˚C

Ambient Temperature : -20 to +60°C
Maximum Working Pressure : 4MPa(SE115E to SE205E), 2MPa(SE208E to SE220E)
Flange rating should be also considered.

(2) Wiring

WARNING

All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
Note a warning label worded as follows.

Warning : A SEAL SHALL BE INSTALLED WITHIN 50cm OF THE ENCLOSURE.
UN SCELLEMENT DOIT ÉTRE INSTALLÉ À MOINS DE 50cm DU BOÎTIER.

When installed in Class I, Division 2, "SEALS NO REQUIRED."

(3) Operation

WARNING

Note a warning label worded as follows.

Warning : OPEN CIRCUIT BEFORE REMOVING COVER.
OUVRIR LE CIRCUIT AVANT D'EN LEVER LE COUVERCLE.

Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(4) Maintenance and Repair

WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void CSA Explosionproof Certification.

6.4 SAA

(1) Technical Data

SA Certificate No.: AUS Ex 3764X
Type of Protection : Ex d m ia II C T6...T3
Enclosure Type : IP67
Excitation Circuit : 41Vmax, 6/6.25Hz
Electrode Circuit Um : 250V ac/dc

Temperature Code	Maximum Ambient Temperature	Maximum Process Temperature	Minimum Process Temperature
T6	+60˚C	+70˚C	-40˚C
T5	+60˚C	+85˚C	-40˚C
T4	+60˚C	+120˚C	-40˚C
T3	+60˚C	+150˚C	-40˚C

Ambient Temperature : -20 to +60°C

(2) Installation

WARNING

- All wiring shall comply with local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified flameproof type, suitable for the contidions of use and correctrly installed.

(3) Operation

WARNING

- Open circuit before opening the covers.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

(4) Maintenance and Repair

WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the certification.

7. PRESSURE EQUIPMENT DIRECTIVE

This chapter is described further requirements and notices concerning the PED (Pressure Equipment Directive). The description in this chapter is prior to other description in this User's Manual.

(1) Technical Data

Module : H
Type of Equipment : Piping
Type of Fluid : Liquid and Gas
Group of Fluid : 1 and 2

Model	DN(mm)*	PS(MPa)*	PS-DN(MPa-mm)	CATEGORY**
SE115D/E	15	4	60	Article 3,*** paragraph 3
SE202D/E	25	4	100	
SE204D/E	40	4	160	II
SE205D/E	50	4	200	II
SE208D/E	80	2	160	II
SE210D/E	100	2	200	II
SE215D/E	150	2	300	II
SE220D/E	200	2	400	III
SE325D/E	250	2	500	III
SE330D/E	300	2	600	III
SE335D/E	350	1	350	II
SE340D/E	400	1	400	III

* PS: Maximum allowable pressure for Flow Tube
DN: Nominal size

** Referred to Table 6 covered by ANNEX II of EC Directive on Pressure Equipment Directive 97/23/EC)

*** SE115D/E and SE202D/E are not attached CE mark of PED because they do not come under CE marking of PED.

(2) Installation

WARNING

- Please tighten the bolts for piping-joint according to the prescribed torque values.
- Please take measure to protect the flowmeters from forces caused by vibration through piping.

(3) Operation

WARNING

- The temperature and pressure of fluid should be applied under the normal operating condition.
- The ambient temperature should be applied under the normal operating condition.
- Please pay attention to prevent the excessive pressure like water hammer, etc. When water hammer is to be occurred, please take measures to prevent the pressure from exceeding PS(maximum allowable pressure) by setting the safety valve, etc. at the system and the like.
- When external fire is to be occurred, please take safety measures at the device or system not to influence the flowmeters.
- Please avoid the fluid exceeding the corrosion proof of lining and electrode.
- Please pay attention not to be abrade the metal pipe, when the fluid to abrade the lining such as slurry and sand are contained.