User's Manual



EJX110A, EJX120A, EJX130A, EJX310A, EJX430A and EJX440A Differential Pressure and Pressure Transmitters

IM 01C25B01-01E

vigilantplant.





IM 01C25B01-01E 8th Edition

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REVISION RECORD

When using the EJX in a Safety Instrumented Systems(SIS) application, refer to Appendix A in either IM 01C25T01-01E for the HART protocol or IM 01C25T03-01E for the BRAIN protocol.

1. INTRODUCTION

Thank you for purchasing the DPharp EJX Differential Pressure and pressure transmitter.

Your EJX Pressure Transmitter was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the instrument.

This manual describes the hardware configurations of EJX series transmitters. For information on the software configuration and operation, please refer to either IM 01C25T03-01E for the EJX series BRAIN communication type or IM 01C25T01-01E for the EJX series HART communication type.

For FOUNDATION Fieldbus protocol type, please refer to IM 01C25T02-01E.

To ensure correct use of this instrument, read both the hardware and software manuals thoroughly before use.

When using the EJX in a Safety Instrumented Systems (SIS) application, refer to Appendix A in either IM 01C25T01-01E for the HART protocol or IM 01C25T03-01E for the BRAIN protocol. The instructions and procedures in this section must be strictly followed in order to maintain the transmitter for this safety level.



This manual covers the EJX110A, EJX120A and EJX130A differential pressure transmitter, EJX430A and EJX440A gauge pressure transmitter and EJX310A absolute pressure transmitter whose style codes are as described in the following table.

Unless otherwise stated, the illustrations in this manual are of the EJX110A differential pressure transmitter. Users of the other models should bear in mind that certain features of their instrument will differ from those shown in the illustrations of the EJX110A.

Model	Style code
EJX110A	S3
EJX120A	S1
EJX130A	S2
EJX310A	S2
EJX430A	S2
EJX440A	S2

Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change 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 manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- 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.
- The following safety symbols are used in this manual:

Indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.



Draws attention to information essential for understanding the operation and features.

---- Direct current

1.1 Safe Use of This Product

For the safety of the operator and to protect the instrument and the system, please be sure to follow this manual's safety instructions when handling this instrument. If these instructions are not heeded, the protection provided by this instrument may be impaired. In this case, Yokogawa cannot guarantee that the instrument can be safely operated. Please pay special attention to the following points:

(a) Installation

- This instrument may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the instrument or its casing.
- Never loosen the process connector nuts when the instrument is installed in a process. This can lead to a sudden, explosive release of process fluids.
- When draining condensate from the pressure detector section, take appropriate precautions to prevent the inhalation of harmful vapors and the contact of toxic process fluids with the skin or eyes.
- When removing the instrument from a hazardous process, avoid contact with the fluid and the interior of the meter.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring

- The instrument must be installed by an engineer or technician who has an expert knowledge of this instrument. Operators are not permitted to carry out wiring unless they meet this condition.
- Before connecting the power cables, please confirm that there is no current flowing through the cables and that the power supply to the instrument is switched off.

(c) Operation

• Wait 5 min. after the power is turned off, before opening the covers.

(d) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

(e) Explosion Protected Type Instrument

- Users of explosion proof instruments should refer first to section 2.9 (Installation of an Explosion Protected Instrument) of this manual.
- The use of this instrument is restricted to those who have received appropriate training in the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.

(f) Modification

• Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
- If any problems are experienced with this instrument, the customer should contact the Yokogawa representative from which this instrument was purchased or the nearest Yokogawa office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.
- The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:
 - Improper and/or inadequate maintenance by the purchaser.
 - Malfunction or damage due to a failure to handle, use, or store the instrument in accordance with the design specifications.
 - Use of the product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.
 - Failure or damage due to modification or repair by any party except Yokogawa or an approved representative of Yokogawa.
 - Malfunction or damage from improper relocation of the product in question after delivery.
 - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

1.3 ATEX Documentation

This is only applicable to the countries in European Union.



All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.



Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.



Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E

Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.



Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.



Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.



Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.



Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.



Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.



Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.



Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ΑΤΕΧ Εχ διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Εχ στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.



Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Exprístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.



Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.



Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës "Yokogawa" biuru arba atstovu.



Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.



Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima Iokagava (Yokogawa) kontori või esindaja poole.



Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja. obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.



Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v anglišėini, nemšėini ter francošėini. Èe so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.



Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.



Всички упътвания за продукти от серията ATEX Ех се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ех на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.



Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.



Il-manwali kollha ta' l-istruzzjonijiet ghal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franciż. Jekk tkun tehtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew ufficċju ta' Yokogawa.

2. HANDLING CAUTIONS

This chapter provides important information on how to handle the transmitter. Read this carefully before using the transmitter.

EJX Series transmitters are thoroughly tested at the factory before shipment. When taking delivery of an instrument, visually check them to make sure that no damage occurred during shipment.

Also check that all transmitter mounting hardware shown in figure 2.1 is included. If the transmitter is ordered without the mounting bracket and the process connector, the transmitter mounting hardware will not be included. After checking the transmitter, carefully repack it in its box and keep it there until you are ready to install it.



Figure 2.1 Transmitter Mounting Hardware

2.1 Model and Specifications Check

The model name and specifications are written on the name plate attached to the case.



Figure 2.2 Name Plate (EJX110A)

2.2 Unpacking

Keep the transmitter in its original packaging to prevent it from being damaged during shipment. Do not unpack the transmitter until it reaches the installation site.

2.3 Storage

The following precautions must be observed when storing the instrument, especially for a long period.

- (a) Select a storage area which meets the following conditions:
 - It is not exposed to rain or subject to water seepage/leaks.
 - Vibration and shock are kept to a minimum.
 - It has an ambient temperature and relative humidity within the following ranges.

Ambient temperature:

-40 to 85°C without integral indicator

-30 to 80°C with integral indicator

Relative humidity:

0% to 100% R.H. Preferred temperature and humidity: approx. 25°C and 65% R.H.

- (b) When storing the transmitter, repack it carefully in the packaging that it was originally shipped with.
- (c) If the transmitter has been used, thoroughly clean the chambers inside the cover flanges, so that there is no process fluid remaining inside. Before placing it in storage, also make sure that the pressuredetector is securely connected to the transmitter section.

2.4 Selecting the Installation Location

The transmitter is designed to withstand severe environmental conditions. However, to ensure that it will provide years of stable and accurate performance, take the following precautions when selecting the installation location.

(a) Ambient Temperature

Avoid locations subject to wide temperature variations or a significant temperature gradient. If the location is exposed to radiant heat from plant equipment, provide adequate thermal insulation and/or ventilation.

(b) Ambient Atmosphere

Do not install the transmitter in a corrosive atmosphere. If this cannot be avoided, there must be adequate ventilation as well as measures to prevent the leaking of rain water and the presence of standing water in the conduits.

(c) Shock and Vibration

Although the transmitter is designed to be relatively resistant to shock and vibration, an installation site should be selected where this is kept to a minimum.

(d) Installation of Explosion-protected Transmitters An explosion-protected transmitters is certified for installation in a hazardous area containing specific gas types. See subsection 2.9 "Installation of an Explosion-Protected Transmitters."

2.5 Pressure Connection

- Never loosen the process connector bolts when an instrument is installed in a process. The device is under pressure, and a loss of seal can result in a sudden and uncontrolled release of process fluid.
- When draining toxic process fluids that have condensed inside the pressure detector, take appropriate steps to prevent the contact of such fluids with the skin or eyes and the inhalation of vapors from these fluids.

The following precautions must be observed in order to safely operate the transmitter under pressure.

- (a) Make sure that all the process connector bolts are tightened firmly.
- (b) Make sure that there are no leaks in the impulse piping.

(c) Never apply a pressure higher than the specified maximum working pressure.

2.6 Waterproofing of Cable Conduit Connections

Apply a non-hardening sealant to the threads to waterproof the transmitter cable conduit connections. (See figure 6.8, 6.9 and 6.10.)

2.7 Restrictions on Use of Radio Transceivers

Although the transmitter has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or its external wiring, the transmitter may be affected by high frequency noise pickup. To test this, start out from a distance of several meters and slowly approach the transmitter with the transceiver while observing the measurement loop for noise effects. Thereafter use the transceiver outside the range where the noise effects were first observed.

2.8 Insulation Resistance and Dielectric Strength Test

Since the transmitter has undergone insulation resistance and dielectric strength tests at the factory before shipment, normally these tests are not required. If the need arises to conduct these tests, heed the following:

- (a) Do not perform such tests more frequently than is absolutely necessary. Even test voltages that do not cause visible damage to the insulation may degrade the insulation and reduce safety margins.
- (b) Never apply a voltage exceeding 500 V DC (100 V DC with an internal lightning protector) for the insulation resistance test, nor a voltage exceeding 500 V AC (100 V AC with an internal lightning protector) for the dielectric strength test.
- (c) Before conducting these tests, disconnect all signal lines from the transmitter terminals. The procedure for conducting these tests is as follows:
- Insulation Resistance Test
- 1) Short-circuit the + and SUPPLY terminals in the terminal box.

- 2) Turn OFF the insulation tester. Then connect the insulation tester plus (+) lead wire to the shorted SUPPLY terminals and the minus (-) leadwire to the grounding terminal.
- 3) Turn ON the insulation tester power and measure the insulation resistance. The voltage should be applied as briefly as possible to verify that the insulation resistance is at least 20 M Ω .
- 4) After completing the test and being very careful not to touch exposed conductors disconnect the insulation tester and connect a 100 kΩ resistor between the grounding terminal and the shortcircuiting SUPPLY terminals. Leave this resistor connected at least one second to discharge any static potential. Do not touch the terminals while it is discharging.

• Dielectric Strength Test

- 1) Short-circuit the + and SUPPLY terminals in the terminal box.
- Turn OFF the dielectric strength tester. Then connect the tester between the shorted SUPPLY terminals and the grounding terminal. Be sure to connect the grounding lead of the dielectric strength tester to the ground terminal.
- 3) Set the current limit on the dielectric strength tester to 10 mA, then turn ON the power and gradually increase the test voltage from '0' to the specified voltage.
- 4) When the specified voltage is reached, hold it for one minute.
- 5) After completing this test, slowly decrease the voltage to avoid any voltage surges.

2.9 Installation of an Explosion-Protected Instrument

🖄 ΝΟΤΕ

For FOUNDATION Fieldbus explosion protected type, please refer to IM 01C22T02-01E.

If a customer makes a repair or modification to an intrinsically safe or explosionproof instrument and the instrument is not restored to its original condition, its intrinsically safe or explosionproof construction may be compromised and the instrument may be hazardous to operate. Please contact Yokogawa before making any repair or modification to an instrument.

This instrument has been tested and certified as being intrinsically safe or explosionproof. Please note that severe restrictions apply to this instrument's construction, installation, external wiring, maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.

Maintaining the safety of explosionproof equipment requires great care during mounting, wiring, and piping. Safety requirements also place restrictions on maintenance and repair. Please read the following sections very carefully.

The range setting switch must not be used in a hazardous area.

2.9.1 FM Approval

a. FM Intrinsically Safe Type

Caution for FM intrinsically safe type. (Following contents refer "DOC. No. IFM022-A12")

- Note 1. Model EJX Series Differential, gauge and absolute pressure transmitters with optional code /FS1 are applicable for use in hazardous locations.
 - Applicable Standard: FM3600, FM3610, FM3611, FM3810
 - Intrinsically Safe for Class I, Division 1, Groups A, B, C & D. Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0 in Hazardous Locations, AEx ia IIC
 - Nonincendive for Class I, Division 2, Groups A, B, C & D. Class II, Division 2, Groups F & G and Class III, Division 1, Class I, Zone 2, Groups IIC, in Hazardous Locations.
 - Outdoor hazardous locations, NEMA 4X.
 - Temperature Class: T4
 - Ambient temperature: -60 to 60°C
- Note 2. Entity Parameters
 - Intrinsically Safe Apparatus Parameters [Groups A, B, C, D, E, F and G] Vmax = 30 V Ci = 6 nF Imax = 200 mA Li = 0 µH Pmax = 1 W

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* Associated Apparatus Parameters (FM approved barriers) $Voc \le 30 V$ Ca > 6 nF

$Voc \le 30 V$	Ca > 6 nF
$Isc \le 200 \text{ mA}$	La > 0 μH
$Pmax \le 1W$	

 Intrinsically Safe Apparatus Parameters [Groups C, D, E, F and G]
 Vmax = 30 V Ci = 6 nF
 Imax = 225 mA Li = 0 μH

Pmax = 1 W

- * Associated Apparatus Parameters (FM approved barriers) Voc ≤ 30 V Ca > 6 nF Isc ≤ 225 mA La > 0 μ H Pmax ≤ 1 W
- Entity Installation Requirements
 Vmax ≥ Voc or Uo or Vt, Imax ≥ Isc or Io or It,
 Pmax (or Po) ≤ Pi, Ca or Co ≥ Ci + Ccable,
 La or Lo ≥ Li + Lcable
- Note 3. Installation
 - Barrier must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.
 - Control equipment connected to barrier must not use or generate more than 250 V rms or V dc.
 - Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electric Code (ANSI/NFPA 70).
 - The configuration of associated apparatus must be FMRC Approved.
 - Dust-tight conduit seal must be used when installed in a Class II, III, Group E, F and G environments.
 - Associated apparatus manufacturer's installation drawing must be followed when installing this apparatus.
 - The maximum power delivered from the barrier must not exceed 1 W.
 - Note a warning label worded "SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY," and "INSTALL IN ACCORDANCE WITH DOC. No. IFM022-A12"

Note 4. Maintenance and Repair

• The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.





b. FM Explosionproof Type

Caution for FM explosionproof type.

- Note 1. Model EJXseries pressure transmitters with optional code /FF1 are applicable for use in hazardous locations.
 - Applicable Standard: FM3600, FM3615, FM3810, ANSI/NEMA 250
 - Explosionproof for Class I, Division 1, Groups B, C and D.
 - Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G.
 - Enclosure rating: NEMA 4X.
 - Temperature Class: T6
 - Ambient Temperature: -40 to 60°C
 - Supply Voltage: 42 V dc max.
 - Output signal: 4 to 20 mA
- Note 2. Wiring
 - All wiring shall comply with National Electrical Code ANSI/NFPA70 and Local Electrical Codes.
- When installed in Division 1, "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED."

Note 3. Operation

• Keep the "WARNING" nameplate attached to the transmitter.

WARNING: OPEN CIRCUIT BEFORE REMOV-ING COVER. FACTORY SEALED, CONDUIT SEAL NOT REQUIRED. INSTALL IN ACCOR-DANCE WITH THE USERS MANUAL IM 01C25.

• Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 4. Maintenance and Repair

• The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Explosionproof Approval.

c. FM Intrinsically Safe Type/FM Explosionproof Type

Model EJX Series pressure transmitters with optional code /FU1 or /V1U can be selected the type of protection (FM Intrinsically Safe or FM Explosionproof) for use in hazardous locations.

- Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.
- Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

2.9.2 CSA Certification

a. CSA Intrinsically Safe Type

Caution for CSA Intrinsically safe and nonincendive type. (Following contents refer to "DOC No. ICS013-A13")

Note 1. Model EJX Series differential, gauge, and absolute pressure transmitters with optional code /CS1 are applicable for use in hazardous locations

Certificate: 1606623

[For CSA C22.2]

- Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.1010.1
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1
- Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups E, F & G, Class III, Division 1

- Enclosure: Type 4X,
- Temp. Code: T4
- Amb. Temp.:–50 to 60°C
- Process Temperature: 120°C max.
- [For CSA E60079]
- Applicable Standard: CAN/CSA E60079-0, CAN/CSA E60079-11, CAN/CSA E60079-15, IEC 60529:2001-02
- Ex ia IIC T4, Ex nL IIC T4
- Ambient Temperature :-50 to 60°C
- Max. Process Temp.: 120°C
- Enclosure: IP66 and IP67

Note 2. Entity Parameters

- Intrinsically safe ratings are as follows: Maximum Input Voltage (Vmax/Ui) = 30 V Maximum Input Current (Imax/Ii) = 200 mA Maximum Input Power (Pmax/Pi) = 0.9 W Maximum Internal Capacitance (Ci) = 10 nF Maximum Internal Inductance (Li) = 0 µH
- Type "n" or Nonincendive ratings are as follows: Maximum Input Voltage (Vmax/Ui) = 30 V Maximum Internal Capacitance (Ci) = 10 nF Maximum Internal Inductance (Li) = 0 μH
- Installation Requirements

 $Uo \le Ui$, $Io \le Ii$, $Po \le Pi$,

- $Co \ge Ci + Ccable$, $Lo \ge Li + Lcable$
- $Voc \le Vmax$, $Isc \le Imax$,
- $Ca \ge Ci + Ccable, La \ge Li + Lcable$
- Uo, Io, Po, Co, Lo, Voc, Isc, Ca and La are parameters of barrier.

Note 3. Installation

- In any safety barreir used output current must be limited by a resistor 'R' such that Io=Uo/R or Isc=Voc/R.
- The safety barrier must be CSA certified.
- Input voltage of the safety barrier must be less than 250 Vrms/Vdc.
- Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- Dust-tight conduit seal must be used when installed in Class II and III environments.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and Yokogawa Corporation of America is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.

2-5



b. CSA Explosionproof Type

Caution for CSA explosionproof type.

- Note 1. Model EJX series pressure transmitters with optional code /CF1 are applicable for use in hazardous locations:
 - Certificate: 2014354
 - Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.0.5, C22.2 No.25, C22.2 No.30, C22.2 No.94, C22.2 No.61010.1-01, C22.2 No.60079-0, C22.2 No.60079-1
 - Explosion-proof for Class I, Groups B, C and D.
 - Dustignition-proof for Class II/III, Groups E, F and G.
 - Enclosure: TYPE 4X
 - Temperature Code: T6...T4
 - Ex d IIC T6...T4
 - Enclosure: IP66 and IP67
 - Maximum Process Temperature: 120°C (T4), 100°C (T5), 85°C (T6)
 - Ambient Temperature: -50 to 75°C (T4), -50 to 80°C (T5), -50 to 75°C (T6)
 - Supply Voltage: 42 V dc max.
 - Output Signal: 4 to 20 mA dc

Note 2. Wiring

- All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
- In hazardous location, wiring shall be in conduit as shown in the figure.

• WARNING:

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

• WARNING: WHEN INSTALLED IN CL.I, DIV 2, SEAL NOT REQUIRED.

UNE FOIS INSTALLÉ DANS CL I, DIV 2, AUCUN JOINT N'EST REQUIS.



- 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 conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is flameproof certified.)

Note 3. Operation

• WARNING:

AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.

APRÉS POWER-OFF, ATTENDRE 5 MINUTES AVANT D'OUVRIR.

- WARNING: WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES ≥ 90°C. QUAND LA TEMPÉRATURE AMBIANTE ≥ 65°C, UTILISEZ DES CÂBLES RÉSISTANTES Á LA CHALEUR ≥ 90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 4. Maintenance and Repair

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

c. CSA Intrinsically Safe Type/CSA Explosionproof Type

- Model EJX Series pressure transmitters with optional code /CU1 or /V1U can be selected the type of protection (CSA Intrinsically Safe or CSA Explosionproof) for use in hazardous locations.
- Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.
- Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

2.9.3 CENELEC ATEX (KEMA) Certification

1) Technical Data

a. CENELEC ATEX (KEMA) Intrinsically Safe Type

Caution for CENELEC ATEX (KEMA) Intrinsically safe type.

- Note 1. Model EJX series pressure transmitters with optional code /KS2 for potentially explosive atmospheres:
 - No. KEMA 03ATEX1544 X
 - Applicable Standard: EN 50014:1997, EN 50020:2002, EN 50284:1999, EN 50281-1-1:1998
 - Type of Protection and Marking code: EEx ia IIC T4
 - Group: II
 - Category: 1GD
 - Ambient Temperature for gas-proof: -50 to 60°C
 - Process Temperature (Tp.): 120°C max.
 - Maximum Surface Temperature for dust-proof: T85°C (Tamb.: -40 to 60°C, Tp.: 80°C) T100°C (Tamb.: -40 to 60°C, Tp.: 100°C) T120°C (Tamb.: -40 to 60°C, Tp.: 120°C)
 - Enclosure: IP66 and IP67

Note 2. Electrical Data

- In type of explosion protection intrinsic safety EEx ia IIC only for connection to a certified intrinsically safe circuit with following maximum values:
 - Ui = 30 V
 - Ii = 200 mA
 - Pi = 0.9 W
 - Effective internal capacitance; Ci = 10 nF
 - Effective internal inductance; Li = 0 mH
- Note 3. Installation
- All wiring shall comply with local installation requirements. (Refer to the installation diagram)

Note 4. Maintenance and Repair

• The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void KEMA Intrinsically safe Certification.

Note 5. Special Conditions for Safe Use

• In the case where the enclosure of the Pressure Transmitter is made of aluminium, if it is mounted in an area where the use of category 1 G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.





*1: In any safety barriers used the output current must be limited by a resistor "R" such that Imaxout-Uz/R.

• CENELEC ATEX Type of Protection "Dust"

- Type of Protection and Marking Code: II 1D
- Maximum Surface Temperature: T80°C (Tamb.: -40 to 40°C, Tp.: 80°C) T100°C (Tamb.: -40 to 60°C, Tp.: 100°C) T120°C (Tamb.: -40 to 80°C, Tp.: 120°C)

To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

b. CENELEC ATEX (KEMA) Flameproof Type

Caution for CENELEC ATEX (KEMA) flameproof type.

- Note 1. Model EJX series pressure transmitters with optional code /KF21 for potentially explosive atmospheres:
 - No. KEMA 07ATEX0109
 - Applicable Standard: EN 60079-0:2006, EN 60079-1:2004, EN 61241-0:2006, EN 61241-1:2004
 - Type of Protection and Marking Code: Ex d IIC T6...T4, Ex tD A21 IP6x T85, T100, T120
 - Group: II
 - Category: 2G, 2D
 - Enclosure: IP66 and IP67
 - Temperature Class for gas-poof : T6, T5, and T4
 - Ambient Temperature for gas-proof: -50 to 75°C (T6), -50 to 80°C (T5), and -50 to 75°C (T4)
 - Maximum Process Temperature (Tp.) for gas-proof: 85°C (T6), 100°C (T5), and 120°C (T4)
 - Maximum Surface Temperature for dust-proof: T85°C (Tamb.: -40 to 40°C, Tp.: 85°C) T100°C (Tamb.: -40 to 60°C, Tp.: 100°C) T120°C (Tamb.: -40 to 80°C, Tp.: 120°C)
- Note 2. Electrical Data
 - Supply voltage: 42 V dc max.
 - Output signal: 4 to 20 mA
- Note 3. Installation
 - All wiring shall comply with local installation requirement.
 - The cable entry devices shall be of a certified
- $flame proof type, suitable for the conditions of use. \\ Note 4. Operation$
 - Keep the "WARNING" label attached to the transmitter.
 - WARNING: AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP.≧65°C, USE HEAT-RESISTING CABLES≧90°C.
 - Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 5. Maintenance and Repair

• The instrument modification or part replacement by other than an authorized representative of Yokogawa Electric Corporation is prohibited and will void KEMA Flameproof Certification.

To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

c. CENELEC ATEX (KEMA) Intrinsically Safe Type/CENELEC ATEX (KEMA) Flameproof Type/CENELEC ATEX Type n

Model EJX series pressure transmitters with optional code /KU21 or /V1U can be selected the type of protection CENELEC ATEX (KEMA) Intrinsically Safe, Flameproof or CENELEC ATEX Type n for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this user's manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

• CENELEC ATEX Type of Protection "n"

- Applicable Standard: EN 60079-15
- Referential Standards: IEC60079-0, IEC 60079-11
- Type of Protection and Marking Code: Ex nL IIC T4
- Temperature Class: T4
- Enclosure: IP66 and IP67
- Process Temperature: 120°C max.
- Ambient Temperature: -50 to 60°C
- Note 1. Electrical Data
 - Ui = 30 V

```
Effective internal capacitance; Ci = 10 nF
```

Effective internal inductance; Li = 0 mH

Note 2. Installation

• All wiring shall comply with local installation requirements. (refer to the installation diagram)

Note 3. Maintenance and Repair

• The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Type of Protection "n".

[Installation Diagram]



Ratings of the Power Supply as follows; Maximum Voltage: 30 V

(2) Electrical Connection

A mark indicating the electrical connection type is stamped near the electrical connection port. These marks are as followed.



(3) Installation

- All wiring shall comply with local installation requirements and the local electrical code.
- There is no need for conduit seal in Division 1 and Division 2 hazardous locations because this product is sealed at the factory.

(4) Operation

- OPEN CIRCUIT BEFORE REMOVING COVER. INSTALL IN ACCORDANCE WITH THIS USER'S MANUAL
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

(5) Maintenance and Repair

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

(6) Name Plate

Name plate



• Tag plate for flameproof type





MODEL: Specified model code. STYLE: Style code SUFFIX: Specified suffix code. SUPPLY: Supply voltage. OUTPUT: Output signal. MWP: Maximum working pressure. CAL RNG: Specified calibration range. NO.: Serial number and year of production^{*1}. TOKYO 180-8750 JAPAN:

> The manufacturer name and the address^{*2}.

*1: The first ditital in the final three numbers of the serial number appearing after "NO." on the nameplate indicates the year of production. The following is an example of a serial number for a product that was produced in 2004:



*2: "180-8750" is a zip code which represents the following address.

2-9-32 Nakacho, Musashino-shi, Tokyo Japan

2.9.4 IECEx Certification

- Model EJX Series pressure transmitters with optional code /SU2 can be selected the type of protection (IECEx Intrinsically Safe/type n or flameproof) for use in hazardous locations.
- Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.
- Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

a. IECEx Intrinsically Safe Type / type n

- Caution for IECEx Intrinsically safe and type n.
- Note 1. Model EJX Series differential, gauge, and absolute pressure transmitters with optional code /SU2 are applicable for use in hazardous locations
 - No. IECEx CSA 05.0005
 - Applicable Standard: IEC 60079-0:2000, IEC 60079-11:1999, IEC 60079-15:2001
 - Ex ia IIC T4, Ex nL IIC T4
 - Ambient Temperature :-50 to 60°C
 - Max. Process Temp.: 120°C
 - Enclosure: IP66 and IP67
- Note 2. Entity Parameters
 - Intrinsically safe ratings are as follows: Maximum Input Voltage (Vmax/Ui) = 30 V Maximum Input Current (Imax/Ii) = 200 mA Maximum Input Power (Pmax/Pi) = 0.9 W Maximum Internal Capacitance (Ci) = 10 nF Maximum Internal Inductance (Li) = 0 µH
 - Type "n" ratings are as follows: Maximum Input Voltage (Vmax/Ui) = 30 V Maximum Internal Capacitance (Ci) = 10 nF Maximum Internal Inductance (Li) = 0 μH
 - Installation Requirements
 - $Uo \le Ui, Io \le Ii, Po \le Pi,$
 - $Co \ge Ci + Ccable$, $Lo \ge Li + Lcable$
 - $Voc \leq Vmax$, $Isc \leq Imax$,
 - $Ca \ge Ci + Ccable, La \ge Li + Lcable$
 - Uo, Io, Po, Co, Lo, Voc, Isc, Ca and La are parameters of barrier.
- Note 3. Installation
 - In any safety barreir used output current must be limited by a resistor 'R' such that Io=Uo/R.
 - The safety barrier must be IECEx certified.
 - Input voltage of the safety barrier must be less than 250 Vrms/Vdc.

• The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and will void IECEX Intrinsically safe and type n certification.



b. IECEx Flameproof Type

Caution for IECEx flameproof type.

- Note 1. Model EJXseries pressure transmitters with optional code /SF2 or /SU2 are applicable for use in hazardous locations:
 - No. IECEx CSA 07.0008
 - Applicable Standard: IEC60079-0:2004, IEC60079-1:2003
 - Flameproof for Zone 1, Ex d IIC T6...T4
 - Enclosure: IP66 and IP67
 - Maximum Process Temperature: 120°C (T4), 100°C (T5), 85°C (T6)
 - Ambient Temperature: -50 to 75°C (T4), -50 to 80°C (T5), -50 to 75°C (T6)
 - Supply Voltage: 42 V dc max.
 - Output Signal: 4 to 20 mA dc

Note 2. Wiring

- In hazardous 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.
- Note 3. Operation
- WARNING:

AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.

2. HANDLING CAUTIONS

- WARNING: WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES ≥ 90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.
- Note 4. Maintenance and Repair
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Certification.

2.10 EMC Conformity Standards

EN61326, AS/NZS CISPR11

To meet EMC regulations, Yokogawa recommends that customers run signal wiring through metal conduits or use shielded twisted-pair cabling when installing EJX series transmitters in a plant.

2.11 Pressure Equipment Directive (PED)

(1) General

- EJX series pressure transmitters are categorized as pressure accessories under the vessel section of directive 97/23/EC, which corresponds to Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).
- EJX110A-□MS, EJX110A-□HS, EJX110A-□VS, EJX130A, EJX440A, EJX510A-□D, and EJX530A-□D can be used above 200 bar and therefore considered as a part of a pressure retaining vessel where category III, Module H applies. These models with option code /PE3 conform to that category.

(2) Technical Data

- Models without /PE3 Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).
- Models with /PE3 Module : H Type of Equipment :Pressure Accessory - Vessel Type of fluid : Liquid and Gas Group of fluid : 1 and 2

Model	Capsule	PS	V(L)	PS·V	Category*2
	code	(bar)*1		(bar·L)	
F.IX110A	L	160	0.01	1.6	Article 3, Paragraph 3
Loxinon	M, H, V	250	0.01	2.5	(SEP)
EJX110A with code /PE3	M, H, V	250	0.01	2.5	Ш
EJX130A	М, Н	500	0.01	5.0	Article 3, Paragraph 3 (SEP)
EJX130A with code /PE3	М, Н	500	0.01	5.0	Ш
EJX310A	L, M, A, B	160	0.01	1.6	Article 3, Paragraph 3 (SEP)
EJX430A	H, A, B	160	0.01	1.6	Article 3, Paragraph 3 (SEP)
EJX440A	C, D	500	0.1	5.0	Article 3, Paragraph 3 (SEP)
EJX440A with code /PE3	C, D	500	0.1	5.0	III
EJX510A	A, B, C	100	0.1	10	Article 3, Paragraph 3
	D	700	0.1	70	(SEP)
EJX510A with code /PE3	D	700	0.1	70	111
EJX530A	A, B, C	100	0.1	10	Article 3, Paragraph 3
	D	700	0.1	70	(SEP)
EJX510A with code /PE3	D	700	0.1	70	III

*1: PS is maximum allowable pressure for vessel itself.
*2: Referred to Table 1 covered by ANNEX II of EC Directive on Pressure Equipment Directive 97/23/EC

T0202.EPS

(3) Operation

- The temperature and pressure of fluid should be maintained at levels that are consistent with normal operating conditions.
- The ambient temperature should be maintained at a level that is consistent with normal operating conditions.
- Please take care to prevent water hammer and the like from inducing excessive pressures in pipes and valves. If phenomena are likely, install a safety valve or take some other appropriate measure to prevent pressure from exceeding PS.
- Take appropriate measures at the device or system level to protect transmitters if they are to be operated near an external heat source.

2.12 Low Voltage Directive

Applicable standard : EN61010-1

(1) Pollution Degree 2

"Pollution degree" describes the degree to which a soild, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condenstaion must be expected.

(2) Installation Category I

"Overvoltage category(Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. " I " applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.

3. COMPONENT NAMES



F0301.EPS

Note 1: See subsection 9.2, "Model and Suffix Codes," for details. A process connector will not be applied for lower side of EJX430A. Note 2: Applicable for BRAIN/HART communication type. Set the switches as shown in the figure above to set the burn-out direction and write protection. The Burnout switch is set to the H side for delivery (unless option code /C1 or /C2 is specified in the order), and the hardware write protection switch is set to E side. The setting of the switches can be confirmed via communication. An external zero adjustment screw can only be disabled by communication. To disable the screw, set a parameter before activating the hardware write protect function. See each communication manual.

Figure 3.1 Component Names

Table 3.1 Display Symbol

Display Symbol	Meaning of Display Symbol		
\sim Display mode is 'square root'. (Display is not lit when 'linear' mode			
The output signal being zero-adjusted is increasing.			
The output signal being zero-adjusted is decreasing.			
0	Write protect function is enabled.		

T0301.EPS

4. INSTALLATION

4.1 Precautions

Before installing the transmitter, read the cautionary notes in section 2.4, "Selecting the Installation Location." For additional information on the ambient conditions allowed at the installation location, refer to subsection 9.1 "Standard Specifications."

- When welding piping during construction, take care not to allow welding currents to flow through the transmitter.
- Do not step on this instrument after installation.
- For the EJX430A and EJX440A, the atmo-
- spheric opening is located on the low pressure side cover flange. The opening must not face upward. See section 9.4, "Dimensions," for the location of the opening.

Figure 4.1 and 4.2 shows the mounting of the transmitter for horizontal piping and vertical piping with using the mounting bracket. The transmitters with the installation code -U (Univsersal flange) can be used for either type of mounting.

Vertical pipe mounting



Transmitter

mounting bolt

U-bolt

F0402.EPS

4.2 Mounting

- The transmitter is shipped with the process connection, according to the ordering specifications. To change the orientation of the process connections, refer to section 4.3.
- With differential pressure transmitters, the distance between the impulse piping connection ports is usually 54 mm (figure 4.1). By changing the orientation of the process connector, the dimension can be changed to 51 mm or 57 mm.
- The transmitter can be mounted on a nominal 50 mm (2-inch) pipe using the mounting bracket supplied, as shown in figure 4.2 and 4.3 The transmitter can be mounted on either a horizontal or a vertical pipe.
- When mounting the bracket on the transmitter, tighten the (four) bolts that hold the transmitter with a torque of approximately 39 N·m {4kgf·m}.







50 mm(2-inch) pipe

U-bolt nut

Mounting bracket

Vertical pipe mounting (Process connector downside)



Vertical pipe mounting (Process connector upside)



Figure 4.3 Transmitter Mounting (Vertical Impulse Piping Type)

4.3 Changing the Process Connection

The transmitter is shipped with the process connection specified at the time of ordering. To change the process connection, the drain (vent) plug must be repositioned.

To reposition a drain (vent) plug, use a wrench to slowly and gently unscrew it. Then, remove and remount it on the opposite side. Wrap sealing tape around the drain (vent) plug threads (*1 in the figure below), and apply a lubricant to the threads of the drain (vent) screw(s) (*2 below). To tighten the drain (vent) plugs, apply a torque of 34 to 39 N·m (3.5 to 4 kgf·m). Process connector bolts are to be tightened uniformly to a torque shown in table 4.1.

Table 4.1 Torque

Model	EJX110A, EJX120A,	EJX440A		
Model	EJX130A, EJX310A, EJX430A	C capsule	D capsule	
Torque(N·m) {kgf·m}	39 to 49 {4 to 5}		49 to 59 {5 to 6}	

T0401.EPS

Vertical impulse piping type Hor

Horizontal impulse piping type



Figure 4.4 Changing Process Connection

4.4 Swapping the High/Lowpressure Side Connection

IMPORTANT

This section is applicable only for EJX110A, EJX120A and EJX130A differential transmitters, and not applicable for gauge or absolute pressure transmitters.

4.4.1 Rotating Pressure-detector Section 180 $^{\circ}$

This procedure can be applied only to a transmitter with a vertical impulse piping type.

The procedure below can be used to turn the pressure detector assembly 180°. Perform this operation in a maintenance shop with the necessary tools laid out and ready for use, and then install the transmitter in the field after making the change.

- 1) Use an Allen wrench (JIS B4648, nominal 2.5 mm) to remove the two setscrews at the joint between the pressure-detector section and transmitter section.
- 2) Leaving the transmitter section in position, rotate the pressure-detector section 180°.
- 3) Tighten the two setscrews to fix the pressuredetector section and transmitter section together (at a torque of 1.5 N·m).

Reposition the process connector and drain (vent) plugs to the opposite side as described in subsection 4.3.



Figure 4.5 Before and After Modification

4.4.2 Using the Communicator

This method is applicable only to the Model EJX110A, EJX120A and EJX130A.

With a communicator, you can change which process connection is used as the high-pressure side without mechanically rotating the pressure-detector section 180 as described in subsection 4.4.1. To change, call parameter 'D15: H/L SWAP' for BRAIN Communication or 'H/L swap' for HART Communication and select REVERSE (right side: low pressure; left side: high pressure) or select NORMAL to change back to normal (right side: high pressure; left side: low pressure).



Figure 4.6 Input/Output Relationship



Since the H/L label plate on the capsule assembly will remain unchanged, use this function only when you cannot switch the impulse piping. If the 'H/L SWAP' parameter setting is changed, the input/output relationship is reversed as shown in figure 4.6; be sure this is understood by all. After reversing the setting, modify the H/L label plate to clearly indicate this change.

4.5 Rotating Transmitter Section

The transmitter section can be rotated approximately 360° (180° to either direction or 360° to one direction from the original position at shipment, depending on the configuration of the instrument.) It can be fixed at any angle within above range.

- 1) Remove the two setscrews that fasten the transmitter section and capsule assembly, using the Allen wrench.
- 2) Rotate the transmitter section slowly and stop it at designated position.
- 3) Tighten the two setscrews to a torque of $1.5 \text{ N} \cdot \text{m}$.

IMPORTANT

Do not rotate the transmitter section more than the above limit.





Figure 4.7 **Rotating Transmitter Section (Left Side High** Pressure Type)

4.6 Changing the Direction of Integral Indicator

IMPORTANT

Always turn OFF power, release pressure and remove a transmitter to non-hazardous area before disassembling and reassmbling an indicator.

An integral indicator can be installed in the following three directions. Follow the instructions in section 8.4 for removing and attaching the integral indicator.





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5. INSTALLING IMPULSE PIPING

5.1 Impulse Piping Installation Precautions

The impulse piping that connects the process outputs to the transmitter must convey the process pressure accurately. If, for example, gas collects in a liquidfilled impulse line, or the drain for a gas-filled impulse line becomes plugged, it will not convey the pressure accurately. Since this will cause errors in the measurement output, select the proper piping method for the process fluid (gas, liquid, or steam). Pay careful attention to the following points when routing the impulse piping and connecting the impulse piping to a transmitter.

5.1.1 Connecting Impulse Piping to a Transmitter

(1) Check the High and Low Pressure Connections on the Transmitter (Figure 5.1)

Symbols "H" and "L" have been placed on the capsule assembly to indicate high and low pressure side. With differential pressure transmitters, connect the high pressure side impulse line to the "H" side, and the low pressure side impulse line to the "L" side.

With gauge/absolute pressure transmitters, connect the impulse line to the 'H' side.

Differential Pressure Transmitter







Figure 5.1 "H" and "L" Symbols on a Capsule Assembly

(2) Changing the Process Connector Piping Connections (Figure 4.1) (for differential pressure transmitters)

The impulse piping connection distances can be changed between 51 mm, 54 mm and 57 mm by changing the orientation of the process connectors. This is convenient for aligning an impulse line with a process connectors.

(3) Tightening the Process Connector Mounting Bolts

After connecting an impulse line, tighten the process connector mounting bolts uniformly.

(4) Removing the Impulse Piping Connecting Port Dustproof Cap

The impulse piping connecting port on the transmitter is covered with a plastic cap to keep out dust. This cap must be removed before connecting the line. (Be careful not to damage the threads when removing this cap. Never insert a screwdriver or other tool between the cap and port threads to remove the cap.)

(5) Connecting the Transmitter and 3-Valve Manifold (for differential pressure transmitters)

A 3-valve manifold consists of two stop valves to block process pressure and an equalizing valve to equalize the pressures on the high and low pressure sides of the transmitter. Such a manifold makes it easier to disconnect the transmitter from the impulse piping, and is convenient when adjusting the transmitter zero point.

There are two 3-valve manifold types: the pipemounting type and the direct-mounting type; care should be taken with respect to the following points when connecting the manifold to the transmitter.

■ Pipe-Mounting Type 3-Valve Manifold (Figure 5.2)

- Screw nipples into the connection ports on the transmitter side of the 3-valve manifold, and into the impulse piping connecting ports on the process connectors. (To maintain proper sealing, wind sealing tape around the nipple threads.)
- Mount the 3-valve manifold on the 50 mm (2-inch) pipe by fastening a U-bolt to its mounting bracket. Tighten the U-bolt nuts only lightly at this time.

- 3) Install the pipe assemblies between the 3-valve manifold and the process connectors and lightly tighten the ball head lock nuts. (The ball-shaped ends of the pipes must be handled carefully, since they will not seal properly if the ball surface is scratched or otherwise damaged.)
- 4) Now tighten the nuts and bolts securely in the following sequence:

Process connector bolts \rightarrow transmitter-end ball head lock nuts \rightarrow 3-valve manifold ball head lock nuts \rightarrow 3-valve manifold mounting bracket U-bolt nuts



Figure 5.2 3-Valve Manifold (Pipe-Mounting Type)

■ Direct-Mounting Type 3-Valve Manifold (Figure 5.3)

- Mount the 3-valve manifold on the transmitter. (When mounting, use the two gaskets and the four bolts provided with the 3-valve manifold. Tighten the bolts evenly.)
- 2) Mount the process connectors and gaskets on the top of the 3-valve manifold (the side on which the impulse piping will be connected).



Figure 5.3 3-Valve Manifold (Direct-Mounting Type)



After completing the connection of the transmitter and 3-valve manifold, be sure to CLOSE the low pressure and high pressure stop valves, OPEN the equalizing valve, and leave the manifold with the equalizing valve OPEN. You must do this in order to avoid overloading the transmitter from either the high or the low pressure side when beginning operation. This instruction must also be followed as part of the startup procedure (chapter 7.)

5.1.2 Routing the Impulse Piping

(1) Process Pressure Tap Angles

If condensate, gas, sediment or other extraneous material in the process piping gets into the impulse piping, pressure measurement errors may result. To prevent such problems, the process pressure taps must be angled as shown in figure 5.4 according to the kind of fluid being measured.

- If the process fluid is a gas, the taps must be vertical or within 45° either side of vertical.
- If the process fluid is a liquid, the taps must be horizontal or below horizontal, but not more than 45° below horizontal.
- If the process fluid is steam or other condensing vapor, the taps must be horizontal or above horizontal, but not more than 45° above horizontal.



Figure 5.4 Process Pressure Tap Angle (For Horizontal Piping)

(2) Position of Process Pressure Taps and Transmitter

If condensate (or gas) accumulates in the impulse piping, it should be removed periodically by opening the drain (or vent) plugs. However, this will generate a transient disturbance in the pressure measurement, and therefore it is necessary to position the taps and route the impulse piping so that any extraneous liquid or gas generated in the leadlines returns naturally to the process piping.

- If the process fluid is a gas, then as a rule the transmitter must be located higher than the process pressure taps.
- If the process fluid is a liquid or steam, then as a rule the transmitter must be located lower than the process pressure taps.

(3) Impulse Piping Slope

The impulse piping must be routed with only an upward or downward slope. Even for horizontal routing, the impulse piping should have a slope of at least 1/10 to prevent condensate (or gases) from accumulating in the pipes.

(4) Temperature Difference Between Impulse Lines (for differential pressure transmitters)

If there is a temperature difference between the high and low impulse lines, the density difference of the fluids in the two lines will cause an error in the measurement pressure. When measuring flow, impulse lines must be routed together so that there is no temperature difference between them.

(5) Condensate Pots for Steam Flow Measurement (for differential pressure transmitters)

If the liquid in the impulse piping repeatedly condenses or vaporizes as a result of changes in the ambient or process temperature, this will cause a difference in the fluid head between the high pressure and low pressure sides. To prevent measurement errors due to these head differences, condensate pots are used when measuring steam flow. (6) Preventing Wind Speed Effects in Very Low Differential Pressure Measurement (for differential pressure transmitters)

IMPORTANT

When using a differential pressure transmitter to measure very low pressures (draft pressure), the low pressure connection port is left open to atmospheric pressure (the reference pressure). Any wind around the differential pressure transmitter will therefore cause errors in the measurement. To prevent this, it will be necessary either to enclose the transmitter in a box, or to connect an impulse line to the low pressure side and insert its end into a wind-excluding pot (cylindrical with a base plate).

(7) Preventing Freezing

If there is any risk that the process fluid in the impulse piping or transmitter could freeze, use a steam jacket or heater to maintain the temperature of the fluid.

After completing the connections, close the valves on the process pressure taps (main valves), the valves at the transmitter (stop valves), and the impulse piping drain valves, so that condensate, sediment, dust and other extraneous material cannot enter the impulse piping.

5.2 Impulse Piping Connection Examples

Figure 5.5 and 5.6 show examples of typical impulse piping connections. Before connecting the transmitter to the process, study the transmitter installation location, the process piping layout, and the characteristics of the process fluid (corrosiveness, toxicity, flammability, etc.), in order to make appropriate changes and additions to the connection configurations.

Note the following points when referring to these piping examples.

- The high pressure connecting port on the transmitter is shown on the right (as viewed from the front).
- The transmitter impulse piping connection is shown for a vertical impulse piping connection configuration in which the direction of connection is either upwards or downwards.
- If the impulse line is long, bracing or supports should be provided to prevent vibration.
- The impulse piping material used must be compatible with the process pressure, temperature, and other conditions.
- A variety of process pressure tap valves (main valves) are available according to the type of connection (flanged, screwed, welded), construction (globe, gate, or ball valve), temperature and pressure. Select the type of valve most appropriate for the application.



Figure 5.5 Impulse Piping Connection Examples for Differential Pressure Transmitters



Figure 5.6 Impulse Piping Connection Examples for Gauge/absolute Pressure Transmitters

6. WIRING

6.1 Wiring Precautions

- Lay wiring as far as possible from electrical noise sources such as large capacity transformers, motors, and power supplies.
- Remove the electrical connection dust cap before wiring.
- All threaded parts must be treated with waterproofing sealant. (A non-hardening silicone group sealant is recommended.)
- To prevent noise pickup, do not pass signal and power cables through the same ducts.
- Explosion-protected instruments must be wired in accordance with specific requirements (and, in certain countries, legal regulations) in order to preserve the effectiveness of their explosionprotected features.
- The terminal box cover is locked by an Allen head bolt (a shrouding bolt) on ATEX flameproof type transmitters. When the shrouding bolt is driven clockwise using an Allen wrench, it goes in. The cover lock can then be released and the cover can be opened by hand. See subsection 8.4 "Disassembly and Reassembly" for details.
- Plug and seal an unused conduit connection.

6.2 Selecting the Wiring Materials

- (a) Use stranded leadwires or cables which are the same as or better than 600 V grade PVC insulated wire (JIS C3307) or its equivalent.
- (b) Use shielded wires in areas that are susceptible to electrical noise.
- (c) In areas with higher or lower ambient temperatures, use appropriate wires or cables.
- (d) In environment where oils, solvents, corrosive gases or liquids may be present, use wires or cables that are resistant to such substances.
- (e) It is recommended that crimp-on solderless terminal lugs (for 4 mm screws) with insulating sleeves be used for leadwire ends.

6.3 Connections of External Wiring to Terminal Box

6.3.1 Power Supply Wiring Connection

Connect the power supply wiring to the SUPPLY + and – terminals. When /AL is specified, also refer to subsection 6.3.5.



Figure 6.1 Power Supply Wiring Connection

6.3.2 External Indicator Connection

Available only when /AL is not specified.

Connect wiring for external indicators to the CHECK + and – terminals.

(Note) Use a external indicator whose internal resistance is 10 Ω or less.





6.3.3 Communicator Connection

Connect the BT200 or HART275 HHT to the SUPPLY + and – terminals. (Use hooks.)



Figure 6.3 BT200 Connection

6.3.4 Check Meter Connection

Available only when /AL is not specified.

Connect the check meter to the CHECK + and – terminals. (Use hooks.)

- A 4 to 20 mA DC output signal from the CHECK + and terminals.
- (Note) Use a check meter whose internal resistance is 10 $\boldsymbol{\Omega}$ or less.



Figure 6.4 Check Meter Connection

6.3.5 Status Output Connection

When option code /AL is specified, connect the external wiring as shown in Figure 6.3.5.

To configure and activate the process alarm function and status output, it is necessary to set some parameters. Refer to each communication manual for procedures.



Figure 6.5 Status Output Connection

6.4 Wiring

6.4.1 Loop Configuration

Since the DPharp uses a two-wire transmission system, signal wiring is also used as power wiring.

DC power is required for the transmitter loop. The transmitter and distributor are connected as shown below.

For details of the power supply voltage and load resistance, see section 6.6; for communications line requirements, see section 9.1.

(1) General-use Type and Flameproof Type



Figure 6.6 Connection between Transmitter and Distributor

(2) Intrinsically Safe Type

With the intrinsically safe type, a safety barrier must be included in the loop.



Figure 6.7 Connection between Transmitter and Distributor

6.4.2 Wiring Installation

(1) General-use Type and Intrinsically Safe Type

With the cable wiring, use a metallic conduit or waterproof glands.

• Apply a non-hardening sealant to the terminal box connection port and to the threads on the flexible metal conduit for waterproofing.



Figure 6.8 Typical Wiring Using Flexible Metal Conduit

(2) Flameproof Type

Wire cables through a flameproof packing adapter, or use a flameproof metal conduit.

- Wiring cable through flameproof packing adapter.
- Apply a non-hardening sealant to the terminal box connection port and to the threads on the flameproof packing adapter for waterproofing.



Figure 6.9 Typical Cable Wiring Using Flameproof Packing Adapter

- Flameproof metal conduit wiring
- A seal fitting must be installed near the terminal box connection port for a sealed construction.
- Apply a non-hardening sealant to the threads of the terminal box connection port, flexible metal conduit and seal fitting for waterproofing.





6.5 Grounding

Grounding is always required for the proper operation of transmitters. Follow the domestic electrical requirements as regulated in each country. For a transmitter with a built-in lightning protector, grounding should satisfy ground resistance of 10Ω or less.

Ground terminals are located on the inside and outside of the terminal box. Either of these terminals may be used.





6.6 Power Supply Voltage and Load Resistance

When configuring the loop, make sure that the external load resistance is within the range in the figure below.

(Note) In case of an intrinsically safe transmitter, external load resistance includes safety barrier resistance.



Figure 6.12 Relationship between Power Supply Voltage and External Load Resistance

7. OPERATION

7.1 Preparation for Starting Operation

This section describes the operation procedure for the EJX110A and EJX120A as shown in figure 7.1a (vertical impulse piping type, high-pressure connection: right side) when measuring the liquid flow rate, and EJX430A, EJX440A and EJX310A as shown in figure 7.1b when measuring pressure.



Check that the process pressure tap valves, drain valves, and 3-valve manifold stop valves

on both the low pressure and high pressure sides are closed, and that the 3-valve manifold equalizing valve is opened.

(a) Follow the procedures below to introduce process pressure into the impulse piping and transmitter.

■ Differential Pressure Transmitters

- 1) Open the low pressure and high pressure tap valves to fill the impulse piping with process liquid.
- 2) Slowly open the high pressure stop valve to fill the transmitter pressure-detector section with process liquid.
- 3) Close the high pressure stop valve.
- 4) Gradually open the low pressure stop valve and completely fill the transmitter pressure-detector section with process liquid.
- 5) Close the low pressure stop valve.
- 6) Gradually open the high pressure stop valve. At this time, equal pressure is applied to the low and high pressure sides of the transmitter.
- Check that there are no liquid leaks in the impulse piping, 3-valve manifold, transmitter, or other components.

■ Gauge/Absolute Pressure Transmitters

- 1) Open the tap valve (main valve) to fill the impulse piping with process fluid.
- 2) Gradually open the stop valve to introduce process fluid into the transmitter pressure-detector section.
- 3) Confirm that there is no pressure leak in the impulse piping, transmitter, or other components.

Venting Gas from the Transmitter Pressuredetector Section

- Since the piping in the example of figure 7.1 is constructed to be self-venting, no venting operation is required. If it is not possible to make the piping selfventing, refer to subsection 7.5 for instructions. Leave the equalizing valve open even after venting gas.
- (b) Turn ON power and connect the communicator. Open the terminal box cover, and connect the communicator to the SUPPLY + and – terminals.
- (c) Using the communicator, confirm that the transmitter is operating properly. Check parameter values or change the setpoints as necessary. See IM 01C25T03-01E (BRAIN communication) or

IM 01C25T01-01E (HART communication) for communicator operation.

If the transmitter is equipped with an integral indicator, its indication can be used to confirm that the transmitter is operating properly.







Figure 7.1b Liquid Pressure Measurement

Confirming that Transmitter is Operating Properly

Using the BT200

- If the wiring system is faulty, 'communication error' appears on the display.
- If the transmitter is faulty, 'SELF CHECK ERROR' appears on the display.





(Faulty wiring)

(Faulty transmitter) F0702.EPS

Figure 7.2 BT200 Display

Using the integral indicator

- If the wiring system is faulty, the display stays blank.
- If the transmitter is faulty, an error code is displayed.



the integral indicator (Faulty transmitter)

Figure 7.3 Integral Indicator with Error Code



If any of the above errors are indicated on the display of the integral indicator or the communicator, refer to subsection 8.5.3 for the corrective action.

■ Verify and Change Transmitter Parameter Setting and Values

The parameters related to the following items are set at factory as specified in order.

- · Calibration range
- Integral indicator display
- Output mode
- Software damping (optional)

Other parameters like following are shipped with the default setting.

- Low-cut
- Process alarm setting
- Static pressure range
- · Signal characterizer
- Write protection

To confirm or change the values, see IM 01C25T01-01E or 01C25T03-01E.

7.2 Zero Point Adjustment

After completing preparations for operating the transmitter, adjust the zero point.

Zero point adjustment can be done by turning the transmitter's zero-adjustment screw or by using the communicator. This section describes the procedure for the zero-adjustment screw. For the communicator procedure, see the communication manual.

IMPORTANT

Do not turn off the power to the transmitter immediately after performing a zero point adjustment. Powering off within 30 seconds of performing this procedure will return the zero point to its previous setting.

NOTE

Before performing this adjustment, make sure that the external zero adjustment function has NOT been disabled by a parameter setting.

To check the output signal, use a digital multimeter, calibrator, or communicator.

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7.2.1 Adjusting Zero Point for Differential Pressure Transmitters

Before adjusting zero point, make sure that the equalizing valve is open.



Figure 7.4 External Zero Adjustment Screw

The zero-adjustment screw is located inside the cover. Use a slotted screwdriver to turn the zero-adjustment screw. Equalize the transmitter, then turn the screw clockwise to increase the output or counterclockwise to decrease the output. The zero point adjustment can be made with a resolution of 0.01% of the setting range. The degree of zero adjustments varies with the screw turning speed; turn the screw slowly to make a fine adjustment, quickly to make a rough adjustment.

When using differential pressure transmitters for level measurement and if you cannot obtain the lower range value from the actual measurement value of 0%, refer to subsection 7.2.2(2).

7.2.2 Adjusting Zero Point for Gauge/ Absolute Pressure Transmitters

When you can obtain the Low Range Value from the actual measured value of 0% (0 kPa, atmospheric pressure);

For pressure measurement using gauge pressure transmitters, follow the steps below before performing zero point adjustment.

- 1) Close the tap valve (main valve).
- 2) Loosen the fill plug so that the pressure applied to the transmitter is only the head of the seal liquid.
- 3) Adjust the zero point at this status.
- 4) After the adjustment, close the fill plug and then gradually open the tap valve.

Use a slotted screwdriver to turn the zero-adjustment screw. Turn the screw clockwise to increase the output or counterclockwise to decrease the output. The zero point adjustment can be made with a resolution of 0.01% of the setting range. Since the degree of the zero adjustment varies with the screw turning speed, turn the screw slowly to make a fine adjustment and quickly to make a rough adjustment.

(2) When you cannot obtain the Low Range Value from the actual measured value of 0%;

Adjust the transmitter output to the actual measured value obtained by a digital manometer or a glass gauge.

[Example]

The measuring range of 50 to 250 kPa; the actual measured value of 130 kPa.

Actual measured value=
$$\frac{130-50}{250-50}$$
 x 100=40.0% (=10.4mA)

Turn the screw to match the output signal to the actual measured value.

7.3 Starting Operation

After completing the zero point adjustment, follow the procedures below to start operation. Steps 1) and 2) are specific to the differential pressure transmitters.

- 1) Close the equalizing valve.
- Gradually open the low pressure stop valve. This places the transmitter in an operational condition.
- Confirm the operating status. If the output signal exhibits wide fluctuations (hunting) due to periodic variation in the process pressure, use the communicator to dampen the transmitter output signal. Confirm the hunting using a receiving instrument or the integral indicator, and set the optimum damping time constant.
- 4) After confirming the operating status, perform the following.

- Remove the communicator from the terminal box, and confirm that none of the terminal screws are loose.
- Close the terminal box cover and the amplifier cover. Screw each cover in tightly until it will not turn further.
- There are two covers that must be locked on the ATEX Flameproof type transmitters. An Allen head bolt (shrouding bolt) under the edge of each cover is used to lock the cover. When the shrouding bolt is driven counterclockwise with an Allen wrench, the bolt rotates upward and locks the cover. (See section 8.4.) After locking the covers, confirm that they are secure and cannot be opened by hand. Tighten the zero-adjustment cover mounting

Tighten the zero-adjustment cover mounting screw to secure the cover.
• Tighten the zero-adjustment cover mounting screw to secure the cover.

7.4 Shutting Down the Transmitter

Shut down the transmitter as follows.

Steps 2) and 3) are specific to the differential pressure transmitters.

- 1) Turn off the power.
- 2) Close the low pressure stop valve.
- 3) Open the equalizing valve.
- 4) Close the high pressure stop valve.
- 5) Close the high pressure and low pressure tap valves.

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- Whenever shutting down the transmitter for a long period, remove any process fluid that is in the transmitter pressure-detector section.
- The equalizing valve must be left OPEN.

7.5 Venting or Draining Transmitter Pressure-detector Section

Since this transmitter is designed to be self-draining and self-venting with vertical impulse piping connections, neither draining nor venting will be required if the impulse piping is configured appropriately for selfdraining or self-venting operation.

If condensate (or gas) collects in the transmitter pressure-detector section, the measured pressure may be in error. If it is not possible to configure the piping for self-draining (or self-venting) operation, you will need to loosen the drain (vent) screw on the transmitter to completely drain (vent) any stagnated liquid (gas.)

However, since draining condensate or bleeding off gas disturbs the pressure measurement, this should not be done when the loop is in operation.



Since the accumulated liquid (or gas) may be toxic or otherwise harmful, take appropriate care to avoid contact with the body, or inhalation of vapors.

7.5.1 Draining Condensate

- 1) Gradually open the drain screw or drain plug and drain the transmitter pressure-detector section. (See figure 7.5.)
- 2) When all accumulated liquid is completely removed, close the drain screw or drain plug.
- 3) Tighten the drain screw to a torque of 10 N·m, and the drain plug to a torque of 34 to 39 N·m.



When you loosen the drain screw or drain plug, the accumulated liquid will be expelled in the direction of the arrow.

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Figure 7.5 Draining the Transmitter

7.5.2 Venting Gas

- Gradually open the vent screw to vent gas from the transmitter pressure-detector section. (See figure 7.6.)
- 2) When the transmitter is completely vented, close the vent screw.
- 3) Tighten the vent screw to a torque of $10 \text{ N} \cdot \text{m}$.



When you loosen the vent screw, the gas escpes in the direction of the arrow.

Figure 7.6 Venting the Transmitter

IM 01C25B01-01E

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7.6 Setting the Range Using the Range-setting Switch

The range setting switch must not be used in the hazardous area.

When it is necessary to use the switch, operate it in a non-hazardous location.

When pressure is applied to the transmitter, the lowand high-limit values for the measurement range (LRV and URV) can be changed (re-ranged) using the rangesetting switch (push-button) located on the optional integral indicator plate and the external zero adjustment screw. This procedure does not require use of the communicator. However, changes in the scale range and engineering unit display settings for the integral indicator require use of the communicator.

Follow the procedure below to change the LRV and URV settings.

[Example]

Rerange LRV to 0 and URV to 3 MPa.

- Connect the transmitter and apparatus as shown in Figure 8.1 and warm it up for at least five minutes.
- 2) Press the range-setting push-button. The integral indicator then displays "LRV.SET."
- 3) Apply a pressure of 0 kPa (atmospheric pressure) to the transmitter. ^(Note 1)
- Turn the external zero-adjustment screw in the desired direction. The integral indicator displays the output signal in %. ^(Note 2)
- 5) Adjust the output signal to 0% (1 V DC) by rotating the external zero-adjustment screw. Doing so completes the LRV setting.
- 6) Press the range-setting push-button. The integral indicator then displays "URV.SET."
- 7) Apply a pressure of 3 MPa to the transmitter. (Note 1)
- Turn the external zero-adjustment screw in the desired direction. The integral indicator displays the output signal in %. (Note 2)
- Adjust the output signal to 100% (5 V DC) by rotating the external zero-adjustment screw. Doing so completes the URV setting.
- 10) Press the range-setting push-button. The transmitter then switches back to the normal operation mode with the measurement range of 0 to 3 MPa.

- Note 1: Wait until the pressure inside the pressure-detector section has stabilized before proceeding to the next step.
- Note 2: If the pressure applied to the transmitter exceeds the previous LRV (or URV), the integral indicator may display error number "AL.30" (In this case, the output signal percent and "AL.30" are displayed alternately every two seconds). Although "AL.30" is displayed, you may proceed to the next step. However, should any other error number be displayed, take the appropriate measure in reference to , "Errors and Countermeasures" in each communication manual.

- Do not turn off the power to the transmitter immediately after completion of the change in the LRV and/or URV setting(s). Note that powering off within thirty seconds after setting will cause a return to the previous settings.
- Changing LRV automatically changes URV to the following value.

URV = previous URV + (new LRV – previous LRV)

 If the range-setting push-button and external zero-adjustment screw are not touched during a range-change operation, the transmitter automatically switches back to the normal operation mode.



Figure 7.7 Range-setting Switch

8. MAINTENANCE

8.1 Overview

Since the accumulated process fluid may be toxic or otherwise harmful, take appropriate care to avoid contact with the body or inhalation of vapors when draining condensate or venting gas from the transmitter pressure-detector section and even after dismounting the instrument from the process line for maintenance.

Maintenance of the transmitter is easy due to its modular construction. This chapter describes the procedures for calibration, adjustment, and the disassembly and reassembly procedures required for component replacement.

Transmitters are precision instruments. Please carefully and thoroughly read the following sections for information on how to properly handle them while performing maintenance.

- As a rule, maintenance of this transmitter should be done in a shop that has all the necessary tools.
- The CPU assembly contains sensitive parts that can be damaged by static electricity. Take precautions such as using a grounded wrist strap when handling electronic parts or touching the board circuit patterns. Also be sure to place the removed CPU assembly into a bag with an antistatic coating.

8.2 Calibration Instruments Selection

Table 8.1 lists the instruments that can be used to calibrate a transmitter. When selecting an instrument, consider the required accuracy level. Exercise care when handling these instruments to ensure they maintain the specified accuracy.

8.3 Calibration

Use the procedure below to check instrument operation and accuracy during periodic maintenance or troubleshooting.

1) Connect the instruments as shown in figure 8.1 and warm up the instruments for at least five minutes.

- To adjust the transmitter for highest accuracy, make adjustments with the power supply voltage and load resistance including leadwire resistances set close to the conditions under which the transmitter is installed.
- If the measurement range 0% point is 0 kPa or shifted in the positive direction (suppressed zero), the reference pressure should be applied as shown in the figure.

If the measurement range 0% point is shifted in the negative direction (elevated zero), the reference pressure should be applied using a vacuum pump.

2) Apply reference pressures of 0%, 50%, and 100% of the measurement range to the transmitter. Calculate the errors (differences between digital voltmeter readings and reference pressures) as the pressure is increased from 0% to 100% and is decreased from 100% to 0%, and confirm that the errors are within the required accuracy.

Table 8.1 Instruments Required for Calibration

Name	Yokogawa-recommended Instrument	Remarks
Power supply	Model SDBT or SDBS distributor	4 to 20 mA DC signal
Load	Model 2792 standard resistor [250 Ω ±0.005%, 3 W]	
resistor	Load adjustment resistor [100 Ω ±1%, 1 W]	
Voltmeter	Model 2501 A digital multimeter Accuracy (10V DC range): ±(0.002% of rdg + 1 dgt)	
Digital manometer	Model MT220 precision digital manometer 1) For 10 kPa class Accuracy: $\pm (0.015\%$ of rdg + 0.015% of F.S.) for 0 to 10 kPa $\pm (0.2\%$ of rdg + 0.1% of F.S.) for -10 to 0 kPa 2) For 130 kPa class Accuracy: $\pm 0.02\%$ of rdg for 25 to 130 kPa ± 5 digits for 0 to 25 kPa $\pm (0.2\%$ of rdg + 0.1% of F.S.) for -80 to 0 kPa 3) For 700 kPa class Accuracy: $\pm (0.02\%$ of rdg + 3digits) for 100 to 700 kPa ± 5 digits for 0 to 100 kPa ± 5 digits for 0 to 100 kPa $\pm 10.2\%$ of rdg + 0.1% of F.S.) for 0 to 100 kPa $\pm 10.2\%$ of rdg + 0.1% of F.S.) for 0 to 100 kPa $\pm 10.2\%$ of rdg + 0.1% of F.S.) for 0 to 3000 kPa $\pm 10.2\%$ of rdg + 0.1% of F.S.) for 0 to 3000 kPa $\pm (0.2\%$ of rdg + 10 digits) for 0 to 3000 kPa $\pm (0.2\%$ of rdg + 0.1% of F.S.) for -80 to 0 kPa $\pm (0.2\%$ of rdg + 0.1% of F.S.) for 0 to 3000 kPa $\pm (0.2\%$ of rdg + 0.1% of F.S.) for 0 to 130 kPa abs	Select a manometer having a pressure range close to that of the transmitter.
Proceuro	Model 7674 pneumatic pressure standard for 200 kPa {2 kgf/cm ² }, 25 kPa {2500 mmH ₂ O} Accuracy: $\pm 0.05\%$ of F.S.	Requires air pressure supply.
generator	Dead weight gauge tester 25 kPa {2500mmH ₂ O} Accuracy: ±0.03% of setting	Select the one having a pressure range close to that of the transmitter.
Pressure source	Model 6919 pressure regulator (pressure pump) Pressure range: 0 to 133 kPa {1000 mmHg}	Prepare the vacuum pump for negative pressure ranges.

Note: The above table contains the instruments capable of performing calibration to the 0.2% level. Since special maintenance and management procedures involving traceability of each instrument to higher-level standards are required for calibration to the 0.1% or higher level, there may be difficulties in calibration to this level in the field. For calibration to the 0.1% level, contact Yokogawa representatives from which the instrument was purchased or the nearest Yokogawa office.



Figure 8.1 Instrument Connections (EJX110A)

8.4 Disassembly and Reassembly

This section describes procedures for disassembly and reassembly for maintenance and component replacement.

Always turn OFF power and shut off and release pressures before disassembly. Use proper tools for all operations. Table 8.2 shows the tools required.

Table 8.2 Tools for Disassembly	y and Reassembly
---------------------------------	------------------

ΤοοΙ	Quantity	Remarks
Phillips screwdriver	1	JIS B4633, No. 2
Slotted screwdriver	1	
Allen wrenches	3	JIS B4648 One each, nominal 3, 4 and 2.5 mm Allen wrenches
Wrench	1	Width across flats, 17 mm
Torque wrench	1	
Adjustable wrench	1	
Socket wrench	1	Width across flats, 16 mm
Socket driver	1	Width across flats, 5.5 mm
Tweezers	1	

Precautions for ATEX Flameproof Type Transmitters

- Flameproof type transmitters must be, as a rule, removed to a non-hazardous area for maintenance and be disassembled and reassembled to the original state.
- On the flameproof type transmitters the two covers are locked, each by an Allen head bolt (shrouding bolt). When a shrouding bolt is driven clockwise by an Allen wrench, it is going in and cover lock is released, and then the cover can be opened.

When a cover is closed it should be locked by a shrouding bolt without fail. Tighten the shrouding bolt to a torque of $0.7 \text{ N}\cdot\text{m}$.



Figure 8.2 Shrouding Bolts

8.4.1 Replacing the Integral Indicator

Cautions for Flameproof Type Transmitters

Users are prohibited by law from modifying the construction of a flameproof type transmitter. This would invalidate the agency approval for the use of the transmitter in a rated area. It follows that the user is prohibited from using a flameproof type transmitter with its integral indicator removed, or from adding an integral indicator to a transmitter. If such modification is absolutely required, contact Yokogawa.

This subsection describes the procedure for replacing an integral indicator. (See figure 8.3)

Removing the Integral Indicator

- 1) Remove the cover.
- 2) While supporting the integral indicator with one hand, loosen its two mounting screws.
- 3) Dismount the LCD board assembly from the CPU assembly.

When doing this, carefully pull the LCD board assembly straight forward so as not to damage the connector pins between it and the CPU assembly.

Attaching the Integral Indicator

- 1) Align both the LCD board assembly and CPU assembly connectors and engage them.
- 2) Insert and tighten the two mounting screws.
- 3) Replace the cover.



Figure 8.3 Removing and Attaching LCD Board Assembly and CPU Assembly

8.4.2 Replacing the CPU Board Assembly

This subsection describes the procedure for replacing the CPU assembly. (See figure 8.3)

Removing the CPU Assembly

- 1) Remove the cover. If an integral indicator is mounted, refer to subsection 8.4.1 and remove the indicator.
- Turn the zero-adjustment screw to the position (where the screw head slot is horizontal) as shown in figure 8.3.
- Disconnect the output terminal cable (cable with brown connector at the end). When doing this, lightly press the side of the CPU assembly connector and pull the cable connector to disengage.
- 4) Use a socket driver (width across flats, 5.5mm) to loosen the two bosses.
- 5) Carefully pull the CPU assembly straight forward to remove it.
- 6) Disconnect the flat cable (cable with white connector at the end) that connects the CPU assembly and the capsule.

NOTE

Be careful not to apply excessive force to the CPU assembly when removing it.

Mounting the CPU Assembly

- 1) Connect the flat cable (with white connector) between the CPU assembly and the capsule.
- 2) Connect the output terminal cable (with brown connector).



Make certain that the cables do not get pinched between the case and the edge of the CPU assembly.

- Align and engage the zero-adjustment screw pin with the groove on the bracket on the CPU assembly. Then insert the CPU board assembly straight onto the post in the amplifier case.
- Tighten the two bosses. If the transmitter is equipped with an integral indicator, refer to subsection 8.4.1 to mount the indicator.



Confirm that the zero-adjustment screw pin is placed properly in the groove on the bracket prior to tightening the two bosses. If it is not, the zero-adjustment mechanism will be damaged.

5) Replace the cover.

8.4.3 Cleaning and Replacing the Capsule Assembly

This subsection describes the procedures for cleaning and replacing the capsule assembly. (See figure 8.4.)

Cautions for Flameproof Type Transmitters

Users are prohibited by law from modifying the construction of a flameproof type transmitter. If you wish to replace the capsule assembly with one of a different measurement range, contact Yokogawa.

The user is permitted, however, to replace a capsule assembly with another of the same measurement range. When doing so, be sure to observe the following.

- The replacement capsule assembly must have the same part number as the one being replaced.
- The section connecting the transmitter and capsule assembly is a critical element in preservation of flameproof performance, and must be checked to verify that it is free of dents, scratches, and other defects.
- After completing maintenance, be sure to securely tighten the setscrews that fasten the transmitter section and pressure-detector section together.

Removing the Capsule Assembly

IMPORTANT

Exercise care as follows when cleaning the capsule assembly.

- Handle the capsule assembly with care, and be especially careful not to damage or distort the diaphragms that contact the process fluid.
- Do not use a chlorinated or acidic solution for cleaning.
- Rinse thoroughly with clean water after cleaning.
- 1) Remove the CPU assembly as shown in subsection 8.4.2.
- 2) Remove the two setscrews that connect the transmitter section and pressure-detector section.
- 3) Remove the hexagon-head screw and the stopper.
- 4) Separate the transmitter section and pressuredetector section.
- 5) Remove the nuts from the four flange bolts.
- 6) While supporting the capsule assembly with one hand, remove the cover flange.
- 7) Remove the capsule assembly.
- 8) Clean the capsule assembly or replace with a new one.

Reassembling the Capsule Assembly

- Insert the capsule assembly between the flange bolts, paying close attention to the relative positions of the H (high pressure side) and L (low pressure side) marks on the capsule assembly.
- Replace the two capsule gaskets with new gaskets. 2) Install the cover flange on the high pressure side,
- and use a torque wrench to tighten the four nuts uniformly to a torque shown below.

	EJX110A, EJX	EJX120A	
Model	Wetted parts		
	S	H,M,T,A,D,B	
Torque(N·m) {kgf·m}	17 {1.7}	40 {4.1}	40 {4.1}

	EJX130A		EJX440A		
Model	Bolts & nuts material code				
	G, C	J	G, C	J	
Torque(N·m) {kgf·m}	90 {9.2}	110 {11.2}	70 {7.1}	100 {10.2}	
				T0803.EPS	

- 3) After the pressure-detector section has been reassembled, a leak test must be performed to verify that there are no pressure leaks.
- 4) Reattach the transmitter section to the pressuredetector section.

Reattach the stopper with the hexagon-head screw.

- 5) Tighten the two setscrews. (Tighten the screws to a torque of 1.5 N·m)
- 6) Install the CPU assembly according to subsection 8.4.2.
- 7) After completing reassembly, adjust the zero point and recheck the parameters.



Figure 8.4 Removing and Mounting the Pressuredetector Section

IMPORTANT

If you remove the drain/vent plugs when disassembling EJX130A and EJX440A transmitters, install the plugs again before reassembling the cover flanges with the capsule assmbly.

8.4.4 Replacing the Process Connector Gaskets

This subsection describes process connector gasket replacement. (See figure 8.5.)

- (a) Loosen the two bolts, and remove the process connectors.
- (b)Replace the process connector gaskets.
- (c) Remount the process connectors. Tighten the bolts securely and uniformly to a torque shown below, and verify that there are no pressure leaks.



Figure 8.5 Removing and Mounting the Process Connector

8.5 Troubleshooting

If any abnormality appears in the measured values, use the troubleshooting flow chart below to isolate and remedy the problem. Since some problems have complex causes, these flow charts may not identify all. If you have difficulty isolating or correcting a problem, contact Yokogawa service personnel.

8.5.1 Basic Troubleshooting

First determine whether the process variable is actually abnormal or a problem exists in the measurement system.

If the problem is in the measurement system, isolate the problem and decide what corrective action to take.

This transmitter is equipped with a self-diagnostic function which will be useful in troubleshooting, and the transmitter equipped with an integral indicator will show an alarm code as a result of self-diagnosis. See subsection 8.5.3 for the list of alarms. See also each communication manual.



Figure 8.5.1 Basic Flow and Self-Diagnostics



IM 01C25B01-01E

8. MAINTENANCE



8.5.3 Alarms and Countermeasures

Table 8.1 Alarm Message Summary

Indicator	Cause	Output Operation during Error	Countermeasure
None			
AL. 01 CAP. ERR	Sensor problem.	Outputs the signal (Hold, High, or Low) set with parameter.	Replace capsule when error keeps appearing even after restart.
	Capsule temperature sensor problem.		
	Capsule EEPROM problem.		
AL. 02	Amplifier temperature sensor problem.	Outputs the signal (Hold,	Replace amplifier.
AMP. ERR	Amplifier EEPROM problem.	High, or Low) set with	
	Amplifier problem.	parameter.	
AL. 10 PRESS	Input is outside measurement range limit of capsule.	Outputs high range limit value or low range limit value.	Check input or replace capsule when necessary.
AL. 11 ST. PRSS	Static pressure exceeds limit.	Continues to operate and output.	-
AL. 12 CAP. TMP	Capsule temperature is outside range (–50 to 130°C).		Use heat insulation or make lagging to keep
AL. 13 AMP. TMP	Amplifier temperature is outside range (-50 to 95°C).		temperature within range.
AL. 30 RANGE	Output is outside upper or lower range limit value.	Outputs high range limit value or low range limit value.	Check input and range setting, and change
AL. 31 SP. RNG	Static pressure exceeds specified range.	Holds output immediately before error occurred.	them as needed.
AL. 35 ^{*1} P. HI	Input pressure exceeds specified threshold.	Continues to operate and output.	Check input.
AL. 36 ^{*1} P. LO			
AL. 37 ^{*1} SP. HI	Input static pressure exceeds specified threshold.		
AL. 38 ^{*1} SP. LO			
AL. 39 ^{*1} TMP. HI	Detected temperature exceeds specified threshold.		
AL. 40 ^{*1} TMP. LO			
AL. 50 P. LRV	Specified value is outside of setting range.	Holds output immediately before error occurred.	Check setting and change them as needed.
AL. 51 P. URV			
AL. 52 P. SPN			
AL. 53 P. ADJ		Continues to operate and output.	Check input.
AL. 54 SP. RNG		Continues to operate and output holding static pressure in %.	Check setting and change them as needed.
AL. 55 SP. ADJ		Continues to operate and output.	Check input.
AL. 60 SC. CFG	Specified values or settings to define signal characterizer function do not satisfy the condition.		Check setting and change them as needed.
AL. 79 OV. DISP	Displayed value exceeds limit.		

*1: These alarms may appear only when process alarm function is activated.

T0804.EPS

9.1 Standard Specifications

Refer to IM 01C25T02-01E for FOUNDATION Fieldbus communication type marked with " \diamond ".

Performance Specifications

See General Specifications sheet of each model.

Functional Specifications

Span & Range Limits EJX110A

Mea Spa	surement an/Range	kPa	inH ₂ O(/D1)	mbar(/D3)	mmH ₂ O(/D4)
	Span	0.1 to 10	0.4 to 40	1 to 100	10 to 1000
L	Range	-10 to 10	-40 to 40	-100 to 100	-1000 to 1000
	Span	0.5 to 100	2 to 400	5 to 1000	50 to 10000
IVI	Range	-100 to 100	-400 to 400	-1000 to 1000	-10000 to 10000
	Span	2.5 to 500	10 to 2000	25 to 5000	0.025 to 5 kgf/cm ²
	Range	-500 to 500	-2000 to 2000	-5000 to 5000	-5 to 5 kgf/cm ²
V	Span	0.07 to 14 MPa	10 to 2000 psi	0.7 to 140 bar	0.7 to140 kgf/cm ²
v	Range	-0.5 to 14 MPa	-71 to 2000 psi	-5 to 140 bar	-5 to 140 kgf/cm ²
TQ90					

EJX120A

Me Sj	asurement ban/Range	kPa	inH ₂ O(/D1)	mbar(/D3)	mmH ₂ O(/D4)
	Span	0.025 to 1	0.1 to 4	0.25 to 10	2.5 to 100
-	Range	-1 to 1	-4 to 4	-10 to 10	-100 to 100
					70010 500

EJX130A

	Mea Spa	surement ın/Range	kPa	inH ₂ O(/D1)	mbar(/D3)	mmH ₂ O(/D4)
		Span	1 to 100	4 to 400	10 to 1000	100 to 10000
		Range	-100 to 100	-400 to 400	-1000 to 1000	-10000 to 10000
	ш	Span	5 to 500	20 to 2000	50 to 5000	0.05 to 5 kgf/cm ²
		Range	-500 to 500	-2000 to 2000	-5000 to 5000	-5 to 5 kgf/cm ²
						T0902.EPS

EJX310A

	Meas Spa	surement in/Range	kPa abs	psi abs (/D1)	mbar abs(/D3)	mmHg abs(/D4)
	I	Span	0.5 to 10	0.15 to 2.95 inHg	5 to 100	3.8 to 75
	-	Range	0 to 10	0 to 2.95 inHg	0 to 100	0 to 75
	м	Span	1.3 to 130	0.39 to 38 inHg	13 to 1300	9.8 to 970
		Range	0 to 130	0 to 38 inHg	0 to 1300	0 to 970
I	٨	Span	0.0175 to 3.5 MPa	2.5 to 500	0.175 to 35 bar	0.175 to 35 kgf/cm ²
		Range	0 to 3.5 MPa	0 to 500	0 to 35 bar	0 to 35 kgf/cm ²
	в	Span	0.08 to 16 MPa	12 to 2300	0.8 to 160 bar	0.8 to 160 kgf/cm ²
	D	Range	0 to 16 MPa	0 to 2300	0 to 160 bar	0 to 160 kgf/cm ²
ĺ	T0903.EI					

EJX430A

	Mea Spa	surement an/Range	MPa	psi (/D1)	bar(/D3)	kgf/cm ² (/D4)
		Span	2.5 to 500 kPa	10 to 2000 inH ₂ O	0.025 to 5	0.025 to 5
	н	Range	–100 to 500 kPa	- 400 to 2000 inH ₂ O	-1 to 5	-1 to 5
		Span	0.0175 to 3.5	2.5 to 500	0.175 to 35	0.175 to 35
	А	Range	-0.1 to 3.5	- 15 to 500	-1 to 35	-1 to 35
	Б	Span	0.08 to 16	12 to 2300	0.8 to 160	0.8 to 160
	В	Range	-0.1 to 16	-14.7 to 2300	-1 to 160	-1 to 160

EJX440A

Measurement Span/Range		surement in/Range	MPa	psi (/D1)	bar(/D3)	kgf/cm ² (/D4)
	6	Span	0.25 to 32	36 to 4500	2.5 to 320	2.5 to 320
		Range	-0.1 to 32	-14.5 to 4500	-1 to 320	-1 to 320
		Span	0.25 to 50	36 to 7200	2.5 to 500	2.5 to 500
		Range	-0.1 to 50	-14.5 to 7200	-1 to 500	-1 to 500
						TOOOS EDO

Output "�"

Two wire 4 to 20 mA DC output with digital communications, linear or square root programmable. BRAIN or HART FSK protocol are superimposed on the 4 to 20 mA signal.

Output range: 3.6 mA to 21.6 mA

Output limits conform to NAMUR NE43 can be pre-set by option C2 or C3.

Failure Alarm "O"

Output status at CPU failure and hardware error; Up-scale: 110%, 21.6 mA DC or more (standard) Down-scale: -5%, 3.2 mA DC or less Note: Applicable for Output signal code D and E

Damping Time Constant (1st order)

Amplifier damping time constant is adjustable from 0 to 100.00 seconds and added to response time.

Note: For BRAIN protocol type, when amplifier damping is set to less than 0.5 seconds, communication may occasionally be unavailable during the operation, especially while output changes dynamically. The default setting of damping ensures stable communication.

Update Period "�"

Differential Pressure: 45 msec Static Pressure: 360 msec

Zero Adjustment Limits

Zero can be fully elevated or suppressed, within the lower and upper range limits of the capsule.

External Zero Adjustment "�"

External Zero is continuously adjustable with 0.01% incremental resolution of span. Re-range can be done locally using the digital indicator with range-setting switch.

Integral Indicator (LCD display)

5-digit Numerical Display, 6-digit Unit Display and Bar graph.

The indicator is configurable to display one or up to four of the following variables periodically.;

Differential pressure in %, Scaled Differential pressure, Differential Pressure in Engineering unit, Static Pressure in Engineering unit.

See "Setting When Shipped" for factory setting.

Burst Pressure Limits

[EJX110A, EJX310A, EJX430A] 69 MPa (10000 psi) 132 MPa (19100 psi) [EJX130A, EJX440A]

NORMAL OPERATING CONDITION

(Optional features or approval codes may affect limits.)

Ambient Temperature Limits

-40 to 85°C (-40 to 185°F)

- -30 to 80°C (-22 to 176°F) with LCD display
- -25 to 80°C (-40 to 176°F) for EJX120A

Process Temperature Limits

- -40 to 120°C (-40 to 248°F)
- -25 to 80°C (-40 to 176°F) for EJX120A -40 to 100°C (-40 to 212°F) for EJX310A L capsule

Ambient Humidity Limits

0 to 100% RH

Working Pressure Limits (Silicone oil)

EJX120A -50 to 50 kPa

Maximum Pressure Limits

EJX110A

Capsule	Pressure
L	16 MPa (2300 psi)
M, H, V	25 MPa (3600 psi)*
* 16 MPa for v	vetted parts material code H, M, T, A,
D,and B,	

EJX130A

Capsule	Pressure
М, Н	32 MPa (4500 psi)

EJX310A

Capsule Pressure					
L	10 kPa abs (2.95 inHg abs)				
М	130 kPa abs (38 inHg abs)				
A	3.5 MPa abs (500 psia)				
В	16 MPa abs (2300 psia)				

EJX430A

Capsule	Pressure	
Н	500 kPa (2000 inH ₂ O)	
A	3.5 MPa (500 psi)	
В	16 MPa (2300 psi)	

EJX440A

Capsule	Pressure
С	32 MPa (4500 psi)
D	50 MPa (7200 psi)

Minimum Pressure Limit

See graph below

EJX110A, EJX130A, EJX430A, EJX440A



EJX310A



Figure 9.1 Working Pressure and Process Temperature

Maximum Over Pressure

EJX310A	
Capsule	Pressure
L, M	500 kPa abs (72 psia)
A	16 MPa abs (2300 psia)
В	25 MPa abs (3600 psia)
EJX430A	
Capsule	Pressure
H, A	16 MPa (2300 psi)
В	25 MPa (3600 psi)*
*24 MPa for	wetted parts material H, M, T, A, D, B.

EJX440A

Capsule	Pressure
С	48 MPa (6750 psi)
D	75 MPa (10800 psi)

Supply & Load Requirements "◇" (Optional features or approval codes may affect electrical requirements.)

With 24 V DC supply, up to a 550 Ω load can be used. See graph below.







Supply Voltage

- 10.5 to 42 V DC for general use and flameproof type.
- 10.5 to 32 V DC for lightning protector (Option code /A).
- 10.5 to 30 V DC for intrinsically safe, type n or non-

incendive type.

Minimum voltage limited at 16.6 V DC for digital communications, BRAIN and HART

Load (Output signal code D and E)

0 to 1290 Ω for operation

250 to 600 Ω for digital communication

Communication Requirements "�"

(Safety approvals may affect electrical requirements.)

BRAIN

Communication Distance

Up to 2 km (1.25 miles) when using CEV polyethyleneinsulated PVC-sheathed cables. Communication distance varies depending on type of cable used.

Load Capacitance

 $0.22\ \mu F$ or less

Load Inductance

3.3 mH or less

Input Impedance of communicating device $10 \text{ k}\Omega$ or more at 2.4 kHz.

HART

Communication Distance

Up to 1.5 km (1 mile) when using multiple twisted pair cables. Communication distance varies depending on type of cable used.

EMC Conformity Standards (€, CN200

EN 61326, AS/NZS CISPR11

□ PHYSICAL SPECIFICATIONS

Wetted Parts Materials

Diaphragm, Cover Flange, Process Connector, Capsule Gasket, and Vent/Drain Plug Refer to "MODEL AND SUFFIX CODE."

Process Connector Gasket/o-ring

[EJX110A, EJX120A, EJX430A, EJX310A] PTFE Teflon Fluorinated rubber for Option code /N2 and /N3 [EJX130A] Fluorinated rubber(O-ring) [EJX440A] Fluorinated rubber(O-ring) for C capsule Glass reinforced Teflon(gasket) for D capsule

Non-wetted Parts Materials

Bolting

ASTM-B7M carbon steel, 316 SST(ISO A4-70) stainless steel, or ASTM grade 660 stainless steel

Housing

Low copper cast aluminum alloy with polyurethane, mintgreen paint (Munsell 5.6BG 3.3/2.9 or its equivalent) or ASTM CF-8M stainless steel

Degrees of Protection

IP67, NEMA4X, JIS C0920

Cover O-rings

Buna-N

Name plate and tag

304 SST, 316SST (option)

Fill Fluid

Silicone, Fluorinated oil (option)

Weight

[Installation code 7, 8 and 9 and wetted parts material code S for EJX110A, EJX310A and EJX430A] 2.8 kg (6.2 lb) without integral indicator, mounting bracket, and process connector. [Installation code 7, 8 and 9 for EJX120A] 3.7 kg (8.2 lb) without integral indicator, mounting bracket, and process connector. [Installation code 7, 8 and 9 for EJX130A] 6.8 kg (14.3 lb) without integral indicator, mounting bracket, and process connector. [Installation code 7, 8 and 9 for EJX130A] 6.8 kg (14.3 lb) without integral indicator, mounting bracket, and process connector. [Installation code 7, 8 and 9 for EJX440A] 4.9 kg (10.8 lb) without integral indicator, mounting bracket, and process connector.

Add 1.5 kg(3.3lb) for amplifier housing code 2.

Connections

Refer to "MODEL AND SUFFIX CODE."

Process Connection of Cover Flange(models except for EJX440A- \Box D) : IEC61518

9.2 MODEL AND SUFFIX CODES

MODEL EJX110A

Model	Suffix Codes		es	Description			
EJX110A				Differential pressure transmitter			
Output signal	-D • • • • • • • • • • • • • • • • • • •				4 to 20 mA DC with digital communication (BRAIN protocol)		
	-E			4 to 20 mA DC with digital communication (HART protocol)			
	-F · · · · · · · · · · · · · · · · · · ·				Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)		
Measurement	L·	• • • •			0.1 to 10 kPa (0.4 to 40 inH ₂ O)		
span (capsule)	M۰	•••			0.5 to 100 kPa (2 to 400 inH ₂ O)		
	H ·	• • • •	• • • • • • •		2.5 to 500 kPa (10 to 2000 inH ₂ O)		
	V ·		• • • • • • •		0.07 to 14 MPa (10 to 2000 psi)		
Wetted parts]		• • • • • • • • •	Refer to Table "Wetted Parts Materials" below.		
material *1							
Process conne	ctions	Ο.	•••••		without process connector (Rc1/4 female on the cover flanges)		
		1.	•••••		with Rc1/4 female process connector		
		2 ·	•••••		with Rc1/2 female process connector		
		3.	• • • • • • • •	• • • • • • • • • •	with 1/4 NPT female process connector		
		4.	• • • • • • • •	• • • • • • • • • •	with 1/2 NPT female process connector		
	公	5.	• • • • • • • •	• • • • • • • • • •	without process connector (1/4 NPT female on the cover flanges)		
Bolts and nuts	materia	l v	J	• • • • • • • • • •	ASTM-B7M carbon steel		
		0	G • • • • • •		316 SST (ISO A4-70) stainless steel		
		0			ASTM grade 660 stainless steel		
Installation			-7 • • • •		Vertical piping, left side high pressure, and process connection downside		
			-8 • • • •		Horizontal piping and right side high pressure		
<u>ب</u> -9۰۰۰۰۰۰۰۰			Horizontal piping and left side high pressure				
-B · · · · · · ·			Bottom Process Connection, left side high pressure				
			-U · · · ·		Universal flange		
Amplifier housing		• • • • • • • • • •	Cast alluminum alloy				
2		•••••	ASTM CF-8M Stainless steel				
Electrical conne	ection		0		G1/2 female, one electrical connection without blind plugs		
			☆ 2・・		1/2 NPT female, two electrical connections without blind plugs		
			4 · ·		M20 female, two electrical connections without blind plugs		
	5		• • • • • • • • • •	G1/2 female, two electrical connections and a blind plug			
			7		1/2 NPT female, two electrical connections and a blind plug		
			9.	•••••	M20 temale, two electrical connections and a blind plug		
			A ·	•••••	G1/2 female, two electrical connections and a 316 SST blind plug		
			C ·	•••••	1/2 INP L ternale, two electrical connections and a 316 SST blind plug		
D		• • • • • • • • • • •	M20 female, two electrical connections and a 316 551 blind plug				
Integral indicate	or		[Digital indicator		
E		E • • • • • • • • •	Digital indicator with the range setting switch				
☆ N · · · · · ·		•••••	None				
Mounting bracket 🖄 B ·····		В	304 SST 2-inch pipe mounting, flat type (for horizontal piping)				
				D	304 SST 2-inch pipe mounting, L type (for vertical piping)		
G · · · · ·		G	304 SST 2-inch pipe mounting (for bottom process connection type)				
J		J	316 SST 2-inch pipe mounting, flat type (for horizontal piping)				
К		Κ	316 SST 2-inch pipe mounting, L type (for vertical piping)				
				M •••••	316 SST 2-inch pipe mounting (for bottom process connection type)		
N · · · · ·		Ν · · · · ·	None				
Optional Codes	6				/ Optional specification		
					T0906.EPS		

The "☆" marks indicate the most typical selection for each specification.

*1: Users must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process fluids.

Wetted parts material code	Cover flange and process connector	Capsule	Capsule gasket	Drain/Vent plug
s #	ASTM CF-8M	Hastelloy C-276 (Diaphragm) 316L SST (Others)	Teflon-coated 316L SST PTFE for EJX120A	316 SST
Н	ASTM CF-8M	Hastelloy C-276	PTFE (Teflon)	316 SST
М	ASTM CF-8M	Monel	PTFE (Teflon)	316 SST
Т	ASTM CF-8M	Tantalum	PTFE (Teflon)	316 SST
A	Hastelloy C-276 equivalent	Hastelloy C-276	PTFE (Teflon)	Hastelloy C-276
D	Hastelloy C-276 equivalent	Tantalum	PTFE (Teflon)	Hastelloy C-276
В	Monel equivalent	Monel	PTFE (Teflon)	Monel
•	*	*		T0907.EPS

Table. Wetted Parts Materials

The '#'marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

MODEL EJX120A

Model	Suffix Codes		Description		
EJX120A			Gauge pressure transmitter		
Output Signal	-D		4 to 20 mA DC with digital communication (BRAIN protocol)		
	-E		4 to 20 mA DC with digital communication (HART protocol)		
	-F • • • • • • • • •		Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)		
Measurement	E		0.025 to 1 kPa (0.1 to 4 inH ₂ O)		
span (capsule)					
Wetted parts	S		Refer to "Wetted Parts Material" Table on page 9-4.		
material*1					
Process conne	ctions 0····		without process connector (Rc1/4 female on the cover flanges)		
	1		with Rc1/4 female process connector		
	2 · · ·		with Rc1/2 female process connector		
	3		with 1/4 NPT female process connector		
	4		with 1/2 NPT female process connector		
	☆ 5		without process connector (1/4 NPT female on the cover flanges)		
Bolts and nuts	material J.	• • • • • • • • • • • • • • • •	ASTM-B7M carbon steel		
	G·		316SST(ISO A4-70) stainless steel		
	C.		ASTM grade 660 stainless steel		
Installation	';	3	Vertical piping, right side high pressure, and process connection down side		
		- 7	Vertical piping, left side high pressure, and process connection down side		
	-8	8	Horizontal piping and right side high pressure		
A -9		9	Horizontal piping and left side high pressure		
		- U	Universal flange		
Amplifier housing 1		1	Cast alluminum allov		
	19	2	ASTM CF-8M Stainless Steel		
Electrical conne	ection		G1/2 female, one electrical connection without blind plugs		
		☆ 2	1/2 NPT female, two electrical connections without blind plugs		
		4	M20 female, two electrical connections without blind plugs		
5		5	G1/2 female, two electrical connections and a blind plugs		
7		7	1/2 NPT female, two electrical connections and a blind plug		
		9	M2 Nor Frendle, two electrical connections and a blind plug		
		A	G1/2 female, two electrical connections and a 316 SST blind plug		
		<u>с</u>	1/2 NPT female, two electrical connections and a 316 SST blind plug		
D		D	M20 female, two electrical connections and a 216 SST blind plug		
Integral indicate			Digital indicator		
integral indicate	ונ	D	Digital indicator with the range estiting switch		
Mounting brook	at	X N			
		~ B ·····	304 SST 2-incn pipe mounting, flat type (for horizontal piping)		
		D	304 SST 2-incn pipe mounting, L type (for vertical piping)		
		G	304 551 2-incripipe mounting (for bottom process connection type)		
		J	310 SST 2-mon pipe mounting, flat type (for nonzontal piping)		
K · · · · ·		K · · · · ·	316 SST 2-inch pipe mounting, L type (for vertical piping)		
		N · · · · ·	NONE		
Optional Codes	6		/ Optional specification		
			T0917.EPS		

The " \precsim " marks indicate the most typical selection for each specification.

*1: Ulrs must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process fluids.

MODEL EJX130A

Model	Suffix Codes		Description		
EJX130A			Differential pressure transmitter		
Output signal	-D		4 to 20 mA DC with digital communication (BRAIN protocol)		
	-E • • • • • • • • • • • • •		4 to 20 mA DC with digital communication (HART protocol)		
	-F		Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)		
Measurement	M · · · · · · · · · · · · · · ·		1 to 100 kPa (4 to 400 inH ₂ O)		
span (capsule)	н		5 to 500 kPa (20 to 2000 inH ₂ O)		
Wetted parts	S · · · · · · ·		Refer to "Wetted Parts Material for EJX130A" Table below.		
material*1					
Process conne	ctions 3	•••••	with 1/4 NPT female process connector *2		
	4		with 1/2 NPT female process connector *2		
	☆ 5		without process connector (1/4 NPT female on the cover flanges)		
Bolts and nuts	material J · · · · ·		ASTM-B7M carbon steel		
	G		316 SST (ISO A4-70) stainless steel		
	c		ASTM grade 660 stainless steel		
Installation	-7 · · · ·		Vertical piping, left side high pressure, and process connection downside		
	-8 · · · ·		Horizontal piping and right side high pressure		
	☆ -9 ····		Horizontal piping and left side high pressure		
-U			Universal flange		
Amplifier housing1			Cast alluminum alloy		
2			ASTM CF-8M Stainless Steel		
Electrical conne	ection 0.		G1/2 female, one electrical connection without blind plugs		
	☆ 2・		1/2 NPT female, two electrical connections without blind plugs		
	4 -		M20 female, two electrical connections without blind plugs		
5			G1/2 female, two electrical connections and a blind plug		
7			1/2 NPT female, two electrical connections and a blind plug		
9			M20 female, two electrical connections and a blind plug		
	A		G1/2 female, two electrical connections and a 316 SST blind plug		
	C.		1/2 NPT female, two electrical connections and a 316 SST blind plug		
D			M20 female, two electrical connections and a 316 SST blind plug		
Integral indicator D		D · · · · · · · ·	Digital indicator		
-		E	Digital indicator with the range setting switch		
☆ N · · · · · ·		N · · · · · · · · ·	None		
Mounting bracket 🔅 B · · · · ·		а в	304 SST 2-inch pipe mounting, flat type (for horizontal piping)		
D · · · · ·		D	304 SST 2-inch pipe mounting, L type (for vertical piping)		
		J	316 SST 2-inch pipe mounting, flat type (for horizontal piping)		
κ		κ	316 SST 2-inch pipe mounting, L type (for vertical piping)		
N ·····			None		
Optional code			/ Optional specifications		

The "the most typical selection for each specification.

*1: Users must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process

fluids. Table. Wetted Parts Materials for EJX130A

Wetted parts material code	Cover flange	Process connector	Capsule	Capsule gasket	Drain/Vent plug
s #	316 SST	ASTM CF-8M *1	Hastelloy C-276 *2 (Diaphragm) 316L SST (Others)	Teflon-coated 316L SST	316 SST
					M02E.EPS

*1: Cast version of 316 SST. Equivalent to SCS14A.

*2: Hastelloy C-276 or ASTM N10276.

The '#' marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of

316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

MODEL EJX310A

Model	Suffix Codes		5	Description					
EJX310A	•••••			•••	• • • • • • • • •	Absolute pressure transmitter			
Output Signal	-D · · · · · · · · · · · · · · · · · · ·			•••		4 to 20 mA DC with digital communication (BRAIN protocol)			
	-E · · · · · · · · · · · · · · · · · · ·			4 to 20 mA DC with digital cor	mmunication (HART protocol)				
	-F			•••	• • • • • • • • •	Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)			
Measurement		L • • •	•••	••••	• • • •	• • • • • • • •	0.5 to 10 kPa abs	(0.15 to 2.95 inHg abs)	
span (capsule)		M··	••••	• • • • •	•••		1.3 to 130 kPa abs	(0.39 to 38 inHg abs)	
	1	Α · · ·		• • • •	•••		0.0175 to 3.5 MPa abs	(2.5 to 500 psia)	
		B · · ·	• • • •	••••	•••	• • • • • • • • •	0.08 to 16 MPa abs	(12 to 2300 psia)	
Wetted parts		S	•••	••••	• • • •	• • • • • • • • •	Refer to Table "Wetted Parts Materials" on page 9-4.		
material *1									
Process conne	ctior	ıs	0	••••	• • • •		without process connector (Re	c1/4 female on the cover flanges)	
			1	••••	• • • •		with Rc1/4 female process co	nnector	
			2 · ·	••••	• • • •	• • • • • • • • •	with Rc1/2 female process co	nnector	
			3	••••	• • • •	• • • • • • • • •	with 1/4 NPT female process	connector	
			4 · ·	••••	• • • •		with 1/2 NPT Ternale process	(4 NPT famale on the cover flanges)	
		~	3	••••	• • • •			4 NF T leffiale of the cover hanges)	
Bolts and nuts	mate	erial	J	• • • • •	•••	• • • • • • • •	ASIM-B/M carbon steel		
			G	••••	• • • •	••••	316 SST (ISO A4-70) stainles		
					••••	••••			
Installation				-3 · ·	••••	••••	Vertical piping, right side high	pressure, and process connection down side	
				-7 · ·	••••		Horizontal piping, left side high p	le bigh process connection down side	
			~	-9			Horizontal piping and left side		
			×	-B · ·			Bottom process connection.	left side high pressure	
				-U · ·			Universal flange		
Amplifier housi	ng			1.			Cast alluminum alloy		
	-			2 ·	•••		ASTM CF-8M stainless steel		
Electrical conn	ectio	n		0)		G1/2 female, one electrical co	onnection without blind plugs	
				☆ 2	<u>?</u>	• • • • • • • •	1/2 NPT female, two electrica	I connections without blind plugs	
				4	· · · -	• • • • • • • •	M20 female, two electrical cor	nnections without blind plugs	
5			G1/2 female, two electrical co	nnections and a blind plug					
					· · · ·	•••••	M20 female, two electrical cor	I connections and a blind plug	
				4	.		G1/2 female, two electrical co	innections and a 316 SST blind plug	
				Ċ			1/2 NPT female, two electrical connections and a 316 SST blind plug		
					j		M20 female, two electrical cor	nnections and a 316 SST blind plug	
Integral indicat	or				D		Digital indicator		
intograf indioat	01				E		Digital indicator with the range	e setting switch	
				☆	N		(None)	-	
Mounting brack	ket				☆	в	304 SST 2-inch pipe mountin	ng, flat type (for horizontal piping)	
D		304 SST 2-inch pipe mounting, L type (for vertical piping)							
G		304 SST 2-inch pipe mounting (for bottom process connction)							
						J • • • • •	316 SST 2-inch pipe mountin	ng, flat type (for horizontal piping)	
						κ	316 SST 2-inch pipe mountin	ng, L type (for vertical piping)	
M · · · · ·		316 SST 2-inch pipe mounting (for bottom process connction)							
N ·····		(None)							
Optional code							/ U Optional specification	T0909.EPS	

The " $\dot{\approx}$ " marks indicate the most typical selection for each specification.

*1: Users must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process fluids.

MODEL EJX430A

Model	Suffix Codes		des	Description			
EJX430A				Gauge pressure transmitter			
Output Signal	-D · ·				4 to 20 mA DC with digital communication (BRAIN protocol)		
	-Е			4 to 20 mA DC with digital communication (HART protocol)			
	-F			Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)			
Measurement	H				2.5 to 500 kPa (10 to 2000 inH ₂ O)		
span (capsule)	A				0.0175 to 3.5 MPa (2.5 to 500 psi)		
	В				0.08 to 16 MPa (12 to 2300 psi)		
Wetted parts	[_ •••			Refer to Table "Wetted Parts Materials" on page 9-4.		
material*1							
Process conne	ctions	0.			without process connector (Rc1/4 female on the cover flanges)		
		1.			with Rc1/4 female process connector		
		2 .			with Rc1/2 female process connector		
		3.			with 1/4 NPT female process connector		
		4.			with 1/2 NPT female process connector		
	☆	5.			without process connector (1/4 NPT female on the cover flanges)		
Bolts and nuts	materia	al J	••••	• • • • • • • • • •	ASTM-B7M carbon steel		
		0	.		316SST(ISO A4-70) stainless steel		
		0	;	••••	ASTM grade 660 stainless steel		
Installation		·	-3 · · · ·		Vertical piping, right side high pressure, and process connection down side		
			-7 • • • •		Vertical piping, left side high pressure, and process connection down side		
			-8 • • • •		Horizontal piping and right side high pressure		
		☆	-9		Horizontal piping and left side high pressure		
-В			Bottom Process Connection, left side high pressure				
			-U · · ·		Universal flange		
Amplifier housi	ng		1		Cast alluminum alloy		
			2 · · ·		ASTM CF-8M Stainless Steel		
Electrical conne	ection		0.		G1/2 female, one electrical connection without blind plugs		
			☆ 2・		1/2 NPT female, two electrical connections without blind plugs		
			4 .		M20 female, two electrical connections without blind plugs		
5			G1/2 female, two electrical connections and a blind plug				
7			1/2 NPT female, two electrical connections and a blind plug				
			9.		M20 female, two electrical connections and a blind plug		
			A ·		G1/2 female, two electrical connections and a 316 SST blind plug		
			C.		1/2 NPT female, two electrical connections and a 316 SST blind plug		
			D.		M20 female, two electrical connections and a 316 SST blind plug		
Integral indicate	or			D · · · · · · · ·	Digital indicator		
E		E · · · · · · · ·	Digital indicator with the range setting switch				
☆ N · · · · · ·		Ν · · · · · · · · ·	None				
Mounting brack	tet		z	☆ B · · · · ·	304 SST 2-inch pipe mounting, flat type (for horizontal piping)		
D		D	304 SST 2-inch pipe mounting, L type (for vertical piping)				
				G	304 SST 2-inch pipe mounting (for bottom process connection type)		
J		J	316 SST 2-inch pipe mounting, flat type (for horizontal piping)				
				κ	316 SST 2-inch pipe mounting, L type (for vertical piping)		
				м	316 SST 2-inch pipe mounting (for bottom process connection type)		
				N •••••	None		
Optional Codes	5				/ Optional specification		

The " $\overset{\wedge}{\Join}$ " marks indicate the most typical selection for each specification.

*1: Users must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process fluids.

*2: Lower limit of ambient and process temperature is -15°C.

T0910.EPS

MODEL EJX440A

EUX40A ··························· Absolute pressure transmitter Output Signal -D ····································	Model	Suffix Codes		des	Description		
Output Signal -B	EJX440A	•••••		• • • • • • • • • • • •	Absolute pressure transmitter		
+E 4 to 20 mA DC with digital communication (HART protocol) Measurement span (capsule) C Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E) Measurement span (capsule) D 0.25 to 50 MPa abs (36 to 4500 psi) Wetted parts material '1 S Refer to "Wetted Parts Material for EJX440A" Table below. Process connections * 3 with 1/4 NPT female process connector*2*3 Mithout process connector (1/4 NPT female on the cover flanges) S Bolts and nuts material J ASTM-B7M carbon steel C G 316 SST (ISO A4-70) stainless steel C ASTM grade 660 stainless steel Installation S	Output Signal	-D			4 to 20 mA DC with digital communication (BRAIN protocol)		
Image:		-E · · · · · · · · · · · · · · · · · · ·			4 to 20 mA DC with digital communication (HART protocol)		
Measurement span (capsule) C 0.25 to 32 MPa (36 to 4500 psi) Span (capsule) D 0.25 to 50 MPa abs (36 to 7200 psi) Wetted parts S Refer to "Wetted Parts Material for EJX440A" Table below. material '1 Process connections 3 with 1/4 NPT female process connector*2*3 ** S with 1/2 NPT female process connector*2*3 Bolts and nuts material J ASTM-B7M carbon stel G G 316 SST (ISO A4-70) stainless stel C		-F · · ·	• • • •	••••		Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01E)	
span (capsule) D D 0.25 to 50 MPa abs (36 to 7200 psi) Wetted parts material '1 S Refer to "Wetted Parts Material for EJX440A" Table below. Process connections with a span (capsule) S with 1/4 NPT female process connector* ²⁺³ with 1/2 NPT female process connector (1/4 NPT female on the cover flanges) Bolts and nuts material J ASTM-B7M carbon steel G Steeles G	Measurement	C · ·	•••			0.25 to 32 MPa (36 to 4500 psi)	
Wetted parts material '1 S Refer to "Wetted Parts Material for EJX440A" Table below. Process connections 3 with 1/4 NPT female process connector*2*3 ** 4 with 1/2 NPT female process connector*2*3 5 • with 1/2 NPT female process connector*2*3 5 • 316 SST (ISO A4-70) stainless steel C • ASTM-87M carbon steel G • • 1 • • ** • ASTM-87M carbon steel C • • ASTM 1/4 NPT female process connection down side • • • • 1 • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •	span (capsule)	D · ·	•••	• • • • • •	•••••	0.25 to 50 MPa abs (36 to 7200 psi)	
material '1 with 1/4 NPT female process connector'2*3 Process connections	Wetted parts	S	•••	• • • • • •		Refer to "Wetted Parts Material for EJX440A" Table below.	
Process connections 3 ••••••••••••••••••••••••••••••••••••	material *1						
** 4	Process conne	ctions	3.	• • • • • •	• • • • • • • • • • • •	with 1/4 NPT female process connector*2*3	
** 5 ········ without process connector (1/4 NPT female on the cover flanges) Bolts and nuts material J ······· ASTM-B7M carbon steel G ······ 316 SST (ISO A4-70) stainless steel 316 SST (ISO A4-70) stainless steel Installation -7 ······ ASTM grade 660 stainless steel Installation -7 ······ Vertical piping, right side high pressure, and process connection down side -8 ······ Horizontal piping and right side high pressure Horizontal piping and right side high pressure -9 ····· Universal flange ASTM CF-8M stainless steel Electrical connection 61/2 female, two electrical connections without blind plugs 4 ······ 01/2 INPT female, two electrical connections and a blind plug 5 ······ G1/2 female, two electrical connections and a blind plug 6 ······ G1/2 female, two electrical connections and a blind plug 9 ····· M20 female, two electrical connections and a blind plug 9 ····· M20 female, two electrical connections and a blind plug 9 ····· G1/2 female, two electrical connections and a blind plug 9 ····· G1/2 female, two electrical connections and a blind plug 9 ····· G1/2 female, two electrical connections and a 316 SST blind plug			4.			with 1/2 NPT female process connector*2*3	
Bolts and nuts material J ASTM-B7M carbon steel G 316 SST (ISO A4-70) stainless steel 316 SST (ISO A4-70) stainless steel Installation -3 Vertical piping, right side high pressure, and process connection down side -7 Vertical piping, left side high pressure, and process connection down side -8 Horizontal piping and right side high pressure -9 Universal flange 2 Cast alluminum alloy 2 Cast alluminum alloy 2 Cast alluminum alloy 2 1/2 IPT female, two electrical connections without blind plugs 4 M20 female, two electrical connections and a blind plug 5 G1/2 female, two electrical connections and a blind plug 7 G1/2 female, two electrical connections and a blind plug 8 G1/2 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a 316 SST blind plug 1 G1/2 female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 0 M20 female, two electrical connections and a 316 SST blind plug <t< td=""><td></td><td>☆</td><td>5.</td><td></td><td>• • • • • • • • • • • •</td><td>without process connector (1/4 NPT female on the cover flanges)</td></t<>		☆	5.		• • • • • • • • • • • •	without process connector (1/4 NPT female on the cover flanges)	
G 316 SST (ISO A4-70) stainless steel ASTM grade 660 stainless steel ASTM grade 660 stainless steel Installation -7 Vertical piping, right side high pressure, and process connection down side -7 Vertical piping, left side high pressure, and process connection down side -8 Horizontal piping and right side high pressure -9 Universal flange Amplifier housing 1 Cast alluminum alloy 2	Bolts and nuts	materia	I J	• • • • •		ASTM-B7M carbon steel	
Installation -3 Vertical piping, right side high pressure, and process connection down side -7 -7 Vertical piping, right side high pressure, and process connection down side -8 -9 Horizontal piping and right side high pressure -9 -10 Universal flange Amplifier housing 1 Cast alluminum alloy 2 -2 Cast alluminum alloy 3 -2 -2 Cast alluminum alloy 4 -2 -2 Cast alluminum alloy 4 -2 -2 -2 1/2 NPT female, two electrical connections without blind plug -2 0 -2 -2 -2			G			316 SST (ISO A4-70) stainless steel	
Installation -3			C	;	• • • • • • • • • • • •	ASTM grade 660 stainless steel	
-7 Vertical piping, left side high pressure, and process connection down side -8 Horizontal piping and right side high pressure -9 Horizontal piping and left side high pressure -0 Universal flange Amplifier housing 1 2 ASTM CF-8M stainless steel Electrical connection 61/2 female, one electrical connections without blind plugs 4 0 4 M20 female, two electrical connections without blind plugs 5 61/2 female, two electrical connections without blind plugs 5 61/2 female, two electrical connections and a blind plug 9 1/2 NPT female, two electrical connections and a blind plug 9 1/2 NPT female, two electrical connections and a blind plug 9 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 1/2 NPT female, two electrical connections and a 316SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 1/2 NPT femal	Installation			-3 · · ·		Vertical piping, right side high pressure, and process connection down side	
-8 Horizontal piping and right side high pressure -9 Horizontal piping and left side high pressure -9 Universal flange Amplifier housing 1 2 Cast alluminum alloy 2 G1/2 female, one electrical connection without blind plugs 2 G1/2 female, two electrical connections without blind plugs 4 M20 female, two electrical connections and a blind plug 5 G1/2 female, two electrical connections and a blind plug 7 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 G1/2 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a 316SST blind plug 1/2 NPT female, two electrical connections and a 316SST blind plug 0 G1/2 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug 0 Digital indicator Digital indicator Digital indicator Digital indicator with the range setting switch Nounting bracket X X B				-7 • • •		Vertical piping, left side high pressure, and process connection down side	
★ -9				-8 · · ·	••••	Horizontal piping and right side high pressure	
Amplifier housing 1 Cast alluminum alloy AsTM CF-8M stainless steel ASTM CF-8M stainless steel Electrical connection 0 G1/2 female, one electrical connection without blind plugs 4 1/2 NPT female, two electrical connections without blind plugs 5 G1/2 female, two electrical connections without blind plugs 9 G1/2 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug Integral indicator E Digital indicator with the range setting switch N N Mounting bracket M M SST 2-inch pipe mounting, flat type (for horizontal piping) J J SIG SST 2-inch pipe mounting, L type (for vertical piping) SIG SST 2-inch pipe mounting, L type (for vertical piping) <td></td> <td></td> <td>☆</td> <td>-9 · · ·</td> <td></td> <td>Horizontal piping and left side high pressure</td>			☆	-9 · · ·		Horizontal piping and left side high pressure	
Amplifier housing 1 Cast alluminum alloy 2 ASTM CF-8M stainless steel Electrical connection G1/2 female, one electrical connection without blind plugs 4 1/2 NPT female, two electrical connections without blind plugs 5 G1/2 female, two electrical connections without blind plugs 5 G1/2 female, two electrical connections and a blind plug 7 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a 316SST blind plug 0 1/2 NPT female, two electrical connections and a 316 SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug 0 M20 female, two electrical connections and a 316 SST blind plug 0 M20 female, two electrical connections and a 316 SST blind plug 0 M20 female, two electrical connections and a 316 SST blind plug 0 M20 female, two electrical connections and a 316 SST blind plug 0 N N <	-U · · · · · · ·		• • • • • • • • • • • • •	Universal flange			
Electrical connection ^A STM CF-8M stainless steel Electrical connection ^G 1/2 female, one electrical connections without blind plugs ^A	Amplifier housing		••••	Cast alluminum alloy			
Electrical connection G1/2 female, one electrical connection without blind plugs ** 2 1/2 NPT female, two electrical connections without blind plugs 5 G1/2 female, two electrical connections without blind plugs 7 G1/2 female, two electrical connections without blind plugs 9 G1/2 female, two electrical connections without blind plugs 9 G1/2 female, two electrical connections and a blind plug 9 G1/2 female, two electrical connections and a blind plug 9 G1/2 female, two electrical connections and a blind plug A G1/2 female, two electrical connections and a blind plug 0 G1/2 female, two electrical connections and a 316SST blind plug 1/2 NPT female, two electrical connections and a 316 SST blind plug C 1/2 NPT female, two electrical connections and a 316 SST blind plug D 1/2 NPT female, two electrical connections and a 316 SST blind plug D 1/2 NPT female, two electrical connections and a 316 SST blind plug D 1/2 NPT female, two electrical connections and a 316 SST blind plug D 1/2 NPT D D Note M20 female, two electrical connections and a 316 SST blind plug 0				2	•••••	ASTM CF-8M stainless steel	
** 2 1/2 NP1 female, two electrical connections without blind plugs 4 M20 female, two electrical connections without blind plugs 5 G1/2 female, two electrical connections and a blind plug 7 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug 0 G1/2 female, two electrical connections and a blind plug 0 G1/2 female, two electrical connections and a 316SST blind plug C 1/2 NPT female, two electrical connections and a 316 SST blind plug D M20 female, two electrical connections and a 316 SST blind plug D M20 female, two electrical connections and a 316 SST blind plug D M20 female, two electrical connections and a 316 SST blind plug D M20 female, two electrical connections and a 316 SST blind plug D M20 female, two electrical connections and a 316 SST blind plug D D Digital indicator E M20 female, two electrical connections and a 316 SST blind plug D 304 SST 2-inch pipe mounting, flat type (for horizontal piping)	Electrical connection			G1/2 female, one electrical connection without blind plugs			
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7 1/2 NPT female, two electrical connections and a blind plug 9 M20 female, two electrical connections and a blind plug A G1/2 female, two electrical connections and a blind plug C G1/2 female, two electrical connections and a 316SST blind plug C 1/2 NPT female, two electrical connections and a 316SST blind plug D M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug D Digital indicator ★ Digital indicator ★ B Mounting bracket ★ B 304 SST 2-inch pipe mounting, flat type (for horizontal piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) N (None)				5		G1/2 female, two electrical connections without blind plugs	
9 ······ M20 female, two electrical connections and a blind plug A ····· G1/2 female, two electrical connections and a 316SST blind plug C ······ 1/2 NPT female, two electrical connections and a 316SST blind plug D ······ M20 female, two electrical connections and a 316SST blind plug M20 female, two electrical connections and a 316SST blind plug D ······ M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug Mounting bracket B ······ Mounting bracket B ······ M04 SST 2-inch pipe mounting, flat type (for vertical piping)				7		1/2 NPT female, two electrical connections and a blind plug	
A ······ G1/2 female, two electrical connections and a 316SST blind plug C ····· 1/2 NPT female, two electrical connections and a 316 SST blind plug D ····· M20 female, two electrical connections and a 316 SST blind plug Integral indicator D ····· ☆ D ····· Mounting bracket A ····· ☆ B ····· J ····· 304 SST 2-inch pipe mounting, flat type (for horizontal piping) J ····· 316 SST 2-inch pipe mounting, flat type (for vertical piping) J ····· 316 SST 2-inch pipe mounting, flat type (for vertical piping) J ····· 316 SST 2-inch pipe mounting, flat type (for vertical piping) J ····· 316 SST 2-inch pipe mounting, L type (for vertical piping) J ····· 316 SST 2-inch pipe mounting, L type (for vertical piping) N ····· N ·····				9		M20 female, two electrical connections and a blind plug	
C 1/2 NPT female, two electrical connections and a 316 SST blind plug M20 female, two electrical connections and a 316 SST blind plug Integral indicator D ☆ D Mounting bracket B ☆ B J 304 SST 2-inch pipe mounting, flat type (for horizontal piping) J 304 SST 2-inch pipe mounting, flat type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) N 316 SST 2-inch pipe mounting, flat type (for vertical piping) N 316 SST 2-inch pipe mounting, L type (for vertical piping) N N N Mounting, L type (for vertical piping)				A		G1/2 female, two electrical connections and a 316SST blind plug	
D M20 female, two electrical connections and a 316 SST blind plug Integral indicator D Digital indicator E Digital indicator with the range setting switch N Mounting bracket M SOURCE SOURCE Mounting bracket M SOURCE SOURCE SOURCE Mounting bracket M SOURCE SOURCE SOURCE Mounting bracket M SOURCE SOURCE SOURCE SOURCE Mounting bracket M SOURCE		c			1/2 NPT female, two electrical connections and a 316 SST blind plug		
Integral indicator D: Digital indicator ☆ D: Digital indicator with the range setting switch (None) Mounting bracket ☆ B 304 SST 2-inch pipe mounting, flat type (for horizontal piping) D: 304 SST 2-inch pipe mounting, L type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for vertical piping) K 316 SST 2-inch pipe mounting, L type (for vertical piping) N (None)				D	•••••	M20 female, two electrical connections and a 316 SST blind plug	
E Digital indicator with the range setting switch (None) Mounting bracket B 304 SST 2-inch pipe mounting, flat type (for horizontal piping) D 304 SST 2-inch pipe mounting, L type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for horizontal piping) K 316 SST 2-inch pipe mounting, L type (for vertical piping) N N N (None)	Integral indicat	or			D · · · · · ·	Digital indicator	
Image: Market Image: Name (None) Mounting bracket Image: Barket 304 SST 2-inch pipe mounting, flat type (for horizontal piping) Image: Data structure Image: Data structure 304 SST 2-inch pipe mounting, L type (for vertical piping) Image: Jack structure Image: Jack structure 316 SST 2-inch pipe mounting, flat type (for horizontal piping) Image: Karbon structure Image: Structure Image: Structure Image: Karbon structure Image: Structure Image:	-				E • • • • • • • •	Digital indicator with the range setting switch	
Mounting bracket $\stackrel{\wedge}{}$ B				☆	Ν · · · · · · · ·	(None)	
D 304 SST 2-inch pipe mounting, L type (for vertical piping) J 316 SST 2-inch pipe mounting, flat type (for horizontal piping) K 316 SST 2-inch pipe mounting, L type (for vertical piping) N (None)	Mounting bracket 🔅 B · · · · ·		☆ B · · · · ·	304 SST 2-inch pipe mounting, flat type (for horizontal piping)			
J ····· 316 SST 2-inch pipe mounting, flat type (for horizontal piping) K ····· 316 SST 2-inch pipe mounting, L type (for vertical piping) N ····· (None)	D		D	304 SST 2-inch pipe mounting, L type (for vertical piping)			
K 316 SST 2-inch pipe mounting, L type (for vertical piping) N (None)	J				J	316 SST 2-inch pipe mounting, flat type (for horizontal piping)	
N · · · · · (None)	К ·····				К	316 SST 2-inch pipe mounting, L type (for vertical piping)	
	N ·····				N · · · ·	(None)	
Optional code / Optional specification	Optional code					/ Optional specification	

The "☆" marks indicate the most typical selection for each specification.

*1: Users must consider the characteristics of selected wetted parts material and influence of process fluids. Specifying inappropriate materials has the potential to cause serious damage to human body and plant facilities resulted from an unexpected leak of the corrosive process fluids.

*2: Lower limit of ambient and process temperature is -15°C for capsule code C.

*3: Specify the process connections code 3 or 4, when using the process connector for D capsule. Without the process connector, use the 1/4 NPT male piping to directly connect to the cover flange.

Table. Wetted Parts Materials for EJX440A

Wetted parts material code	Cover flange	Process connector	Capsule	Capsule gasket	Drain/Vent plug
s #	316 SST	ASTM CF-8M ¹ (C-capsule) 316L SST (D-capsule)	Hastelloy C-276 *2 (Diaphragm) 316L SST (Others)	Teflon-coated 316L SST	316 SST
					M03E.EPS

*1: Cast version of 316 SST. Equivalent to SCS14A.

*2: Hastelloy C-276 or ASTM N10276.

The '#' marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of

316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

9.3 OPTIONAL SPECIFICATIONS

Item	Description	Code
Factor (Mutual (FM))	FM Explosionproof Approval *1 Explosionproof for Class I, Division 1, Groups B, C and D Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G Hazardous (classified) locations, indoors and outdoors (NEMA 4X)	FF1
Factory Mutual (FM)	 FM Intrinsically safe Approval *1*3 Intrinsically Safe for Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E, F and G and Class III, Division 1 Hazardous Locations. Nonincendive for Class I, Division 2, Groups A, B, C and D, Class II, Division. 2, Groups F and G, and Class III, Division 1 Hazardous Locations. 	FS1
	Combined FF1 and FS1 *1*3	FU1
	CENELEC ATEX (KEMA) Flameproof Approval *1 II 2G Exd IIC T4, T5, T6	KF21
CENELEC ATEX	CENELEC ATEX (KEMA) Intrinsically safe Approval *1*3 II 1G EEx ia IIC T4	KS2
	Combined KF21, KS2 and Type n *1*3 Type n: II 3G Ex nL IIC T4	KU21
Canadian Standards Association (CSA)	CSA Explosionproof Approval *1 Explosionproof for Class I, Groups B, C and D Dustignitionproof for Class II/III, Groups E, F and G Enclosure TYPE 4X, Temp.Code:T6T4 Ex d IIC T6T4 Enclosure IP66 and IP67 Process Sealing Certification Dual Seal Certified by CSA to the requirement of ANSI/ISA 12.27.01 No additional sealing required Primary seal failure annuniciation: at the zero adjustment screw	CF1
	CSA Intrinsically safe Approval *1 *3 [For CSA C22.2] Intrinsically safe for Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E,F and G, Class III, Division 2, Groups A, B, C and D, Class II, Division 2, Groups E,F and G, Class III, Division 1 [For CSA E60079] Ex ia IIC T4, Ex nL IIC T4 Process Sealing Certification Dual Seal Certified by CSA to the requirement of ANSI/ISA 12.27.01 No additional sealing required Primary seal failure annuniciation: at the zero adjustment screw	CS1
	Combined CF1 and CS1 *1*3	CU1
IECEx Scheme	IECEx flameproof Approval *1 Flameproof for Zone1, Ex d IIC T6T4	SF2
	IECEx Intrinsically safe, type n and flameproof Approval *1*3 Intrinsically safe and type n Ex ia IIC T4, Ex nL IIC T4 Flameproof Flameproof for Zone1, Ex d IIC T6T4	SU2
Combined Approvals	Combination of /KU21, /FU1 and /CU1*1*3	V1U

Contact Yokogawa representative for the codes indicated as '-'. *1: Applicable for Electrical connection code 2, 4, 7, and 9.

*2: Applicable for Electrical connection code 2 and 7.

*3: Not applicable for option code /AL.

Item		Description					
Painting	Color change	Terminal cover only					
	Color change	Both sides of amplifier covers, Munsell 7.5 R4/14					
	Coating change	Anti-corrosion coating					
316 SST exterior parts		316 SST name plate, tag plate a	nd zero adjustmen	t screw		нс	
Lightning protector		Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.) Allowable current: Max. 6000 A ($1 \times 40 \ \mu s$), Repeating 1000 A ($1 \times 40 \ \mu s$) 100 times Applicable Standards: IEC 61000-4-4, IEC 61000-4-5					
Status output*6	3	Transistor output (sink type) Contact rating :10.5 to 30 VDC,	120 mA DC(max)	Low level	: 0 to 2 VDC	AL	
		Degrease cleansing treatment				K1	
Oil-prohibited ι	ISE ^{*1}	Degrease cleansing treatment an Operating temperature -20 to 8	nd with fluorinated 0°C(–4 to 176°F)	oilfilled ca	psule.	K2	
Oil-prohibited (Degrease cleansing treatment ar	nd dehydrating trea	atment		K5	
with dehydratin	ig treatment*1	Degrease cleansing treatment and dehydrating treatment with fluorinated oilfilled capsule. Operating temperature -20 to $80^{\circ}C(-4$ to $176^{\circ}F)$					
Capsule fill flui	d	Fluorinated oil filled in capsule					
		P calibration (psi unit)					
Calibration unit	s*2	bar calibration (bar unit) (See Table for Span and Bange Limits)					
		M calibration (kgf/cm ² unit)					
Long vent*3		Total length: 119 mm (standard: 34 mm); Total length when combining with Optional code K1, K2, K5, and K6: 130 mm. Material: 316SST.				U1	
130 Pa abs ca	libration*9	Minimum input puressure at calibration testing : 130 Pa abs (1 mmHg abs)					
		Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2mA DC or less.					
Output limits and failure ope	ration*4	NAMUR NE43 Compliant Output signal limits : 3.8 mA to	Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less.			C2	
		20.5 mA	Failure alarm up-scale : Output status at CPU failure and hardware error is -110% , 21.6 mA or more.				
		Without drain and vent plugs					
Body option*5		N1 and Process connection, based on IEC61518 with female thread on both sides of cover flange, with blind kidney flanges on back.					
		N2 and Material certificate for cover flange, diaphragm, capsule body, and blind kidney flange					
Stainless steel tag plate		304SST tag plate wired onto transmitter				N4	
Data configuration at factory ^{*6}		Data configuration for HART communication type Software damping, Descriptor, Mess		damping, Descriptor, Message	СА		
	and at fuotory	Data configuration for BRAIN communication type Software damping				СВ	
European Pressure Directive*7		PED 97/23/EC Category: III, Module: H, Type of Equipment; Pressure Accessory-Vessel, Type of Fluid; Liquid and gas, Group of Fluid: 1 and 2				PE3	

*1: Applicable for Wetted parts material code S, H, M and T.

*2: The unit of MWP (Max. working pressure) on the name plate of the housing is the same unit as specified by Option code D1, D3, and D4.

*3: Applicable for vertical impulse piping type (Installation code 7) and Wetted parts material code S, H, M and T.

*4: Applicable for output signal code D and E. The hardware error indicates faulty amplifier or capsule.

*5: Applicable for Wetted parts material code S, H, M and T; Process connection code 3, 4, and 5; Installation code 9; and Mounting bracket code N. Process connection faces on the other side of zero adjustment screw.

*6: Also see 'Ordering Instructions'.

*7: Applicable for M and H capsules of EJX110A with wetted parts material code S, and all the ranges of EJX130A and EJX440A.

*8: Not applicable for output signal code F.

*9: Applicable only for EJX310A M and A capsules whose upper range value is set as smaller than 53.3 kPa abs.

Item	Description				
Material certificate*1	Cover flange *2				
	Cover flange, Process connector *3				
	Test Pressure: 16 MPa(2300 psi)*4		T12		
Pressure test/	Test Pressure: 25 MPa(3600 psi)*5	Nitrogen(N ₂) Gas*11	T13		
Leak test certificate	Test Pressure: 3.5 MPa(500 psi)*6	Retention time: one minute	T01		
	Test Pressure: 500 kPa(2000 inH ₂ O)*7		T11		
	Test Pressure: 50 kPa(200 inH ₂ O) ^{*8}		T04		
	Test Pressure: 32 MPa(4500 psi)*9	Nitrogen(N ₂) Gas or water*12	T09		
	Test Pressure: 50 MPa(7200 psi)*10	Retention time: one minute	T08		
	•		T0914.EPS		

*1: Material traceability certification, per EN 10204 3.1B.

*2: Applicable for Process connections code 0 and 5.

*3: Applicable for Process connections code 1, 2, 3, and 4.

*4: Applicable for Capsule code L of EJX110A, Capsule code B of EJX430A and EJX310A, and all the capsules of EJX110A with wetted parts maerial code H, M, T, A, D, and B.

*5: Applicable for Capsule code M, H and V of EJX110A with wetted parts material code S.

*6: Applicable for Capsule code A of EJX430A and EJX310A.

*7: Applicable for Capsule code H of EJX430A.

*8: Applicable for EJX120A and Capsule code L and M of EJX310A.

*9: Applicable for EJX130A and Capsule code C of EJX440A.

*10: Applicable for Capsule code D of EJX440A.

*11: Pure nitrogen gas is used for oil-prohibited use (Option code K1, K2, K5, and K6).

*12: Pure nitrogen gas or pure water is used for oil-prohibited use (Option code K1, K2, K5, and K6).

9.4 **DIMENSIONS**

[Model EJX110A]



(i.e. High pressure side is on the right side.)

*2: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.

*3: When Option code K1, K2, K5, or K6 is selected, add 30 mm(1.18 inch) to the value in the figure.

F0905_1.EPS

Unit : mm (approx. inch)



• Vertical Impulse Piping Type (Installation code -7), Wetted parts material code : H, M, T, A, D, B

Horizontal Impulse Piping Type (Installation code -9), Wetted parts material code : H, M, T, A, D, B



*3: When Option code K1, K2, K5, OF TO 18 Series.
*4: 15 mm(0.59 inch) for right side high pressure.

F0905_2.EPS

(5.04)

• Bottom Process Connection (Installation code -B)

Unit: mm (approx. inch)



• Universal Flange (Installation code -U)



*1: When Option code K1, K2, K5, or K6 is selected, add 30 mm(1.18 inch) to the value.

F0907.EPS

[Model EJX120A]



F0908.EPS

• Universal Flange (Installation code -U)

Unit : mm (approx. inch)



*1: When Option code K1, K2, K5, or K6 is selected, add 30 mm(1.18 inch) to the value.

F0909.EPS

[Model EJX130A]



(i.e. High pressure side is on the right side.)
*2: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.
*3: When Option code K1, K2, K5, or K6 is selected, add 30 mm(1.18 inch) to the value in the figure.

F0910.EPS

F0911.EPS

• Universal Flange (Installation code -U) Unit : mm (approx. inch) Zero adjustment External indicator Conduit connection 85(3.35) 93(3.66) 110(4.33) Conduit connection 9 39 (optional) 95(3.74) Integral indicator (0.35)(1.54) (optional) 54 ø78(3.07) (2.13) (2.76) ø70 6 159(6.26) (0.24) 143(5.63) 197(7.76) Ground terminal 7 Electrical connection Þ Q ∎ 臣 for code 5, 9, A, and D. Vent plug (\uparrow) Į Drain plug Drain plug 68 Shrouding bolt 54 (2.68) Vent plug (for flame-proof type) (2.13) High pressure side Low pressure 168(6.61) 154(6.06)*1 Drain plug Process connector side (optional)

*1: When Option code K1, K2, K5, or K6 is selected, add 30 mm(1.18 inch) to the value.

IM 01C25B01-01E

[Model EJX310A]



*1: When Installation code -8 is selected, high and low pressure side on above figure are reversed. (i.e. High pressure side is on the right side.)

*2: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.

F0912.EPS

ີ (2.32)

• Bottom Process Connection (Installation code -B)

Unit : mm (approx. inch)

Universal Flange (Installation code -U)

Unit : mm (approx.inch)

*1: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value.

F0914.EPS

[Model EJX430A]

Vertical Impulse Piping Type (Installation code -7), Wetted parts material code : S

Unit : mm (approx. inch)

*1: When Installation code -8 is selected, high and low pressure side on above figure are reversed. (i.e. High pressure side is on the right side.)

*2: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.

F0915_1.EPS

Unit : mm (approx. inch)

• Horizontal Impulse Piping Type (Installation code -9), Wetted parts material code : H, M, T, A, D, B

F0915_2.EPS

• Bottom Process Connection (Installation code -B)

Unit : mm (approx. inch)

• Universal Flange (Installation code -U)

Unit : mm (approx. inch)

*1: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value.

[Model EJX440A]

*1: When Installation code -8 is selected, high and low pressure side on above figure are reversed. (i.e. High pressure side is on the right side.)
*2: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value in the figure.

F0918.EPS
9. GENERAL SPECIFICATIONS

• Universal Flange (Installation code -U)

Unit : mm (approx. inch)



*1: When Option code K1, K2, K5, or K6 is selected, add 15 mm(0.59 inch) to the value.

• Terminal Configuration



Terminal Wiring

SUPPLY +	Power supply and output terminal
CHECK ⁺ or ALARM ⁺	External indicator (ammeter) terminal ^{*1*2} or Status contact output terminal ^{*2} (when /AL is specified)
<u> </u>	Ground terminal

*1: When using an external indicator or check meter, the internal resistance must be 10 Ω or less. A check meter or indicator cannot be connected when /AL option is specified.

*2: Not available for fieldbus communication type.

F0911.EPS

F0919.EPS

< Factory Setting >

Tag Number	As specified in order			
Amplifier Damping *2	'2 sec.' or as specified in order			
Output Mode	'Linear' unless otherwise specified in order			
Calibration Range Lower Range Value	As specified in order			
Calibration Range Upper Range Value	As specified in order			
Calibration Range Units	Selected from the followings. Only one unit can be specified. [Differential/gauge pressure transmitter] mmH ₂ O, mmH ₂ O(68°F),mmAq, mmWG, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O(68°F),inHg, ftH ₂ O, ftH ₂ O(68°F) or psi. [Absolute pressure transmitter] torr, Pa abs, hPa abs, kPa abs, MPa abs, mbar abs, bar abs, mmH ₂ O abs, mmH ₂ O(68°F) abs, mmH ₂ O abs, inH ₂ O (68°F), inHg abs, inH ₂ O abs, inH ₂ O abs(68°F), inHg abs, ftH ₂ O abs, ftH ₂ O abs(68°F), atm, or psia.			
Display Setting	Designated differential pressure value specified in order. (%, Engineering unit or user scaled value.) Display mode 'Linear' or 'Square root' is also as specified in order.			
Static Pressure Display Range*1	'0 to 25 MPa' for M and H capsule of EJX110A, '0 to 16 MPa' for L capsule, and '0 to 32 MPa' for EJX130A. Display unit is selectable from the units listed in above 'Calibration Range Units'.			

*1: For differential pressure transmitters only.
*2: To specify these items at factory, /CA or /CB option is required.

REVISION RECORD

Title: EJX110A, EJX120A, EJX130A, EJX310A, EJX430A and EJX440A Differential Pressure and Pressure Transmitters Manual No.: IM 01C25B01-01E

Edition	Date	Page	Revised Item		
1st	Mar. 2004	_	New publication		
2nd	Apr. 2004	_	Revise words and phrases.		
		2-6	2.9.3 • Correct Ambient temperature $-60 \Rightarrow -50$		
		4-4	4.5 • Change the description of rotation angle.		
		8-3	• Add Allen wrench nominal 3mm to Table 8.4.1.		
3rd	Feb. 2005	_	Re-number figure and table title.		
		i	Add subsection 6.3.5.		
		ii	Add note for Safety Transmitter.		
		1-1	1. • Add note for Fieldbus communication type.		
		1-3	1.1 • Add (f) Modification.		
		2-5	2.9.2 • Modify descriptions and instructions for CSA certification		
		2-3	2.9 • Add NOTE for fieldbus communication type.		
		2-7	2.9.3 • Correct number in Note 4. 10 MINUTES \Rightarrow 5 MINUTES		
		2-8	 Delete WARNING on non-incendive power supply. 		
			- Correct number for Electrical data Ci. 6 nF $\Rightarrow 10~\text{nF}$		
		3-1	3. • Correct label of the switch in the figure. N \Rightarrow E, Y \Rightarrow D		
			Add descriptions in Note 2.		
		4-3	4.4.1 • Add description about process connector in 3).		
		4-4	4.6 • Add section 4.6.		
		6-1	6.3.1, 6.3.2 • Add limitation/note when /AL is specified.		
		6-2	6.3.4 • Add limitation when /AL is specified.		
		6-2	6.3.5 • Add subsection 6.3.5.		
		7-3	7.2.1 • Add descriptions about zero adjustment.		
		9-1, 9-2	9.1 • Add notes for FOUNDATION fieldbus communication type.		
			Add capsule code H.		
		9-4, 9-5	9.2 • Add output signal code -F and capsule code H.		
		9-6	9.3 • Add CSA approvals and note *2 and *3		
		9-8	9.4 • Add note *3.		
		9-10	9.4 • Add notes for /AL and FOUNDATION Fieldbus.		
4th	Sep.2005	1-1	1. Add model names to the manual coverage.		
		2-3 through 2-8	2 Add applicable standard and certificate number for each approval.		
		2-11	2.10 Change australian reference standard.		
		2-11	2.11 Add descriptions for PED.		
		2-12	2.11 Add section 2.12.		
		4-1	4.1 Add model name.		
		4-2	4.3 Add table 4.1.		

		8-5	8.4.3	Add table for torque.
			Add not	es for reassembling EJX130A and EJX440A.
			8.4.4	Add table for torque.
		9-1 through 9-18	9.	Add specifications, codes, and dimensions for EJX130A, EJX310Aand EJX440A.
5th	July 2006	2-8-	2.9.3	Change applicable standards for ATEX type n.—
6th	Nov. 2007	1-1	1.	Add model code table.
		2-3	2.9	Add note for EJX130A.
		9-10	9.3	Add note for EJX130A
		9-15	9.4	Modify dimensions of EJX130A.
		A-1	APPEN	DIX 1. Add "EJX130A ADDITIONAL INFORMATION."
7th	Feb. 2008	_		Change of the style code, add EJX120A.
		General		Change the figure of amplifier housing.
		1-1	1	Add style code table.
		2-1	2.1	Update the Figure 2.2.
		2-5	2.9.1	Add code /V1U.
		2-6	2.9.2	Revise information for CSA Explosionproof type.
		2-7	2.9.2	Add code /V1U.
		2-8 through 2-8	2.9.3	• Revise information for KEMA flameproof type. Add code /V1U.
		2-9	2.9.3	• Revise Figure in (2) Electrical connection and (6) Nameplate.
		210	2.9.4	Revise information for IECEx flameproof type.
		9-1 through 9-3	9.1	Add information for EJX120A.
		9-5 through 9-10	9.2	 Add new suffix codes for 316 SST blind plugs and brackets. Add EJX120A.
		9-11	9.3	• Remove /KF2 and /KU2. Add /KF21, /KU21, /SF2 and /V1U.
		9-12		• Add /HC.
		9-14 thorugh 9-20	9.4	Revise external dimensions.Add EJX120A.
		—		Remove Appendix 1 'Additional Information for EJX130A.'
8th	June 2008	2-6	2.9.2	Correct certification number.
		2-8	2.9.3	• Revise applicabble standards for ATEX Type n.
		2-11	2.11	 Add EJX110A V capsule, wetted parts matterial code S and EJX310A Lcapsule.
		4-1	4.2	Add information of Universal flange.
		8-5	8.4.3	Add wetted parts material code in the torque table.
		9-1 thorough 9-27	9.	 Add EJX110A V capsule, EJX110A/EJX430A wetted parts material code H, M, T, A, D, and B, EJX310A L capsule and option code / S1, and universal flange.
		9-10	9.3	 Add statement of sealing certification for CSA approval