1. Introduction

This installation manual provides the basic guidelines for installation and wiring procedures of the DPharp EJX series and EJA-E series transmitters with BRAIN and HART protocols and is composed of the information extracted from the product users' manuals as listed in Table 1.1. It does not provide the information including wiring procedures of the transmitters with FOUNDATION Fieldbus, Profinis and Modbus protocols, product specific functional specifications and explanations, operation, maintenance and trouble-shooting.

For EJXC40A Digital Remote Sensor, as this Installation Manual does not cover the product, please refer to the dedicated manual for EJXC40A.

**WARNING**

To ensure correct and safe use of the instrument, obtain the manuals applicable to designated models and specifications as listed Table 1.1, read them thoroughly and fully understand how to operate the instrument before operating it.

Users' manual for each product consists of a hardware manual describing installation, wiring, operation, maintenance and specification including detailed model and suffix code information, and a communication manual describing information specific to each communication protocol type, including safety manual for safety instrumented system.

These manuals can be downloaded from the website of Yokogawa or purchased from the Yokogawa representatives.

Website address: http://www.yokogawa.com/fld/

Table 1.1 PDF Manual List and Applicable Style Code

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<tr>
<td>DPharp PROFIBUS PA Communication Type</td>
<td>IM 01C25T04-01E</td>
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</tr>
</tbody>
</table>

Note: An exclusive User’s Manual might be attached for the products whose suffix codes or optional codes contain code “Z”. Please read it along with the standard manuals.
1. Introduction

Regarding This Manual

- This manual should be passed on 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.
- When describing the model name like EJ□110□ in this manual, it shows the applicability for both EJX110A and EJA110E. The same representations are used for the other models, too.
- The following safety symbol marks are used in this manual:

**WARNING**

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

**CAUTION**

 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.

**IMPORTANT**

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

**NOTE**

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>☼ ☼</td>
<td>Direct current</td>
</tr>
<tr>
<td>☼</td>
<td>Functional grounding terminal</td>
</tr>
<tr>
<td>☳</td>
<td>Caution</td>
</tr>
</tbody>
</table>

This symbol indicates that the operator must refer to an explanation in the user’s manual in order to avoid the risk of injury or death of personnel or damage to the instrument.

1.1 For Safe Use of Product

For the protection and safety of the operator and the instrument or the system including the instrument, please be sure to follow the instructions on safety described in this manual when handling this instrument. In case the instrument is handled in contradiction to these instructions, Yokogawa does not guarantee safety. Please give your attention to the followings.

(a) Installation

**WARNING**

- The instrument must be installed by an expert engineer or a skilled personnel. The procedures described about INSTALLATION are not permitted for operators.
- In case of high process temperature, care should be taken not to bum yourself because the surface of body and case reaches a high temperature.
- The instrument installed in the process is under pressure. Never loosen the process connector bolts to avoid the dangerous spouting of process fluid.
- During draining condensate from the pressure detector section, take appropriate care to avoid contact with the skin, eyes or body, or inhalation of vapors, if the accumulated process fluid may be toxic or otherwise harmful.
- When removing the instrument from hazardous processes, avoid contact with the fluid and the interior of the meter.
- All installation shall comply with local installation requirement and local electrical code.
(b) Wiring

**WARNING**

- The instrument must be installed by an expert engineer or a skilled personnel. The procedures described about WIRING are not permitted for operators.
- Please confirm that voltages between the power supply and the instrument before connecting the power cables and that the cables are not powered before connecting.

(c) Operation

**WARNING**

- Wait 5 min. after power is turned off, before opening the covers.
- Do not open the cover in wet weather or humid environment. If the cover is opened, stated enclosure protection is not applicable.

(d) Maintenance

**WARNING**

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

(e) Explosion Protected Type Instrument

**WARNING**

- Users of explosion proof instruments should refer first to section 2.4 (Installation of an Explosion Protected Instrument) of this manual.
- For TIIS flameproof type instruments, be sure to read “INSTALLATION AND OPERATING PRECAUTIONS FOR TIIS FLAMEPROOF EQUIPMENT” at the end 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

**WARNING**

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

(g) Product Disposal

The instrument should be disposed of in accordance with local and national legislation/regulations.

(h) Authorized Representative in EEA

In relation to the CE Marking, The authorized representative for this product in the EEA (European Economic Area) is: Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort, The Netherlands
(i) Control of Pollution Caused by the Product

This is an explanation for the product based on “Control of Pollution caused by Electronic Information Products” in the People's Republic of China. The information is valid only in China.

<table>
<thead>
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<th>型号</th>
<th>部件名称</th>
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<tr>
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<td></td>
<td>铅（Pb）</td>
</tr>
<tr>
<td>EJX/EJA/EJAJA/A Series</td>
<td>壳体</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>膜盒组件</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>基板组件</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>电源连接线</td>
<td>×</td>
</tr>
</tbody>
</table>

○：表示该部件的所有均质材料中的有害物质的含量均在 GB/T26572 标准中规定的限量以下。
×：表示至少该部件的某些均质材料中的有害物质的含量均在 GB/T26572 标准中规定的限量以上。

环保使用期限：

该标识适用于 SJ/T11364 中所述，在中华人民共和国销售的电子电气产品的环保使用期限。

注）该年数为“环保使用期限”，并非产品的质量保证期。

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurred during the warranty period shall basically be repaired free of charge.
- In case of problems, the customer should contact the Yokogawa representative from which the 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.
- Responsible party for repair cost for the problems shall be determined by Yokogawa based on our investigation.
- 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.
  - Failure or damage due to improper handling, use or storage which is out of design conditions.
  - 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.

■ Trademarks:
- ‘DPharp’, ‘EJX’, ‘EJA’, ‘FieldMate’ and ‘BRAIN TERMINAL’ are registered trademarks of Yokogawa Electric Corporation. Company names and product names used in this material are registered trademarks or trademarks of their respective owners.
- In this manual, trademarks or registered trademarks are not marked with ™ or ®.
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 relatet 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.

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

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

Kaikkien ATEX Ex -tyypistien tuotteiden käyttöohjeet ovat saatavilla englanniksi-, saksaan- ja ranskansiksi. Mikäli tarvitsette Ex -tyypistien tuotteiden ohjeita omalla paikalliseella kielelläsi, ottakaa yhteyttä tämänpään Yokogawa-toimiston talo - eduustajaan.

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.

Ala instruktionärbok för ATEX Ex (explosionsssäkra produkter) är tillgängliga på engelska, tyska och franska. Om ni behöver instruktioner för dessa explosionsssäkra produkter på annat språk, skall ni kontakta närmaste Yokogawaakontor eller representant.

Όλα τα εγχειρία κατεργασίας των προϊόντων με ATEX Ex διαθέτονται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα, επικοινωνήστε με το πληροφορητήριο της Yamaha ή αντιπρόσωπό της.

Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušná schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Podítejte se pokyny týkající se výrobku s nevýbušným schválením ve vašem místním jazyku, kontaktujte prosím vaši nejbližší reprezentanta kancelář Yokogawa.

Visos gaminio ATEX Ex kategorijos Eksplotacinio įrenginių instrukcijos teikiami anglų, vokiečių ir prancūzų kalbos. Nors jie gali būti perduodami susikūręs su artimiausiu bendrovės "Yokogawa" biuru arba atstumui.

Vsi vmesniško dokumentacije za ATEX Ex so v skupaj len v Angleščini, Nemščini in francoskini. Če želite dokumentacijo v svoji domači jeziki, se obrnite na najbližji predstavnik Yokogawa.

Kök ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeltes. Ex seadmete müükide dokumentatsiooni saatmiseks võib olla soovitatav kokku jõuda Yokogawa kontori või esindajate poole.

Wszystkie instrukcje obsługi dla urządzeń wykonanej przeciwbymbowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym języku, prosimy o kontakt z najbliższym biurem Yokogawa.

Vai predpis i navodila za ATEX Ex sorodni pridetki so pri roki v angliščini, nemščini ter francoskini. Če so vso sorodna navodila potrebna v vašem tukajnem jeziku, kontaktirajte vaš najbližji Yokogawa office ali predstavnika.

Az ATEX Ex műszerek képalkotóvá tehetők angol, német és francia nyelven. Amennyiben helyi nyelvű kérik az Ex eszközök leírását, kérjük, keressék fel a legközelebbi Yokogawa irodát, vagy képviselőt.

Все инструкции для продуктов от сертификации ATEX Ex относятся на английский, немецкий и французский языки. Если потребуется данная инструкция в вашем родном языке, обратитесь к ближайшему представительству на фирма Yokogawa.

Toate manualele de instrucțiuni pentru produsele ATEX Ex sunt disponibile în limba engleză, germană și franceză. În cazul în care doriti instrucțiuni în limba locală, trebuie să contactați cel mai apropiat birou sau reprezentant Yokogawa.

Im manuskript till en instruktionssjälv för produkter med ATEX Ex etiketten på engelska, tyska och svenska. Om ni behöver instruktioner för dessa produkter på annat språk, rekommenderar ni att kontakta närmaste Yokogawaakontor eller representant.
2. Handling Cautions

When the transmitter is delivered, 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 was ordered without the mounting bracket or without the process connector, the transmitter mounting hardware is not included.

**Table 2.1 Applicable Model Code for Mounting Hardware**

<table>
<thead>
<tr>
<th>Applicable model</th>
<th>Suffix code</th>
<th>Part name</th>
<th>Qty</th>
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<td>EJX910A</td>
<td>1</td>
<td>Process connector bolt</td>
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<td>Process connector</td>
<td>2</td>
</tr>
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<td>EJX910A</td>
<td>3</td>
<td>Process connector gasket</td>
<td>2</td>
</tr>
<tr>
<td>EJX930A</td>
<td>4</td>
<td>Process connector</td>
<td>1</td>
</tr>
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<td>EJX910A</td>
<td>5</td>
<td>Process connector gasket</td>
<td>1</td>
</tr>
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<td>EJX930A</td>
<td>6</td>
<td>U-bolt</td>
<td>1</td>
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<td>7</td>
<td>U-bolt</td>
<td>2</td>
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<td>EJX930A</td>
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<td>Mounting bracket (L or flat type)</td>
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<td>9</td>
<td>Transmitter mounting bolt</td>
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</tr>
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<td>EJX930A</td>
<td>10</td>
<td>U-bolt</td>
<td>1</td>
</tr>
<tr>
<td>EJX910A</td>
<td>11</td>
<td>U-bolt</td>
<td>2</td>
</tr>
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<td>EJX930A</td>
<td>12</td>
<td>Mounting bracket</td>
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<td>13</td>
<td>Transmitter mounting bolt</td>
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<td>U-bolt nut (L and S)</td>
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<td>RTD cable</td>
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<td>18</td>
<td>External temperature input 1, 2, 3 and 4</td>
<td>Cable gland</td>
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<td>EJX910A</td>
<td>21</td>
<td>Option code /TF1</td>
<td>Teflon film</td>
</tr>
<tr>
<td>EJX930A</td>
<td>22</td>
<td>Option code /TF1</td>
<td>Fluorinated oil</td>
</tr>
</tbody>
</table>

*: For measurement span code F.
2.1 Model and Specifications Check

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

![Name Plate]

Figure 2.2 Name Plate

2.2 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 transmitter is certified for installation in a hazardous area containing specific gas types. See subsection 2.4 “Installation of an Explosion-Protected Instrument.”

2.3 Pressure Connection

WARNING

- 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 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.

2.4 Installation of an Explosion-Protected Instrument

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.

CAUTION

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.

WARNING

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.
## 2. Handling Cautions

### 2.4.1 FM Approval

#### a. FM Intrinsically Safe/Nonincendive for HART/BRAIN Protocol Type (Except for EJX9□0A)

**Note 1.** EJX/EJA-E Series pressure transmitters with optional code /FS1 are applicable for use in hazardous locations.

- **Applicable Standard:**
  - NEMA 250:1991

- **Rating Intrinsically Safe for**
  - Class I, II, III Division 1,
  - Groups A, B, C, D, E, F, G T4
  - Class I Zone 0 AEx ia IIC T4

- **Nonincendive for**
  - Class I, II, Division 2
  - Groups A, B, C, D, F, G T4
  - Class I Zone 2 Group IIC T4

- **Ambient temperature:** –60 to 60°C

- **Enclosure:** Type 4X

**Note 2.** Installation

Installation should be in accordance with Control Drawing IFM022-A12.

**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 Factory Mutual Intrinsically safe and Nonincendive Approval.
b. FM Intrinsically Safe/Nonincendive for Fieldbus Type (Except for EJX9C0A)

EJX/EJA-E Series pressure transmitters with optional code /FS15 are applicable for use in hazardous locations.

Note 1.
• Applicable Standard:
  - NEMA 250:1991
• Rating
  - Intrinsically Safe with Entity/FISCO for Class I, II, III Division 1, Groups A, B, C, D, E, F, G T4
  - Class I Zone 0 AEx ia IIC T4
  - Nonincendive field wiring/FNICO for Class I, II Division 2
  - Groups A, B, C, D, F, G T4
  - Class III Division 1 T4
  - Class I, Zone 2 Group IIC T4
• Ambient temperature: –40 to 60°C
• Enclosure: Type 4X
• Electrical Connection:
  - 1/2 NPT female, M20 female

Note 2. Installation
Installation should be in accordance with Control Drawing IFM24-A12.
2. Handling Cautions

IM
01C25A01-01E

- FM Intrinsically Safe/Nonincendive for Fieldbus Type for EJX
  - Applies only to the associated nonincendive field wiring apparatus.
  - FCC certification is not required by the apparatus not included in the package.
  - Intrinsically safe/Nonincendive for Fieldbus Type for EJX

Note 1.
- Applicable Standard:

- Ambient temperature: –40 to 60°C
- Enclosure: Type 4X
- Electrical Connection: 1/2 NPT female, M20 female
- Note 2. Installation:
  - Installation should be in accordance with Control Drawing IFM026-A12.
<2. Handling Cautions>

2. Handling Cautions

The FISCO Concept allows the interconnection of intrinsically safe apparatus and associated apparatus not specifically certified in each combination. The intention for such interconnections is that the voltage UU, the current IL and the power PU which intrinsically safe apparatus can receive and send intrinsically safe, considering faults, must be less or equal to or less than the voltage UU, current IU, or power PU which can be supplied by the associated apparatus (supply unit). In addition, the maximum unexpected residual apparatus (FF and intrinsically safe IL of each apparatus other than intrinsically safe) connected to the FISCO must be smaller than its UU and IU respectively.

In each I.S. Fieldbus station only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed residual UU, IU or PU of the associated apparatus needed to supply the bus cable must be limited to the range of 14Vdc to 142Vdc. All other equipment connected to the bus cable line is to be passive, ensuring that the apparatus is not allowed to provide energy to the system, except leakage current of IL for each connected device. Separately powered equipment needs galvanic isolation to ensure the intrinsically safe Fieldbus circuit remains passive.

The cable used to interconnect the devices needs to comply with the following parameters:
- Long resistance: 0.125Ωkm
- Capacitance per unit length: 450 mF/km
- Impedance: 100Ω
- Pins of types 4 or 5 are used.

The configuration of associated apparatus must be FM Approved.

Requirements:
1. Barrier must be installed in an enclosure that meets the requirements of ANSI/ISA 61051.1.
2. Intrinsically safe Fieldbus systems are considered Class I, Division 1, and 2, Group C and D, and Class II, Division 1, Group C, D, E, and G.
3. Intrinsically safe Fieldbus systems are considered Class I, Division 1, and 2, Group C and D, and Class II, Division 1, Group C, D, E, and G.

Electrical data:

- Supply circuit:
  - Rating 1 (FISCO): 105V
  - Rating 2 (FISCO): 115V

- Terminal:
  - Rating 1 (FISCO): 105V
  - Rating 2 (FISCO): 115V

- Protection:
  - Rating 1 (FISCO): 105V
  - Rating 2 (FISCO): 115V
2. Handling Cautions

d. FM Explosionproof

Caution for FM explosionproof type.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /FF1 or /V1F 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: Type 4X
- Temperature Class: T6
- Ambient Temperature: -40 to 60°C
- Supply Voltage: 42 V dc max. 32 V dc max. (FOUNDATION Fieldbus and PROFIBUS PA type) 9 to 28 V dc, 27 mW (Low Power type) 9 to 30 V dc, 250 mW (RS485 Modbus Communication Type)
- Output signal: 4 to 20 mA 15 mA (FOUNDATION Fieldbus and PROFIBUS PA type) 1 to 5 V (Low Power type) RS485 Modbus (RS485 Modbus Communication Type)

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.”
- Wiring connection for output signal code Q (Low Power type) shall follow the diagram below.

---

### Pressure Transmitters

#### Three-Wire Connection

- **SUPPLY**
- **A**
- **V**
- **V**
- **SUPPLY**

#### Four-Wire Connection

- **SUPPLY**
- **A**
- **V**
- **V**
- **SUPPLY**
2. Handling Cautions

Note 3. Operation
- Keep the "WARNING" nameplate attached to the transmitter.

WARNING: OPEN CIRCUIT BEFORE REMOVING COVER. FACTORY SEALED, CONDUIT SEAL NOT REQUIRED. INSTALL IN ACCORDANCE 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.

e. FM Intrinsically Safe and Explosion Proof Combination for HART/BRAIN Protocol Type

EJX/EJA-E Series pressure transmitters with optional code /FU1 or /V1U1 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.

2.4.2 CSA Certification

a. CSA Intrinsically Safe for HART/BRAIN Protocol Type (Except for EJX9□0A)

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

Note 1. EJX/EJA-E Series 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.60079-0, C22.2 No.61010-1, C22.2 No.61010-2-030
- 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 F & G, Class III, Division 1
- Enclosure: Type 4X
- Temp. Code: T4
- Amb. Temp.: –50° to 60°C
- –15°C when /HE is specified.
- Process Temperature: 120°C max.

[For CSA E60079]
- Ex ia IIC T4, Ex nL IIC T4
- Ambient Temperature: –50 to 60°C
- Max. Process Temp.: 120°C
- Enclosure: IP66/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 ≤ Ui, Io ≤ Ii, Po ≤ Pi,
  - Co ≥ Ci + Ccable, Lo ≥ Li + Lcable
  - Voc ≤ Vmax, Isc ≤ Imax,
  - Ca ≥ Ci + Ccable, La ≥ Li + Lcable
  - Uo, Io, Po, Co, Lo, Voc, Isc, Ca and La are parameters of barrier.

Note 3. Installation
- In any safety barrier 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.
b. **CSA Intrinsicly Safe for Fieldbus Type (Except for EJX9□0A)**

EJX/EJA-E Series pressure transmitters with optional code /CS15 are applicable for use in hazardous locations.

- **Certificate**: 1689689
- **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.61010-1, C22.2 No.61010-2-030, C22.2 No.60079-0, CAN/CSA E60079-0, CAN/CSA E60079-11, CAN/CSA E60079-15, IEC 60529
- **CSA Intrinsicly Safe Approval**
  - Class I, Division 1, Groups A, B, C, & D; Class II, Division 1, Groups E, F & G; Class III; Ex ia IIC T4 Ambient Temperature: -40° to 60°C (-40° to 140°F) Encl. Type 4X, IP66/IP67
- **CSA Nonincendive Approval**
  - Class I, Division 2, Groups A, B, C, & D; Class II, Division 2, Groups F & G; Class III; Ex nIIC T4 Ambient Temperature: -40° to 60°C (-40° to 140°F) Encl. Type 4X, IP66/IP67

**Note 1.** The safety barrier must be CSA certified.

**Note 2.** Input voltage of the safety barrier must be less than 250Vrms/Vdc.

**Note 3.** Installation should be in accordance with Canadian Electrical Code Part I and local Electrical Code.

**Note 4.** Do not alter drawing without authorization from CSA.

**Electrical Data:**

- **Rating 1 (Entity)**
  - For Groups A, B, C, D, E, F, and G or Group IIC
    - Ui (vmax) = 24 V dc
    - li (Imax) = 250 mA
    - Pi (Pmax) = 1.2 W
    - Ci = 3.52 nF
    - Li = 0 μH
  
- **Rating 2 (FISCO)**
  - For Groups A, B, C, D, E, F, and G or Group IIC
    - Ui (vmax) = 17.5 V dc
    - li (Imax) = 380 mA
    - Pi (Pmax) = 5.32 W
    - Ci = 3.52 nF
    - Li = 0 μH

---

**Caution for CSA Intrinsicly Safe Type. (Following Contents Refer to “DOC. No. ICS018)**

**Installation Diagram for Intrinsicly Safe (Division 1 Installation)**

Note 1. The safety barrier must be CSA certified.

Note 2. Input voltage of the safety barrier must be less than 250Vrms/Vdc.

Note 3. Installation should be in accordance with Canadian Electrical Code Part I and local Electrical Code.

Note 4. Do not alter drawing without authorization from CSA.
2. Handling Cautions

- Rating 3 (FISCO)
  For Groups C, D, E, F, and G or Group IIIB
  \( U_i \) (vmax) = 17.5 Vdc
  \( I_i \) (Imax) = 460 mA
  \( C_i \) = 3.52 nF
  \( L_i \) = 0 μH

Installation requirements:
\[ P_o \leq P_i \quad U_o \leq U_i \quad I_o \leq I_i, \]
\[ C_o \geq C_i + C_{cable} \quad L_o \geq L_i + L_{cable} \]
\[ V_{max} \geq V_{oc} \quad I_{max} \geq I_{sc} \]
\[ C_a \geq C_i + C_{cable} \quad L_a \geq L_i + L_{cable} \]

\[ U_o, \quad I_o, \quad P_o, \quad C_o, \quad L_o, \quad V_{oc}, \quad I_{sc}, \quad C_a \text{ and } L_a \text{ are parameters of barrier.} \]

- Caution for CSA Non-incendive Type.
  (Following contents refer to “DOC. No. ICS018”)

Installation Diagram for Non-incendive or Type of protection “n” (Division 2 Installation)

Note 1. Installation should be in accordance with Canadian Electrical Code Part I and local Electrical Code.

Note 2. Dust-tight conduit seal must be used when installed in class II and III environments.

Note 3. Do not alter drawing without authorization from CSA.

Electrical Data:
- Rating (including FNICO)
  \( U_i \) or \( V_{max} \) = 32 V
  \( C_i \) = 3.52 nF
  \( L_i \) = 0 μH

---

c. CSA Explosionproof Type

Caution for CSA explosionproof type.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /CF1 or /V1F 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, C22.2 No.61010-2-30, 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/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)
  * –15°C when /HE is specified.
- Supply Voltage: 42 V dc max.
  32 V dc max. (FOUNDATION Fieldbus and PROFIBUS PA type)
  9 to 28 V dc, 27 mW (Low Power type)
  9 to 30 V dc, 250 mW (RS485 Modbus Communication Type)
- Output Signal: 4 to 20 mA dc
  15 mA (FOUNDATION Fieldbus and PROFIBUS PA type)
  1 to 5 V (Low Power type)
  RS485 Modbus (RS485 Modbus Communication Type)

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.
2. Handling Cautions

- 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.)
- Wiring connection for output signal code Q (Low Power type) shall follow the diagram below.

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.

2.4.3 ATEX Certification

(1) Technical Data

a. ATEX Intrinsically Safe for HART/BRAIN Protocol Type (Except for EJX9□0A)

Caution for ATEX Intrinsically safe type.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /KS21 for potentially explosive atmospheres.
- No. DEKRA 11ATEX0228 X
  EN 60079-11:2012
2. Handling Cautions

- Type of Protection and Marking code:
  - Ex ia IIC T4 Ga
  - Ex ia IIIC T85 °C T100 °C T120 °C Db
- Group: II
- Category: 1G, 2D
- Ambient Temperature for EPL Ga: –50 to 60 °C
- Ambient Temperature for EPL Db: –30° to 60 °C
  * –15 °C when /HE is specified.
- Process Temperature (Tp.): 120 °C max.
- Maximum Surface Temperature for EPL Db:
  - T85 °C (Tp.: 80 °C)
  - T100 °C (Tp.: 100 °C)
  - T120 °C (Tp.: 120 °C)
- Enclosure: IP66 / IP67
  To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

Note 2: Electrical Data
- In type of explosion protection intrinsic safety Ex ia IIC or Ex ia IIIC, only for connection to a certified intrinsically safe circuit with following maximum values:
  - $U_i = 30 \text{ V}$
  - $I_i = 200 \text{ mA}$
  - $P_i = 0.9 \text{ W}$
  (Linear Source)
- Maximum internal capacitance; $C_i = 27.6 \text{ nF}$
- Maximum internal inductance; $L_i = 0 \mu\text{H}$

When the lightning protector option is specified, the apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

Note 3: Installation
- Refer to the control drawing. All wiring shall comply with local installation requirements.

![Control Drawing]

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 DEKRA Intrinsically safe Certification.

Note 5: Special Conditions for Safe Use

**WARNING**
- When the enclosure of the Pressure Transmitter is made of aluminum, if it is mounted in an area where the use of category 1G equipment 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.
- Electrostatic charges on the coated parts of Pressure Transmitter shall be avoided.
- Electrostatic charge may cause an exlosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- In case of the enclosure of the Pressure Transmitter with paint layers, if it is mounted in an area where the use of category 2D equipment is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.

b. ATEX Intrinsically Safe for Fieldbus Type (Except for EJX9□0A)

Caution for ATEX Intrinsically safe type.

Note 1. EJX/EJA-E series pressure transmitters with optional code /KS26 are applicable for use in hazardous locations.
- No. KEMA 04ATEX1116 X
  EN 60079-11:2012

Note 2. Ratings
- Type of Protection and Marking Code:
  - Ex ia IIC/IIB T4 Ga
  - Ex ia IIIC T85 °C T100 °C T120 °C Db
- Group: II
- Category: 1G, 2D
- Ambient Temperature for EPL Ga: –40 to 60 °C
- Ambient Temperature for EPL Db: –30° to 60 °C
  * –15 °C when /HE is specified.
- Maximum Process Temperature (Tp.): 120 °C
- Maximum Surface Temperature for EPL Db:
  - T85 °C (Tp.: 80 °C)
  - T100 °C (Tp.: 100 °C)
  - T120 °C (Tp.: 120 °C)
- Ambient Humidity:
  - 0 to 100% (No condensation)
- Degree of Protection of the Enclosure:
  - IP66 / IP67
Electrical Data

- When combined with Trapezoidal and Rectangular output characteristic FISCO model IIC barrier
  \[ U_i = 17.5 \text{ V}, \quad I_i = 380 \text{ mA}, \quad P_i = 5.32 \text{ W}, \quad C_i = 3.52 \text{ nF}, \quad L_i = 0 \mu\text{H} \]

- When combined with Linear characteristic barrier
  \[ U_i = 24 \text{ V}, \quad I_i = 250 \text{ mA}, \quad P_i = 1.2 \text{ W}, \quad C_i = 3.52 \text{ nF}, \quad L_i = 0 \mu\text{H} \]

- When combined with Trapezoidal or Rectangular output characteristic FISCO model IIB barrier
  \[ U_i = 17.5 \text{ V}, \quad I_i = 460 \text{ mA}, \quad P_i = 5.32 \text{ W}, \quad C_i = 3.52 \text{ nF}, \quad L_i = 0 \mu\text{H} \]

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 DEKRA Intrinsically safe Certification.

Note 5. Special Conditions for Safe Use

**WARNING**

- 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.

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.

- In the case where the enclosure of the Pressure Transmitter is made of aluminum, if it is mounted in an area where the use of category 2D apparatus is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.

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

- When the lightning protector option is specified, the apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

Note 6. Installation Instructions

[Installation Diagram]

- In the rating 1(*1), the output current of the barrier must be limited by a resistor 'Ra' such that \( I_o = U_o/ Ra \).

- In the rating 2(*2), the output of the barrier must be the characteristics of the trapezoid or the rectangle and this transmitter can be connected to Fieldbus equipment which are in according to the FISCO model.

- The terminators may be built in by a barrier.

- More than one transmitter may be connected to the power supply line.

- The terminator and the safety barrier shall be certified.

Electrical data:

- Maximum Input Voltage \( U_i \): 24 V
- Maximum Input Current \( I_i \): 250 mA
- Maximum Input Power \( P_i \): 1.2 W
- Maximum Internal Capacitance \( C_i \): 3.52 nF
- Maximum Internal Inductance \( L_i \): 0 \mu F

or

- Maximum Input Voltage \( U_i \): 17.5 V
- Maximum Input Current \( I_i \): 380 mA
- Maximum Input Power \( P_i \): 5.32 W
- Maximum Internal Capacitance \( C_i \): 3.52 nF
- Maximum Internal Inductance \( L_i \): 0 \mu F

or

- Maximum Input Voltage \( U_i \): 17.5 V
- Maximum Input Current \( I_i \): 460 mA
- Maximum Input Power \( P_i \): 5.32 W
- Maximum Internal Capacitance \( C_i \): 3.52 nF
- Maximum Internal Inductance \( L_i \): 0 \mu F

---

*1: Rating 1
*2: Rating 2
c. ATEX Intrinsically Safe for Fieldbus Type for EJX9C0A

Caution for ATEX Intrinsically safe type.

Note 1. EJX multivariable transmitter with optional code /KS26 are applicable for use in hazardous locations:
- No. KEMA 06ATEX2078 X

Note 2. Ratings
Type of Protection and Marking Code:
Ex ia IIC/IIB T4 Ga
Ex ia IIIC T85°C T100°C T120°C Db
Group: II
Category: 1G, 2D
Ambient Temperature for EPL Ga:
–40 to 60°C
Ambient Temperature for EPL Db:
–30°C to 60°C
*–15°C when /HE is specified.
Maximum Process Temperature (Tp.): 120°C
Maximum Surface Temperature for EPL Db:
T85°C (Tp.: 80°C)
T100°C (Tp.: 100°C)
T120°C (Tp.: 120°C)
Ambient Humidity:
0 to 100% (No condensation)
Degree of Protection of the Enclosure:
IP66/IP67
Electrical Data
- When combined with Trapezoidal or Rectangular output characteristic FISCO model IIC barrier
  [Supply circuit (terminals + and -)]
  \[U_i = 17.5 \text{ V}, I_i = 380 \text{ mA}, P_i = 5.32 \text{ W},\]
  \[C_i = 3.52 \text{ nF}, L_i = 0 \text{ µH}\]
  [Sensor circuit]
  \[U_o = 7.63 \text{ V}, I_o = 3.85 \text{ mA}, P_o = 0.008 \text{ W},\]
  \[C_o = 4.8 \text{ µF}, L_o = 100 \text{ mH}\]
- When combined with Linear characteristic barrier
  [Supply circuit (terminals + and -)]
  \[U_i = 24 \text{ V}, I_i = 250 \text{ mA}, P_i = 1.2 \text{ W},\]
  \[C_i = 3.52 \text{ nF}, L_i = 0 \text{ µH}\]
  [Sensor circuit]
  \[U_o = 7.63 \text{ V}, I_o = 3.85 \text{ mA}, P_o = 0.008 \text{ W},\]
  \[C_o = 4.8 \text{ µF}, L_o = 100 \text{ mH}\]
- When combined with Trapezoidal or Rectangular output characteristic FISCO model IIC barrier
  [Supply circuit (terminals + and -)]
  \[U_i = 17.5 \text{ V}, I_i = 460 \text{ mA}, P_i = 5.32 \text{ W},\]
  \[C_i = 3.52 \text{ nF}, L_i = 0 \text{ µH}\]
  [Sensor circuit]
  \[U_o = 7.63 \text{ V}, I_o = 3.85 \text{ mA}, P_o = 0.008 \text{ W},\]
  \[C_o = 4.8 \text{ µF}, L_o = 100 \text{ mH}\]

Note 3. Installation
- All wiring shall comply with local installation requirements. (Refer to the installation diagram)
• In the rating 1(*1), the output current of the barrier must be limited by a resistor ‘Ra’ such that \( I_o = \frac{U_o}{Ra} \).
• In the rating 2(*2), the output of the barrier must be the characteristics of the trapezoid or the rectangle and this transmitter can be connected to Fieldbus equipment which are in accordance to the FISCO model.
• The terminators may be built in by a barrier.
• More than one transmitter may be connected to the power supply line.
• The terminator and the safety barrier shall be certified.

Electrical data:
Supply circuit
Maximum Input Voltage \( U_i \): 24 V
Maximum Input Current \( I_i \): 250 mA
Maximum Input Power \( P_i \): 1.2 W
Maximum Internal Capacitance \( C_i \): 3.52 nF
Maximum Internal Inductance \( L_i \): 0 \( \mu \)H

or

Maximum Input Voltage \( U_i \): 17.5 V
Maximum Input Current \( I_i \): 380 mA
Maximum Input Power \( P_i \): 5.32 W
Maximum Internal Capacitance \( C_i \): 3.52 nF
Maximum Internal Inductance \( L_i \): 0 \( \mu \)H

Sensor circuit
Maximum Output Voltage \( U_o \): 7.63 V
Maximum Output Current \( I_o \): 3.85 mA
Maximum Output Power \( P_o \): 0.008 W
Maximum Internal Capacitance \( C_o \): 4.8 \( \mu \)F
Maximum Internal Inductance \( L_o \): 100 mH

• RTD sensor is prepared by the user.
  The sensor signal line must suited a test voltage of 500Vac.

**d. ATEX Flameproof Type**

Caution for ATEX flameproof type.

**Note 1.** EJX/EJA-E Series pressure transmitters with optional code /KF22 or /V1F are applicable for use in hazardous locations.
• No. KEMA 07ATEX0109 X
• Applicable Standard:
  EN 60079-0:2012+A11:2013
• Type of Protection and Marking Code:
  Ex d IIC T6...T4 Gb, Ex tb IIIC T85°C Db
• Group: II

**Category: 2G, 2D**
**Enclosure: IP66 / IP67**
**Temperature Class for gas-proof:**
  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)
**Process Temperature (Tp.) for gas-proof:**
  –50 to 85°C (T6), –50 to 100°C (T5), and
  –50 to 120°C (T4)
**Maximum Surface Temperature for dust-proof:**
  T85°C (Tamb.: –30° to 75°C, Tp.: –30° to 85°C)
  *–15°C when /HE is specified.

**Note 2. Electrical Data**
• Supply voltage: 42 V dc max.
  32 V dc max. (FOUNDATION Fieldbus and PROFIBUS PA type)
  9 to 28 V dc, 27 mW (Low Power type)
  9 to 30 V dc, 250 mW (RS485 Modbus Communication Type)
• Output signal: 4 to 20 mA
  15 mA (FOUNDATION Fieldbus and PROFIBUS PA type)
  1 to 5 V (Low Power type)
  RS485 Modbus (RS485 Modbus Communication Type)

**Note 3. Installation**
• All wiring shall comply with local installation requirement.
• Cable glands, adapters and/or blanking elements with a suitable IP rating shall be of Ex d IIC/Ex tb IIIC certified by ATEX and shall be installed so as to maintain the specific degree of protection (IP Code) of the equipment.
• Wiring connection for output signal code Q (Low Power type) shall follow the diagram below.

![Three-Wire Connection](image1)

![Four-Wire Connection](image2)
2. Handling Cautions

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 CABLE AND CABLE GLAND ≥90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 5. Specific Conditions of Use

![WARNING]

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- 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 2D apparatus is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.
- The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.
- The fasteners used to fasten the transmitter enclosure onto the sensor capsule is special fastener, and the property class of it is A2-50(A4-50) or more.

e. ATEX Intrinsically Safe and ATEX Flameproof Combination for HART/BRAIN Protocol Type (Except for EJX90A)

EJX/EJA-E Series pressure transmitters with optional code /KU22 or /V1U1 can be selected the type of protection ATEX Flameproof, Intrinsically Safe. Ex ia, or Ex ic for use in hazardous area.

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. For combined approval types
Once a device of multiple approval type is installed, it should not be re-installed using any other approval types. Apply a permanent mark in the check box of the selected approval type on the certification label on the transmitter to distinguish it from unused approval types.

- **ATEX Intrinsically Safe Ex ic**
  - Caution for ATEX intrinsically safe Ex ic
  - Applicable Standard:
    EN 60079-0:2012+A11:2013
    EN 60079-11:2012
  - Type of Protection and Marking Code:
    II 3G Ex ic IIC T4 Gc
  - Ambient Temperature: –30° to +60°C
    * –15°C when /HE is specified.
  - Ambient Humidity: 0 to 100% (No condensation)
  - Maximum Process Temperature: 120°C
  - IP Code: IP66
  - Ambient pollution degree: 2
  - Overvoltage category: I

Note 1. Electrical Data
- \( U_i = 30 \) V
- \( C_i = 27.6 \) nF
- \( L_i = 0 \) µH

Note 2. Installation
- All wiring shall comply with local installation requirements. (refer to the control drawing)
- Cable glands, adapters and/or blanking elements shall be of Ex “n”, Ex “e” or Ex “d” and shall be installed so as to maintain the specified degree of protection (IP Code) of the transmitters.

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 ATEX intrinsically safe.

Note 4. Specific Conditions of Use

![WARNING]

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- When the lightning protector option is specified, the apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.
2. Handling Cautions

f. ATEX Intrinsically Safe Ex ic for Fieldbus Type (Except for EJX9□0A)

Caution for ATEX Intrinsically safe Ex ic. EJX/EJA-E Series pressure transmitters with optional code /KN26 are applicable for use in hazardous locations.

- EN 60079-11:2012
- Type of Protection and Marking Code: II 3G Ex ic IIC T4 Gc
- Ambient Temperature: –30°C to +60°C
  * –15°C when /HE is specified.
- Maximum Process Temperature: 120°C
- Ambient Humidity: 0 to 100% (No condensation)
- IP Code: IP66
- Ambient pollution degree: 2
- Overvoltage category: I

Note 1. Electrical Data
  \( U_{i} = 32 \text{ V} \)
  \( C_{i} = 3.52 \text{ nF} \)
  \( L_{i} = 0 \text{ µH} \)

Note 2. Installation
  - All wiring shall comply with local installation requirements. (refer to the control drawing)
  - When installing the transmitter in “ic” FISCO system or FNICO system, follow the installation requirements of each system.
  - Cable glands, adapters and/or blanking elements shall be of Ex “n”, Ex “e” or Ex “d” and shall be installed so as to maintain the specified degree of protection (IP Code) of the transmitters.

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 ATEX intrinsically safe.

[Control Drawing]

Note 4. Specific Conditions of Use

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the gereration of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- When the lightning protector option is specified, the apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

(2) Electrical Connection

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

<table>
<thead>
<tr>
<th>Screw Size</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO M20 × 1.5 female</td>
<td>Δ M</td>
</tr>
<tr>
<td>ANSI 1/2 NPT female</td>
<td>Δ N or Δ W</td>
</tr>
</tbody>
</table>

(3) Installation

**WARNING**

- 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

**WARNING**

- 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

**WARNING**

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

- Tag plate for intrinsically safe Ex ia for HART/BRAIN

- Tag plate for intrinsically safe Ex ia for Fieldbus

- Tag plate for intrinsically safe Ex ic for HART/BRAIN

- Tag plate for intrinsically safe Ex ic for Fieldbus

---

**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: The first number in the second block of "NO." column is the last one number of the production year.

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

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

*3: The identification number of Notified Body.
2.4.4 IECEx Certification

Model EJX Series pressure transmitters with optional code /SU21 can be selected the type of protection (IECEx Intrinsically Safe Ex ia, Ex ic or flameproof) for use in hazardous locations.

EJX Series pressure transmitters with optional code /SS26 can be selected the type of protection (IECEx intrinsically safe Ex ia or Ex ic) for use in hazardous locations.

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. For combined approval types, once a device of multiple approval type is installed, it should not be re-installed using any other approval types. Apply a permanent mark in the check box of the selected approval type on the certification label on the transmitter to distinguish it from unused approval types.

a. IECEx Intrinsically Safe Ex ia for HART/ BRAIN Protocol Type (Except for EJX9□0A)

Caution for IECEx Intrinsically safe Ex ia.

Note 1. EJX/EJA-E series pressure transmitters with optional code /SU21 are applicable for use in hazardous locations
- No. IECEx DEK 11.0081X
- Ex ia IIC T4 Ga
- Ambient Temperature: –50 to 60°C
- Max. Process Temp.: 120°C
- Enclosure: IP66/IP67
To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

Note 2. Electrical Data
- Maximum Input Voltage (Ui) = 30 V
- Maximum Input Current (Ii) = 200 mA
- Maximum Input Power (Pi) = 0.9 W (linear source)
- Maximum Internal Capacitance (Ci) = 27.6 nF
- Maximum Internal Inductance (Li) = 0 μH
When the lightning protector option is specified, the apparatus is not capable of withstanding the 500V insulation test required by IEC60079-11. This must be taken into account when installing the apparatus.

Note 3. Installation
- In any safety barrier used output current must be limited by a resistor ‘R’ such that Io=Uz/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 is prohibited and will void IECEx certification.

b. IECEx Intrinsically Safe Ex ic for HART/ BRAIN Protocol Type (Except for EJX9□0A)

Caution for IECEx Intrinsically safe Ex ic.

Note 1. EJX/EJA-E series pressure transmitters with optional code /SU21 are applicable for use in hazardous locations
- No. IECEx DEK 13.0061X
- Ex ic IIC T4 Gc
- Ambient Temperature: –30°C to 60°C
  * -15 °C when /HE is specified.
- Max. Process Temp.: 120°C
- IP Code: IP66
- Overvoltage Category: I

Warning

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- When the enclosure of the pressure transmitter is made of aluminum, if it is mounted in an area where the use of EPL Ga equipment 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.
- Electrostatic charges on the coated parts of Pressure Transmitter shall be avoided.
2. Handling Cautions

Note 2. Electrical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Input Voltage (Ui)</td>
<td>30 V</td>
</tr>
<tr>
<td>Maximum Internal Capacitance (Ci)</td>
<td>27.6 nF</td>
</tr>
<tr>
<td>Maximum Internal Inductance (Li)</td>
<td>0 μH</td>
</tr>
</tbody>
</table>

Note 3. Installation

- The pressure transmitter is allowed to be installed in "nL" systems, on condition that the output parameters of "nL" source (associated energy-limited apparatus) are suitable to the above mentioned input parameters of the pressure transmitter and the cable parameters.
- Cable glands, adapters and/or blanking elements shall be of Ex "n", Ex "e" or Ex "d" and shall be installed so as to maintain the specified degree of protection of the equipment.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx certification.

Note 3. Installation

- In the rating 1(*1), the output current of the barrier must be limited by a resistor 'Ra' such that Io = Uo/Ra.
- In the rating 2(*2), the output of the barrier must be the characteristics of the trapezoid or the rectangle and this transmitter can be connected to Fieldbus equipment which are in according to the FISCO model.
- The terminators may be built in by a barrier.
- More than one transmitter may be connected to the power supply line.
- The terminator and the safety barrier shall be certified.

Note 4. Specific Condition of Use

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- The apparatus is not capable of dielectric strength tests required by IEC 60079-11. This must be taken into account when installing the apparatus.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /SS26 are applicable for use in hazardous locations.

- No. IECEx DEK 12.0016X
- Ex ia IIC/IIB T4 Ga
- Ambient Temperature: –40 to 60°C
- Max. Process Temp.: 120°C

---

**c. IECEx Intrinsically Safe Ex ia for Fieldbus Type (Except for EJX9□0A)**

Caution for IECEx Intrinsically safe Ex ia.

- In the rating 1(*1), the output current of the barrier must be limited by a resistor 'Ra' such that Io = Uo/Ra.
- In the rating 2(*2), the output of the barrier must be the characteristics of the trapezoid or the rectangle and this transmitter can be connected to Fieldbus equipment which are in according to the FISCO model.
- The terminators may be built in by a barrier.
- More than one transmitter may be connected to the power supply line.
- The terminator and the safety barrier shall be certified.
Electrical data:
Maximum Input Voltage $U_i$: 24 V
Maximum Input Current $I_i$: 250 mA
Maximum Input Power $P_i$: 1.2 W
Maximum Internal Capacitance $C_i$: 3.52 nF
Maximum Internal Inductance $L_i$: 0 $\mu$H

or

Maximum Input Voltage $U_i$: 17.5 V
Maximum Input Current $I_i$: 380 mA
Maximum Input Power $P_i$: 5.32 W
Maximum Internal Capacitance $C_i$: 3.52 nF
Maximum Internal Inductance $L_i$: 0 $\mu$H

or

Maximum Input Voltage $U_i$: 17.5 V
Maximum Input Current $I_i$: 460 mA
Maximum Input Power $P_i$: 5.32 W
Maximum Internal Capacitance $C_i$: 3.52 nF
Maximum Internal Inductance $L_i$: 0 $\mu$H

Note 4. Specific Condition of Use

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- In the case where the enclosure of the pressure transmitter is made of aluminum, if it is mounted in an area where the use of EPL Ga equipment is required, it shall be installed in such a way that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- When the lightning protector option is specified, the apparatus is not capable of withstanding the 500 V insulation test required by IEC 60079-11. This must be taken into account when installing the apparatus.

**IECEx Intrinsically Safe Ex ic for Fieldbus Type (Except for EJX9□0A)**

Caution for IECEx Intrinsically safe Ex ic.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /SS26 are applicable for use in hazardous locations.

- No. IECEx DEK 13.0064X
- Ex ic IIC T4 Gc
- Ambient Temperature: –30°C to 60°C *
  -15°C when /HE is specified.
- Max. Process Temp.: 120°C
- IP Code: IP66
- Overvoltage Category: I

**Note 2. Electrical Data**

- Intrinsically safe ratings are as follows:
  - Maximum Input Voltage ($U_i$) = 32 V
  - Maximum Internal Capacitance ($C_i$) = 3.52 nF
  - Maximum Internal Inductance ($L_i$) = 0 $\mu$H

**Note 3. Installation**

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and will void IECEx Intrinsically safe and type certification.
- The pressure transmitter is allowed to be installed in "nL" systems, on condition that the output parameters of "nL" source (associated energy-limited apparatus) are suitable to the above mentioned input parameters of the pressure transmitter and the cable parameters.
- When installing the transmitter in "ic" FISCO system or FNICO system, follow the installation requirements of each system.
- Cable glands, adapters and/or blanking elements shall be of Ex "n", Ex "e" or Ex "d" and shall be installed so as to maintain the specified degree of protection of the equipment.
- For multiple types of protection, the selected Ex marking on the marking plate shall be checked at the time of installation.

**Note 4. Specific Condition of Use**

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.
- When the lightning protector option is specified, the apparatus is not capable of withstanding the 500 V insulation test required by IEC 60079-11. This must be taken into account when installing the apparatus.
e. IECEx Flameproof Type

Caution for IECEx flameproof type.

Note 1. EJX/EJA-E Series pressure transmitters with optional code /SF2 or /SU21 are applicable for use in hazardous locations:

- No. IECEx CSA 07.0008
- Flameproof for Zone 1, Ex d IIC T6...T4 Gb
- Enclosure: IP66/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. (FOUNDATION Fieldbus and PROFIBUS PA type)
  9 to 28 V dc, 27 mW (Low Power type)
  9 to 30 V dc, 250 mW (RS485 Modbus Communication Type)
- Output Signal: 4 to 20 mA dc
  15 mA (FOUNDATION Fieldbus and PROFIBUS PA type)
  1 to 5 V (Low Power type)
  RS485 Modbus (RS485 Modbus Communication Type)

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.
- Wiring connection for output signal code Q (Low Power type) shall follow the diagram below.

Note 3. Operation

- WARNING: AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
- WARNING: WHEN THE AMBIENT TEMP.≥65°C, USE HEAT-RESISTING CABLE AND CABLE GLAND ≥90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.
- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of the product.

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

<table>
<thead>
<tr>
<th>Screw Size</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO M20 × 1.5 female</td>
<td>△M</td>
</tr>
<tr>
<td>ANSI 1/2 NPT female</td>
<td>△N or △W</td>
</tr>
</tbody>
</table>

Location of the mark

2.5 EMC Conformity Standards

EN 61326-1 Class A, Table 2 (for use in industrial locations)
EN 61326-2-3
EN 61326-2-5 (for Fieldbus)

CAUTION

To meet EMC regulations, Yokogawa recommends that customers run signal wiring through metal conduits or use shielded twisted-pair cabling when installing EJX/EJA-E Series transmitters in a plant.
## 2.6 Pressure Equipment Directive (PED)

### (1) General
- EJX/EJA-E Series pressure transmitters are categorized as piping under the pressure accessories section of directive 2014/68/EU, which corresponds to Article 4, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).
- EJX110A-□MS, EJX110A-□HS, EJX110A-□VS, EJA110E with /HG, EJC130□, EJC440□, EJC510□-□D, EJC530□-□D, EJX610A-□D, and EJX630A-□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 4, 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Capsule code</th>
<th>PS*1 (bar)</th>
<th>V(L)</th>
<th>PS.V (bar.L)</th>
<th>Category*2</th>
</tr>
</thead>
<tbody>
<tr>
<td>EJA110E</td>
<td>M, H, V</td>
<td>160</td>
<td>0.01</td>
<td>1.6</td>
<td>Art, 4, Par 3 (SEP)</td>
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<tr>
<td>EJ□□110□</td>
<td>F, L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EJ□□110□ with code /HG</td>
<td>M, H, V</td>
<td>250</td>
<td>0.01</td>
<td>2.5</td>
<td>III</td>
</tr>
<tr>
<td>EJ□□110□ with code /PE3</td>
<td>M, H, V</td>
<td>250</td>
<td>0.01</td>
<td>2.5</td>
<td>III</td>
</tr>
<tr>
<td>EJC□□130□</td>
<td>M, H</td>
<td>500</td>
<td>0.01</td>
<td>5.0</td>
<td>Art, 4, Par 3 (SEP)</td>
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<tr>
<td>EJC□□130□ with code /PE3</td>
<td>M, H</td>
<td>500</td>
<td>0.01</td>
<td>5.0</td>
<td>III</td>
</tr>
<tr>
<td>EJC□□310□</td>
<td>L, M, A, B</td>
<td>160</td>
<td>0.01</td>
<td>1.6</td>
<td>Art, 4, Par 3 (SEP)</td>
</tr>
<tr>
<td>EJC■□430□</td>
<td>H, A, B</td>
<td>160</td>
<td>0.01</td>
<td>1.6</td>
<td>Art, 4, Par 3 (SEP)</td>
</tr>
<tr>
<td>EJC□□440□</td>
<td>C, D</td>
<td>500</td>
<td>0.1</td>
<td>5.0</td>
<td>Art, 4, Par 3 (SEP)</td>
</tr>
<tr>
<td>EJC□□440□ with code /PE3</td>
<td>C, D</td>
<td>500</td>
<td>0.1</td>
<td>5.0</td>
<td>III</td>
</tr>
</tbody>
</table>

*1: PS is maximum pressure for vessel itself based on Pressure Equipment Directive 2014/68/EU. Refer to General Specification for maximum working pressure of a transmitter.
*2: Referred to Table 1 covered by ANNEX II of EC Directive on Pressure Equipment Directive 2014/68/EU.

### (3) Operation

⚠️ **CAUTION**
- 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.
2.7 Safety Requirement Standards

Applicable standard: EN 61010-1, EN 61010-2-30, C22.2 No.61010-1, C22.2 No.61010-2-030

(1) Pollution Degree 2

"Pollution degree" describes the degree to which a solid, 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 condensation 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) Altitude of installation site:

Max. 2,000 m above sea level

(4) Indoor/Outdoor use
3. Installation

**IMPORTANT**

- 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 EJ□430□, EJ□440□ and EJ□438□, the atmospheric opening is located on the low pressure side cover flange. For EJ□530□ and EJX630A whose capsule code is A, B, or C, the pipe of the atmospheric opening is located on the pressure detecting section. These openings must not face upward.

![Diagram of EJ□530□ and EJX630A Horizontal Mounting Position](F0301.ai)

### 3.1 Mounting

- The transmitter can be mounted on a nominal 50 mm (2-inch) pipe using the mounting bracket supplied, as shown in Figure 3.2 and 3.3. Tighten the (four) bolts that hold the transmitter with a torque of approximately 39 N·m (4 kgf·m).

![Diagram of Transmitter Mounting (Horizontal Impulse Piping Type)](F0302.ai)

### 3.2 Mounting the Diaphragm Seals

**IMPORTANT**

- Please use a gasket with an inside diameter (ød) that is greater than the diameter of the diaphragm seal. If a gasket with a smaller inside diameter is used, the diaphragm may not function correctly.
- During the diaphragm seal installation, ensure as far as possible that no seal liquid head pressure is applied to the diaphragm seals.
- Exercise care so as not to damage diaphragm surfaces. Since the diaphragm protrudes approx. 1 mm from the flange surface, do not place the pressure detector section face down on a surface as this can damage the diaphragm.
- Do not sharply bend or twist capillary tube or apply excessive stress to them.
- Never loosen the four bolts securing the cover flange or the screws at the joints between the capillary tube and cover flanges. If the seal liquid leaks, the transmitter cannot be used.

![Diagram of Transmitter Mounting (Vertical Impulse Piping Type)](F0303.ai)

![Diagram of EJ□510□ and EJ□530□ Mounting](F0304.ai)
3.2.1 EJ□210□

The transmitter is mounted on a process using its high pressure side flange as shown in Figure 3.5. The customer should prepare the mating flange, gasket, stud bolts and nuts.

![Figure 3.5 EJ□210□ Mounting](F0305.ai)

3.2.2 EJ□118□ and EJ□438□

Mount the diaphragm seals using the flanges as shown in Figure 3.6. The mating flange, gasket, bolts and nuts are to be procured by the customer.

![Figure 3.6 Mounting the Diaphragm Seals](F0306.ai)

3.3 Diaphragm Seals Installation Consideration

**IMPORTANT**

- When measuring the liquid level of the tank, the minimum liquid level (zero point) must be set to a level at least 50 mm above the center of the high pressure side diaphragm seal (see Figure 3.7).
- Correctly install the diaphragm seals on the high and low pressure sides of the process, checking the label on each seal.
- To avoid measuring error due to temperature difference between the two diaphragm seals, capillary tube must be bound together. The capillary tube must be securely fixed to the tank wall to prevent movement by wind or vibration. If the capillary tube is too long, loosely coil the extra tube portion (coil diameter of 300 mm or more) and secure the coiled tube with a clamp.

![Figure 3.7 Installing the Diaphragm Seals to a Tank](F0307.ai)
IMPORTANT

The transmitter should be installed at least 600 mm below the high pressure (HP) process connection to ensure a positive head pressure of fill fluid. Pay special attention to vacuum applications.

If it cannot be installed at least 600 mm below the HP process connection, please use the equation below:

\[ h = \frac{(P-P_0)}{d_s} \times 0.102 \text{ [mm]} \]

- \( h \): Vertical height between the HP process connection and the transmitter (mm)
- \( h \leq 0 \): Install the transmitter at least \( h \) (mm) below the HP process connection
- \( h > 0 \): Install the transmitter at most \( h \) (mm) above the HP process connection

\( P \): Pressure in the tank (Pa abs)
\( P_0 \): Minimum working pressure limit of the transmitter (Pa abs) See below table.

[For fill fluid code A, B, C, D, E]

<table>
<thead>
<tr>
<th>Wetted parts material code</th>
<th>Capillary length</th>
<th>Process connection size code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW</td>
<td>1 to 5m</td>
<td>2, 8</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>10030, 3520</td>
</tr>
<tr>
<td>SE</td>
<td>1 to 5m</td>
<td>6790, 3190</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>10030, 3520</td>
</tr>
<tr>
<td>SY</td>
<td>1 to 5m</td>
<td>3190</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>3520</td>
</tr>
<tr>
<td>HW</td>
<td>1 to 5m</td>
<td>19150, 6140</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>8390, 3520</td>
</tr>
<tr>
<td>TW</td>
<td>1 to 5m</td>
<td>9820, 3620</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>4210</td>
</tr>
<tr>
<td>UW</td>
<td>1 to 5m</td>
<td>9540, 4750</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>6050</td>
</tr>
</tbody>
</table>

[For fill fluid code 1, 2, 4]

<table>
<thead>
<tr>
<th>Wetted parts material code</th>
<th>Capillary length</th>
<th>Process connection size code</th>
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</thead>
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<tr>
<td>SW</td>
<td>1 to 5m</td>
<td>2, 8</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>4680, 530</td>
</tr>
<tr>
<td>SE</td>
<td>1 to 5m</td>
<td>2570, 320</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>4680, 530</td>
</tr>
<tr>
<td>SY</td>
<td>1 to 5m</td>
<td>2570, 320</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>4680, 530</td>
</tr>
<tr>
<td>HW</td>
<td>1 to 5m</td>
<td>10220, 2050</td>
</tr>
<tr>
<td></td>
<td>6 to 10m</td>
<td>3450</td>
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<td>TW</td>
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<td>4270, 570</td>
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<tr>
<td></td>
<td>6 to 10m</td>
<td>960</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Fill fluid code</th>
<th>A, 1, 4</th>
<th>B</th>
<th>C, 2</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>ds: Specific gravity</td>
<td>1.07</td>
<td>0.94</td>
<td>1.09 to 1.92</td>
<td>1.09</td>
<td></td>
</tr>
</tbody>
</table>

3.4 Mounting the Flushing Connection Ring

3.4.1 Mounting to Pressure Detector Section

The flushing connection ring is mounted to the pressure detector section as shown in Figure 3.9.

At the factory shipment, the flushing connection ring is already assembled and attached to process detector section.

(1) Mount the ring holder on the ring and loosely tighten the mounting screws.
(2) Place the spiral gasket in the ring groove. With the ring correctly aligned and flush with the face of the pressure detector, securely tighten each ring holder’s mounting screws.
(3) Position the ring so that the vent/drain plugs are aligned straight up and down.

Figure 3.9 Mounting to Pressure Detector Section
3.4.2 Mounting to Process Flange

Tighten the bolts to completely close the gap between the ring and the pressure detector section. The mating flange, gasket, stud bolts and nuts are to be procured by the customer.

![Diagram of Mounting to Process Flange]

**IMPORTANT**

- Confirm that there is no gap between the ring and the process-detector section after they are mounted on the process flange. A gap can lead to a sudden, explosive release of process fluids.
- When mounting or removing the ring, take care not to tilt the pressure detector downward as the ring can slip off and cause injury.
- When re-mounting the ring, use the new spiral gasket as shown in below table.

<table>
<thead>
<tr>
<th>Table 3.1 Spiral Gasket for Pressure Detector Section Side*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>F9350SV</td>
</tr>
<tr>
<td>F9970XF</td>
</tr>
<tr>
<td>F9350ST</td>
</tr>
<tr>
<td>F9970XD</td>
</tr>
<tr>
<td>F9346ZH</td>
</tr>
<tr>
<td>F9970XB</td>
</tr>
</tbody>
</table>

*: Material: 316SST (Hoop), PTFE Teflon (Filler)
**: For oil-prohibited use (Option code: /K1, /K2, /K5, /K6)

---

3.5 Affixing the Teflon Film

**IMPORTANT**

The FEP Teflon option includes a teflon film and fluorinated oil. Before mounting the transmitter to the process flange, affix the teflon film as follows:

1) Position the diaphragm seal so that the diaphragm is in an upward position.
2) Pour the fluorinated oil on the diaphragm and gasket area covering it completely and evenly. Be careful not to scratch the diaphragm or change its shape.
3) Affix the teflon film over the diaphragm and gasket area.
4) Next, carefully inspect the cover and try to identify any entrapped air between the diaphragm and the teflon film. The air must be removed to ensure optimum performance. If air pockets are present, use your fingers to remove the air by starting at the center of the diaphragm and work your way out.
5) Position the gasket on the Teflon film.
6) Mount the transmitter onto the process flange.

![Diagram of Affixing the Teflon Film]
3.6 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 N·m.

**IMPORTANT**

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

3.7 Changing the Direction of Integral Indicator

**IMPORTANT**

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

An integral indicator can be installed in the following three directions.

**Figure 3.13 Integral Indicator Direction**

**IMPORTANT**

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 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 N·m.

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.
4) After rotating the LCD, align both the LCD board assembly and CPU assembly connectors and engage them.
5) Insert and tighten the two mounting screws.
6) Replace the cover.

**Figure 3.14 Rotating Integral Indicator**
4. Installing Impulse Piping

4.1 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 liquid-filled impulse line, or the drain of 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.

4.1.1 Connecting Impulse Piping to the Transmitter

(1) Check the High and Low Pressure Connections on the Transmitter (Figure 4.1)

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.

(2) Changing the Process Connector Piping Connections (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 the 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 pipe-mounting 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 |

---

| Impulse piping |
| Stop valve (low pressure side) |
| Equalizing valve (balancing) |
| 3-valve manifold |
| Process connector |
| Nipple |
| Pipe |
| Ball head lock nut |
| Stop valve (high pressure side) |
| 50 mm (2-inch) pipe |

---

Figure 4.3 3-Valve Manifold (Pipe-Mounting Type)
1) 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.)

2) 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 → transmitter-end ball head lock nuts → 3-valve manifold ball head lock nuts → 3-valve manifold mounting bracket U-bolt nuts

**Direct-Mounting Type 3-Valve Manifold**

1) 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.)

**4.1.2 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 4.5 according to the kind of fluid being measured.

**NOTE**

- 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 4.5 Process Pressure Tap Angle (For Horizontal Piping)](F0405.ai)

(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.

**NOTE**

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.
4. Installing Impulse Piping

(4) Temperature Difference Between Impulse Piping (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 a 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.

NOTE

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.

4.2 Impulse Piping Connection Examples

Figure 4.6, 4.7, and 4.8 shows 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.

- 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 4.6 Impulse Piping Connection Examples (for differential pressure transmitters)

Figure 4.7 Impulse Piping Connection Examples (for differential pressure transmitters)
4.3 Process Piping Installation Precautions (EJ□115□)

4.3.1 Connecting Process Piping to the Transmitter

(1) Confirming the Process Fluid Flow Direction

The mark “<” on the manifold indicates the direction in which the process fluid is flowed (from right to left). When connecting the process piping to the process connector, confirm the process fluid flow direction.

(2) Tightening the Process Connector Mounting Bolts

The transmitter is shipped with the process connector mounting bolts only loosely tightened. After connecting the process piping, tighten these bolts uniformly to prevent leaks with a torque of 39 to 49 N·m (4 to 5 kgf·m).

(3) Removing the Process Connector Port Dustproof Cap

The process connector port threads are covered with a plastic cap to exclude dust. This cap must be removed before connecting the piping. (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.)

4.3.2 Routing the Process Piping

(1) Relationship between Process Fluid and Manifold Locations (For the vertical impulse piping type)

If condensate (or gas) generated in the process piping were allowed to accumulate, then it would be necessary to remove it periodically by opening the drain (or vent) plug. However, this would generate a transient disturbance in the pressure measurement. Therefore, the process piping must be routed so that any condensate (or gas) generated in the process piping will not accumulate in the pressure-sensing assembly of the transmitter.

NOTE

- If the process fluid is a gas, then as a rule the manifold must be located at the downside of the pressure-sensing assembly.
- If the process fluid is a liquid, then as a rule the manifold must be located at the upside of the pressure-sensing assembly.

(2) Pipe Size for Process Piping

Use a 15 mm (1/2-inch) pipe for process piping connection to the process connector.

(3) Preventing Freezing

If there is any risk that the process fluid in the transmitter pressure-sensing assembly could freeze or solidify, use a steam jacket or heater to maintain the temperature of the fluid.

(4) Process Piping Connection Examples

Figure 4.10 shows examples of typical process 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 process piping material used must be compatible with the process pressure, temperature, and other conditions.
A variety of process piping-mounted stop 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 4.10 Process Piping Connection Examples (EJ□115□)**
5. Wiring

5.1 Wiring Precautions

- Lay wiring as far as possible from electrical noise sources such as large capacity transformers, motors, and power supplies.
- Remove 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 explosion-protected 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.

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 N·m.

Plug and seal an unused conduit connection.

5.2 Connections of External Wiring to Terminal Box

- Terminal Configuration

RTD cable connection*

- Terminal Wiring for 4 to 20 mA output

| SUPPLY + | Power supply and output terminals |
| CHECK or ALARM | External indicator (ammeter) terminals[1][2] |
| Status contact output terminals[2] (when /AL is specified) |
| Ground terminal |

*For EJX9□□A only.

- Terminal Wiring for 1 to 5 V output

| SUPPLY + | Power supply terminals |
| VOUT + | 1 to 5 V DC with HART communication terminals |
| Ground terminal |

- Terminal Wiring for 4 to 20 mA output [EJX9□□A]

| SUPPLY + | Power supply and output terminals |
| CHECK + | External indicator (ammeter) terminals[1][2] |
| PULSE + | Pulse or status contact output terminals[2] |
| 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 FOUNDATION Fieldbus and PROFIBUS PA communication types.

---

*Figure 5.1 Shrouding Bolt

*Figure 5.2 Terminal
5.2.1 Power Supply Wiring Connection

**IMPORTANT**

Connecting with the commercial AC power supply will damage the device. Be sure to use the DC power supply in the predetermined range.

Connect the power supply wiring to the SUPPLY + and – terminals.

![Figure 5.3 Power Supply Wiring Connection](F0502.ai)

Load resistance is not necessary for 1 to 5 V output.

**Figure 5.3 Power Supply Wiring Connection**

5.2.2 Configuration Tool Connection

- **4 to 20 mA output, BRAIN / HART**

Connect the configuration tool to the SUPPLY + and – terminals. (Use hooks.)

![Figure 5.4 Configuration Tool Connection](F0503.ai)

Ignore the polarity since the configuration tool is AC-coupled to the terminal box.

**Figure 5.4 Configuration Tool Connection**

- **1 to 5 V output, HART**

Connect the HART communicator or configuration tool to the SUPPLY - and VOUT (+) terminals. (Use hooks.)

![Figure 5.5 Four wire connection](F0532.ai)

**Figure 5.5 Four wire connection**

5.2.3 Status Output Connection

When option code /AL is specified, connect the external wiring as shown in Figure 5.7.

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 5.7 Status Output Connection](F0504.ai)

**Figure 5.7 Status Output Connection**

Transmitter terminal box

24V DC

Distributor

External power supply 30V DC, 120mA max

AC power supply

Magnetic valve

Use two-wire separately shielded cables.

Transmitter terminal box

250Ω

Power supply

Voltage

PC/FieldMate Modem

 Voltmeter

Power supply

USB

PC/FieldMate

 Voltmeter

USB

PC/FieldMate

 Voltmeter

USB

PC/FieldMate
### 5.2.4 Connection Example for EJX910A and EJX930A

#### Table 5.1  The connection example for simultaneous analog and pulse and alarm, status output. (For HART protocol type)

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog Output</strong></td>
<td>In this case, Communication is possible (up to a distance of 2km when a CEV cable is used.)</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Either B or +</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td>24V DC</td>
</tr>
<tr>
<td>PULSE B</td>
<td>250Ω</td>
</tr>
<tr>
<td>Distributor</td>
<td></td>
</tr>
<tr>
<td><strong>Pulse Output</strong></td>
<td>In this case, No communication is possible.</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Shielded Cable</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td></td>
</tr>
<tr>
<td>PULSE B</td>
<td>Either B or +</td>
</tr>
<tr>
<td>Distributor</td>
<td>Electric counter</td>
</tr>
<tr>
<td>250Ω</td>
<td></td>
</tr>
<tr>
<td><strong>Status Output</strong></td>
<td>In this case, No communication is possible.</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Shielded Cable</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td></td>
</tr>
<tr>
<td>PULSE B</td>
<td>Either B or +</td>
</tr>
<tr>
<td>Distributor</td>
<td>Relay</td>
</tr>
<tr>
<td>250Ω</td>
<td></td>
</tr>
<tr>
<td><strong>Simultaneous Analog - Pulse Output</strong></td>
<td>When analog and pulse output are used, the length of communication line is subjected to wiring conditions. Refer to example 1 to 3.</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Shielded Cable</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td></td>
</tr>
<tr>
<td>PULSE B</td>
<td>Either B or +</td>
</tr>
<tr>
<td>Distributor</td>
<td>Electric counter</td>
</tr>
<tr>
<td>250Ω</td>
<td></td>
</tr>
<tr>
<td><strong>Simultaneous Analog - Pulse Output</strong></td>
<td>When analog and pulse output are used, the length of communication line is subjected to wiring conditions. Refer to example 1 to 3.</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Shielded Cable</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td></td>
</tr>
<tr>
<td>PULSE B</td>
<td>Either B or +</td>
</tr>
<tr>
<td>Distributor</td>
<td>Electric counter</td>
</tr>
<tr>
<td>250Ω</td>
<td></td>
</tr>
<tr>
<td><strong>Simultaneous Analog - Pulse Output</strong></td>
<td>When analog and pulse output are used, the length of communication line is subjected to wiring conditions. Refer to example 1 to 3.</td>
</tr>
<tr>
<td>Transmitter Electrical Terminal</td>
<td>Shielded Cable</td>
</tr>
<tr>
<td>SUPPLY +</td>
<td></td>
</tr>
<tr>
<td>PULSE B</td>
<td>Either B or +</td>
</tr>
<tr>
<td>Distributor</td>
<td>Electric counter</td>
</tr>
<tr>
<td>250Ω</td>
<td></td>
</tr>
</tbody>
</table>

#### Example 1
**In this case, Communication is possible (up to a distance of 2km when a CEV cable is used).**

- **Example 2**
  In this case, Communication is possible (up to a distance of 200m when a CEV cable is used) and R = 1kΩ.

- **Example 3**
  In this case, No communication is possible (when shielded cable is not used).

**The range of load resistance R for the pulse output.**

The load resistance of pulse output should be used to 1kΩ, 2W.

If no translation of the pulse output possible by the cable length or the frequency of the pulse output, the load resistance should be selected by calculation as shown below.

\[
\frac{E}{120} \leq R \leq \frac{0.1}{C(\mu F) \times f (kHz)}
\]

Where
- \( E \) = Supply voltage (V)
- \( f \) = Frequency of pulse output (kHz)
- \( R \) = Value of load resistance (kΩ)

**Example of CEV cable capacitance**

\[
C = 0.1 \mu F/km
\]

**Example 3**

In this case, No communication is possible (when shielded cable is not used).

\[
P (mW) = \frac{E^2}{R (k\Omega)}
\]

Where
- \( E \) = Supply voltage (V)
- \( R \) = Value of load resistance (kΩ)

- **1:** To avoid the influence of external noise, use an electric counter which fits to the pulse frequency.
- **2:** Resistor is not necessary in case of an electric counter which can receive contact pulse signal directly.
- **3:** When using analog and pulse output simultaneously, the HART communication may be influenced by noise comparing analog output only. Take countermeasure for noise shown above, e.g. use shield cable etc.
5.2.5 External Temperature Connection (for EJX910A and EJX930A)

Connect the RTD cable assembly to the Juck Terminal.

Figure 5.8 External Temperature Connection

5.3 Wiring

5.3.1 Loop Configuration

Since the DPharp uses a two-wire transmission system for 4 to 20 mA output, 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 5.6.

For 1 to 5 V output, three or four wire system is used. See (4).

(1) General-use Type and Flameproof Type (4 to 20 mA output)

- Analog Output

Hazardous Location
Transmitter terminal box

Nonhazardous Location
Distributor (Power supply unit)

Receiver instrument

Figure 5.9 Connection between Transmitter and Distributor

- Pulse output and Alarm, Status Output or Simultaneous Analog-Pulse Output (for EJX910A and EJX930A)

Hazardous Location
Transmitter terminal box

Nonhazardous Location
Distributor (Power supply unit)

Receiver instrument

Figure 5.10 Connection between Transmitter and Distributor

(2) Intrinsically Safe Type (4 to 20 mA output)

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

Hazardous Location
Transmitter terminal box

Nonhazardous Location
Distributor (Power supply unit)

Receiver instrument

Safety barrier

Figure 5.11 Connection between Transmitter and Distributor

(3) Intrinsically Safe Type (for EJX910A and EJX930A)

- Analog Output

Hazardous Location
Transmitter terminal box

Nonhazardous Location
Safety barrier (Isolation type)

Receiver instrument (and power supply)

Power supply
Analog input

Figure 5.12 Connection between Transmitter and Distributor
5.3.2 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.

![Diagram of typical wiring using flexible metal conduit]

5. Wiring

- Simultaneous Analog-Pulse Output

![Diagram of connection between Transmitter, barrier and receiver]

(4) 1 to 5 V output

Either three or four wire system can be used. Power supply line and 1 to 5 V signal line commonly use the SUPPLY - terminal.

**NOTE**

With three wire connection, the cable length may affect the measurement accuracy of the output signal. In either three-wire or four-wire connection, recommended wiring distance is 200 m or less, and the use of shielded cable is recommended.

- Three wire connection

  A negative wiring shall be commonly used for power supply and signal line.

  ![Diagram of connection between Transmitter, Distributor and Receiver]

- Four wire connection

  Fasten the negative side wiring of both power supply and signal line to the SUPPLY - terminal.

  ![Diagram of connection between Transmitter, Distributor and Receiver]
(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.

![Diagram of Flameproof Type Wiring](F0512.ai)

**Figure 5.16 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.

![Diagram of Flameproof Metal Conduit Wiring](F0513.ai)

**Figure 5.17 Typical Wiring Using Flameproof Metal Conduit**

5.4 RTD Cable Connection (EJX910A/EJX930A)

Connection of the RTD cable is always required to measure external temperature. Follow the procedures below to connect a cable when a cable gland or a conduit is used.

5.4.1 Connecting Shielded Cable with Cable Gland (External temperature input code: -1, -2, -3, and -4)

- RTD connection components: EJX multivariable transmitter, two cable glands, and RTD cable. Two cable glands are attached.

![Diagram of RTD Cable Connection](F0514.ai)

**Figure 5.18 RTD Cable Connection Using Flameproof Packing Adapter**

The RTD cable connecting port is covered with a cap to keep out dust. The cap should not be removed until you are ready to install the cable.

- Components for the cable gland
The cable gland assembly consists of an entry, seal, running coupler, and backnut. Confirm that the seal is attached inside the entry and that the thread size of the cable gland is the same as that for the RTD electrical connection.

1/2NPT Type

![Diagram of 1/2NPT Type Cable Gland](F0515.ai)

**Figure 5.19 1/2NPT Type Cable Gland**

M20 Type

![Diagram of M20 Type Cable Gland](F0516.ai)

**Figure 5.20 M20 Type Cable Gland**

⚠️ CAUTION

Input/output signal is non-isolated. Do not turn on power supply until you complete all the wiring work.
Procedure

1. Disassemble the cable gland: loosen the running coupler to separate the backnut from the entry.

2. Remove the protection cap over the transmitter electrical connection and install the entry on the electrical connection. Note that a non-hardening sealant should be applied to the threads for a 1/2 NPT connection and a gasket should be used for an M20 connection.

3. Pass the RTD cable through the running coupler and backnut assembly.

4. Insert the RTD cable and firmly plug its connector into the connecting port in the transmitter's terminal box.

5. Align the running coupler on the entry.

6. Turn the running coupler until the seal in the entry comes into contact with the RTD cable.

7. Rotate the running coupler another half turn to securely tighten the seal on the RTD cable.

8. Use a protection conduit, if necessary. In this case, insert the cable through the conduit and attach it to the Backnut.

CAUTION
After the cable is secured as explained above, do not tighten the running coupler any further; to do so could damage the RTD connection. Do not pull the cable or subject it to excessive mechanical shock.

5.4.2 Connecting Shielded Cable for Conduit Use (External temperature input code: -B, -C, and -D)

- RTD connection components: EJX multivariable transmitter and RTD cable

Procedure

1. Remove the protection cap protecting the RTD electrical connection and insert the RTD cable.

2. Remove the cap protecting the connecting port. Then insert the RTD cable and firmly plug the connector into the connecting port in the transmitter's terminal box.

3. Insert the cable through the conduit and attach it to the RTD electrical connection.

CAUTION
Do not pull the cable or subject it to excessive mechanical shock.
5.4.3 Cable Connection RTD Terminal Box Side

EJX multivariable transmitter RTD I/F is for 3-wire Type RTD, Pt100. 
Heed the following when wiring an RTD of the 2- or 4-wire type.

**NOTE**

Please note that a temperature error will occur when you use a 2-wire RTD because of wiring resistance. Please do not ground the shield on the RTD side of the cable.

**CAUTION**

Please use only the cables provided with this instrument.
When wiring, be sure not to damage the cable's insulation or its core.
All the cable cores must have sufficient insulation around them.
Do not let the signal line contact the shield line.
Do not allow the shield line or the signal line to come the earth potential voltage.

<table>
<thead>
<tr>
<th>RTD Terminal</th>
<th>A</th>
<th>a</th>
<th>B</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Wire</td>
<td>White</td>
<td>-</td>
<td>Blue1 and Blue2</td>
<td>-</td>
</tr>
<tr>
<td>3-Wire</td>
<td>White</td>
<td>-</td>
<td>Blue1</td>
<td>Blue2</td>
</tr>
<tr>
<td>4-Wire</td>
<td>White</td>
<td>open</td>
<td>Blue1</td>
<td>Blue2</td>
</tr>
</tbody>
</table>

**NOTE**

The color display in the table shows the white line of the cable.
The cable color could change depending on the cable type.
Blue 1 and blue 2 allow changing places.
For 2-wire Type, connect either which is blue 1 or blue 2, and give other side as OPEN.

5.5 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.

5.6 Power Supply Voltage and Load Resistance

For 4 to 20 mA output only.
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.
6. Operation

NOTE
For FOUNDATION Fieldbus, PROFIBUS PA and Modbus communication types and for the transmitter operating confirmation and zeroing by any communication method, refer to each communication manual.

6.1 Preparation for Starting Operation

- Confirming that Transmitter is Operating Properly
  
  On the integral indicator
  - If the wiring system is faulty, the display stays blank.
  - If the transmitter is faulty, an error code is displayed.

- 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, please refer to each communication manual.

- Output Status Setting at CPU Failure and Hardware Write Protection
  
  Set the switches as shown in the figure below 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 except EJX910A and EJX930A. The setting of the switches can be confirmed via communication.

6.2 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 zero-adjustment via communication, procedure, please refer to each 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.

6.2.1 Adjusting Zero Point for Differential Pressure Transmitters

Before adjusting zero point, make sure that the equalizing valve is open.
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 6.2.2(2).

6.2.2 Adjusting Zero Point for Gauge/Absolute Pressure Transmitters

(1) 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.

\[
\text{Actual measured value} = \frac{130 - 50}{250 - 50} \times 100 = 40.0\% 
\]

(=10.4mA)

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

6.3 Local Parameter Setting

**WARNING**

The local push button on the integral indicator must not be used in a hazardous area. When it is necessary to use the push button, operate it in a non-hazardous location.

**IMPORTANT**

- Do not turn off the power to the transmitter immediately after performing parameter setting. Powering off within 30 seconds of performing this procedure will return the parameter to its previous setting.
- The parameter of Ext SW must be "Enabled" to perform this configuration. See the user’s manual IM 01C25T (HART/BRAIN) for the setting procedure.
- The Local Parameter Setting function is available with HART or BRAIN communication type.

6.3.1 Local Parameter Setting (LPS) Overview

Parameter configuration by the external adjustment screw and push button (integral indicator code E) offers easy and quick setup for parameters of Tag number, Unit, LRV, URV, Damping, Output mode (linear/square root), Display out 1, and Re-range by applying actual pressure (LRV/URV). There is no effect on measurement signal (analog output or communication signal) when Local Parameter Setting is carried out.

![Figure 6.3 External Adjustment Screw](F0604.ai)

**Figure 6.3 External Adjustment Screw**

![Figure 6.4 Range –Setting Switch (push button)](F0605.ai)

**Figure 6.4 Range –Setting Switch (push button)**
* Note that the above 1 to 7 parameter configurations are available with the software revision (SOFT REV) 2.03 or later. Software revision can be checked via a field communicator (HART/BRAIN) or DTM. Please refer to IM 01C25T01 for HART parameter “Software rev” and IM 01C25T03 for BRAIN “SOFT REV”.

Figure 6.5
# 7. Errors and Countermeasures

**NOTE**

For HART protocol revision 7, FOUNDATION Fieldbus, PROFIBUS PA and Modbus communication types, please refer to each communication manual.

The table below shows a summary of error messages for BRAIN and HART (protocol revision 5) protocols.

| Table 7.1 Alarm Message Summary (Except EJX910A and EJX930A) |
|-------------------|-------------------|-------------------|-------------------|
| Indicator         | Cause             | Output Operation during Error | Countermeasure     |
| None              | None              | None              | 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. |
| AL. 02 AMP. ERR   | Amplifier temperature sensor problem. | Outputs the signal (Hold, High, or Low) set with parameter. | Replace amplifier. |
| 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. | Use heat insulation or make lagging to keep temperature within range. |
| AL. 12 CAP. TMP   | Capsule temperature is outside range (–50 to 130°C). | | |
| AL. 13 AMP. TMP   | Amplifier temperature is outside range (–50 to 95°C). | | |
| 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 them as needed. |
| AL. 31 SP. RNG    | Static pressure exceeds specified range. | Continues to operate and output. | |
| AL. 35 * P. HI    | Input pressure exceeds specified threshold. | | |
| AL. 36 * P. LO    | | | Check input. |
| AL. 37 * SP. HI   | Input static pressure exceeds specified threshold. | | |
| AL. 38 * SP. LO   | | | |
| AL. 39 * TMP. HI  | Detected temperature exceeds specified threshold. | | |
| AL. 40 * 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     | | | |
| AL. 54 SP. RNG    | Continues to operate and output. | | |
| AL. 55 SP. ADJ    | | | Check input. |
| AL. 60 SC. CFG    | Specified values or settings to define signal characterizer function do not satisfy the condition. | Continues to operate and output. | 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.
Table 7.2 Alarm Message Summary (For EJX910A and EJX930A, HART protocol type)

<table>
<thead>
<tr>
<th>Integral indicator</th>
<th>Cause</th>
<th>4-20mA Output operation during error</th>
<th>Countermeasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL. 01 CAP. ERR</td>
<td>Sensor problem.</td>
<td>Outputs the signal (High or Low) set with burnout direction switch. [status output: undefined]</td>
<td>Replace capsule if the error recurs after the transmitter is restarted.</td>
</tr>
<tr>
<td></td>
<td>Capsule temperature sensor problem.</td>
<td></td>
<td>Replace capsule.</td>
</tr>
<tr>
<td></td>
<td>Capsule EEPROM problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 02 AMP. ERR</td>
<td>Amplifier temperature sensor problem.</td>
<td></td>
<td>Replace amplifier.</td>
</tr>
<tr>
<td></td>
<td>Amplifier EEPROM problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amplifier problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A/D Converter problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 03 ET. ERR</td>
<td>External temperature sensor connection.</td>
<td></td>
<td>Check external temperature sensor.</td>
</tr>
<tr>
<td></td>
<td>No device ID is found.</td>
<td>Continuous to operate and output.</td>
<td>Replace amplifier.</td>
</tr>
<tr>
<td>AL. 10 PRESS</td>
<td>Differential pressure is outside measurement range limit of capsule.</td>
<td>When PV is Pres Output AO upper limit or AO Lower limit.</td>
<td>Check input or replace capsule when necessary.</td>
</tr>
<tr>
<td>AL. 11 ST. PRSS</td>
<td>Static pressure exceeds limit.</td>
<td>When PV is SP Output AO upper limit or AO Lower limit.</td>
<td></td>
</tr>
<tr>
<td>AL. 12 CAP. TMP</td>
<td>Capsule temperature is outside range (–50 to 130°C).</td>
<td>Continues to operate and output.</td>
<td>Use heat insulation or make lagging to keep temperature within range.</td>
</tr>
<tr>
<td>AL. 13 AMP. TMP</td>
<td>Amplifier temperature is outside range (–50 to 95°C).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 14 EXT. TMP</td>
<td>External temperature sensor disconnection.</td>
<td>When PV is ET Output AO upper limit or AO Lower limit.</td>
<td></td>
</tr>
<tr>
<td>AL. 15 EXT. TMP</td>
<td>External temperature sensor resistance is out specification.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 16 PLS</td>
<td>Pulse output is out specification.</td>
<td>Continues to operate and output.</td>
<td>Check settings and change them.</td>
</tr>
<tr>
<td>AL. 30 PRS. RNG</td>
<td>Differential pressure exceeds specified range.</td>
<td>When PV is Pres Output AO upper limit or lower limit.</td>
<td>Check input and range setting, and change them as needed.</td>
</tr>
<tr>
<td>AL. 31 SP. RNG</td>
<td>Static pressure exceeds specified range.</td>
<td>When PV is SP Output AO upper limit or lower limit.</td>
<td></td>
</tr>
<tr>
<td>AL. 32 F. RNG</td>
<td>Flow exceeds specified range.</td>
<td>When PV is Flow Output AO upper limit or lower limit.</td>
<td></td>
</tr>
<tr>
<td>AL. 33 ET. RNG</td>
<td>External temperature exceeds specified range.</td>
<td>When PV is ET Output AO upper limit or lower limit.</td>
<td></td>
</tr>
<tr>
<td>AL. 35 PHI</td>
<td>Input pressure exceeds specified threshold.</td>
<td>Continues to operate and output.</td>
<td>Check input.</td>
</tr>
<tr>
<td>AL. 36 PLO</td>
<td>Input static pressure exceeds specified threshold.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 37 SP.HI</td>
<td>Input flow exceeds specified threshold.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 38 SP.LO</td>
<td>Input external temperature exceeds specified threshold.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 41 F.HI</td>
<td>Specified value is outside of setting range.</td>
<td>Holds at the output value that existed immediately before the error occurred.</td>
<td>Check settings and change them as needed.</td>
</tr>
<tr>
<td>AL. 42 F.LO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL. 43 ET.HI</td>
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<td>AL. 44 ET.LO</td>
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<td>AL. 50 P. LRV</td>
<td>Specified value is outside of setting range.</td>
<td>Holds at the output value that existed immediately before the error occurred.</td>
<td>Check settings and change them as needed.</td>
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<td>AL. 51 P. URV</td>
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<td>AL. 52 P. SPN</td>
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<td>AL. 53 P. ADJ</td>
<td>Continues to operate and output.</td>
<td>Adjust settings and change them as needed.</td>
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<td>AL. 54 SP. RNG</td>
<td>Holds at the output value that existed immediately before the error occurred.</td>
<td>Check settings and change them as needed.</td>
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<td>AL. 55 SP. ADJ</td>
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<td>AL. 56 ET. RNG</td>
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<td>AL. 57 ET. ADJ</td>
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<td>AL. 58 FL. ADJ</td>
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<td>AL. 59 PLS. ADJ</td>
<td>Specified value is outside of setting pulse output.</td>
<td>Normal calculation.</td>
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<td>Under Temperature Fix Mode. PV is ET Temp. Output Fix at 4mA.</td>
<td>Leave from Temperature Fix Mode.</td>
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### 7. Errors and Countermeasures

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<tr>
<th>Integral indicator</th>
<th>Cause</th>
<th>4-20mA Output operation during error</th>
<th>Countermeasure</th>
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<td>AL.79 OV. DISP</td>
<td>Displayed value exceeds limit.</td>
<td>Continues to operate and output.</td>
<td>Check settings and change them as needed.</td>
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<td>AL.87 FLG. HI</td>
<td>Flange temperature exceeds a preset upper limit.</td>
<td>It depends on the Diag Out Option setting.</td>
<td>Check the heater failure.</td>
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<td>AL.87 FLG. LO</td>
<td>Flange temperature is below a preset lower limit.</td>
<td>Off: Continue to operate and output. Burnout: Outputs AO upper limit or AO lower limit. Fall back: Outputs Diag Out Fixed Val.</td>
<td>Check the capsule temp. and Amplifier temp. Adjust Flg Temp Coef.</td>
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<tr>
<td>AL.88 INVR.DP</td>
<td>Differential pressure/pressure fluctuation does not reach the reference level required to blockage detection so that no blockage detection is carried out.</td>
<td>Continue to operate and output.</td>
<td>Check process condition.</td>
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<tr>
<td>AL.88 INVR.SL</td>
<td>Low-pressure-side fluctuation does not reach the reference fluctuation level required to blockage detection.</td>
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<tr>
<td>AL.88 INVR.SH</td>
<td>High-pressure-side fluctuation does not reach the reference fluctuation level required to blockage detection.</td>
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<td>AL.88 INVR.F</td>
<td>BlkF can not be used for blockage detection for some reasons.</td>
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<td>AL.89 ILBD.OV</td>
<td>Appointed the diagnosis range outside.</td>
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<td>AL.89 B BLK</td>
<td>B Blocking (both-side blockage) is detected.</td>
<td>It depends on the Diag Out Option setting.</td>
<td>Check process condition.</td>
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<tr>
<td>AL.89 H BLK</td>
<td>High-pressure-side blockage is detected.</td>
<td>Off: Continue to operate and output. Burnout: Outputs AO upper limit or AO lower limit. Fall back: Outputs Diag Out Fixed Val.</td>
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<td>AL.89 L BLK</td>
<td>Low-pressure-side blockage is detected.</td>
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<td>AL.89 H LRG</td>
<td>Pressure fluctuation amplitude of high-pressure side is large.</td>
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<tr>
<td>AL.89 L LRG</td>
<td>Pressure fluctuation amplitude of low-pressure side is large.</td>
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<td>AL.89 A BLK</td>
<td>A Blocking (single-side blockage) is detected.</td>
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<td>AL. 90 SIM</td>
<td>Under Simulation Mode for flow.</td>
<td>Simulate input output.</td>
<td>Check Simulation Mode.</td>
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<td>AL. 91 F. SIM</td>
<td>Under Simulation Mode for device variables.</td>
<td>Output the setting value of Simulate-Value.</td>
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<td>AL. 91 P. SIM</td>
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## Revision Information

- **Title**: EJX and EJA-E Series Differential Pressure and Pressure Transmitters Installation Manual
- **Manual No.**: IM 01C25A01-01E

<table>
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<th>Edition</th>
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<td>1st</td>
<td>Aug. 2009</td>
<td></td>
<td>New publication</td>
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<td>2nd</td>
<td>Apr. 2010</td>
<td>7 to 14</td>
<td>Add limitation of ambient temperature for HE.</td>
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<td>Oct. 2010</td>
<td>1, 5 and 15</td>
<td>Add EJX610A and EJX630A.</td>
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<td>5.4 Modify pictures of cable gland.</td>
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<td>41 to 43</td>
<td>8. Add parameters for EJX900A (Dev.rev.2).</td>
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<td>5.2.4 Add note (*3).</td>
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<td>Add parameters and notes.</td>
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<td>Feb. 2017</td>
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<td>Delete descriptions and add Control Drawing for FM approval.</td>
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<td>Update ATEX applicable standards.</td>
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<td>Revise notes for ATEX flameproof type.</td>
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<td>Update the tag plate for ATEX flameproof. Delete tag plate for EJX9□0A intrinsically safe for HART/BRAIN.</td>
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<td>Update IECEx applicable standards. Revise notes for IECEx intrinsically safe type.</td>
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