User's Manual

EJX/EJA-E Series NEPSI Certification

[Option code: /NF2, /NF21, /NS21, /NS24 and /NS25]

DPharp EJX™
DPharp EJA™

IM 01C25A00-12E

DPharp FOR THE DIGITAL WORLD

YOKOGAWA
Yokogawa Electric Corporation

IM 01C25A00-12E
13th Edition

1. Introduction

Thank you for purchasing the DPharp electronic pressure transmitter.

This manual contains important notes and handling cautions for the DPharp EJX Series and EJA-E Series Differential Pressure/Pressure Transmitters with NEPSI certification, option code /NF2, /NF21, /NS21, /NS24 and /NS25.

Refer to each of the following user's manuals for standard specifications, functions, handling cautions, and operations, etc.

Table 1 List of Individual User's Manuals

Model	Document No.
EJX110A, EJX120A, EJX130A, EJX310A, EJX430A, EJX440A, EJA110E, EJA120E, EJA130E, EJA310E, EJA430E and EJA440E	IM 01C25B01-01E
EJX210A and EJA210E	IM 01C25C01-01E
EJX510A, EJX530A, EJX610A, EJX630A, EJA510E and EJA530E	IM 01C25F01-01E
EJX118A, EJX438A, EJA118E and EJA438E	IM 01C25H01-01E
EJX115A and EJA115E	IM 01C25K01-01E
EJX910A and EJX930A	IM 01C25R01-01E
EJXC40A Digital Remote Sensor	IM 01C25W05-01EN
DPharp BRAIN Communication Type	IM 01C25T03-01E
DPharp HART Communication Type	IM 01C25T01-06EN
DPharp Fieldbus Communication Type	IM 01C25T02-01E
DPharp PROFIBUS PA Communication Type	IM 01C25T04-01EN

2. NEPSI Certification

a. NEPSI Flameproof Type (/NF2)

Caution for NEPSI flameproof type.

Note 1. Model EJX/EJA-E Series differential, gauge, and absolute pressure transmitters with optional code /NF2 are applicable for use in hazardous locations:

- Certificate No.: GYJ18.1010X
  GYJ13.1043X(until March 28, 2018)
- Applicable Standard: GB3836.1-2010, GB3836.2-2010
- Type of Protection and Marking Code:
  Ex d IIC T4~T6 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.
  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)
  7.14 Vdc max, 20mW (Slave module 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. (Refer to Note 5)
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is certificated as the flame proof IP66/IP67 as a part of this apparatus.) (Refer to Note 5)
- In case of ANSI 1/2 NPT plug, ANSI hexagonal wrench should be applied to screw in.
- The external earth connection facility shall be connected reliably.

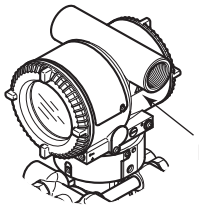
Note 3. Operation

- WARNING:
  Output signal code except P or S
  AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
  Output signal code P or S
  AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING.
- WARNING:
  WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES 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 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void NEPSI Certification. (Refer to Note 6)
- Electrical Connection
  A mark indicating the electrical connection type is stamped near the electrical connection port. These marks are as followed.

Screw Size	Marking
ISO M20 × 1.5 female	⚠M
ANSI 1/2 NPT female	⚠N or ⚠W



Location of the mark

F0201.ai

Note 5. Conditions for safe use

- If the thread type of cable entry is M20×15 or 1/2-14NPT, adapters and/or blanking elements, certified by notified body with type of protection Ex d IIC Gb in accordance with GB3836.1-2010 and GB3836.2-2010, should be applied when installation in hazardous location. The IP code should be IP66/IP67 Blanking elements supplied by manufacturer is also available. If the thread type of cable entry is G1/2, only cable gland and/or blanking elements supplied by the manufacturer should be used.
- It is forbidden to change the configuration, to ensure the equipment's explosion protection performance.
- When installation, use and maintenance of pressure transmitter, observe following standards GB3836.13-2013 "Explosive atmospheres-Part13:Equipment repair, overhaul and reclamation" GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres part 15: Electrical installations in hazardous area (other than mines)" GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)" GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

Note 6. Special Condition for safe 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 values of the flamepaths are different from the standard values given in GB3836.2-2010. Repair of the equipment is only allowed when done by the manufacturer or authorized representative.

(The suffix "X" placed after the certificate number indicates that this product is subject to special condition for safe use.)

b. NEPSI Flameproof Type (/NF21)

Caution for NEPSI flameproof type.

Note 1. Model EJX/EJA-E Series differential, gauge, and absolute pressure transmitters with optional code /NF21 are applicable for use in hazardous locations:

- Certificate No.: GYJ18.1134X
- Applicable Standard: GB3836.1-2010, GB3836.2-2010, GB12476.1-2013, GB12476.5-2013
- Type of Protection and Marking Code:
  Ex d IIC T4~T6 Gb ,
  Ex tD A21 IP66/IP67 T85°C
- Enclosure: IP66/IP67
- 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.
- 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)
- Slave module type, output signal code “S”, is only to be connected to Master module type, output signal code “P”, for power supply and communication by a 4-wire connection.

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. (The plug attached is certificated as the flame proof IP66/IP67 as a part of this apparatus.)
- In case of ANSI 1/2 NPT plug, ANSI hexagonal wrench should be applied to screw in.
- The external earth connection facility shall be connected reliably.

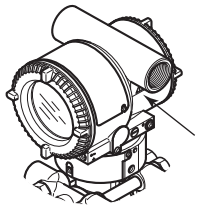
Note 3. Operation

- WARNING:
  Output signal code except P or S
  AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
  Output signal code P or S
  AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING.
- WARNING:
  WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES AND CABLE GLAND ≥ 90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.
- 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.

Note 4. Maintenance and Repair

- The instrument modification or repair by other than personnel authorized by Yokogawa Electric Corporation is prohibited and will void NEPSI Certification.
- Electrical Connection
  A mark indicating the electrical connection type is stamped near the electrical connection port. These marks are as followed.

Screw Size	Marking
ISO M20 × 1.5 female	⚠M
ANSI 1/2 NPT female	⚠N or ⚠W



Note 5. Special conditions for safe use

WARNING

- The flame paths differ from the standard values in GB3836.2-2010. Repair of the equipment is only allowed when done by the manufacturer or authorized representative.
- The property class of the fasteners used to fasten the transmitter enclosure onto the sensor capsule is at least A*-50.
- For transmitters with a membrane made of titanium, ignition hazard due to impact and friction on the membranes shall be avoided.

Note 6. Conditions for safe use

- M20×1.5 or 1/2-14NPT thread type cable entry, adapters and/or blanking elements, certified by notified body with type of protection Ex d IIC Gb in accordance with GB3836.1-2010 and GB3836.2-2010, should be applied when installation in explosive gas atmosphere. The IP code should be IP66/IP67.
- M20×1.5 or 1/2-14NPT thread type cable entry, adapters and/or blanking elements, certified by notified body with type of protection Ex tD A21 in accordance with GB12476.1-2013 and GB12476.5-2013, should be applied when installation in combustible dust atmosphere. At least IP6X should be guaranteed after the assembly.
- Forbid end user to change the configuration to ensure the equipment's explosion protection performance.
- When installation, use and maintenance of pressure transmitter, observe following standards
  GB3836.13-2013 "Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation"
  GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)"
  GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"
  GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"
  GB15577-2007 "Safety regulations for dust explosion prevention and protection"
  GB12476.2-2010 "Electrical apparatus for use in the presence of combustible dust- Part 2: Selection and installation"

c. NEPSI Intrinsic Safety Type for HART/ BRAIN Protocol Type (Except for EJX9□0A)

Caution for NEPSI Intrinsic safety type.

Note 1. Model EJX/EJA-E Series differential, gauge, and absolute pressure transmitters with optional code /NS21 are applicable for use in hazardous locations:

- Certificate No.: GYJ17.1224X
- Applicable Standard: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
- Type of Protection and Marking Code: Ex ia IIC T4 Ga
- Enclosure: IP66/IP67 in accordance with GB 4208
- Ambient Temperature: –50 to 60°C
- Max. Process Temp.: 120°C

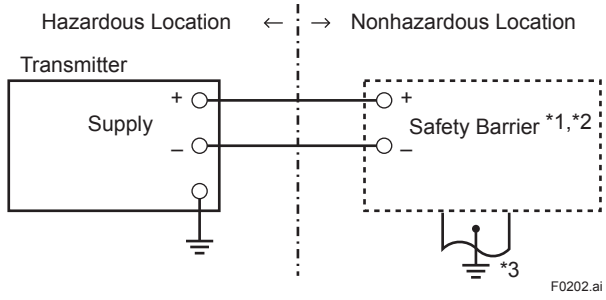
Note 2. Entity Parameters

- Intrinsic safety ratings are as follows:
  Ui = 30 V
  Ii = 200 mA
  Pi = 0.9 W (linear source)
  Ci = 27.6 nF
  Li = 0 µH

Note 3. Installation

Refer to the control drawing. All wiring shall comply with local installation requirements.

[Control Drawing]



*1: In any safety barrier used output current must be limited by a resistor 'R' such that Io=Uz/R.
*2: The safety barrier must be NEPSI certified.
*3: When using non isolation barrier, connect to IS earthing system.

Note 4. Special Conditions for Safe Use

- When the enclosure of the Pressure Transmitter is made of aluminium, 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 and non-metallic parts of the Pressure Transmitter shall be avoided.

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.

Note 5. Condition for safe use

- This product should be used in explosive gas atmospheres together with associated apparatus, follow the instruction manual of this product and the associated apparatus when connecting the wiring. Connect the wiring terminals correctly.
- It is forbidden to change the configuration, to ensure the equipment's explosion protection performance.
- When installation, use and maintenance of pressure transmitter, observe the following standards;
  GB3836.13-2013 "Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation"
  GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)"
  GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"
  GB3836.18-2010 "Explosive atmospheres - Part 18: Intrinsically safe system"
  GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

d. NEPSI Intrinsic Safety Type for Fieldbus Type (Except for EJX9□0A)

Caution for NEPSI Intrinsic safety type.

Note 1. Model EJX/EJA-E Series differential, gauge, and absolute pressure transmitters with optional code /NS25 are applicable for use in hazardous locations:

- Certificate No.: GYJ16.1180X
- Applicable Standard: GB3836.1-2010, GB3836.4-2010, GB3836.19-2010, GB3836.20-2010
- Type of Protection and Marking Code: Ex ia IIC/IIB T4 Ga
- Enclosure: IP66/IP67 in accordance with GB 4208
- Ambient Temperature: –40 to 60°C
- Max. Process Temp.: 120°C

Note 2. Entity Parameters

- Intrinsic safety ratings are as follows:

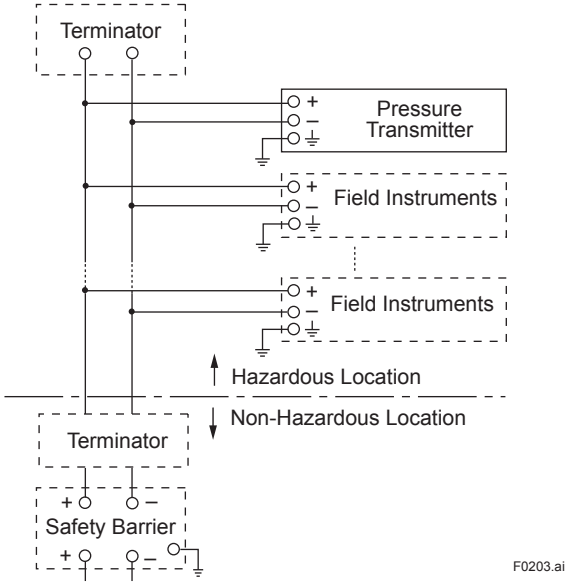
[Entity]
Maximum Input Voltage (Ui) = 24 V
Maximum Input Current (Ii) = 250 mA
Maximum Input Power (Pi) = 1.2 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH

[FISCO IIC]
Maximum Input Voltage (Ui) = 17.5 V
Maximum Input Current (Ii) = 380 mA
Maximum Input Power (Pi) = 5.32 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH

[FISCO IIB]
Maximum Input Voltage (Ui) = 17.5 V
Maximum Input Current (Ii) = 460 mA
Maximum Input Power (Pi) = 5.32 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH

Note 3. Installation

Refer to the control drawing. All wiring shall comply with local installation requirements.



- 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 (Ui) = 24 V
Maximum Input Current (Ii) = 250 mA
Maximum Input Power (Pi) = 1.2 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH
} *1: Rating 1

or

Maximum Input Voltage (Ui) = 17.5 V
Maximum Input Current (Ii) = 380 mA
Maximum Input Power (Pi) = 5.32 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH
or
Maximum Input Voltage (Ui) = 17.5 V
Maximum Input Current (Ii) = 460 mA
Maximum Input Power (Pi) = 5.32 W
Maximum Internal Capacitance (Ci) = 3.52 nF
Maximum Internal Inductance (Li) = 0 µH
} *2: Rating 2

Note 4. Special conditions for safe use

- For the enclosure of the pressure transmitter made of aluminium alloy, when used in a potentially explosive atmosphere requiring equipment protection level (EPL) Ga, they must be installed so that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.
- Precautions shall be taken to minimize the risk from electrostatic discharge of painted parts.
- When a zener barrier is used together with the pressure transmitter, the earthing facility in nonhazardous locations should be in accord with Clause 12.2.4 in GB 3836.15-2000.

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.

Note 5. Conditions for Safe Use

- This product should be used in explosive gas atmospheres together with associated apparatus, follow the instruction manual of this product and the associated apparatus when connecting the wiring. Connect the wiring terminals correctly.
- It is forbidden to change the configuration, to ensure the equipment's explosion protection performance.
- When installation, use and maintenance of pressure transmitter, observe the following standards;

  GB3836.13-2013 "Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation"

  GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15:Electrical installations in hazardous area (other than mines)"

  GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"

  GB3836.18-2010 "Explosive atmospheres - Part 18: Intrinsically safe system"

  GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

e. NEPSI Intrinsic safety Type for Digital Remote Sensor

Caution for NEPSI Intrinsic safety.

Note 1. EJX/EJA-E series pressure transmitters with optional code /NS24 are applicable for use in hazardous locations

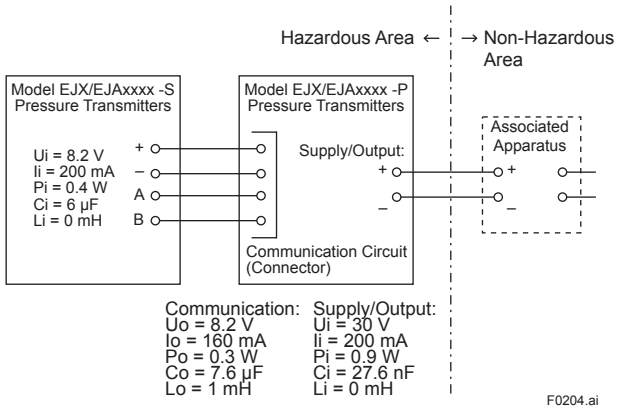
- Certificate No.: GYJ17.1162X
- Applicable Standard: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
- Type of Protection and Marking code: Ex ia IIC T4 Ga
- Ambient Temperature: –50°C to +60°C
- Maximum Process Temperature: 120°C
- Enclosure: IP66/IP67 in accordance with GB 4208

Note 2. Electrical Parameters

- EJX****-P, EJA****-P series
  Supply/Output Circuit (Terminal: + and –)
  Ui: 30 V Ii: 200 mA Pi: 0.9 W
  Ci: 27.6 nF Li: 0 mH
  Communication Circuit (Connector)
  Uo: 8.2 V Io: 160 mA Po: 0.3 W
  Co: 7.6 µF Lo: 1 mH
- EJX****-S, EJA****-S series
  Ui: 8.2 V Ii: 200 mA Pi: 0.4 W
  Ci: 6 µF Li: 0 mH

Note 3. Installation

- Refer to the control drawing. All wiring shall comply with local installation requirements.



- Note: The Associated Apparatus must be a linear power source.

Note 4. Special Conditions for Safe Use

- When the enclosure of the Pressure Transmitters is made of aluminum alloy, if it is mounted in a potentially explosive atmosphere requiring apparatus of equipment EPL Ga, it must be installed such that, even in the event of rare incidents, an ignition source due to impact and/or friction sparks is excluded.
- Precautions shall be taken to minimize the risk from electrostatic discharge of painted parts.
- Model EJX****-P and EJA****-P series pressure transmitters are not capable of withstanding the dielectric strength of 500 V r.m.s. between the intrinsically safe circuit and the enclosure. The earthling facility should be in accordance with Clause 12.2.4 of GB3836.15-2000.

WARNING

- POTENTIAL ELECTROSTATIC CHARGING HAZARD – WHEN THE EQUIPMENT IS USED IN HAZARDOUS LOCATIONS, AVOID ANY ACTIONS WHICH GENERATE ELECTROSTATIC CHARGES, SUCH AS RUBBING WITH A DRY CLOTH.

Note 5. Conditions for Safe Use

- This product should be used in explosive gas atmospheres together with associated apparatus, follow the instruction manual of this product and the associated apparatus when connecting the wiring. Connect the wiring terminals correctly.
- It is forbidden to change the configuration, to ensure the equipment's explosion protection performance.
- Cable entry should be applied when installation in hazardous location and redundant holes for cable entry should be closed by blanking elements. The IP code should be IP66/IP67.
- When installation, use and maintenance of pressure transmitter, observe the following standards;
  GB3836.13-2013 "Explosive atmospheres - Part 13: Equipment repair, overhaul and reclamation"
  GB3836.15-2000"Electrical apparatus for explosive gas atmospheres – Part 15:Electrical installations in hazardous area (other than mines)"
  GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"
  GB3836.18-2010 "Explosive atmospheres - Part 18: Intrinsically safe system"
  GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

Revision Record

Edition	Data	Revised Item
1st	Feb. 2007	New Publication.
2nd	Oct. 2008	Revise certificate no. and ambient temperature specification for flameproof type. Remove intrinsically safe type description.
3rd	April 2010	Correct WARNING statement for ambient temperature.
4th	Dec. 2011	Add limitation when /HE is specified. Delete certificate no.
5th	Aug. 2012	Add EJA-E Series.
6th	Dec. 2012	Add 'b. NEPSI Intrinsically Safe Type.'
7th	May 2013	Add renewed certificate information.
8th	Dec. 2015	Correct WARNING message. Add figure of electrical connection.
9th	July 2016	Add "c. NEPSI Intrinsic Safety Type for Fieldbus Type". Change "Intrinsically safe" to "Intrinsic safety".
10th	May 2017	Add descriptions for Digital Remote Sensor (Output signal code -P and -S) to "a. NEPSI Flameproof type."
11th	Sep. 2017	Update the certification of b & c. Add "d. NEPSI Intrinsic safety Type for Digital Remote Sensor."
12th	Mar. 2018	Update the certificate number of NEPSI Flameproof Type.
13th	June 2018	Add "b. NEPSI Flameproof Type (/NF21). The alphabet of the item title shifts by one accordingly.