## User's Manual

EJX/EJA-E Series NEPSI Certification [Option code: /NF2, /NF21, /NS21, /NS24 and /NS25]



IM 01C25A00-12E







IM 01C25A00-12E 15th 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
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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  $\geq$  65°C, USE THE HEAT-RESISTING CABLES AND CABLE GLAND  $\geq$  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	ΔM
ANSI 1/2 NPT female	⚠ N or ⚠ W



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- 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



- 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	ΔM
ANSI 1/2 NPT female	⚠́N or ⚠́W
	_ocation of the mark

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Note 5. Special conditions for safe use



- 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:

- Applicable Standards: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
- Certificate number: GYJ22.1766X
- Specific Ex marking: Ex ia IIC T4 Ga
- Ambient temperature:  $-50^{\circ}C \le Ta \le +60^{\circ}C$
- Process temperature: -50°C ≤ Tp ≤ +120°C
- Enclosure: IP66/IP67 in accordance with GB/T4208-2017
- Power supply:  $\leq$  30 V,  $\leq$  21.6 mA
- · Dielectric strength:
- 500 V AC, r.m.s.,1 min Terminals: to Enclosure

Supply + Supply -

Note 2. Special Conditions for Safe Use

- When the equipment 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, an ignition source due to impact and/or friction sparks is excluded.
- Precaution shall be taken to minimize the risk from electrostatic discharges on the non-metallic parts (excluding glass parts) or coated parts of the equipment.
- The dielectric strength of at least 500 V of the intrinsically safe circuits of the equipment is limited only by the overvoltage protection.
   From the safety point of view, the intrinsically safe circuit of the equipment shall be assumed to be connected to earth.

- Note 3. 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 following standards;

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

GB/T3836.15-2017 "Explosive atmospheres - Part 15: Electrical installations design, selection and erection, MOD"

- GB/T3836.16-2017 "Explosive atmospheres - Part 16: Electrical installations Inspection and maintenance"
- GB/T3836.18-2017 "Explosive atmospheres - Part 18: Intrinsically safe electrical systems, MOD"
- GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering"

Note 4. Installation and erection

Cable entry devices suitable for the thread form and the size of the cable entries must be used, according to the following marking on the equipment.

Screw Size	Marking
ISO M20 × 1.5 female	Ш
ANSI 1/2 NPT female	⚠S or ⚠N or ⚠W
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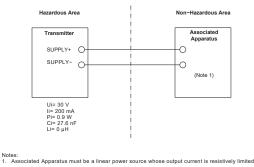
Note 5. Use and setting-up (operation) If the equipment is mounted in an area where explosive atmospheres may be present, it must be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust are avoided.



A modification of the equipment would no longer comply with the construction described in the certificate documentation.

Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

#### Note 7. Control Drawing



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

Caution for NEPSI Intrinsic safety.

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

Certification Information:

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A modification of the equipment would no longer comply with the construction described in the certificate documentation.

Certificate No.: GYJ21.1008X



The symbol "X" placed after the certificate number indicates that the equipment is subject to specific conditions of use.

Applicable Standard: GB3836.1-2010, GB3836.4-2010, GB3836.19-2010, GB3836.20-2010

#### Note 2. Rating

Type of Protection and Marking Code: Ex ia IIC/IIB T4 Ga

#### Enclosure:

IP66/IP67 in accordance with GB 4208 Temperature specifications:

Ambient Temperature range and Process Temperature range for Gas:

Ambient	Process
temperature range	temperature range
–55 to 60°C	–55 to 120°C

#### Electrical Parameters:

Intrinsically safe ratings are as follows: [Entity]

Ui = 24 V li = 250 mA Pi = 1.2 WCi = 3.52 nF  $Li = 0 \mu H$ [FISCO IIC] Ui = 17.5 V li = 380 mA Pi = 5.32 W Ci = 3.52 nF  $Li = 0 \mu H$ **IFISCO IIB1** Ui = 17.5 V Ii = 460 mAPi = 5.32 W Ci = 3.52 nF  $Li = 0 \mu H$ 

- Note 3. Installation
  - Refer to the control drawing (Note 8.)
  - The type of threads is indicated at the cable entry, using the following marking.

Screw Size	Marking
ISO M20 × 1.5 female	ΔM
ANSI 1/2 NPT female	⚠S or ⚠N or ⚠W
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#### Note 4. Operation

 If the pressure transmitter is mounted in an area where explosive atmospheres may be present, it must be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust are avoided. Note 5. Special Conditions for Safe Use

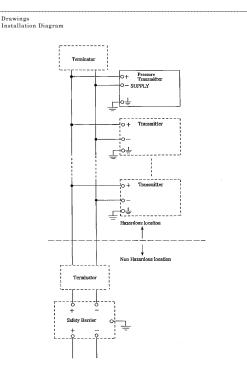
- When the pressure transmitter is made of aluminum alloy, if it is mounted in an area where the use of EPL Ga equipment is required, it shall be installed such that, even in the event of rare incidents, an ignition source due to impact and friction sparks is excluded.
- Precautions shall be taken to minimize the risk from electrostatic discharge of painted parts.
- The dielectric strength of at least 500 V of the intrinsically safe circuits of the pressure transmitter is limited only by the overvoltage protection.
- When a zener barrier is used together with the pressure transmitter, the earthing facility in non-hazardous locations should be in accord with Clause 12.2.4 in GB 3836.15-2017.

#### Note 6. 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.
- Forbid end user to change the configuration to ensure the equipment's explosion protection performance.
- For installation, use and maintenance of the product, the end user shall observe the instruction manual and the following standards:
  - GB3836.13-2013 "Explosive atmospheres-Part 13: Equipment repair, overhaul and reclamation".
  - GB/T3836.15-2017 "Explosive atmospheres-Part 15: Electrical installations design, selection and erection".
  - GB/T3836.16-2017 "Explosive atmospheres-Part 16: Electrical installations inspection and maintenance".
  - GB/T3836.18-2017 "Explosive atmospheres-Part 18: Intrinsically safe electrical systems".
  - GB50257-2014 "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering".

- Note 7. Maintenance and Repair
  - Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

#### Note 8. Control drawing

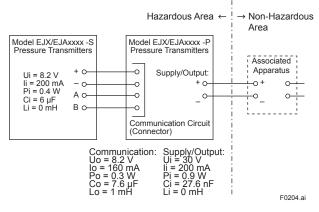


Note • In the rating 1(\*1), the output current of the barrier must be limited by a resistor "Ra" such that Io-Uu?Ra. • In the rating 2(\*2), the output of the barrier must be the characteristics of the trapezoid or the rectangle and this transmitter can be connected to Fieldbus equipment which are in 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:24V Maximum Input Voltage Ui:24V Maximum Input Power Pi:1.29 Maximum Internal Capacitance Ci: <u>0.2 FOR P</u> 3.52n F Δ Maximum Input Voltage Ui:17.5V Maximum Input Voltage Ui:17.5V Maximum Internal Inductance Ci: 0.0 μ H or Maximum Input Voltage Ui:17.5V Maximum Input Notage Ui:17.5V 7

#### 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.: GYJ22.1765X
  - 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 li: 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 GB/T3836.15-2017.

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 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 following standards;
  - GB3836.13-2013 "Explosive atmospheres
    - Part 13: Equipment repair, overhaul and reclamation"
  - GB/T3836.15-2017 "Explosive atmospheres - Part 15: Electrical installations design, selection and erection, MOD"
  - GB/T3836.16-2017 "Explosive atmospheres - Part 16: Electrical installations inspection and maintenance"
  - GB/T3836.18-2017 "Explosive atmospheres - Part 18: Intrinsically safe electrical systems, MOD"
  - 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.
14th	April 2021	Update "d. NEPSI Intrinsic Safety Type for Fieldbus Type (Except for EJX9□0A) "
15th	May 2022	Update "c. NEPSI Intrinsic Safety Type for HART/BRAIN Protocol Type (Except for EJX9□0A)" and "e. NEPSI Intrinsic safety Type for Digital Remote Sensor"