NAGANO KEIKI

Pressure Sensor

Rev.3

EJ15
Intrinsically Safe Pressure Sensor

- Acquired: IECEx, ATEX, Japanese Explosion-proof Standards, TS, NEPSI and KCs
- Compatible with high-pressure hydrogen applications
- Zero Adjustment: External Zero Adjustment Type

Highly accurate pressure measurement is possible in a wide range of industrial process measurements!

TD10003L 19-AV4BO-0654 GYJ19.1315

OUTLINE

Acquired international explosion-proof standards [IECEx], also acquired Japanese standards and European standards [ATEX]. Moreover, enable global response considering acquisition of overseas standards.

FEATURES

- Acquired IECEx, ATEX, Japanese explosion-proof standards, TS, NEPSI and KCs
- Accuracy (±0.25% F.S.), Improvement of temperature characteristics
- Exterior is all stainless steel
- Incorporated external zero adjustment function
- Environmental resistance: IP65 equivalent

SPECIFICATIONS

		For General industry			For High Pressure Hydrogen
Application		Standard	High corrosion resistance	Corrosion resistance	High pressure hydrogen
Model No.		EJ15-□□4	EJ15-□□6	EJ15-□□G	EJ15-□□H
Wetted parts	Pressure sensor	SUS630(17-4PH)	Co–Ni Alloy	SUS316L	SUH660
	Fitting	SUS316	SUS316	SUS316L	SUS316-Ni equivalent amount
Pressure range		0 to 0.5, 1, 2, 3.5, 5, 10, 20, 35, 50, 70, 100 MPa -0.1 to 0.5, 1, 2 MPa	0 to 0.5, 1, 2, 3.5, 5, 10, 20 MPa -0.1 to 0.5, 1, 2 MPa	0to 0.5, 1, 2, 3.5, 5, 10, 20, 35 MPa -0.1 to 0.5, 1, 2 MPa	0 to 35, 50, 70, 100, 120 MPa
Allowable maximum pressure*1		200% F.S. However, 35、50 MPa range: 150% F.S., 70, 100 MPa range: 120% F.S.	200% F.S.	150% F.S. However, 3.5 to 35 MPa range: 120% F.S.	35, 50 MPa range: 150% F.S. 70, 100, 120 MPa range: 120% F.S.
Measuring fluid		Gas, liquid (however, do not corrode wetted material)			hydrogen
Connection fitting*2		G1/4B、G3/8B、G1/2B R1/8, R1/4, R3/8, R1/2 (R thread can be manufactured below 50 MPa range only.) 9/16-18UNF Female (1/4 coned and thread)			G1/4B (50 MPa range or less), G3/8B (50 MPa range or less), G1/2B 9/16-18UNF Female Female (1/4 coned and thread)
Temperature characteristics (Temperature compensation range)		ZERO, SPAN: ±0.25% F.S./10°C			ZERO: ±0.5% F.S.(-20 to 50°C) SPAN: ±1.0% F.S.(-20 to 50°C)

Common specifications to general industries and high pressure hydrogen

Item	Description
Type	M12 Connector type
	Terminal box type
Case material	SUS304, SUS305, chloroprene rubber/POM (for zero-point adjuster portion)
Accuracy	±0.25% F.S.(at 23°C) (Linearity, hysteresis and repeatability included)
Transmission	2-wire system
Output	4 to 20 mA DC
Operating temperature and humidity	-20 to 60°C, 35 to 85% RH (No freezing or condensation)
Storage temperature and humidity	-30 to 80°C, 35 to 85% RH (No freezing or condensation)
Zero-Point adjuster	External Zero. ADJ. (Side) ·Push-turn type (Push and turn without removing cover.)
Power supply voltage	11 to 28V DC ·Refer to the following formula for the relation between the power supply voltage and the load resistance.
Load resistance	R max(Ω)=50E−500(E: Power Supply Voltage)*3
Insulation resistance	100MΩ or Higher (Form fittings to input/output terminal collectively 50V DC)
Container protection class*4	Equivalent to IP65(under JIS C 0920)
CE marking	Conformity directive: 2014/30/EU(EMC Directive) Conformity Standards: EN61326-1: 2013; EN61326-2-3: 2013 ·Connect to the indoor power distribution network which is not affected either by lightning surge voltage or power system switching transience.
RoHS compliant	Compliant with RoHS Directive
Weight	M12 Connector type: Approx. 150 g (The cable is excluded. It depends on the fitting type.)
	Terminal box type: Approx. 450 g (The cable is excluded. It depends on the fitting type.)

*1 Max. allowable pressure is the upper limit of pressure value which may safely be applied to the product and remain in specification once pressure is returned to the rated pressure range, with a couple of times over-pressurization for about 10 minutes. Effects of continuous overpressure are not guaranteed.

*2 For connection fitting UPG, please contact us.

*3 Relational Expression of load Resistance is specification of EJ1 single unit. In fact, it depends on Combination with Safety Barrier.

*4 M12 connector type is guaranteed only when the cable with the M12 connector is in the mated state, and the terminal box type is guaranteed only when a suitable cable gland and cable are installed correctly.

Intrinsically Safe Specifications

Intrinsically safe standard	IECEx (International)	ATEX*1 (Europe)	JAPAN	TS (Taiwan)	NEPSI (China)	KCs (Korea)
Certificate No.	IECEx CML 19.0013	CML 19ATEX2063	CML 19JPN2184	TD10003L (Identification No.)	GYJ19.1315	19-AV4BO-0654
Hazardous area classifications	Zone0	Category 1G	Zone0			
Intrinsic safe type	Exia IIC T4 Ga Ga: Equipment protection level T4: Temperature class IIC: Gas group Exia: Technological standard intrinsically safe					
Safety maintenance rating	Maximum input voltage (Ui) : 28V Maximum input current (Ii) : 93mA Maximum input power (Pi) : 651mW Maximum internal inductance (Li) : 0mH Maximum internal capacitance (Ci) : 0.052μF Ambient temperature : –20 to 60°C					
External cable	Li + Lc ≦ Lo Lc : Inductance of external cable Ci + Cc ≦ Co Cc : Capacitance of external cable (It varies by safety barrier used)					
Withstand voltage	500 V AC, 1 min.					

*1 Comformity directive: 2014/34/EU (ATEX Directive)
*The intrinsically safe construction is achieved only when this pressure sensor is used in combination with a safety barrier.

Combined conditions related to safety barrier rating

Safety maintenance rating of intrinsic safety device	Combined conditions	Safety maintenance rating of safety barrier
Maximum input voltage (Ui)	≧	Maximum output voltage (Uo)
Maximum input current (Ii)	≧	Maximum output current (Io)
Maximum input power (Pi)	≧	Maximum output power (Po)

Combined conditions related to parameter

Parameter of intrinsic safety device and wiring	Combined conditions	Parameter of safety barrier
Maximum internal inductance (Li) + Inductance of external cable (Lc)	≦	Maximum external inductance (Lo)
Maximum internal capacitance (Ci) + Capacitance of external cable (Cc)	≦	Maximum external capacitance (Co)

Recommended Safety Barrier

The safety barrier can be selectable by the customer.

Insulation Type

Item	Description		
Manufacture	P & F Co.,Ltd.	Cooper industries Japan K.K.	IDEC
Type	KFD2—STC4—Ex1	MTL5541	D5014S (Input 1ch) D5014D (Input 2ch)
Type approval number (JP)	TC16232	TC19435	TC21005
Intrinsically safe construction type	Exia IIC	Exia IIC	Exia IIC

*Ground of intrinsic safety regulation is unnecessary because an insulated barrier is isolated from intrinsically safe circuit.

Zener Type

Item	Description
Manufacturer	Cooper Industries Japan K.K
Type	MTL7787+
Type approval number (JP)	TC16447
Intrinsically safe construction type	Exia IIC

*Use of Zener safety barrier requires Type A intrinsic safety groundwork.

Group classification

The types of Intrinsically safe construction electrical equipment are classified into Group Ⅰ and Group Ⅱ according to the place where they are used.
This equipment belongs to Group Ⅱ and is used in hazardous locations in factories or offices, except for hazardous locations in the mine.

Applicable group of gas or steam

Gas or steam	Applicable group		
A	ⅡA	ⅡB	ⅡC
B	—	ⅡB	ⅡC
C	—	—	ⅡC

Ignition point of gas or steam which T4 can apply

Ignition point of gas or steam	Applicable temperature class					
Higher than 450℃	T1	T2	T3	T4	T5	T6
Higher than 300℃	—	T2	T3	T4	T5	T6
Higher than 200℃	—	—	T3	T4	T5	T6
Higher than 135℃	—	—	—	T4	T5	T6
Higher than 100℃	—	—	—	—	T5	T6
Higher than 85℃	—	—	—	—	—	T6

Examples of applicable gas and steam

Temperature class / Group	T1	T2	T3	T4	T5	T6
ⅡA	Acetone Ammonia Ethane Acetic acid Ethyl acetate Toluene Benzene Methane	1-Butanol Butane Propane Methanol	Hexane	Acetaldehyde		Ethyl nitrite
ⅡB	Carbon monoxide	Ethylene Ethylene oxide Ethanol		Ethyl methyl Ether		
ⅡC	Hydrogen	Acetylene				Carbon disulfide

Equipment protection level (EPL) classification symbol

EPL Ga ： Equipment for explosive gas atmospheres, having a "very high" Level of Protection, which is not a source of ignition in normal operation, during expected malfunctions or during rare malfunctions.

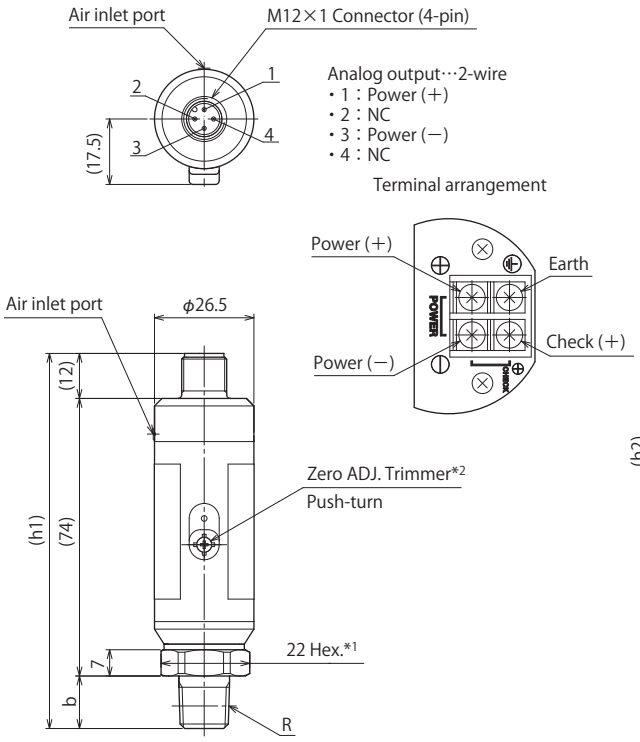
EPL Gb ： Equipment for explosive gas atmospheres, having a "high" Level of Protection, which is not a source of ignition in normal operation or during expected malfunctions.

EPL Gc ： Equipment for explosive gas atmospheres, having an "enhanced" Level of Protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences (for example failure of a lamp).

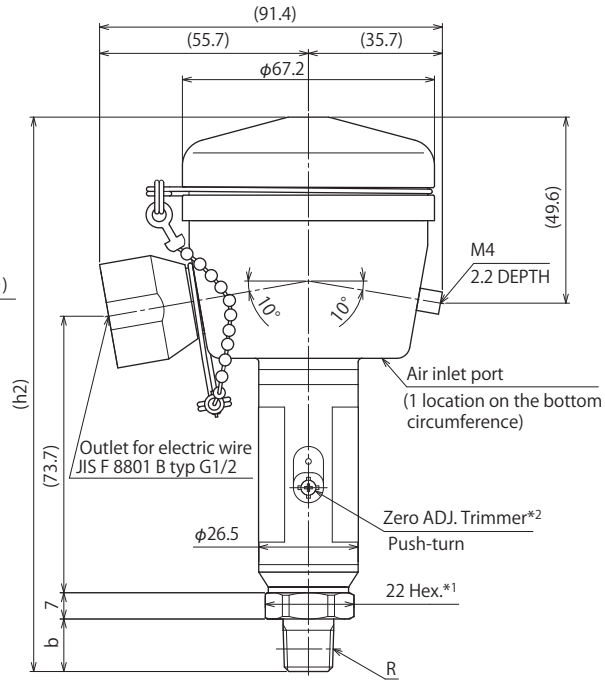
Standard

EJ15 Dimensions (Standard)

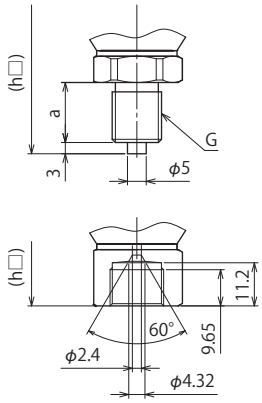
Unit : mm



EJ15-M□□



EJ15-T□□



Model number	EJ15-□2□	EJ15-□3□	EJ15-□4□	EJ15-□6□
Connection fitting	G1/4B	G3/8B	G1/2B	R1/8
External dimensions	a:16 h1:105 h2:152.8	a:18 h1:107 h2:154.8	a:20 h1:109 h2:156.8	b:14 h1:100 h2:147.8

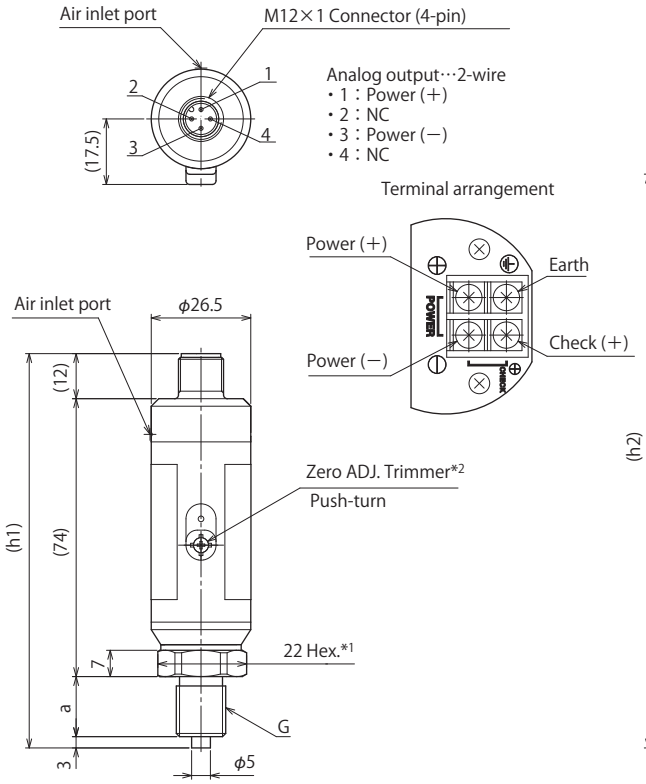
Model number	EJ15-□7□	EJ15-□8□	EJ15-□9□	EJ15-□F□
Connection fitting	R1/4	R3/8	R1/2	9/16-18UNF
External dimensions	b:16 h1:102 h2:149.8	b:18 h1:104 h2:151.8	b:20 h1:106 h2:153.8	———— h1:94 h2:141.8

*1 When SUS316L is selected as the wetted part material, "LC" is marked at any position on the hexagon.

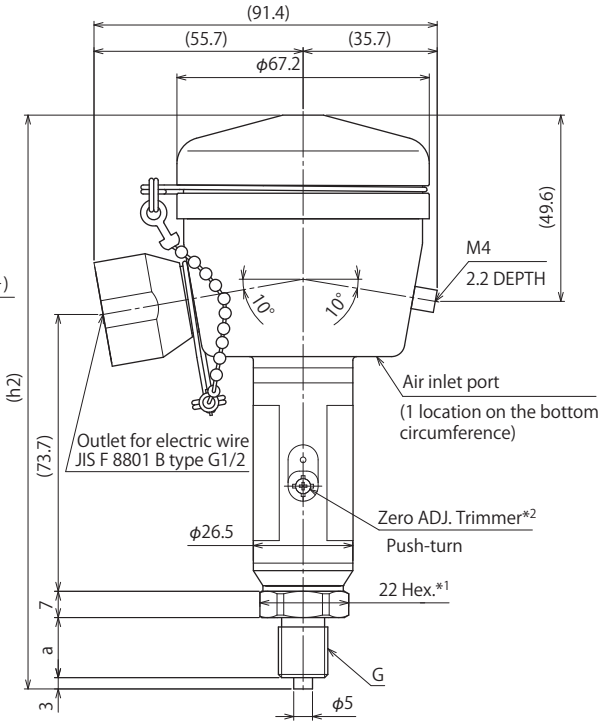
*2 Not to be removed

EJ15 Dimensions (For High Pressure Hydrogen)

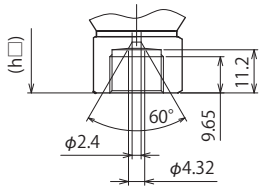
Unit：mm



EJ15-M□H



EJ15-T□H



Model number	EJ15-□2H	EJ15-□3H	EJ15-□4H	EJ15-□FH
Connection fitting	G1/4B	G3/8B	G1/2B	9/16-18UNF
External dimensions	a：16 h1：105 h2：152.8	a：18 h1：107 h2：154.8	a：20 h1：109 h2：156.8	———— h1：94 h2：141.8

*1 “Ni” is marked at any position on the hexagon.
*2 Not to be removed

Standard

Model Number Configuration
Please specify the model number, each specs and the range for ordering.

Model Number

EJ15	—	①	②	③	—	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
Intrinsically Safe Pressure Sensor (Standard)							4	Y	1		×		×	0	×	×	

Model Number		Selective Spec	Additional Spec
EJ15	[Standard Spec] Intrinsically Safe Construction: Exia IIC T4 Ga Certifications: IECEx/ATEX/Japan/TS/NEPSI/KCs Accuracy: ±0.25%F.S. (at 23℃)		Case Construction: IP65 Case Material: Stainless Steal External Zero Adjustment Type (Side)

①Mounting

M	M12 Connector Type
T	Terminal Box Type (Stainless Steal)

②Connection of Fitting

2	G1/4B
3	G3/8B
4	G1/2B
6	R1/8 (50 MPa Range or Less)
7	R1/4 (50 MPa Range or Less)
8	R3/8 (50 MPa Range or Less)
9	R1/2 (50 MPa Range or Less)
F	9/16-18UNF (1/4 Coned and Thread)
	Others (NPT etc.)

③Wetted Parts Materials

4	Diaphragm: SUS630 (17-4PH), Fitting: SUS316
6	Diaphragm: Co-Ni Alloy (Up to 20 MPa), Fitting: SUS316
G	Diaphragm: SUS316L (Up to 35 MPa), Fitting: SUS316L

④Pressure Range

Please specify the pressure range and units separately besides selection of range code.

		Diaphragm Material		
		SUS630	Co-Ni	SUS316L
5	-0.1 to 0.5 MPa	○	○	○
6	-0.1 to 1 MPa	○	○	○
7	-0.1 to 2 MPa	○	○	○
E	0 to 0.5 MPa	○	○	○
G	0 to 1 MPa	○	○	○
J	0 to 2 MPa	○	○	○
K	0 to 3.5 MPa	○	○	○
L	0 to 5 MPa	○	○	○
N	0 to 10 MPa	○	○	○
Q	0 to 20 MPa	○	○	○
R	0 to 35 MPa	○	×	○
S	0 to 50 MPa	○	×	×
T	0 to 70 MPa	○	×	×
U	0 to 100 MPa	○	×	×

⑤Accuracy

4	±0.25% F.S.

⑥Power Source

Y	11 to 28V DC

⑦Output

1	4 to 20 mA DC (2-Wire System)

⑧Outlet for Electric Wire

M12 Connector Type		
0	M12 Connector (Without Cable / Only Pressure Sensor)	
Terminal Box Type		
C	JIS F 8801 G1/2 (Female Thread)*1	
1	Cable Gland (Shipped as an Accessory) Made by AVC Corporation of Japan	Model Number: FSA21-10 Applicable Cable Diameter: 6-10 mm
2		Model Number: FSA21-13 Applicable Cable Diameter: 9-14 mm

⑩Treatment

0	Not Required
1	Use No Oil
2	Use No Water
3	Use No Oil & Water

⑫Application

0	Standard Spec.

⑮Documents

0	Not Required
1	Required

When ordering the recommended barrier, please specify separately the desired specifications. When using the non-recommended barrier, please observe the "Safety maintenance rating".

Option : M12 Connector Cable

M12 Connector Cable		
PUR Cable (Oilproof)	Straight	3 m
	L Type	3 m
PVC Cable (Stainless Nut)	Straight	3 m
	L Type	3 m
PUR Cable (Oilproof)	Straight	5 m
	L Type	5 m
PVC Cable (Stainless Nut)	Straight	5 m
	L Type	5 m

*1 Always use a metal cable gland etc. that conforms to the specifications of the outlet for electric wire. (Do not use resin cable gland.)

・For "Document", select only "Not Required" or "Required", and specify the contents separately.

Model Number Configuration

Please specify the model number, each specs and the range for ordering.

Model Number

EJ15	—	①	②	H	—	④	4	Y	1	⑧	×	3	×	⑫	×	×	⑮

Intrinsically Safe Pressure Sensor (For High Pressure Hydrogen)

Model Number		Selective Spec	Additional Spec
EJ15	[Standard Spec] Intrinsically Safe Construction: Exia IIC T4 Ga Certifications: IECEx/ATEX/Japan/TS/NEPSI/KCs Accuracy: ±0.25%F.S. (at 23℃)		Case Construction: IP65 Case Material: Stainless Steal External Zero Adjustment Type (Side)

①Mounting	M	M12 Connector Type
	T	Terminal Box Type (Stainless Steal)
②Connection of Fitting*1	2	G1/4B (50 MPa Range or Less)
	3	G3/8B (50 MPa Range or Less)
	4	G1/2B
	F	9/16-18UNF (1/4 Coned and Thread)
		Others
③Wetted Parts Materials	H	Diaphragm: SUH660 (A286), Fitting: SUS316 (Ni Equivalent Material)
④Pressure Range	R	0 to 35 MPa
	S	0 to 50 MPa
	T	0 to 70 MPa
	U	0 to 100 MPa
	V	0 to 120 MPa
⑤Accuracy	4	±0.25% F.S.
⑥Power Source	Y	11 to 28V DC
⑦Output	1	4 to 20 mA DC (2-Wire System)
⑧Outlet for Electric Wire	M12 Connector Type	
	0	M12 Connector (Without Cable / Only Pressure Sensor)
	Terminal Box Type	
	C	JIS F 8801 G1/2 (Female Thread)*2
	1	Cable Gland (Shipped as an Accessory) Made by AVC Corporation of Japan — Model Number: FSA21-10, Applicable Cable Diameter: 6-10 mm
	2	Model Number: FSA21-13, Applicable Cable Diameter: 9-14 mm
⑩Treatment	3	Use No Oil & Water
⑫Application	7	[Standard] Airtightness Inspection Results (He Leak Test)
	A	Pressure Resistance/Airtightness Inspection Results
⑮Documents	0	Not Required
	1	Required

Please specify the pressure range and units separately besides selection of range code.

When ordering the recommended barrier, please specify separately the desired specifications. When using the non-recommended barrier, please observe the "Safety maintenance rating".

Option : M12 Connector Cable

M12 Connector Cable		
PUR Cable (Oilproof)	Straight	3 m
	L Type	3 m
PVC Cable (Stainless Nut)	Straight	3 m
	L Type	3 m
PUR Cable (Oilproof)	Straight	5 m
	L Type	5 m
PVC Cable (Stainless Nut)	Straight	5 m
	L Type	5 m

*1 Please contact us for connection fitting UPG.

*2 Always use a metal cable gland etc. that conforms to the specifications of the outlet for electric wire. (Do not use resin cable gland.)

・For "Document", select only "Not Required" or "Required", and specify the contents separately.

NAGANO KEIKI

NAGANO KEIKI CO., LTD.

URL : https://www.naganokeiki.co.jp/

HEAD OFFICE & OVERSEAS SALES DEPT

1-30-4, HIGASIMAGOME OHTA-KU, TOKYO, JAPAN.

PHONE : +81-3-3776-5328 FAX : +81-3-3776-5447

E-mail : overseas_sales_dept@naganokeiki.co.jp