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CS
CODE AND SPECIFICATIONS SHEET

Intelligent Liquid Level Transmitter with Remote-Sealed Diaphragm

EDR-N8FS

EDR-N8FS Liquid Level Transmitter with Remote-Sealed Diaphragm incorporates semiconductor sensors and a micro computer and converts measured differential pressures to 4 to 20mA DC signals with high accuracy.
EDR-N8FS is suitable for measuring flow volumes, levels (water levels) and pressures of various types of process fluids such as gas, liquid and steam and also supports various installation environments such as explosion-prevented areas, etc.

STANDARD SPECIFICATIONS

Model EDR-N8FS

Differential pressure range

Range Code	Measuring Span	Settable Range Limits
8000	2 to 80kPa	-80≦LRV≦80kPa, -80≦URV≦80kPa
40000	20 to 400kPa	-400≦LRV≦400kPa, -400≦URV≦400kPa

Note) URV is the input differential pressure to give 100% output (20mA DC)
LRV is the input differential pressure to give 0% output (4mA DC)

Output signal 4 to 20mA DC

Output signal range 3.6 to 21.6mA DC (-2.5 to 110%)

Power supply voltage 11.4 to 42.0V DC

Allowable load resistance 600Ω (at 24V DC power supply voltage)

Communication protocol Hitachi communication

Communication line conditions

Power supply voltage 16.7 to 42.0V DC

Load resistance 250 to 1.2kΩ
See Fig. 1 for the relationship between power supply voltage and load resistance.

External adjustment /configuration Zero point adjustment (±100% of measured span), LRV and URV adjustment and configuration and damping time constant are configurable (however, only with indicator and when the function is enabled).

Burn-out at error Burn-up, burn-down or no burn-out can be selected. (No burn-out is configured at shipment.)

Accuracy

Range Code	Accuracy	
8000	±0.2% ±〔0.1+(0.1×8/X)〕%	X is 8kPa or higher X is less than 8kPa
40000	±0.2% ±〔0.1+(0.1×40/X)〕%	X is 40kPa or higher X is less than 40kPa

Note1) Accuracy is the percentage to X.
X is the absolute value of URV, LRV or the biggest value of measured span. X's unit is kPa.

Note2) For square-root output, With zero-cut designation
Output 1.1% or less:
± (linear output accuracy × 45)%
Output 1.1 to 50%:
± (linear output accuracy × 50 / square-root output %) %
Output 50% or higher: Same as linear output
*It is possible to select whether getting the outputs under the zero-cut point zero, or the zero-cut point from an arbitrary straight line or proportional outputs through communication.
Without zero-cut designation
Output 20% or less: Straight line at 0 to 20% point
Output 20% or higher: Same as the above "With zero-cut designation".

Response time

Dead time 0.15s (Minimum)

Damping time constant (Amplifier time constant) Electrically configurable from 0.1 to 102.4s (at 0.1s step) by using a communicator.

Sensor body time constant

Range Code	Time constant (at 25℃)	
	Sensor body	Capillary per 1m
8000	Approx. 0.05s	Approx. 0.2s
40000	Approx. 0.03s	Approx. 0.1s

・Response time is the sum of time constants of the Sensor body and damping time constant (amplifier time constant) and dead time.

Storage temperature range -40 to 85℃

Operating humidity range 0 to 100%RH

Operating temperature range

Ambient temperature range -40 to 85℃

Wetted parts temperature range -40 to 180℃

Maximum operating pressure The highest or below operating pressure of flange (See Fig. 2 for negative pressure.)

Site vibration Continuous vibration below 29.4 m/s^2

Temperature characteristics (at −20 to 60℃)

Range Code	Temperature characteristics		
8000	Zero shift	±[0.05+(0.5×T/50)]%	X is 16kPa or higher
		±[0.05+(0.35+0.15×16/X)×T/50]%	X is less than 16kPa
	Total shift	±[0.05+(0.8×T/50)]%	X is 16kPa or higher
		±[0.05+(0.65+0.15×16/X)×T/50]%	X is less than 16kPa
40000	Zero shift	±[0.05+(0.5×T/50)]%	X is 80kPa or higher
		±[0.05+(0.35+0.15×80/X)×T/50]%	X is less than 80kPa
	Total shift	±[0.05+(0.8×T/50)]%	X is 80kPa or higher
		±[0.05+(0.65+0.15×80/X)×T/50]%	X is less than 80kPa

Note) Temperature characteristic is the percentage to the X.
X is the absolute value of URV, LRV or the biggest value of measured span. X's unit is kPa.
T (℃) is temperature variation width.

Static pressure characteristics (at 25℃)

Range Code	Static pressure characteristics		
8000	Zero shift	±[0.05+(0.05×P/2.5)]%	X is 40kPa or higher
		±[0.05+(0.05×40/X)×P/2.5]%	X is less than 40kPa
	Total shift	±[0.05+(1.95+0.1×80/X)×P/2.5]%	
40000	Zero shift	±[0.05+(0.05×P/2.5)]%	X is 200kPa or higher
		±[0.05+(0.05×200/X)×P/2.5]%	X is less than 200kPa
	Total shift	±[0.05+(1.45+0.1×400/X)×P/2.5]%	

Note) Static pressure characteristic is the percentage to X.
X is the absolute value of URV, LRV or the biggest value of measured span. X's unit is kPa.
P is a static pressure. P's unit is MPa.

Materials

Diaphgram	SUS316L
Wetted parts other than diaphgram	SUS316
Standard flange	SUS304 or SUSF304
Capillary	SUS316 (polyethylene-covered)
Sensor body flange bolt	SCM435
Amplifier case	Aluminum alloy

Sealed liquid Silicon oil
(Relative density: For 0.955, at 25℃)

Process connection JIS 10K 80A RF (similar flange)

Length of protruding part of flange 0mm (connection aperture 80A)

Capillary length 5m

Capillary ejection direction Wafer type (Horizontal to side of diaphragm)

Wire connection G1/2

Check terminal Current output (Ampere meter is required for measurement)

Protection grade JIS C 0920 IP67

Surge absorber Incorporated into the power input circuit
Surge tolerance: 1,000A (8/20 μs)
Impact test voltage: 15,000V (1.2/50 μs)

Color Light gray (anti-acid painting)

Weight Approx. 10kg

Mounting Directly mounted on tank

Accessories External adjustment /configuration magnet

ADDITIONAL SPECIFICATIONS

Communication protocol HART communication

TIIS flameproof, Oil-immersion

Applicable Standard	Exdo II CT4 X Note) Available for use at Zone1, Zone2 groups of hazardous place. Note) If the indicator is not equipped, please construct an external alarm indication system by scaling out of the output signal.
Operating temperature range	Ambient temperature range: −20 to 55℃ Wetted parts temperature range: −20 to 100℃
Wire connection	Please use X-EXRCA pressure proof packing brackets (or EXPC-16B by Shimada Electric Co.,Ltd).

FM explosionproof approval (Arranging)

Applicable Standard	Explosionproof CLI,DIV 1,GPS B,C&D Dust-ignition proof CL Ⅱ/Ⅲ,GPS E,F&G Temperature Code T4
Operating temperature range	Ambient temperature range: −40 to 60℃ Wetted parts temperature range: −40 to 120℃

NEPSI explosionproof approval (Arranging)

Applicable Standard	Explosionproof Ex d ⅡC T4
Operating temperature range	Ambient temperature range: −40 to 60℃ Wetted parts temperature range: −40 to 120℃

Indicator Digital indicator
Indication 5 digits, unit 7 digits, bar graph
Indication items
Individual enable/disable indication of the following items:
Automatic switching when selecting the items
Differential pressure%,
Differential pressure value,
Actual scale of differential pressure,
Static pressure%,
Static pressure value
Actual scale
Unit is selected from pressure, flow volume, height or discretionary configuration.
Configuration range: −99,999 to 99,999
Ambient temperature range: −20 to 85℃

Flange standard JIS 20K, ANSI 150, ANSI 300, JPI 150, JPI 300, etc.
Connection aperture 80A(3B), 100A(4B)
(See Code table for details.)

Length of protruding part of flange 50mm, 100mm, 150mm

Diaphragm cover (Only for aperture 80A(3B) without protruding part)
Material: FEP
(Operating pressure: Atmospheric pressure or higher, operating temperature: −10 to 120℃)
±0.5% is added to the accuracy when the diaphragm cover is used.

Capillary length 1 to 10m (Unit: 1m)

Capillary ejection direction Back ejection (Vertical to side of diaphragm)

Sealed liquid

Fluorine oil	Wetted parts temperature range:−20 to 120℃ Relative density:1.860 (at 20℃) (See Fig. 3 for negative pressure.) Specify also the oil-prohibitive finish together for oxygen measurement.
Silicone oil for sanitary purposes	Wetted parts temperature range:−20 to 150℃ Relative density:0.965 (at 25℃) (See Fig. 4 for negative pressure.)
Propylene glycol	Wetted parts temperature range:−20 to 150℃ Relative density:1.037 (at 25℃) (Not available for negative pressure.)
Wetted parts finish	Oil prohibitive or oil and water prohibitive finish
Vacuum type (Code: V)	Wetted parts temperature range: −20 to 180℃ Ambient temperature range: −20 to 85℃ Sealed liquid is the same as the standard specifications. (Operating pressure varies depending on the temperature. See Fig. 2 for proper usage.)

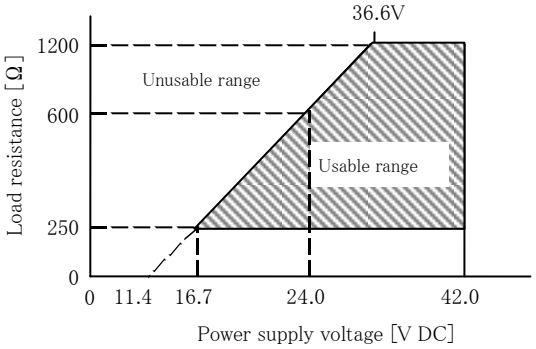
Wetted parts materials

Material Code	Diaphragm	Wetted parts except for diaphragm
316L	SUS316L	SUS316L
HC	Hastelloy C	Hastelloy C
TA	Tantalum	Tantalum

Note) Protruding part length of 0mm is only manufactured for the Material Code TA.

*Select a material considering the anti-corrosion characteristics. Using gold-plated diaphragm (Code:Z52) or embedded with gold-plated diaphragm + hydrogen absorbing alloy (Code:Z72)is recommended if there is any concern about the error caused by hydrogen permeation of diaphragm due to hydrogen in the measured fluid, etc. (However, it is difficult for Z52 and Z72 to completely prevent the error caused by hydrogen permeation.)

Bolt material Sensor body flange bolt:SUS630



The minimum load resistance of 250Ω is required to communicate by connecting the communicator.

Fig. 1 Power supply voltage / load resistance characteristics

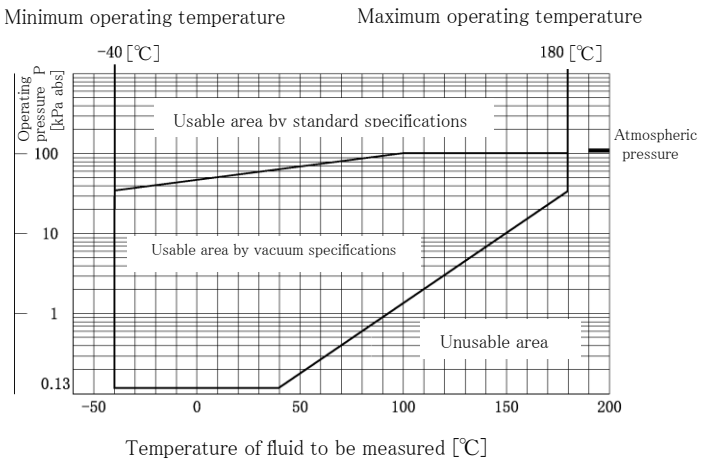


Fig. 2 Wetted parts temperatures and ambient temperature
(Standard and Vacuum specifications)

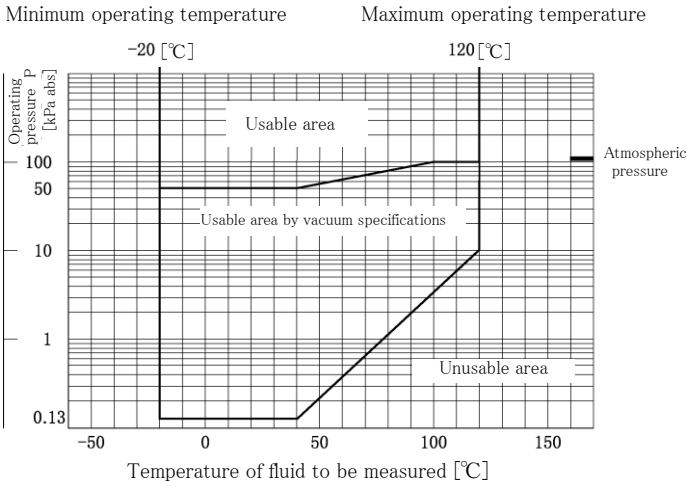


Fig. 3 Operating pressure and wetted parts temperature
(Sealed liquid:Fluorine oil)

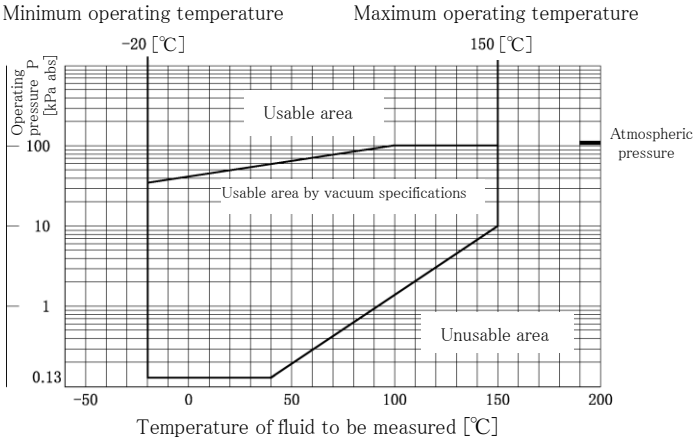
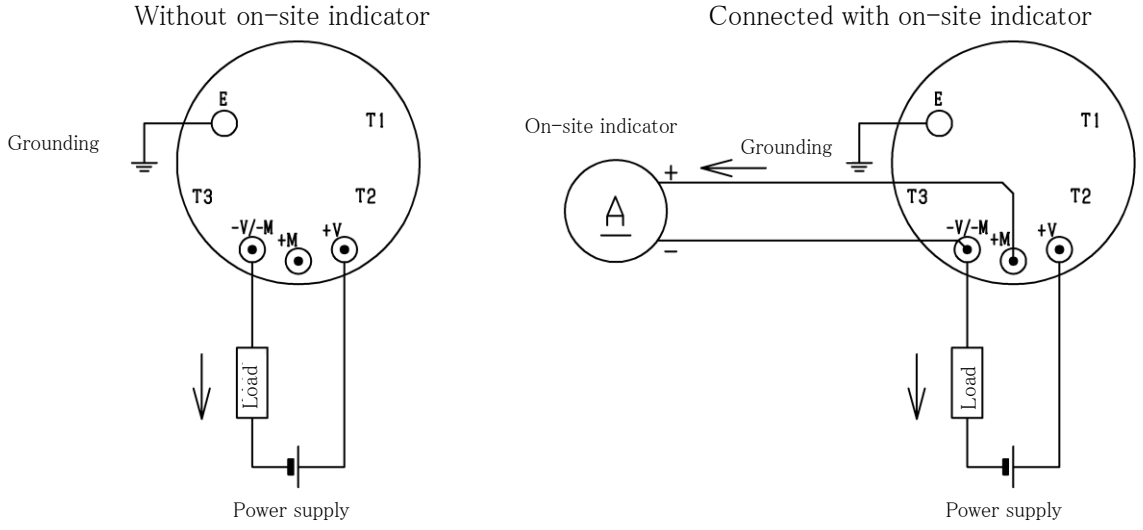


Fig. 4 Operating pressure and wetted parts temperature
(Sealed liquid:Sanitary silicone oil)

EXTERNAL CONNECTION DRAWING

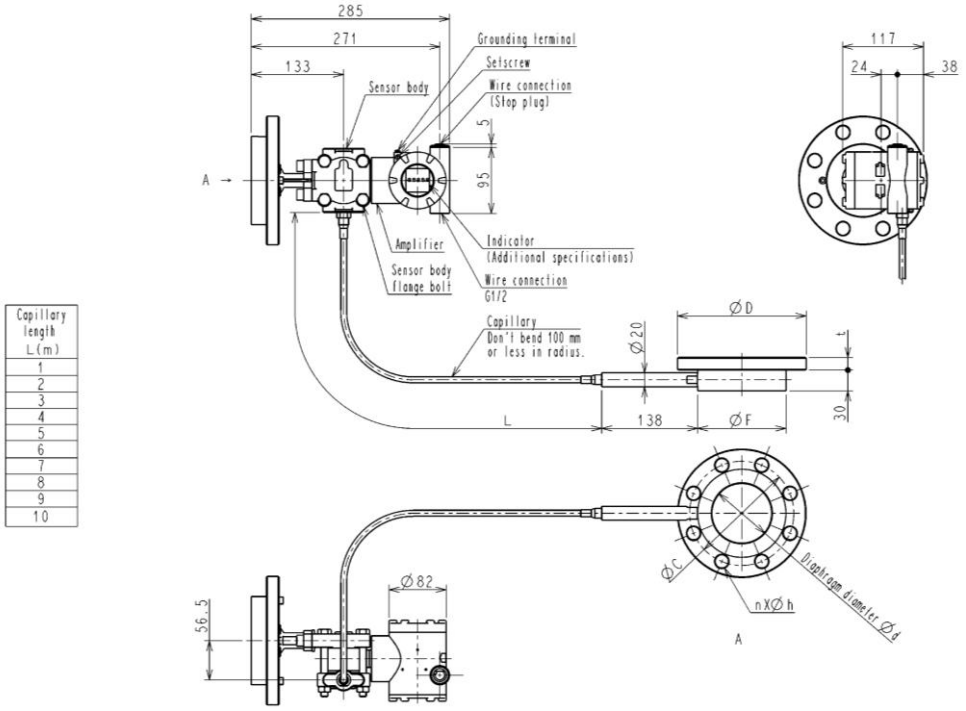


Note1) Perform Class D grounding work (ground resistance of 100Ω or less) for grounding.
Note2) Ground either the transmitter or the receiving instrument. Be careful not to be dual-grounded.
Note3) Grounding terminals on the transmitter are located inside the terminal box and outside the amplifier case.
You can use either of the groundings.
Note4) T1, T2 and T3 terminals are not connected.
Note5) The resistance value needs to be 20Ω or less including wire resistance to connect an on-site indicator.

DIMENSIONS (Unit: mm)

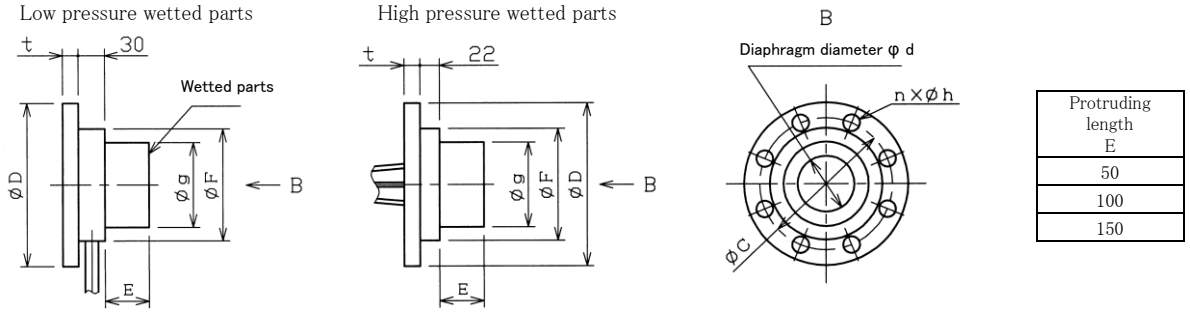
Wafer type

Without protruding part (E0)



Capillary length L(m)
1
2
3
4
5
6
7
8
9
10

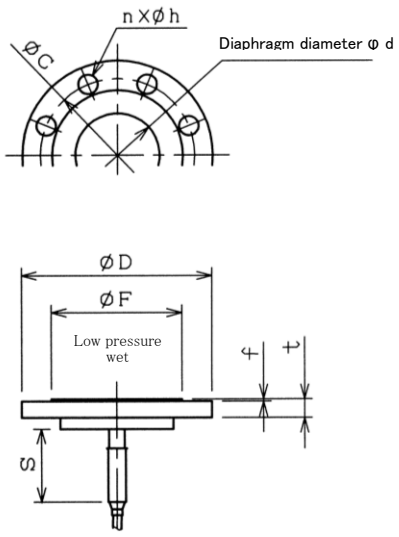
With protruding part (E50, E100, E150)



Protruding length E
50
100
150

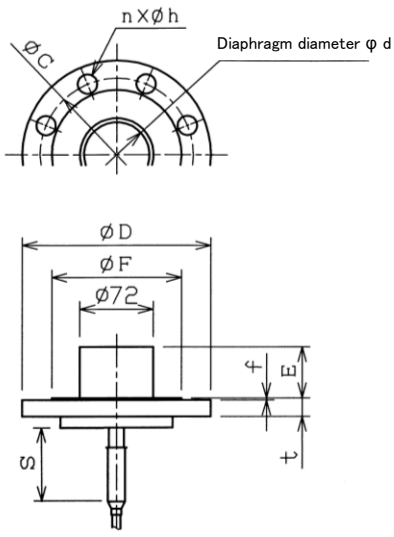
Back ejection type on low pressure wet side

Without protruding part (E0)

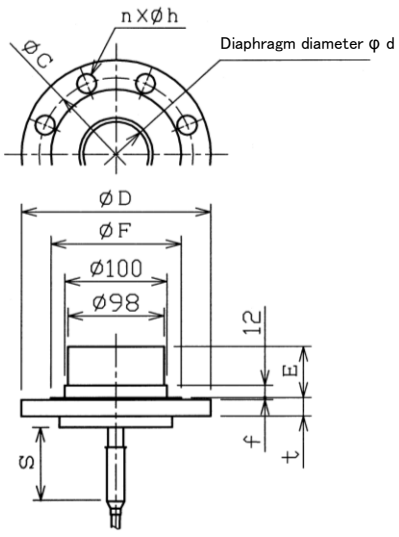


With protruding part (E50, E100, E150)

For 80A(3B)



For 100A(4B)



Wafer type

Without protruding part (E0)

Flange standard (similar flange)		ϕD	ϕF	ϕd	ϕC	n× ϕh	t
80A	JIS10K	185	127	88	150	8×19	18
	JIS20K	200	127	88	160	8×23	22
	JIS30K	210	127	88	170	8×23	28
	JIS40K	210	127	88	170	8×23	32
	JIS63K	230	127	88	185	8×25	40
100A	JIS10K	210	154	88	175	8×19	18
	JIS20K	225	154	88	185	8×23	24
	JIS30K	240	154	88	195	8×25	32
	JIS40K	250	154	88	205	8×25	36
	JIS63K	270	154	88	220	8×27	44
80A (3B)	ANSI150	191	127	88	152.4	4×20	24
	ANSI300	210	127	88	168.3	8×23	29
	ANSI600	210	127	88	168.3	8×23	32
	ANSI900	241	127	88	190.5	8×26	38.5
	ANSI1500	267	127	88	203.2	8×32	48
	ANSI2500	305	127	88	228.6	8×35	67
100A (4B)	ANSI150	229	154	88	190.5	8×20	24
	ANSI300	254	154	88	200	8×23	32
	ANSI600	273	154	88	215.9	8×26	38.5
	ANSI900	292	154	88	235	8×32	44.5
	ANSI1500	311	154	88	241.3	8×35	54
	ANSI2500	356	154	88	273	8×42	76.5

* JPI flange is the same size as ANSI flange.
* ϕd is for diaphragm material of SUS316L

With protruding part (E50, E100, E150)

Flange standard (similar flange)		ϕD	ϕF	ϕg	ϕd	ϕC	n× ϕh	t
80A	JIS10K	185	127	72	64	150	8×19	18
	JIS20K	200	127	72	64	160	8×23	22
	JIS30K	210	127	72	64	170	8×23	28
	JIS40K	210	127	72	64	170	8×23	32
	JIS63K	230	127	72	64	185	8×25	40
100A	JIS10K	210	154	96	88	175	8×19	18
	JIS20K	225	154	96	88	185	8×23	24
	JIS30K	240	154	96	88	195	8×25	32
	JIS40K	250	154	96	88	205	8×25	36
	JIS63K	270	154	96	88	220	8×27	44
80A (3B)	ANSI300	191	127	72	64	152.4	4×20	24
	ANSI600	210	127	72	64	168.3	8×23	29
	ANSI900	210	127	72	64	168.3	8×23	32
	ANSI1500	241	127	72	64	190.5	8×26	38.5
	ANSI2500	267	127	72	64	203.2	8×32	48
100A (4B)	ANSI150	305	127	72	64	228.6	8×35	67
	ANSI300	229	154	96	88	190.5	8×20	24
	ANSI600	254	154	96	88	200	8×23	32
	ANSI900	273	154	96	88	215.9	8×26	38.5
	ANSI1500	292	154	96	88	235	8×32	44.5
	ANSI2500	311	154	96	88	241.3	8×35	54

* JPI flange is the same size as ANSI flange.
* ϕd is for diaphragm material of SUS316L

Back ejection type on low pressure wet side

Without protruding part (E0)

Flange standard (similar flange)		ϕD	ϕF	ϕd	ϕC	n× ϕh	t	f
80A	JIS10K	185	127	88	150	8×19	18	2
	JIS20K	200	127	88	160	8×23	22	2
	JIS30K	210	127	88	170	8×23	28	2
	JIS40K	210	127	88	170	8×23	32	2
	JIS63K	230	127	88	185	8×25	40	2
100A	JIS10K	210	151	88	175	8×19	18	2
	JIS20K	225	160	88	185	8×23	24	2
	JIS30K	240	160	88	195	8×25	32	2
	JIS40K	250	165	88	205	8×25	36	2
	JIS63K	270	165	88	220	8×27	44	2
80A (3B)	ANSI150	191	127	88	152.4	4×20	23.9	1.6
	ANSI300	210	127	88	168.1	8×23	28.5	1.6
	ANSI600	210	127	88	168.1	8×23	38.3	6.4
	ANSI900	241	127	88	190.5	8×26	44.5	6.4
	ANSI1500	267	127	88	203.2	8×32	54.2	6.4
	ANSI2500	305	127	88	228.6	8×35	73	6.4
100A (4B)	ANSI150	229	157	88	190.5	8×20	23.9	1.6
	ANSI300	254	157	88	200.2	8×23	31.8	1.6
	ANSI600	273	157	88	215.9	8×26	44.5	6.4
	ANSI900	292	157	88	235	8×32	50.9	6.4
	ANSI1500	311	157	88	241.3	8×35	60.4	6.4
	ANSI2500	356	157	88	273	8×42	82.6	6.4

* JPI flange is the same size as ANSI flange.
* ϕd is for diaphragm material of SUS316L

With protruding part (E50, E100, E150)

Flange standard (similar flange)		ϕD	ϕF	ϕd	ϕC	n× ϕh	t	f
80A	JIS10K	185	127	64	150	8×19	18	2
	JIS20K	200	127	64	160	8×23	22	2
	JIS30K	210	127	64	170	8×23	28	2
	JIS40K	210	127	64	170	8×23	32	2
	JIS63K	230	127	64	185	8×25	40	2
100A	JIS10K	210	151	88	175	8×19	18	2
	JIS20K	225	160	88	185	8×23	24	2
	JIS30K	240	160	88	195	8×25	32	2
	JIS40K	250	165	88	205	8×25	36	2
	JIS63K	270	165	88	220	8×27	44	2
80A (3B)	ANSI150	191	127	64	152.4	4×20	23.9	1.6
	ANSI300	210	127	64	168.1	8×23	28.5	1.6
	ANSI600	210	127	64	168.1	8×23	38.3	6.4
	ANSI900	241	127	64	190.5	8×26	44.5	6.4
	ANSI1500	267	127	64	203.2	8×32	54.2	6.4
100A (4B)	ANSI2500	305	127	64	228.6	8×35	73	6.4
	ANSI150	229	157	88	190.5	8×20	23.9	1.6
	ANSI300	254	157	88	200.2	8×23	31.8	1.6
	ANSI600	273	157	88	215.9	8×26	44.5	6.4
	ANSI900	292	157	88	235	8×32	50.9	6.4
	ANSI1500	311	157	88	241.3	8×35	60.4	6.4

* JPI flange is the same size as ANSI flange.
* ϕd is for diaphragm material of SUS316

CODE TABLES

EDR-N8FS Intelligent Liquid Level Transmitter with Remote-Sealed Diaphragm

Model				
EDR-N8FS				
No.	Item	Code		Remarks
1	Range Code	8000		Measuring span 2 to 80kPa
		40000		Measuring span 20 to 400kPa
2	Communication	-		Hitachi communication
		H		HART communication
3	Functional safety	-		None
4	Adjustment range	-		Adjust between 0 and Maximum range
		C( )		Describe adjustment range and unit sign in ( )
5	Certification	-		None
		XC		TIIS flameproof, Oil-immersion
		FM		FM explosionproof approval (Arranging)
		NEPSI		NEPSI explosionproof approval (Arranging)
6	Indicator	-		None
		M		With digital indicator (Indication 0 to 100%)
		MJ( )		With digital indicator, describe indication scale and unit sign in actual scale indication ( )
7	Flange standard	JIS	80J10	Flange standard JIS 10K 80A RF-equivalent
			80J20	Flange standard JIS 20K 80A RF-equivalent
			80J30	Flange standard JIS 30K 80A RF-equivalent
			80J40	Flange standard JIS 40K 80A RF-equivalent
			80J63	Flange standard JIS 63K 80A RF-equivalent
			100J10	Flange standard JIS 10K 100A RF-equivalent
			100J20	Flange standard JIS 20K 100A RF-equivalent
			100J30	Flange standard JIS 30K 100A RF-equivalent
			100J40	Flange standard JIS 40K 100A RF-equivalent
			100J63	Flange standard JIS 63K 100A RF-equivalent
		ANSI	80A150	Flange standard ANSI 150 3B RF-equivalent
			80A300	Flange standard ANSI 300 3B RF-equivalent
			80A400	Flange standard ANSI 400 3B RF-equivalent
			80A600	Flange standard ANSI 600 3B RF-equivalent
			80A900	Flange standard ANSI 900 3B RF-equivalent
			80A1500	Flange standard ANSI 1500 3B RF-equivalent
			80A2500	Flange standard ANSI 2500 3B RF-equivalent
			100A150	Flange standard ANSI 150 4B RF-equivalent
			100A300	Flange standard ANSI 300 4B RF-equivalent
			100A400	Flange standard ANSI 400 4B RF-equivalent
			100A600	Flange standard ANSI 600 4B RF-equivalent
			100A900	Flange standard ANSI 900 4B RF-equivalent
			100A1500	Flange standard ANSI 1500 4B RF-equivalent
			100A2500	Flange standard ANSI 2500 4B RF-equivalent
		JPI	80JP150	Flange standard JPI 150 3B RF-equivalent
			80JP300	Flange standard JPI 300 3B RF-equivalent
			80JP400	Flange standard JPI 400 3B RF-equivalent
			80JP600	Flange standard JPI 600 3B RF-equivalent
			80JP900	Flange standard JPI 900 3B RF-equivalent
			80JP1500	Flange standard JPI 1500 3B RF-equivalent
			80JP2500	Flange standard JPI 2500 3B RF-equivalent
			100JP150	Flange standard JPI 150 4B RF-equivalent
			100JP300	Flange standard JPI 300 4B RF-equivalent
			100JP400	Flange standard JPI 400 4B RF-equivalent
			100JP600	Flange standard JPI 600 4B RF-equivalent
			100JP900	Flange standard JPI 900 4B RF-equivalent
			100JP1500	Flange standard JPI 1500 4B RF-equivalent
			100JP2500	Flange standard JPI 2500 4B RF-equivalent
8	Protruding flange part and diaphragm cover	E0		Protruding part length 0mm
		E50		Protruding part length 50mm
		E100		Protruding part length 100mm
		E150		Protruding part length 150mm
		E0TDS		Protruding part length 0 mm with FEP Diaphragm cover (Operating pressure: atmospheric pressure or higher, operating temperature -10 to 120℃) Only 80A can be selected.
9	Capillary length	Wafer type	1	Capillary length 1m
			2	Capillary length 2m
			3	Capillary length 3m
			4	Capillary length 4m
			5	Capillary length 5m
			6	Capillary length 6m
			7	Capillary length 7m
			8	Capillary length 8m
			9	Capillary length 9m
			10	Capillary length 10m
		Back ejection type	1U	Capillary back ejection Length 1m
			2U	Capillary back ejection Length 2m
			3U	Capillary back ejection Length 3m
			4U	Capillary back ejection Length 4m
			5U	Capillary back ejection Length 5m
			6U	Capillary back ejection Length 6m
			7U	Capillary back ejection Length 7m
			8U	Capillary back ejection Length 8m

			9U	Capillary back ejection　Length　9m
			10U	Capillary back ejection　Length　10m
10	Material	–		Diaphragm: SUS316L　Wetted part: SUS316
		316L		Diaphragm: SUS316L　Wetted part: SUS316L
		HC		Diaphragm: Hastelloy C　Wetted part: Hastelloy C
		TA		Diaphragm: Tantalum　Wetted part: Tantalum　Only E0
11	Bolt material	–		Sensor body flange bolt: SCM435
		S630		Sensor body flange bolt: SUS630
12	Sealed liquid	–		Silicone oil
		FO		Fluorine oil
		100CS		Sanitary silicone oil
		PG		Propylene glycol
13	Oil prohibition	–		No finish
		NL		Oil prohibitive finish
		NLW		Oil and water prohibitive finish
14	Wetted parts conditions	–		Standard
		V		Vacuum type

Example of Code description：EDR-N8FS-8000XC-M-80J10-E0-5

●HART® is a registerd trademark of the Field Comm Group.

●Please read the “Instruction Manual” carefully before use.

●Appearance and specifications are subject to change partially for improvement.