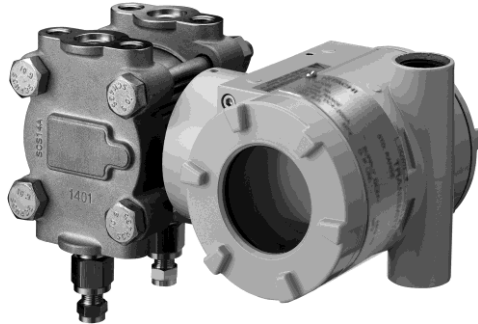


# CS

CODE AND SPECIFICATIONS SHEET

## Intelligent Differential Pressure Transmitter

# EDR-N8



EDR-N8 Differential Pressure Transmitter incorporates semiconductor sensors and a microcomputer and converts measured differential pressures to 4 to 20mA DC signals with high accuracy.

EDR-N8 is suitable for measuring flow volumes, levels (water levels) and pressures of various process fluid including gas, liquid and steam and also supports various installation environments including explosion-prevented areas.

EDR-N8, by adopting semiconductor composite sensors, is capable of pressure measurement and communication and output.

### STANDARD SPECIFICATIONS

**Model** EDR-N8

#### Differential pressure range

Range Code	Measuring Span	Settable Range Limits
800	0.098 to 8kPa	$-8 \leq \text{LRV} \leq 8\text{kPa}$ , $-8 \leq \text{URV} \leq 8\text{kPa}$
8000	0.4 to 80kPa	$-80 \leq \text{LRV} \leq 80\text{kPa}$ , $-80 \leq \text{URV} \leq 80\text{kPa}$
40000	4 to 400kPa	$-400 \leq \text{LRV} \leq 400\text{kPa}$ , $-400 \leq \text{URV} \leq 400\text{kPa}$
100000	100 to 1000kPa	$-1000 \leq \text{LRV} \leq 1000\text{kPa}$ , $-1000 \leq \text{URV} \leq 1000\text{kPa}$

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)

<b>Output signal</b>	4 to 20mA DC
<b>Output signal range</b>	3.6 to 21.6mA DC (-2.5 to 110%)
<b>Power supply voltage</b>	11.4 to 42.0V DC
<b>Allowable load resistance</b>	600 Ω (at 24V DC power supply voltage)
<b>Communication protocol</b>	Hitachi communication
<b>Communication line conditions</b>	
Power supply voltage	16.7 to 42.0V DC
Load resistance	250 to 1.2k Ω

See Fig. 1 for the relationship between power supply voltage and load resistance.

**External adjustment / configuration** Zero point adjustment ( $\pm 100\%$  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

●Material Code: Standard, 316L

Range Code	Accuracy
800	$\pm 0.15\%$ X is 2kPa or higher $\pm [0.1 + (0.05 \times 2/X)]\%$ X is less than 2kPa or $\pm 1.96\text{kPa}$ whichever is bigger
8000	$\pm 0.075\%$ X is 8kPa or higher $\pm [0.002 + (0.073 \times 8/X)]\%$ X is less than 8kPa
40000	$\pm 0.075\%$ X is 40kPa or higher $\pm [0.002 + (0.073 \times 40/X)]\%$ X is less than 40kPa
100000	$\pm 0.2\%$

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:  
 $\pm$  (linear output accuracy  $\times 45$ )%  
Output 1.1 to 50%:  
 $\pm$  (linear output accuracy  $\times 50$  / 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.

Range Code	Time constant (at 25°C)
	Sensor body
800	Approx. 0.2s
8000	Approx. 0.05s
40000	Approx. 0.03s
100000	Approx. 0.03s

•Response time is the sum of time constants of the Sensor body and damping time constant (amplifier time constant) and dead time.  
•For possible pressure pulsation, please use the fixed electric damper (approx. 1s) (Code: Z25). At this time, inserting a capillary of  $\phi 1$  internal diameter (1m or longer length) is recommended.

**Storage temperature range** -40 to 85 °C

**Operating humidity range** 0 to 100%RH

**Operating temperature range**

Ambient temperature range -40 to 85°C (See Fig. 2.)  
(-10 to 60°C for Range Code 100000)

Wetted parts temperature range -40 to 120°C  
(-10 to 100°C for Range Code 100000)

**Maximum operating pressure**

Range Code	Maximum operating pressure
800	5MPa
8000	15MPa
40000	15MPa
100000	10MPa

Note) See Fig. 3 and 4 for negative pressure.

**Site vibration** Continuous vibration below 29.4m/s<sup>2</sup>

**Temperature characteristics** (at -20 to 60°C)

●Material Code: Standard, 316L

Range Code	Temperature characteristics	
800	Zero shift	$\pm[0.05+(0.45 \times T/50)]\%$ X is 3kPa or higher $\pm[0.05+(0.25+0.2 \times 3/X) \times T/50]\%$ X is less than 3kPa
	Total shift	$\pm[0.05+(0.75 \times T/50)]\%$ X is 3kPa or higher $\pm[0.05+(0.45+0.3 \times 3/X) \times T/50]\%$ X is less than 3kPa
8000	Zero shift	$\pm[0.05+(0.3 \times T/50)]\%$ X is 30kPa or higher $\pm[0.05+(0.15+0.15 \times 30/X) \times T/50]\%$ X is less than 30kPa
	Total shift	$\pm[0.05+(0.55 \times T/50)]\%$ X is 30kPa or higher $\pm[0.05+(0.4+0.15 \times 30/X) \times T/50]\%$ X is less than 30kPa
40000	Zero shift	$\pm[0.05+(0.3 \times T/50)]\%$ X is 160kPa or higher $\pm[0.05+(0.15+0.15 \times 160/X) \times T/50]\%$ X is less than 160kPa
	Total shift	$\pm[0.05+(0.55 \times T/50)]\%$ X is 160kPa or higher $\pm[0.05+(0.4+0.15 \times 160/X) \times T/50]\%$ X is less than 160kPa
100000	Zero shift	$\pm[0.05+(0.3 \times T/50)]\%$ X is 400kPa or higher $\pm[0.05+(0.15+0.15 \times 400/X) \times T/50]\%$ X is less than 400kPa
	Total shift	$\pm[0.05+(0.55 \times T/50)]\%$ X is 400kPa or higher $\pm[0.05+(0.4+0.15 \times 400/X) \times T/50]\%$ X is less than 400kPa

Note) Temperature 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.  
T (°C) is temperature variation width.

**Static pressure characteristics** (at 25°C)

●Material Code: Standard, 316L

Range Code	Static pressure characteristics	
800	Zero shift	$\pm[0.05+(0.1 \times 8/X \times P/5)]\%$
8000	Zero shift	$\pm[0.05+(0.1 \times P/10)]\%$ X is 40kPa or higher $\pm[0.05+(0.1 \times 40/X) \times P/10]\%$ X is less than 40kPa
	Total shift	$\pm[0.05+(1.95+0.1 \times 80/X) \times P/10]\%$
40000	Zero shift	$\pm[0.05+(0.1 \times P/10)]\%$ X is 200kPa or higher $\pm[0.05+(0.1 \times 200/X) \times P/10]\%$ X is less than 200kPa
	Total shift	$\pm[0.05+(1.45+0.1 \times 400/X) \times P/10]\%$
100000	Zero shift	$\pm[0.05+(0.1 \times P/10)]\%$ X is 500kPa or higher $\pm[0.05+(0.1 \times 500/X) \times P/10]\%$ X is less than 500kPa
	Total shift	$\pm[0.05+(1.45+0.1 \times 1000/X) \times P/10]\%$

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.

**Overpressure characteristics** (Zero point)  $\pm 5\%$  (when the applied operating pressure is the maximum)  
(for the maximum span)

**Long-term stability** (Zero point)  $\pm 0.1\%$  / 1year (for the maximum span)  
Range Code: 8000, 40000, 100000  
Material Code: Standard, 316L  
Varied volume under basic operable conditions ( $23 \pm 2^\circ\text{C}$ , under atmospheric pressure)

**Material**

Diaphragm	SUS316L
Sensor body	SUS316L
Sensor body flange	SCSI4A (SUS316 equivalent casting)
Sensor body flange bolt	SCM435
Sensor body flange O-ring	EPDM
Amplifier case	Aluminum alloy
Mounting plate	SPCC (anti-acid painting)
U-bolt	SUS304

**Sealed liquid** Silicone oil

**Pressure inlet** Upper inlet Rc1/4 without oval flange

**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(8/20μs)  
Impact test voltage: 15,000V(1.2/50μs)

**Color** Light gray (anti-acid painting)

**Weight** Approx. 4.0kg

**Mounting** Use U-bolts for 50A pipes, etc.

**Accessories** A set of 50A pipe mounting plate and U-bolts,  
External adjustment/configuration magnet

**ADDITIONAL SPECIFICATIONS**

**Communication protocol** HART communication

**Static pressure measurement** (Absolute pressure measurement)

Output form Composite converter EDB500MA outputs 1 to 5V DC that is displayed with the incorporated indicator.

Measuring span 0.5 to 5MPa abs.

Accuracy  $\pm 0.2\%$  X is 1MPa or higher  
 $\pm 0.2 \times (1/X)\%$  X is less than 1MPa

**Temperature characteristics**

Zero shift	$\pm[0.05+(1.0 \times T/50)]\%$ X is 2MPa or higher $\pm[0.05+(0.5+0.5 \times 2/X) \times T/50]\%$ X is less than 2MPa
Total shift	$\pm[0.05+(2.5 \times T/50)]\%$ X is 2MPa or higher $\pm[0.05+(2.0+0.5 \times 2/X) \times T/50]\%$ X is less than 2MPa

Note) Accuracy and temperature characteristics are the percentages to X. X is the absolute value of URV, LRV or the biggest value of measured span. X's unit is MPa.  
T (°C) is temperature variation width.

**TIIS flameproof approval, Oil-immersion**

Applicable Standard Exdo II CT4 X <sup>Note)</sup>  
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°C  
Wetted parts temperature range: -20 to 100°C

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°C  
Wetted parts temperature range: -40 to 120°C

**NEPSI explosionproof approval (Arranging)**

Applicable Standard Explosionproof Ex d II C T4

Operating temperature range Ambient temperature range: -40 to 60°C  
Wetted parts temperature range: -40 to 120°C

**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°C

**Sealed liquid**

Fluorine oil Wetted parts temperature range: -20 to 120°C  
(See Fig. 5 for negative pressure.)  
Specify also the oil-prohibitive finish together for oxygen measurement.

Silicone oil for sanitary purposes Wetted parts temperature range: -20 to 120°C  
(See Fig. 6 for negative pressure.)

**Wetted parts finish**

Oil prohibitive or oil and water prohibitive finish

**Pressure inlet (with oval flange)**

Rc1/4, Rc1/2, 1/4NPT, 1/2NPT  
15A socket welding (socket screw-in type)

**Wetted parts conditions**

Vacuum type (Code: V) Wetted parts temperature range: -40 to 120°C  
Sealed liquid is the same as the standard specifications.  
(Operating pressure varies depending on the temperature. See Fig. 3 and 4 for proper usage.)

**Bolt material**

Sensor body flangebolt: SUS304, SUS630  
(Maximum operating pressure for SUS304 is 1/2 of the standard product except for Range Code: 800.)

**Wetted parts materials**

Material Code	Diaphragm	Sensor body wetted parts	Sensor body flange
316L	SUS316L	SUS316L	SCS16A (SUS316L equivalent)
HC316	Hastelloy C	SUS316L	SCS14A (SUS316L equivalent)
HC316L	Hastelloy C	SUS316L	SCS16A (SUS316L equivalent)
HC	Hastelloy C	Hastelloy C	Hastelloy C
TA	Tantalum	Tantalum	Tantalum

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

Note) The table below shows Pressure inlet and Maximum operating pressure.

Material Code	Pressure inlet	Maximum operating pressure
HC	Retrieval from the side of Rc1/4	7.5MPa (Range Code 800 is 5MPa)
TA		

**Accuracy**

● Material Code: HC316, HC316L, HC, TA

Range Code	Accuracy	
800	±0.2% ±[0.1+(0.1×3/X)]%	X is 3kPa or higher X is less than 3kPa
8000	±0.2% ±[0.15+(0.05×10/X)]%	X is 10kPa or higher X is less than 10kPa
40000	±0.2% ±[0.1+(0.1×100/X)]%	X is 100kPa or higher X is less than 100kPa
100000	±0.2% ±[0.1+(0.1×500/X)]%	X is 500kPa or higher X is less than 500kPa

Note) 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.

**Temperature characteristics** (at -20 to 60°C)

●Material Code: HC316, HC316L, HC, TA

Range Code	Temperature characteristics	
800	Zero shift $\pm[0.1+(1.0 \times T/50)]\%$	X is 5kPa or higher
	$\pm[0.1+(0.5+0.5 \times 5/X) \times T/50]\%$	X is less than 5kPa
	Total shift $\pm[0.1+(1.5 \times T/50)]\%$	X is 5kPa or higher
	$\pm[0.1+(0.75+0.75 \times 5/X) \times T/50]\%$	X is less than 5kPa
8000	Zero shift $\pm[0.1+(0.4 \times T/50)]\%$	X is 50kPa or higher
	$\pm[0.1+(0.3+0.1 \times 50/X) \times T/50]\%$	X is less than 50kPa
	Total shift $\pm[0.1+(0.9 \times T/50)]\%$	X is 50kPa or higher
	$\pm[0.1+(0.8+0.1 \times 50/X) \times T/50]\%$	X is less than 50kPa
40000	Zero shift $\pm[0.1+(0.4 \times T/50)]\%$	X is 200kPa or higher
	$\pm[0.1+(0.3+0.1 \times 200/X) \times T/50]\%$	X is less than 200kPa
	Total shift $\pm[0.1+(0.9 \times T/50)]\%$	X is 200kPa or higher
	$\pm[0.1+(0.8+0.1 \times 200/X) \times T/50]\%$	X is less than 200kPa
100000	Zero shift $\pm[0.1+(0.5 \times T/50)]\%$	X is 500kPa or higher
	$\pm[0.1+(0.25+0.25 \times 500/X) \times T/50]\%$	X is less than 500kPa
	Total shift $\pm[0.1+(1.0 \times T/50)]\%$	X is 500kPa or higher
	$\pm[0.1+(0.75+0.25 \times 500/X) \times T/50]\%$	X is less than 500kPa

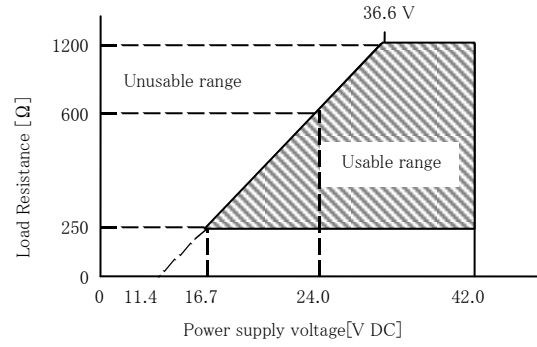
Note) Temperature characteristic is the percentage to X.  
 X is the absolute value of URV, LRV or the biggest value of measured span. X's unit is kPa.  
 T (°C) is temperature variation width.

**Static pressure characteristics** (at 25°C)

●Material Code: HC316, HC316L, HC, TA

Range Code	Static pressure characteristics	
800	Zero shift $\pm[0.05+(0.3 \times 8/X \times P/5)]\%$	
8000	Zero shift $\pm[0.1+(0.1 \times P/10)]\%$	X is 50kPa or higher
	$\pm[0.1+(0.1 \times 50/X) \times P/10]\%$	X is less than 50kPa
	Total shift $\pm[0.1+(0.5+0.2 \times 80/X) \times P/10]\%$	
	Zero shift $\pm[0.1+(0.1 \times P/10)]\%$	X is 300kPa or higher
40000	$\pm[0.1+(0.1 \times 300/X) \times P/10]\%$	X is less than 300kPa
	Total shift $\pm[0.1+(0.5+0.2 \times 400/X) \times P/10]\%$	
100000	Zero shift $\pm[0.1+(0.4 \times P/10)]\%$	X is 600kPa or higher
	$\pm[0.1+(0.4 \times 600/X) \times P/10]\%$	X is less than 600kPa
	Total shift $\pm[0.1+(2.5+0.2 \times 1000/X) \times P/10]\%$	

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.



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

Fig. 1 Power supply voltage / load resistance characteristics

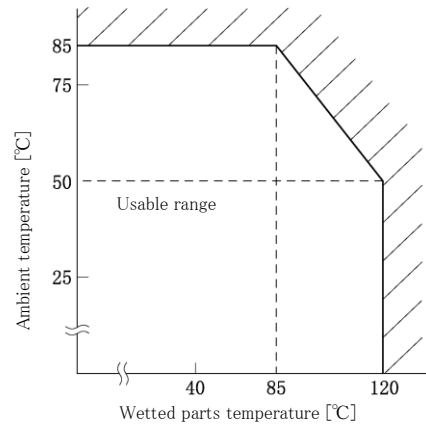


Fig. 2 Wetted parts temperature and ambient temperature

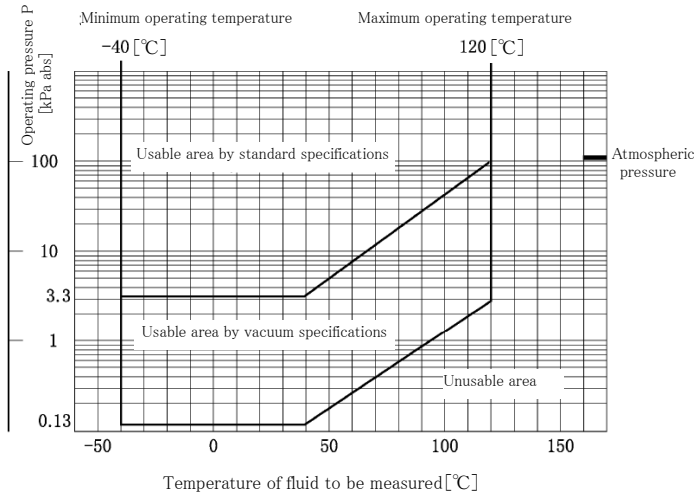


Fig. 3 Operating pressure and wetted parts temperature  
(Standard / vacuum type specifications, except for Range Code: 100000)

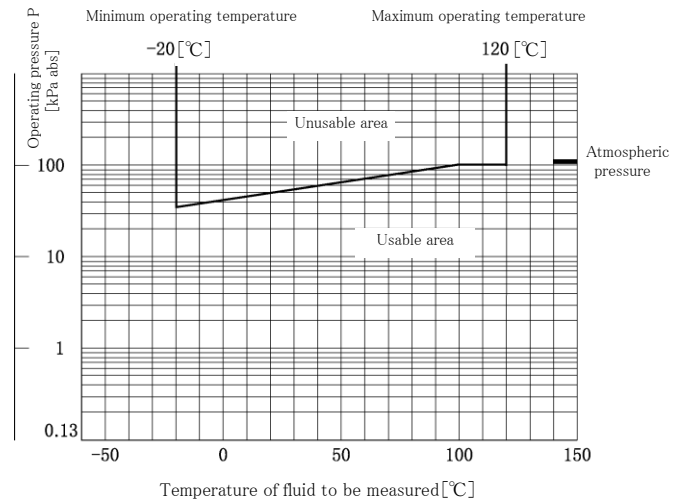


Fig. 6 Operating pressure and wetted parts temperature  
(Sealed liquid: Silicone oil for sanitary purposes)

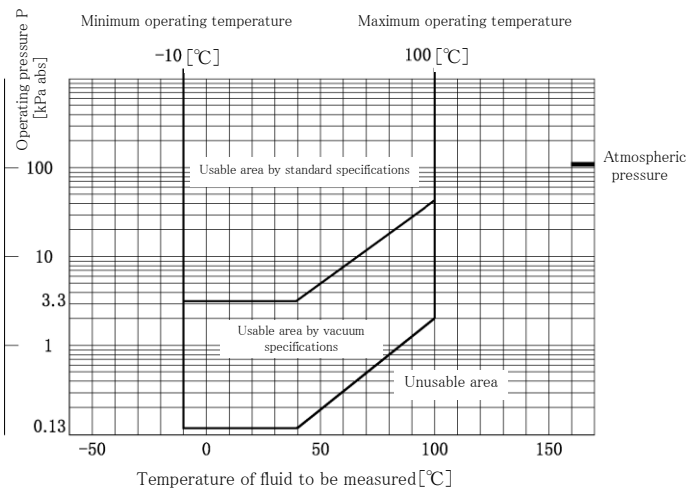


Fig. 4 Operating pressure and wetted parts temperature  
(Standard / vacuum type specifications, Range Code: 100000)

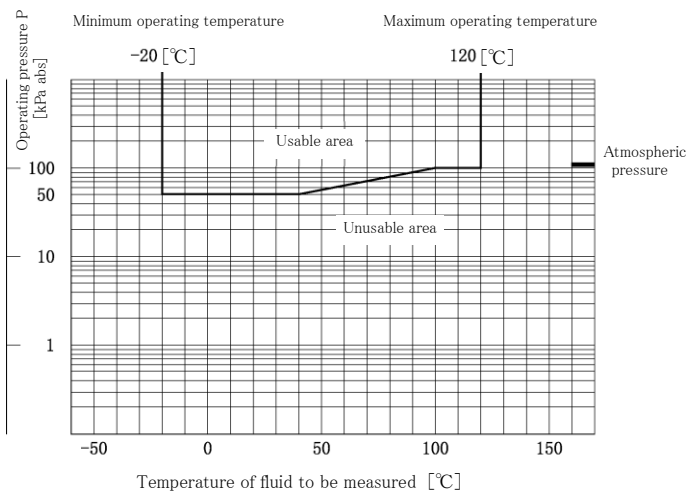
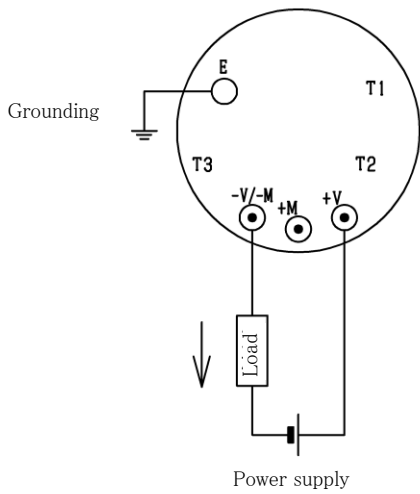


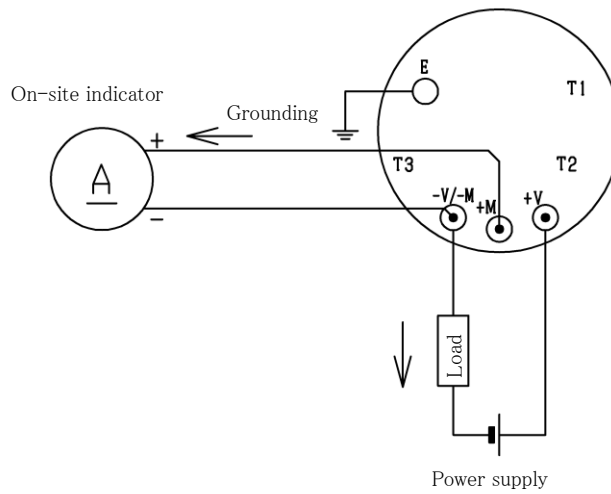
Fig. 5 Operating pressure and wetted parts temperature  
(Sealed liquid: Fluorine oil)

# EXTERNAL CONNECTION DRAWING

Without on-site indicator



Connected with on-site indicator



Note1) Perform Class D grounding work (ground resistance of  $100\ \Omega$  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.

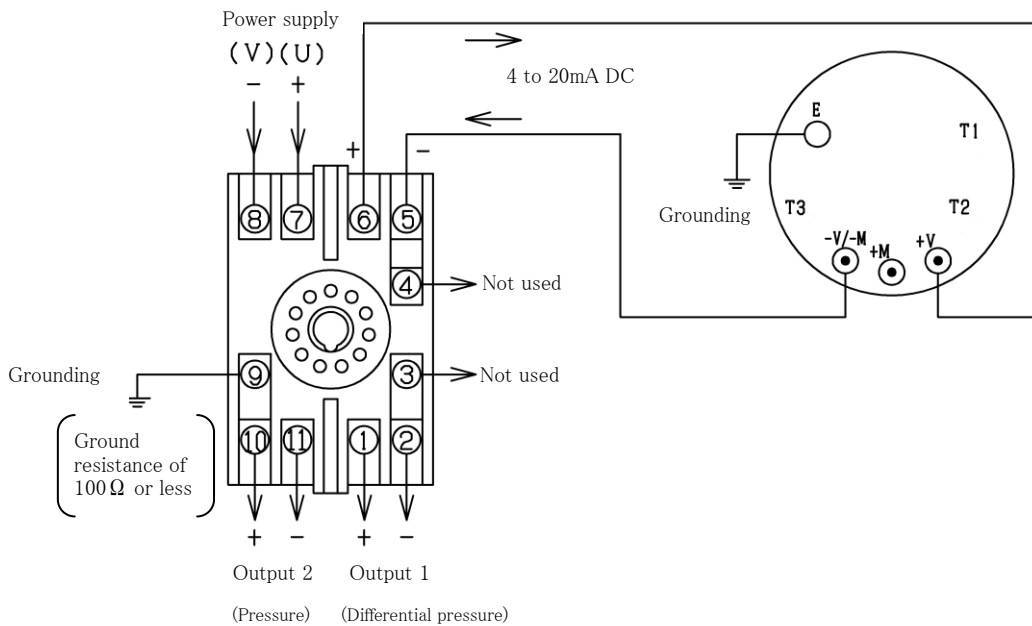
You can use either of the groundings.

Note4) T1, T2 and T3 terminals are not connected.

Note5) The resistance value needs to be  $20\ \Omega$  or less including wire resistance to connect an on-site indicator.

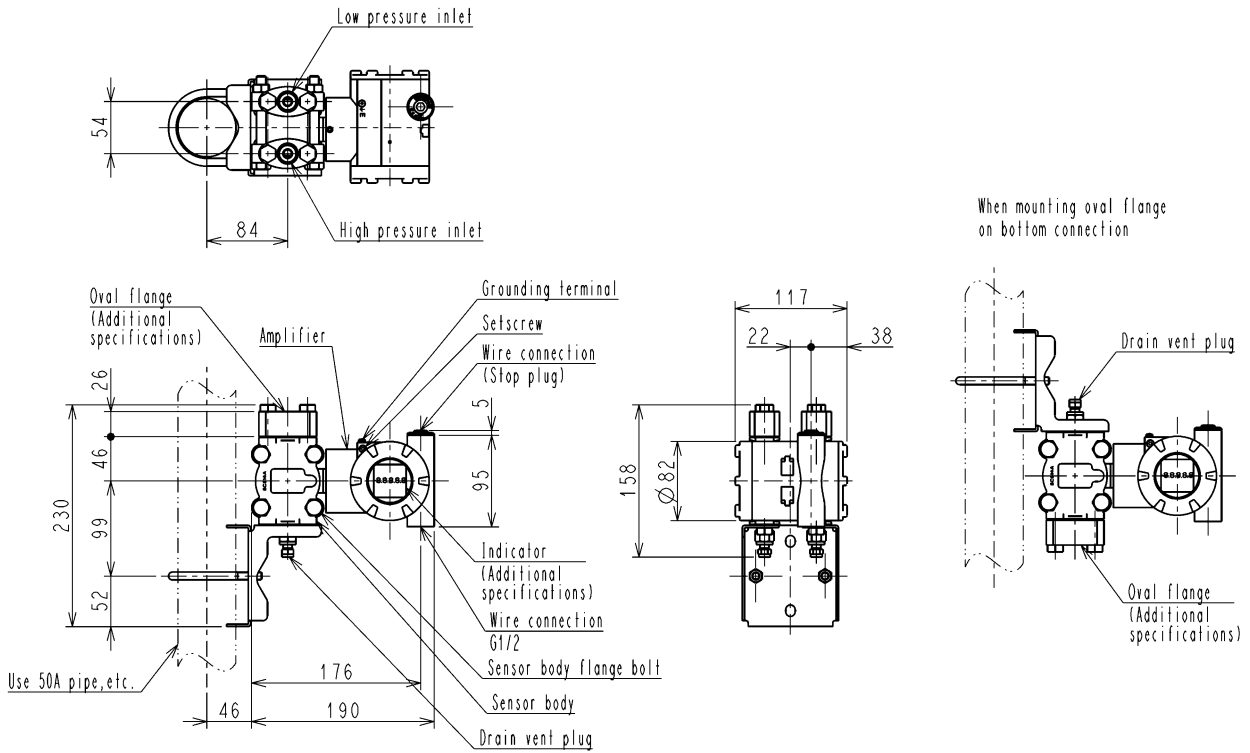
Connected with EDB500MA

EDB500MA  
Composite converter

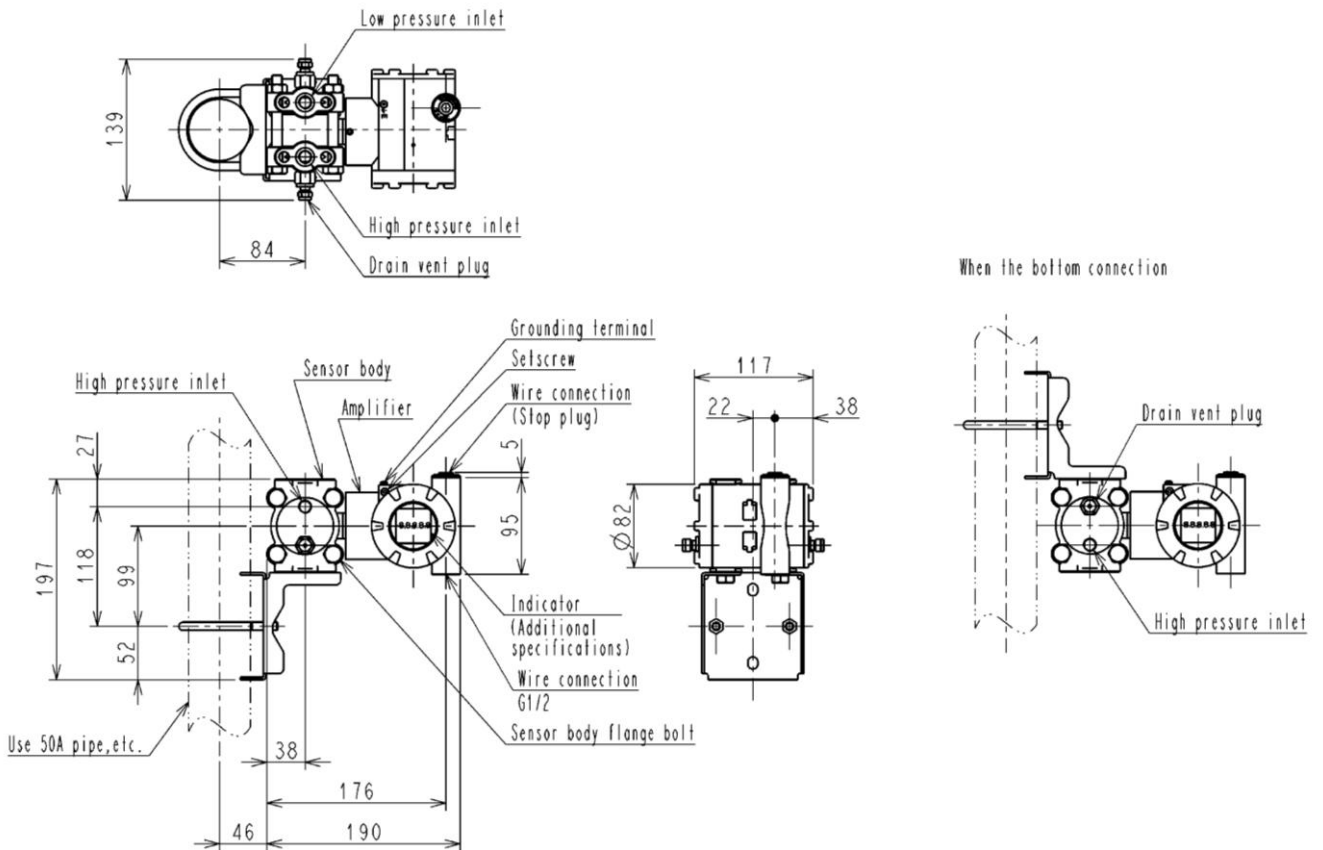


## DIMENSIONS (Unit: mm)

Material Code: Standard, 316L, HC316, HC316L



Material Code: HC, TA



## CODE TABLES

### EDR-N8 Intelligent Differential Pressure Transmitter

Model			
EDR-N8			
No.	Item	Code	Remarks
1	Range Code	800	Measuring span 0.098 to 8kPa
		8000	Measuring span 0.4 to 80kPa
		40000	Measuring span 4 to 400kPa
		100000	Measuring span 100 to 1000kPa
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	Material	-	Diaphragm: SUS316L Sensor body: SUS316L Sensor body flange: SCS14A
		316L	Diaphragm: SUS316L Sensor body: SUS316L Sensor body flange: SCS16A
		HC316	Diaphragm: Hastelloy C Sensor body: SUS316L Sensor body flange: SCS14A
		HC316L	Diaphragm: Hastelloy C Sensor body: SUS316L Sensor body flange: SCS16A
		HC	Diaphragm: Hastelloy C Sensor body: Hastelloy C Sensor body flange: Hastelloy C
		TA	Diaphragm: Tantalum Sensor body: Tantalum Sensor body flange: Tantalum
8	Bolt /mounting plate material	-	Sensor body flange bolt: SCM435 Mounting plate: SPCC U-bolt: SUS304
		S304	Sensor body flange bolt: SUS304 Mounting plate: SUS304 U-bolt: SUS304 (Maximum operating pressure is 1/2 of the standard.)
		S630	Sensor body flange bolt: SUS630 Mounting plate: SUS304 U-bolt: SUS304
9	Sealed liquid	-	Silicone oil
		FO	Fluorine oil
		100CS	Silicone oil for sanitary purposes
10	Oil prohibition	-	No finish
		NL	Oil prohibitive finish
		NLW	Oil and water prohibitive finish
11	Pressure inlet	T0	Top connection Rc1/4 without oval flange Material Codes HC,TA cannot be specified.
		R2	Top connection Rc1/2 with oval flange Material Codes HC,TA cannot be specified.
		R4	Top connection Rc1/4 with oval flange Material Codes HC,TA cannot be specified.
		N2	Top connection 1/2NPT with oval flange Material Codes HC, TA cannot be specified.
		N4	Top connection 1/4NPT with oval flange Material Codes HC, TA cannot be specified.
		S2	Top connection 15A pipe insertion welding with oval flange (socket screw-in type) Material Codes HC, TA cannot be specified.
		PV4	Top connection at side Rc1/4 without oval flange Material Code HC,TA can be specified.
		B0	Bottom connection Rc1/4 without oval flange Material Codes HC,TA cannot be specified.
		BR2	Bottom connection Rc1/2 with oval flange Material Codes HC,TA cannot be specified.
		BR4	Bottom connection Rc1/4 with oval flange Material Codes HC,TA cannot be specified.
		BN2	Bottom connection 1/2NPT with oval flange Material Codes HC, TA cannot be specified.
		BN4	Bottom connection 1/4NPT with oval flange Material Codes HC,TA cannot be specified.
		BS2	Bottom connection 15A pipe insertion welding with oval flange (socket screw-in type) Material Codes HC,TA cannot be specified.
		BPV4	Bottom connection at side Rc1/4 without oval flange Material code HC,TA can be specified.
12	Wetted parts conditions	-	Standard
		V	Vacuum type

Example of Code description: EDR-N8-800-XC-M-R2

- HART® is a registered trademark of the Field Comm Group.
- Please read the “Instruction Manual” carefully before use.
- Appearance and specifications are subject to change partially for improvement.