M-PA11-PA41-PE-EN-V1.3

Electronic Pressure Sensors

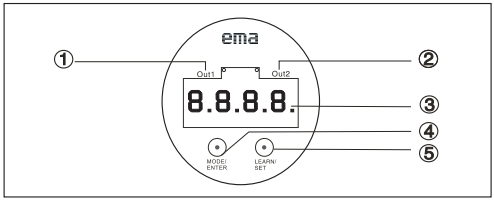
Analogue+Switching output

■ English

IP68 CE RoHS

www.ema-electronic.com

Display and visual indication



①	Out1	Out1 status; lights on under connecting to the output terminal
②	Out2	Out2 status; lights on under connecting to the output terminal
③	7-segment Display	System pressure display, Parameter and parameter value display
④	MODE/ENTER	Selection of parameter and acknowledgement of parameter value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

By the probe, the pressure sensor can detect and then display the current system pressure; meanwhile, it can output two signals according to the setting of output.

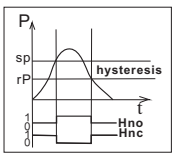
Output 1	Output 2
Hysteresis function/N.O.(Hno)	Analogue 4~20 mA(I)
Hysteresis function/N.C.(Hnc)	
window function/N.O.(Fno)	Analogue 0~10 V(U)
window function/N.C.(Fnc)	

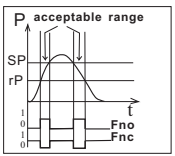
Hysteresis

The hysteresis keeps the switching state of the outputs stable if the system pressure varies about the preset value.
When the system pressure is increasing, the output switches when the switch-on point has been reached (SP1); when the system pressure is decreasing again, the output switch-off point (rP1) has been reached. The hysteresis can be adjusted: first the switch-on point is set, then the switch-on point with the requested difference.

Window function:

The window function enables the monitoring of a defined acceptable range.When the system pressure varies between the switch-on point (SP1) and the switch-off point (rP1) ,the output is switched (window function/NO) or not switched (window function/NC).The width of the window can be set by means of the difference between SP1 and rP1. SP1=upper value, rP1=lower value.





Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.

Unlock: Keep pressing "LEARN/SET" button under the normal pressure display mode (run mode), and then press "MODE/ENTER" for 5 sec. until the "ULC" is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating modes

Run mode:
(Normal operating mode)
When the supply voltage has been applied, the unit is in the Run mode .it monitors and switches the transistor output according to the set parameters.
The value of the analogue output depends on the system pressure.
The digit display indicates the current system pressure; the red LED indicates the switching state of the transistor output.

Display mode:
(Indication of parameters and the set parameter values)
When the "MODE/ENTER" button is pressed briefly, the unit passes to the Display mode which allows parameter values to be read. The internal sensing , processing and output functions of the unit continue as if in Run mode.
・The parameter names are scrolled with each pressing of the "MODE/ENTER" button.
・when the "LEARN/SET" button is pressed briefly, the corresponding parameter value is displayed for 5 sec. After another 5 sec.The unit returns to the Run mode.

Programming mode:
(Setting of the parameter values)
The unit passes to the programming mode when after the selection of a parameter value (Display mode) the "LEARN / SET" button is pressed until the display of the parameter value is changed. Internally the unit remains in the operating mode. It continues its monitoring function with the existing parameters until the change has been terminated.
You can change the parameter value by pressing the "LEARN /SET" button and confirm it by pressing the "MODE/ENTER" button. The unit returns to the Run mode when no button has been pressed for 5 second.

Menu setting

Menu	Function	Range	
OU1	Output1	SP1 Switch point1	See table 1
		rP1 Switch point	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
		N-P Output selection	NPN
			PNP
		dS1 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr1 Delay for switch off	Range: 0~50s Step of range:0.1s
		dA1 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0 ~ 2s Step past 0.008s

OU2	Output 2	U_I	Analogue output selection	U(0-10V) /I(4-20MA)	
		ASP	Analogue start point	See table 1 for corresponding pressure range	
		AEP	Analogue end point	See table 1 for corresponding pressure range	
		DA2	Damping for Analogue output	0-2s	0.08s
UNI		Unit selection		bar psi kgf/cm^2 MPa	
DIS	DEL	Update rate and display		0ms/50ms/200ms/600ms/OFF	
	P_D	Positive and Opposite display		P positive display, D opposite display	
EF	COF	Calibration		-5%~+5% of Full Sensing Range	0.1
	CAR	Zero-point Calibration		Clean the COF setting value	
	PH	Max. value record		Recording Max. value during operation and back to zero after power off.	

Programming

①		Press the "MODE/ENTER" button several times until the respective parameter is displayed.
②		Press the "SET" button and keep it pressed. The current parameter value is indicated in 5 sec., then the value is increased (incremental by pressing briefly or scrolling by holding pressed).
③		Press the " MODE/ENTER" button briefly (=acknowledgement). The parameter is displayed again; the set parameter value becomes effective.

Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

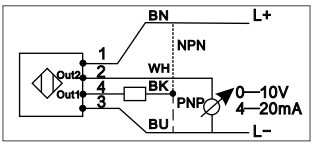
Error status

Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.
SC	Overload or short circuit, causing product damage. The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection



Core color:

1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black)

Electrical Connection

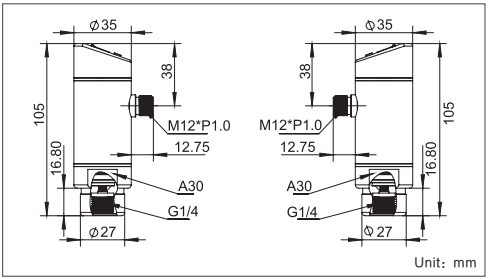
1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.Please purchase ema qualified Ex−proof wire for this Ex−proof product.
5.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC
Operating voltage[V]	18...36DC
Measuring range[bar]	−1...1/2/5/10/20/50/100/200/250/400/600
Max.overload pressure[bar]	6/8/20/35/60/140/300/400/650/880
Measuring range[mbar]	−100...100/−100...250/−100...500
Max.overload pressure[mbar]	1.3/1.3/1.3
Load current[mA]	300
Short−circuit protection	pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<60
Switching output	PNP/NPN programmable
The accuracy of switch point[%]	< ± 0.5
Analogue output	4...20mA/0...10V programmable
Analogue output 4−20mA load[Ohm]	Max500
Analogue output 0−10V load[Ohm]	Min1000
Analogue output Reaction time[ms]	<3
Operating temperature[℃/℉]	−25...+80/−13...+176
Medium temperature[℃/℉]	−25...+80/−13...+176
Storage temperature[℃/℉]	−40...100/−40...+212
Insulation resistance[MΩ]	>100(500 V DC)
Shock resistance[g]	50
Vibration resistance[g]	20
Switching cycles Min	One billion
Housing material	Stainless steel 304
Probe material	Stainless steel 316L
Protection classification	IP68
EX marking	PE: Ex ec IIC T4 GC / Ex tb IIIC T90℃ Db

Dimensions



Mounting and maintenance

1.To reduce the shock to the product, please install this product vertically to the flow of medium.
2.To avoid damage of the product, please do not make the loading pressure of the product exceed the range of acceptable pressure by twice.
3.When pressure sensing range is higher than 100 bar (including 100 bar),the device must be mounted with damping screw,so that it can prevent impact caused during valve opening moment.
4.To install M12 connector and the adapter, please do not forcefully tighten it, and the torque do not exceed 36Nm(350kgf/cm²).
5.When installing Ex-Proof wire, it is necessary to tighten it with wrench. Torque:1.5Nm.
6.The housing of product in the pipe should be correctly connected with the equipotential grounding system.
7.Do not open when an explosive dust asmosphere is present.

Table1

Range [mbar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
−100...100	mbar	-99...100	-100...99	1
	Psi	-1.44...1.45	-1.45...1.44	0.02
	kgf/cm²	-0.099...0.100	-0.100...0.99	0.001
	bar	-0.099...0.100	-0.100...0.99	0.001
−100...250	mbar	-99...250	-100...249	1
	Psi	-1.43...3.60	-1.45...3.58	0.02
	kgf/cm²	-0.099...0.250	-0.100...0.249	0.001
	bar	-0.099...0.250	-0.100...0.249	0.001
−100...500	mbar	-99...500	-100...499	1
	Psi	-1.43...7.25	-1.45...7.23	0.02
	kgf/cm²	-0.099...0.500	-0.100...0.449	0.001
	bar	-0.099...0.500	-0.100...0.449	0.001

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
−1...1	bar	−0.98...1.00	−0.99...0.99	0.01
	Psi	−14.2...14.6	−14.4...14.4	0.20
	kgf/cm²	−0.98...1.02	0.99...1.01	0.01
	Mpa	−0.098...0.10	−0.099...0.099	0.001
2	bar	0.02...2.00	0.01...1.99	0.01
	Psi	0.40...29.0	0.20...28.8	0.20
	kgf/cm²	0.02...2.04	0.01...2.03	0.01
	Mpa	0.002...0.20	0.001...0.199	0.001
5	bar	0.04...5.00	0.02...4.98	0.02
	Psi	0.80...72.4	0.40...72.0	0.40
	kgf/cm²	0.04...5.10	0.02...5.08	0.02
	Mpa	0.004...0.50	0.002...0.498	0.002

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
10	bar	0.10...10.0	0.05...9.95	0.05
	Psi	2.00...145	1.00...144	1.00
	kgf/cm²	0.10...10.2	0.05...10.1	0.05
	Mpa	0.01...1.00	0.005...0.995	0.005
20	bar	0.20...20.0	0.10...19.9	0.10
	Psi	4.00...290	2.00...288	2.00
	kgf/cm²	0.20...20.4	0.10...20.3	0.10
	Mpa	0.02...2.00	0.01...1.99	0.01
50	bar	0.40...50.0	0.20...49.8	0.20
	Psi	8.00...724	4.00...720	4.00
	kgf/cm²	0.40...51.0	0.20...50.8	0.20
	Mpa	0.04...5.00	0.02...4.98	0.02

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
100	bar	1.00...100	0.50...99.5	0.50
	Psi	20.0...1450	10.0...1440	10.0
	kgf/cm²	0.10...10.2	0.50...101	0.50
	Mpa	0.10...10.0	0.05...9.95	0.05
200	bar	2.00...200	1.00...199	1.00
	Psi	30.0...2895	15.0...2880	15.0
	kgf/cm²	2.00...204	1.00...203	1.00
	Mpa	0.20...20.0	0.10...19.9	0.10
250	bar	2.00...250	1.00...249	1.00
	Psi	30.0...3495	15.0...3480	15.0
	kgf/cm²	2.00...255	1.00...254	1.00
	Mpa	0.20...25.0	0.10...24.9	0.10

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
400	bar	4.00...400	2.00...398	2.00
	Psi	60.0...5790	30.0...5760	30.0
	kgf/cm²	4.00...408	2.00...406	2.00
	Mpa	0.40...40.0	0.20...39.8	0.20
600	bar	4.00...600	2.00...598	2.00
	Psi	60.0...8700	30.0...8680	30.0
	kgf/cm²	4.00...612	2.00...610	2.00
	Mpa	0.40...60.0	0.20...59.8	0.20

Electronic Pressure Sensors

Two switching output

■ English

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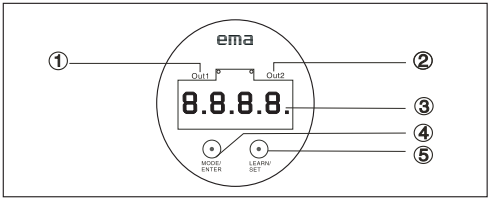
Display and visual indication



①	Out1	Out1 status;lights on under connecting to the output terminal
②	Out2	Out2 status;lights on under connecting to the output terminal
③	7-segment Display	System pressure display, Parameter and parameter value display
④	MODE/ENTER	Select on of parameter and acknowledgement of parameter value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

By the probe, the pressure sensor can detect and then display the current system pressure; meanwhile, it can output two signals according to the setting of output.

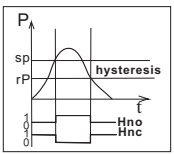
Output 1	Output 2
Hysteresis function/N.O.(Hno)	Hysteresis function/N.O.(Hno)
Hysteresis function/N.C.(Hnc)	Hysteresis function/N.C.(Hnc)
window function/N.O.(Fno)	window function/N.O.(Fno)
window function/N.C.(Fnc)	window function/N.C.(Fnc)

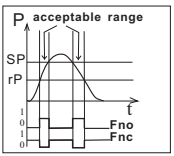
Hysteresis

The hysteresis keeps the switching state of the outputs stable if the system pressure varies about the preset value.
When the system pressure is increasing, the output switches when the switch-on point has been reached (SP1); when the system pressure is decreasing again, the output switch-off point (rP1) has been reached. The hysteresis can be adjusted: first the switch-on point is set, then the switch-on point with the requested difference.

Window function:

The window function enables the monitoring of a defined acceptable range.When the system pressure varies between the switch-on point (SP1) and the switch-off point (rP1) ,the output is switched (window function/NO) or not switched (window function/NC).The width of the window can be set by means of the difference between SP1 and rP1. SP1=upper value, rP1=lower value.





Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.

Unlock: Keep pressing “LEARN/SET” button under the normal pressure display mode (run mode), and then press “MODE/ENTER” for 5 sec. until the “ULC” is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating modes

Run mode:
(Normal operating mode)
When the supply voltage has been applied, the unit is in the Run mode .it monitors and switches the transistor output according to the set parameters.
The value of the analogue output depends on the system pressure.
The digit display indicates the current system differential pressure range; the red LED indicates the switching state of the transistor output.

Display mode:
(Indication of parameters and the set parameter values)
When the “MODE/ENTER” button is pressed briefly, the unit passes to the Display mode which allows parameter values to be read. The internal sensing , processing and output functions of the unit continue as if in Run mode.
・The parameter names are scrolled with each pressing of the “MODE/ENTER” button.
・when the “LEARN/SET” button is pressed briefly, the corresponding parameter value is displayed for 5 sec. After another 5 sec.The unit returns to the Run mode.

Programming mode:
(Setting of the parameter values)
The unit passes to the programming mode when after the selection of a parameter value (Display mode) the “LEARN / SET” button is pressed until the display of the parameter value is changed. Internally the unit remains in the operating mode. It continues its monitoring function with the existing parameters until the change has been terminated.
You can change the parameter value by pressing the “LEARN /SET” button and confirm it by pressing the “MODE/ENTER” button. The unit returns to the Run mode when no button has been pressed for 5 second.

Menu setting

Menu	Function	Range	
OU1	Output1	SP1 Switch point1s	See table 1
		rP1 Switch point1s	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
		N-P Output selection	NPN output
			PNP output
		dS1 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr1 Delay for switch off	Range: 0~50s Step of range:0.1s
		dA1 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0 ~ 2s Step past 0.008s

Menu	Function	Range	
OU2	Output2	SP2 Switch point2	See table 1
		rP2 Switch point2	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
			dES diagnostic output(NC)
		N-P Output selection	NPN output
			PNP output
		dS2 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr2 Delay for switch off	Range: 0~50s Step of range:0.1s
		dR2 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0 ~ 2s Step past 0.008s

UN1	unit conversion	bar		
		Psi		
		kgf/cm2		
		Mpa		
DIS	P_D	DEL	Update rate and display	0ms/50ms/200ms/600ms/OFF
		P_D	Positive and Opposite display	P positive display, D opposite display
EF	Enhanced Function	COF Calibration offset	Theory value(sensor's operating value) and measured value exist deviation Setting range: -5%...+5% of pressure measured range Step range: 0.1% of pressure measured range	
		CRr	Zero point calibration	
		PH	Max. value record	Recording Max. value during operating and back to zero after power off.

Programming

①		Press the "MODE/ENTER" button several times until the respective parameter is displayed.
②		Press the "SET" button and keep it pressed. The current parameter value is indicated in 5 sec., then the value is increased (incremental by pressing briefly or scrolling by holding pressed).
③		Press the " MODE/ENTER" button briefly (=acknowledgement). The parameter is displayed again; the set parameter value becomes effective.

Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

Diagnostic function

If OUT2=dEs,OUT2 wil be use for diagnostic output.(1)If there is no error ,OUT2output UB+(OUT1=PNP),(2)If there is an error ,OUT2 output invalid,maybe has the following problems; measurement of small defects;OUT1overload or short circuit; exceed or not meet the limitation of measurement range; EEPRON error;RAM error;CPU error.

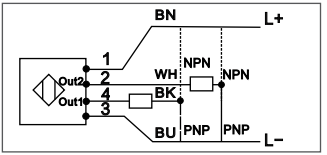
Error status

Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.
SC1	OUT1 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC2	OUT2 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC	OUT1 and OUT2 output overload or short circuit, causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
Err	Internal error.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection

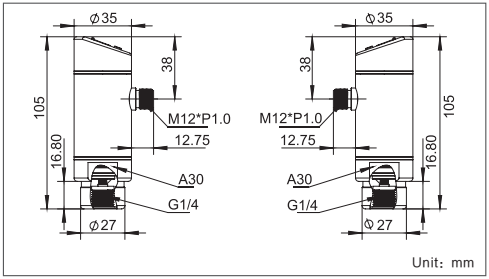


Core color:
1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black);

Electrical Connection

1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.Please purchase ema qualified Ex−proof wire for this Ex−proof product.
5.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Dimensions



Mounting and maintenance

1.To reduce the shock to the product, please install this product vertically to the flow of medium.
2.To avoid damage of the product, please do not make the loading pressure of the product exceed the range of acceptable pressure by twice.
3.When pressure sensing range is higher than 100 bar (including 100 bar),the device must be mounted with damping screw,so that it can prevent impact caused during valve opening moment.
4.When installing Ex-Proof wire, it is necessary to tighten it with wrench. Torque:1.5Nm.
5.The housing of product in the pipe should be correctly connected with the equipotential grounding system.
6.Do not open when an explosive dust asmosphere is present.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC
Operating voltage[V]	18...36V
Measuring range[bar]	−1...1/2/5/10/20/50/100/200/250/400/600
Max.overload pressure[bar]	6/8/20/35/60/140/300/400/650/880
Load current[mA]	300
Short−circuit protection	Pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<60
Operating temperature[℃/℉]	−25...+80/−13...+176
Medium temperature[℃/℉]	−25...+80/−13...+176
Storage temperature[℃/℉]	−40...100/−40...+212
Insulation resistance[MΩ]	>100(500 V DC)
Shock resistance[g]	50
Vibration resistance[g]	20
switching cycles Min	One billion
Housing material	Stainless steel 304
Probe material	High−class stainless steel 316L
Protection classification	IP68
EX marking	PE: Ex ec IIC T4 GC / Ex tb IIIC T90℃ Db

Table1

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
−1...1	bar	−0.98...1.00	−0.99...0.99	0.01
	Psi	−14.2...14.6	−14.4...14.4	0.20
	kgf/cm²	−0.98...1.02	−0.99...1.01	0.01
	Mpa	−0.0 98...0.10	−0.099...0.099	0.001
2	bar	0.02...2.00	0.01...1.99	0.01
	Psi	0.40...29.0	0.20...28.8	0.20
	kgf/cm²	0.02...2.04	0.01...2.03	0.01
	Mpa	0.002...0.20	0.001...0.199	0.001
5	bar	0.04...5.00	0.02...4.98	0.02
	Psi	0.80...72.4	0.40...72.0	0.40
	kgf/cm²	0.04...5.10	0.02...5.08	0.02
	Mpa	0.004...0.5	0.002...0.498	0.002

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
10	bar	0.10...10.0	0.05...9.95	0.05
	Psi	2.00...145	1.00...144	1.00
	kgf/cm²	0.10...10.2	0.05...10.1	0.05
	Mpa	0.01...1.00	0.005...0.995	0.005
20	bar	0.20...20.0	0.10...19.9	0.10
	Psi	4.00...290	2.00...288	2.00
	kgf/cm²	0.20...20.4	0.10...20.3	0.10
	Mpa	0.02...2.00	0.01...1.99	0.01
50	bar	0.40...50.0	0.20...49.8	0.20
	Psi	8.00...724	4.00...720	4.00
	kgf/cm²	0.40...51.0	0.20...50.8	0.20
	Mpa	0.04...5.00	0.02...4.98	0.02

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
100	bar	1.00...100	0.50...99.5	0.50
	Psi	20.0...1450	10.0...1440	10.0
	kgf/cm^2	0.10...10.2	0.50...101	0.50
	Mpa	0.10...10.0	0.05...9.95	0.05
200	bar	2.00...200	1.00...199	1.00
	Psi	30.0...2895	15.0...2880	15.0
	kgf/cm^2	2.00...204	1.00...203	1.00
	Mpa	0.20...20.0	0.10...19.9	0.10
250	bar	2.00...250	1.00...249	1.00
	Psi	30.0...3495	15.0...3480	15.0
	kgf/cm^2	2.00...255	1.00...254	1.00
	Mpa	0.20...25.0	0.10...24.9	0.10

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
400	bar	4.00...400	2.00...398	2.00
	Psi	60.0...5790	30.0...5760	30.0
	kgf/cm^2	4.00...408	2.00...406	2.00
	Mpa	0.40...40.0	0.20...39.8	0.20
600	bar	4.00...600	2.00...598	2.00
	Psi	60.0...8700	30.0...8680	30.0
	kgf/cm^2	4.00...612	2.00...610	2.00
	Mpa	0.40...60.0	0.20...59.8	0.20

Differential Pressure Sensors

Analogue+Switching output

■ English

IP68 CE RoHS

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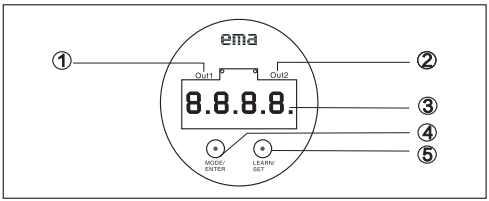
Display and visual indication



①	Out1	Out1 status; lights on under connecting to the output terminal
②	Out2	Out2 status; lights on under connecting to the output terminal
③	7-segment Display	System differential pressure range display, Parameter and parameter value display
④	MODE/ENTER	Selection of parameter and acknowledgement of parameter value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

By the probe, the differential pressure sensor can detect and then display the current system pressure; meanwhile, it can output two signals according to the setting of output.

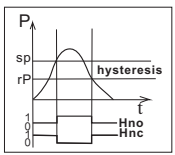
Output 1	Output 2
Hysteresis function/N.O.(Hno)	Analogue 4~20 mA(I)
Hysteresis function/N.C.(Hnc)	
window function/N.O.(Fno)	Analogue 0~10 V(U)
window function/N.C.(Fnc)	

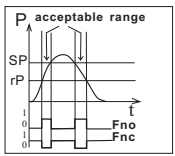
Hysteresis

The hysteresis keeps the switching state of the outputs stable if the system pressure varies about the preset value.
When the system pressure is increasing, the output switches when the switch-on point has been reached (SP1); when the system pressure is decreasing again, the output switch-off point (rP1) has been reached. The hysteresis can be adjusted: first the switch-on point is set, then the switch-on point with the requested difference.

Window function:

The window function enables the monitoring of a defined acceptable range.When the system pressure varies between the switch-on point (SP1) and the switch-off point (rP1) ,the output is switched (window function/NO) or not switched (window function/NC).The width of the window can be set by means of the difference between SP1 and rP1. SP1=upper value, rP1=lower value.





Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.
Unlock: Keep pressing “LEARN/SET” button under the normal pressure display mode (run mode), and then press “MODE/ENTER” for 5 sec. until the “ULC” is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating modes

Run mode:
(Normal operating mode)
When the supply voltage has been applied, the unit is in the Run mode .it monitors and switches the transistor output according to the set parameters.
The value of the analogue output depends on the system pressure.
The digit display indicates the current system differential pressure range; the red LED indicates the switching state of the transistor output.

Display mode:
(Indication of parameters and the set parameter values)
When the "MODE/ENTER" button is pressed briefly, the unit passes to the Display mode which allows parameter values to be read. The internal sensing , processing and output functions of the unit continue as if in Run mode.
・The parameter names are scrolled with each pressing of the "MODE/ENTER" button.
・when the "LEARN/SET" button is pressed briefly, the corresponding parameter value is displayed for 5 sec. After another 5 sec.The unit returns to the Run mode.

Programming mode:
(Setting of the parameter values)
The unit passes to the programming mode when after the selection of a parameter value (Display mode) the "LEARN / SET" button is pressed until the display of the parameter value is changed. Internally the unit remains in the operating mode. It continues its monitoring function with the existing parameters until the change has been terminated.
You can change the parameter value by pressing the "LEARN /SET" button and confirm it by pressing the "MODE/ENTER" button. The unit returns to the Run mode when no button has been pressed for 5 second.

Menu setting

Menu	Function	Range	
OU1	Output1	SP1 Switch point1	See table 1
		rP1 Switch point	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
		N-P Output selection	NPN
			PNP
		dS1 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr1 Delay for switch off	Range: 0~50s Step of range:0.1s
		dA1 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0~2s Step past 0.008s

OU2	Output 2	U_I	Analogue output selection	U(0-10V) /I(4-20MA)	
		ASP	Analogue start point	See table 1 for corresponding pressure range	
		AEP	Analogue end point	See table 1 for corresponding pressure range	
		DA2	Damping for Analogue output	0~2s	0.08s
UNI		Unit selection		bar	
				psi	
				kgf/cm^2	
				MPa	
DIS	DEL	Update rate and display	0ms/50ms/200ms/600ms/OFF		
	P_D	Positive and Opposite display	P positive display, D opposite display		
EF	COF	Calibration	-5%~+5% of Full Sensing Range	0.1	
	CAR	Zero-point Calibration	Clean the COF setting value		
	PH	Max. value record	Recording Max. value during operation and back to zero after power off.		

Programming

①		Press the "MODE/ENTER" button several times until the respective parameter is displayed.
②		Press the "SET" button and keep it pressed. The current parameter value is indicated in 5 sec., then the value is increased (incremental by pressing briefly or scrolling by holding pressed).
③		Press the " MODE/ENTER" button briefly (=acknowledgement). The parameter is displayed again; the set parameter value becomes effective.

Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

Error status

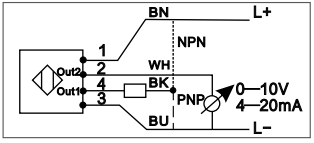
Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.

SC	Overload or short circuit, causing product damage. The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection



Core color:

1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black)

Electrical Connection

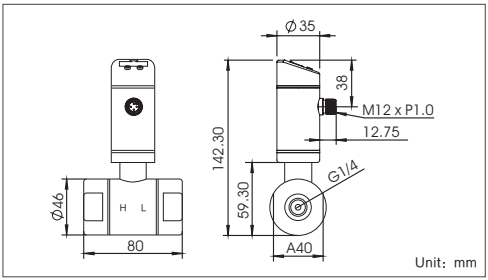
1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.Please purchase ema qualified Ex−proof wire for this Ex−proof product.
5.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC
Operating voltage[V]	18...36DC
Measuring range[bar]	0.35/1/2/5/10
Static pressure[bar]	250
One line static pressure[bar]	150
Load current[mA]	300
Short−circuit protection	pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<60
Switching output	PNP/NPN programmable
The accuracy of switch point[%]	< ± 0.5
Analogue output	4...20mA/0...10V programmable
Analogue output 4−20mA load[Ohm]	Max 500
Analogue output 0−10V load[Ohm]	Min 1000
Analogue output Reaction time[ms]	<3
Operating temperature[℃/℉]	−25...+70/−13...+158
Medium temperature[℃/℉]	−25...+70/−13...+158
Storage temperature[℃/℉]	−40...100/−40...+212
Insulation resistance[MΩ]	>100(500 V DC)
Shock resistance[g]	50
Vibration resistance[g]	20
Min. switching cycles	100 million
Housing material	Stainless steel 304
Probe material	Stainless steel 316L
Protection classification	IP68
EX marking	PE: Ex ec IIC T4 GC / Ex tb IIIC T90℃ Db

Dimensions



Mounting and maintenance

1.To reduce the shock to the product, please install this product vertically to the flow of medium.
2.The static pressure of the device shall not exceed 250 bar, and the one line static pressure shall not exceed 150 bar.
3.Device "H" corresponds to high voltage, "L" corresponds to low voltage, and needs to be installed from high to low direction.

Table1

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
0.35	bar	0.02...0.35	0.01...0.34	0.01
	Psi	0.40...5.2	0.20...4.96	0.20
	kgf/cm²	0.02...0.36	0.01...0.35	0.01
	Mpa	0.002...0.035	0.001...0.034	0.001
1	bar	0.02...1	0.01...0.99	0.01
	Psi	0.40...14.6	0.2...14.4	0.20
	kgf/cm²	0.02...1.02	0.01...1.01	0.01
	Mpa	0.002...0.10	0.001...0.099	0.001
2	bar	0.02...2.00	0.01...1.99	0.01
	Psi	0.40...29.0	0.20...28.8	0.20
	kgf/cm²	0.02...2.04	0.01...2.03	0.01
	Mpa	0.002...0.20	0.001...0.199	0.001

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
5	bar	0.04...5.00	0.02...4.98	0.02
	Psi	0.80...72.4	0.40...72.0	0.40
	kgf/cm^2	0.04...5.10	0.02...5.08	0.02
	Mpa	0.004...0.50	0.002...0.498	0.002
10	bar	0.10...10.0	0.05...9.95	0.05
	Psi	2.00...145	1.00...144	1.00
	kgf/cm^2	0.10...10.2	0.05...10.1	0.05
	Mpa	0.01...1.00	0.005...0.995	0.005

Differential Pressure Sensors

Two switching output

■ English

IP68 CE RoHS

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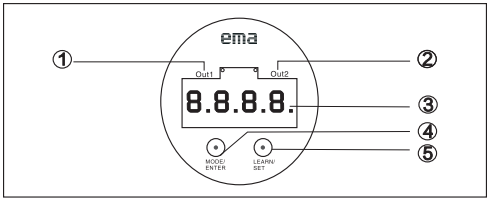
Display and visual indication



①	Out1	Out1 status; lights on under connecting to the output terminal
②	Out2	Out2 status; lights on under connecting to the output terminal
③	7-segment Display	System differential pressure range display, Parameter and parameter value display
④	MODE/ENTER	Selection of parameter and acknowledgement of parameter value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

By the probe, the differential pressure sensor can detect and then display the current system pressure; meanwhile, it can output two signals according to the setting of output.

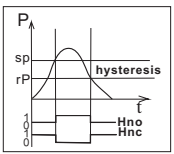
Output 1	Output 2
Hysteresis function/N.O.(Hno)	Hysteresis function/N.O.(Hno)
Hysteresis function/N.C.(Hnc)	Hysteresis function/N.C.(Hnc)
window function/N.O.(Fno)	window function/N.O.(Fno)
window function/N.C.(Fnc)	window function/N.C.(Fnc)

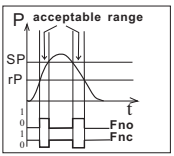
Hysteresis

The hysteresis keeps the switching state of the outputs stable if the system pressure varies about the preset value.
When the system pressure is increasing, the output switches when the switch-on point has been reached (SP1); when the system pressure is decreasing again, the output switch-off point (rP1) has been reached. The hysteresis can be adjusted: first the switch-on point is set, then the switch-on point with the requested difference.

Window function:

The window function enables the monitoring of a defined acceptable range.When the system pressure varies between the switch-on point (SP1) and the switch-off point (rP1) ,the output is switched (window function/NO) or not switched (window function/NC).The width of the window can be set by means of the difference between SP1 and rP1. SP1=upper value, rP1=lower value.





Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.

Unlock: Keep pressing "LEARN/SET" button under the normal pressure display mode (run mode), and then press "MODE/ENTER" for 5 sec. until the "ULC" is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating modes

Run mode:
(Normal operating mode)
When the supply voltage has been applied, the unit is in the Run mode .it monitors and switches the transistor output according to the set parameters.
The value of the analogue output depends on the system pressure.
The digit display indicates the current system differential pressure range; the red LED indicates the switching state of the transistor output.

Display mode:
(Indication of parameters and the set parameter values)
When the "MODE/ENTER" button is pressed briefly, the unit passes to the Display mode which allows parameter values to be read. The internal sensing , processing and output functions of the unit continue as if in Run mode.
・The parameter names are scrolled with each pressing of the "MODE/ENTER" button.
・when the "LEARN/SET" button is pressed briefly, the corresponding parameter value is displayed for 5 sec. After another 5 sec.The unit returns to the Run mode.

Programming mode:
(Setting of the parameter values)
The unit passes to the programming mode when after the selection of a parameter value (Display mode) the "LEARN / SET" button is pressed until the display of the parameter value is changed. Internally the unit remains in the operating mode. It continues its monitoring function with the existing parameters until the change has been terminated.
You can change the parameter value by pressing the "LEARN /SET" button and confirm it by pressing the "MODE/ENTER" button. The unit returns to the Run mode when no button has been pressed for 5 second.

Menu setting

Menu	Function	Range	
OU1	Output1	SP1 Switch point1s	See table 1
		rP1 Switch point1s	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
		N-P Output selection	NPN output
			PNP output
		dS1 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr1 Delay for switch off	Range: 0~50s Step of range:0.1s
		dA1 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0 ~ 2s Step past 0.008s

Menu	Function	Range	
OU2	Output2	SP2 Switch point2	See table 1
		rP2 Switch point2	
		FUN function	Hno Hysteresis NO
			Hnc Hysteresis NC
			Fno Window NO
			Fnc Window NC
			dES diagnostic output(NC)
		N-P Output selection	NPN output
			PNP output
		dS2 Delay for switch on	Range: 0~50s Step of range:0.1s
		dr2 Delay for switch off	Range: 0~50s Step of range:0.1s
		dR2 Damping for switching output	Filter out high frequency pressure spikes or instantaneous Setting range 0 ~ 2s Step past 0.008s

UN1	unit conversion	bar		
		Psi		
		kgf/cm2		
		Mpa		
DIS	P_D	DEL	Update rate and display	0ms/50ms/200ms /600ms/OFF
		P_D	Positive and Opposite display	P positive display, D opposite display
EF	Enhanced Function	COF Calibration offset	Theory value(sensor's operating value) and measured value exist deviation Setting range: -5%...+5% of pressure measured range Step range: 0.1% of pressure measured range	
		CRr	Zero point calibration	
		PH	Max. value record	Recording Max. value during operation and back to zero after power off.

Programming

①		Press the "MODE/ENTER" button several times until the respective parameter is displayed.
②		Press the "SET" button and keep it pressed. The current parameter value is indicated in 5 sec., then the value is increased (incremental by pressing briefly or scrolling by holding pressed).
③		Press the " MODE/ENTER" button briefly (=acknowledgement). The parameter is displayed again; the set parameter value becomes effective.

Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

Diagnostic function

If OUT2=dEs,OUT2 wil be use for diagnostic output.(1)If there is no error ,OUT2output UB+(OUT1=PNP),(2)If there is an error ,OUT2 output invalid,maybe has the following problems; measurement of small defects;OUT1overload or short circuit; exceed or not meet the limitation of measurement range; EEPRON error;RAM error;CPU error.

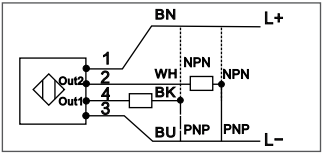
Error status

Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.
SC1	OUT1 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC2	OUT2 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC	OUT1 and OUT2 output overload or short circuit, causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
Err	Internal error.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection



Core color:
1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black);

Electrical Connection

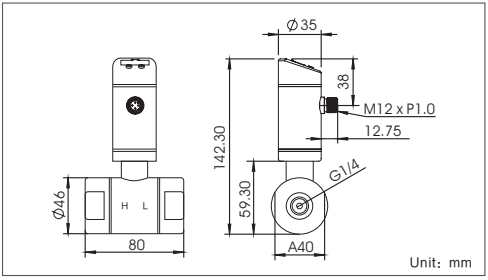
1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.Please purchase ema qualified Ex−proof wire for this Ex−proof product.
5.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC
Operating voltage[V]	18...36DC
Measuring range[bar]	0.35/1/2/5/10
Static pressure[bar]	250
One line static pressure[bar]	150
Load current[mA]	300
Short-circuit protection	pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<60
Switching output	PNP/NPN programmable
The accuracy of switch point[%]	<±0.5
Operating temperature[℃/℉]	-25...+70/-13...+158
Medium temperature[℃/℉]	-25...+70/-13...+158
Storage temperature[℃/℉]	-40...100/-40...+212
Insulation resistance[MΩ]	>100(500 V DC)
Shock resistance[g]	50
Vibration resistance[g]	20
Min. switching cycles	100 million
Housing material	Stainless steel 304
Probe material	Stainless steel 316L
Protection classification	IP68
EX marking	PE: Ex ec IIC T4 GC / Ex tb IIIC T90℃ Db

Dimensions



Mounting and maintenance

1. To reduce the shock to the product, please install this product vertically to the flow of medium.
2. The static pressure of the device shall not exceed 250 bar, and the one line static pressure shall not exceed 150 bar.
3. Device "H" corresponds to high voltage, "L" corresponds to low voltage, and needs to be installed from high to low direction.

Table1

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
0.35	bar	0.02...0.35	0.01...0.34	0.01
	Psi	0.40...5.2	0.20...4.96	0.20
	kgf/cm^2	0.02...0.36	0.01...0.35	0.01
	Mpa	0.002...0.035	0.001...0.034	0.001
1	bar	0.02...1	0.01...0.99	0.01
	Psi	0.40...14.6	0.2...14.4	0.20
	kgf/cm^2	0.02...1.02	0.01...1.01	0.01
	Mpa	0.002...0.10	0.001...0.099	0.001
2	bar	0.02...2.00	0.01...1.99	0.01
	Psi	0.40...29.0	0.20...28.8	0.20
	kgf/cm^2	0.02...2.04	0.01...2.03	0.01
	Mpa	0.002...0.20	0.001...0.199	0.001

Range [bar]	Unit	SP1/2 Setting Range	rP1/2 Setting Range	Step Range
5	bar	0.04...5.00	0.02...4.98	0.02
	Psi	0.80...72.4	0.40...72.0	0.40
	kgf/cm^2	0.04...5.10	0.02...5.08	0.02
	Mpa	0.004...0.50	0.002...0.498	0.002
10	bar	0.10...10.0	0.05...9.95	0.05
	Psi	2.00...145	1.00...144	1.00
	kgf/cm^2	0.10...10.2	0.05...10.1	0.05
	Mpa	0.01...1.00	0.005...0.995	0.005

Pressure and Temperature Sensors

Two analogue output

■ English

IP68 CE RoHS

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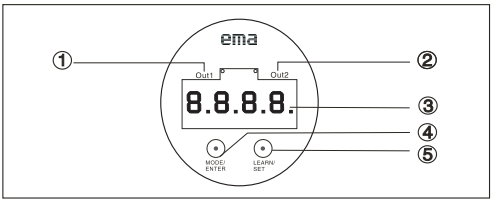
Display and visual indication



①	Out1	Out1 status: lights on when connecting to the output terminal
②	Out2	Out 2 status: lights on when connecting to the output terminal
③	7-segment Display	System pressure or temperature display, Parameter and parameter value display
④	MODE/ENTER	Selection of parameters and acknowledgement of parameters value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

Through the probe, the pressure and temperature sensor can detect and then display the current system pressure (bar;Psi;kgf;MPa), the temperature(℃ or ℉); Meanwhile, it can output two signals according to output setting.

Output 1	Output 2
Analogue 4~20 mA(I)	Analogue 4~20 mA(I)
Analogue 0~10 V(U)	Analogue 0~10 V(U)

Measuring range

℃	−40...+150
℉	−40...+302

Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.
Unlock: Keep pressing “LEARN/SET” button under the normal pressure display mode (run mode), and then press “MODE/ENTER” for 5 sec. until the “ULC” is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating mode

Run mode:
(Normal operating mode)

When the supply voltage has been applied, the unit is in the Run mode. It monitors and switches the transistor output according to the set parameters.
The value of the analogue output depends on the system pressure.
The digit display indicates the current system pressure or temperature value; the red LED indicates the switching state of the transistor output.

Display mode:
(Indication of parameters and the set parameter values)

When the display indicates the pressure value, press “MODE/ENTER” button, then it turn to the temperature value. When the display show the temperature value, press “MODE/ENTER” ,then it turn to the pressure value.
The unit passes to the Display mode which allows parameter values to be read. The internal data , processing and output remain as Run mode.
・ The parameter names are scrolled with each pressing of the “MODE/ENTER” button.
・ When the“LEARN/SET”button is pressed briefly, the corresponding parameter value is displayed for 5 second. After another 5 second, the unit returns to the Run mode.

Programming mode:
(Setting of the parameter values)

After enter a set parameter value (Display mode), the unit passes to the Programming mode. Continue to press “LEARN / SET” button is pressed until the display of the parameter value is changed. Internally the unit remains in the Operating mode.
The unit keep monitoring the existing parameters until the parameter value change.
The user can change the parameter value by pressing the “LEARN /SET” button and confirm it by pressing the “MODE/ENTER” button. The unit returns to the Run mode when no button is pressed for 5 second.

Menu Setting

Menu	Function	Range			
OU1	Output 1	U_I	Analogue outout selection	U(0−10v):Voltage output I(4−20MA):Current outout	
		ASP	Start point of analogue output		
			Unit	Setting range	In steps of
			℃	−40...+140	0.5
			℉	−40...+284	1
		AEP	End point of analogue output		
			Unit	Setting range	In steps of
			℃	−30...+150	0.5
			℉	−22...+302	1
OU2	Output 2	U_I	Analogue output selection	U(0-10V):Voltage output I(4-20mA): Current output	
		ASP	Analogue start point	Different pressure value according to different range	
		AEP	Analogue end point	Different pressure value according to different range	
		DA2	Damping for analogue output	Filter out high frequency pressure spikes or instantaneous Setting range: 0-2s Step of range: 0.08s	

Menu	Function	Range		
PEF	Pressure advanced function	UNI	Unit selection	bar
				psi
				kgf/cm²
				Mpa
		COF	Calibration	Setting range:-5%... +5% of sensing range Setting Step of range: 0.1%
		CAR	Zero-point calibration	Clean the COF setting value
		PH	Max.Value recode	Recording Max.value during operation and back to zero after power off.
TEF	Temperature advanced function	C_F	unit selection	℃:Celsius
				℉:Fahrenbeit
		CAL	Calibration	Celsius: -9.9℃−−+9.9℃ Step of range:0.1
				Fahrenbeit: -17.5℉−−+17.5℉ Step of range:0.5
		HI	Max. temperature record	Recording Max.temperature value during operation and back to zero after power off.
		LO	Mini. temperature record	Recording Mini.temperature value during operation and back to zero after power off.
DIS	display function improve	DEL	display update rate	0ms/50ms/200ms/600ms
		P_d	Positive and opposite display	p:positive display
				d:opposite display
		SPT	temperature/ pressure display switch	S−P:pressure display
				S−T:temperature display

Programming

①		Press the "MODE/ENTER" button several times until the respective parameter is displayed.
②		Press the "SET" button and keep it pressed. The current parameter value is indicated in 5 sec., then the value is increased (incremental by pressing briefly or scrolling by holding pressed).
③		Press the " MODE/ENTER" button briefly (=acknowledgement). The parameter is displayed again; the set parameter value becomes effective.

Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

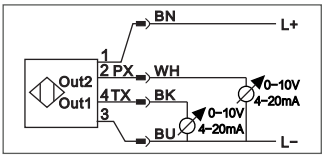
Error status

Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection



Core color:

1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black)

Electrical Connection

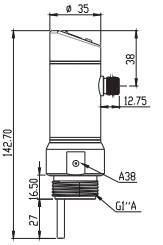
1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC 4...20mA, 0-10V
Operating voltage[V]	18...36DC
Measuring range[bar]	-1...1/2/5/10/20/50
Max.overload pressure[bar]	6/8/20/35/60/140
Short-circuit protection	pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<80
Analogue output2	4...20mA/0...10V programmable(pressure)
Analogue output load[ohm]	4...20mA;Max.(UB-10V)*50/0...10V:Mini:2000
Analogue output1	4...20mA/0...10V programmable(temperature)
Analogue output load[ohm]	4...20mA;Max.(UB-10V)*50/0...10V:Mini:2000
Programming options	Hysteresis range / Window function; NO / NC; Calibration; Unit display; Output 2 setting: Current / Voltage output; Output 1 setting: NPN / PNP output; [℃/℉]
Temperature checking range[℃/℉]	-40...150/-40...302
Switching output[℃/℉]	0.5/1
Display[℃/℉]	0.5/1
Ambient temperature[℃/℉]	-25...80/-13...176
Medium temperature[℃/℉]	-25...80/-13...176
Storage temperature[℃/℉]	-40...100/-40...212
Protection rating	IP68
Insulation resistance[MΩ]	> 100 (500VDC)
ESD	6KV
EFT	2KV
Walkie talkie experiment[mm]	< 10
Shock resistance[g]	50
Vibration resistance[g]	20
Housing material	Stainless steel 304
Probe material	Stainless steel 316L
Medium contacting material	Ceramics,Stainless steel 316L;FPM(Viton)

Dimensions



Unit: mm

Mounting and maintenance

1. To reduce the shock to the product, please install this product vertically to the flow of medium.
2. To avoid damage of the product, please do not make the loading pressure of the product exceed the range of acceptable pressure by twice.
3. To install M12 connector and the adapter, please do not forcefully tighten it, and the torque do not exceed 36Nm (350kgf/cm²).

Pressure and Temperature Sensors

Two switching output

■ English

IP68 CE RoHS

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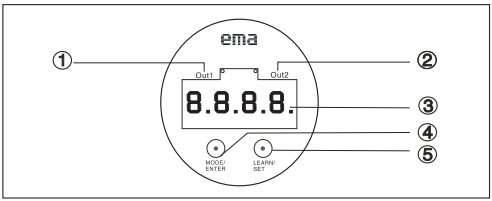
Display and visual indication



①	Out1	Out1 status: lights on when connecting to the output terminal
②	Out2	Out 2 status: lights on when connecting to the output terminal
③	7-segment Display	System pressure or temperature display, Parameter and parameter value display
④	MODE/ENTER	Selection of parameters and acknowledgement of parameters value
⑤	LEARN/SET	Setting of learn mode and parameter value

Functions and features

Through the probe, the pressure sensor can detect and then display the current system pressure; Meanwhile, it can output two signals according to output setting.

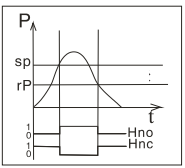
Output 1	Output 1	Measuring range	
Hysteresis function/N.O. (Hno)	Hysteresis function/N.O. (Hno)	℃	−40...+150
Hysteresis function/N.C. (Hnc)	Hysteresis function/N.C. (Hnc)		
Window function/N.O. (Fno)	Window function/N.O. (Fno)	℉	−40...+302
Window function/N.C.(Fnc)	Window function/N.C.(Fnc)		

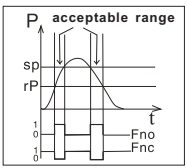
Hysteresis

The hysteresis keeps the switching state of the outputs stable if the system temperature varies about the preset value. When the system temperature is increasing, the output switcheswhen the switch-on point has been reached (SP1); when thesystem temperature is decreasing again, the output switch-off point (rP1) has been reached. The hysteresis can be adjusted:first the switch-on point is set, then the switch-on point with the requested difference.

Window function:

The window function enables the monitoring of a defined acceptable range. When the system temperature varies between the switch-on point (SP1) and the switch-off point (rP1) ,the output is switched (window function/NO) or not switched (window function/NC).
The width of the window can be set by means of the difference between SP1 and rP1. SP1=upper value, rP1=lower value.





Lock/Unlock:

Lock: This unit features auto-lock function. When there is no button being pressed in 1 minute, it will be locked automatically. The monitor of the pressure is running normally.
Unlock: Keep pressing “LEARN/SET” button under the normal pressure display mode (run mode), and then press “MODE/ENTER” for 5 sec. until the “ULC” is displayed, meaning that it's unlock.

The original setting is under lock mode.

Operating mode

Run mode:

(Normal operating mode)

When the supply voltage has been applied, the unit is in the Run mode. It monitors and switches the transistor output according to the set parameters.
The value of the number output depends on the system pressure.
The value of the number output depends on the system temperature.
The digit display indicates the current system pressure or temperature value; the red LED indicates the switching state of the transistor output.

Display mode:

(Indication of parameters and the set parameter values)

When the display indicates the pressure value, press "MODE/ENTER" button, then it turn to the temperature value. When the display show the temperature value, press "MODE/ENTER" ,then it turn to the pressure value.
The unit passes to the Display mode which allows parameter values to be read. The internal data , processing and output remain as Run mode.

- The parameter names are scrolled with each pressing of the "MODE/ENTER" button.
- When the"LEARN/SET"button is pressed briefly, the corresponding parameter value is displayed for 5 second. After another 5 second, the unit returns to the Run mode.

Programming mode:

(Setting of the parameter values)

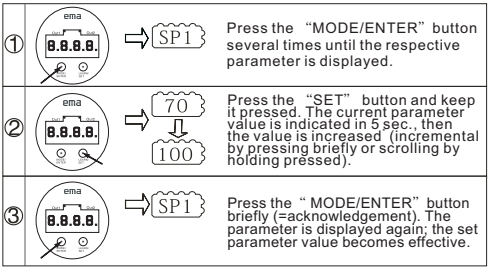
After enter a set parameter value (Display mode), the unit passes to the Programming mode. Continue to press "LEARN / SET" button is pressed until the display of the parameter value is changed. Internally the unit remains in the Operating mode.
The unit keep monitoring the existing parameters until the parameter value change.
The user can change the parameter value by pressing the "LEARN /SET" button and confirm it by pressing the "MODE/ENTER" button. The unit returns to the Run mode when no button is pressed for 5 second.

Menu Setting

Menu	Function	Range		
OU1	Output 1	SP1	Switch point 1: the upper limit value of the output	Celsius: -39.5℃...+150℃ Step of range: 0.5
				Fahrenheit: -39˚F...+302˚F Step of range:1
		rP1	Reverse point 1: the lower limit value of the output	Celsius: -40℃...+149.5℃ Step of range: 0.5
				Fahrenheit: -40˚F...+301˚F Step of range: 1
		FUN function	Function configuration of switching output	Hno Hysteresis NO
				Hnc Hysteresis NC
				Fno Window NO
				Fnc Window NC
		N-P Output selection	Switching output selection	NPN:NPN Output
				PNP:PNP Output
OU2	Output 2	SP2 Switch point2		See table 1
		rP2 Switch point2		
		FUN function		Hno Hysteresis NO
				Hnc Hysteresis NC
				Fno Window NO
				Fnc Window NC
				dES diagnostic output(NC)
		N-P Output selection		NPN output
				PNP output

		dS2 Delay for switch on		Range: 0~50s Step of range:0.1s
		dr2 Delay for switch off		Range: 0~50s Step of range:0.1s
		dR2 Damping for switching output		Filter out high frequency pressurespikes or instantaneous Setting range 0 ~ 2s Step past 0.008s
PEF	Pressure advanced function	UNI	Unit selection	bar
				psi
				kgf/cm²
				Mpa
		COF	Calibration	Setting range: -5%... +5% of sensing range Setting Step of range: 0.1%
		CAR	Zero-point calibration	Clean the COF setting value
		PH	Max.Value recode	Recording Max.value during operation and back to zero after power off.
TEF	Temperature advanced function	C_F	unit selection	℃:Celsius
				℉:Fahrenbeit
		CAL	Calibration	Celsius: -9.9℃~+9.9℃ Step of range:0.1
				Fahrenbeit: -17.5℉~+17.5℉ Step of range:0.5
		HI	Max. temperature record	Recording Max.temperature value during operation and back to zero after power off.
		LO	Mini. temperature record	Recording Mini.temperature value during operation and back to zero after power off.
DIS	display function improve	DEL	display update rate	0ms/50ms/200ms/600ms
		P_d	Positive and opposite display	p:positive display
				d:opposite display
		SPT	temperature/pressure display switch	S-P:pressure display
				S-T:temperature display

Programming



Decrease parameter value: Make the parameter value displayed reach the highest of the parameter setting, and then recycle to the highest value from the lowest.

Diagnostic function

If OUT2=dEs,OUT2 wil be use for diagnostic output.(1)If there is no error ,OUT2output UB+(OUT1=PNP),(2)If there is an error ,OUT2 output invalid,maybe has the following problems; measurement of small defects;OUT1overload or short circuit; exceed or not meet the limitation of measurement range; EEPRON error;RAM error;CPU error.

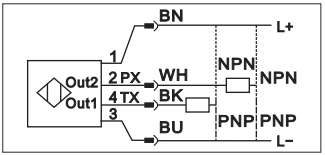
Error status

Detecting safety of device if the operation works ineffective.
Error status:

OL	If the instantaneous pressure is too high, please immediately check whether the onsite pressure is too high. If the pressure is too high for a long time, the pressure components could be cracked, causing product damage.
LO	The pressure is too low. Please check whether the onsite pressure is too low.
SC1	OUT1 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC2	OUT2 output overload or short circuit,causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.
SC	OUT1 and OUT2 output overload or short circuit, causing product damage.The LED light of PNP/NPN will flash, indicating that the output circuit is abnormal.

Please refer to the wiring carefully. If the wiring method is incorrect, the product could be damaged.

Connection



Core color:

1 = BN (brown);
2 = WH (white);
3 = BU (blue);
4 = BK (black)

Electrical Connection

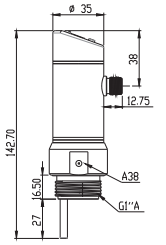
1.The unit must be connected by a technical electrician.
2.The national and international regulations for the installation of electrical equipment must be adhered to Voltage supply to EN50178,SELV,PELV.
3.Disconnect the power before connecting the unit.
4.When in use, the pipe must be grounded. Otherwise, the sensor may be damaged. If the grounding condition is not available, please contact the manufacturer. Do not connect the power without authorization.

Technical data

Detected objects: Relative medium for gas and liquid

Electric design	DC PNP/NPN
Operating voltage[V]	18...36DC
Measuring range[bar]	−1...1/2/5/10/20/50
Max.overload pressure[bar]	6/8/20/35/60/140
Short-circuit protection	pulse
Reverse polarity protection	Yes
Overload protection	Yes
Watchdog	Yes
Voltage drop[V]	<2
Current consumption[mA]	<80
Switching output2	NPN/PNP programmable(pressure)
Switching output load(mA)	300
Switching output1	NPN/PNP programmable(temperature)
Switching output load(mA)	300
Switching point SP[℃/℉] Recover point RP[℃/℉] Step range [℃/℉]	−39.5...150/−39...302 −40...149.5/−40...301 0.5/1
Temperature checking range[℃/℉]	−40...150/−40...302
Switching output[℃/℉]	0.5/1
Display[℃/℉]	0.5/1
Ambient temperature[℃/℉]	−25...80/−13...176
Medium temperature[℃/℉]	−25...80/−13...176
Storage temperature[℃/℉]	−40...100/−40...212
Protection rating	IP68
Insulation resistance[MΩ]	> 100 (500VDC)
ESD	6KV
EFT	2KV
Walkie talkie experiment[mm]	<10
Shock resistance[g]	50
Vibration resistance[g]	20
Housing material	Stainless steel 304
Probe material	Stainless steel 316L
Medium contacting material	Ceramics,Stainless steel 316L;FPM(Viton)

Dimensions



Unit: mm

Mounting and maintenance

1. To reduce the shock to the product, please install this product vertically to the flow of medium.
2. To avoid damage of the product, please do not make the loading pressure of the product exceed the range of acceptable pressure by twice.
3. To install M12 connector and the adapter, please do not forcefully tighten it, and the torque do not exceed 36Nm (350kgf/cm²).

Electronic Pressure Transmitters

PB/PC Type

■ English

IP68 CE RoHS

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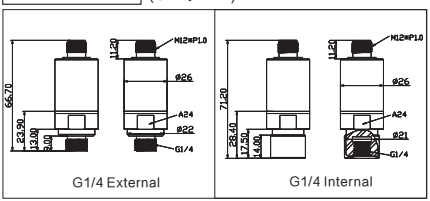
Operating principle

When the pressure acts on the interface of the ceramic diaphragm, the diaphragm is deformed slightly and then connected as a Wheatstone bridge through the thick film resistor printed at the back of the diaphragm. Owing to Piezoresistive Effect from voltage dependant resistor, the electric bridge will produce a high-linear voltage signal with a direct ratio to the pressure, converting the signal to a standard voltage signal via circuit and transmitting the standard voltage to the intelligent system. The digit-segment display shows the value of pressure and then the value will be compared to setting points by the user. Finally, this value is converted to signals for switching output (NPN, PNP) or for analog output. By ema programmer UP0001, Output SP can be set or two outputs SP and rP can be set.

Feature

1. Wild power input range broadens the application and reduce the stock effectively.
2. Compact structure without adjustment and easy installation.
3. Low power consumption, low temperature drift, high accuracy, and high stability.
4. Highly resistant to shock, to vibration, and to overload with a solid structure.
5. Uniqu digital adjustment to ensure high accuracy.
6. Warning points are set discretionally for flexible application.

Dimension (Unit: mm)

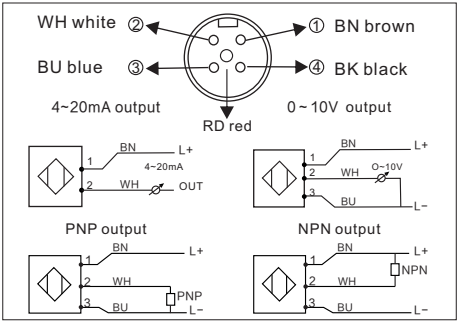


G1/4 External G1/4 Internal

Functions and features

1. 4~20mAOutput
2. 0~10VOutput
3. PNP or NPN output (By ema programmer UP0001, Output SP can be set or two outputs SP and rP can be set.)

Wiring



Certification

1.Meet CE directive
2.Meet UL directive
(Insulation resistance, Impact resistance,electrostatic protection. shock resistance, vibration resistance, drop impact reliabicity. Average lifetime is not less than 15,000 hours)

Technical data

Specification / Parameter	PB /PC Series Pressure Transmitter
Sensing substance	Relative pressure gas and liquid
Voltage output[V]	8...36DC (4...20mA)
	18...36DC (PNP/NPN or 0...10V)
Reverse polarity protection	Yes
Voltage drop[V]	< 2

Current consumption[mA]	< 30										
Sensing range[bar]	-1...1	2	5	10	20	50	100	200	250	400	600
Burst pressure[bar]	6	8	20	35	60	140	300	400	650	650	880
Output	PB	4 ~ 20mA Output									
		0 ~ 10V Output									
	PC	PNP/NPN output									
4 ~ 20mAOutput load [Ω]	Maximum 500										
0 ~ 10VOutput load [Ω]	Minimum 2000										
PNP/NPN Output current[mA]	300										
Cable spec.	M12										
Power consumption	0.72W Max										
Operating temperature[℃/℉]	−25...+80/−13...+176										
Medium temperature[℃/℉]	−25...+80/−13...+176										
Storage temperature[℃/℉]	−40...+100/−40...+212										
Housing material	Stainless steel 304										
Probe material	Stainless steel 316L										
Insulation resistor[M]	> 100 (500 V DC)										
Resistance to shock[g]	50										
Resistance to vibration[g]	20										
Protection classification	IP68										

Notice:
1. To reduce shock to this product, this product should be Installed vertically to the flow of the substance.
2. To avoid damage, max. overload pressure can not exceed the double of standard sensing range.
3. Please ask technician to install this product and follow the domestic or international regulation of electric devices. Power should be turn off before installation.