Pressure sensors

When the pressure acts on the interface of the ceramic-diaphragm,the diaphragm is deformed slightly. It is furthermore connected to a Wheatstone bridge through a thick film resistor in the back of the diaphragm. Due to the Piezo resistive Effect from voltage dependant resistors, the electric bridge will produce a high-linear voltage signal with a direct ratio to pressure. Then it is converted to a standard voltage signal which is then transmitted to the system. The 3-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 analogue output(0-10V,4-20mA).

IP68 IP69K CE RoHS

www.ema-electronic.com

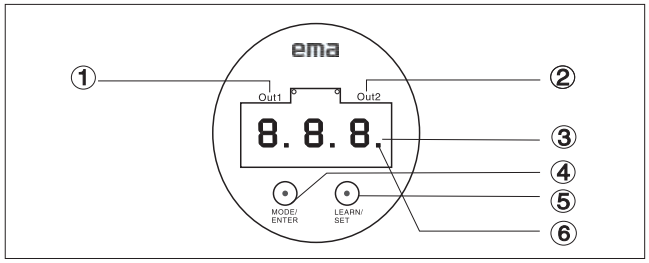
Features

Pressure sensors are applied to a variety of fields in industrial automation such as water conservancy, hydroelectric industry, intelligent architecture, automation control, aviation, military industry, petroche-mical industry, electric power, shipping, machinery tools, and more.

Applications

- Measure and control the pressure of gas and of liqulid in the pipeline trans-portation systems.
- Monitor the pressure values of the oil of cutting machines.
- Monitor the pressure in the oiling cylinders, oil circuits, and oil pipes in order to secure the oil circuits and reach specify pressure
- Detect pressure of oil in pipes in wind power equipments
- Detect pressure of enzymes or other chemicals in containers.
- Monitor pressure of liquids in the containers, and warn while the pressure detected is over that set by users.
- Detect pressure in liquid waste processing systems.
- Measure and control the pressure of gas and of liquids.
- Detect pressure of materials in extracting systems controled by motors.

Controls and visual indication



①	Out1	Out1 output connected, LED light on
②	Out2	Out2 output connected, LED light on
③	7-segment LED	Displays system pressure, parameters and setting value
④	MODE/ENTER	Selection of parameter and acknowledgement of parameter value
⑤	LEARN/SET	Setting of learn mode and parameter value
⑥	Millesimal display	The value displayed should be multiplied by 10 when this dot flashes.

Fuctions and features

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

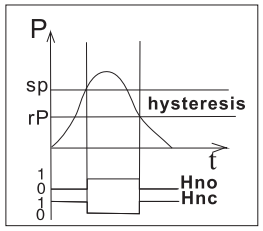
Output 1	Output 2
Hysteresis/N.O.(Hno)	Analogue output
Hysteresis function/N.C.(Hnc)	4~20mA(I)
window function/N.O.(Fno)	Analogue output
window function/N.C.(Fnc)	0~10V(U)

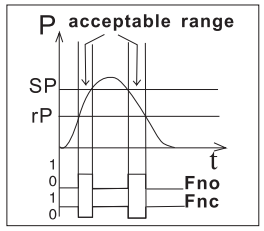
Hysteresis

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 different demand.

Window function :

The Window function enables the monitoring of a defined acceptable range. When the system press 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.





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 output value of analogue signal is related to system presure
- The digit display indicates the current system pressure; the red LED indicates the switching state of the transistor output.

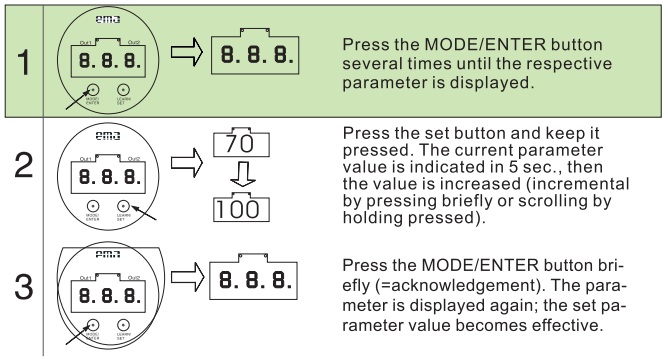
Display mode:(Indication of parameters and the set parameter values)

- When the "MODE/ENTER" button is pressed briefly, the unitpasses 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 "SET" button is pressed briefly, the correspond-ing 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 it 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 has been 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 seconds.

Programming



- **Decrease parameter value:** Make the parameter value displayed reach the maximum setting of the parameter value, and then recycle from the minimum value to the maximum value
- **Lock:** The device has automatically lock function.If no key pressed when it is in the run mode, it will automatically lock the pushbuttons,normally detect temperature fluctuations, and output control value.
- **Unlock:** When it is in normal pressure display state(run mode),long press LEARN/SET, then press MODE/ENTER, maintaining 10 seconds, until display ULC the device is unlocked. All devices from the factory are locked.

Setting / Operation

Detecting security of device if the operation works effective. Fault situations:

OL	Too high pressure
LO	Too low pressure
Sc	Flashing = PNP or NPN output means overload or short circuit

- Programmable smart pressure sensor, user can set the pressure range and switch point via buttons easily
- Offering 4 units of pressure, Bar, Kg/cm^2 , Mpa, and Psi, to be converted
- Power protection: overload, short-circuit, reverse polarity
- Delivers high accuracy, high stability and anticorrosive
- Protection:IP68

QUALITY ASSURANCE 2 Years QUALITY ASSURANCE

IP68 CE Oil RoHS

Accessories:

Type	Connector Order No.						Drawing No.
	C	02	I	5	C	12	I:E1I38
I	C: Cable	Length 02: 2M 05: 5M 10: 10M	Connector I: Straight L: Angled	Pole 4: 4 5: 5	Material R: PUR C: PVC S: PVC Shielded Wire	Size 12: M12	
L							L:E1I39

Order No.	US0004	US0005	US0006
Type	 G1/4" – G1/2"	 G1/4" – G1/4"	 G1/4" – M20 x 1.5
Drawing No.	E3U04	E3U05	E3U06

Drawing

Page	>>> P. 50–53

Order NO.

Order NO.	Thread (Internal)	Sensible Range (bar)	Supply Voltage (V)	Output 1	Output 2	Electric design	Drawing No.
PA1140	G¼"I	−1...1	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1141	G¼"I	2	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1142	G¼"I	5	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1143	G¼"I	10	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1144	G¼"I	20	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1145	G¼"I	50	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1146	G¼"I	100	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1147	G¼"I	200	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1148	G¼"I	250	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1149	G¼"I	400	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1150	G¼"I	600	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P01
PA1160	G¼"I	−1...1	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1161	G¼"I	2	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1162	G¼"I	5	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1163	G¼"I	10	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1164	G¼"I	20	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1165	G¼"I	50	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1166	G¼"I	100	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1167	G¼"I	200	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1168	G¼"I	250	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1169	G¼"I	400	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01
PA1170	G¼"I	600	18~36 DC	PNP NO/NC, NPN NO/NC	PNP NO/NC, NPN NO/NC	4	E3P01

Technical parameters:

Probe material: Stainless steel 316L
Accuracy[%]: ≤ ±0.5
Current load [mA]: 300
Voltage drop [V]: < 2
Analogue output response time [ms] : < 3
Power–on delay time [s]:0.3
Medium temperature[°C]: −25...80
Pressure element: High–precision ceramic diaphragm

- Simple structure、Easy installation、No calibration required
- Unique way of digital calibration, high accuracy, high stability
- All stainless steel structure. Anti-resistant, anti-alkali/corrosion and shock resistant
- High precision ceramic components
- Analogue output 4-20 mA or 0-10 V
- Switching point can be set flexibly and easily
- Protection:IP68

IP68 CE Oil RoHS

QUALITY ASSURANCE 2 Years QUALITY ASSURANCE

Accessories:

Type	Connector Order No.						Drawing No.
	C	02	I	5	C	12	I:E3U11
I	C: Cable	Length 02: 2M 05: 5M 10: 10M	Connector I: Straight L: Angled	Pole 4: 4 5: 5	Material R: PUR C: PVC S: PVC Shielded Wire	Size 12: M12	
L							L:E3U12

Order No.	US0004	US0005	US0006
Type			
	G1/4" – G1/2"	G1/4" – G1/4"	G1/4" – M20 x 1.5
Drawing No.	E3U04	E3U05	E3U06

Drawing

Page	>>> P. 50–53

Order NO.

Order NO.	Thread Type	Thread	Sensible Range (bar)	Supply Voltage (V)	Output	Electric design	Drawing No.
PB1140	Internal	G¼"I	-1...1	18~36 DC	4~20mA	2	E3P03
PB1141	Internal	G¼"I	2	18~36 DC	4~20mA	2	E3P03
PB1142	Internal	G¼"I	5	18~36 DC	4~20mA	2	E3P03
PB1143	Internal	G¼"I	10	18~36 DC	4~20mA	2	E3P03
PB1144	Internal	G¼"I	20	18~36 DC	4~20mA	2	E3P03
PB1145	Internal	G¼"I	50	18~36 DC	4~20mA	2	E3P03
PB1146	Internal	G¼"I	100	18~36 DC	4~20mA	2	E3P03
PB1147	Internal	G¼"I	200	18~36 DC	4~20mA	2	E3P03
PB1148	Internal	G¼"I	250	18~36 DC	4~20mA	2	E3P03
PB1149	Internal	G¼"I	400	18~36 DC	4~20mA	2	E3P03
PB1150	Internal	G¼"I	600	18~36 DC	4~20mA	2	E3P03
PB1160	Internal	G¼"I	-1...1	18~36 DC	0~10V	3	E3P03
PB1161	Internal	G¼"I	2	18~36 DC	0~10V	3	E3P03
PB1162	Internal	G¼"I	5	18~36 DC	0~10V	3	E3P03
PB1163	Internal	G¼"I	10	18~36 DC	0~10V	3	E3P03
PB1164	Internal	G¼"I	20	18~36 DC	0~10V	3	E3P03
PB1165	Internal	G¼"I	50	18~36 DC	0~10V	3	E3P03
PB1166	Internal	G¼"I	100	18~36 DC	0~10V	3	E3P03
PB1167	Internal	G¼"I	200	18~36 DC	0~10V	3	E3P03
PB1168	Internal	G¼"I	250	18~36 DC	0~10V	3	E3P03
PB1169	Internal	G¼"I	400	18~36 DC	0~10V	3	E3P03
PB1170	Internal	G¼"I	600	18~36 DC	0~10V	3	E3P03

Technical parameters:

Probe material: Stainless steel 316L
Accuracy[%]:≤±1
Current load [mA]: <30
Voltage drop [V]: < 2
Analogue output response time [ms] : < 3
Power-on delay time [s]:0.3
Medium temperature[°C]: -25...80
Pressure element: High-precision ceramic diaphragm

Order NO.

Order NO.	Thread Type	Thread	Sensible Range (bar)	Supply Voltage (V)	Output	Electric design	Drawing No.
PB2140	External	G¼"A	−1...1	18~36 DC	4~20mA	2	E3P04
PB2141	External	G¼"A	2	18~36 DC	4~20mA	2	E3P04
PB2142	External	G¼"A	5	18~36 DC	4~20mA	2	E3P04
PB2143	External	G¼"A	10	18~36 DC	4~20mA	2	E3P04
PB2144	External	G¼"A	20	18~36 DC	4~20mA	2	E3P04
PB2145	External	G¼"A	50	18~36 DC	4~20mA	2	E3P04
PB2146	External	G¼"A	100	18~36 DC	4~20mA	2	E3P04
PB2147	External	G¼"A	200	18~36 DC	4~20mA	2	E3P04
PB2148	External	G¼"A	250	18~36 DC	4~20mA	2	E3P04
PB2149	External	G¼"A	400	18~36 DC	4~20mA	2	E3P04
PB2150	External	G¼"A	600	18~36 DC	4~20mA	2	E3P04
PB2160	External	G¼"A	−1...1	18~36 DC	0~10V	3	E3P04
PB2161	External	G¼"A	2	18~36 DC	0~10V	3	E3P04
PB2162	External	G¼"A	5	18~36 DC	0~10V	3	E3P04
PB2163	External	G¼"A	10	18~36 DC	0~10V	3	E3P04
PB2164	External	G¼"A	20	18~36 DC	0~10V	3	E3P04
PB2165	External	G¼"A	50	18~36 DC	0~10V	3	E3P04
PB2166	External	G¼"A	100	18~36 DC	0~10V	3	E3P04
PB2167	External	G¼"A	200	18~36 DC	0~10V	3	E3P04
PB2168	External	G¼"A	250	18~36 DC	0~10V	3	E3P04
PB2169	External	G¼"A	400	18~36 DC	0~10V	3	E3P04
PB2170	External	G¼"A	600	18~36 DC	0~10V	3	E3P04

Drawing

Page	>>> P. 50–53

Technical parameters:

Probe material: Stainless steel 316L
Accuracy[%]: ⩽±1
Current load [mA]: <30
Voltage drop [V]: < 2
Analogue output response time [ms] : < 3
Power–on delay time [s]:0.3
Medium temperature[°C]: –25...80
Pressure element: High–precision ceramic diaphragm

- Simple structure、Easy installation、No calibration required
- Unique way of digital calibration, high accuracy, high stability
- All stainless steel structure. Anti-resistant, anti-alkali/corrosion and shock resistant
- High precision ceramic element
- PNP or NPN NO/NC switching output
- Switching point can be adjusted by programmable unit

IP68 CE Oil RoHS

QUALITY ASSURANCE 2 Years QUALITY ASSURANCE

Accessories:

Type	Connector Order No.						Drawing No.
 I  L	C	02	I	5	C	12	I:E3U11 L:E3U12
	C: Cable	Length 02: 2M 05: 5M 10: 10M	Connector I: Straight L: Angled	Pole 4: 4 5: 5	Material R: PUR C: PVC S: PVC Shielded Wire	Size 12: M12	

Order No.	US0004	US0005	US0006
Type	 G1/4" – G1/2"	 G1/4" – G1/4"	 G1/4" – M20 x 1.5
Drawing No.	E3U04	E3U05	E3U06

Order No.	Programmable Unit Order No.	Drawing No.
UP0001	 Pressure range:-1...+600 bar Connection: M12 Socket Power supply interface:24VDC	E3U14

Drawing

Page	>>> P. 50–53

Order NO.

Order NO.	Thread Type	Thread	Sensible Range (bar)	Supply Voltage (V)	Output	Electric design	Drawing No.
PC2140	External	G¼"A	-1...1	18~36 DC	PNP NO/NC	3	E3P05
PC2141	External	G¼"A	2	18~36 DC	PNP NO/NC	3	E3P05
PC2142	External	G¼"A	5	18~36 DC	PNP NO/NC	3	E3P05
PC2143	External	G¼"A	10	18~36 DC	PNP NO/NC	3	E3P05
PC2144	External	G¼"A	20	18~36 DC	PNP NO/NC	3	E3P05
PC2145	External	G¼"A	50	18~36 DC	PNP NO/NC	3	E3P05
PC2146	External	G¼"A	100	18~36 DC	PNP NO/NC	3	E3P05
PC2147	External	G¼"A	200	18~36 DC	PNP NO/NC	3	E3P05
PC2148	External	G¼"A	250	18~36 DC	PNP NO/NC	3	E3P05
PC2149	External	G¼"A	400	18~36 DC	PNP NO/NC	3	E3P05
PC2150	External	G¼"A	600	18~36 DC	PNP NO/NC	3	E3P05
PC2160	External	G¼"A	-1...1	18~36 DC	NPN NO/NC	3	E3P05
PC2161	External	G¼"A	2	18~36 DC	NPN NO/NC	3	E3P05
PC2162	External	G¼"A	5	18~36 DC	NPN NO/NC	3	E3P05
PC2163	External	G¼"A	10	18~36 DC	NPN NO/NC	3	E3P05
PC2164	External	G¼"A	20	18~36 DC	NPN NO/NC	3	E3P05
PC2165	External	G¼"A	50	18~36 DC	NPN NO/NC	3	E3P05
PC2166	External	G¼"A	100	18~36 DC	NPN NO/NC	3	E3P05
PC2167	External	G¼"A	200	18~36 DC	NPN NO/NC	3	E3P05
PC2168	External	G¼"A	250	18~36 DC	NPN NO/NC	3	E3P05
PC2169	External	G¼"A	400	18~36 DC	NPN NO/NC	3	E3P05
PC2170	External	G¼"A	600	18~36 DC	NPN NO/NC	3	E3P05

Technical parameters:

Probe material: Stainless steel 316L
Accuracy[%]:≤±1
Current load [mA]: <30
Voltage drop [V]: < 2
Analogue output response time [ms] : < 3
Power-on delay time [s]:0.3
Medium temperature[°C]: -25...80
Pressure element: High-precision ceramic diaphragm

- This electronic pressure sensors meet the standard of sanitary design
- Embedded high-precision ceramic diaphragm
- Elegant design, smooth surface, anti-acid, anti-alkali and anti-corrosion
- Users can set pressure range and switch point via buttons easily
- All stainless steel structure and the rating is up to IP69K

QUALITY ASSURANCE 2 Years QUALITY ASSURANCE

IP68 IP69K CE RoHS

Order NO.

Order NO.	Thread (External)	Sensible Range (bar)	Supply Voltage (V)	Output 1	Output 2	Electric design	Drawing No.
PA3201	G¾"A	−1...2	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P02
PA3202	G¾"A	−1...5	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P02
PA3203	G¾"A	−1...10	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P02
PA3204	G¾"A	−1...20	18~36 DC	PNP NO/NC, NPN NO/NC	0~10V, 4~20mA	4	E3P02

Accessories:

Type	Connector Order No.						Drawing No.
	C	02	I	5	C	12	I:E3U11
 I	C: Cable	Length 02: 2M 05: 5M 10: 10M	Connector I: Straight L: Angled	Pole 4: 4 5: 5	Material R: PUR C: PVC S: PVC Shielded Wire	Size 12: M12	
 L							L:E3U12

Order No.	US0061	US0062
Type	 Hygienic welding adapter	 Hygienic Tri Clamp adapter
Drawing No.	E3U15	E3U16

Technical parameters:
Probe material: Stainless steel 316L
Accuracy[%]: ≤ ±0.5
Max current load[mA]:300
Voltage drop [V]: < 2
Analogue output response time [ms] : < 3
Power–on delay time [s]:0.3
Medium temperature [℃]: –25...125(145 max/1h)
Pressure element: ceramic diaphragm

Drawing

Page	>>> P. 50–53