Liquid and/or Gas
Incorporating stainless diaphragm pressure sensor

CE40
IR Communication type Pressure Switch

Overview

Digital settings including such as switch operating point is possible via IR data communication without actually applying pressure to the switch. This small and lightweight pressure switch is available exploring new applications in conjunction with dedicated remote communicator.

※Available in flush diaphragm type

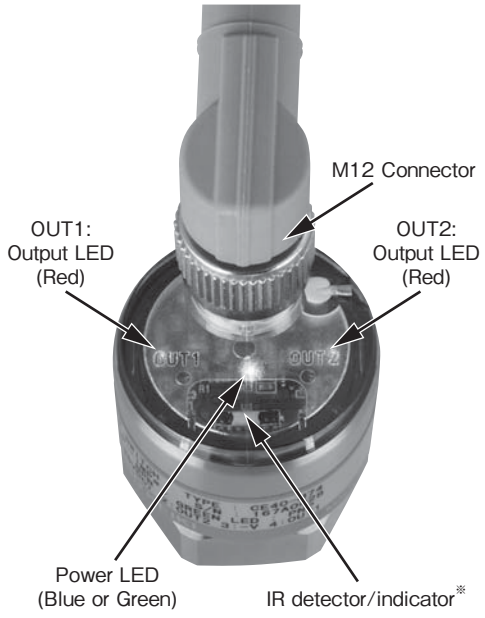
Features

- Available in a wide ranges (24 ranges)
  0 to 120kPa abs., 0 to 35kPa→0 to 50MPa,
  -20 to 20kPa→-100 to 300kPa,
  -0.1 to 0.5MPa→-0.1 to 2MPa
  (Compound ranges available)
- Compatible with gases and liquids measurement with stainless diaphragm
- Excellent environmental resistance (IP67)
  ※With vent hole: IP65
- Available in various measurements/settings /memory functions with ER40 IR COMMUNICATOR (IR data communication)

This pressure switch has a chance to expand application in conjunction with dedicated remote communicator.

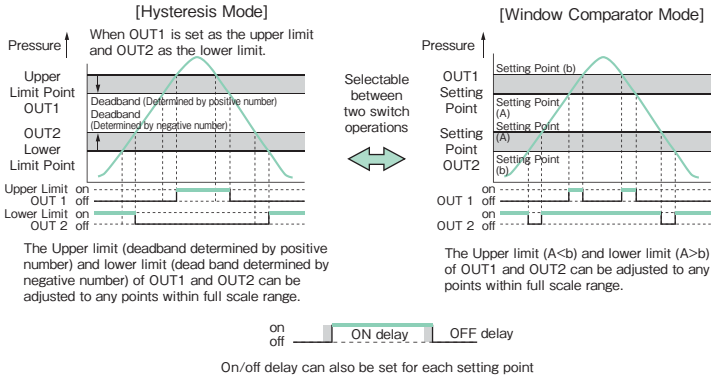
Featured functions

CE40 Indicating Part



※ Communication range between CE40 and ER40:
Effective range within 300mm Effective angle within ±15°

● **Comparator switch operation can be selected and set via IR data communication**



The Upper limit (deadband determined by positive number) and lower limit (dead band determined by negative number) of OUT1 and OUT2 can be adjusted to any points within full scale range.

The Upper limit (A<b) and lower limit (A>b) of OUT1 and OUT2 can be adjusted to any points within full scale range.

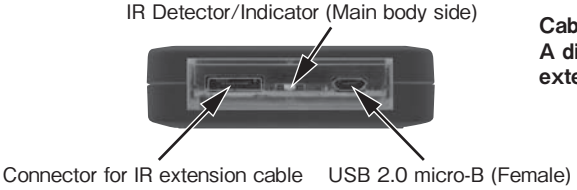
On/off delay can also be set for each setting point

● **Power LED turns Red and Green for NPN/PNP identification**

● **Protection cap (Accessory)**

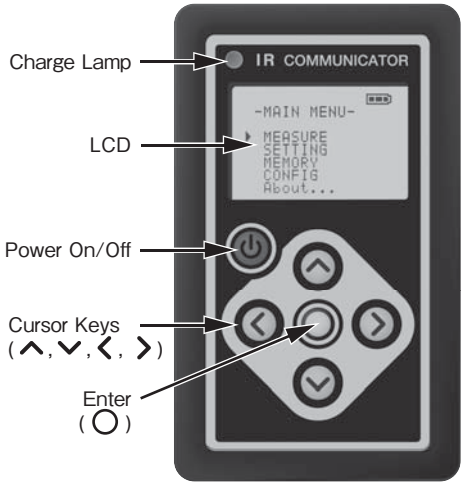
When the CE40s are adjacently mounted, the attached protective cap is effective shutting off other signals input to the IR receiver. It also helps for keeping IR detector/operation indicating part clean.

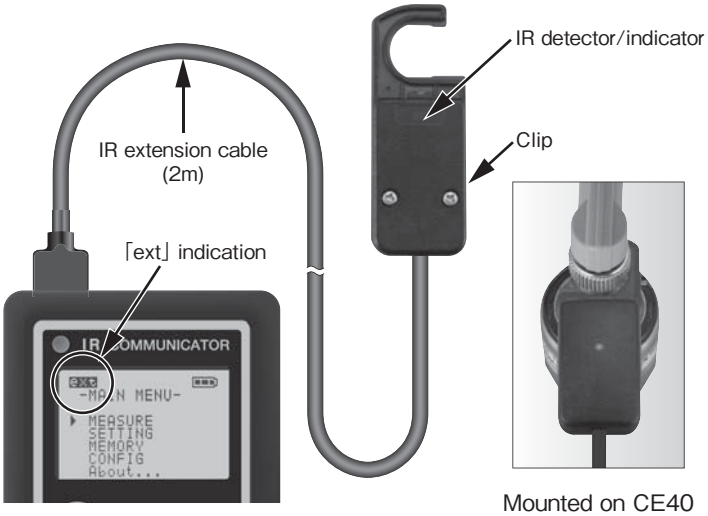
ER40 Indicating/Setting Part



● **IR Extension Cable (Optional)**

Cable attachment can establish one-to-one communication with CE40. A display message of 「ext」 at the upper left on LCD indicates that extension cable is attached.





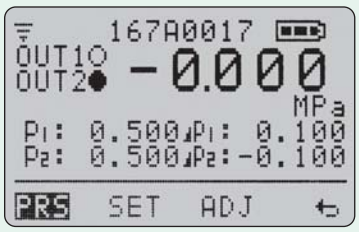
Mounted on CE40

＊There is a main power switch at the side of communicator.

ER40 Configurations and Functions

※Refer to instruction manual for operation procedure

MEASURE

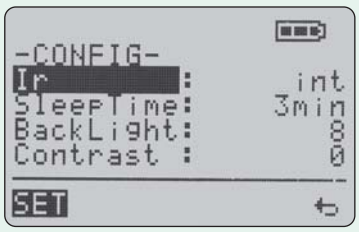


- ○Real-time pressure value indication [PRS]
- ○Setting Value Adjustment [SET]
- ○Zero Adjustment [ADJ]
- ○Peak Hold [TOP,BTM]
- ○Loop Check [LPC]

MAIN MENU

- ○MEASURE
- ○SETTING
- ○MEMORY
- ○CONFIG
- ○About...

CONFIG



- ○Ir (Select IR sensor element)
- ○SleepTime (Automatic power OFF)
- ○BackLight (Brightness)
- ○Contrast (Contrast Difference)

Read Setting Value from CE40 and Edit

Edit Setting Value Saved into CE40

SETTING

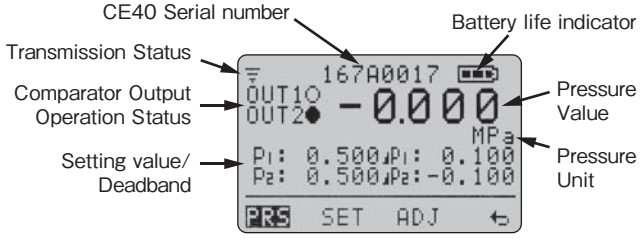
- ○**COMPARATOR setting**
- ○**DELAY (On, Off):**
  (Hysteresis/Window comparator) ON/Off and delay time setting
- ○**FUNCTION:**
  - •NPN/PNP output selection
  - •Comparator Operation Selection: Hysteresis or Window comparator
  - •Filter function: It is useful when pressure fluctuations can result in erratic, difficult to read displays (Selectable 6 internal time constant filters: 10ms, 50ms, 150ms, 500ms, 1s, 5s)
- ○**SPECIAL:**
  - •Key Lock: It manually disables CE40 IR communication by selecting LOCK.
  - •CE40 program version is displayed.

MEMORY

- ○**User can edit and send setting data in ER40.**
  (COMPARATOR/DELAY/FUNCTION/SPECIAL etc.)
- ○**FILE : Sets Tag No. of saved files.**
- ○**COPY : Saves setting data read from CE40 to ER40.**
- ○**SEND : Sends edited data to CE40.**
- ○**SEARCH: Starts a connection (pairing) with CE40.**

※Max. Memory Storage: 12

● Display on Measurement Mode



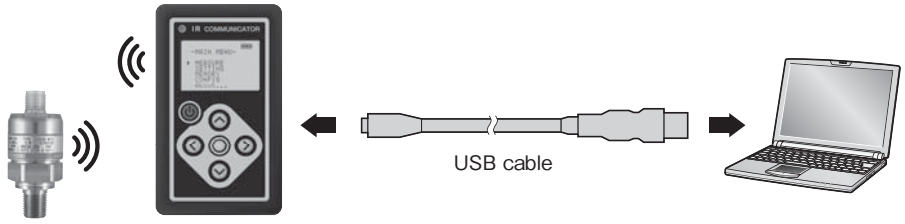
● Comparator Setting Table

Open collector output: Select NPN or PNP.

Items	Factory Default Setting (Factory default setting)	Other than default settings
Setting Value	OUT1: Upper limit (H) 50% F.S. or above On OUT2: Lower limit (L) 50% F.S. or below On	Specify preferable setting if any when ordering
Deadband	Hysteresis 10%F.S.	
Delay	0s	
Filter	No setting (Response time: 1ms or less)	

● ER40 Memory Function

User can save the data read from CE40 with IR communication and the data input from the PC to the ER40 Memory



Dedicated software is available from our website.
※The software is available from our website.

Option:
USB cable (1m)
※USB 2.0 micro-B (Male) -USB type A
※USB cable (for charging/data transmission) is also available on the market.

Specifications 1

CE40 Pressure Switch

Classification	Pressure Ranges: Gauge pressure		Pressure Ranges: Absolute pressure	Allowable maximum pressure※1	Allowable vacuum pressure	Position difference	Accuracy (at 23℃)	Temperature Characteristic (Zero・Span)
Low Pressure・Absolute Pressure	0 to 35kPa (3500)			100kPa	130Pa abs. and above	30Pa or less /90°	Repeatability ±0.2%F.S. Setting Accuracy※2 ± (0.5%F.S. + 1 count)	±0.05%F.S. /℃
	0 to 50kPa (500)	-20 to 20kPa (400)		200kPa				
	0 to 100kPa (1000)	-50 to 50kPa (1000)						
		-100 to 0kPa (1000)						
			0 to 120kPa abs. (1200)	200kPa abs.				
	0 to 200kPa (2000)	-100 to 100kPa (2000)		400kPa				
		-100 to 200kPa (3000)						
	0 to 300kPa (3000)	-100 to 300kPa (400)		1000kPa				
Medium Pressure to High Pressure	0 to 0.5MPa (500)	-0.1 to 0.5MPa (600)	——	200% of pressure range	——	——		
	0 to 1MPa (1000)	-0.1 to 1MPa (1100)						
	0 to 2MPa (2000)	-0.1 to 2MPa (2100)						
	0 to 3.5MPa (3500)							
	0 to 5MPa (500)							
	0 to 10MPa (1000)							
	0 to 20MPa (2000)							
	0 to 35MPa (3500)			150% of pressure range				
	0 to 50MPa (500)							

( ) represents count number

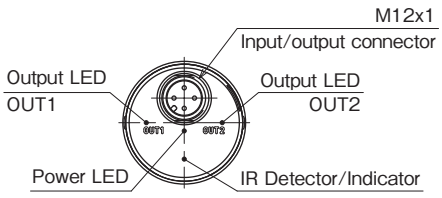
Item	Description
Media	Air, water and oil (Compatible with wetted material)
Installation environment	Install in location where no gases or liquids may exist that have the potential to become flammable or ignitable under normal operating condition.
Process Connection	Medium Pressure to High Pressure: R1/4, G1/4A (10MPa or below), G3/8A Low Pressure・Absolute Pressure: R1/4, G1/2A (Flush diaphragm type)
Power Supply	9 to 36V DC
Setting Method	Effective communication range within 300mm※3
Current Consumption	30mA DC (max.) not including comparator output current
Display	Comparator operation indicator Red LED × 2 (When ON) Power Indicator NPN: Blue LED PNP: Green LED
Output	Comparator Outputs (Default) NPN open collector 2 outputs PNP open collector 2 outputs
	Deadband Hysteresis Variable Window Comparator Fixed at 1%F.S.
	Output Capacity※4 NPN 36V DC, 250mA (max.) PNP Output Capacity, 250mA (max.)
	Response time 1ms or less
Actuation Delay Time	50ms
Operating Temperature	-20 to 70℃
Operating Humidity	85%RH or less when pressure range is 2Mpa or below (Non-Freezing, Non-Condensing)
Storage Temperature/Humidity	-30 to 80℃, 95%RH or less (Non-Freezing, Non-Condensing)
Withstand Voltage	Leak current 5mA (max.) (250V AC (50/60Hz), 1 minute)
Insulation Voltage	100MΩ min. (50V DC)
Case Construction	Indoor use (IEC60529 IP67) (Ranges 2MPa or below: IEC60529 IP65)
Case Material	SUS304, PES※5
Wetted parts	Medium Pressure to High Pressure: SUS630 (17-4PH), SUS304, Rigid NBR (Depending upon connection size) Low Pressure・Absolute Pressure: SUS316L (Flush diaphragm type may be exposed to process media depending upon process environment.)
Filled liquid	Silicone oil (Low Pressure・Absolute Pressure only)
Vibration	Frequency 10 to 2000Hz, Acceleration 200m/s^2
Shock	Acceleration 1000m/s^2, Operating time: 6ms
Connector	M12 Connector (4P)
Protective Circuit	Reverse-polarity protecting system, Short-circuit (over-current) protection
Weight	Approx. 100g
UL Standard	Applicable standard number: UL508 File No.: E484608 Condition of usage: Utilize NEC (Nationla Electrical Code) Class 2 for power supply.
EMC Standard	EN61326-1:2013 EN61326-2-3:2013
RoHS Standard	EU RoHS Directive applicable

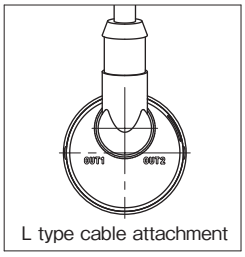
※1 The maximum allowable pressure is the maximum pressure that does not affect the accuracy of the pressure range and the performance as it is applied to the temporary. Therefore, it does not allow to be subjected to repeated impermissible pressure on the pressure sensor.
※2 Accuracy includes the effects of linearity and Hysteresis
※3 Effective range for IR communication with ER40 (Sold Separately)
※4 Output capacity vs. Temperature: 100mA max. at 55 to 70℃, 150mA max. at 45 to 55℃, 200mA max. at 35 to 45℃, 250mA max. at -20 to 35℃.
※5 Polar solvent and strong acid like Acetone, chloroform could be corrosive. Ketone and Ester could generate stress cracking.

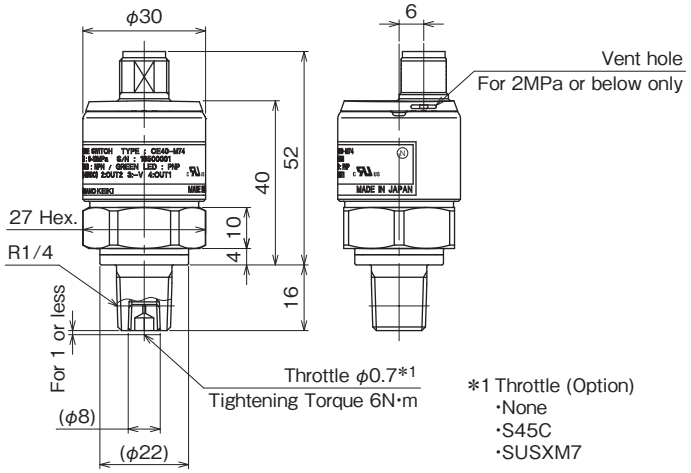
Dimensions 1

Unit: mm

Medium Pressure to High Pressure Ranges
(0 to 0.5MPa or below)



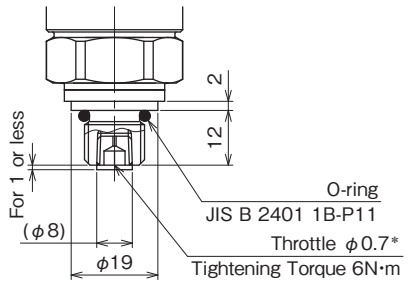




*1 Throttle (Option)
·None
·S45C
·SUSXM7

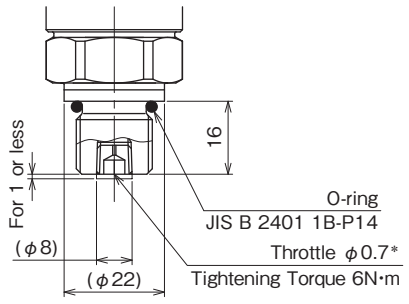
■Connection
(Medium Pressure to High Pressure Ranges)

G1/4A



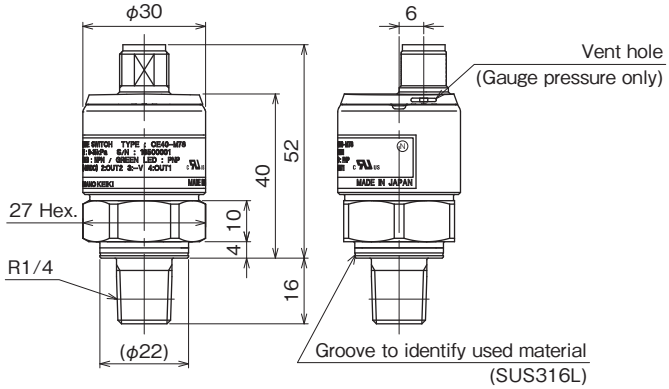
Pressure Ranges: 10MPa or below

G3/8A

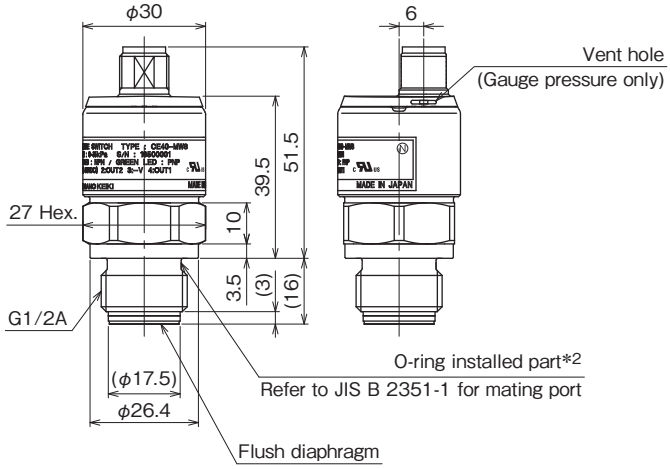


Low Pressure・Absolute Pressure Ranges

●Standard

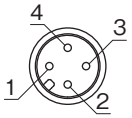


●Flush diaphragm type



*2 O-ring is not installed at the time of shipment.

Electrical pin array

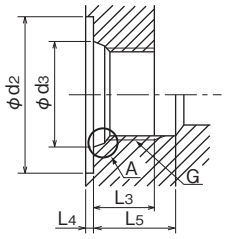
Pin array for electrical input/output	Terminal number	Description	Cable color※
	1	Power Supply (+), COM (For PNP open collector)	Brown
	2	OUT2 open collector output	White
	3	Power Supply (−), COM (For NPN open collector)	Blue
	4	OUT1 open collector output	Black

※Color is assigned to accommodate to optional M12 connector cable.

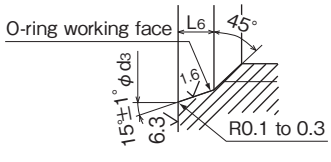
■Mating port for flush diaphragm type

〔Source from JISB 2351-1 Table 7〕

O type
(O type ring sealing method)



A enlarged view (Reference)



Thread size G	d_2±0.3	$d_3{}^{+0.1}_{0}$	L_3 (Min.)	L_4 (Max.)	L_5 (Min.)	$L_6{}^{+0.4}_{0}$	Applicable O-ring number
1/2	34	22.6	16	2.5	24	2.5	P18

1. Thread G represents JIS B 0202 applicable pipe thread.
2. O-ring working face must not contain vertical scratch or spiral tool mark.
3. Spot face must be flat and vertical against the axis of screw thread.

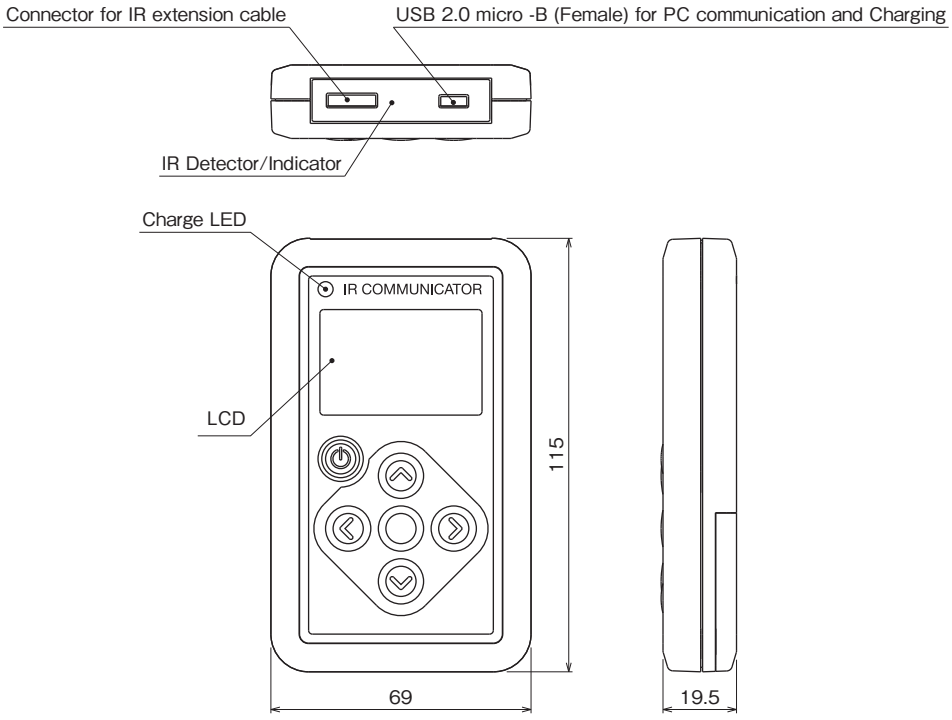
Specifications 2

ER40 IR COMMUNICATOR (Indicator・Setting Unit)

Item	Description
Transmission Method	IR Communication
Communication Range	Effective range within 300mm, Effective angle within ±15°
Batteries	AAA battery × 2 (Rechargeable nickel-hydrogen or Alkaline batteries)
Charge (USB Connector)	USB 2.0 micro-B (Female)
Operating Temperature	0 to 40℃ (When Nickel - hydrogen batteries is used.)
Storage Temperature	-10 to 50℃ (Batteries removed)
Enclosure Structure	Indore use (non-waterproof)
Case Material	ABS
Option	Anti-shock silicone case, IR extension cable

Dimensions 2

Unit: mm



＊There is a main power switch at the side of communicator.

Optional

Anti-shock silicone case (Color: Dark gray)	IR Extension Cable (2m)	Portable power supply※1 (E39-VA made by Omron Corporation)	Dedicated carrying case
			

※1 Power supply for CE40 operation check

Medium Pressure to High Pressure Ranges

Model number configuration 1

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

Model

C E 4 0	—	M		4	—		W	1					×	×	×	×	
Pressure Switch		①	②	③		④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
Model number						Product specifications					Additional specifications (Optional)						

① Model

M	Integral connector type M12×1 (4P)

② Connection / Max. Operating Pressure

7	R1/4	50MPa
B	G1/4A	10MPa
C	G3/8A	50MPa

③ Wetted parts

4	Diaphragm: SUS630 (17-4PH) Fitting: SUS304, Rigid NBR (Depending upon connection size)

Please specify pressure range and unit of measure along with corresponding ordering code.

④ Pressure Ranges

5	-0.1 to 0.5MPa	K	0 to 3.5MPa
6	-0.1 to 1.0MPa	L	0 to 5MPa
7	-0.1 to 2.0MPa	N	0 to 10MPa
E	0 to 0.5MPa	Q	0 to 20MPa
G	0 to 1MPa	R	0 to 35MPa
J	0 to 2MPa	S	0 to 50MPa

⑤ Power Supply

W	9 to 36V DC

⑥ Accuracy

1	Setting Accuracy: ±(0.5%F.S.+1 count) Repeatability: ±0.2%F.S.

⑦ Comparator Output*

J	NPN Open collector
K	PNP Open collector

⑧ Setting Value*

0	Not required
1	Setting Value

⑨ Surge Protection (Throttle)

8	Not required
F	S45C
G	SUSXM7

⑩ Treatment

0	Not required
1	Use no oil
2	Use no water
3	Use no oil & water

⑮ Documents

0	Not required
1	Required (Documents available upon request) Datasheet (Drawing / Specifications) Instruction manual Inspection procedure Mill test report Calibration test report (One-part one sheet) Inspection / Traceability certificate Calibration test report for pressure standard Strength calculation sheet Attending inspection

※Accessory: Protection Cap (IR detector/indicator)
※Option (Sold Separately): M12 mating connector cable

Types of M12 mating connector cable		
PUR Cable (Oil proof)	Straight	Cable length 2m
	L type	
PVC Cable (Stainless steel nut)	Straight	Cable length 2m
	L type	
PUR Cable (Oil proof)	Straight	Cable length 5m
	L type	
PVC Cable (Stainless steel nut)	Straight	Cable length 5m
	L type	

*Factory Default Setting (User selectable with ER40)

※Specify preferable comparator settings at the time of order over factory default setting (if any).
Refer to "Comparator Setting Table" for default settings reference.
※Consult us for diaphragm seal type (direct connection)

Treatment against wetted parts

■Use no oil
Oil used in manufacturing the gauges had been flushed out & no oil residue remained inside its wetted parts.

■Use no water
Water used in manufacturing the gauges had been flushed out & no water residue remained inside its wetted parts.

■Use no oil & water
Oil/Water used in manufacturing the gauges had been flushed out & no oil/water residue remained inside its wetted parts.

*Specify code "X" to refer N/A

Low Pressure・Absolute Pressure Ranges

Model number configuration 2

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

Model

C E 4 0	—	M		8	—		W	1			×		×	×	×	×	
Pressure Switch		①	②	③		④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
Model number						Product specifications					Additional specifications (Optional)						

① Model

M	Integral connector type M12×1 (4P)

② Connection

7	R1/4
W	G1/2A (Flush diaphragm type)

③ Wetted parts

8	Diaphragm: SUS316L Fitting: SUS316L (Flush diaphragm type may be exposed to process media depending upon process environment.)

Please specify pressure range and unit of measure along with corresponding ordering code.

④ Pressure Ranges

4	-20 to 20kPa	X	0 to 35kPa
8	-50 to 50kPa	W	0 to 50kPa
P	-100 to 0kPa	A	0 to 100kPa
1	-100 to 100kPa	B	0 to 200kPa
2	-100 to 200kPa	C	0 to 300kPa
3	-100 to 300kPa	Z	0 to 120kPa abs.

⑤ Power Supply

W	9 to 36V DC

⑥ Accuracy

1	Setting Accuracy: ±(0.5%F.S.+1 count) Repeatability: ±0.2%F.S.

⑦ Comparator Output*

J	NPN Open collector
K	PNP Open collector

⑧ Setting Value*

0	Not required
1	Setting Value

⑩ Treatment

0	Not required
1	Use no oil
2	Use no water
3	Use no oil & water

⑮ Documents

0	Not required
1	Required (Documents available upon request) Datasheet (Drawing / Specifications) Instruction manual Inspection procedure Mill test report Calibration test report (One-part one sheet) Inspection / Traceability certificate Calibration test report for pressure standard Strength calculation sheet Attending inspection

※Accessory: Protection Cap (IR detector/indicator)
※Option (Sold Separately): M12 mating connector cable

Types of M12 mating connector cable		
PUR Cable (Oil proof)	Straight	Cable length 2m
	L type	
PVC Cable (Stainless steel nut)	Straight	Cable length 2m
	L type	
PUR Cable (Oil proof)	Straight	Cable length 5m
	L type	
PVC Cable (Stainless steel nut)	Straight	Cable length 5m
	L type	

*Factory Default Setting (User selectable with ER40)

※Specify preferable comparator settings at the time of order over factory default setting (if any).
Refer to "Comparator Setting Table" for default settings reference.

Treatment against wetted parts

■**Use no oil**
Oil used in manufacturing the gauges had been flushed out & no oil residue remained inside its wetted parts.

■**Use no water**
Water used in manufacturing the gauges had been flushed out & no water residue remained inside its wetted parts.

■**Use no oil & water**
Oil/Water used in manufacturing the gauges had been flushed out & no oil/water residue remained inside its wetted parts.

*Specify code "X" to refer N/A

IR COMMUNICATOR (Indicator・Setting Unit)

Model number configuration 3

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

Model															
E R 4 0	—	0	0	1	—	×	×	×	×			×	×	×	×	×	
IR COMMUNICATOR (Indicator・Setting Unit)		①	②	③		④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
Model number		Product specifications				Additional specifications (Optional)											

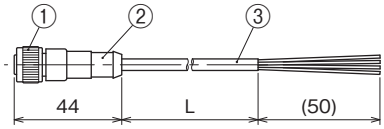
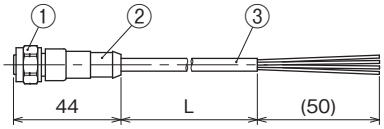
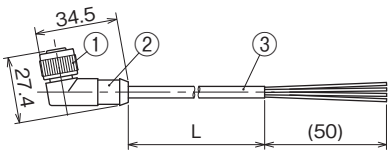
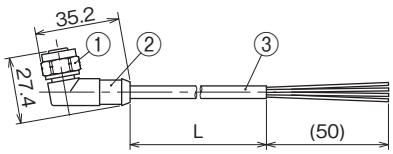
Product specifications		Additional specifications (Optional)	
⑧ Protective Case	0	Not required	
	1	Anti-shock silicone case	
⑨ IR Extension Cable	0	Not required	
	1	IR Extension Cable (2m)	
⑮ Documents*	0	Not required	
	1	Required (Documents available upon request) Datasheet (Drawing / Specifications) Instruction manual	

※Option (Sold Separately)
- Portable power supply: E39-VA made by Omron Corporation
- USB cable: USB 2.0 micro-B (Male) - USB type A (1m)
- Dedicated carrying case

＊As for ER40 IR communicator, calibration test report and traceability certificate can't be generated with combination with CE40

※Specify code "X" to refer N/A

M12 mating connector cable (Optional)

	PUR Cable (Oil proof)	PVC Cable (Stainless steel nut)
Straight		
L type		
Material	① Zinc alloy die casting (Nickel plating) ② TPU (Green) ③ PUR	① Stainless steel ② TPU (Black) ③ PVC
Cable length (L)	2m, 5m	2m, 5m
Conductor cross-sectional area	0.34mm² (22AWG)	0.34mm² (22AWG)
Insulator outside diameter	1.27mm	1.52mm
Sheath outside diameter	4.7mm	5.2mm