AR INDAP51/INDAP52 CE

For your safety, please read the following before using.
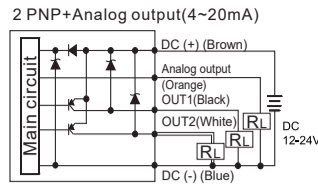
① Do not use corrosive or flammable gas or liquid with this product.
② Please use within the rating pressure range. Do not apply pressure beyond recommended maximum withstand pressure, permanent damage to the pressure sensor may occur.
③ Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
④ Turn power off before connecting wiring. Wrong wiring or short circuit will damage and / or cause malfunction.
⑤ Do not use in environment containing steam or oil vapor.
⑥ This product is not explosion-proof rated. Do not use in atmosphere containing flammable & explosive gases.
⑦ Wiring for pressure sensor should avoid power source line and high voltage line. If use in the same circuit, noise may cause malfunction.

A. SPECIFICATIONS

TYPE		INDAP51PNPCON (Vacuum Pressure)	INDAP52PNPCON (Positive Pressure)
Rated pressure range		0.0 ~ -101.3 kPa	0.000 ~ 1.000 MPa
Set pressure range		10.0 ~ -101.3 kPa	-0.100 ~ 1.000 MPa
Withstand pressure		300 kPa	1.5 MPa
Fluid		Filtered air, Non-corrosive / Non-flammable gas	
Set pressure resolution	kPa	0.1	—
	MPa	—	0.001
	kgf/cm²	0.001	0.01
	bar	0.001	0.01
	psi	0.01	0.1
	inHg	0.1	—
	mmHg	1	—
Power supply voltage		12 ~ 24V DC ±10%, Ripple (P-P) ≤ 10%	
Current consumption		≤ 40mA (With no load)	
Switch output		2 PNP: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 24V DC Residual voltage: ≤ 1.5V	
Repeatability		±0.2% F.S. ±1 digit	
Hysteresis	One point set mode	Adjustable (*1)	
	Hysteresis mode		
	Window comparator mode		
Response time		≤ 2.5ms (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selectable)	
Output short circuit protection		Yes	
Display		3 ½ digital, 7 segment LCD display (Red / Green / Orange) (Sampling rate : 5 times / sec.)	
Indicator accuracy		±2% F.S. ±1 digit (ambient temperature: 25 ±3°C)	
Switch on indicator		Orange Indicator 1 : OUT1 & Orange Indicator 2 : OUT2	
Analog output (Current Output)		Output Current: 4 ~ 20mA ±2.5% F.S.(within rated pressure range) Linearity: ±1% F.S. Max.Load impedance: 300Ω at power supply of 12V 600Ω at power supply of 24V Min.Load impedance: 50Ω	
Environment	Enclosure	IP40	
	Ambient temp. range	Operation: 0 ~ 50°C, Storage:-10 ~ 60°C (No condensation or freezing)	
	Ambient humidity range	Operation/Storage: 35 ~ 85% RH (No condensation)	
	Withstand voltage	1000V AC in 1-min (between case and lead wire)	
	Insulation resistance	50MΩ (at 500V DC, between case and lead wire)	
	Vibration	Total amplitude 1.5mm or 10G,10Hz-55Hz-10Hz scan for 1 minute, 2 hours each direction of X, Y and Z	
	Shock	100m/s²(10G), 3 times each in direction of X, Y and Z	
Temperature characteristic		±2.5% F.S. of detected pressure (25°C) at temp. (Range of 0~50°C)	
Port size		G1/8"(BSPP), M5	
Lead wire		Ø4 Oil-resistance cable (PVC) - 26 AWG (0.15 mm²) - 5 cores	
Weight		Approx. 80g (with 2 meter lead wire)	

*1. Hysteresis value is adjustable within 1 ~ 8 digits for one point set mode and window comparator mode.

B. OUTPUT CIRCUIT WIRING DIAGRAMS

2 PNP+Analog output(4~20mA)

DC (+) (Brown)
Analog output OUT1(Black) (Orange)
OUT2(White)
DC 12~24V
DC (-) (Blue)

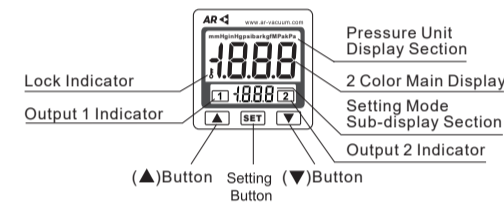## C. ORDERING INFORMATION

I N D A P 5 [1] P N P C O N

Pressure Range
1 : Vacuum pressure (10.0~-101.3kPa)
2 : Positive pressure (-0.100~1.000MPa)

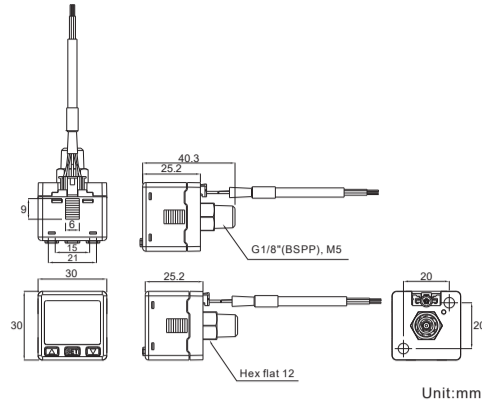**Output Specifications**
PNP : 2 PNP+Analog (Current) output (4~20mA)

Pressure Port
G1/8"(BSPP), M5

Optional Parts
BT-12 : Mounting bracket
BT-13 : Mounting bracket
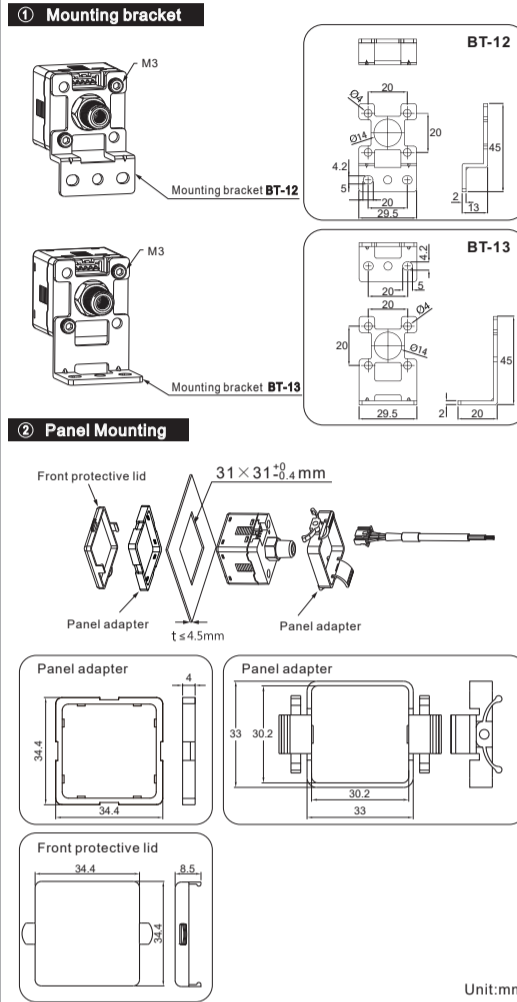PA-C : Panel adapter
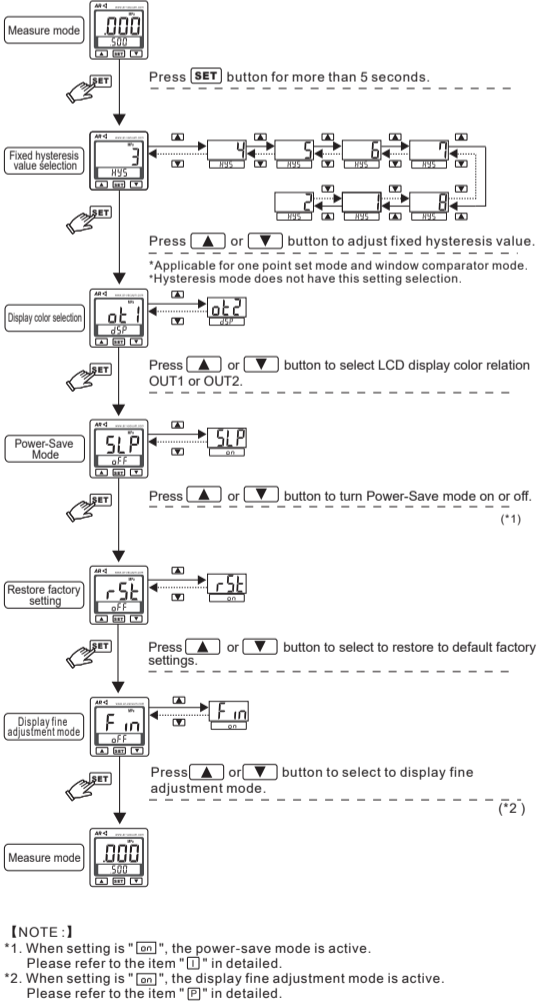PA-D : Panel adapter + Front protective lid

D. PANEL DESCRIPTION

Lock Indicator
Output 1 Indicator
(▲)Button
Setting Button
(▼)Button
Pressure Unit Display Section
2 Color Main Display
Setting Mode Sub-display Section
Output 2 Indicator

E. DIMENSIONS

G1/8"(BSPP), M5
Hex flat 12

Unit:mm

F. OPTIONAL PARTS DIMENSIONS

① Mounting bracket

Mounting bracket **BT-12**
Mounting bracket **BT-13**
BT-12
BT-13

② Panel Mounting

31×31 $^{+0}_{-0.4}$ mm

Front protective lid
Panel adapter
Panel adapter
t ≤ 4.5mm

Panel adapter
Panel adapter

Front protective lid

Unit:mm

G. INITIAL SETTING MODE

Measure mode
Press **SET** button for more than 3 seconds.

OUT1 Operating mode setting
oPS : One point set mode / HYS : Hysteresis mode / Uin : Window comparator mode
Use the ▲ or ▼ button to set OUT1 operating mode.

OUT1 type setting
no : NO mode / nL : NC mode
Use the ▲ or ▼ button to set OUT1 type.

OUT2 Operating mode setting
oFF : oFF mode / oPS : One point set mode / HYS : Hysteresis mode / Uin : Window comparator mode
Use the ▲ or ▼ button to set OUT2 operating mode.

OUT2 type setting
no : NO mode / nL : NC mode
Use the ▲ or ▼ button to set OUT2 type. (*1)

Response time setting
2.5ms / 25ms / 100ms / 250ms / 500ms / 1500ms / 1000ms
Use the ▲ or ▼ button to select response time.

Display color setting
Sor : ON:Green OFF:Red / Grn : ON:Red OFF:Green / rEd : ON: Green / LoL : ON: OFF: Red
Use the ▲ or ▼ button to set display color.

Unit setting
PA (kPa/MPa) / GF (kgf/cm²) / bAr (bar) / PS (psi) / inH (inHg) / nnH (mmHg) (*2) (*3) (*3)
Use the ▲ or ▼ button to set desired pressure unit.

Measure mode

【 NOTE : 】
*1. This setting mode will not display when output 2 is set to oFF.
*2. Pressure unit is MPa with positive pressure.
   Pressure unit is kPa with vacuum pressure.
*3. Only applicable for Vacuum.

H. ADVANCE SETTING MODE

Measure mode
Press **SET** button for more than 5 seconds.

Fixed hysteresis value selection
Press ▲ or ▼ button to adjust fixed hysteresis value.
*Applicable for one point set mode and window comparator mode.
*Hysteresis mode does not have this setting selection.

Display color selection
Press ▲ or ▼ button to select LCD display color relation OUT1 or OUT2.

Power-Save Mode
Press ▲ or ▼ button to turn Power-Save mode on or off. (*1)

Restore factory setting
Press ▲ or ▼ button to select to restore to default factory settings.

Display fine adjustment mode
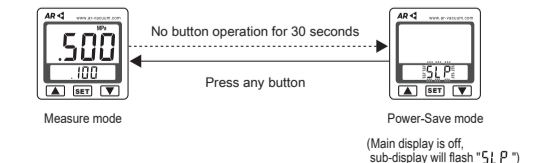Press ▲ or ▼ button to select to display fine adjustment mode. (*2)

Measure mode

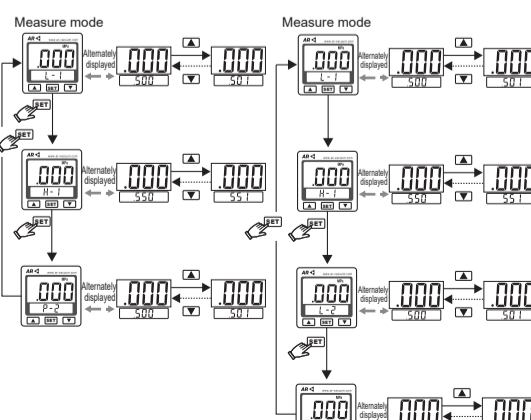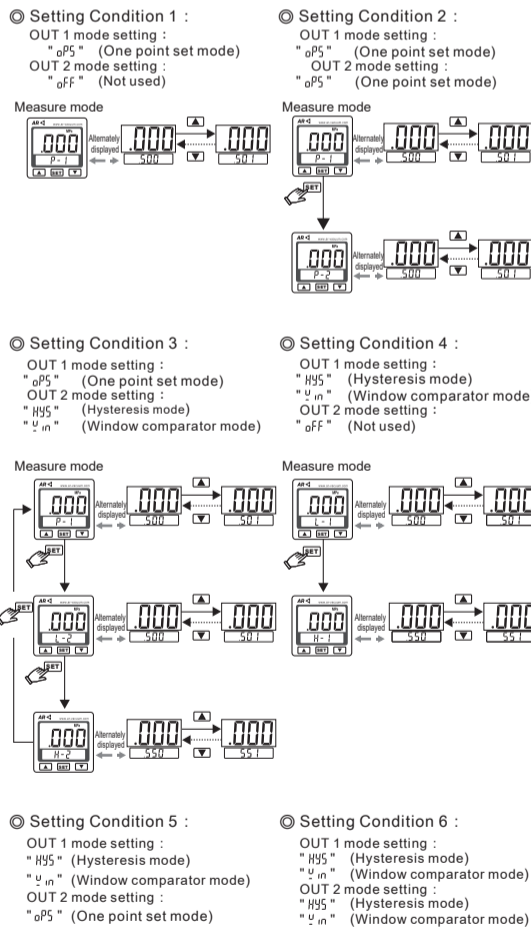【NOTE：】
*1. When setting is "on", the power-save mode is active.
   Please refer to the item "I" in detailed.
*2. When setting is "on", the display fine adjustment mode is active.
   Please refer to the item "P" in detailed.

I. POWER-SAVE MODE

◎ During Power-Save mode, the main display will turned off if no buttons is pressed after 30 seconds.
◎ During Power-Save mode, the output LCD may not be synchronize with the output. It is normal and will not affect output operation.
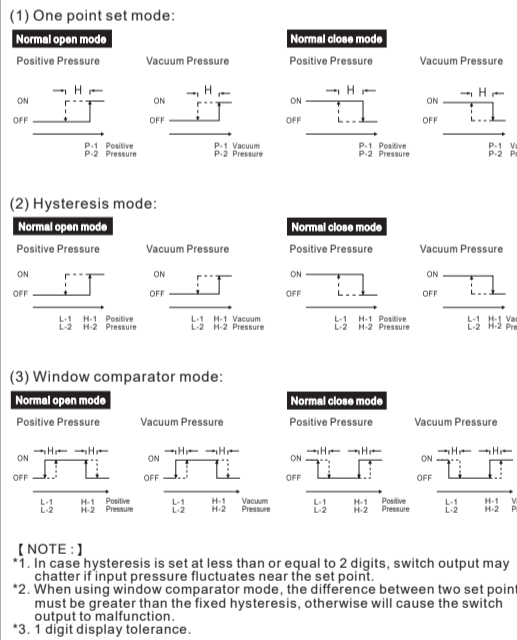◎ Press any button to turn-on main display temporarily.

Measure mode
No button operation for 30 seconds
Press any button
Power-Save mode
(Main display is off, sub-display will flash "SLP")

J. PRESSURE SETTING MODE

◎ Setting Condition 1 :
OUT 1 mode setting :
" oPS " (One point set mode)
OUT 2 mode setting :
" oFF " (Not used)

◎ Setting Condition 2 :
OUT 1 mode setting :
" oPS " (One point set mode)
OUT 2 mode setting :
" oPS " (One point set mode)

◎ Setting Condition 3 :
OUT 1 mode setting :
" oPS " (One point set mode)
OUT 2 mode setting :
" HYS " (Hysteresis mode)
" Uin " (Window comparator mode)

◎ Setting Condition 4 :
OUT 1 mode setting :
" HYS " (Hysteresis mode)
" Uin " (Window comparator mode)
OUT 2 mode setting :
" oFF " (Not used)

◎ Setting Condition 5 :
OUT 1 mode setting :
" HYS " (Hysteresis mode)
" Uin " (Window comparator mode)
OUT 2 mode setting :
" oPS " (One point set mode)

◎ Setting Condition 6 :
OUT 1 mode setting :
" HYS " (Hysteresis mode)
" Uin " (Window comparator mode)
OUT 2 mode setting :
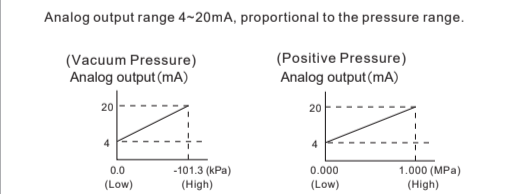" HYS " (Hysteresis mode)
" Uin " (Window comparator mode)

【NOTE：】
Do not disconnect power when the sub-display and setting value is flashing alternately; otherwise the system cannot store the values.
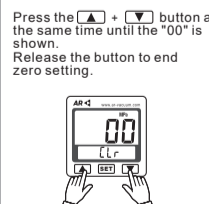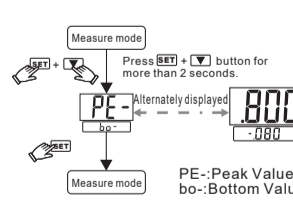
K. OUTPUT TYPE

(1) One point set mode:
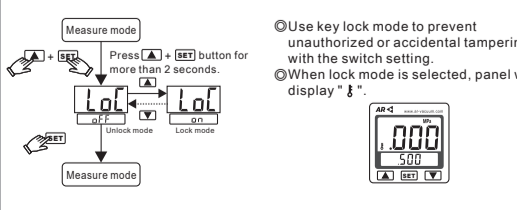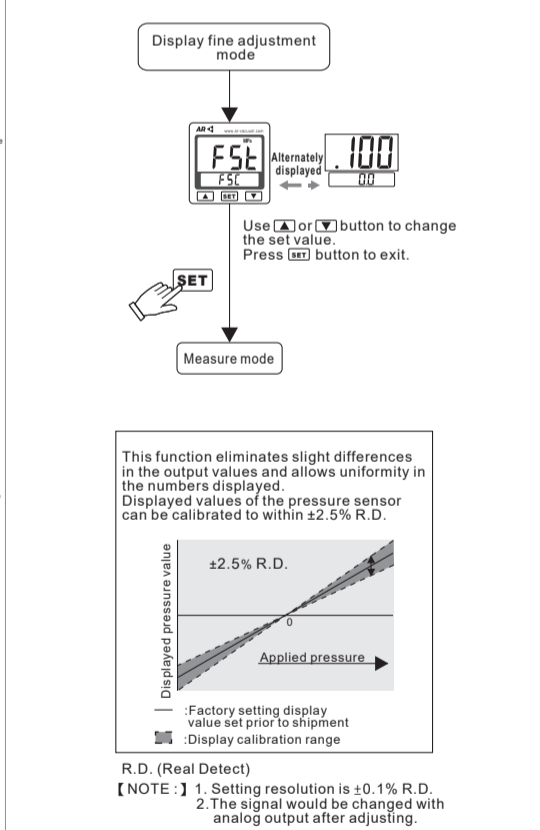
Normal open mode / Normal close mode
Positive Pressure / Vacuum Pressure

(2) Hysteresis mode:

Normal open mode / Normal close mode
Positive Pressure / Vacuum Pressure

(3) Window comparator mode:

Normal open mode / Normal close mode
Positive Pressure / Vacuum Pressure

【 NOTE : 】
*1. In case hysteresis is set at less than or equal to 2 digits, switch output may chatter if input pressure fluctuates near the set point.
*2. When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.
*3. 1 digit display tolerance.

L. ANALOG OUTPUT DESCRIPTION

Analog output range 4~20mA, proportional to the pressure range.

(Vacuum Pressure) Analog output (mA)
0.0 (Low) -101.3 (kPa) (High)

(Positive Pressure) Analog output (mA)
0.000 (Low) 1.000 (MPa) (High)

M. ZERO POINT SETTING

Press the ▲ + ▼ button at the same time until the "00" is shown.
Release the button to end zero setting.

N. PEAK/BOTTOM HOLD FUNCTION

Measure mode
Press **SET** + ▼ button for more than 2 seconds.
PE-:Peak Value
bo-:Bottom Value

O. KEY LOCK/UNLOCK MODE

Press ▲ + **SET** button for more than 2 seconds.
Unlock mode / Lock mode

◎Use key lock mode to prevent unauthorized or accidental tampering with the switch setting.
◎When lock mode is selected, panel will display " ▌ ".

Measure mode

P. FINE ADJUSTMENT MODE

Display fine adjustment mode
Use ▲ or ▼ button to change the set value.
Press ▌ button to exit.
SET
Measure mode

This function eliminates slight differences in the output values and allows uniformity in the numbers displayed.
Displayed values of the pressure sensor can be calibrated to within ±2.5% R.D.

±2.5% R.D.
Displayed pressure value
Applied pressure

— :Factory setting display value set prior to shipment
 :Display calibration range

R.D. (Real Detect)
【 NOTE : 】 1. Setting resolution is ±0.1% R.D.
2.The signal would be changed with analog output after adjusting.

Q. ERROR CODE INSTRUCTION

Error Type	Error code	Error Condition	Troubleshooting
Excess load current error	out1	Output 1 load current is more than 125 mA	Turn power off and check the cause of overload current or lower the current load under 125 mA, then restart.
	out2	Output 2 load current is more than 125 mA	
Residual pressure error		During zero setting, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
Applied pressure error	HHH	Supply pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	LLL	Supply pressure exceeds the lower limit of pressure setting.	
System error	Er4	Internal system error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
	Er5	Internal system error	
	Er6	Internal data error	
	Er7	Internal data error	

R. PRESSURE UNIT CONVERSION TABLE

To From	Pa	kPa	MPa	kgf/cm²	mmHg	psi	bar	inHg
1 Pa	1	0.001	0.000001	0.0000101971	0.00750062	0.000145038	0.00001	0.0002953
1 kPa	1000.000	1	0.001000	0.010197	7.500616	0.145038	0.010000	0.2953
1 MPa	1000000.0	1000.0	1	10.197	7500.616	145.038	10	295.2998
1 kgf/cm²	98066.5	98.0665	0.0980665	1	735.559	14.2233	0.980665	28.95979
1 mmHg	133.32	0.13332	0.000133	0.0013596	1	0.019336	0.0013332	0.039370
1 psi	6895	6.895	0.006895	0.070307	51.7157	1	0.06895	2.036074
1 bar	100000.0	100.000	0.100000	1.01972	750.062	14.5038	1	29.52998
1 inHg	3386.388	3.386388	0.003386	0.034530	25.40000	0.491141	0.033861	1

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PAP