

For your safety, please read the following before using.

- Do not use corrosive or flammable gas or liquid with this product.
- Please use within the rating pressure range. Do not apply pressure beyond recommended maximum withstand pressure. Permanent damage to the pressure sensor may occur.
- Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
- Turn power off before connecting wiring. Wrong wiring or short circuit will damage and / or cause malfunction.
- Do not use in environment containing steam or oil vapor.
- This product is not explosion-proof rated. Do not use in atmosphere containing flammable or explosive gases.
- Wiring for pressure sensor should avoid power source line and high voltage line. If use in the same circuit, noise may cause malfunction.
- With IO link function, the maximum extension for each individual connection is 20M between sensor and master.
- While switching ON, please start detection after 200ms.
- Sensors at end-of-life must be disposed of in accordance with E-Waste regulations of the country/region, NOT disposed of with regular garbage.

A. SPECIFICATIONS

MODEL	INDAP51IOCON (Vacuum Pressure)
Rated Pressure Range	0.0 ~ -100.0kPa
Set Pressure Range	10.5 ~ -105.0kPa
Withstand Pressure	500kPa
Fluid	Filtered air, Non-corrosive / Non-flammable gas
	kPa 0.1
	kgf/cm ² 0.001
Set Pressure Resolution	bar 0.001
	psi 0.01
	inHg 0.1
	mmHg 1
Power Supply Voltage	24V DC, Ripple (P-P) ≤10%
Current Consumption	≤ 35mA (no load)
Output Short Circuit Protection	Yes
Switch Output	NPN : open collector outputs Max. Load Current : 150 mA Max. Supply Voltage : 30 V DC Residual Voltage : ≤ 1 V (Load current 150 mA) PNP : open collector outputs Max. Load Current : 150 mA Max. Supply Voltage : 24 V DC Residual Voltage : ≤ 1 V (Load current 150 mA)
Repeatability	±0.2% F.S ±1 digit
Hysteresis	SinglePointMode Window ComparatorMode
Adjustable	
Display	Main Display:4 digital, 7 segment LCD display (Red/Green) Sub Display :4 digital, 1st digit 11 segment, 7 segment for other (Orange)
Indicator Accuracy	±2% F.S. ±1 digit (Ambient temperature:25±3°C)
Switch on Indicator	Red Indicator 1, 2 : OUT1 or OUT2 Green Indicator 1, 2 : OUT1 or OUT2
Analog Output (Voltage Output)	Output Voltage : 1~5V or 0~10V ±2.5% F.S (within rated pressure range) Linearity : ±1.5% F.S. Output Impedance : about 1kΩ
Analog Output (Current Output)	Output Current : 4~20mA ±2.5% F.S (within rated pressure range) Linearity : ±1.5% F.S. Max. Load Impedance : 500Ω
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 500 V 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/s ² (10G), 3 times each in direction of X, Y and Z
Temperature Characteristic	±2% F.S of detected pressure (25°C) at temp. (Range of 0~50°C)
Port Size	F1:R1/8", M5:F2:NPT1/8", #10-32 UNF;F3:G1/8"(BSP), M5
Lead Wire	Ø4 Oil-resistance cable (PVC) -26 AWG (0.15 mm ²) - 5 cores
Weight	Approx. 80g (with 2 meter lead wire)

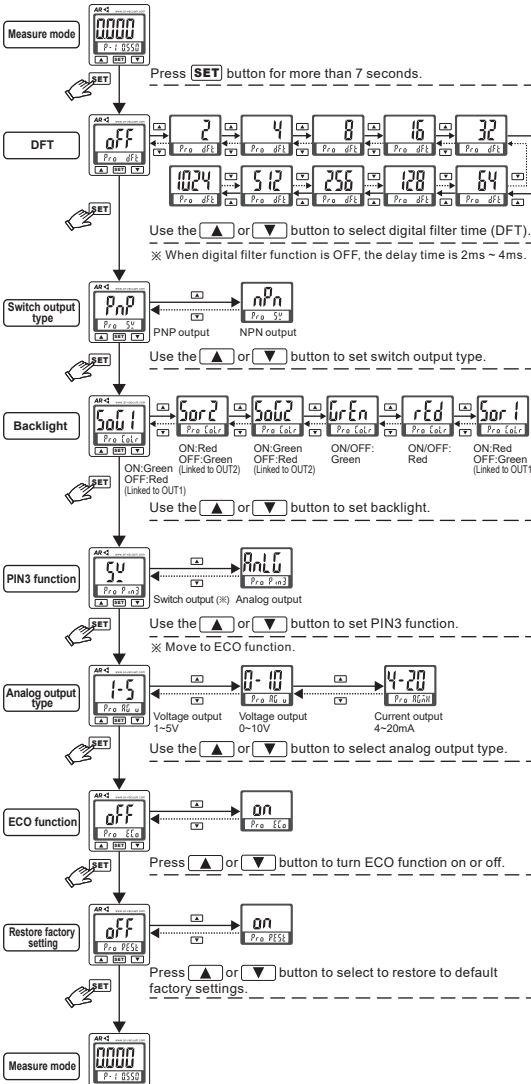
•IO-Link Specifications

Type	Device
Version	V1.1
Communication Speed	COM2 (38.4kbps)
Configuration File	IODD file ※1
Min. Cycle Time	3ms
Process Data Length	Input Data:2 byte (2 bit BCD;14 bit PDV) , Output Data:0 byte
On Request Data Communication	Available
Data Storage Function	Available
Event Function	Available
Vendor ID	1254 (0x04E6)
Device ID	INDAP51IOCON : 100 (0x0000AA)

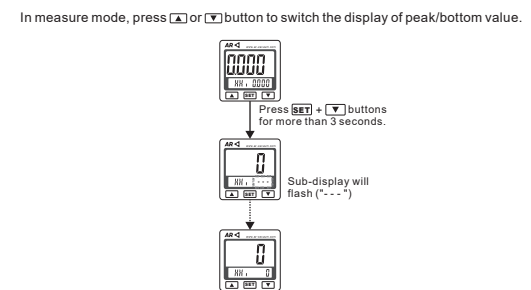
NOTE

※1: The configuration file (IODD file) can be downloaded from the AR website. (www.ar-vacuum.com)

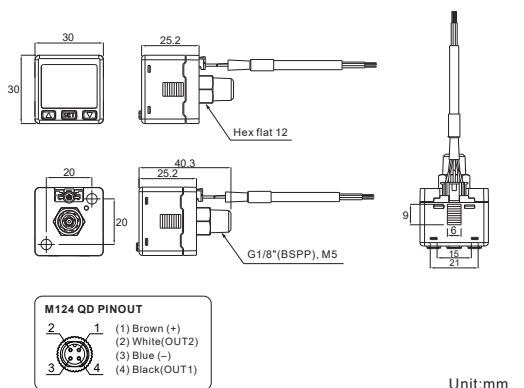
M. ADVANCE SETTING MODE



N. CLEAR PEAK/BOTTOM VALUE FUNCTION

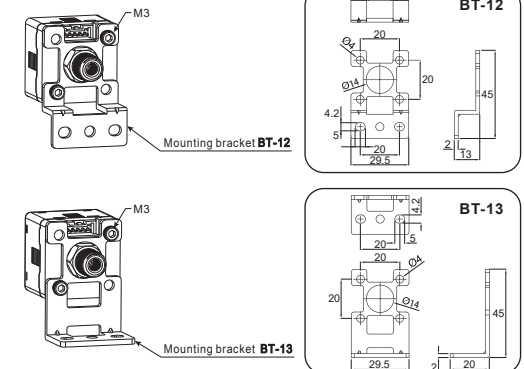


B. DIMENSIONS

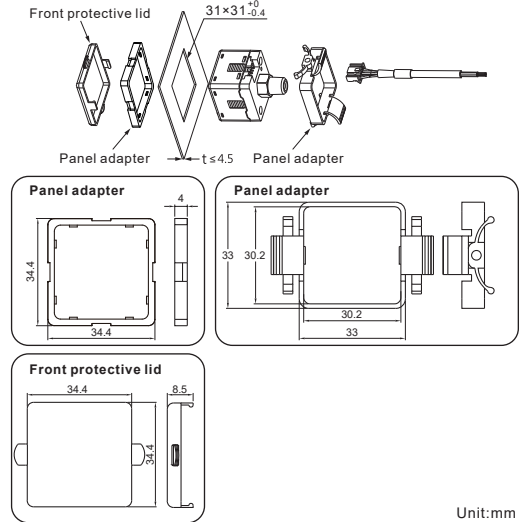


C. OPTIONAL PARTS DIMENSIONS

① Mounting bracket

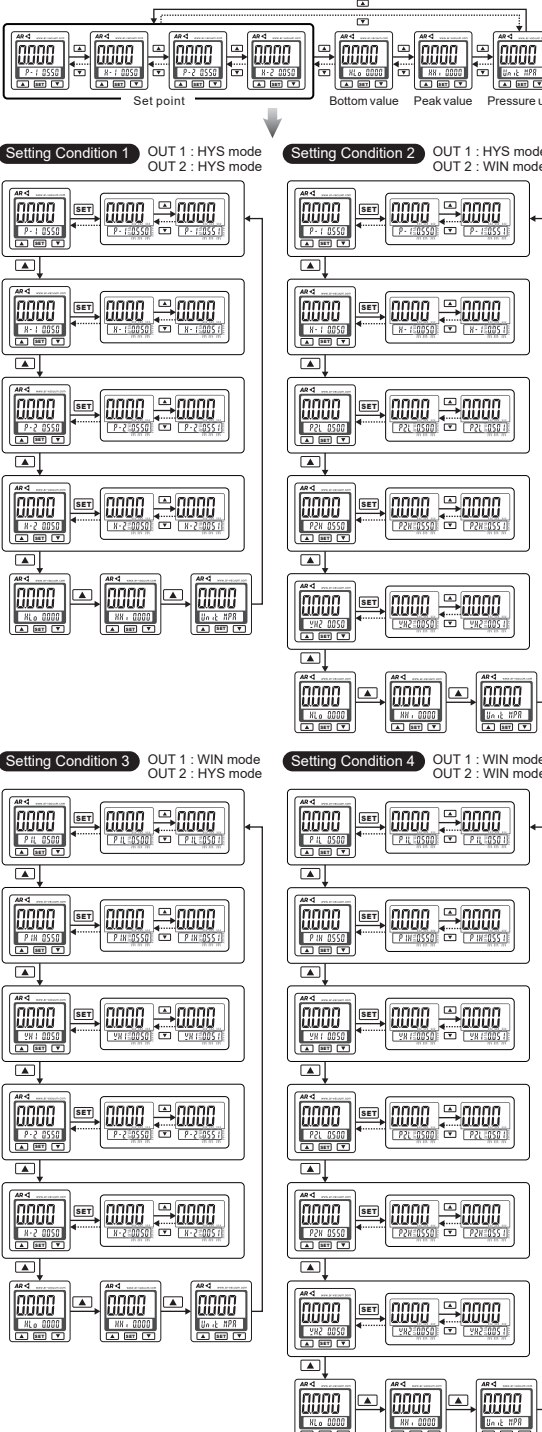


② Panel Mounting

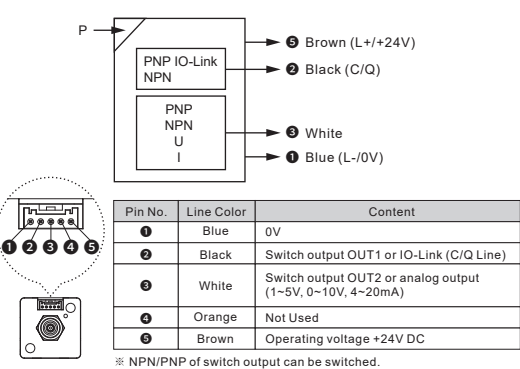


O. SUB-DISPLAY DISPLAY SETTING

In measure mode, press **▲** or **▼** button to switch set point, unit or peak / bottom value.



D. OUTPUT CIRCUIT WIRING DIAGRAMS



E. ORDERING INFORMATION

INDAP51IOCON

Pressure Range

1 : Vacuum pressure (10.5 ~ -105.0kPa)

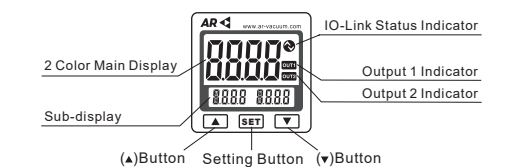
Pressure Port

G1/8"(BSP), M5

Optional Parts

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

F. PANEL DESCRIPTION

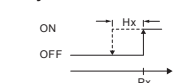


G. IO-LINK STATUS INDICATOR DESCRIPTION

Indicator Light	Display	Status
	Off	SIO Mode
	Flashing	When communication starts up / Offline
	On	IO-Link Mode

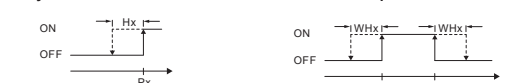
H. SWITCH MODE

• Hysteresis Mode



※ When Hx is zero, the sensor can work at any value within setting pressure range.

• Window Comparator Mode



P. PROCESS DATA

• Process Data Input

Bit Offset	Item	Note
0	OUT1 output	OFF = 0 ; ON = 1
1	OUT2 output	OFF = 0 ; ON = 1
2~15	Measurment value	Unsigned 14 bit ※1

NOTE

※1: Refer to the table (Unit specification and measurement value(PDV))

• PDI Data Structure

Bit Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Item	Measurment value (PDV)															OUT2	OUT1

• Unit Specification and Measurement Value (PDV)

Series	Unit	Set Pressure Range	Gradient	Intercept	DisplayDot
INDAP51IOCON	kPa	10.5 ~ -105.0	-0.007049990844	10.5	1
	kgf/cm ²	0.107 ~ -1.071	-0.000071903803	0.107	3
	bar	0.105 ~ -1.050	-0.000070499908	0.105	3
	psi	1.52 ~ -15.23	-0.00102240127	1.52	2
	inchHg	3.1 ~ -31.0	-0.002081425868	3.1	1
	mmHg	78 ~ -788	-0.052859671611	78	0

Conversion formula of the process data and pressure measurement value.
Pressure measurement value = Gradient × PDV + Intercept
Pressure set value = Gradient × PDV + Intercept

Q. IO-LINK PARAMETER SETTING

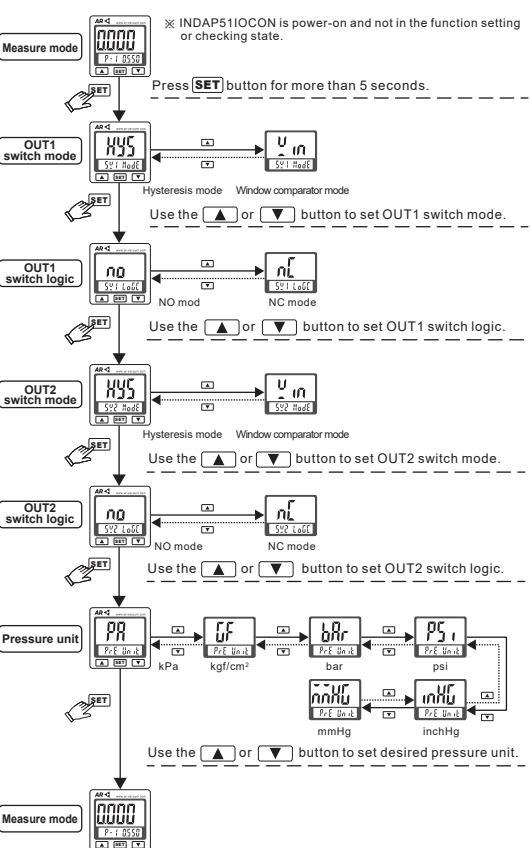
• Direct Parameters Page 1

Address	Access	Parameter Name	Initial Value (dec)	Contents
0x07	R	Vendor ID	0x04E6 (1254)	AR Vacuum Technology
0x08	R	Device ID	0x0000AA (100)	INDAP51IOCON

• ISDU Parameters

Index (dec)	Subindex	Access	Parameters	Initial Value	Remarks
0x0002 (2)	0	W	System command		Refer to the table 1
0x000C (12)	0	R/W	Device access lock	0x0000	Refer to the table 2
0x0010 (16)	0	R	Vendor name	AR Vacuum Technology	
0x0011 (17)	0	R	Vendor text	http://www.ar-vacuum.com	
0x0012 (18)	0	R	Product name	INDAP51IOCON	
0x0013 (19)	0	R	Product ID	INDAP51IOCON	
0x0014 (20)	0	R	Product text	Pressure sensor	
0x0015 (21)	0	R	Serial number	xxxxxxxxxxxxxx	
0x0016 (22)	0	R	Hardware version	Vx.y	
0x0017 (23)	0	R	Software version	Vx.y	
0x0018 (24)	0	R/W	Application specific tag	xxx	
0x0019 (25)	0	R/W	Function tag	xxx	
0x001A (26)	0	R/W	Location tag	xxx	
0x0024 (36)	0	R	Device status parameter		Refer to the table 3
0x0025 (37)	0	R	Device detailed state parameter		Refer to the table 4
0x0028 (40)	0	R	Process data input		The latest value of process data can be read.

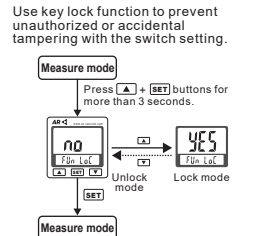
I. INITIAL SETTING MODE



J. ZERO CLEAR

Press the **▲** + **▼** buttons at the same time until the "----" is shown.
Release the buttons to end zero clear.

K. KEY LOCK FUNCTION



L. ERROR CODE INSTRUCTION

Error Name	Error Code	Error Condition	Troubleshooting
Excess load current error	Errr1	Output 1 load current is more than 150mA.	Turn power off and check the cause of overload current or lower the current load under 150mA, then restart.
Residual pressure error	Errr2	Output 2 load current is more than 150mA.	
System error	Errr3	During zero reset, ambient pressure is over ± 3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
Internal temperature overrun	Errr4	Device Hardware Fault (EEPROM)	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
Applied pressure error	Errr5	IO-Link Fault-Device	Turn power off, remove load and restart, if sensor is still not in normal state, please return it to factory for analysis.
	XXXX	Supply pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	LLLL	Supply pressure exceeds the lower limit of pressure setting.	

• Table 1

Value (dec)	Function Definition	Description
0x80 (128)	Device reset	Restarts the device
0x81 (129)	Application reset	Clear peak/bottom value
0x82 (130)	Restore factory settings	Restores factory default values
0x83 (131)	Back-to-box	The parameter of the device are set to factory default values and communication will be inhibited until the next power cycle.
0xA0 (160)	Zero clear	Executes zero clear

• Table 2

Value (dec)	Contents
0x0000 (0)	Key unlock (initial value)
0x0008 (8)	Key lock

• Table 3

Value (dec)	State Definition
0x00 (0)	Normal operation
0x01 (1)	Maintenance inspection required
0x02 (2)	Out of specification
0x03 (3)	Function check
0x04 (4)	Failure

• Table 4

Array	Event Content	Event Classification	Event Code
		Definition Value	
1	Internal Failure	Error 0xF4	0x1801
2	OUT2(PIN3) overload/short circuit	Error 0xF4	0xB0D1
3	Pressure overrun	Warning 0xE4	0x8CA1

• Product Individual Parameters

Index (dec)	Subindex	Access	Parameter	Data Storage	Data Type	Initial value (dec)	Remarks
0x003C (60)	1	R/W	OUT1 set point 1 WIN mode (P1L)	Y	Uint 16	P1L = -50.0	
	2	R/W	OUT1 set point 2 HYS mode (P-1) WIN mode (P1H)	Y	Uint 16	P-1 = P1H = -55.0	
0x003D (61)	1	R/W	OUT1 switch logic	Y	Uint 8	N.O.	0x00 = N.O. 0x01 = N.C.
	2	R/W	OUT1 switch mode	Y	Uint 8	HYS mode	0x01 = HYS mode 0x02 = WIN mode
	3	R/W	OUT1 switch hysteresis HYS mode (H-1) WIN mode (WH1)	Y	Uint 16	H1 = WH1 = -5.0	
0x003E (62)	1	R/W	OUT2 set point 1 WIN mode (P2L)	Y	Uint 16	P2L = -50.0	
	2	R/W	OUT2 set point 2 WIN mode (P2H)	Y	Uint 16	P-2 = P2H = -55.0	
0x003F (63)	1	R/W	OUT2 switch logic	Y	Uint 8	N.O.	0x00 = N.O. 0x01 = HYS mode 0x02 = WIN mode
	2	R/W	OUT2 switch mode	Y	Uint 8	HYS mode	0x01 = HYS mode 0x02 = WIN mode
	3	R/W	OUT2 switch hysteresis HYS mode (H-2) WIN mode (WH2)	Y	Uint 16	H2 = WH2 = -5.0	
0x0118 (280)	0	R/W	Backlight	Y	Uint 16	SOG1	0 : SOG1 1 : SOG2 2 : SOG2 3 : SOG2 4 : GREEN 5 : RED
0x016C (364)	0	R/W	Analog output type	Y	Uint 16	1~5V	0 : 0~10V 1 : 1~5V 2 : 4~20mA
0x017F (383)	0	R/W	Pressure unit	Y	Uint 16	kPa	0 : kPa 1 : kgf/cm ² 2 : bar 3 : psi 4 : inchHg 5 : mmHg
0x0162 (386)	0	R/W	DFT (Digital Filter Time)	Y	Uint 16	OFF	0 : OFF 1 : 2ms 2 : 4ms 3 : 6ms 4 : 16ms 5 : 32ms 6 : 64ms 7 : 128ms 8 : 256ms 9 : 512ms 10 : 1024ms
0x01E2 (482)	0	R/W	PIN3 function	Y	Uint 16	Switch output	0 : Switch output 1 : Analog output
0x01E8 (488)	0	R/W	ECO function	Y	Uint 16	OFF	0 : OFF 1 : ON
0x01EA (490)	0	R/W	Key lock function	Y	Uint 16	Unlock	0 : Unlock 1 : Lock
0x2005 (8197)	0	R	Bottom value	N	Uint 16		
0x2006 (8198)	0	R	Peak value	N	Uint 16		