HUMITRON® HPX1000

Integral & flush type differential pressure, temperature, humidity and dew point temperature transmitter

User Manual

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Cautions

1. This product may cause an electric shock in handling. Please do not attempt to open it with power turned on.
2. This product should be installed in a place fixed secured by a rack or panel.
3. This product can be used under the following environmental condition. ① Indoor ②Pollution Degree 2 ③At an altitude of 2000m or below
4. Power input must be within the designated ranges.
5. To turn on or turn off power supply for this product, please the circuit breaker or switch of a standard product of IEC 60947-1 or IEC 60947-3 product and install it within a close distance allowing convenient operation by user.
6. Please be understood that if this product is dismantled or modified discretionary, after sales service will not be able to be provided.
7. An output wire to be used for this product should be inflammable grade FV1 (V-1 grade or above), the thickness of the wire should be AWG No. 20 or above(0.50mm2).
8. In order to prevent it from an inductive noise, please maintain the high-voltage wire and power wire separated.
9. Please avoid installing the product in a place where a strong magnetism, noise, severe vibration and impact exist.
10. When extending the sensor wire, use a shield wire and do not extend it unnecessary long.
11. The sensor wire and signal wire should be away from the power and load wires using conduits separately installed.
12. Please avoid using the product near a device generating strong high frequency noise (high-frequency welding machine, high-frequency sewing machine, high-frequency radiotelegraph, high capacity SCR controller)
13. Product's damages other than those decribed in the guarantee conditions provided by the manufacturer shall not be respoinsible by us.
14. If this unit is used to control machineries (Medical equipment, vehicle, train, airplane, combustion apparatus, entertainment, processing and transportation equipment, elevator and various safety device etc.) enabling to effect on human or property, it is required to install fail-safe device.

※ The Aforementioned precautions must be observed, and if you fail to do so, it may cause a product's breakdown.
※ The specifications, dimensions, and etc. are subject to change for enhancement without a prior notice.

Clean room / Pharmaceutical industry & Hospitals / various semiconductor equipments / Precision instruments / Indoor

- Integral & flush type transmitter
- Application of high resolution graphic LCD
- Capacitive touch button
- Displays four measured values (Diff. press, temp. humidity and dew point temp.) at once
- Display function of trend data graph
- 2 digital alarm outputs
- 3 analog (4~20m A) outputs
- RS485 Modbus RTU communication
- Front cover made of stainless steel

Range by unit of pressure

Unit	Minimum	Maximum
Pa	-500.0	500.0
kPa	-0.50	0.50
hPa	-5.00	5.00
mmAq	-50.98	50.98
mbar	-5.00	5.00
inchH_2O	-2.00	2.00
mmHg	-3.75	3.75

※ There may be a difference in measurement range in accordance with order specifications.
Parameter value related to pressure will be initialized when changing unit of pressure.

Range by unit of temperature

Unit	Minimum	Maximum
°C	-10.00	60.00
°F	14.00	140.0

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: Specifications

Differential pressure

Pressure range	±25Pa, ±125Pa, ±500Pa
Accuracy	±3% of reading
Zero span	±0.1Pa(±25Pa, ±125Pa) / ±0.2Pa(±500Pa)
Repeatability	0.5% of reading
Reliability	< 0.1Pa/year
Type of fluid	Air, N_2, O_2
Display unit of pressure	Pa, mmHg, InH_2O, mmAq(mmH_2O), hPa, kPa, mbar

Humidity

Measurement range	0 ~ 100%RH
Accuracy *	±1.8%RH (0 ~ 80%RH)
Repeatability	±0.2%RH
Hysterisis	< ±1%RH
Response time	< 4sec
Long term drift	< 0.5%RH /Year

Temperature

Measurement range	-10 ~ 60℃
Accuracy	±0.2℃ (0 ~ 60℃)
Repeatability	±0.1℃
Response time	< 5sec
Long term drift	< 0.05℃/year

Dew point

Measurement range	-40 ~ 60℃
Accuracy **	±4℃ (-10 ~ 20℃)
Repeatability	±0.1℃

* Accuracy at 23 degrees Celsius
** Accuracy at 25 degrees Celsius of dry-bulb temperature

Common Specifications

Power supply	24Vdc ±10%, 24Vac ±10%, 50/60Hz
Current consumption	max. 120mA @24Vdc
Relay output	2-CH, 5A, 250Vac
Current output	3-CH, Opto-isolation
Digital output	RS485, Galvanic-isolation (Modbus RTU protocol)
Material	SUS304 Hairline
Display	High resolution MONO LCD (268 x 128 Pixel) / Capacitive touch button
Operating temperature	Temperature: -10 ~ 60℃, (Non condensation)
Storage temperature	Temperature: -20 ~ 70℃, Humidity: Below 95%RH
Dimensions	95(W)mm X 234(H)mm X 42(D)mm
IP rating	IP65 (Front panel)
Weight	600g

: Ordering guide

HPX1000 -	①	②	③	Description
① Measureable parameters	A			Differential pressure, temperature, humidity and dew point temperature
	D			Differential pressure
	H			Temperature, humidity and dew point temperature
② Differential pressure range		0		Temperature, humidity and dew point temperature
		1		-25 ~ 25 Pa
		2		-125 ~ 125 Pa
		3		-500 ~ 500 Pa
③ Sensor Option			S	Split type for temp. & humidity sensor (Cable length: 1.5M)
			Nil	Built in type for temp. & humidity sensor

※ Silicon Tube **Φ**6.0 * 3.0 2M Exclusive tube (Standard scope of supply)

Accessory (Options)

Model	Description
AX7241	RS485 communication converter (RS485 to USB converter)
Extension nipple	When silicon tubes connection is required to measure diffential pressure on its front side
HTM-1.5M / HPX1000	Separate type Temp. Humidity sensor module (1.5m Cable for HPX1000)

Specifications by Model Order

HPX1000 - A1 : Differential pressure, temperature, humidity and dew point temperature model / Differential pressure range : -25 ~ 25 Pa
HPX1000 - A2 : Differential pressure, temperature, humidity and dew point temperature model / Differential pressure range : -125 ~ 125 Pa
HPX1000 - A3 : Differential pressure, temperature, humidity and dew point temperature model / Differential pressure range : -500 ~ 500 Pa
HPX1000 - D1 : Pressure differential model / Differential pressure range : -25 ~ 25 Pa
HPX1000 - D2 : Pressure differential model / Differential pressure range : -125 ~ 125 Pa
HPX1000 - D3 : Pressure differential model / Differential pressure range : -500 ~ 500 Pa
HPX1000 - H0 : temperature, humidity model

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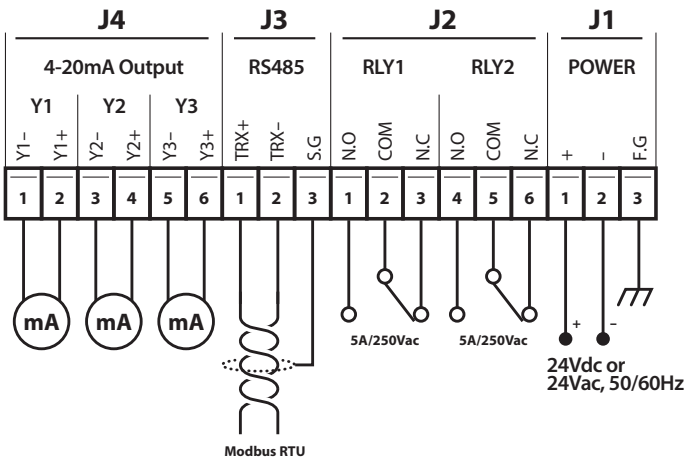
: Installation

☐ Wiring

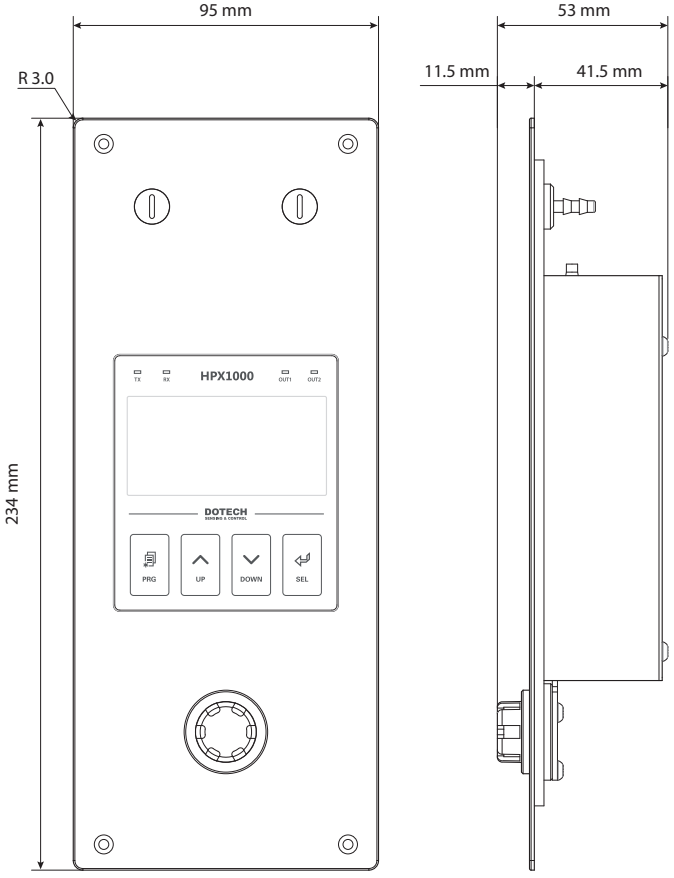


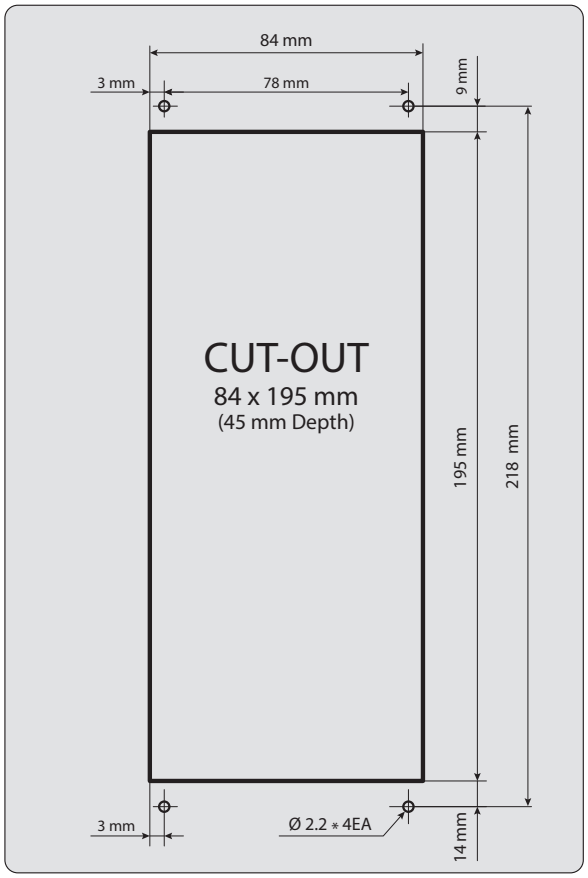
PIN		Definition	Description
J1	1	Power supply	+24Vdc / 24Vac (L)
	2		GND / 24Vac (N)
	3		F.G
J2	1	Relay output 1 (RLY 1)	NO(Normal Open) Contact
	2		Common
	3		NC(Normal Close) Contact
	4	Relay output 2 (RLY 2)	NO(Normal Open) Contact
	5		Common
	6		NC(Normal Close) Contact
J3	1	RS485 communication	TRX +
	2		TRX -
	3		S.G
J4	1	4~20mA output 1 (Y1)	-
	2		+
	3	4~20mA output 2 (Y2)	-
	4		+
	5	4~20mA output 3 (Y3)	-
	6		+

Recommendations for terminal and wire

Terminal: Pen hole(PEN HOLE), 0.75 ~ 1.0
Wire : AWG 18 ~ 28

☐ Dimensions and panel cut out

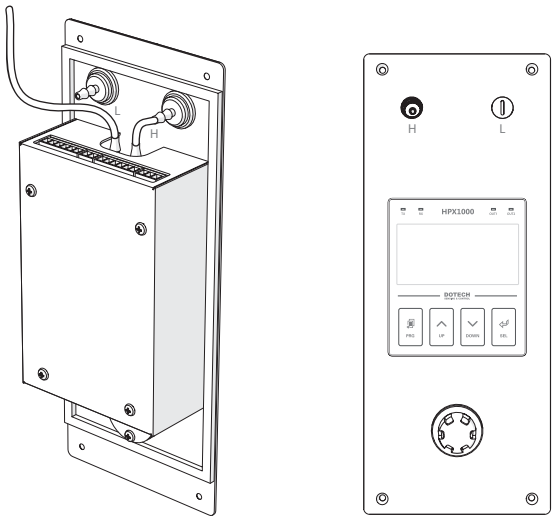




Precautions for mounting

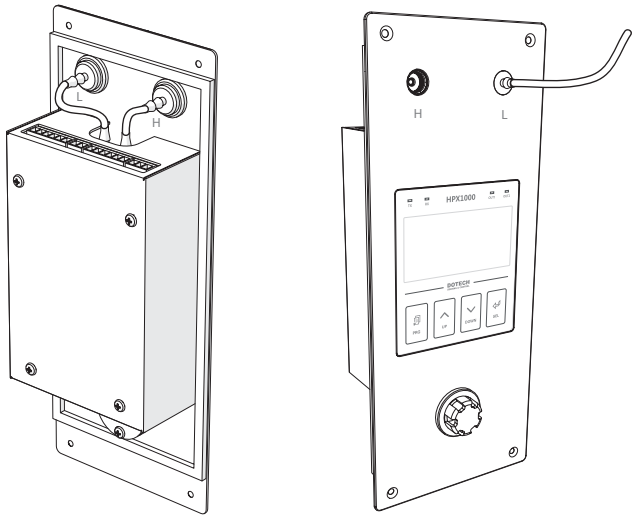
1. Cut away into 84 x 198mm (Depth:45mm) to install a transmitter in the wall.
2. Drill 4 mounting holes into Ø2.2 as shown above.
3. Insert HPX1000 into the wall and fix it with the 4 screws.

☐ Connections in accordance with measurement method of diff. pressure



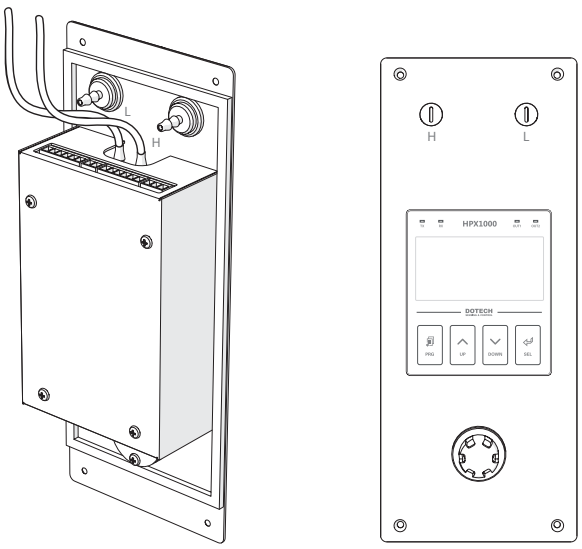
Installation method 1

1. Remove the front plug for high pressure after connecting the high pressure port of differential pressure sensor with high pressure nipple at the rear using silicon tube
2.Lay along the inside of the wall after connecting silicon tube at the low pressure port of differential
pressure senor, and extend it to space of low pressure measurement



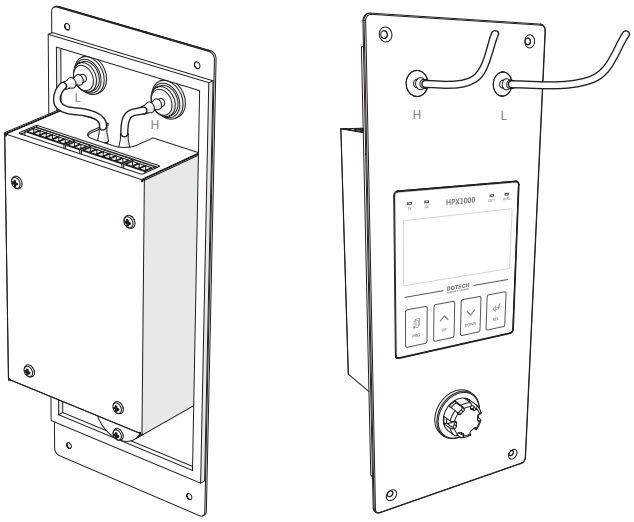
Installation method 2

1. Remove a front plug for high pressure after connecting the high pressure port of differential pressure sensor with the high pressure nipple at the rear using silicon tube
2. Connect the low pressure port of differential pressure sensor with the low pressure nipple at the rear
using silicon tube
3. Remove the front plug for low pressure and assemble a extension nipple
4. Connect assembled extension nipple with silicon tube and extend it to space of low pressure measurement.



Installation method 3

1. Lay along the inside of the wall after connecting silicon tubes at the high and low pressure port of differential pressure senor, and extend them to spaces of high and low pressure measurement.

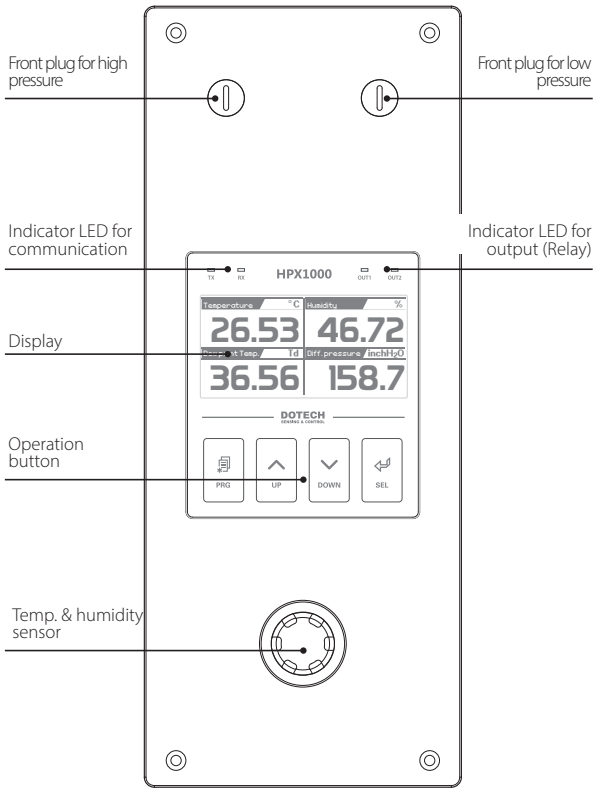


Installation method 4

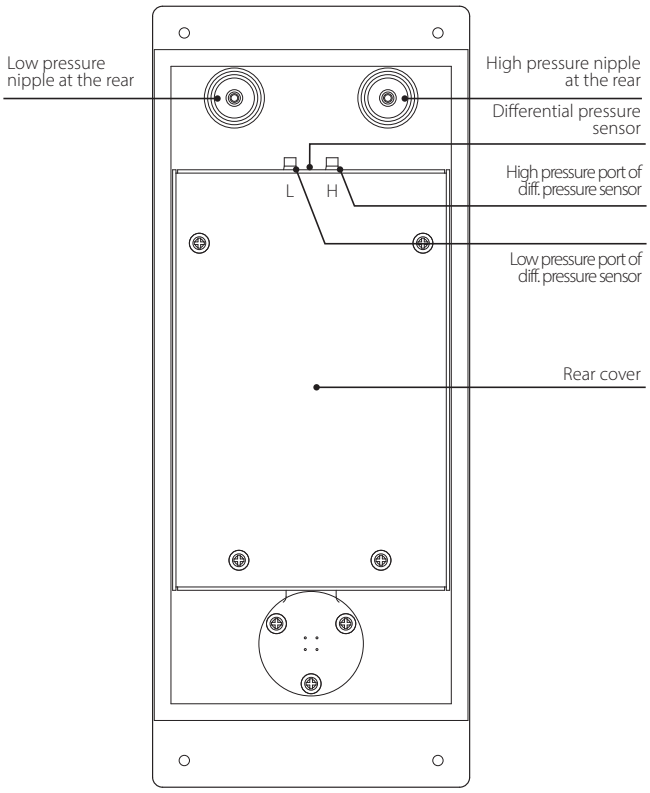
1. Connect the high and low pressure port of differential pressure sensor with high and low pressure nipple at the rear using silicon tubes
2. Assemble extension nipples after removing front plugs for high and low pressure
3. Connect assembled extension nipples with silicon tubes and extend them to spaces of high and low pressure measurement.

: Structure & operation

☐ Structure

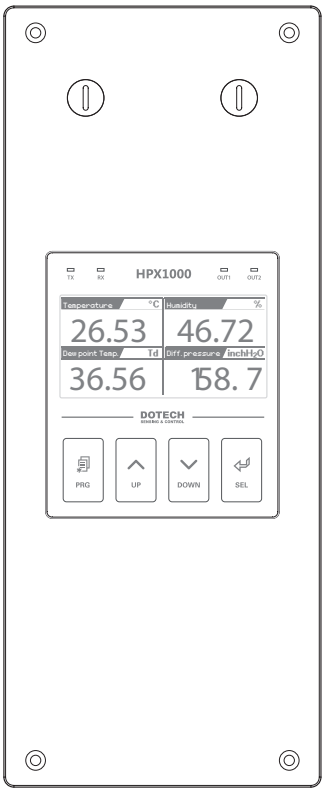


Front side

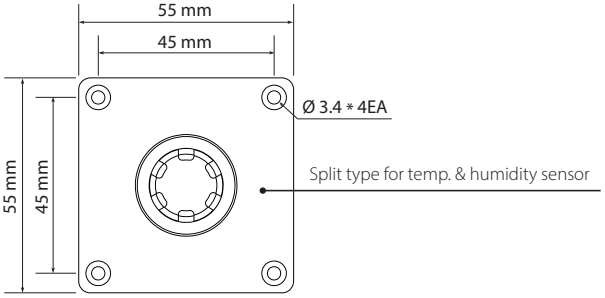


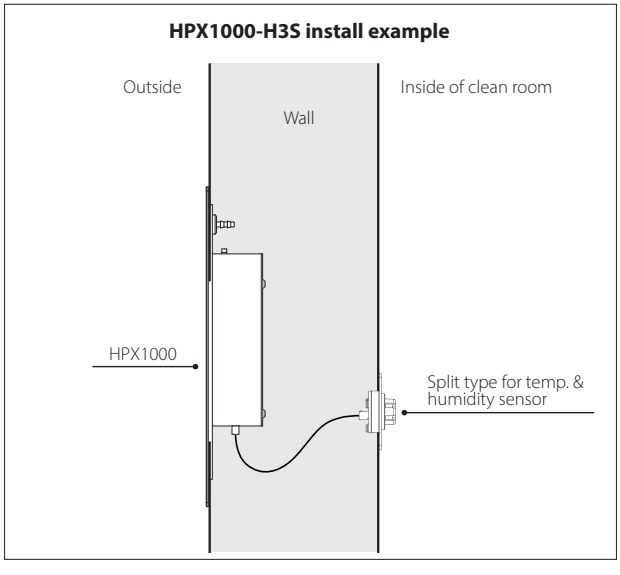
Rear side

☐ Split type for temp. & humidity sensor

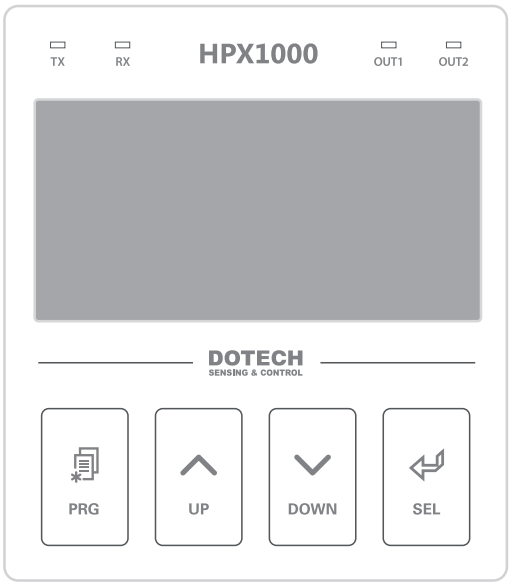


Front of split type



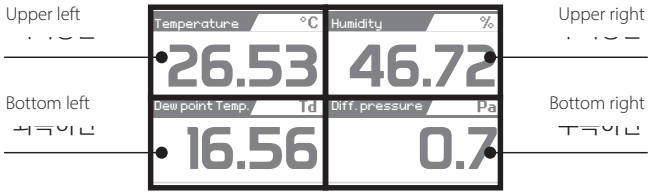


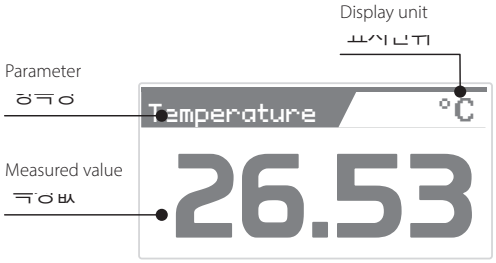
☐ Operation and status display



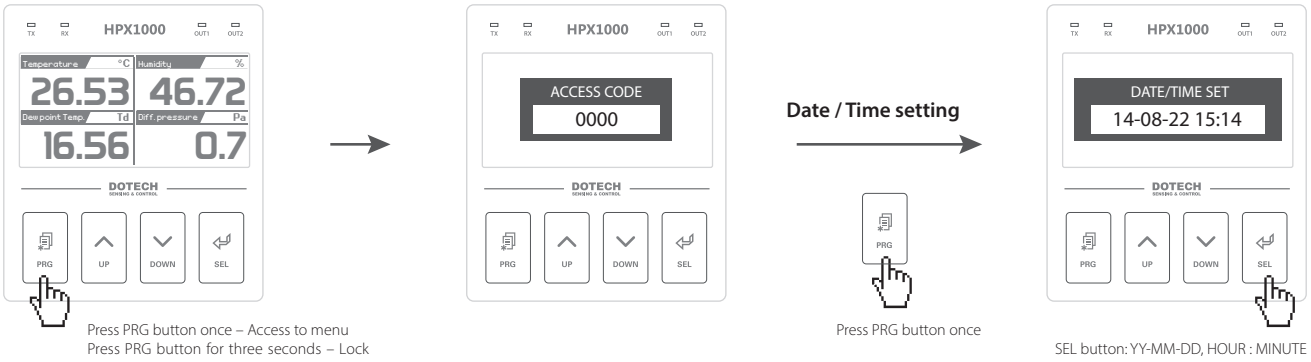
		Definition	Description
Operation		PRG Button	Access to menu and setting
		UP Button	Upward (Increase) / Access to trend screen
		DOWN Button	Downward (Decrease) / Access to trend screen
		SEL Button	Selection
Status	TX	Communication transmission LED	LED On at the state of communication
	RX	Communication receiving LED	
	OUT1	Relay output 1 LED (RLY1)	LED On at the state of relay output
	OUT2	Relay output 2 LED (RLY 2)	

☐ Composition of screen (Composition of screen can be configurable in accordance with settings)





☐ Date / Time setting

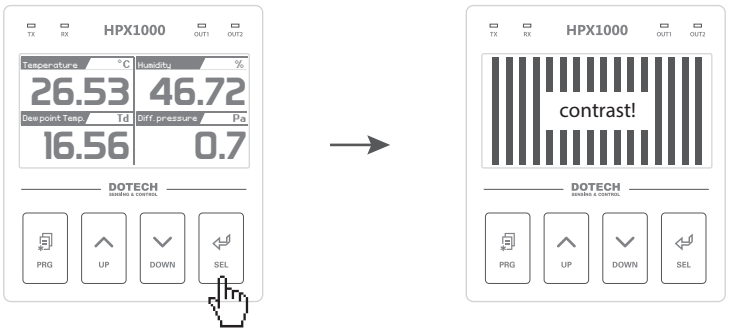


Press PRG button once – Access to menu
Press PRG button for three seconds – Lock mode

Press PRG button once

SEL button: YY-MM-DD, HOUR : MINUTE

☐ Display contrast setting (Contrast adjustments)



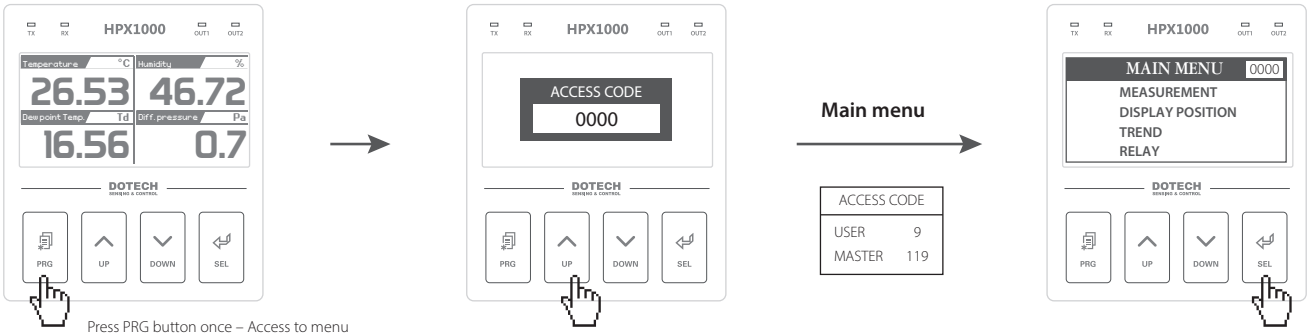
Press SEL button for five seconds – Contrast setting

UP / DOWN button – Increase or decrease of contrast value

SEL button – Save the set value

: Parameter

☐ How to access to parameters



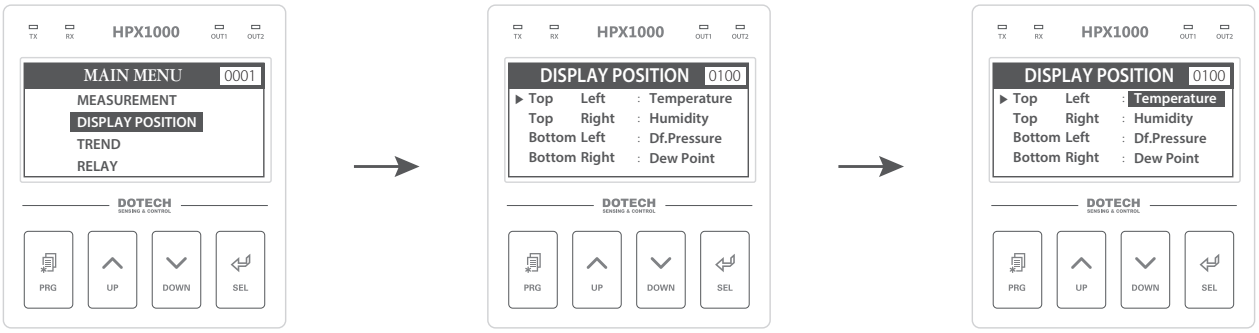
Press PRG button once – Access to menu
Press PRG button for three seconds – Lock mod

Enter the password using UP / DOWN button
(If button is being pressed, value will be changed continuously)

☐ Access to set parameter (Lock mode will be activated if press PRG button for three seconds)

Access	Password	Available and accessible menu	Duration time
USER	0009	Measurement, display position, trend, device configuration	10 min
MASTER	0119	All menus except for factory setup	30 min
FACTORY	****	Factory mode	60 min

☐ Parameter change



UP / DOWN button : Movement of menu
SEL button: Selection of menu
PRG button: Return to previous stage

UP / DOWN button : Movement of menu item
SEL button : Selection of menu item
PRG button: Return to previous stage

UP / DOWN button: Adjustment of set value
SEL button: Save of set value
PRG button: Return to previous stage

☐ Parameter structure

MAIN MENU
MEASUREMENT
DISPLAY POSITION
TREND
RELAY
ANG OUTPUT
SENSOR CONFIG
DEVICE CONFIG
MANUAL TEST

MEASUREMENT	
Modbus address.	Description
40001	Display present value of temperature
40002	Display present value of humidity
40003	Display present value of differential pressure
40004	Display present value of dew point temperature

DISPLAY POSITION	
Modbus address.	Description
40021	Top Left
40022	Top Right
40023	Bottom Left
40024	Bottom Right

TREND	
Modbus address.	Description
40041	Trend 1 Source
40042	Trend 1 Interval
40043	Trend 2 Source
40044	Trend 2 Interval

RELAY	
Modbus address.	Description
40141	RLY1 Source
40142	RLY1 Type
40143	RLY1 Upper Limit
40144	RLY1 Lower Limit
40145	RLY1 Hysteresis
40146	RLY1 Alarm Sound
40147	RLY2 Source
40148	RLY2 Type
40149	RLY2 Upper Limit
40150	RLY2 Lower Limit
40151	RLY2 Hysteresis
40152	RLY2 Alarm Sound

ANG OUTPUT	
Modbus address.	Description
40201	ANG1 Source
40202	ANG1 4mA
40203	ANG1 20mA
40204	ANG2 Source
40205	ANG2 4mA
40206	ANG2 20mA
40207	ANG3 Source
40208	ANG3 4mA
40209	ANG3 20mA

SENSOR CONFIG	
Modbus address.	Description
40221	Temp Unit
40222	D.P. Unit
40223	Temp Offset
40224	Humidity Offset
40225	D.P. Offset
40226	Dew Point Offset
40227	D.P. Span Gain

DEVICE CONFIG	
Modbus address.	Description
40241	Language
40242	Master Password
40244	Parameter Reset
40247	Communication ID
40248	Baud Rate
40250	Buzzer Mode
40251	LCD Blacklight

MANUAL TEST	
Modbus address.	Description
40261	Test Mode
40262	RLY1
40263	RLY2
40264	ANG Output 1
40265	ANG Output 2
40266	ANG Output 3

Factory setup	
	Description
	Y1 4mA
	Y1 20mA
	Y2 4mA
	Y2 20mA
	Y3 4mA
	Y3 20mA

※ FACTORY settings

□ Parameters table (Press **PRG** button to access to parameters)

MEASUREMENT

Modbus address	Description	Unit	Step	Min.	Max.	Default
40001	Display present value of temperature	℃	0.01	-10.00	60.00	℃
		℉	0.01	14.00	140.0	
40002	Display present value of humidity	%RH	0.01	0.00	100.00	%RH
40003	Display present value of differential pressure	Pa	0.1	-500.0	500.0	Pa
		kPa	0.01	-0.50	0.50	
		hPa	0.01	-5.00	5.00	
		mmAq	0.01	-50.98	50.98	
		mBar	0.01	-5.00	5.00	
		inchH_2O	0.01	-2.00	2.00	
		mmHg	0.01	-3.75	3.75	
40004	Display present value of dew point temperature	℃	0.01	-30.00	50.00	℃
		℉	0.01	-22.00	122.0	

DISPLAY POSITION

Modbus address	Description	Unit	Step	Min.	Max.	Default
40021	Top Left	-	-	Temperature, humidity, differential pressure, dew point		Temperature
40022	Top Right	-	-			Humidity
40023	Bottom Left	-	-			Differential pressure
40024	Bottom Right	-	-			Dew point

TREND

Modbus address	Description	Unit	Step	Min.	Max.	Default
40041	Trend 1 Source	-	-	Temperature, humidity, differential pressure, dew point		Temperature
40042	Trend 1 Interval	sec	1	1	100	1
40043	Trend 2 Source	-	-	Temperature, humidity, differential pressure, dew point		Humidity
40044	Trend 2 Interval	sec	1	1	100	1

RELAY

Modbus address	Description	Unit	Step	Min.	Max.	Default
40141	RLY1 Source	-	-	Temperature, humidity, differential pressure, dew point		Temperature
40142	RLY1 Type	-	-	Always Off Always OFF regardless of relay source		High Active * **Release for manual reset** : Press SEL button at output state of manual reset mode and select release in pop up generated.
				High Active (Automatic reset) Above upper limit of relay, relay On (activate)		
				Low Active (Automatic reset) Below lower limit of relay, relay On (activate)		
				INSIDE Active (Automatic reset) Within upper and lower limit of relay, relay On (activate)		
				OUT. Active (Automatic reset) Above upper limit or below lower limit, relay On (activate)		
				HIGH Latch (Manual reset)* Above upper limit of relay, relay On		
				LOW Latch (Manual reset)* Below lower limit of relay, relay On		
				Inside Latch (Manual reset)* Within upper and lower limit of relay, relay On		
				Outside Latch (Manual reset)* Above upper limit or below lower limit, relay On		
				Always On Always OFF regardless of relay source		
				Sensor Fault (Automatic reset) In case of pressure sensor or temperature sensor error, relay On (activate)		
				T sensor err (Automatic reset) In case of temperature senor error, relay On (activate)		
				P sensor err (Automatic reset) In case of pressure sensor error, relay On (activate)		
40143	RLY1 Upper Limit	℃	0.01	-40.00	120.00	50.00
40144	RLY1 Lower Limit	℃	0.01	-40.00	120.00	0
40145	RLY1 Hysteresis	℃	0.01	0	119.99	0
40146	RLY1 Alarm Sound	-	-	Off, BEEP - BEEP, BEEP		Off
40147	RLY2 Source	-	-	Temperature, humidity, differential pressure, dew point		Humidity
40148	RLY2 Type	-	-	※ RLY1 타입과 동일		High Active
40149	RLY2 Upper Limit	%RH	0.01	0	100.00	70.00
40150	RLY2 Lower Limit	%RH	0.01	0	100.00	30.00
40151	RLY2 Hysteresis	%RH	0.01	0	99.99	0
40152	RLY2 Alarm Sound	-	-	Off, BEEP - BEEP, BEEP		Off

ANG OUTPUT

Modbus address	Description	Unit	Step	Min.	Max.	Default
40201	ANG1 Source	-	-	Temperature, humidity, differential pressure, dew point		Temperature
40202	ANG1 4mA	℃	0.01	-40.00	120.00	-10.00
40203	ANG1 20mA	℃	0.01	-40.00	120.00	60.00
40204	ANG2 Source	-	-	Temperature, humidity, differential pressure, dew point		Humidity
40205	ANG2 4mA	%RH	0.01	0	100.00	0.00
40206	ANG2 20mA	%RH	0.01	0	100.00	100.00
40207	ANG3 Source	-	-	Temperature, humidity, differential pressure, dew point		
40208	ANG3 4mA	Pa	0.1	-500.0	500.0	0.0
40209	ANG3 20mA	Pa	0.1	-500.0	500.0	500.0

SENSOR CONFIG

Modbus address	Description	Unit	Step	Min.	Max.	Default
40221	Temp Unit	-	-	℃		℃
				°F		
40222	D.P. Unit (Differential Pressure)	-	-	Pa		Pa
				mbar		
				kPa		
				hPa		
				mmAq(mmH_2O)		
				$inchH_2O$		
				mmHg		
40223	Temp Offset	℃	0.01	-19.99	19.99	0.00
40224	Humidity Offset	%RH	0.01	-19.99	19.99	0.00
40225	D.P. Offset	Pa	0.1	-19.9	19.9	0.0
40226	Dew Point Offset	℃	0.01	-19.99	19.99	0.00
40227	D.P. Span Gain	%	0.001	0	9.999	1.000

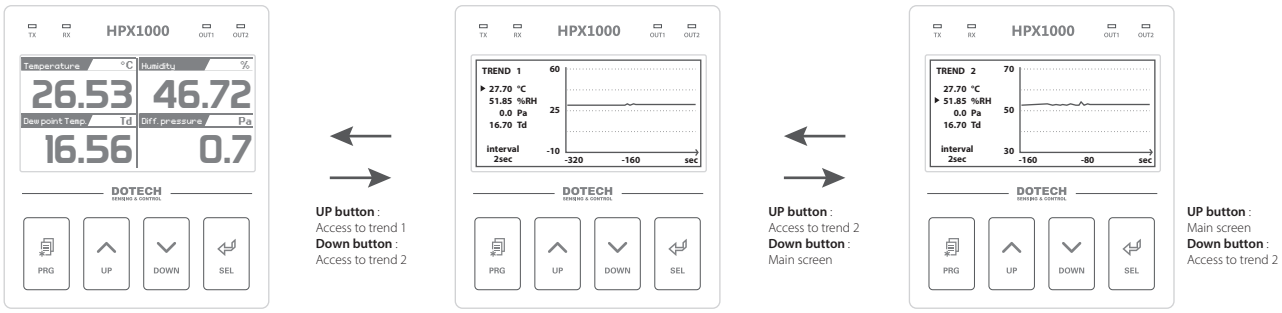
DEVICE CONFIG

Modbus address	Description	Unit	Step	Min.	Max.	Default
40241	Language	-	-	English, Korean		English
40242	Master Password	-	1	0	9999	119
40244	Parameter Reset	-	-	No, Yes		No
40247	Communication ID	-	1	1	255	1
40248	Baud Rate	-	-	4800 BPS		9600 BPS
				9600 BPS		
				19200 BPS		
				38400 BPS		
40250	Buzzer Mode	-	-	Disable		Touch & Alarm
				Touch & Alarm		
				Touch Only		
				Alarm Only		
40251	LCD Blacklight	-	-	Disable		Always ON
				Always ON		
				Button Touch		

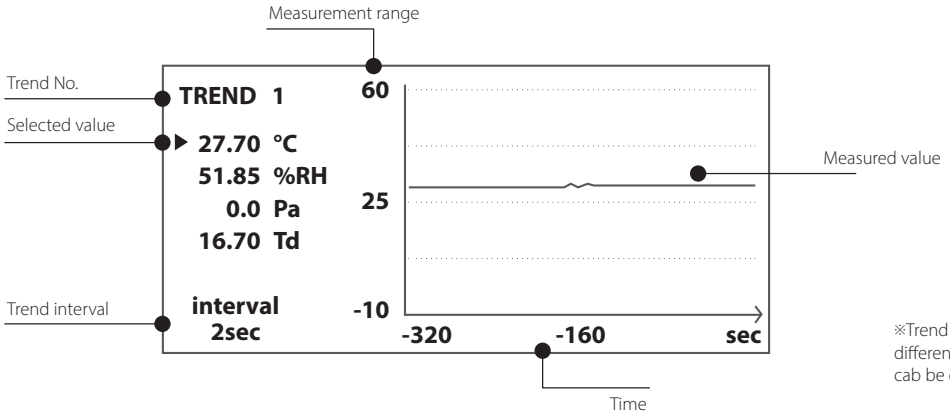
MANUAL TEST

Modbus address	Description	Unit	Step	Min.	Max.	Default
40261	Test Mode	-	-	Off, On		Off
40262	RLY1	-	-	Off, On		Off
40263	RLY2	-	-	Off, On		Off
40264	ANG Output 1	mA	0.01	4.00	20.00	12.00
40265	ANG Output 2	mA	0.01	4.00	20.00	12.00
40266	ANG Output 3	mA	0.01	4.00	20.00	12.00

: Trend



Main screen | Trend 1 | Trend 2



※Trend display of temperature, humidity, differentia pressure and dew point temperature cab be configurable in trend menu

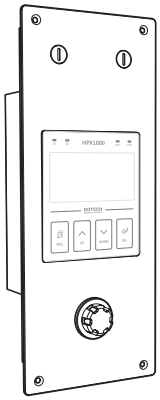
: Communication

Item	Description
Transmission line connection	Multiple line
Communications method	RS485
BPS	BPS default 9600 BPS
Parity, Data, Stop bit	None, 8 Data, 1 Stop
Protocol Type	Modbus RTU Mode
Maximum Read Word	Modbus RTU Mode : 32Word
Poll interval	1000msec

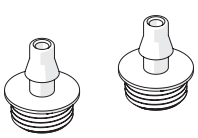
※ **Recommendations for communication line**

Use of industrial communication cables is recommended and wire communication line with equivalent in LG LIREV-AMESB AWG22, BELDEN 9841(2), FTP, UTP (in case of installing a number of channels at the same time).

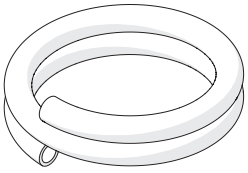
: Components



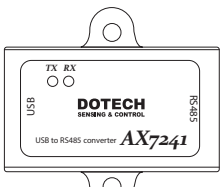
HPX1000



Extension nipple (※Options)



Silicon tube



AX7241
USB-RS485 Converter

Communications converter (※Options)