Digital Pressure Switch

DPX100

User Manual

DOTECH
SENSING & CONTROL

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INNOBIZ

⚠ 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 giade 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 responsible 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.

1. OVERVIEW

※ FEATURES

DPX100 is a digital pressure switch with functions of several pressure switch and gauges. It measures the low pressure of suction or the high pressure of discharge of compressor and controls the pressure within predetermined ranges.

: SPECIFICATIONS(STANDARD MODEL)

		Description
Power		100 ~ 240 Vac. 50/60 Hz
Power Consumption		MAX 10 VA
Output		3P Relay Outputs / 250Vac. 30Vdc. 5 A
Pressure Sensors	Measurement Range	DPX100-115 : -0.10 ~ 1.50 MPa DPX100-150 : -0.10 ~ 5.00 MPa
	Accuracy	±1.0 %FS
	Overpressure	150 %FS
	Stability	±0.5 %FS/year
	Shock	20 g sinusoidal, 11 msec
	Vibration	x-y-z directions of 5 ~2000Hz / 10g
	Working Temp.	-40 ~ 100 °C
	Connection	7/16UNF" / MALE
	Pressure Type	Gauge
Dimensions		159(W)mm X 128(H)mm X 58(D)mm
Operation		Temperature -10~50 °C / Humidity 90%RH or less
Storage		Temperature -20~60 °C / Humidity 90%RH or less

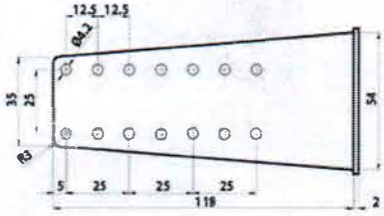
: SELECTION GUIDE

Model	Description
DPX100-115 / Low Pressure Sensor = -0.10 ~ 1.50 MPa	
DPX100-115-00-MPA	Digital Pressure Switch Standard(Pressure Unit: MPa)
DPX100-115-R4-MPA	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-115-00-KGF	Digital Pressure Switch Standard(Pressure Unit: kgf/cm2)
DPX100-115-R4-KGF	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-115-00-BAR	Digital Pressure Switch Standard(Pressure Unit: bar)
DPX100-115-R4-BAR	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-115-00-PSI	Digital Pressure Switch Standard(Pressure Unit: psi)
DPX100-115-R4-PSI	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-150 / High Pressure Sensor = -0.10 ~ 5.00 MPa	
DPX100-150-00-MPA	Digital Pressure Switch Standard(Pressure Unit: MPa)
DPX100-150-R4-MPA	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-150-00-KGF	Digital Pressure Switch Standard(Pressure Unit: kgf/cm2)
DPX100-150-R4-KGF	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-150-00-BAR	Digital Pressure Switch Standard(Pressure Unit: bar)
DPX100-150-R4-BAR	Digital Pressure Switch for Communication(RS485 Modbus)
DPX100-150-00-PSI	Digital Pressure Switch Standard(Pressure Unit: psi)
DPX100-150-R4-PSI	Digital Pressure Switch for Communication(RS485 Modbus)

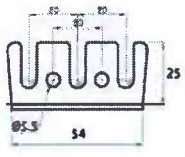
※ Communication is not supported in standard models.
※ Specify the pressure unit when ordering.

: Supplied Contents

※ This item is provided for securing the bracket tightening all bolts please.



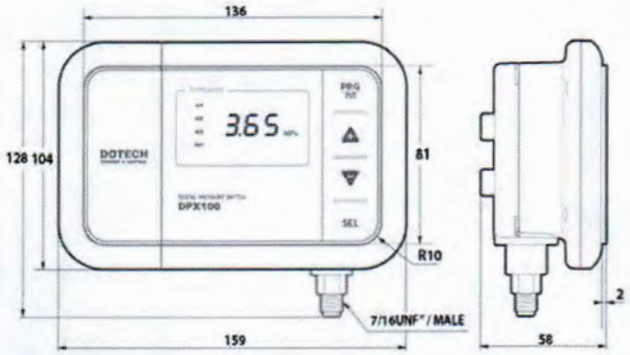
Bracket 1ea

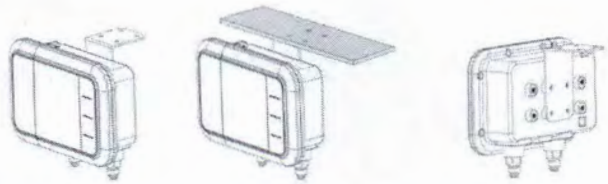


User Manual

2. INSTALLATION

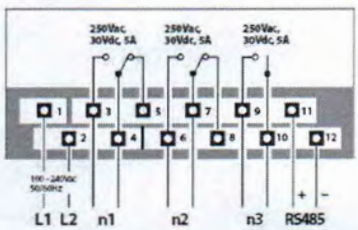
: DIMENSIONS AND MOUNTING(unit: mm)





※ Please install a siphon tube to protect from pulsating pressure and high temperature contact.

: WIRING DIAGRAM



Capacity of relay contact
250Vac,30Vdc, 5A

No	Connection	Description
1	L1	100~240Vac, 50/60Hz Power Input
2	L2	
3	n1	Step 1 Normal open signal
4		common signal
5		Step 1 Normal close signal
6	n2	Step 2 Normal open signal
7		common signal
8		Step 2 Normal close signal
9	n3	Step 3 Normal open signal
10		common signal
11	RS485	TRX + signal
12		TRX – signal

3. USER INTERFACES

: DISPLAY AND CONTROLS

		Description
LED	n1	Step1 ON/OFF of Output
	n2	Step2 ON/OFF of Output
	n3	Step3 ON/OFF of Output
Button	PRG rst	Parameter Settings / Manual Reset(if pressed twice quickly)
	▲	Increase or Move Up
	▼	Decrease or Move Down
	SEL	Select & Save / Display of Saturated Temperature
	PRG rst ▼	Setup values will be initialized if pushing PRG button and ▼button for 10 seconds.

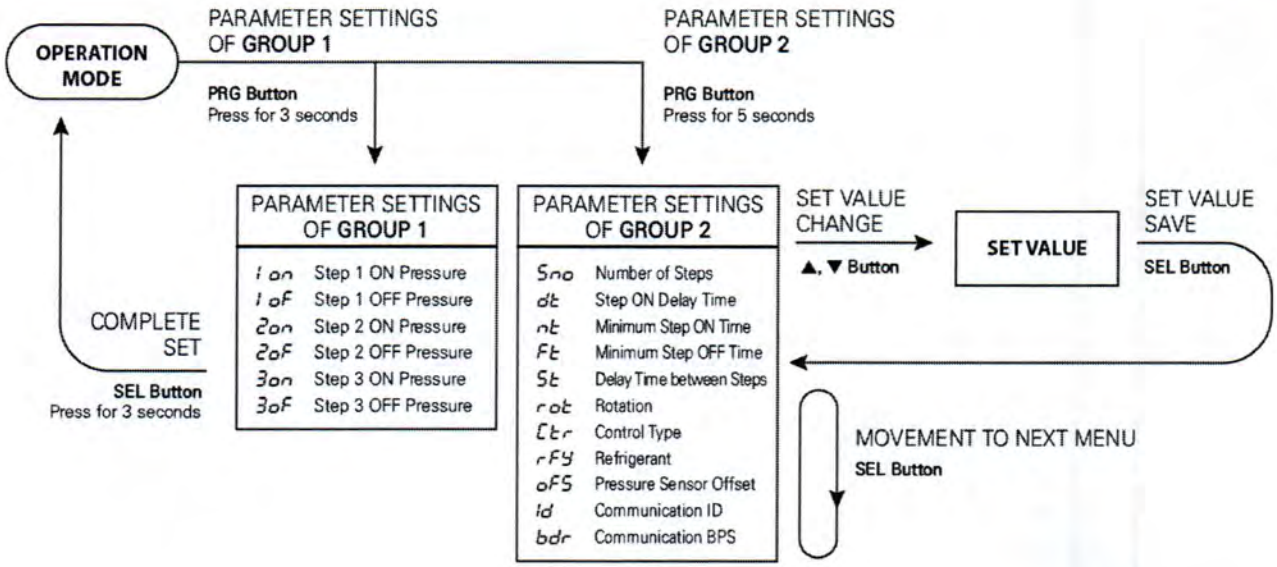
: TRIP / ALARM MESSAGE

No	Menu	Code	Description / Instructions	Response at Detection	Reset Type
1	Internal Parameter Error	SYS	Change any parameters and turn off. Then restart.	Immediate Stop	Automatic Reset
2	Pressure Sensor Open	oPn	Please check a pressure sensor because it is open	Immediate Stop	Automatic Reset
3	Pressure Sensor Short	SHt	Please check a pressure sensor because it is short	Immediate Stop	Automatic Reset

※ When it alarms, it beeps and all the outputs are cut off. To stop the beep, press the reset.

4. PARAMETER

: PARAMETER CHANGE



- If there was no input for 3 minutes during setup, it will be returned to operation mode
- If PRG button is pressed at any step, it returns to operation mode.

※ This manual is based on the standard model for MPa and the displays and settings of pressure unit are subject to change depending on the models for other pressure units.

: PARAMETER SETTINGS OF GROUP 1 (PRG Button Press for 3 seconds)

Address	Menu	Code	Unit	Step	Min	Max	Default		CustomSetup
							DPX100-115	DPX100-150	
4 0031	**Step 1 ON Pressure**	1on	MPa	0.01	-0.10	5.00	0.30	1.40	
4 0033	**Step 1 OFF Pressure**	1oF	MPa	0.01	-0.10	1on-0.01	0.20	1.30	
4 0041	**Step 2 ON Pressure**	2on	MPa	0.01	-0.10	5.00	0.45	1.50	
4 0043	**Step 2 OFF Pressure**	2oF	MPa	0.01	-0.10	2on-0.01	0.35	1.40	
4 0051	**Step 3 ON Pressure**	3on	MPa	0.01	-0.10	5.00	0.50	1.60	
4 0053	**Step 3 OFF Pressure**	3oF	MPa	0.01	-0.10	3on-0.01	0.40	1.50	

※ STEP CONTROL OF PRESSURE

Depressurization Control : After comparing the ON pressure of each step, it outputs a signal from the lowest pressure.
Ex.) If ON steps are set(Step 1: 14.0, Step 2: 1.50, and Step 3: 1.60), it begins from the lowest(Step 1) and moves to the next steps in order(→ Step 2 → Step 3).

Pressurization Control : After comparing the ON pressure of each step, it outputs a signal from the highest pressure..
Ex.) If ON steps are set(Step 1: 16.0, Step 2: 1.50, and Step 3: 1.40), it begins from the highest(Step 1) and moves to the next steps in order(→ Step 2 → Step 3).

※ The pressure range depends on a model.

Model	Min	Max
DPX100-115	-0.10	1.50
DPX100-050	-0.10	5.00

※ The OFF pressure range depends on a control type.

Control Type	Min	Max
DN(Depressurization Control)	-0.10	1on-0.01
Step OFF pressure must be set under ON pressure.		
UP(Pressurization Control)	1on+0.01	5.00
Step OFF pressure must be set over ON pressure.		

: PARAMETER SETTINGS OF GROUP 2 (PRG Button Press for 5 seconds)

Address	Menu	Code	Unit	Step	Min	Max	Default	Custom Setup
4 0068	Number of Steps	Sno	-	1	0	3	3	
4 0074	Step ON Delay Time (※1)	dt	sec	1	0	999	0	
4 0075	Minimum Step ON Time (※2)	nt	sec	1	0	999	0	
4 0076	Minimum Step OFF Time (※3)	Ft	sec	1	0	999	0	
4 0067	Delay Time between Steps (※4)	St	sec	1	0	999	5	
4 0069	Rotation (※5)	rot	oFF(0)= No Use, on(1) = ON Rotation when On, onF(2)= ON/OFF Rotation				onF (2)	
4 0070	Control Type	Ctr	dn (0)= Depressurization Control		UP (1)= Pressurization Control		dn (0)	
4 0061	Refrigerant selection (Saturated Temperature) (※6)	rFg	r22 (0)= R22 r23 (1)= R23 123 (2)= R-123	124 (3)= R-124 134 (4)= R-134a 404 (5)= R-404a	407 (6)= R-407c 410 (7)= R-410a 507 (8)= R-507		r22 (0)	
4 0072	Pressure Sensor Offset (※7)	oFS	MPa	0.01	-1.99	1.99	0.00	
4 0063	Communication ID	Id	-	1	1	255	1	
4 0064	Communication BPS	bdr	48 (0)= 4800	96 (1)= 9600	192 (2)= 19200	384 (3)= 38400	96 (1)	

(※1) **ON Delay Time:** Although it is ON condition, it is turned on after ON Delay Time.

(※2) **Minimum ON Time:** Once the output is on, it is not turned off during the minimum ON time even if it is under the OFF condition.

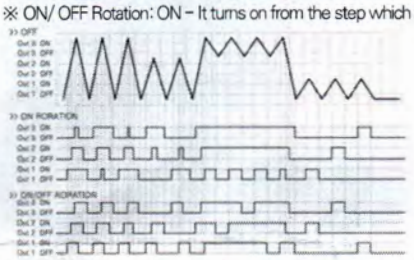
(※3) **Minimum OFF Time:** Once the output is off, it is not turned on during the minimum OFF time even if it is under the ON condition.

(※4) **Delay Time between Steps:** Under the condition that multiple steps are turned on simultaneously, the lead step is turned on first and then the next step is on after Delay Time between Steps.

(※5) **Rotation:** It controls all the units evenly according to the predetermined ON/OFF and step parameters.

※ ON Rotation: ON – It turns on from the step which is being off the longest. OFF – The step which was on by step ON pressure turns off if it reaches its step OFF pressure.

※ ON/ OFF Rotation: ON – It turns on from the step which was off the longest. OFF – It turns off from the step which is being ON the longest.



(※6) **Refrigerant selection**: Display saturation temperature in accordance with selected refrigerant.

(※7) **Offset**: Offset the differential for pressure sensor.

e.g) If displayed pressure value: 0.20MPa and actual pressure value: 0.22MPa. It is offset by inputting +0.02MPa.

5. COMMUNICATIONS SPECIFICATIONS

: Communication Model (-R4)

	Description
Transmission line connection	Multiple line
Communications method	RS485 (2-wire, half-duplex)
BPS	BPS default 9600 BPS
Parity, Data, Stop bit	None, 8 Data, 1 Stop
Protocol Type	Modbus RTU MODE
Function Code	Read HOLD REGISTERS (0x03) , Preset Single Register (0x06)
Maximum Read Word	16 Word
Media Type	BELDEN 9841 / 9842, LG LIREV-AMESB
Poll interval	100msec

※ Pressure Unit Conversion Table

	MPa	bar	kgf/cm²	psi
1MPa	1	1 x 10	1.0197162 x 10	1.450382 x 10^2
1bar	1 x 10^{-1}	1	1.019716	1.4503824 x 10
1kgf/cm²	9.80665 x 10^{-2}	9.80665 x 10^{-1}	1	1.4223393 x 10
1psi	6.895 x 10^{-3}	6.8947 x 10^{-2}	7.0307 x 10^{-2}	1

: HOLD STATES REGISTERS

Address	Menu	Unit	Type	Size (Word)	DPX100	MMI	Scale
4 0011	Output status code	-	Digital	INT 16	Refer to bit status below		-
Bit0	n1 Output status	-	Digital	Bit	0 : OFF	1 : ON	-
Bit1	n2 Output status	-	Digital	Bit	0 : OFF	1 : ON	-
Bit2	n3 Output status		Digital	Bit	0 : OFF	1 : ON	-
4 0013	Alarm status code	-	Digital	INT 16	Refer to bit status below		-
Bit0	Pressure sensor faulty	-	Digital	Bit	0 : Normal	1 : Alarm	-
4 0024	Display of pressure value	MPa	Analog	INT 16	-0.10 ~ 1.50	-10 ~ 150	1/100
4 0027	Display of saturation temperature for low pressure	℃	Analog	INT 16	-150.0 ~ 200.0	-1500 ~ 2000	1/10