



DOTECH INC. 6F, JOONGANG-ILBO B/D, 30, Dongsan-ro, Danwon-gu, Ansan-si, Gyeonggi-do, KOREA



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 ② Pollution Degree 2 ③ At 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 described 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.



- Heating/Cooling Output
- Independent Timer Output
- High/Low Limit Alarm
- Defrost Output
- Sensor Calibration
- Sensor Error Detection
- Automatic Output Cycle after Sensor Error
- Auto Save and Restoration of Parameter Values
- Minimum On/Off Duration Time
- Analog Signal Output(4-20mA)
- Communication via RS485 MODBUS
- Remote Control(FX3D to FX3D)

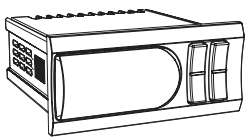
Technical Specifications

Power	100-240Vac, 50/60Hz
Current	MAX 6 VA
Connection	Screw Bolt Connector(1.5mm ² Wire Use Possibility)
Output	Relay Output 2 Point (250Vac / 5A)
Input	Temp. Sensor Input 1 Point
Dimensions	78(W)mm X 35(H)mm X 78(D)mm
Operation	Temperature: -10 ~ 50°C, Humidity: Below 90%RH
Storage	Temperature: -20 ~ 60°C, Humidity: Below 90%RH

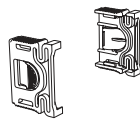
Ordering guide

FX3D-00	Basic Model
FX3D-A1	4~20mA Trans output model
FX3D-R4	RS485 Comm. model
FX3D-A1R4	4~20mA Trans output & RS485 Comm. model

Components



Product

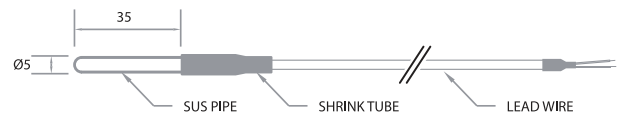


Bracket 2ea

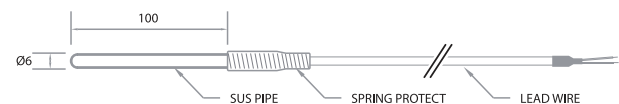


User's Manual

Accessories



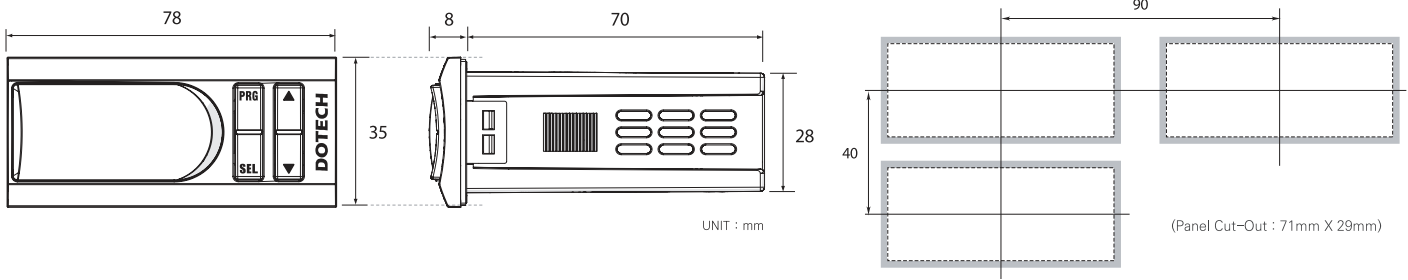
DPR-TH01-ET : NTC 5 KΩ at 25 °C / -50~105 °C / ±0.3 °C at 25 °C



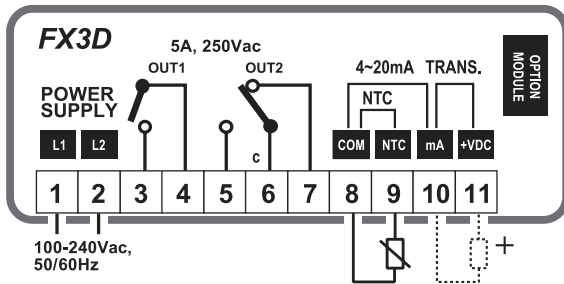
DPR-TH02-P6D100L : NTC 10 KΩ at 25 °C / -50~150 °C / ±1.5 °C at 25 °C

※ Specifications are subject to change without prior notice.

Dimensions and Panel Cut-Out Form

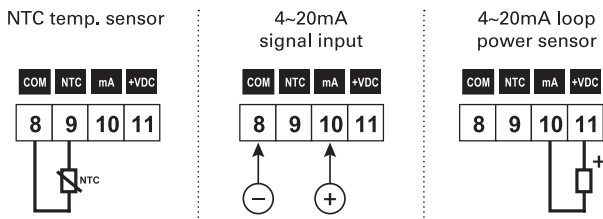


Wiring

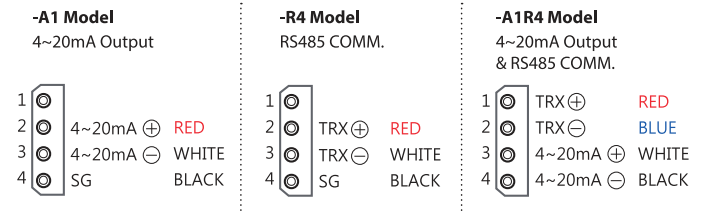


NO	Connection	Description
1	POWER	100-240Vac, 50/60Hz
2		
3	OUT1	Relay output OUT1 when closed
4		Common signal
5	OUT2	Relay output OUT1 when closed
6		Common signal
7		Relay output OUT1 when open
8	COM	Common signal
9	NTC	Temp. sensor input
10	mA	4~20mA signal input
11	+Vdc	4~20mA sensor power (12Vdc)

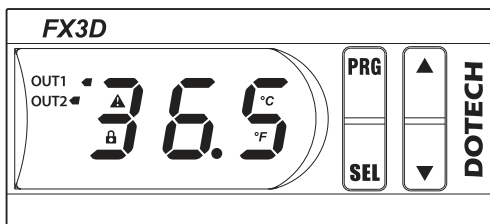
Sensor connection



Option Module connection



Constitution (Function of Display Lamp and Button)



OUT1	Turn on when output #1 is ON (Flickering at standby)
OUT2	Turn on when output #2 is ON (Flickering at standby)
LED	°C / °F Celsius / Fahrenheit display units
▲	ON at trip, Flickering at alarm
🔒	Parameter set up locked
PRG	Use at program setup
SEL	Execute selected menu or Input setup value
BUTTON	▲ Move between menus & Increase setup value
	▼ Move between menus & Decrease setup value
PRG + ▼	If pushing for 10 sec. at the same time , setup value is initialized

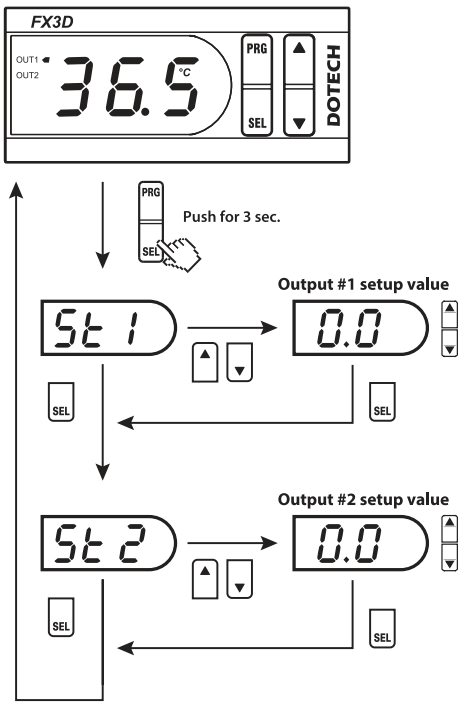
Trip / Alarm Messages

※ In case of error occurring, the following messages are flickering at every 0.5 sec. intervals.

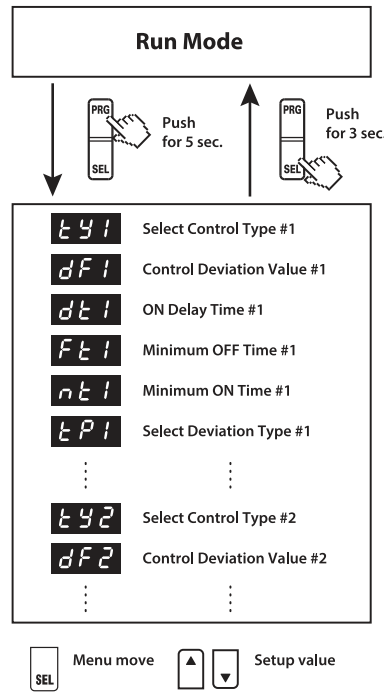
Code	Menu	Description / Instructions	Response at Detection	Reset Type
595	Internal Parameter Error	In Case of change of set value by an unknown case.	Immediate Stop	Automatic Reset
oPn	Sensor Open	In case of Input sensor open wire(Normal operation after sensor connecting)	Immediate Stop	Automatic Reset
SHt	Sensor Short	In case of Input sensor short circuit	Immediate Stop	Automatic Reset
LLL	Lower Input	Lower sensor input than measuring range	Immediate Stop	Automatic Reset
HHH	Higher Input	Higher sensor input than measuring range	Immediate Stop	Automatic Reset
RLL	Lower Low Limit	Lower Low Limit Alarm than Low Limit Alarm Value	Immediate Stop	Automatic Reset
RLH	Higher High Limit	Higher High Limit Alarm than High Limit Alarm Value	Immediate Stop	Automatic Reset

Parameter

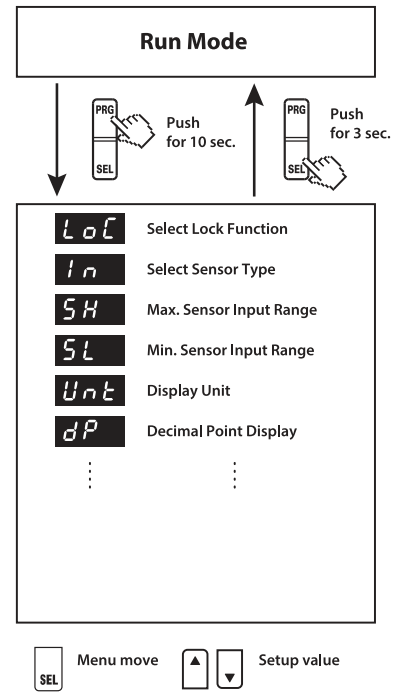
Temperature Setting Group



Setting 1 Group



Setting 2 Group



Temperature Setting Group (SEL Button Push for 3 Sec.)

No	Menu	Code	Unit	Step	Min	Max	Default	Custom Setup
4 0001	Output #1 setup value	St1	°C	0.1	UL1	UH1	0.0	
4 0002	Output #2 setup value	St2	°C	0.1	UL2	UH2	0.0	

Setting 1 Group (PRG Button Push for 5 Sec.)

No	Menu	Code	Unit	Step	Min	Max	Default	Custom Setup
4 0003	Select Control Type	tY1	oFF (0) : Display C (1) : Cooling mode H (2) : Heating mode				C (1)	
4 0004	Control Deviation Value	dF1	°C	0.1	0.1	999.9	1.0	
4 0005	ON DelayTime	dt1	Sec	1	0	999	1	
4 0006	Minimum OFF Time(※1)	Ft1	Sec	1	0	999	0	
4 0007	Minimum ON Time(※2)	nt1	Sec	1	0	999	5	
4 0008	Deviation Type(※3)	tP1	P (0) : Deviation Pn (1): ± Deviation				P	
4 0009	Set Value Max.	UH1	°C	1	UL1	SH	100	
4 0010	Set Value Min.	UL1	°C	1	SL	UH1	-45	
4 0011	Select Control Type	tY2	oFF (0) : Display C (1) : Cooling mode H (2) : Heating mode				C (1)	
4 0012	Control Deviation Value	dF2	°C	0.1	0.1	999.9	1.0	
4 0013	ON DelayTime	dt2	Sec	1	0	999	2	
4 0014	Minimum OFF Time(※1)	Ft2	Sec	1	0	999	0	
4 0015	Minimum ON Time(※2)	nt2	Sec	1	0	999	5	
4 0016	Deviation Type(※3)	tP2	P (0) : Deviation Pn (1): ± Deviation				P	
4 0017	Set Value Max.	UH2	°C	1	UL2	SH	100	
4 0018	Set Value Min.	UL2	°C	1	SL	UH2	-45	

※1) Min OFFTime : It doesn't make it output within Min. OFFTime after output is OFF. During Min OFFTime, output lamp is turned on with output after it ticks every 1 second intervals.

※2) Min ONTime : It is for avoiding frequent ON/OFF of control output and maintains ON condition in spite of OFF condition during Min ONTime after being turned on.

※3) Select Deviation Type : It selects deviation type. e.g) Condition (Cooling, Setup value 10.0, Deviation 1.0)
In case of +deviation -> Operate at ON (11.0) / OFF (10.0) In case of ±deviation -> Operate at ON (10.5) / OFF (9.5)

Setting 2 Group (PRG Button Push for 10 Sec.)

No	Menu	Code	Unit	Step	Min	Max	Default	Custom Setup																
4 0061	Lock Function	LoL	oFF (0) : Lock cancel L1 (1) : Setting 2 group lock L2 (2) : Setting 1,2 group lock L3 (3) : Setting 1, 2 group, temp. setup lock				oFF (0)																	
4 0062	Sensor Type	In	tH1 (0) : DPR-TH01 (-50~105°C) tH2 (1) : DPR-TH02 (-50~150°C) 420 (2) : 4-20mA signal input (In case of connecting with press.&humidity sensor) St1 (3) : OUT1 set temperature (St1) display St2 (4) : OUT1 set temperature (St2) display Std (5) : St1 or St2 (※1)				tH1 (0)																	
4 0063	Max. Sensor Input Range	SH	°C	1	SL	999	105																	
4 0064	Min. Sensor Input Range	SL	°C	1	-199	SH	-50																	
4 0065	Unit of temperature	Unk	°C (0) : Celsius °F (1) : Fahrenheit				°C (0)																	
4 0066	Decimal Point Display(※2)	dP	0.1 (0) : Decimal point display 1 (1) : Do not display decimals				0.1 (0)																	
4 0067	Sensor Correction(※3)	Cor	°C	0.1	-19.9	19.9	0.0																	
4 0068	Sensor Input Filter	SFt	Sec	0.1	0.1	5.0	2.0																	
4 0069	Sensor Value Display Cycle	Sdt	Sec	0.1	0	5.0	0.5																	
4 0070	Operation Cycle Output at Error Occurrence #1(※4)	CL1	Min	1	0	999	oFF(0)																	
4 0071	Operation Ratio Output at Error Occurrence #1(※4)	dU1	%	1	0	100	50																	
4 0072	Analogue Trans. Output(4~20mA) Mode (-A1 model)	Roñ	PH (0) : Current Temp. H (1) : Heating proportional control C (2) : Cooling proportional control St1 (3) : Set value Temp.#1 St2 (4) : Set value Temp.#2				PH (0)																	
4 0073	Setup Value Unication Mode (※5)	Sto	oFF (0) : Output #1, #2 separation mode On (1) : Unication mode				oFF (0)																	
4 0074	Output #2, Select Extended Function. (Display tY2 as oFF)	nc2	<table border="1"> <tr> <th colspan="2">Automatic reset alarm</th> <th colspan="2">Manual reset alarm(※6)</th> </tr> <tr> <td>RL1 (1) : Output ON at sensor alarm + high limit alarm</td> <td>RL4 (4) : Output ON & manual reset at sensor alarm + high limit alarm</td> <td>RL5 (5) : Output ON & manual reset at sensor alarm + low limit alarm</td> <td>RL6 (6) : Output ON & manual reset at sensor alarm + high/low limit alarm</td> </tr> <tr> <td>RL2 (2) : Output ON at sensor alarm + low limit alarm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>RL3 (3) : Output ON at sensor alarm + high/low limit alarm</td> <td></td> <td></td> <td></td> </tr> </table> t1n (7) : Timer output (Regular cycle timer output) dFH (8) : Timer output (Regular cycle timer output : heater defrost) dFC (9) : Timer output (Regular cycle timer output : hot gas defrost)		Automatic reset alarm		Manual reset alarm(※6)		RL1 (1) : Output ON at sensor alarm + high limit alarm	RL4 (4) : Output ON & manual reset at sensor alarm + high limit alarm	RL5 (5) : Output ON & manual reset at sensor alarm + low limit alarm	RL6 (6) : Output ON & manual reset at sensor alarm + high/low limit alarm	RL2 (2) : Output ON at sensor alarm + low limit alarm				RL3 (3) : Output ON at sensor alarm + high/low limit alarm						oFF (0)	
Automatic reset alarm		Manual reset alarm(※6)																						
RL1 (1) : Output ON at sensor alarm + high limit alarm	RL4 (4) : Output ON & manual reset at sensor alarm + high limit alarm	RL5 (5) : Output ON & manual reset at sensor alarm + low limit alarm	RL6 (6) : Output ON & manual reset at sensor alarm + high/low limit alarm																					
RL2 (2) : Output ON at sensor alarm + low limit alarm																								
RL3 (3) : Output ON at sensor alarm + high/low limit alarm																								
4 0075	Output #2, Timer OFF Time (Defrost Cycle)	oF2	Min	1	0	999	360																	
4 0076	Output #2, Timer ON Time (DefrostTime)	on2	Min	1	0	999	30																	
4 0077	Alarm Range High Limit (※7)	RLH	-	0.1	ALL	SH	30.0																	
4 0078	Alarm Range Low Limit (※7)	RLL	-	0.1	SL	RLH	-10																	
4 0079	Alarm Sensing Hysteresis	RYH	K	0.1	0	99.9	1.0																	
4 0080	Communication Address (※8)	Adr	-	1	-64	64	1																	

- (※1) Std : Sensor Value Display Value : Display set value of output 1,2 as present value by input ON/OFF.
- (※2) Decimal Point Display : Decimal point display : It sets the current value display unit as 0.1/1, i.e. In case of setting as '1', it displays the current value with cutting the decimal place.
- (※3) Correct Temp. Sensor : Correct deviations of temperature sensor. e.g) if displayed temperature is 19°C and actual temperature is 18°C, it is corrected by inputting -1.0°C
- (※4) Control Output Operation at Error Occurrence : When error occurs, control output repeatedly operates OFF/ON until error is reset.
e.g) In case of setting of operation cycle : 60minutes, ON ratio 20%, it repeatedly operates a cycle of OFF (48 minutes) / ON (12 minutes).
- (※5) Setup Value Unication Mode : In case of setting this function as ON, setup value is unied and controlled as 1 case.
- (※6) Manual Reset alarm : In case of selecting manual reset alarm, it is reset by re-inputting power or pushing PRG button rapidly 2 times.
- (※7) In case of occurrence of high or low limit alarm, it doesn't affect control output #1 at all.
- (※8) Communication Address : Master mode address is to -1 from -64.

Communication

Transmission line connection	Multiple line
Communications method	RS485 (2-wire, half-duplex)
BPS	BPS default 4800 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)
Poll interval	100msec

Change of BPS
Default value of this model is 4800bps and it should be changed separately.



1. Entry into parameter relating to BPS
Press **PRG** + **SEL** + **▲** + **▼** buttons simultaneously for 5 seconds as shown in the figure
2. **bdr** BDR Communication Speed (Press the SEL button eight times)
Adjust BPS using **▲** / **▼** buttons from the **bdr** parameter
(48 : 4800bps, 96 : 9600bps, 192 : 19200bps, 384 : 38400bps)
3. Store set value (Press the SEL button for three seconds)

Communication Table

No	Menu	Unit	Type	Size (Word)	FX	MMI	Scale
4 0101	Product status codes		Digital	INT 16	Refer to bit status below		
Bit 0	Output 1 ON / OFF status		Digital	Bit	0 : OFF	1 : ON	
Bit 1	Output 2 ON / OFF status		Digital	Bit	0 : OFF	1 : ON	
Bit 2	Defrost output ON / OFF status		Digital	Bit	0 : OFF	1 : ON	
Bit 12	Min. range alarm		Digital	Bit	0 : Normal	1 : Alarm	
Bit 13	Max. range alarm		Digital	Bit	0 : Normal	1 : Alarm	
Bit 14	Sensor (disconnection, short-circuit) Alarm		Digital	Bit	0 : Normal	1 : Alarm	
Bit 15	EEPROM alarm		Digital	Bit	0 : Normal	1 : Alarm	
4 0102	Current temperature value (PV)	°C	Analog	INT 16	-50 ~ 105	-500 ~ 1050	1/10
4 0103	FND display current temp. value (PV)	°C	Analog	INT 16	-50 ~ 105	-500 ~ 1050	1/10
4 0104	Output 1 (St1) settings (*read only)	°C	Analog	INT 16	-50 ~ 105	-500 ~ 1050	1/10
4 0105	Output 2 (St2) settings (*read only)	°C	Analog	INT 16	-50 ~ 105	-500 ~ 1050	1/10
4 0107	Command of compulsory defrost with manual		Analog	INT 16	1 : START (Auto-reset)		
4 0108	Command of compulsory defrost termination		Analog	INT 16	1 : STOP (Auto-reset)		