Digital Humidity & Temp. Controller

FX3DH

User's Manual

DOTECH
SENSING & CONTROL

.DOTECH INC http://www.aboxin.com TEL: +98-21-46803105

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(0.50mm^2).
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.

- Humidification(Heating) /Dehumidification(Cooling) Output
- Switching Display of Temperature and Humidity
- High/Low Limit Alarm
- Sensor Calibration
- Sensor Error Detection and On/Off Output Control
- Minimum On/Off Duration Time
- Manual Relay Control
- Analog Signal Output(4-20mA)
- Communication via RS485 MODBUS

Ordering guide

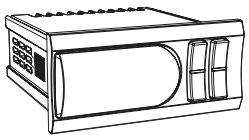
FX3DH-00	Basic Model
FX3DH-A1	4~20mA Trans output model
FX3DH-R4	RS485 Comm. model
FX3DH-A1R4	4~20mA Trans output & RS485 Comm. model

Technical Specifications

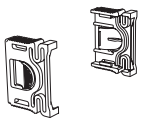
Power	100–240Vac, 50/60Hz
Current	MAX 6 VA
Connection	Screw Bolt Connector(1.5mm^2 Wire Use Possibility)
Output	Relay Output 2 Point (250Vac / 5A)
Input	Humidity 1 Point (HTX20-FTS-502, HTX3515) Temp. 1 Point (DPR-TH01-ET)
Dimensions	78(W)mm X 35(H)mm X 78(D)mm
Operation	Temperature: -10 ~ 50°C, Humidity: Below 90%RH
Storage	Temperature: -20 ~ 60°C, Humidity: Below 90%RH

※ Specifications are subject to change without prior notice.

Components



Product



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User's Manual

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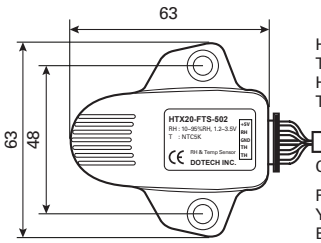
Accessories

HTX20-FTS-502 : Temp.& Humidity sensor



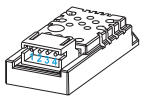
Humidity range: 10 ~ 95%RH
Temp. range: 0 ~ 60℃
Humidity output :1.2~3.5V
Temp. output: NTC5K

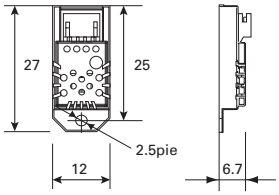
Cable length 3M

Red : Humidity sensor power +5V
Yellow : Humidity measurement signal output
Black : Humidity sensor power 0V
white : Temperature sensor(NTC5K)
Blue : Temperature sensor(NTC5K)

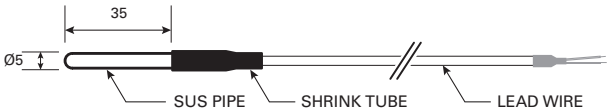
HTX3515 : Humidity sensor

Humidity range: 0~100%RH
Humidity output: 1.0~3.6Vdc
Connection Cable length 3M
1: Black : Humidity sensor power 0V
2: Red : Humidity sensor power+5V
4: White : Humidity measurement signal output

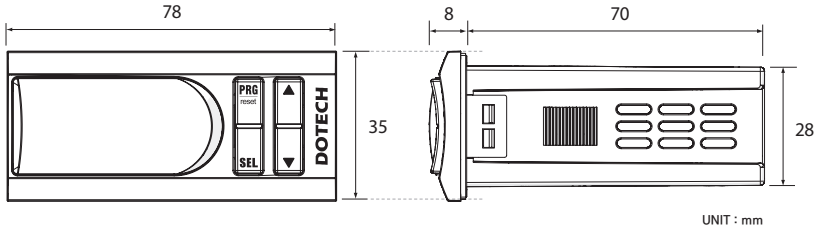


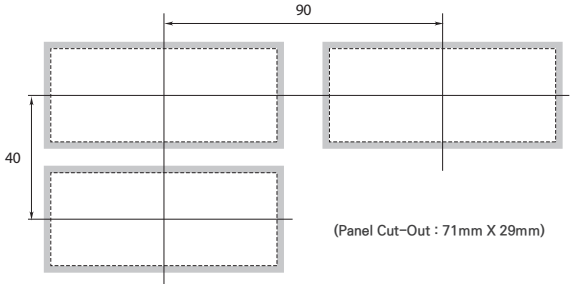


DPR-TH01-ET : Temperature sensor

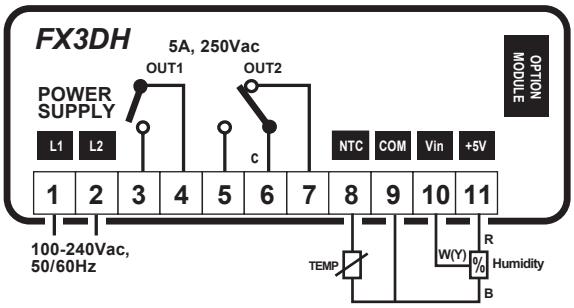


Dimensions and Panel Cut-Out Form





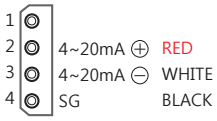
Wiring



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

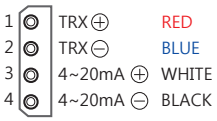
Option Module connection

-A1 Model
4~20mA Output



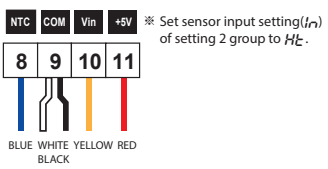
-R4 Model
RS485 COMM.

-A1R4 Model
4~20mA Output
& RS485 COMM.



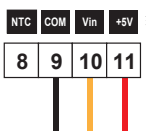
Sensor connection

HTX20-FTS-502
Temp. & Humidity sensor



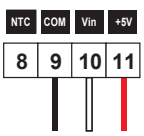
※ Set sensor input setting(In) of setting 2 group to Ht.

HTX20-FTS-502
Humidity sensor



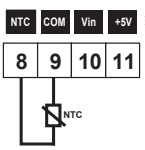
※ Set sensor input setting(In) of setting 2 group to H.

HTX3515
Humidity sensor



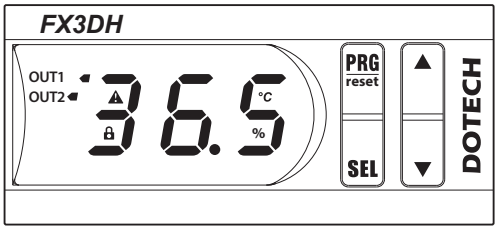
※ Set sensor input setting(In) of setting 2 group to H.

DPR-TH01-ET
Temp. sensor



※ Set sensor input setting(In) of setting 2 group to t.

Constitution (Function of Display Lamp and Button)



LED	**OUT1**	Turn on when output #1 is ON (Flickering at standby)
	OUT2	Turn on when output #2 is ON (Flickering at standby)
	⚠	ON at trip, Flickering at alarm
	🔒	Parameter set up locked
BUTTON	**PRG**	Use at program setup
	SEL	Execute selected menu or Input setup value
	▲	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

※ Reboot or push PRG button in 2 successive time when alarm output is removed.

Code	Menu	Description / Instructions	Response at Detection	Reset Type
SYS	Internal Parameter Error	In Case of change of set value by an unknown case.	Immediate Stop	Automatic Reset
HoP	Humidy Sensor Open	In case of Input sensor open wire(Normal operation after sensor connecting)	Immediate Stop	Automatic Reset
HSt	Humidy Sensor Short	In case of Input sensor short circuit	Immediate Stop	Automatic Reset
HLL	Humidy Lower Input	Lower sensor input than measuring range	Immediate Stop	Automatic Reset
HHH	Humidy Higher Input	Higher sensor input than measuring range	Immediate Stop	Automatic Reset
toP	Temp. Lower Low Limit	Lower Low Limit Alarm than Low Limit Alarm Value	Immediate Stop	Automatic Reset
tSt	Temp. Higher High Limit	Higher High Limit Alarm than High Limit Alarm Value	Immediate Stop	Automatic Reset
tLL	Temp. Lower Input	Lower sensor input than measuring range	Immediate Stop	Automatic Reset
tHH	Temp. Higher Input	Higher sensor input than measuring range	Immediate Stop	Automatic Reset

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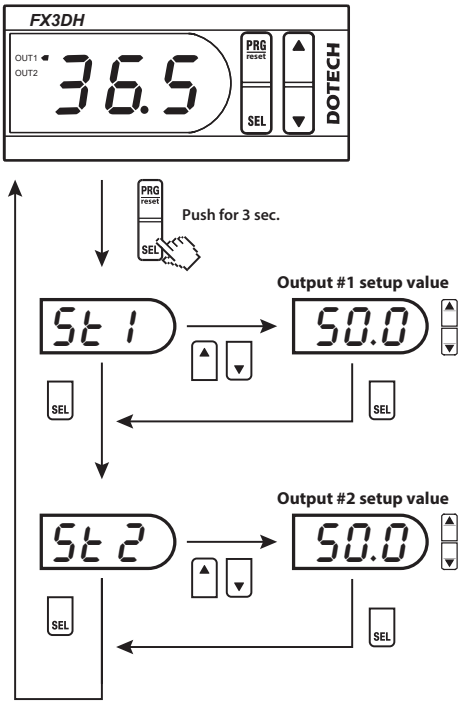
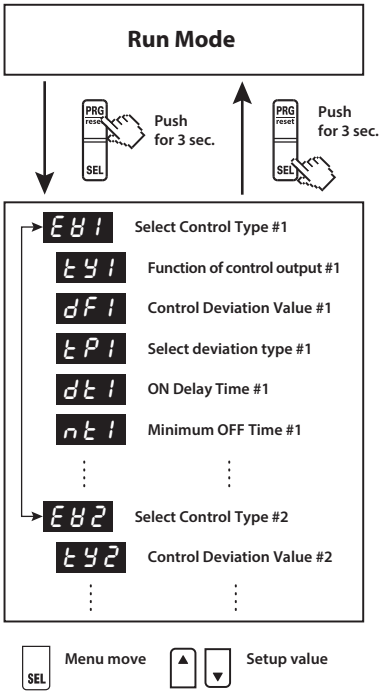
Parameter

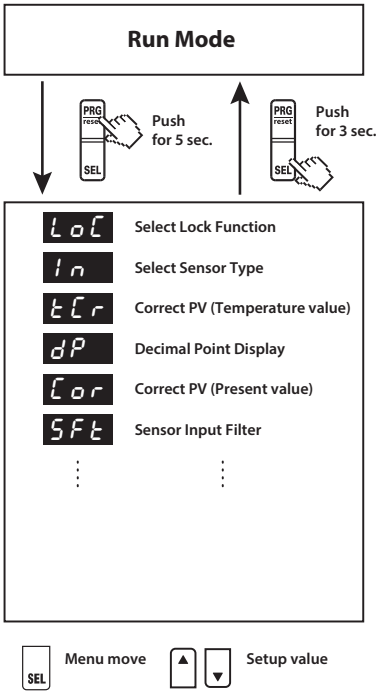
Humidity & Temp. Setting Group



Setting 1 Group



Setting 2 Group



Humidity & Temp. 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	50.0	
4 0002	Output #2 setup value	St2	%, °C	0.1	UL2	UH2	50.0	

※ If the set value of the In is set to control the humidity Ht St1 , St2 are used as temperature control.

Setting 1 Group (PRG Button Push for 3 Sec.)

No	Menu		Code	Unit	Step	Min	Max	Default	Custom Setup
4 0016		Select Control Type	tY1	oFF (0) : Display C (1) : Cooling mode H (2) : Heating mode AL 1 (3) : Deviation high limit alarm AL2 (4) : Deviation low limit alarm AL3 (5) : Deviation high, low limit alarm AL4 (6) : Deviation high, low limit reverse alarm AL5 (7) : Absolute value high limit alarm AL6 (8) : Absolute value low limit alarm SbA (9) : Sensor open wire alarm				C (1)	
4 0017		Control Deviation Value	dF1	K	0.1	0.1	99.9	2.0	
4 0018		Select Deviation Value	tP1	P (0) : Deviation Pn (1): ± Deviation				P (0)	
4 0020		ON Delay Time (※1)	dt1	Sec	1	0	999	1	
4 0021	EU1 Output #1	Minimum OFF Time (※2)	Ft1	Sec	1	0	999	5	
4 0022		Minimum ON Time (※3)	nt1	Sec	1	0	999	5	
4 0023		Output at Sensor Error (※4)	SF1	oFF(0) On (1)				oFF(0)	
4 0024		Alarm Deviation Value	HY1	K	0.1	0.0	99.9	1.0	
4 0025		Alarm Option	AP1	ALA(0): General alarm, ALb(1): Maintain alarm, ALC(2): Standby alarm, ALd(3): Maintain & standby alarm				ALA(0)	
4 0026		High limit by user setup	UH1	%, °C	1	UL1	105	100	
4 0027		Low limit by user setup	UL1	%, °C	1	-50	UH1	0	
4 0028		Manual Output Mode Output (※5)	md1	oFF(0) : Output by PV (Present Value)		on(1) : Output by mU2 (-R4 model)		oFF(0)	
4 0029		Manual Output Value Output (※6)	mU1	oFF(0) : Always output OFF		on(1) : Always output ON		oFF(0)	
4 0031		Select Control Type	tY2	oFF (0) : Display C (1) : Cooling mode H (2) : Heating mode AL 1 (3) : Deviation high limit alarm AL2 (4) : Deviation low limit alarm AL3 (5) : Deviation high, low limit alarm AL4 (6) : Deviation high, low limit reverse alarm AL5 (7) : Absolute value high limit alarm AL6 (8) : Absolute value low limit alarm SbA (9) : Sensor open wire alarm				H (2)	
4 0032		Control Deviation Value	dF2	K	0.1	0.1	99.9	2.0	
4 0033		Select Deviation Value	tP2	P (0) : Deviation Pn (1): ± Deviation				P (0)	
4 0035		ON Delay Time (※1)	dt2	Sec	1	0	999	1	
4 0036	EU2 Output #2	Minimum OFF Time (※2)	Ft2	Sec	1	0	999	5	
4 0037		Minimum ON Time (※3)	nt2	Sec	1	0	999	5	
4 0038		Output at Sensor Error (※4)	SF2	oFF(0) On (1)				oFF(0)	
4 0039		Alarm Deviation Value	HY2	K	0.1	0.0	99.9	1.0	
4 0040		Alarm Option	AP2	ALA(0): General alarm, ALb(1): Maintain alarm, ALC(2): Standby alarm, ALd(3): Maintain & standby alarm				ALA(0)	
4 0041		High limit by user setup	UH2	%, °C	1	UL2	105	100	
4 0042		Low limit by user setup	UL2	%, °C	1	-50	UH2	0	
4 0043		Manual Output Mode Output (※5)	md2	oFF(0) : Output by PV (Present Value)		on(1) : Output by mU2 (-R4 model)		oFF(0)	
4 0044		Manual Output Value Output (※6)	mU2	oFF(0) : Always output OFF		on(1) : Always output ON		oFF(0)	

※1) ON delay time : It outputs after setting delay time in spite of output condition. During ON delay time, output lamp is turned on with output after flickering in fast cycle

※2) Min OFF Time : It lets output not occur within min. OFF time after it is turned off. During min. OFF time, output lamp is turned on with output after it flickers every 1 second intervals

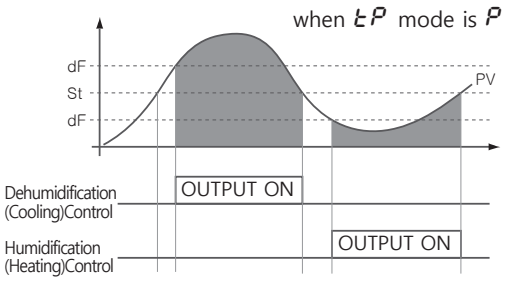
※3) Min ON Time : It is for avoiding frequent ON/OFF of control output and maintains ON condition in spite of OFF condition during Min ON Time after being turned on.
(In case of sensor error, OFF at once)

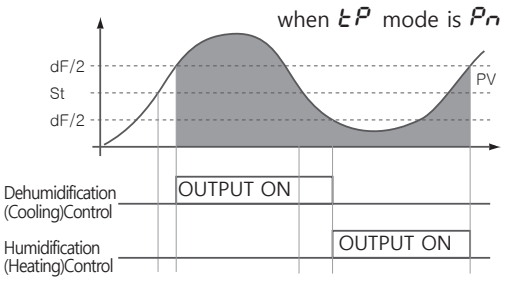
※4) Output at Sensor Error : In case of sensor error such as open wire/short, it sets ON/OFF status of the related output.

※5) Manual Output Mode : OFF : Output by PV / ON : Output by mU1,mU2 (-R4 model)

※6) Manual Output Value Setup : It outputs continuously regardless of PV. if manual output value is ON when manual output mode is ON. (-R4 model)

Deviation Control





Alarm Operation Group tY1 , tY2 (* SV : St1 ~ St2 * dF : dF1 ~ dF2 * HY : HY1 ~ HY2)

AL1	OFF HY ON; SV 80, PV 90 ※ set dF to 10 OFF HY ON; PV 70, SV 80 ※ set dF to -10	**Deviation High Limit Alarm** Output is ON when the deviation between PV value and SV value is higher than setup value of control deviation
AL2	ON HY OFF; PV 70, SV 80 ※ set dF to 10 ON HY OFF; SV 80, PV 90 ※ set dF to -10	**Deviation Low Limit Alarm** Output is ON when the deviation between PV value and SV value is lower than setup value of control deviation.
AL3	ON HY OFF HY ON; PV 70, SV 80, PV 90 ※ set dF to 10	**Deviation High & Low Limit Alarm** Output is ON when the deviation between PV value and SV value is higher or lower than setup value of control deviation . Control deviation is set up at dF in setting 1 group. If dF value ≤ 0, it is always OFF.
AL4	OFF HY ON HY OFF; PV 70, SV 80, PV 90 ※ set dF to 10	**Deviation High & Low Limit Reverse Alarm** Output is OFF when the deviation between PV value and SV value is higher or lower than setup value of control deviation . Control deviation is set up at dF in setting 1 group. If dF value ≤ 0, it is always OFF.
AL5	OFF HY ON; PV 70 ※ set dF to 70 OFF HY ON; PV 90 ※ set dF to 90	**Absolute Value High Limit Alarm** Output is ON when PV value is higher than or equal as control deviation setup value. Alarm temperature is set up at dF in setting 1 group. It works regardless of SV(Set value).
AL6	ON HY OFF; PV 70 ※ set dF to 70 ON HY OFF; PV 90 ※ set dF to 90	**Absolute Value Low Limit Alarm** Output is ON when PV value is lower than or equal as control deviation setup value. Alarm temperature is set up at dF in setting 1 group. It works regardless of SV(set value).
SbA		**Sensor Open Wire Alarm** Output is ON when sensor wire is opened.

Alarm Operation Group AP1 , AP2

CODE	OPERATION TITLE	DESCRIPTION FOR ALARM OPTION OPERATION
ALA	General alarm	Standard alarm operation without option
ALb	Maintain alarm	Maintain output ON after alarm occurs
ALC	Standby alarm	No output at initial operation (until achieve the 1st setup value)
ALd	Maintain & standby alarm	Execute both ALb & ALC at the same time

※ Reboot or push PRG button in 2 successive time when alarm output is removed.

Setting 2 Group (PRG Button Push for 5 Sec.)

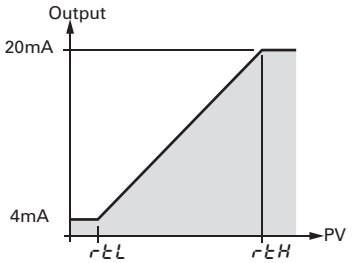
No	Menu	Code	Unit	Step	Min	Max	Default	Custom Setup
4 0076	Lock Function	LoC	oFF (0) : Lock cancel LC 1 (1) : Setting 2 group lock LC2 (2) : Setting 1,2 group lock LC3 (3) : Setting 1, 2 group, Humidity & Temp. setup lock				oFF (0)	
4 0077	Sensor Type	In	H(0) : Use for humidity control only t(1) : Use for temp. control only Ht (2) : Use for humidity and temperature control Htd(3) : Use for humidity control and temperature display				H (0)	
4 0080	Correction of temperature sensor (※1)	tCr	°C	0.1	-19.9	99.9	0.0	
4 0081	Decimal Point(PV) Display (※2)	dP	0.1(0) : Decimal point display		1 (1) : Do not display decimals		0.1(0)	
4 0082	Correction of PV	Cor	K	0.1	-19.9	19.9	0.0	
4 0083	Sensor Input Filter (※3)	SFt	Sec	0.1	0.1	5.0	2.0	
4 0084	Sensor Value Display Cycle	Sdt	Sec	0.1	0	5.0	0.5	
4 0085	Set Value(SV) Unification Mode	Sto	oFF : Individual SV mode		on : Unifying SV mode		oFF (0)	
4 0086	Communication Address (-R4 model)	Adr	1	1	1	128	1	
4 0087	Communication Speed (-R4 model)	bdr	48 : 4800BPS 96 : 9600BPS 192 : 19200BPS 384 : 38400BPS				96	
4 0088	Analogue Trans. Output (4~20mA) Mode (-A1 model)	Aon	PV (0) : PV Trans. dir (1) : Humidification(Heating) proportional Control rEV (2) : Dehumidification(Cooling) proportional Control St1 (3) : SV1(Set value) Trans. St2 (4) : SV2(Set value) Trans.				PV	
4 0089	Analogue Trans. Output (20mA) (-A1 model)	rtH	-	`	-199	999	100	
4 0090	Analogue Trans. Output (4mA) (-A1 model)	rtL		1	-199	999	0	

※1) Correction of temperature sensor : It is displayed when sensor input mode(In) set to Temp. & Humidity control mode or humidity control and temp. display mode.

※2) PV Decimal Point Display : In case of setting as '1', it displays the current value with cutting the decimal place.

※3) Sensor Input Filter Value : It avoids hunting by giving temperature measuring delay.

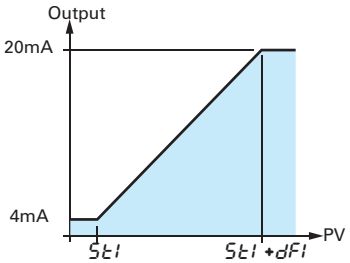
Current value (PV) trans. output



set Aon to PV (Current value)

rtL Input PV at 4mA output.
rtH Input PV at 20mA output.

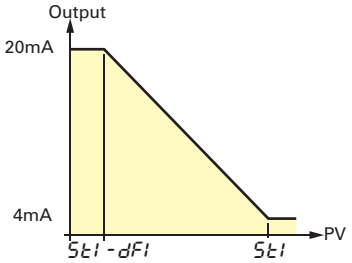
Dehumidification(Cooling) proportional Control



set Aon to rEV (Dehumidification (Cooling) proportional Control)

St1 Input SV at 4mA output.
dF1 Input DF at 20mA output.

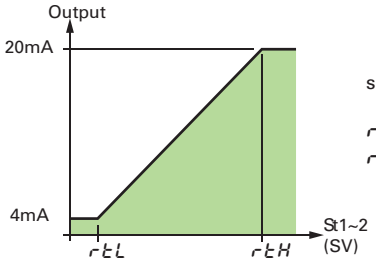
Humidification(Heating) proportional Control



set Aon to dir (Humidification (Heating) proportional Control)

St1 Input SV at 4mA output.
dF1 Input DF at 20mA output.

Set value(St) trans. output



set Aon to St1 -2 (set value)

rtL Input SV at 4mA output.
rtH Input SV at 20mA output.

Communication

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)
Poll interval	100msec

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 13	Temp. Sensor (disconnection, short-circuit) Alarm		Digital	Bit	0 : Normal 1 : Alarm		
Bit 14	Humidity Sensor (disconnection, short-circuit) Alarm		Digital	Bit	0 : Normal 1 : Alarm		
Bit 15	EEPROM alarm		Digital	Bit	0 : Normal 1 : Alarm		
4 0107	Current humidity value (PV)	%	Analog	INT 16	0 ~ 100	0 ~ 1000	1/10
4 0108	Current temp. value (PV)	°C	Analog	INT 16	-50 ~ 105	-500 ~ 1050	1/10