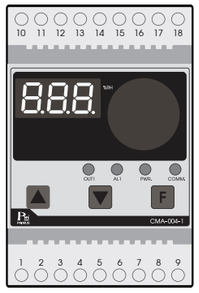
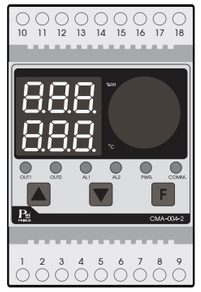
CMA-004-SERIES DIGITAL HYGROSTAT AND THERMOSTAT CONTROLLER

Primus
User Manual



CMA-004-1

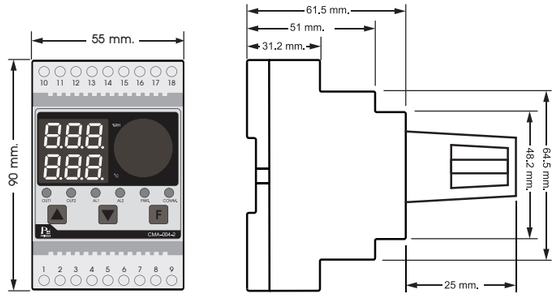


CMA-004-2

TECHNICAL SPECIFICATION

		CMA-004-1	CMA-004-2
Power Supply		220V~±10% 50Hz	220V~±10% 50Hz
Power Consumption		2.5VA	
Display		7 Segment, Size 0.39 Inch, 3 Digit, (1 Row for CMA-004-1) (2 Row for CMA-004-2)	
		1 LED (Show Output)	2 LED (Show Output)
		1 LED (Show Alarm)	2 LED (Show Alarm)
		1 LED (Show Power Supply)	
		1 LED (Show Communication)	
Temperature Range		-	0-80°C
Temperature Accuracy		-	±1°C
Relative Humidity Range		0-100% RH	
Relative Humidity Accuracy		± 5% RH	
Response Time		5 Sec	
Output	Relay	1 Relay NO/NC 10A, 250VAC	2 Relay NO/NC 10A, 250VAC
	Alarm	1 Alarm NO 3A, 250VAC	2 Alarm NO 3A, 250VAC
Communication	Protocol	MODBUS RTU	
	Baud Rate	4800, 9600, 19200, 38400, 57600 bps	
	Parity	None, Odd, Even	
	Stop Bits	1 Bits, 2 Bits	
	Data Bits	8 Bits	
	Maximum Support Node	255	
Ambient Operation	Temperature	-20°C to 60°C	
	Humidity	85 % RH Non-Condensing	
Ambient Storage	Temperature	-20°C to 80°C	
	Humidity	85 % RH Non-Condensing	
Protection Degree		IP20	
Installation		DIN RAIL	
Material		PC-ABS (UL94V-0)	
Size (mm.)		90 x 55 x 61.5	
Weight		166 g.	

DIMENSION



DESCRIPTION

- CMA-004-Series is a digital hygrostat and thermostat controller.
- Measure Range
  - Humidity : 1-100 % RH
  - Temperature : 0.00-80.0°C
- Display by 7-Segment LED 3 Digits
- There are Relay Output and Alarm Output (CMA-004-1 amount 1 Relay, 1 Alarm and CMA-004-2 amount 2 Relay, 2 Alarm).
- Direct Control (Cooling) and Reverse Control (Heating) operation control functions.
- Comunication with computer via RS-485 MODBUS RTU Protocol

OPERATION

CMA-004-Series is a digital hygrostat and thermostat controller classified by usage into 2 models follow :

CMA-004-1 Digital hygrostat Controller has probe inside measure range 1-100% RH There are 1 Relay Output NO/NC 10A 250VAC and 1 Alarm Output NO 3A, 250 VAC display by 7-Segment LED 3 Digits 2 rows

Output operation can choose 2 types of control functions are

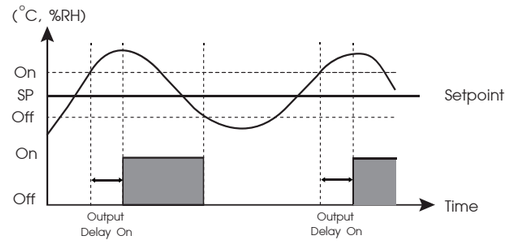
Direct Control (Cooling) is Output which will operate when the measured value over than Setpoint (SP) value and Output will stop when the measured value is less than Setpoint (SP) (reference from the operation graph) picture 2

Reverse Control (Heating) is the Output that will operate when the measured value is less than Setpoint (SP) value (reference from the operation graph) picture 2

CMA-004-Series can communicate with the computer to save data or Monitor via RS-485 MODBUS RTU Protocol

Alarm operation is Absolute type by the value used to switch the operation of the Alarm Alarm operation will separate from Setpoint value(SP) or we can define this is the relay switch phase by not including SP value to calculate classified into 4 models such as High-Low Alarm, High Alarm, Low Alarm, and High-Low Alarm.

Output Control Function graph

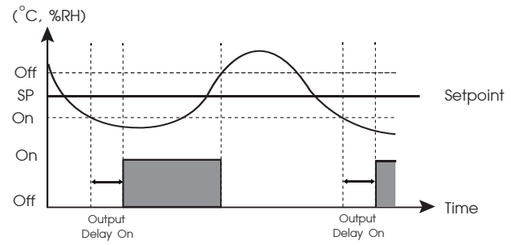


Picture 1 Direct Control (Cooling)

Example

SP1 = 40.0 %RH, On = 1.0, Off = 1.0	SP2 = 50.0°C, On = 3.0, Off = 3.0
when 41.0 %RH ⩾ SP+On, OUT1 : On	when 53.0°C ⩾ SP+On, OUT2 : On
when 38.9 %RH < SP-Off, OUT1 : Off	when 46.9°C < SP-Off, OUT2 : Off

*Output Delay On (Odo) operation will work when PV remain in the condition until the expiration time



Picture 2 Reverse Control (Heating)

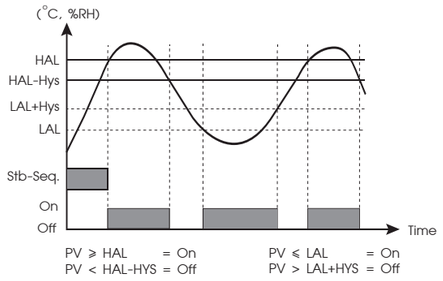
Example

SP1 = 40.0 %RH, On = 1.0, Off = 1.0	SP2 = 50.0°C, On = 3.0, Off = 3.0
when 39 %RH ⩽ SP-On, OUT1 : On	when 47°C ⩽ SP-On, OUT2 : On
when 41.1 %RH > SP+Off, OUT1 : Off	when 53.1°C > SP+Off, OUT2 : Off

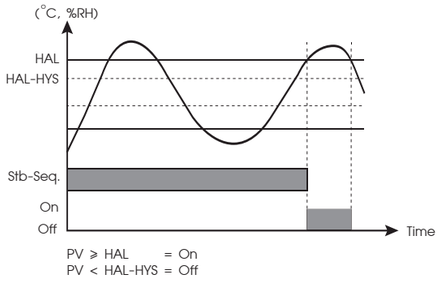
*Output Delay On (Odo) operation will work when PV remain in the condition until the expiration time

Alarm Function graph

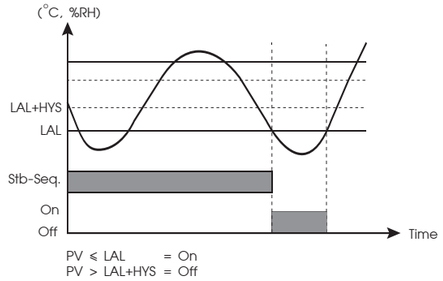
1.Absolute Value High-Low Band Alarm



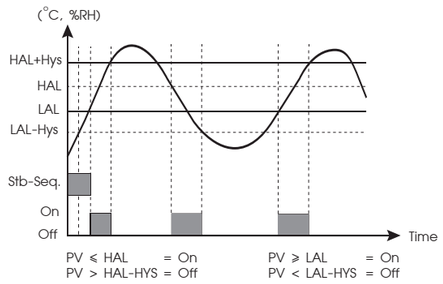
2.Absolute Value High Alarm



3.Absolute Value Low Alarm



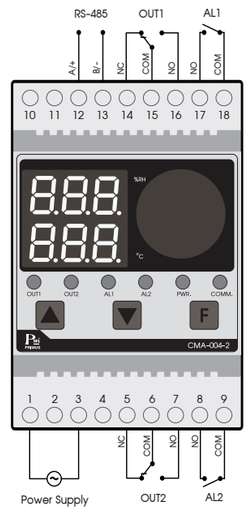
4.Absolute Value High-Low Range Alarm



Stand-by sequence operation will start to check the status of the readable value that has matched with a condition. The alarm will not operate until the value matches the condition the second time, it will command the Alarm to operate and stop Stand-by Sequence

WIRING DIAGRAM

CMA-004-1



CMA-004-2

ORDERING CODE

CMA-004 - [INPUT] - [OPTION]

INPUT	
1	HYGROSTAT
2	HYGROSTAT AND THERMOSTAT

OPTION	
NONE	NONE
M	RS-485

CMA-004-SERIES DIGITAL HYGROSTAT AND THERMOSTAT CONTROLLER

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SETTING PARAMETER

- Power ON — Blink for 3 seconds. For Initial Hardware
- Display Version — Show Firmware Version
- Operation Mode Display — Display Humidity, %RH; Display Temperature, °C

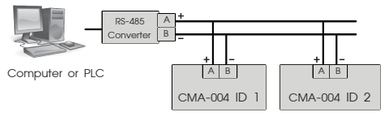
Press F Hold for 3 Sec.

1. Setpoint Setting for Control Output1 (Humidity) — Set Setpoint1 (SP1) for control humidity (OUT1) — Press ▲ or ▼ for setting 0.0 - 99.0 %RH
2. ON Position Setting for SP1 — Set ON Position OUT1 (On) — Press ▲ or ▼ for setting -19.9 - 19.9 %RH
3. OFF Position Setting for SP1 — Set Off Position OUT1 (Off) — Press ▲ or ▼ for setting -19.9 - 19.9 %RH
4. Control Mode for Output 1 — Set Control mode for control OUT1 — Press ▲ or ▼ 0 : Direct Control (Cooling) 1 : Reverse Conrol (Heating)
5. Output Delay ON for Output 1 — Set Delay ON for OUT1 — press ▲ or ▼ for setting 0 - 999 Sec.
6. Setpoint Setting for Control Output2 (Temperature) — Set Setpoint2 (SP2) to control temperature (OUT2) — Press ▲ or ▼ for setting 0.0 - 80.0 °C
7. ON Position Setting for SP2 — Set ON Position OUT2 (On) — Press ▲ or ▼ For setting -19.9 - 19.9 °C
8. OFF Position Setting for SP2 — Set Off position OUT2 (Off) — Press ▲ or ▼ for setting -19.9 - 19.9 °C
9. Control Mode for Output 2 — Set control mode to control OUT2 — Press ▲ or ▼ 0 : Direct Control (Cooling) 1 : Reverse Conrol (Heating)
10. Output Delay ON for Output 2 — Set Output Delay ON OUT2 — Press ▲ or ▼ For setting 0 - 999 Sec.
11. Function Setting for Alarm 1 — Set Alarm1 Function — 0 : None; 1 : Stand-by Sequence; 0 : OFF; 1 : Absolute Value High-Low Band Alarm; 2 : Absolute Value High Alarm; 3 : Absolute Value Low Alarm; 4 : Absolute Value High-Low Range Alarm
12. High Limit Setting for Alarm 1 (Humidity) — Set Humidity Hight Limit Alarm1 — Press ▲ or — 0.0 to 99 %RH
13. Low Limit Setting for Alarm 1 (Humidity) — Set Humidity Low Limit Alarm1 — Press ▲ or ▼ 0.0 to 99 %RH
14. Control Sensitivity Setting for Alarm 1 — Set Hysteresis Alarm1 — Press ▲ or ▼ -19.9 to 199 %RH
15. Function Setting for Alarm 2 — Set Alarm2 Function — 0 : None; 1 : Stand-by Sequence; 0 : OFF; 1 : Absolute Value High-Low Band Alarm; 2 : Absolute Value High Alarm; 3 : Absolute Value Low Alarm; 4 : Absolute Value High-Low Range Alarm
16. High Limit Setting for Alarm 2 (Temperature) — Set Temperature High Limit Alarm2 — Press ▲ or ▼ 0.0 to 80.0 °C
17. Low Limit Setting for Alarm 2 (Temperature) — Set Temperature Low Limit Alarm2 — Press ▲ or ▼ 0.0 to 80.0 °C
18. Control Sensitivity Setting for Alarm 2 — Set Hysteresis Alarm2 — Press ▲ or ▼ -19.9 to 199 °C
19. Power ON Alarm Over Ride — Set Power ON Alarm Over Ride when turn ON — Press ▲ or ▼ Delay Alarm operation when turn on 0 to 999 Sec.
20. Key Lock — Set Key Lock — Press ▲ or ▼ Set Lock Key at Operat Display 0 : None 1 : All Lock Except Parameter LOC If press button correct Lock will show 100 for 15 Sec.
21. PV Correction 1 — Set Humidity compensate — Press ▲ or ▼ Set compensate readable %RH -19.9 to 19.9 %RH.
22. PV Correction 2 — Set Temperature compensate — Press ▲ or ▼ Set compensate Temp readable -19.9 to 19.9 °C
23. Device Address Setting — Set Device Address — Press ▲ or ▼ Device Address set 1 to 255
24. Baudrate Setting — Set Baudrate — Press ▲ or ▼ Set Baud Rate 4.8 = 4800 bps; 9.6 = 9600 bps; 19.2 = 19200 bps; 38.4 = 38400 bps; 57.6 = 57600 bps
25. Communication Setting — Set Parity and Stop Bit — Press ▲ or ▼ Set Parity & Stop Bit; Data Bits เป็น 8 Bits เสมอ; 8n1 = Data 8 Bits None Parity Stop Bit 1; 8n1 = Data 8 Bits Odd Parity Stop Bit 1; 8n1 = Data 8 Bits Even Parity Stop Bit 1; 8n2 = Data 8 Bits None Parity Stop Bit 2; 8n2 = Data 8 Bits Odd Parity Stop Bit 2; 8n2 = Data 8 Bits Even Parity Stop Bit 2

SERIAL COMMUNICATION

The CMA-004-Series are Equipped With a RS-485 Series Communication Interface to Allow Connection to Computer or PLCs. MODBUS PROTOCOL is Provided as Standard Communication. The User Can Connect CMA-004-Series as Network Up to 128 Meters.

Wiring Diagram



MODBUS PROTOCOL

This MODBUS PROTOCOL Has Been Implement In Accordance With MODBUS.ORG MODBUS Application PROTOCOL Specification V1.1 With The Following Conditions Applying. The Following Conditions Apply Baudrate Can Selected Refer 22. Speed Setting The Format Is MODBUS RTU Refer 22. Speed Setting The Format Is MODBUS RTU UART Data Can Selected Refer 23. Communication Setting Data Is Considered To Be Half Duplex Using 2 Wire.

Modbus Function code

Function code	Operation	Brodcast
0x03	Read Holding Registers	No
0x04	Read Multiple Registers	No
0x06	Preset Single Registers	Yes
0x10	Preset Multiple Registers	Yes

Modbus Exception code

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the data field is not an allowable value for server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Example of a client request and server exception response

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	84
Starting Address Hi	00	Exception Code	02
Starting Address Lo	00	CRC Hi	C2
Quantity of Input Reg. Hi	00	CRC Lo	C1
Quantity of Input Reg. Lo	1E		
CRC Hi	70		
CRC Lo	02		

MODBUS of KM-20 Table

Modbus Table 1

Reg. Address		Reg. Name	Description Name	Format	Word	Access
Decimal	Hex					
0	0x0	PV1	Process Value of Humidity	int	1	Read Only
1	0x1	PV2	Process Value of Temperature	int	1	Read Only
2	0x2	SP1	Set Point for Output Control Humidity	int	1	Read/Write
3	0x3	SP2	Set Point for Output Control Temperature	int	1	Read/Write
4	0x4	ON1	Control Sensitivity Setting for SP1	int	1	Read/Write
5	0x5	OFF1	OFF Position Setting for SP1	int	1	Read/Write
6	0x6	CON1	Control mode for Output1	int	1	Read/Write
7	0x7	ODO1	Output Delay ON for Output1	int	1	Read/Write
8	0x8	ON2	Control Sensitivity Setting for SP2	int	1	Read/Write
9	0x9	OFF2	OFF Position Setting for SP2	int	1	Read/Write
10	0xA	CON2	Control mode for Output2	int	1	Read/Write
11	0xB	ODO2	Output Delay ON for Output2	int	1	Read/Write
12	0xC	ALF1	Function Setting for Alarm1	int	1	Read/Write
13	0xD	ALH1	High Ilimite Setting for Alarm1 (Humidity)	int	1	Read/Write
14	0xE	ALL1	Low Ilimite Setting for Alarm1 (Humidity)	int	1	Read/Write
15	0xF	HYS1	Control Sensitivity Setting for Alarm1 (Humidity)	int	1	Read/Write
16	0x10	ALF2	Function Setting for Alarm2	int	1	Read/Write
17	0x11	ALH2	High limite Setting for Alarm2 (Temperature)	int	1	Read/Write
18	0x12	ALL2	Low limite Setting for Alarm2 (Temperature)	int	1	Read/Write
19	0x13	HYS2	Control Sensitivity Setting for Alarm2 (Temperature)	int	1	Read/Write
20	0x14	PAO	Power on Alarm Override	int	1	Read/Write
21	0x15	LOC	Key Lock Parameter Setting	int	1	Read/Write
22	0x16	PVS1	PV Correction 1	int	1	Read/Write
23	0x17	PVS2	PV Correction 2	int	1	Read/Write

CMA-004

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