NOTE: Date: 2016.07.14

- The serial communication of this controller can support RS485 interface. When wiring, please pay attention to RJ-12 connector polarity.
- The protocols of ModBus are adopted, which supports formats of RTU and ASCII.
- Supports the 00 function of ModBus diagnostic Mode (0x08).
- Maximum 8 sets for multiple write-in / read.
- In order to lengthen the lifespan of internal memory (EEPROM) of the controller, if the data changes frequently, it is suggested set the contact point (Coil) address "0000" to 0 (power off no memory). When the data is no longer being written, set this address as 1 (data write EEPROM).
- For settings and English names of communication parameters, please see Operating Manual.

Description	Address	Read/Write	Function Code
Set Value (SV) setting. Range: SV L ~ SV H	0000	r/w	03/06
Min. output setting of control output 1 (o1 L). Range: 0~300 (unit: 0.1%)	0001	r/w	03/06
Max. output setting of control output 1 (o1 H). Range: 500~1000 (unit: 0.1%)	0002	r/w	03/06
Alarm output 1 (AL 1) setting. Range: -1999 ~ 9999	0005	r/w	03/06
Alarm output 2 (AL 2) setting. Range: -1999 ~ 9999 (note 1)	0006	r/w	03/06
Alarm output 3 (AL 3) setting. Range: -1999 ~ 9999 (note 1)	0007	r/w	03/06
Setting of alarm 1 (A1Fu). Range: 00~26	0008	r/w	03/06
Setting of alarm 2 (A2Fu). Range: 00~26 (note 1)	0009	r/w	03/06
Setting of alarm 3 (A3Fu). Range: 00~26 (remark 1)	0010	r/w	03/06
Time setting of alarm 1 (A3Tr). Range: -1999~9999 sec.	0011	r/w	03/06
Time setting of alarm 2 (A3Tr). Range: -1999~9999 sec. (note 1)	0012	r/w	03/06
Time setting of alarm 3 (A3Tr). Range: -1999~9999 sec. (note 1)	0013	r/w	03/06
Setting proportional band 1 (P). Range: 0~2000	0014	r/w	03/06
Integration time setting (I). Range: 0~3600 sec.	0015	r/w	03/06
Differentiation time setting (d). Range: 0~240 sec.	0016	r/w	03/06
AT offset value (AtSv). Range: 0~999	0018	r/w	03/06
Output cycle time (Cyc). Range: 0~120 sec.	0019	r/w	03/06
Hysteresis width (Hys). Range: 0~900	0020	r/w	03/06
SV Low limit setting (SV L). Range: subject to specs.	0023	r/w	03/06
SV High limit setting (SV H). Range: subject to specs.	0024	r/w	03/06
PV Compensation (PvCm). Range: -999~999	0026	r/w	03/06
Soft start (Soft). Range: 0~20 times	0027	r/w	03/06
Prevention of integration stop (ARW). Range: 0~100%	0028	r/w	03/06
Filter parameter setting (FiLr). Range: 001~999 (unit: 0.01sec)	0029	r/w	03/06
Analog input displays decimal point (Pnt). Range: 0~3	0030	r/w	03/06
Setting of low limit display of analog input (In1L). Range: -1999~9999	0031	r/w	03/06
Setting of high of limit display of analog input (In1H). Range:-1999~9999	0032	r/w	03/06
Low calibration of analog output 1 (Co1L). Range: 2~9000	0035	r/w	03/06
High calibration of analog output 1 (Co1H). Range: 0~4000	0036	r/w	03/06
Selection of re-transmission target (o3TY). Range: PV, Out1, Out2	0039	r/w	03/06
Low calibration of analog re-transmission (Co3L). Range: 0~9000	0040	r/w	03/06
High calibration of analog output (Co3H). Range: 0~4000	0041	r/w	03/06
Low display setting of re-transmission output (o3L). Range: -1999~9999	0042	r/w	03/06

High display setting of re-transmission output (o3 H). Range: -1999~9999	0043	r/w	03/06
(Process control)			
Process initial step (strt): Range 0~15	0045	r/w	03/06
Process ending step (endt): Range strt~15	0046	r/w	03/06
Repeat times (rept): Range 0~9999	0047	r/w	03/06
Wait temperature (wait): Range 0~1000	0048	r/w	03/06
Target value of step 0 (SV 0): Range SV L ~ SV H	0049	r/w	03/06
Target value of step 1 (SV 1): Range SV L ~ SV H	0050	r/w	03/06
Target value of step 2 (SV 2): Range SV L ~ SV H	0051	r/w	03/06
Target value of step 3 (SV 3): Range SV L ~ SV H	0052	r/w	03/06
Target value of step 4 (SV 4): Range SV L ~ SV H	0053	r/w	03/06
Target value of step 5 (SV 5): Range SV L ~ SV H	0054	r/w	03/06
Target value of step 6 (SV 6): Range SV L ~ SV H	0055	r/w	03/06
Target value of step 7 (SV 7): Range SV L ~ SV H	0056	r/w	03/06
Target value of step 8 (SV 9): Range SV L ~ SV H	0057	r/w	03/06
Target value of step 9 (SV 10): Range SV L ~ SV H	0058	r/w	03/06
Target value of step 10 (SV 11): Range SV L ~ SV H	0059	r/w	03/06
Target value of step 11 (SV 12): Range SV L ~ SV H	0060	r/w	03/06
Target value of step 12 (SV 13): Range SV L ~ SV H	0061	r/w	03/06
Target value of step 13 (SV 14): Range SV L ~ SV H	0062	r/w	03/06
Target value of step 14 (SV 14): Range SV L ~ SV H	0063	r/w	03/06
Target value of step 15 (SV 15): Range SV L ~ SV H	0064	r/w	03/06
Heating time of step 0 (Tr 0): Range 0~6000 minute	0065	r/w	03/06
Heating time of step 1 (Tr 1): Range 0~6000 minute	0066	r/w	03/06
Heating time of step 2 (Tr 2): Range 0~6000 minute	0067	r/w	03/06
Heating time of step 3 (Tr 3): Range 0~6000 minute	0068	r/w	03/06
Heating time of step 4 (Tr 4): Range 0~6000 minute	0069	r/w	03/06
Heating time of step 5 (Tr 5): Range 0~6000 minute	0070	r/w	03/06
Heating time of step 6 (Tr 6): Range 0~6000 minute	0071	r/w	03/06
Heating time of step 7 (Tr 7): Range 0~6000 minute	0072	r/w	03/06
Heating time of step 8 (Tr 8): Range 0~6000 minute	0073	r/w	03/06
Heating time of step 9 (Tr 9): Range 0~6000 minute	0074	r/w	03/06
Heating time of step 10 (Tr 10): Range 0~6000 minute	0075	r/w	03/06
Heating time of step 11 (Tr 11): Range 0~6000 minute	0076	r/w	03/06
Heating time of step 12 (Tr 12): Range 0~6000 minute	0077	r/w	03/06
Heating time of step 13 (Tr 13): Range 0~6000 minute	0078	r/w	03/06
Heating time of step 14 (Tr 14): Range 0~6000 minute	0079	r/w	03/06
Heating time of step 15 (Tr 15): Range 0~6000 minute	0080	r/w	03/06
Max. output of step 0 (Ho 0): Range 0.0~100.0%	0081	r/w	03/06
Max. output of step 1 (Ho 1): Range 0.0~100.0%	0082	r/w	03/06
Max. output of step 2 (Ho 2): Range 0.0~100.0%	0083	r/w	03/06
Max. output of step 3 (Ho 3): Range 0.0~100.0%	0084	r/w	03/06
Max. output of step 4 (Ho 4): Range 0.0~100.0%	0085	r/w	03/06
Max. output of step 5 (Ho 5): Range 0.0~100.0%	0086	r/w	03/06

Max. output of step 6 (Ho 6): Range 0.0~100.0%	0087	r/w	03/06
Max. output of step 7 (Ho 7): Range 0.0~100.0%	0088	r/w	03/06
Max. output of step 8 (Ho 8): Range 0.0~100.0%	0089	r/w	03/06
Max. output of step 9 (Ho 9): Range 0.0~100.0%	0090	r/w	03/06
Max. output of step 10 (Ho 10): Range 0.0~100.0%	0091	r/w	03/06
Max. output of step 11 (Ho 11): Range 0.0~100.0%	0092	r/w	03/06
Max. output of step 12 (Ho 12): Range 0.0~100.0%	0093	r/w	03/06
Max. output of step 13 (Ho 13): Range 0.0~100.0%	0094	r/w	03/06
Max. output of step 14 (Ho 14): Range 0.0~100.0%	0095	r/w	03/06
Max. output of step 15 (Ho 15): Range 0.0~100.0%	0096	r/w	03/06
Alarm hysteresis setting (Ahys) Range 00~1000	0097	r/w	03/06
0098~0127 Reserved			
Control output (out). Range: 0~1000 (unit: 0.1%) (Can be changed only when under manual mode)	0128	r/(w)	03/(06)
Present value (PV) (Accuracy is subject to the digits set with via Pnt)	0130	r	03
Temperature at cool junction (CjT) (room temperature) (Unit: 0.1℃)	0131	r	03
Load current (LoadCur)	0133	r	03
Error code: 0x01: Input open circuit 0x02: Cooling compensation error 0x08: Input exceeds positive range 0x10: Input exceeds negative range 0x20: AD circuit fault	0134	r	03
Contact status, word format, convenient for one-time reading: (1/0) 0x001: Writes in data 0x002: Disable panel buttons 0x004: Execute AT 0x008: Auto/Manual mode 0x010: none 0x020: Cool/Heat mode 0x040 : none 0x080: ℉/℃ 0x100: Alarm 1 0x200: Alarm 2 0x400: Alarm 3 0x0800: OUT1 0x1000: OUT2 0x2000: Process run/stop 0x8000: Process Hold status	0135	r	03
Process control: Process running segment (ProSeg) Display range: 0~15	136	r	03
Process control: Present running linearity target value (ProRunSv) Range: SV L ~ SV H	137	r/w	03/06
Process control: Present running segment final target (ProSv) Range: SV L ~ SV H	138	r	03
Process control: Remained time (ProLeft) Display range: 5999 ~ 0 minute	139	r	03
Process control: Remained cycle times (ProRepeat) Display range: 9999 ~ 0 times	140	r	03

Coil

Data writing (DataWrite) Set 1, the data will be written into the internal EEPROM. It will reset to 0 after 2 sec.	0000	r/w	01/05
Panel Lock (PnLock): Disable controller buttons **(Note 3)**	0001	r/w	01/05
Execute Auto-Tuning	0002	r/w	01/05

Auto / Manual Switch Auto(1)/Manu (0)	0003	r/w	01/05
Reserved	0004		
Control direction (Dir) Cool(1)/Heat(0)	0005	r/w	01/05
Reboot **(Note 4)**	0006	r/w	01/05
Temperature unit indication (Unit). ℉(1)/℃(0)	0007	r	01
Alarm 1 status (ALM 1) On(1)/Off(0)	0008	r	01
Alarm 2 status (ALM 2) On(1)/Off(0) **(Note 2)**	0009	r	01
Alarm 3 status (ALM 3) On(1)/Off(0) **(Note 2)**	0010	r	01
Output status (Out) 1(when out>0%) / 0(when out=0%)	0011	r	01
Process status run(1)/stop(0)	0013	r/w	01/05
Process status Skip(1) and reset to 0 automatically	0014	r/w	01/05
Process status Hold (1)/continue(0)	0015	r/w	01/05

- Calculation of ModBus register addresses: command address +40001
  Calculation of coil address: command address + 00001
- All addresses and function codes are decimal.

Note 1. This controller provides 1 alarm output （NPN circuit）, it can also set various parameters and action mode of ALM2 & ALM3 to be like the ALM1 via communication.

Note 2. When ALM2 & ALM3 have set alarm actions (A2Fu, A3Fu>0) and output conditions established, COIL (address 0009, 0010) status will set as 1.

Note 3. There is a "Tour"(Time-Out") parameter among the communication parameters. The set range is 5~99 sec. If communication is disconnected and over this set time, PnLock is deactivated automatically. If the controller is at manual mode, it will reset output (out1, out2) to zero

Note 4. To set COIL address 0006 as 1, this controller will executes soft start, do no need to shut down the power. If communication parameter is changed, it can execute remote reboot.

Responded Error Code

01	Address error. Possible cause: read data address in not defined, or multiple read/write exceeds the range
02	Multiple read/write exceeds 8 operations
03	Unsupported ModBus command or command error
04	Data temporarily cannot be set. The panel is inputting data

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