SCD8000/8100 Temperature Controller
Instruction Sheet

Thank you very much for choosing SCD8000/8100 series temperature controller. Please read this instruction sheet carefully before using your SCD8000/8100 to ensure proper operation. Keep this instruction sheet handy for quick reference.

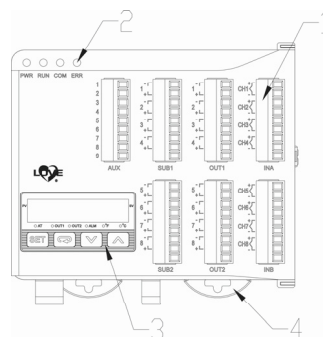## 1 Precaution

⚠ **DANGER! CAUTION! ELECTRIC SHOCK!**

⚠ **SCD8000/8100 is an OPEN-TYPE device and therefore should be installed in an enclosure free of airborne dust, humidity, electric shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required for opening the enclosure) in case danger and damage on the device may occur.**

1. Prevent dust or metallic debris from falling into the device and cause malfunctions. DO NOT modify or uninstall the circuit board of SCD8000/8100 without being permitted. DO NOT use empty terminals.
2. Keep away from high-voltage and high-frequency environment during the installation in case of interference. Prevent using the device in premises which contain:
   (a) dust or corrosive gas;   (b) high humidity and high radiation;   (c) shock and vibration.
3. The power has to be switched off when wiring or changing the temperature sensor.
4. When installing the circuit board of the accessory, please make sure the power of the main unit is switched off and insert the accessory into the correct slot on the main unit.
5. Make sure to use compensation wire which matches the thermocouple or platinum resistance when extending or connecting the thermocouple or platinum resistance.
6. Keep the wire as short as possible when wiring a sensor to the controller. Separate the power cable and load wire in order to prevent interference and induced noise.
7. Make sure the power cables and signal device are installed correctly before switching on the power; otherwise serious damage may occur.
8. DO NOT touch the terminal or repair the device when the power is on; otherwise an electric shock may occur.
9. Please wait for 1 minute after the power is switched off to allow the capacitor to discharge and DO NOT touch the internal wiring within this period.
10. DO NOT touch the internal terminal when SCD8000/8100 is either switched on or off in case you may damage the circuit.
11. Please place SCD8000/8100 with other heating objects (e.g. power supply) within proper distance while installing SCD8000/8100.

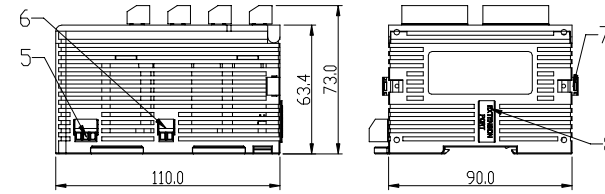## 2 Functions & Electrical Specifications

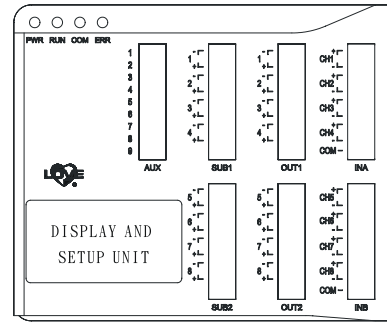|	
Power input	DC 24V, isolated switching power supply
Voltage range	90% ~ 110% rated voltage
Power consumption	Max. 10W + 3W × number of SCD2000 controllers connected in parallel (Max. 7)
Input sensor	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum resistance: Pt100, JPt100, Cu50
Sampling cycle	Thermocouple or platinum resistance: 1.0 second/all input
Control method	PID, PID programmable, manual, ON/OFF
Output accessories (optional)	Relay output: SPST, Max. AC 250V load, 3A resistive load
	Voltage pulse output: DC 24V, Max. 40mA current output
	Current output: DC 4 ~ 20mA output (resistive load < 500Ω); for OUT1 and OUT2 only
	Analog voltage output: 0 ~ 10V (resistive load > 1,000Ω); for OUT1 and OUT2 only
Output functions	Control output, alarm output or proportional output (proportional output is only applicable in the model with linear voltage and current output for OUT1, OUT2)
Alarm modes	12 alarm modes available
Communication	RS-485 digital communication; supports baud rate 2,400bps ~ 115,200bps
Communication protocol	Supports Modbus ASCII/RTU
Extension port	The extension port transmits 24V power supply and communication signals to extension module SCD2000.
Vibration resistance	10 ~ 55Hz 10m/s^2 3 axes 10mins
Shock resistance	Max. 300m/s^2 3 axes 6 directions, 3 times each
Ambient temperature	0°C ~ +50°C
Storage temperature	-20°C ~ +65°C
Operation altitude	< 2,000m
Ambient humidity	35% to 85% RH (non-condensing)
Pollution degree	2

3 Product Profile & Outline

SCD8000/8100

1	I/O terminals
2	Status LED
3	Display and setup unit
4	DIN rail clip
5	Power input port
6	RS-485 communication port
7	Extension module fixing clip
8	Extension port

4 Panel Layout


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DISPLAY AND
SETUP UNIT
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5 Input

The standard SCD8000/8100 main unit is attached with 4 channels of inputs. You can purchase additional SCD-4T or SCD-4R to expand the number of input channels. SCD8000/8100 supports maximum 8 channels of inputs which belong to group INA and group INB. Each group possesses 4 input channels.

SCD8000/8100 series supports the following input sensors:

Input Sensor Type	Register Value	Range
For SCD8100 / SCD-4R		
Temperature measurement resistance (Cu50)	13	-50 ~ 150°C
Platinum resistance (Pt100)	12	-200 ~ 600°C
Platinum resistance (JPt100)	11	-20 ~ 400°C
For SCD8000 / SCD-4T		
Thermocouple TXK type	10	-200 ~ 800°C
Thermocouple U type	9	-200 ~ 500°C
Thermocouple L type	8	-200 ~ 850°C
Thermocouple B type	7	100 ~ 1,800°C
Thermocouple S type	6	0 ~ 1,700°C
Thermocouple R type	5	0 ~ 1,700°C
Thermocouple N type	4	-200 ~ 1,300°C
Thermocouple E type	3	0 ~ 600°C
Thermocouple T type	2	-200 ~ 400°C
Thermocouple J type	1	-100 ~ 1,200°C
Thermocouple K type	0	-200 ~ 1,300°C

✏ **Note:** The default setting in SCD8000 is "thermocouple K type". The default setting in SCD8100 is "Pt100".

Communication address: Input sensor types at H10A0 ~ H10A7; input upper limits at H1010 ~ H1017; input lower limits at H1018 ~ H101F.

6 Output

SCD8000/8100 supports maximum 16 channels of outputs, belonging to output groups OUT1, OUT2, SUB1 and SUB2, each group with 4 channels. See the explanations below for how your channels correspond to output groups.

- Without group INB (4 channels of input): Every channel corresponds to 2 groups of output and 2 groups of alarms. OUT1 and SUB1 are for control output, and OUT1 can be used for proportional output. OUT2 and SUB2 are fixed for alarm output.
- With group INB (8 channels of input): Every channel is paired with 2 groups of outputs. OUT1 and OUT2 are used for control output or proportional output of CH1 ~ CH8. SUB1 and SUB2 are used for control output or alarm output.

See Table 1 for the relations between input and output.

Output Group	4 channels of input	8 channels of input	
	INA (CH1 ~ CH4)	INA (CH1 ~ CH4)	INB (CH5 ~ CH8)
OUT1	Main control output or proportional output	Main control output or proportional output	No corresponding output
OUT2	Alarm 1 output	No corresponding output	Main control output or proportional output
SUB1	Control output	Control output or alarm output	No corresponding output
SUB2	Alarm 2 output	No corresponding output	Control output or alarm output

Table 1

✏ **Note:** SUB1 and SUB2 do not support SCD-46 and SCD-45. Please install the optional output modules you purchase into the correct slot.

Communication Address of Output & How to Set up Parameters:

See Table 2 for the communication addresses of output and Table 3 for the definition of the value in the address.

	INA				INB			
	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
OUT1, OUT2	H10A8	H10A9	H10AA	H10AB	H10AC	H10AD	H10AE	H10AF
SUB1, SUB2	H10B0	H10B1	H10B2	H10B3	H10B4	H10B5	H10B6	H10B7

Table 2

	Value = 0	Value = 1	Value = 2	Value = 3
OUT1, OUT2**	Heating control	Cooling control	Proportional output	Disable output
SUB1, SUB2**	Heating control	Cooling control	Alarm output*	Disable output

Table 3

*When there are only 4 channels of inputs, SUB1 cannot be used for alarm output but heating/cooling control only.

**When there are only 4 channels of inputs, OUT2 and SUB2 cannot be set up by the user but set up automatically as "alarm output" by the controller.

Control Output:

SCD8000/8100 offers PID control, ON/OFF control, manual control and programmable PID control. Control output methods are set at address H10B8 ~ H10BF (default = 0: PID), PID parameters at H1028 ~ H105F, ON/OFF parameters at H1058 ~ H106F, and manual control parameters at H1070 ~ H107F.

Alarm Output:

SCD8000/8100 offers 12 alarm modes. The alarm modes are set up at address H10C0 ~ H10C7, upper limits at H1080 ~ H1087 and lower limits at H1088 ~ H108F.

SV	Alarm Mode	Alarm Output Operation
0	No alarm	Off
1	Alarm output is enabled when the temperature reaches upper and lower limits: The alarm will be enabled when PV exceeds SV + AL-H or falls below SV – AL-L.	
2	Alarm output will be enabled when the temperature reaches the upper limit: The alarm will be enabled when the PV exceeds SV + AL-H.	
3	Alarm output will be enabled when the temperature reaches the lower limit: The alarm will be enabled when the PV falls below SV – AL-L.	
4	Alarm output will be enabled when the PV is between SV + AL-H and SV – AL-L.	
5	Alarm output will be enabled when the temperature reaches the absolute value of the upper and lower limits: The alarm will be enabled when the PV exceeds AL-H or falls below AL-L.	
6	Alarm output will be enabled when the temperature reaches the absolute value of the upper limit: The alarm will be enabled when the PV exceeds AL-H.	
7	Alarm output will be enabled when the temperature reaches the absolute value of the lower limit: The alarm will be enabled when the PV falls below AL-L.	
8	Upper/lower limit standby alarm: The alarm will be enabled when the PV reaches SV and further exceeds SV + AL-H or falls below SV – AL-L.	
9	Upper limit standby alarm: The alarm will be enabled when the PV reaches SV and further exceeds SV + AL-H.	
10	Lower limit standby alarm: The alarm will be enabled when the PV reaches SV and further falls below SV – AL-L.	
11	Upper limit hysteresis alarm: The alarm will be enabled when the PV exceeds SV + AL-H. The alarm will be disabled when the PV falls below SV + AL-L.	
12	Lower limit hysteresis alarm: The alarm will be enabled when the PV falls below SV – AL-H. The alarm will be disabled when the PV exceeds SV – AL-L.	

7 LED Display

PWR: On ⇨ SCD8000/8100 is powered.

RUN: On ⇨ Any of the channel is executing.

COM: Flashing ⇨ Communication in progress

ERR: Indicating errors (red)

ERR LED is on indicates one of the following errors occur, and the output has to be disabled.
1. Memory EEPROM error.
2. Any of the input points is not connected.
3. Any of the input points exceeds the setup range.
4. Any of the input temperatures has not been stabilized.

8 Synchronous Communication Protocol & Auto ID Setup

This function allows the auto setup of communication protocol in extension module SCD2000 following the communication protocol set in the SCD8000 main unit. The station IDs of SCD2000 decrease. See below for the steps.

1. Set the auto communication ID of SCD8000 as "1" (communication address: H10F8).
2. Switch off SCD8000. Connect SCD8000 with extension module SCD2000 and switch on SCD8000 again.
3. Default communication protocol: 9,600bps, 7 bits, Even, 1 stop bit, communication address = 01.
4. This function will consume 3 ~ 5 seconds more when you switch on SCD8000.

9 RS-485 Communication

1. SCD8000/8100 supports baud rates 2,400/4,800/9,600/19,200/38,400/57,600/115,200 bps and does not support communication format 7, N, 1/8, E, 2/8, O, 2. Communication protocol = Modbus ASCII or RTU.
2. Function codes: H03 = read maximum 8 words in the register; H06 = write 1 word into the register.
3. Address and contents: Every parameter has 2 communication addresses. One is numbered by the function of the parameter, and the other is by the order of channel (as shown in the table below).

Parameter Address Table

Content	Explanation	INA				INB			
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Present temperature value/input error code	Unit; 0.1 See Table 5	H1000 (H1100)	H1001 (H1200)	H1002 (H1300)	H1003 (H1400)	H1004 (H1500)	H1005 (H1600)	H1006 (H1700)	H1007 (H1800)
Set temperature value	Unit: 0.1	H1008 (H1101)	H1009 (H1201)	H100A (H1301)	H100B (H1401)	H100C (H1501)	H100D (H1601)	H100E (H1701)	H100F (H1801)
Max. temperature value	Disabled when higher than default value	H1010 (H1102)	H1011 (H1202)	H1012 (H1302)	H1013 (H1402)	H1014 (H1502)	H1015 (H1602)	H1016 (H1702)	H1017 (H1802)
Min. temperature value	Disabled when lower than default value	H1018 (H1103)	H1019 (H1203)	H101A (H1303)	H101B (H1403)	H101C (H1503)	H101D (H1603)	H101E (H1703)	H101F (H1803)
Error temperature value	-999 ~ +999 Unit: 0.1°C	H1020 (H1104)	H1021 (H1204)	H1022 (H1304)	H1023 (H1404)	H1024 (H1504)	H1025 (H1604)	H1026 (H1704)	H1027 (H1804)
Proportional band value (Pb)	0 ~ 9,999 Unit: 0.1	H1028 (H1105)	H1029 (H1205)	H102A (H1305)	H102B (H1405)	H102C (H1505)	H102D (H1605)	H102E (H1705)	H102F (H1805)
Ti value	0 ~ 9,999	H1030 (H1106)	H1031 (H1206)	H1032 (H1306)	H1033 (H1406)	H1034 (H1506)	H1035 (H1606)	H1036 (H1706)	H1037 (H1806)
Td value	0 ~ 9,999	H1038 (H1107)	H1039 (H1207)	H103A (H1307)	H103B (H1407)	H103C (H1507)	H103D (H1607)	H103E (H1707)	H103F (H1807)
Integration default	0.0 ~ 100.0% Unit: 0.1%	H1040 (H1108)	H1041 (H1208)	H1042 (H1308)	H1043 (H1408)	H1044 (H1508)	H1045 (H1608)	H1046 (H1708)	H1047 (H1808)
Proportional control offset error value, when Ti = 0	0.0 ~ 100.0% Unit: 0.1%	H1048 (H1109)	H1049 (H1209)	H104A (H1309)	H104B (H1409)	H104C (H1509)	H104D (H1609)	H104E (H1709)	H104F (H1809)
Proportional band coefficient of output 1 and output 2	0.01 ~ 99.99 Unit: 0.01	H1050 (H110A)	H1051 (H120A)	H1052 (H130A)	H1053 (H140A)	H1054 (H150A)	H1055 (H160A)	H1056 (H170A)	H1057 (H180A)
Dead band of control output 1 & output 2.	-99.9 ~ 999.9	H1058 (H110B)	H1059 (H120B)	H105A (H130B)	H105B (H140B)	H105C (H150B)	H105D (H160B)	H105E (H170B)	H105F (H180B)
Hysteresis for output 1	0 ~ 9,999 Unit: 0.1%	H1060 (H110C)	H1061 (H120C)	H1062 (H130C)	H1063 (H140C)	H1064 (H150C)	H1065 (H160C)	H1066 (H170C)	H1067 (H180C)
Hysteresis for output 2	0 ~ 9,999 Unit: 0.1%	H1068 (H110D)	H1069 (H120D)	H106A (H130D)	H106B (H140D)	H106C (H150D)	H106D (H160D)	H106E (H170D)	H106F (H180D)
Read/write output 1 value	Unit: 0.1 %	H1070 (H110E)	H1071 (H120E)	H1072 (H130E)	H1073 (H140E)	H1074 (H150E)	H1075 (H160E)	H1076 (H170E)	H1077 (H180E)
Read/write output 2 value	Unit: 0.1 %	H1078 (H110F)	H1079 (H120F)	H107A (H130F)	H107B (H140F)	H107C (H150F)	H107D (H160F)	H107E (H170F)	H107F (H180F)
Upper limit for alarm output	Alarm enabled when temperature exceeds upper limit	H1080 (H1110)	H1081 (1210)	H1082 (H1310)	H1083 (H1410)	H1084 (H1510)	H1085 (H1610)	H1086 (H1710)	H1087 (H1810)
Lower limit for alarm output	Alarm enabled when temperature falls below lower limit	H1088 (H1111)	H1089 (H1211)	H108A (H1311)	H108B (H1411)	H108C (H1511)	H108D (H1611)	H108E (H1711)	H108F (H1811)
Tuning for upper limit of analog output	Current (4 ~ 20mA) or voltage output tuning	H1090 (H1112)	H1091 (H1212)	H1092 (H1312)	H1093 (H1412)	H1094 (H1512)	H1095 (H1612)	H1096 (H1712)	H1097 (H1812)
Tuning for lower limit of analog output	Current (4 ~ 20mA) or voltage output tuning	H1098 (H1113)	H1099 (H1213)	H109A (H1313)	H109B (H1413)	H109C (H1513)	H109D (H1613)	H109E (H1713)	H109F (H1813)
Input sensor type	See "Input" section	H10A0 (H1114)	H10A1 (H1214)	H10A2 (H1314)	H10A3 (H1414)	H10A4 (H1514)	H10A5 (H1614)	H10A6 (H1714)	H10A7 (H1814)
Output function for output 1	0: heating 1: cooling 2: proportional output	H10A8 (H1115)	H10A9 (H1215)	H10AA (H1315)	H10AB (H1415)	H10AC (H1515)	H10AD (H1615)	H10AE (H1715)	H10AF (H1815)
Output function for output 2	0: heating (default) 1: cooling 2: alarm	H10B0 (H1116)	H10B1 (H1216)	H10B2 (H1316)	H10B3 (H1416)	H10B4 (H1516)	H10B5 (H1616)	H10B6 (H1716)	H10B7 (H1816)
Control method	0: PID 1: ON-OFF 2: manual 3: PID programmable	H10B8 (H1117)	H10B9 (H1217)	H10BA (H1317)	H10BB (H1417)	H10BC (H1517)	H10BD (H1617)	H10BE (H1717)	H10BF (H1817)
Alarm 1 output mode	See "Alarm Output" section	H10C0 (H1118)	H10C1 (H1218)	H10C2 (H1318)	H10C3 (H1418)	H10C4 (H1518)	H10C5 (H1618)	H10C6 (H1718)	H10C7 (H1818)
Alarm 2 output mode	See "Alarm Output" section	H10C4 (H1518)	H10C5 (H1618)	H10C6 (H1718)	H10C7 (H1818)				
Heating/cooling cycle for output 1	1 ~ 99 seconds 0 = 0.5 second	H10C8 (H1119)	H10C9 (H1219)	H10CA (H1319)	H10CB (H1419)	H10CC (H1519)	H10CD (H1619)	H10CE (H1719)	H10CF (H1819)
Heating/cooling cycle for output 2	1 ~ 99 seconds 0 = 0.5 second	H10D0 (H111A)	H10D1 (H121A)	H10D2 (H131A)	H10D3 (H141A)	H10D4 (H151A)	H10D5 (H161A)	H10D6 (H171A)	H10D7 (H181A)
Run/Stop the control	0: stop 1: executing 2: program stops 3: program pauses	H10D8 (H111B)	H10D9 (H121B)	H10DA (H131B)	H10DB (H141B)	H10DC (H151B)	H10DD (H161B)	H10DE (H171B)	H10DF (H181B)
Status of PID auto-tuning	0: stop 1: executing	H10E0 (H111C)	H10E1 (H121C)	H10E2 (H131C)	H10E3 (H141C)	H10E4 (H151C)	H10E5 (H161C)	H10E6 (H171C)	H10E7 (H181C)
Positive/negative proportional	0: positive 1: negative (slope)	H10E8 (H111D)	H10E9 (H121D)	H10EA (H131D)	H10EB (H141D)	H10EC (H151D)	H10ED (H161D)	H10EE (H171D)	H10EF (H181D)

Content	Explanation	INA				INB			
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
output									
Other statuses	Other statuses	H10F0 Temperature unit	H10F1 Open special function (H1234)	H10F2 Return to default (H1357)	H10F3 Reserved	H10F4 Reserved	H10F5 Reserved	H10F6 Reserved	H10F7 Reserved
Communication specifications	See Table 4	H10F8 Auto ID setup	H10F9 Reserved	H10FA Baud rate	H10FB ASCII = 0 RTU = 1	H10FC 8 bits=0 7 bits=1	H10FD 2 stop=0 1 stop=1	H10FE Parity	H10FF Address 1 ~ 247

Communication Parameter Setting:

Content	0	1	2	3	4	5	6
Baud rate	2,400bps	4,800bps	9,600bps	19,200bps	38,400bps	57,600bps	115,200bps
Parity bit	None (N)	Even (E)	Odd (O)				

Table 4

Error Codes:

The error codes can be read from address H1000 ~ H1007. When the input operation is in normal status, H1000 ~ H1007 are for input values. When input error occurs (except for stable status and input exceeding the range), SCD8000/8100 will read error codes in H8001 ~ H8002.

H1000	Error description
H8001	EEPROM cannot be written in.
H8002	Input sensor is not connected.
H8003	Group INB is not connected.

Table 5

Analog output current tuning scale: $1\,\mu$A/scale
Analog output voltage tuning scale: 1mV/scale
Returning to Default Value: Write H1234 into address H10F1 and H1357 into address H10F2. Restart SCD8000/8100.

Programmable Communication Parameter Setting:

Content	Explanation	INA				INB			
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Read remaining time of the step	Unit: sec	H111E	H121E	H131E	H141E	H151E	H161E	H171E	H181E
Read remaining time of the step	Unit: min	H111F	H121F	H131F	H141F	H151F	H161F	H171F	H181F
Read the NO. of the current pattern	0 ~ 7	H1120	H1220	H1320	H1420	H1520	H1620	H1720	H1820
Read the NO. of the current step	0 ~ 7	H1121	H1221	H1321	H1421	H1521	H1621	H1721	H1821
NO. of start pattern	0 ~ 7	H1122	H1222	H1322	H1422	H1522	H1622	H1722	H1822
NO. of start step	0 ~ 7	H1123	H1223	H1323	H1423	H1523	H1623	H1723	H1823

Programmable Parameter Setting:

Content	Explanation	Pattern 0	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern 7
Max. number of steps in the pattern	0 ~ 7 = N: The pattern executes from step 0 to N.	H2068	H2069	H206A	H206B	H206C	H206D	H206E	H206F
Number of cycles of pattern 0 ~ 7 execution	0 ~ 199: The pattern has been executed for 1 ~ 200 times	H2070	H2071	H2072	H2073	H2074	H2075	H2076	H2077
NO. of current link pattern	0 ~ 8: 8 refers to end of program; 0 ~ 7 refer to the NO. of next pattern	H2078	H2079	H207A	H207B	H207C	H207D	H207E	H207F

Address	Default	Content	Explanation
2000H ~ 203FH	0	Target temperatures for pattern 0 ~ 7 Pattern 0: 2000H ~ 2007H	Unit: 0.1°C
2080H ~ 20BFH	0	Execution time for pattern 0 ~ 7 Pattern 0: 2080H ~ 2087H	Time: 0 ~ 900 (Unit: 1 min)

4. Communication format: H03 = read bit data; H06 = write bit data

ASCII Mode:

Read Command		Read Response Message		Write Command		Write Response Message	
Start word	':'	Start word	':'	Start word	':'	Start word	':'
Machine address 1	'0'	Machine address 1	'0'	Machine address 1	'0'	Machine address 1	'0'
Machine address 0	'1'	Machine address 0	'1'	Machine address 0	'1'	Machine address 0	'1'
Command 1	'0'	Command 1	'0'	Command 1	'0'	Command 1	'0'
Command 0	'3'	Command 0	'3'	Command 0	'6'	Command 0	'6'
Read start address of data/bit	'1'	Length of response data (byte)	'0'	Data address	'1'	Data address	'1'
	'0'		'4'		'0'		'0'
	'0'	Data content in H1000	'0'		'0'		'0'
	'0'		'1'		'0'		'0'
Read length of data/bit (word/bit)	'0'		'F'	Write data content	'0'	Write data content	'0'
	'0'		'4'		'3'		'3'
	'0'	Data content in H1001	'0'		'E'		'E'
	'2'		'0'		'8'		'8'
LRC1 check	'E'		'0'	LRC1 check	'F'	LRC1 check	'F'
LRC0 check	'A'		'0'	LRC0 check	'D'	LRC0 check	'D'
End word 1	CR	LRC1 check	'0'	End word 1	CR	End word 1	CR
End word 0	LF	LRC0 check	'3'	End word 0	LF	End word 0	LF
		End word 1	CR				
		End word 0	LF				

LRC Check:

Sum up the contents from "machine address" to "data content", e.g. H01 + H03 + H10 + H00 + H00 + H02 = H16. Obtain 2'scomplement H EA.

RTU Mode:

Read Command		Read Response Message		Write Command		Write Response Message	
Machine address	H01	Machine address	H01	Machine address	H01	Machine address	H01
Command	H03	Command	H03	Command	H06	Command	H06
Read start address of data	H10	Length of response data (byte)	H04	Write data address	H10	Write data address	H10
	H00	Data content 1	H01		H01		H01
Read length of data (bit/word)	H00		HF4	Write data content	H03	Write data content	H03
	H01	Data content 2	H03		H20		H20
CRC low byte	HC0		H20	CRC low byte	HDD	CRC low byte	HDD
CRC high byte	HCB	CRC low byte	HBB	CRC high byte	HE2	CRC high byte	HE2
		CRC high byte	H15				

CRC (Cyclical Redundancy Check) is obtained by the following steps:

```
unsigned int reg_crc = 0xffff;
i = 0;
while (length--)
{   reg_crc ^= RTUData[i];
    i ++;
    for (j = 0; j < 8; j++)
    {   if (reg_crc & 0x01)    reg_crc = (reg_crc >> 1) ^ 0xA001;
        else                   reg_crc = reg_crc >> 1;
    }
}
return(reg_crc);
```

Software for Setting up Communication on PC: Download the free software on Dwyer's website.

10 — How to Mount & DIN Rail Size

SCD unit — Mounting Panel — DIN rail — 1 2 3

Dimensions: 8.0 / 5.0 / 100.8 / 92.3

Connect maximum 7 SCD2000 controllers to SCD8000 by using DIN rail.

SCD unit — Mounting Panel — DIN rail — 1 2 3