DAM-3063 CK-3083
DAM-3043 CK-3163

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DataSheet

Vr1.20 Date:2015-06-04

Summarize ◆

DAM module is a new generation of modular data collector based on embedded system. It adopts standard DIN35 rail installation method, which is easy to install on site and flexible to use; it can cope with various on-site applications. The module is equipped with an isolated RS485 interface, which can communicate with a PC or PLC alone, or can be used in a network with multiple 485 modules. In addition, DAM-3043 also supports RS232 interface.

The 30X3 thermal resistance data collector can collect up to 16-ch thermal resistance signals; the module adopts a high-performance 16-bit AD chip, and the acquisition and measurement accuracy is ± 0.5 ° C. It is suitable for collecting various temperature signals in industrial sites.

30X3 adopts advanced and efficient photoelectric + magnetic isolation technology, and the three terminals of power supply, communication and signal input are isolated, which effectively guarantees the speed, reliability and safety of data collection.

Product Features◆

◆ARM embedded real-time operating system
◆Input channel: 4/6/8/16 thermal resistance
◆Input type: PT100/PT1000 thermal resistance (factory set)
◆AD conversion resolution: 16 bits
◆Measurement accuracy: ±0.5℃ (typ.)
◆Conversion rate: 3 times/second (single channel)
◆Wide power supply range: DC 9～30V
◆Address/baud rate can be configured by user
◆Support Modbus RTU protocol, isolated RS485
◆±15KV ESD protection
◆Three-terminal isolation withstand voltage: ≥1500V AC between power/communication/analog input
◆Working temperature range: -40℃～80℃
◆Industrial grade ABS flame retardant housing, standard DIN35 guide rail

Functional configuration◆

Model	DAM-3043	DAM-3063	CK-3083	CK-3163
AD (16bit)	4-Ch RTD	6-ch RTD	8-ch RTD	16-ch RTD
RS485	Yes	Yes	Yes	Yes
RS232	Yes	NO	NO	NO

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Applications◆

Automation Equipment/Instrumentation

Remote monitoring and data collection

Smart Manufacturing/Smart Factory

Industrial Field Control

Smart Warehousing and Monitoring

Medical and industrial control product development

Packaging and Material Transfer

electronics manufacturing

CONTENT

1 DAM-30x3 Introduction

DAM-30x3 is a thermal resistance input data collector, equipped with a maximum of 16 thermal resistances (CK-3163), which are suitable for collecting various temperature signals in industrial sites.

DAM-30X3 Module physical map

1.1 Isolation of Input and Output

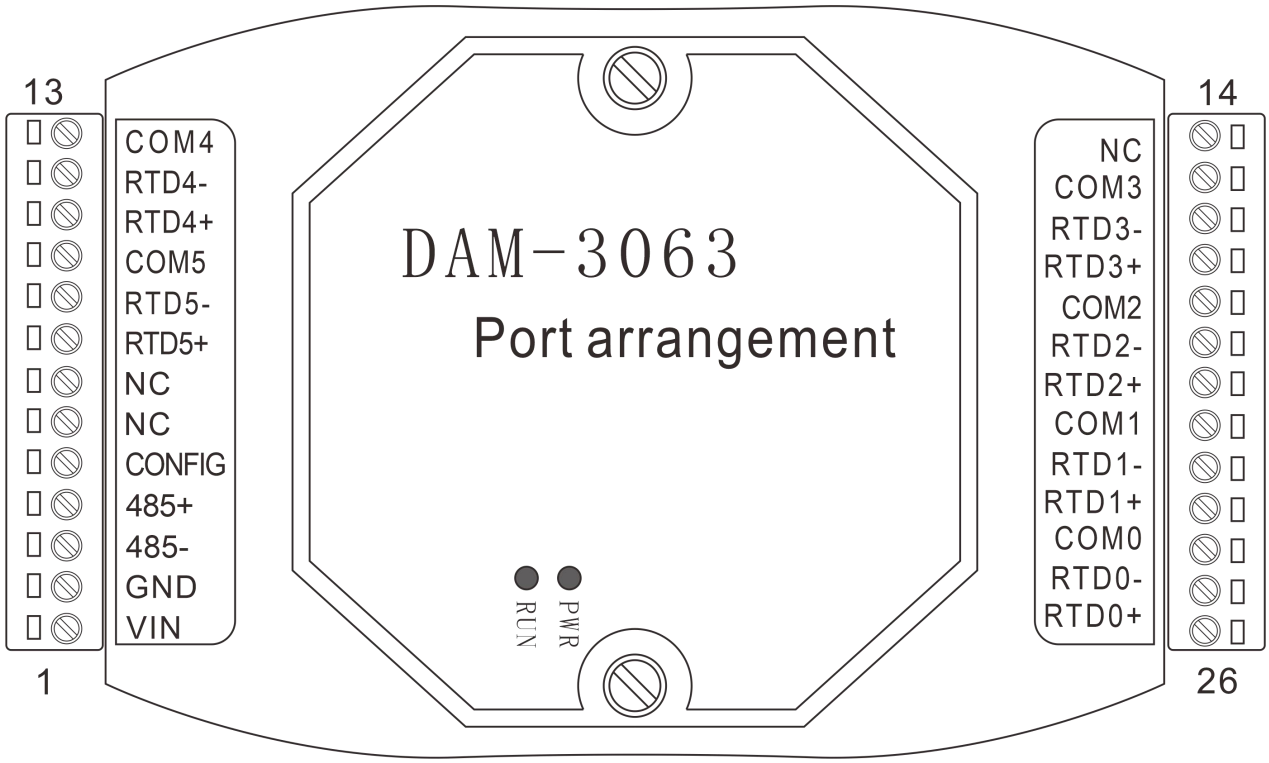
The product is designed for industrial applications: through DC-DC conversion to realize the Power isolation between the measurement circuit and the main control circuit ; meanwhile, the control unit and the communication unit are electrically isolated by photoelectric isolation technology, then achieve the purpose of three-terminal isolation of power supply, communication and acquisition; effectively guarantee the Data collection is reliable and secure.

1.2 Surge Protection

The module is equipped with a transient suppression circuit, which can effectively suppress various surge pulses and protect the module to work reliably in harsh environments.

2 Port Information

2.1 DAM-3063 Port Arrangement



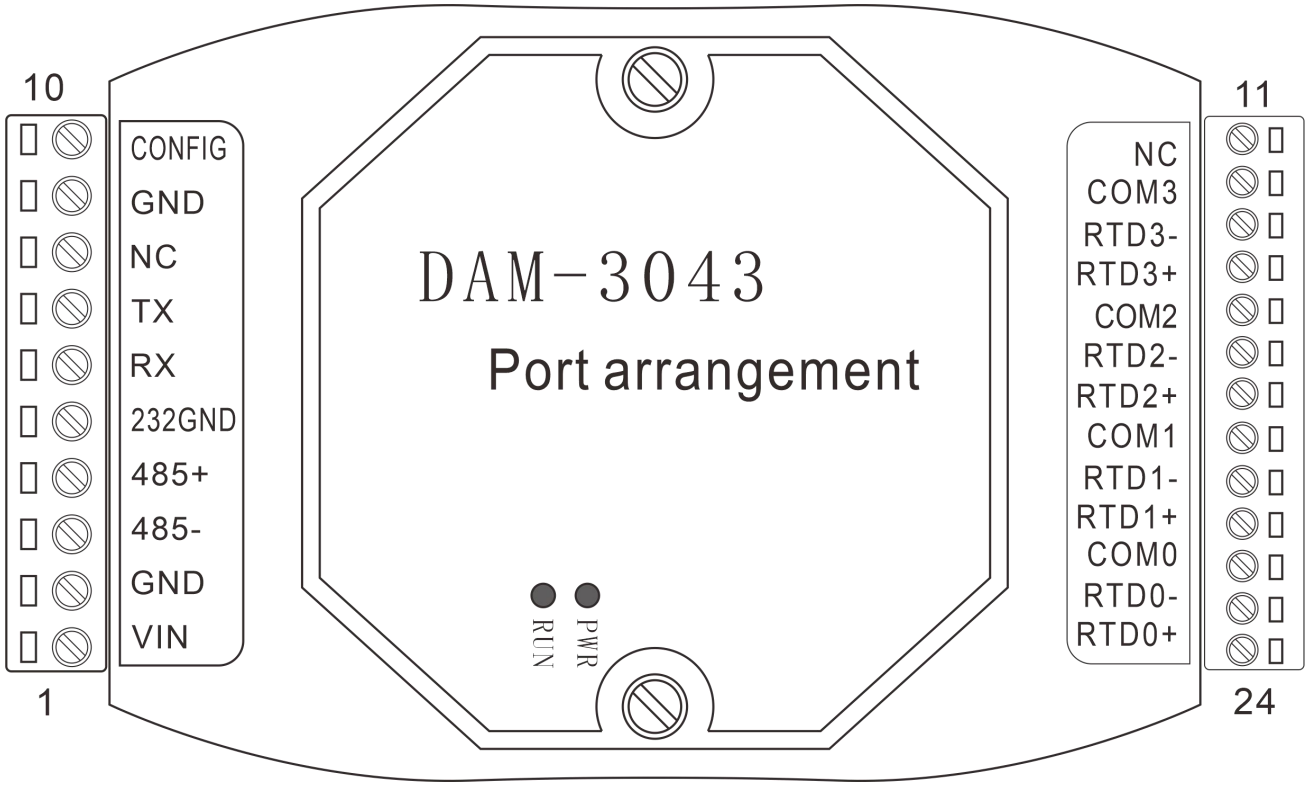
DAM-3063 Module Port Location Diagram

2.2 DAM-3063 Port description

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
1	VIN	Power input positive port	14	NC	empty Port
2	GND	Power ground	15	COM3	RTD input channel 3 common
3	485-	RS485 signal negative input port	16	RTD3-	RTD input channel 3 negative port
4	485+	RS485 signal Positive input port	17	RTD3+	RTD input channel 3 positive port
5	CONFIG	configuration Port	18	COM2	RTD input channel 2 common
6	NC	empty Port	19	RTD2-	RTD input channel 2 negative port
7	NC	empty Port	20	RTD2+	RTD input channel 2 positive port
8	RTD5+	RTD input channel 5 positive port	21	COM1	RTD input channel 1 common
9	RTD5-	RTD input channel 5 negative port	22	RTD1-	RTD input channel 1 negative port

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
10	COM5	RTD input channel 5 common	23	RTD1+	RTD input channel 1 positive port
11	RTD4+	RTD input channel 4 positive port	24	COM0	RTD input channel 0 common
12	RTD4-	RTD input channel 4 negative port	25	RTD0-	RTD input channel 0 negative port
13	COM4	RTD input channel 4 common	26	RTD0+	RTD input channel 0 positive port

2.3 DAM-3043 Port Arrangement



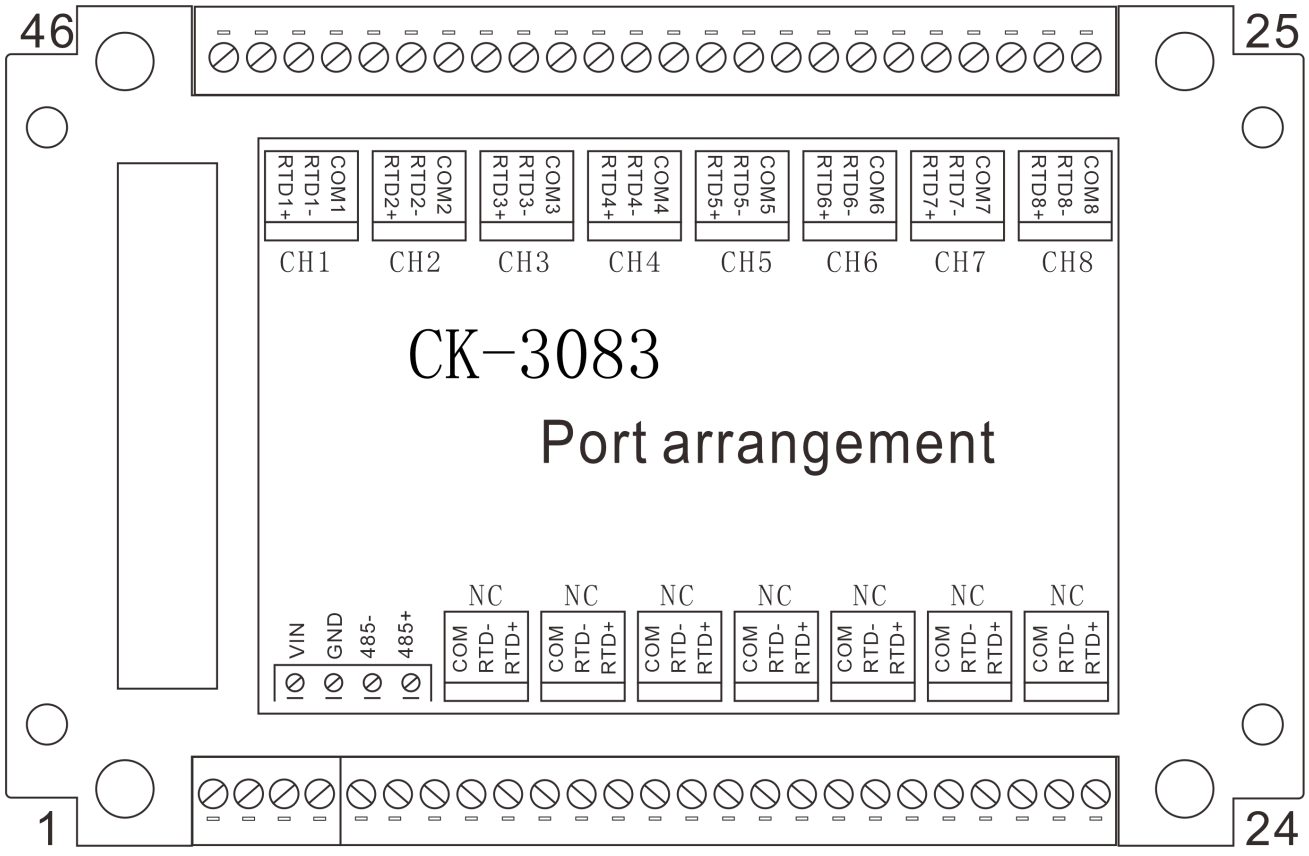
DAM-3043 Module Port Location Diagram

2.4 DAM-3043 Port description

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
1	VIN	Power input positive port	13	RTD3-	RTD input channel 3 negative port
2	GND	Power ground	14	RTD3+	RTD input channel 3 positive port
3	485-	RS485 signal negative input port	15	COM2	RTD input channel 2 common

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
4	485+	RS485 signal Positive input port	16	RTD2-	RTD input channel 2 negative port
5	232GND	Isolate RS232 signal ground	17	RTD2+	RTD input channel 2 positive port
6	RX	RS232 receive Port	18	COM1	RTD input channel 1 common
7	TX	RS232 send Port	19	RTD1-	RTD input channel 1 negative port
8	NC	empty Port	20	RTD1+	RTD input channel 1 positive port
9	GND	Power ground	21	COM0	RTD input channel 0 common
10	CONFIG	configuration Port	22	RTD0-	RTD input channel 0 negative port
11	NC	empty Port	23	RTD0+	RTD input channel 0 positive port
12	COM3	RTD input channel 3 common			

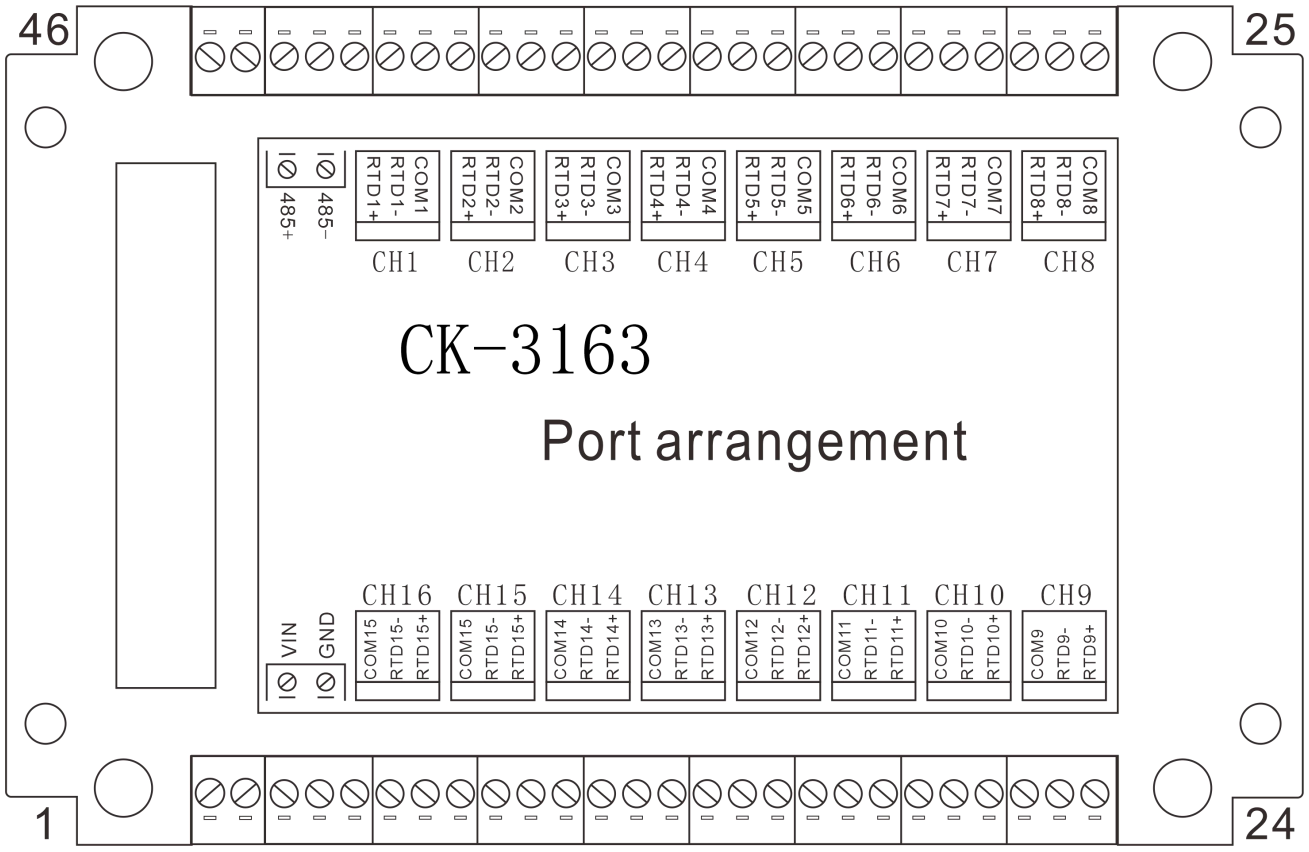
2.5 CK-3083 Port description



CK-3083 Module Port Location Diagram

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
1	VIN	Power input positive port	24	RTD8-	RTD input channel 8 negative port
2	GND	Power ground	25	RTD8+	RTD input channel 8 positive port
3	485-	RS485 signal negative input port	26	COM7	RTD input channel 7 common
4	485+	RS485 signal Positive input port	27	RTD7-	RTD input channel 7 negative port
5	COM	empty Port	28	RTD7+	RTD input channel 7 positive port
6	RTD-	empty Port	29	COM6	RTD input channel 6 common
7	RTD+	empty Port	30	RTD6-	RTD input channel 6 negative port
8	COM	empty Port	31	RTD6+	RTD input channel 6 positive port
9	RTD-	empty Port	32	COM5	RTD input channel 5 common
10	RTD+	empty Port	33	RTD5-	RTD input channel 5 negative port
11	COM	empty Port	34	RTD5+	RTD input channel 5 positive port
12	RTD-	empty Port	35	COM4	RTD input channel 4 common
13	RTD+	empty Port	36	RTD4-	RTD input channel 4 negative port
14	COM	empty Port	37	RTD4+	RTD input channel 4 positive port
15	RTD-	empty Port	38	COM3	RTD input channel 3 common
16	RTD+	empty Port	39	RTD3-	RTD input channel 3 negative port
17	COM	empty Port	40	RTD3+	RTD input channel 3 positive port
18	RTD-	empty Port	41	COM2	RTD input channel 2 common
19	RTD+	empty Port	42	RTD2-	RTD input channel 2 negative port
20	COM	empty Port	43	RTD2+	RTD input channel 2 positive port
21	RTD-	empty Port	44	COM1	RTD input channel 1 common
22	RTD+	empty Port	45	RTD1-	RTD input channel 1 negative port
23	COM8	RTD input channel 8 common	46	RTD1+	RTD input channel 1 positive port

2.6 CK-3163 Port description



CK-3163 Module Port Location Diagram

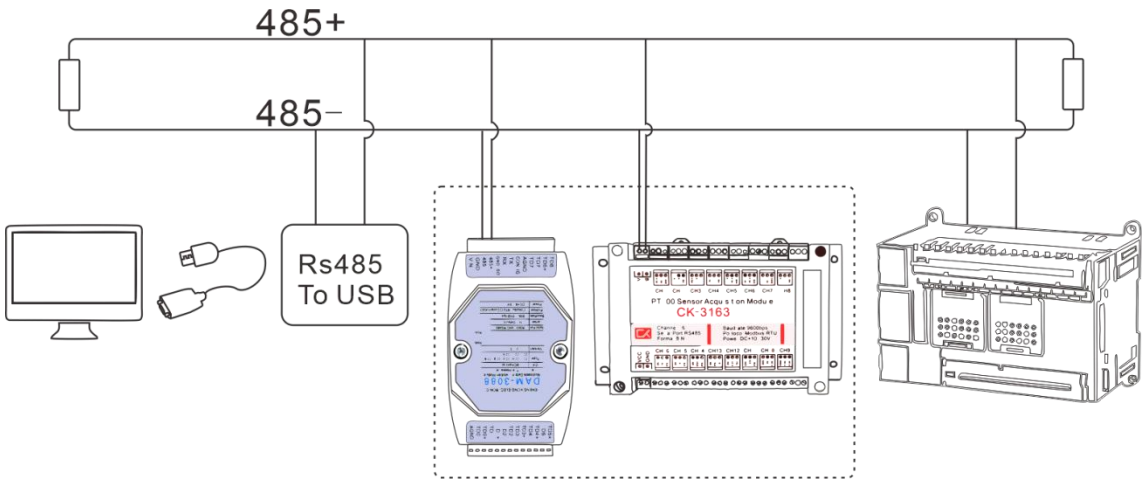
Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
1	VIN	Power input positive port	27	COM8	RTD input channel 8 common
2	GND	Power ground	28	RTD8-	RTD input channel 8 negative port
3	COM16	RTD input channel 16 common	29	RTD8+	RTD input channel 8 positive port
4	RTD16-	RTD input channel 16 negative port	30	COM7	RTD input channel 7 common
5	RTD16+	RTD input channel 16 positive port	31	RTD7-	RTD input channel 7 negative port
6	COM15	RTD input channel 15 common	32	RTD7+	RTD input channel 7 positive port
7	RTD15-	RTD input channel 15 negative port	33	COM6	RTD input channel 6 common
8	RTD15+	RTD input channel 15 positive port	34	RTD6-	RTD input channel 6 negative port
9	COM14	RTD input channel 14 common	35	RTD6+	RTD input channel 6 positive port

Port No.	Port Mark	Port Function	Port No.	Port Mark	Port Function
10	RTD14-	RTD input channel 14 negative port	36	COM5	RTD input channel 5 common
11	RTD14+	RTD input channel 14 positive port	37	RTD5-	RTD input channel 5 negative port
12	COM13	RTD input channel 13 common	38	RTD5+	RTD input channel 5 positive port
13	RTD13-	RTD input channel 13 negative port	39	COM4	RTD input channel 4 common
14	RTD13+	RTD input channel 13 positive port	40	RTD4-	RTD input channel 4 negative port
15	COM12	RTD input channel 12 common	41	RTD4+	RTD input channel 4 positive port
16	RTD12-	RTD input channel 12 negative port	42	COM3	RTD input channel 3 common
17	RTD12+	RTD input channel 12 positive port	43	RTD3-	RTD input channel 3 negative port
18	COM11	RTD input channel 11 common	44	RTD3+	RTD input channel 3 positive port
19	RTD11-	RTD input channel 11 negative port	45	COM2	RTD input channel 2 common
20	RTD11+	RTD input channel 11 positive port	46	RTD2-	RTD input channel 2 negative port
21	COM10	RTD input channel 10 common	47	RTD2+	RTD input channel 2 positive port
22	RTD10-	RTD input channel 10 negative port	48	COM1	RTD input channel 1 common
23	RTD10+	RTD input channel 10 positive port	49	RTD1-	RTD input channel 1 negative port
24	COM9	RTD input channel 9 common	50	RTD1+	RTD input channel 1 positive port
25	RTD9-	RTD input channel 9 negative port	51	485-	RS485 signal negative input port
26	RTD9+	RTD input channel 9 positive port	52	485+	RS485 signal Positive input port

3 Communication

3.1.1 RS485 Wiring

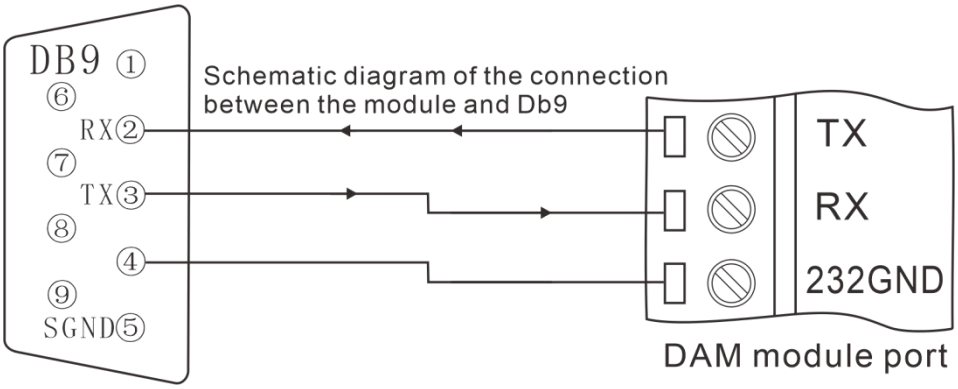
DAM30X3 series modules support standard RS485 interface.



30x3Wiring diagram of DAM module connect with device networ through RS485

3.1.1 RS232 Wiring

The RS232 interface of the DAM module is the standard RS232 interface, which conforms to relevant specifications. As shown in the figure, the 2-pin of the serial port is connected to the TX of the DAM module, the 3-pin of the serial port is connected to the RX of the DAM module, and the 5-pin of the serial port is connected to the 232GND of the DAM module.

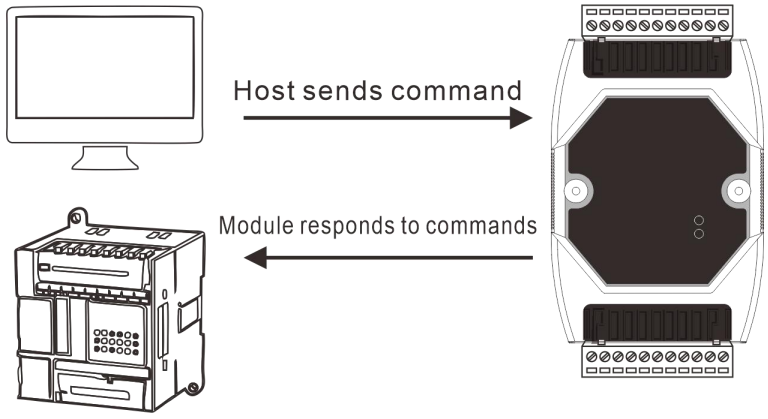


DAM module and PC connection diagram

3.2 Communication Mode

3.2.1 Master-slave mode

The communication mode of the DMA-30x3 module is usually the master-slave mode (one question and one answer mode); the host sends commands to the module through the communication interface, and the module responds accordingly after receiving the correct command.



master-slave mode

3.3 Communication parameters

3.3.1 communication address

The communication address range of the DMA-80X1 module is 01~FA (1~250), and the module factory address is 01; the module communication address can be modified by the user through commands according to the requirement on the site. For the specific method, please refer to the corresponding command.

3.3.2 Communication baud rate

30X3 module RS485 supports baud rate: 1200bps, 2400bps, 4800bps, 9600bps, 14400bps, 19200bps; the communication rate of the module can be modified by the user through commands according to the needs of the site. For the specific method, see the corresponding commands.

3.4 Communication Protocol

3.4.1 Custom-ASCII Protocol

DAM module supports Custom-ASCII protocol (custom ASCII protocol), users can easily read measurement data and configure module parameters through simple ASCII commands, such as configuration address (0x01 ~ 0xFF), baud rate.

3.4.2 Modbus RTU Protocol

The module supports the industry standard Modbus RTU protocol, and can work in the Modbus slave state. It can communicate with various brands of PLC, touch screen, industrial computer and PC. The Modbus commands of DAM-30x3 supported are as follows:

Serial	Command(HEX)	Function	Remark
1	03	Read temperature data	

The DAM module MODBUS address assignment is as follows:

Command（HEX）	Register address（HEX）	data explanation
03	02H	Sensor channel 0 temperature value [Note 0] [Note 1]
03	03H	Sensor channel 1 temperature value
03	04H	Sensor channel 2 temperature value
03	05H	Sensor channel 3 temperature value
03	06H	Sensor channel 4 temperature value
03	07H	Sensor channel 5 temperature value
03	08H	Sensor channel 6 temperature value
03	09H	Sensor channel 7 temperature value
03	0AH	Sensor channel 8 temperature value

Command（HEX）	Register address（HEX）	data explanation
03	0BH	Sensor channel 9 temperature value
03	0CH	Sensor channel 10 temperature value
03	0DH	Sensor channel 11 temperature value
03	0EH	Sensor channel 12 temperature value
03	0FH	Sensor channel 13 temperature value
03	10H	Sensor channel 14 temperature value
03	11H	Sensor channel 15 temperature value

Note 0: The temperature value is a 2-byte signed integer, which is 10 times the actual temperature value, and the unit is ° C

Example: The return value is 013AH=314D The actual temperature value is: 31.4℃

Note 1: DAM-3043 only supports 4 registers starting from 02H, DAM-3063 only supports 6 registers starting from 02H, CK-3083 only supports 8 registers starting from 02H, CK-3163 supports all 16 registers.

4 Custom ASCII command set

4.1 Common commands

4.1.1 List of common commands

Serial	Function	Command	Remark
1	command of read all channel data	#aa<cr>	
2	command of read single channel data	#aan<cr>	

4.1.2 Command of read analog input

4.1.2.1 command of read all channel data

command format	#aa<cr>	
command length	5 characters	
command explanation	aa	The hexadecimal address of the module, the address range is 01～FF
	<cr>	Carriage return and line feed, the command ends, its ASCII code is 13 10, and its hexadecimal code is 0D 0A
Application notice	aa must be 2 digits, such as #01<cr> cannot be written as #1<cr>	

E.g.:

Command	**Return(4/6/8/16 channel temperature acquisition value ℃)**
#01<cr>	>+0025.0+0038.0+0099.9+0168.5（4-ch DAM-3043）
#02<cr>	>+0025.0+0038.0+0199.9+0168.5+0168.8+0168.0（6-ch DAM-3063）

#03<cr>	>+0025.0+0038.0+0199.9+0168.5+0168.1+0168.3+0168.8+0168.6（8-ch CK-3083）
#03<cr>	>+0025.0+0038.0+0199.9+0168.5+0168.1+0168.3+0168.8+0168.6+0025.0+0038.0+0199.9+0168.5+0168.1+0168.3+0168.8+0168.6（16-ch CK-3163）

4.1.2.1 command of read single channel data

command format	#aan<cr>	
command length	6 characters	
command explanation	aa	The hexadecimal address of the module, the address range is 01～FF
	n	The number of module channels, the channel range is 0～F
	<cr>	Carriage return and line feed, the command ends, the ASCII code is 13, 10; the hexadecimal code is 0D, 0A
Application notice	aa must be 2 digits, such as #01<cr> cannot be written as #1<cr> n can only be 1 bit, the number of channels is counted from 0, not from 1	

E.g.:

Command	**Return(Single channel temperature acquisition value ° C)**
#011<cr>	>+0025.0
#F12<cr>	>+0168.5

5 Electrical parameters

Unless otherwise specified, the electrical parameters of DAM-30x3 data acquisition module are the values when Tamb=25℃.

5.1 Module Parameters

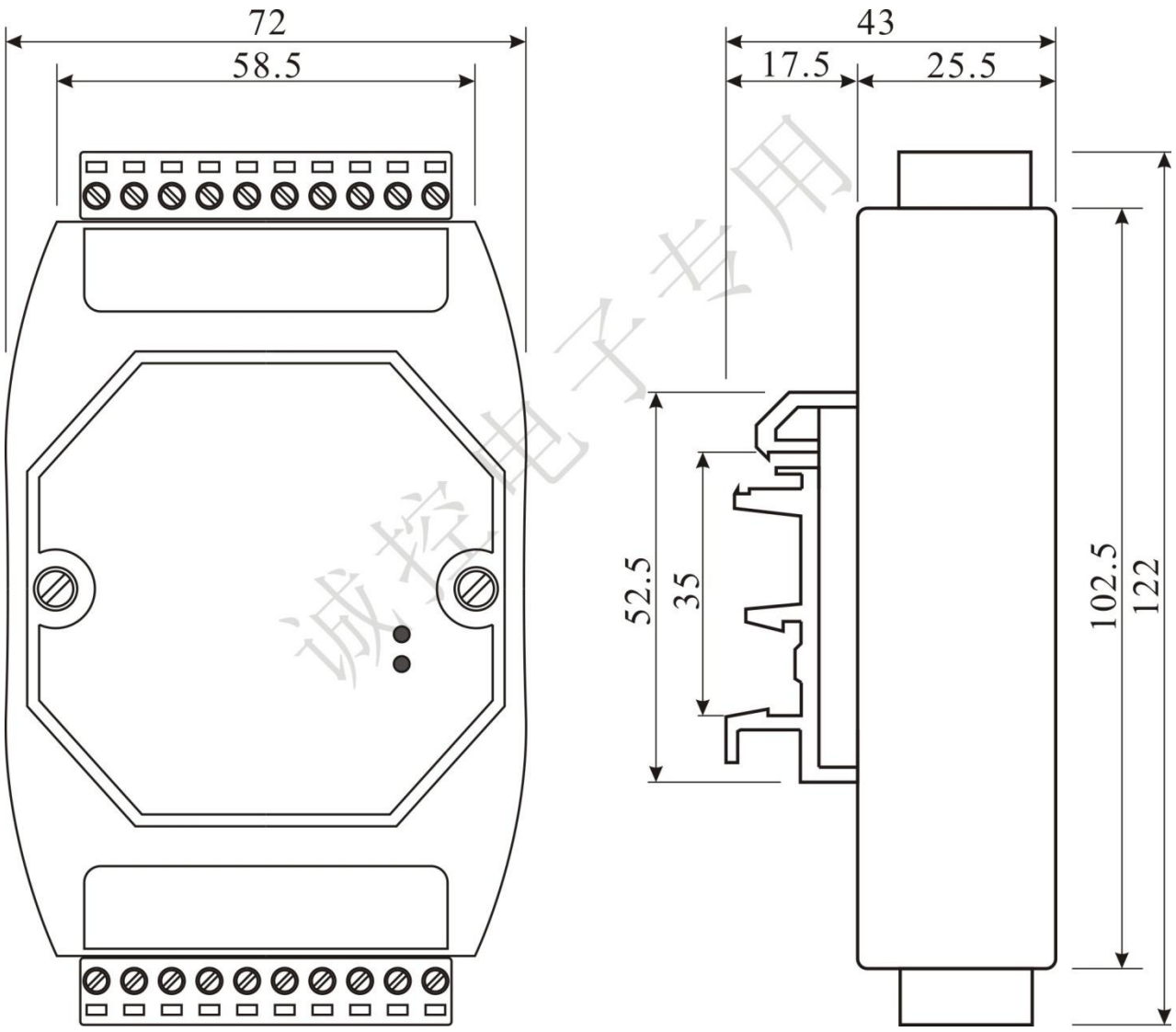
Parameter	Min	Typ	Max	Unit
Power Supply	+9	---	+30	V
Watchdog Period		1		S
Input Protect		100/60		mA/V

5.2 Analog input Parameters

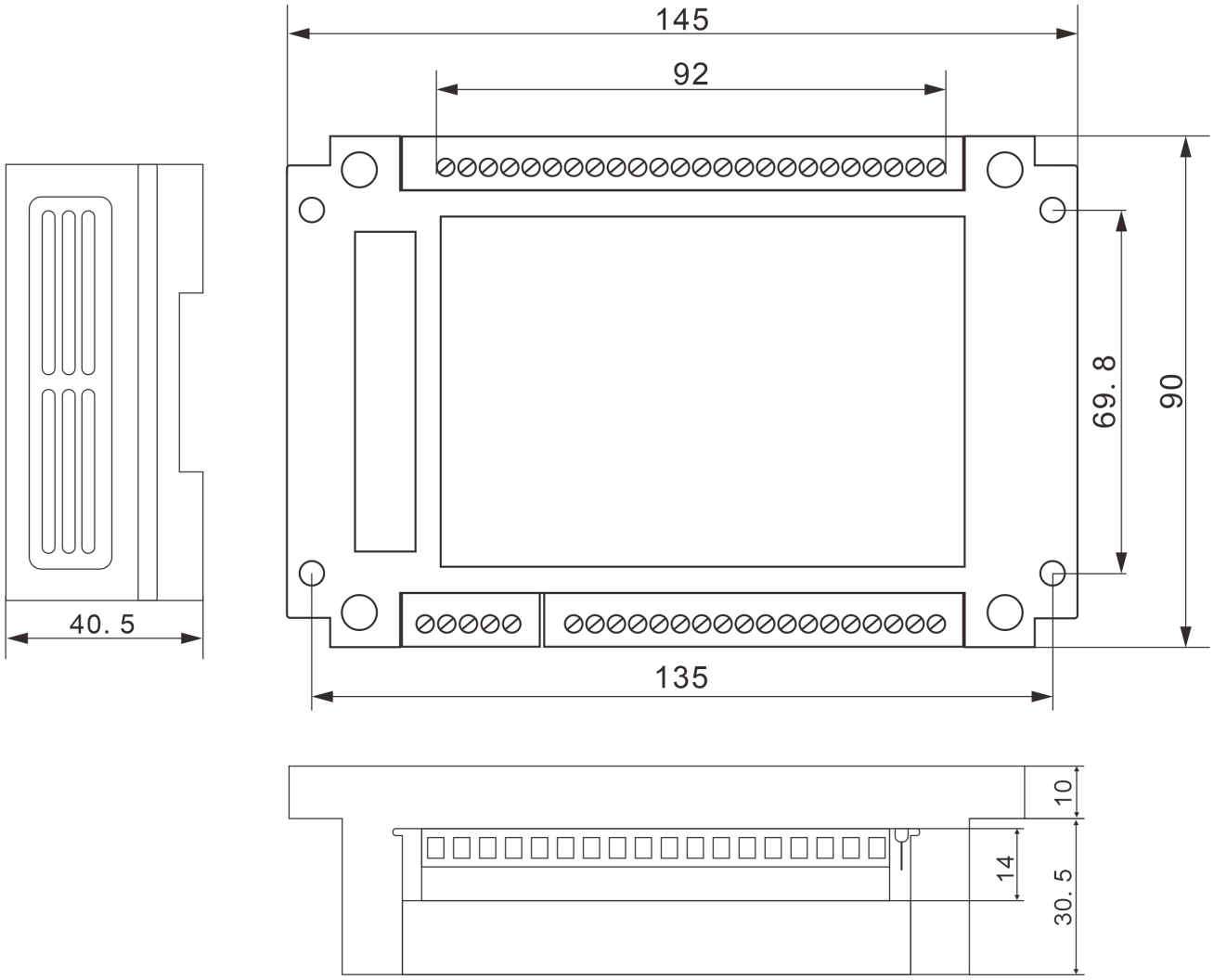
Parameter	Min	Typ	Max	Unit
Resolution		16		bit
Accuracy		±0.5℃		% of SFR
Zero Drift	-50		+50	uV/℃
Temperature Coefficient			±50	ppm/℃
Differential Nonlinearity			±2	LSB
Isolation Voltage			1500	Vdc
Load Impedance		1M		Ω

6 Mechanical Specifications

6.1 Dimension



DAM-3043/3063 Dimensions



CK-3083/3163 Dimensions

6.2 Installation method

DAM-30x3 supports DIN35 rail installation, users can easily install the module on the rail or remove it, providing help for industrial field application and installation.

7 Three guarantees and maintenance instructions

Within five years from the date of sale, if the product is damaged or the product quality is lower than the technical specifications under the conditions of compliance with storage, transportation and use requirements, the user can return to the factory for free maintenance. If the damage is caused by violating the operating regulations and requirements, the device fee and maintenance fee shall be paid.

8 Disclaimer

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