DAM6600

User's Manual

Beijing ART Technology Development Co., Ltd.

Contents

Chapter 1 Overview

DAM6000 series through multi-channel I/O modules for data acquisition and process control, and provides flexible data acquisition and control applications for industrial application. This product consists of two parts: the base (main unit) and I/O modules. The main unit contains two parts: DAM6600—Distributed RS-485/Ethernet data acquisition and control system, DAM6800— visual data acquisition and control system.

DAM6600—Distributed RS-485/Ethernet data acquisition and control system supports Ethernet bus, RS-485 bus, CAN bus, customers can select a variety of communication methods, the kernel is small, run fast, and the module distribution provide a flexible system configuration. DAM6600 can be used for a variety of industrial environments, the I/O standard signal including: analog input/output, thermocouple, RTD, digital input/output, relay output, counter/frequency.

1.1 FEATURES

DAM6600—Distributed RS-485/Ethernet data acquisition and control system including the CPU module, power module, 8-slot chassis and with RS232, RS485 bus, I/O modules. CPU module, power module, 8-slot chassis referred to the base (main unit).

High-performance 32-bit RISC processor (ARM7TDMI core)

With RJ-45 10/100M base-T Ethernet Interface

256Kbytes internal high-speed Flash

16Kbytes internal high-speed SRAM

1Mbytes external high-speed SRAM

256Mbytes (Nand) +2 Mbytes (Nor) external Flash memory

256bytes EEPROM

Accurate low-power real time clock RTC

Compatible CAN2.0A, CAN2.0B CAN bus controller (CAN bus software is upgraded, the current is not recommended)

Frequency up to 60MHz (external crystal oscillator to 18.432MHz)

A three-wire RS232 serial port for CPU program updates

Two RS232/RS485 optional serial ports, one RS485 interface for communication

With eight 16-channel I/O modules, control local 128 I/O points

Support Modbus RTU and Modbus TCP (Server, Client) protocol

1.2 Product View

Chapter 2 Using Method

2.1 Working Requirements

Environment Temperature:

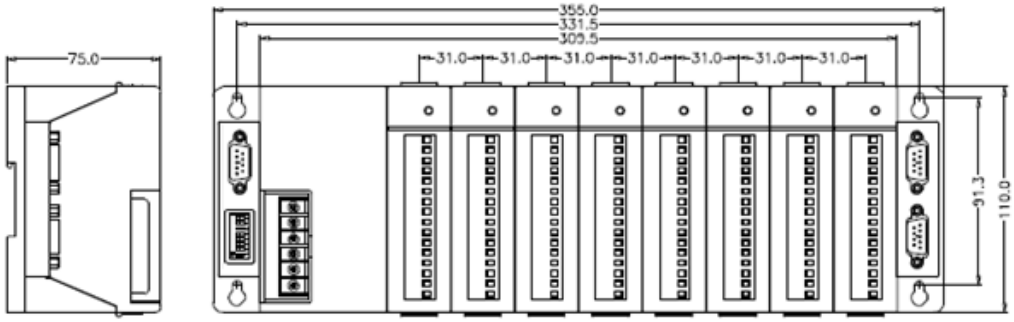
Storage Temperature: -25 ~ +85℃

Operating Temperature: -10 ~ +70℃

Operating Humidity: 5~95%

Operating Voltage: +12V ~ +36Vdc (the whole system voltage)

2.2 Dimension



2.3 Module Installation

DAM6600 system peripheral interface is flexible, customers can choose IO modules according to their needs, the specific optional IO modules reference to Chapter 3. In DAM6600 base, there are eight system slots for plug-IO module board, plug method shown as following. If the customers do not need to configure all eight IO modules, the slot without IO module can be covered with the case.

2.4 Fixed Installation

DAM6600 can be mounted in a vertical wall or DIN rail.

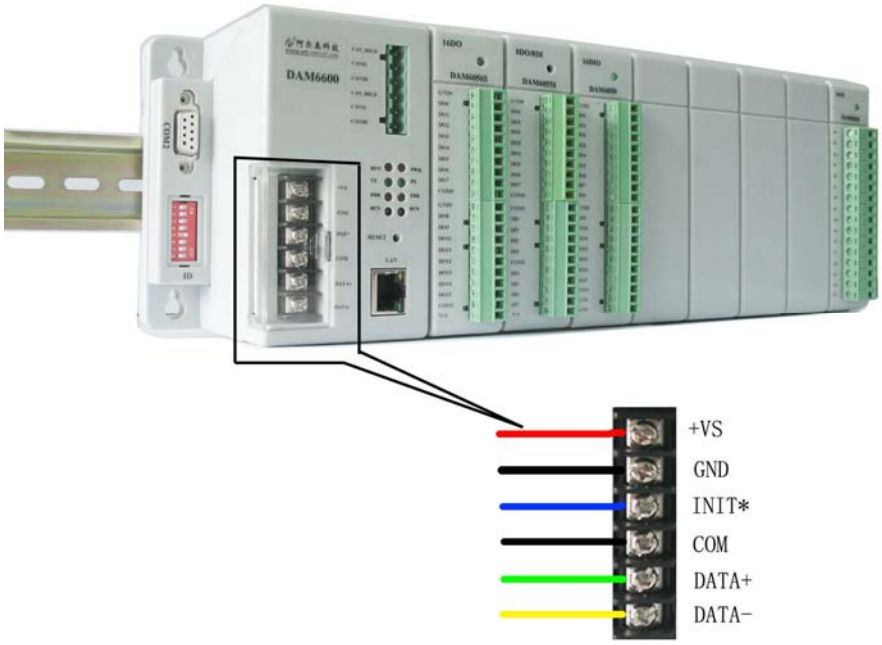
Wall Mounting: the system is installed in the wall by screws, the screw is the # 7 (4mm diameter).

DIN Rail Mounting: DAM6600 system can be installed in the cabinet by DIN-rail mounting. There are three rail locking clips at the bottom of the system, before installation, first, pull out the locking clips. Second, bulldoze the system and pressed into the rail. Last, push the locking clips to fix the system. If want to remove the system, pull out the locking clip, then lift and remove the system.

2.5 Panel Description

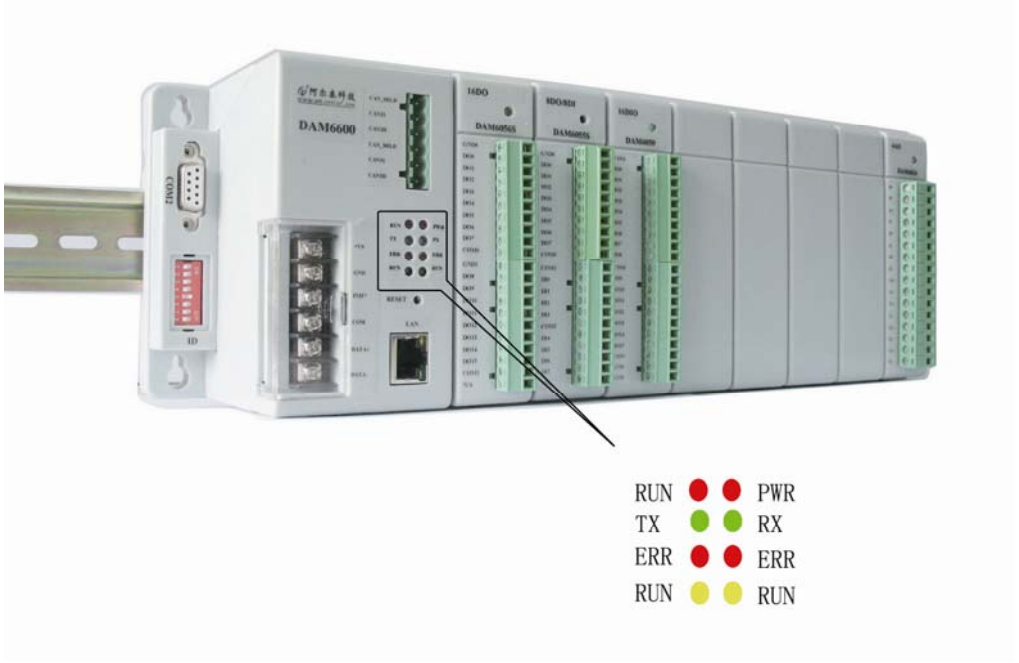
DC Power Wiring: shown as the following, the system power supply is +12~+36 Vdc, wiring between +Vs and GND. Recommended to use the red wire and black wire, red for positive power supply (+Vs), the black wire for negative (GND), diameter is at least ϕ2mm.

In addition to the power terminal wiring, there are four interfaces, INIT*, COM, DATA + and DATA-. INIT* is used to restore the system state, when the INIT* is in logic low level, the system all user setting values failure. COM provides the reference ground plane for RS485 bus. DATA + and DATA- provide RS485 differential bus terminal. RS485 bus interface is COM1 (software setting), RS485 bus transfer rate up to 115200bps, it can connect with 32 devices.



LED Indicators: there are eight LED indicators, shown as the following.

PWR（Red）	CPU power indicator
RUN（Red）	CPU running indicator
TX（Green）	Serial port to send data indicator
RX（Green）	Serial port to receive data indicator
CAN bus indicator, CAN Bus software is being upgraded, the following indicator function to be determined.	
ERR（Left Red）	CAN bus 1 error indicator
ERR（Right Red）	CAN bus 2 error indicator
RUN（Left Yellow）	CAN bus 1 running indicator
RUN（Right Yellow）	CAN bus 2 running indicator



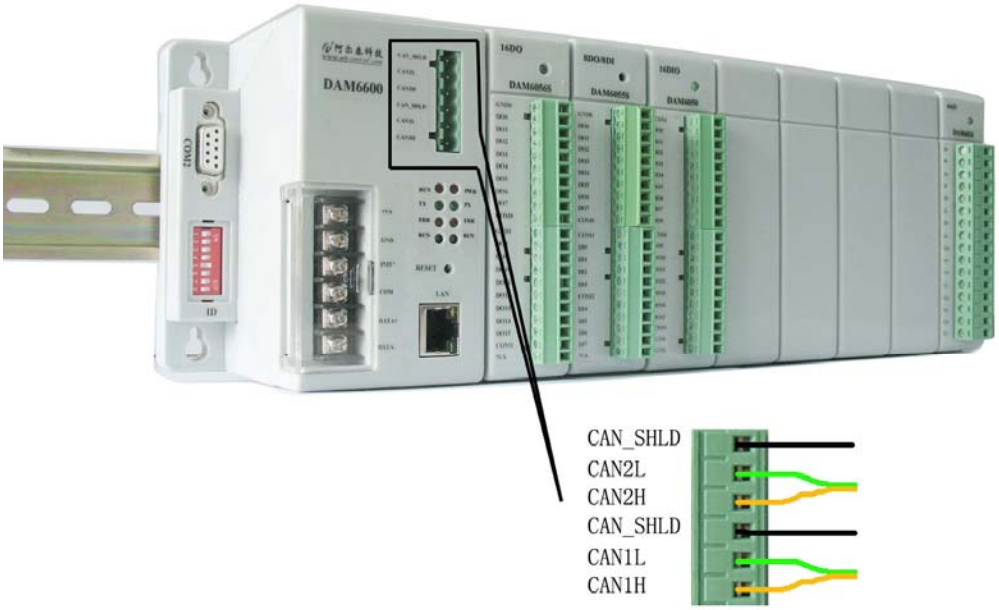
In addition, each IO module with a green LED indicator, indicate IO module is running normally, some digital input/ output modules with port status indicator, such as DAM6051D, DAM6056D and so on.

Reset Button: "RESET" button is used to reset the system, when the host and this system is disconnected and reconnect or replace the input and output modules, just as the machine is still in the last work mode, this time we can click the reset button to reset the control.

ID Setting: When multiple DAM6600 work simultaneously, the serial communication to distinguish each system, it needs to set 8-bit DIP switch to different values. DIP switch to "ON", this bit is logic 0, the DIP switch to "OFF", this bit is logic 1. This setting is useful for serial port connects with DAM6000.exe software.

Note: ID numbers available range is from 1 to 255 (01h to FFh). The default setting is 00h.

CAN Bus Interface: DAM6600 with two CAN bus, the software is upgrading, the hardware connection shown as the following, CAN_SHILD is the shield cable, if not use it, it can not be connected. CAN bus interface can connect with the host computer, and can also connect with other DAM6600.



Ethernet Interface: DAM6600 provides 10/100MBase_T Ethernet communication interface, can connect with computer, router by CAT5 twisted-pair, both straight cable and crossover can be used, transmission distance up to 100m. Shown as below.

The default setting: IP address: 192.168.2.80

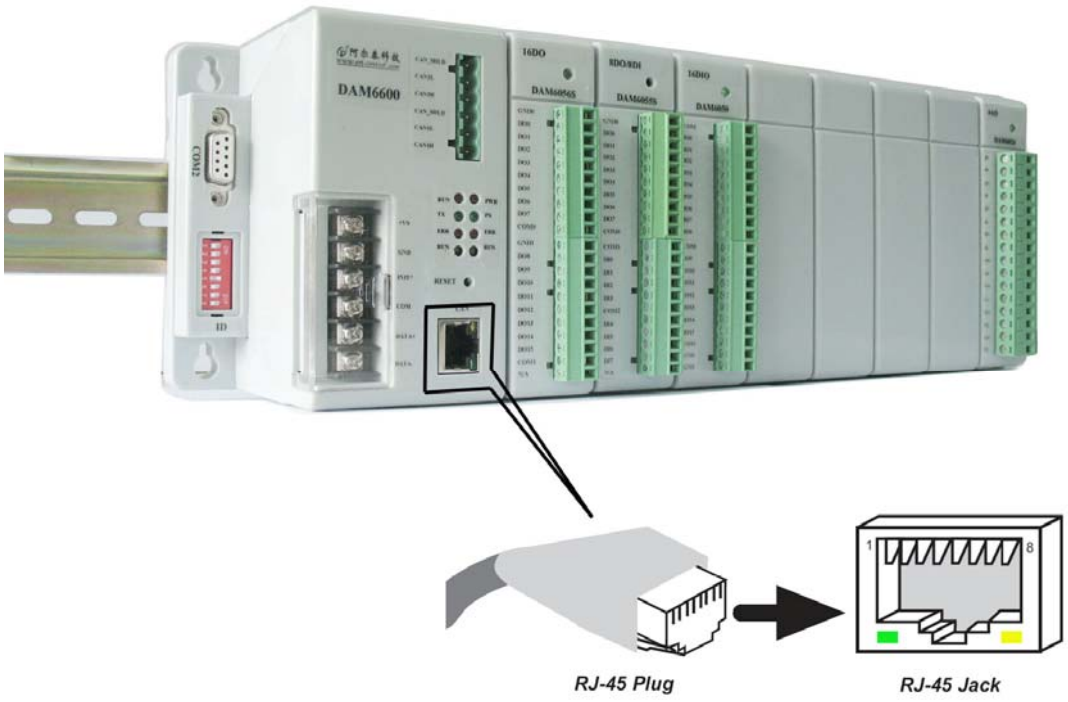
Port number: 502

Default Gateway: 192.168.2.1

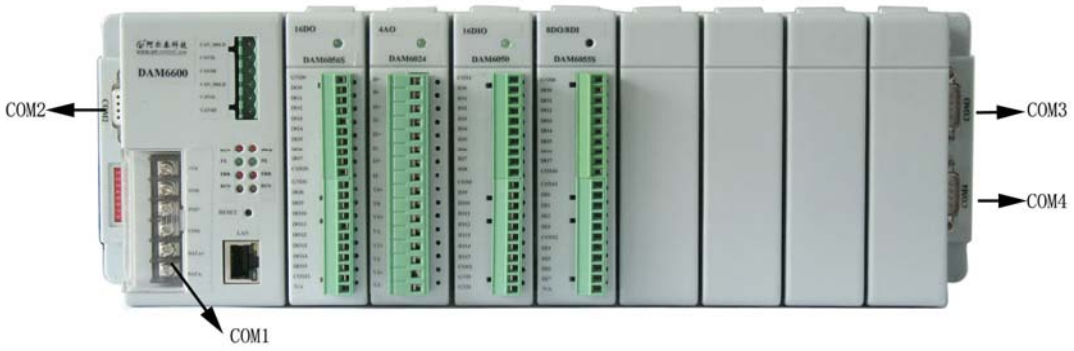
IP address can be modified by the software DAM6000.exe.

RJ45 Ethernet port has two LED lights, the following are functions:

	Status	功能
Green LED	ON	100Mbps
	OFF	10Mbps
Orange LED	Flashing	Data communication
	OFF	No data

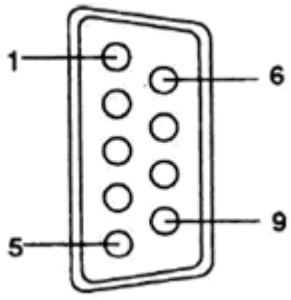


COM Port: This machine has four COM ports, COM1 is the RS-485 bus, COM2 is the 3-wire RS232, DB9 female connector, COM3, COM4 is RS232 (9-wire)/RS485 optional port, are DB9 male connector. The unit provides a serial port communication rate up to 115200bps, the default baud rate is 9600bps.



(1) COM1 interface is RS485 interface.

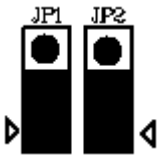
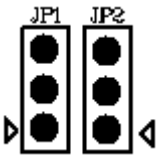
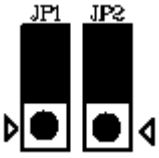
(2) COM2 Interface is the 3-wire RS232, use DB9 female socket, used for CPU updates, from the system output, it needs cross-DB9 serial cable to connect with computer.



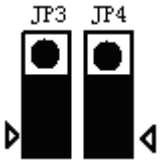
DB9 Female Connector

Pin NO.	Description
Pin 1	Not Used
Pin 2	Data Send（TXD）
Pin 3	Data Receive（RXD）
Pin 4	Not Used
Pin 5	RS232 Signal Ground (GND)
Pin 6	Not Used
Pin 7	Not Used
Pin 8	Not Used
Pin 9	Not Used

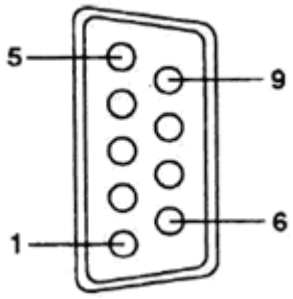
(3) COM3, COM4 interface is RS232, RS485 optional interface, the interface functions can be select by the JP1, JP2, as follows:

	Jumper
RS232（9-wire）	
RS232（9-wire）	 No jumper
RS485	

JP3, JP4 is used to select the RS485 termination resistor:

	Jumper
termination resistor 300R	
termination resistor 120R	

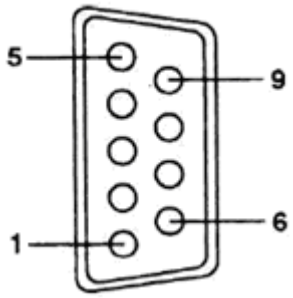
COM3, COM4 pin definition are the same, 9-wire RS232 interface is DB9 male connector, from the system output, it needs cross-DB9 serial cable to connect with computer.



DB9 Male Interface

Pin NO.	Description
Pin 1	Carrier Detect（DCD）
Pin 2	Data Send（RXD）
Pin 3	Data Receive（TXD）
Pin 4	Data Terminal Ready（DTR）
Pin 5	RS232 Signal Ground (GND)
Pin 6	Data Set Ready（DSR）
Pin 7	Request to Send（RTS）
Pin 8	Clear to Send（CTS）
Pin 9	Ring Indicator（RI）

RS485 Interface



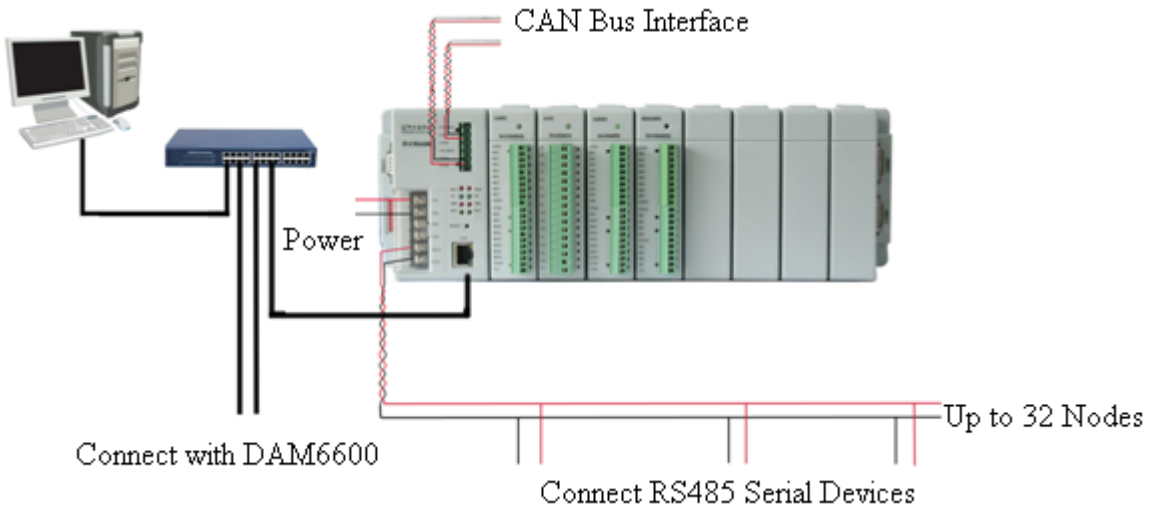
DB9 Male Interface

Pin NO.	Description
Pin 1	RS485 Data-
Pin 2	Not Used
Pin 3	Not Used
Pin 4	RS485 Data+

Pin 5	RS485 Signal Ground (GND)
Pin 6	Not Used
Pin 7	Not Used
Pin 8	Not Used
Pin 9	Not Used

The Module port: Port connection of each module reference the module wiring.

2.6 System Connection



2.7 Accessories

Standard: one RS232 serial cable (crossover)

one Disk

Chapter 3 IO Module Description

Customers can choose the IO module, IO module is including digital input/output, analog input/output, counter and other functions.

DAM6000 Series I/O Module Selection Table

Analog Input Table:

Module	DAM6013	DAM6017	DAM6018
Resolution	16-bit	16-bit	16-bit
Input Channel	3	8	7
Sample Rate	10	100	10
Input Voltage	——	±150mV ±500mV ± 1 V ± 5 V ±10V	±15mV ±50mV ±100mV ±500mV ±1V ±2.5 V
Input Current	——	± 20 mA	±20 mA
Sensor Input	Pt100 or Cu50, Cu100 RTD	——	J, K, T, E, R, S, B, N, C, WRe5-WRe26
Isolation Voltage	3000Vdc	3000Vdc	3000Vdc

Analog Output Table:

Module	DAM6024
Resolution	12-bit
Output Channel	8
Output Voltage	0-10V
Output Current	0-20mA 4-20mA
Isolation Voltage	3000Vdc

Digital Input/Output Table:

Module	DAM 6050	DAM 6051D	DAM 6051S	DAM 6052	DAM 6055S	DAM 6056D	DAM 6056S	DAM 6060	DAM 6068	DAM 6069
Input Channel	16 DIO selection	16 (LED)	16 (LED)	8	8 (LED)					
Output Channel					8 (LED)	16 (LED)	16 (LED)	6 (relay)	8 (relay)	8 (power relay)
Isolation Voltage			2500V dc	5000V rms	2500V dc		2500V dc			

Counter Table

Module	DAM6080	DAM6081
Resolution	32-bit	32-bit (with 4 open-collector outputs)
Counter Channel	4	4
Input Frequency	Up to 5000Hz	Up to 1MHz
Counter Mode	Frequency up/down counter, bidirectional relay	Frequency up/down counter, bidirectional relay
Isolation Voltage	2500Vrms	2500Vrms

Chapter4 Data Format Conversion

4.1 Analog Input Data Format

Assume read the AD port data from the device is Lsb, the voltage is Volt, the range of the conversion formula is: Volt = (Lsb / 27647) * Range

Note: the Range is maximum value that compared between the absolute of the upper limit (range) and the absolute of the lower limit (range).

The table is the Range value of the each range:

input range	lower limit	upper limit	Range value
Voltage			
±15mV	-15	15	15
±50mV	-50	50	50
±100mV	-100	100	100
±150mV	-150	150	150
±500mV	-500	500	500
±1V	-1000	1000	1000
±2.5V	-2500	2500	2500
±5V	-5000	5000	5000
±10V	-10000	10000	10000
Current			
±20mA	-20	20	20
Thermocouple			
J 0℃ ~ 1200℃	0	1200	1200
K 0℃ ~ 1300℃	0	1300	1300
T -200° C ~ 400℃	-200	400	400
E 0℃ ~ 1000℃	0	1000	1000
R 500℃ ~ 1750℃	500	1700???	1700
S 500℃ ~ 1768℃	500	1768	1768
B 500℃~ 1800℃	500	1800	1800
N 0℃~ 1300℃	0	1300	1300
C 0℃ ~ 2090℃	0	2090	2090
WRe5-WRe26 0℃ ~2300℃	0	2300	2300

RTD				
Pt100(385)	-200℃~600℃	-200	600	600
Pt100(385)	-100℃~100℃	-100	100	100
Pt100(385)	0℃~100℃	0	100	100
Pt100(385)	0℃~200℃	0	200	200
Pt100(385)	0℃~600℃	0	600	600
Pt100(3916)	-200℃~600℃	-200	600	600
Pt100(3916)	-100℃~100℃	-100	100	100
Pt100(3916)	0℃~100℃	0	100	100
Pt100(3916)	0℃~200℃	0	200	200
Pt100(3916)	0℃~600℃	0	600	600
Pt100	-200℃~600℃	-200	600	600
Cu50	-50℃~150℃	-50	150	150
Cu100	-50℃~150℃	-50	150	150
BA1	-200℃~650℃	-200	650	650
BA2	-200℃~650℃	-200	650	650
G53	-50℃~150℃	-50	150	150

4.2 Analog Output Data Format

Assume that the output voltage is Volt (unit: mV), the DA source code is Lsb, the range of conversion formula is: Lsb = (Volt / Range) * 27647

Note: the Range is maximum value that compared between the absolute of the upper limit (range) and the absolute of the lower limit (range).

The table is the Range value of the each range:

output range	lower limit	upper limit	Range value
Voltage			
0~10V	0	10000	10000
Current			
0~20mA	0	20	20
4~20mA	4	20	20

Chapter 5 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART's factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART's guarantee in the following situations:

- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).
- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.

5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.