

# 700Analog (temperature, voltage and current) module

## Instruction Manual

### V2.2



### This manual for CF-6T-2DA and CF-6AD-2DA two products

- CF-6T-2DA supports 6-channel temperature (ambient temperature -600 °C) input
- CF-6AD-2DA supports 6-channel voltage (0-10V) Current (0-20mA) input
- Supports two-way 0-10V voltage output
- Each has a separate indicator do status indication
- All input and output with external isolation
- Support RS232 / RS422 communication
- Supports all Mitsubishi PLC (including Japan Mitsubishi)
- Support tandem expansion, the largest expansion of 72 inputs, 24 outputs

### Product Overview

- CF-6T-2DA has 6-channel temperature inputs, two voltage outputs

 Email : [arco@arcozhang.com](mailto:arco@arcozhang.com) Yahoo IM : arcozhang Skype : arcozhang.cn

- CF-6AD-2DA has 6-channel voltage and current inputs,2 voltage outputs.
- CF-6T-2DA and CF-6AD-2DA is 2 analog module,suitable for all Mitsubishi PLC, including supporting the use of domestically Mitsubishi PLC, Module has two serial ports, one by PLC, another is equivalent to a serial port of the PLC, with a penetrating communication function, it may connect to computer,text or touch screen.PLC and analog modules are connected together very easily via the serial cable to, not occupy the PLC communication port. (Actually the occupied PLC communication port moved to the module above).
- Input and output modules corresponding to PLC registers.
- Analog modules with active communication function, input port data collected will be automatically transferred to the PLC registers inside, PLC's analog output value will be automatically transferred to the analog output port.

## Analog Input

6 analog inputs, the input channel 0-5, corresponding to the PLC D0-D5.

Input channel	PLC register mapping	Output channel	PLC register mapping
Input channel 0	D0	Input channel 0	D6
Input channel 1	D1	Input channel 1	D7
Input channel 2	D2		
Input channel 3	D3		
Input channel 4	D4		
Input channel 5	D5		

**CF-6T-2DA**, the outside can be directly connected to K-type thermocouple to measure the temperature, no with the adapter. Measuring range: ambient temperature up to 600 °C, not lower than the measured ambient temperature, if they are lower than the ambient temperature, the ambient temperature measurement results. Unit 0.1 °C. Resolution 0.5 °C.

For example D1 data for 3000 which represents a value of the input channel temperature 0.1 °C \* 3000 that is 300.0 °C.

Although the maximum value is 6000 (i.e., 600 °C), but the probe off, the value of inside is 10000,To show abnormalities.

Probe Type: K-type thermocouple.need to confirm the two terminals of the thermocouple are not connect with the housing, that infinite resistance. Otherwise, it may damage the PLC.

**CF-6AD-2DA** each input support 0-10V amount of voltage and 0-20mA amount of current. When the current measurement, is required between the port and the common terminal connect the external resistor 500Ω. Specific reference to the back of the wiring diagram. Value range 0-4000. Resolution 2.5mV or 5uA, that each data representation 2.5mV or 5uA. For example, D2 which data is 800, indicating that the voltage of input channel 2 is 2.5mV \* 800 that 2000mV or 5uA \* 800 that 4000uA that 4mA.

## Analog Output

Analog output channels 0 and 1, corresponding to the PLC D6 and D7. each output support 0-10V voltage output.

Value range 0-4000. Resolution 2.5mV.

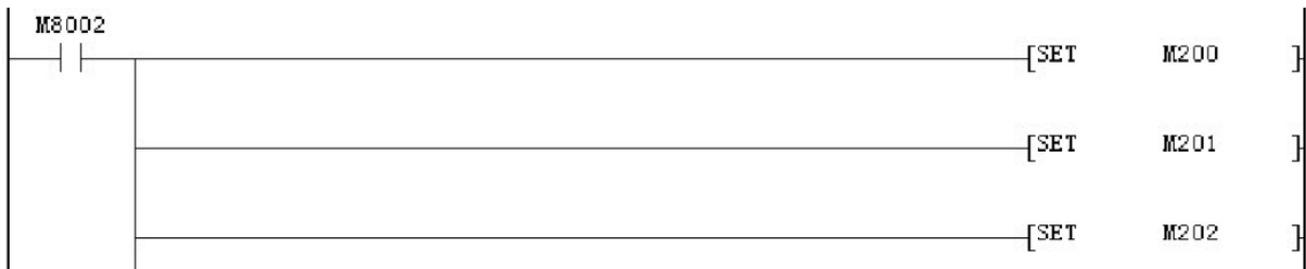
If the channel is enabled (ie open), D6 and D7 inside the data is automatically converted to the amount of voltage sent out from the output channels 0 and 1.

For example D6 inside the value is 600, the output voltage of channel 0 is 2.5V \* 600 that 1500mV that is 1.5V.

Does not support the amount of current output.

## Channel Enable

Each channel input and output channels, has a corresponding enable relay control, in order put this channel is closed when not in use, so as not to alarm channel indicator. No other significance.



The M200-M205 of PLC are enabled relay of input channel 0-5. Enable relay is energized, the corresponding channel is opened, the data which was automatically transferred to the corresponding registers inside the PLC, M206/M207 of PLC, is enabled relay of output channels 0 and 1, Enable relay is energized, the corresponding channel is opened, output port will produce a corresponding output voltage according to the corresponding data registers inside the PLC.

## Probe shedding relay

CF-6T-2DA

Probe off relay is shedding mark of external probe. Detection of this relay, you can determine the corresponding channel probe is normal or not.

M400-M405 is the probe shedding the relay, the corresponding input channels 0-5 in the corresponding channel is enabled, if the probe is off, the corresponding relay PLC will be energized when the probe is off, the

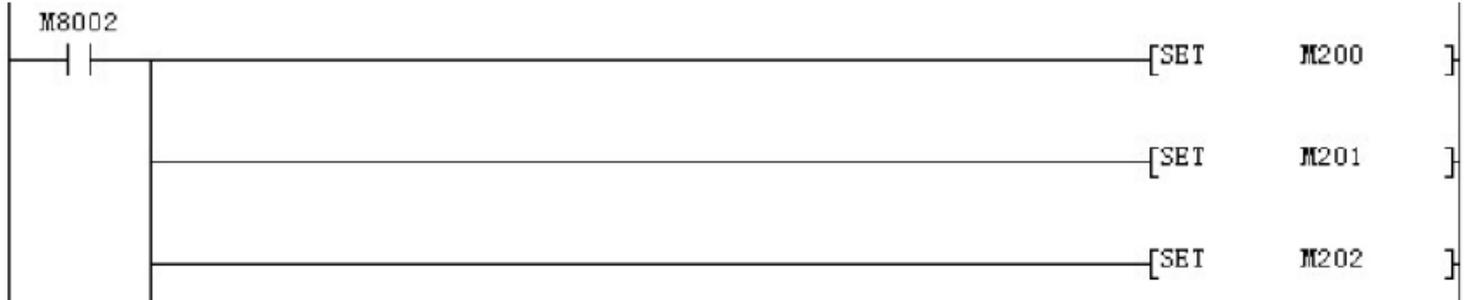


corresponding register inside is 10000.

CF-6AD-2DA no such relay

## PLC programming

one of the most simple PLC drive analog modules Ladder program is as follows:



Open the analog input channels 0-2.

Then D0-D2 can read the data of channel 0-2.

Note that, from opening a channel to channel data transmit to related PLC registers, it will take about several tens of milliseconds, The specific time depending on the response speed. In the meantime, relevant registers D0-D2 inside the data is zero, not the external analog data.

## Indicator

Each input and output has a indicator.

**CF-6T-2DA** corresponding input indicator indicate the status of the probe:

- The input indicator light turns off, indicating that the channel is closed.
- Input indicator light, indicating the probe is normal.
- The input indicator flashes, indicating that the probe off.
- Output indicator is off, the channel is closed.
- Output indicator light, said channel enable; greater the Indicator brightness, the stronger the output signal.

**CF-6AD-2DA** corresponding input indicator indicate the status of the probe:

- The input indicator light turns off, indicating that the channel is closed.
- The input indicator light, indicates channel enable, the greater brightness Indicator, the stronger the input signal.
- The output indicator light turns off, indicating that the channel is closed.
- The output indicator light, indicates channel enable, the greater brightness Indicator, the stronger the output signal.
- Output indicator light, said channel enable; greater the Indicator brightness, the stronger the output signal. Channel Indicator Comm color with red and green LED, green LED flashes to indicate that the module and PLC communications; red LED flashes to indicate that the module and behind equipment, such as computers, touch screens, text, or the next module communication. Each flip once, indicating successful communication once. The faster flashes, the faster the communication indicates, the faster the response speed of the module.



## Communication connection

A typical connection scheme as shown below:

As can be seen, PLC communication port is moved to the module above, so that the communication PLC completely unaffected.



There are two communication ports above the module, one labeled "To PLC"

To connect this port and PLC, In the case of the channel is enabled, channel 0-5 analog input value will be automatically sent to the PLC D0-D5 inside.

In the Ladder program, D0-D5 value inside can be directly read.

In the case of the channel is enabled, PLC's D6 and D7 value inside will be automatically transferred to the analog module output channel. In the Ladder program.





D6 and D7 for write operations, will be automatically transferred to the analog module output channel.

The modules are connected via serial port and PLC, while providing another serial above the module, with a penetrating communication function, which is equivalent to move the PLC serial to analog module above. So do not affect PLC serial communication functions. For example, the program download, monitor, connect the touch screen and text functions, etc., are completely unaffected.

This product supports RS232 or RS422 / 485 communications. Since the two kinds of communication can not be used simultaneously (can interfere with each other in individual cases), so there are two versions, the 232 version and the 422 version.

Module 2 communication ports are defined as follows Figure :

To PLC Communication port		To PC(HMI)Communication port	
Pin No.	definition	Pin No.	definition
1	TD+	1	RD+
2	RxD	2	TxD
3	TxD	3	RxD
4		4	
5	GND	5	GND
6	TD-	6	RD-
7		7	
8	RD-	8	TD-
9	RD+	9	TD+

### RS232 communication

RS232 communication distance is relatively close, but the low cost. In the industrial field, due to more serious interference, in order to ensure the reliability of communication, general communication distance should not be more than 5 meters.

Using a standard serial cable (straight line) can be. Including connections to PLC, computer, touch screen, so the same series modules. Or homemade communication line, the communication port of 2,3,5-pin direct connection.

To PLC communication port		RS232 connection	To PC (HMI) communication port	
Pin No.	Definition		Definition	Definition
1	TD+		1	RD+
2	RxD		2	TxD
3	TxD		3	RxD
4			4	
5	GND		5	GND
6	TD-		6	RD-
7			7	
8	RD-		8	TD-
9	RD+		9	TD+

#### RS422 / 485 communication

Relatively far of distance communication RS422 / 485, and a few hundred meters is no problem. But the high cost of wiring.

Japan's Mitsubishi PLC is RS422 communication, not the RS485 communications. R422 is compatible with RS485 communication via wired connection, but RS485 can not compatible with RS422.

RS422 need four lines, RS485 need two lines, so the RS485 wiring costs are relatively low.

<b>Analog To PLC side</b>	1 TD+		2 RD-	<b>Mitsubishi PLC side</b>
	6 TD-		1 RD+	
	8 RD-		4 TD-	

(9PIN)	9 RD+		7 TD+	(8PIN)
	5 GND		3 GND	

Or use our communication line CF320-FX422-CAB0 also available.

Module and the module is connected, that is modules in series, using a standard RS422 serial cable connection can be realized. Homemade communication lines, refer to the diagram.

To PLC communication port		RS422 connection	To PC (HMI) communication port	
Pin No.	Definition		Definition	Definition
1	TD+		1	RD+
2	RxD		2	TxD
3	TxD		3	RxD
4			4	
5	GND		5	GND
6	TD-		6	RD-
7			7	
8	RD-		8	TD-
9	RD+		9	TD+

To PLC communication port		RS485 connection	To PC (HMI) communication port	
Pin No.	Definition		Definition	Definition
1	TD+		1	RD+
2	RxD		2	TxD
3	TxD		3	RxD
4			4	
5	GND		5	GND
6	TD-		6	RD-
7			7	
8	RD-		8	TD-
9	RD+		9	TD+

Connection of module and touch screen, needs to find the information of touch screen communication port, refer to the diagram, connect the associated port to it. More detailed information please refer to the instruction manual inside the text PLC and touch screen connected parts.

## Used in tandem

Way through several modules in series, you can increase the number of channels



Before used in tandem, first set the address code of the module.

As shown, the case of serial debugging tools, and the module and the PLC connect (communication indicator flashes), with the communication line connecting the module and the computer, in accordance with the methods and procedures illustrated, set the address code.

Send "SET1" to the module (shown in step 6), received "OK1". Indicates that the module has successfully set to address 1. Likewise, send "SET2" receive "OK2", indicates that the module is set to address two successfully, you can repeat the setting.

The default the module address is 0 when shipping.

Address Number	Analog Input	Analog Output	Enable	Probe status	Remarks
0 (default when shipped)	D0-D5	D6, D7	M200-M207	M400-M407	Voltage module does not probe state relay
1	D8-D13	D14, D15	M208-M213	M408-M413	
2	D16-D21	D22, D23	M216-M203	M416-M403	
3	D24-D29	D30, D31	M224-M231	M424-M431	
4	D32-D37	D38, D39	M232-M239	M432-M439	
5	D40-D45	D46, D47	M240-M247	M440-M447	
6	D48-D53	D54, D55	M248-M255	M448-M455	
7	D56-D61	D62, D63	M256-M263	M456-M463	
8	D64-D69	D70, D71	M264-M271	M464-M471	
9	D72-D77	D78, D79	M272-M279	M472-M479	
10	D80-D85	D86, D87	M280-M287	M480-M487	
11	D88-D93	D94, D95	M288-M295	M488-M495	



Serial number being used currently is limited to 11.

## Response speed

Because speed of serial communication is limited, therefore, the response speed of this module is also limited. Given here Typical values 100mS.

Given here Typical values 100mS. That if the analog input voltage or current changes, about 100mS, the value of D0-D5 will be updated. If D6 or D7 to write a value, about 100mS, voltage of analog output terminal will be updated. The actual response time between 80-130mS.

When used in series, the response speed is  $N * 100mS$ , N is the number used in series. Close to the PLC modules, the response rate will be slightly faster. This module also take other computer, touch screen, or text, the response rate of  $2 * 100mS$  that 200mS.

## Power Supply

This module uses the 24V DC power supply voltage range of 16-30V, lower requirements of power supply accuracy and ripple, can be shared 24V power supply with PLC or other device.

Basic Operating Current: <100mA

The maximum operating current: 100mA + maximum output current

Input channel impedance: CF-6T-2DA 1M $\Omega$ ; CF-6AD-2DA 200K $\Omega$

Output channel impedance: 200 $\Omega$

Maximum input voltage: CF-6T-2DA 12V; CF-6AD-2DA 24V

Maximum output current: Single channel 20mA, 2 channel 30mA.

## Mechanical Dimensions

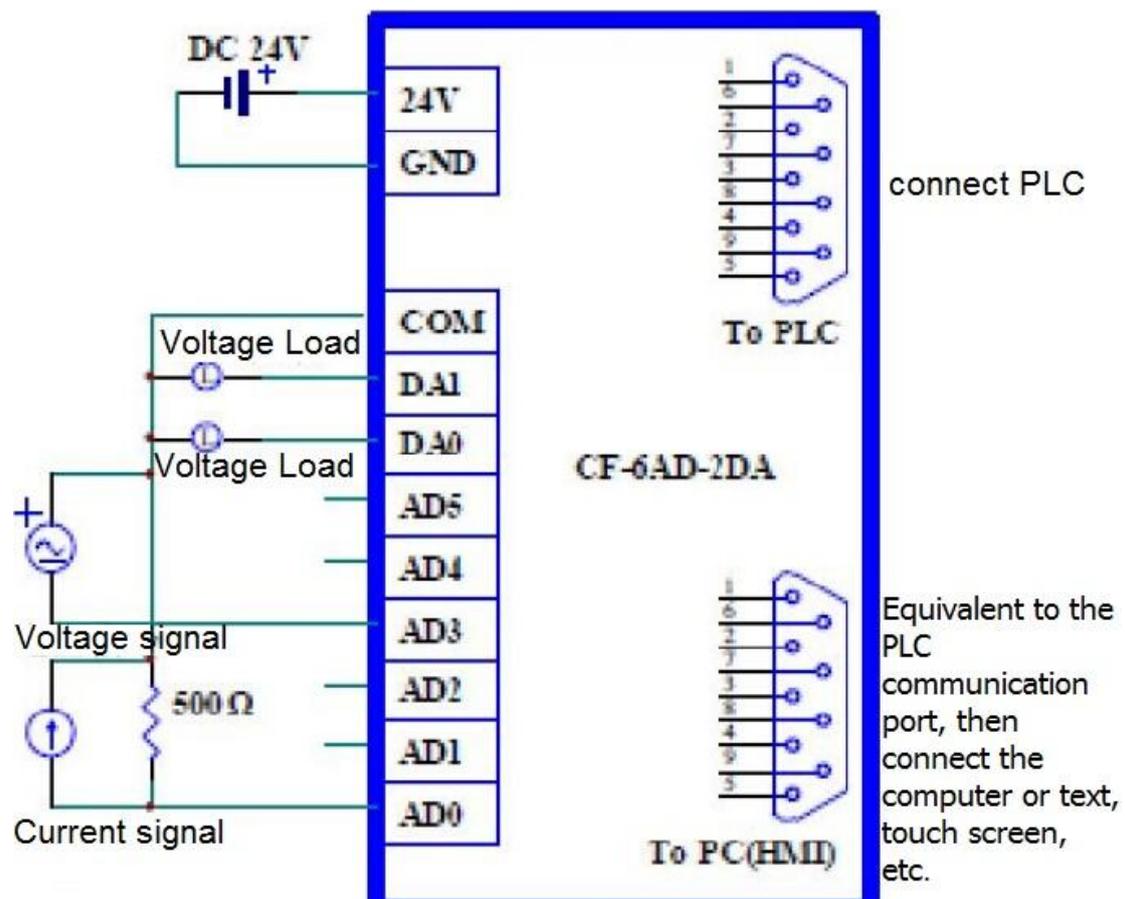
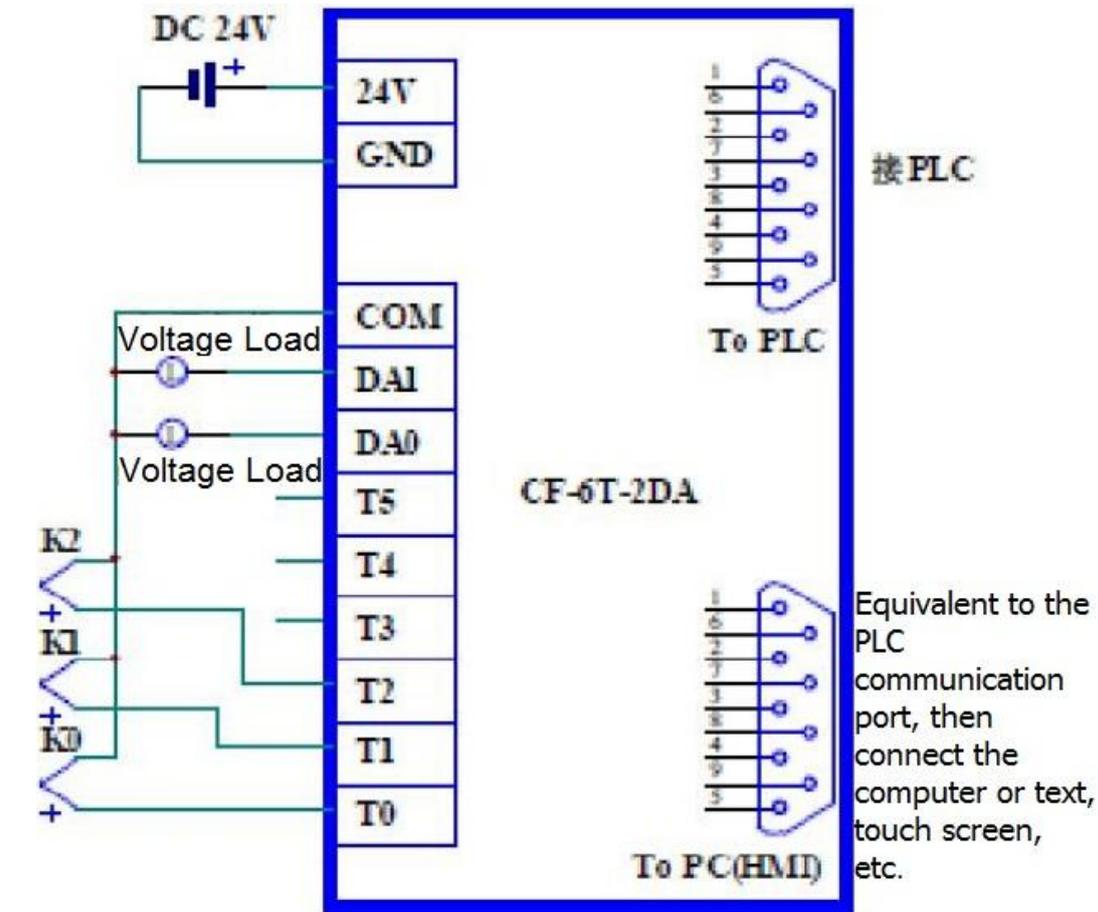
L \* W \* H = 115 \* 90 \* 41mm

## Wiring Methods

All inputs and outputs are isolation and with external 24V power supply, but are not mutually isolation between channels.

Wiring method is as follows:





Voltage module (CF-6AD-2DA) may encounter three-terminal signal source, there is power, ground and signal common three terminals, then need to connect COM terminal and GND terminal of module, Then the power supply of signal source connect to the power supply of module, the ground of signal source connect to the ground of the module, the signal of signal source connect to signal of the module. The following figure. Because COM end and GND terminal modules connected together, so the anti-interference ability modules declined.

