COMPANY PROFILE

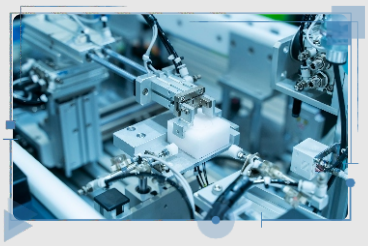
Chengkong Electronics,
Professional data collection product supplier。

More than ten years of ingenious quality assurance
and first-class data collection services

Product Categories

Ⅰ	Analog input module	Ⅱ	Analog output module
Ⅲ	AC input module	Ⅳ	Weighing module
Ⅴ	TC/RTD temperature acquisition module	Ⅵ	Analog input and output module
Ⅶ	Switching/digital module	Ⅷ	Develop custom modules
Ⅸ	signal isolator	Ⅹ	Interface conversion module

Application areas

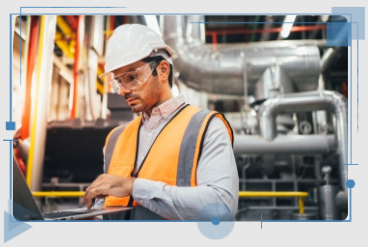


Automation equipment

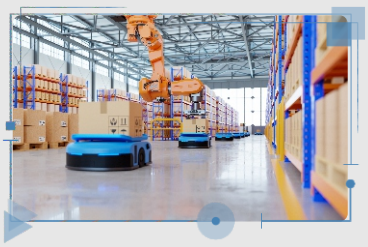
Medical electronics

Smart manufacturing

Remote monitoring

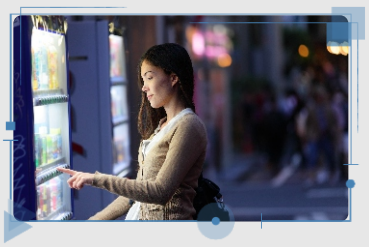


industrial control



Smart warehousing

Instruments anemometer



new retail

16-bit analog input module

Overview

The CK module is a new generation of modular data collector based on embedded system. It adopts the standard DIN35 rail mounting method, which is easy to install and flexible to use; it can cope with a variety of on-site applications. The module is equipped with RS485 interface and Ethernet interface cascade, which is convenient for communication with PC or PLC.

CK-7160E analog input data collector can collect up to 16 differential analog signals; the module adopts a high-performance 16-bit AD chip, collecting measurement accuracy ±0.1%. It is suitable for collecting various voltage and current signals from industrial sites.

The CK-7160E utilizes photoelectric technology to ensure reliable and safe data collection.

Technical Parameters

- ◆EmbeddedReal-TimeOperatingSystem
- ◆Analoginputchannel:16-ch differential
- ◆Analoginputsignalrange： ±20mA,±10V,±5V 0-20mA,4-20mA,0-5V,0-10V
- ◆ADconversionresolution:16bit
- ◆measurementaccuracy： ±0.1%
- ◆Conversionrate:50times/s(allchannels)
- ◆Widepowersupplyrange： DC+10～+30V
- ◆Address/baudrateconfigurablebyuser
- ◆SupportMODBUS-RTU/MODBUS-TCPprotocol
- ◆Supportmodulemaster-slavedatatransmissionmode
- ◆ESDprotection:±15KV
- ◆Powerconsumption:<2W
- ◆Isolationwithstandvoltage:DC2500V
- ◆Operatingtemperaturerange:-30℃～+70℃
- ◆Inputovervoltageprotection,overcurrentprotection,andlow-passfiltering
- ◆NormalModeRejection(NMR):60dB（1kΩSourceImbalance@50/60Hz)
- ◆CommonModeRejection(CMR):120dB（1kΩSourceImbalance@50/60Hz)
- ◆Industrialgradeplastichousing,standardDIN35railinstallation

Applications

Automation equipment
Remote monitoring and data collection
Intelligent manufacturing/smart factory
Industrial site control
Smart warehousing and monitoring
Medical and industrial control product development
Packaging and material transfer
Electronic product manufacturing

Function configuration

Module model	CK-7041E	CK-7082E	CK-7160E	CK-8082E	CK-8160E
AD resolution	16bit	16bit	16bit	24bit	24bit
channel	8	8	16	8	16
RS485	support	support	support	support	support
Ethernet	support cascade	support cascade	unsupported	support cascade	unsupported
Local dial code	support	support	unsupported	support	unsupported
OLED display	unsupported	unsupported	support	unsupported	support

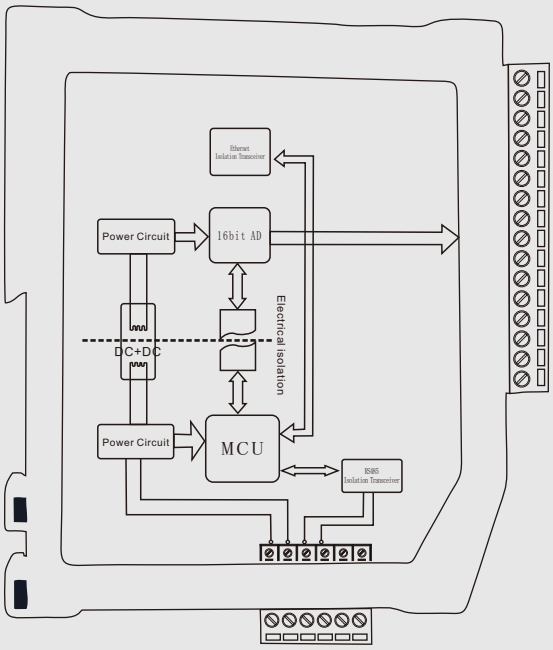
contents

CK-7160E 16-CH input

Input: 0-20mA/4-20mA/0-5V/0-10V
±20mA/±10V/±5V
Output: RS485/Ethernetmodbus TCP

CK-7160E is a 16-bit analog input module, supporting 16-channel 4-20 MA/0-10V inputs, adopting high-precision ADC chip and high-performance ARM processor. It supports Ethernet /RS485 communication interface, standard modbus-RTU and Modbus TCP protocols, and triple isolation of power, signal, and communication, realizing high-precision and high-reliability data acquisition. Blade-type rail mounting, space-saving, support for local dialing code to adjust the address, greatly facilitating the use of the site. It can communicate with many kinds of PLC, industrial control machine, touch screen and configuration software. Applied in automation equipment manufacturing, remote data monitoring, intelligent factory, on-site data acquisition and other fields.

Module working principle diagram



High-precision data acquisition

CK-7160E adopts advanced △-∑ high-precision integrated digital-to-analog converter. The resolution of 7160E is up to 16 bits, and the measurement accuracy is better than 0.1% (typical value). It can meet the industrial sites with high measurement requirements and security, smart buildings, smart homes, power monitoring, process control and other occasions.

Input and output isolation

The product is designed for industrial applications: through DC-DC conversion, the measurement circuit and the main control circuit power supply are isolated; at the same time, the control unit and the signal acquisition unit are electrically isolated using photoelectric isolation technology, effectively ensuring reliable and safe data acquisition.

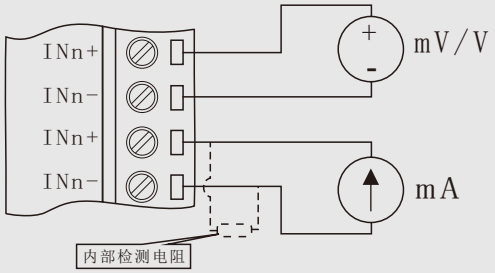
Surge protection

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.

analog input

The so-called analog signals are continuous signals that can be any value at any time, such as our common signals of temperature, pressure, flow, etc. The CK-7160E module is equipped with up to 16 differential analog inputs.

Analog input wiring

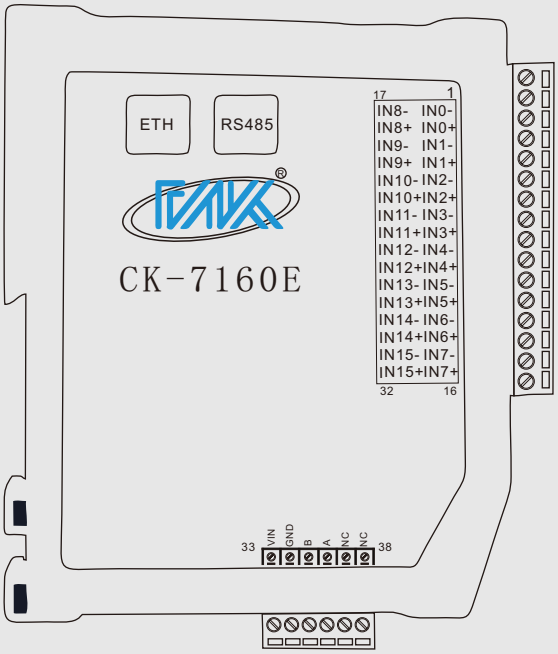


CK-7160E analog input wiring diagram

The analog input of CK-7160E is differential input. Each analog input channel has two wiring ports, namely analog input positive (Inn+) and analog input negative (INn-).

Voltage signals and current signals can be directly connected to the module for detection . When collecting current, it is necessary to inform the module for collecting current signals when ordering. In this way, the module will have a high-precision current detection resistor placed inside the module and calibrated with a standard current signal when leaving the factory.

port information



CK-7160E Port Description

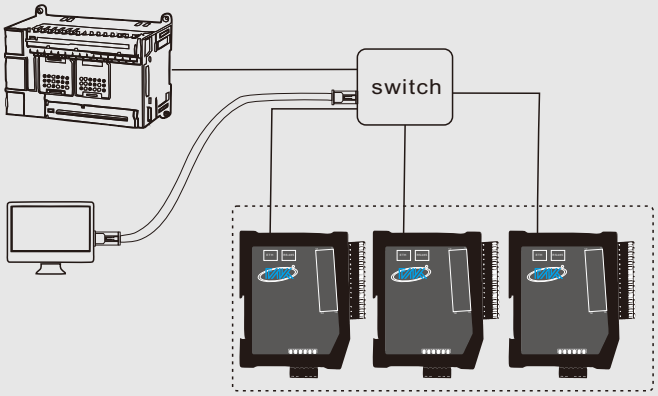
Port	Port ID	port Function	Port	Port ID	Port Function
1	IN0-	Analog input channel 0 negative terminal	20	IN9+	Analog input channel 0 positive terminal
2	IN0+	Analog input channel 0 positive terminal	21	IN10-	Analog input channel 10 negative terminal
3	IN1-	Analog input channel 1 negative terminal	22	IN10+	Analog input channel 10 positive terminal
4	IN+	Analog input channel 1 positive terminal	23	IN11-	Analog input channel 11 negative terminal
5	IN2-	Analog input channel 2 negative terminal	24	IN11+	Analog input channel 11 positive terminal
6	IN2+	Analog input channel 2 positive terminal	25	IN12-	Analog input channel 12 negative terminal
7	IN3-	Analog input channel 3 negative terminal	26	IN12+	Analog input channel 12 positive terminal
8	IN3+	Analog input channel 3 positive terminal	27	IN13-	Analog input channel 13 negative terminal
9	IN4-	Analog input channel 4 negative terminal	28	IN13+	Analog input channel 13 positive terminal
10	IN4+	Analog input channel 4 positive terminal	29	IN14-	Analog input channel 14 negative terminal
11	IN5-	Analog input channel 5 negative terminal	30	IN14+	Analog input channel 14 positive terminal
12	IN5+	Analog input channel 5 positive terminal	31	IN15-	Analog input channel 15 negative terminal
13	IN6-	Analog input channel 6 negative terminal	32	IN15+	Analog input channel 15 positive terminal
14	IN6+	Analog input channel 6 positive terminal	33	VIN	Power input positive terminal
15	IN7-	Analog input channel 7 negative terminal	34	GND	Power Ground
16	IN7+	Analog input channel 7 positive terminal	35	B	RS485 signal negative input terminal
17	IN8-	Analog input channel 8 negative terminal	36	A	RS485 signal positive input terminal
18	IN8+	Analog input channel 8 positive terminal	37	NC	Null Port
19	IN9-	Analog input channel 9 negative terminal	38	NC	Null Port

Communication interface

CK-7160E is equipped with 1 Ethernet interface and 1 RS485 interface; it can be connected to PLC or other host individually or multiple modules can be networked to connect to PLC or other host.

Ethernet connection

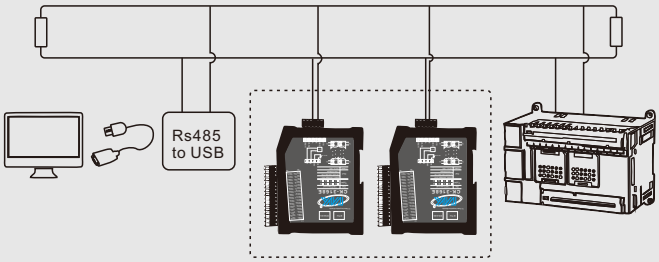
Some modules of the CK series support 100M/10M standard Ethernet interface, Modbus-TCP/Modbus-RTU, and automatic polarity identification of the network port (AUTO MDIX).



CK module network connection diagram through Ethernet interface device

RS485 Connection

The RS485 interface of the CK series module is a standard RS485 interface, which adopts differential signal logic. The logic "1" is represented by a voltage difference of +(2~6)V between the two lines; the logic "0" is represented by a voltage difference of -(2~6)V between the two lines. The network connection of RS485 devices is very simple. You only need to connect the positive and negative ends of the device to the bus. When the communication distance is long, you should pay special attention to the network topology. The RS485 network topology generally adopts a terminal matching bus structure, and does not support ring or star networks. The lead-out length from the bus to each node should be as short as possible to minimize the impact of the reflected signal in the lead-out line on the bus signal. For more detailed information, please refer to the relevant information

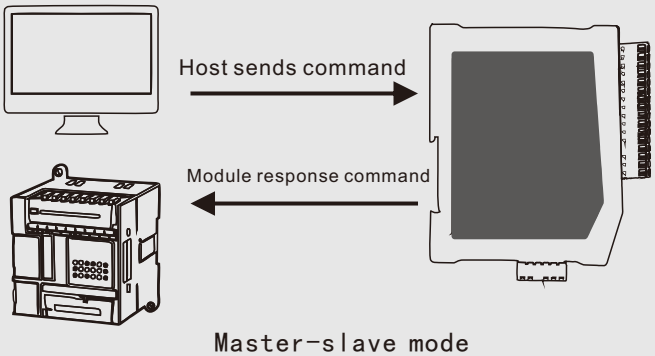


Schematic diagram of the module connecting to other devices via RS485 interface

Module communication mode

Master-slave mode

The communication mode of CK-7160E module is usually 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

Serial communication parameters (default 96008, N, 1 address 01)

contact address

The communication address range of the CK-7160E module is 01 to F7 (1 to 247). The module address is set to 01 at the factory. The module communication address can be modified by the user through commands according to site needs. For specific methods, please refer to the corresponding commands.

Communication Protocol

MODBUS-RTU/ MODBUS-TCP protocol

Modbus protocol is a universal communication protocol that has been widely used in today's industrial control field. Through this protocol, controllers can communicate with each other or with other devices via a network (such as Ethernet).

The MODBUS address allocation of the CK module is as follows:

命令(HEX)	寄存器地址(HEX)	对应PLC地址（DEC）	数据说明
03	0060	40097	AD channel 0 collects the results by amplifying the range by 1000 times(I)
03	0061	40098	AD channel 1 collects the results by amplifying the range by 1000 times
03	0062	40099	AD channel 2 collects the results by amplifying the range by 1000 times
03	0063	40100	AD channel 3collects the results by amplifying the range by 1000 times
03	0064	40101	AD channel 4 collects the results by amplifying the range by 1000 times
03	0065	40102	AD channel 5 collects the results by amplifying the range by 1000 times
03	0066	40103	AD channel 6 collects the results by amplifying the range by 1000 times
03	0067	40104	AD channel 7 collects the results by amplifying the range by 1000 times
03	0068	40095	AD channel 8 collects the results by amplifying the range by 1000 times
03	0069	40096	AD channel 9 collects the results by amplifying the range by 1000 times
03	006A	40097	AD channel 10 collects the results by amplifying the range by 1000 times
03	006B	40108	AD channel 11 collects the results by amplifying the range by 1000 times
03	006C	40109	AD channel 12 collects the results by amplifying the range by 1000 times
03	006D	40110	AD channel 13 collects the results by amplifying the range by 1000 times
03	006E	40111	AD channel 14 collects the results by amplifying the range by 1000 times
03	006F	40112	AD channel 15 collects the results by amplifying the range by 1000 times

(I) The total number of channels varies depending on the module model.

AD type acquisition module Modbus output data calculation:

The read data result is a 16-bit signed number, and the result value is related to the range.

$$\text{Measurement results} = \frac{\text{Data Results}}{1000}$$

for example:

Range ± 20mA, The data read out is16781, The measurement results are16781 ÷ 1000 = 16.781mA;

Range ± 10V, The data read out is5089, The measurement results are5089 ÷ 1000 = 5.089V;

Range ± 5V, The data read out is-3511, The measurement results are-3511 ÷ 1000 = -3.511V;

communications rate

CK-7160E module RS485 supports baud rates: 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps; the module communication rate can be modified by the user through commands according to site needs. For specific methods, please refer to the corresponding commands.

The module supports the industrial standard MODBUS-RTU (Rs485)/MODBUS-TCP (Ethernet) protocol, and the module works in MODBUS slave (server) state. It can communicate with PLC, RTU or computer of various brands. The module supports MODBUS commands as follows:

Serial number	Command (HEX)	Function	Remark
1	03	Read module AD conversion results and module information	

Modbus RTU communication example of AD acquisition module:

In actual use, due to different module configuration addresses and different input signal amplitudes, the data is not completely consistent with the example. When using PLC and other communications, you may not need to understand the underlying communication protocol, so you do not need to understand the following table. You can refer to the communication examples of related products.

Example	
Module Description	Channel quantity: 4, address: 1, range: ±10V
Master sends	01 03 00 60 00 04 44 17
Module Reply	01 03 08 11 68 16 39 09 26 F6 D7 C7 8B
The main station sends analysis	01: Module slave address 03: Modbus RTU Read holding register function code 00 60:0x0060 Register start address 00 04:Number of registers 44 17:CRCCheck Digit
Module reply analysis	01:Module slave address 03: Modbus RTU Read holding register function code 08:Number of data bytes

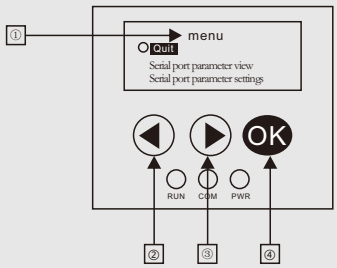
Channel	Receive data	Hexadecimal	10 hex	Parsing results
0	11 68	0x1168	4456	4.456V
1	16 39	0x1639	5689	5.689V
2	09 26	0x0926	2342	2.342V
3	F6 D7	0xF6D7	-2345	-2.345V

C7 8B:CRC Check Digit

Menu Operation

CK series modules, some models are equipped with OLED menu (see function configuration table for details). Through the OLED menu, you can query and configure serial communication parameters, Ethernet communication parameters, sensor calibration, etc.

Menu Appearance Description



①Menu display area;

②Left button: select the position to move left, move up, or adjust parameters;

③Down key: select position down, parameter adjustment button;

④OK button: enter the menu and confirm the adjustment parameter button;

Menu Operation

Enter and exit menu

In standby mode, press the OK button to enter the menu settings.

Move the selection items up and down in the menu, select the exit item, and press the OK button to exit the menu settings.

Serial port parameter settings

①In standby mode, press the OK button to enter the menu settings,move down to the serial port parameter settings, and press the OK button to enter;

②Move up or down to select the parameter you want to set, and press OK to enter. For example: To set the device station number, move the cursor to the device station number and press OK.

③When setting IP, move the cursor to the left to select the parameter to be adjusted, and press the up key to adjust the parameter. After adjustment, press the OK key to confirm the setting parameter;

④Move the cursor to the Exit option and press OK to exit the settings;

After the network parameters are set, they will not take effect immediately. Exit the network parameter settings, restart the device or power on again to make the settings effective.

If DHCP is turned on in the network parameter settings and the series is set to dynamic IP, the IP set in the menu will be invalid, waiting for the router to assign an IP, and the menu related items will be hidden. DHCP is turned off, the system is set to static IP, and the IP set in the menu will take effect.

The factory default settings are DHCP: Off, IP: 192.168.1.30, Subnet Mask: 255.255.255.0, Gateway: 192.168.1.1.

Electrical parameters

Unless otherwise specified, the electrical parameters of the CK-7160E data acquisition module are the values when Tamb=25℃.

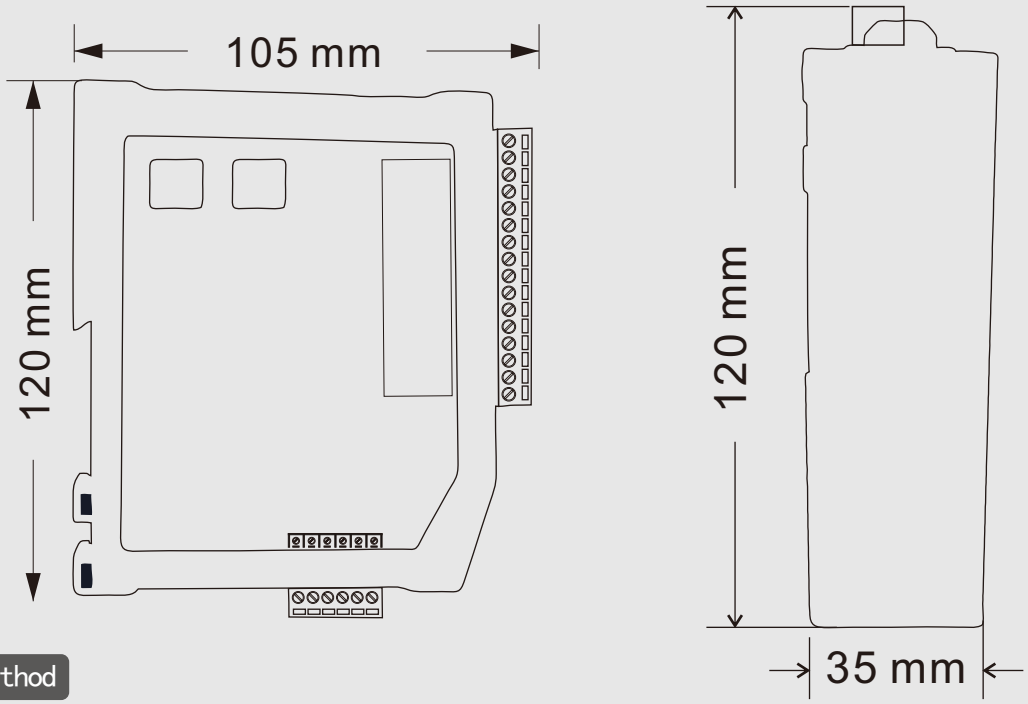
Module parameters

参数	Parameter	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
供电电压	Power Supply	+10	---	+30	V
看门狗复位周期	Watchdog Period		1		S
输入保护	Input Protect		100/60		mA/V

Analog input parameters

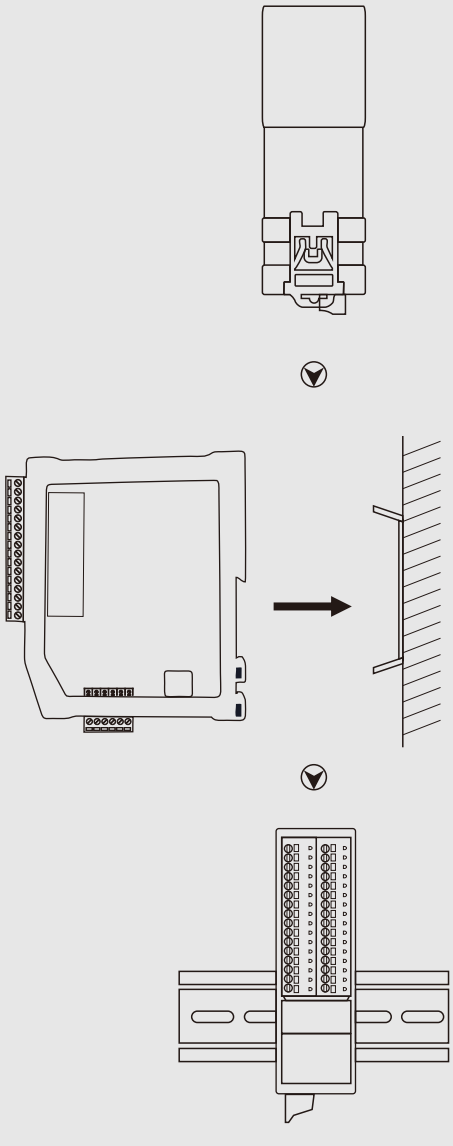
参数	Parameter	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
分辨率	Resolution		16		bit
精度	Accuracy		±0.1		%of SFR
零点飘移	Zero Drift	-50		+50	uV/℃
温度系数	Temperature Coefficient			±50	ppm/℃
非线性	Differential Nonlinearity			±1	LSB
隔离电压	Isolation Voltage			2500	Vdc
输入阻抗	Load Impedance		2M		Ω

Mechanical Dimensions



Installation method

CK-7160E supports DIN35 rail installation. Users can easily install or remove the module on the rail, providing assistance for industrial site application and installation.



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 indicators under the conditions of storage, transportation and use, the user can return it to the factory for free repair. If the damage is caused by violation of operating regulations and requirements , the device fee and repair fee shall be paid.

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Product Showcase

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Wiring Diagram