Integrated EtherCAT bus remote IO module

MODEL：CK-TP5321

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Switch input module

Overview

The CK-TP series module is a new generation of modular data collector based on embedded system. It adopts standard DIN35 rail installation method, which is simple to install on site and flexible to use; it can cope with various field applications. The module is equipped with Ethernet cascade communication, which can communicate with PC, PLC, touch screen and other devices that support Modbus-TCP protocol.

CK-TP5321 switch input and output data collector can collect up to 32 switch signals (optical coupler input). It is suitable for collecting and controlling various IO signals in industrial sites.

CK-TP5321 adopts photoelectric isolation technology to effectively ensure reliable and safe data collection.

Technical Parameters

- ◆Embedded real-time operating system
- ◆Input and output channels: 32 inputs
- ◆Input type: compatible with NPN, PNP and dry nodes
- ◆Wide power supply range: DC 10-30V
- ◆Nominal power supply voltage: DC 12/24V
- ◆Module power consumption: 2W
- ◆Support Modbus tcp protocol
- ◆Dual network ports support on-chip cascading
- ◆ESD protection: ±15KV
- ◆Isolation withstand voltage: DC 2500V
- ◆Operating temperature range: -35℃～75℃
- ◆Industrial grade plastic housing, standard DIN35 rail installation

Application

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

Model	DI (Optocoupler)	DO (NPN)	DO (Relay)	ETH cascade
CK-TP5162	16	16		support
CK-TP5163	16		12	support
CK-TP5161	16			support
CK-TP5016		16		support
CK-TP5321	32			support
CK-TP5032		32		support

CONTENTS

CK-TP5161 16DI
CK-TP5321 32DI

Input Type: Optocoupler compatible with NPN and PNP types

CK-TP series modules are a new generation of modular data loggers based on embedded systems. They are installed using standard DIN35 rails, are easy to install on site, and are flexible to use. They can handle a variety of field applications. The modules are equipped with Ethernet cascade communication and can communicate with PC, PLC, touch screens, and other devices that support the Modbus-TCP protocol.

Switching data acquisition

CK-TP5321 adopts advanced data processing technology to collect various active and passive switch/digital signals in industrial sites. It can meet the industrial sites with high measurement requirements and security, smart buildings, smart homes, power monitoring, process control and other occasions.

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.

Input and output isolation

The product is designed for industrial applications: through photoelectric isolation technology, 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 by photoelectric isolation technology, which effectively ensures the reliability and safety of data acquisition.

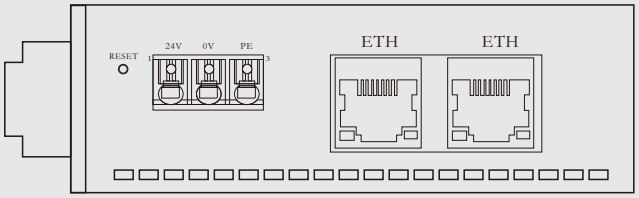
Technical indicators

Switch input

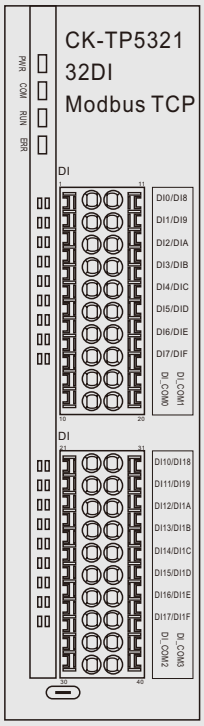
- Number of input channels: up to 32
- Input type: Optocoupler compatible with NPN and PNP types

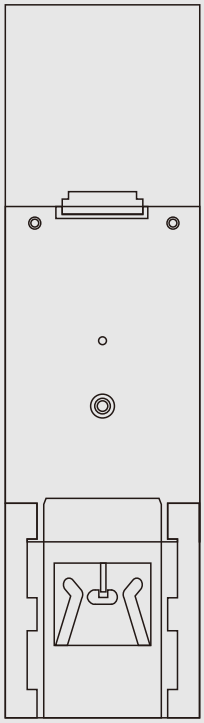
Tp5321 inputs share a common COM terminal for every 8 channels. When the COM terminal is connected to 12/24V, the DI in the group can be connected to an NPN sensor. When the COM terminal is connected to 0V, the DI in the group can be connected to a PNP sensor. Regardless of whether the COM terminal is connected to 0V or 12/24V, the DI in the group can be connected to a dry node (passive contact, button, etc.).

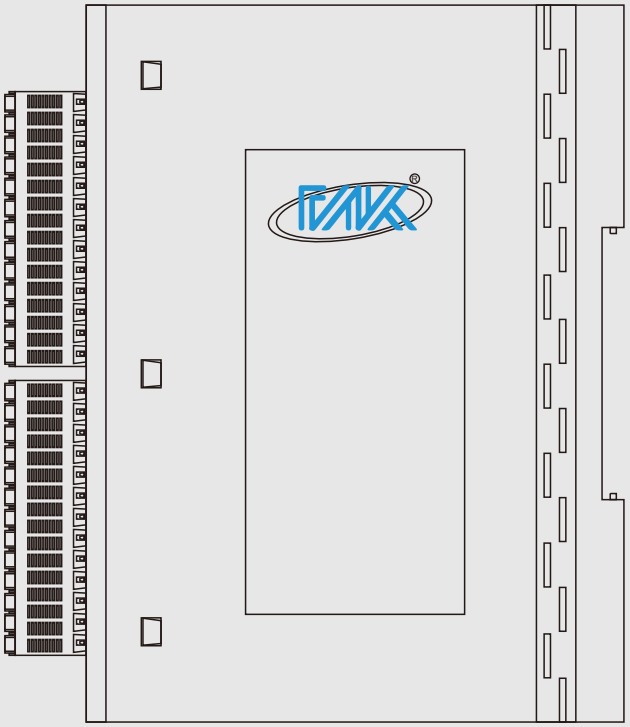
Port Information



Serial Number	Mark	Definition
1	24V	Power input positive
2	0V	Power input negative
3	PE	Ground terminal







CK-EC5321 Port Description

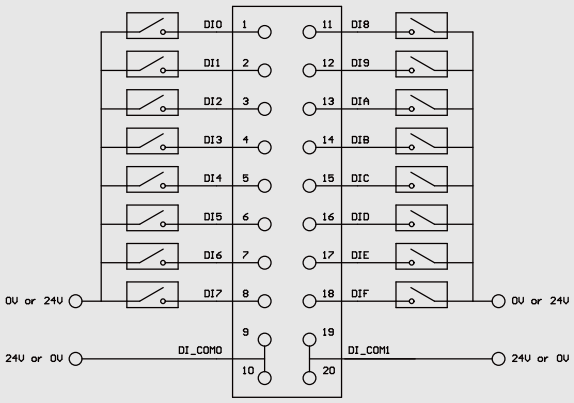
Description	Serial number	Mark	Mark	Serial number	Description
DI signal Input	1	DI0	DI8	11	DI signal Input
	2	DI1	DI9	12	
	3	DI2	DI10	13	
	4	DI3	DI11	14	
	5	DI4	DI12	15	
	6	DI5	DI13	16	
	7	DI6	DI14	17	
	8	DI7	DI15	18	
Common port0	9	0V or 24V	0V or 24V	19	Common port1
	10			20	
DI signal Input	21	DI10	DI18	31	DI signal Input
	22	DI11	DI19	32	
	23	DI12	DI1A	33	
	24	DI13	DI1B	34	
	25	DI14	DI1C	35	
	26	DI15	DI1D	36	
	27	DI16	DI1E	37	
	28	DI17	DI1F	38	
Common port2	29	0V or 24V	0V or 24V	39	Common port3
	30			40	

*:Terminals 9 and 10 are internally connected,terminals 19 and 20 are internally connected.
Terminals 29 and 30 are internally connected,terminals 39 and 40 are internally connected.
DI_COM0 and DI_COM1,DI_COM2 and DI_COM3 can be connected to the same or different signals

Wiring Diagram

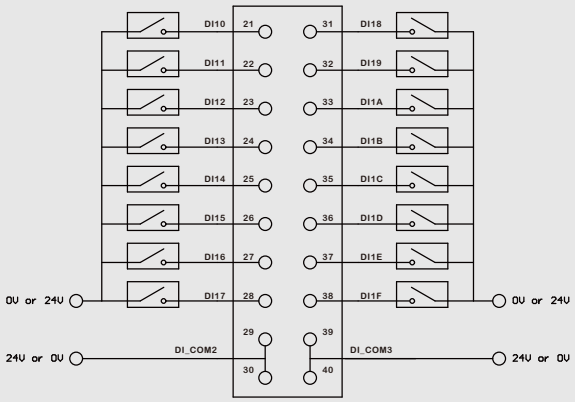
CK-TP5321 Wiring Diagram

1~16-CH DI INPUT



Terminals 9 and 10 are internally connected
Terminals 19 and 20 are internally connected
DI_COM0 and DI_COM1 can be connected to the same or different signals.

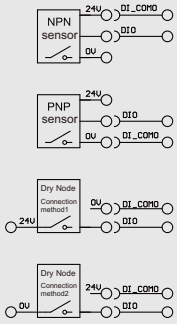
17~32-CH DI INPUT



Terminals 29 and 30 are internally connected
Terminals 39 and 40 are internally connected
DI_COM2 and DI_COM3 can be connected to the same or different signals.

DI inputsensoraccessexampl ediagram

DI input sensor connection example

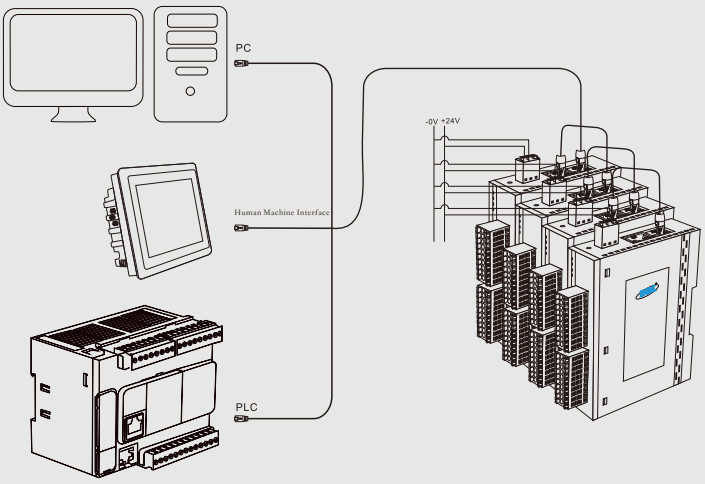


It is recommended to use cables with a core diameter less than 1mm². The cold terminal

Communication interface

Ethernet connection

Some modules of the CK series support 100M/10M standard Ethernet interface. Support Modbus TCP protocol, support network port cascading, and automatic polarity recognition (AUTO MDIX).

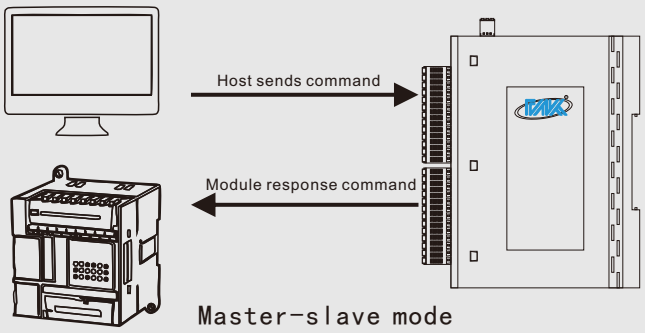


Schematic diagram of cascading network connection of Ck modules through Ethernet interface

Module communication mode

Master-slave mode

The communication mode of the CK-TP5321 module is usually the master-slave mode (question-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

Ethernet communication parameters (default IP 192. 168. 1. 30 port number 502)

Communication Protocol

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 CK-TP5321 module supports the industrial standard MODBUS-TCP (Ethernet) protocol, and the module works in the MODBUS slave (server) state. It can communicate with PLCs and computers of various brands.

The module supports MODBUS commands as shown in the figure:

Serial number	Order(HEX)	Function	Remark
1	01	Read single/multi-channel switch output status (bit)	Output Channel
2	02	Read single/multi-channel switch input status (bit)	Input Channels
3	03	Read switch status (byte)	Input and output channels
4	05	Set the single-channel switch output status (bit)	Output Channel
5	06	Write switch output status (byte)	Output Channel
6	0F	Set the multi-channel switch output status (bit)	Output Channel

01,02,05,0F Bitwise operation allows users to read and write one or more consecutive input and output channels at a time;

03, 06, 10 are byte-based operations. Users can read and write up to 16 input and output channels at a time.

The MODBUS address allocation of CK module is as follows: (CK-TP5321)

Bit operation register description:

Bit operation function code: 01H (read multi-channel output switch status), 02H (read multi-channel input switch status), 05H (set single-channel switch output status), 0FH (set multi-channel switch output status)

Order (HEX)	Register address (HEX)	Data Description
02	0	Read digital input 0 status
02	1	Read digital input 1 status
02	2	Read digital input 2 status
02	3	Read digital input 3 status
02	4	Read digital input 4 status
02	5	Read digital input 5 status
02	6	Read digital input 6 status
02	7	Read digital input 7 status
02	8	Read digital input 8 status
02	9	Read digital input 9 status
02	A	Read digital input 10 status
02	B	Read digital input 11 status
02	C	Read digital input 12 status
02	D	Read digital input 13 status
02	E	Read digital input 14 status
02	F	Read digital input 15 status
02	10	Read digital input 16 status
02	11	Read digital input 17 status
02	12	Read digital input 18 status
02	13	Read digital input 19 status
02	14	Read digital input 20 status
02	15	Read digital input 21 status
02	16	Read digital input 22 status
02	17	Read digital input 23 status
02	18	Read digital input 24 status
02	19	Read digital input 25 status
02	1A	Read digital input 26 status
02	1B	Read digital input 27 status
02	1C	Read digital input 28 status
02	1D	Read digital input 29 status
02	1E	Read digital input 30 status
02	1F	Read digital input 31 status
03	22	Read switch input status 0~15 channels, (bit 0 indicates channel 0)
03	23	Read switch input status 16~31 channels, (bit 16 indicates channe17)

Modbus TCP communication example of DI type acquisition module:

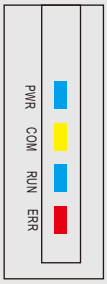
<table>
<tr><td>Example</td><td>Read DI input status</td></tr>
<tr><td>Module Description</td><td>Number of channels: 8, address: 1</td></tr>
<tr><td>Master sends</td><td>00 01 00 00 00 06 01 02 00 00 00 08</td></tr>
<tr><td>Module Reply</td><td>00 01 00 00 00 04 01 02 01 21</td></tr>
<tr><td>The main station sends analysis</td><td>00 01:Message sequence number
00 00: Modbus TCP Communication protocol identifier
00 06: Indicates that the following data length is 6 bytes
01:Module slave address
02: Modbus Read input discrete quantity function code
00 00:0x0000 Register start address
00 08:Read register quantity</td></tr>
<tr><td>Module reply analysis</td><td>00 01:Message sequence number
00 00: Modbus TCP Communication protocol identifier
00 04: Indicates that the following data length is four bytes
01:Module slave address
02: Modbus Read input discrete quantity function code
01:Number of data bytes
21:Input status data, the binary corresponding to 0x21 is 0 0 1 0 0 0 0 1.
<table>
<tr><td></td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
<tr><td>Reading Data</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Channel Number</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Channel Status</td><td>Low</td><td>Low</td><td>high</td><td>Low</td><td>Low</td><td>Low</td><td>Low</td><td>high</td></tr>
</table></td></tr>
</table>

Indicator Lights

The user can judge the operation and communication status of the module, as well as the status of the DIO channel through the LED status indicator.

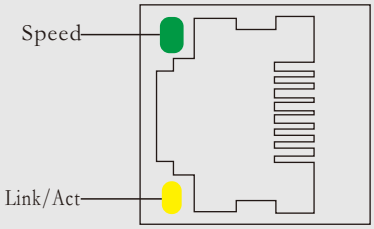
Module status indicator

Light logo	Color	Explanation
PWR	Blue	On: The module is powered on.
COM	Yellow	Flashing: The module is communicating with the master station
RUN	Blue	Flashing: The device program is running
ERR	Red	On: The module detects an error



EtherNET port indicator

Light logo	color	Explanation
Speed	Green	Link speed indicator light: On: 100M Off: 10M
Link/Act	Yellow	Link status indicator Steady on:Physical link connected,no communication Blinking:Communicating Off:Link not connected



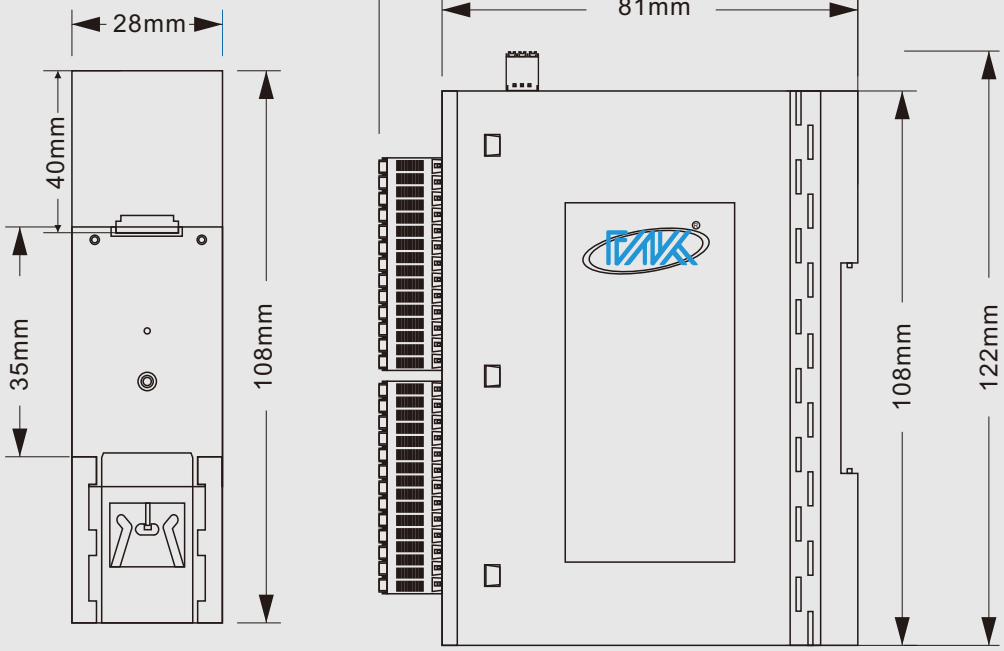
Electrical parameters

Unless otherwise specified, the electrical parameters of the CK-TP5321 data acquisition module are the values when Tamb=25℃.

Module parameters

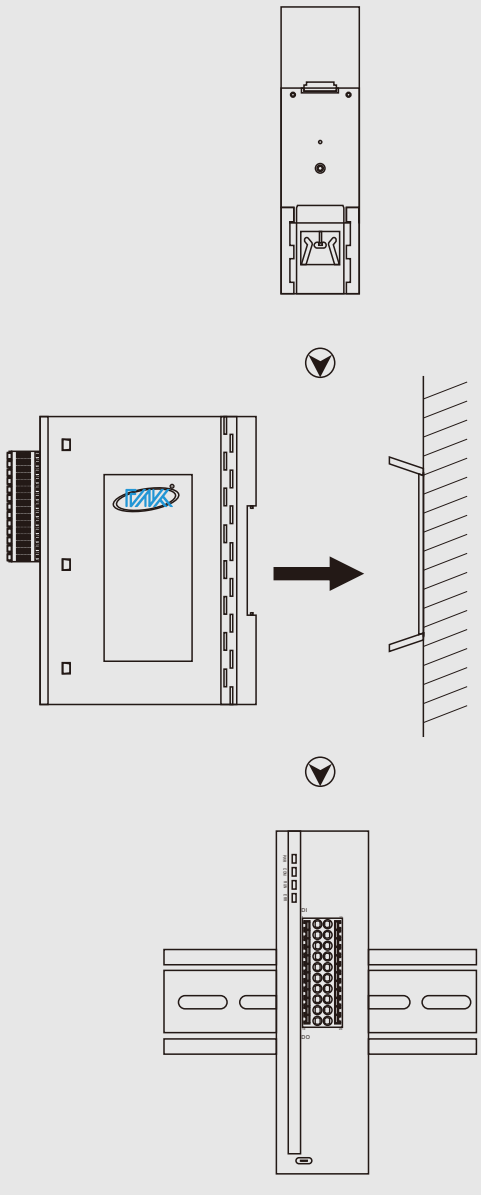
Entry	Parameter	Entry	Parameter
Power supply	10-30VDC (nominal 24VDC)	Input isolation voltage	2500V rms
Power consumption	2W	Turn-on voltage	8V-30V (relative to the common terminal)
Communication Protocol	Modbus TCP	Input Impedance	>8KΩ
Network Interface	2*RJ45	Input Delay	Max. 2mS
Connection rate	10/100Mbps	Input signal type	Both NPN and PNP support common terminal connection of 24V for NPN and 0V for PNP.Every 8 inputs share one common terminal.
Number of DI input channels	32		

Mechanical specifications



Installation Method

CK-TP5321 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 two 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 display picture

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