Integrated Modbus-TCP bus remote IO module

MODEL：CK-TP5016

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Switching output 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-TP5016 switch output data collector can collect and output up to 16 digital signals (NPN type). It is suitable for collecting and controlling various IO signals in industrial sites.

CK-TP5016 adopts photoelectric isolation technology to effectively ensure reliable and safe data collection.

Technical Parameters

◆Embedded real-time operating system
◆output channels: 16 outputs
◆Output type: NPN type
◆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-TP5016 16DO(NPN)
CK-TP5032 32DO(NPN)

Output Type: NPN

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 PCs, PLCs, touch screens, and other devices that support the Modbus-TCP protocol.

Switching data acquisition

CK-TP5016 adopts advanced data processing technology to collect various active and passive switch/digital signals in industrial sites. It can meet the requirements of industrial sites with high measurement requirements, security, smart buildings, smart homes, power monitoring, process control and other occasions.

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.

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.

Technical indicators

Switch output

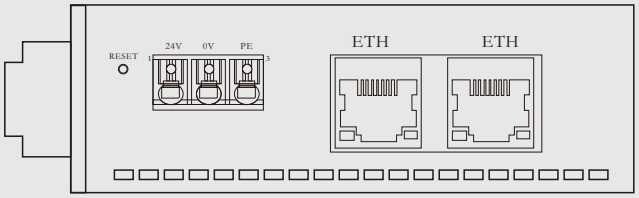
◆Number of output channels:16

◆Output type:NPN

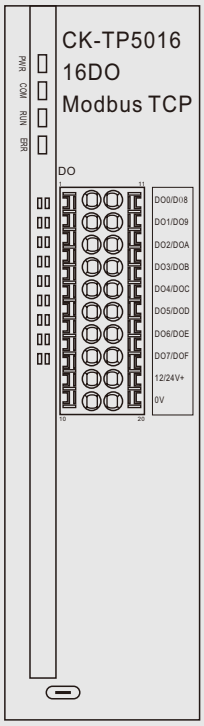
◆Load capacity:0.5A per channel

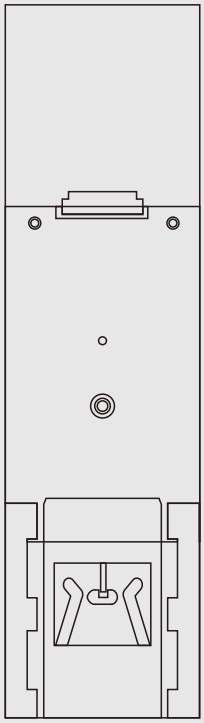
◆Load switching voltage:DC10-30V equivalent to DO power supply voltage

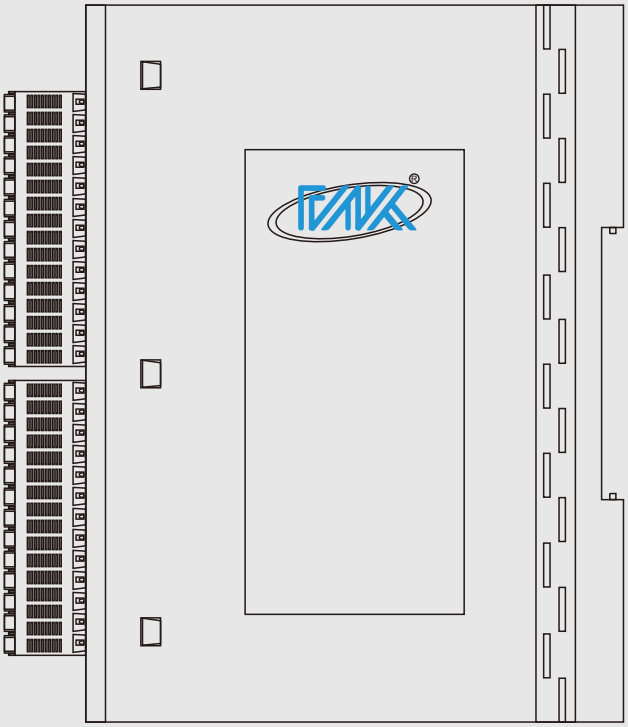
Port Information



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







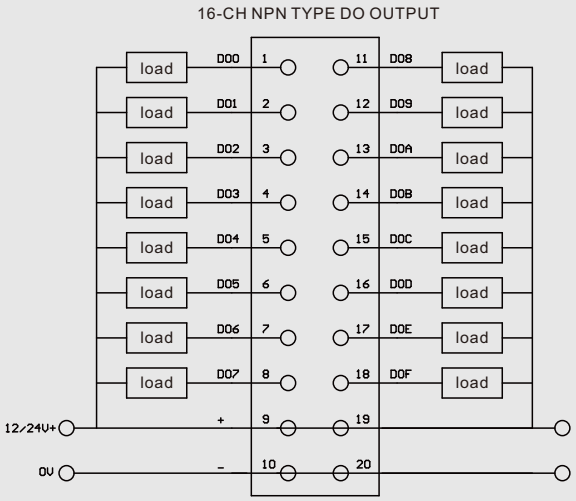
CK-TP5016 Port Description

Description	Serial number	Mark	Mark	Serial number	Description
DO output terminal	1	DO0	DO8	11	DO output terminal
	2	DO1	DO9	12	
	3	DO2	DOA	13	
	4	DO3	DOB	14	
	5	DO4	DOC	15	
	6	DO5	DOD	16	
	7	DO6	DOE	17	
	8	DO7	DOF	18	
Power input 24V	9	+		19	Power input 24V
Power input 0V	10	-		20	Power input 0V

*:module needs to be connected to a set of power supplies on9,19 and 10,20.

Wiring Diagram

CK-TP5016 Wiring Diagram



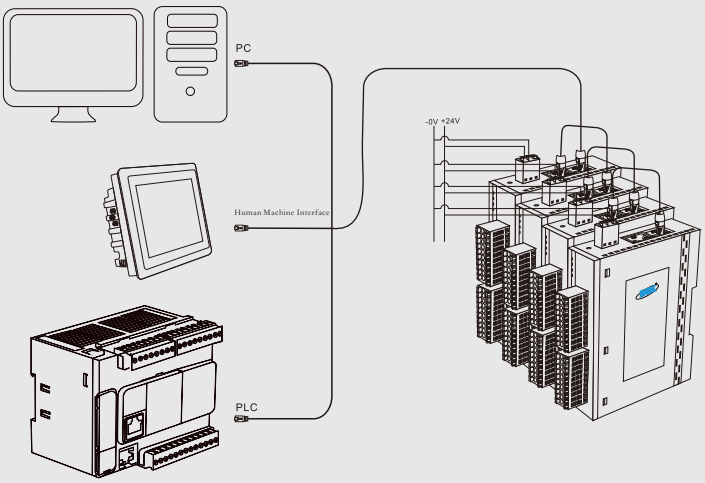
Terminals 9 and 19 are internally connected
Terminals 10 and 20 are internally connected
Terminals 9, 19 and 10, 20 need to be connected to a power supply

It is recommended to use cables with a core diameter less than 1mm². The cold terminal parameters are as follows:

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).

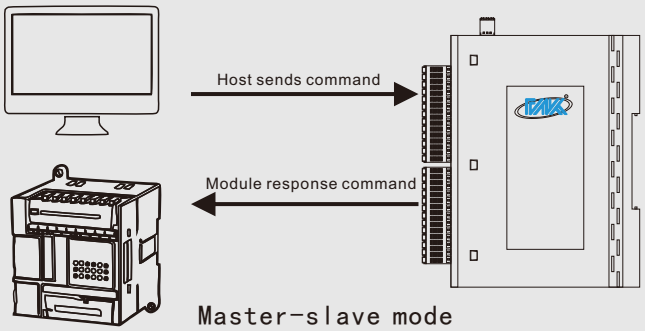


Schematic diagram of cascading network connection of Ck modules through Ethernet interface

Module communication mode

Master-slave mode

The communication mode of the CK-TP5016 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-TP5016 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-TP5016)

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
01/05/0F	0	Read and write DO output 0 output status (write 1 load to get power)
01/05/0F	1	Read and write DO output 1 output status (write 1 load is powered)
01/05/0F	2	Read and write DO output 2 output status (write 1 load is powered)
01/05/0F	3	Read and write DO output 3 output status (write 1 load is powered)
01/05/0F	4	Read and write DO output 4 output status (write 1 load is powered)
01/05/0F	5	Read and write DO output 5 output status (write 1 load is powered)
01/05/0F	6	Read and write DO output 6 output status (write 1 load is powered)
01/05/0F	7	Read and write DO output 7 output status (write 1 load is powered)
01/05/0F	8	Read and write DO output 8 output status (write 1 load is powered)
01/05/0F	9	Read and write DO output 9 output status (write 1 load is powered)
01/05/0F	A	Read and write DO output 10 output status (write 1 load is powered)
01/05/0F	B	Read and write DO output 11 output status (write 1 load is powered)
01/05/0F	C	Read and write DO output 12 output status (write 1 load is powered)
01/05/0F	D	Read and write DO output 13 output status (write 1 load is powered)
01/05/0F	E	Read and write DO output 14 output status (write 1 load is powered)
01/05/0F	F	Read and write DO output 15 output status (write 1 load is powered)
03/06/10	20	Read and write switch output status 0~15 channels, (bit 0 represents channel 0)

DO type output module Modbus TCP communication example:

Example	Set DO output status
Module Description	Number of channels: 8, address: 1
Master sends	00 01 00 00 00 08 01 0F 00 00 00 08 01 C3
Module Reply	00 01 00 00 00 06 01 0F 00 00 00 08
The main station sends analysis	00 01:Message sequence number 00 00: Modbus TCP Communication protocol identifier 00 08: Indicates that the following data length is 8 bytes 01:Module slave address 0F: Modbus Continuously write coil function code 00 00:0x0000 Register start address 00 08:Number of registers written 01:Number of data bytes C3:Output status data, the binary corresponding to 0xC3 is 1 1 0 0 0 0 1 1. Relay output type: Set state 1 to relay energized. 0C output type: Set state 1 to 0C gate open (connected to GND).
Module reply analysis	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 0F: Modbus continuous write coil function code 00 00:0x0000 Register start address 00 08:Number of registers written

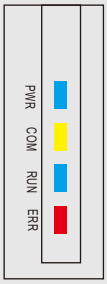
	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Writing Data	1	1	0	0	0	0	1	1
Channel Number	7	6	5	4	3	2	1	0
Set Status	1	1	0	0	0	0	1	1

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.

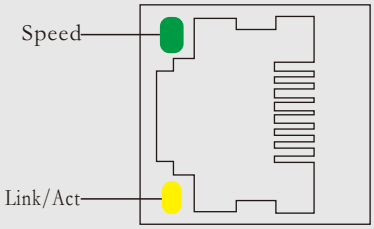
Module status indicator

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



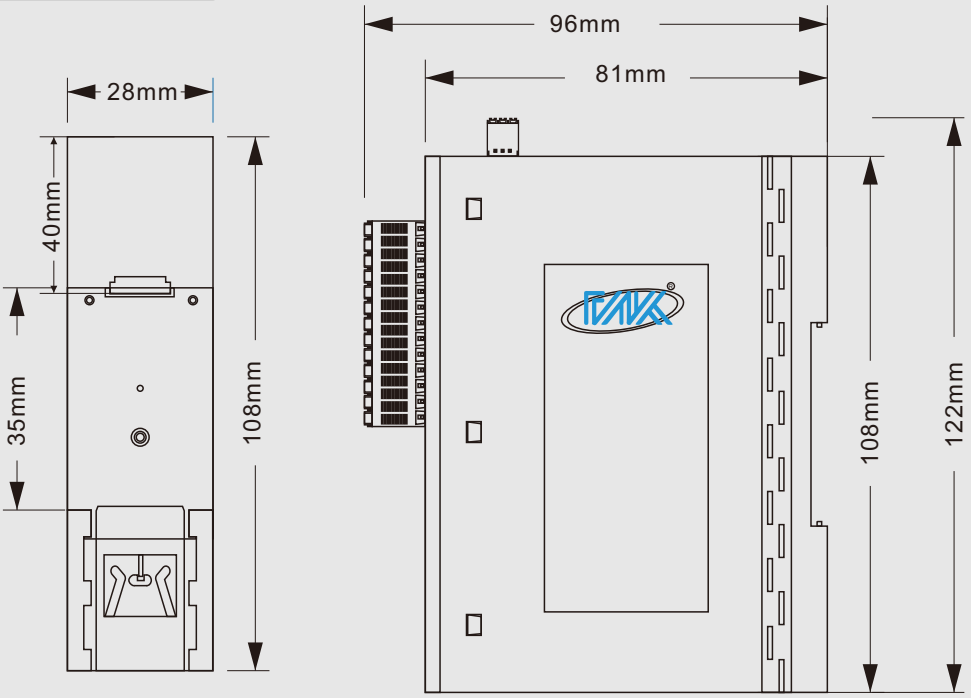
Electrical parameters

Unless otherwise specified, the electrical parameters of the CK-TP5016 data acquisition module are the values when Tamb=25℃.

Module parameters

Entry	Parameter	Entry	Parameter
Power supply	10-30VDC (nominal 24VDC)	Rated output current	Single channel maximum 500mA
Power consumption	2W	DO output protection	Over temperature, over current, short circuit
Communication Protocol	Modbus TCP	Turn off leakage current	Max 50uA
Network Interface	2*RJ45	On-resistance	Typical value: 0.5Ω
Connection rate	10/100Mbps	Output Type	NPN type/leakage type Open output 0V, Close output high impedance
Number of DO input channels	16		
Operating temperature	-35-75℃	wiring	I/Owiring:Maximum 1mm²
Protection level	IP20	Ambient humidity	5%-95% (no condensation)

Mechanical specifications

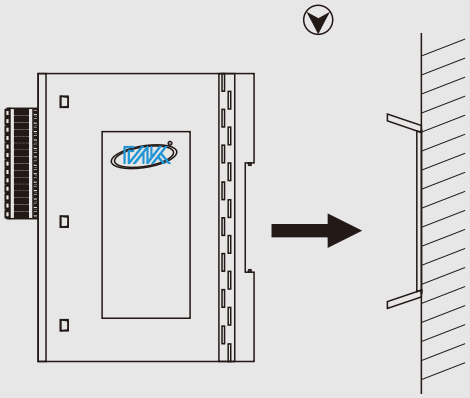


Installation Method

CK-TP5016 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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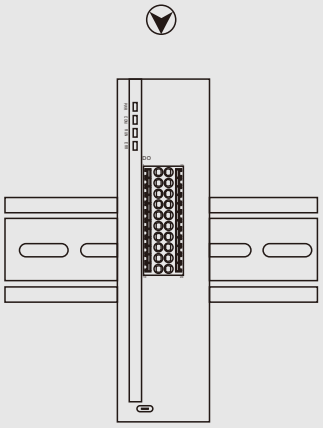

Product display picture

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