

RP20 Series I/O System

RP20-0016DTP RP20-0808DTP RP20-0016DTN RP20-1600DT

Digital I/O Module

User Manual

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Support

If you have questions during product selection or usage, customers in China can call our technical support hotline at 400-700-5281 (Chinese service only).

For inquiries about the products described in this manual, please contact your local Kinco office or distributor. For information on user training, visit our company website or consult your local distributor for training plans.

Manual Acquisition

This manual is a paperless document. To obtain a PDF version, visit the Kinco official website (<u>https://en.kinco.cn/</u>), navigate to "Service \rightarrow Download", and search by keywords to download.

Device Description File Acquisition

The RP20 series I/O modules file (.xml) integrates device descriptions for all CPU modules in the AK8X0 series or RP20 series couplers. Please visit the Kinco official website https://www.kinco.cn/ (CN), <a href="https

Reversion History

Reversion Date	Release Version	Description
2024/12/25	RP20DIO_usermanual_V000	Initial Revision

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1 Safety Instructions

This chapter outlines safety precautions for proper use of the product. Before use, read this manual and any related documentation to understand the safety instructions. Failure to follow these precautions may result in death, serious injury, or equipment damage.

The "Danger," "Warning," and "Caution" notes in this manual are not exhaustive but supplement general safety measures.

Use this product within its design specifications to avoid malfunctions. Damage or issues caused by non-compliance are not covered under warranty.

Kinco assumes no legal responsibility for personal injury, property damage, or other accidents resulting from non-compliance with this manual or improper operation of the product.

To ensure safe use, this manual employs specific symbols and graphical markings to highlight important safety-related information. Please adhere strictly to these precautions.

\bigcirc	Danger/Prohibited Indicates prohibited actions. If proper precautions are not taken, it may result in serious personal injury or even death.
<u>.</u>	Warning Indicates cautionary actions. If proper precautions are not taken, it may result in serious personal injury or even death.
!	Caution Indicates general information or directives. If the corresponding precautions are not followed, it may lead to unintended results.

During power supply



 During power supply, do not touch terminals or attempt disassembly. Wait for capacitors to discharge after turning off the power to avoid electric shock or hazards.

During electrical assembly

Installation, wiring, maintenance, and inspection must be performed by qualified personnel trained in electrical equipment.
 Avoid dusty, corrosive, or high-temperature environments.



When processing screw holes or wiring, take care to prevent metal shavings, dust, and wire fragments from entering the controller's ventilation channels, as this may cause fire, malfunctions, or other unintended operations.

During wiring



The installation, wiring, maintenance, and inspection of this product must be carried out by professional electrical maintenance personnel who have received relevant training in electrical equipment and possess sufficient electrical knowledge.

Wiring work must only be performed after ensuring that the external power supply to the system is completely disconnected. Otherwise, there is a risk of electric shock, equipment failure, or unintended operation.



After completing installation and wiring, ensure the product is fully assembled (including end caps and cover plates) before powering on and operating; otherwise, there is a risk of electric shock.

 Cable terminals must be properly insulated, and the insulation distance between cables should not decrease after installation on the terminal block. Failure to do so may result in electric shock, short circuit, or equipment damage.



When processing screw holes or wiring, take care to prevent metal shavings, dust, and wire fragments from entering the controller's ventilation channels, as this may cause fire, malfunctions, or unintended operations.

 Before connecting cables, confirm the type of interface being connected. Incorrect interface connections or wiring errors may result in controller or external equipment malfunctions or damage.

- Tighten the bolts on the terminal block within the specified torque range. Failure to tighten them properly may result in circuit short circuits, loose connections, or fire hazards. Over-tightening could damage the bolts or the controller, causing component detachment, circuit short circuits, or fire hazards.
- When connecting external devices via connectors, use tools specified by the

manufacturer for proper crimping, pressing, or soldering. Poor connections may lead to short circuits, fire, or unintended operations.

- Do not bundle control lines or communication cables with main circuit or power supply lines, nor place them too close to each other. Ensure control and communication cables are arranged at least 100 mm apart from main circuit power lines in separate cable ducts or spaces to prevent noise-induced malfunctions.
- For applications with severe interference, use specialized shielded cables for high-frequency signal input or output to enhance the system's antiinterference capability.

During system design and debugging



 Always design a safety circuit to ensure that the control system remains secure in the event of an external power failure or controller malfunction.

If the output circuit experiences prolonged overcurrent due to exceeding the rated load current or a short circuit in the load, the controller may emit smoke or catch fire. Install external fuses or circuit breakers as safety protection devices.



Ensure that the external circuit of the controller includes an emergency brake circuit, protection circuit, interlock circuits for forward/reverse operations, and upper/lower limit interlock switches to prevent machine damage.

- To ensure safe equipment operation, design external protection circuits and safety mechanisms for output signals related to critical accidents.
- The controller's CPU may automatically disable all output signals when detecting a system abnormality. If part of the controller's circuitry malfunctions, outputs may become uncontrollable. To ensure proper operation of the equipment, design appropriate external control circuits.
- If the controller's transistor output unit is damaged, its output state may become uncontrollable.
- Programmable Logic controllers (PLCs) are designed for indoor use in electrical environments with overvoltage category II. The power supply system should include lightning protection devices to prevent overvoltage caused by lightning from affecting the power input, signal input, or control output ports of the controller, thus avoiding equipment damage.

During operation and maintenance



The installation, wiring, maintenance, and inspection of this product must be carried out by professional electrical maintenance personnel who have received relevant training in electrical equipment and possess sufficient electrical knowledge.

 Before cleaning or re-tightening the bolts on the terminal block or the connector installation bolts, please ensure that the system's power supply is completely disconnected.



• During equipment debugging, thoroughly read the user manual before performing operations such as online program modifications, forced outputs, start (RUN), and stop (STOP). Ensure that the safety of these operations is fully confirmed before proceeding.

2 Overview

To explore diverse automation application scenarios and providing customers with more comprehensive automation solutions, Kinco has launched the Kinco-RP20 series bus-based I/O system.

2.1 Introduction

The RP20 series products, with their robust industrial design and manufacturing quality, outstanding performance, and comprehensive feature integration, are not only widely applicable in the field of general industrial automation but also highly suitable for various specialized smart sectors such as building automation, agricultural intelligence, energy monitoring, and energy management. They are designed to offer customers versatile and flexible solution possibilities.



2.2 Naming Rules

Fig. 2.2-1 RP20 series naming rules

According to the naming rules, the functionality of I/O modules can be inferred from their model numbers. For example:

- RP20-0016DTP: A 16-channel digital transistor output module with PNP output.
- **RP20-0016DTN**: A 16-channel digital transistor output module with NPN output.

• **RP20-1600DT**: A 16-channel digital input module supporting both sourcing and sinking types.

Note: The simplified naming rules may not fully describe the characteristics of the products. For instance, the digital hybrid module RP20-0808DTP has 8 transistor digital outputs (PNP type) and 8 digital inputs (supporting only sourcing input). Therefore, when selecting mixed modules, it is recommended to refer to the detailed product specifications.

2.3 Fuselage Label



Fig.2.3-3 A sample of naming description

No.	ltem	Description	
	Model and Brief	Includes basic information such as product	
Ú	Description	model, power supply, and function description.	
2	Product Serial	Unique and traceable.	
	Number		
3	Certification	Includes the product's certification standards.	
4	Kinco official QR	Scan the code to directly access Kinco's official	

	Code	website for more information.
5	I/O Wiring Diagram	Provides a clear view of wiring information.
6	Kinco official	Enter the website address to visit Kinco's
	website	official website for more information.

3 General Specification

Transportation and Storage Conditions		
	Ambient Temperature	-40°C∼+70°C
Climatic	Relative Humidity	10% \sim 95%,no condensation
Conditions	Atmospheric Pressure	Equivalent to 0-3000 meters above sea level.
Mechanical Conditions Free Fall		With transport packaging, allows 5 drops from 1m height to the cement floor.
Operating Conditi	ons	
Climatic	Ambient Temperature	Open device with natural ventilation, ambient temperature range: -20° C \sim 55 °C.
Conditions	Relative Humidity	10% \sim 95%,no condensation
	Atmospheric Pressure	Altitude ≤2000 meters
	Pollution Level	Suitable for pollution level 2
Mechanical Conditions	Sine Vibration	5 < f < 8.4 Hz, Random: 3.5mm displacement; Continuous: 1.75mm displacement.
		8.4 < f < 150 Hz, Random: 1.0g acceleration; Continuous: 0.5g acceleration
	Shock	Half sine wave, 15g, 11ms, 6 times per axis.
Electromagnetic Compatibility	EMC Immunity Level	Zone B,IEC61131-2
	Electrostatic Discharge	Air discharge 8kV, contact discharge 4kV. Performance Leve A
	Surge	DC power supply 0.5kV CM, 0.5kV DM. I/O and communication ports:
		1kV CM.

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		Performance Leve A
	Fast Transient Burst	Power coupling: 2kV, 5kHz. I/O and communication coupling: 1kV, 5kHz.
		Performance Level A
Protection Level		IP20
Cooling Type		Natural air cooling
Installation Type		DIN35 rail mounting

4 Product List

Order Number	Description
RP20-0016DTP	DO 16*24V DC, PNP
RP20-0016DTN	DO 16*24V DC, NPN
RP20-1600DT	DI 16*24V DC(sourcing/sinking)
RP20-0808DTP	DI 8*24V DC(sourcing), DO 8*24V DC, PNP;
*RP20-0008DR	DO 8*Relay

5 Component Description



Fig.5.1-1 Component description

No.	ltem	Comment		
1)	Color Label	Indicate the type of the module	Refer to <u>Chapter 2</u> Meaning: Orange, Coup Red, Digital C Blue, Digital	2.2 oler Dutput Module Input Module d DI/O Module
		PR: Operating Status	Steady On: Norma Fast Blinking (50m Slow Blinking (200 ID Single Blink (200m Double Blink (200 operating state	al operating state ns / 50ms): Error event Oms / 200ms): Uninitialized ns / 1000ms): Stopped state ms / 200ms / 1000ms): Safe
		Err: Error State	Steady On: An internal error has occurred, refer to <u>Chapter 11</u> for error diagnosis. Off: No internal error has occurred.	
2	Indicator Lights		00-07 (2 Groups) : Indicate the channel operating status of DI/O mixed modules.	For hybrid digital modules, there are two groups of 16 channel indicator lights (corresponding to A/B group terminals), each indicating the operating status of the respective I/O channels.
		DI/DO Indicators	00-17 (1 Group) : Indicate the channel operating status of DI or DO modules.	For digital input or output modules, there's one group of 16 channel indicator lights (corresponding to terminals on both sides of A/B groups), each indicating the operating status of the respective I/O channels.
3	I/O Connector	Plug-In Spring Terminals: Tool-free installation and efficient connections. For details, refer to specific model connection diagrams.		
4	Locking Latch	Compatible with standard DIN35 rails for assembly.		
5	Side Connectors	Used for backplane (expansion) communication and power supply.		
6	DIN Rail	Standard DIN35 rail installation.		

	Slot	
7	Fuselage Label	Includes basic product information such as model number, serial number, certifications, and wiring diagrams. Refer to <u>Chapter 2.3</u> for details.
Q	Top Front	
[™] F	Rail	Used for dual-side alignment when coupling modules
	Bottom	directly, ensuring vertical alignment with the front module.
9	Front Rail	
(10)	Top Rear	
U	Rail	Used for dual-side alignment during module coupling,
(11)	Bottom	ensuring vertical alignment with the rear module.
Û	Rear Rail	

6 Technical Specification

6.1 RP20-0016DTP

Technical Specifications		
Output Channels	16	
Output type	Transistor output, PNP	
Turn-On Delay	<50µs	
Turn-Off Delay	<50µs	
"0" Signal Level	MOSFET off	
"1" Signal Level	MOSFET on	
On-State Resistance	Typical: 0.15 Ω , Maximum: 0.3 Ω	
Rated Output Voltage	24V DC, allowable range: 20.4V DC - 28.8V DC	
	Resistive Load: 12A/point, 48W/module	
Load	Inductive Load: 6W/point, 24W/module	
	Lamp Load: 5W/point, 20W/module	
Maximum Switching	100Hz (resistive load)	
Frequency		
Output Leakage Current	Maximum 10µA	
Brotection	Short-circuit protection	
	Overcurrent protection	
Isolation	\checkmark	
Hot Swapping	×	
K-Bus Current Consumption	135mA (5V DC, room temperature)	
Indicator	The corresponding LED light is on(green) when	
	there is an output signal	
Dimensions (W $ imes$ H $ imes$ D)	12mm $ imes$ 100mm $ imes$ 80mm	
Weight	pprox70g	

6.2 RP20-0016DTN

Technical Specifications		
Output Channels	16	
Output type	Transistor output, NPN	
Turn-On Delay	<50µs	
Turn-Off Delay	<50µs	
"0" Signal Level	MOSFET off	
"1" Signal Level	MOSFET on	
On-State Resistance	Typical: 0.26 Ω , Maximum: 0.56 Ω	
Rated Output Voltage	24V DC, allowable range: 20.4V DC - 28.8V DC	
	Resistive Load: 12A/point, 48W/module	
Load	Inductive Load: 6W/point, 24W/module	
	Lamp Load: 5W/point, 20W/module	
Maximum Switching	100Hz (resistive load)	
Frequency		
Output Leakage Current	Maximum 10µA	
Protoction	Short-circuit protection	
	Overcurrent protection	
Isolation	\checkmark	
Hot Swapping	×	
K-Bus Current Consumption	135mA (5V DC, room temperature)	
Indicator	The corresponding LED light is on(green)when	
	there is an output signal	
Dimensions (W $ imes$ H $ imes$ D)	12mm $ imes$ 100mm $ imes$ 80mm	
Weight	pprox70g	

6.3 RP20-1600DT

Technical Specifications				
Input channels	16			
Input type	Sourcing/Sinking			
Turn-on Delay	<50µs			
Turn-off Delay	<50µs			
Rated Input Voltage	24V DC			
Logic "0" Max. Input	5V 0 8mA			
Voltage	5V, 0.811A			
Logic "1" Min. Input	15V/ 2mA			
Voltage	13V, 211A			
Input Current	3.5mA @ 24V DC			
Input Impedance	6.8K			

Isolation	\checkmark
Hot Swapping	×
Indicator	The corresponding LED light is on(green)when
Indicator	there is an input signal.
Software Filtering Time	,
Setting	~
K-Bus Current Consumption	135mA (5V DC, room temperature)
Dimensions (W $ imes$ H $ imes$ D)	12mm $ imes$ 100mm $ imes$ 80mm
Weight	pprox70g

6.4 RP20-0808DTP

Digital Input Specifications				
Input channels	8			
Input type	Sourcing			
Turn-on Delay	<50µs			
Turn-off Delay	<50µs			
Rated Input Voltage	24V DC			
Logic "0" Max. Input Voltage	5V, 0.8mA			
Logic "1" Min. Input Voltage	15V, 2mA			
Input Current	3.5mA @ 24V DC			
Input Impedance	6.8K			
Isolation	\checkmark			
Software Filtering Time Setting	\checkmark			
Indicator	The corresponding LED light is on(green)when there is an input signal.			
Digital Output Specifications				
Output Channels	8			
Output type	Transistor output, PNP			
Turn-On Delay	<50µs			
Turn-Off Delay	<50µs			
"0" Signal Level	MOSFET off			
"1" Signal Level	MOSFET on			
On-State Resistance	Typical: 0.15 Ω , Maximum: 0.3 Ω			
Rated Output Voltage	24V DC, allowable range: 20.4V DC - 28.8V DC			

	Resistive Load: 12A/point, 48W/module			
Load	Inductive Load: 6W/point, 24W/module			
	Lamp Load: 5W/point, 20W/module			
Maximum Switching	100Hz (resistive load)			
Frequency				
Output Leakage Current	Maximum 10µA			
Protoction	Short-circuit protection			
Protection	Overcurrent protection			
Isolation	\checkmark			
Indicator	The corresponding LED light is on(green)when there is an output signal.			
General Specification				
Hot Swapping	×			
K-Bus Current Consumption	135mA (5V DC, room temperature)			
Dimensions (W $ imes$ H $ imes$ D)	12mm $ imes$ 100mm $ imes$ 80mm			
Weight	\approx 70g			

7 Wiring

7.1 RP20-0016DTP



Fig.7.1-1 RP20-0016DTP wiring diagram

7.2 RP20-0016DTN



Fig.7.2-1 RP20-0016DTN wiring diagram

7.3 RP20-1600DT



Fig.7.3-1 RP20-1600DT wiring diagram

7.4 RP20-0808DTP



Fig.7.4-1 RP20-0808DTP wiring diagram

8 Dimensions



Fig.8.1-1 Dimensional drawing

The dimensions of the above product are applicable to the following models: RP20-0016DTP, RP20-0016DTN, RP20-0808DTP and RP20-1600DT.

9 Assembly Instructions

9.1 Assembly Dimensions





The above assembly dimensions are applicable to the following models: RP20-0016DTP, RP20-0016DTN, RP20-0808DTP and RP20-1600DT.

9.2 Assembly Method

9.2.1 DIN Rail Dimensions

It is recommended to use a standard 35mm wide, 1mm thick DIN rail for assembly. The following two heights are commonly used.



Fig.9.2-1 Standard DIN Rail

Notes: When the rail thickness <1mm, the latch may not lock securely, causing looseness. When >1mm, the latch may not close properly, and forcing it to lock could damage the module.

9.2.2 Module Assembly

Modules are effectively connected through the positional relationship between the top rail and the bottom rail.



Fig.9.2-2 Module assembly

When assembling modules, align the top and bottom rails of the module to be connected with the rails of the target module. Simultaneously clip them onto the rails, then push the module vertically until it is fully inserted and aligned.



Fig.9.2-3 Module assembly

To secure the module onto the DIN35 rail, first pull the spring lever at the top of the module upward. Then, clip the module vertically onto the rail. Release the lever, and the locking mechanism will automatically snap back to secure the module in place.



Fig.9.2-4 Secure the module onto the DIN35 rail

After all modules are assembled, use rail fixing blocks that are compatible with the rail size to secure the modules in their intended positions on the rail. This prevents improper displacement during mechanical vibrations or transportation, ensuring system safety.





During disassembly, first loosen the rail fixing block, then use a flathead screwdriver or other tools to lift the spring-loaded self-locking latch on top of the module. Afterward, remove the module from the rail.



Fig.9.2-7 Module disassembly

Notes: Rail fixing blocks must match the size of the DIN rail. Customers should purchase the blocks separately based on their specific requirements.

9.2.2 Connector Assembly

When connector disassembly:



Fig.9.2-8 connector disassembly

4

When connector assembly:



Fig.9.2-9 connector assembly

The module terminals (front connection area) are equipped with cable fixing points. Using accessories such as cable clamps or straps, I/O cables can be secured, making cable management easier and more organized.



Fig.9.2-10 Cable management

10 Getting Start

10.1 Device Description File Acquisition

The I/O modules do not have separate device description files. Instead, they are integrated into the device description file of the RP20 series coupler or the device installation package of the AK8X0 series PLC. Please visit the Kinco official website <u>https://www.kinco.cn/(</u>CN), <u>https://en.kinco.cn/</u>(EN) or contact Kinco's official customer service department to obtain the latest device description files.

10.2 Install Device Description File

10.2.1 When Used with RP20 Coupler

10.2.1.1 Installation

This chapter demonstrates the device installation process using the standard CoDeSys-style interface (CoDeSys V3.5.19) and RP20 EtherCAT coupler. <u>Step 1</u>: Open CoDeSys V3.5.19, locate and open the "Device Repository" under the "Tools" menu.



Fig. 10.2.1-1 Open "Device Repository"

<u>Step2</u>: Select the "Install.." option, locate the target file in the opened directory, and open it.

😤 Device R	Repository				×
Location	System Reposito (C:\ProgramDat	ry a\CODESYS\Devices)			✓ Edit Locations
Installed D String for	evice Description a full text search	s Vendor <	All vendors>		✓ Install
Name		Vendor Version Des	cription		Uninstall
■ 11 M	fiscellaneous	📦 Install Device Descriptio	n		× Export
₩- ∏ H	IMI devices LCs	$\leftarrow \rightarrow \checkmark \uparrow$	« 2024-12 » RP20	✓ C 在 RP20 中搜索	Q
🖻 - 🔗 s	oftMotion drives	组织 ▼ 新建文件夹		=	• 🖬 😗
		2024-12	名称 个	修改日期	类型
		MFCApplicatio	RP20_ECT_1.1.0.6	2024/12/17 14:00) SLBrowser
		MFC_TEST			Details
		> 🔷 WPS云盘			
		> 🖳 Windows-SSE			
		> 🛁 Data (D:)			
		5 5 网络		\ \	
		7 T 1998			
		文件	名(N): RP20_ECT_1.1.0.6	 EtherCAT ESI (* 	xml) ~
				Open(O) 🔽	Cancel

Fig. 10.2.1-2 Select file and install





Fig. 10.2.1-3 Wait for the installation to complete

10.2.1.2 Configuration

This section demonstrates the configuration process for RP20 series I/O modules using the RP20 series EtherCAT coupler as an example. The RP20 series offers 2 configuration methods:

Method 1: Configuration via scanning. This method requires an actual slave device to be connected.

perice (connected) (www.eoooon.uv/r)				
🖶 🚮 PLC Logic	Applications			
🖻 🚫 Application				
Library Manager	Backup and Restore			
🖷 📄 PLC_PRG (PRG)				
🔜 init	Files		•	
🖮 🧱 Task Configuration	100	Gatewa	/	
🖶 🍪 EtherCAT_Task	Scan Devices		- 0 X	~
DIC_PRG				
AainTask	Scanned Devices			
HSIO (HSIO)	Device name Devi	ce type	Alias Address	
	- RP20C_ECT RP200	C-ECT-1. 1. 0. 6	0	
	- RP20_08080TP RP20	-0808DTP (8-channel DI and 8-channel DO (PWP) modul	e) (0)	
- 🗃 LocalBus (LocalBus)	- RP20_1600DT RP20	-1600DT (16-channel DImodule) (0)		
Modbus_Slave_TCP (Modbus Slave TCP ETH1)	A.T."			
EtherCAT (EtherCAT Master SoftMotion)				
K RP20C_ECT (RP20C-EC) Cut				
- 1 RP20_0016DTP (R B) Copy				1 i
RP20_0808DTP (R R Paste module))				
P) module)))			
RP20_0016DTP_1				
P) module)))			
RP20_0016DTP_2 🛗 Properties.				
Since_FD_RX (FD Drive the Add Object				
Axis (SM_Drive_) Control Add Folder			····· · · · · · · · · · · · · · · · ·	
Star Kinco_FD_RX_1 (FD Dr	Assign Address		Droject	
Axis_1 (SM_Drive Lesent Device				
Since Kince_FD_RX_2 (FD Dr	Scan Device	Cop	/ All Devices to Projec Close	
Axis_2 (SM_Drive				
Gina Kinco_FD_RX_3 (FD Dr				
Axis_3 (SM_Drive				
Edit Object				
Axis_4 (SM_Drive Edit Object With				
Since_FD_RX_5 (FD Dr Edit IO mapping				
Axis_5 (SM_Drive Import mappings from CSV		Your device can be secured. Learn more		
Since Kinco_FD_RX_6 (FD Dr Export mappings to CSV		ļ		
Axis_6 (SM_Drive_GenericDSP402)	Messages - Total 0 error(s), 0 warning(s), 0 message(s)		
SoftMotion General Axis Pool		O error(s) O warning(s)	🕽 0 message(s) 🗙 💥	
	Description			

Fig. 10.2.1-4 Scan for devices

Method 2: Configuration by manually adding modules. For this method, the order of module addition must match the actual connection sequence of the modules; otherwise, communication errors will occur.



Fig. 10.2.1-5 Add the coupler

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Fig. 10.2.1-6 Add modules

10.2.1.3 Usage Demonstration

The digital modules of the RP20 series are defined as byte transfer in the device description. After configuration, each module is automatically assigned a unique address, which can be viewed and utilized in the "Module I/O Mapping" interface in the configuration panel.

Below is a demonstration of the configuration process using a coupler in CoDeSys V3.5.19.

Method 1: Direct addresses usage (Byte /Bit)

During variable definition, map the corresponding I/O channel address to a specific variable or directly use the channel address.

Devices 👻 🗘 🗙	PLC_PRG BD20_CAN	CANbus CANopen_Manager	Device /	RP20_0016DTN ×				
E 👔 Untitled4		Find Filter Show			- dh Add	ER for IO	Channel	* Go to Instance
Device (AK840M-0808DTN/P)	Startup Parameters	The show	v dii	1	· · · · · ·	TO TOT TO	channel	
B I PLC Logic	Module I/O Mapping	Variable	Mapping	Channel	Address	Туре	Unit	Description
= 😳 Application		IS#1600 0016DTN(Output 16-bit)Mapping						
Library Manager	Module IEC Objects	÷-**		Digital Output CH0-8bit	%Q816	USINT		Digital Output CH0-8bit
PLC_PRG (PRG)		- 5		Bit0	%QX16.0	BOOL		Digital Output CH0-8bit
😑 🧱 Task Configuration	Information	- 50		Bit1	%QX16.1	BOOL		Digital Output CH0-8bit
🕸 EtherCAT_Task		- 50		Bit2	%QX16.2	BOOL		Digital Output CH0-8bit
🖻 🥩 MainTask		50		Bit3	%QX16.3	BOOL		Digital Output CH0-8bit
- DIC_PRG		- 50		Bit4	%QX16.4	BOOL		Digital Output CH0-8bit
SoftMotion_PlanningTask		50		Bit5	%QX16.5	BOOL		Digital Output CH0-8bit
HSIO (HSIO)		- 50		Bit6	%QX16.6	BOOL		Digital Output CH0-8bit
- 📆 EXP_0 (EXP_0)		- 5		Bit7	%QX16.7	BOOL		Digital Output CH0-8bit
EVP_1 (EVP_1)		÷- •		Digital Output CH1-8bit	%Q817	USINT		Digital Output CH1-8bit
BD20_CAN (BD20-CAN)		- 50		Bit0	%QX17.0	BOOL		Digital Output CH1-8bit
LocalBus (LocalBus)		- 50		Bit1	%QX17.1	BOOL		Digital Output CH1-8bit
Modbus_Slave_TCP (Modbus Slave TCP ETH1)		- 50		Bit2	%QX17.2	BOOL		Digital Output CH1-8bit
EtherCAT (EtherCAT Master SoftMotion)		- 50		Bit3	%QX17.3	BOOL		Digital Output CH1-8bit
K RP20C_ECT (RP20C-ECT-1.1.0.6)		50		Bit4	%QX17.4	BOOL		Digital Output CH1-8bit
RP20_0016DTN (RP20-0016DTN(16-channel DO(NPN) mo		- 50		Bit5	%QX17.5	BOOL		Digital Output CH1-8bit
🛐 RP20_0016DTP (RP20-0016DTP(16-channel DO(PNP) mod		59		Bit6	%QX17.6	BOOL		Digital Output CH1-8bit
RP20_1600DT (RP20-1600DT(16-channel DI module))		L. 5g		Bit7	%QX17.7	BOOL		Digital Output CH1-8bit
🖶 🚰 CANbus (CANbus)								
CANopen_Manager (CANopen_Manager)								
SoftMotion General Axis Pool								

Fig. 10.2.1-7 "Module I/O Mapping"

RP20 series digital I/O module user manual



Fig. 10.2.1-8 Use the address directly

Method 2: Address Mapping (Byte /Bit)

In this method, the I/O channel addresses are directly mapped to specific variables through the "Module I/O Mapping" interface. This allows the variables to be directly associated with the corresponding I/O channels for use in the program.



Fig. 10.2.1-9 Address mapping

10.2.2 When used with AK840M Controller

This chapter demonstrates the device installation process using the standard CoDeSys-style interface (CoDeSys V3.5.19).

10.2.2.1 Installation

<u>Step 1</u>: Open CoDeSys V3.5.19, locate and open the "CODESYS Installer" under the "Tools" menu.



Fig. 10.2.2-1 Open 'CODESYS installer'

<u>Step 2</u>: In the CODESYS Installer, click **Install File** to select the device you want to install. Before installation, please close the CODESYS software as instructed, otherwise the installation cannot proceed.

CODESYS Installer				- 0
raion DDESYS 64 3.5.19.10				
cation \codesys\CODESYS				Brows
innel for Setups leases	Channel for Add-ons Releases			
.dd-Ons				
		Install File	Export Configuration	Import Configuration
Installed Browse Updates				
CODESYS Application Composer	4.2.0.0			
CODESYS Automation Server Connector	1.29.0.0			
CODESYS C Code Integration	4.0.0.0			
CODESYS CANopen	4.1.1.0			
CODESYS CFC	4.2.0.0			
CODESYS Code Generator ARM	4.0.2.0			
CODESYS Code Generator ARM64	4,0.0.0			
😫 CODESYS Code Generator Blackfin	4.0.0.0			
CODESYS Code Generator ColdFire	4.0.0.0			

Fig. 10.2.2-2 Select file and install

<u>Step 3</u>: After the prompt box appears, check the box 'I want to continue despite the missing signature', and click 'Continue' to proceed with the next step of the installation.

	Install packages			-		×
	C Kinco XMLs for AK84x 1.0.0.4		Kinco XMLs for AK84x 1.0.0.4			
5		Signature				
No.		No signature was found in package.				
(L						
B'						
Y'II S						
a						
•						
	✓ I want to continue despite of the mi	issing signature(s)		Continue	Cance	el
	A 10 Ar	alay wiley in the sector				

Fig. 10.2.2-3 Click 'Continue' to proceed

<u>Step 4</u>: Please wait patiently for the installation to complete.

➢ Install packages —	C		×
Downloading package 1/1			
100%			
Installing package 1/1	_		
070			
Installing package Kinco XMLs for AK84x 1.0.0.4: 正在初時社化			
0%			
		Cano	el

Fig. 10.2.2-4 Wait for the installation to complete

<u>Step 5</u>: Wait for the installation to finish. After that, you can close the installer and restart CODESYS software.

CODESYS Installer					-	
ision						
JDE313 04 3.3.19.10						
ation \codesys\CODESYS						Brow
annel for Setupe leases	Ŧ	Channel for Add-ons Releases				
.dd-Ons						
			Install File	Export Configuration	Import Conf	iguratior
Installed Browse Updates						
CODESYS Sercos III	4.0.0.0	s				
CODESYS SFC	4.1.0.0					
CODESYS SoftMotion	4.14.0.0					
CODESYS Target Settings Export	4.0.0.0					
CODESYS Trace	4.0.0.0					
CODESYS Visualization	4.3.0.0					
CODESYS Visualization Support	4.1.1.0					
😫 Kinco XMLs for AK84x	1.0.0.4	L				
	4					
right © 2023 CODESYS Development GmbH About	Read-Only Mode (R	estart as Administrator)				

Fig. 10.2.2-5 Installation complete

10.2.2.2 Configuration

Configure under "localbus" by manually adding modules. This method requires manually adding I/O modules, ensuring the addition sequence matches the actual module connection sequence. Otherwise, communication errors may occur.

Devices v A X	RC_PRG 8020_CAN CAlopen_Manager Device RP20_00160TN	
	Procesul FOC P	×
(10) 700 (10) 5 5000000, ViewordTak (10) 6000 (10) 60	String for a fall text search Verider Vandor Name Vendor Version Description Image: String for a fall text search Vendor Vendor Version Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search Vendor Vendor Vendor Image: String for a fall text search	~
Add Tolder A	Remer: 9720-15000T(16-dwarel 01 module) Venden: Rike: Disk: (Penden) Ltd. Categories: Vension: 1.0.0.4 Order Rundler: #720-15000T Description: 16-dward 01 module	Ŵ
	Append selected device as last child of Localbus (You can select another target node in the navigator while this window is open.)	Add Device Close

Fig. 10.2.2-6 Configure under "localbus"

10.2.2.3 Usage Demonstration

The digital modules of the RP20 series are defined as byte transfer in the device description. After configuration, each module is automatically assigned a unique address, which can be viewed and utilized in the "Module I/O Mapping" interface in the configuration panel.

The usage method is identical to that described in <u>Section 10.2.1.3</u>. Please refer to that section for details.



Fig. 10.2.2-7 "Module I/O Mapping"

11 Error Diagnostics

When the module's Err indicator (red) lights up, it indicates a fault in the module. The fault code can be obtained through the online monitoring interface of the master station software. The object dictionary for the fault code is 0xAXXX.

The corresponding module object dictionary index is related to the module's position under the coupler ($n=1^{-16}$). The relationship between the index and the position is as follows:

 $Index = 0xA000 + 0x10 \times (n-1)$

For example, if three modules are connected in the "Online CoE" interface in CoDeSys (Fig. 11.1-1), the corresponding fault indices would be: 0xA010, 0xA020, 0xA030.

	-	-	10#0020.10#00	100001 mourie contigure parameters	_		
EtherCAI (EtherCAI Master SoftMotion)	•	÷.	16#A000:16#00	0016DTP Diagnosis information			
K RP20C_ECT (RP20C-ECT-1.1.0.6)			:16#01	0016DTP Moudle ID	RO	USINT	
RP20_0016DTP_1 (RP20-0016DTP(16-channel [:16#02	0016DTP Moudle SW Version	RO	USINT	
Image: Propulses RP20_0808DTP_1 (RP20-0808DTP(6-channel.n.) Image: Propulses RP20_1600DT_1 (RP20-1600DT(16-channel.DI) Image: Chibus (CANbus) Image: Chibus (CANopen_Manager)			:16#03	0016DTP Moudle HW Version	RO	USINT	
			:16#04	0016DTP Moudle Diagnotics Code	RO	USINT	
		ġ	16#A010:16#00	0808DTP Diagnosis information			
			:16#01	0808DTP Moudle ID	RO	USINT	
SoftMotion General Axis Pool			:16#02	0808DTP Moudle SW Version	RO	USINT	
			:16#03	0808DTP Moudle HW Version	RO	USINT	
			:16#04	0808DTP Moudle Diagnotics Code	RO	USINT	
X		ġ.	16#A020:16#00	1600DT Diagnosis information			
			:16#01	1600DT Moudle ID	RO	USINT	
			:16#02	1600DT Moudle SW Version	RO	USINT	
			:16#03	1600DT Moudle HW Version	RO	USINT	
			:16#04	1600DT Moudle Diagnotics Code	RO	USINT	
		1					

Fig. 11.1-1 "CoE Online" Tag

Object Dictionary Index Definition				
0xA000+0x10*(n-1)				
Sub-index	Туре	Definition		
01	UINT8	Module ID		
02	UINT8	Module SW Version / Software version		
03	UINT8	Module HW Version / Hardware version		
04	UINT8	Module Diagnosis information / Error code		

The object dictionary index $0 \times 000 + 0 \times 10 \times (n-1)$ has a specific entry for the module error code at 0x04. Below are some common error codes and their meanings:

Code	Definition
0x01	Error caused by the master device. Please check the master device's
	status and perform fault diagnosis (refer to the corresponding user
	manual of the master device).
0x02	Error caused by the module itself.
0x03	The module ID returned by the module is invalid. Please check the
	module configuration and module position.