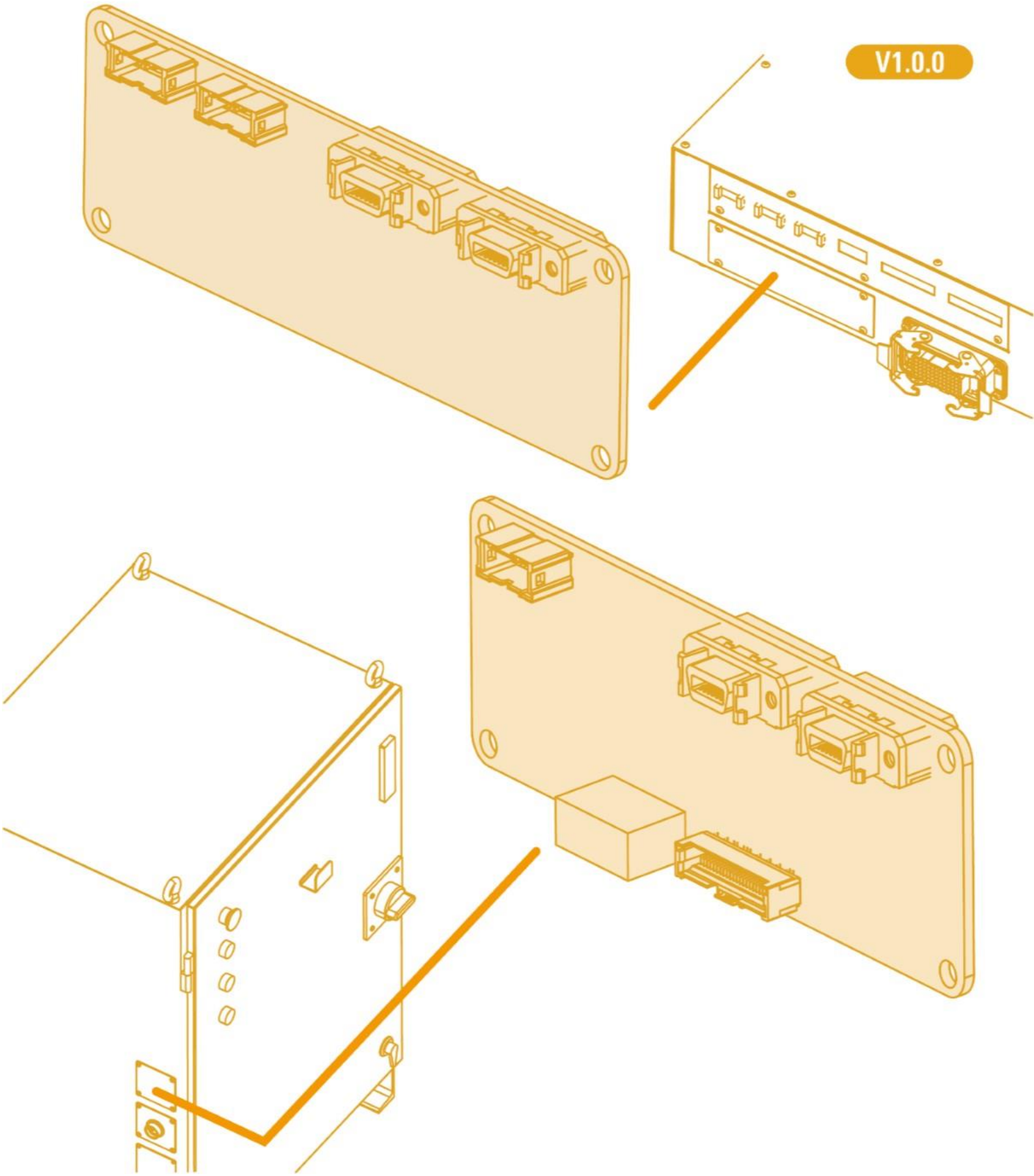
PEITIAN ROBOTICS

Multifunctional Interface Expansion System
User Manual

V1.0.0



Introduction

About this manual

This manual is intended to allow technicians to quickly, correctly and safely install and use the multi-function interface expansion system and familiarize themselves with relevant precautions.

Operating prerequisites

Before operating the robot, be sure to carefully read the product's general safety instructions and safety precautions. Users must understand safety knowledge and basic operating knowledge before operating the robot.

Please refer to:

- "inCube1x Control Cabinet Manual"
- "inCube2x Control Cabinet Manual"
- "ARC4-50 Control Cabinet Manual"
- "ARC4-165 Control Cabinet Manual"
- "Optional Accessories Installation and User Manual"
- "AIR-TP Teach Pendant Operation Manual"
- "Conveyor Tracking Function Instruction Manual"
- "Arc Welding Function Instruction Manual"

Target groups

- Operator
- Product technician
- Technical service personnel
- Robot teacher

Common logo meanings

The symbols appearing in the manual and their meanings are detailed in Table 1 below.

Table 1 Logo used in this manual

Logo	Meaning
Danger	If instructions are not followed, an accident may occur, resulting in serious or fatal injury.
Warning	If instructions are not followed, an accident may occur, resulting in moderate or minor injuries, or only material damage.

Logo	Meaning
Caution	Prompts you to pay attention to the environmental conditions and important matters, or quick operation methods
Prompt	You are prompted to refer to other literature and instructions for additional information or more detailed operating instructions for acquire

Manual instructions

The contents of this manual will be supplemented and modified. Please pay attention to the "Download Center" on our website regularly and obtain the latest version of the manual in time.

Website URL: http://robot.peitian.com/

Revision history

Revision history accumulates descriptions of each manual update. The latest version of manual contain contains the updated content of all previous document versions.

Table 2 Document revision records

Version	release time	Modify the description
V1.0.0	2020.08.01	First official release

Document number and version

The document number and version information are shown in Table 3.

Table 3 Document related information

Document name	"Multifunctional Interface Expansion System User Manual"
Document number	UM-GP001-014
Document version	V1.0.0

Contents

Introduction I

Contents i

1 IEB overview 1

1.1 MCB-IEB 1
1.2 MCBS-IEB 2

2 The connection of the IEB to each model control cabinet 5

2.1 The connection of the MCB-IEB to the inCube 10/12 control cabinet 5
2.1.1 Configuration instructions 5
2.1.2 Connection Method 5
2.2 Connection of MCB-IEB to ARC4-50/165 control cabinet 7
2.2.1 Configuration instructions 7
2.2.2 Connection Method 8
2.3 The connection of the MCBS-IEB to the inCube 20/21 control cabinet 11
2.3.1 Configuration instructions 11
2.3.2 Connection Method 12
2.4 Connection between MCBS-IEB and inCube2S control cabinet 15
2.4.1 Configuration instructions 15
2.4.2 Connection Method 16

3 Installing encoders for conveyor tracking 19

3.1 Instructions for use 19
3.2 Select encoder type 19
3.3 Encoder position 19
3.4 Encoder wiring connected to MCB-IEB J7 interface 19
3.5 Encoder cable with MCBS-IEB (J7 interface) coupled 21
3.6 PLC slave configuration of control cabinet 22

4 Analog communication 25

4.1 Instructions for use 25
4.2 Connection of Analog Wires to MCB-IEB (J3 /J5 Interface) 25
4.3 Encoder cable with MCBS-IEB (J3/J5 interface) coupled 26
4.4 PLC slave configuration of control cabinet 27
4.5 Analog configuration 29

5 CANopen bus communication 33

5.1 Instructions for use 33
5.2 CANopen interface of communication module 33
5.3 CANopen bus and MCB-IEB (J6 interface) coupled 33
5.4 Connection between CANopen bus and MCBS-IEB (J6 interface) 34
5.5 The wiring relationship between the CANopen bus and the CANopen interface of the communication module 35
5.6 PLC slave configuration of control cabinet 36

5.7 CANopen baud rate setting.....38

1 IEB overview

The multi-function interface expansion system is an optional accessory added to the MCB/MCBS/MCBF module, providing CAN, magnetic scale, incremental encoder, absolute encoder, analog output, analog input, PWM output, etc. Extend interface for users to use.

Prompt

This optional accessory generally cannot be used independently and needs to be used in conjunction with user wiring harness and software functions to achieve communication.

1.1 MCB-IEB

Definition

MCB-IEB (MCB Interface Extension Board), an abbreviation for MCB interface expansion board.

Adapted control cabinet model

MCB-IEB adapts to control cabinet models contain inCube10/12 and ARC4-50/165.

Function Introduction

MCB-IEB-P1.2 diagram and interface description refer to Figure 1-1 and Table 1-1 respectively.

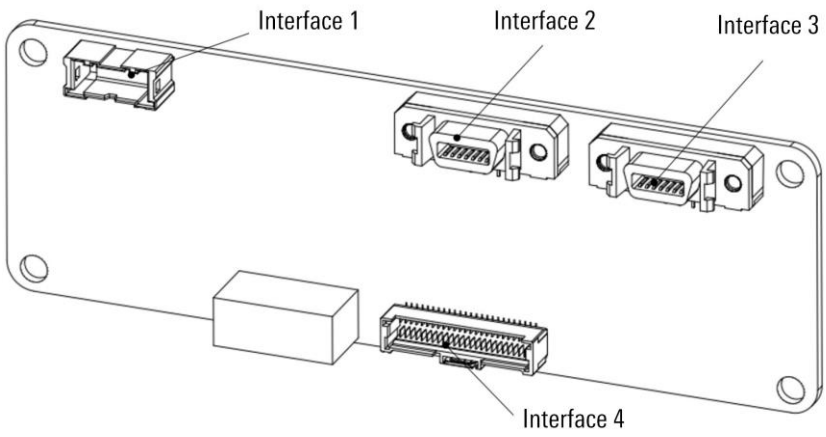


Figure 1-1 Diagram of MCB-IEB-P1.2

Table 1-1 MCB-IEB-P1.2 interface description

Rank number	Project	Illustrate	Remark	The main function
1	MCB-IEB	Internal board		
1.1	Interface 4	MCB and MCB-IEB coupled device	J2	
1.2	Interface 3	CAN_magnetic scale common interface	J6	CAN open digital welding machine interaction; magnetic scale position

Rank number	Project	Illustrate	Remark	The main function
				sensor input, can be used in application scenarios such as bending machine position acquire or other linear position measurement
1.3	Interface 2	Incremental encoder interface	J7	Incremental encoder input to obtain encoder current position, which can be used in application scenarios such as conveyor belt or non-servo axis position acquisition
1.4	Interface 1	Analog output interface	J5	Voltage and current output can control welding machine output or other analog input devices

MCB-R1.2 diagram and interface description refer to Figure 1-2and Table 1-2 respectively.

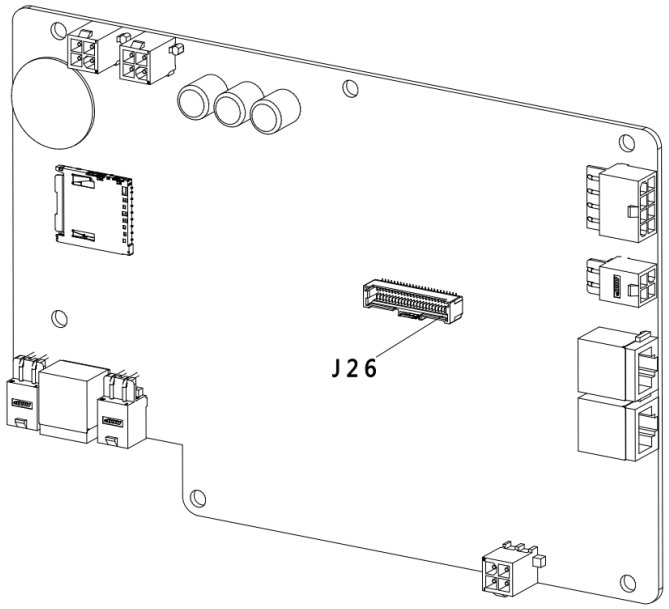


Figure 1-2 Diagram of MCB-R1.2

Table 1-2 MCB-R1.2 interface description

Rank number	Project	Illustrate
1	MCB	Main control board
1.1	J26	MCB-IEB and MCB connector

1.2 MCBS-IEB

definition

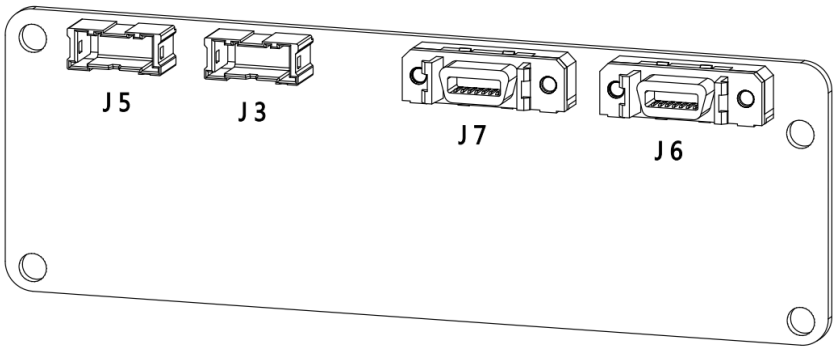
MCBS-IEB (MCBS Interface Extension Board), an abbreviation for MCBS interface expansion board.

Adapted control cabinet model

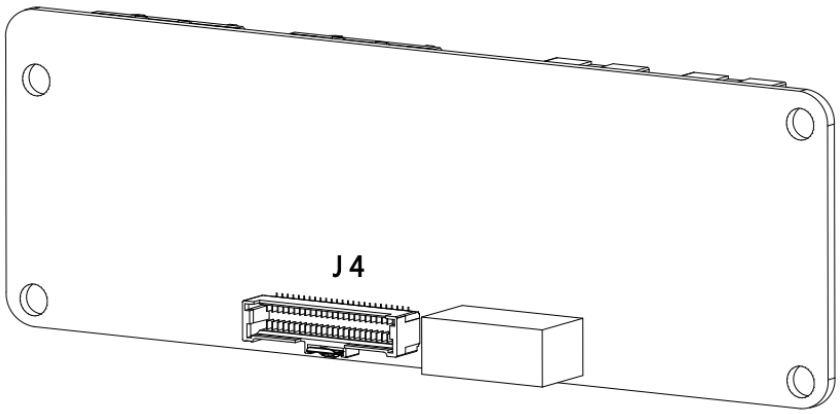
MCBS-IEB adapted control cabinet model contain inCube20/21/2S.

Function Introduction

MCBS-IEB front and back diagrams and interface descriptions refer to Figure 1-3 and Table 1-3 respectively.



(a) Front view



(b) Back view

Figure 1-3 MCBS-IEB front and back diagram

Table 1-3 MCBS-IEB interface description

Rank number	Project	Illustrate	The main function
1	MCBS-IEB	Internal board	
1.1	J4	MCBS-IEB and MCBS connector	
1.2	J5	PWM output and analog output interface	Voltage and current output can control welding machine output or other analog input devices; PWM output can be used to control solenoid valves and other equipment
1.3	J3	Voltage input and current input interface	Voltage and current input can accept the analog output of the welding machine, acquire the feedback of the current welding machine, or be used for signal collection of other analog sensors
1.4	J7	Encoder interface	Incremental and absolute encoder input, acquire encoder current position, can be used in application scenarios such as conveyor belt or non-servo axis position acquire

Rank number	Project	Illustrate	The main function
1.5	J6	Magnetic scale and CAN interface	CANopen digital welding machine interaction; magnetic scale position sensor input, can be used in application scenarios such as bending machine position acquire or other linear position measurement

2 The connection of the IEB to each model control cabinet

2.1 The connection of the MCB-IEB to the inCube 10/12 control cabinet

2.1.1 Configuration instructions

inCube10/12 control cabinet multi-function communication module configuration instructions are detailed in Table 2-1.

Table 2-1 inCube10/12 control cabinet multi-function communication module main configuration table

Serial number	Name	Specification	Adaptation control cabinet	Material No.	Composition dosage	Standard/optional
1	MCB-IEB	MCB-IEB_P1.2 and above	inCube10/12	P05245000088	1	Optional
2	Female and male type hexagonal isolation column	M4X5+6/copper		P02110000051	4	Optional
3	Cross recessed pan head combination screws	M4X8		P02023001004	4	Optional
4	ARCCD20-MCBS and gusset coupled cable	Cabinet wiring		P04082000595	1	Optional
5	ARCCD10-CAN_Magnetic scale cabinet inner wiring harness	Cabinet inner wiring		P04082000774	Choose one from three	Select according to the specific functions used
6	ARCCD10-encoder cabinet inner wiring harness			P04082000775		
7	ARCCD10-analog cabinet inner wiring harness			P04082000776		
8	ARCCD10-Common wiring harness outside the gusset cabinet	5m		P04082000777	1	Optional
9	Integrated spring terminal block	54*45*40		P09050410004	1	Optional

2.1.2 Connection Method

Step1. Open the upper cabinet door of the control cabinet and confirm that the MCB version number is R1.2 and above. To determine the version, refer to the model in Figure 1 1. If it is not version R1.2 or above, it needs to be replaced with MCB of version R1.2 or above.

Step2. Place ① MCB-IEB in the position shown in Figure 2-1, screw the four ② female and male hexagon isolation columns into the four holes next to the control box MCB and secure with the four ③ M4X8 crosshead head set screws, refer to Figure 2-1.

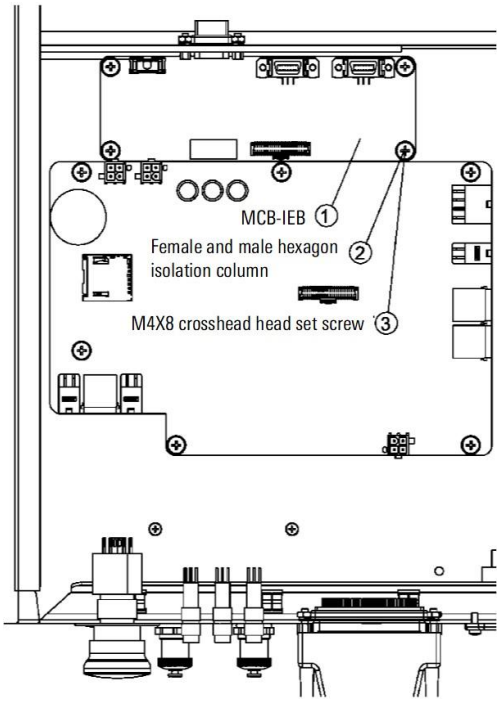


Figure 2-1 Diagram of installing MCB-IEB

Step3. Connect the MCB and ① MCB-IEB using the ④ ARCCD20-MCBS and the buckle board connector as shown in Figure 2-2.

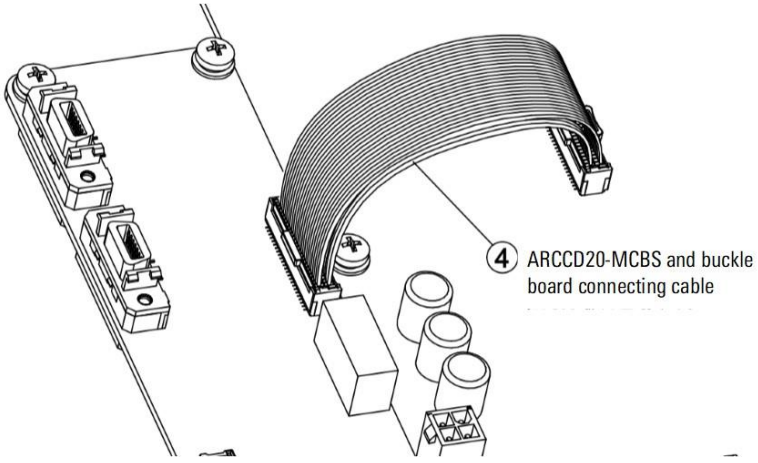


Figure 2-2 Diagram of connecting MCB and MCB-IEB

Step4. Connect the cables inside the cabinet according to the functions used, as shown in Figure 2-3:

a) Use the ARCCD10-CAN_magnetic scale signal, connect the J6 interface of the coupled ①MCB-IEB on the wiring harness side of the ⑤ARCCD10-CAN_magnetic scale cabinet, The other side is installed to the X28 interface on the control cabinet panel;

b) Using incremental encoder signals, install the J7 interface of coupled ①MCB-IEB on one side of the ⑥ ARCCD10-encoder cabinet wiring harness and the other side to X28 interface on the control cabinet panel;

c) Using ARCCD10-analog signal, install the J5 interface of coupled ①MCB-IEB on one side of the ⑦ ARCCD10-analog cabinet wiring harness and the other side to the control X28 interface on the cabinet panel.

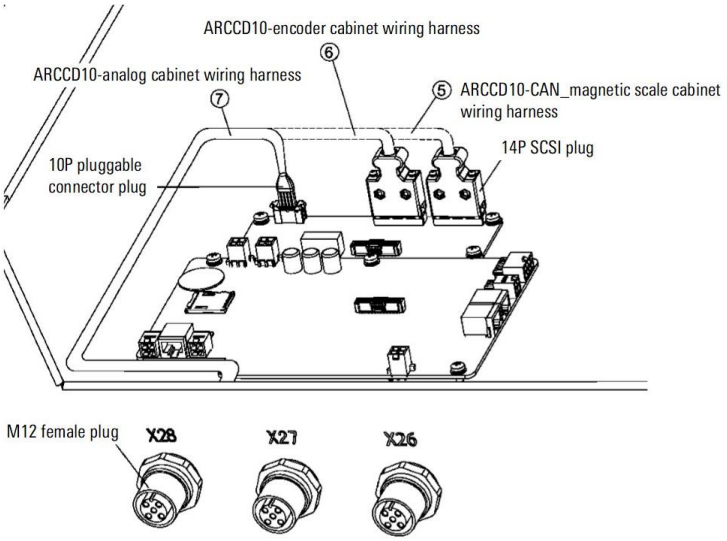


Figure 2-3 MCB-IEB cabinet inner wiring diagram

Step5. Connect one end of the ⑧ARCCD10- buckle board cabinet external common wiring harness with an M12 straight plug to the X28 interface of the cabinet (refer to Figure 2-4), and the other end connected to ⑨ integrated spring terminal block.

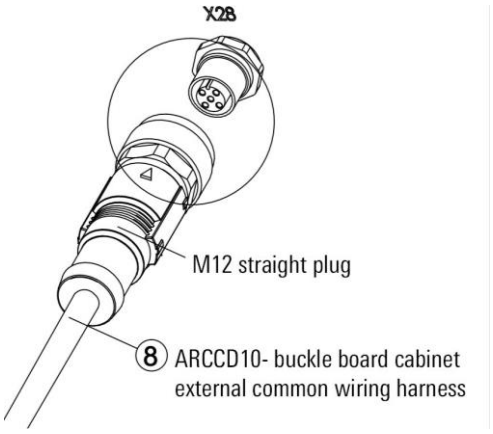


Figure 2-4 M12 interface location diagram

2.2 Connection of MCB-IEB to ARC4-50/165 control cabinet

2.2.1 Configuration instructions

Please refer to Table 2-2 for configuration instructions of the multi-function communication module of the ARC4 series control cabinet.

Table 2-2 ARC4 series control cabinet multi-function communication module configuration table

Serial number	Name	Specification	Control cabinet	Material No.	Construct quantity	Remark
1	M12 connector sheet metal	Square sheet metal bezel	ARC4	P01035000614	1	Optional
2	MCB-IEB mounting plate	For installing MCB-IEB	ARC4	P01035000616	1	
3	MCB-IEB	MCB-IEB_P1.2 and above	ARC4	P05245000088	1	
4	Single head hexagonal stud	M4X20	ARC4	P02110000027	6	
5	Cross recessed pan head combination screws	M4X8	ARC4	P02023000019	10	
6	ARCCD20-MCBS and gusset coupled cable	Cabinet inner wiring	ARC4	P04082000595	1	
7	CAN_magnetic scale common wiring harness	Connect MCB-IEB_J6 and M12 connector inside the cabinet	ARC4-50	P04082000780	1	Optional (choose one of three)
			ARC4-165	P04082000781		
8	Incremental encoder harness	Connect MCB-IEB_J7 and M12 connector inside the cabinet	ARC4-50	P04082000778	1	
			ARC4-165	P04082000779		
9	Analog output harness	Connect MCB-IEB_J5 and M12 connector inside the cabinet	ARC4-50	P04082000782	1	
			ARC4-165	P04082000783		
10	ARCCD10-common wiring harness outside the gusset cabinet	Black twisted pair shielded wire, 5 meters long	ARC4	P04082000777	1	
11	Integrated spring terminal block	54*45*40	ARC4	P09050410004	1	Optional

2.2.2 Connection Method

Step1. Use a Phillips screwdriver to remove the original reserved cable mounting plate (refer to Figure 2-5), and remove the ① M12 connector mounting plate (refer to Figure 2 6) installed on the cabinet.

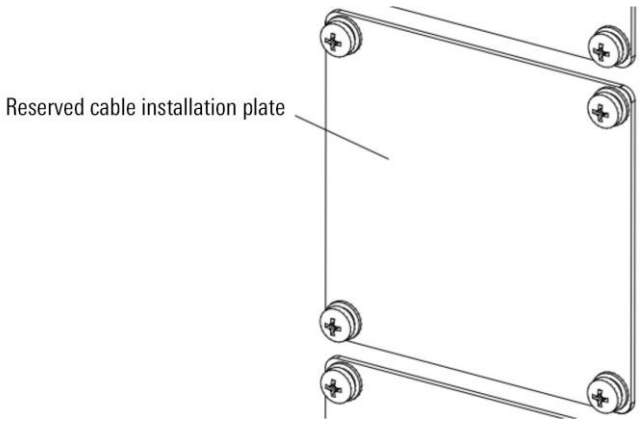


Figure 1 5 Reserved cable installation plate

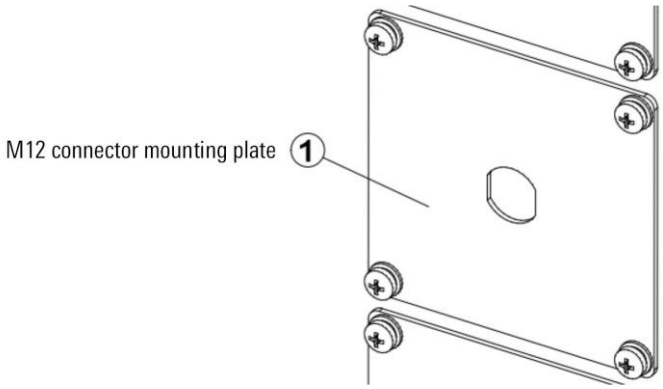


Figure 2-5 M12 connector mounting plate

Step2. Install the M12 female connector (reference Figure 2-6) on the M12 connector mounting plate.

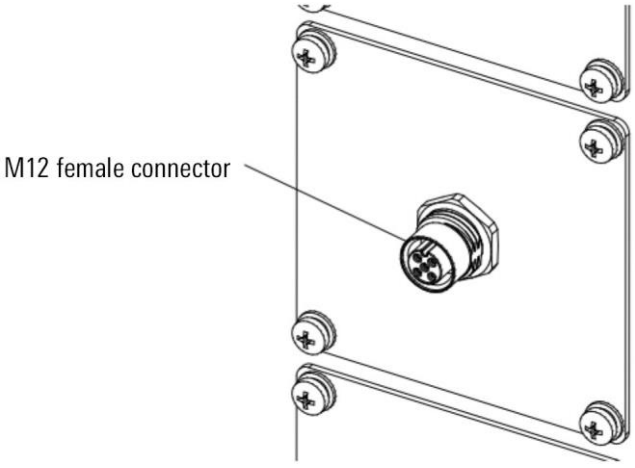


Figure 2-6 M12 female connector

Step3. Pass the ② MCB-IEB mounting plate through 5 ④ M4×20 single-head hexagonal studs and 5 ⑤ M4×8 cross recessed pan head combination screws are fixed on the MCB, and ③ MCB-IEB is passed through 4 ⑤ M4×8 cross recessed pan head combination screws fixed on ② MCB-IEB mounting plate, refer to Figure 2-7.

Step4. Connect the 50P connector plugs at both ends of the ⑥ ARCCD20-MCBS and buckle plate cables to the 50P connector sockets on the MCB and ③ MCB-IEB respectively, refer to Figure 2-8.

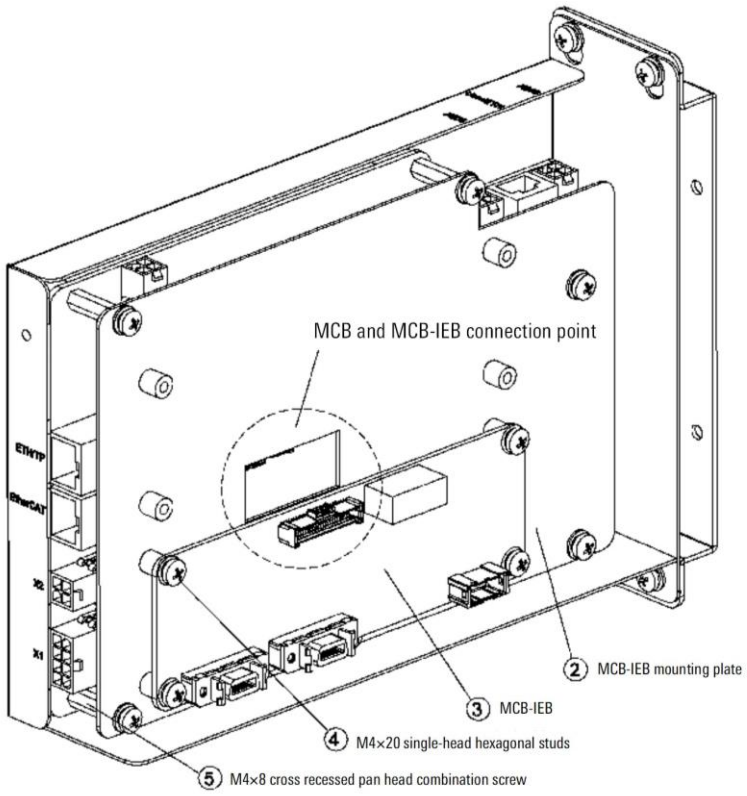


Figure 2-7 Install MCB-IEB

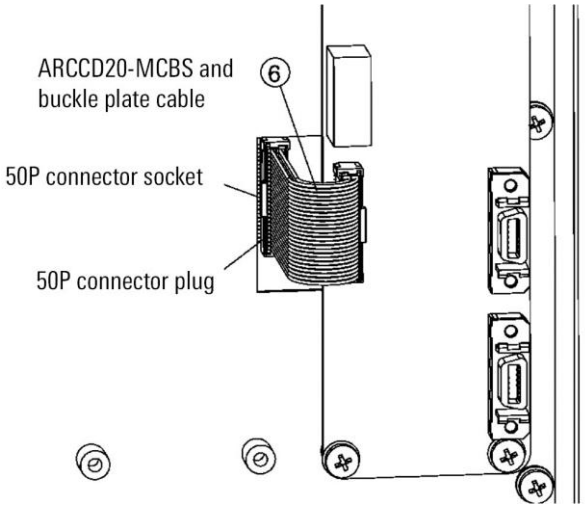


Figure 2-8 MCB and MCB-IEB connection

Step5. As shown in Figure 2-9, according to actual needs, ⑦ CAN_magnetic scale common wire harness or ⑧ incremental encoder harness or the ⑨ analog output harness is connected to the corresponding interface on the ③ MCB-IEB (⑦ CAN_magnetic scale common wire harness is connected to J6 interface, ⑧ incremental encoder wire harness is connected to J7 interface, ⑨ analog output wire harness is connected to J5 interface), install the M12 female connector at the other end on the ① M12 connector mounting plate.

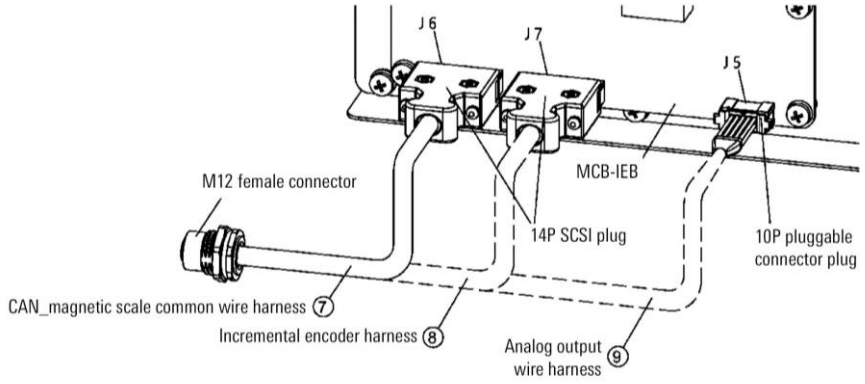


Figure 2-9 Multi-function communication module connection diagram

Step6. Connect one end of the ⑩ ARCCD10- buckle plate cabinet external common wiring harness with an M12 straight plug to the M12 female connector of the cabinet according to the triangular positioning mark, and the other end to the ⑪ integrated spring terminal block, refer to Figure 2-10.

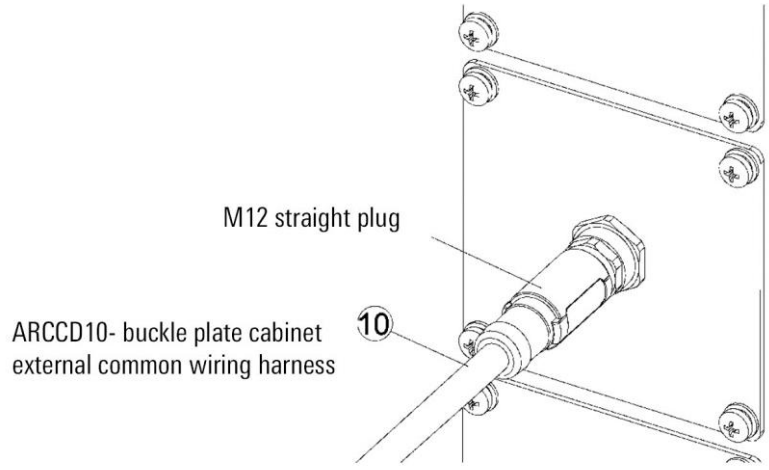


Figure 2-10 ARCCD10- shared wiring harness outside the buckle board cabinet

2.3 The connection of the MCBS-IEB to the inCube 20/21 control cabinet

2.3.1 Configuration instructions

The inCube20/21 control cabinet multi-function communication module configuration description is detailed in Table 2-3.

Table 2-3 inCube20/21 control cabinet multi-function communication module main configuration table

Serial number	Name	Specification	Adaptation control cabinet	Material No.	Composition dosage	Standard/optional
1	MCBS-IEB	MCBS-IEB_P1.1 and above	inCube20/21	P05245000108	1	Optional
2	ARCCD20-installation	-		P01035000547	1	

Serial number	Name	Specification	Adaptation control cabinet	Material No.	Composition dosage	Standard/optional
	of gusset sheet metal					
3	Cross recessed pan head combination screws	M4X8		P02023001004	4	
4	ARCCD20-MCBS and gusset coupled line	Cabinet inner wiring		P04082000595	1	
5	The magnetic scale and CAN_encoder share the same wiring harness	5m		P04082000596	According to usage	
					According to usage	
6	PWM and analog output_voltage and current input harness-5 meters	5m		P04082000594	1	
					1	
7	Integrated spring terminal block	54*45*40		P04082000595	1	

2.3.2 Connection Method

Step1. Use a hexagonal screwdriver to unscrew the four hexagonal screws on the rear panel of the control cabinet and remove the cover plate. Refer to Figure 2-11.

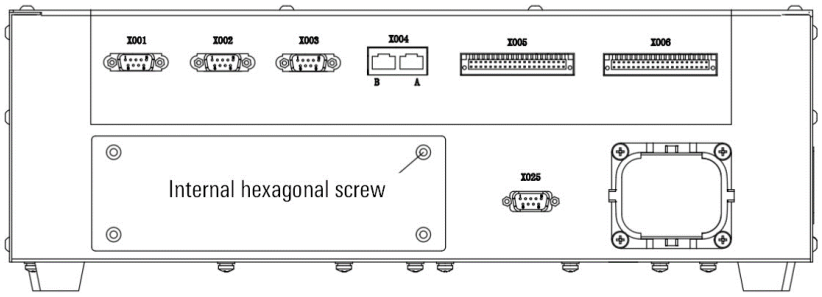
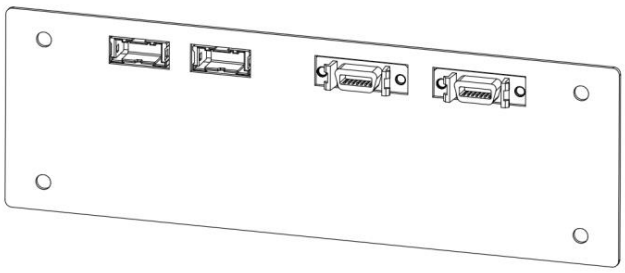


Figure 2-11 Diagram of the rear panel of the control cabinet

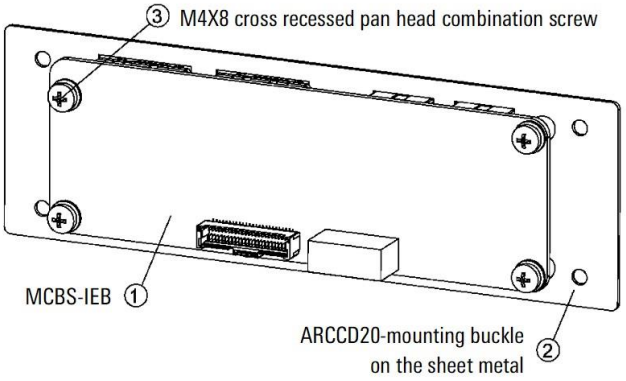
Prompt

The four hexagon socket head screws need to be saved for subsequent use.

Step2. Use 4 ③ M4X8 cross recessed pan head combination screws to fix ① MCBS-IEB to ② ARCCD20-mounting buckle on the sheet metal, refer to Figure 2-12.



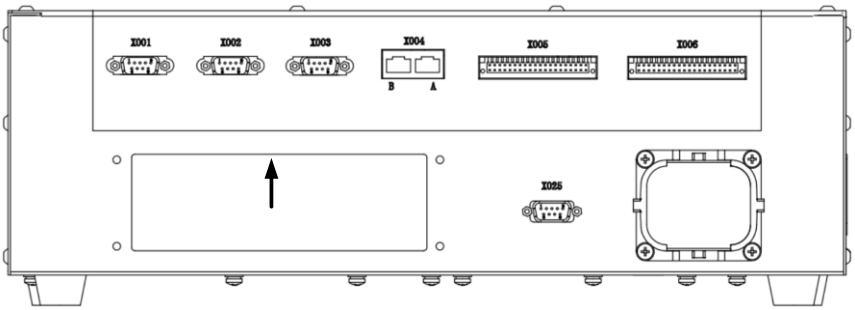
(a)



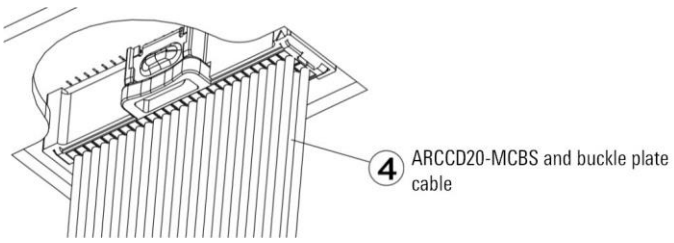
(b)

Figure 2-12 Install MCBS-IEB

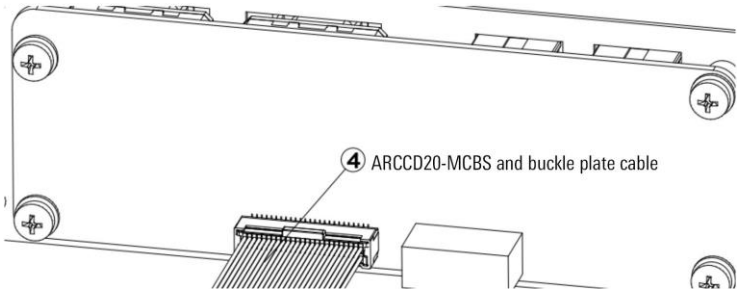
Step3. Connect one side of the ④ ARCCD20-MCBS and buckle plate cable to the position of the arrow in Figure 2-13, and the other side to ① MCBS-IEB corresponds to the connector of J4.



(a)



(b)



(c)

Figure 2-13 Installation of ARCCD20-MCBS and buckle plate connection cable

Step4. Use 4 hexagonal socket screws removed in step 1 to fix the ② ARCCD20-mounting plate sheet metal to the rear panel, refer to Figure 2-14.

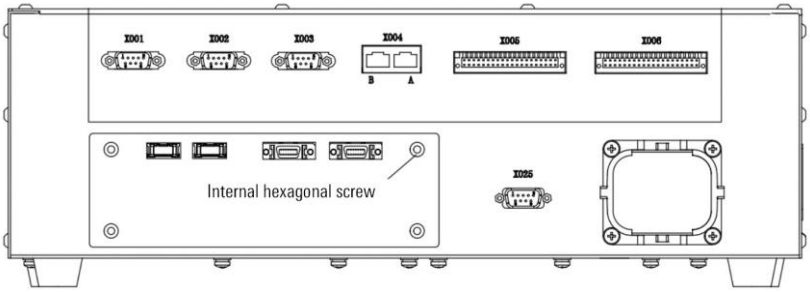


Figure 2-14 ARCCD20-diagram after installing the gusset plate and fixing the sheet metal

Step5. Connect the outside cables of the cabinet according to the functions used, refer to Figure 2-15:

a) Use PWM output and analog output signals: use ⑥PWM and analog output_voltage and current input harness-5 meters coupled to J5;

b) Use voltage input and current input signals: use ⑥PWM and analog output_voltage and current input wiring harness-5 meters coupled to J3;

c) Use encoder signal: use ⑤magnetic scale and CAN_encoder to share the wiring harness coupled to J7;

d) Using magnetic scale and CAN signal: Use ⑤magnetic scale and CAN_encoder to share the wiring harness coupled to J6.

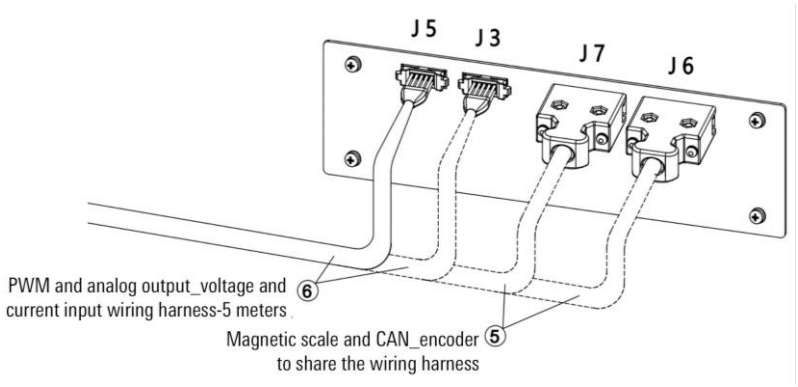


Figure 2-15 MCBS-IEB front view

The voltage input and current input interfaces have voltage and current range limits. Exceeding the limits may cause device damage. Please strictly follow the ranges in Table 2-4.

Table 2-4 PWM and analog output_voltage and current range limits

Connector	Pin	Function	Parameter	Numerical value	Unit	Remark
J3	1	Voltage input 1	Voltage	-10~+10	V	
	2	Voltage input 2	Voltage	-10~+10	V	
	5	Voltage input 3	Voltage	-10~+10	V	
	6	Current input 1	current	0~+20	mA	
	9	Current input 2	current	0~+20	mA	
	10	Current input 3	current	0~+20	mA	

2.4 Connection between MCBS-IEB and inCube2S control cabinet

2.4.1 Configuration instructions

For details on the configuration of the multi-function communication module in the inCube2S control cabinet, see Table 2-5.

Table 2-5 inCube2S control cabinet multi-function communication module main configuration table

Serial number	Name	Specification	Adaptation control cabinet	Material No.	Composition dosage	Standard/optional
1	MCBS-IEB	MCBS-IEB_P1.1 and above	inCube2S	P05245000108	1	Optional
2	inCube2S-installation of gusset sheet metal	-		P01035000693	1	
3	Cross recessed pan head combination screws	M4X8		P02023001004	4	
4	ARCCD20-MCBS and gusset coupled cable	Cabinet inner cable		P04082000595	1	
5	The magnetic scale and CAN_encoder share the same wiring harness	5m		P04082000596	According to usage	
					According to usage	
6	PWM and analog output_voltage and current input harness-5 meters	5m		P04082000594	1	
					1	

Serial number	Name	Specification	Adaptation control cabinet	Material No.	Composition dosage	Standard/optional
7	Integrated spring terminal block	54*45*40		P04082000595	1	

2.4.2 Connection Method

Step1. Use a hexagonal screwdriver to unscrew the four hexagonal screws on the rear panel of the control cabinet and remove the cover plate. Refer to Figure 2-16.

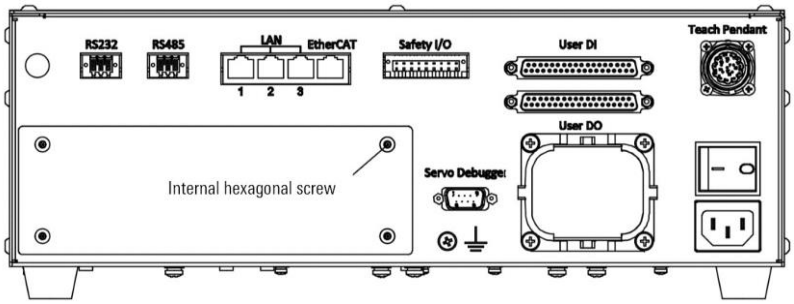
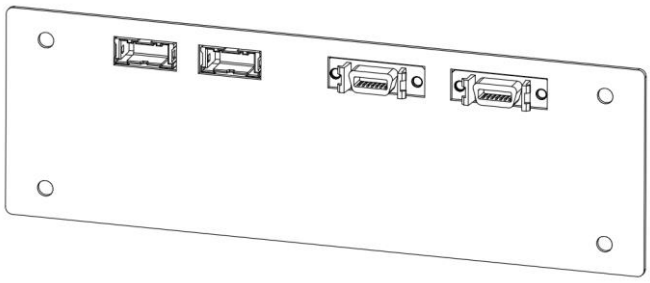


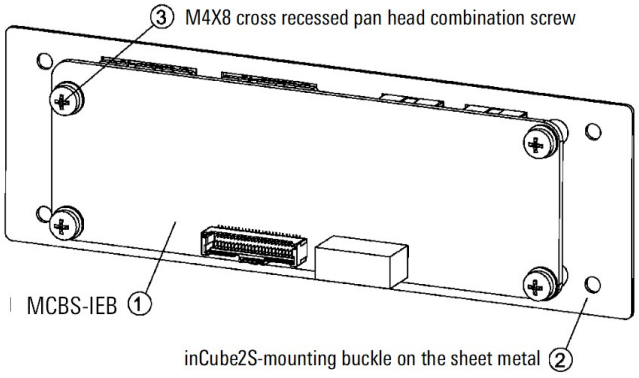
Figure 2-16 Diagram of the rear panel of the control cabinet

> Prompt
>
> The four hexagon socket head screws need to be saved for subsequent use.

Step2. Use 4 ③ M4X8 cross recessed pan head combination screws to fix ① MCBS-IEB to ② inCube2S-mounting buckle on the sheet metal, refer to Figure 2-17.



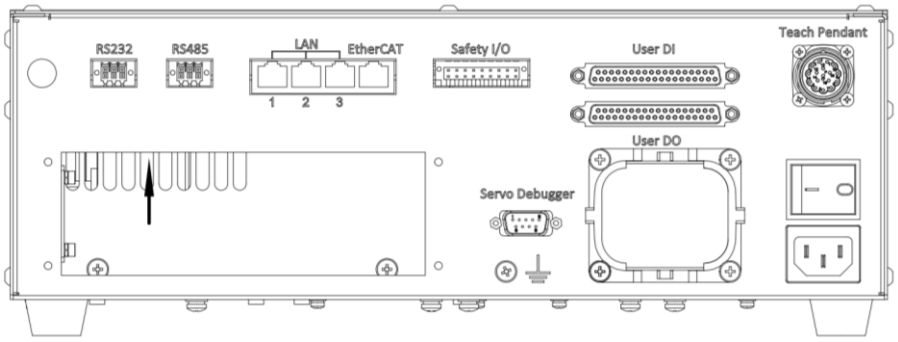
(a)



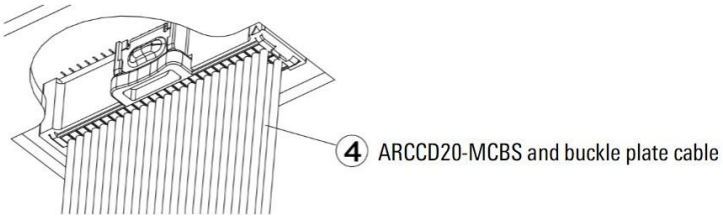
(b)

Figure 2-17 8 Install MCBS-IEB

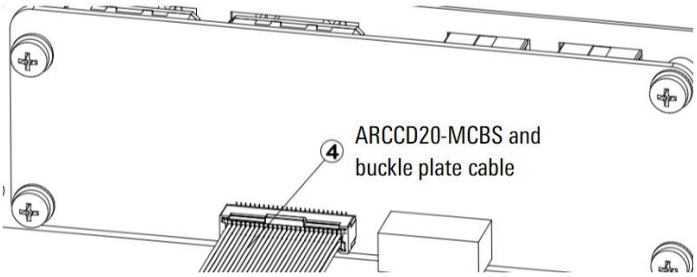
Step3. Connect one side of the ④ ARCCD20-MCBS and buckle plate cable to the position of the arrow in Figure 2-18(a), and the other side to ① MCBS-IEB corresponds to the J4 connector.



(a)



(b)



(c)

Figure 2-18 Install ARCCD20-MCBS and daughter plate connection cable

Step4. Use 4 hexagonal socket screws removed in step 1 to fix the ② inCube2S-mounting plate sheet metal to the rear panel, refer to Figure 2-19.

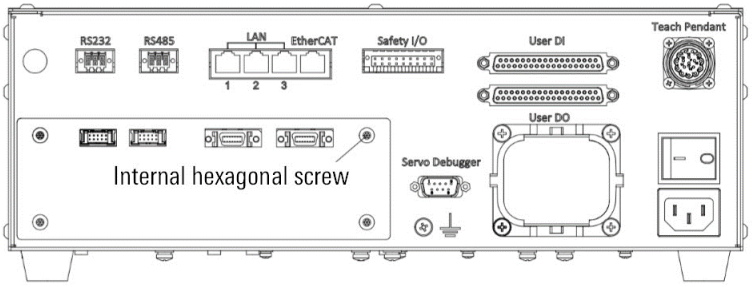


Figure 2-19 inCube2S- diagram after installing the plate and sheet metal fixation

Step5. Connect the outside wires of the cabinet according to the functions used, refer to Figure 2-20:

a) Use PWM output and analog output signals: use ⑥ PWM and analog output_voltage and current input harness-5 meters coupled to J5;

b) Use voltage input and current input signals: use ⑥PWM and analog output_voltage and current input wiring harness-5 meters coupled to J3;

c) Use encoder signal: use ⑤magnetic scale and CAN_encoder to share the wiring harness coupled to J7;

d) Using magnetic scale and CAN signal: Use ⑤magnetic scale and CAN_encoder to share the wiring harness coupled to J6.

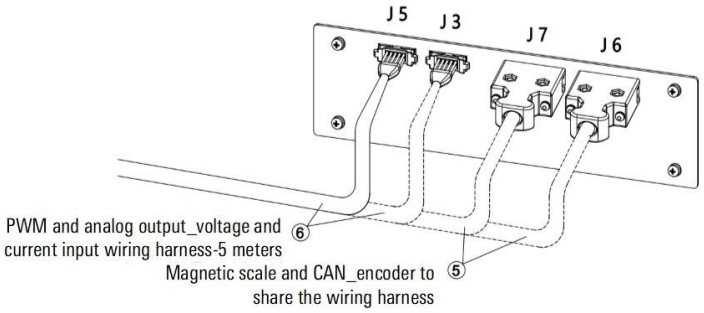


Figure 2-20 MCBS-IEB front view

Caution

The voltage input and current input interfaces have voltage and current range limits. Exceeding the limits may cause device damage. Please strictly follow the ranges in Table 2-6.

Table 2-6 PWM and analog output_voltage and current range limits

Connector	Pin	Function	Parameter	Numerical value	Unit	Remark
J3	1	Voltage input 1	Voltage	-10~+10	V	
	2	Voltage input 2	Voltage	-10~+10	V	
	5	Voltage input 3	Voltage	-10~+10	V	
	6	Current input 1	current	0~+20	mA	
	9	Current input 2	current	0~+20	mA	
	10	Current input 3	current	0~+20	mA	

3 Installing encoders for conveyor tracking

3.1 Instructions for use

Contents of this chapter:

- Applicable to all control cabinet models.
- Only the coupled method of hardware is introduced. For more detailed software operation content, please refer to our "Conveyor Tracking Function Instruction Manual".

3.2 Select encoder type

Both absolute encoders and incremental encoders can work in absolute coordinate mode and relative coordinate mode, which mainly depends on the design of their parameters (which can also be controlled in the program).

The difference between the two is:

- For absolute encoders, when the power is turned off, the internal power supply still supplies power to the encoder. Therefore, when the servo motor is rotated after the power is turned off, the coordinate position will be recorded internally, and the coordinate position will change after the power is turned on again;
- Incremental encoders have no internal holding power supply. After a power outage, their coordinate system no longer exists. Therefore, the incremental encoder must return to the origin or preset the origin after powering on again.

Prompt

The inCube10/12 control cabinet can only be connected to incremental encoders.

3.3 Encoder position

The encoder coupled method is as follows:

- One end of the encoder is fixed on the conveyor belt, and the rotation of the conveyor belt drives the encoder to rotate and count.
- The other end of the encoder is coupled IEB (for coupled method, please refer to Chapter 3.4 and Chapter 3.5).
- IEB and control cabinet coupled (for the coupled method of each model of control cabinet, please refer to chapter 2).

3.4 Encoder wiring connected to MCB-IEB J7 interface

Wiring mode

When the control cabinet model is the ARC4-50/165, three types of wiring harnesses are necessary for cabling: the "ARC4-50 Incremental Encoder Cabinet Wiring Harness," "ARC4-165 Incremental Encoder Cabinet Wiring Harness," and the "ARCCD10 Shared Wiring Harness Outside the Latch Panel Cabinet."

When the control cabinet model is inCube10/12, two types of wiring harnesses are required: "ARCCD10 - wiring harness inside the encoder cabinet" and "ARCCD10 - common wiring harness outside the buckle board cabinet".

For detailed wiring methods, please refer to Chapter 2.1.2 and Chapter 2.2.2.

ARC4-50 incremental encoder cabinet optional wiring harness diagram and pin definitions

For the diagram and pin definition of the optional wiring harness in the ARC4-50 incremental encoder cabinet, please refer to Figure 3-1

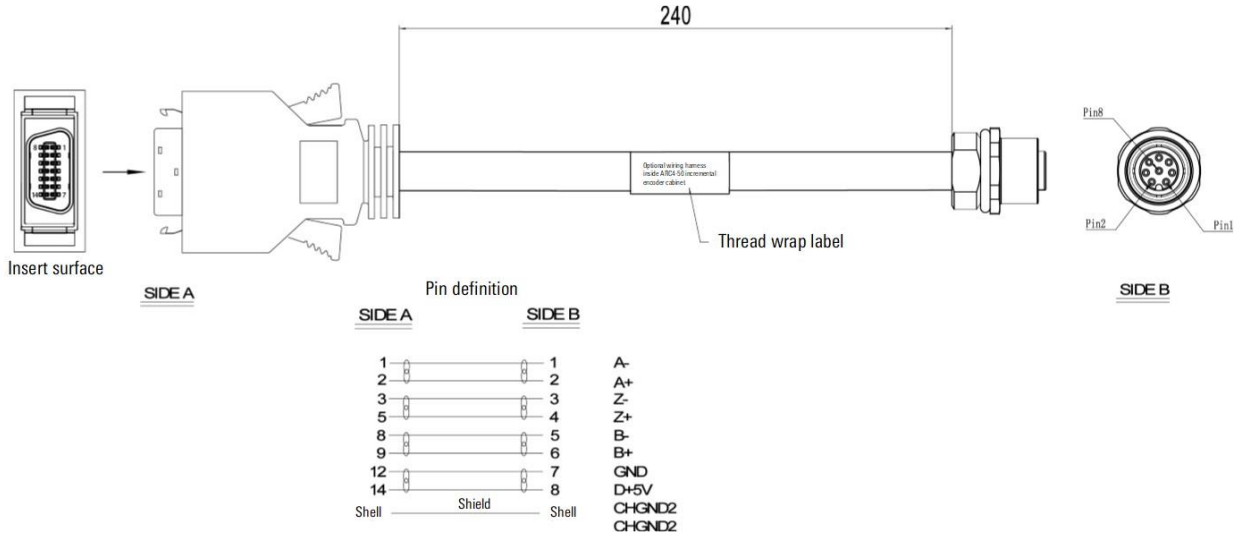


Figure 3-1 Diagram and pin definition of the optional wiring harness in the ARC4-50 incremental encoder cabinet

ARC4-165 incremental encoder cabinet optional wiring harness diagram and pin definitions

For the diagram and pin definition of the optional wiring harness in the ARC4-165 incremental encoder cabinet, please refer to Figure 3-2.

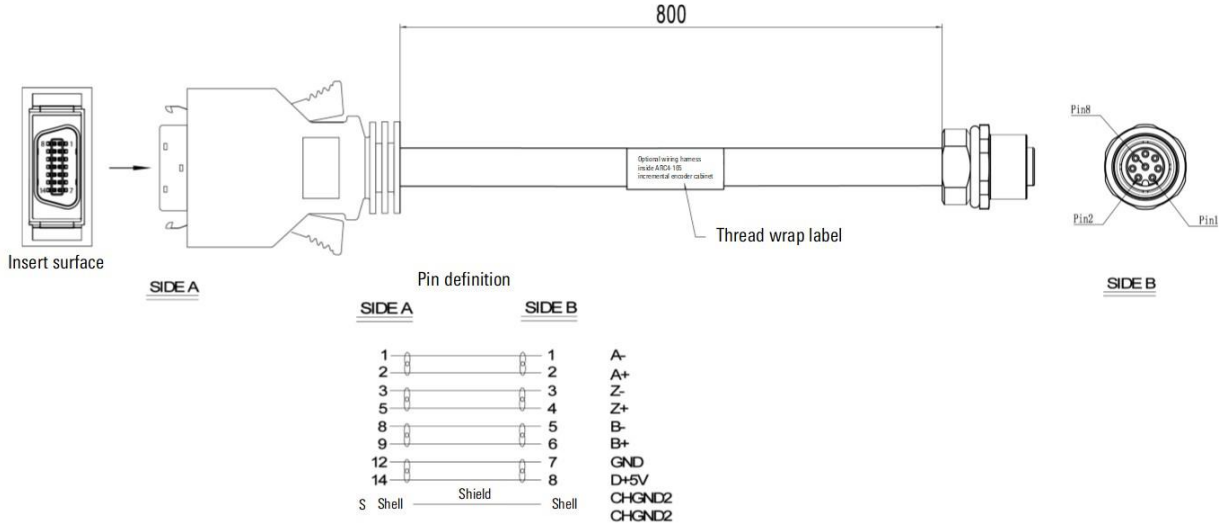


Figure 3-2 ARC4-165 incremental encoder cabinet optional wiring harness diagram and pin definition

ARCCD10-Encoder cabinet wiring harness diagram and pin definitions

For the wiring harness diagram and pin definitions in the ARCCD10-encoder cabinet, please refer to Figure 3-3.

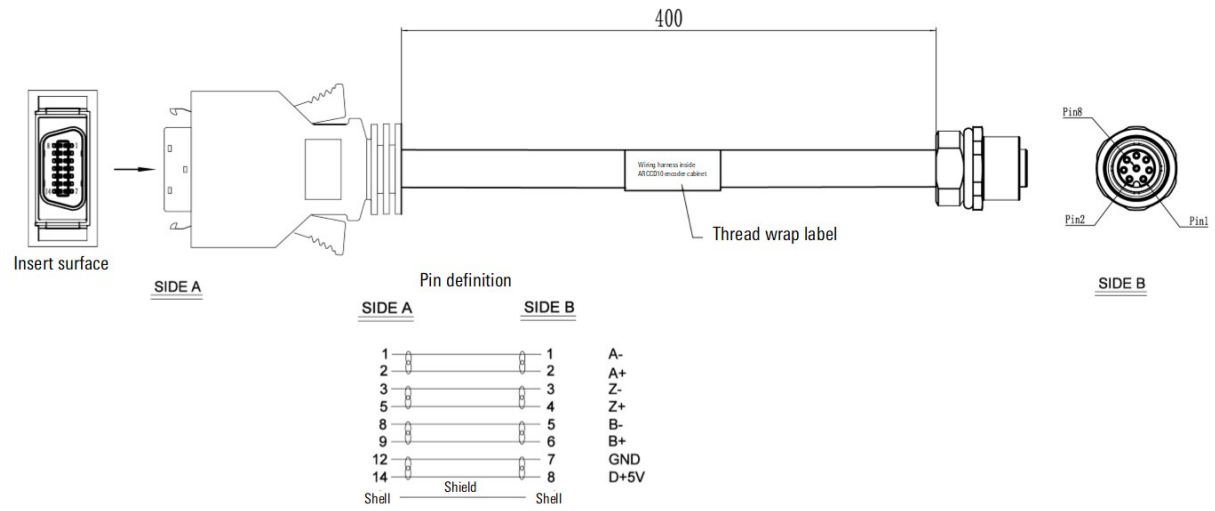


Figure 3-3 ARCCD10-Wiring harness diagram and pin definition in the encoder cabinet

ARCCD10-Common wiring harness diagram and pin definition outside the gusset cabinet

For the diagram and pin definition of the common wiring harness outside the ARCCD10-pinboard cabinet, please refer to Figure 3-4.

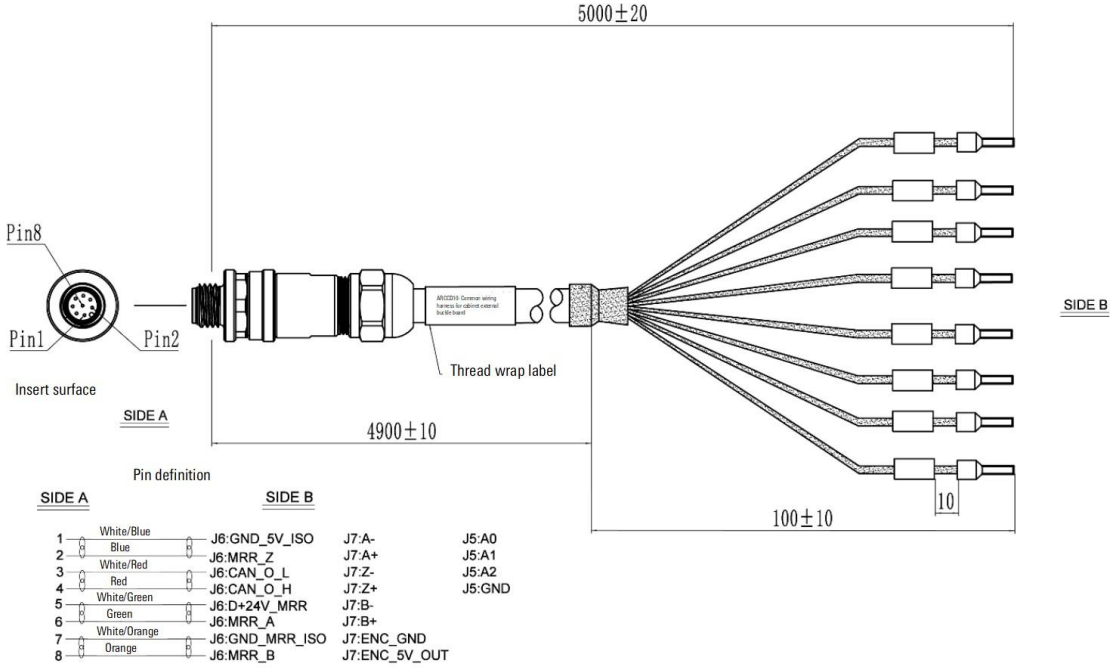


Figure 3-4 ARCCD10- shared wiring harness diagram and pin definition outside the buckle board cabinet

3.5 Encoder cable with MCBS-IEB (J7 interface) coupled

Wiring mode

When the control cabinet model is inCube20/21/2S, the "shared wire harness for magnetic scale and CAN_encoder" is required for wiring.

For detailed wiring methods, please refer to Chapter 2.3.2 and Chapter 2.4.2.

The magnetic scale and CAN_encoder share the wiring harness diagram and pin definitions

For the diagram and pin definition of the common wiring harness between the magnetic scale and CAN_encoder, please refer to Figure 3-5.

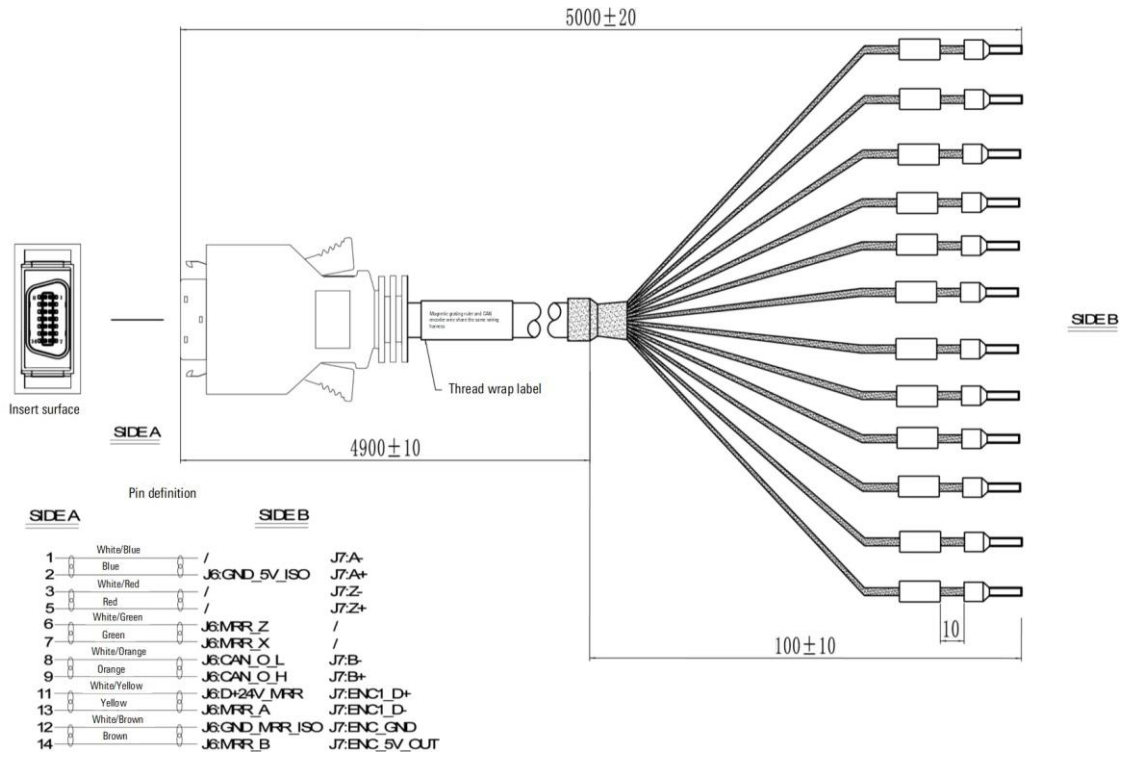


Figure 3-5 A-Magnetic scale and CAN_encoder shared wiring harness diagram and pin definition

3.6 PLC slave configuration of control cabinet

The robot can be connected to a variety of external I/O devices. By selecting the required I/O device in the PLC slave configuration, the system will automatically assign the corresponding I/O address mapping to the device to complete the I/O interaction between the robot and the device.

Step1. On the main interface of the teach pendant, click the [System/System Configuration/PLC Slave Configuration] option, as shown in Figure 3-6.

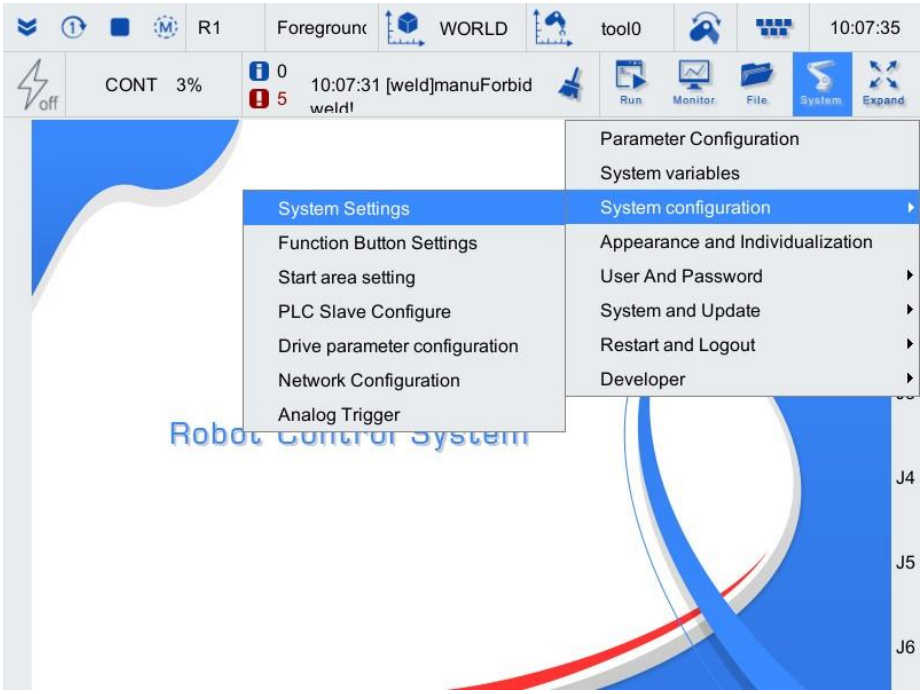


Figure 3-6 PLC slave configuration selection

Step2. In the pop-up [PLC slave station configuration] interface, select the options that need to be configured (the first PLC slave station configuration does not support modification), and click the <Config> button. As shown in Figure 3-7.

Figure 3-7 [PLC slave configuration] interface

Step3. In the [Configure PLC Slave Station-2] interface, select the matching "PLC Slave Station Type" based on the information in Table 3-1. Figure 3-8 shows the interface for selecting "MFDB_BASE".

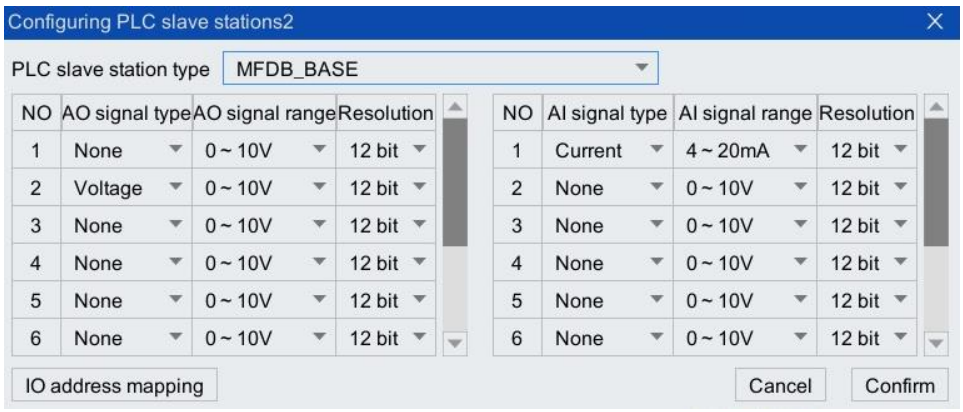


Figure 3-8 [Configure PLC slave-2] interface

Table 3-1 PLC Slave Station Type Description

Slave type	Illustrate
MFDB_BASE	Used for inCube10/12 and ARC4 control cabinets to expand analog interfaces, encoder interfaces or magnetic scale interfaces. This slave type needs to be configured after the control cabinet expands these interfaces.
IEB_BASE	Used to expand the analog interface, encoder interface, magnetic scale interface or PWM output interface of the inCube20/21 control cabinet. The slave station type needs to be configured after the control cabinet expands these interfaces.

Step4. After completing the parameter configuration in Figure 3-8, click <Yes>, and a prompt dialog box will pop up (as shown in Figure 3-9). Click <Yes>, and after the power is turned off and restarted, the configuration takes effect. After taking effect, re-enter the [PLC Slave Configuration] interface, and the display will be shown in Figure 3-10.

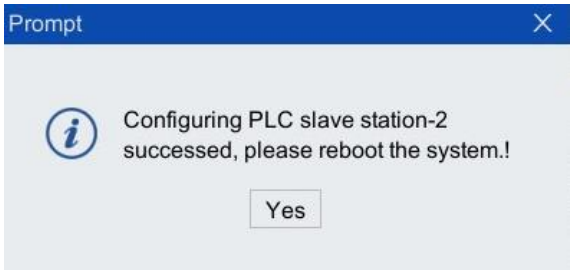


Figure 3-9 Prompt dialog box

Figure 3-10 [PLC slave configuration] interface

4 Analog communication

4.1 Instructions for use

Contents of this chapter:

- Only applicable to inCube10/12/20/21 control cabinet.
- Only the coupled method of hardware and the PLC slave configuration of the control cabinet are introduced. For more detailed software operation content, please refer to our company's "Arc Welding Function User Manual".

4.2 Connection of analog wires to MCB-IEB (J3 /J5 Interface)

Wiring mode

When the control cabinet model is inCube10/12, two types of wiring harnesses are required: "ARCCD10 - wiring harness inside the encoder cabinet" and "ARCCD10 - common wiring harness outside the buckle board cabinet".

For detailed wiring methods, please refer to Chapter 2.1.2.

ARCCD10-Analog cabinet wiring harness diagram and pin definitions

For the diagram and pin definition of the wiring harness in the ARCCD10-analog cabinet, please refer to Figure 4-1.

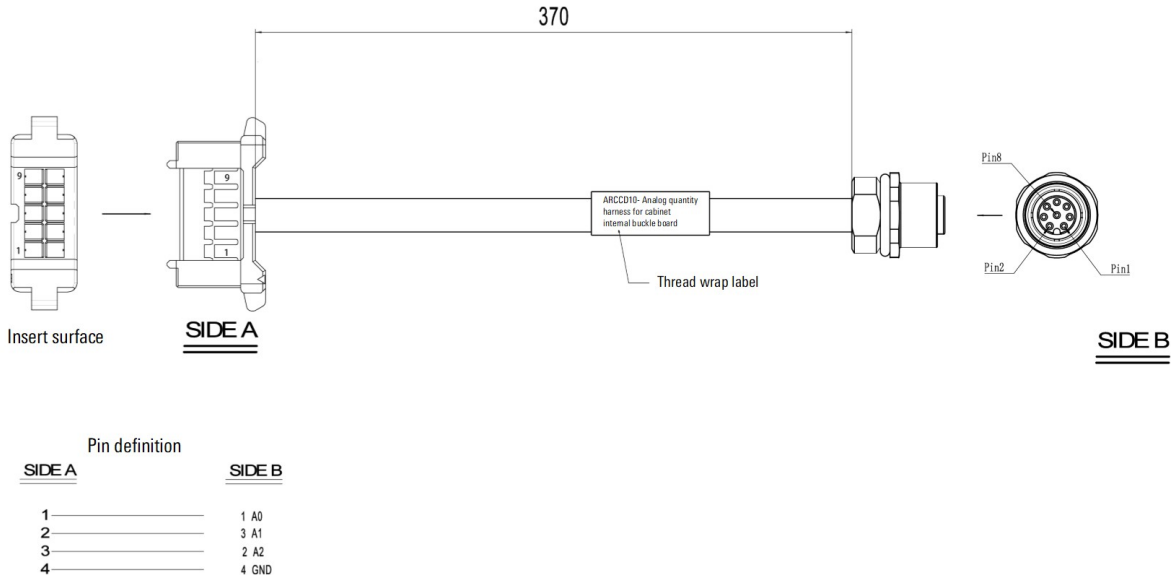


Figure 4-1 ARCCD10-analog cabinet wiring harness diagram and pin definition

ARCCD10-Common wiring harness diagram and pin definition outside the gusset cabinet

For the diagram and pin definition of the common wiring harness outside the ARCCD10-pinboard cabinet, please refer to Figure 4-2.

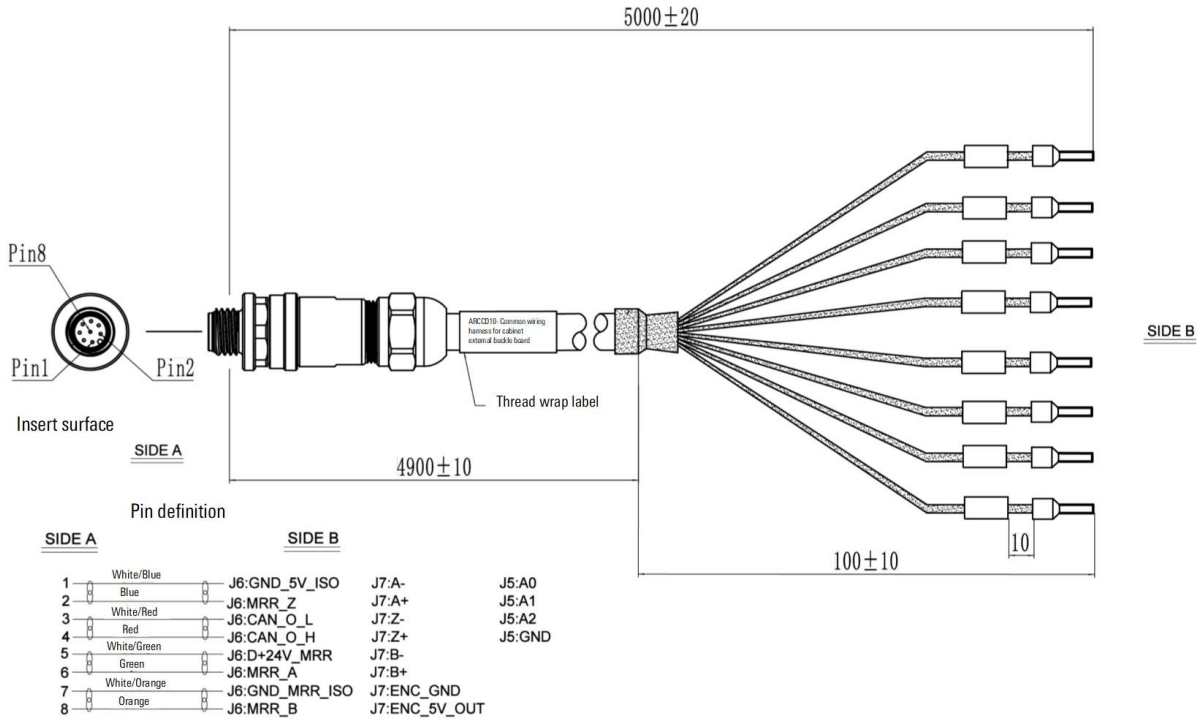


Figure 4-2 ARCCD10- shared wiring harness diagram and pin definition outside the buckle board cabinet

4.3 Encoder cable with MCBS-IEB (J3/J5 interface) coupled

Wiring mode

When the control cabinet model is inCube20/21, the "PWM and analog output_voltage and current input wire harness (5m)" is required for wiring.

For detailed wiring methods, please refer to Chapter 2.3.2.

PWM and analog output_voltage and current input harness (5m) diagram and pin definition

PWM and analog output_voltage and current input harness (5m) diagram refers to Figure 4-3.

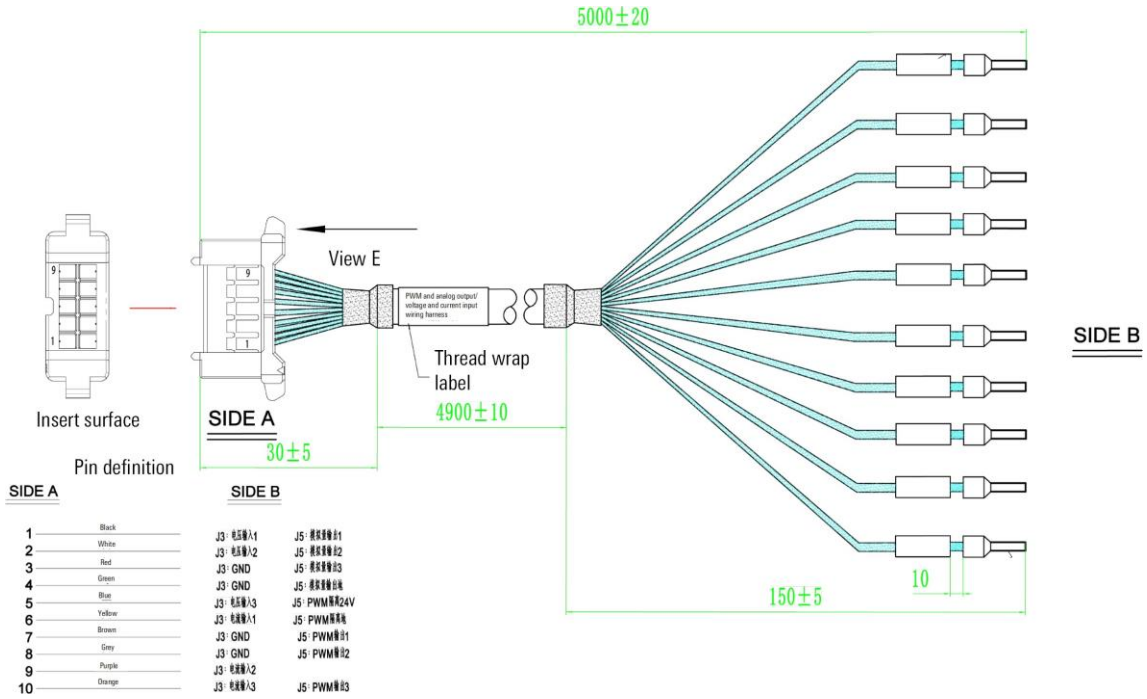


Figure 4-3 PWM and analog output_voltage and current input harness (5m) diagram and pin definition

4.4 PLC slave configuration of control cabinet

The robot can be connected to a variety of external I/O devices. By selecting the required I/O device in the PLC slave configuration, the system will automatically assign the corresponding I/O address mapping to the device to complete the I/O interaction between the robot and the device.

Step1. On the main interface of the teach pendant, click the [System/System Configuration/PLC Slave Configuration] option, as shown in Figure 4-4.

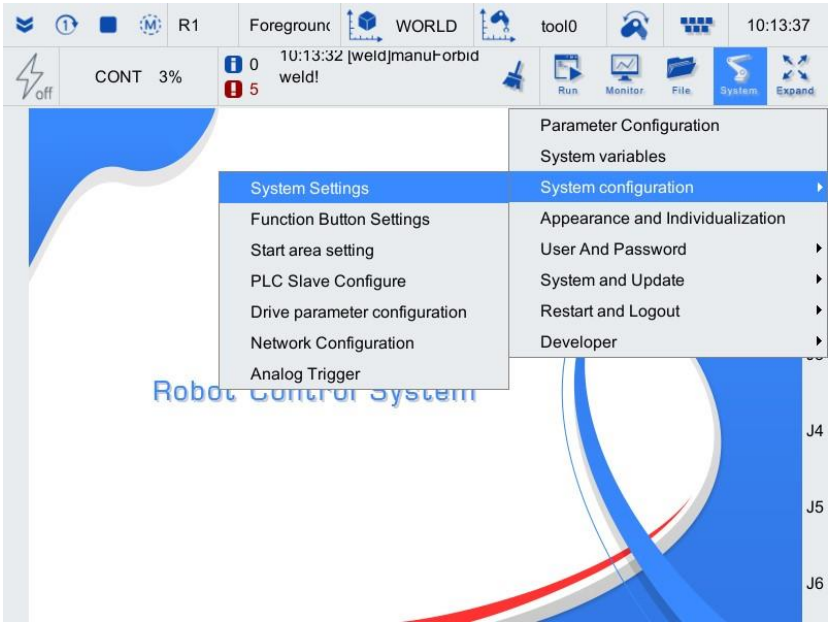


Figure 4-4 PLC slave configuration selection

Step2. In the pop-up [PLC slave station configuration] interface, select the options that need to be configured (the first PLC slave station configuration does not support modification), and click the <Config> button. As shown in Figure 4-5.

Figure 4-5 [PLC slave configuration] interface

Step3. In the [Configure PLC Slave-2] interface, select the matching "PLC slave type" based on the information in Table 4-1. Figure 4-6 shows the interface for selecting "IEB_BASE".

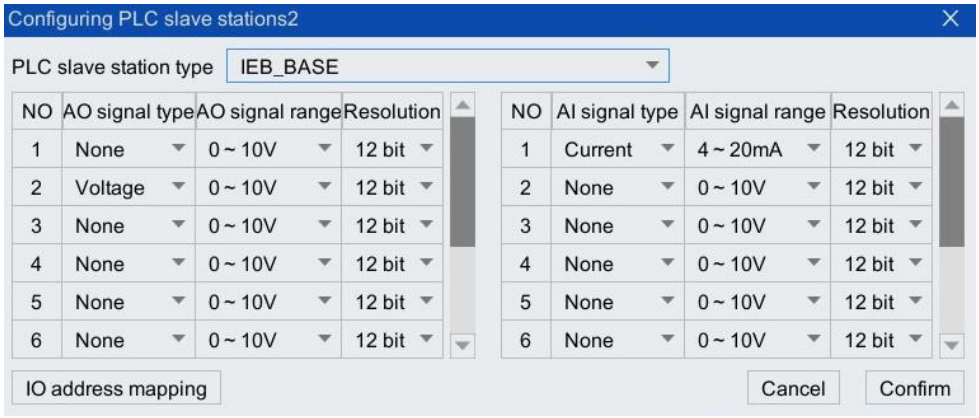


Figure 4-6 [Configure PLC slave-2] interface

Table 4-1 PLC slave type description

Slave type	Illustrate
MFDB_BASE	Used for inCube10/12 and ARC4 control cabinets to expand analog interfaces, encoder interfaces or magnetic scale interfaces. This slave type needs to be configured after the control cabinet expands these interfaces.
IEB_BASE	Used to expand the analog interface, encoder interface, magnetic scale interface or PWM output interface of the inCube20/21 control cabinet. The slave station type needs to be configured after the control cabinet expands these interfaces.

Step4. After completing the parameter configuration in Figure 4-6, click <Yes>, and a prompt dialog box will pop up (as shown in Figure 4-7). Click <Yes>, and after the power is turned off and restarted, the configuration takes effect.

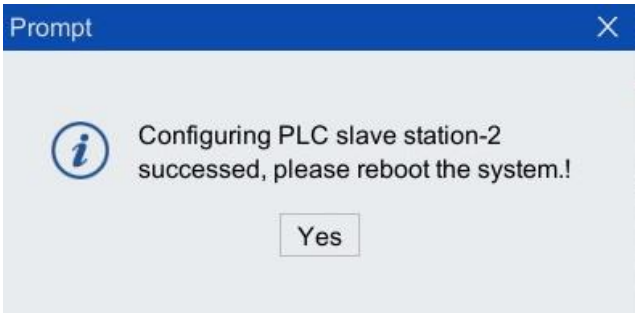


Figure 4-7 Prompt dialog box

4.5 Analog configuration

After the PLC slave station of the control cabinet is successfully configured, on the main interface of the teach pendant, click the [System/System Configuration/PLC Slave Station Configuration] option, and a [PLC slave station] as shown in Figure 4-8 will pop up, select the <Config> button behind "IEB_BASE", enter the [Configuration PLC slave station-2] interface as shown in Figure 4-9, you can set the signal type, signal range and other parameters of AO and AI respectively.

Figure 4-8 [PLC slave configuration] interface

For analog output voltage and current configuration instructions, please refer to Table 4-2.

Table 4-2 Analog output voltage and current configuration instructions

Connector	pin	Function	parameter	value
J5	1	Analog output 1	Voltage and current	The analog output voltage supports three ranges: 0~10V, 0~5V, and -10V~10V, refer to Figure 4-9 The analog output current supports two ranges: 0~20mA and 4~20mA, refer to Figure 4-10
	2	Analog output 2	Voltage and current	
	3	Analog output 3	Voltage and current	

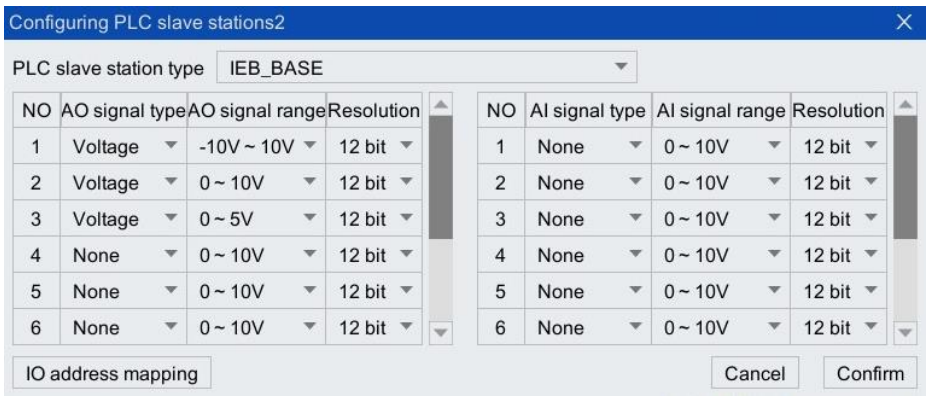


Figure 4-9 Analog output voltage configuration

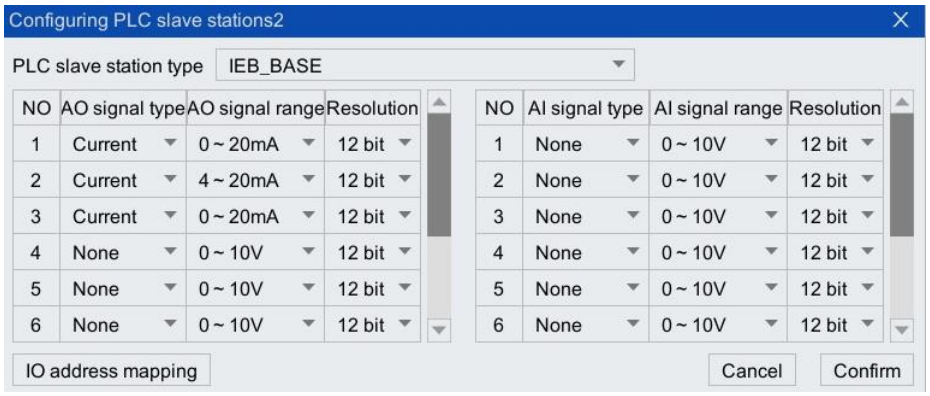


Figure 4-10 Analog output current configuration

For analog input voltage and current configuration instructions, please refer to Table 4-3.

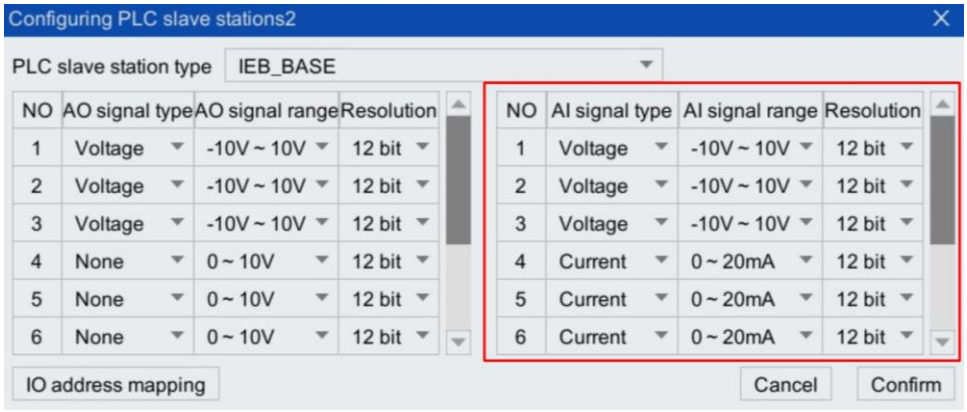


Figure 4-11 AI signal type configuration method

Table 4-3 Analog input voltage and current configuration instructions

Connector	Pin	Function	Parameter	Value	Unit	Remark
J3	1	Voltage input 1	Voltage	-10~+10	V	It can only be configured in serial numbers 1, 2, and 3 of the [Configure PLC Slave-2] interface, refer to the red box area in Figure 4-11
	2	Voltage input 2	Voltage	-10~+10	V	
	5	Voltage input 3	Voltage	-10~+10	V	
	6	Current input 1	current	0~+20	mA	It can only be configured in serial numbers

Connector	Pin	Function	Parameter	Value	Unit	Remark
	9	Current input 2	current	0~+20	mA	4, 5, and 6 of the [Configure PLC Slave-2] interface, refer to the red box area in Figure 4-11
	10	Current input 3	current	0~+20	mA	

5 CANopen bus communication

5.1 Instructions for use

Contents of this chapter:

- Only applicable to inCube10/12/20/21 control cabinet.
- Only the coupled method of hardware and the PLC slave configuration of the control cabinet are introduced. For more detailed software operation content, please refer to our company's "Arc Welding Function Package Instruction Manual".

5.2 CANopen interface of communication module

The CANopen interface aviation plug pin sequence of the communication module is as shown in Figure 5-1. The pin definition is shown in Table 5-1.

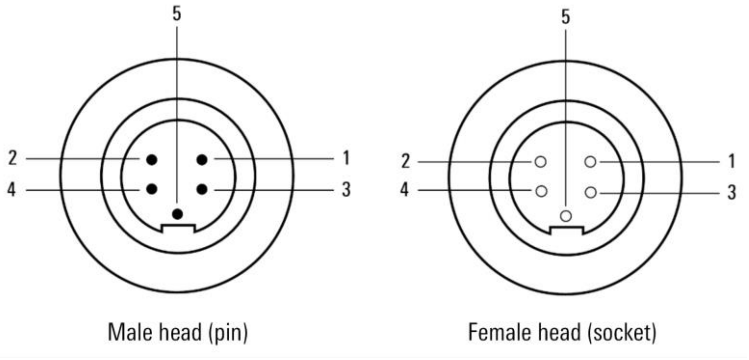


Figure 5-1 Diagram of the CANopen interface aviation plug pin of the communication module

Table 5-1 Aviation plug pin definition

Pin number	Color	Signal name	Function
1	Red(18AWG)	24V power supply	Robot power signal
2	White(22AWG)	CAN_H signal line	Communication cable CAN_H
3	Black(18AWG)	land	Robot power ground
4	Blue(22AWG)	CAN_L signal cable	Communication cable CAN_L
5	Shielded wire (18AWG)	Shielded wire	Shell PE

5.3 CANopen bus and MCB-IEB (J6 interface) coupled

Wiring mode

When the control cabinet model is inCube10/12, two types of wiring harnesses are required: "ARCCD10-CAN_magnetic scale cabinet internal wiring harness" and "ARCCD10-gusset board external common wiring harness".

For detailed wiring methods, please refer to chapter 2.1.2.

ARCCD10-CAN_Wiring harness diagram and pin definition in the magnetic scale cabinet

For the ARCCD10-CAN_magnetic scale cabinet wiring harness diagram and pin definition, please refer to Figure 5-2.

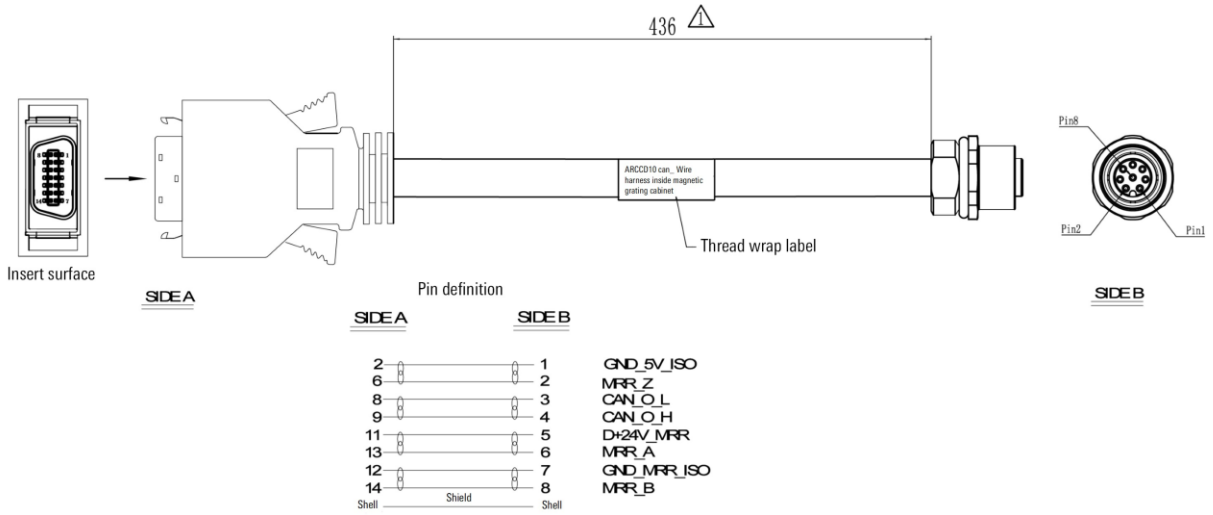


Figure 5-2 ARCCD10-CAN_ Wiring harness diagram and pin definition in the magnetic scale cabinet

ARCCD10-Common wiring harness diagram and pin definition outside the gusset cabinet

For the diagram and pin definition of the common wiring harness outside the ARCCD10-buckle board cabinet, please refer to Figure 5-3.

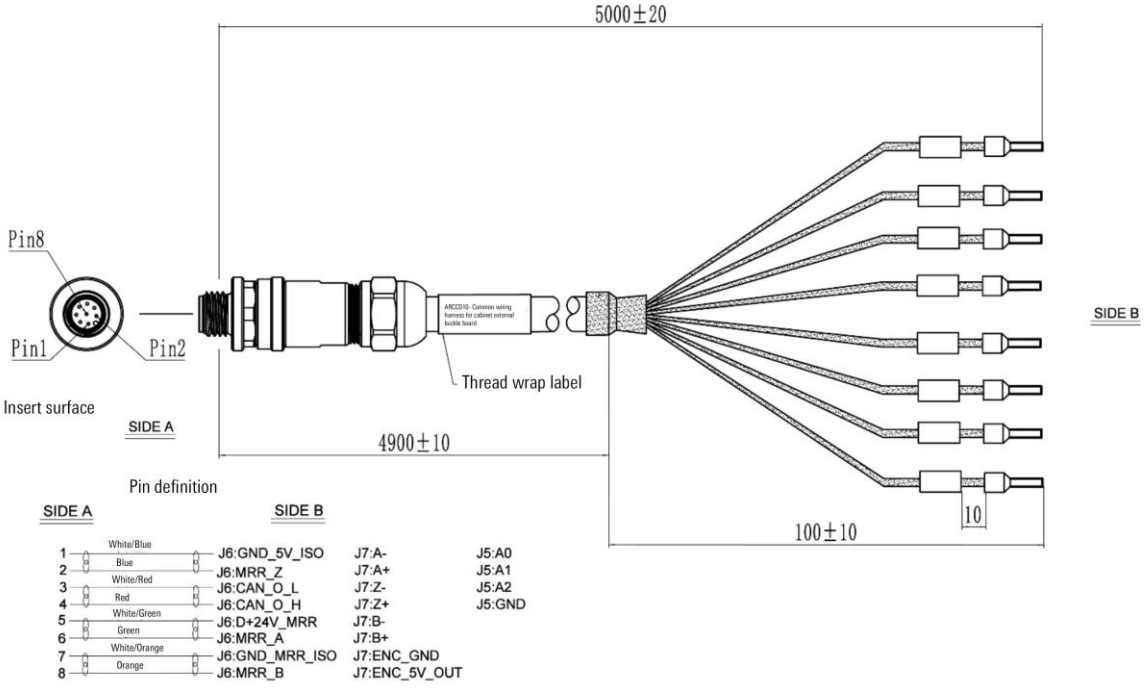


Figure 5-3 ARCCD10- shared wiring harness diagram and pin definition outside the buckle board cabinet

5.4 Connection between CANopen bus and MCBS-IEB (J6 interface)

Wiring mode

When the control cabinet model is inCube20/21, the "shared wire harness for magnetic scale and CAN_encoder" is required for wiring.

For detailed wiring methods, please refer to chapter 2.3.2.

The magnetic scale and CAN_encoder share the wiring harness diagram and pin definitions

For the diagram and pin definition of the common wiring harness between the magnetic scale and CAN_encoder, please refer to Figure 5-4.

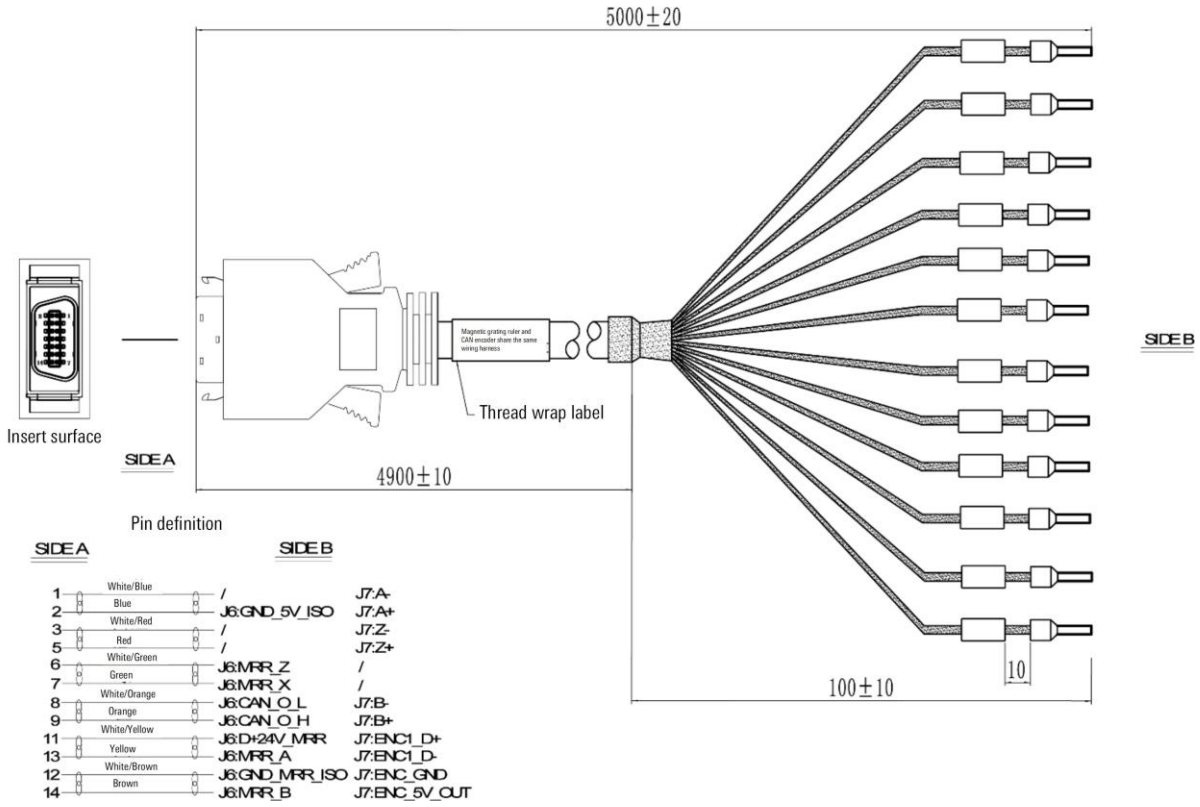


Figure 5-4 A-Magnetic scale and CAN_encoder shared wiring harness diagram and pin definition

5.5 The wiring relationship between the CANopen bus and the CANopen interface of the communication module

The wiring relationship between the CANopen bus and the CANopen interface of the communication module is shown in Table 5-2.

Table 5-2 Wiring relationship between bus and CANopen interface of communication module

CANopen bus SIDEB		Robot digital interface	
Pin number	Name	Pin number	Signal name
1	CAN_O_L	4	CAN_L signal cable
5	CAN_O_H	2	CAN_H signal line

CANopen bus SIDEB		Robot digital interface	
8	USER_GND	3	land

5.6 PLC slave configuration of control cabinet

The robot can be connected to a variety of external I/O devices. By selecting the required I/O device in the PLC slave configuration, the system will automatically assign the corresponding I/O address mapping to the device to complete the I/O interaction between the robot and the device.

Step1. On the main interface of the teach pendant, click the [System/System Configuration/PLC Slave Configuration] option, as shown in Figure 5-5.

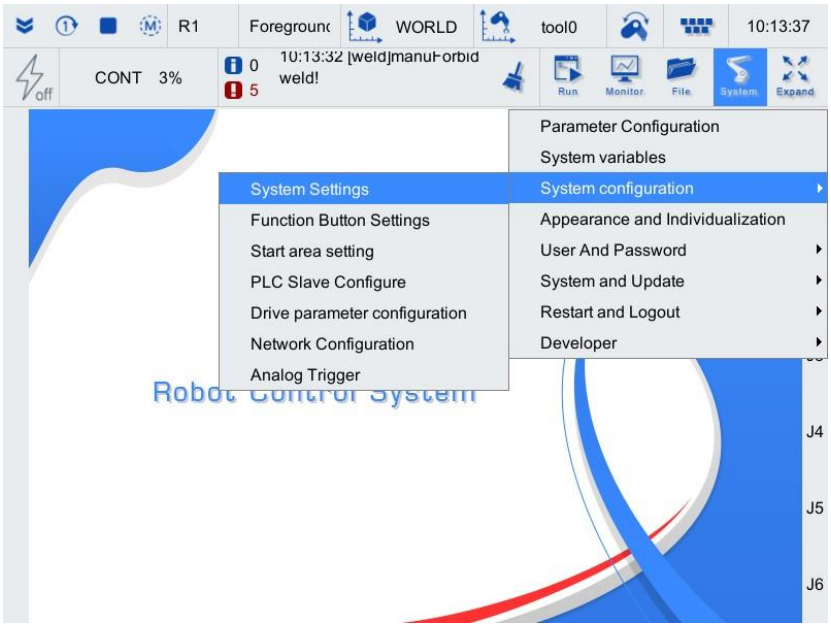


Figure 5-5 PLC slave configuration selection

Step2. In the [PLC slave configuration] interface, select the options that need to be configured (the first PLC slave configuration does not support modification), and click the <Config> button. As shown in Figure 5-6.

Figure 5-6 [PLC slave configuration] interface

Step3. In the [Configure PLC Slave Station-2] interface, select the matching "PLC Slave Station Type" based on the information in Table 5-3. Figure 5-7 shows the interface for selecting "MFDB".

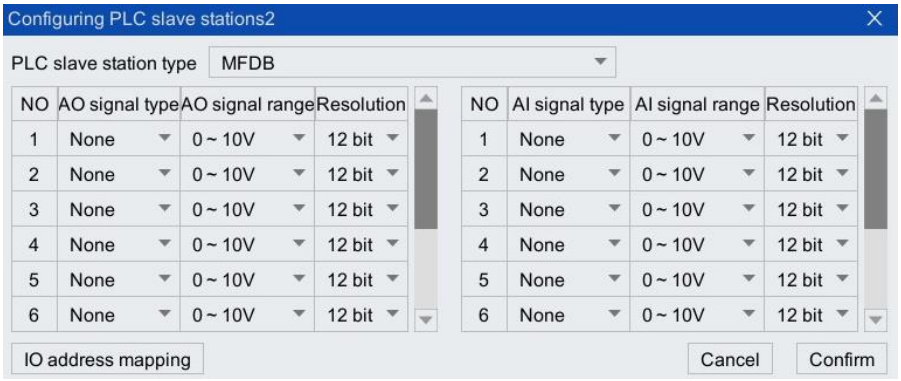


Figure 5-7 Configure PLC slave interface

Table 5-3 PLC slave type description

Slave type	Illustrate
IEB	Used to expand the CANopen interface of the inCube20/21 control cabinet. After the control cabinet expands the interface, the slave station type needs to be configured.
MFDB	Used for inCube10/12 and ARC4 control cabinets to expand the CANopen interface. After the control cabinet expands the interface, the slave station type needs to be configured.

Step4. After completing the parameter configuration in Figure 5-7, click <Yes>, and a prompt dialog box will pop up (as shown in Figure 5-8). Click <Yes>, and after the power is turned off and restarted, the configuration takes effect. After taking effect, re-enter the [PLC Slave Configuration] interface, and the display will be shown in Figure 5-9.

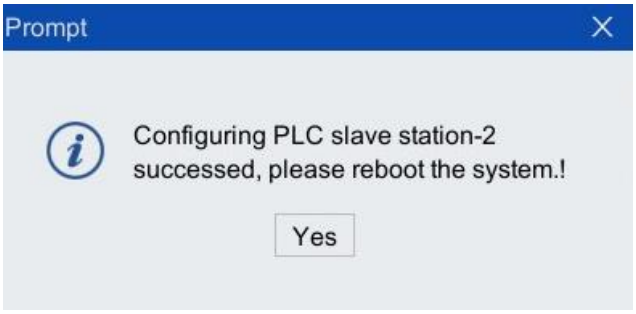


Figure 5-8 Prompt dialog box

Figure 5-9 [PLC slave configuration] interface

5.7 CANopen baud rate setting

Setup steps:

Step1. In the main interface of the teach pendant, click the [System/Parameter Configuration] option to enter the [Parameter Configuration] interface as shown in Figure 5-10.

Step2. Find and select the "CANOPEN_BAUD (CANopen baud rate setting)" parameter in the [Global] tab, click the <Edit> button at the bottom of the interface, and refer to Figure 5-10.

Step3. In the pop-up [Parameter Editing] interface shown in Figure 5-11, modify the value of the parameter (default is 125kbps, which needs to be set to the same baud rate as the device). After the modification is completed, click <Yes> on the interface to return to the [Parameter Configuration] interface.

Step4. Click the <Save> button at the bottom of the [Parameter Configuration] interface, and the configuration will take effect after the power is turned off and restarted.

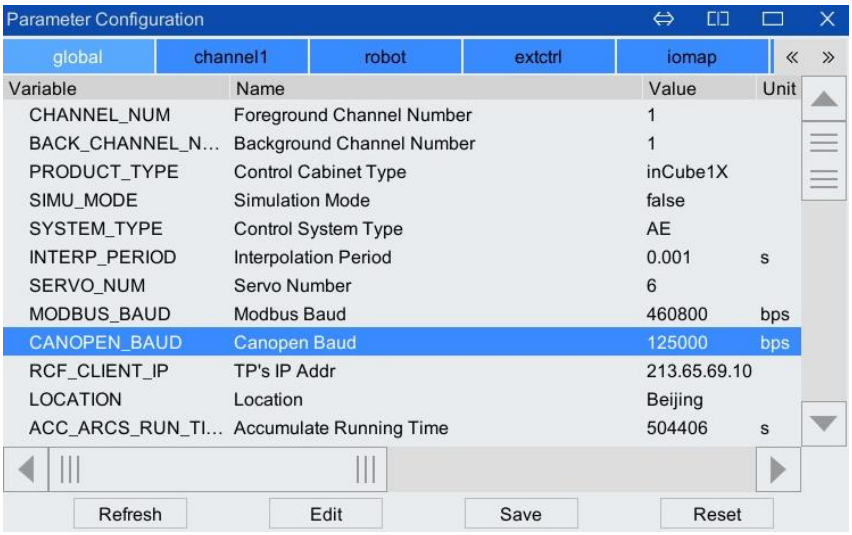


Figure 5-10 [Parameter configuration] interface

Figure 5-11 [Parameter editing] interface

PEITIAN ROBOTICS

WeChat Official Account

Official Website

Sevice Hotline : 400-990-0909
Official Website : http://robot.peitian.com

UM-GP001-014 / V1.0.0 / 2023.12.29
© 2011-2023 Peitian Robotics Co., Ltd. All right Reserved.

The description about the product characteristics and availability does not constitute a performance guarantee, and is reference only.The scope of services for the products delivered is subject to the specific contract.