HITBOT

Product Brochure

The most affordable or nothing.

Main category: Industrial robot arm /Collaborative robot arm /
Electric gripper/Intelligent actuator/Automation solutions

Huiling-tech Robotic Co.,Ltd.

Z-Arm 4160/Z-Arm XX60

High precision

Repeatability
±0.05mm

Z-axis customization

0.1-1m

Large arm span

J1 axis 325mm
J2 axis 275mm

Competitive price

Industrial-level quality
Comsumptive price

Model Definition

Z-Arm T4160N0-A0T1M1-G1-FXXX-01

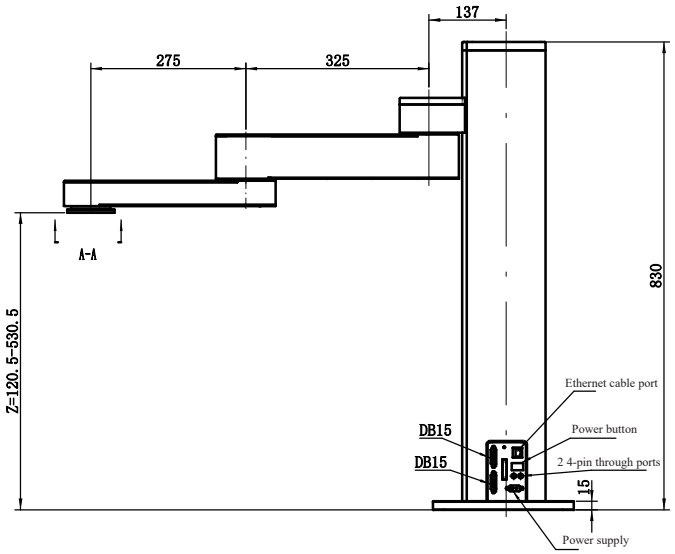
T	41	60	N	0	A0	T1
Blank: Four axis F: Five axis T: Three axis	If z-axis stroke is 410,here is 41	If robot arm span is 600, here is 60	Non-collaborative N	0 is silver color 1 is black color	A0 means two straight-through cables A2 means two vacuum tubes	T1: the standard configuration of the I/O version, which can be adapted to Z-EFG-8S/Z-EFG-12/Z-EFG-20/ Z-EFG-30 T2: the I/O version has 485, which can be connected to Z-EFG-100/ Z-EFG-50 users and others who need 485 communication

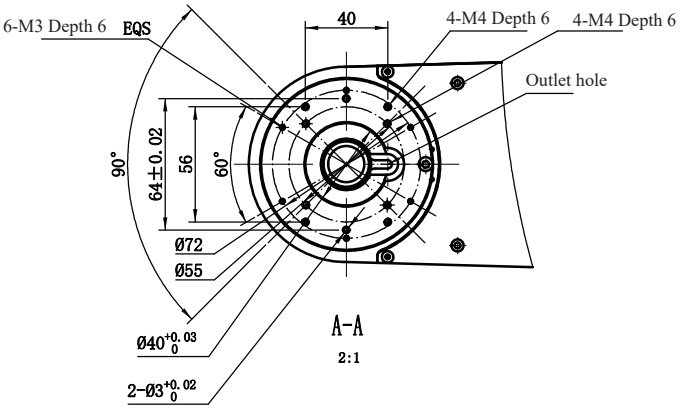
M1	G1	FXXX-01
M1: Second arm motion range ±164 deg M2: Second arm motion range 15deg - 345deg	Blank: no need to install electric grippers; G1: Required to install the electric gripper, which is installed horizontally to realize the hollow wiring; G2: Required to install the electric gripper, which is installed vertically to realize the hollow wiring.	F: Non-standard customized option, if it is a standard product, it is blank XXX: XXX: Customer label number 01: version number

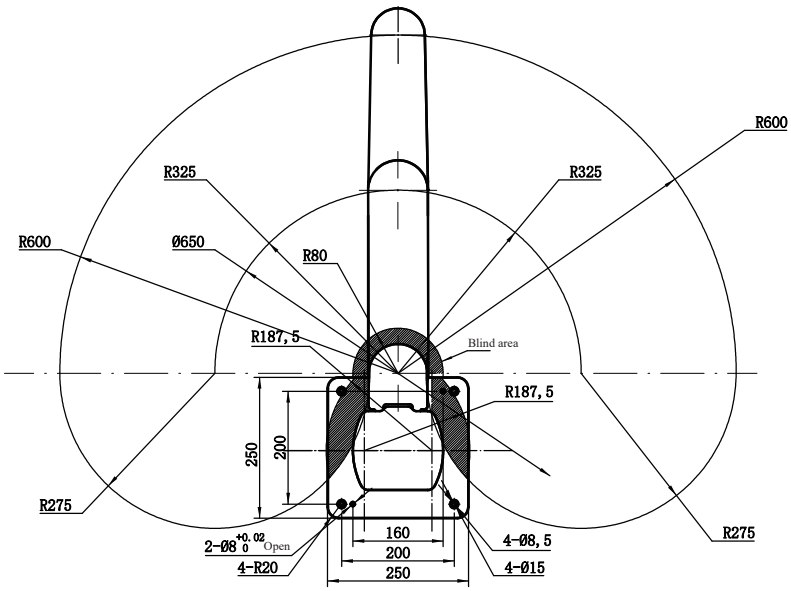
Specification Parameter

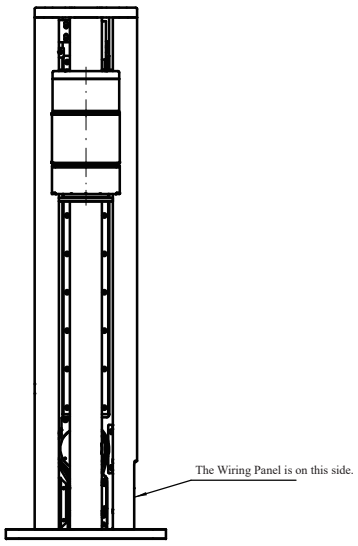
Z-Arm XX60 Collaborative robot arm	Parameters
1 axis arm length	325mm
1 axis rotation angle	±90°
2 axis arm length	275mm
2 axis rotation angle	±164°
Z axis stroke	Height can be customized
R axis rotation range	±1080°without mechanical limit/±170°with mechanical limit
Linear speed	1500mm/s (payload 3kg)
Repeatability	±0.05mm
Standard payload	3kg
Maximum payload	3.5kg
Degree of freedom	4
Power supply	220V/110V50-60HZ adapt to DC48V peak power 960W
Communication	Ethernet
Expandability	Built-in integrated motion controller provides 24 I/O + under-arm expansion
Z-axis can be customized in height	0.1m-1m
Electrical reserved interface	Standard configuration: 2 4*23awg (unshielded) wires from the socket panel through the lower arm cover Optional: 2 φ4 vacuum tubes through the socket panel and flange
Optional accessories	T1: the standard configuration of the I/O version, which can be adapted to Z-EFG-8S/Z-EFG-12/Z-EFG-20/ Z-EFG-30 T2： the I/O version has 485, which can be connected to Z-EFG-100/Z-EFG-50 users and others need 485 communication
Use environment	Ambient temperature: 0-55°C Humidity: RH85 (no frost)
I/O port digital input (isolated)	9+3+forearm extension (optional)
I/O port digital output (isolated)	9+3+forearm extension (optional)
I/O port analog input (4-20mA)	/
I/O port analog output (4-20mA)	/
Robot arm height	830mm
Robot arm weight	410mm stroke net weight 28.5kg
Base size	250mm*250mm*15mm
Distance between base fixing holes	200mm*200mm with four M8*20 screws
Collision detection	/
Drag teaching	/

Motion Range M1 Version

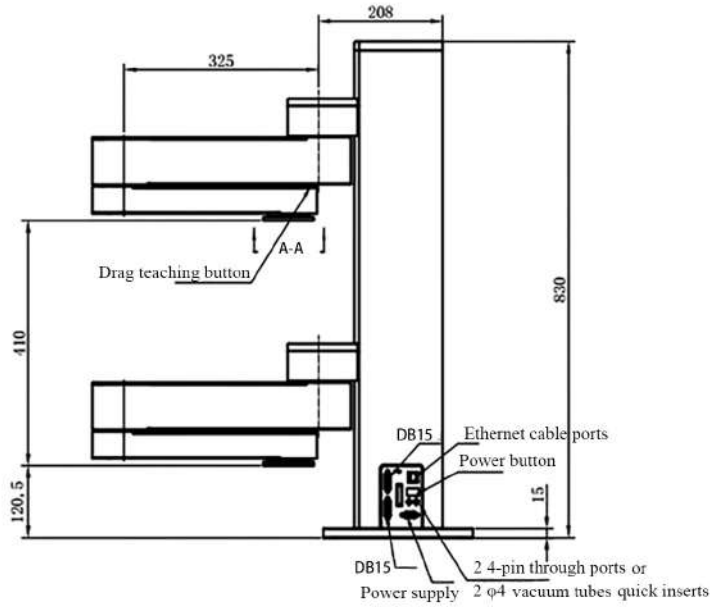


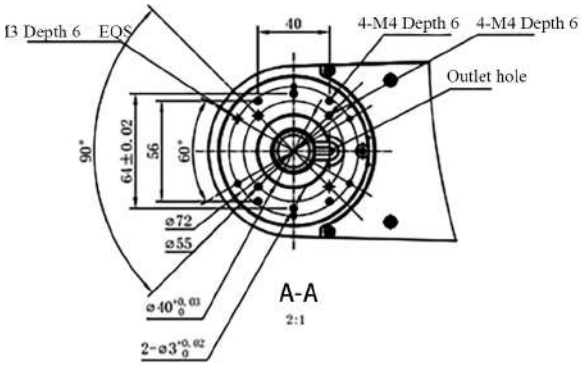


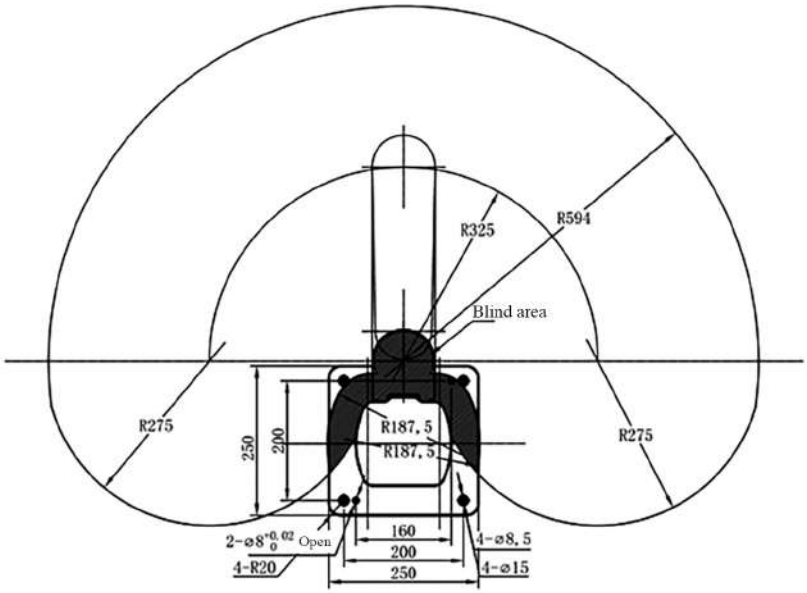


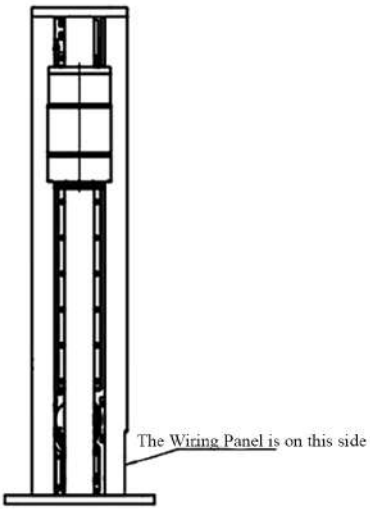


Motion Range M2 Version

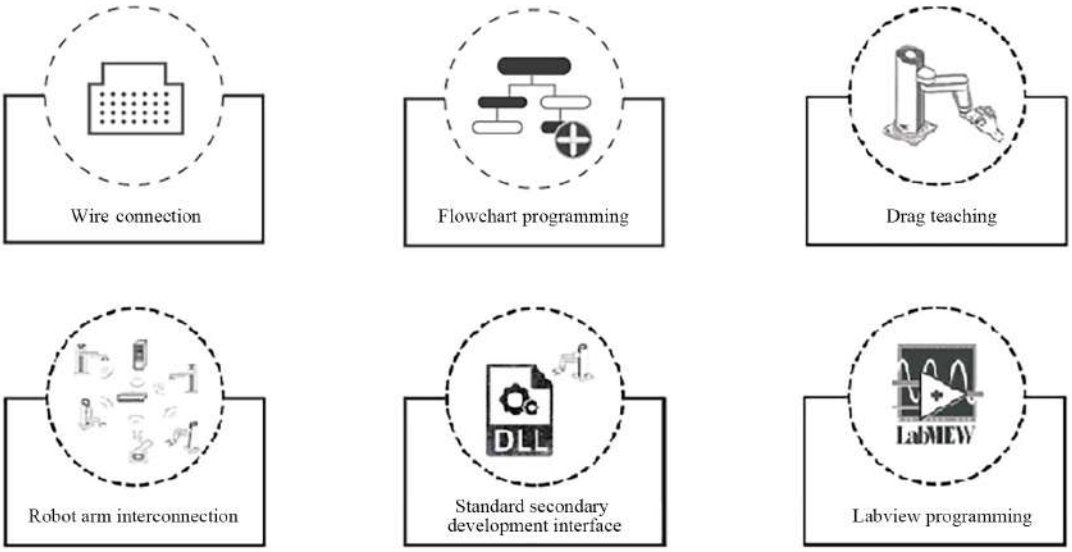








Instructions



Interface Introduction

The Z-Arm 4160 robot arm interface is installed in 2 locations, the side of the robot arm base (defined as A) and the inside of the end arm.The interface panel at A has a power switch interface (J1), 24V power supply interface DB2 (J2), output to user I/O port DB15 (J3), user input I/O port DB15 (J4) and K5 IP address configuration buttons. There is a straight through wire on the panel at B, and there are input, output and gripper control ports inside.

Interface Diagram and Instructions for Use

1. General schematic diagram of the base interface at A (shown in Figure 1)

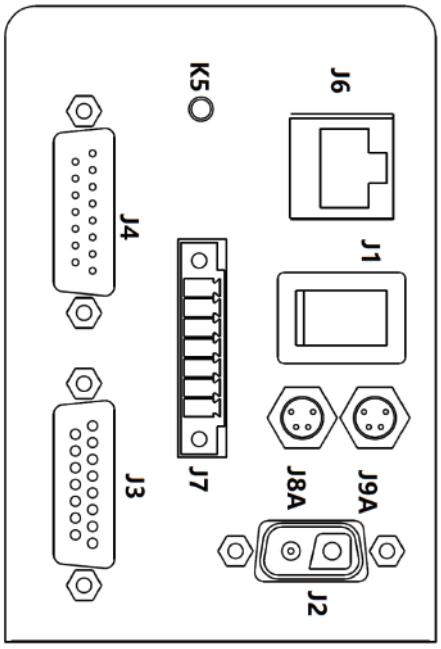


Figure 1

2. Figure 1 interface definition description

(1) J1 is the power switch interface, which is used to control the power on and off;
(2) J2 is the power input port, 24V DC voltage source input;
(3) J3 is the I/O output port, with 9 groups of internal optocoupler isolated NPN outputs;
(4) J4 is the user I/O input port, with 9 sets of internal optocoupler isolated inputs;
(5) K5 robot arm IP address configuration button, press and hold the button to power on, the robot arm enters the IP address configuration state;
(6) J6 is the ethernet port, used for computer communication;
(7) J7 is the I/O input expansion port, with 3 groups of common ground optocoupler isolated input;
(8) J8A is a 4-core straight through wire aviation plug to the end or straight through vacuum tube M8 to the end (optional);
(9) J9A is a 4-core straight through wire aviation plug to the end or straight through vacuum tube M9 to the end (optional).

3. The internal circuit design of the J3 and J4 interfaces in Figure 1

(1) J3 interface DB15 male pin definition (shown in Figure 2)

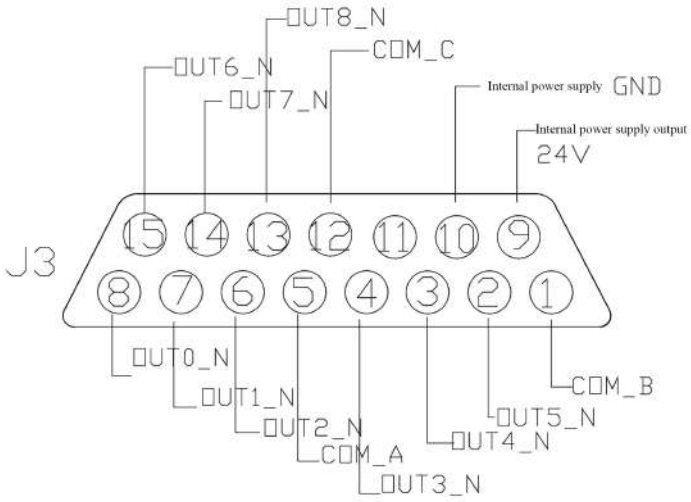


Figure 2

(2) J3 I/O output port internal simplified circuit design (shown in Figure 3)

There are 9 output ports for I/O output, OUT0_N OUT1_N OUT2_N share COM_A, OUT3_N OUT4_N OUT5_N share COM_B, OUT6_N OUT7_N OUT8_N share COM_C, built-in ordinary optocoupler isolator, open-collector output, the user needs to connect pull-up or pull-down resistor according to the power supply requirements when applying. For example, 24V power supply pull up 4.7K resistance application.

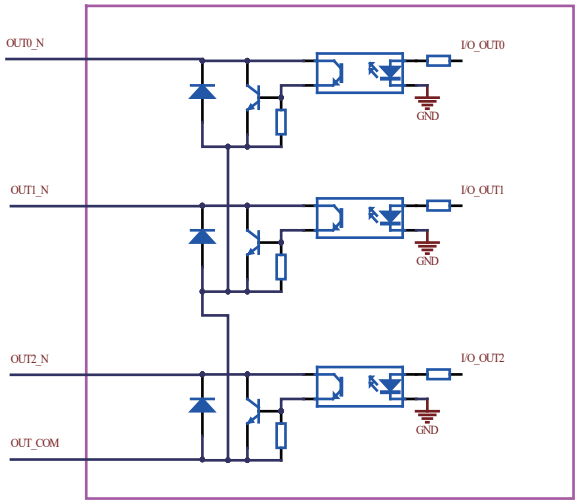


Figure 3

(3) The definition of J4 interface DB15 female (shown in Figure 4)

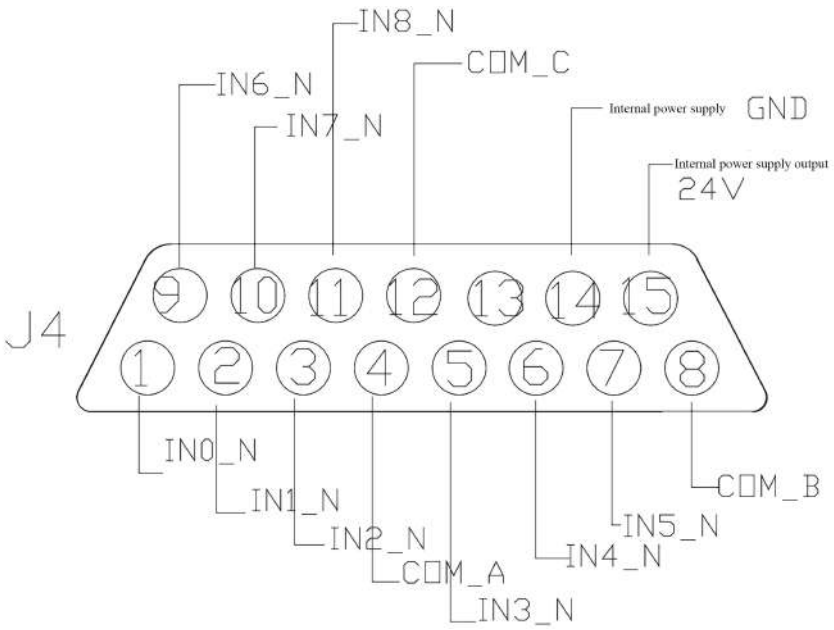


Figure 4

(4) J4 I/O input port internal control circuit design (shown in Figure 5)

There are 9 input ports for the robot I/O imput, IN0_N IN1_N IN2_N share COM_A, IN3_N IN4_N IN5_N share COM_B, IN6_N IN7_N IN8_N share COM_C, built-in optocoupler isolator, electrical isolation, strong anti-interference ability, working drive current is recommended at about 10mA, the current is too small to affect the drive performance, and the typical input voltage is 24V.

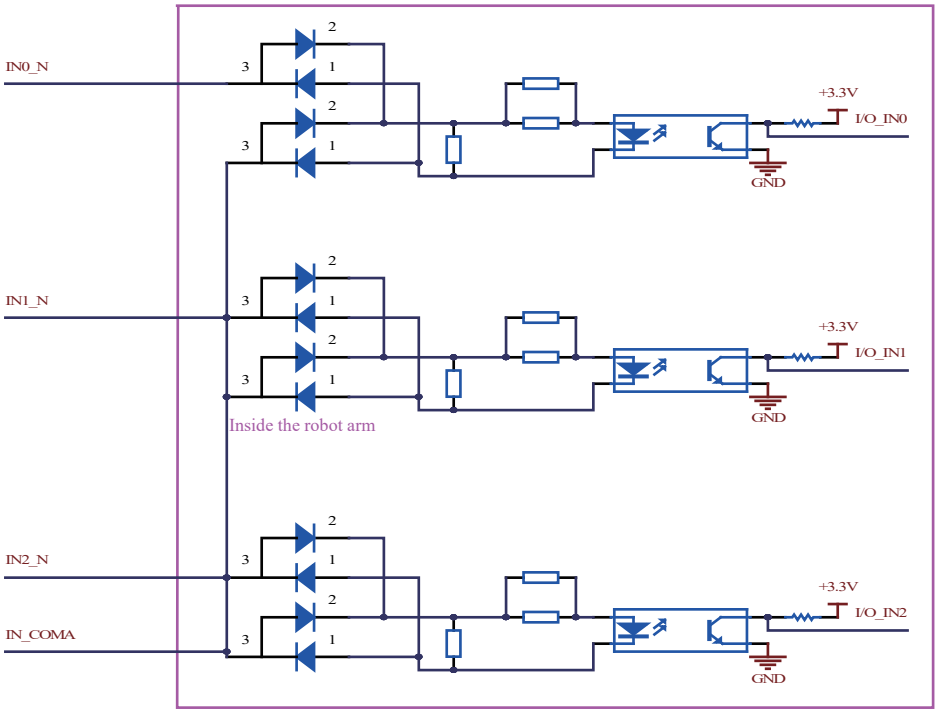


Figure 5

(5) J7 interface male pin definition (shown in Figure 6)

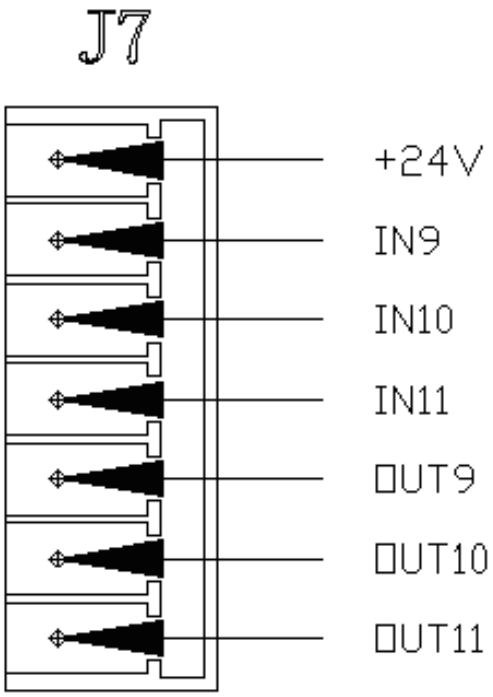


Figure 6

(6) J7 I/O input port internal simplified circuit design
There are 3 input ports of the robot arm I/O input. IN9, IN10 and IN11 share the internal GND. When the +24V terminal is connected to the IN port, the robot has signal output..

(7) J7 I/O outlet internal simplified circuit design
There are 3 outputs of the robot arm I/Oinput, OUT9 OUT10 OUT11 share the internal GND, NPN type output, when the output is valid, the output voltage is 0V (refer to 24V on the port).

4. When the end is a straight through wire, the projection is shown in Figure 7

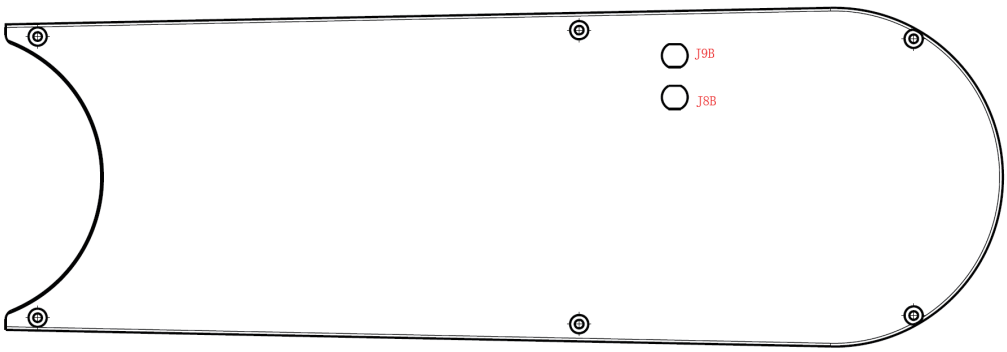


Figure 7

5 The internal input and output structure is shown in Figure 8. The output is NPN output, and the input defaults to be NPN input, which can be adjusted by the jumpers, as shown in the red box.

Figure 8

(1) When the T1 version is selected: IN0~IN1 are effective, OUT0~OUT1 are effective, and the gripper interface is effective

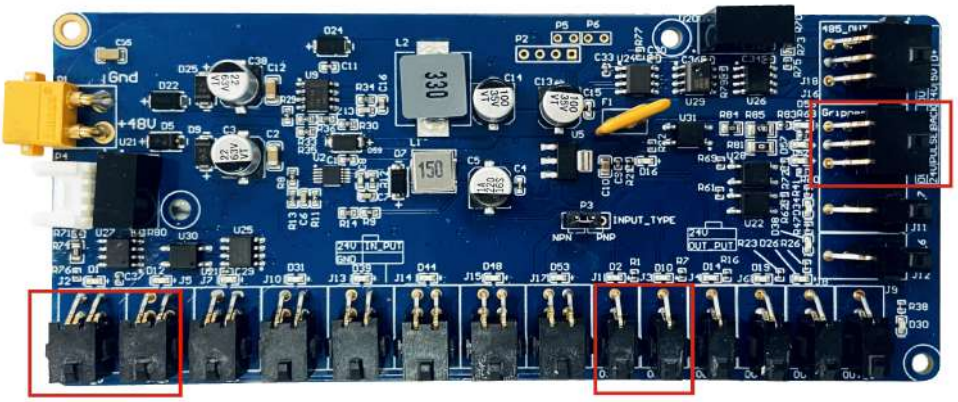


Figure 9

(2) When the T2 version is selected, the 485 transmission communication is effective

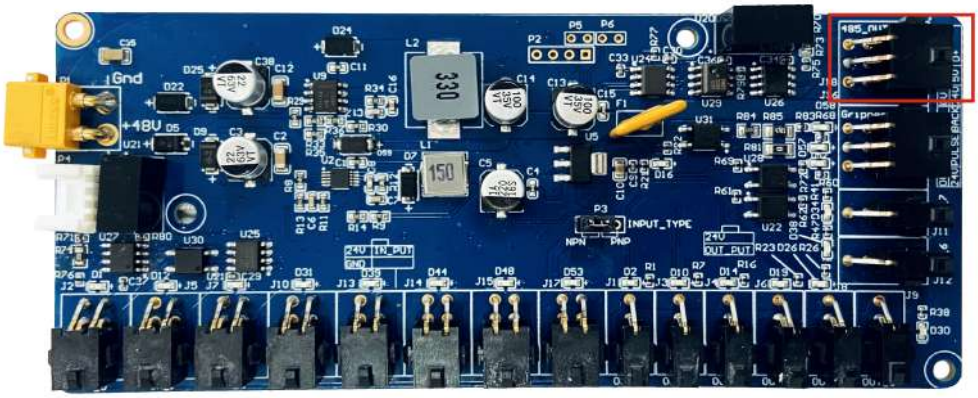


Figure 10

(3) When the T3 version is selected, IN0~IN7 are effective, OUT0~OUT7 are effective

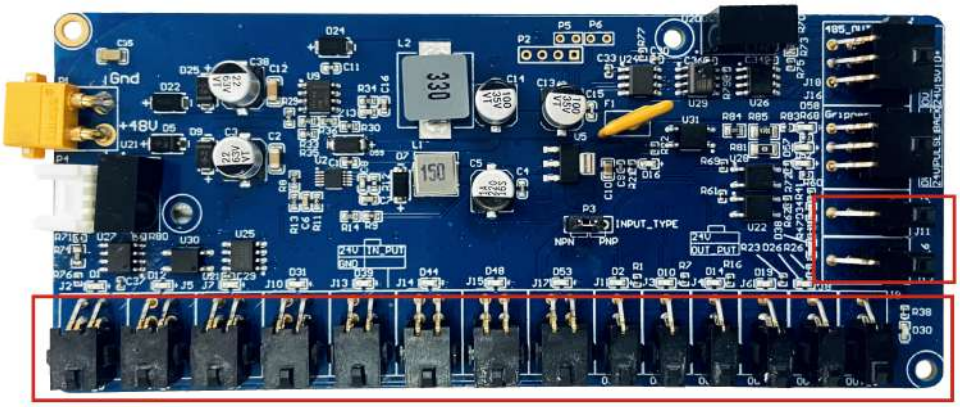
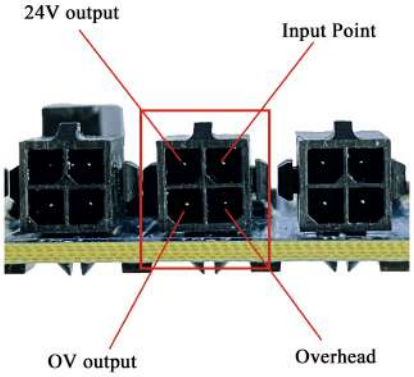


Figure 11

(4) The input port can be used with TE 794617-4
The output port can be used with TE 794615-2
485 transmissions and grippers are available with TE 794617-6
Input ports definition:



（Sensor power supply）

Figure 12

Output ports definition:

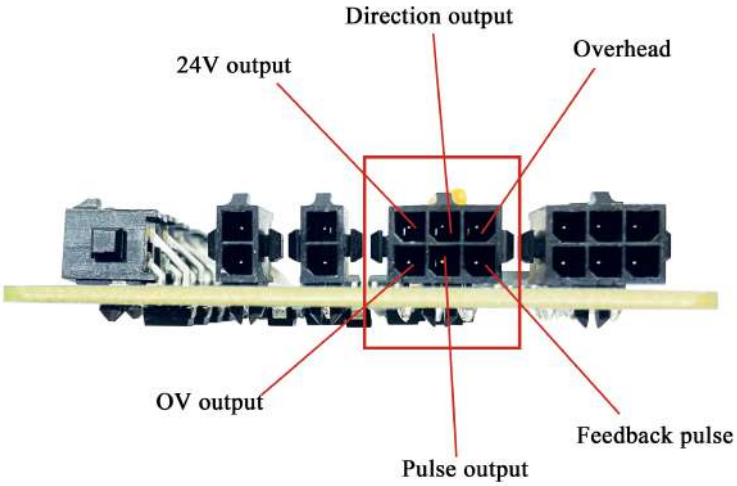


Figure 13

Gripper wiring port definition

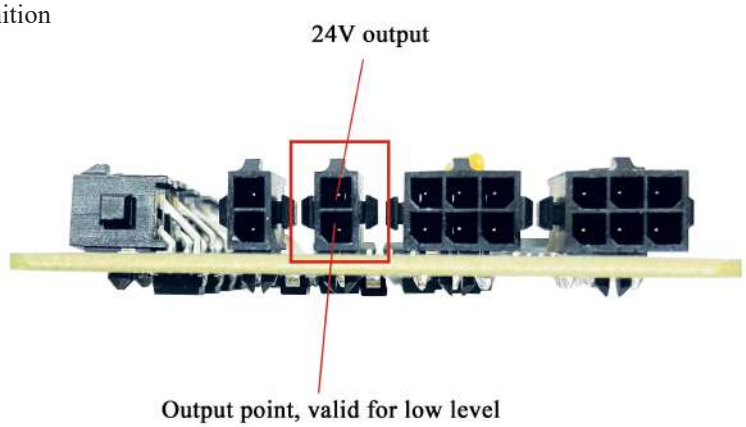


Figure 14

The 485 transmission interface is defined as follows:

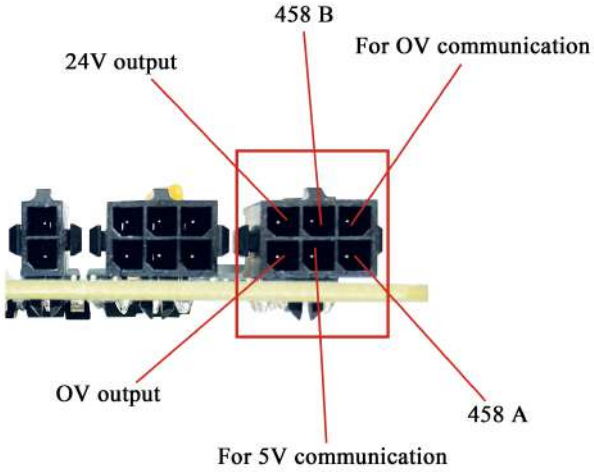


Figure 15

Precautions

1. Payload inertia

The payload center of gravity and the recommended payload range with the Z axis movement inertia are shown in Figure 16.

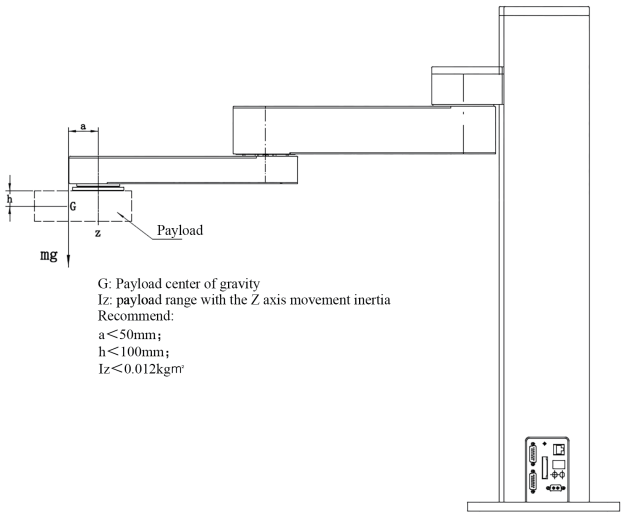


Figure 16 XX60 series payload description

2. Collision force
Trigger force of horizontal joint collision protection: XX60 non-collaborative.

3. Z-axis external force
The external force of the Z axis shall not exceed 120N

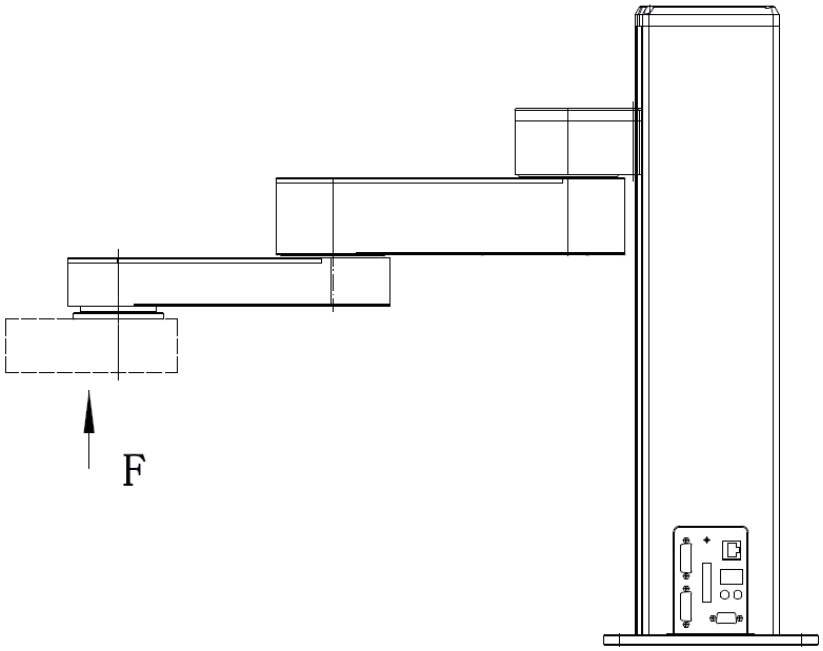
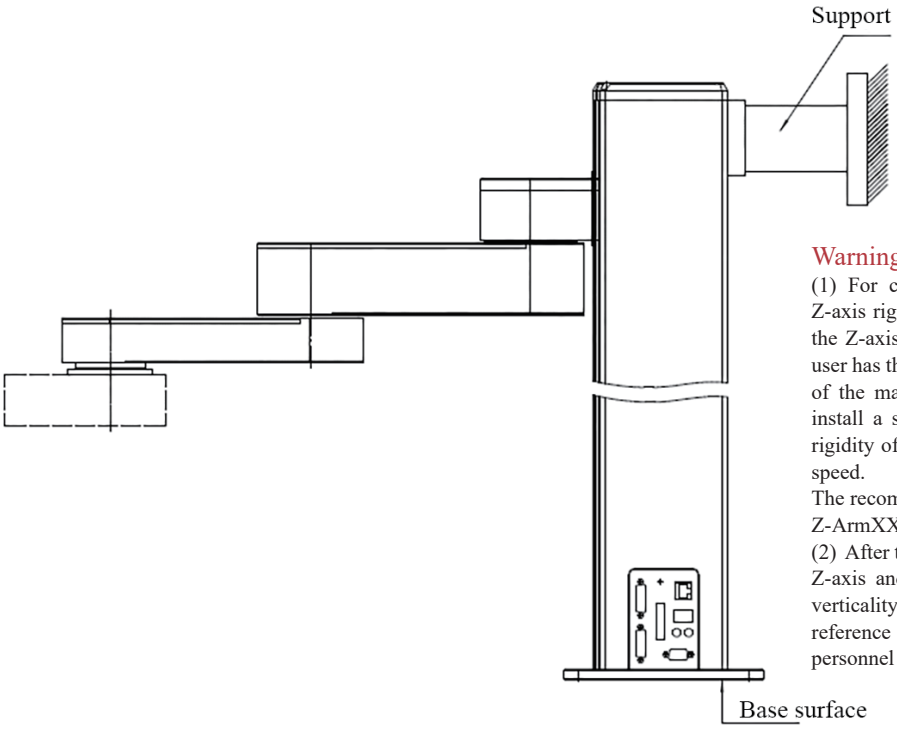


Figure 17

4. Note for installation of customized Z axis, see Figure 18 for details.



Warning note：
(1) For customized Z-axis with a large stroke, The Z-axis rigidity decreases as the stroke increases. When the Z-axis stroke exceeds the recommended value, the user has the rigidity requirement, and the speed is >50% of the maximum speed, it is highly recommended to install a support behind the Z-axis to ensure that the rigidity of the robot arm meets the requirement at high speed.
The recommended values are as follows：
Z-ArmXX60 series Z-axis stroke >700mm
(2) After the Z-axis stroke is increased, the verticality of Z-axis and the base will be greatly reduced. If strict verticality requirements for the Z-axis and the base reference are not applicable, please consult the technical personnel separately.

Figure 18

5.Power cable hot-plugging forbidden. Reverse warning when the positive and negative poles of the power supply are disconnected.

6. Do not press down the horizontal arm when the power is off

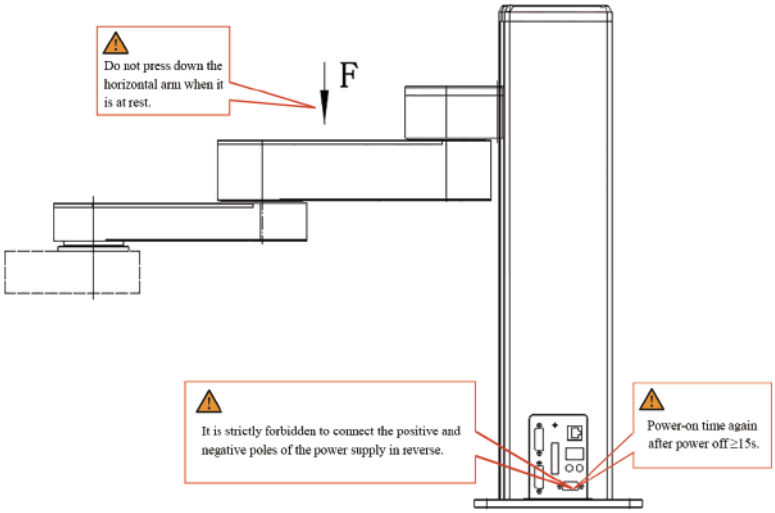


Figure 19

DB15 Connector Recommendation

Recommended model: Gold-plated male head with ABS shell YL-SCD-15M
Gold-plated female with ABS shell YL-SCD-15F
Size Description: 55mm*43mm*16mm
(Refer to Figure 20)

Figure 20

Robot Arm Compatible Grippers Table

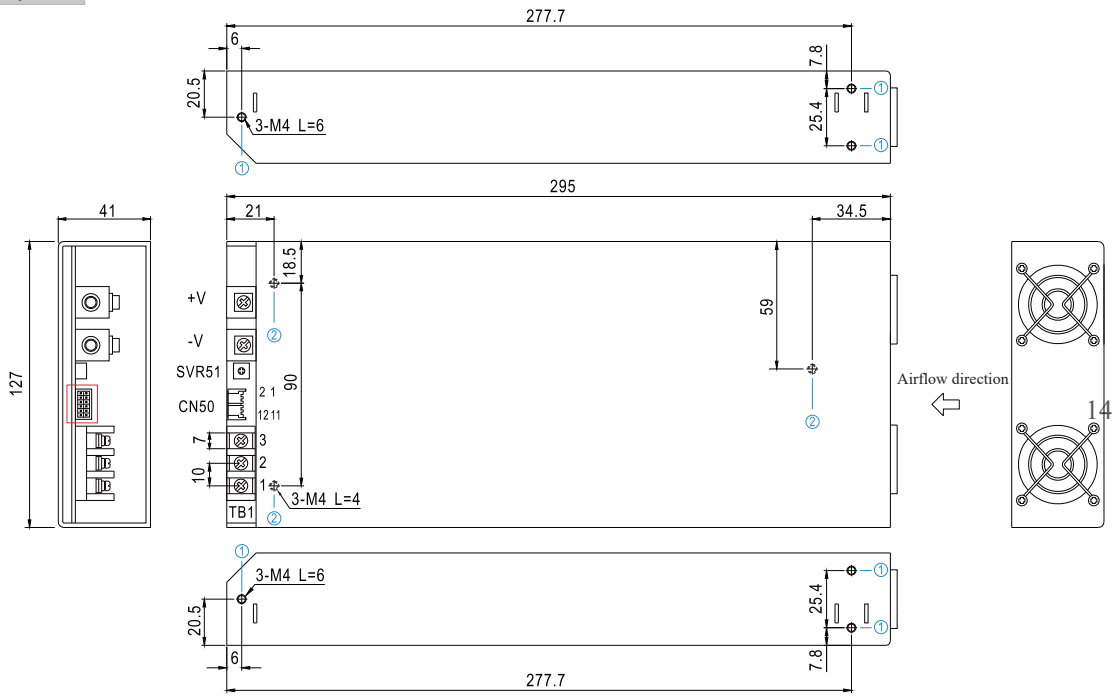
Robot arm Model No.	Compatible grippers
XX60 T1	Z-EFG-8S NK/Z-EFG-12 NK/Z-EFG-20 NM NMA/Z-EFG-20S/ Z-EFG-30NM NMA The 5th axis 3D printing
XX60 T2	Z-EFG-50 ALL/Z-EFG-100 TXA

Power Adapter Installation Size Diagram

XX60 configuration 48V 1000W RSP-1000-SPEC-CN power supply

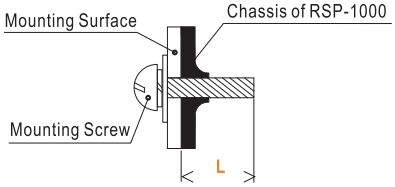
■ Robot arm body size

Machine case number: 952B Unit: mm



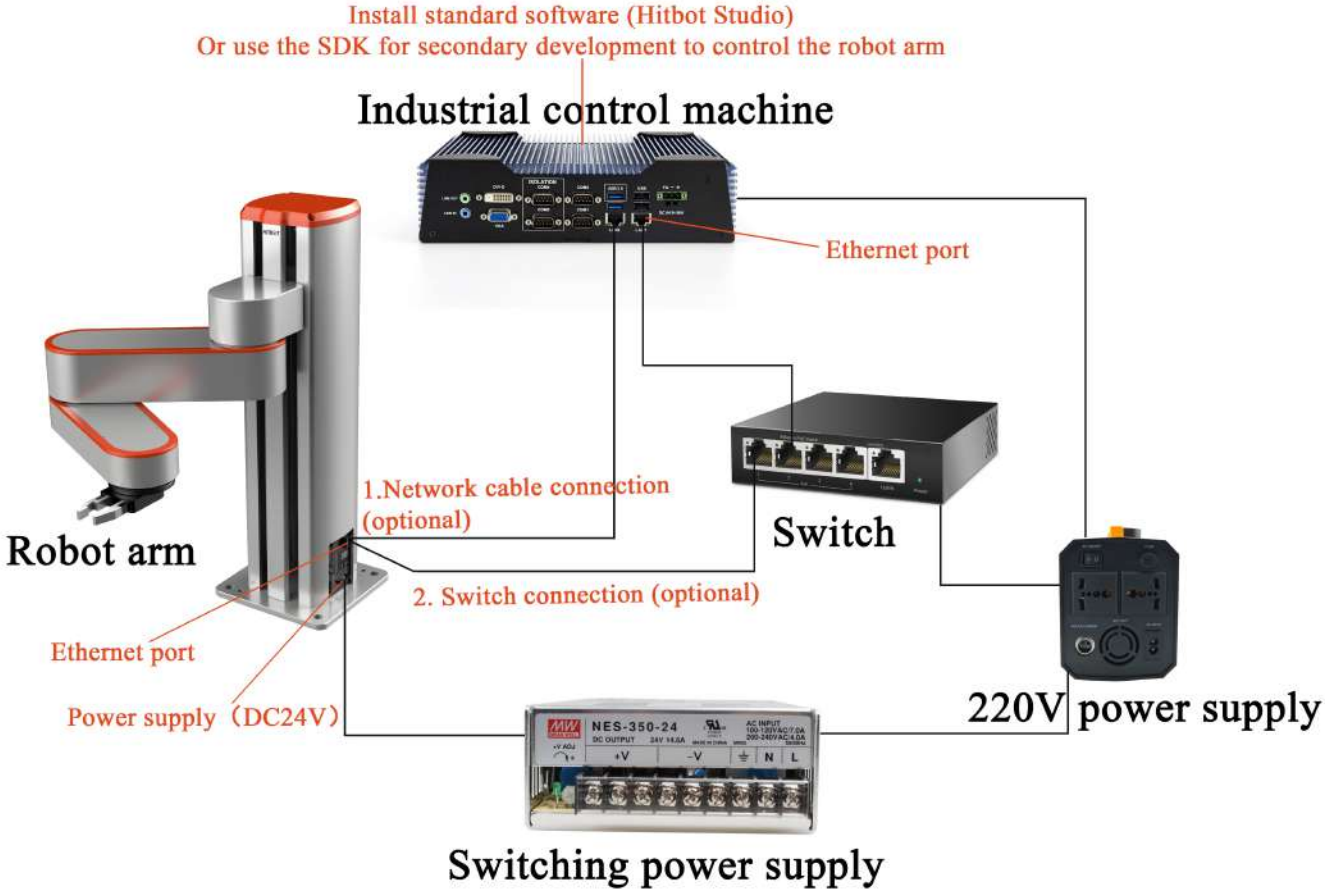
※ Installation guide

Hole number	Recommend screw model No.	Maximum penetration depth L	Recommended installation torque
①	M4	6mm	7~11Kgf-cm
②	M4	4mm	7~11Kgf-cm



※ Control pin definition (CN50): HRS DF11-12DP-2DS or equivalent level

Diagram of the External Use Environment of the Robot Arm



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