Instructions

Rochu Control Unit PCU2 V1.0

Safety Caution

Warning: Please strictly observe the safety precautions, incorrect operation may cause damage to the product and personal injury.

1. Please use the power adapter in the fittings. Do not use other voltage and low power adapter to avoid irreversible circuit damage.

2. Please use 0.45 ~ 1.00MPa **dry clean air source** with flow rate > 200 L/min. If the pressure is overload, the internal components will be damaged, and if the pressure is lack, the grabbing force of the gripper will be insufficient.

3. Do not put too much force to the shell. It may cause damage and lower the protection level.

Packing List

1. Rochu control unit X 1
2. Power adapter (24VDC 1.05A 25W) X 1
3. Communication port cable, DB25 X 1
4. Reducer joints, 10-6mm X 2, 10-8mm X 2
5. Air pipes, 10mm X 2m, 6mm X 2m

Naming

PCU2 - ☐

Functional Characteristics ●

Mark	Content
M	Manual regulator.
V	Electronic regulator. 0 ~ 10V voltage analog.

Parameter

Name	Range	Name	Range
Rated Voltage	24 VDC ±10%	Shell Material	Aluminum alloy
Rated Power	24 W	Size	280 x 165 (+35) x 125 mm
Air Source	0.45~1.00 MPa dry clean flow > 200 L/min	Net Weight	3.85 kg
		Life	5000 million times
Output Pressure	-80~300 kPa	Control Mode	MODBUS TCP/RTU
Protection Level	IP54		I/O, level signal
Working Noise	70 dB		Manual button
Pressure Flow	260 L/min		Remote control (PCU2-M)
Vacuum Flow	80 L/min	Working Mode	Continuous signal drive

Note: the flow data is measured under the conditions of 0.6MPa air source pressure, 100kPA pressure setting and -80kPa vacuum setting.

Installation

Board Installation
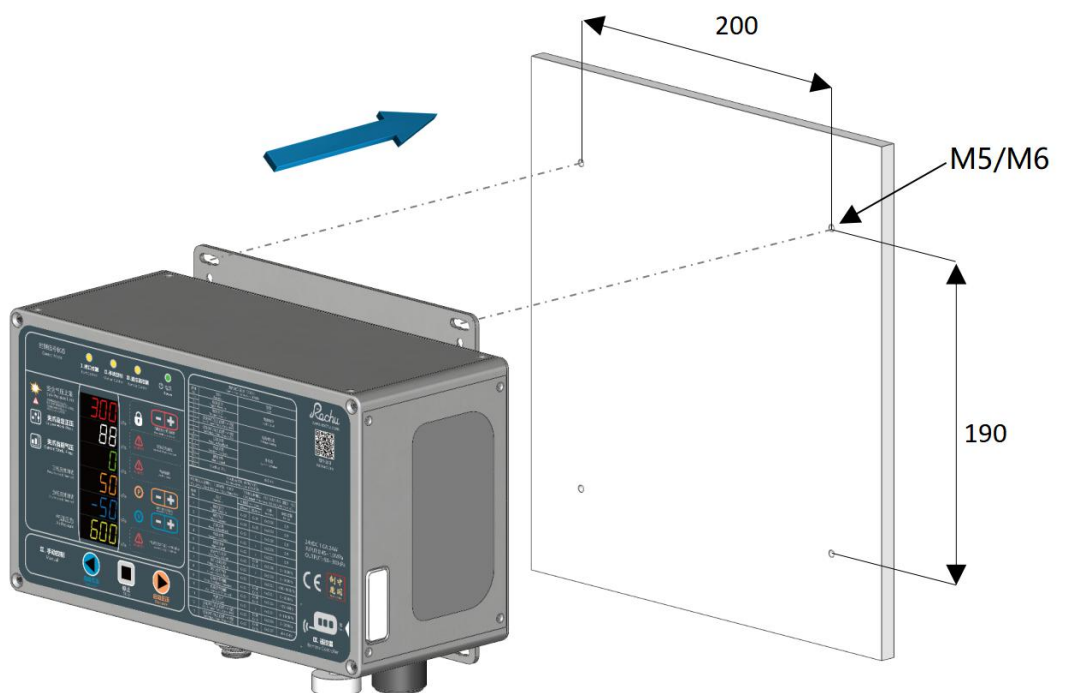
Function

Function description of driver display panel and interface panel.

Display Panel

No.	Legend	Function
1	Power (电源) indicator	Driver power on indicator.
2	I.端口控制 Port Control / II.手动控制 Manual Control / III.遥控器控制 Remote Control	Driver control signal indicator. Priority: I > II > III.
3	安全气压上限 Safe Pressure Limit — 120 kPa	Set the safety pressure of gripper. Setting range: 0 ~ 400kPa. This value is the maximum allowable air pressure under the pressure state of the gripper. The factory default value is 120.
4	Lock icon	Lock screen indicator. Any one of the three groups of adjustment buttons can be unlocked by pressing for 3 seconds at the same time, and it will be locked automatically after 10 seconds without operation.
5	− + (同时按住3秒解锁 Press Both 3s to Unlock)	Safety pressure adjustment button. Adjust the upper limit of safety pressure.
6	夹爪设定正压 Gripper Work. Press. — 88 kPa	The set pressure value of gripper. The pressure value of the gripper under positive pressure.
7	ALARM1 设定正压超压 Set Work. Press. Overload	Alarm1, the set pressure overload alarm lamp. When the set pressure of the gripper exceeds the upper limit of the safety pressure, the lamp is always on.
8	夹爪当前气压 Current Work. Press. — 88 kPa	Current pressure value of the gripper. It monitors the pressure value of the Gripper Port in real time.
9	ALARM2 气路错误 Air Path Error	ALARM2, air path error alarm lamp. When the pressure of the Gripper Port is higher than the Air Supply and exceeds 50kPa, the alarm lamp flashes quickly.
10	正压反馈阈值 Press. Feedback Threshold — H 50 kPa	Pressure feedback threshold. Setting range: - 10 ~ 400kPa. This pressure is the value that triggers the pressure feedback. When the feedback is triggered, H is displayed. The factory default value is 50.

11		**Pressure feedback indicator.** When the current pressure of the gripper is greater than the pressure feedback threshold, the pressure feedback will be triggered, and the lamp will be on constantly.
12		**Pressure feedback threshold adjustment button.** Adjust the threshold value of pressure feedback.
13		**Vacuum feedback threshold.** Setting range: - 99 ~ 10kPa. This pressure is the value that triggers the vacuum feedback. When the feedback is triggered, L is displayed. The factory default value is -50.
14		**Vacuum feedback indicator.** When the current pressure of the gripper is lower than the vacuum feedback threshold, the vacuum feedback will be triggered, and the lamp will be on constantly.
15		**Vacuum feedback threshold adjustment button.** Adjust the threshold value of vacuum feedback.
16		**Air pressure of air source.** It monitors the pressure value of the Air Supply in real time.
17		**Alarm 3, insufficient air pressure alarm lamp.** When the Air Supply pressure is lower than 450kpa, the lamp will flash slowly.
18		Manual button.

Interface Panel

Setup

1. Use the power adapter in the accessory to power up the driver.
2. **Set the safety pressure according to the gripper type (finger / beak) (very important).**

   Unlock (refer to F&Q), adjust , make equal to the safety pressure of the gripper (consult our technical engineer).
3. Zero the Gripper Work. Press., Current Work. press. and Air Pressure digital display meter.

   Check whether the 3 digital display meters are 0. , , . If it is not 0, please zero when

the Gripper port and Air Supply are hanging in the air (refer to F&Q).

4. Connect the Air Supply with the air source and check the Air Pressure.
   If the pipe diameter is inconsistent, the reducing joint in the fittings can be used.

   Check the ALARM2 and the ALARM3 trigger the alarm. If there is an alarm, remove the fault according to F&Q.

5. **Set the gripper working pressure.**

   PCU2-M, by adjusting the Set Work. Press hand valve , PCU2-V (HVN), by regulating voltage analog, to set the gripper working pressure.

   Check the ALARM1 trigger the alarm, remove the fault according to F&Q.

6. Connect the Gripper Port with the gripper. In order to ensure the response speed, the length of the air pipe between the driver and the gripper should be as short as possible (1.5 ~ 3M is preferred), and the pipe diameter should be as thick as possible (a 10 mm air pipe can be selected, and a variable diameter joint can be used to convert to a 6 mm or 4 mm pipe diameter when close to the gripper).

7. Operate the panel button, **set the gripper working vacuum**, and check the status of the gripper and the driver.

   PCU2-M, by adjusting the Set Work. Vac. hand valve , PCU2-V (HVN), by regulating voltage analog, to set the gripper working vacuum.

8. Communication port connect to the PLC and mechanical arm output port.

Signal Communication

There are two communication modes, as I/O and MODBUS.
MODBUS control priority is higher than I/O, and it can be divided into TCP and RTU.

No.	Function	Type
1+	Trigger Pressure	Level 5~24V
2-	Trigger Pressure	Level 5~24V
3+	Trigger Vacuum	Level 5~24V
4-	Trigger Vacuum	Level 5~24V
5+	Set Gripper Press. (only PCU2-V)	Voltage Analog 0~10V
6-	Set Gripper Press. (only PCU2-V)	Voltage Analog 0~10V
7+	Set Gripper Vac. (only PCU2-V)	Voltage Analog 0~10V
8-	Set Gripper Vac. (only PCU2-V)	Voltage Analog 0~10V
9+	Pressure Feedback	Switching Value
10-	Pressure Feedback	Switching Value
11+	Vacuum Feedback	Switching Value
12-	Vacuum Feedback	Switching Value
13+	Alarm Signal	Switching Value
14-	Alarm Signal	Switching Value
15+	MODBUS RTU	485 AB
16-	MODBUS RTU	485 AB

Wiring case A: AUBO cooperative robot I5 series, the device's output and input signal are NPN.
To control the driver, please connect lines 1 and 3 to the 24V common port, and lines 2 and 4 to the DO output port.
To receive the feedback signal of the driver, please connect lines 9 and 11 to the DI input port, and lines 10 and 12 to the 0V common port.
To receive the driver alarm signal, connect line 13 to DI input port and line 14 to 0V common port.

Wiring case B: Siemens PLC 200SMART series, the equipment's output is PNP, input is also set to PNP.
To control the driver, please connect lines 2 and 4 to the 0V common port, and lines 1 and 3 to the output port Q.
To receive the feedback signal of the driver, please connect lines 10 and 12 to the input port I, and lines 9 and 11 to the 24V common port.
To receive drive alarm signal, please connect line 14 to the input port I and line 13 to the 24V common port.

PCU2-V (HVN) set the pressure and vacuum wiring method:
Verify that the control device is equipped with an analog voltage output port. Lines 5 and 7 are connected to the AO output port, and lines 6 and 8 are connected to the 0V common port.
Setting the pressure, and the analog signal of 0~10V corresponds to the pressure regulating range of 0~0.5MPa.

Then, $\dfrac{0.5-0}{10} = 0.05MPa/V$

That is, 1V voltage signal corresponds to 0.05MPa = 50kPa
For example, the pressure needs to be set to 80kPa, and the voltage analog quantity is 1.6V. It needs to be set to 220kPa and the voltage analog is 4.4V.
Setting the vacuum, and the analog quantity of 0~10V signal corresponds to the vacuum regulating range of -80~0kPa.

Then, $\dfrac{80-0}{10} = 8kPa/V$

That is, 1V voltage signal corresponds to 8kPa
For example, the vacuum needs to be set to -40KPa, and the voltage analog quantity is 5V. It needs to be set to -80kPa and the voltage analog is 10V.

		Function Code			
No.	Function	Read	Write	Address	Range
1	Trigger Pressure	0x01	0x05	0x100	0/1
2	Trigger Vacuum	0x01	0x05	0x101	0/1
3	Pressure Feedback	0x02	/	0x200	0/1
4	Vacuum Feedback	0x02	/	0x201	0/1
5	Alarm Signal	0x02	/	0x202	0/1
6	Safe Pressure Limit	0x03	0x06 0x10	0x300	0~500kPa
7	Gripper Work. Press.	0x03	/	0x301	0~500kPa
8	Current Work. Press.	0x03	/	0x302	-100~500kPa
9	Pressure Feedback Threshold	0x03	0x06 0x10	0x303	0~500kPa
10	Vacuum Feedback Threshold	0x03	0x06 0x10	0x304	-100~0kPa
11	Air Pressure	0x03	/	0x305	0~1000kPa
12	Set Gripper Press. (only PCU2-V)	0x03	0x06 0x10	0x306	0~500kPa
13	Set Gripper Vac. (only PCU2-V)	0x03	0x06 0x10	0x307	-80~0kPa

MODBUS Instruction (TCP/RTU)

RTU default slave address: 1   Baud Rate: 9600
TCP default IP address: 192.168.1.200   Port: 502

F&Q

1. **Alarm lamp ALARM1 is always on.**

   The Gripper Work. Press. exceeds the Safety Pressure Limit. For example, as shown in the image below, ALARM1 is always on.
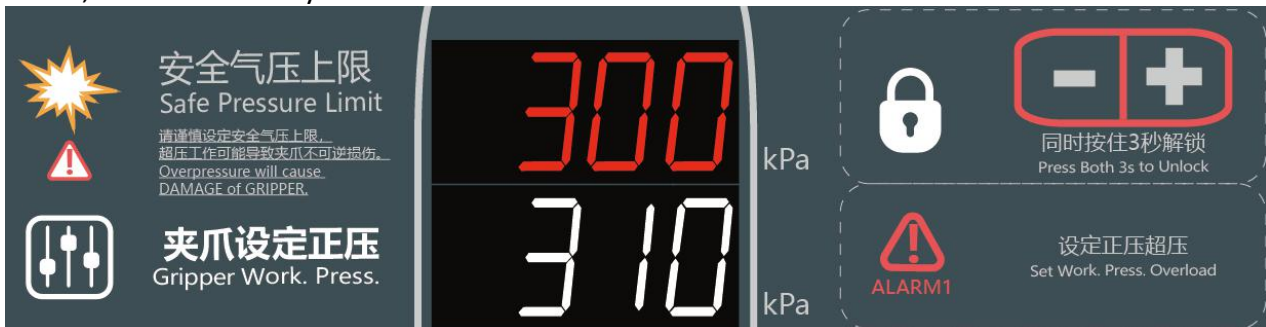

   To remove the alarm, lower the Gripper Work. Press. By adjusting the Set Work. Press hand valve for PCU2-M, and by reducing the voltage analog for PCU2-V (HVN), until the value is less than the Safety Pressure Limit.

   In this state, the drive stops working and can resume normal work after removing the fault.

2. **Alarm lamp ALARM2 rapid flash.**

   The pressure of the Gripper Port is too large, the Current Work. Press. exceeds the Air Pressure. For example, as shown in the following figure, ALARM2 rapid flash, while ALARM3 slow flash.
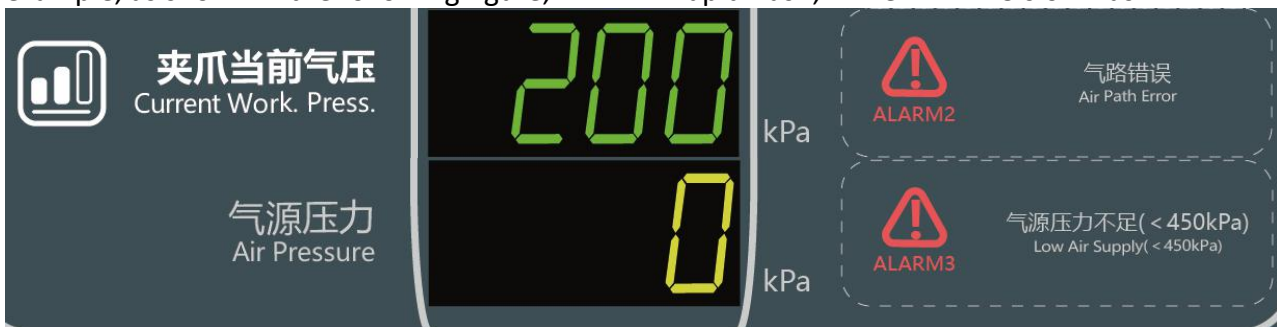
   Please check the air path of the Gripper Port, whether it is inversely connected with the Air Supply port.

3. **Alarm lamp ALARM3 slow flash.**

   The pressure of the Air Supply port is lower than 0.45MPa. For example, the ALARM3 slow flash is shown below.

   This state may result in insufficient output vacuum of the drive (less than -50kPa). Finger series showed insufficient opening and beak series showed small gripping force.
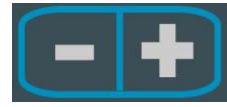
   To remove the alarm, please check the state of air source or increase the pressure of air source. The recommended pressure of air source is 0.6Mpa =600kPa.

   In this state, the drive will not automatically stop working, please remove the fault in time.

   In addition, this alarm will not be triggered when the drive is in vacuum. Because the driver consumes a lot of compressed air through the vacuum generator to produce vacuum, which may lead to insufficient pressure of the Air Supply port in a short time. ALARM3 is shielded under vacuum to prevent false alarms.

4. **Unlock the panel adjustment button.**

Press any one of three groups of buttons , , for 3 seconds until the lock screen lamp goes off.

If the adjusting button is not operated for 10 seconds, the drive will automatically enter the state of lock screen.

5. **Monitor digital display table to adjust zero.**

With the panel unlocked, long press 5 seconds until ,

, .

6. **Priority of various control modes**

Port Control (MODBUS and I/O) > Manual Control (panel button) > Remote Control