



安装使用说明书

柔触驱动器 PCU2 系列 V1.1



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安全注意事项



警告：请严格遵守安全注意事项，错误操作可能导致本产品损坏和人身伤害。

1. 请使用配件中的电源适配器。不可用其他电压及低功率电源适配器，以免造成不可逆电路损伤。
2. 请使用 **0.45MPa~1.00MPa 干燥清洁**且流量 > 200L/min 压缩空气气源。压力过大气源会造成内部元件不可逆损伤，压力过小气源会造成夹爪夹持力不足或张开角度不足。
3. 请勿对外壳施加过大外力造成破损，以免降低防护等级。

装箱清单

1. 柔触驱动器本体 X 1
2. 电源适配器 (24VDC 2.5A 60W) X 1
3. 适配器电源线 X 1
4. 通讯端口线缆，DB25 X 1
5. 变径接头，10-6mm X 2，10-8mm X 2
6. 气管，10mm X 2m，6mm X 2m

选型规则

PCU2 - ☐
功能特性 ●

记号	内容
M	手动调压。
V	电子调压。0~10V 电压模拟量。

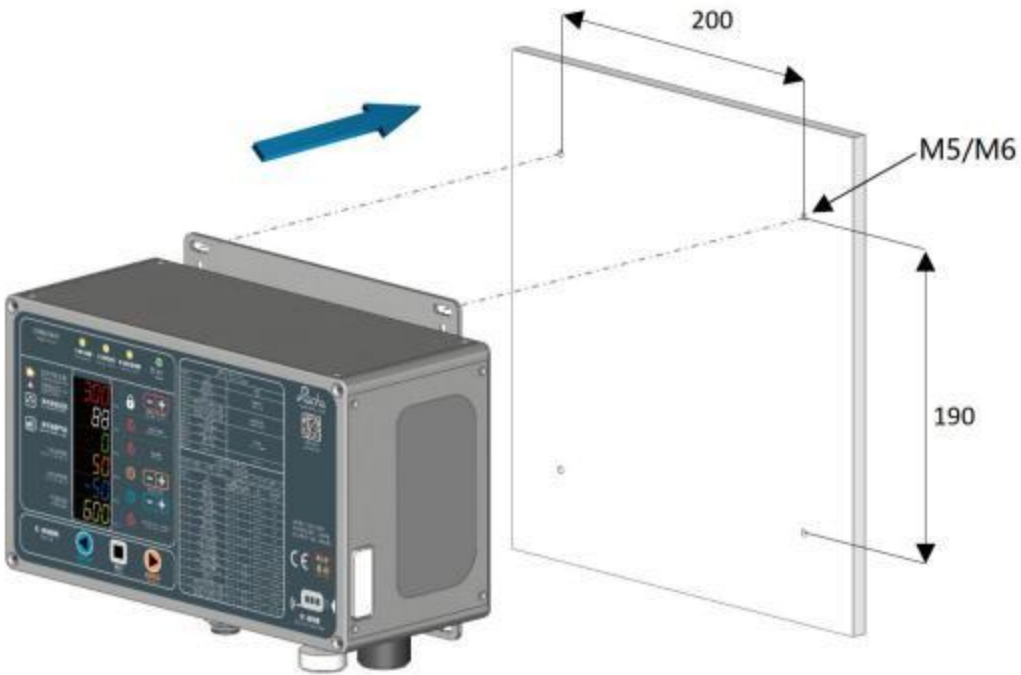
参数

名称	范围	名称	范围
额定电压	24 VDC±10%	外壳材质	铝合金阳极氧化
额定功率	24 W	尺寸	280 x 165(+35) x 125 mm
输入气源	0.45~1.00 MPa 干燥清洁 流量 > 200 L/min	净重	3.85 kg
输出气压	-80~300 kPa 精度±1kpa	寿命	5000 万次
防护等级	IP54	控制方式	MODBUS TCP/RTU
工作噪音	73 dB		I/O, 电平信号
正压流量	260 L/min		手动按钮
负压流量	80 L/min		遥控器 (PCU2-M)
		工作模式	持续信号驱动

注：流量参数是在 0.6MPa 气源压力，正压设定 100kPa，负压设定-80kPa 条件下的数据。

固定方式

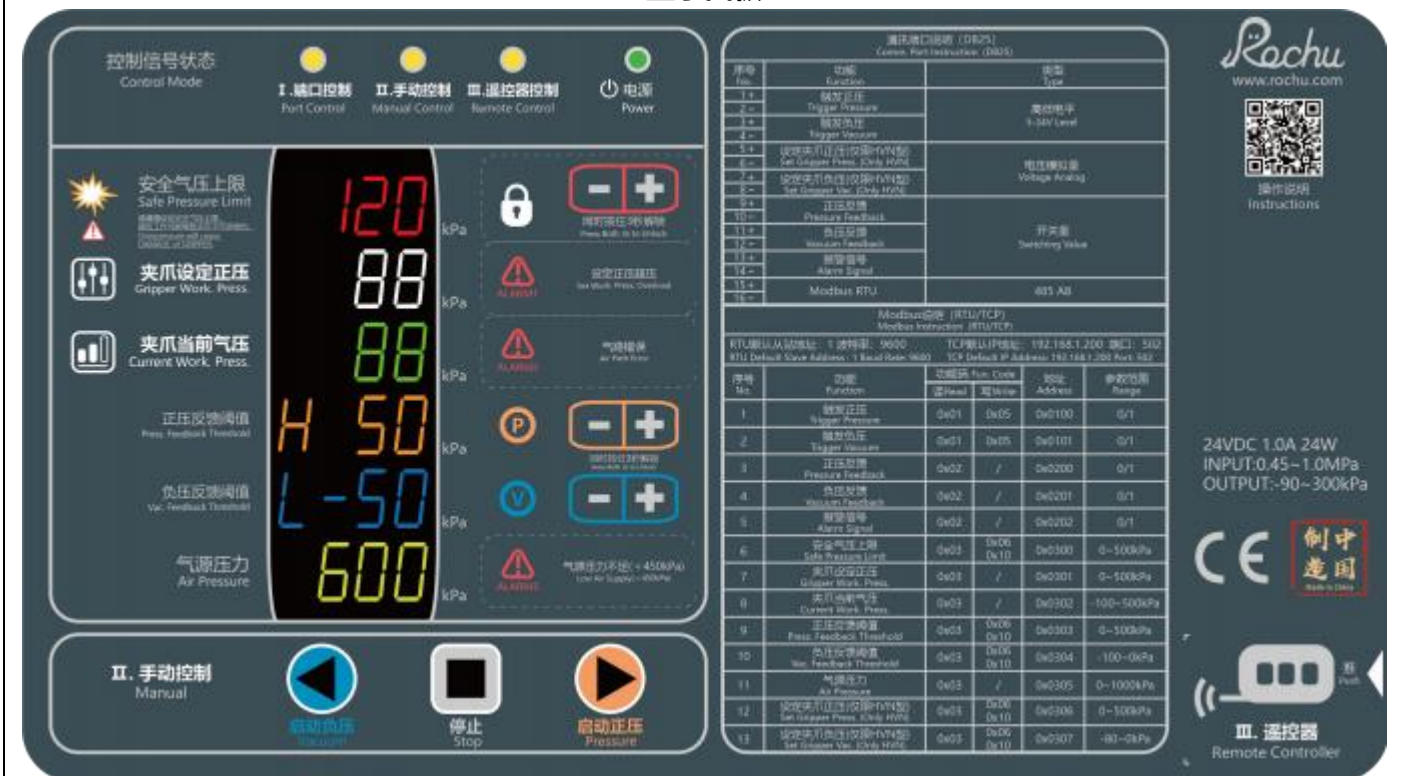
平面安装



功能

驱动器显示面板和接口面板功能说明。

显示面板



序号

图例

功能说明

1



驱动器上电指示灯。

2



驱动器控制信号指示灯。优先级：I > II > III。

3



设定的夹爪安全气压值。设定范围：0~400kPa。该值为夹爪正压状态下允许到达的气压最大值。出厂默认值为 120。

4



锁屏指示灯。三组调节按钮任意一组同时长按 3 秒可解锁，无操作 10 秒后自动上锁。

5



安全气压上限数值调节按钮。调节安全气压上限值大小。

6



夹爪设定正压气压值。夹爪正压状态下的气压值。

7



ALARM1 设定正压超压报警灯。夹爪设定正压超过安全气压上限，该灯常亮。

8



夹爪当前气压值。实时监测夹爪端口气压值。

9



ALARM2 气路错误报警灯。夹爪端口气压值高于气源端口气压值且超过 50kPa，该灯快闪。

10



正压反馈阈值。设定范围：-10~400kPa。该值为触发正压反馈的压力值。正压反馈触发后，H 显示。出厂默认值为 50。

11		正压反馈指示灯。夹爪当前气压大于正压反馈阈值后，触发正压反馈，该灯常亮，即正压姿态到位。
12		正压反馈阈值调节按钮。调节正压反馈阈值大小。
13		负压反馈阈值。设定范围：-99~10kPa。该值为触发负压反馈的压力值。负压反馈触发后，L显示。出厂默认值为-50。
14		负压反馈指示灯。夹爪当前气压小于正压反馈阈值后，触发负压反馈，该灯常亮，即负压姿态到位。
15		负压反馈阈值调节按钮。调节正负压反馈阈值大小。
16		气源压力气压值。实时监测气源端口气压值。
17		ALARM3 气源压力不足报警灯。气源压力低于 450kPa，该灯慢闪。
18		手动按钮。

接口面板



安装步骤

1. 使用配件中的电源适配器，给驱动器上电。
2. 根据夹爪型号(手指/柔喙)设置安全气压上限（非常重要）。

解锁（参考 F&Q），调节 ，使  等于夹爪型号的安全气压上限值（可咨询我司技术工程师）。

3. 设定正压、当前气压以及气源压力数显表校零。

检查三个数显表头





是否为 0。若不为 0，请在夹爪端口、气源端口悬空状态下进行校零（参考 F&Q）。

4. 气源端口连接气源，检查气源压力。

若管径不一致，可使用配件中的变径接头。



检查 ALARM2



和 ALARM3

是否触发报警。若有

报警，根据 F&Q 排除故障。

5. 设定夹爪正压。



PCU2-M 通过调节夹爪正压手拧阀模拟量，来设定夹爪正压。

，PCU2-V 型号（HVN）通过调节电压



检查 ALARM1

是否触发报警。若有报警，根据 F&Q 排除故障。

6. 夹爪端口连接夹爪，为确保响应速度，驱动器与夹爪间的气管长度应尽量短（1.5~3m 为佳），管径应尽量粗(可选用 10mm 气管，靠近夹爪时使用变径接头转换为 6mm 或 4mm 管径）。

7. 操作面板按钮，设定夹爪负压，检查夹爪、驱动器工作情况。

PCU2-M 通过调节夹爪负压手拧阀



，PCU2-V 型号（HVN）通过调节电压

模拟量，来设定夹爪负压。



8. 通讯端口

与 PLC、机械臂输出端口连接。

通讯

PCU2 的通讯有 2 种方式，分别为 I/O 和 MODBUS。

其中 MODBUS 控制优先级高于 I/O，且分为 TCP 和 RTU 两种类型。

通讯端口说明（DB25）		
序号	功能	类型
1+	触发正压	高低电平 5~24V
2-		
3+	触发负压	
4-		
5+	设定夹爪正压（仅限 PCU2-V 型号）	电压模拟量 0~10V
6-		
7+	设定夹爪负压（仅限 PCU2-V 型号）	
8-		
9+	正压反馈	开关量
10-		
11+	负压反馈	
12-		
13+	报警信号	
14-		
15+	MODBUS RTU	485 AB
16-		

接线案例 A: AUBO 协作机器人 i5 系列，该设备为 NPN 输出、输入。

控制驱动器，请将 1、3 号线接 24V 公共端，2、4 号线接 DO 输出端。

接收驱动器反馈信号，请将 9、11 号线接 DI 输入端，10、12 号线接 0V 公共端。

接收驱动器报警信号，请将 13 号线接 DI 输入端，14 号线接 0V 公共端。

接线案例 B: 西门子 PLC 200SMART 系列，该设备为 PNP 输出，输入也设置成 PNP。

控制驱动器，请将 2、4 号线接 0V 公共端，1、3 号线接输出端 Q。

接收驱动器反馈信号，请将 10、12 号线接输入端 I，9、11 号线接 24V 公共端。

接收驱动器报警信号，请接 14 号线接输入端 I，13 号线接 24V 公共端。

PCU2-V 型号 (HVN) 设定夹爪正、负压接线：

确认控制设备带有模拟量电压输出端，5、7 号线接 AO 输出端，6、8 号线接 0V 公共端。

设定正压，模拟量 0~10V 信号对应调压范围量程 0~0.5MPa。

设定负压，模拟量 0~10V 信号对应调压范围量程 -80~0kPa。

通过 MODBUS 中的设定夹爪正压以及设定夹爪负压去设置实时气压值，并通过置位触发正压*或者触发负压*，使其生效。

MODBUS 说明 (TCP/RTU)					
RTU 默认从站地址: 1 波特率: 9600					
TCP 默认 IP 地址: 192.168.1.200 端口: 502					
序号	功能	功能码		地址	参数范围
		读	写		
1	触发正压	0x01	0x05	0x100	0/1
2	触发负压	0x01	0x05	0x101	0/1
3	正压反馈	0x02	/	0x200	0/1
4	负压反馈	0x02	/	0x201	0/1
5	报警信号	0x02	/	0x202	0/1
6	安全气压上限	0x03	0x06 0x10	0x300	0~500kPa
7	夹爪设定正压	0x03	/	0x301	0~500kPa
8	夹爪当前气压	0x03	/	0x302	-100~500kPa
9	正压反馈阈值	0x03	0x06 0x10	0x303	0~500kPa
10	负压反馈阈值	0x03	0x06 0x10	0x304	-100~0kPa
11	气源压力	0x03	/	0x305	0~1000kPa
12	设定夹爪正压 (仅限 PCU2-V 型号)	0x03	0x06 0x10	0x306	0~500kPa
13	设定夹爪负压 (仅限 PCU2-V 型号)	0x03	0x06 0x10	0x307	-80~0kPa

1. 报警灯 ALARM1 常亮。

夹爪设定正压超过了当前安全气压上限。例如下图所示，ALARM1 常亮报警。



要解除该报警，PCU2-M 通过调节夹爪正压手拧阀逆时针旋转，PCU2-V (HVN) 通过降低电压模拟量，来调低夹爪设定正压，直至小于安全气压上限数值。

该状态下，驱动器停止工作，解除故障后可恢复正常工作。

2. 报警灯 ALARM2 快闪。

夹爪端口气压值过大，夹爪当前气压超过了气源压力。例如下图所示，ALARM2 快闪报警，同时 ALARM3 慢闪报警。



请检查夹爪端口气路，是否与气源端口接反。

3. 报警灯 ALARM3 慢闪。

气源端口气压值低于 0.45MPa 或流量不足。例如下图所示，ALARM3 慢闪报警。



此状态有可能导致驱动器输出负压不足（不足-50kPa）。手指系列表现为张开不够，柔喙系列表现为夹持力小。

要解除该报警，请检查气源状态或增大气源压力，推荐气源压力 0.6MPa=600kPa。

该状态下，驱动器不会自动停止工作，请及时排查解除故障。

另外，驱动器负压状态下，不会触发该报警，是因为驱动器通过真空发生器大量消耗压缩空气来产生负压，可能会导致气源端口压力值短时间压力不足从而产生误报警。

4. 解锁面板调节按钮。

三组调节按钮  任意一组同时长按 3 秒，直至锁屏灯  熄灭。

调节按钮 10 秒无操作，自动进入锁屏状态。

5. 监测数显表校零。

面板解锁状态下，长按 5 秒  直至 、
、
。

6. 多种控制方式的优先级。

端口控制（MODBUS 和 I/O）> 手动控制（面板按钮）> 遥控器控制





Instructions

Rochu Control Unit PCU2 V1.1



CATALOG

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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.

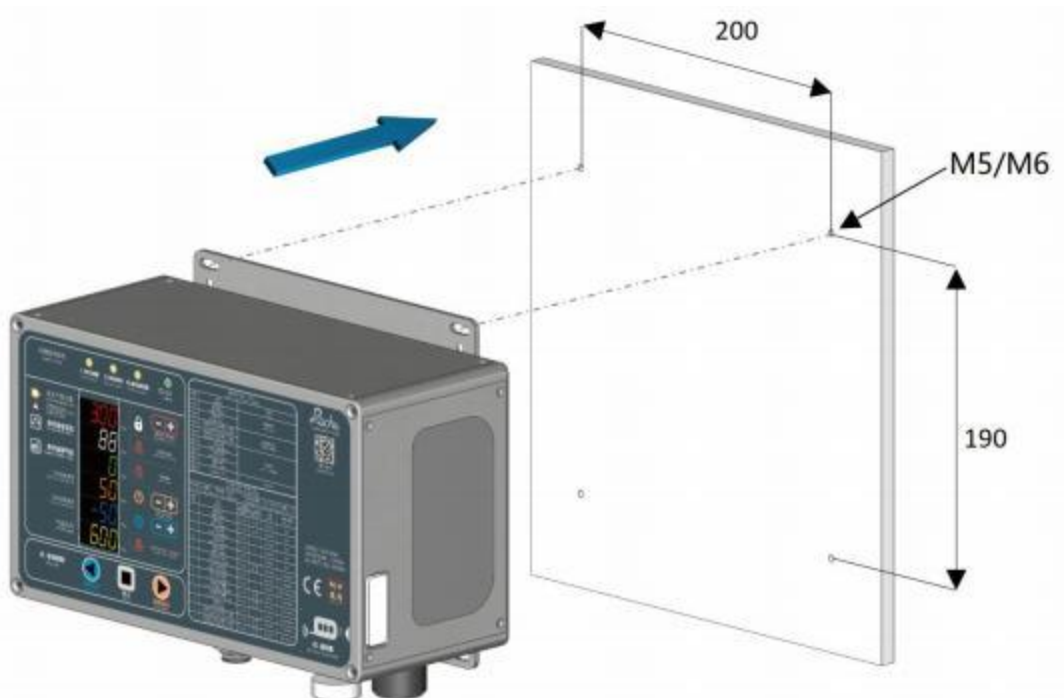
Parameter

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 Accuracy ± 1kPa	Control Mode	MODBUS TCP/RTU
Protection Level	IP54		I/O, level signal
Working Noise	73 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.

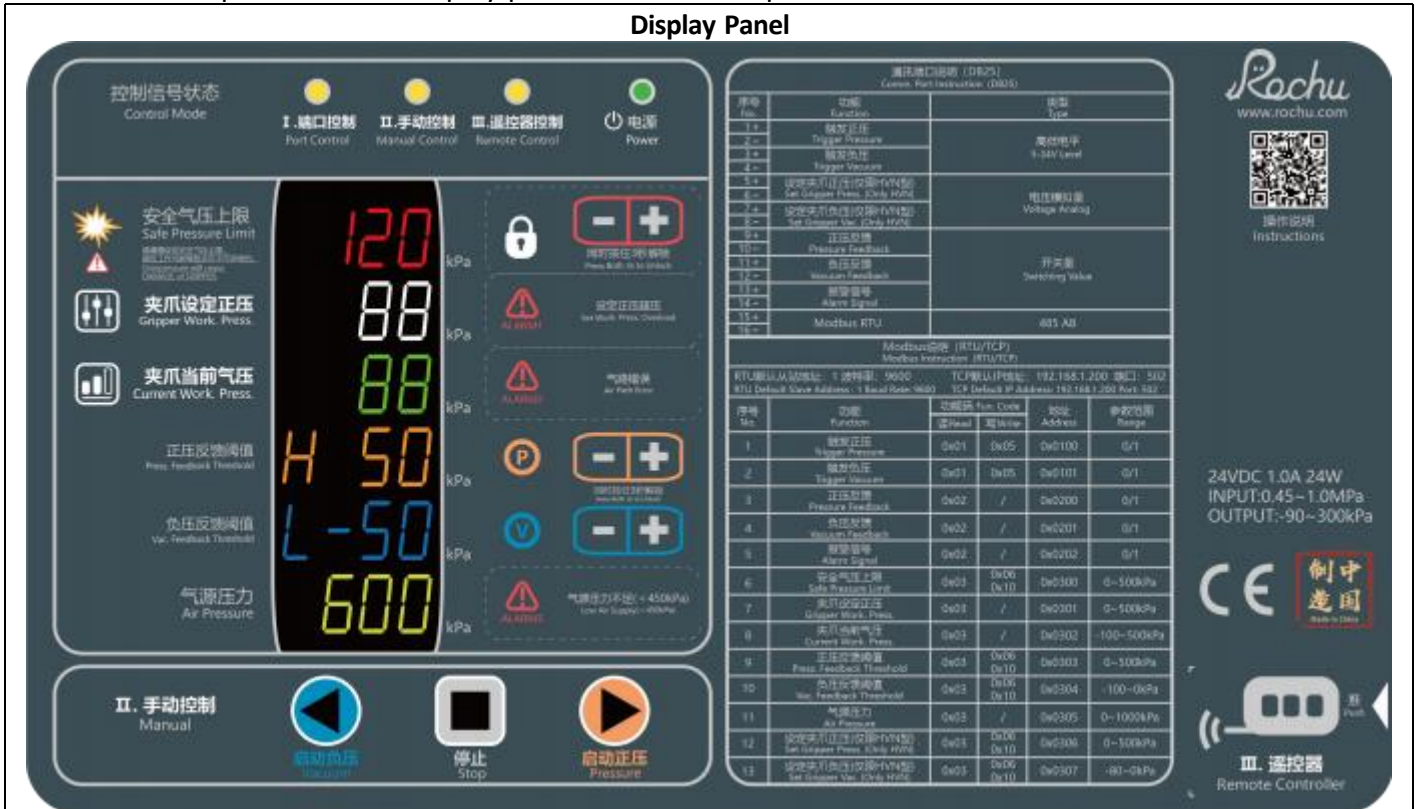
Installation

Board
Installation



Function

Function description of driver display panel and interface panel.



No.	Legend	Function
1		Driver power on indicator.
2		Driver control signal indicator. Priority: I > II > III.
3		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 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		Safety pressure adjustment button. Adjust the upper limit of safety pressure.
6		The set pressure value of gripper. The pressure value of the gripper under positive pressure.
7		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		Current pressure value of the gripper. It monitors the pressure value of the Gripper Port in real time.
9		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		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 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 **0**, 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.

MODBUS control priority is higher than 1/0, and it can be divided into 101 and 102.

Communication Port Instruction (DB25)		
No.	Function	Type
1+	Trigger Pressure	Level 5~24V
2-		
3+	Trigger Vacuum	
4-		
5+	Set Gripper Press. (only PCU2-V)	Voltage Analog 0~10V
6-		
7+	Set Gripper Vac. (only PCU2-V)	
8-		
9+	Pressure Feedback	Switching Value
10-		
11+	Vacuum Feedback	
12-		
13+	Alarm Signal	
14-		
15+	MODBUS RTU	485 AB
16-		

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.

Setting the vacuum, and the analog quantity of 0~10V signal corresponds to the vacuum regulating range of -80~0kPa.

Set the real-time air pressure value by setting the clamp positive pressure and clamp negative pressure in MODBUS, and trigger positive pressure * or negative pressure * through setting to make it effective.

MODBUS Instruction (TCP/RTU)					
RTU default slave address: 1 Baud Rate: 9600					
TCP default IP address: 192.168.1.200 Port: 502					
No.	Function	Function Code		Address	Range
		Read	Write		
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

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  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

