Air Compressor Controller

AP80480T070WTR01

User Manual

(V1.0)

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SAFETY PRECATIONS

This user manual contains content related to safety, which is marked with the following symbols. The explanations of the safety symbols are all main content and must be strictly followed.

Please read the user manual carefully before use.

The installation of the air compressor controller AP48270T043WTR01 must be carried out by professional technicians.

Choose an appropriate installation location to ensure heat dissipation of the controller and to minimize electromagnetic interference.

Please wire according to the rules of separating high voltage and low voltage to reduce electromagnetic interference.

Relays controlling the AC contactors and solenoid valves need to be connected with surge absorbers to reduce electromagnetic interference.

Before powering on, please check the input and output wiring to avoid incorrect wiring that could damage the controller.

Please ensure the grounding terminal is reliably grounded to enhance the controller's ability to resist interference.

Table of Contents

1 Product Introduction

1.1 Appearance

1.2 Features

- Equipped with a 7-inch LCD touch screen and buttons for easy operation.
- Utilizes RS485 communication to control the VFD, supporting the MODBUS RTU protocol, with the ability to preset up to 10 VFD communication protocols, offering more flexible selection and more precise control.
- Real-time measurement of electricity consumption and cumulative electricity usage.
- Features scheduled start and pressure functions.
- Equipped with various motor protection functions: overvoltage, undervoltage, input phase loss, input imbalance, and output overload, etc.
- Optional built-in 4G communication module for real-time data exchange with the cloud, enabling remote monitoring.

1.3 Technical Specifications

[1] Operating Environment: -20℃～+60℃; Relative Humidity: ≤98%.

[2] Digital Input: 4-channel digital input.

[3] Digital Output: 3-channel relay digital output.

[4] Analog Input:

- 1-channel PT100 temperature input.
- 1-channel 4~20 mA pressure input.
- One set of three phase input with a single current transformer

[5] Phase Input Voltage: Three phase 380V/220V.

[6] Operating Voltage: AC16 - 28V/DC22 - 40V.

[7] Display Range:

- Exhaust Temperature: -50～250℃; Precision: ±1℃.
- Operating Time: 0～999999 hours.
- Current: 0～999.9A.
- Pressure: 0～1.60MPa, up to 0～10.00MPa; Precision: 0.01Mpa.

[8] Protection

- Phase Sequence Protection: When the air compressor is in a shutdown state, if a reverse phase sequence is detected, the action time is ≤1 second.
- Phase Loss Protection: When the air compressor is in a shutdown state, if a phase loss is detected in any input phase, the action time is ≤2 seconds.
- Temperature Protection: If the detected actual temperature is higher than the set temperature, the action time is ≤2 seconds.
- Fan Unbalance Protection: When the difference between the maximum current value and the minimum current value is greater than or equal to the set value multiplied by the minimum current value divided by 10, the action time is ≤2 seconds.
- Fan Overload Protection: When the motor operating current is greater than or equal to 1.2 times to 3.0 times the set current, follow the overload multiple and delay action time specified in Table 1.3-1.

Table 1.3-1 The overload multiple and delay action time

Overload Multiple	≥1.2	≥1.3	≥1.5	≥1.6	≥2.0	≥3.0
Action Time (S)	60	48	24	8	5	1

[9] Output Relay Contact Rating: 250V, 5A; Life: 500000 operations.

[10] Communication Interface:

- One channel for interlock control or communication with a computer.
- One channel for communication with the VFD, to control its operation and read its operating parameters.

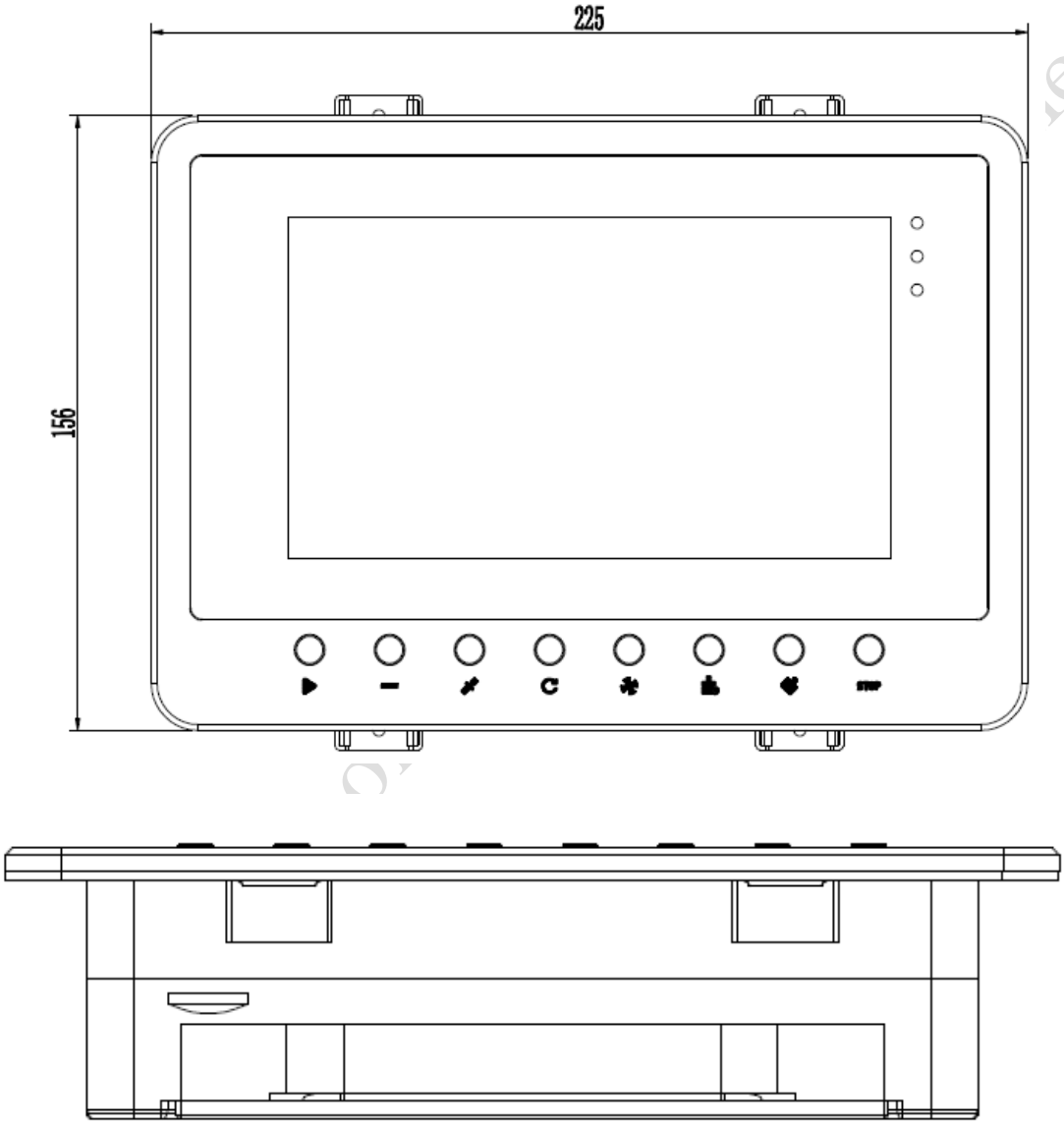
[11] Remote Control: When the start/stop mode is set to remote, the user can start or stop the air compressor via remote terminals.

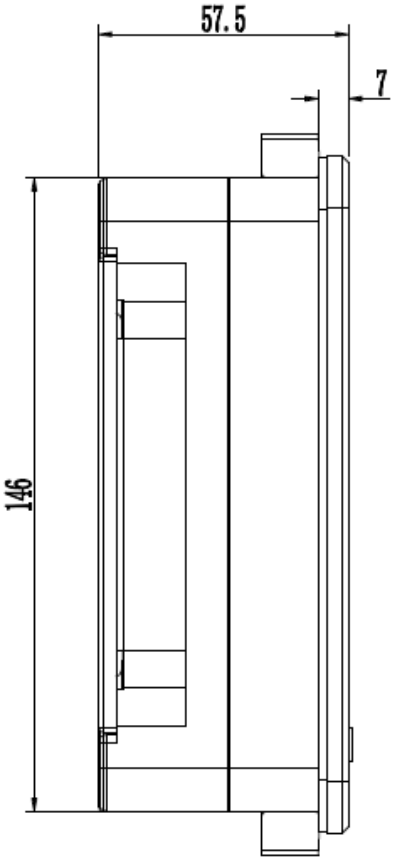
[12] Optional built-in 4G communication module for real-time data interaction with the cloud, enabling remote monitoring.

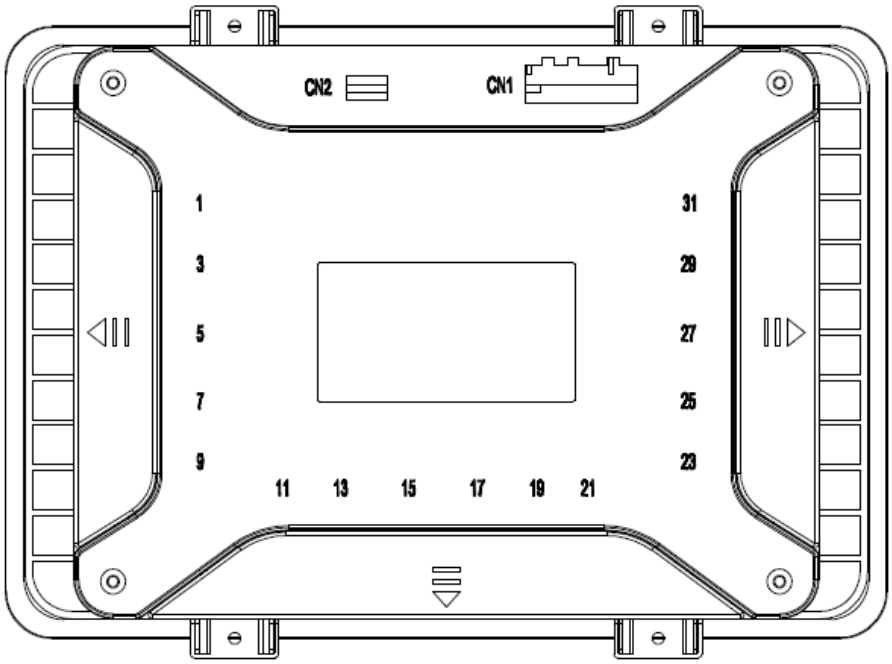
2 Installation

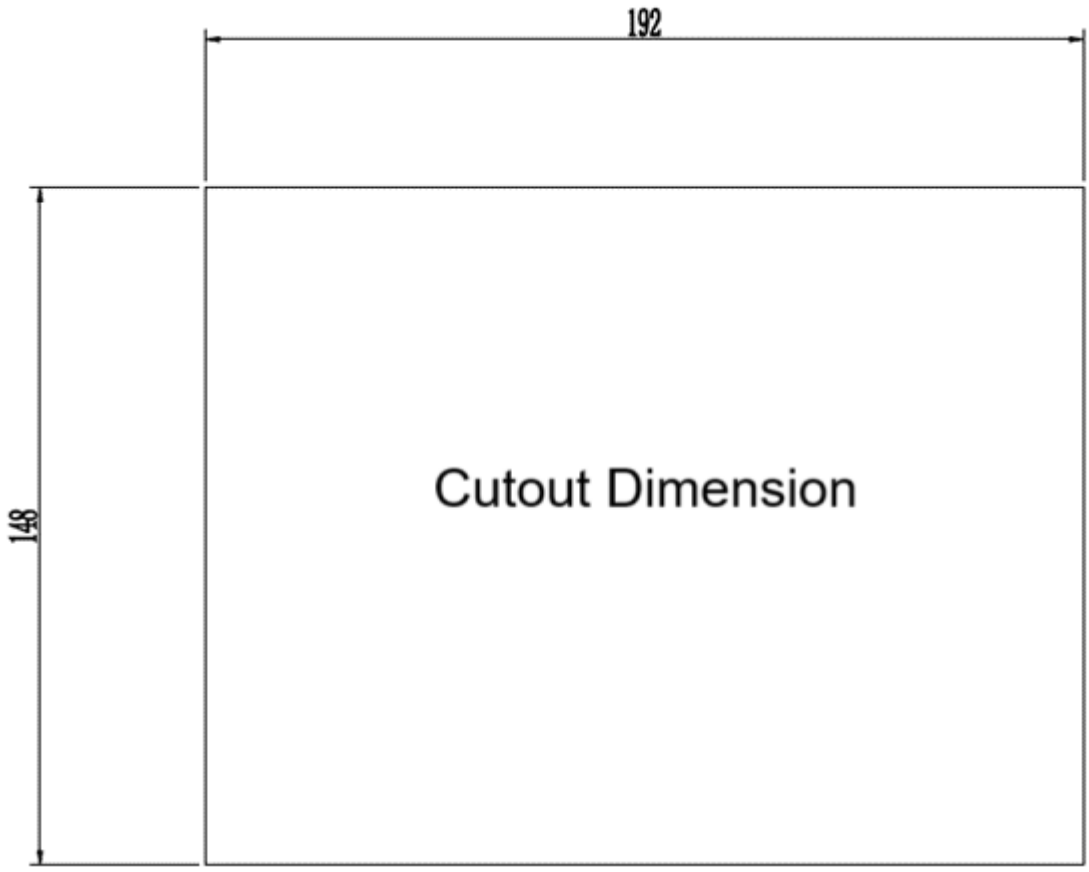
2.1 Controller Installation

The controller is panel-mounted, and there should be adequate space around the controller for wiring. The specific dimensions are as follows.









2.2 Wiring

Table 2.2-1 PIN Configuration

No.	Definition	Description
1	CT_C	Fan current transformer Phase C.
2	CT_B	Fan current transformer Phase B.
3	CT_A	Fan current transformer Phase A.
4	PRESSURE_SIGNAL	Pressure sensor signal.
5	PRESSURE_COM	Pressure sensor common.
6	TEMP_SIGNAL	Temperature sensor signal.
7	TEMP_COM	Temperature sensor common.
8	FG	FG ground.
9	24V_B	For AC 24V, connect to one of the power lines; for DC 24V, connect to DC ground (GND).
10	24V_A	For AC 24V, connect to one of the power lines; for DC 24V, connect to DC ground (GND).
11	AC220	Connect to AC 220V power supply.
12	FAN_POW	Connect to the fan relay terminal.
13	VALUE_POW	Connect to the load valve relay terminal.
14	VF_SON2	VFD start/stop terminal 2.
15	VF_SON1	VFD start/stop terminal 1.
16	POW_C	Connect to phase C of the power supply.
17	NC	
18	POW_B	Connect to phase B of the power supply.
19	NC	
20	POW_A	Connect to phase A of the power supply.
21	RS485_GND	485 common ground.
22	RS485_B2	Second RS-485 B.
23	RS485_A2	Second RS-485 A.
24	EXIT_COM	Common terminal of the hardware.
25	EXIT_IN1	Hardware terminal 1
26	EXIT_IN2	Hardware terminal 2
27	EXIT_IN3	Hardware terminal 3
28	EXIT_IN4	Hardware terminal 4
29	RS485_B1	First RS-485 B, connected to the VFD.
30	RS485_A1	First RS-485 A, connected to the VFD.

2.3 Current Transformer Installation

The current transformer should be installed in a position where it can measure the line current of the motor. This allows the controller to be set according to the motor nameplate specifications. The specific installation dimensions are as follows.

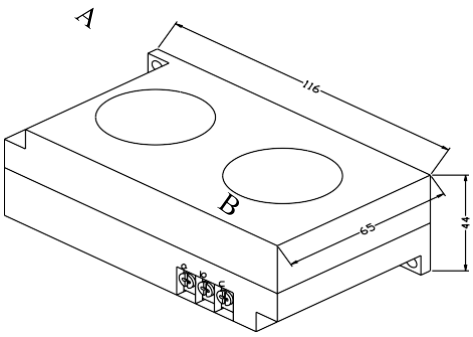


Figure 2.3-2 CT1 mechanical drawing (ϕ36 drilled hole)

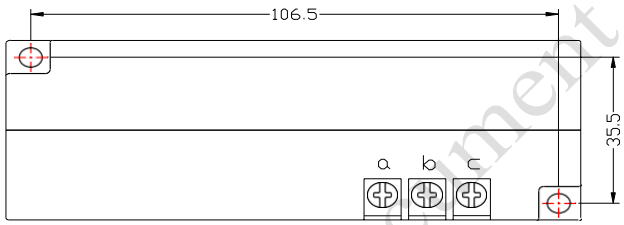


Figure 2.3-1 CT1 installation dimension

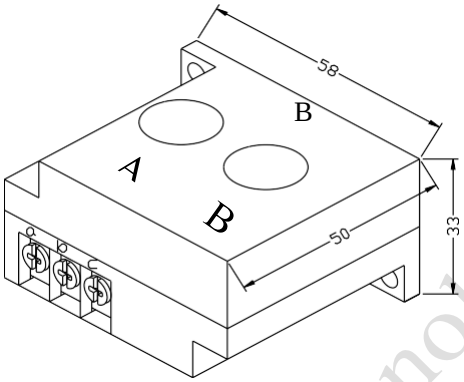


Figure 2.3-4 CT2 mechanical drawing (ϕ10 drilled hole)

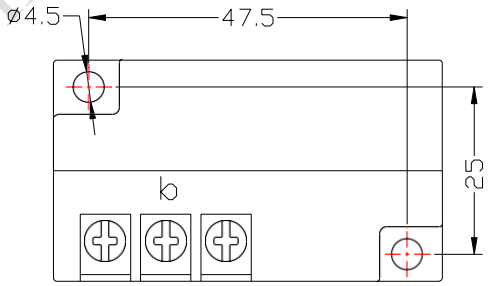


Figure 2.3-3 CT2 installation dimension

3 Basic Operations

3.1 Button

Figure 3.1-1 AP80480T070WTR01 front view

【1】Start Button

When the air compressor is in standby or idle mode, pressing this button will start the air compressor. If the communication mode is set to block control and the communication address is set to 1, starting the air compressor will also activate the linked control function.

【2】Stop Button

When the air compressor is running, pressing this button will stop the air compressor. If the communication mode is set to block control and the communication address is set to 1, stopping the air compressor will also deactivate the linked control function, and the master will stop sending control commands to the slave unit.

【3】Load/Unload Button

On the homepage, when the air compressor is running, pressing this button allows for control of loading and unloading.

【4】Reset Button

After a fault stop, press and hold the reset button for more than 5 seconds to clear the fault.

【5】Fan On/Off Button

On the homepage, when the air compressor is idle, in standby mode, or normally shut down, pressing this button allows for control of the fan's on and off state.

【6】Running Time Clearing Button

On the homepage, when the air compressor is idle, in standby mode, or normally shut down, holding the reset button for 5 seconds will clear the total running and load time.

【7】Maintenance Usage Time Clearing Button

On the homepage, when the air compressor is idle, in standby mode, or normally shut down, holding the reset

button for 5 seconds will clear the usage time of maintenance (oil filter, oil separator, air filter, lubricating oil, and grease).

【8】Emergency Stop Button

On the homepage, when the air compressor is running, holding this button for more than 100 mS allows for control of emergency stop.

3.2 Indicator Light

[1] Power: After powering on the controller, the indicator light is red.

[2] Run: When the air compressor motor is running, the running indicator light is green.

[3] Fault: During alarm, the fault indicator flashes red; during fault stop, the fault indicator stays solid red; after clearing the fault, it goes off upon resetting.

3.3 Touch

[1] Start Button

When the air compressor is in standby or idle mode, pressing this button will start the air compressor. If the communication mode is set to block control and the communication address is set to 1, starting the air compressor will also activate the linked control function.

[2] Stop Button

When the air compressor is running, pressing this button will stop the air compressor. If the communication mode is set to block control and the communication address is set to 1, stopping the air compressor will also deactivate the linked control function, and the master will stop sending control commands to the slave unit.

[3] Load/Unload Button

On the homepage, and while the air compressor is running, pressing this button allows for load/unload control.

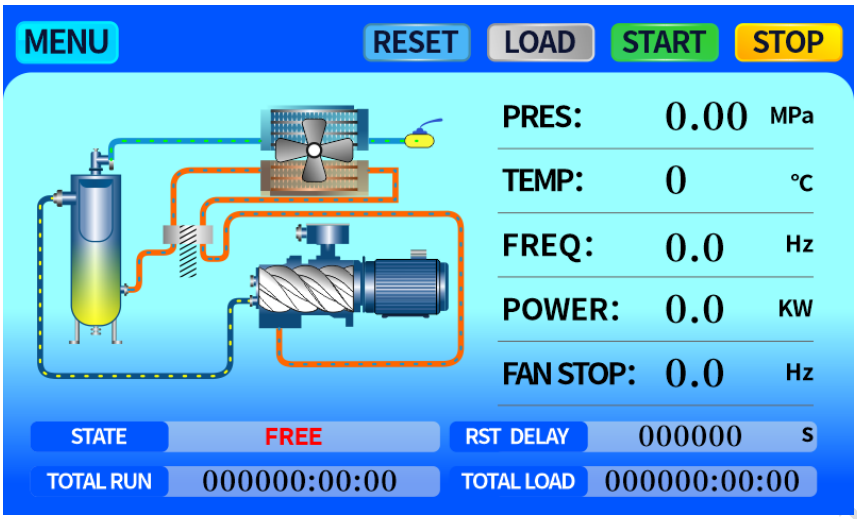
[4] Reset Button

After a fault stop, click the reset button to clear the fault.

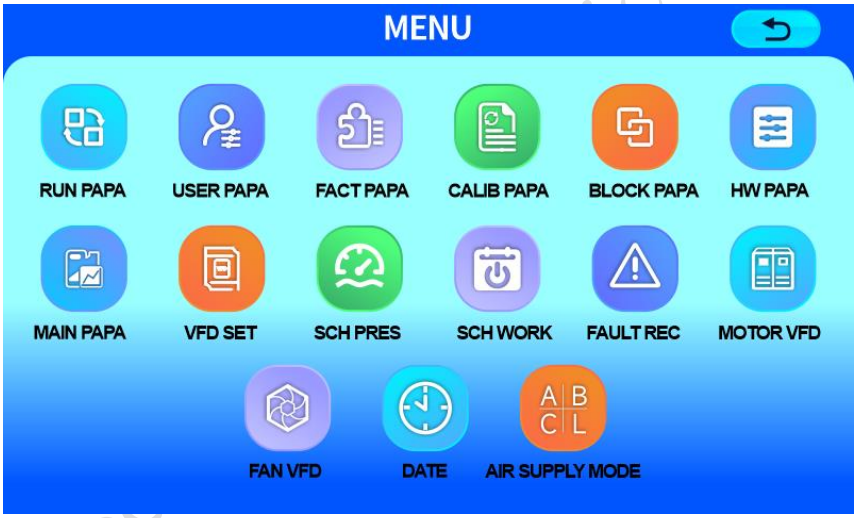
3.4 Status Display and Operation

Upon powering on the controller, the startup interface is displayed.

After a 5-second delay, enter the following operational parameters main interface.



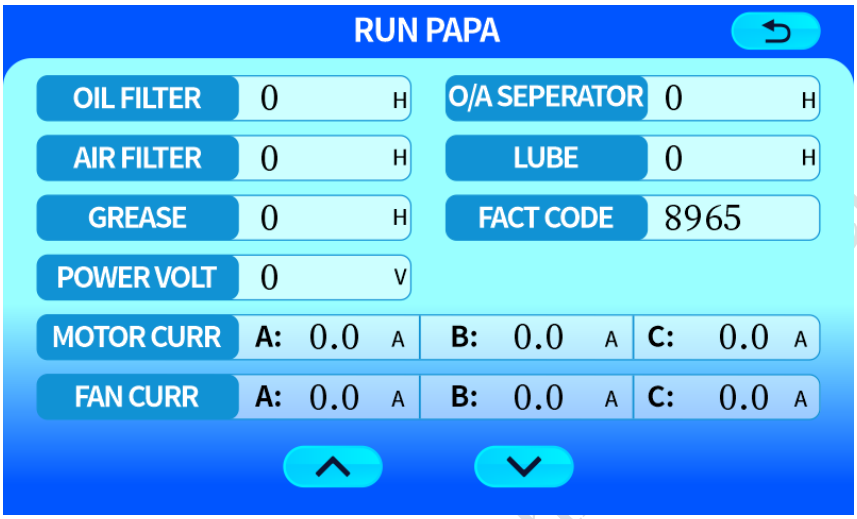
By clicking the "Menu" button on the main interface, the user enters the menu selection interface. Within the menu interface, by clicking on options such as "Operating Parameter", "User Parameter", "Manufacturer Parameter", and "Calibration Parameter" the user can access the corresponding interfaces to view and set parameters.



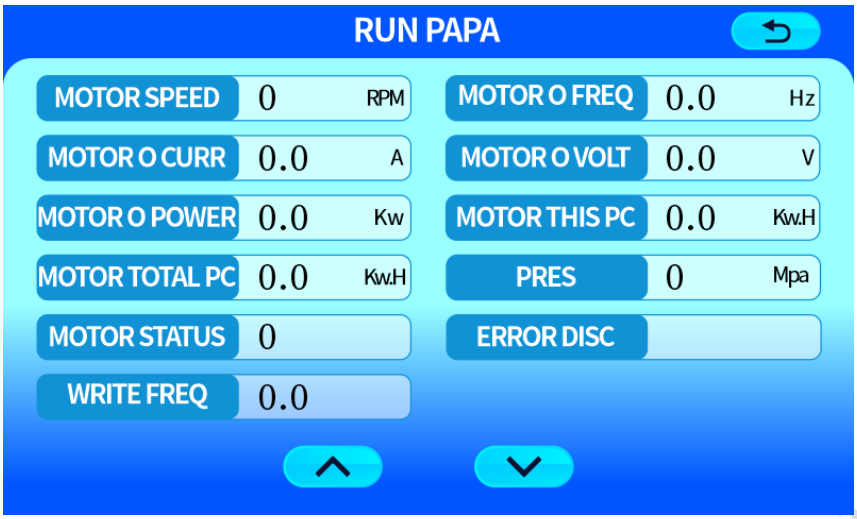
4 Function Parameter

4.1 Run Parameters

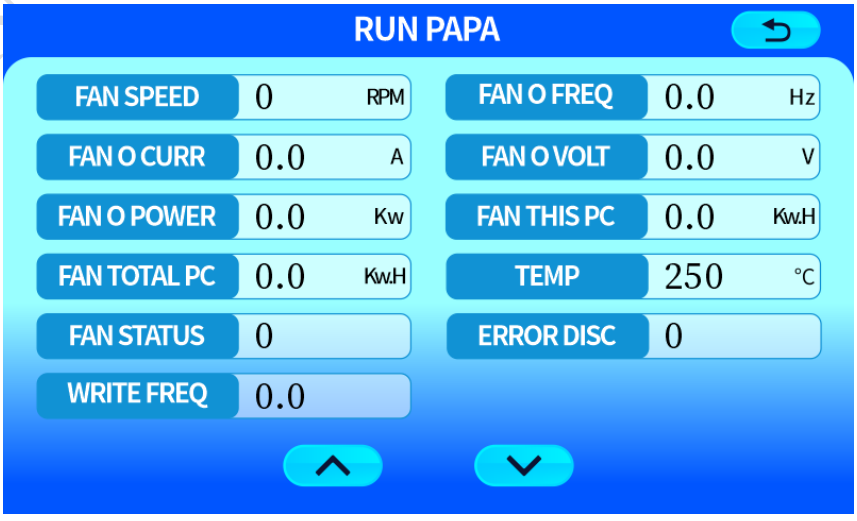
Click “RUN PAPA” to check the relevant data.



Parameter	Initial Value	Description
OIL FILTER	0000H	Total running time of oil filter.
O/A SEPERATOR	0000H	Total running time of oil separator.
AIR FILTER	0000H	Total running time of air filter.
LUBE	0000H	Total running time of lubricating oil.
GREASE	0000H	Total running time of lubricating grease.
FACT CODE	00000000	Factory code.
POWER VOLT	0000V	Power supply voltage.
MOTOR CURR	A：000.0A B：000.0A C：000.0A	Motor current.
FAN CURR	A：000.0A B：000.0A C：000.0A	Fan current.



Parameter	Initial Value	Description
MOTOR SPEED	0000 RPM	Current motor real-time rotation speed.
MOTOR O FREQ	000.0 Hz	Current motor VFD output frequency.
MOTOR O CURR	000.0 A	Current motor VFD output current.
MOTOR O VOLT	000.0 V	Current motor VFD output voltage.
MOTOR O POWER	000.0 Kw	Current motor VFD output power.
MOTOR THIS PC	0000000.0Kw.H	Electricity consumption of the motor during this operation.
MOTOR TOTAL PC	0000000.0Kw.H	Total electricity consumption of the motor.
PRES	00.00MPa	Current pressure.
MOTOR STATUS	0000	Motor VFD status description.
ERROR DISC	0000	Motor VFD error description.
WRITE FREQ	000.0	The motor frequency value obtained by the controller after PID calculation.

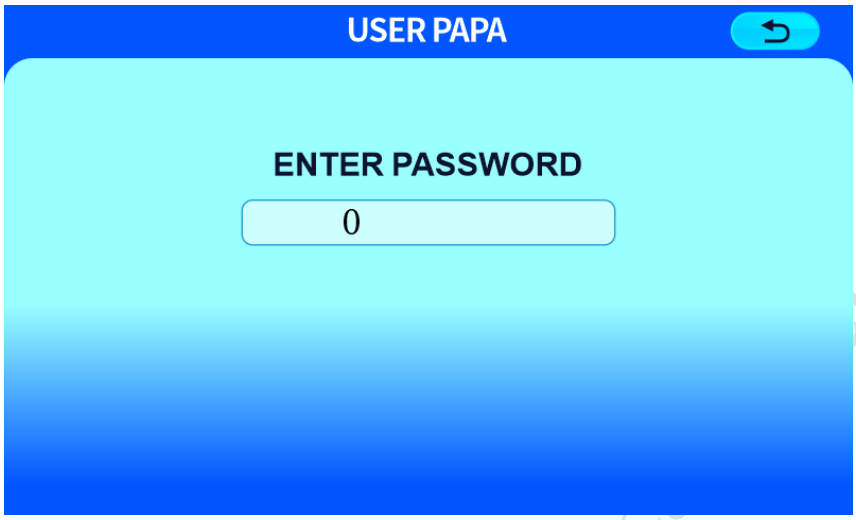


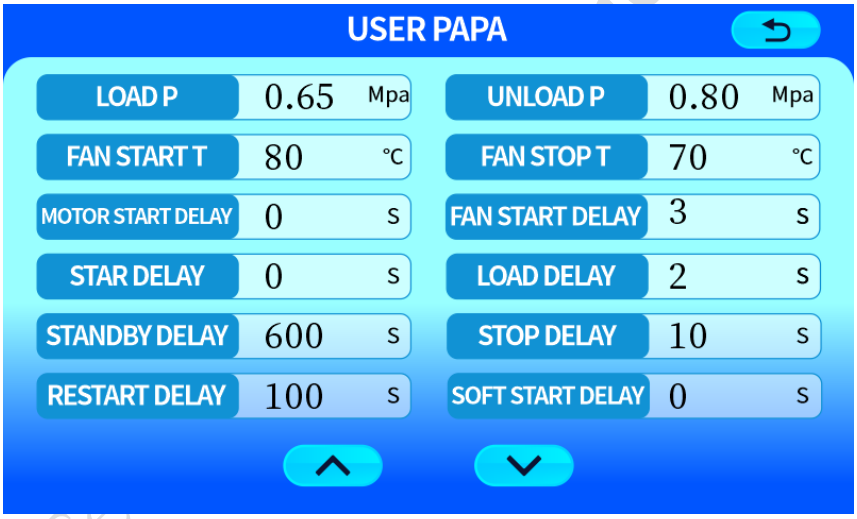
Parameter	Initial Value	Description
FAN SPEED	0000 RPM	Current real-time speed of the fan.
FAN O FREQ	000.0 Hz	Current output frequency of the fan VFD.
Fan Output Current	000.0 A	Current output current of the fan VFD.
FAN O CURR	000.0 V	Current output voltage of the fan VFD.
FAN O POWER	000.0 Kw	Current real-time output power of the fan VFD.
FAN THIS PC	000000.00Kw.H	Electricity consumption of the fan during this operation cycle.
FAN TOTAL PC	000000.00Kw.H	Cumulative electricity consumption of the fan.
TEMP	000 °C	Current temperature.
FAN STATUS	0000	Fan VFD status description.
ERROR DISC	0000	Fan VFD error description.
WRITE FREQ	000.0	The frequency value obtained by the controller after PID calculation.

Parameter	Initial Value	Description
PROD DATE	00000000	Date of production.
THIS RUN TIME	0000：00：00	The operating time of the air compressor in this cycle.
THIS LOAD TIME	0000：00：00	The load time of the air compressor in this cycle.
VERSION	000	
CHECK 1	00000000	
CHECK 2	00000000	

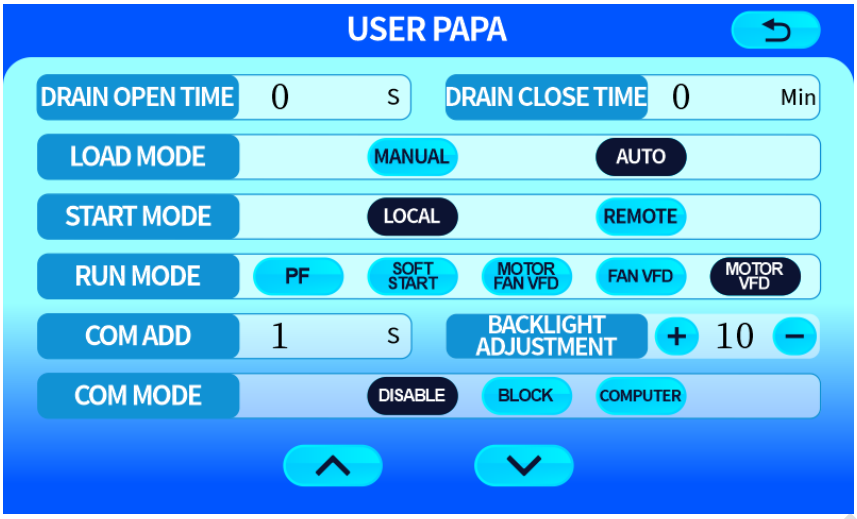
4.2 User Parameter

Click “USER PAPA” to check and set the relevant data. To view or modify user parameters, verification of the user password is required.

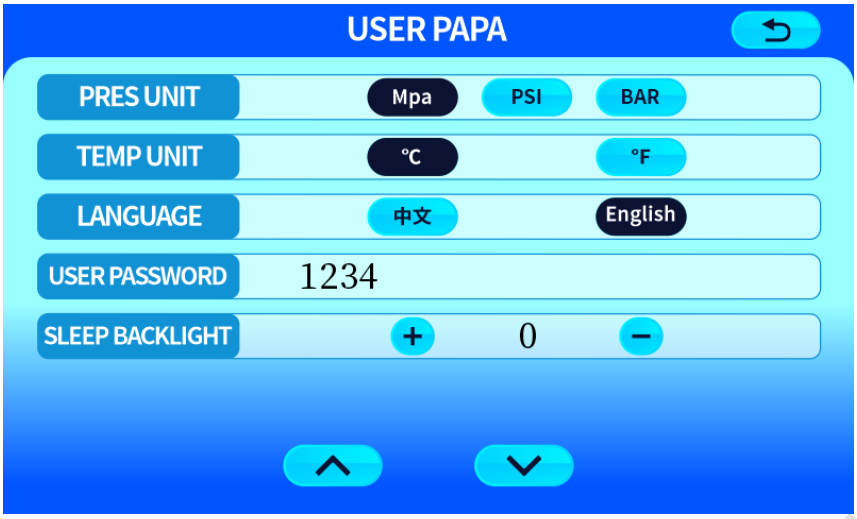




Parameter	Initial Value	Description
LOAD P (MPa)	0.65	● When set to "Auto" mode, if the air compressor is in unloaded operation and the pressure drops below this value, the air compressor will automatically switch to loaded operation. ● During no load stop, if the pressure drops below this threshold and operating conditions are met, the air compressor will automatically start running.
UNLOAD P (MPa)	0.80	● If the pressure exceeds this value while the air compressor is in loaded operation, the air compressor will switch to unloaded operation. ● The "LOAD P" cannot exceed this value, and the "UNLOAD P" is constrained by the "Unload Pressure Upper Limit".
FAN START T (℃)	80	If the air compressor is running and the exhaust temperature exceeds this value, the fan will start running.
FAN STOP T (℃)	70	If the air compressor is running and the exhaust temperature drops below this value, the fan will stop running.
MOTOR START DELAY (S)	0	During this period after machine startup, there is no protection against motor current overload.
FAN START DELAY (S)	3	During this period after machine startup, there is no protection against fan current overload.
STAR DELAY (S)	0	Backup.
LOAD DELAY (S)	2	Load delay time after motor startup.
STANDBY DELAY (S)	600	If the unloaded operation exceeds this time, the air compressor will automatically stop and enter the no load stop state.
STOP DELAY (S)	10	During normal stop, the air compressor will immediately switch to unloaded operation and stop running after exceeding this time.
RESTART DELAY (S)	100	During normal stop, no load stop, or fault stop, the air compressor can only be restarted after the delay time set here has elapsed.
SOFT START DELAY (S)	0	Backup.



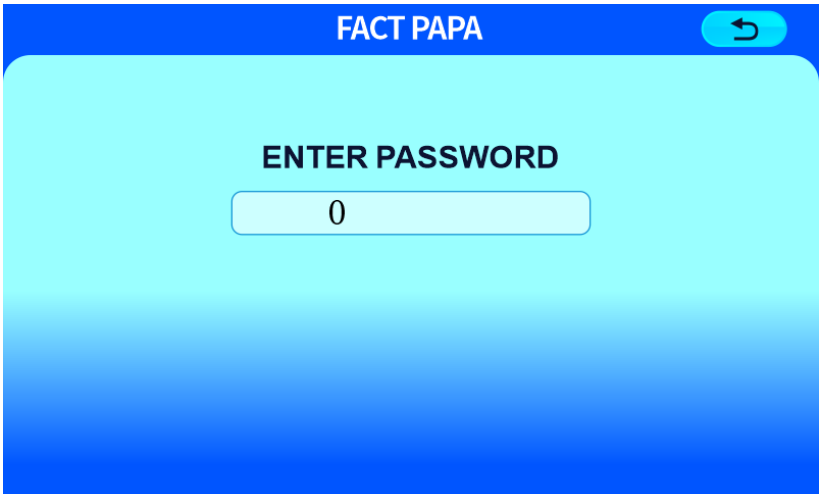
Parameter	Initial Value	Description
DRAIN OPEN TIME (S)	0	Backup.
DRAIN CLOSE TIME (M)	0	Backup.
LOAD MODE	AUTO	● Auto: When the pressure exceeds the " UNLOAD P ", the air compressor will automatically unload. In all other situations, the load/unload button controls the operation. ● Manual: The controller automatically manages the loading and unloading of the air compressor based on the pressure and the set load and unload pressures.
START MODE	LOCAL	● Local: Remote start terminal function is disabled. ● Remote: Remote start terminal function is enabled.
RUN MODE	Motor VFD	Currently, three modes are supported: MOTOR FAN VFD, FAN VFD, and MOTOR VFD. Others are backup. Users should select the air compressor model based on their needs. Refer to the corresponding electrical wiring diagram for the selected model.
COM ADD	1	The controller's communication address when the communication mode is set to computer or block.
BACKLIGHT ADJUSTMENT	10	Adjust the backlight brightness. The higher the value, the stronger the brightness. (Brightness is adjustable from level 1 to 7.)
COM MODE	DISABLE	● Disable: Communication is not functional. ● Computer: Acts as a slave device, communicating with external devices according to the MODBUS RTU protocol. Baud Rate: 9600; Data Format: 8N1; Parity Bit: No parity (contact the manufacturer for details). ● Block: Multiple air compressors can operate in a network.

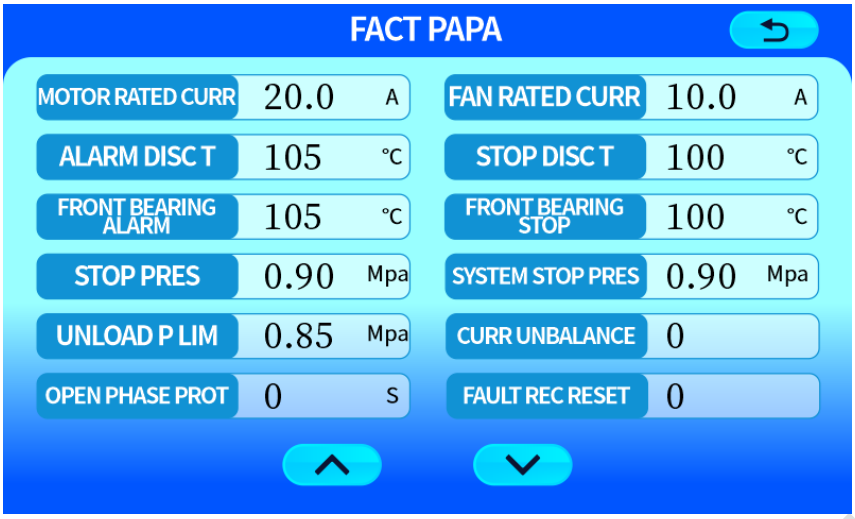


Parameter	Initial Value	Description
PRES UNIT	MPa	MPa: Parameters related to pressure are displayed in units of MPa. PSI: Parameters related to pressure are displayed in units of PSI. BAR: Parameters related to pressure are displayed in units of BAR.
TEMP UNIT	℃	℃: Parameters related to temperature are displayed in units of ℃. ℉: Parameters related to temperature are displayed in units of ℉.
LANGUAGE	中文	When set to “中文”, the interface is shown in Chinese. When set to English, the interface is shown in English.
USER PASSWORD	****	User password that can be modified.
SLEEP BACKLIGHT	0	Backlight brightness in sleep mode.

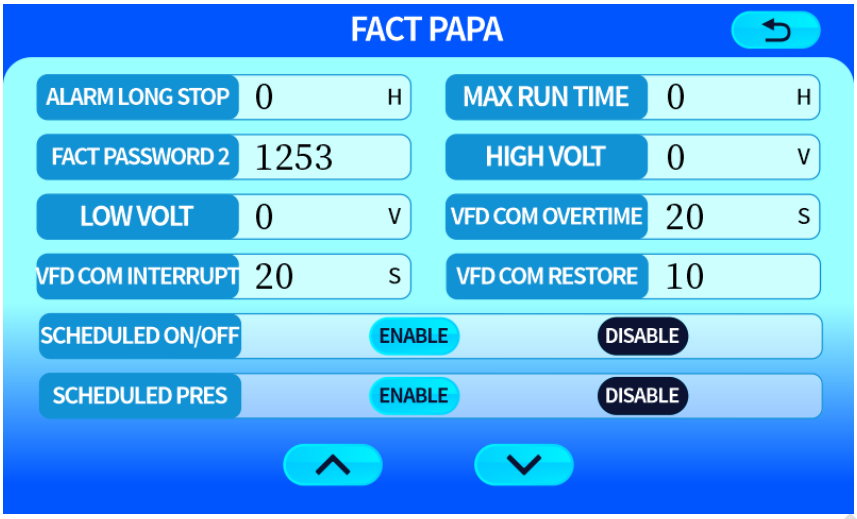
4.3 Factory Parameters

Click “FACT PAPA” to check and set the relevant data. To view or modify factory parameters, verification of the factory password is required.

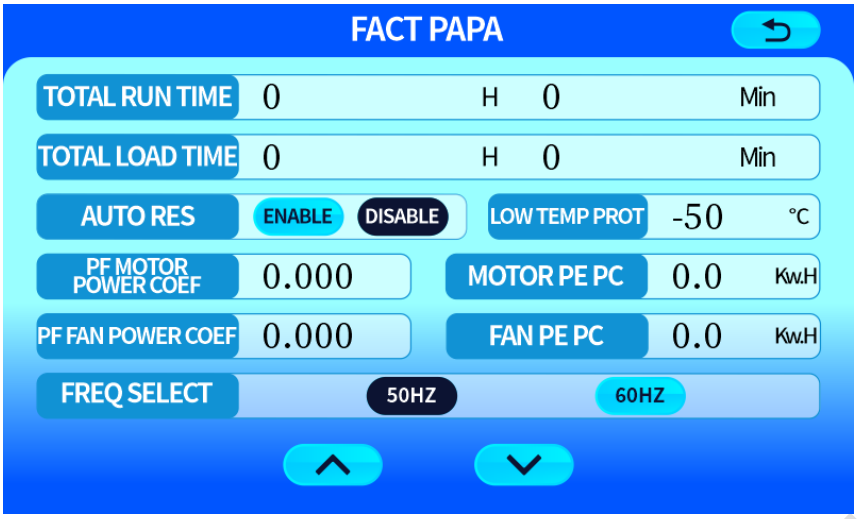




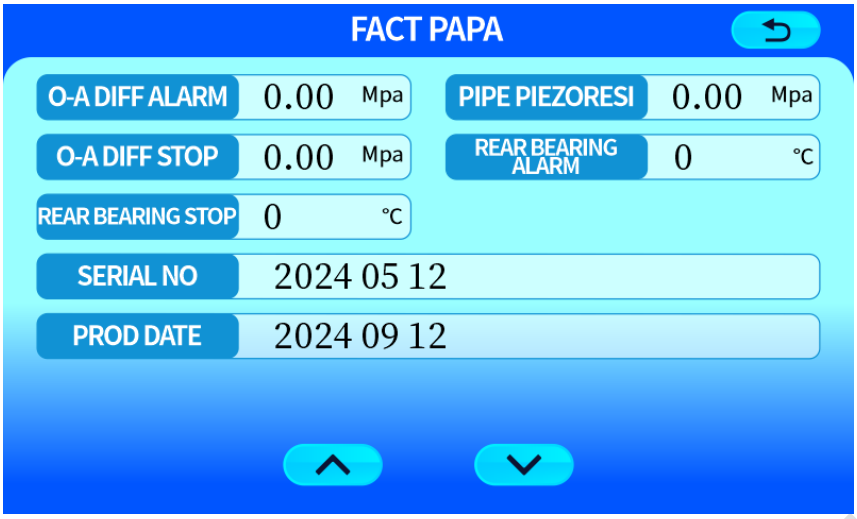
Parameter	Initial Value	Description
MOTOR RATED CURR (A)	20.0	When the motor current exceeds the set value by more than 1.2 times, the machine will trip according to the overload inverse time delay.
FAN RATED CURR (A)	10.0	When the fan current exceeds the set value by more than 1.2 times, the machine will trip according to the overload inverse time delay.
ALARM DISC T (℃)	105	When the discharge temperature exceeds the set temperature, an alarm is triggered.
STOP DISC T (℃)	100	When the discharge temperature exceeds the set temperature, the air compressor will shut down.
FRONT BEARING ALARM (℃)	105	Backup.
FRONT BEARING STOP (℃)	100	Backup.
STOP PRES (MPa)	0.90	When the air supply stop pressure exceeds the set temperature, the air compressor will shut down.
SYSTEM STOP PRES (MPa)	0.90	When the system pressure exceeds the set temperature, the air compressor will shut down.
UNLOAD PLIM (MPa)	0.85	The "Supply Air Unload Pressure" is constrained by the "Unload Pressure Upper Limit".
CURR UNBALANCE	0	If the ratio of (maximum phase current / minimum phase current) is greater than or equal to [1 + (set value / 10)], the controller will determine that there is an unbalance in the current, and the air compressor will shut down. When the set value is greater than or equal to 20, the imbalance protection is disabled.
OPEN PHASE PROT (S)	0	When the set value is greater than or equal to 25, the open phase protection is disabled.
FAULT REC RESET	0	When this value is set to 888, the historical faults will be cleared.



Parameter	Initial Value	Description
ALARM LONG STOP (H)	0	When the consumable value exceeds the set value, the air compressor will shut down.
MAX RUN TIME (H)	0	When the total running time exceeds the set value and the air compressor is in a shutdown state, the controller displays a "usage error" fault alarm. When this value is set to 0, the function will be disabled.
FACT PASSWORD 2	0000	Manufacturer password that can be modified.
HIGH VOLT (V)	0	When the detected voltage exceeds the set value, the overvoltage protection will trigger a shutdown. When this value is set to 0, the function will be disabled.
LOW VOLT (V)	0	When the detected voltage falls below the set value, the undervoltage protection will trigger a shutdown. When this value is set to 0, the function will be disabled.
VFD COM OVERTIME (S)	20	When the controller sends out a command and does not receive a response from the VFD within this time, the controller determines a timeout and resends the command data.
VFD COM INTERRUPT (S)	20	If the controller does not receive the correct data from the VFD for a continuous period exceeding the set time, it reports a communication interruption.
VFD COM RESTORE	10	After a communication interruption, if the controller receives the correct data from the VFD for a continuous number of times exceeding the set threshold, it is considered that the communication has returned to normal.
SCHEDULED ON/OFF	DISABLE	● ENABLE : Scheduled on/off function is enabled. ● DISABLE : Scheduled on/off function is disabled.
SCHEDULED PRES	DISABLE	● ENABLE : Scheduled pressure function is enabled. ● DISABLE : Scheduled pressure function is disabled.



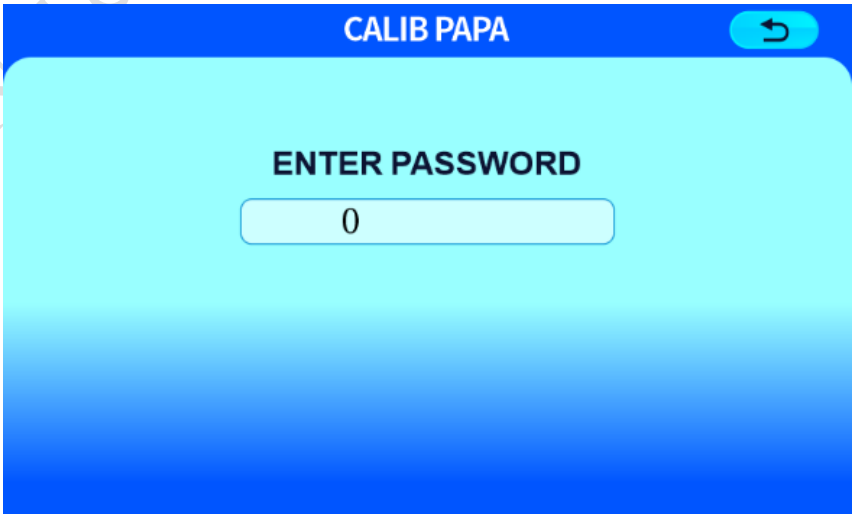
Parameter	Initial Value	Description
TOTAL RUN TIME (H)	0 H 0 Min	Modify the total operating time of the air compressor.
TOTAL LOAD TIME (H)	0 H 0 Min	Modify the total load time of the air compressor.
LOW TEMP PROT (℃)	-50	Upon booting, if the temperature is detected to be below the set value, a prompt is given that the temperature is too low, and the air compressor is not allowed to start; Three minutes after booting, if the temperature is detected to be below the set value, a malfunction of the temperature sensor is reported, and the machine is stopped.
AUTO RES	DISABLE	● Enable: Auto power restart function is enabled. ● Disable: Scheduled start/stop function is disabled.
PF MOTOR POWER COEF	0.0	Backup.
MOTOR PE PC (kW.H)	0.0	Backup.
PF FAN POWER COEF	0.0	Backup.
FAN PE PC (Kw.H)	0.0	Backup.
FREQ SELECT	50Hz	Set the power supply frequency.

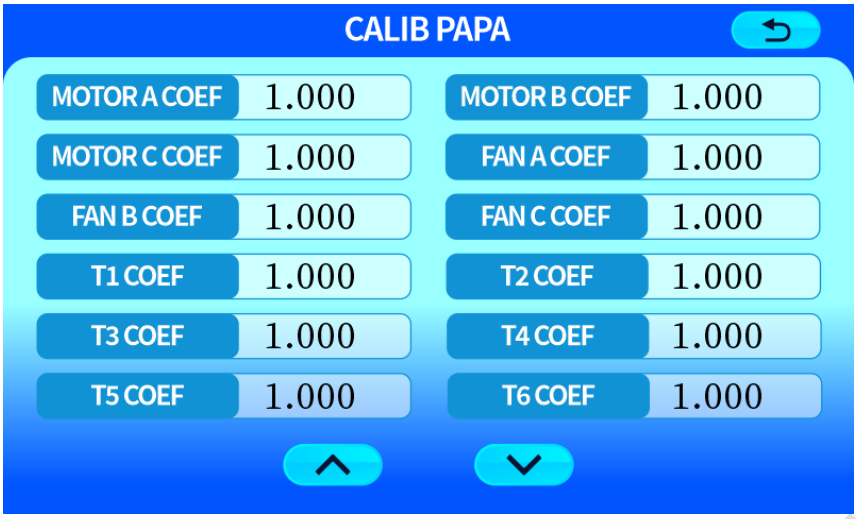


Parameter	Initial Value	Description
O-A DIFF ALARM (MPa)	0.0	Backup.
O-A DIFF STOP (MPa)	0.0	Backup.
PIPE PIEZORESI (MPa)	0.0	Backup.
REAR BEARING ALARM (℃)	0	Backup.
REAR BEARING STOP (℃)	0	Backup.
SERIAL NO	20240512	Serial number of production.
PROD DATE	20240912	Date of production.

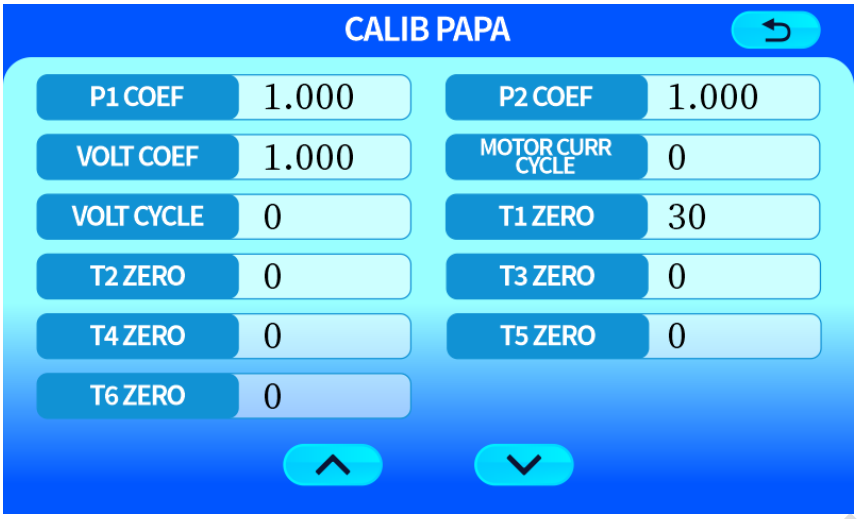
4.4 Calibration Parameters

Click “CALIB PAPA” to check and set the relevant data. To view or modify calibration parameter, verification of the calibration password is required.





Parameter	Initial Value	Description
MOTOR A COEF	1.000	Current calibration factor, setting range: 0.8-2.0. Current value = Sampling value × Current calibration factor.
MOTOR B COEF	1.000	
MOTOR C COEF	1.000	
FAN A COEF	1.000	
FAN B COEF	1.000	
FAN C COEF	1.000	
T1 COEF	1.000	Exhaust temperature calibration factor, setting range: 0.8-2.0. Temperature value = Detected temperature ×temperature calibration factor
T2 COEF	1.000	Backup.
T3 COEF	1.000	
T4 COEF	1.000	
T5 COEF	1.000	
T6 COEF	1.000	

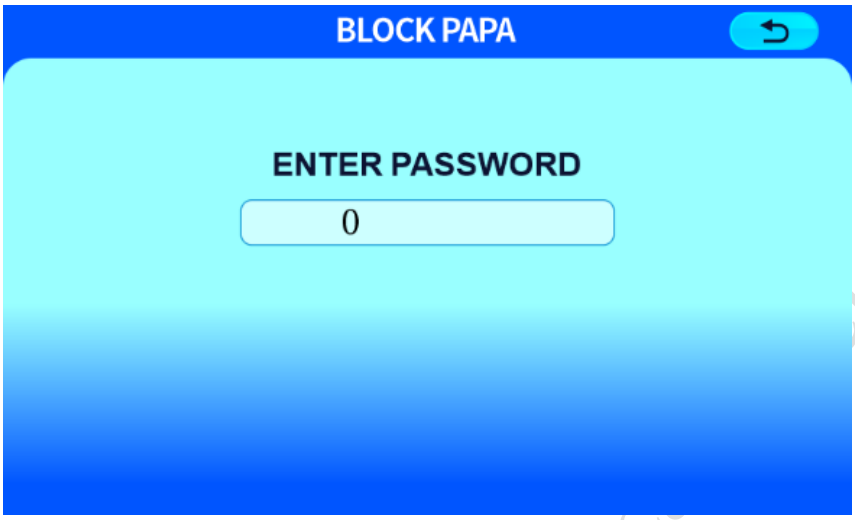


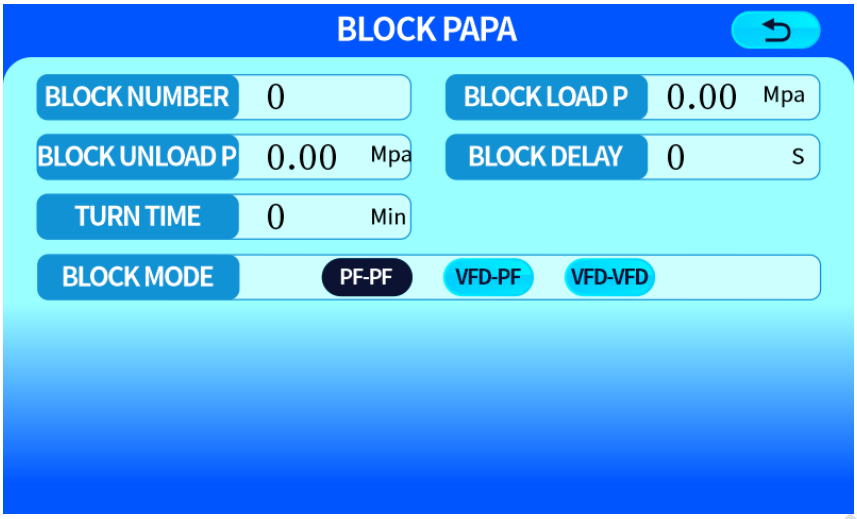
Parameter	Initial Value	Description
P1 COEF	1.000	Air supply pressure calibration factor, setting range: 0.8-2.0. Pressure value = Detected pressure × Pressure calibration factor.
P2 COEF	1.000	Backup.
VOLT COEF	1.000	Voltage calibration factor, setting range: 0.8-2.0. Voltage value = Detected voltage ×Voltage calibration factor.
MOTOR CURR CYCLE	0	Backup.
VOLT CYCLE	0	Backup.
T1 ZERO	30	Temperature calibration value.
T2 ZERO	0	Backup.
T3 ZERO	0	Backup.
T4 ZERO	0	Backup.
T5 ZERO	0	Backup.
T6 ZERO	0	Backup.

Parameter	Set Initial Value	Description
P1 ZERO	200	Pressure sensor zero-drift calibration value.
P2 ZERO	0	Backup.
P1 SENSOR RANGE (MPa)	1.60	Air supply pressure sensor range.
P2 SENSOR RANGE (MPa)	0.00	Backup.
PHASE PROT (V)	0.0	When the three-phase sequence detection circuit detects a voltage value lower than the set value here, it reports a sequence error. When this value is set to 0, the phase sequence protection function is disabled.
OPEN PHASE PROT (V)	0.0	When the detected open phase voltage value is lower than the set value, it reports a phase sequence error. When this value is set to 0, the open phase protection function is disabled.
MOTOR CURR RATIO	1.000	Motor rated current.
FAN CURR RATIO	1.000	Fan rated current.

4.5 Block Parameters

Click “BLOCK PAPA” to check and set the relevant data. To view or modify block parameters, verification of the block password is required.

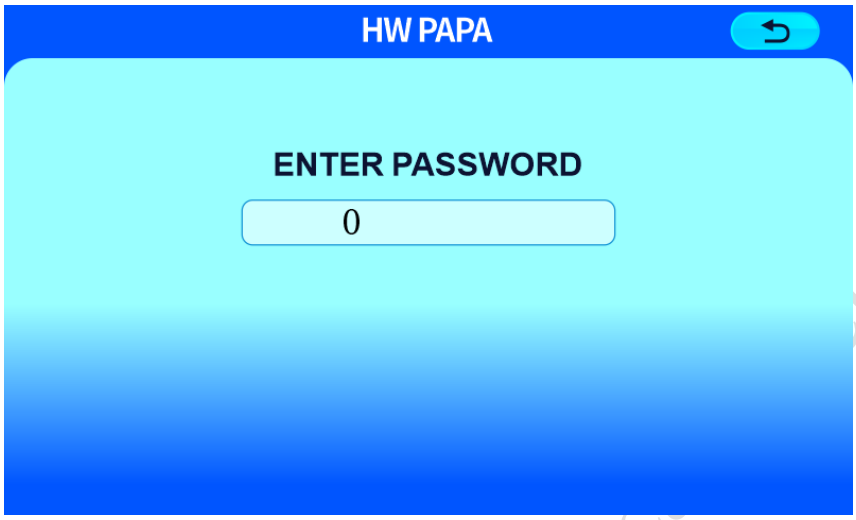


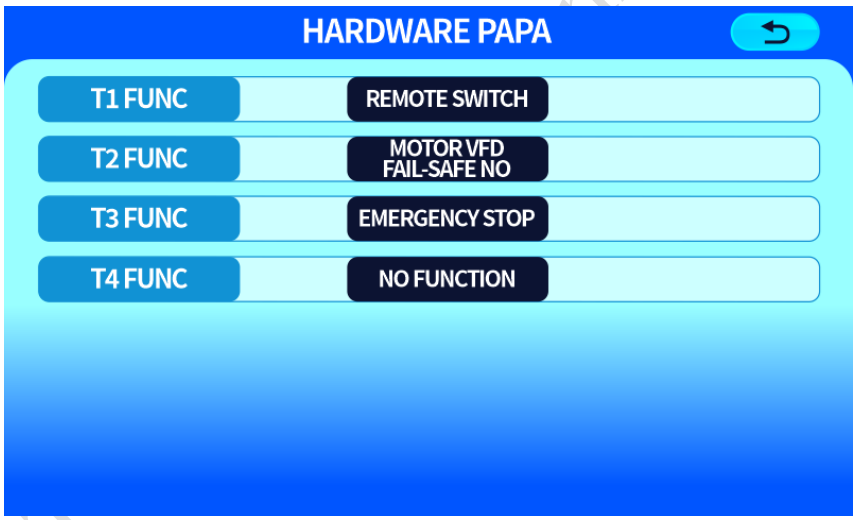


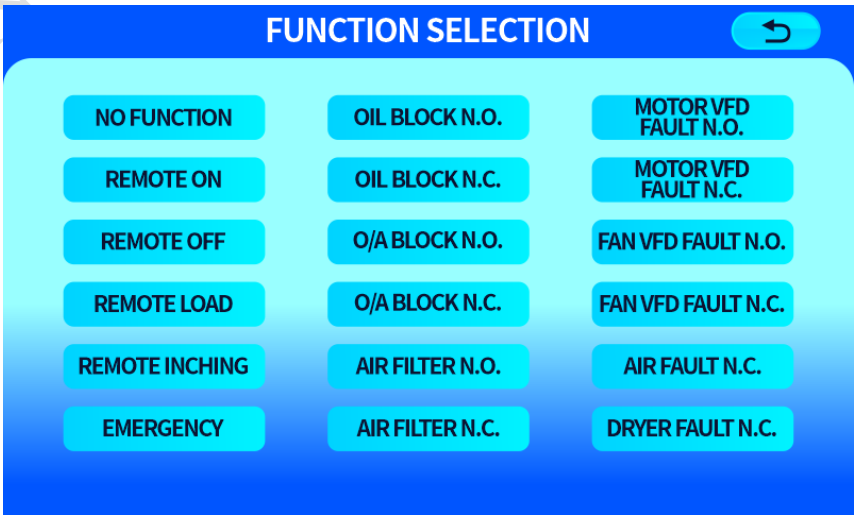
Parameter	Set Initial Value	Description
BLOCK NUMBER	0	The number of air compressors in the network.
BLOCK LOAD P (MPa)	0.0	When the master pressure is lower than the set pressure, find a machine from the network to load or start.
BLOCK UNLOAD P (MPa)	0.0	When the master unit's pressure is higher than the set pressure, find a machine from the network to unload or stop.
BLOCK DELAY (S)	0	The waiting time between the master sending control commands twice continuously.
TURN TIME (M)	0	When the master operates between the load pressure and unload pressure, if there is a machine in the network that is running and another that is stopped, and this situation lasts for a period reaching the rotation time, the master sends a stop command to the running machine and a start command to the stopped machine.
BLOCK MODE	VFD-VFD	PF-PF: PF air compressors are linked with other PF air compressors. VFD-PF: VFD air compressors are linked with PF air compressors. VFD-VFD: VFD air compressors are linked with other VFD air compressors.

4.6 Hardware Parameters

Click “HARDWARE PAPA” to check and set the relevant data. To view or modify hardware parameters, verification of the hardware password is required.



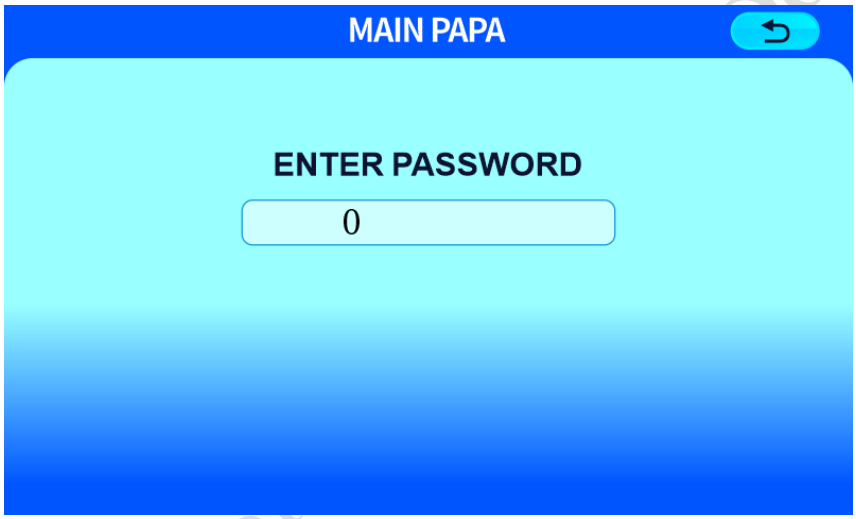


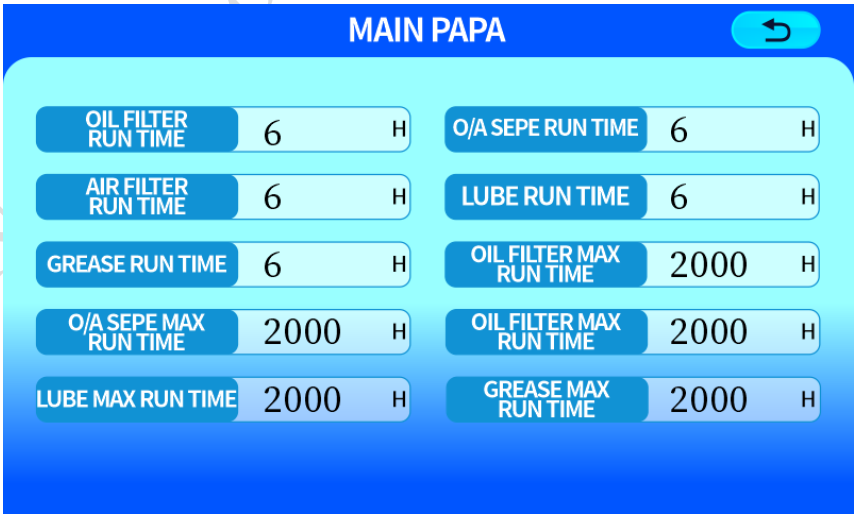


Parameter	Set Initial Value	Description
T1 FUNC	Remote switch	NO FUNCTION/REMOTE ON/REMOTE OFF/REMOTE LOAD/ REMOTE INCHING/EMERGENCY/OIL BLOCK N.C./OIL BLOCK N.O./ O/A BLOCK N.C./O/A BLOCK N.O./AIR FILTER N.C./AIR FILTER N.O./MOTOR VFD FAULT N.O./MOTOR VFD FAULT N.C./FAN VFD FAULT N.O./FAN VFD FAULT N.C./AIR FAULT N.C./DRYER FAULT N.C. Note: Users can set the digital input to the function as needed.
T2 FUNC	Motor VFD Fail-safe NO	
T3 FUNC	Emergency Stop	
T4 FUNC	No Function	

4.7 Maintenance Parameters

Click “MAIN PAPA” to check and set the relevant data. To view or modify maintenance parameters, verification of the consumable password is required.

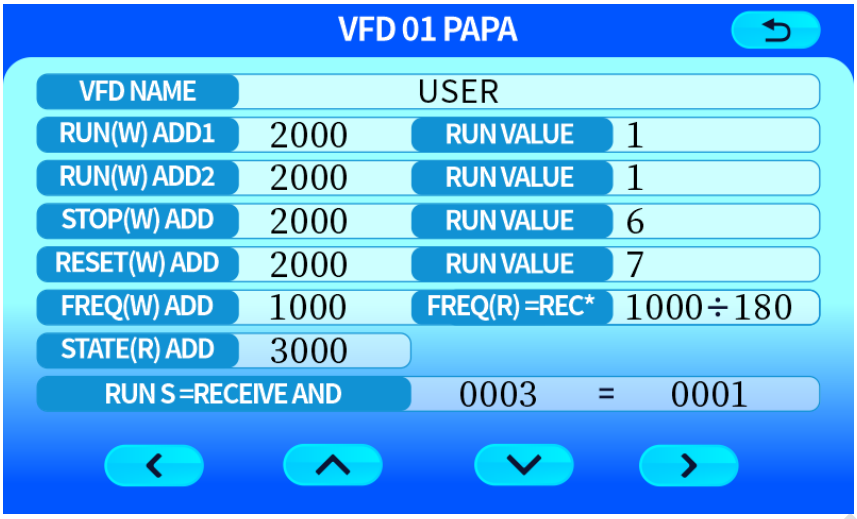




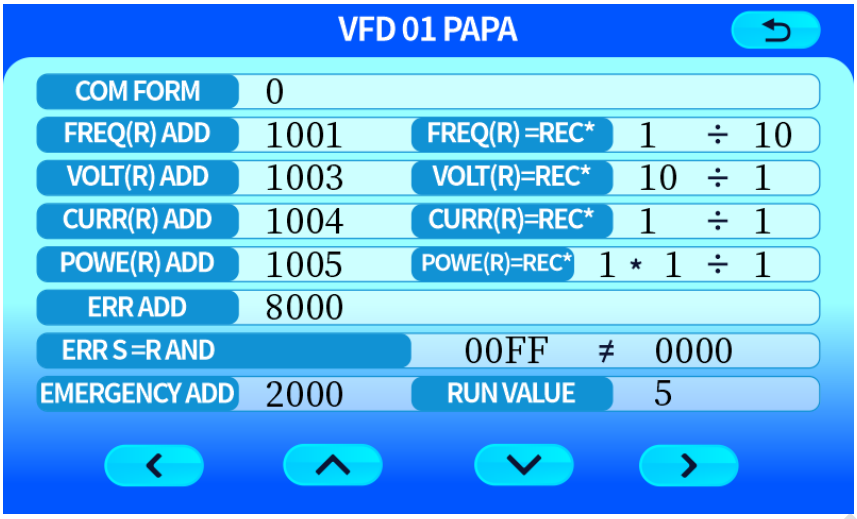
Parameter	Set Initial Value	Description
OIL FILTER RUN TIME (H)	0	Oil filter cumulative usage time. Reset to zero manually after replacing with a new oil filter.
O/A SEPE RUN TIME (H)	0	Oil separator cumulative usage time, reset to zero manually after replacing with a new oil separator.
AIR FILTER RUN TIME (H)	0	Air filter cumulative usage time. Reset to zero manually after replacing with a new air filter.
LUBE RUN TIME (H)	0	Lubricating oil cumulative usage time. Reset to zero manually after changing the lubricating oil.
GREASE RUN TIME (H)	0	Lubricating grease cumulative usage time. Reset to zero manually after changing the lubricating grease.
OIL FILTER MAX RUN TIME (H)	2000	● When the oil filter usage time exceeds this value, the controller issues an alarm. ● If set to 0000, the oil filter alarm function is disabled.
O/A SEPE MAX RUN TIME (H)	2000	● When the oil separator usage time exceeds this value, the controller issues an alarm. ● If set to 0000, the oil separator alarm function is disabled.
OIL FILTER MAX RUN TIME (H)	2000	● When the air filter usage time of the air filter exceeds this value, the controller issues an alarm. ● If set to 0000, the air filter alarm function is disabled.
LUBE MAX RUN TIME (H)	2000	● When the lubricating oil usage time exceeds this value, the controller issues an alarm. ● If set to 0000, the lubricating oil alarm function is disabled.
GREASE MAX RUN TIME (H)	2000	● When the lubricating grease usage time exceeds this value, the controller issues an alarm. ● If set to 0000, the lubricating grease alarm function is disabled.

4.9 VFD Set

Click “VFD SET” to check and set the relevant data. To view or modify VFD set parameter, verification of the VFD set password is required.



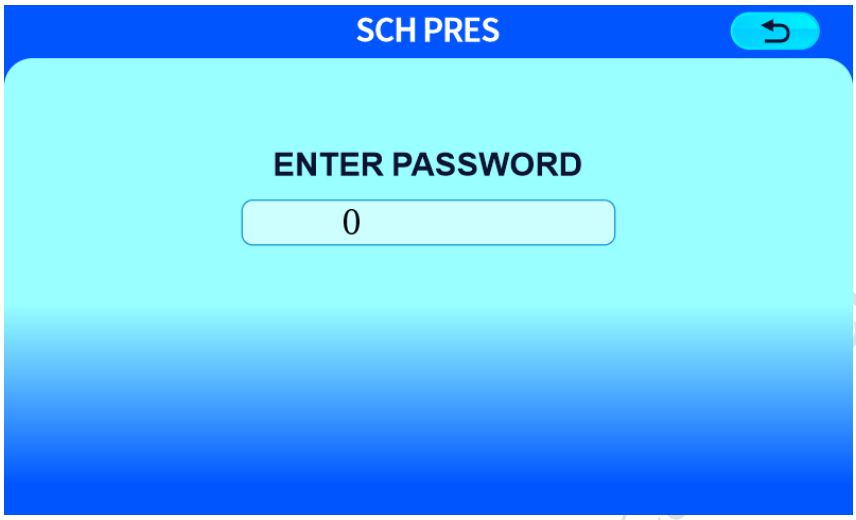
Parameter	Set Initial Value	Description
VFD NAME	USER	Motor VFD model, with 10 built-in VFD models.
RUN(W) ADD1	2000	Address 1 for VFD start command.
RUN VALUE	1	This value is the VFD start value.
RUN(W) ADD2	2000	Address 2 for VFD start command.
RUN VALUE	1	This value is the VFD start value.
STOP(W) ADD	2000	Address for VFD stop command.
RUN VALUE	6	This value is the VFD start value.
RESET(W) ADD	2000	Address for inverter reset command.
RUN VALUE	0001	This value is the VFD start value.
FREQ(W) ADD	1000	Register address for VFD communication to set frequency.
FREQ(R) =REC*	*1000 ÷ 180	For different VFDs, convert data through a formula and send to the VFD.
STATE(R) ADD	3000	The address to read the VFD's running status.
RUN S =RECEIVE AND	0003 = 0001	The formula used to determine if the VFD is running.

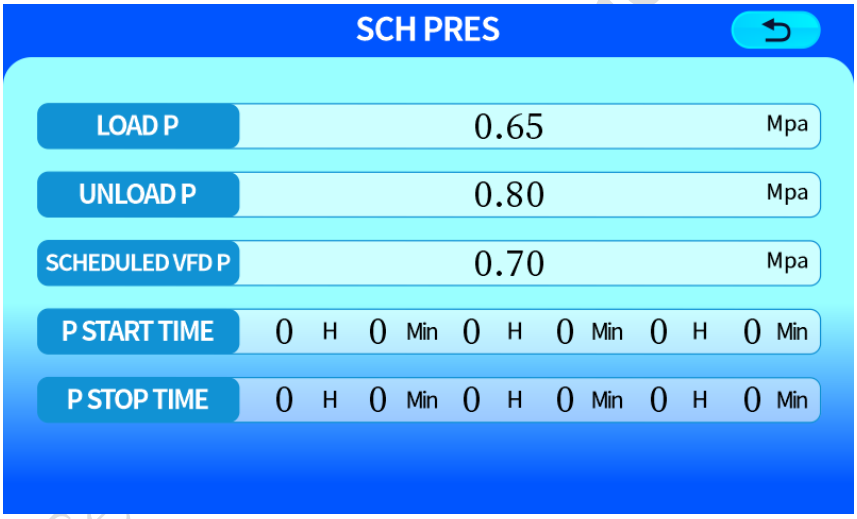


Parameter	Set Initial Value	Description
COM FORM	0	Setting the data format for communication between the controller and the VFD. 0: 8N1-N: One start bit, 8 data bits, 1 stop bit, no parity bit; Note: When communicating with the VFD, the baud rate is fixed at 9600. For other configurations, please contact the manufacturer.
FREQ(R) ADD	1001	The address to read the VFD frequency.
FREQ(R) =REC*	1 ÷ 10	Formula for calculating VFD frequency.
VOLT(R) ADD	1003	The address to read the VFD voltage.
VOLT(R)=REC*	10 ÷ 1	Formula for calculating VFD voltage.
CURR(R) ADD	1004	The address to read the VFD current.
CURR(R)=REC*	1 ÷ 1	Formula for calculating VFD current.
POWE(R) ADD	1005	The address to read the VFD power.
Power = Receive*	1 * 1 ÷ 1	Formula for calculating VFD power.
ERR ADD	8000	The address to read the VFD errors.
ERR S =R AND	00FF≠0000	Formula for determining if the VFD reports a fault.
EMERGENCY ADD	2000	Address for the VFD emergency stop command.
RUN VALUE	1	This value is the VFD start value.

4.10 Scheduled Pressure

Click “SCH PRES” to check and set the relevant data. To view or modify scheduled pressure parameters, verification of the scheduled pressure password is required.



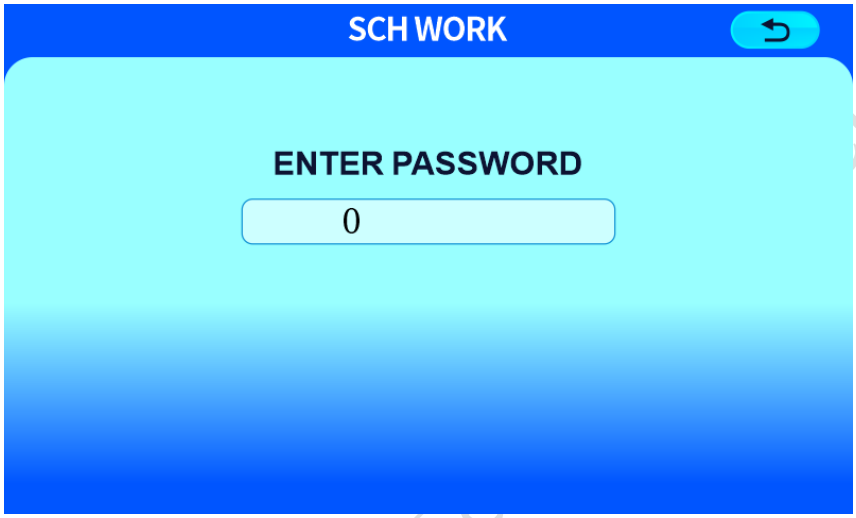


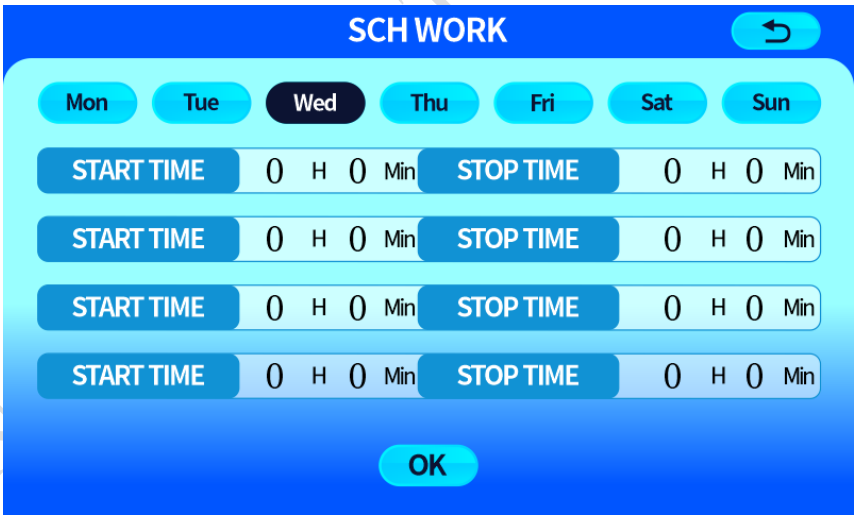
Parameter	Set Initial Value	Description
LOAD P (MPa)	0.65	Load when the pressure is below the set value during the specified start and end times. When set to "0 H 0 Min", this function is invalid.
UNLOAD P (MPa)	0.80	Unload when the pressure is above the set value during the specified start and end times.
SCHEDULED VFD P (MPa)	0.70	Set the air supply pressure for the stable operation of the VFD air compressor during the specified start and end times.
P START TIME	0 H 0 Min	When set to "0 H 0 Min", this function is invalid.
P STOP TIME	0 H 0 Min	When set to "0 H 0 Min", this function is invalid.

4.11 Scheduled On/Off

Click “SCH WORK” to check and set the relevant data. To view or modify scheduled on/off parameters, verification of the scheduled on/off password is required.

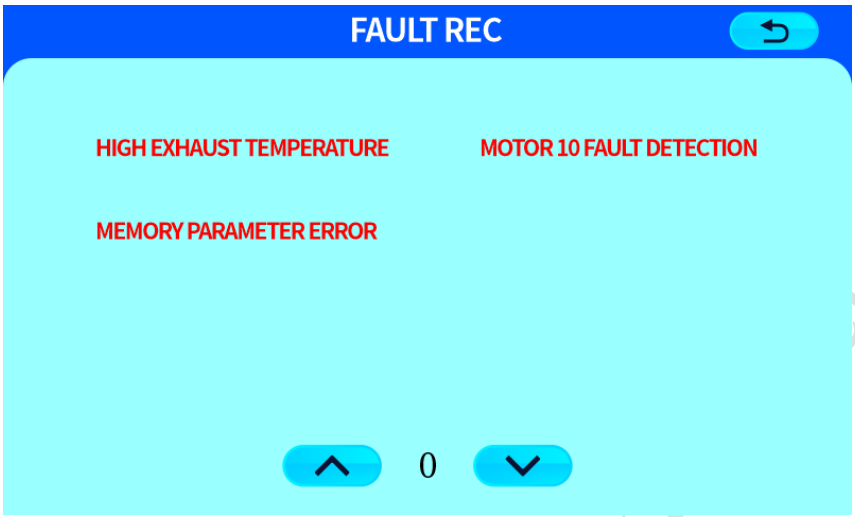
Scheduled on/off are used to set the timing for power on and off throughout the week, with up to four timing periods that can be set for each day. To modify the scheduled on/off, verification of the scheduled on/off password is required. When the data is set to 00:00, this function is inactive.





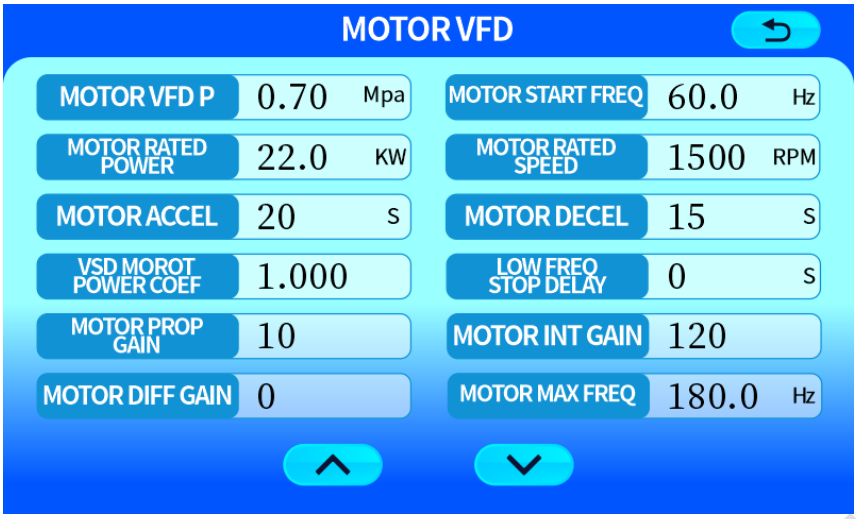
4.12 Fault Record

Record historical fault information to facilitate users in identifying the cause of the fault and excluding peripheral faults. The controller can record up to 100 historical faults.

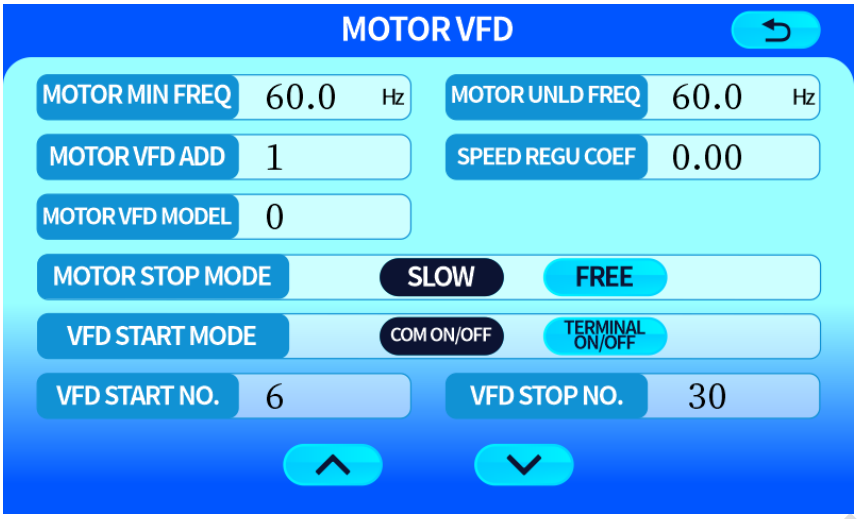


4.13 Motor VFD

Click “MOTOR VFD” to check and set the relevant data. To view or modify motor VFD parameters, verification of the motor VFD password is required.

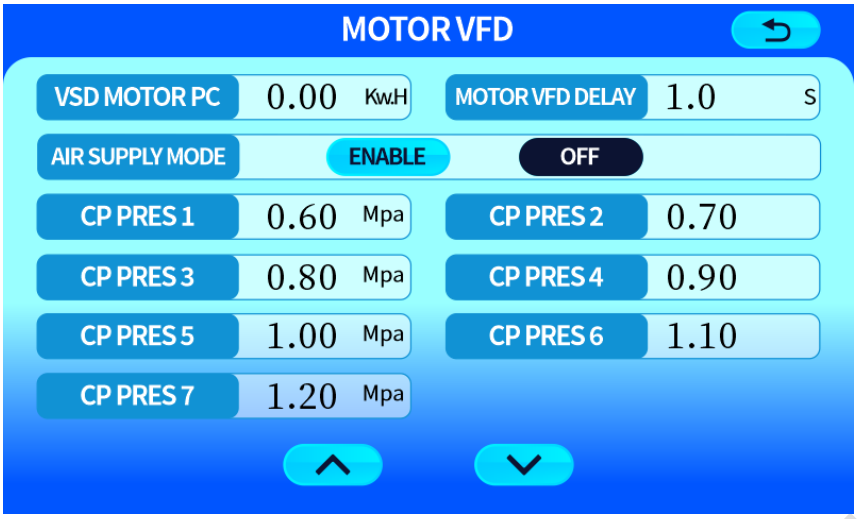


Parameter	Set Initial Value	Description
MOTOR VFD P (MPa)	0.70	Set the supply pressure for stable operation of the VFD air compressor.
MOTOR START FREQ (Hz)	60.0	Set the starting frequency for the operation of the VFD.
MOTOR RATED POWER (KW)	22.0	Set the rated power of the motor.
MOTOR RATED SPEED (RPM)	1500	Set the motor's rotational speed at the highest operating frequency.
MOTOR ACCEL (S)	20	The time it takes for the motor to reach the operating frequency from the starting frequency.
MOTOR DECEL (S)	15	The time it takes for the motor to stop from the operating frequency.
VSD MOROT POWER COEF	1.000	Set the coefficient used to calculate the power of the motor.
LOW FREQ STOP DELAY (S)	0	When set to 0 second, the low frequency function is invalid.
MOTOR PROP GAIN	10	The proportional gain for PID control.
MOTOR INT GAIN	120	The integral gain for PID control.
MOTOR DIFF GAIN	0	The derivative gain for PID control.
MOTOR MAX FREQ (Hz)	180.0	The maximum operating frequency allowed for output when the air compressor is loaded.

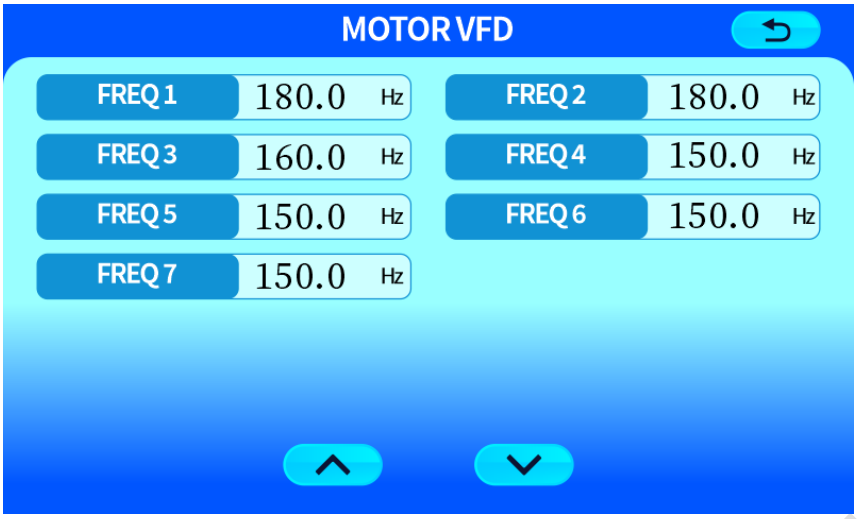


Parameter	Set Initial Value	Description
MOTOR MIN FREQ (HZ)	60.0	The minimum operating frequency allowed for output.
MOTOR UNLD FREQ	60.0	The working frequency allowed for output when unloaded.
MOTOR VFD ADD	1	Set the motor VFD's station number, which must be consistent with the communication station number of the VFD.
SPEED REGU COEF	0.00	Backup.
MOTOR VFD MODEL	0	Backup.
MOTOR STOP MODE	Deceleration Stop	1. Communication Start/Stop: Deceleration Shutdown: Upon receiving the shutdown command, the loading valve is disconnected, and the controller sends a deceleration shutdown command to the VFD. The VFD then decelerates and shuts down according to the set deceleration time. Free Shutdown: Upon receiving the shutdown command, the loading valve is disconnected. The controller sends a frequency writing command through the RS-485 communication port, controlling the VFD's frequency to decrease until, 1 second before the shutdown delay countdown is completed, it sends a shutdown command to the VFD. 2. Terminal Start/Stop: Deceleration Shutdown: After receiving the shutdown command, the loading valve is disconnected, and the motor VFD's running terminal is also disconnected, allowing the VFD to decelerate and shut down based on the set deceleration time. Free Shutdown: After receiving the shutdown command, the loading valve is disconnected while the motor VFD's running terminal remains connected, controlling the VFD's frequency to decrease until it is disconnected 1 second

		before the shutdown delay countdown is completed. Terminal Start and Stop: The frequency converter is started and stopped through switch signals.
VFD START MODE	Communication Start/Stop	Communication Start/Stop: The VFD is started through RS-485 communication. Terminal Start/Stop: The VFD is started and stopped through switch signals.
VFD START NO.	6	After the controller sends a start command to the VFD and discovers that the VFD has not executed the run command, it will resend the start command up to a set number of times. After the controller sends a shutdown command to the VFD and discovers that the VFD has not executed the shutdown command, it will resend the shutdown command up to a set number of times.
VFD STOP NO.	30	After the controller sends a shutdown command to the VFD and discovers that the VFD has not executed the shutdown command, it will resend the shutdown command up to a set number of times.



Parameter	Set Initial Value	Description
VSD MOTOR PC (kW.H)	0.0	Set the motor VFD accumulation electricity usage during operation.
MOTOR VFD DELAY (S)	1.0	After pressing the start button, send a start command to the VFD after a delay set time.
AIR SUPPLY MODE	Disable	Backup.
CP PRES 1 (MPa)	0.60	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 1" value.
CP PRES 2 (MPa)	0.70	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 2" value.
CP PRES 3 (MPa)	0.80	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 3" value.
CP PRES 4 (MPa)	0.90	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 4" value.
CP PRES 5 (MPa)	1.00	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 5" value.
CP PRES 6 (MPa)	1.10	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 6" value.
CP PRES 7 (MPa)	1.20	During constant power operation, when the pressure is greater than or equal to this value, the maximum allowable output frequency is set to the "Constant Power Frequency 7" value.



Parameter	Set Initial Value	Description
FREQ 1 (HZ)	180.0	See the description of constant power operation below the table.
FREQ 2 (HZ)	160.0	
FREQ 3 (HZ)	150.0	
FREQ 4 (HZ)	150.0	
FREQ 5 (HZ)	150.0	
FREQ 6 (HZ)	150.0	
FREQ 7 (HZ)	150.0	

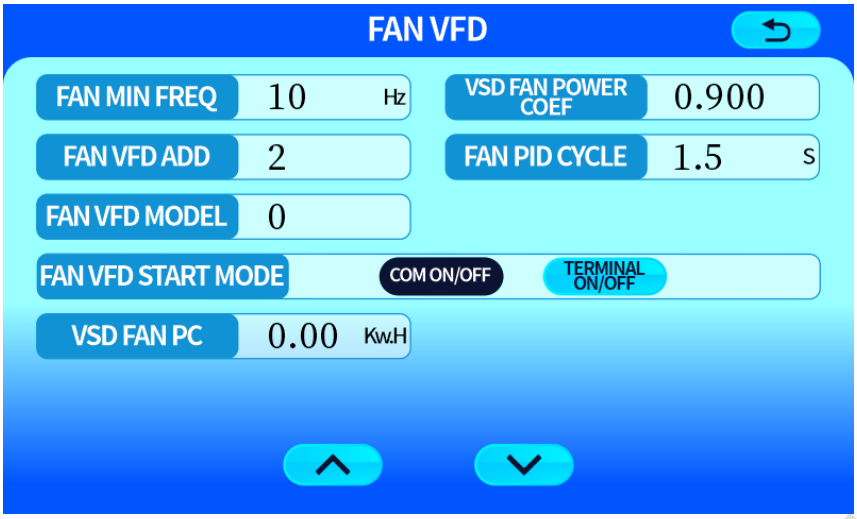
Constant power operation description:

- Constant Power Pressure Setting Requirements: Constant Power Pressure 1 ≤ Constant Power Pressure 2 ≤ Constant Power Pressure 3 ≤ Constant Power Pressure 4 ≤ Constant Power Pressure 5 ≤ Constant Power Pressure 6 ≤ Constant Power Pressure 7;
- Constant Power Frequency Setting Requirements: Constant Power Frequency 1 ≥ Constant Power Frequency 2 ≥ Constant Power Frequency 3 ≥ Constant Power Frequency 4 ≥ Constant Power Frequency 5 ≥ Constant Power Frequency 6 ≥ Constant Power Frequency 7;
- If M > N, when Constant Power Pressure N is set to 00.00, the Constant Power Pressure M and the corresponding Constant Power Frequency M will not take effect;
- When the constant power function is not used, Constant Power Pressure 1 can be set to 00.00 MPa.

4.14 Fan VFD

Click “FAN VFD” to check and set the relevant data. To view or modify fan VFD parameters, verification of the fan VFD password is required.

Parameter	Set Initial Value	Description
FAN VFD T (℃)	78	Set the exhaust temperature for stable operation of the air compressor.
MAX VSD T (℃)	85	When the exhaust temperature is greater than or equal to this value, control the output frequency of the fan VFD to the upper limit frequency set in the manufacturer's parameters.
FAN ACCEL (S)	20	The time it takes for the motor to reach the operating frequency from the start frequency.
FAN DECEL (S)	15	The time it takes for the motor to reach a stop from the operating frequency.
FAN RATED POWER (KW)	1.5	Set the rated power of the fan.
FAN RATED SPEED (RPM)	1500	Set the speed when the fan operates at the maximum frequency.
FAN VFD START (℃)	70	When the exhaust temperature exceeds this set value, the VFD fan starts.
FAN VFD STOP (℃)	65	When the exhaust temperature is lower than this set value, the VFD fan stops.
MOTOR PROP GAIN	10	PID control proportional gain.
FAN INT GAIN	200	PID control integral gain.
MOTOR DIFF GAIN	0	PID control derivative gain.
FAN MAX FREQ (HZ)	50.0	The maximum working frequency allowed for output.



Parameter	Set Initial Value	Description
FAN MIN FREQ (HZ)	10.0	The minimum working frequency allowed for output.
VSD FAN POWER COEF	0.900	Calculate the power coefficient of the fan VFD.
FAN VFD ADD	2	Set the communication station number corresponding to the fan VFD.
Fan PID Cycle (S)	1.5	Backup.
FAN VFD MODEL	0	Backup.
FAN VFD START MODE	Communication Start/Stop	Set the start method for the fan VFD.
VSD FAN PC (kW.H)	0.00	Electricity consumption of the fan VFD.

4.15 Date and Time

Click “Date and Time” to check and set the relevant data.

4.16 Operation Permissions and Password Management

Password Type	Password	Permission
User Password	****	Allow modification of all user parameters.
Factory Parameters Password	****	Allow modification of all factory parameters.
Calibration Password	****	Allow modification of all calibration parameters.
Block Parameters Password	****	Allow modification of all block parameters.
Hardware Password	****	Allow modification of all hardware parameters.
Maintenance Parameters Password	****	Allow modification of all maintenance parameters.
VFD Set Password	****	Allow modification of all VFD set parameters.
Scheduled Pressure Password	****	Allow modification of all scheduled pressure parameters.
Scheduled On/Off Password	****	Allow modification of all scheduled on/off parameters.
Motor VFD Password	****	Allow modification of all motor VFD parameters.
Fan VFD Password	****	Allow modification of all fan VFD parameters.

5 Alarm

No.	Alarm Type	Description
1	Air Filter Alarm	● Detect air filter blockage. (In the hardware parameters, there is a switch input terminal function, set as an air filter detection function.) When the air filter differential pressure switch is closed, the display prompts "Air Filter Blocked"; ● Air filter usage time warning. When the air filter usage time is up, the display prompts "Air Filter Usage Time Expired".
2	Oil Filter Alarm	● Detect oil filter blockage (In the hardware parameters, there is a switch input terminal function, set as an oil filter detection function.) When the oil filter differential pressure switch is closed, the display prompts "Oil Filter Blocked". ● Oil filter usage time warning. When the oil filter usage time is up, the display prompts "Oil Filter Usage Time Expired".
3	Oil Separator Alarm	● Detect oil separator blockage (In the hardware parameters, there is a switch input terminal function, set as an oil separator detection function.) When the oil separator differential pressure switch is closed, the display prompts "Oil Separator Blocked". ● Oil filter usage time warning. When the oil filter usage time is up, the display prompts "Oil Filter Usage Time Expired".
4	Lubricating Oil Usage Time Alarm	When the lubricating oil usage time is up, the display prompts "Lubricating Oil Usage Time Expired".
5	Lubricating Grease Usage Time Alarm	When the lubricating grease usage time is up, the display prompts "Lubricating Grease Usage Time Expired".
6	High Exhaust Temperature Alarm	When the system detects that the exhaust temperature value exceeds the "Exhaust Temperature Alarm" value set in the manufacturer's parameters, and the display prompts "High Exhaust Temperature".

6 Safety Protection and Trouble Shooting

No.	Fault	Reason	Solution
1	Motor Overload	Overload,、bearing wear off or other mechanical failure.	Check the set data, voltage, bearing, tubes and other mechanical system.
2	Fan Motor Overload	Overload,、bearing wear off or other mechanical failure.	Check the set data, voltage, bearing, tubes and other mechanical system.
3	Power Input Phase Loss	Power or contactor phase loss. When the air compressor is shut down, it is not allowed to start the air compressor if a phase loss in the power supply is detected. At this time, check the three-phase input lines of the controller.	Check the power and contactors.
4	Power Input Phase Sequence Protection	Power supply, contactor, or power phase sequence error. When the air compressor is shut down, it is not allowed to start if a phase sequence error is detected. In this case, swap any two power supply lines and check the direction of the motor rotation.	Check the wiring.
5	Voltage Too High	Motor power supply voltage high.	Check the power and contactors.
6	Voltage Too Low	Motor power supply voltage low.	Check the power and contactors.
7	Fan Unbalance	Poor contact in the contactor, open circuit within the motor.	Check the power, contactors and motor.
8	High Exhaust Temperature	When the discharge temperature exceeds the set high limit, the controller to issue an alarm and stop the machine.	Check the vent condition and lubricant amount etc.
9	Air Supply Overpressure	When the air supply pressure exceeds the set high limit, the controller to issue an alarm and stop the machine.	Check the pressure and the pressure sensor.
10	Pressure Sensor Fault	When the pressure sensor is open-circuited, the controller issues an alarm and stops the machine.	Check the wiring and pressure transmitter.
11	Temperature Sensor Fault	When the temperature sensor is open-circuited, the controller issues an alarm and stops the machine.	Check the wiring and PT100.
12	Memory Parameter Error	When the version parameters change, the controller issues an alarm.	Restart

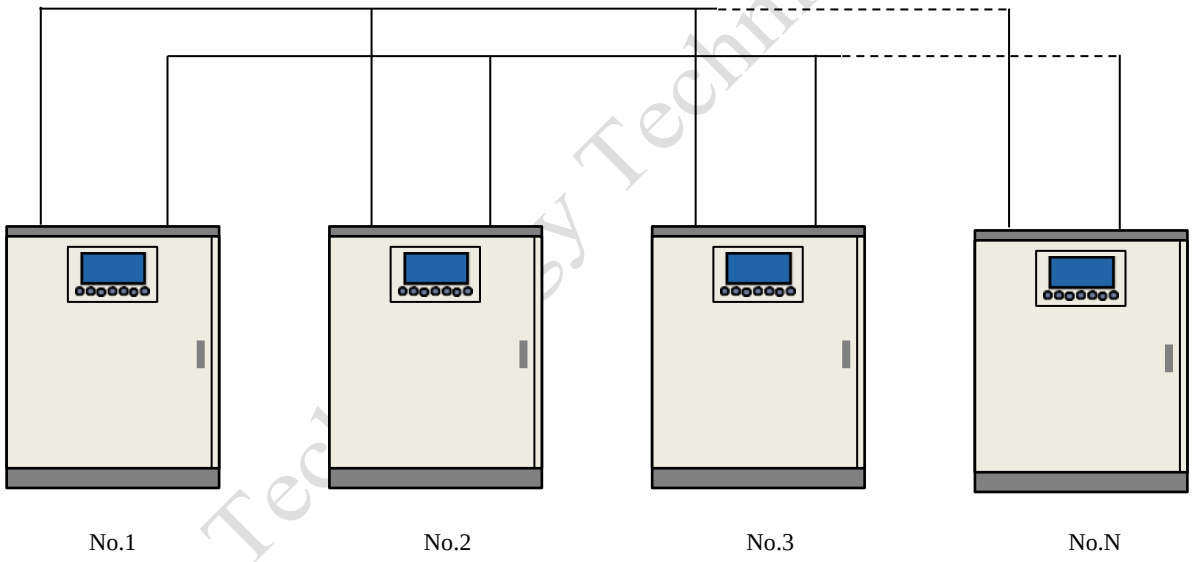
7 Block Control and Network Communication

7.1 Block Control

DWIN air compressor controller AP80480T070WTR01 can work in block mode, with a maximum of 16 air compressors controllable in block operation.

Compressor with COM ADD 0001 is the master, others are slave. Any DWIN air compressor controller AP80480T070WTR01 can be set as a master or slave.

In BLOCK PARAMETER SET menu, set as VSD-VSD or PF-PF, master chooses compressor to work according to the TOTAL RUN TIME. Compressor with shorter running time is chosen to start and compressor with longer running time is chosen to stop with priority.



7.2 Block Control Set

【1】Set as master

Set the COM ADD in USER PARA to 1. Set block parameters in BLOCK PARA.

【2】Set as slave

Set “COM MODE” to “BLOCK”. Set “COM ADD” according to the number of air compressors, ranging from 2 to 16 in sequence in user parameters.

7.3 Block Control

Make sure block cables is connected correctly and the air compressor parameters are set correctly. Activate No. 1 master. The master will automatically control the operation of the air compressors in the network based on the detected air supply pressure. When manually stopping the No. 1 master, the block control will stop and the No. 1 master will no longer send control commands to the networked air compressors.

8 Network Communication

DWIN air compressor controller AP48270T043WTR01 supports MODBUS RTU protocol and can serve as salve when connected with other devices. It supports 03 and 06 MODBUS command. Communication baud rate: 9600 BPS. 1 start bit, 8 data bits, 1 stop bit and no parity bit. Specific requirements can be discussed by contacting DWIN.

9 Schematic Diagram