Air Compressor Control System HMI-680T Interface Manual V1.0

The air compressor control system HMI-680T developed by our company has rich interface display, powerful function and simple use, which can easily realize the human-computer interaction function of the air compressor control system. Thank you for your choice!

1、Hardware parameters

1.1 Installation dimension and overall dimension

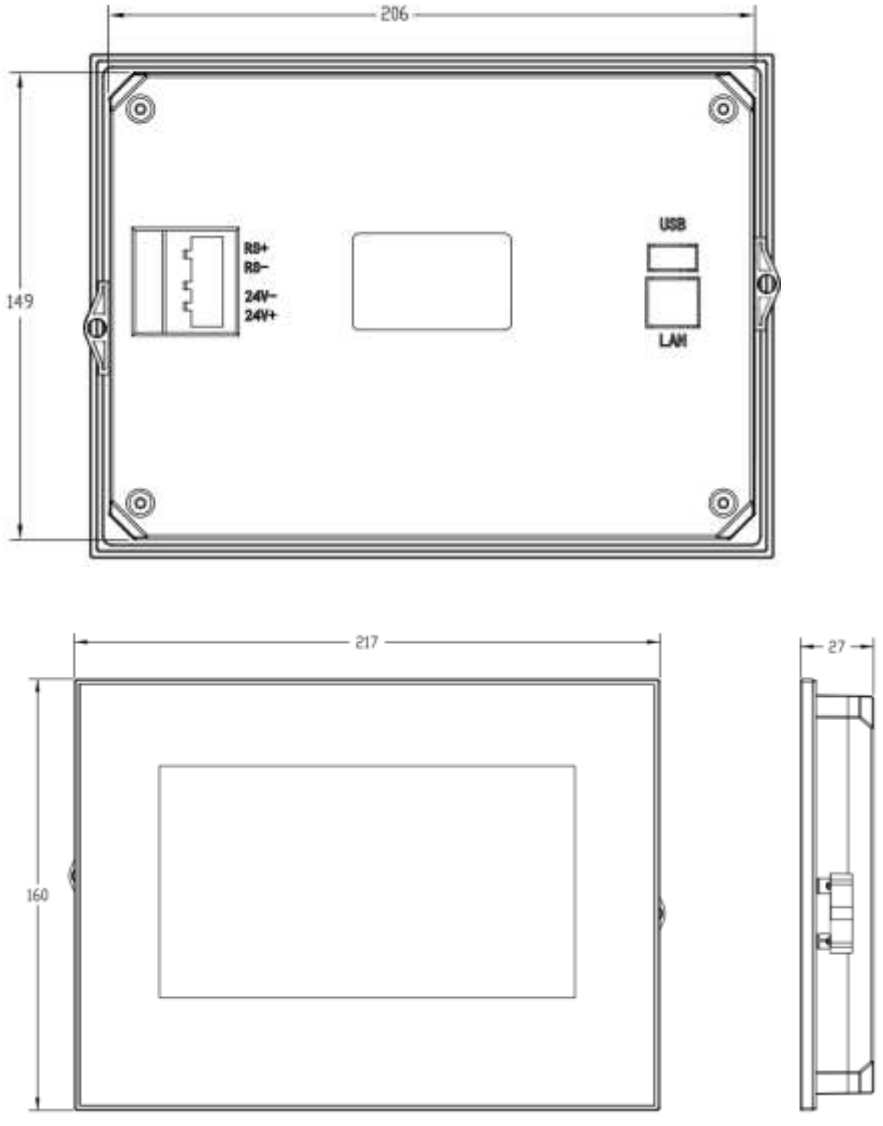


Fig. 1 Structure Diagram

1.2 Wiring terminal diagram

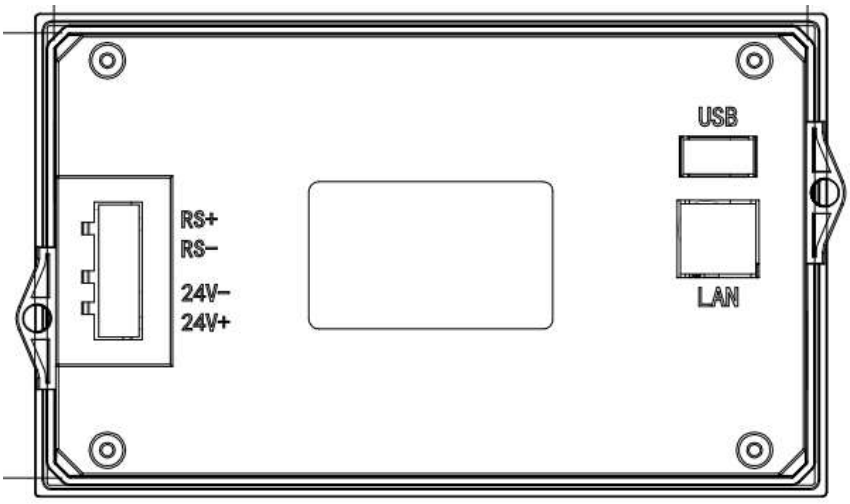
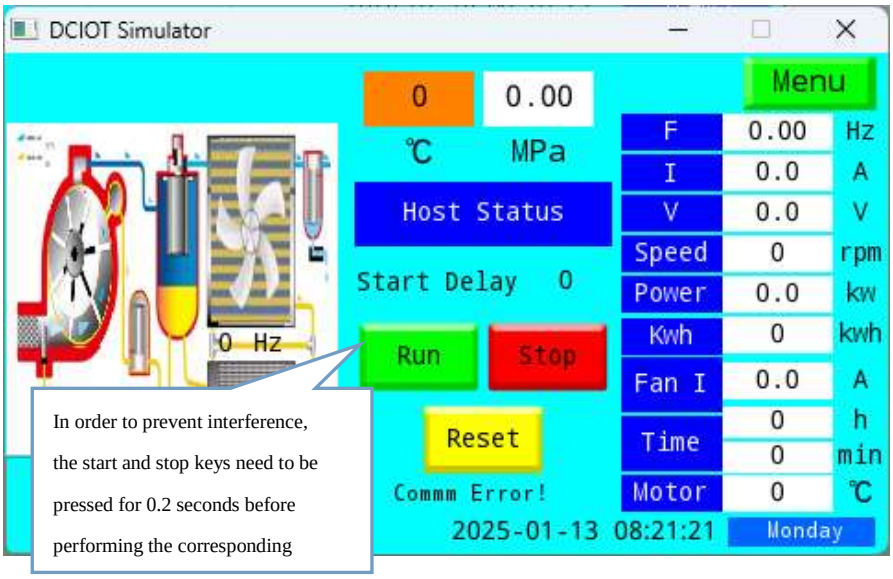


Figure 2 Terminal Definition

Note: Please install the corresponding terminal wiring. Wrong wiring will cause damage to the touch screen.

2、The system starts

Supply power to the touch screen, the power supply is DC24V, wait for a few seconds to complete the system data loading, and enter the main interface, as shown in Figure 3:



2.1 System settings

（1）The system main interface

① System startup is completed, enter the main interface, main show air compressor running commands (start, stop, and reset), running parameters (temperature, pressure, output frequency, output current, output voltage, output speed and output power, electricity, fan current ， operating time 、 motor temp and motor temperature.).

② The lower left corner has multiple fault display functions. When the communication between the touch screen and the frequency converter is interrupted, the communication fault is displayed at the lower end of the reset button.

③ Current time display, the lower right corner display includes the current year, month, day and week display, long press "year" display for 3 seconds, can enter the time adjustment mode.

（2）System to the main menu

Click "menu" option, a pop-up in the main menu including user parameters, timing control, fault records, maintenance parameter，options such as manufacturer parameters and manufacturer information.

Into the part of the menu to enter the password in the interface, including the "users" parameters "timing control" "maintenance parameters" parameters "manufacturer" as shown in figure 4:

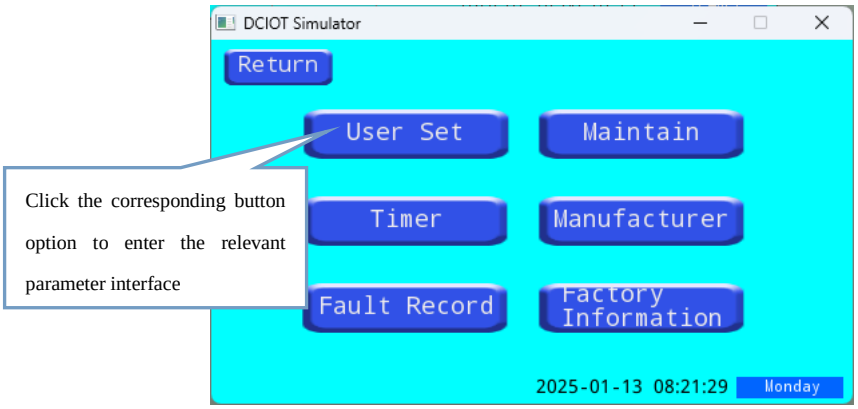


Figure 4
The main menu

（3）User Set

Click on the "user set" option, "password" interface, enter the password to enter parameter interface, as shown in figure 5 :

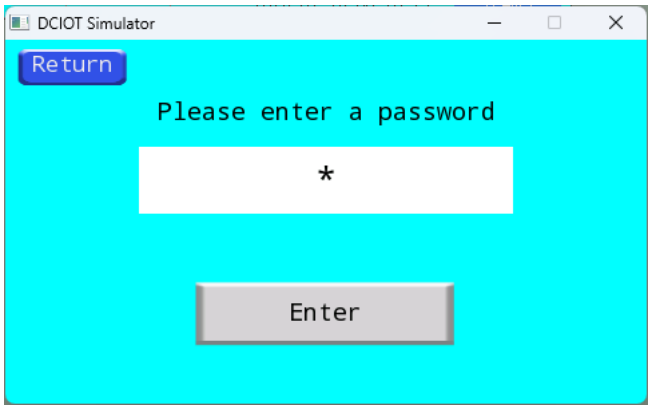


Figure 5
The password input

Enter a password to enter the "user parameters" interface, users can set in the "user preferences" delay, pressure and fan control parameters, as shown in figure 6:

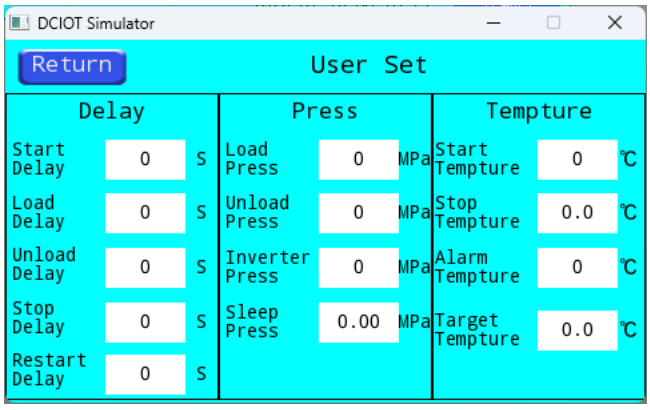


Figure 6
User set

（4）Timing control

"Timing control" function can be set up the system in week timing boot and shutdown time, realize the automatic operation of the system. In the corresponding input box input time Settings, click the corresponding "tick" set to complete; Do not use this function, all the "tick" no choice; As shown in figure7:

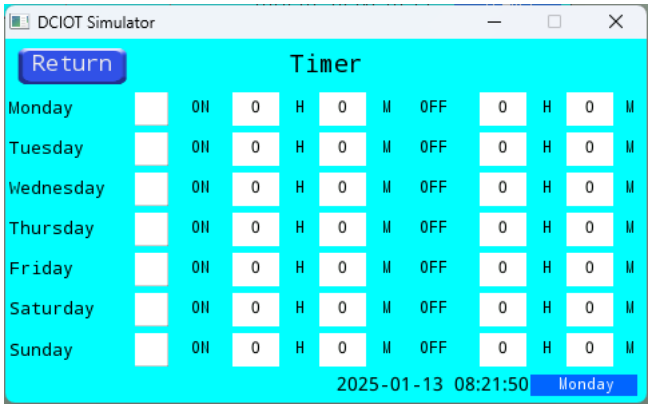


Figure 7
Timing control

（5）Fault record query

Click on the "failure record" "fault record" interface, real record system fault type and fault time, as shown in figure 8:

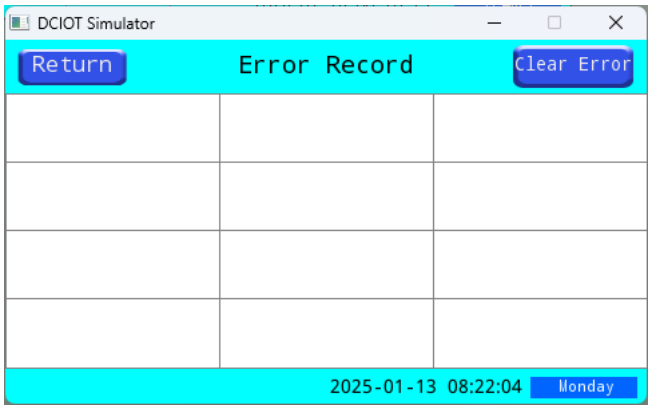


Figure 8
Fault record query

（6）Maintain parameter

Click on the "maintenance parameter" option, "password" interface, enter the password to enter parameter interface, as shown in figure 9 :

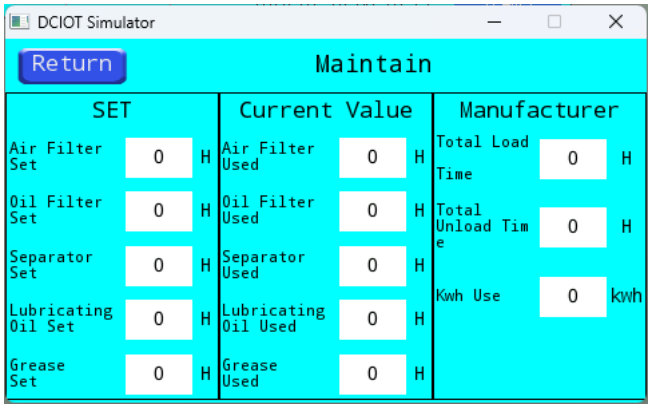


Figure 9
Maintain parameter

（7）Manufacturer of parameters

Click on the "manufacturer" parameters, the pop-up interface "password", enter the password to enter parameter interface, as shown in figure 10:

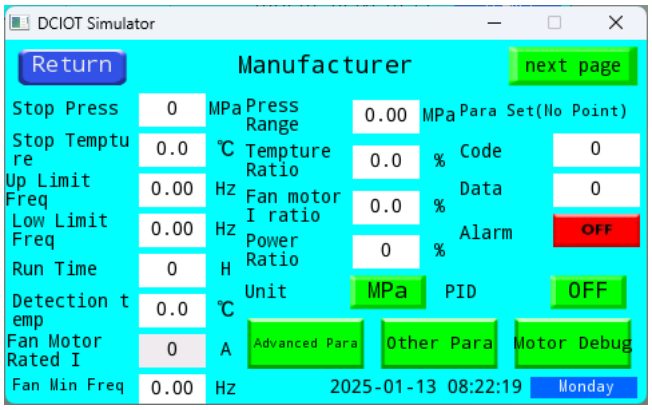


Figure 10
Manufacturer of parameters

Main features include: motor debugging, the function parameter Settings, analog keyboard and information.

①.Motor Debugging

Click "motor debugging", "Motor debugging" into the interface as shown in figure:11

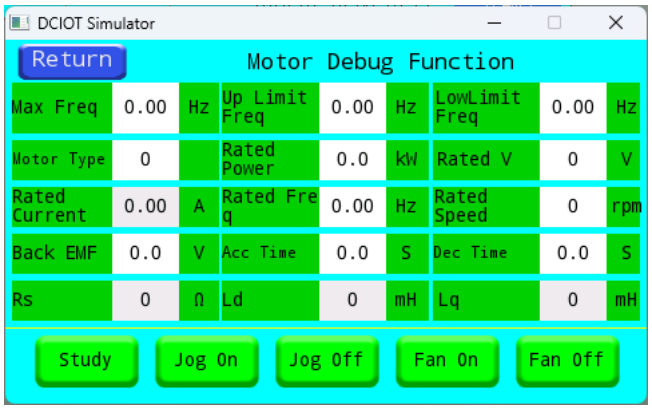


Figure 11
The motor parameters

Main features include: set motor related parameters, self-learning, inching commissioning and fan start-stop control.

② Motor since the study

Click "study", and under the conditions of machine downtime, system of motor, automatically self learning, learning is completed, the system prompt "studying", if learning fails, then the system prompt "study error", the interface is shown in figure 12:

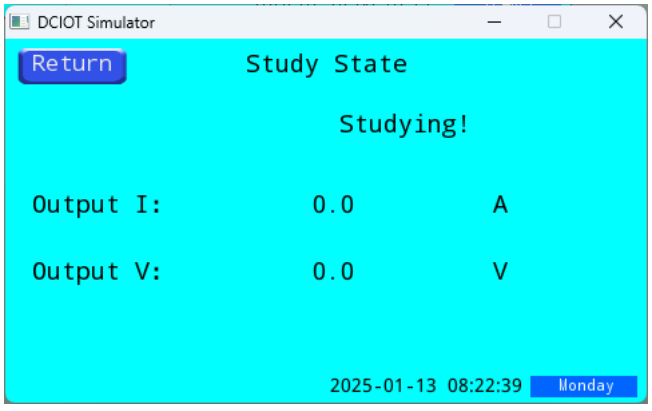


Figure 12
Motor since the study

Learning success and then click the back button, enter the machine debugging interface, inching test used to test the motor steering, the default run at 10 Hz, observe the motor turned to

whether it is right, such as steering error in time click on the "point move to stop" button, change the motor line, debug step motor to appeal.

Fan, debugging, and click "run" fan, fan to observe whether it is right, such as working properly, then stop running, back to the main interface, such as reverse operation is changing any two fan thread.

③ Information

Click on "information" button, enter the interface system parameters, the password used for manufacturer and user password change, as shown in figure 13:

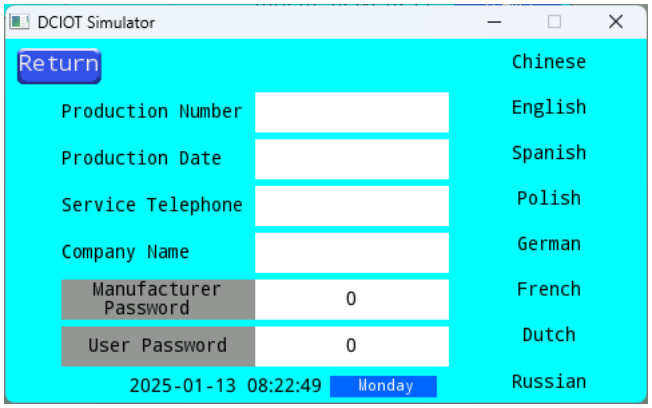


Figure 13 Information

（8）Information

Click on the "Information", "Information" into the interface, as shown in figure 14:

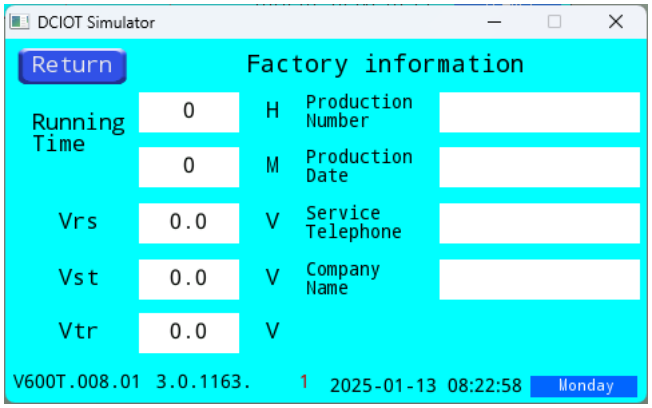
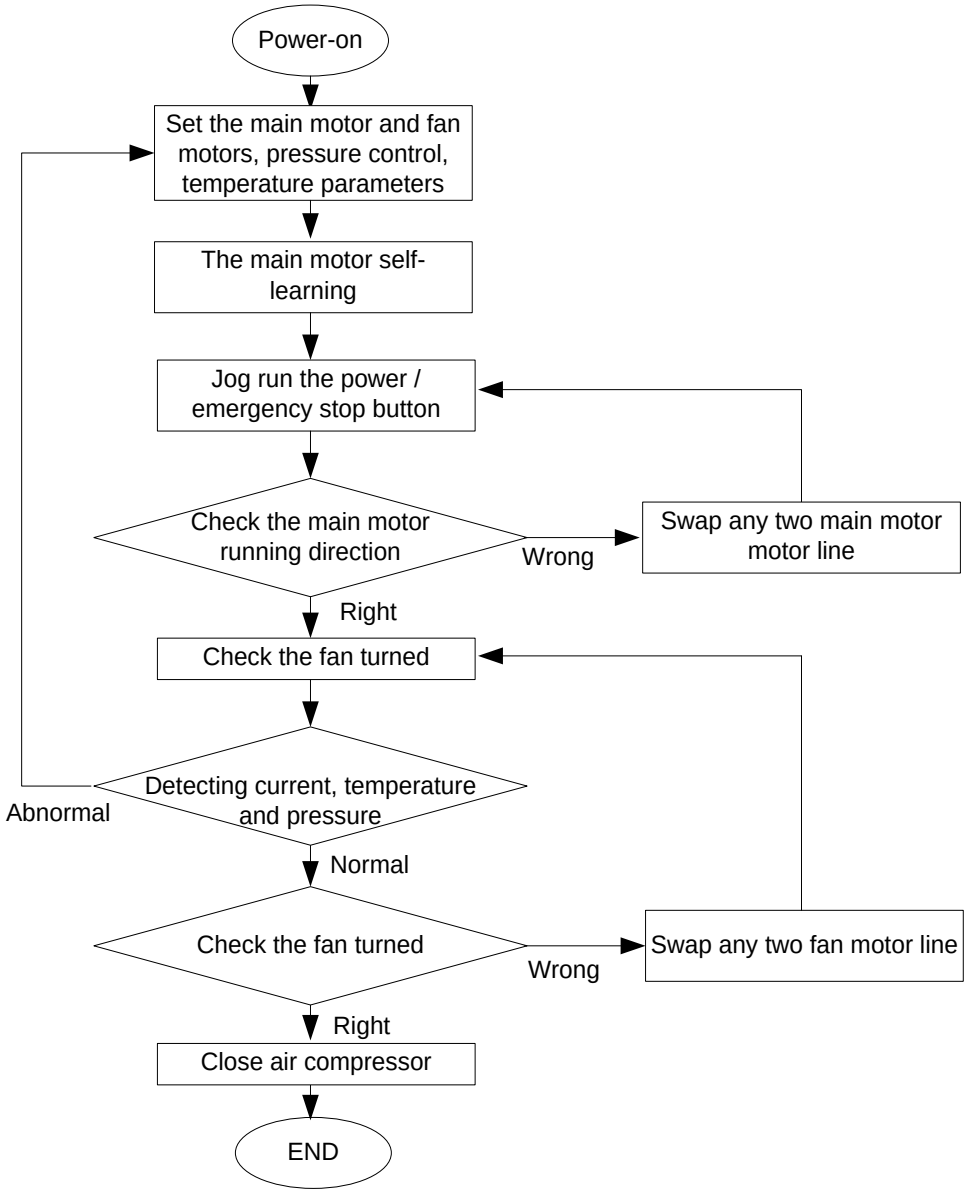


Figure 14 Information

Note: the above function if you have deviation with the actual use, is the function of the software version upgrades, please refer to use.

3、System debugging/operation



SP600 SP600 Series Air Compressor Integrator User Manual

Foreword

Thank you for choosing SP600 series air compressor integrator.

SP600 series air compressor integrator using sheet metal structure, floor and wall supports two kinds of installation, ease of installation; commissioning wiring products easy to operate, wherein the control circuit terminal plug-in connector terminals, and mistake proofing plug design; high integration products: built-in DC reactors to reduce the external interference, improve the power factor; built-in 220V AC power supply, transformer anti-over current fuses provide 24V DC external output; the other built-in integrated PT100 and PTC, and other detection circuit and protection circuit. Product software uses special software, communications equipment HMI, and other things with no debugging achieve a key to start.

This guide describes the SP600 series air compressor integrator basic information and use instructions, please be sure to carefully read this manual before use.

Precautions
● The illustrations in this manual are for illustrative purposes only, and may differ from the product you ordered. ● The company is committed to continuous improvement of products, will continue to upgrade product function, the information provided is subject to change without notice. ● If you use with a problem, please contact our agents in each region, please contact customer service with the company.

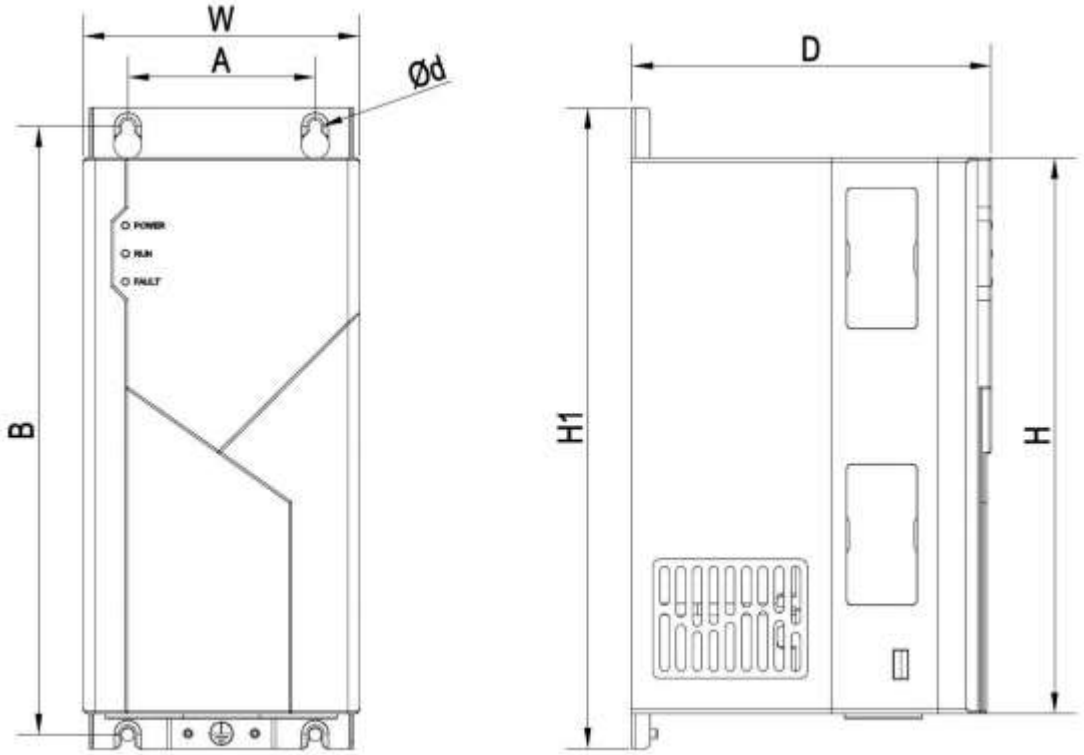
1 Basic Specifications

Item		specification
Basic control functions	Control mode	Open loop vector control, V / F control
	Maximum frequency	Open loop vector control：0～600Hz，V / F control：0～3200Hz
	Carrier frequency	0.5kHz ～ 15kHz ， The carrier frequency is automatically adjusted based on the load features.
	Input frequency resolution	Digital setting：0.01Hz Analog setting: maximum frequency x 0.025%
	Startup torque	0.5 Hz/150%
	Speed range	1:100
	Speed stability accuracy	± 0.2%
	Torque control accuracy	±10%
	Overload capacity	60s for 150% of the rated current, 3s for 180% of the rated current.
	Torque boost	Fixed boost Customized boost 0.1%–30.0%
	V/F curve	Straight-line V/F curve Multi-point V/F curve N-power V/F curve (1.2-power, 1.4-power, 1.6-power, 1.8-power, square)
	V/F separation	Two types: complete separation; half separation
	Ramp mode	Straight-line ramp S-curve ramp Four groups of acceleration/deceleration time with the range of 0.0–6500.0s
	Communication methods	RS485
	JOG control	JOG frequency range: 0.00–50.00 Hz JOG acceleration/deceleration time: 0.0–6500.0s
	Built-in PID	It realizes process-controlled closed loop control system easily.
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Frequency source	Digital setting
Input and output interfaces	Analog Input	1 pressure sensor: 4 ~ 20mA input 2 temperature sensor: PT100
	Digital input	2 digital input 1 PTC circuit protection (compatible with normal digital inputs)

	Digital Output	1 normally open relay output (built in 220VAC voltage)
	LED diode display	Standard 3 LED display
protection	Motor overheating protection (PTC), the power-to-ground short-circuit protection, inverter over-current, overload, over voltage, under voltage, over temperature, output phase, communication fault, fault current detection, EEPROM write failure and so on。	
Environment	Installation location	Indoor, free from direct sunlight, dust, corrosive gas,combustible gas, oil smoke, vapor, drip or salt.
	Altitude	Lower than 1000 m
	Ambient temperature	-10°C ～40°C (Downshift if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C～60°C

2 Dimensions

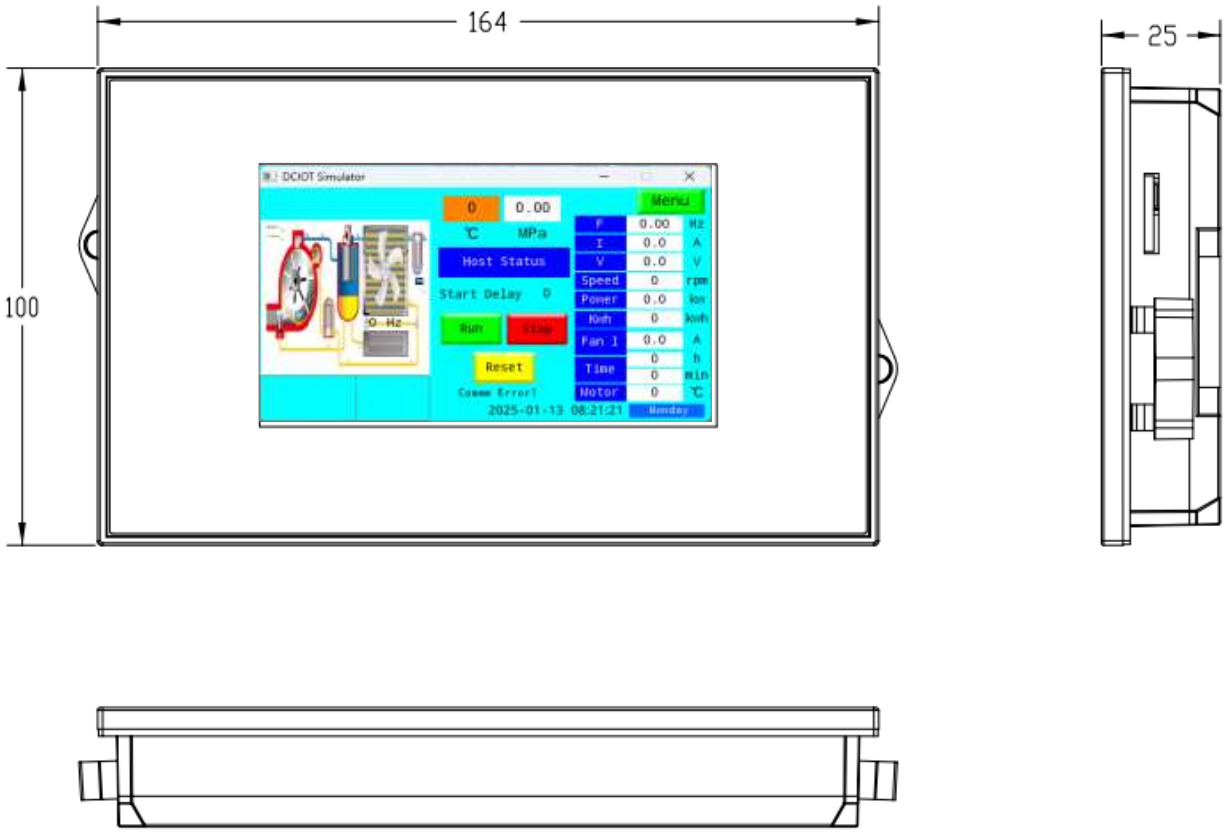
2.1 Closet dimensions

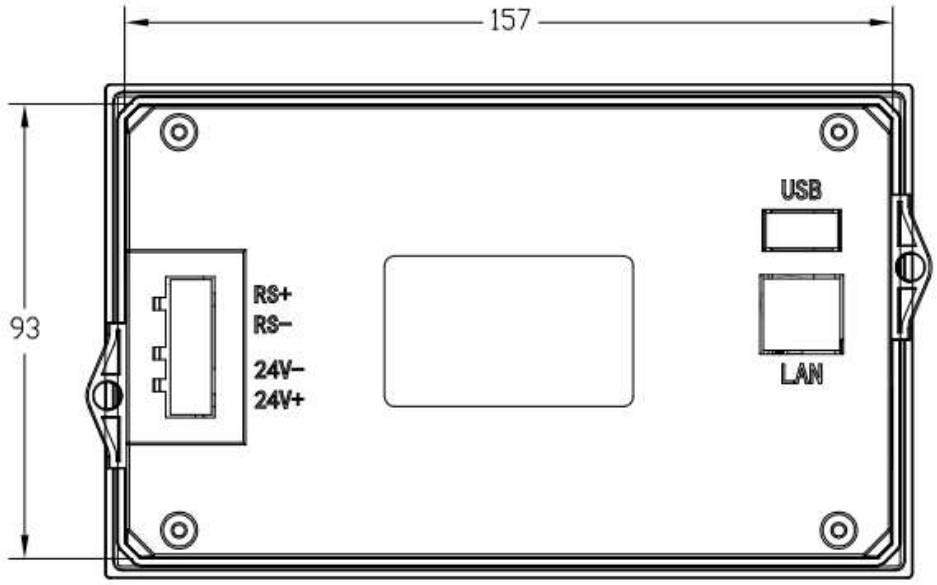


MODEL	W	H	H1	D	A	B	Ød
SP600T-5R5KY-4 SP600T-7R5KY-4	118	238	274	154	80	260	5.5
SP600T-011KY-4 SP600T-015KY-4	145	293	335	172	100	320	7
SP600T-018KY-4 SP600T-022KY-4	168	338	380	172	100	365	7
SP600T-030KY-4 SP600T-037KY-4	217	400	--	216	202	385	7
SP600T-045KY-4 SP600T-055KY-4	300	440	470	275	210	455	9
SP600T-075KY-4	338	455	485	240	270	470	9
SP600T-090KY-4	275	590	630	310	200	612	9
SP600T-110KY-4							
SP600T-132KY-4	300	610	650	310	200	633	9
SP600T-160KY-4	400	675	715	310	320	695	11

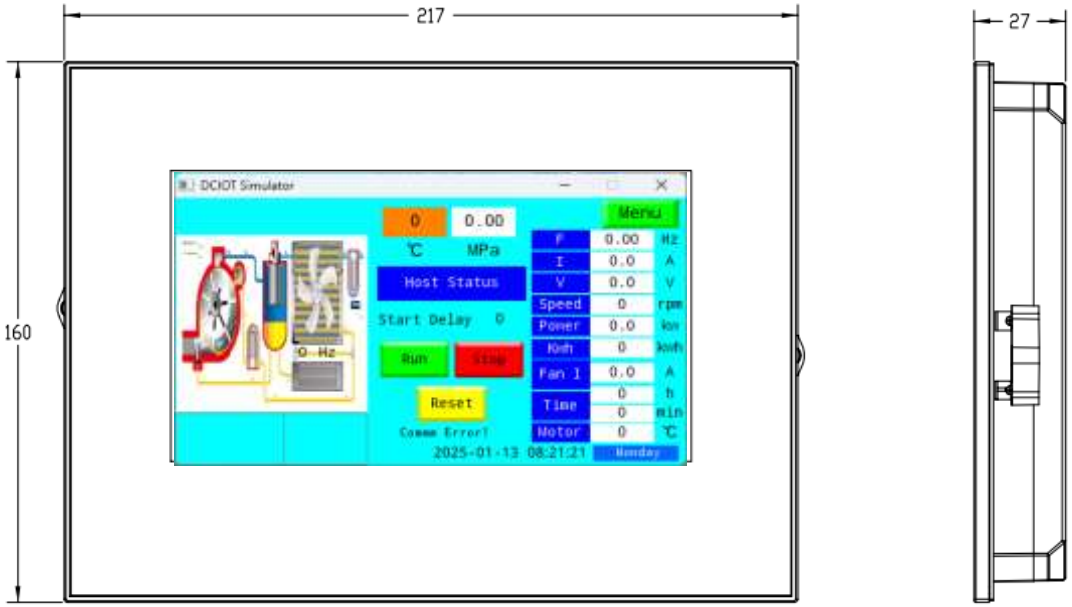
2.2 HMI installation dimension

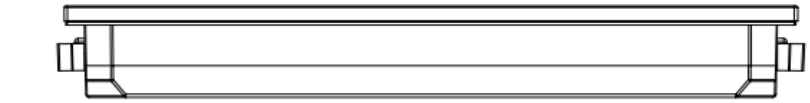
HMI-600T（4.3 inch）

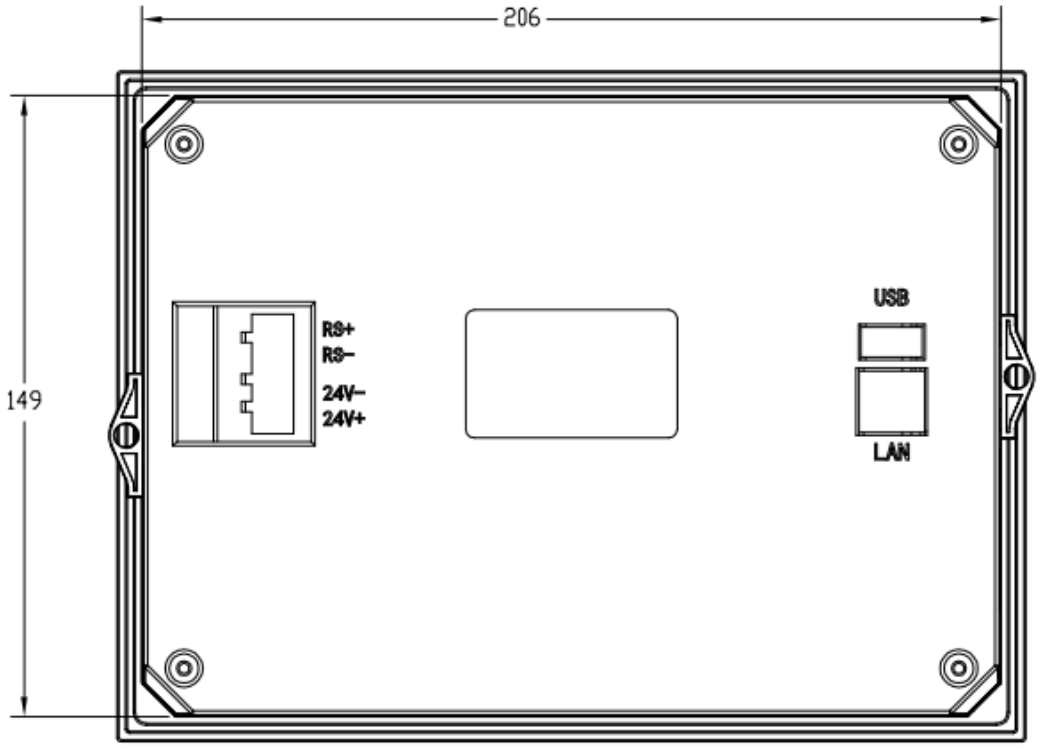



157
93
USB
RS+
RS−
24V−
24V+
LAN

HMI-680T（7 inch）

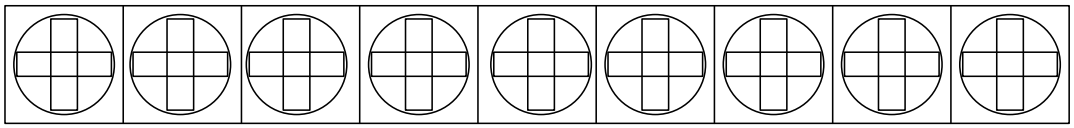






3 Terminal Definition

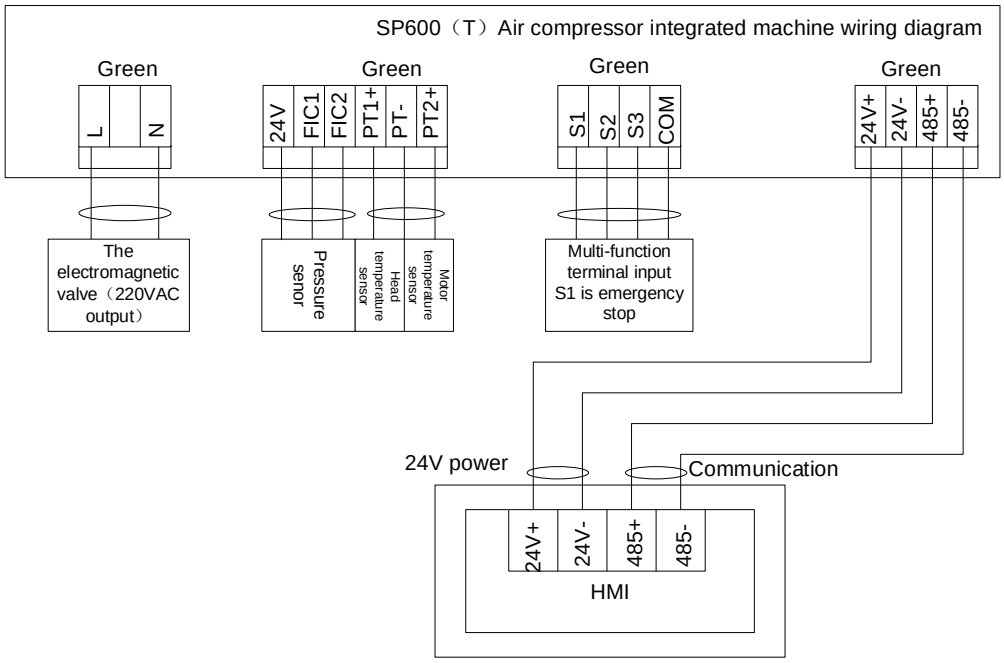
3.1 Main circuit terminal definitions



U2 V2 W2 R S T U1 V1 W1

Terminal symbol	Terminal functions
R、S、T	Three-phase AC input terminals
U1、V1、W1	The master three-phase AC inverter output terminals
U2、V2、W2	Fan-phase AC output terminal
PE	Ground terminal

3.2 Definition of the control terminal and wiring



Note:

1) PT2 +, PT 2- are motor PT100 terminals, please shorted missed, otherwise it will report motor overheating fault.

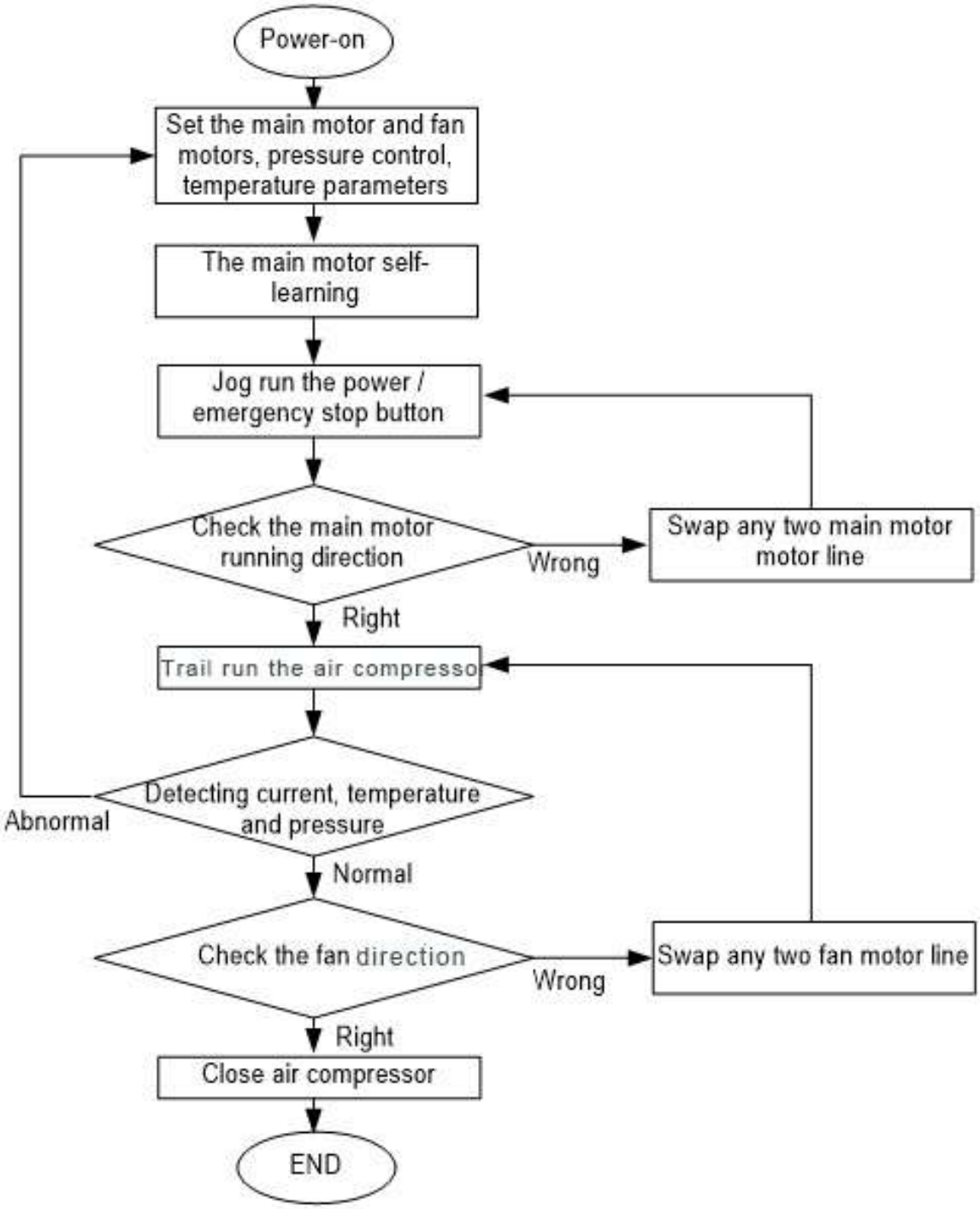
2) S3 is the Motor PTC terminals, please COM shorted missed, otherwise it will be reported to the motor overheating fault.

3.3 Rated input/output current

Model	Rate input current	Main motor rate output	Fan motor rate output

	（A）	current（A）	current（A）
SP600T-5R5KY-4	15.9	13	3
SP600T-7R5KY-4	20	17	3
SP600T-11KY-4	26	25	3
SP600T-15KY-4	35	32	3
SP600T-18.5KY-4	38	37	3
SP600T-22KY-4	46	45	3
SP600T-30KY-4	62	60	3
SP600T-37KY-4	76	75	3
SP600T-45KY-4	92	90	15
SP600T-55KY-4	113	110	15
SP600T-75KY-4	157	150	15
SP600T-90KY-4	180	176	15
SP600T-110KY-4	214	210	15
SP600T-132KY-4	256	253	15
SP600T-160KY-4	307	300	15

4 Debugging Process


Power-on
Set the main motor and fan motors, pressure control, temperature parameters
The main motor self-learning
Jog run the power / emergency stop button
Check the main motor running direction
Wrong
Swap any two main motor motor line
Right
Trail run the air compresso
Detecting current, temperature and pressure
Abnormal
Normal
Check the fan direction
Wrong
Swap any two fan motor line
Right
Close air compressor
END

5 Function parameter

Group P0 Monitoring Preferences			
Code	**Function**	**Accuracy**	**type of data**
P0.00	Display selection	0-32	Read-only
P0.01	Set frequency	0.01Hz	Read-only
P0.02	Output frequency	0.1Hz	Read-only
P0.03	Output current	0.1A	Read-only
P0.04	Running speed	1rpm	Read-only
P0.05	DCV	0.1V	Read-only
P0.06	Inverter temperature	1℃	Read-only
P0.07	Pressure compressor	0.01MPa	Read-only
P0.08	Running hours	1hour	Read-only
P0.09	Output voltage	0.1V	Read-only
P0.10	PID stage status	0：Start-up delay 1： Loading delay 2： Running 3： Pressure relief 4： Sleeping 10：Stop delay 11：Standby 12：Restart delay 13：malfunction	Read-only
P0.11	PID each stage timing	1s	Read-only
P0.13	Head temperature	1℃（PT1+/PT1-）	Read-only
P0.14	Inverter fault	Bit0: Inverter fault Bit1: Air Compressor overheating Bit2: Air Compressor over pressure Bit3: EMERGENCY	Read-only

		Bit4: Fan status Bit5: Phase sequence fault Bit6: Pressure sensor failure(<2Ma) Bit7: Motor overheating PT100 Bit8: Motor failure PTC Bit9: Communication fault Bit10: Electromagnetic valve Bit11: Reserved Bit12: Fan motor over current alarm Bit13: Fan inverter alarm	
P0.15	Air filter used time	1hour	Read-only
P0.16	Oil filter used time	1hour	Read-only
P0.17	Splitter used time	1hour	Read-only
P0.18	Lubricants used time	1hour	Read-only
P0.19	Grease used time	1hour	Read-only
P0.20	Power	0.1KW	Read-only
P0.21	Motor temperature	1℃（PT2+/PT2-）	Read-only
P0.22	Total running time	1hour	Read-only
P0.23	Total loading time	1hour	Read-only
P0.24	Total uninstall time	1hour	Read-only
P0.25	Fan current	0.0A	Read-only
P0.26	Energy used	1kwh	Read-only
P0.27	Fault code	Inverter fault codes	Read-only
P0.28	Inverter status	1：Forward running 2：Reverse running 3：Stop	Read-only
P0.29	Running time in minutes		
P0.32	Main inverter fault code		Read-only

Group P1 Master basic parameters and motor parameters			
Code	**Function**	**Setting range**	**Factory default**
P1.00	Keyboard setting frequency	0~P1.05	00.00Hz
P1.01	Control method	0:Vector without PG 1:V / F control	0
P1.02	Frequency setting mode	0:KEY 1:FIC: 4-20mA 2:Communication	0
P1.03	Operation mode	0: KEY 1: I/O 2: Communication control	0
P1.04	Enable reverse	0：Prohibit Reverse 1：Allow Reverse	0
P1.05	Upper limit frequency	50.00Hz	50.00Hz
P1.06	Lower limit frequency	00.00Hz	00.00Hz
P1.07	Acceleration time	Changing	30.00s
P1.08	Deceleration time	Changing	30.00s
P1.09	Stop mode	0-Deceleration stop; 1-Coast to stop	0
P1.12	Power Factor	0~200.0%	100.0%
P1.13	Carrier frequency	1.0-16.0k	change
P1.17	Factory Reset	Factory Reset=08	0
P1.18	Parameter lock	0：Unlock parameters 1：Lock parameters	0
P1.19	Inverter maximum frequency	Rated motor frequency~500.00hz	50Hz
Master parameters			
P1.20	Motor type	0-Asynchronous；2-Synchronous	Refer to the motor
P1.21	Rated motor power	0.1~1000.0kW	Refer to the motor

P1.22	Rated motor voltage	0~690V	Refer to the motor
P1.23	Rated motor current	0.01~655.35A	Refer to the motor
P1.24	Rated motor frequency	0.00~500.00HZ	Refer to the motor
P1.25	Rated motor speed	0~65536rpm	Refer to the motor
P1.26	Motor Back EMF	0~380V	Refer to the motor
P1.28	Rated fan current	When select inverter fan, Inverter read current	Refer to the motor
P1.29	Minimum percentage of fan	0-100%	40.0%
P1.30	Auto-tune	1: Static state 2: dynamic state	0
P1.31	Stator resistance RS		
P1.32	LD		
P1.33	LQ		
P1.34	Inverter function code		
P1.35	Inverter data		
Group P2 Multi-function input / output			
P4.13	FIC Minimum input	0~F2.01	2.00V
P4.15	FIC Maximum input	F2.01~20.0mA	10.00V
P4.00	S1 function	0： no function 8：EMERGENCY STOP normally closed 32：Motor overheating protection	8
P4.01	S2 function		00
P4.02	S3 function		33
Multi-function Output			
F2.30	Fan switch mode	0: Auto; 1 ON; 2 OFF	0
F2.34	Motor temperature alarm threshold	0~200℃	125℃
Group P5 Air compressor constant pressure control specific parameters (set P6.00 = 1 is valid)			
P5.00	Frequency pressure	P5.02~P5.01	7.00kgf/cm2
P5.01	Unloading pressure	P5.00~P5.03	8.00kgf/cm2
P5.02	Loading pressure	0~P5.00	6.50kgf/cm2

P5.03	Stop pressure	P5.01~30.00kgf/cm2	10.00kgf/cm2
P5.04	Pressure gauge range	0.00~30.00kgf/cm2	16.00kgf/cm2
P5.05	Fan start temperature	Fan stop temperature~120.0C℃	80℃
P5.06	Fan stop temperature	0~Fan start temperature	70℃
P5.07	Stop Temperature	Fan start temperature~180℃	100℃
P5.08	Start-up delay	0~100s	3s
P5.09	Loading delay	0~3000s	20s
P5.10	Uninstall delay	0~3000s	120s
P5.11	Restart delay	0~3000s	5s
P5.12	Stop delay	0~3000s	30s
P5.22	Fan current coefficient		
P5.53	Loading	0：No function; 1：Running; 2：Fault; 10：Loading; 11：Fan of air compressor	10(loading)
P5.54	3phase 380V fan		11
Group P 6			
P6.00	Compressor constant voltage control mode valid	0- Invalid 1- Valid	0
P6.02	Inverter fan temperature		75℃
P6.07	PID-P	0.0~200.0	100.0
P6.08	PID-I	0.0~200.0s	0.5s
P6.10	PID Steps	0.00~10.00Hz	2.50Hz
P621	PID feedback loss alarm mode	0: No warning 1: Warning but not stop, fault code “20” 2: warning and stop, fault code“20”	0
P622	PID feedback loss detection value	Range :0~10.0V (If 4~20mA is selected, it is disconnected if it is less than 2mA; set P622=2mA*500Ω=0.50V)	1.00V
P623	PID feedback loss detection value	0.0s~20.0s	1.0s
P6.24	PID setting		
Group P8 Advanced parameters			

P8.00	Group P8 Parameter Lock	0- LOCK 1- UNLOCK	1
P8.13	Phase sequence detection times	0~1000	300
P8.14	Temperature correction coefficient	0-200.0%	100%
P8.15	Inverter type	0- Synchronous，1- Asynchronous	0
P8.16	Fan work mode	1	1

Air Compressor Fault Type	
H-OP	Over voltage alarm
H-OH	Over-temperature alarm
NOTO	Motor overheating protection
ES	EMERGENCY stop
CO	Communication failure (inverter)
PHAS	Phase sequence fault
NNA	Pressure Sensor disconnection fault
djoH	Motor over-temperature alarm
Master inverter fault	
oC1 oC2 oC3	Over current
oU1 oU2 oU3	Over voltage
LU	Under voltage
CBC	Rapid current limit timeout
Lo	Output phase loss
oL1	Motor overload
oL2	Inverter overload
oH	Inverter overheat
IE	Current detection abnormal
CE	Communication timeout
EF	External fault

RAY	Relay abnormal
Inverter fan fault	
FoC1, FoC2, FoC3	Output short circuit
FUC1,FUC2,FUC3	Output short circuit
FoU1,FoU2,FoU3	Over voltage
FLU	Under voltage
Flo	Output phase loss
FoL1,FoL2,FoL3	Inverter overload
FoH	Inverter overheat