DETROITAIR

COMPRESSED AIR INNOVATION THROUGH TECHNOLOGY

OPERATING MANUAL FOR

OIL-FREE AIR COMPRESSOR-V-0.15/8PMV (50L)

PLEASE READ THE INSTRUCTIONS BEFORE OPERATION

CONTENT

1. BRIEF DESCRIPTION

Detroit Air compact oil-free variable speed small-bore air compressor is designed to encompass modern design, excellent workmanship, compact size and portability. The variable speed control system offers many advantages in safety, efficiency and low-noise operation. Oil-free machines are widely used in specific applications such as medical, chemical, lab and food-based industries.

2. GENERAL VIEW AND MAIN COMPONENTS

V-0.15/81

1. Controller
2. Protective cover
3. High-pressure tube
4. Push button - On/Off
5. Pressure regulating valve
6. Pressure sensor
7. Air outlet valve
8. Pressure gauge
9. Safety valves
10. Check valve
11. Tank
12. Footpad
13. Drain valve
14. Solenoid valve
15. Power train
16. Wheel

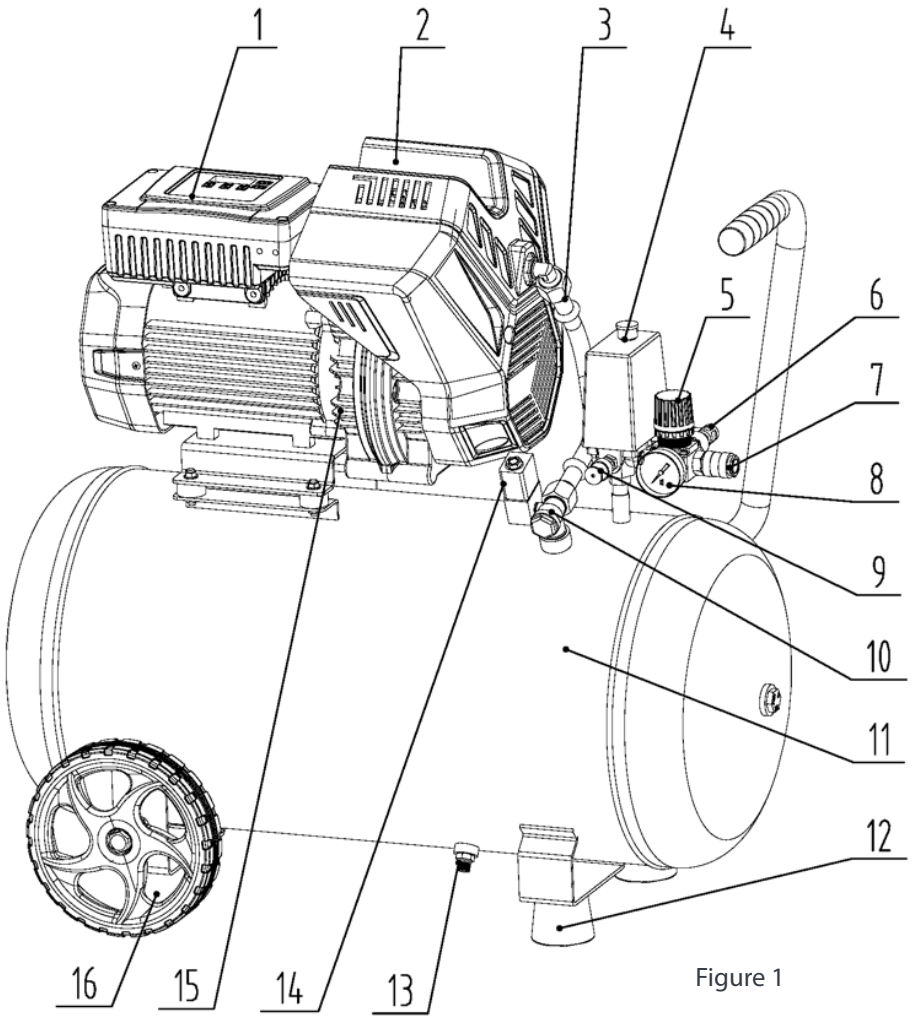


Figure 1

3. MAIN TECHNICAL PARAMETER

Model	V-0.045 / V-0.067		V-0.045/8-24L / V-0.067/8-24L		V-0.1/8-50L / V-0.15/8-50L	
Power	825W	1100W	825W	1100W	1500W	1800W
Voltage	200~240V	200~240V	200~240V	200~240V	200~240V	200~240V
Current	6A	7A	6A	7A	10.5A	13.5A
Rate	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Rate Speed	2000r/min	2800r/min	2000r/min	2800r/min	2000r/min	2800r/min
Air tank Capacity	/		24L		50L	
Free Air Delivery	0.045m3/min	0.067 m3/min	0.045 m3/min	0.067 m3/min	0.1 m3/min	0.14 m3/min
Discharge Pressure	0.8MPa	0.8MPa	0.8MPa	0.8MPa	0.8MPa	0.8MPa
Dimensions (mm)	380×180×340		730×400×700		730×400×700	
Weight	10Kg		25Kg		39Kg	

4. OPERATION AND ADJUSTMENT

1. Operate in a clean, dry, and well-ventilated area only.

2. Ensure voltage is within ±5% of rated supply.

3. Turning the air compressor on: Insert the power plug into the power socket first, and then pull the button on the pressure switch upward to engage the contactor. At this time, the controller will illuminate and is powered on (see Figure 2).

   Press the green start button with your finger for 2 seconds to automatically start the motor. When stopping, press the green key with your finger and the air compressor will stop automatically.

   Push the button on the pressure switch down to disengage the contactor; this will turn off the machine.

   The blue "mute mode" key can reduce the frequency of the air compressor, that is, switch the speed of the motor during operation (high/low speed). For other operations refer to the controller operation manual.

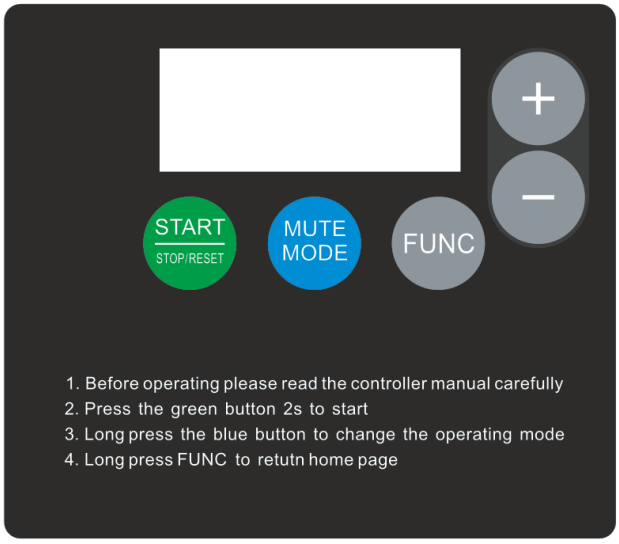


Figure 2

4. When working normally, the air compressor is controlled by the controller: when the pressure reaches the rated working pressure of 0.8mpa, the air compressor will automatically stop. When the pressure drops to about 0.6mpa, the air compressor will start working automatically. The rated working pressure has been set in the factory, so please do not change it. When the machine stops automatically, the compressed air in the exhaust pipe will be automatically discharged through the solenoid valve on the one-way valve in preparation for starting again (light load). Never start the machine if the solenoid valve is not working correctly. If necessary, the working pressure can be set through the switch button on the controller. Specifically, the two-dimensional code on the left side of the controller panel or in the controller manual that comes with the air compressor can be scanned for operation. But it can only be lowered (pressure ≤ 0.8mpa), it is not recommended to increase the working pressure, otherwise the safety valve will automatically open to protect the system.

5. The output pressure of compressed air can be adjusted by regulating the valve.
Pull up the knob of the regulation valve and turn it clockwise to increase the pressure

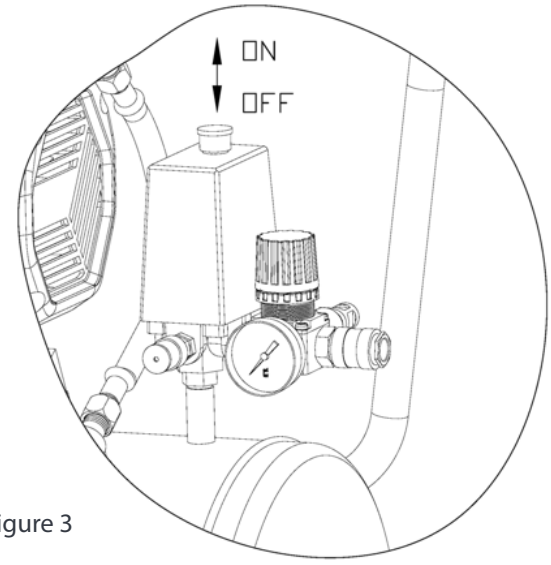


Figure 3

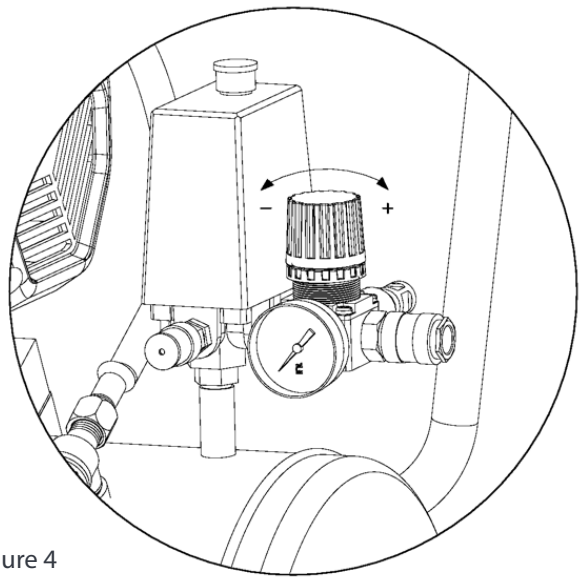


Figure 4

5. CAUTIONS

1. Never unscrew any connecting part when the tank is pressurized.
2. Never disassemble any electrical part before disconnecting the main plug.
3. Never adjust the safety valve carelessly.
4. Never use the compressor in place where voltage is too low or too high.
5. Never use an electric wire more than 5m long with less than the section shown in table 2.

Motor output (HP/kw	220～240V Single-phase
	Power line (mm^2)
0.75/1.1	1.0
1.5/2.2	1.5

Table 2

6. Do not pull out the power plug to shut down the air compressor. Always shut it down on the controller first.
7. If it is found that the solenoid valve cannot automatically vent when the machine is shut down, the reason should be found immediately and eliminated so as to avoid the motor burning – which is caused by starting under pressure.
8. For oil-lubricated models: The lubricating oil must be clean and the oil level should be kept at the top of the oil glass.
9. When the air compressor fails, the controller will automatically protect it and automatically show a fault code. At this time, the two-dimensional code on the controller can be scanned to find the cause of the fault. At the same time, the power supply should be cut off, then power on and start air compressor troubleshooting.
10. For abnormal shutdown, please use the green button of the controller to start.

6. MAINTENANCE

- Open drain cock under the tank to exhaust condensate after every 60 working hours.
- At 120 hours, check safety valve and pressure gauge function normally.
- After 60 hours, check all nuts, bolts and screws for tightness.

7. TROUBLESHOOTING

Trouble	Possible Causes	Remedies
Motor not running, running slow, or or getting hot	(1) Fault in line, or insufficient voltage (2) Power wire too thin or too long (3) Fault in motor (4) Sticking of main compressor	(1) Check the line (2) Replace the wire (3) Repair or replace (4) Check and repair
Sticking of main compressor	Moving parts damaged or jammed by foreign body	Check crankshaft, bearing, connecting rod, piston, piston ring, etc., and replace if necessary
Vibration or noise	(1) Connecting parts loose (2) Foreign body got into main compressor (3) Piston knocking valve seat (4) Moving parts seriously worn	(1) Check and retighten (2) Check and clean (3) Replace with thicker paper gasket (4) Repair or replace
Pressure insufficient or discharge capacity decreased	(1) Motor running too slow (2) Leakage of safety valve (3) Leakage of discharge pipe (4) Sealing gasket damaged (5) Valve plate damaged, carbon build-up or stuck (6) Piston ring and cylinder worn or damaged	(1) Check and remedy (2) Check and replace (3) Check and repair (4) Check and replace (5) Replace and clean (6) Repair or replace

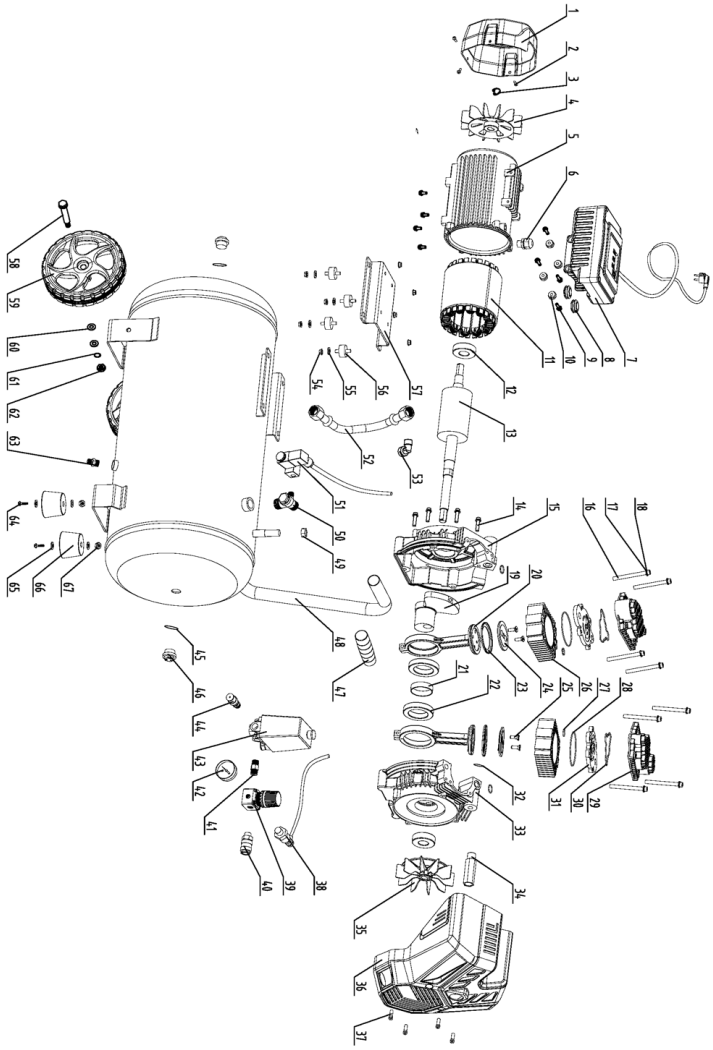
8. PARTS ILLUSTRATION

This chart is only for reference when repairing the air compressor or buying parts.

As the product is constantly improving, the parts described in this chart may be slightly different from the purchased product.

V-0.15/8-50L Figure 7

V-0.15/8-50L Part list					
NO.	DESIGNATION	QTY	NO	DESIGNATION	QTY
1	Motor air hood	1	35	Cooling fan	1
2	Pan head bolts M5*8	3	36	Crankcase cover	1
3	Retainer clip	2	37	Bolt M6*16	4
4	Motor fan	1	38	Pressure transducer	1
5	Motor stator housing	1	39	Five-way pressure regulating valve	1
6	Plastic sleeve M14*1.5	1	40	Bleed valve	1
7	Controller	1	41	¼ barrel nipple	1
8	Wire grommet	1	42	Pressure gauge φ40	1
9	Hex bolt M5*12	8	43	Switch	1
10	Damping ring	4	44	Relief valve	1
11	Motor	1	45	Plug seal ring	2
12	Bearing 6303	1	46	Plug G1/2	2
13	Rotor	1	47	Handle cover	1
14	Bolt M6*25	4	48	Tank	1
15	Enclosure	1	49	Retainer nut	1
16	Bolt M6*65	4	50	Three-way check valve	1
17	Spring washers φ6	8	51	Solenoid valve	1
18	Flat mat φ6	8	52	Corrugated pipe	1
19	Crankshaft	1	53	Crossover sub R3/8-G3/8	1
20	Connecting rod	2	54	Nylock nut M6	8
21	Bearing spacer	1	55	Washer φ6	4
22	Bearing 6204	2	56	Rubber mount	4
23	Piston ring	2	57	Motor base stand	1
24	Piston ring press plate	2	58	Axle shaft φ10	2
25	Countersunk head screw M6*14	4	59	Rubber wheel	1
26	Cylinder	2	60	Washer φ10	4
27	Exhaust seal ring	4	61	Spring washers φ10	2
28	Cylinder seal ring	2	62	Nut M10	2
29	Cylinder head	2	63	Drain valve	1
30	Cylinder head seal ring	2	64	M8 bolt	4
31	Valve plate component	2	65	Washer φ8	4
32	Box seal ring	1	66	Rubber foot	2
33	Enclosure	1	67	Nut M8	4
34	Crossover sub Rp3/8-G3/8	1			



DETROITAIR

COMPRESSED AIR INNOVATION THROUGH TECHNOLOGY

MOTOR DRIVER USER MANUAL

Product model:

A220-1200W, A220-2200

Version: v1.0

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CONTENT

1. CONTROLLER MODEL SPECIFICATION

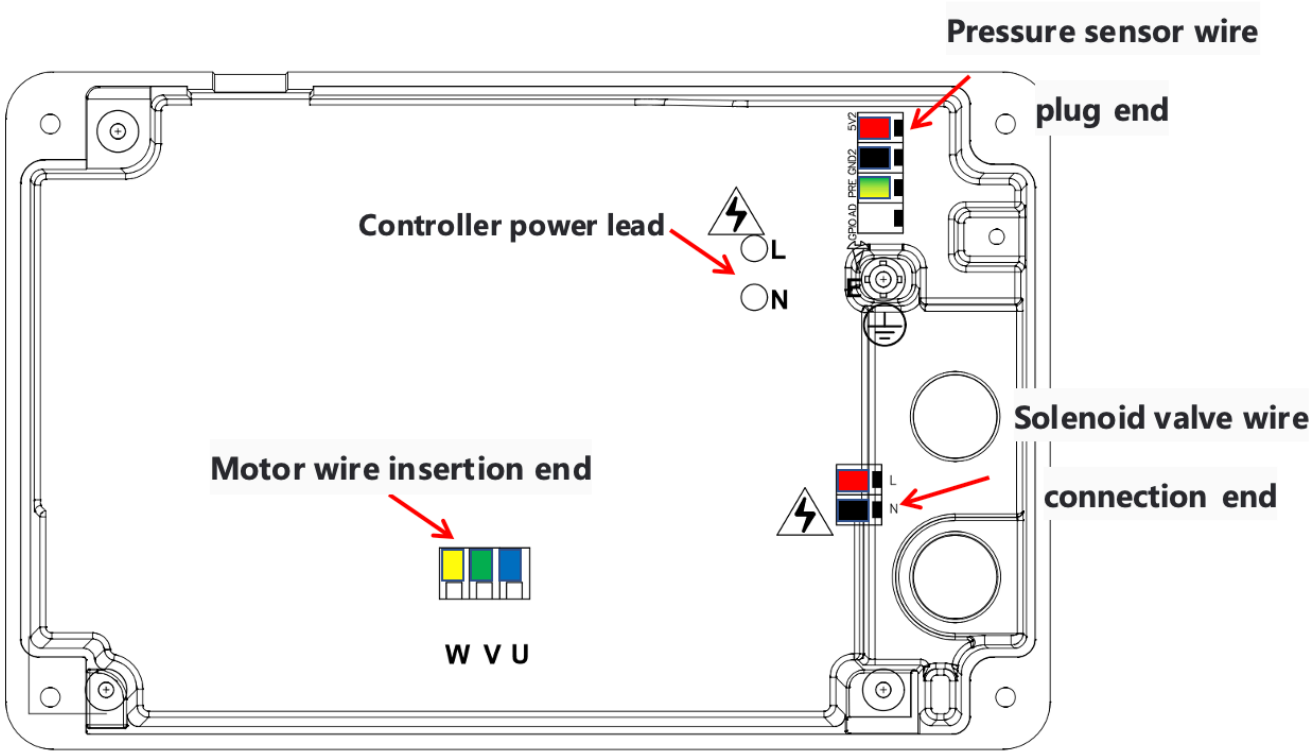
Electronic control electrical specifications and adaptive motor specifications						
Electronic control model	Adapt motor specifications (V)	Max. input power (W)	Max. input current (A)	Max. input voltage AC(V)	Min. input voltage AC(V)	Work environment (°C)
A220-1200W	Rated 220V motor	1300	12	270	160	-15-60
A220-2200W	Rated 220V motor	2300	12	270	160	-15-60

2. CONTROLLER TECHNICAL SPECIFICATION

Project		Technical specifications
Input	Rated voltage/frequency	Single phase: 200V~240V; frequency: 50hz / 60hz
	Allowable voltage operating range	Single phase: 180V~260V; frequency: ±5%
	Input power	1300w max./2300w max.
Output	Output voltage	0 ~ rated input voltage
Main control performance	Motor type	Permanent magnet synchronous motor
	Control mode	Velocity sensorless vector control
	Carrier frequency	5khz
	Maximum adjustable speed	3200rpm
	Speed-set resolution	10rpm
	Steady speed accuracy	±1%
	Acceleration and deceleration curve	Linear acceleration and deceleration change, acceleration and deceleration time adjustable range: 3s ~ 20s
Display and key operation	Digital tube display	Display parameters
	Key function selection	Separate and combined key function to prevent accidental touch
Circumstance	Operation place	Indoor, not directly exposed to the sun, no dust, corrosive gas, combustible gas, oil mist, water steam, dripping water or salt, etc
	Altitude	Derated use above 1000m, derate by 10% for every 1000m increase
	Environment temperature	-15°C ~ +60°C (environmental temperature in 50°C ~ 60°C please degrade use)
	Humidity	Less than 95%rh, anhydrous condensation
	Storage temperature	-20°C~ +60°C

3. CONTROLLER WIRING SCHEMATIC DIAGRAM

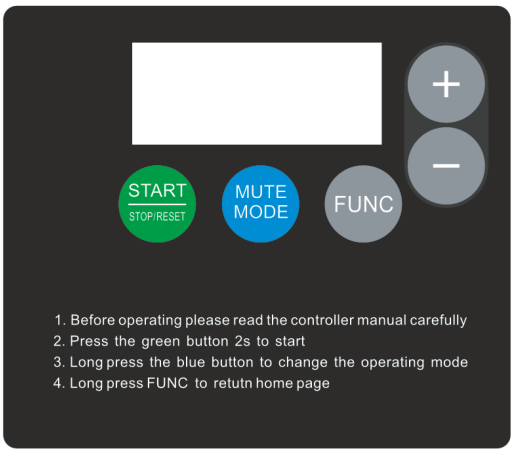
Figure 1-0 schematic diagram of cable connections



4. INTRODUCTION OF THE OPERATION AND DISPLAY INTERFACE

With the operation panel, you can modify the functional parameters of the controller, monitor the working status of the controller, and control the operation of the controller (start and stop). Its appearance and functional areas are shown as below:

Figure 1-1 Schematic diagram of the operation panel



4.1 DIGITAL DISPLAY AREA:

A total of five LED displays; the first digital tube displays the first letter of the current display content name and the last four display values - the specific content is as follows:

Initial letter display	Name	Function
Static	Real-time pressure display constant voltage and frequency conversion setting are display	1. The device default in the real-time pressure display main interface, which displays the real-time pressure value of the pressure sensor. 2. When switching to the variable frequency conversion pressure setting interface, the interface displays the current set variable frequency conversion pressure, and the set value can be adjusted by short pressing the + and - keys. After no 10S operation, return to the real-time pressure display interface.
Flashing	Mute mode display	1. In mute mode, the controller speed target changes to the set mute speed. 2. When switching to the mute speed setting interface, the required mute speed is displayed, and the setting value can be adjusted by pressing + and - short. After 10S without operation, return to the real-time pressure display interface.
	Load pressure settings display	Display the set load pressure value (Mpa)
	Unload pressure settings display	Display the set unloading pressure value (Mpa)
	Output voltage display	Display the output voltage value (unit V)
	Output current display	Current value showing the output (unit A)
	Output speed display	Display the output speed value (unit Rpm)
	Motor cumulative running time display	Display the output speed value (unit Rpm)
	Motor fault code display	Display the motor fault code

4.2 KEY DESCRIPTION TABLE:

Key	Name	Function
	Start/stop/ reset key	1. Press key for 2S to start the device 2. Press the key briefly to stop the device 3. In the equipment fault state, short press the key to reset the fault to the stop state.
	Silent mode button	1. In constant voltage frequency conversion mode, enter the mute mode; entering the mode shows the mute mode set speed (default is 1800rpm and flashing, adjust the mute mode speed by short pressing + and -) 2. Then long press the key in the silent mode to exit the silent mode and switch back to the constant voltage frequency conversion mode.
	Switch button	1. Press the button short to switch the display in the following order: Frequency Conversion Pressure-> Load Pressure-> Unload Pressure-> Output voltage-> Output Current-> Output Speed-> Motor running time-> Recent fault record 2. Long press the key for 2S to switch back to the real-time pressure display interface
	Plus button	1. Press this button short to increase the set value of the corresponding parameter. 2. In the real-time pressure display interface, long press the + key or the - key for 2S to quickly enter the frequency conversion pressure setting (the current mode constant pressure frequency conversion mode), or mute the speed setting (the current mode is silent mode) 3. In the shutdown state, press + and - keys for 2S to enter the advanced menu setting.
	Minus button	1. Press this button short to increase the set value of the corresponding parameters. 2. In the real-time pressure display interface, long press + key or - key for 2S to quickly enter the frequency conversion pressure setting (current mode), or silent speed setting (current mode is silent mode) 3. In the shutdown state, press + and - keys for 2S to enter the advanced menu setting.

5. OPERATION AND OPERATION INSTRUCTIONS

5.1 DEVICE STARTUP

1. Press the button to start

After the controller turns on the power supply, the controller is in the shutdown state by default. Long pressing the start button for 2S will produce a start device command. When the pressure value of the pressure sensor is lower than the unloading pressure, the device will start.

2. Loading pressure starts

When the current controller is running the command, if the pressure value of the pressure sensor is less than the set load pressure value, the controller will automatically start the device.

3. Failure self-recovery start (default failure)

When the current controller is running the command, the controller will automatically reset and start the device (if using this function, set it up through the advanced menu).

5.2 EQUIPMENT SHUTDOWN

1. Normal shutdown

When the controller drives the device normally and the operator needs to stop it, the operator can short press the stop key. The device will be shut down after the shutdown command is generated.

2. Over-pressure shutdown

When the current controller is in the running command, if the pressure value of the pressure sensor is greater than the set unloading pressure value, the controller will automatically stop the device.

3. Fault shutdown

When the current controller is in the running command and the controller system fails, the controller will stop the device immediately. After a failure shutdown occurs, the default will not automatically resume startup.

5.3 CONSTANT VOLTAGE FREQUENCY CONVERSION MODE OPERATION

If the current operation mode of the controller is the constant voltage frequency conversion mode, the controller will check the pressure value of the pressure sensor in real-time and take the frequency conversion pressure set value as the target to dynamically adjust the output speed.

5.4 SILENT MODE RUNNING

If the current controller operation mode is silent mode, the controller will run the device according to the maximum speed set in the mute mode.

6. BRIEF TABLE OF CONTROLLER FUNCTION PARAMETERS

Project	Project	Technical specifications	Project	Project
F0-00	Factory data reset	0 - 100	0	21: Reset user settings 23: Restore the factory settings
F0-01	Maximum output speed Minimum output speed Acceleration time	A220-1200w: 500 - 1300 A220-2200w: 500 - 2300	A220-1200w: 1200 A220-2200w: 2300	Unit: W
F0-02	Maximum output speed	2500 - 3200	3000	Unit: Rpm
F0-03	Minimum output speed	1800 - 2500	1800	Unit: Rpm
F0-04	Acceleration time	3 - 20	5	Unit: S
F0-05	Deceleration time	3 - 20	5	Unit: S
F0-06	Upper limit of unloading pressure	800 - 1020	800	Unit: 0.001mpa
F0-07	Constant voltage and frequency conversion ratio coefficient	1 - 20	10	
F0-08	Constant voltage and frequency conversion integral coefficient	1 - 20	10	
F0-09	Pressure sensor repair value (0mpa, lower voltage output)	100 - 1000	500	Unit: MV
F0-10	Pressure sensor adjustment value (voltage output at 0.8mpa)	2000 - 4000	3120	Unit: MV
F0-11	Failure reset number setting	0 - 5	0	
F0-12	Controller model	/	/	Show only
F0-13	Software version number	/	/	Show only
F0-14	Controller temperature	/	/	Show only

7. FAULT ALARM AND TROUBLESHOOTING INSTRUCTIONS

Fault name	Interface display	Troubleshooting	Troubleshooting Measures
System failure	E01	1. Motor startup failed. 2. Stopping the motor in operation. 3. Motor out of phase. 4. Abnormal motor speed.	1. Check that the motor model matches the controller model. 2. Check the motor bearing impeller for easy rotation . 3. Check whether the one-way valve function is normal, and the motor load is abnormal. 4. Check whether the wiring connection between the controller and the motor is loose or abnormally connected. Measure the impedance between each line of the motor to determine.
Hardware over-current protection	E07	1. The output circuit of the controller is short-circuited. 2. The controller driver module is abnormal. 3. The power inverter module of the controller is abnormal. 4. The acceleration time or deceleration time of the controller is set too short. 5. Motor parameters do not match the controller. 6. The input voltage is low when starting the motor.	1. Check that the motor model matches the controller model. 2. Check the connection between the controller and the motor. 3. To eliminate the controller hardware reasons, remove the motor cable and try to start. If E07 fault is still reported, the hardware is damaged. 4. Increase the acceleration or deceleration time. 5. Avoid starting the controller with low voltage.
Voltage fault	E09	1. The input voltage of the controller is too low (the undervoltage protection determines that the voltage is less than AC160V). 2. The input voltage of the controller is too high (the overvoltage protection determines the voltage is greater than AC270V). 3. The acceleration or deceleration time is too short.	1. Adjust the input voltage to the normal range. 2. Increase acceleration or deceleration time.
	E10	1. The lead of the temperature sensor on the controller is improperly connected. 2. The temperature sensor of the controller is abnormal. 3. The ambient temperature is too high.	1. Check whether the temperature sensor of the controller is properly connected. 2. Reduce the ambient temperature. 3. Choose an open and ventilated environment as far as possible.
Power inverter module overheating	E14	1. The controller is improperly connected to the motor. 2. The hardware of the controller mainboard is damaged.	1. Check the motor and the controller connection terminals. 2. Seek technical support.
Output lack of phase	E16	1. Main board panel communication is abnormal.	1. Restart the device. 2. Seek technical support.
Display communication fault			
Frequency converter overload	E21	1. The load is too large or the motor is jammed. 2. Motor out of phase. 3. Motor parameters do not match with the controller.	1. Check whether the motor model matches the controller. 2. Reduce the load and check the motor and mechanical conditions.
Motor overload	E25	1. The load is too large or there is a motor blockage. 2. Motor out of phase. 3. Motor parameters do not match with the controller.	1. Check whether the motor model matches the controller. 2. Reduce the load and check the motor and mechanical conditions.
pressure sensor fault	E63	1. Pressure sensor lead contact is abnormal. 2. Pressure sensor failure.	1. Check whether the pressure sensor wiring terminal is abnormal. 2. Replace the pressure sensor.