



# **DMC** **SCREW COMPRESSOR** **OPERATION MANUAL**

SHANGHAI DAVEY MACHINERY CO.,LTD

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## Caution

Please read the maintenance manual carefully before maintaining the machine



— — Don't dismantle any connector or equipment when machine is running. Otherwise, the high-pressure gas and high temperature will hurt you seriously.



— — Please pay more attention to parts such as pump, oil tank and pipelines, because they are high temperature when machine is running.



— — Don't try to change the working pressure rated . Because change working pressure exceeding the rated range will cause machines to overload and stop to work.



— — Provide proper grounding connection for electric parts according to electric security regulations. Use suitable wires matching the working power, otherwise they will burnt out due to high temperature or some other dangerous events occur.



— — The compressed air for breath use is prohibit.

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## **Regular maintenance interval schedule**

Every 50 hours or weekly

- Check oil level.
- Check intake filter, if necessary clean it.
- Drain condensation water from oil tank.

Every 500 hours

- Check and adjust belt tension if necessary (belt driven only)

Every 2000 hours

- Replace lubricants (for mineral lubricants oil)
- Replace oil filter.
- Replace intake filter

Every 4000 hours

- Replace lubricants (for synthetic lubricants oil)
- Replace oil separator
- Clean cooler for dirt

### **Attention:**

- 1、 Replace filter element and lubricant after first 500 hours of operation.
- 2、 Use incorrect lubricant oil and spare parts will cause compressor damage, only use original manufacture oil and parts.
- 3、 The service life of compressor depends on the environment conditions such as dust, vent etc.

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Guarantee card

<b>Product name</b>		<b>Reference</b>		<b>Buying date</b>	
<b>Customer name</b>		<b>Contact person</b>		<b>Telephone</b>	
<b>Address:</b>					
<b>Maintenance date</b>	<b>Maintenance content</b>		<b>Maintenance man signature</b>	<b>Customer signature</b>	

Guarantee period

**Our products enjoy 1-year guarantee calculated from the buying date for complete machine and two-year guarantee for air end. Our company will not offer free of charge service to repair damaged machine due to installation error, using error, maintenance error and use of not original manufacturer parts.**

**For routine or unscheduled maintenance note that DMC international technical service is able to provide you with assistance and spare parts as and when required.**

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# 1、 General

DMC screw air compressor adapts up-to-date structure design from Italy. Its key parts such as screw air end, control valves are of European origin. It which falls into the category of products of intellect-type and environments-protecting-type is microcomputer -controlled feathering compact structure, high efficiency, low noise, long life period and so on. And it is the ideal air source equipment popularly applied to textile, machinery, chemicals, electric, mining and other industrial areas. It runs intelligently, and realizes long-range control and chain control.

## 1.1 Working principle

**Compression:** the screw air end sucks air through air intake filter and intake control valve. Then the rotary double shafts compress the air . At the same time, oil is put into the air compressing cavity making the screw and bearing cool and lubricant.

**Separation:** The mixed gas of air and oil generated by compressing is exhausted into air and oil separation cartridge. Most of oil is separated from the mixed gas under the influence of gravity and mechanical centrifugal force. Almost all oil mist is separated out after the gas of air and oil is through separation cartridge core. So then the oil amount of the mixed gas is below 3PPM. The oil separated through separation cartridge core is back to screw principal machine through oil return tube. A throttle is mounted on the oil return tube in order to keep the loss of compressed air in the lowest extent. The clean oil flows into air end internal cavity after being filtered.

**Cooling:** After oil is separated, compressed air flows out of separation element through minimum pressure valve then into after-cooler. Then cool the compressed air into a temperature towering above environmental temperature by 7-10 degrees centigrade before it is discharged. Minimum pressure valve guarantees the minimum pressure needed to keep up circulation of oil when the screw air compressor is started or when it is running normally. Due to the check valve on minimum pressure valve, the compressed air can't flow backwards into separation element.

## 1.2 System control

The aim of having a control system is how to control the intake valve correctly to let air in normally. The system is comprised of intake valve, work piston, magnet valve and pressure gauge.

**Start-up:** the intake valve shuts up under the influence of spring force. Hence only little air is sucked through single-direct valve of intake valve to generate cartridge pressure to keep up circulation of oil when screw air compressor is started up from no-load state.

**Load:** when compressor is running to a load state, it's vacuum within compressor. And there is pressure in intake filter. So, due to the difference of pressure, which makes the piston of intake valve work, intake valve opens. Vacuum of one side lets air in then be compressed, which makes intake valve open fully. After that, system pressure increases.

**Full load:** when the pressure of oil separation cartridge reaches 0.4MPa, minimum valve opens to let compressed air flow out. (When the system pressure is lower than the rated pressure, intake valve will be open all the time.)

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**No-load:** when the pressure of empty pipeline reaches the maximum pressure rated by pressure switch, the switch turns off the magnet valve's power. Then there is no pressure difference. Intake valve shuts up under the influence of spring force. Discharge magnet valve releases pressure and the pressure of separation element goes down. All these make backpressure of frame end of screw air compressor low down. When compressor is in the no-load condition, a little air goes in to keep certain pressure. It is needed as working pressure of lubricant system to make rotors and bearing lubricant. When the pressure of pipeline goes down to the rated load pressure, compressor is back to load state. Then magnet valve gets power. Intake valve opens. Accordingly, the system pressure goes up. As per requirement to compressed air, make the process be in a cycle.

**Stop:** when the compressor is stopped, all magnet valves' power will be turned off. Then intake valve will close up. Last the discharge magnet valve will release the cartridge pressure.

### **1.3 Manipulation temperature**

Screw air compressor's environment temperature ranges from 5 degrees centigrade to 40 degrees centigrade. Intake point is the measure point.

#### **Condensation---low temperature**

When the manipulation temperature is lower, water would concentrate in oil on the location of higher degree of moisture. Compressor is equipped with a thermostatic valve. And the temperature is set to 70°C. (Upon reaching the temperature, water vapors.) Oil won't pass through the oil cooler until it reaches the rated temperature.

In the area of temperature below 5 °C, anti-condensation apparatus should be mounted. And a heater should be installed under the separation element too.

#### **Overheat---high temperature**

The air sucked under this condition (environmental temperature is above 40°C or the compressor is installed in a house where there is a boiler) when the compressor is in full load state may be excessively hot and above the cooling requirement. The air for cooling use had better be input from outdoors. When the load rate is below 100% load, a higher environmental temperature can also meet the cooling requirements. The maximum of working temperature of compressor is 105°C. If the temperature is above 105°C, the compressor will be overheat and cease to work.

#### **Discharge temperature**

The measure point of discharge temperature is located in the vent of frame end of compressor. Discharge would vary according to environmental temperature, load percentage, cleanliness of cooler, cleanliness of intake filter and the cleanliness of oil filter. The normal manipulation temperature is between 70°C and 90°C. When the compressor is started up from a cool condition, the discharge temperature will go up quickly to 85°C. Then thermostatic valve open fully. (it sets to open when the temperature is 70°C) If it is with down

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loads, oil temperature will be back to 70°C. At this time a little oil will pass through thermostatic valve in case the oil temperature be too low. With the increase of load, thermostatic valve adjusts discharge temperature by control the oil amount through oil cooler.

#### 1.4 Lubricant features

The features of DMC screw air compressor is as follow:

- Low degree of blister, not easy to volatilize
- High degree of anti-emulsification, high degree of anti-oxidation
- Motion viscosity (40°C) mm<sup>2</sup>/s 46
- Pour point temperature -35°C anti-solidification, low energy-consumption
- Flash temperature 230°C, anti-carbon-deposit, and low-energy-consumption

Oil for bearing of motor:

Commended: Shell Alvania RL 3

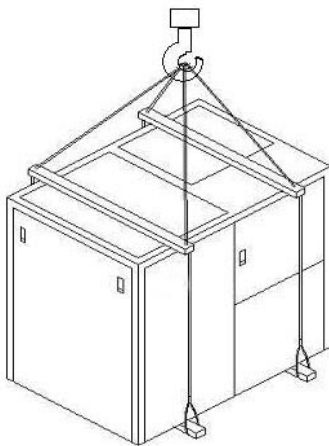
## 2. Installation requirements and inspection before running machine

Examine in details whether there is damage due to transportation or not before accepting the compressor. If any, please request the shipping company to confirm it by signing and contact us immediately.

### 2.1 Hoist and transportation

- Guide rope should be used when compressor is being hoisted lest it be damaged. Check if welding crack and bolt become loose after it is lifted up. As figure shows, a supporting board is needed when compressor is being hoisted.
- If use a platform trailer to transport the compressor, make sure the trailer has enough driving-power.
- If use a forklift to transport the compressor, also make sure it has enough driving-power. Specific requirement is subject to the local regulation.

The length of fork should not be less than the length of the base of compressor.





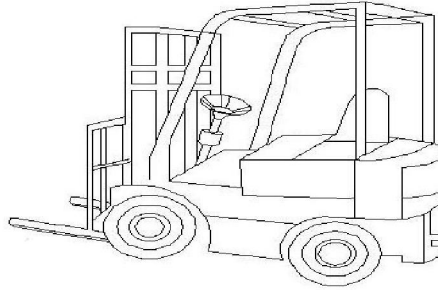
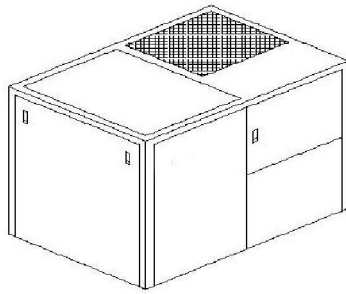


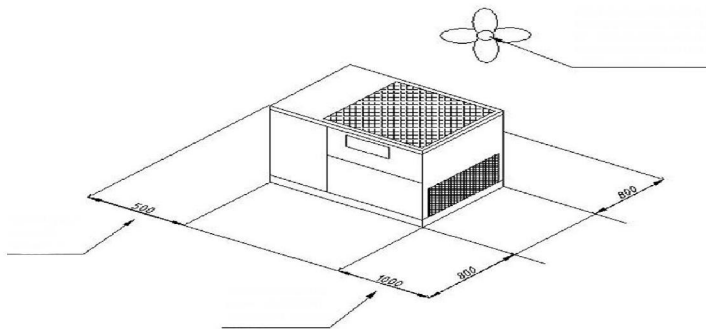
Figure 3

## 2.2 Field requirements

- Compressor should be located in a clean, no-dust, well-ventilated place (discharge the heat wind from upside, input air from bottom) with air excluding toxic gas, inflammable gas and explosive gas. Where it is easy to maintain the compressor.
- Compressor mustn't be used outdoors. Because there is a bad condition. That is, there is a great quantity of dust. A filter screen should be mounted in the air intake of house in order to reduce the quantity of dust.
- Environmental temperature should be above 5°C to guarantee lubricant a normal cycle.
- Some space (1m between compressor and wall is perfect) must be set aside in order to make daily maintenance work convenient. See figure3.
- Compressor should be placed in a solid level surface. There is no using nut to fasten it.

**Tip:** Don't put it in a place where the hot wind can be sucked circularly. (Put it in a well-ventilated place)

If compressor is mounted in an enclosed room, an exhaust fan must be mounted in this room with a view to keep the room temperature. The exhausting quantity must be more than air volume of circulating fan or cooling fan. There should be enough area of entrance of cool air. The minimum of maintenance space should be 500mm or above. If air entrance for cooling is in this direction, the minimum of maintenance space should be 1000mm and above.



## 2.3 Requirement for cooling water and water-cooling set

- General hardness expressed by CaCo3 should be less than 100PPM (100 milligram/liter)
- PH value varies from 6-8
- Suspended material should be less than 50PPM (50 milligram/liter)

**Tip:** the temperature of cooling water is set to 32°C. And the water quality must be in conformity with general industrial water. Avoid using ground water. If the water quality is not good, use purifying agent to clean depositing dirt periodically. If the compressor comes into disuse for a long time, drain out all cooling water.

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## 2.4 Connection requirements for air pipe

- The diameter of discharge pipe should be at least the same as that of compressor. All pipes and connectors should be able to bear the rated pressure. The configuration should meet the requirements for flowing velocity of compressed air. And the pressure drop of pipeline mustn't exceed the set pressure by 5% or more. Try to use elements with a bent or high drag coefficient as little as may be. If the pipeline is relatively long, adopt pipes with a diameter bigger than rated one.
- Don't let this matter occur. That is, don't let condensation water flow into working machine or elements driven by air along the pipeline. An oil/water separation apparatus and a dirt-draining apparatus should be mounted on front end of pipeline. Install the main pipe with a slope of 1-2 degrees, and then the condensate water can be easily drained out.
- One-way valve, stop valve are mounted at the exit of compressor. And a sample connection of pressure and a stop valve for maintenance and pipe-connecting use are mounted after them.
- Because there is an anti-vibration mat and not supporting things for fixing, all external pipelines should have its individual supporting things. In order not to let condensate water flow back into compressor when it stops, make pipeline lower than the air gate of compressor.
- When compressor is used with drier, an air reservoir should be installed in between compressor and drier. In this case, it can low down the temperature of discharged air and separate a part of condensate water. At the same time, compressed air of lower temperature and less amount of water is transported into the drier through air reservoir. In such way, it can lessen the load of drier and save energy.
- Main pipeline going around the whole air-use house is the ideal plan. In this case, compressed air from direction can be got anywhere. If there is a sudden increase of air-use quantity on some branch pipe, it can reduce pressure drop. Moreover, mounting proper valves on main pipeline can insure convenience for maintenance. Because we can cut it off, if necessary.

## 2.5 Electric installation requirements

All internal wires of compressor are through test by factory. All external wires linked to compressor must be manufactured by qualified factory. According to the input working power required by compressor set, choose right wire specification. If the wire is too long, line loss should be taken into consideration. Under this circumstance, diameter of wire should be made bigger so as to meet the requirements for starting-up and running.

Compressor of a big quantity of discharging air needs an individual power-supply system; otherwise it will have bad influence on normal working of other equipment.

Make sure that power voltage meets rated working voltage of compressor before running it.

Reliable grounding of compressor set is needed to avoid dangers resulted in by power leaking.

### Power supply

Standard requirements:

230V, 3 phase, 60Hz grounding  460V, 3 phase, 60Hz grounding

380V, 3 phase, 50Hz grounding  415V, 3 phase, 50Hz grounding

Other

Make special requirements on placing the order

### Turning of motors

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Power must be linked to compressor correctly to guarantee the right turning of motor. DMC screw air compressor is equipped with a special apparatus to avoid contra-rotation of motor. (If the sequence of 3 phases is not correct, motor stops automatically to protect the motor.)

Particularized methods as follow: First, switch on power. Second, unloose the scram button. Third, press the stop button. Then the machine will check itself. Finally, press the start button. If the machine is running normally, that means the sequence of 3 phases is correct.

If the motor stops automatically, that means the sequence of 3 phases is not. Then exchange the two phases of power input. (Instead of exchanging the wire ring of motor or the wire ring of starter, all these wire rings are set to optimize the performance of motor.) Men with electrician certification should finish wire-linking work.

## **2.6 Machine inspection**

### **Inspection for screw air end**

- Revolve the belt pulley or shaft coupling of gear end by hands from two different directions. Check if the screw end is not locked.
- When compressor is not in use for more than two months or stored for a period of time, intake valve should be opened. Then fill half-kilolitre of oil into compressor through it. Revolve the belt pulley or shaft coupling of air end by hands from two different directions. Make sure all oil enters air end.
- When reconnect inlet pipe, make sure nozzle is sealed.

### **Inspection for oil level**

When open the side door, you can see the oil inspection mirror. The maximum oil level must not be higher than the upper part of oil inspection mirror and the minimum oil level must not be lower than the bottom of oil inspection mirror. The requirements also holds true when compressor is running.

Charge the rated amount of oil. Make sure the lid to the nozzle is screwed on well and seal ring is in good condition.

**Tips:** Charge oil according to the amount stipulated. Too much oil will make the compressed air contain too much oil. And too little oil will lead to high temperature of compressor.

### **Inspection for transmission system**

- Inspection for belt

Check if all belts are in the groove. Adjust the tightness of belts through the adjusting bolt on motor.

- Inspection for flexible shaft coupling

Check if the bolt of the flexible shaft coupling is in fixed state.

### **Inspection for all valves of system**

Check if stop valve is open.

## **3、 Daily operation**

The procedure below is for starting up for the first time or compressor being not in use for more than two months.

### **3.1 Preparations before running**

DMC screw air compressor is with an advanced delay-start/delay-stop function. This function can protect motor, air end and electromagnetic starter so as to optimize operating performance.

**Delay-start:** This function is to avoid starting up continuously after power cut or emergency shut down. During

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this period, compressor can't be started up. Make sure the pressure is cut down to avoid starting up the compressor when there is backpressure. Press the start button. And this signal will be put down automatically by system. When the delaying time has elapsed, compressor will start up automatically.

**Delay-stop:** This is a soft stop function. This function makes compressor unload and cease to work. First, press the stop button to unload compressor. Then it will be running for a while until the preset time and stop. (This will contribute to reducing the pressure of oil separation cartridge.) During the delaying time, if press the start button, the delaying time will be finished automatically. If the system pressure needs loading, the compressor will load or unload normally.

### 3.2 Start-up procedure for the first time

- Check if the stop valve on outlet is open. (If the stop valve is open, this pressure is the pressure of compressor system)
- Turn on power, and then power indicator light will be on. Compressor begins its delay-start. Starting instantly is forbidden.
- Press start button to run the compressor, and then compressor is in the normal delay-start condition. Once it reaches the preset time, compressor will start up automatically. (During the delaying time, press the stop button, and then compressor will stop)
- Watch the manipulating temperature and system pressure on control pane to manipulate the compressor correctly.
- When it reaches the pressure stipulated, Compressor goes on running. But it is running in a un-load state.
- Compressor supplies compressed air through loading and unloading. Pay attention to pressure, temperature and power flux when manipulating it. Make sure there is no accidental vibration and compressor is running smoothly.

### 3.3 Start-up procedure for the daily time

- Check if oil level is correct. The oil level must be in the center of oil gage.
- Drain out the condensate water in the air-storing tank.
- Confirm that stop valve is open.
- Press start button. (Compressor does not start up automatically. But run light is flashing, it means compressor is in a delay-start state.)

**Attention:** Do not start up it within 60seconds after compressor is stopped. Release all pressure within separation element. (Avoid that compressor is started up when there is backpressure.)

### 3.4 Turn-off procedure

Press the stop button, and then the compressor will be in delay-stop state. Meanwhile, the stand-by indicator light is flashing. After some time, the compressor stops.

If the compressor is start stopping, press the stop button to make it stop thoroughly.

Attention: when compressor is in stand-by state, it may stop and may start up at some time. So don't take it for granted that compressor has been stopped when the motor is not in motion. Check if the stand-by light is on.

**Tip:** emergency shut down button is generally pressed on emergency.

# PACK series 4-15kw

## 4.Control Panel Operation ( PACK series 4-15kw)

### 4.1 Control panel

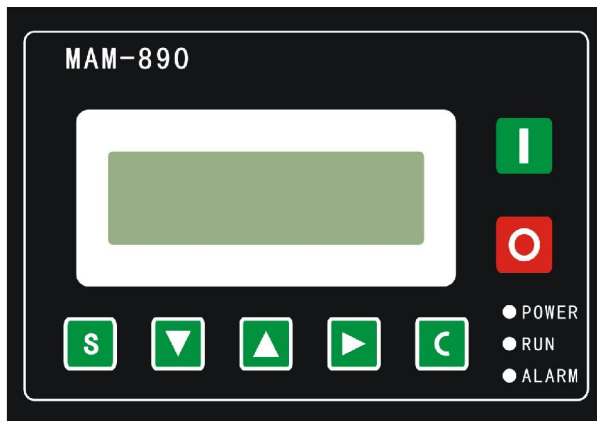









Figure: 1.1.1

-  — Start Button: Press this button to start the compressor.
-  — Stop button: Press this button to stop the compressor.
-  — Set Button/ Loading / unloading Button: After modification, press this to confirm and save modified data; When the compressor is running ,press this button to load or unload under a certain pressure.
-  — Move up button/increase button: Data at current position is increased by pressing this button when data are modified; Menu is moved upwards when menu is selected.
-  — Move down button / Descending button: Data at current position is descended by pressing this button when data are modified; menu is moved downwards when menu is selected.
-  — Shift button /Enter button: This button services as shift button when data are modified and services as enter button when menu is selected.
-  — Back button / Reset button: This button services as back button when operate menu to come back  
Parent menu; resetting is carried out by pressing this button for a little long time when failure shutdowns

## 4.1.2、Indicator instructions

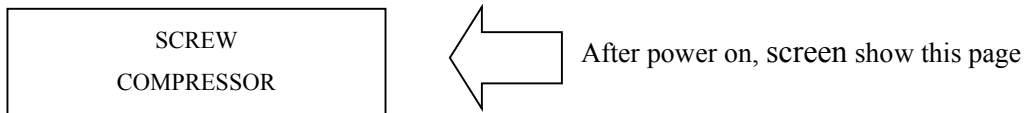
Power: After controller power on, power LED light

Run: Compressor operation, run LED light.

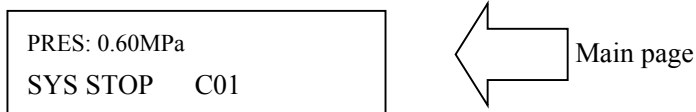
Alarm: Early warning, the fault light flashes; fault shutdown, fault lights lit, clear fault, reset off.

## 4.1.3、Display of status and operations

The display screen will be as follow when the units are powered on:



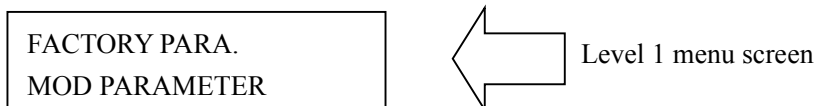
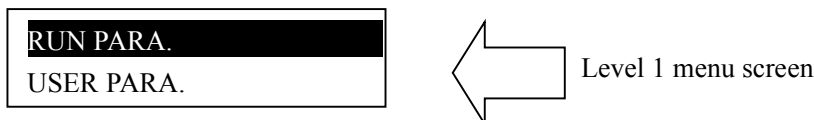
After 5 seconds, the main page will show up as:



Press shift button, the main page will show up as:

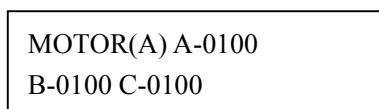


Press “Move down button” to enter into Menu Selection Interface:



## 4.1.4、Operating parameters

Press “Move down button” or “Move up button” to move the black cursor to “RUN PARA.”, press enter button to pop up submenu:

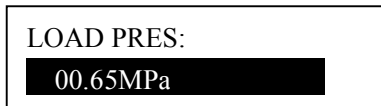


Continuously press “Move down button” you can see run parameters and run state parameters as follows:

Fan current, Total run time, Total load time, This run time, This load time, Oil filter time, O-a filter time, Air filter time, Lube time, Grease time, Belt time.....etc.

## 4.1.5、User Parameter (Customer Parameter):

In primary menu,, press the move button to move the black slider to the "USER PARA." menu, press the shift button to switch to the following menu:



In this menu, Press shift button , Switch to the following interface requirements to enter a user password



After showing this interface, The first bit data or password started flashing, press “increase button” or “descending button” to modify the flashing data equal to the first bit of password, Press the shift button, move the cursor to the next data bit,modify the current data is equal to the second password data, Accordance with the above , modify the third and fourth Finally, press the “Set button” to confirm the input, the system verify the password is correct, switch to the following interface:



The upper right corner with "\*" "prompt said the system has passed the password authentication

In as shown above interface, press “enter button” , then the data of loading pressure start to flash, users can press “increase button” or “Descending button” to modify the present data. When finished, press “Set Button” to confirm and save. the controller prompt sends out the short voice to tip.

#### 4.1.6、 Customer Parameter and Functions

Parameters	Preset Value	Functions
LOAD PRES.	*.**MPa	LOADING PRESSURE VALUE
UNLOAD PRES.	*.**Mpa	UNLOADING PRESSURE VALUE
MOTOR DELAY T	0008S	When using the controller to protect the motor, it is required that the time set here will not meet the impulse starting current of the motor, the value here must be longer than the STAR DELAY TIME plus LOAD DELAY TIME
LOAD DELAY TIME	0002S	The loading delay time after star pressure descending.
EMPTY DELAY T	0020M	Load free continuous running time, the machine will automatically stop after this time
STOP DELAY TIME	0010S	The machine will not stop until the load free running status lasting till this time
START DELAY T	0100S	Machine can not be restarted before this set time after stopped or over time operation at load free state

START MODE	LOCAL/FAR	When the remote mode is set, both the button on the controller and the remote control button can turn on and off the machines;When the near mode is set,only the button on the controller can turn on and off the machines.
LOAD MODE	AUTO/MANU	When the manual mode is set, the Load/Unload function can only be executed by pressing “load/unload”button
COM MODE	BAN/COMP./BLOCK	When this is set as “BAN” the communication function is not available When this is set as “COMP.”the Controller as a slave, in accordance with MODBUS protocol communications with external devices When this is set block,block control active
COM ADDRESS	0255	Communication address
SEQ STATE	SLAVE	Service as main or assistant air compressor during interlocking operation. The MAIN controls the SLAVE
TOGGLES TIME	9999 Hours	During interlocking operation, if one air compressor continuously operates for time period more than time set here and rest time of one air compressor in interlocking network has reached the time set here, alternative rest is achieved by starting the resting air compressor and stopping the operating air compressor
SEQ NUMER	0016	Number of air compressors in interlocking network during interlocking operation
SEQ LOAD PRES.	*.**MPa	The main air compressor searches for one device in the interlocking network for loading or starting when main air compressor’s gas supply pressure is less than the value set here during interlocking operation
SEQ U.L. PRES.	*.**MPa	The main air compressor searches for one device in the interlocking network for unloading or stopping when main air compressor’s gas supply pressure is more than the value set here during interlocking operation
SEQ DELAY	0030S	The least waiting time that the main air compressor needs to continuously sends control commands two time
OIL FILTER	0000H	Reset time for the duration of oil filter changing
O/A FILTER	0000H	Reset time for O/G Separator changing
AIR FILTER	0000H	Reset time for gas filter changing
LUBE	0000H	Reset time for Lubricate Oil Changing
GREASE	0000H	Reset time for Lubricate Grease Changing
BELT	0000H	Reset time for Belt Grease Changing
OIL FILTER	9999H	Set this value to “0” will make the oil filter alarm not available
O/A SEPARATOR	9999H	Set this value to “0” to disable the O/G separator alarm function



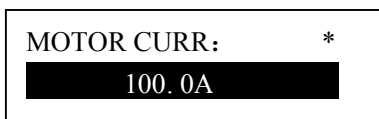
AIR FILTER	9999H	Set this value to “0” to disable the alarm function of gas filter
LUB	9999H	Set this value to “0” to disable the time alarm of lub. oil
GREASE	9999H	Set this value to “0” to disable the time alarm of Lub. Grease
BELT	9999H	Set this value to “0” to disable the time alarm of belt.
LANGUAGE SEL	ENGLISH/CHINESE	Set this value to “EN” , Display text in English Set this value to “CH” , Display text in Chinese
USER PASSWORD	****	Customer could modify the user password

#### 4.1.7、 Factory Parameters

The factory parameters can be looked over and modified with manufacturer password, but its operation method is the same as that of user parameters. Please refer to following table for main functions and purposes.



Manufacturers enter the correct password, press set button, switch to the factory parameters of the interface as follows



Continuously press “Move down button” you can see factory parameters as follows: FAN CURR, PRE-ALARM TEM, STOP TEMP, STOP PRESS, MAX U.L. PRESS, TOTAL RUN TIME, TOTAL LOAD TIME, RESET FAULT ect.

Factory parameters "run time", "phase sequence protection," "Frequency Selection" and the time need check super password to changes.

#### 4.1.8、Manufacturers and function

Parameter	Initial Value	Functions
MOTOR CURR	MAXIMUM OVERLOAD VAULE OF THE MOTOR /1.2	After the starting delay time, when the motor current is greater than 1.2 times of the set value and less than 4 times of the set value, the unit will jump as per overload feature.
ALARM T.	105°C	Pre-alarm when the temperature reaches this set value
STOP T.	110°C	Alarm when the air exhausting temperature reaches this set value.
STOP P.	1.00MPa	Alarm and stop the machine when the air supply temperature reaches this set value
MAX U.L.	0.80MPa	The Unload Limit Pressure in the Customer Parameter must be set lower than this value.
RUN TIME	****Hours	The manufacturer can modify the total running time
LOAD TIME	****Hours	The manufacturer can modify the load running time
CLR FAULT	****	Input the history failure password to clear all the history failures.
CUR UN.BAL.	0006	When (the max. phase current / min. phase current) is not greater than (1+set value), the unbalance protection will stop the machine. If the set value is greater than 15, the unbalance protection will be unavailable.
LACK PAHSE	005.0	If set time of phase failure $\geq 20$ seconds, phase failure doesn't function; If unbalance protection is activated, it will stop operation.
DATA	****_**_**	The manufacturer input the product date of the unit.
SERIAL	*****	The manufacturer input the product No. of the unit
PHASE PRO.	ON/OFF	ON:Select sequence protection OFF:Not select sequence protection
POWER FREQ	50H	Set the power frequency
TIME LIM	0000H	When the compressor run time is greater than TIME LIM set, the controller will stop the compressor and alarm ; If the value set as '0000'the function is disable.
ALM STOP	0010H	Warning time over here to set, compressor report "warning too long" and stop
COM SET PARA	ON/	
PARA1	****	Manufacture password, it can be modified.
START MODE SEL	DIRECT START/STAR-DELTA	DIRECT START or STAR-DELTA

#### 4.1.9、 Calibration parameters

Calibration parameter used to set the controller data, Does not allow unauthorized users to view and modify



View calibration parameters as follows, Press the “Move down button”, Move the cursor to the “MOD PARAMETE” menu, then press “Enter button”, Verify the password, you can view the calibration parameters. The calibration parameter and functions as list

Parameter		Initial Value	Functions
M O T O R  A	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
M O T O R  B	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
M O T O R  C	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.

---

#### 4.1.10、 the operating authority and password

Controller provides multiple passwords and access management, according to different levels of passwords, providing different levels of operating authority, different levels of passwords and permissions as follows:

1. user's password: fixed as : \_\_\_\_\_  
Permissions: allows to modify the load pressure unload pressure, fan start temperature, fan stop temperature, start and stop mode, loading method, communication mode, communication address and linkage parameters.
2. User Password: set as: \_\_\_\_\_
3. Permissions: Allows to modify all user parameters.
4. manufacturers sales password: this password can be modify, set to : \_\_\_\_\_  
Permissions: Allows users to modify all the parameters, the user password, and the parameters of some manufacturers, manufacturers selling password.
5. manufacturers Password: factory fixed: \_\_\_\_\_  
Permissions: Allows users to modify all the parameters, the user password, and the parameters of some manufacturers, manufacturers selling password.
6. Calibration Password: set as: \_\_\_\_\_  
Permissions: allows you to modify the current parameters of the calibration parameters
7. Super Password: set as: \_\_\_\_\_  
Permissions: Allows users to modify "run time " "phase sequence protection " "power frequency " "max run time"

## 4.2、 Technical parameters and functions

4.2.1、 Digital input: Digital input of 2# circuit; digital output of relay of 3# circuit;

4.2.2、 Simulation quantity: Pt100 temperature input of 1# circuit; 4~20mA input of transducer of 1# circuit; one groups of three phase current input(CT provided);

4.2.3、 Controller's power supply: AC20V、 50Hz、 10VA;

4.2.4、 Measurement range displayed:

- ①、 Oil temperature:-50~150℃; precision: ±1℃.
- ②、 Air temperature:-50~150℃; precision:±1℃.
- ③、 Operation time: 0~999999 hours.
- ④、 Measurement range displayed for current:0~999.9A.
- ⑤、 Pressure: 0~1.60MPa. Precision: 0.01Mpa.

4.2.5、 Protection of motor: this controller has five basic protection functions for main motor and fan's motor

- ①、 block protection: When working current reaches to from 4 times to 8 times of set current after finish starting, response time ≤0.2s;
- ②、 Short circuit protection: when testing current reaches above 8 times of set current, response time ≤0.2s;
- ③、 Protection of phase failure: in case of phase failure of any one phase, operation time equals setup time;
- ④、 Unbalance protection: when currents of any two phase differ 60~75%,operation time equals set time;

- ⑤、 Protection characteristics of reverse time limit of overload (time unit: second), please see following table (table 2.1.1),  $\text{multiple} = I_{\text{actual}} / I_{\text{set}}$   
 motor operates with delay time according to overload factors and operation time shown in following table (table 2.1.1) when motor's working current is larger or equal to from 1.2 times and 3.0 times of set current.

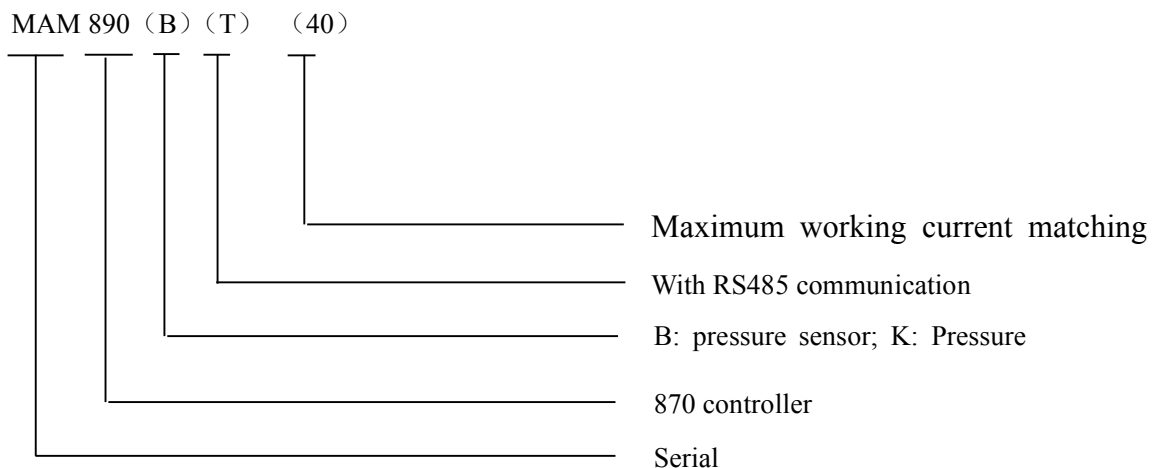
$I_{\text{actual}}/I_{\text{set}}$ Time parameters	$\geq 1.2$	$\geq 1.3$	$\geq 1.5$	$\geq 1.6$	$\geq 2.0$	$\geq 3.0$
Operation time (S)	60	48	24	8	5	1

Table 2.1.1 curve table of reverse time limit for protection of motor

- 4.2.6、 Temperature protection: when actual temperature measured is larger than temperature set; response time  $\leq 2s$ ;  
 4.2.7、 Contact capacity of output relay: 250V,5A; Contact endurance 500000 times  
 4.2.8、 Error of displayed current is less than 1.0%.;  
 4.2.9、 RS485 communication

### 4.3、 Type and specification

#### 4.3.1、 Instruction of type



### 4.3.2、 Specification table for power of suited motor

Parameter Specification	Current range (A)	Suited main motor power (KW)	Remark	Description
MAM890 (20)	8~20	4~10		Fan has three levels of current, such as 0.2-2.5A, 1-5A and 4-10A, determined according to fan's current
MAM890 (40)	16~40	8~20		
MAM890 (100)	30~100	15~50		
MAM890 (200)	80~200	40~100		
MAM890 (400)	160~400	80~200		
MAM890 (600/5)	100~600	50~300		

Table 3.2.1 Power Table

## 4.4、 Installation

### 4.4.1、 Installation of transducer

The transducer shall be installed at place where motor's line current (rated current) can be measured, thus controller can be set according to instructions on motor's name plate, the detailed dimensions as followed:

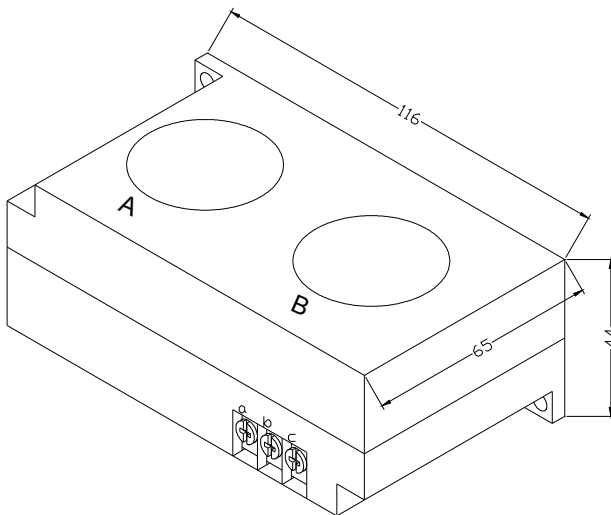


Figure 4.1.1. Structural dimensions of CT1 (φ36 through hole)

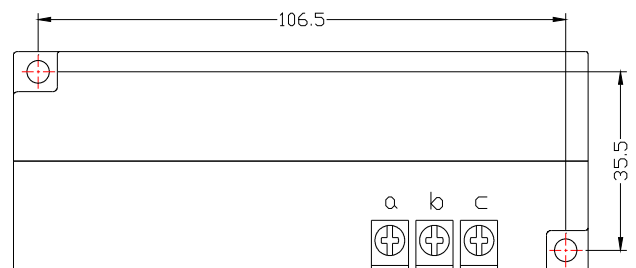


Figure 4.1.2. Install dimensions of CT1

### 4.4.2、 Controller Installation

The controller is installed as plate. Room should be left around controller for wiring. The specific dimensions are as follows:

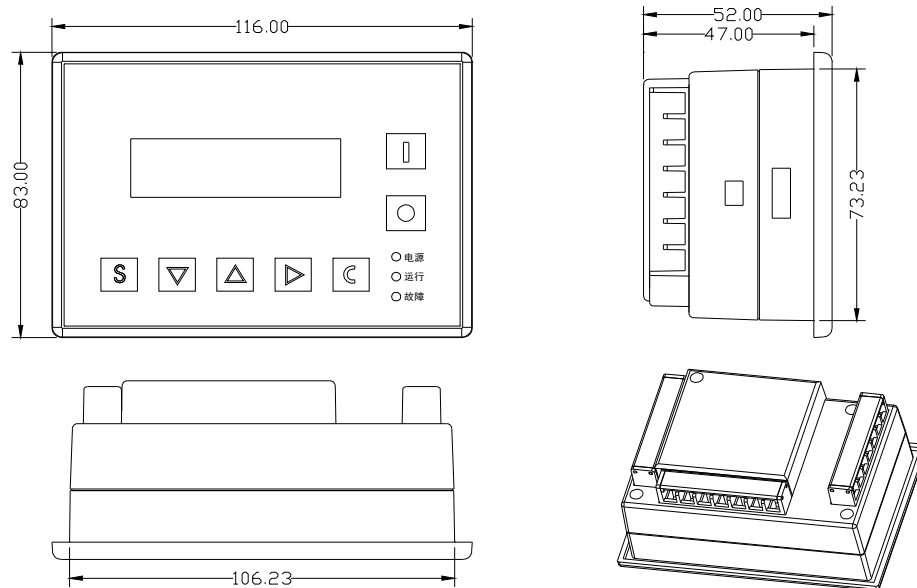


Figure 4.1.5 Controller structure dimensions

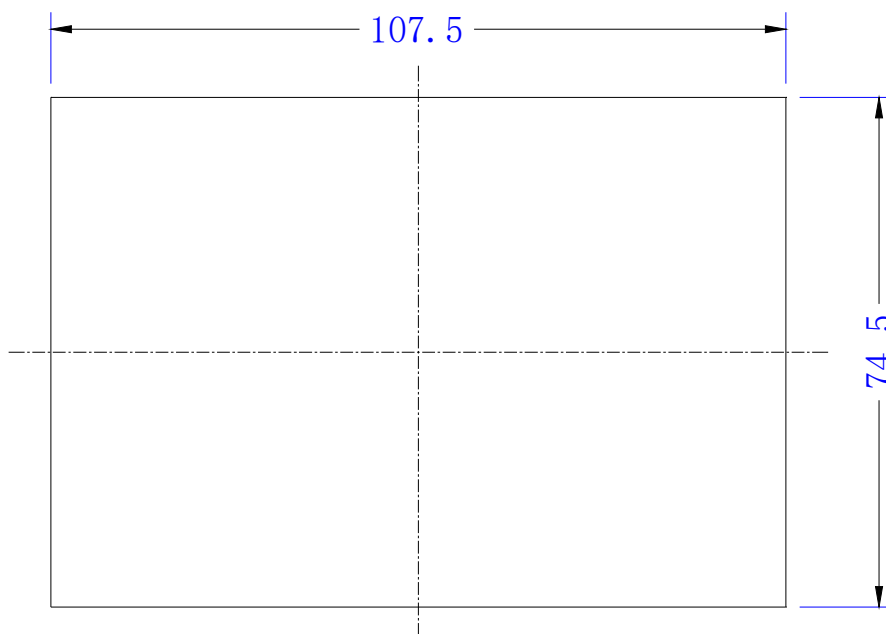


Figure 4.1.6 Hole size

## 4.5、 Control principles

### 4.5.1、 Local Automatic control

①、 press start button for starting:

#### **DIRECT START:**

After power on, Controller take five seconds time to execute self-test. After the self-test finished , Press start button, Compressor will start to run. Air compressor startup procedure is: 9 terminal turned on, KM1 was electric, the main motor and the fan is running.

---

### **STAR-DELTA:**

After power on, Controller take five seconds time to execute self-test. After the self-test finished, Press start button, Compressor will start to run. Air compressor startup procedure is: 11 terminal turned on, Star contactor KM3 was electric, (At this time, the main contactor is disconnected, Delta contactor is disconnected), After 1 second delay, 9 terminal turned on, main contactor turned on, The motor starts to run Star mode, After star-delta time delay the 11 terminal is disconnected, the star contactor KM3 loss of power, angle contactor KM1 was electric, the motor starts running angle.

#### ②. Automatic operation control:

After compressor start, Controller will start accumulating time, When the accumulated time is greater than the set of load time, If the air pressure is less than the unload pressure, 9 terminal turned on, load valve was electric, air compressor is loaded and pressure inside gas tank begins to increase. When increased air pressure is more than higher pressures limit (value of unload pressure), electromagnetism valve for loading is de-energized and electromagnetism valve for discharging is energized, meanwhile, the air compressor operates without load. If air pressure decreases to set lower pressure limits (value of load pressure), the electromagnetism valve for loading is energized again and electromagnetism valve for discharging is de-energized. Air compressor operates normally to increase pressure in air tank. If the unload run time exceeds the set delay time of non-load, the compressor will automatically stop motor's operation to achieve automatic shutdown after works without load for long time. Only when pressure decreases to lower pressure limits, the motor start operation according to course of starting, then circularly repeat this step.

#### ③. Manual loading/unloading under automatic status

When compressor in automatically runs state and runs at unload operation, press down load or unloading button, the electromagnetism valve for loading joggles a little and comes back to unloading status; if the pressure is less than relief pressure, the electromagnetism valve for loading is energized and it returns to unloading status until gas supply pressure becomes larger than relief pressure and device is at loading status. Unloading is performed when press down unloading button "S". If the pressure is higher than loading pressure, the electromagnetism valve for loading is de-energized and turns to status of loading until gas supply pressure is less than loading pressure. If pressure is less than loading pressure, the unloading button do not function.

#### ④. Normal shutdown:

Press the button, the load magnetic valve will loss power and the unload magnetic will be applied with power, after a while of delay (stop delay), the motor contactor will loss power, the host and fan will stop running, after the restarting delay completed, the unload magnetic will loss power. Only pressing the button could restart the motor.

#### ⑤. Control of preventing frequent starting

Press stop button to stop operation; Air compressor can not be started up immediately after shutdown due to operation without load for long time or failure shutdowns, and it can be started up again when remaining delay time is zero which the time display window of the controller in a variety of shutdown state shows.

### 4.5.2、 Remote automatic control

Remote automatic control and local automatic control are basically same, but the



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difference is that starting up or stopping of devices can be achieved by means of control of remote switch.

#### 4.5.3、 Local manual control

Control of starting and stopping are same as automatic control, but device is in status of unloading operation after finish starting up and loading is carried out by pressing down loading and unloading button to load. When gas supply pressure is more than relief pressure, the device unloads automatically. If doesn't press loading, unloading button, the device will operate with unloading until stops without load. During unloading, press loading and unloading button to load. During loading, press loading and unloading button to unload.

#### 4.5.4、 Remote Manual Control

The remote automatic control is almost the same as the local manual control, the only difference is that the start and stop of the unit is controlled by remote control.

#### 4.5.5、 Network control

- ①: When communication method is set "computer", network control between computer and controllers can be achieved
- ②: When communication method is set "interlocking", network control between controllers can be achieved, but the main air compressor only can service as 1# compressor.

#### 4.5.6、 Temperature control of fan

When exhausting temperature is higher than fan's starting temperature, fan operates; when exhausting temperature is lower than fan's stopping temperature, fan stops operation.

#### 4.5.7、 Failure shutdown and emergency shutdown

When electrical failure or high exhausting temperature appears during process of operation, the controller stops motor's operation immediately. Air compressor only can be started up after failure is eliminated. In case of emergency, press down emergency stop button to cut off power of controller and contactors

### 4-6、 Alarm

#### 4.6.1、 Indication of early warning of oil filter

- ①. Early warning for blockage of oil filter

The controller can display the message on the text display to remind the operator that "the air filter is blocked" by checking the pressure difference switch operating state.

- ②. Set the running time alarm of the air filter

The Text displays "**OIL FILTER LIFE END**" when the using time of the oil filter terminates.

#### 4.6.2、 Indication of early warning for air filter

The Text displays "**AIR FILTER LIFE END**" when the using time of the oil filter terminates.

#### 4.6.3、 Indication of early warning for oil separator

The Text displays "**O/A LIFE END**" when the using time of the oil separator terminates.

---

#### 4.6.4、 Indication of early warning for lubricating oil

The Text displays “**LUBE LIFE END**” when the using time of the lube terminates.

#### 4.6.5、 Indication of early warning for grease

The Text displays “**GREASE LIFE END**” when the using time of the grease terminates.

#### 4.6.6、 High air temperature warning

Controller detects the air temperature high, the text display “**HIGH TEMPERATURE**”

## Controller protection

#### 4.6.7、 Motor protection

MAM-870 air compressor controller provides all-round protection functions of short-circuit, locking, phase failure, overload, imbalance for motor.

Electronic failure	Failure Display	Reason
Short circuit	Display failure “HOST/FAN SHORT”	Short circuit or rated current is set by mistake
Blocked	Display failure “HOST/FAN BLOCK”	Too large load, bearing wear and other mechanical failure
Overload	Display failure “HOST/FAN OVER CARRY”	Too large load, bearing wear and other mechanical failure
Phase failure	Display failure “HOST/FAN LACK PHASE”	Power supply, contactor and phase failure of motor
Unbalance	Display failure “HOST/FAN UNBLANCE”	Poor contact of contactor, inside open-loop of motor

#### 4.6.8、 Gas Exhaust Over-temperature Protection

When the Air exhaust temperature is higher than the upper limit of set temperature, the controller would be stopped ,The display will show “**HIGHT T**”.

#### 4.6.9、 Non-reversing Protection of Air Compressor

When three-phase supply phase sequence connected to the air compressor is not the same with that set for the controller, the on-site failure is displayed as “**PHASE REVERSAL**”, as a result, the controller cannot start up the motor. Then just change any arbitrary two-phase power lines leading to check the rotation of motor.

---

#### 4.6.10、 Overpressure Protection of Pressure Supply

When the gas exhaust pressure is higher than the upper limit of set pressure, the controller would be stopped for warning, the on-site failure is displayed as “**HIGH P**”.

#### 4.6.11、 Malfunction Protection of Sensor

When pressure sensor or temperature sensor is disconnected, the controller would be stopped for warning. the on-site failure is displayed as “**\*\*SENSOR FAULT**”.

### Removal of Common Failures

#### 4.6.12、 Failures Review

When a fault occurs, the controller in the main interface displays the current fault content. For example, when the pressure sensor failure, it displays the following interface:

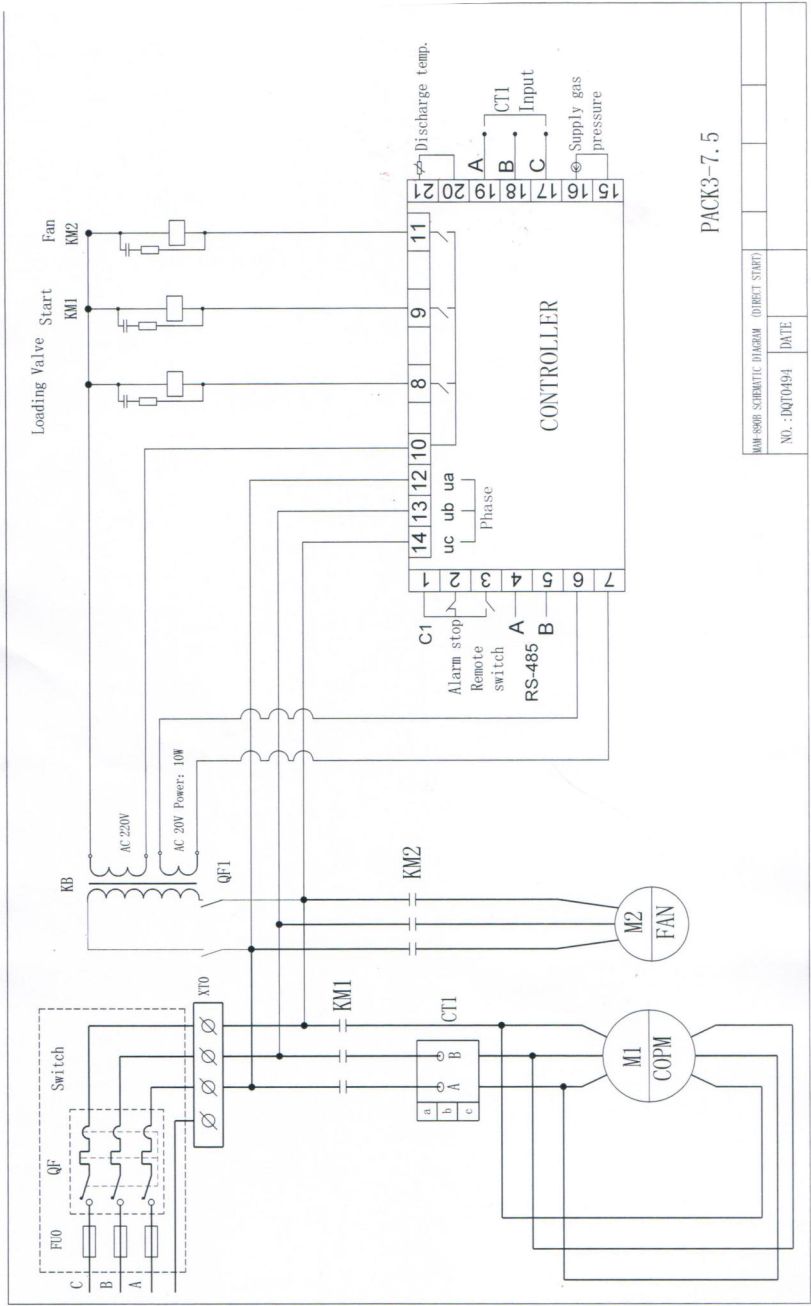
STOP: P SENSOR FAULT
-------------------------

#### 4.6.13、 Common Failures and Causes

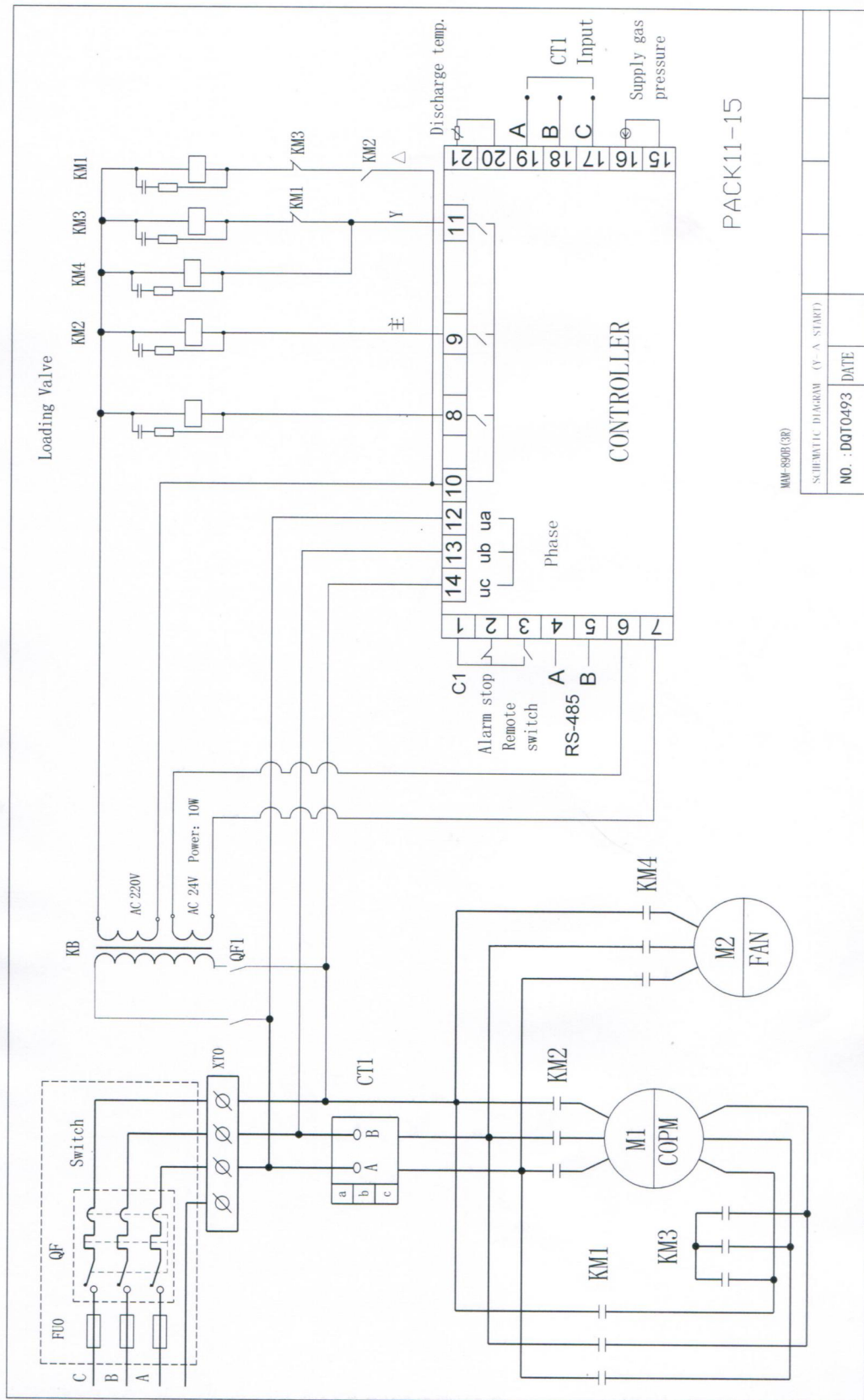
<b>Failure</b>	<b>Reason</b>	<b>Disposal method</b>
Air Exhaust Temperature too high	Bad vent condition, Oil lacking etc.	Check the vent condition and lubricant amount etc.
Temperature Sensor Failure	Cable off or PT100 damaged	Checking the wiring and PT100
Over Pressure	The pressure too high or the pressure sensor failure	Check the pressure and the pressure sensor
Pressure Sensor Failure	Cable off, Sensor damaged or the cable connected reversed	Check the wiring and sensor transformer
Lack Phase	Power phase lacking or the Contactor terminal damaged	Check the power and contactors
Overloaded	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings, tubes and other mechanical system.
Unbalance	Power unbalance, Contactor damaged or the internal open of the motor	Check the power, contactors and the motor
Rotor Lock	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings, tubes and other mechanical system.
Short Circuit	Wrong Wiring, Incorrect Data setting etc.	Checking the wiring and set the data correctly
Wrong Phase Sequence	Reversed Phase sequence or phase off	Check the wiring
Overload or Rotor locking during starting process	Host start time set to a valueless than the star angel time delay	Reset the host starting time to be longer than star angel delay + Load delay time
Main Contactor activate time to time	The emergency button loose	Check the wiring
Air Exhaust Temperature too high	Bad vent condition, Oil lacking etc.	Check the vent condition and lubricant amount etc.
Temperature Sensor Failure	Cable off or PT100 damaged	Checking the wiring and PT100
Over Pressure	The pressure too high or the pressure sensor failure	Check the pressure and the pressure sensor

# 4.7、 Electrical Circuit diagram

## PACK4-7 KW



# PACK11-15KW



MM-806(3R)

SUBMITTAL DIAGRAM (Y-A STAND)

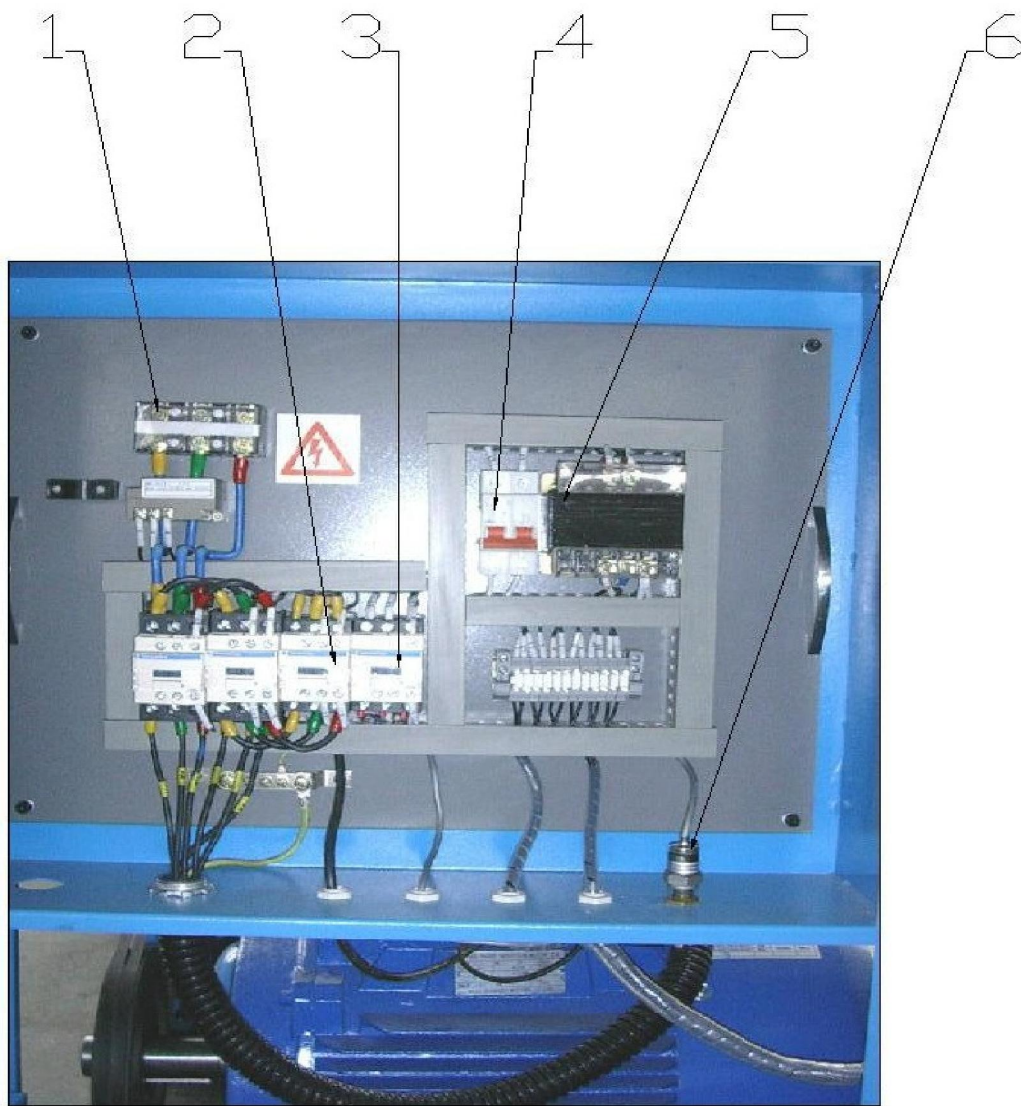
NO. : D0T0493 DATE

PACK11-15

## 4.8. Explored drawing



NO.	PARTS NAME	NO.	PARTS NAME
1	electrical control case	11	cooling fan
2	emergency stop button	12	thermostatic valve
3	PLC controller panel	13	minimum pressure valve
4	v-belt	14	oil tank
5	screw air end	15	oil inject
6	Solenoid valve & intake valve	16	oil glass
7	intake filter	17	drain valve
8	oil filter	18	main electric motor
9	oil separator	19	safety valve
10	oil/air cooler	20	oil return viewer/one way valve



NO.	PARTS NAME	NO.	PARTS NAME
1	power connect terminal	11	
2	main motor contactor	12	
3	fan motor contactor	13	
4	switch	14	
5	transformer	15	
6	pressure sensor	16	
7		17	
8		18	
9		19	
10		20	





## SC series

# 4. Control Panel Operation ( SC series )

## 4-1、 Control Panel

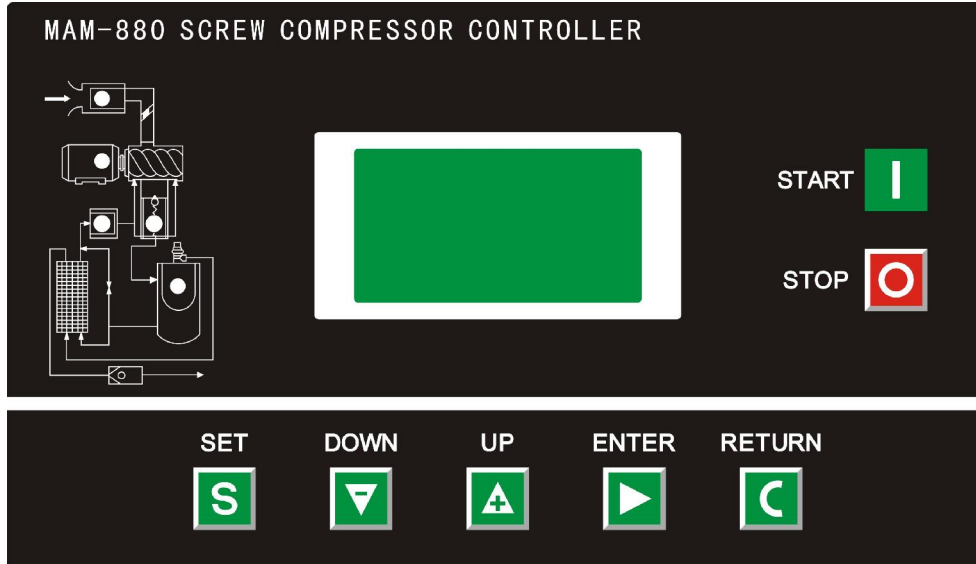


Figure 1.1.1



— Start Button: Press this button to start the compressor.



— Stop button: Press this button to stop the compressor.



— Set Button/ Loading / unloading Button: After modification, press this to confirm and save modified data; When the compressor is running ,press this button to load or unload under a certain pressure.



— Move up button/increase button: Data at current position is increased by pressing this button when data are modified; Menu is moved upwards when menu is selected.



— Move down button / Descending button: Data at current position is descended by pressing this button when data are modified; menu is moved downwards when menu is selected.



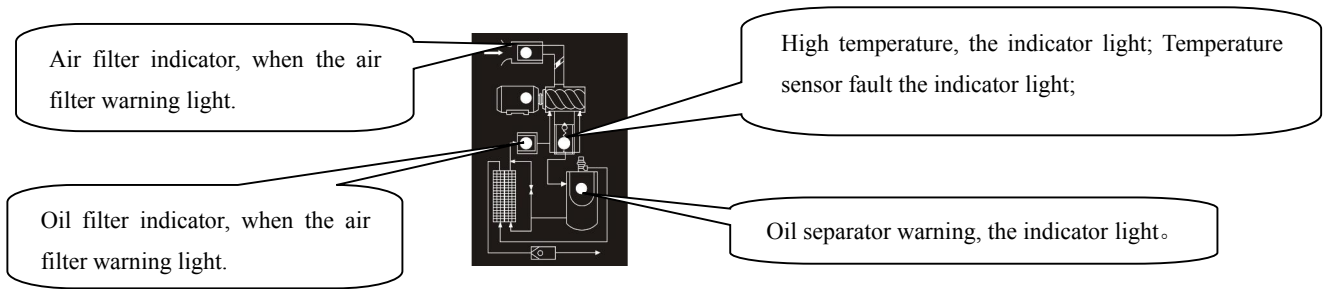
— Shift button /Enter button: This button services as shift button when data are modified and services as enter button when menu is selected.



— Back button / Reset button: This button services as back button when operate menu to come back

Parent menu; resetting is carried out by pressing this button for a little long time when failure shutdowns

## 4. 1.2 Indicator instructions



## 4. 1.3 Display of status and operations

The display screen will be as follow when the units are powered on:

```

WELCOME USING
SCREW COMPRESSOR
    
```

← After power on, screen show this page

After 5 seconds, the main page will show up as:

```

AIR T: 20°C
AIR P: 0.60MPA
NORMAL STOP
C001    REMOTE
    
```

← Main page

Press “Move down button” to enter into Menu Selection Interface:

```

RUN PARA.
USER PARA.
FACTORY PARA.
CALBR PARA.
    
```

← Level 1 menu screen

## 4. 1.4 Operating parameters

Press “Move down button” or “Move up button” to move the black cursor to “RUN PARAMETER”, press enter button to pop up submenu:

```

MOTER FAN CUR
TOTAL RUN TIME
THIS RUN TIME
MAINTAIN PARA.
    
```

HISTORY FAULT
SERIAL NUMBER
THIS FAULT
COM STATUS

Move the scroll bar to the corresponding menu item, press the enter key, see the specific parameters. Such as view, "MOTER FAN CUR " move the scroll bar to the " MOTER FAN CUR " menu item, press the enter key, switch to the motor and fan current interface

MAIN (A)	FAN (A)
A 50.1	2.1
B 50.1	2.1
C 50.1	2.1

If the menu popped up is at the last level, the black cursor will disappear. Press the return button to return to the upper menu or the main page. If the operation stops at a certain page, it will automatically return to the main page after 60 Seconds

#### 4. 1.5 User Parameter (Customer Parameter):

In primary menu,, press the move button to move the black slider to the "USER PARA." menu, press the shift button to switch to the following menu:

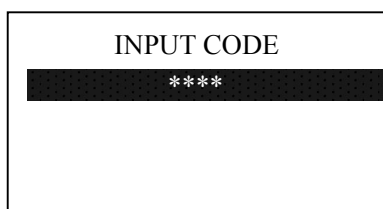
<b>P、 T SET</b>
TIME SET
OPERATION MODE
SEQ PARA. SET

CLR LIFE TIME
MAX LIFE TIME
LAN. SEL:EN
NEW USER PIN: ****

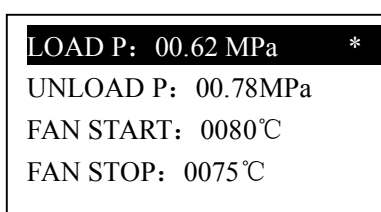
Move the cursor to the "P、 T SET " menu, then press enter button to switch to the following interface:

<b>LOAD P: 00.62 MPa</b>
UNLOAD P: 00.78MPa
FAN START: 0080℃
FAN STOP: 0075℃

Move the cursor to the "LOAD P" menu, Press enter button , Switch to the following interface requirements to enter a user password



After showing this interface, The first bit data or password started flashing, press “increase button” or “descending button” to modify the flashing data equal to the first bit of password, Press the shift button, move the cursor to the next data bit, modify the current data is equal to the second password data, Accordance with the above, modify the third and fourth Finally, press the “Set button” to confirm the input, the system verify the password is correct, switch to the following interface:



The upper right corner with "\*" prompt said the system has passed the password authentication

In as shown above interface, press “enter button”, then the data of loading pressure start to flash, users can press “increase button” or “Descending button” to modify the present data. When finished, press “Set Button” to confirm and save. the controller prompt sends out the short voice to tip.

#### 4. 1.6 Customer Parameter and Functions

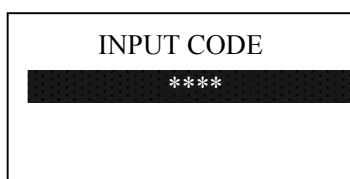
First Submenu	Second submenu	Preset Value	Functions
SET P. T.	LOAD P.	*.**MPa	LOADING PRESSURE VALUE
	UNLOAD P.	*.**Mpa	UNLOADING PRESSURE VALUE
	FAN START	***°C	Control the fan starting. This value will be set as “120°C” if there is no fan present or the fan is not required to be protected.”
	FAN STOP	***°C	Control the stopping of the fan
TIME SET	HOST START	0008S	When using the controller to protect the motor, it is required that the time set here will not meet the impulse starting current of the motor, the value here must be longer than the STAR DELAY TIME plus LOAD DELAY TIME
	FAN START	0006S	When using the controller to protect the motor, it is required that the time set here will not meet the impulse starting current of the motor.
	STAR DELAY	0006S	Star pressure descending start delay time.
	LOAD DELAY	0002S	The loading delay time after star pressure descending.

	EMPTY DELAY	0020M	Load free continuous running time, the machine will automatically stop after this time
	STOP DELAY	0010S	The machine will not stop until the load free running status lasting till this time
	START DELAY	0100S	Machine can not be restarted before this set time after stopped or over time operation at load free state
OPERATION MODE	ON/OFF MODE	NEAR/FAR	When the remote mode is set, both the button on the controller and the remote control button can turn on and off the machines; When the near mode is set, only the button on the controller can turn on and off the machines.
	LOAD MODE	AUTO/MANU	When the manual mode is set, the Load/Unload function can only be executed by pressing "load/unload" button
	COM MODE	BAN/COMP./BLOCK	When this is set as "BAN" the communication function is not available When this is set as "COMP." the Controller as a slave, in accordance with MODBUS protocol communications with external devices When this is set block, block control active
	COM ADD	0255	Communication address
BLOCKING MODE	SEQ STATE	SLAVE	Service as main or assistant air compressor during interlocking operation. The MAIN controls the SLAVE
	TURN TIME	9999 Hours	During interlocking operation, if one air compressor continuously operates for time period more than time set here and rest time of one air compressor in interlocking network has reached the time set here, alternative rest is achieved by starting the resting air compressor and stopping the operating air compressor
	SEQ NUMER	0016	Number of air compressors in interlocking network during interlocking operation
	SEQ LOAD	*.**MPa	The main air compressor searches for one device in the interlocking network for loading or starting when main air compressor's gas supply pressure is less than the value set here during interlocking operation
	SEQ U.L.	*.**MPa	The main air compressor searches for one device in the interlocking network for unloading or stopping when main air compressor's gas supply pressure is more than the value set here during interlocking operation

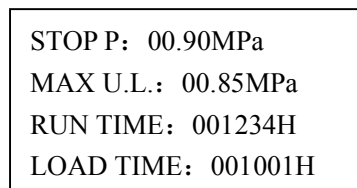
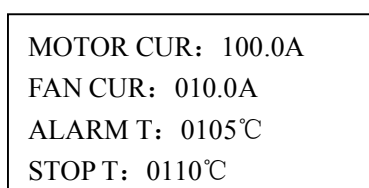
		SEQ DELAY	0030S	The least waiting time that the main air compressor needs to continuously sends control commands two time
CLR TIME	LIFE	OIL FILTER	0000H	Reset time for the duration of oil filter changing
		O/A FILTER	0000H	Reset time for O/G Separator changing
		AIR FILTER	0000H	Reset time for gas filter changing
		LUBE	0000H	Reset time for Lubricate Oil Changing
		GREASE	0000H	Reset time for Lubricate Grease Changing
		BELT	0000H	Reset time for Belt Grease Changing
MAX TIME	LIFE	OIL FILTER	9999H	Set this value to "0" will make the oil filter alarm not available
		O/A SEPARATOR	9999H	Set this value to "0" to disable the O/G separator alarm function
		AIR FILTER	9999H	Set this value to "0" to disable the alarm function of gas filter
		LUB	9999H	Set this value to "0" to disable the time alarm of lub. oil
		GREASE	9999H	Set this value to "0" to disable the time alarm of Lub. Grease
		BELT	9999H	Set this value to "0" to disable the time alarm of belt.
LANG.SEL		EN/CH	EN	Set this value to "EN" , Display text in English Set this value to "CH" , Display text in Chinese
NEW PIN	USER	****	****	Customer could modify the user password

#### 4. 1.7 Factory Parameters

The factory parameters can be looked over and modified with manufacturer password, but its operation method is the same as that of user parameters. Please refer to following table for main functions and purposes.



Manufacturers enter the correct password, press set button, switch to the factory parameters of the interface as follows



Factory parameters "run time", "phase sequence protection," "Frequency Selection" and the time need check super password to changes.

#### 4. 1.8 Manufacturers and function

Parameter	Initial Value	Functions
MOTOR CUR	MAXIMUM OVERLOAD VAULE OF THE MOTOR /1.2	After the starting delay time, when the motor current is greater than 1.2 times of the set value and less than 4 times of the set value, the unit will jump as per overload feature.
FAN CUR	Maximum allowable motor overload value/1.2	Same as above
ALARM T.	105℃	Pre-alarm when the temperature reaches this set value
STOP T.	110℃	Alarm when the air exhausting temperature reaches this set value.
STOP P.	1.00MPa	Alarm and stop the machine when the air supply temperature reaches this set value
MAX U.L.	0.80MPa	The Unload Limit Pressure in the Customer Parameter must be set lower than this value.
RUN TIME	****Hours	The manufacturer can modify the total running time
LOAD TIME	****Hours	The manufacturer can modify the load running time
CLR FAULT	****	Input the history failure password to clear all the history failures.
CUR UN.BAL.	0006	When (the max. phase current / min. phase current) is not greater than (1+set value), the unbalance protection will stop the machine. If the set value is greater than 15, the unbalance protection will be unavailable.
LACK PAHSE	005.0	If set time of phase failure $\geq 20$ seconds, phase failure doesn't function; If unbalance protection is activated, it will stop operation.
DATA	****_**_**	The manufacturer input the product date of the unit.
SERIAL	*****	The manufacturer input the product No. of the unit
PHASE PRO.	ON/OFF	ON:Select sequence protection OFF:Not select sequence protection
POWER FREQ	50H	Set the power frequency
HIGH VOL.	****V	Controller detects the voltage higher than the set value, the shutdown protection, reported voltage is too high. Set this value to 0000, the high voltage function is no function
LOW VOL.	****V	Controller detects the voltage lower than the set value, the shutdown protection, reported voltage is too low. Set this value to 0000, the low voltage function is no function
LOW T PRO-	-48℃	Controller detects the temperature is lower than this value, display temperature is too low, not allowed



		to start the air compressor
TIME LIM	0000H	When the compressor run time is greater than TIME LIM set, the controller will stop the compressor and alarm ;If the value set as '0000' the function is disable.
ALM STOP	0010H	Warning time over here to set, compressor report "warning too long" and stop
COM SET PARA	ON/OFF	
PARA1	****	

#### 4. 1.9 Calibration parameters

Calibration parameter used to set the controller data, Does not allow unauthorized users to view and modify

Parameter		Initial Value	Functions
M O T O R  A	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.
M O T O R  B	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
M O T O R  C	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
F A N	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient

A	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
F A N B	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value can not be set.
F A N C	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient
	COEF	1.000	Calibration current, the input coefficients. Controller displays the current value = sample value × COEF
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.

#### 4. 1.10 Operating authority and password

Controller provides multiple passwords and access management, according to different levels of passwords, providing different levels of operating authority, different levels of passwords and permissions as follows:

8. user's password: fixed as : \_\_\_\_\_  
Permissions: allows to modify the load pressure unload pressure, fan start temperature, fan stop temperature, start and stop mode, loading method, communication mode, communication address and linkage parameters.
9. User Password: set as: \_\_\_\_\_
10. Permissions: Allows to modify all user parameters.
11. manufacturers sales password: this password can be modify, set to : \_\_\_\_\_  
Permissions: Allows users to modify all the parameters, the user password, and the parameters of some manufacturers, manufacturers selling password.
12. manufacturers Password: factory fixed: \_\_\_\_\_  
Permissions: Allows users to modify all the parameters, the user password, and the parameters of some manufacturers, manufacturers selling password.
13. Calibration Password: set as: \_\_\_\_\_  
Permissions: allows you to modify the current parameters of the calibration parameters
14. Super Password: set as: \_\_\_\_\_  
Permissions: Allows users to modify "run time " "phase sequence protection " "power frequency " "max run time"

## 4.2、 Technical parameters and functions

4.2.1 Digital input: Digital input of 3# circuit; digital output of relay of 5# circuit;

4.2.2 Simulation quantity: Pt100 temperature input of 1# circuit; 4~20mA input of transducer of 1# circuit; two groups of three phase current input(CT provided);

4.2.3 Input voltage of phase sequence: three phase 380V/220V;

4.2.4 Controller's power supply: AC20V、 50Hz、 10VA;

4.2.5 Measurement range displayed:

- ①、 Oil temperature:-50~150°C; precision: ±1°C.
- ②、 Air temperature:-50~150°C; precision:±1°C.
- ③、 Operation time: 0~999999 hours.
- ④、 Measurement range displayed for current:0~999.9A.
- ⑤、 Pressure: 0~1.60MPa. Precision: 0.01Mpa.

4.2.6 Phase-sequence protection: When protector inspects wrong phase, response time≤2s (optional);

4.2.7 Protection of motor: this controller has five basic protection functions for main motor and fan's motor

- ①、 block protection: When working current reaches to from 4 times to 8 times of set current after finish starting, response time ≤0.2s;
- ②、 Short circuit protection: when testing current reaches above 8 times of set current, response time≤0.2s;
- ③、 Protection of phase failure: in case of phase failure of any one phase, operation time equals setup time;
- ④、 Unbalance protection: when currents of any two phase differ 60~75%,operation time equals set time;
- ⑤、 Protection characteristics of reverse time limit of overload (time unit: second), please see following table (table 2.1.1),  $\text{multiple} = I_{\text{actual}} / I_{\text{set}}$

motor operates with delay time according to overload factors and operation time shown in following table (table 2.1.1) when motor's working current is larger or equal to from 1.2 times and 3.0 times of set current.

$I_{\text{actual}}/I_{\text{set}}$	$\geq 1.2$	$\geq 1.3$	$\geq 1.5$	$\geq 1.6$	$\geq 2.0$	$\geq 3.0$
Time parameters						
Operation time (S)	60	48	24	8	5	1

Table 2.1.1 curve table of reverse time limit for protection of motor

4.2.8 Temperature protection: when actual temperature measured is larger than temperature set; response time≤2s;

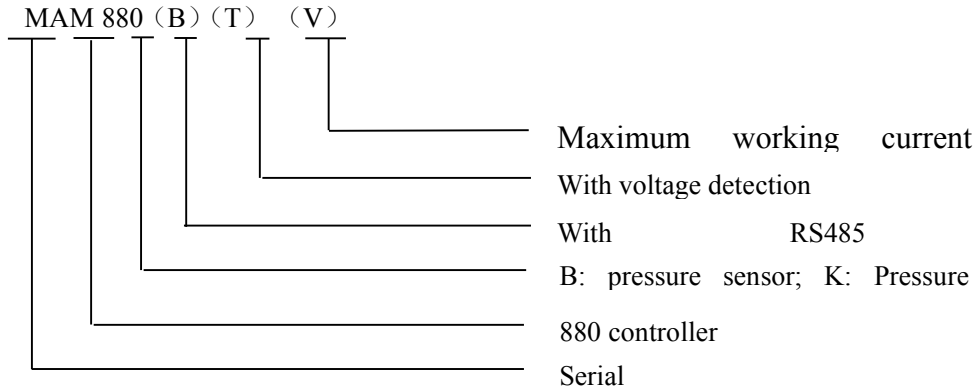
4.2.9 Contact capacity of output relay: 250V,5A; Contact endurance 500000 times

4.2.10 Error of displayed current is less than 1.0%.;

4.2.11 RS485 communication

## 4.3、 Type and specification

### 4.3.1 Instruction of type



### 4.3.2 Specification table for power of suited motor

Parameter Specification	Current range (A)	Suited main motor power (KW)	Remark	Description
MAM880 (20)	8~20	4~10		Fan has three levels of current, such as 0.2-2.5A, 1-5A and 4-10A, determined according to fan's current
MAM880 (40)	16~40	8~20		
MAM880 (100)	30~100	15~50		
MAM880 (200)	80~200	40~100		
MAM880 (400)	160~400	80~200		
MAM880 (600/5)	100~600	50~300		

## 4.4、 Installation

### 4.4.1 Installation of transducer

The transducer shall be installed at place where motor's line current (rated current) can be measured, thus controller can be set according to instructions on motor's name plate, the detailed dimensions as followed:

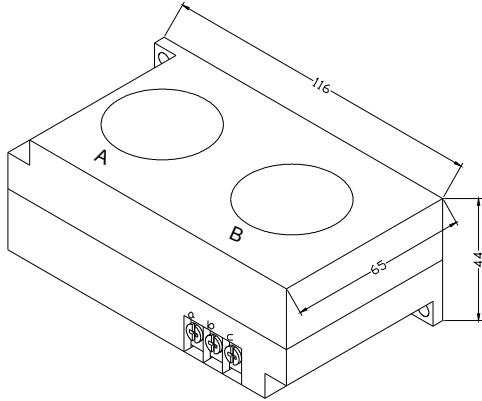


Figure 4.1.1. Structural dimensions of CT1 ( $\phi 36$  through hole)

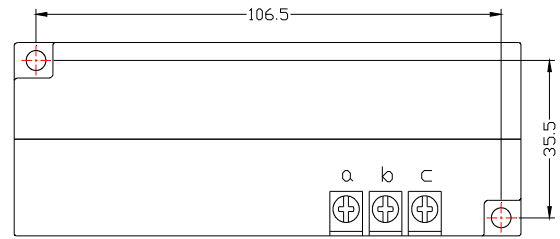


Figure 4.1.2. Install dimensions of CT1

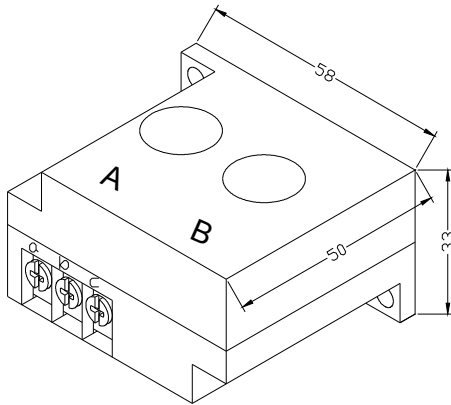


Figure 4.1.3. Structural dimensions of CT2 ( $\phi 10$  through hole)

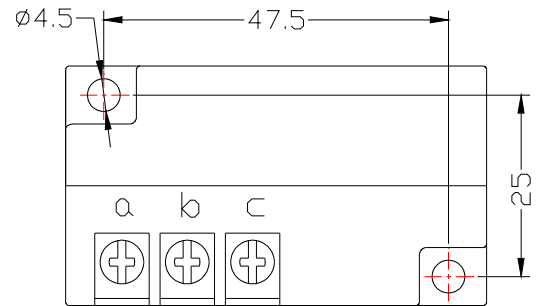


Figure 4.1.4. Install dimensions of CT2

#### 4. 4.2 Controller Installation

The controller is installed as plate. Room should be left around controller for wiring. The specific dimensions are as follows:

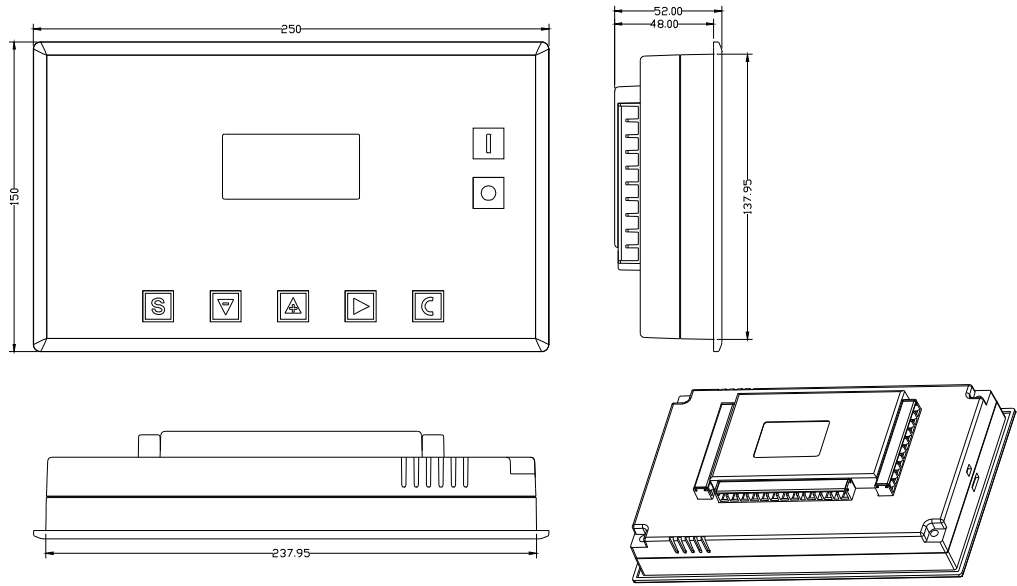


Figure 4.1.5 Controller structure dimensions

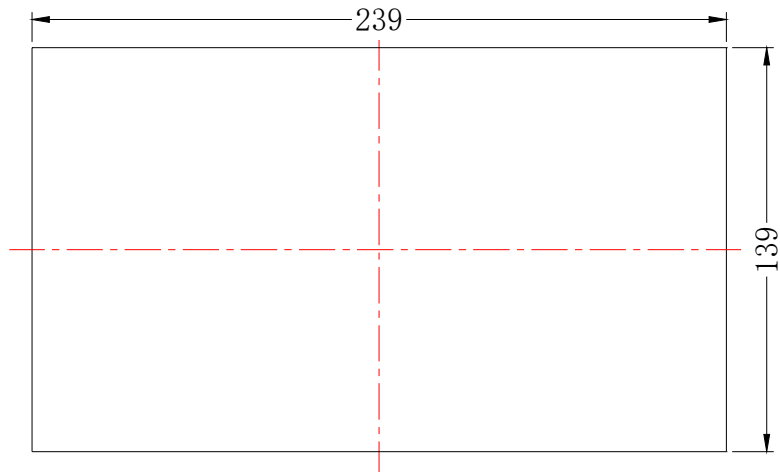


Figure 4.1.6 Hole size

### 4. 4.3 Terminal arrangement diagram

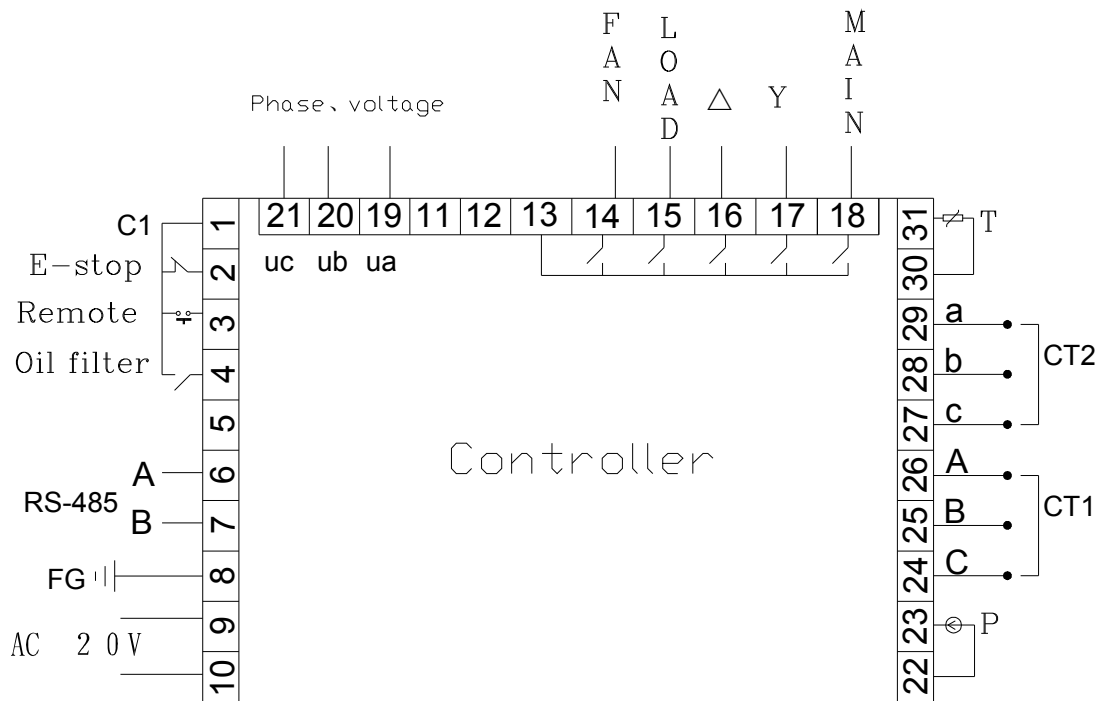


Figure 4.2.1 Terminal arrangement diagram

#### Terminal blocks of controller:

1 is common terminal COM1; 2 is input terminal for emergent stop signal; 3 is remotely controlled for on/off signal input terminal; 4 terminal is used to detect oil filter blocked; 6 is RS485 A; 7 is RS485 B; 8 is the simulated ground (Earth); 17 and 18 are the AC20V power source; 22、23 terminals are Pressure Sensor signal input; 24、25、26 terminals are motor mutual inductor CT1 input; 27、28、29 terminals are Fan mutual inductor CT2 input; 30、31 terminals are Temperature Sensor signal input; 19、20、21 terminals Used to detect the phase sequence and voltage; 13 terminals is common terminal of output relay; 14 terminals controls fan; 15 terminals controls load valve; 16 terminals controls angle-shaped contactor; 17 terminals controls star-shaped contactor; 18 terminals controls main contactor.

**NOTE: Electromagnet coil shall be connected with surge absorber during wiring, and dotted lines are extendable functions.**

## 4.5、 Control principles

### 4. 5.1 Local Automatic control

①. press down start button for starting: (Y-Δstart)

There is five seconds of self-test after controller is energized and it cannot be started by pressing start button. The air compressor starts by pressing start button after self-test finished. The

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course of compressor's start as followed: KM3 and KM2 are energized → Y-type status of start → delay time is reached (Y- $\Delta$ change-over time); KM3 is de-energized (KM1 and KM3 are interlocked) and KM1 is energized → motor operates with  $\Delta$  type to finish start. During the course of starting, all electromagnetism valves are de-energized to achieve no load start.

②. Automatic operation control:

When the motor is started to running in  $\Delta$  status and load the magnetic valve with power applied after a certain period of delay. air compressor is loaded and pressure inside gas tank begins to increase. When increased air pressure is more than higher pressures limit (value of unload pressure), electromagnetism valve for loading is de-energized and electromagnetism valve for discharging is energized, meanwhile, the air compressor operates without load. If air pressure decreases to set lower pressure limits (value of load pressure), the electromagnetism valve for loading is energized again and electromagnetism valve for discharging is de-energized. Air compressor operates normally to increase pressure in air tank. If the unload run time exceeds the set delay time of non-load, the compressor will automatically stop motor's operation to achieve automatic shutdown after works without load for long time. Only when pressure decreases to lower pressure limits, the motor start operation according to course of starting, then circularly repeat this step.

③. Manual loading/unloading under automatic status

When compressor in automatically runs state and runs at unload operation, press down load or unloading button , the electromagnetism valve for loading joggles a little and comes back to unloading status; if the pressure is less than relief pressure, the electromagnetism valve for loading is energized and it returns to unloading status until gas supply pressure becomes larger than relief pressure and device is at loading status. Unloading is performed when press down unloading button "S". If the pressure is higher than loading pressure, the electromagnetism valve for loading is de-energized and turns to status of loading until gas supply pressure is less than loading pressure. If pressure is less than loading pressure, the unloading button do not function.

④. Normal shutdown:

Press the button , the load magnetic valve will loss power and the unload magnetic will be applied with power, after a while of delay (stop delay), the motor contactor will loss power, the host and fan will stop running, after the restarting delay completed, the unload magnetic will loss power. Only pressing the button could restart the motor.

⑤. Control of preventing frequent starting

Press stop button to stop operation; Air compressor can not be started up immediately after shutdown due to operation without load for long time or failure shutdowns, and it can be started up again when remaining delay time is zero which the time display window of the controller in a variety of shutdown state shows.

#### 4. 5.2. Remote automatic control

Remote automatic control and local automatic control are basically same, but the difference is that starting up or stopping of devices can be achieved by means of control of remote switch.

#### 4. 5.3 Local manual control



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Control of starting and stopping are same as automatic control, but device is in status of unloading operation after finish starting up and loading is carried out by pressing down loading and unloading button to load. When gas supply pressure is more than relief pressure, the device unloads automatically. If doesn't press loading, unloading button, the device will operate with unloading until stops without load. During unloading, press loading and unloading button to load. During loading, press loading and unloading button to unload.

#### 4. 5.4 Remote Manual Control

The remote automatic control is almost the same as the local manual control, the only difference is that the start and stop of the unit is controlled by remote control.

#### 4. 5.5 Network control

- ①: When communication method is set "computer", network control between computer and controllers can be achieved
- ②: When communication method is set "interlocking", network control between controllers can be achieved, but the main air compressor only can service as 1# compressor.

#### 4. 5.6 Temperature control of fan

When exhausting temperature is higher than fan's starting temperature, fan operates; when exhausting temperature is lower than fan's stopping temperature, fan stops operation.

#### 4. 5.7 Failure shutdown and emergency shutdown

When electrical failure or high exhausting temperature appears during process of operation, the controller stops motor's operation immediately. Air compressor only can be started up after failure is eliminated. In case of emergency, press down emergency stop button to cut off power of controller and contactors

## 4.6、 Alarm

### 4. 6.1 Indication of early warning of oil filter

- ①. Early warning for blockage of oil filter

The controller can display the message on the text display to remind the operator that "the air filter is blocked" by checking the pressure difference switch operating state.

- ②. Set the running time alarm of the air filter

The Text displays "OIL FILTER LIFE END" when the using time of the oil filter terminates.

### 4. 6.2 Indication of early warning for air filter

The Text displays "AIR FILTER LIFE END" when the using time of the oil filter terminates.

### 4. 6.3 Indication of early warning for oil separator

The Text displays "O/A LIFE END" when the using time of the oil separator terminates.

### 4. 6.4 Indication of early warning for lubricating oil

The Text displays “**LUBE LIFE END**” when the using time of the lube terminates.

#### 4. 6.5 Indication of early warning for grease

The Text displays “**GREASE LIFE END**” when the using time of the grease terminates.

#### 4. 6.6 Indication of early warning for belt

The Text displays “**BELT LIFE END**” when the using time of the belt terminates.

#### 4. 6.7 High air temperature warning

Controller detects the air temperature high, the text display “**HIGH TEMPERATURE**”

### Controller protection

#### 4. 6.8 Motor protection

MAM-880 air compressor controller provides all-round protection functions of short-circuit, locking, phase failure, overload, imbalance for motor.

Electronic failure	Failure Display	Reason
Short circuit	Display failure “HOST/FAN SHORT”	Short circuit or rated current is set by mistake
Blocked	Display failure “HOST/FAN BLOCK”	Too large load, bearing wear and other mechanical failure
Overload	Display failure “HOST/FAN OVER CARRY”	Too large load, bearing wear and other mechanical failure
Phase failure	Display failure “HOST/FAN LACK PHASE”	Power supply, contactor and phase failure of motor
Unbalance	Display failure “HOST/FAN UNBLANCE”	Poor contact of contactor, inside open-loop of motor

#### 4. 6.9 Gas Exhaust Over-temperature Protection

When the Air exhaust temperature is higher than the upper limit of set temperature, the controller would be stopped ,The display will show “**HIGHT T**”.

#### 4. 6.10 Non-reversing Protection of Air Compressor

When three-phase supply phase sequence connected to the air compressor is not the same with that set for the controller, the on-site failure is displayed as “**PHASE REVERSAL**” , as a result, the controller cannot start up the motor. Then just change any arbitrary two-phase power lines leading to check the rotation of motor.

#### 4. 6.11 Overpressure Protection of Pressure Supply

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When the gas exhaust pressure is higher than the upper limit of set pressure, the controller would be stopped for warning, the on-site failure is displayed as “**HIGH P**”.

#### 4. 6.12 Malfunction Protection of Sensor

When pressure sensor or temperature sensor is disconnected, the controller would be stopped for warning. the on-site failure is displayed as “**\*\*SENSOR FAULT**”.

### Removal of Common Failures

#### 4. 6. 13 Failures Review

Shutdown caused by the external parts of controllers may be removed by inquiring the on-site failure or historic failure, with the details shown as below:

Press Down button or Up button , to move the black scroll bar to “**RUN PARAMETER**” menu, then press Enter button , the lower menu would be propped

<b>MOTORS CURRENT</b>
TOTAL RUN TIME
THIS RUN TIME
MAINTENANCE SET

Press Down key always and the following menu will appear:

HISTORY FAULT
PROD DATE NO.
<b>THIS FAULT</b>

Press Enter key and the following failure causes will appear:

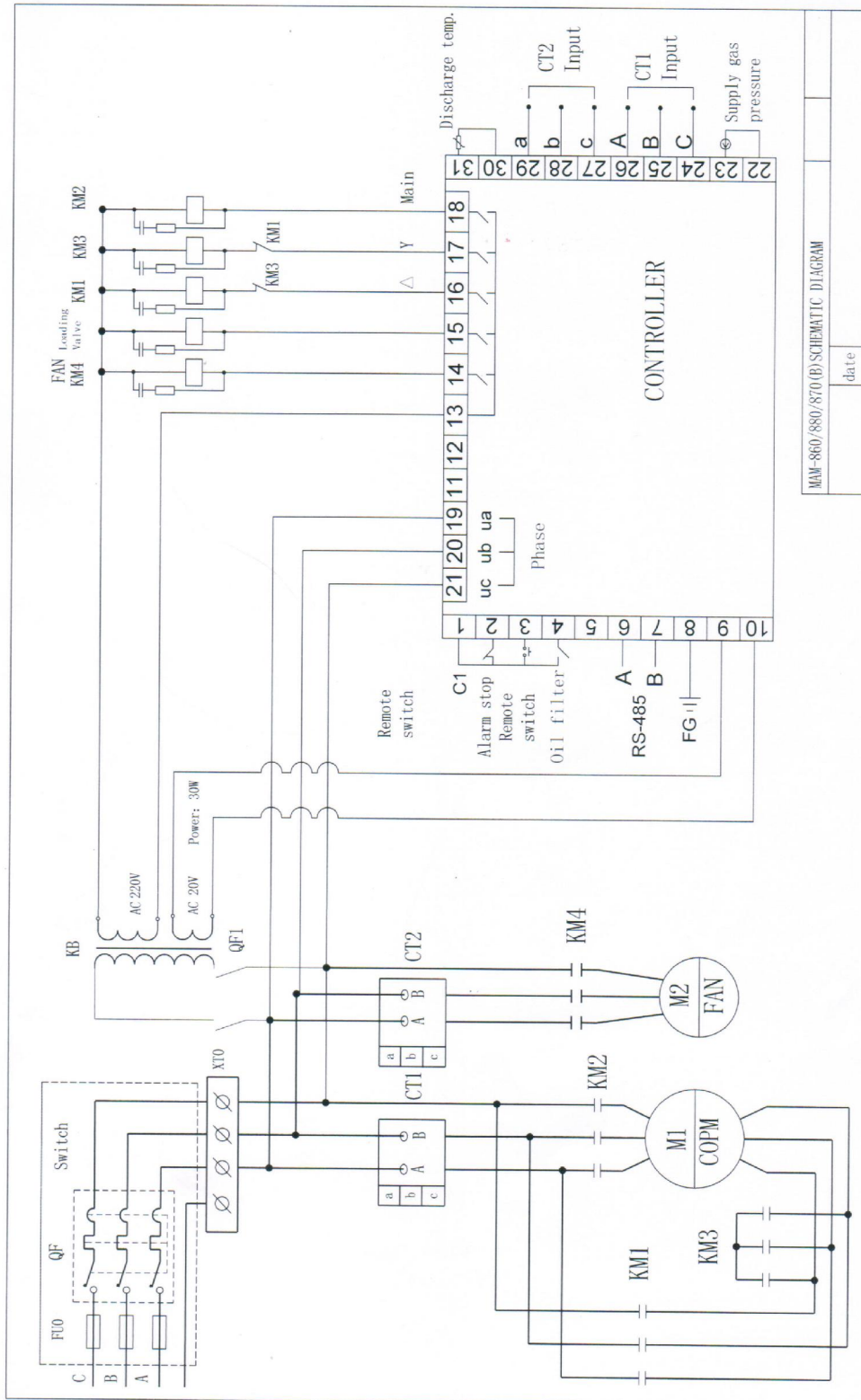
STOP:T1 SENSOR FAULT
0170°C

In this case, check if the temperature sensor is disconnected and if the sensor is damaged, etc.

#### 4. 6.14 Common Failures and Causes of PLC

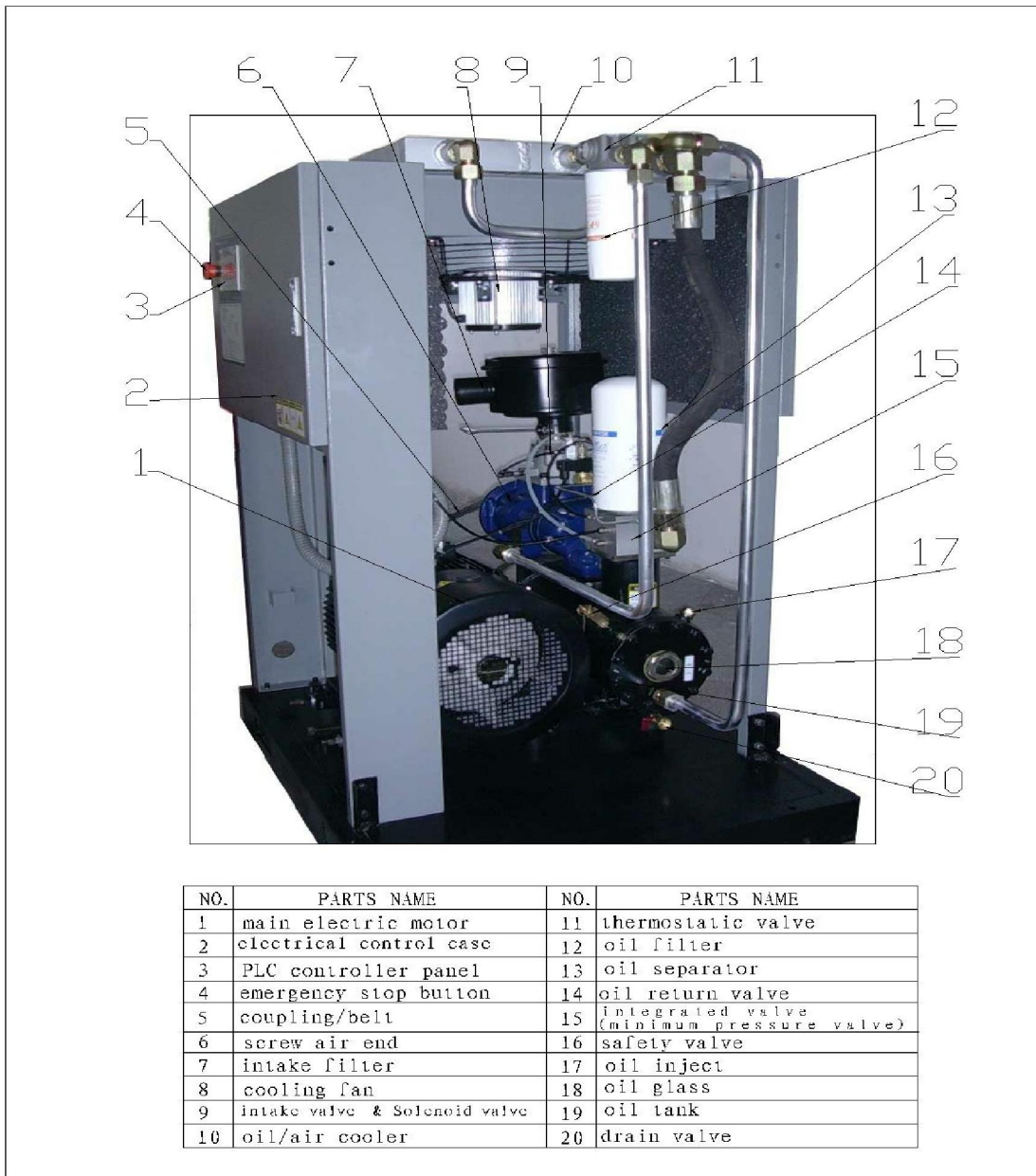
<b>Failure</b>	<b>Reason</b>	<b>Disposal method</b>
Air Exhaust Temperature too high	Bad vent condition, Oil lacking etc.	Check the vent condition and lubricant amount etc.
Temperature Sensor Failure	Cable off or PT100 damaged	Checking the wiring and PT100
Over Pressure	The pressure too high or the pressure sensor failure	Check the pressure and the pressure sensor
Pressure Sensor Failure	Cable off, Sensor damaged or the cable connected reversed	Check the wiring and sensor transformer
Lack Phase	Power phase lacking or the Contactor terminal damaged	Check the power and contactors
Overloaded	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings, tubes and other mechanical system.
Unbalance	Power unbalance, Contactor damaged or the internal open of the motor	Check the power, contactors and the motor
Rotor Lock	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings, tubes and other mechanical system.
Short Circuit	Wrong Wiring, Incorrect Data setting etc.	Checking the wiring and set the data correctly
Wrong Phase Sequence	Reversed Phase sequence or phase off	Check the wiring
Overload or Rotor locking during starting process	Host start time set to a valueless than the star angel time delay	Reset the host starting time to be longer than star angel delay + Load delay time
Main Contactor activate time to time	The emergency button loose	Check the wiring
Air Exhaust Temperature too high	Bad vent condition, Oil lacking etc.	Check the vent condition and lubricant amount etc.
Temperature Sensor Failure	Cable off or PT100 damaged	Checking the wiring and PT100
Over Pressure	The pressure too high or the pressure sensor failure	Check the pressure and the pressure sensor

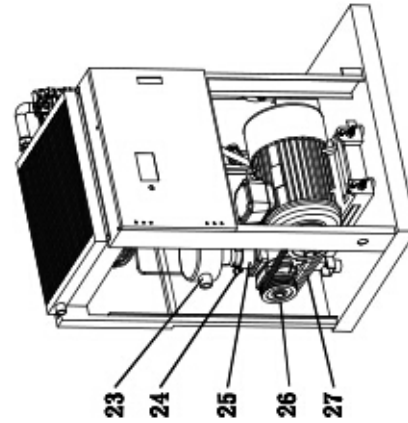
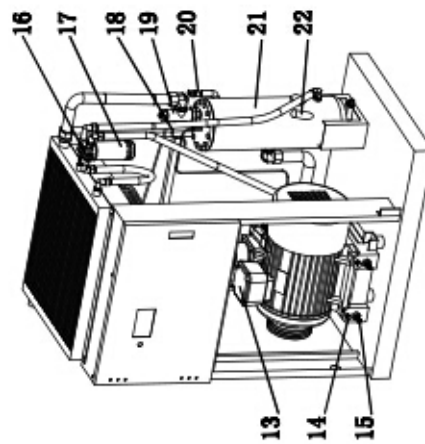
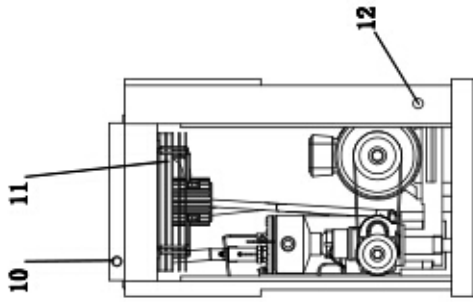
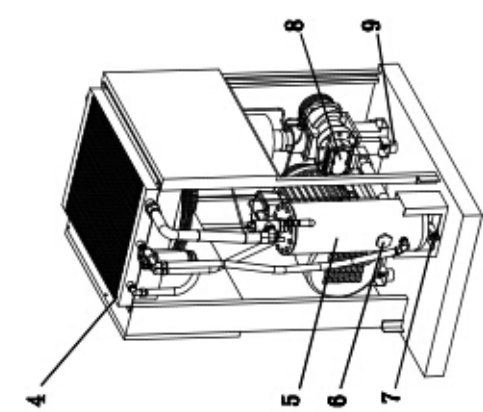
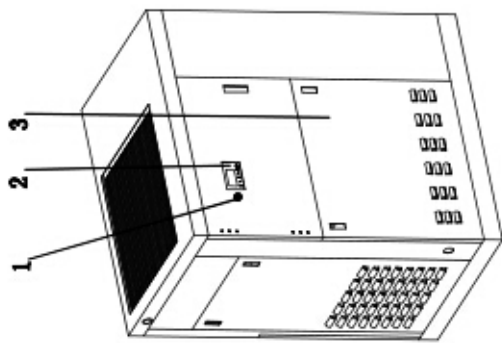
## 4.7、 Electrical Circuit diagram



## 4.8. Explored drawing

### SC (18.5-55 kw)—Belt

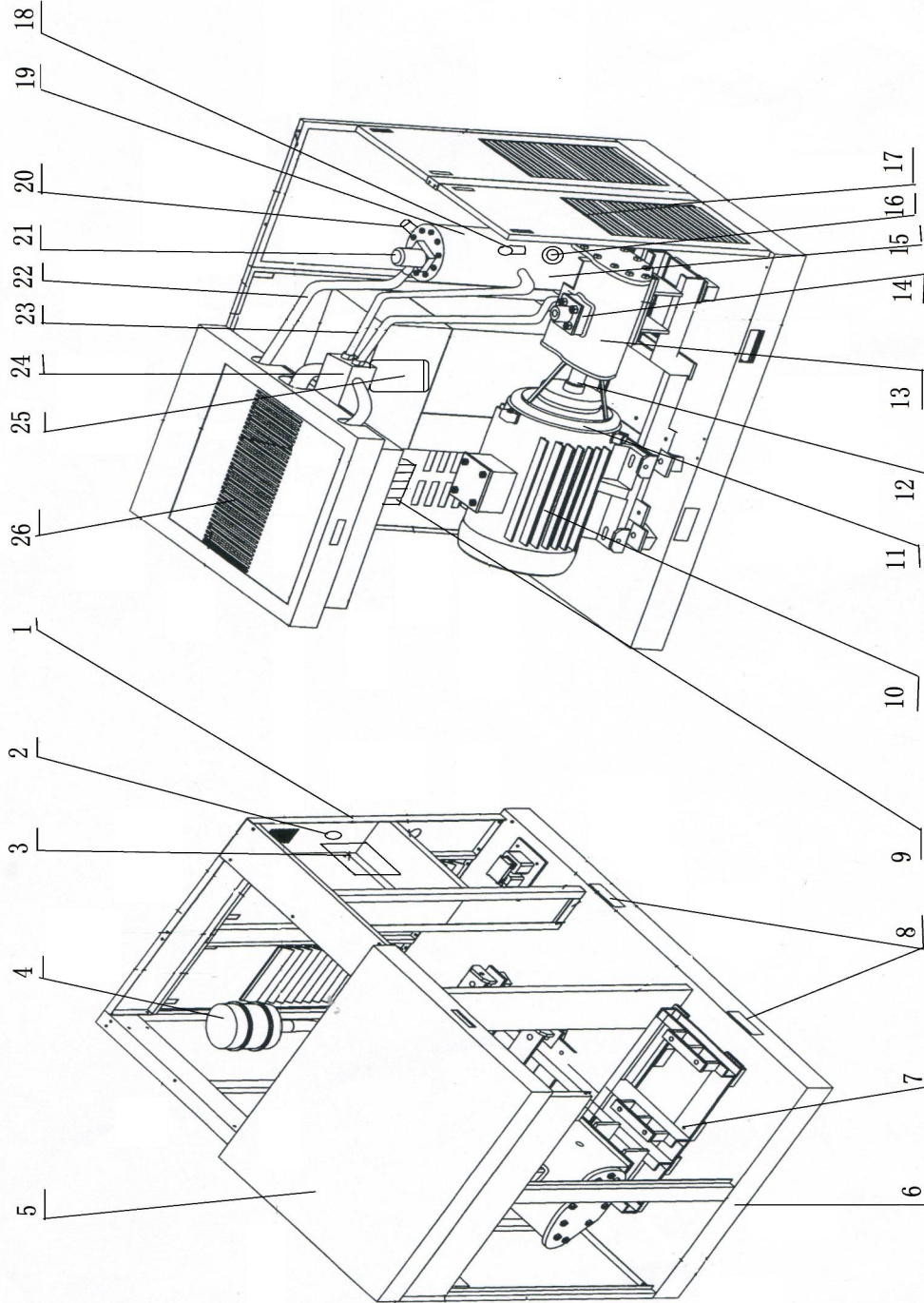




No.	Name	Material	Weight	Remark
18	Pressure sensor			
17	Oil filter			
16	Thermostatic valve			
15	Adjust pole			
14	Bolt			
13	Main motor			
12	Power inlet			
11	Cooling fan			
10	Air outlet			
9	Vibration isolator			
8	Screw air end			
7	Drain valve			
6	Oil glass			
5	Oil tank			
4	Oil/air cooler			
3	Service door			
2	PLC control panel			
1	Emergency stop button			

No.	Name	Material	Weight	Remark
27	Belt			
26	Pulley			
25	Intake valve			
24	Solenoid valve			
23	Intake filter			
22	Oil fill			
21	Internal oil separator			

# SC (18.5-250 kw)--Direct driven



1	electric control case	9	fan and motor	17	wind inlet door	25	oil filter	shanghai davey
2	emergency stop	10	main motor	18	oil fill hole	26	oil/air cooler	machinery co ltd
3	PLC control panel	11	center bracket	19	oil separator (in)			direct driven
4	intake filter	12	shaft coupling	20	safety valve			screw compressor
5	top cover	13	screw air end	21	minimum P valve			part list
6	base	14	intake valve	22	air pipe			drawing (15kw)
7	frame	15	oil tank	23	oil pipe			
8	fork lift place	16	oil glass	24	thermostatic valve			

Version  
 CAD  
 drawing No.  
 signature  
 designer  
 check  
 date










# VSC series

## 4、 Control Panel Operation (VSC series)

### 4.1、 Control Panel



Figure 1.1.1

-  — Start Button:
  - When compressor is at stop status,press this button to start the compressor.
  - When compressor is set as master ( No.1 ) in block mode ,press this button to start the compressor and activate block mode function at the same time.
-  — Stop Button:
  - When the compressor is at running status, press this button to stop.
  - When compressor is set as master (No.1 ) in block mode ,press this button to stop compressor and block mode function as well;
  - When compressor is at stop status,long press this button to display edition.
-  — Set Button /Loading / unloading Button:
  - When the compressor is at running status ,press this button to load,unload ;
  - When the compressor is at setting mode, press this button after modification to confirm and save the modified data.
-  — Move down button / Decreasing button:
  - When viewing the menu, press this button to move downward the cursor.
  - When modifying data,press this button to decrease the data at current position.
-  — Move up button/Increasing button:
  - when viewing the menu,press this button to move upward the cursor ;
  - When modifying data,press this button to increase the data at current position .
-  — Shift button /Enter button:
  - When modifying data,press this button to move to the next data bit;
  - When select menu,press this button to switch to submenu.If no submenu available,the controller will shift to data setting mode.
-  — Return button / Reset button:
  - When modifying data,press this button to exist data setting mode;
  - When viewing the menu,press this button to return to previous menu;
  - When the controller is at failure stop status, long press this button to reset.

---

## 4.1.2、Indicator Instructions

Power: Indicator is on when controller is powered on.

Run: Indicator is on when motor is running.

Alarm: Indicator is on when controller is alarming;

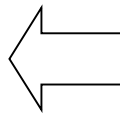
Indicator is on when compressor is failure stop;

Indicator is off after error is cleared and reset.

## 4.1.3、Status Display and Operations

The display screen will show as below after powered on:

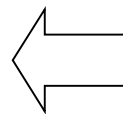
WELCOME USING  
SCREW  
COMPRESSOR




After powered on, show this menu

After 5 seconds, the menu will switch as below:

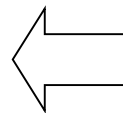
AIR T: 80°C      0.0Hz  
AIR P: 0.53MPA    0RPM  
NORMAL STOP  
381.2V    36.9KW



Main menu

Press “” to enter into Selection Menu:

**RUN PARA.**  
CUSTOMER PARA.  
FACTORY PARA.





Level 1 menu

## 4.1.4、Operating Parameter and Menu


Press “” to move the cursor to “RUN PARAMETER”, then press “” to switch to secondary menu:

**FAN、VF PARA**  
TOTAL RUN TIME  
THIS RUN TIME  
MAINTENANCE PARA.




HISTORY FAULT  
PRO. DATE、SERIAL.  
THIS FAULT  
ABOUT

Move the cursor to the corresponding menu item, press “” to check the specific parameter. Such as viewing item TOTAL RUN TIME, move the cursor to item TOTAL RUN TIME, press “” to switch to item TOTAL RUN TIME .

TOTAL RUN TIME :  
622 H 05 M 12 S  
LOADING TIME :  
615 H 08 M 10 S


Press “” to return to the previous menu or the main menu. If no operation at the current menu for 120 seconds , controller will automatically return to the main menu and turn off the backlight simultaneously.

#### 4.1.5、 Customer Parameter View and Modification:

In first menu, press “” and “” to move the cursor to item CUSTOMER PARA., press “” to switch to the following menu:


**SET P、 T、 VF**  
SET TIME  
OPERATION MODE  
BLOCKING MODE

CLR LIFE TIME  
MAX LIFE TIME  
USER CODE: \*\*\*\*  
LANGUAGE SEL :EN





Move the cursor to item SET P、 T 、 VF , then press “” to switch to the following menu:

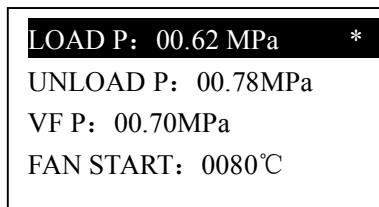
**LOAD P: 00.62 MPa**  
UNLOAD P: 00.78MPa  
VF P: 0070°C  
FAN START : 0075°C

FAN STOP :0070°C  
RAT POWER: 022.0KW  
RAT SPEED: 1500RPM






Move the cursor to item LOAD P, then press “  ” to switch to the following menu which requires a user password input.



In this menu, the first data bit of password started blinking, press “  ” or “  ” to modify the the first bit of password, Press “  ”, move the cursor to the next data bit, modify the second data of password. In accordance with the above, modify the third and fourth data of password in sequence. Press “  ” to confirm the input data and the menu will switch to the following menu after verification:



The upper right corner with "\*" indicate the system verification of the password

In the menu above, press “  ”, the first data of LOAD P starts to blink, user can press “  ” or “  ” to modify the present data in accordance with the above method. Press “  ” to move to next data bit and modify the target data in sequence. When finished, press “  ” to confirm and save the data. The controller prompt sends out a short voice to tip the completion of parameter set.

#### 4.1.6、Customer Parameter Sheet and Function

First menu	Second menu	Preset Data	Function
SET P、 T、 VF	LOAD P.	00.6MPa	1,In AUTO LOADING status , compressor will load if pressure is below this set data 2,In STANDBY mode, compressor will start if the pressure is below this set data
	UNLOAD P.	00.80Mpa	1.Compressor will unload automatically if air pressure is above this set data 2.This data should be set above LOAD P ,also should be set below ULD LIM P
	VF P	00.70MPa	Set AIR P for VF compressor to keep running stable, when pressure is fluctuated around this data, controller will adjust operation frequency of inverter to control the pressure close to this data
	FAN START	0080℃	Fan will start if AIR T is above this set data
	FAN STOP	0070℃	Fan will stop if AIR T is below this set data
	RAT POWER	022.0KW	Set RATED POWER in order to calculate actual power
	RAT SPEED	2600RPM	Set RATED SPEED at 50HZ in order to calculate the actual speed in variable frequency
SET TIME	FAN DELAY	0010S	Set the fan start time, record time when fan is activated, controller will not start overload protection during this time to avoid impulse starting current stopping the fan.
	LOAD DELAY	0005S	Unloading in this set time after enter delta running
	EMPTY DELAY	0010S	When unloading continuously, compressor will automatically stop and enter to standby status if over this set time
	STOP DELAY	0003S	For NORMAL STOP operation, compressor will stop after it continuously unloading over this set time
	START DELAY	0005S	Machine can be restarted only over this set time at any case(after NORMAL STOP, STANDBY or FAILURE STOP)
	VSD UP SPEED	0010	Restrict PID calculations in case the frequency increasing too fast which cause motor speeding up too fast
	VSD DN SPEED	0010	Restrict PID calculations in case the frequency decreasing too fast which cause motor slowing down too fast
OPERATION MODE	ON/OFF MODE	LOCAL/REMOTE	1.When set as LOCAL ,only the button on the controller can turn on and turn off the machine. 2.When set as REMOTE mode, both the button on the controller and the remote control button can turn on and off the machine;

	LOAD MODE	AUTO/MANU	<p>1. When set as the MANU: only when the pressure is above UNLOAD P, compressor will unload automatically .For any other case, the Load/Unload function can only be executed by pressing load/unload key.</p> <p>2. When set as AUTO ,the loading/ unloading function can be executed by the fluctuation of AIR P automatically</p>
	COM MODE	COMP/BAN/ BLOCK	<p>1. When set as BAN, the communication function is invalid.</p> <p>2. When set as COMP, compressor can communicate with computer or DCS as slave according to MODBUS-RTU.</p> <p>3. When set as BLOCK, compressor can work in net</p>
	COM ADD	0016	Set the communication ADD in block mode or when communicate with monitoring center. This ADD is unique for every controller in net
BLOCK MODE	BLOCK STA	MASTER/SLAVE	<p>1. When service as master in BLOCK. Master controls slave, the COM ADD should be set to No.1</p> <p>2. When service as slave in BLOCK, slave is controlled by master</p>
	BLK MODE	VF—PF/VF—VF	<p>VF—PF:VF compressor and PF compressor work in block mode</p> <p>VF—VF:VF compressor and VF compressor work in block mode</p>
	BLK NUM	0000	Number of air compressors in block net
	TURN TIME	9999 Hours	When master pressure is between BLOCK LOAD P and BLOCK UNLOAD P, master determines slave work alternatively over this set time.
	BLK MAX	00.75MPa	In BLOCK mode, one compressor will stop or unload when pressure is above this set data
	BLK MIN	00.65MPa	In BLOCK, one compressor will start or load when pressure is below this set data
	BLOCK DELAY	0000S	In BLOCK mode, when master sends two commands continuously, second command signal delays for this set data,
CLR LIFE TIME	OIL RESET	0000H	Record oil filter total run time. If changing new oil filter, the parameter should be reset by manual operation.
	O/A RESET	0000H	Record O/A separator total run time. If changing new O/A separator, the parameter should be reset by manual operation
	AIR RESET	0000H	Record air filter total run time. If changing new air filter, the parameter should be reset by manual operation
	LUBE RESET	0000H	Record lubricating oil total run time. If changing new lubricating oil, the parameter should be reset by manual operation

	GREASE RST	0000H	Record grease total run time. If changing new grease, the parameter should be reset by manual operation
	BELT RESET	0000H	Record belt total run time. If changing new belt, the parameter should be reset by manual operation
MAX LIFE TIME PRESET	OIL FILTER	0000H	1, Alarm prompts when oil filter total run time is over the parameter set. 2,Set this data to “0” to invalidate the oil filter alarm function
	O-A SEPAR	0000H	1, Alarm prompts when O/A separator total run time is over the set data. 2,Set this data to “0” to invalidate the O/A separator alarm function
	AIR FILTER	0000H	1, Alarm prompts when air filter total run time is over the parameter set. 2,Set this data to “0” to invalidate the alarm function of air filter
	LUBE	0000H	1, Alarm prompts when lubricate total run time is over the parameter set. 2Set this data to “0” to invalidate the alarm of lube.
	GREASE	0000H	1, Alarm prompts when grease total run time is over the parameter set. 2Set this data to “0” to invalidate the alarm of grease.
	BELT	0000H	1, Alarm prompts when belt total run time is over the parameter set. 2Set this data to “0” to invalidate the alarm of belt.
USER CODE		****	It is allowed to modify the USER CODE after authorization
LANGUAGE SEL	CN/EN	EN	Chinese display when set to CN English display when set to EN

#### 4. 1. 7、 Factory Parameter View and Modification

The view and modification of factory parameter requires a factory password, The modification step is same as customer parameter modification. Main function is as below:

PARAMETER		Initial Data	Function
BASIC PARA	FAN CUR	Maximum fan overload data/1.2	When the current of fan is more than 1.2 times and less than 4 times of the set data , the unit will shut down according to overload feature.
	ALARM T.	105℃	Alarm prompt when actual AIR T is over the parameter set
	STOP T.	110℃	Alarm and stop when actual AIR T is over the parameter set

RUN TIME	000010Hours	Modify the TOTAL RUN TIME
LOAD TIME	000009Hours	Modify the LOAD TIME
MAX U.L.	0.80MPa	The UNLOAD P in CUSTOMER PARA must be set no higher than this set data.
STOP P.	1.00MPa	Alarm and stop when actual AIR P is above this set data
FAULT RESET	0000	Input the password and press “set“ button to clear all the history failures record.
SERIAL	*****	The range of every data bit is 16 data: 0-9,A,B,C,D,E,F
DATE	****_**_**	Production date
FREQ.SEL	60HZ/50HZ	Select compressor power frequency to test fan current .Use super password to revise this data
PHASE PRO	ON/OFF	ON: Select phase sequence protection function OFF: Invalid phase sequence protection function. Use super password to revise this data
MAX TIME	0000H	1,Alarm and stop when the compressor is in a stop status and the TOTAL RUN TIME is over this MAX TIME set. 2,Set the data to ‘0000’, to invalid the function.
MAX ALARM	0010H	When controller detect oil filter, O/A separator. lubricating oil ,grease and belt running over the max time and alarm over the data set ,compressor will reports MAX ALARM and stop
SPARE	0001	Standby
LOW T PRO	-048℃	1,In stop mode, air compressor is not allowed to start when air temperature is lower than this set data 2,Two minutes after turn on, when the air temperature is below this data, compressor will stop and indicate LOW T
CODE2	****	Use this code to change all CUSTOMER PARA and part of FACTORY PARA (except TOTAL RUN TIME,LOADING TIME,TIME LIMIT , MAX ALARM , FREQ SEL,PHASE PRO, CODE2,TIME CODE)
TIME CODE	****	Use this code to change all CUSTOMER CODE, TOTAL RUN TIME ,LOADING TIME ,TIME LIMIT,MAX ALARM ,FREQ SEL,PHASE PRO
COM SET PARA	ON/OFF	1. When set as ON,DCS can set data through



			<p>MODBUS protocol;</p> <p>2. When set as OFF,DCS cannot set data through MODBUS protocol</p> <p>3, DCS can set data only when compressor is at stop status .</p>
VF PARA	INT SCAL	00.20 MPa	(PID TARGET PRESS set value - INTEGRAL SCALE)< detected AIR P < (PID TARGET PRESS set value + INTEGRAL SCALE ) INTEGRAL GAIN works
	INT SCAL	0020	When detected AIR P< (PID TARGET PRESS set value-INTEGRAL SCALE ) or Detected AIR P> (PID TARGET PRESS set value+ INTEGRAL SCALE ) Integral calculation based on this data
	PROP GAIN	0010	Track speed of PID TARGET PRESS set value , the bigger the data, the faster the track; the smaller the data the slower the track
	INT. GAIN	0012	Track the speed of PID TARGET PRESS set value and STEADY STATE ERROR, the bigger the data ,the faster the track and the smaller the STEADY-STATE ERRORS  ;the smaller the data ,the slower the track and the bigger the STEADY-STATE ERRORS
	DIFF GAIN	0000	Track the hysteresis system(such as temperature) not use very often and normally set as “0000”
	MAX FREQ	050.0Hz	The max frequency in LOADING MODE
	MIN FREQ	030.0Hz	The min frequency in LOADING MODE
	U.L. FREQ	010.0Hz	Permitted operating frequency in UNLOAD MODE
	DIFF.P	00.72MPa	When use compressor to adjust speed and balance pressure and the AIR P is detected higher than the set DIFF P, the DIFF F works
	DIFF.F	005.0Hz	When use compressor to adjust speed and balance pressure and the AIR P is detected higher than the set DIFF P ,sent the data (CONTROL FREQUENCY based on the PID OPERATION FREQUENCY- SET FREQUENCY) to inverter to avoid AIR P over PID TARGET PRESS too far which may cause the compressor loading and unloading frequently.
VF 0		Set the inverter model, controller read the	

			operation parameter based on user model
	STOP MODE	SLOW-D/FREE-S	When STOP MODE set as FREE-S in FACTORY PARA :compressor receive stop command,16 terminal opens and valve is de-energized ,13 and 14 terminals keep closed until 1 S before STOP DELAY finish .When STOP MODE set as SLOW-D in FACTORY PARA :compressor receive stop command,13 and 14 terminals open and 16 terminal opens, valve is de-energized .The compressor will stop if SLOW D is set to zero
	PID	000.5 S	
HARDWARE FUNCTION SET	3 FUNC	EMERG.、 NO FUNC、 REMOTE OFF、 REMOTE ON、 ON/OFF、 REMOTE(INCHING)	3,4 terminal digital input function set
	4 FUNC	、 PRE-A(NC), ALARM(NO) FAULT(NC), FAULT(NO) AIR FIL(NC), AIR FIL (NO) O-A SEP,(NC) O-A SEP(NO) OIL FIL,(NC) OIL FIL(NO) NO:NORMAL OPEN NC:NORMAL CLOSE	
	17 FUNC	RUN /REMOTE/ALARM	17 terminal can be selected as RUN INDICATOR,REMOTE INDICATOR,ALARM INDICATOR

#### 4.1.8、 Parameter Modification

You can set relative data of controller in “Calibrate parameter”. It is not allowed to view and modify without manufacturers authorization. User can input calibrate password in factory menu to enter the parameter modification menu

	COEF	CURR
A:	1.000	080.2
B:	1.000	080.2
C:	1.000	080.2

Modify this data, adjust coefficient



	COEF	ZERO
T1:	0.980	0020
T2:	0.980	0020
T1:	50	T2: 40

Modify this data, adjust coefficient of AIR T

Modify this data, adjust AIR T zero point

Display the present AIR T, easy for check.



	COEF	ZERO
P1:	0.980	0003
P2:	0.980	0003
P1:	0.50	

Modify this data, adjust AIR P coefficient

Modify this data, adjust AIR P zero point

Display the present AIR P, easy for check



	COEF	ZERO
PWM:	1.000	0020

Adjust analog output zero point

Adjust analog output coefficient



1.2MUL:	0060S
1.3MUL:	0048S
1.4MUL:	0024S
1.5MUL:	0008S

Set the fan alarm time for overload current. when the current is 1.2 times than the rated current, the respond time is 60S



2.0MUL:	0005S
3.0MUL:	0001S

In CALBR PARA menu, user can adjust parameter such as FAN CURRRNT & COEF,TEMP COEF& ZERO POINT ,PRESSURE COEF& ZERO POINT,PWM COEF& ZERO POINT and FAN OVERLOAD.

#### 4.1.9、 Operating Authorization and Password

Controller provides multiple passwords and access management. According to different levels of passwords, controller provides different levels of operating authorization, details as following:

15. USER CODE: factory set:\_\_\_\_\_
 

Permissions:Allows to modify all CUSTOMER PRAMETER.
16. FACTORY CODE: fixed:\_\_\_\_\_
 

Permissions: Allows users to modify all CUSTOMER PARA and FACTORY PARA.
17. CODE2: set in FACTORY PARA,FACTORY CODE is required for reset:\_\_\_\_\_
 

Permissions: Allows users to modify all USER PARA, all FACTORY PARA except TOTAL RUN TIME,LOADING TIME,MAX LIFE TIME,MAX ALARM,FREQ,PHASE PRO,CODE2,TIME CODE.
18. TIME CODE: set in FACTORY PARA,FACTORY CODE is required for reset:\_\_\_\_\_
 

Permissions: Allows users to modify all USER PARA; part of FACTORY PARA such as TOTAL RUN TIME,LOADING TIME,MAX LIFE TIME,MAX ALARM,FREQ,PHASE PRO
5. CALIBRATE CODE: fixed:\_\_\_\_\_ Permissions:Calibrate relative coefficient of fan current

## 4.2 Controller Function and Technical Parameter

- 1、 Digital input&output: 3 points of Digital input ;5 points of digital relay output ;
- 2、 Analog input: 1 point of Pt100 temperature input ; 1 point of 4~20mA pressure signal input;1 group of three phases current inputs(CT provided); 1 point of 4~20mA analog current output
- 3、 Input voltage of phases:380V/220V;
- 4、 Controller working power supply:AC16-28V、 50/60HZ、 0.3A、 6VA(12 VA is recommended)
- 5、 Measurement :
  - ①、 AIR T:-20~150℃; Accuracy:±1℃.
  - ②、 Run time: 0~999999 hours.
  - ③、 Current:0~999.9A.
  - ④、 Pressure: 0~1.60MPa. Accuracy: ±0.01Mpa.
- 6、 Phase-sequence protection: When compressor is at stop mode and detects wrong phase, respond time ≤2s (optional);
- 7、 Open phase protection:When compressor is at stop mode and detects open phase ,respond time ≤2s
- 8、 Motor protection : This controller has overload protection for fan. Show as below:

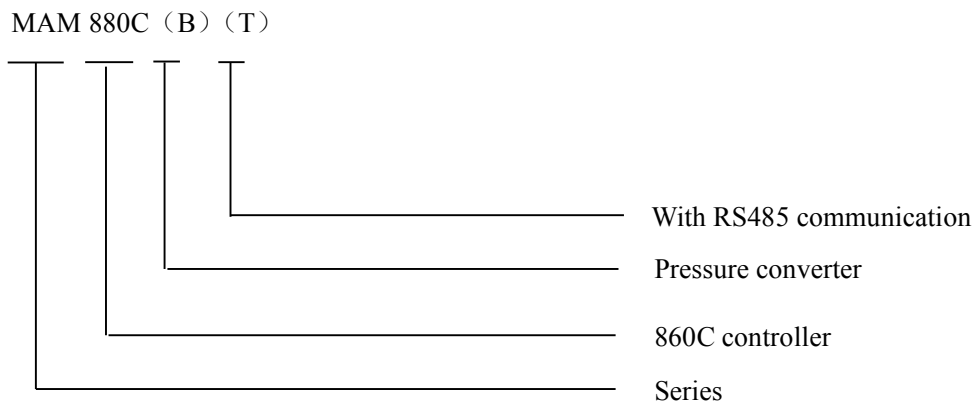
I <sub>actual</sub> /I <sub>set</sub>	≥1.2	≥1.3	≥1.5	≥1.6	≥2.0	≥3.0
Time parameter						
Response time (S)	60	48	24	8	5	1

Table 2.1.1 curve table for protection of motor

- 9、 Temperature protection: when actual temperature detected is higher than temperature set; response time $\leq$ 2s;  
When the temperature detected is lower than the LOW T PRO,the compressor is not allowed to turn on;Two minutes after controller start and detection of low temperature,controller will report LOW T and stop
- 10、 Contact capacity of output relay: 250V,5A; Contact endurance :500000 times
- 11、 Current error is less than 1.0%.
- 12、 RS485 communication function
  - 1. Block mode control
  - 2. Communicate with-external devices as slave through MODBUS RTU,baud rate 9600BPS,1start bit,8 data bits,1 stop bit and even parity
- 13.Remote control compressor:When set as REMOTE,user can remotely control the compressor.

### 4.3、 Model and Specification

#### 1、 Model Description



### 4.4、 Installation

#### 1、 Mechanical Installation

##### ①、 Current transformer installation

The CT shall be installed at a place where the current of motor cable can be measured, thus controller can be set according to instructions on motor nameplate, the detailed dimensions is shown as below:

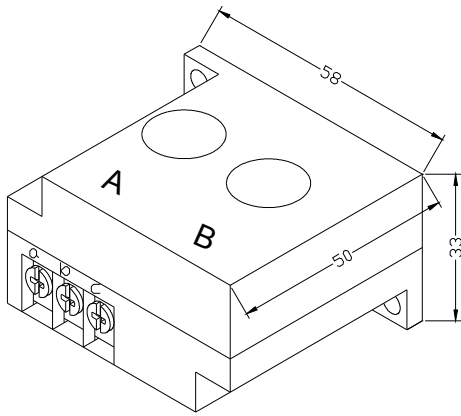


Figure 4.1.1. Structure dimensions of CT2 (φ10 through hole)

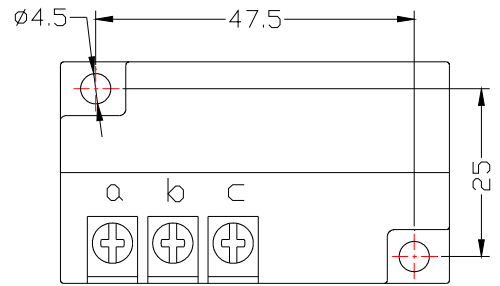


Figure 4.1.2. Installation dimensions of CT2

②、Controller installation

The controller is installed as plate. Room should be left around controller for wiring. The specific dimension is shown as below:

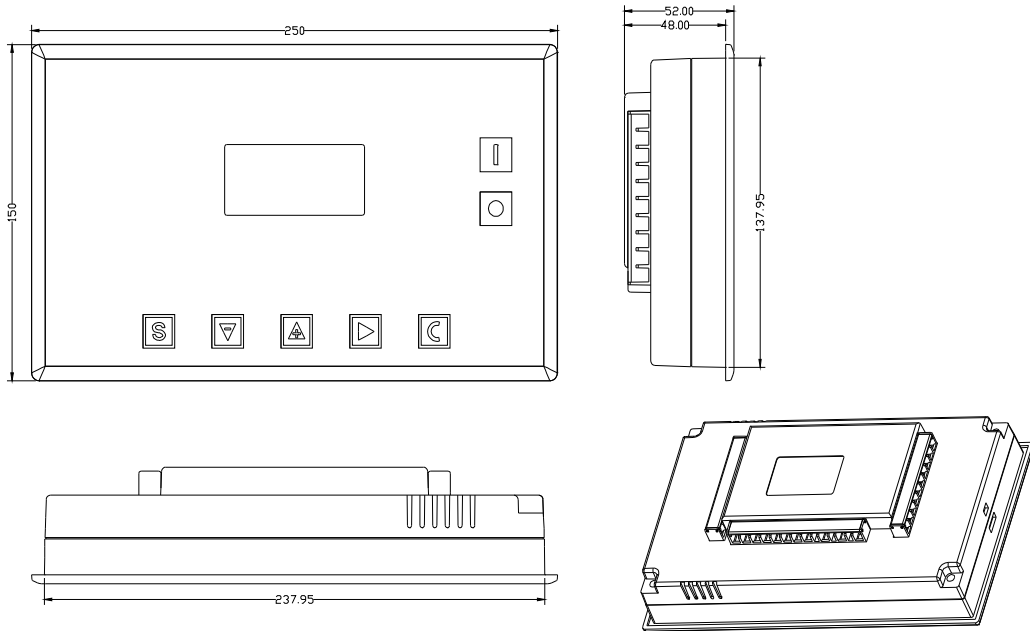


Figure 4.1.3 Controller structure dimension

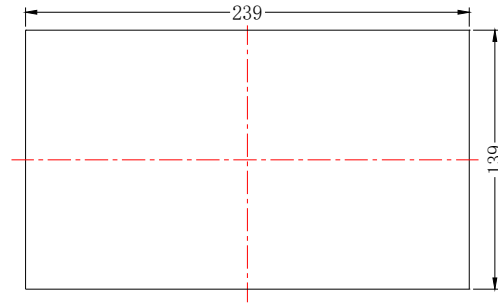




Figure 4.1.4 Hole size

## 4.5、 Control Process

### 1、 Single Machine

- ①. Press “” for starting: (VF start)

The air compressor can not be started by pressing “” until 5 seconds self-test finished. The start course of compressor is as followed: 13 and 14 terminals closed, inverter receives starting signal ,7 and 6 terminals output 4~20mA current to inverter to control operation frequency, motor starts running.

- ②. Automatic operation control:

A, Controller starts PID calculation based on AIR P detected and inverter operation pressure, output 4 ~ 20mA current to inverter to adjust motor speed, the fluctuation of motor speed influence the fluctuation of air supply to realize constant pressure in this closed-loop control system.

B,If AIR P is detected higher than set UNLOAD P,16 terminal opens, loading valve is de-energized, and air compressor is unloading, and also EMPTY DELAY starts record time, If unloading time exceed EMPTY DELAY set, compressor will enter standby mode; If compressor loading within EMPTY DELAY set(when AIR P is below LOAD P or receives loading command),compressor will reset EMPTY DELAY automatically.

C, In standby mode, controller start automatically if detected AIR P is below LOAD P set value

D, In unloading status, controller output unload frequency directly; In load status, frequency is fluctuated between MAX FREQ and MIN FREQ

- ③. Manual load/unload under automatic status

A, When AIR P is between LOAD P and UNLOAD P, press “load/ unload” , controller swift the current status once .

B, When AIR P is above the UNLOAD P, controller will unload automatically, the load/unload button is invalid

C, When AIR P is below the LOAD P, controller will load automatically, the load/unload button is invalid


- ④. Normal stop:

A, FREE-S: After controller receiving stop command,16 terminal opens and valve is de-energized,13 and 14 terminals keep closed till 1 S before stop delay.

B, SLOW-D: After controller receiving stop command,13,14 and16 terminals open, valve is de-energized.

- ⑤. Control of frequent starting

---

After press “” to stop the air compressor, air compressor can not be started immediately after normal stop or FAIL TO STOP, and it can be started again after START DELAY.

⑥.Remote Automatic Control (On-off Mode: Remote; Load Mode: Auto)

In this mode, compressor can be turn on or off by remote control .

⑦.On-site Control (On-off Mode: Local, Load Mode: Manual)

A, Manual control is the same as automatic control, but device is in status of unloading after finish starting up.

B, Loading is carried out by pressing “load/unload” ; When AIR P is higher than UNLOAD P, the device will unload automatically.

C, No press on “load/ unload”, the device will unload until EMPTY STOP.

D, In load status, press “load/unload” to unload.

## 2、 Net Work

- ①.Controller works as slave when COM MODE is set as COMP, and communicates with DCS through MODBUS.
- ②.Controller and other controller can work in block mode when COM MODE is set as BLOCK, but the master only can service as 1# compressor.

## 3、 Fan Operation

When AIR T is higher than FAN START, fan starts; when AIR T is lower than FAN STOP, fan stops.

## 4.6、 Alarm Function

### 1、 Air Filter Alarm

The monitor displays AIR LIFE END when the running time of the air filter exhausts.

### 2、 Oil Filter Alarm

The text displays OIL LIFE END when running time of the oil filter exhausts.

### 3、 O/A separator Alarm

The text displays O/A LIFE END when running time of the O/A separator exhausts.

### 4、 Lubricating Oil Alarm

The text displays LUBE LIFE END when running time of the lubricating oil exhausts.

### 5、 Grease Alarm

The text displays GREASE LIFE END when running time of the grease exhausts.

### 6、 Belt Alarm

The text displays BELT LIFE END when running time of the belt exhausts.

### 7、 High Discharge Air Temperature Alarm

The text displays AIR T HIGH when controller detects the AIR T higher than PRE-A T set data in FACTORY PARA.



---

## Controller Protection

### 1、 Fan Protection

MAM-880C air compressor controller provides overload protection for fan

### 2、 Protection of High Air Temperature

When AIR T is above the high limit of PRE-A T , the controller will alarm and stop and This fault displays AIR T HIGH .

### 3、 Low Temperature Protection

When AIR T is below LOW T PRO in manufacturing parameter. THIS FAULT displays AIR T LOW; two minutes after compressor turns on, the controller will alarm and stop.

### 4、 Protection of Air Compressor Non-reversing

When compressor is at stop mode and three phase sequence is not in order. THIS FAULT displays PHASE REVERSAL, and the controller cannot start the motor. Change the position of any arbitrary two-phase power lines and check the rotation of motor.

### 5、 Open phase protection

When compressor is at stop mode, if phase open is detected. THIS FUALT will display PHASE REVERSAL and compressor is not allowed to start. Check the three phase power.

### 6、 Protection of High P

When the AIR P is above the MAX LIM P, the controller will ALARM AND STOP .THIS FAULT displays HIGH P.



### 7、 Protection of Sensor Failure

When pressure sensor or temperature sensor is disconnected, the controller will alarm and stop. THIS FAULT displays \*\*SENSOR FAULT.

## Troubleshooting of PLC

### 1、 This Fault Review

Failure stop caused by the external parts of controllers may be removed by checking THIS FAULT or HISTORY FAULT, method is shown as below:

Press “”to move the cursor to RUN PARA menu, then press “”, the secondary menu would be prompted out:

FAN、VF PARA  
 TOTAL RUN TIME  
 THIS RUN TIME  
 MAINTENANCE PARA

HISTORY FAULT  
 PROD.DATE、SERIAL  
**THIS FAULT**  
 ABOUT

Move cursor to THIS FAULT press “” to switch to the following error menu:

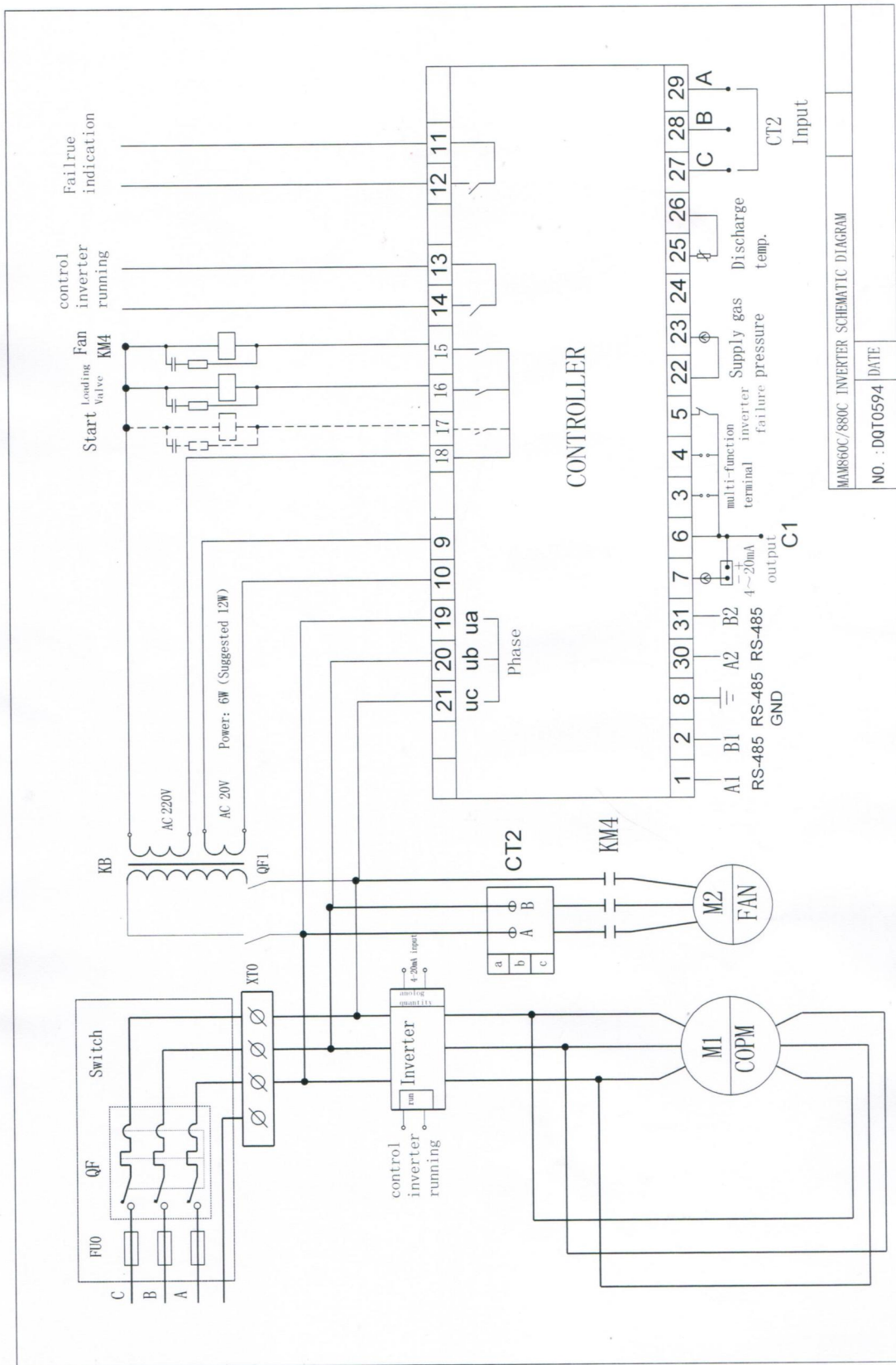
STOP:T SENSOR FAULT  
 0170℃

User can reset the error according to the following information

## 2、 Common Failures and Causes

Failure	Reason	Solution
AIR T HIGH	Bad vent condition, Oil shortage etc.	Check the vent condition and lubricant amount etc.
T SENSOR FAILURE	Cable off or PT100 failure	Check the wiring and PT100
AIR P HIGH	Pressure too high or the pressure sensor failure	Check the pressure and the pressure converter
P SENSOR FAILURE	Cable off, Sensor failure or the cable connect reversed	Check the wiring and pressure converter
PHASE REVERSAL	Reversed phase sequence or open phase	Check the wiring

# 4.7、 Electrical Circuit diagram



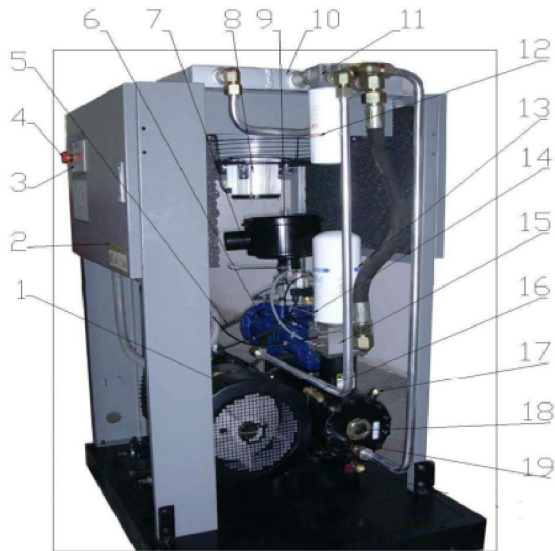
MM860C/880C INVERTER SCHEMATIC DIAGRAM  
 NO. : DQT0594 DATE:

Figure 4.2.1 Terminal arrangement diagram

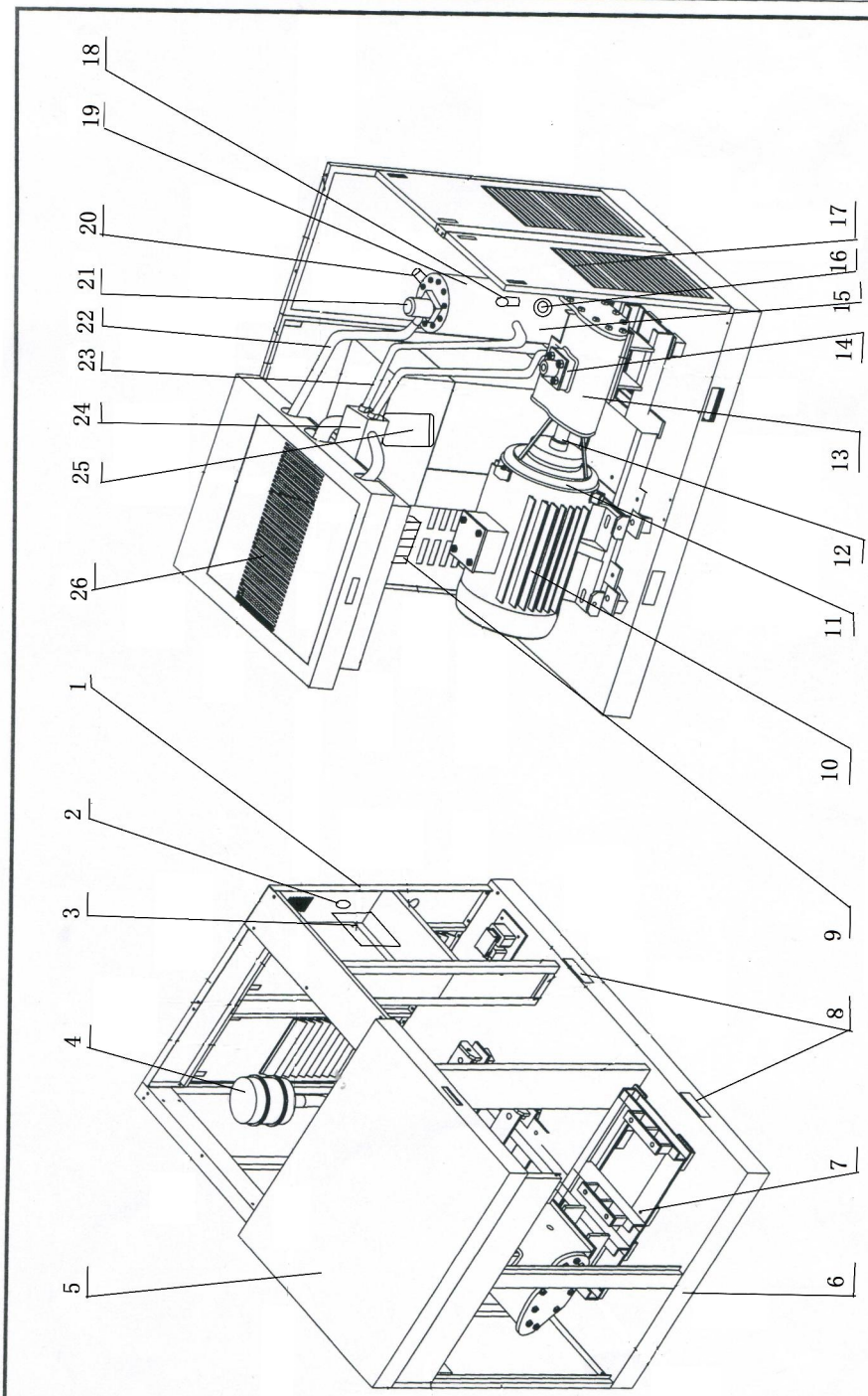
<u>1,2</u>	RS485 port , communicate with compressor or DCS center in block mode	<u>3</u>	Multifunction digital input terminal	<u>4</u>	Multifunction digital input terminal
<u>5</u>	Inverter failure detect terminal	<u>6</u>	Digital input common terminal and 4~20mA output terminal;	<u>7</u>	4~20mA input terminal;
<u>8</u>	485 Communication ground	<u>9, 10</u>	Terminal for the AC20V power source	<u>11, 12</u>	Error signal
<u>13, 14</u>	Start /stop inverter	<u>15</u>	Valve for fan control	<u>16</u>	Loading valve control
<u>17</u>	Multifunctional output relay terminal	<u>18</u>	output relay common terminal	<u>19, 20, 21</u>	Input terminal to detect the phase sequence and voltage
<u>22, 23</u>	Pressure sensor terminal	<u>24</u>	N/A	<u>25, 26</u>	Temperature sensor terminal
<u>27, 28, 29</u>	Fan current transformer terminal	<u>30</u>	Other 485 port, read inverter data		

**Note :Electromagnetism coil shall be connected nearest with RC snubber during wiring**

## 4.8 Explored drawing



NO.	PARTS NAME	NO.	PARTS NAME
1	main electric motor	11	thermostatic valve
2	electrical control case	12	oil filter
3	PLC controller panel	13	oil separator
4	emergency stop button	14	oil return valve
5	coupling/belt	15	integrated valve (minimum pressure valve)
6	screw air end	16	safety valve
7	intake filter	17	oil inject
8	cooling fan	18	oil glass
9	intake valve & Solenoid valve	19	oil tank
10	oil/air cooler	20	inverter



1	electric control case	9	fan and motor	17	wind inlet door	25	oil filter
2	emergency stop	10	main motor	18	oil fill hole	26	oil/air cooler
3	PLC control panel	11	center bracket	19	oil separator(in)		
4	intake filter	12	shaft coupling	20	safety valve		
5	top cover	13	screw air end	21	minimum P valve		
6	base	14	intake valve	22	air pipe		
7	frame	15	oil tank	23	oil pipe		
8	fork lift place	16	oil glass	24	thermostatic valve		

shanghai davey machinery co ltd							
direct driven screw compressor							
part list							
drawing (15kw)							

Version	
CAD	
drawing No.	
signature	
designer	
check	
date	

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## 5. Maintenance

### 5.1 Maintenance items and maintenance period

Compressor will not be in a good motion, unless it gets adequate maintenance. Right maintenance can prolong its service life and greatly cut down the time of stopping due to failure.

#### Daily manipulation

Before starting up: drain out the condensate water in the bottom of oil separation until some oil flows out. And check if the oil level is in correct position.

Attention: Don't open oil-discharging ball valve until five minutes later after stopping

After starting up: Watch the pressure on the control panel. Check manipulating temperature and the general conditions inside compressor. Check if there is leakage on the outer surface of cooler or on bolts.

#### Maintenance plan

Check the running temperature and working pressure. (Every day)

Put down the current, voltage, temperature and pressure. (Every day)

Clean compressor. (Only after stopping). (Every week)

Blew wash the ail filter. (Every week)

Check oil level. (Every month) Check the bolts on the belt pulley (shaft coupling). (Only after compressor stopping)

Blew wash cooler. (Every month)

#### Make maintenance every 500 hours

Check the quality of oil. If it is qualified, it can be used again after be filtered cleanly. Otherwise, replace it.

Replace the core of oil filter

Replace the core of intake filter

Replace the core of oil separation

Replace the filtering net of oil return pipe

Check the fatness of belt pulley or the labiality of the shaft coupling.

Attention: Reduce the replacing time, if the environment is spoiled excessively.

#### Every 2000 hours

Replace the core of oil filter

Replace the core of intake filter or intake filter

Check and adjust the fatness of belt pulley or the labiality of shaft coupling.

Check intake-controlling valve

#### Every 4000 hours

Replace lubricant

Replace the core of oil separation or oil separation

Replace the minimum-pressure control valve

Check thermostatic valve

Check if the electronic lead is tight

Check if main bolts, main nuts and connectors are tight.

Check the security apparatus

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### **Guard for maintenance**

Don't repair and maintain compressor if compressor is in motion or there is pressure in it. First, stop it, and then maintain it after inner pressure is released.

After finishing the repair and maintenance work, check fully if compressor is assembled and set well and if all fixing parts and sealing parts are installed well.

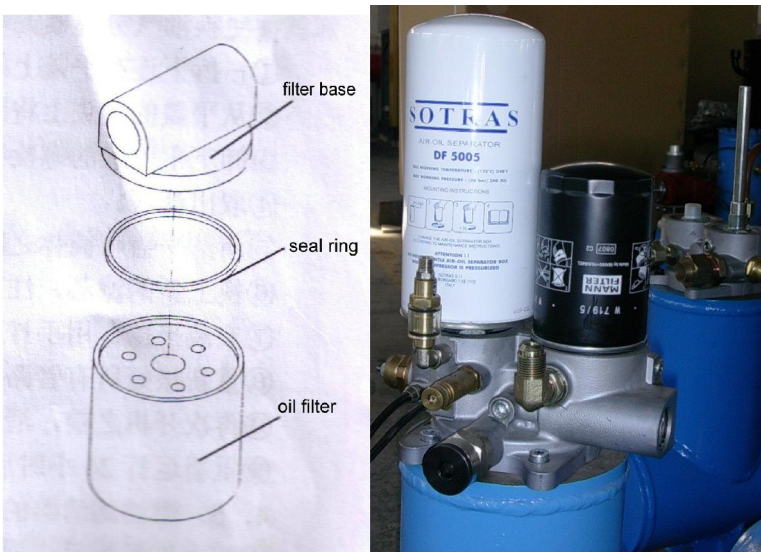
### **Maintenance method for intake filter**

1. Open the end cover
2. Take out the filter core
3. Check the condition of intake filter (if it is not good, replace it)
4. Clean out the dust accumulating on the bottom cover
5. Replace it with a new filter core
6. Fix the end cover well.



### **Maintenance method for oil filter**

1. Screw out the old filter with pliers
2. Clean the touching surface
3. Lay a thin film of oil on the seal ring of new filter
4. Press the filter with handle until the washer is sealed
5. Check if there is leakage after starting up





### Maintenance method for cartridge of oil separator

The method of external type is the same as the oil filter

The method of built-in type is as follow:

1. Open the service wicket door
2. Loosen the connector between pipe and minimum-pressure valve
3. Loosen the pipeline on the cover of oil separation. Make sure it can be reinstalled.
4. Loosen the fixing bolts on the oil separation
5. Lift up the cover board slightly, and then clean the oil return pipe
6. Take out the oil separation cartridge
7. Replace the oil separation cartridge and washer
8. Install it according the reverse procedure. Check the length of oil return pipe (Refer to the maintenance method for oil return pipe)
9. Screw down every bolt with torque spanner.
10. When compressor is started up and reaches the manipulating temperature, screw down the bolts of cover board of oil separation cartridge

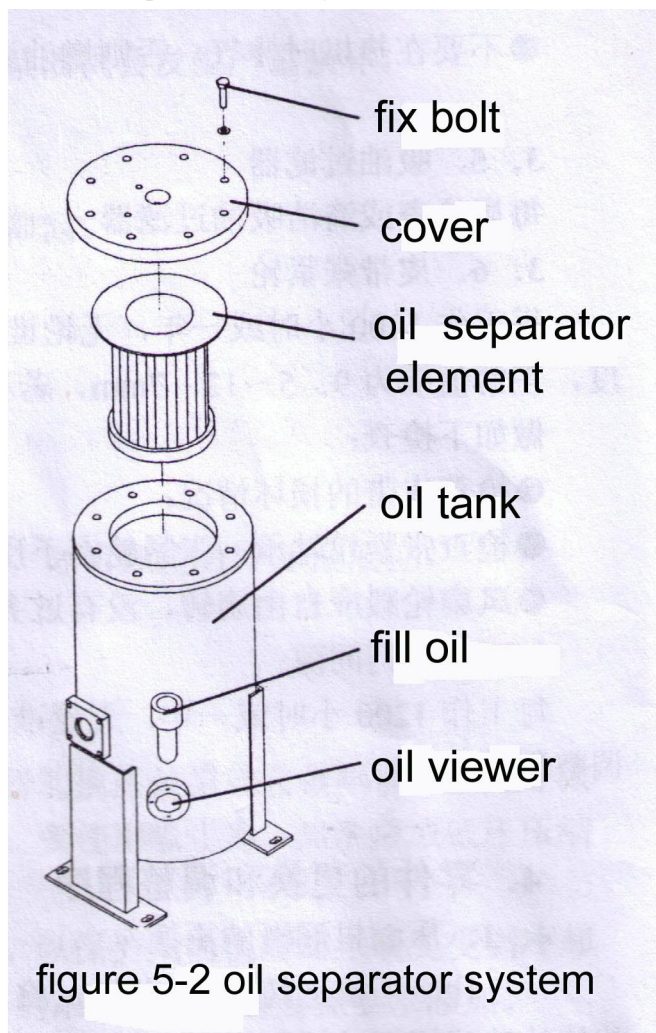


figure 5-2 oil separator system

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### Features of intake valve, solenoids valve and its maintenance method

Intake-controlling valve is mainly composed of valve body, valve gate, piston, cylinder, spring and seal ring and so on. And there is a controlling plate and an electromagnetic control valve on its side. They are with the functions such as load shedding, noise elimination, depressurizing, stopping to release thoroughly, adjustment of on or off, and so on. A small part of air is output through the vintage of intake-controlling valve to balance the amount of sucked air through the vintage. This can keep the pressure in the separation element in the range of 0.2-0.3 Mpa. So that lubricant can be in a normal cycle. The pressure sensor and the electromagnetic valve of adjusting system control the action of on or off of intake-controlling valve automatically. The agility of the action of on or off is very important for the reliability of compressor. So compressor must be maintained periodically, and then it will be in a good motion. When maintaining is being done, parts should be dismantled to check the worn condition on every friction surface. Special attention should be paid to the surface of rubber seal ring. If there is damage or crack on it, it must be replaced. On reinstalling then, every part should be cleaned up and lubricant should be laid on the friction surface of every metal part.



### Maintenance method for minimum-pressure valve and temperature control valve

1. Screw out the lid, pay attention to the spring force of the valve.
2. Take down the lid,
3. Check if there is abrasion on the O-type ring of the piston. If so, replace the ring.
4. Check if there is abrasion on the seal ring. If so, replace it.
5. Lubricate them with high temperature grease. Reinstall them according the revere direction.



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### **Exchanging method for lubricant**

1. Stop compressor
2. Connect up oil-discharging pipe, then open the ball valve, and then drain the oil into the oil-recycling can.
3. Close the oil-discharging ball valve, then open the oil filling cover, and then refill new oil until the oil level is in the center of oil gauge.
4. Fix the oil filling cover, and then check if the O-type ring is in the correct position.
5. Start up the compressor. Check the oil level after compressor running for a while. If oil level is lower, properly fill oil again.

**Attention:** short down the replacing period when there is too much dust or the manipulating temperature is too high.

### **Oil level:**

Maximum oil level: oil level is in the center of oil gauge, after compressor stopping for 30 minutes.

Minimum oil level: oil level is in the lower part of oil gauge when compressor is running.

### **Adjusting method for tightness of belt**

1. Stop
2. Shift out wicket door
3. Loosen the fixing bolt for security under motor base. (Three-fourths ring tightness is always kept)
4. Rotate the adjusting bolt, then adjust the tightness of belt until getting the right tightness
5. Screw down the fixing bolt of gear end

### **Method for replacing belt**

The method is the same as the method of the adjusting method for tightness of belt. First, adjust the belt loose enough, then replace it with a new one, and then adjust the tightness.

Attention: After replacing it, adjust the new belt once 5 minutes later after starting up, and then adjust it once again 10 minutes later after starting up again

**Tip:** full group of belts should be replaced at one time. It is not allowed that replace one or some belts of them at one time.

### **Adjustment of belt pulley**

The parallelism of belt pulley should be adjusted again when the motor or air end is moved or reinstalled.

Poor parallelism of belt pulley will cause belts be abraded quickly, thus reduce the service life of belts and belt pulley. Insure the two belt pulleys in the same plane. First, fix the belt pulley of gear end in the right position, and then adjust the belt pulley of motor to let them be in the same plane.

### **Centering of flexible shaft coupling**

The flexible shaft coupling must be centered when the motor or gear end is moved or reinstalled. And parallelism and axiality must fall into the range of 0-0.05mm

### **Maintenance method for motor**

A lubricant should be applied on the motor bearing every 1500 hours. (Use shell Alvania RL3, if not specified.) Clean up the grease with a clean duster cloth. Run the motor in a unload state after belt pulley being dismantled. Don't stop applying new lubricant when motor is running, until all original oil is drained out through the oil-discharging ventage (Oil-discharging ventage is under the bearing cavity). Finally, Wipe away the excessive grease. (Excessive grease does harm to bearing)

## 6. Troubleshooting

FAULT	POSSIBLE REASON	SOLUTION
<b>Compressor does not start</b>	1、 no electric power to compressor, switch or emergency stop button does not closed	Check electrical connection
	2、 sequence of phases is not correct or phase lacking	Check or interchange two phases (L1,L2 or L3) in the power cable
	3、 overload protection relay does not reset	Reset it with hand
	4、 fuses or electrical contactor are defective	Check it, replace if necessary
<b>Compressor is difficult to start and stop automatically in start process due to high current</b>	1、 under- voltage or three phase voltage is not balance	Ensure constant voltage in accordance with IEC Standard
	2、 electrical connection is flexible	Check and tighten connection
	3、 compressor can not vented perfectly	Check intake valve and replace if necessary
	4、 compressor oil is very viscous due to low ambient temperature	Heat up the compressor before startup
	5、 minimum pressure valve does not closed perfectly	Check the valve spring and replace if necessary
<b>Compressor stop automatically in working process due to over load</b>	1、 exhaust pressure is exceed rated value	Check and adjust unloading pressure value
	2、 setting value of overload protection current is not correct	Check and adjust setting current value of main motor or fan motor
	3、 oil/air separator is jam	Check it, replace if necessary
	4、 pressure control or sensor	Check pressure sensor, switch or computer controller
	5、 screw air end or main motor is defective	Simple examine through rotate it with hand, repair or replace if necessary
<b>Compressor stop automatically in</b>	1、 insufficient oil quantity or use incorrect type oil	Fill oil and ensure oil level is not below than “minimum level” mark, use original manufacture oil only
	2、 cooling unit soiled or internal jam	Clean cooling unit
	3、 ambient temperature too high ( $\geq 40^{\circ}\text{C}$ )	Improve air ventilation of compressor room
	4、 insufficient vent cooling air	Clean and keep air inlet vent opening
	5、 oil filter or thermostatic valve cartridge jam	Clean it , replace if necessary
	6、 cooling fan fault	Check and replace if necessary
	7、 temperature sensor PT100 defective	Check and replace if necessary

<b>working process due to over heat</b>	or wire break	
	8、oil pipe leakage	Fasten and seal oil pipe coupling
<b>Excessive oil consumption</b>	1、oil/air separator element is defective	Check and replace if necessary
	2、excessive oil filling	Drain off some oil, ensure oil level is not higher than “maximum level” mark
	3、oil-return line jam	Check and replace one-way valve if necessary
	4、working pressure is too low for long time ( $\leq 0.6\text{MPa}$ )	User should reduce compressed air consume to let pressure increase
	5、use incorrect oil, more foam and low viscous	Use original manufacture oil only
	6、too many condense water in internal system due to high humidity climate	Drain condensation water from oil tank promptly
<b>No compressed air exhaust, no pressure build up</b>	1、intake valve does not open	Intake controller or solenoid valve is defective, or air pipe connected to controller is leakage, check and replace if necessary
	2、discharge solenoid valve is defective	Check electric supply and clean valve holes, replace if need
	3、minimum pressure valve does not open	Check minimum pressure valve spring , replace if necessary
	4、components in compressor are leaking	Check oil and air lines in compressor, tighten and reseal screw coupling connections
	5、V-belts are slipped or torn	Check and replace if necessary
<b>System pressure does not decrease when reach rated pressure value</b>	1、intake valve does not close	Intake controller or solenoid valve is defective, or air pipe connected to controller is leakage, check and replace if necessary
	2、discharge solenoid valve is defective	Check electric supply and clean valve holes, replace if necessary
	3、system pressure control fault	Check pressure sensor, pressure switch or computer controller, replace if necessary
<b>Oil or oil smoking in intake filter when stop</b>	1、intake valve is leaking	Check and replace if necessary
	2、press Emergency Stop Button when compressor is in loading	Switch off compressor using OFF Button, only use the Emergency Stop Button in emergencies
	3、minimum pressure non-return valve is leaking	Check and replace if necessary
	4、Excessive oil in air	See the reasons of excessive oil consumption
<b>Exhaust volume</b>	1、air vent, intake filter or oil/air	Clean and replace if necessary

<b>decrease</b>	separator jam	
	2、 intake valve does not move perfectly	Check and replace if necessary
	3 、 components in compressor are leaking	Check air lines in compressor, tighten and reseal screw coupling connections if necessary
<b>Compressor load/ unload very frequently</b>	1、 pressure difference value incorrectly set	Adjust pressure difference value, not smaller than 0.15MPA usually
	2、 air consumptions is not steady	Use a bigger volume receiver tank
	3、 external units of the compressed air treatment jam	Clean external air pipeline ,air dryer or air filter , replace if necessary
	4、 ball valve at compressor outlet closed	Open ball valve
<b>Abnormally noise and vibration in compressor</b>	1、 fixed screw on the base is released	Tighten screw
	2、 V-belts are slipped	Adjust v-belts tension, replace if necessary
	3、 friction with fan vane and edge	Adjust fan vane
	4、 compressor install improperly	Mounted compressor in flat ground
	5、 screw air end or motor is defective	Check air end or main motor and fan motor, repair if necessary
<b>Safety valve blows</b>	1 、 operating pressure has been misadjusted	Set operating pressure to the maximum permissible pressure range of compressor (see value in nameplate)
	2、 safety valve is defective	Replace safety valve
	3. System internal pressure has exceed over setting pressure of safety valve	Check and replace air/oil separator if necessary

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