ALINK COMPRESSOR

AG Serial Air Compressor

User Manual

Raed and Save this Manual Carefully

Trademark & Copyright

Attention

Before operating the machine, you should read this manual in detail and well know the operating regulations & techniques, in order to appropriately install, performing-adjust, operate and maintain it.

This manual should be reserved by the end-users.

This manual should be reserved along with the accessorial docs & the machine, till it gets scrapped.

The scope of application of this manual

This manual can be applied to the Stationary screw air Compressor AG200A（W） for their installation, performing-adjustment, running, & maintenance.

This manual does not include the Operating Instruction of the triple-phase asynchronous motor, which is in the accessorial electric motor manual.

This manual can be applied by the design engineer as the design literature for air compressor plant.

Known-how before reading this manual

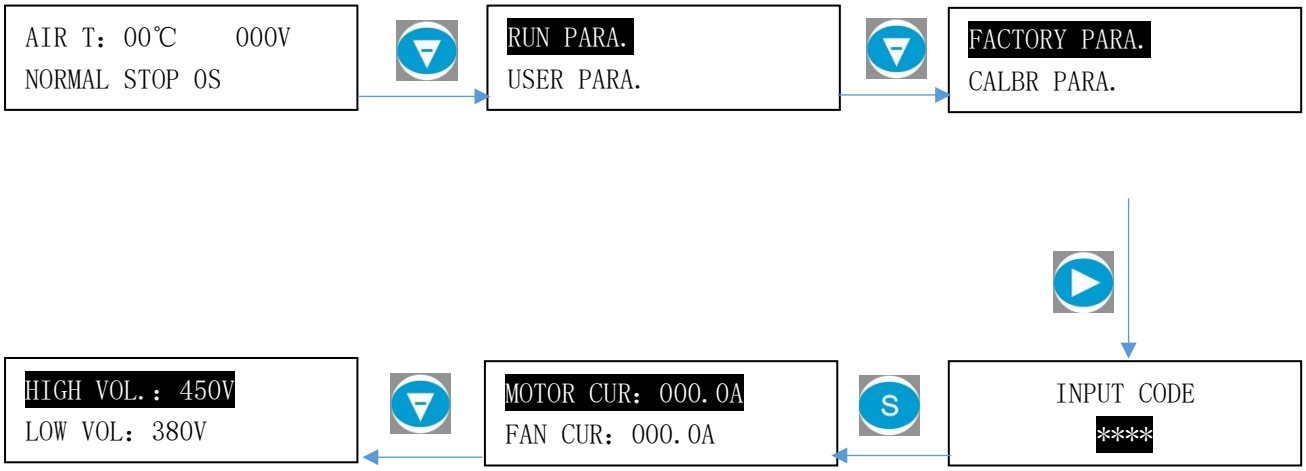
If you possess the professional electric-mechanical knowledge, you'll well understand the Manual description.

This manual is revision V1.1-2019

Note

(1)Before powering on the new device, make sure that the power supply you use matches the device.

(2)After the unit is powered on, set the upper limit voltage and lower limit voltage according to the voltage you are using. The setting method is as follows:



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Set the value of "HIGH VOL." : "the rated voltage multiplied by 1.1" (460V×1.1=506V);

Set the value of "LOW VOL." : "the rated voltage multiplied by 0.9" (460V×0.9=414V).

Contents

NOTE

Be aware of “Attn”, “Caution” and “Danger”

⚠ Attn	Inappropriate treatment may lead to dangerous situation, such as the slight injuries and the device malfunction.

⚠ Caution	Inappropriate treatment may lead to dangerous situation, such as the medium injuries and device malfunction.

⚠ Danger	Inappropriate treatment may lead to the dangerous situation, such as the serious injuries and device damage.

Sometimes, even the inappropriate treatment or non-observance to the “Attn”, may also lead to serious accidents. Therefore, GANEY suggests that all ALERTs in the Manual should be observed.

The operation

⚠ Attn	The operation
⚠	Operating instructions must always be available in the machine's operating area (for example, in the tool room or in the box containing the instructions)! In addition to the operating instructions, all applicable laws and regulations on accident prevention and environmental protection must be observed, and others must be complied with.
⚠	Often check the operator's work is consistent with the operating procedures, whether they pay attention to safety requirements.
⚠	Observe all safety notices and warning signs on the machine. The safety instructions and warning signs posted on the machine must always remain intact and clearly visible.

About the use

⚠ Danger	About the use
⚠	Do not apply the Machine in the sealed room, pit or channel, and do not apply the compressed air for breath.

Regarding the Installation

⚠ Attn Regarding the Installation	
	The machine room should be well ventilated of the clean & fresh air. Do not install the Air-compressor in the area full of aerosol or poisonous, corrosive air.
	The power cord should match the machine rating power, and the machine should be equipped with the circuit breaker or other safety device to ensure the electric device safe & reliable.

⚠ Dangerous Regarding the Installation	
	The compressor body & the Electric Motor enclosure should be reliably grounded, and should be additionally equipped with the Lightening inductor if necessary. The unreliable grounding may lead to fire or injuries.

Regarding the Running

⚠ Attn Regarding the Running	
	If the Room temperature is below 0 ℃ , to avoid the “ice-blocking”phenomena or cold crack, the water in the 1）cooler, 2）Oil-air Separator, & 3）pipelines, should be drained up, when the machine is power off
	Before starting the machine, be sure of nobody, no-tools or no other articles inside the Cabinet, and shut off the door. While Starting the machine, keep the surrounding people posted of Safety Alert

⚠ Dangerous Regarding the Running	
	When in initial starting or if in power cord alteration, check up if the machine rotating direction is consistent with the arrowhead direction.
	3、The machine should not run when the Discharge Pressure is higher than that of rating label. Or else the Electric Motor may overload and then get burnt up.
	When the Machine is in malfunction or other dangerous factor, do not start the machine, whereas cut off the power supply and make obvious mark.

	The Fingers & clothes should be far away from the rotating Fan, Drive Shaft- coupling and other heat-emitted components & parts, such as Oil-air Separator, Pipelines.
	6、While the machine is running, do not dismantle any of the cap/cover/shelter/shield, or components & parts. The high-temperature Liquid & the high pressure air in the machines may lead to serious injuries or even death.

Regarding the Maintenance

⚠ Caution Regarding the Maintenance.	
	While in Servcing or maintenance, be aware of acute parts of the machines, to avoid the scratch or injury.
	Do not take the bare compressor or pipes as the supporting point; and the non-observance may lead to device damage.
	While the Servcing and Maintenance is completed, do clear the dust or other trash off the machine inside & the surrounding, to better the air quality.

⚠ Dangerous Regarding the Maintenance	
	Assure the power supply is off and hang up “Servcing”, “Switch-on Forbidden” or other Caution Labels, when conducting the Servcing or Maintenance. Or else others’ mis-operation may lead to the maintainer’s injuries.
	While in maintenance, assure the compressed air inside the machine should have been released up, the machine should have been segregated from other air source, and the machine should have been cooled up.
	The bare compressor assembly should be conducted by the specialized technician with the specified tools. The end-user should not presumptuously dismantle & servcing the bare compressor

About oil

⚠ Caution About oil	
	**Be sure to use the air compressor oil, or cause the compressor efficiency, or even damage the compressor host.**
	**Dispose of lubricating oil in accordance with national or local laws and regulations. Improper handling of lubricants may cause serious environmental pollution.**

1 Technical specifications

1.1 Technical Data Sheet for AG-10A

No. / Item		AG-10A	
Air-discharge Capacity（CFM)		37.41	
Air-discharge Pressure（PSI）		116	
The setting pressure of the safety valve（Psi）		130.5	
Suction	Temp（℃）	0~40	
	Pressure	Atmospheric Pressure	
compression stages		One-stage	
Air-supply Temp（℃）		≤Ambient Temperature+15	
Cooling Mode		Air Cooling	
Outlet diameter		3/4”NPT	
Oil-content in Air（ppm)		≤3ppm	
Lubricant Oil Volume（gal）		1.05	
Lubricant Oil Spec.		Exclusive Lubricant for air compressor	
Air-suction adjustment Mode		ON/OFF adjustment	
Driving Mode		Direct connection	
Electrical Motor	Power（HP）	10	
	Rotating Speed（RPM）	3490	
	Start mode	Direct Start	
	Voltage（V）/ Freq.（Hz）	460/60	230/60
	Max. Current(A)	14.5	29
N/W（lb）		562	
Net dimension：L×W×H（inch）		34×21.7×28.4	

1.2 Technical Data Sheet for AG-15A

No. / Item		AG-15A	
Air-discharge Capacity（CFM)		44.47	
Air-discharge Pressure（PSI）		116	
The setting pressure of the safety valve（Psi）		130.5	
Suction	Temp（℃）	0~40	
	Pressure	Atmospheric Pressure	
compression stages		One-stage	
Air-supply Temp（℃）		≤Ambient Temperature+15	
Cooling Mode		Air Cooling	
Outlet diameter		1”NPT	
Oil-content in Air（ppm)		≤3ppm	
Lubricant Oil Volume（gal）		1.58	
Lubricant Oil Spec.		Exclusive Lubricant for air compressor	
Air-suction adjustment Mode		ON/OFF adjustment	
Driving Mode		Direct connection	
Electrical Motor	Power（HP）	15	
	Rotating Speed（RPM）	3525	
	Start mode	Star-delta Starting	
	Voltage（V）/ Freq.（Hz）	460/60	230/60
	Max. Current(A)	21	42
N/W（lb）		1080	
Net dimension：L×W×H（inch）		44×24.8×35.3	

1.3 Technical Data Sheet for AG-20A

No. / Item		AG-20A	
Air-discharge Capacity（CFM)		72.01	
Air-discharge Pressure（PSI）		116	
The setting pressure of the safety valve（PSI）		130.5	
Suction	Temp（℃）	0~40	
	Pressure	Atmospheric Pressure	
compression stages		One-stage	
Air-supply Temp（℃）		≤Ambient Temperature+15	
Cooling Mode		Air Cooling	
Outlet diameter		1”NPT	
Oil-content in Air（ppm)		≤3ppm	
Lubricant Oil Volume（gal）		1.58	
Lubricant Oil Spec.		Exclusive Lubricant for air compressor	
Air-suction adjustment Mode		ON/OFF adjustment	
Driving Mode		Direct connection	
Electrical Motor	Power（HP）	20	
	Rotating Speed（RPM）	3525	
	Start mode	Star-delta Starting	
	Voltage（V）/ Freq.（Hz）	460/50	230/50
	Max Current	29	58
N/W（lb）		1124	
Net dimension：L×W×H（inch）		44×24.8×35.3	

2 Installation

2.1 Equipment Acceptance

When receiving the air compressor, please carefully implement the inspection. If you do not right away open the case, you should be aware of any (potential) damage due to the improper handling or/and delivery; and if you find any defects or/and malfunction, you should get the signature & confirmation from the deliverer for the incoming warranty claim.

While conducting th inspection, please kindly follow the items below:

1) Check the Rating Label, and confirm its specification.

The Model No.: Refer to Chapter 1.5 in this MANUAL

The Power Voltage: Check up if the machine matches the local power grid

The Motor Power: select the proper electric power cable

The Weight & Dimension: design the ground base accordingly.

2) Check and confirm the Appearance against any (potential) damage during the handling or/and delivery, such as pipeline cracking, enclosure distortion, component & part damage or/and fall-off

3) Besides the machine & its main body, you should also check and confirm the Accessories (such as the Instruction Manual). Please follow the enclosed Packing List to check and confirm if all accessories are full rigged.

⚠ Attn	After unpacking, please keep the user manual and other accessories.

2.2 Air compressor handling

2.2.1 Fork-lift handling method

When Fork-lift in use, the points below should be followed

(1). The load of fork-lift should comply with the machine total weight.

(2). The machine can be delivered through the fork lift holes. .

⚠ Attn	The load of fork-lift should comply with the machine total weight，or may lead to device damage and serious injuries.

2.2.2. The machine can also be delivered by the way of rolling the wood-bar

2.3 Installation

2.3.1 The requirements and suggestions for the Installation Places

The Air Compressor should be installed in the clean place with enough light, good ventilation, & large vacant space for the maintenance purpose. The good machine room is the critical factor to properly apply the Air compressor System.

2.3.1.1 Ventilation, lighting, environmental temperature, maintenance space

1) Due to large amount of heat yielded during the running, the Air Compressor should be positioned in the room with good-ventilation, and the air inlet in the machine for cooling purpose should be enough.

2) The Installation place should be in good lighting, each side of the machine should be over 1.5m far from the wall, top space should be over 2 m from the ceiling; especially the top space for Air-cooling System should be over 4 m from the ceiling, in order to be convenient for the operation and maintenance.

(3). The environmental temperature should be lower than 40 ℃, in order to prevent the machine from the high-temp shuts-off, due to the high temperature. Also the higher the environmental temperature is, the less air the machine outputs. Meantime, the environmental temperature should be beyond 0 ℃, in order that it should be beyond the condensation point of the water & lubricating oil.

(4). The ambient environment should be taken into the consideration. The machine room for the Air Compressor should be in relatively low humidity /moisture, without dust, chemicals, paint odor or painting operation. If the operating environment is harsh, the Suction inlet of the machine should be additionally equipped with the filter device, for example to apply a ventilation pipe to guide the suction inlet to the relatively clean air.

2.3.2.1 The requirements of foundation

The air compressor should be installed to where the cement ground can hold the high-weight of the machine. The ground should be leveled and well-pressed and the machine should be installed levelly. If there is outside vibration, the vibration-preventive flute should be applied. The bolt dimension should refer to the system Appearance Illustrative. In order to well connect all the inlet-outlet pipelines, the length & width of the cement platform should be bigger by 100mm than that of the machine, and the height of the cement platform should be bigger by 150 mm that the ambient ground. Also the trench should be excavated around the Platform periphery, so that the oil & water can flow away through the trench when the machine shuts off for the oil-replacement or servcing.

2.3.2 Pipeline Installation

2.3.2.1 When the main pipelines are installed, they should be in 1°~2° inclination in order to lead the condensed water out of the pipes.

2.3.2.2 The pipe diameter should be at least equal to the machine discharge pipe. The pressure drop in pipeline should be not more than 5% of set pressure. The Pipe bends & any kinds of valves should be minimized in order to reduce the pressure loss.

2.3.2.3 The main pipeline should not be downsized presumptuously, and if the pipeline has to be downsized or extented, the reducing pipe should be applied; otherwise there may be mixed flow at the joint, which will bring great pressure loss & greatly affect the pipe life.

2.3.2.4 If the air consumption in the Air System in very short time, a buffer tank should be applied to minimize the frequent loading & unloading to extent the machine service life.

2.3.2.5 When several Screw air Compressor share one discharge pipe, each machine should install ball valve to their respective Discharge pipe for segregation purpose. If a single screw machine and a reciprocating air compressor are converged together, an air tank should be installed between two machines. After the Air tank is installed, a cut-off valve & a Pressure-relief valve should be installed between the air collector and the machine (When the machine shuts off, the compressed air between the ball valve & pressure minimum valve in the system can be discharged).

2.3.2.6 The auxiliary pipe should be connected from the main pipe top to prevent the condensed water from dripping to the working machine, the Overflow valve should be installed on the compressor pipes.

2.3.2.7 If the compressor machines are equipped with the Air collector & the dryer, the best layout is the air compressor + the air collector + the dryer.

2.3.2.8 The ideal pipeline layout should be that the main pipe surrounds the whole factory building, and any position requiring the compressed air, can obtain the compressed air from at least 2 directions. The Circular Main pipeline should be equipped with certain of proper valve to cut off the air supply source while in maintenance.

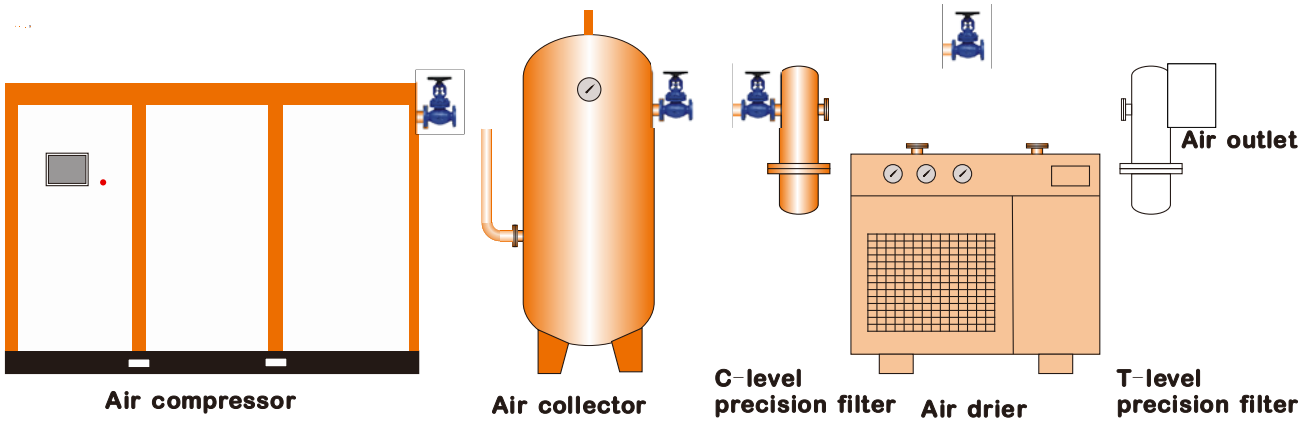


Fig.2-1 air compressor, air collector and air drier

2.3.3 Cooling system

（1）Assure the ambient environment in good ventilation and do not place the air compressor near the high-temperature machinery or place it to an air-tight room.

（2）Assure to periodically clear the dust in the heat-exchanger fins. **Air cooler should be cleaned periodically to prevent the unit from stopping at high temperature.**

⚠ **Attn**	**The windshield shall be installed so as to prevent outdoor dust and rain from pouring into the cooler of the air compressor.**

2.4 Electric Apparatus Installation

2.4.1 The Circuit breaker (Air Switch) Installation

(1) Low-voltage Circuit Breaker is to cut off the machine power supply, & protect the Motor. According to the rating current of the Motor, select proper circuit breakers. The Circuit breaker should possess of the function of the Motor overload protection & automatic circuit break against

the current leakage.

(2) The well-equipped Circuit breaker should be of Motor-protective, and its setting value for the instantaneous operation is by 8-10 times larger than Motor rating current value. Please try to avoid the Circuit Breaker of Normal On-off type; and if the normal on-off type is applied, its setting value for the instantaneous operation is 14 times larger than Motor rating current, or else the circuit breaker may false operate while the motor is started.

(3) The circuit breaker should be installed besides the air-compressor machines for the convenience of the maintenance purpose. And the installation process should comply with the Safety regulation.

2.4.2 The Electric Power Cable Installation

Select the proper electric power cable according to the rating voltage & current of the Air compressor machines. Also the proper cable should be determined by the other factors, such as the environment, the cable routing and the product specification. And the following principles should be observed:

(1) In order to minimize the environmental pressure, the electric power cable should be under earth or covered in the earth-pipe. The routing for the plastic-jacketing cable should be applied with the earth-pipe.

(2) Low-Voltage Power cable should be in quadded electric power cable, and select the proper jacketing according to cable routing.

(3) If the environmental temperature is high, the cable section should be properly extended. And if the routing distance is long, the cable section should be also properly extended in order to reduce the voltage drop.

The low-voltage electric cable in table below is BV-type polyvinyl chloride cable. If select other type Electric Cable, please follow the principles above to select the proper ones. And if the user has no experience, please consult with the Cable manufacturer.

Item / Type	Motor		Power		Circuit-breaker Current（A）
	Power（HP）	Max Current（A）	Voltage（V）	Frequency（Hz）	
AG-10A	10	28.12	230±10%	60±5%	50
AG-10A	10	14.20	460±10%	60±5%	25
AG-15A	15	41.3	230±10%	60±5%	32
AG-15A	15	20.6	460±10%	60±5%	32
AG-20A	20	32	230±10%	60±5%	60
AG-20A	20	32	460±10%	60±5%	60

The Current parameter in the table is only for reference, the actual value should be subjected to the rating label of the product.

⚠ **Danger**	**Do not apply the cable with too small section, or else the high temperature will lead to the danger.** **Do not apply the cable un-matching the required voltage, or else it will lead to the serious hazard, such as the fire, the electric shock and so on.**

2.4.3 Electric Power Requirement

The Electric Power Supply should match the rating voltage and frequency of the Air compressor.

The Power-supply voltage should:

（1）The voltage should not great fluctuate, the fluctuation range should be in -10%~+10% of the

Motor Rating Voltage.

（2）The Voltage Unbalance should not be great, and the triple-phase-voltage unbalance in the triple-phase power supply should not be beyond 5%. If it fluctuates greatly, the power supply should be equipped with the Stabilizer or the power grid should be adjusted.

（3）The Capacity of the Power grid should fulfill the Motor start; or else the motor will be hard started, or even the circuit breaker will trip out.

（4）The Air compressor should have single power supply system for the convenience of maintenance.

⚠ Danger	Do not apply the high-voltage power supply to the low-voltage device, or else it will lead the damage to the device & the injury to man.

2.4.4 Grounding

The Main body of the Air compressor & the Motor enclosure should be reliably grounded, to prevent the Oil-air Separator from the firing due to the static electricity, & avoid the electric leakage.

The Main body of the Air compressor & the Motor enclosure should be connected to the grounding conductor by the PE-Grounding wire or the galvanizing round (flat) steel, to assure its section accord with the relevant requirement.

⚠ Danger	Unreliable grounding or un-grounding may lead to the serious damages, such as the firing and electric shock FORBID taking the gas pipeline or water pipeline as the grounding conductor, or else it will lead to serious damage. DONOT connect the earthed neutral conductor of the triple-phase power supply to the air-compressor enclosure or the grounding conductor, or else it will lead to the device malfunction

2.5 Electric Apparatus Connection

⚠ Caution	The Wiring Operation should be conducted by the Electrician qualified with the Electric Operation Certificate.

2.5.1 The Cable connection from the Power supply to the Air-compressor's control cabinet

If the controlling cabinet is applied with the triple-phase alternated power supply AC 415V (~3xL), the connecting cable will refer to the table of Item 2.6.2; The Electric Power will be connected to the Air-compressor's Input Terminals via the circuit breaker.

⚠ Caution	The Cable connection should be firm & not loose, or else the components & parts may get burnt or even the firing occurs due to the cable heating.

2.5.2 The grounding-wire connection

Connect the right side Earthing terminals of Air Compressor to the Grounding conductor. After the grounding process, apply the Earthed Resistance Detector to measure the earthed resistance, and the resistance should be lower than 4 Ohm.

3 System process and Part Function

3.1 System process chart

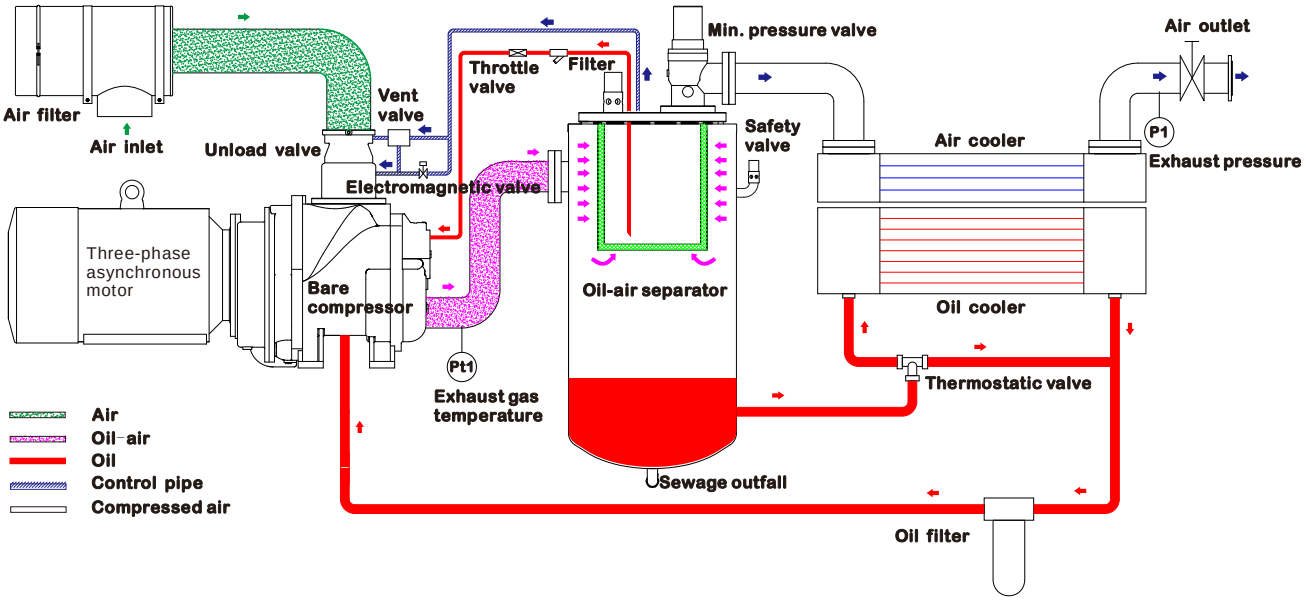


Fig.3-1 System process chart

3.2 Air-Pipeline System

Air-Pipeline system consists of Air Filter, Unloading Valve, Bare compressor, Discharge check valve, Oil-air Separator, Min. pressure valve, Rear cooler, Air pipes etc.

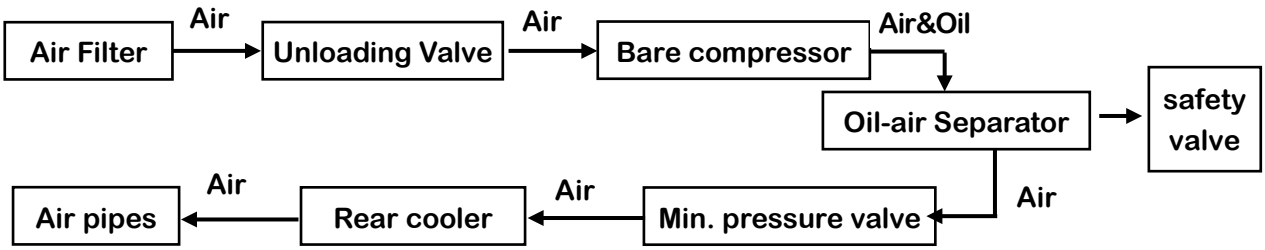


Fig.3-2 Air-pipeline flow chart

Air penetrates filter for dust removal, then get through Unloading Valve, enter in Air Inlet; and the Air is compressed inside the bare Compressor, then discharged from the air-outlet, next puts through the discharge check valve & discharge pipe, and finally enters into Oil-air Separator. The compressed air with oil content rotates & centrifugally separates up inside the Oil-air Separator, and the lubricating oil aggregate on the cavity wall by the centrifugal force, finally drips into the oil tank. After the centrifugal separation, the compressed air then enters into the Oil-air Separator Cartridge to conduct the meticulous separation. The meticulously separated oil aggregates in the Cartridge bottom; due to the Cartridge inside installed with an oil-return pipe, the oil in the bottom under the pressure will get through the oil-return pipe then into the Main suction pipe. With twice separation, the compressed air will be very clean, and the compressed air from the Separator, then get through the Min. Pressure Valve & Cooler for oncoming use.

3.2.1 Air filter

Air Filter mainly clears the dust air to avoid the quicker abrasion of Bare Compressor's screw & bearing, and the being-block phenomena of Oil filter & Oil-air Separator Cartridge. Generally the Air filter should be cleared off every 500 hours by the way of blowing off the dust from its inside to outside by the low-pressure air. The cleaning cycle should be shorter under the more-dust Area.

3.2.2 Unload valve

There is 2 main functions for the unloading valve: 1). when the compressor is started & unloaded, Suction-valve plate will be shut down by the unloading valve, so that the compressor can be started under low current, and run under no load while unloading. 2). While loading, the suction-valve plate is opened by the unloading valve to make suction air equivalent to the actual air exhaustion.

3.2.3 Oil-air Separator (details given should refer to the latter chapter)

3.2.4 Min. pressure valve

Min. pressure valve is positioned at the outlet of Oil-air Separator, its opening pressure is about 65.3Psi, and it mainly functions for:

（1）When starting, the prior Cycling Pressure that lubricating oil requires of, is set up to assure the inside machine well lubricated.

（2） When the pressure exceeds 65.3Psi, the opening valve will lower air Rotating Speed that pass through the Oil-air Separator, which not only assure Oil-air of high separating rate, but also protect Oil-air Separator Cartridge from damage aroused of too big pressure difference.

（3） It can protect the system from pressure reflux when the idling compressor discharges the air.

3.2.5 Rear cooler

Air cooler sucking in cold air by cooling fan, cools the compressed air. Since the air-cooling air compressor is sensitive to the ambient temperature, it should be positioned where is well ventilated.

3.2.6 Safety Valve

Safety Valve: The valve will be started to discharge the pressure, when the air outlet pressure of Oil-air Separator exceeds the rating air discharge pressure by 1.1 times or +14.5Psi, aroused from the improper adjustment or failure of Pressure Switch.。

⚠ Danger	When the Discharge Valve is started, the Segregator Cartridge should be replaced. If not, the Electric Motor will be overloaded in the Current, and then get damaged

3.3 Lubricating oil system

3.3.1 Lubricating oil flow chart（pic3-3）

Lubricating oil of single screw compressor possess of 4 main functions: lubricating the contact surface between bearing & screw, sealing the clearance between gears, cooling compressed air, and lowering down noise. Lubricating oil in Segregator cartridge is pressed into Oil Cooler by high pressure and then cooled. Then the lubricating oil passes through the Oil Filter (to clear off the dross & fouling), and finally enters into the Bare Compressor.

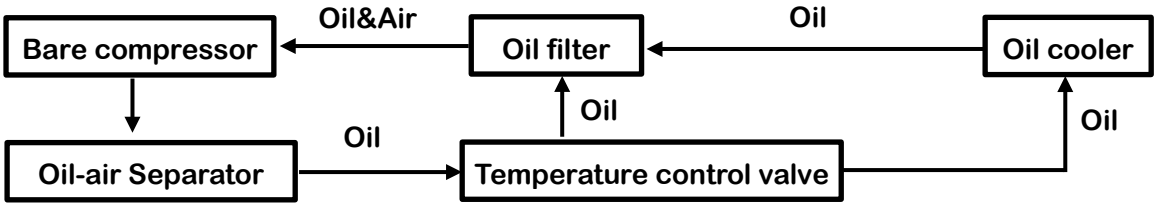


Fig.3-3 Lubricating oil flow chart

3.3.2 Oil filter

The Oil Filter is a kind of paper filter, and its function is to clear the dross off oil, such as the worn metal particle, dust, oil compound etc. Oil Filter's filter finenes is between 10μ～15μ, and it can well protect the Bearing & Screw. When the new machine runs of accumulative 500 hours, the lubricating oil and Oil filter should be replaced, and then the replacement should follow the Indicative Alert of the Filter's Timer. If the Oil filter is not replaced due to the great pressure difference, it will lead to insufficient oil-feeding, & high-temp shut-off. Meanwhile, the insufficient oil-feeding will shorter the Bearing's service life.

3.3.3 Oil cooler

The Oil Cooler Fins of Air-cooling Compressor was coated with dust, which will influence cooling efficiency, and too high Discharge Temp will lead to system shut-off. Therefore, the dust on Oil-cooler surface should be periodically cleared off by the compressed air.

3.3.5 Oil-air Separator

The Segregator possess of functions of oil storage & oil-air segregation. Its flank is equipped with an Oil Gauge. When the machine is on, the Lubricating oil level should point to the median line's vincity of Oil gauge. The Oil tank is also equipped with Oil in-take for oil-feeding. The segregator bottom is installed with Oil-discharge Valve. In damp season, before starting the machine, do turn on the Oil-discharge valve to drain up the condensation water at the Segregator bottom, otherwise, the lubricating oil may get emulsified. The oil spray in the compressed oil can be nearly completely cleared off when it passes through the Segregator Cartridge, and the Oil content will be lower than 3ppm. The oil filtrated by the Cartridge is aggregated at the Cartridge bottom, and then it will get through the Oil-return pipes, the Filter, the throttle Orifice, & the Oil immersion Lens, and finally reflux to the bare compressor.

⚠ Caution	Recommend the user not to apply other-brand lubricating oil, and the inferior may damage the Air compressor

4 Protection System & Alarm Device

4.1 Overloading protection for Main Electric Motor & Fan Motor

If the current of Main Electric Motor overloads & lasts over the set time of Overload protection, the machine will alarm & then automatically stop. By that, please check up the cause of current overload, and eliminate the troubles.

The causes of Motor overload are as follows:

(1) Human-induced mis-operation, such as presumptuously adjusting the air-discharge pressure, & inappropriate adjustment to the system etc.

(2) Mechanical troubles, such as Motor inner abrasion; Safety Valve inaction, Failure against system setting, and Segregator Cartridge blocking etc.

(3) Electric troubles: too low voltage; over current aroused from false connection, and motor rotating in absence of a certain phase

4.2 Protection against the machine contra-rotation

The machine contra-rotation does great harm to the bare compressor. To avoid the contra-rotation, the microprocessor controller is equipped with Phase-sequence protection.

4.3 Protection against too high air-discharge temperature

Alarm set temperature is 100℃. When air-discharge temperature exceeds the set value, Alarm is started; but only when the air-discharge temperature exceeds 105℃, the Alarm lasts and then the machine will stop.

The main causes of too high air-discharge temperature are as follows:

(1) Oil cooler failure, or the air Cooler fins coated with dust.

(2) Oil filter blocked

(3) Too high Ambient temperature & bad-ventilation in the machine room.

4.4 Protection against too low ambient temperature

If the ambient temperature is below the set value -20℃, the machine cannot start. Do be sure of the ambient temperature over 0℃ & no ice-blocking inside the machine, before starting the machine.

4.5 Protection against over air-discharge pressure

When the air-discharge pressure exceeds the unloading pressure+7.25Psi, the machine will alarm and automatically stop running.

The Segregator cap is equipped with Safety Valve, and the air will be released for protection purpose when the air-discharge pressure exceeds its set value.

The Front of Segregator Cartridge is equipped with Pressure-relief Valve, and the Pressure-relief valve will be started when the air-discharge pressure exceeds its set value. By that, the Segregator Cartridge should be replaced.

Please refer to Item 3.2.8 of this MANUAL regarding the set value of Safety Valve & Pressure-relief Valve.

The causes of over air-discharge pressure are as follows:

1) While unloading, the Unloading Valve does not shut off.
2) The Segregator Cartridge is seriously blocked.
3) Ball valve at the air-supply shuts off.

4.6 Alarm for the Service life of lubricating oil & quick-wear Parts

Once the service life for lubricating oil, motor lubricating grease, air filter, & Segregator Cartridge is matured, the alarm will be started to indicate the replacement for the lubricating oil & consumable parts, and filling up lubricating oil for Motor.

5 Operation

5.1 Initial starting & running

5.1.1 Check the first time before starting

（1） Check up the pipeline connector, meter, & electric-circuit connector, and assure of no looseness or falling-off during the delivery or installation. If it's detected out, the user should tighten it up.

（2） Connect the Power cord & Grounding wire, testify the triple-phase power supply & voltage.

（3） Check up and assure the Oil-level pointer of locating in the green area.

（4） If the initial starting & running is conducted a long time after receiving the machine, or re-start the machine when it is vacant for more than 3 month, the user should pour up around 0.5kg lubricating oil in Unloading Valve, and manually rotate the Air compressor for a while. So that it will avoid the deficient oil inside the bare compressor, which may lead the Compressor burnt up.

（5） Check up the Cooling system, and start the Cooling water (if it is of water-cooling type)

（6） If the LCD screen displays "Normal Stop", the user should press button for 1~2s, & immediately press "Emergency Stop" button, then check up if the rotation direction is correct (as indicated by Arrowhead). If the rotation direction is incorrect, the user should transpose any 2 of these 3 pieces of electric wires, & then check up if the rotation direction of Fan motor is correct.

（7） After Emergency Stop resetting, press button, and the air compressor will run

（8） Check up if 1) the LCD screen displays any abnomity, 2) the system normally loads, & 3) the drainer works. And if there is abnormal sound, abnormal vibration, water leakage or oil leakage, the user should immediately press Stop button, check out the root cause and resolve the problem.

（9） Check up 1) if the machine will automatically unload when the air-discharge pressure goes up to the set value of unloading pressure, & 2) if the machine will automatically load when the air-discharge pressure gets down to set value of loading pressure.

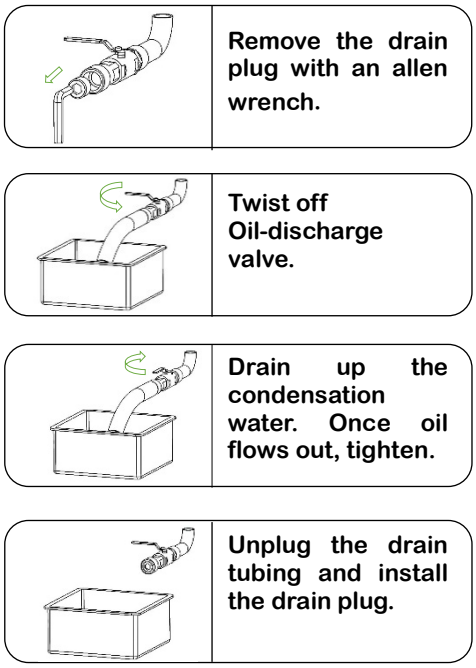
（10） Pressure button to testify the shut-off function.

（11）Remove the bare compressor transport bracket and the motor transport bracket. It is advisable to retain the removed bare compressor transport bracket and motor transport bracket and fasteners for long-distance transport.

⚠ **Caution**	**（1）Before the device is running, it is necessary to remove the bare compressor transport bracket and the motor transport bracket, otherwise it may damage the compressor main unit.** **（2）Before long-distance transporting, must be installed before the bare compressor transport bracket and the motor transport bracket to protect the bare compressor systems.**

5.2 Checking up before starting the machine

（1）Slightly twist off the Oil-discharge valve at the Bottom of Oil-air separator, then drain up the condensation water in the Separator, and finally tighten the Valve. Here below is the procedure to drain up the condensation water in Fig 5-1.



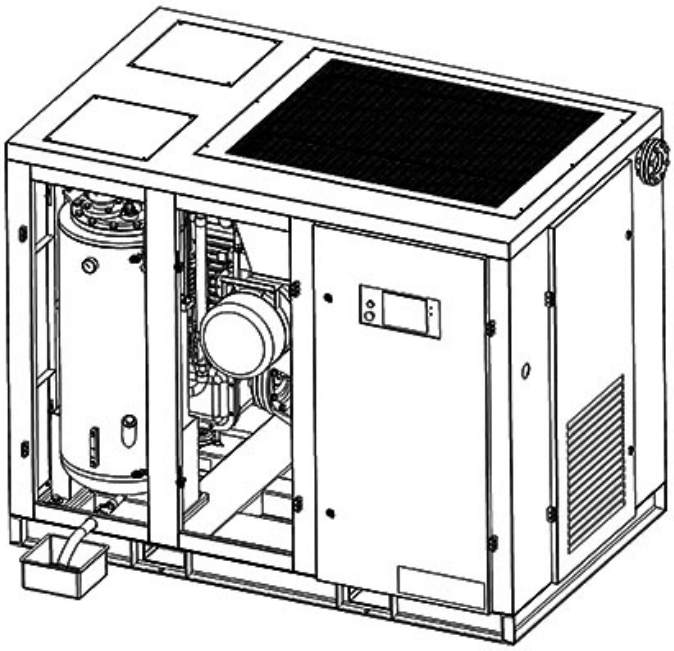


Fig5-1

⚠ Caution	Assure the system of null pressure, before draining up the condensation water

（2）Check up the oil level, and assure the lubricating-oil pointer of locating at the oil median line. If the lubricating oil is excessive, immediately turn down the machine; and discharge some oil through the Oil-discharge valve upon null pressure in the system; If the lubricating oil is insufficient, immediately turn down the machine, open the upper oil lid and fill in with more oil upon null pressure in the system.

⚠ Caution	Assure the system of null pressure before discharging & pouring in oil.

（3） Manually rotate the compressor-motor Shaft coupling and assure its flexibility; If there is clamping stagnation, find out root cause, resolve the problem and then re-start.

（4）Shut off the Power supply, open Stop Valve and assure the system of null pressure.

⚠ Caution	Assure the compressor of no condensation water before starting the machine, and if there is condensation water inside the compressor, it will get the system contaminated. The user should accord with the local condition to determine the intervals of draining up condensation water.

⚠ Caution	If the environmental temperature below 0℃, the user should assure inside the Segregator of no ice-blocking before starting the machine, or else it may lead to serious damage; In such cold districts, the user is generally proposed to drain up the condensation water when the machine is shut off & the Segregator surface temperature does not get down to 0℃

5.3 Start up the machine

When the LCD screen displays “Normal Stop”, press button to start up the machine, and electric motor will be at Y-mode reduced-voltage starting.

⚠ Attn	1) When initial temp of electric motor is equal to ambient temp, the user can successively inching twice, before the electric motor should spontaneously & completely stop the rotation between 2 inchings. 2) When the initial temp of electric motor is equal to its rating running temp, the user should only conduct once inching.

5.4 Unloading Shut-off

While the Air compressor is in normal running, press button & the machine will automatically unload & shut off with the display of Air compressor is on delay shut-off.

⚠ Caution	While in Emergency Stop or sudden Power-supply off, much more lubricating oil may flow into the bare compressor. In order that the lubricating oil can flow out from bare compressor & the machine can normally run, the user should twice or triply inching. If the inching cannot start up the compressor, the user should manually turn the machine for alignment for some cycles till the bare compressor can easily rotate, and then restart the machine; and if it does not work, open the side lid of bare compressor, & then pour most of lubricating oil in the Oil-air Separator, and by that it will work.

5.5 Running

Once the machine is started, it will be automatically controlled by Microprocessor.

Once the electric motor gets completed the star-delta starting in the pre-set time (the star-delta starting time can be set), & then enter into the stabilized running, last 15s (the time can be set), the machine will be on the previously set loading. Then the LCD screen display “ Loading”

If the air-discharge pressure goes up over the unloading pressure value, the machine will be in automatic unloading, and the LCD screen displays “Unloading”; If the air-discharge pressure gets down below the loading pressure value, the machine will be again in automatic loading.

When the machine lasts unloading for 6 minutes, the machine will automatically shut off & be ready for automatic starting with the display of “EMPTY LONG STOP”. The machine will automatically start & run till the system pressure is lower than the loading pressure value.

5.6 RunningEmergency Stop

The machine’s control panel is equipped with Emergency Stop button. Whichever running status the machine is on, press “Emergency Stop” (with self-lock), and the machine will be shut off. While the problem is cleared off, again press Emergency Stop button to reset.

5.5 Solution for long-vacant machine

Here below are the Solutions for long-vacant machine, especially in the districts of high

temperature & humidity

5.5.1 Vacant machine for more than 3 weeks

（1） The Control board of Electric Motor & other electric parts should be preserved with the plastisol or oiled paper against the humidity

（2）Then several day later, drain up the condensation water from Oil-air separator.

5.5.2 Vacant machine for more than 2 months.

（1） Seal all the openings against the humidity & dust.

（2） Preserve the Safety valve, Electric Motor, Control board and other electric parts with plastisol or oiled paper against the humidity

（3） Then several days later, drain up the condensation water from the Oil-air separator.

（4） Notify Local Service Center to conduct the necessary anti-corrosive solution to the bare compressor.

5.5.3 Restart the machine

（1） Get rid of the plasticsol or oil paper off the machine

（2） Measure the resistance of Electric Motor, and it should be ≥6MΩ.

（3） After the long-vacancy, the lubricating oil should be replaced before the machine is started; And the user should follow the mentioned procedures of initial starting.

⚠ Caution	Handling of waste oil: Waste oil from air compressor should be disposed of in accordance with local laws and regulations.。

6 Maintenance and Trouble-shooting

6.1 Safety and Prevention

The maintainer should possess some mechanical-electrical integrated knowledge & the operational skill, and they should know about the air-compressor. Before the maintenance, the operator should carefully read the whole MANUAL.

6.1.1 The maintenance should be conducted under the conditions that the machine is off, the Cut-off valve is off, and the power supply is off.

6.1.2 Before taking down any parts (elements) with pressure or voltage, the operator must verify null pressure in the system

6.1.3 Some parts are in high temperature, when the machine just stops, so the operator should be careful to avoid the scald.

6.1.4 While the maintenance completes, the operator should assure that no tool, part or rag etc. left in the machine.

6.2 Air filter replacement & maintenance

The Operative condition determines the Maintenance cycle. The air filter should be replaced while the new machine accumulates 500-hour operation, and the sequent 2nd replacement should be the accumulative 2000-hours (Under the dust circumstance, the replacement cycle should be shorter). If the air-filter alarm indicates information, the filter should be maintained or replaced.

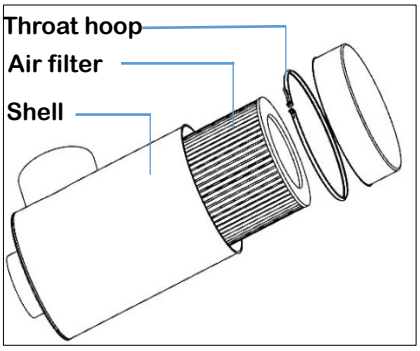


Fig.6-1

6.3 Oil filter replacement

6.3.1 The Oil filter should be replaced against the initial accumulative 500-hour operation, and then every accumulative 2000-hour operation or while the lubricant is replaced. Under the dirt circumstance, the replacement cycle should be shorter.

6.3.2 While the Oil filter alarm indicates of the serviceable time, the oil filter should be replaced. The oil filter replacement should be conducted after the machine stops & the pressure releases. In the replacement process, the oil filter should be applied with anti-clockwise rotation by spanner. The flowing-off lubricating oil should be dripped to the tray in order not to splash off to the ground, During the new Oil filter installation, do not apply the spanner, and just use the hand to tighten components & parts till they close contact. And then tighten the Filter by 1/5 turn by spanner.

6.3.3 Start the machine and check if there is any oil leakage; and if no leakage, the replacement should be well done.

6.3.4 The example of oil filter replacement is indicated as Fig. 6-2.

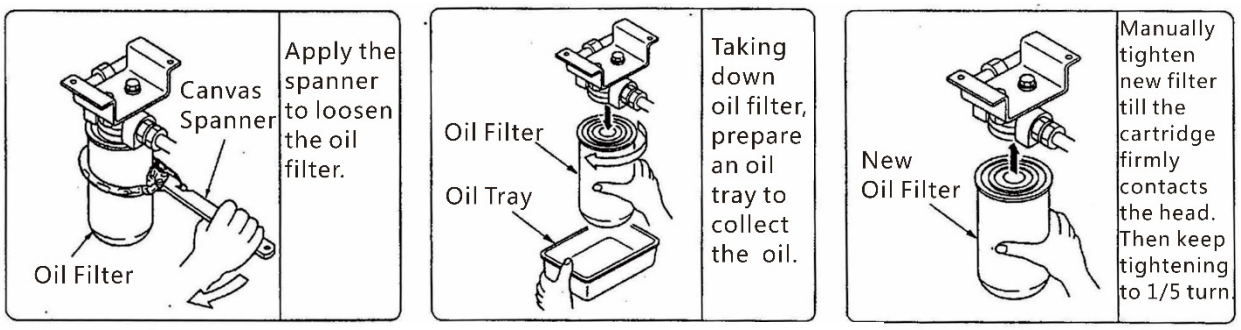


Fig6-2 Replacement Illustrative

6.4 Oil-air Separator Cartridge Replacement

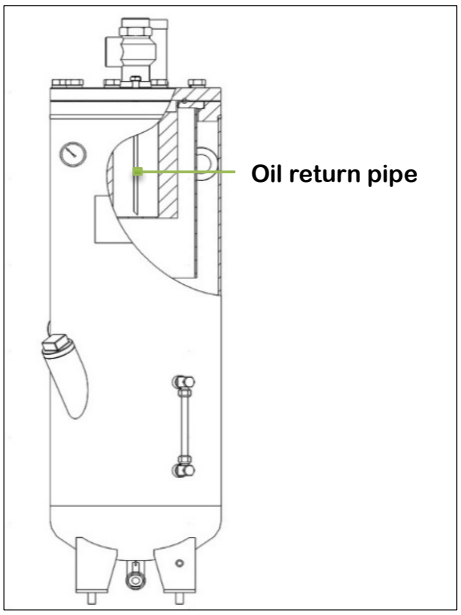


Fig.6-3 Oil-air Separator

The operative condition determines maintenance cycle. If the circumstance is poor, the Maintenance cycle will be shorter. The Oil-air Separator should be replaced with the cycle of 2500 accumulative hours, or it should be replaced while the lubricating oil is replaced. If Oil-air Separator alarm indicates information, the Cartridge should be replaced. Periodically check up the Oil-air Separator pressure & the Panel pressure (while loading), and if the pressure difference is beyond 17.4Psi or the Relief Valve is started, the Cartridge should be replaced.

The Replacement Procedures for the Oil-air Separator Cartridge as follows:

（1）While the air compressor stops, close the air outlet, and confirm null pressure in the system.

（2）Dis-assemble the pipe upside the Oil-air Separator, and detach the flange bolts at the Minimum-pressure-valve outlet.

（3）Take out the fixing bolt of the Separator upper cover.

（4）Twist off the bonnet bolts, lift the upper cover a bit and then twist off the upper cover.

（5）Detach the Oil return pipe .

（6）Take out & replace the cartridge with 2 pcs of new aluminum pads & the new cartridge.

（7）Follow the reverted detaching sequence to install the Oil-air Separator.

⚠ Attn	When installing Oil-return Pipe, the distance from the pipe to bottom, should be no more than 3 mm, otherwise it will cause excessive oil content during discharge.

⚠ Caution	There are two aluminum pads on the flange surfaces of Oil-air Separator cartridge, which is for the purpose of seal and anti-static electricity. Therefore in the replacement, the flange surface must be equipped with a metal soft pad. The violation may lead to very serious result, or even burn up the compressor.

6.5 Lubricating oil replacement

While the new machine runs of accumulative 500 hours, the Timer will alarm of the lubricating oil. Then the old lubricating oil should be replaced. The sequent 2nd replacement cycle for the lubricating oil is of another accumulative 2500 hours.

If air compressor operates in more dust or high temperature conditions, Oil replacement cycle should be shorter.

While in the oil replacement,, it's proposed also to replace the Oil filter, & the Oil-air Separator Cartridge, in order to make the system optimized.

6.5.1 Oil-replacement as follows:

（1） Check up and confirm the machine has completely stopped, and assure null pressure in the Oil-air Separator. Then cut off main circuit board, mark out and pull off the Starter power supply.

（2）Drain up the lubricating oil in the system:

a. Break off the low-point connection, and then drain the oil from pipe;

b. Drain the oil from the Oil-valve of Oil-air Separator;

c. Pour out the oil in the filter, and then reinstall the used oil filter.

（3） Add 50% new oil into the system:

a. Start the compressor and observe its operation;

b. Last 5-min operation (or till the discharge temperature is stable), and then stop the machine.

（4）Drain up the lubricating oil in air compressor.

（5） Replace with a new oil filter and Oil-air Separator Cartridge (those replacement should be synchronous with the oil replacement).

（6） Fill up the system with new oil, and then reinstall the plug in the oil inlet .

⚠ Danger	Air and oil with pressure, may cause serious injury or death. Before disassemble the valve, nut, blocking, & install the screw & filter, shut down the compressor, release all pressure in the system, cut-off the main circuit, and mark out & trip off the starter power supply.

⚠ Danger	he compressor, Oil-air Separator & all pipes in & after operation, is in high temperature.

⚠ Caution	Don’t recommend other-brand lubricating oil, and the disqualified Oil will damage the compressor.

Environmental protection	Dispose of lubricating oil in accordance with relevant national or local laws and regulations. Improper handling of lubricating oil may cause serious environmental pollution. Please take care of the global environment!

6.6 Electric-Motor Maintenance

In order that the air compressor operates well and safely, please periodically maintain the Motor. The detailed Maintenance refers to the Motor Manual.

⚠ Caution	Excessive or inadequate grease will lead to the motor damage. Do observe Motor Manual & Indicating Label on the motor, to add up the Lubricating oil or grease.

6.7 Maintenance items and maintenance cycle

Maintenance term	Operating time (h)	Maintenance List
Day		Before startup, drain up the condensing water in Oil-air Separator
		Before startup & during operating, check up the oil level
	8	Check up the Air compressor Discharge temperature.
	8	Check up the unloading & loading pressure, and check up the Oil return & oil-return immersion lens
Week		Check up the oil leakage
Three months	600	Check up the Cooler, and clean it if necessary.
	500	Clean the Air filter
	500	Check up and confirm the electric wiring tightness.
	500	In the new machine initially accumulative 500 operating hours, the Oil filter, Lubricating oil should be replaced, and the Oil cut-off Valve filter should be cleaned or the Oil cut-off valve cartridge should be replaced.
Year		Check up the Oil-gas Pipe connection
	3000	Clean the Oil cut-off Valve or replace the Oil cut-off Valve Cartridge.
		Manually check and test the Safety Valve (and submit it for annual inspection)
	2000	Replace the Air-filter Cartridge
	2000	Replace the Air collector Cartridge
	2000	Add up lubricating grease into motor
	1500-2500	Replace Oil Filter, Oil-air Separator Cartridge and Lubricating oil (synchronous replacement)
		Check up the Motor, and electric system
	2000-3000	Clean the Radiator.
	5000	Clean unloading valve, oil cut off valve

⚠ Caution	The table is only for user's reference, and the user should adjust the maintenance cycle according to the actual operating condition and working performance.

⚠ Caution	When the air-filter cartridge, oil filter, Oil-air Separator cartridge alarm blocking, they should be replaced.

7 Microprocessor control system for AG-10A

7.1Basic Operation

7.1.1 Button explanation

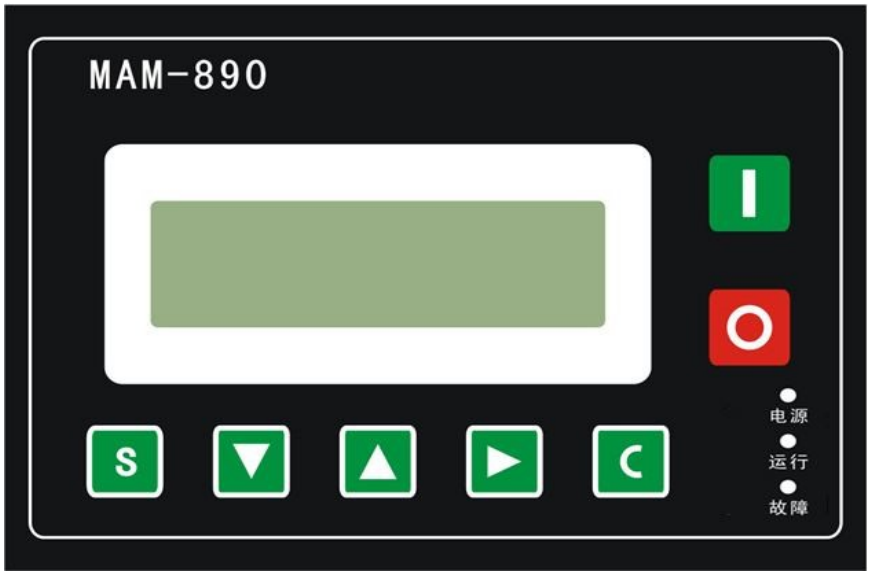


Fig. 7-1

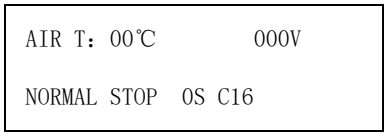
Start Button	(1)When compressor is at stop status, press this button to start the compressor. (2)When compressor is set as master (No.1) in block mode ,press this button to start the compressor and activate block mode function at the same time.
Stop Button	(1)When the compressor is at running status, press this button to stop the compressor. (2)When compressor is set as master (No.1) in block mode ,press this button to stop compressor and block mode function as well. (3)When compressor is at stop status, long press this button to display software edition.
Set Button /Loading / unloading Button	(1)When the compressor is at running status ,press this button to load, unload. (2)When the compressor is at setting mode, press this button after modification to confirm and save the modified data.
Move down button / Decreasing button	(1)When viewing the menu, press this button to move downward the cursor. (2)When modifying data, press this button to decrease the data at current position.
Move up button	(1)When viewing the menu, press this button to move upward the cursor .

/Increasing button	(2) When modifying data, press this button to increase the data at current position .
 Shift button /Enter button	(1)When modifying data, press this button to move to the next data bit; (2)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	(1)When modifying data, press this button to exist data setting mode; (2)When viewing the menu, press this button to return to previous menu; (3)When the controller is at failure stop status, long press this button to reset.

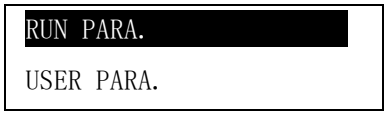
7.1.2 Status Display and Operation

The display screen will show as below after power on:

After 5 seconds, the menu will switch as below:



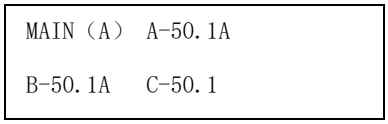
Press “  ” to enter into Selection Menu:



7.1.3 Operating Parameter and Menu

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

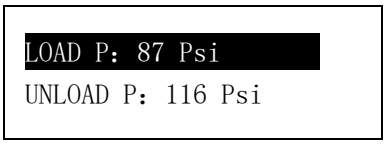
main motor current:



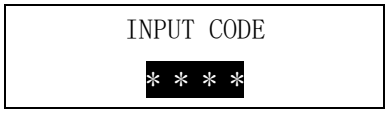
Press the key to check the fan current, total running time, total load time and other running parameters, press the return key, return to the upper menu or main interface. If the operation is stopped at an interface, the main interface is automatically returned after 60 seconds.

7.1.4 User Parameter View and Modification:

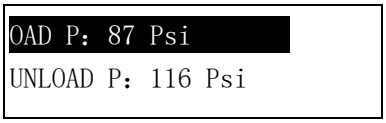
In first menu, press the “ ▼ ” and “ ▲ ” to move the cursor to the "USER PARA." item, press the “ ▶ ” to switch to the following menu:



Move the cursor to the “LOAD P” item, 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 first bit of password.Press the “ ▶ ”, 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“ S ” 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 loading pressure 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 to the target data in sequence. When finished, press

“S” to confirm and save the data. The controller prompt sends out a short voice to tip the completion of parameter set .

7.1.5 User Parameter Sheet and Function

Menu	Preset Data	Function
LOAD P.	87Psi	(1)In AUTO LOADING, 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.	116Psi	(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
FAN START T	0080℃	Fan will start if discharge air temperature is above this set data
FAN STOP T	0070℃	Fan will stop if discharge air temperature is below this set data
MASTER DELAY	0008S	Set the master start time, record time when master is activated, controller will not start overload protection during this time to avoid stopping the master by impulse starting current
FAN DELAY	0006S	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.
STAR DELAY	0006S	Time from star start to delta start.
LOAD DELAY	0002S	Unloading in this set time after enter delta running
UNLOAD DELAY	0600S	When unloading continuously, compressor will automatically stop and enter to standby status if over this set time
STOP DELAY	0010S	For NORMAL STOP operation, compressor will stop after it continuously unloading over this set time
START DELAY	0100S	Machine can be restarted only over this set time at any case(after NORMAL STOP, STANDBY or FAILURE STOP)

Menu	Preset Data	Function
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	(1)When set as the MANU: only when the pressure is above "unloading pressure", compressor will unload automatically. For any other case, the Loading/Unloading function can only be executed by pressing "loading/unloading" key. (2)When set as AUTO ,the loading/ unloading function can be executed by the fluctuation of air pressure automatically
COM MODE	PROHIBIT /COMP./BLOCK	(1)When set as PROHIBIT, the communication function is invalid. (2)When set as COMP. ,compressor function as a slave and is able to communicate with computer or DCS 3.When set as BLOCK, compressor can net control
COM ADDRESS	0001	Set the communication ADD in block mode or when communicate with monitoring center. This ADD is unique for every controller in net
BLOCK MODE	MASTER/SLAVE	(1)When service as master in BLOCK. Master controls slave, the COM ADDRESS should be No.1 (2)When service as slave in BLOCK, slave is controlled by master
TURN TIME	0099 Hours	When master pressure is between BLOCK LOAD P and BLOCK UNLOAD P, master determine slave work alternatively over this set time .
BLK NUMER	0000	Number of air compressors in block net
BLK MIN	94.3Psi	In BLOCK, one compressor will start or load when pressure is below this set data
BLK MAX	108.8Psi	In BLOCK mode, one compressor will stop or unload when pressure is above this set data
BLK DELAY	0050S	In BLOCK mode, when master sends two commands continuously, second command signal delays for this set data,
OIL FILTER	0000H	Record total running time of oil filter, if changing new oil filter, the data should be reset by manual operation.
O/A SEPARATOR	0000H	Record total running time of O/A separator. If changing new O/A separator, the data should be reset by manual operation
AIR FILTER	0000H	Record total running time of air filter .If changing new air filter, the data should be reset by manual operation

LUBE	0000H	Record total running time of lube. If changing lubricate ,the data should be reset by manual operation
GREASE	0000H	Record total running time of grease. If changing new grease, the data should be reset by manual operation
BELT	0000H	Record total running time of belt. If changing new belt, the data should be reset by manual operation
OIL FILTER	500H	(1)Alarm prompts when total running time of oil filter is above the set data . (2)Set this data to "0" to clear oil filter running time
O/A SEPARATOR	2000H	(1)Alarm prompts when total running time of O/A separator is above the set data. (2)Set this data to "0" to clear O/A separator running time
AIR FILTER	500H	(1) Alarm prompts when total running time of air filter is above the set data. (2)Set this data to "0" to clear air filter running time
LUB	500H	(1)Alarm prompts when total running time of lubricate is above the set data. (2)Set this data to "0" to clear lubricate running time.
GREASE	2000H	(1)Alarm prompts when total running time of grease is above the set data. (2)Set this data to "0" to clear grease running time
BELT	0H	(1)Alarm prompts when total running time of belt is above the set data. (2)Set this data to "0" to clear belt running time .
EN/CH	EN	(1)Set to "EN" , Display in English (2)Set to "CH" , Display in Chinese
****	****	User could modify the user password by old user password or factory password

7.2 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 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 display HIGH TEMPERATURE when controller detects the discharge air temperature higher than ALARM T set data in MANUFACTORY PARA.

7.3 Controller Protection

7.3.1 Motor Protection

MAM-880 air compressor controller provides overload, open phase, current unbalance, high voltage, low voltage protection for motor and overload protection for fan

Electronic failure	Failure Display	Reason
Overload	Display “MOTOR/FAN OVER LOAD”	Overload, bearing wear and other mechanical failure
Open phase	Display “MOTOR OPEN PHASE”	Power supply, contactor and open phase of motor
Unbalance	Display “MOTOR UNBLANCE”	Poor contact of contactor, inside open-loop of motor
High voltage	Display“ HIGH VOLTAGE”	High supply voltage
Low voltage	Display “LOW VOLTAGE”	Low supply voltage

7.3.2 Protection of Air Temperature High

When discharge air temperature is above the high limit of set temperature, the controller will send out the alarm to shut down the machine and This fault displays HIGHT T.

7.3.3 Protection of Air Compressor Non-reversing

When compressor stops and three-phases 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.

7.3.4 Protection of High Pressure

When the discharge air pressure is above the MAX LIM P, the controller will send out the alarm to shut down the machine and THIS FAULT displays HIGH P.

7.3.5 Protection of Sensor Failure

When pressure sensor or temperature sensor is disconnected, the controller will send out the alarm to shut down the machine and THIS FAULT displays **SENSOR FAULT.

7.3.6 Low Temperature Protection

When discharge air temperature is below LOW T PRO in manufacturing parameter, THIS FAULT displays P SENSOR FAULT two minutes after compressor turns on, the controller will send out the alarm to shut down the machine .

7.4 Troubleshooting

7.4.1 Due to the outage caused by the external devices of the controller, it is possible to find out the cause of the failure by querying the site failure or historical failure and eliminate the peripheral failure. After the controller fails to stop, switch to the fault content display interface.

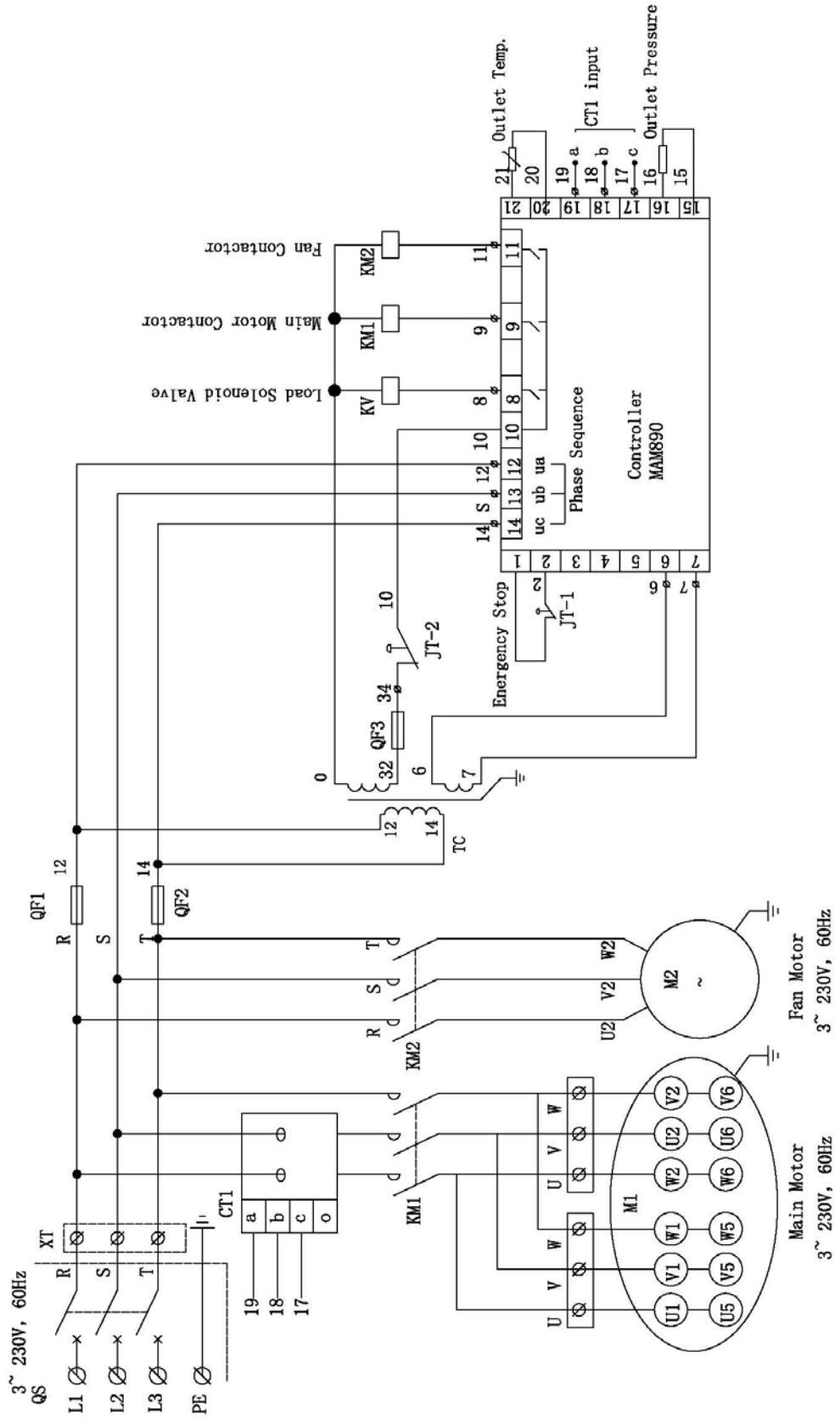
After the user resolves the fault reset controller, switch to the main interface. If the gas supply pressure sensor fails, the failure interface shows:

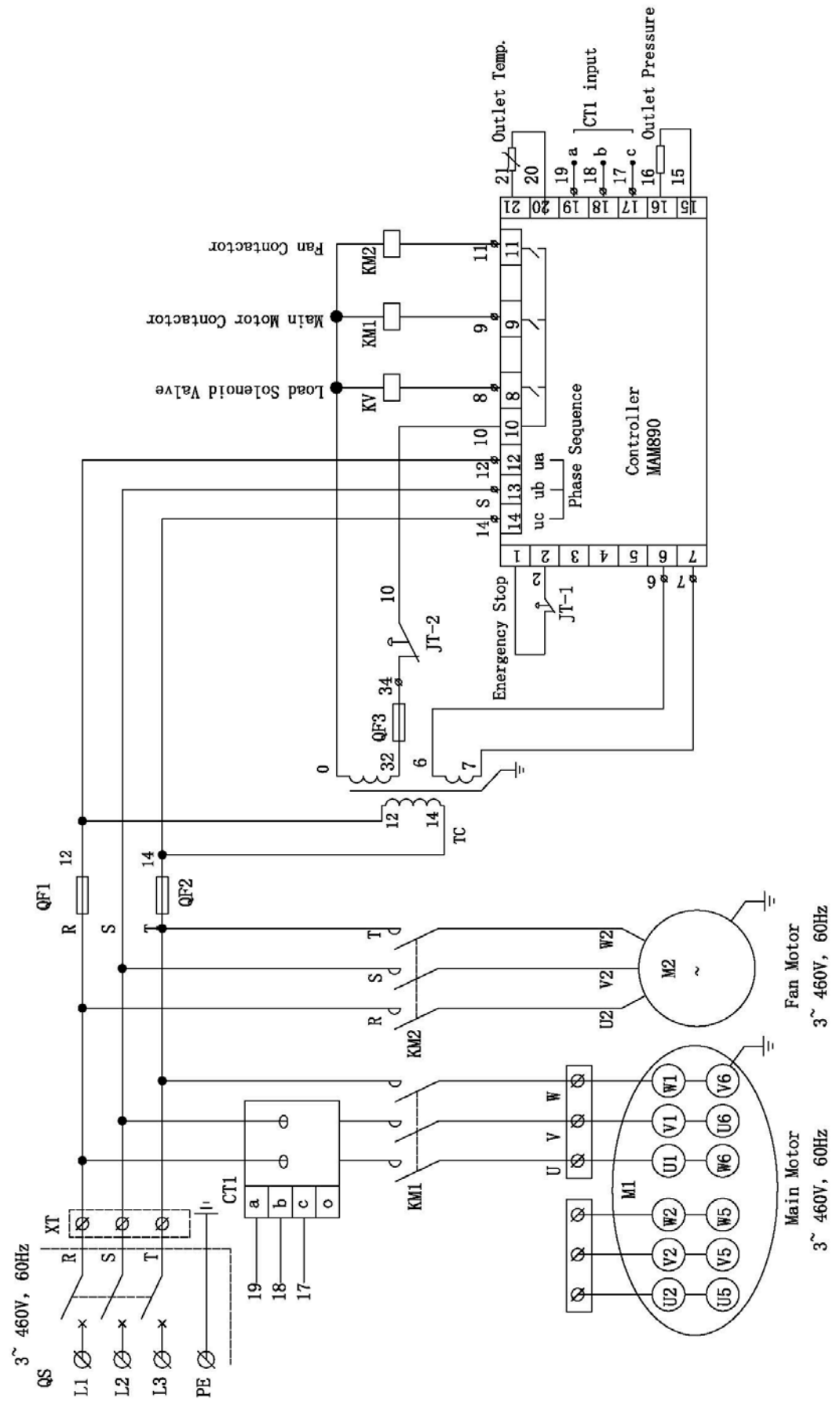
Stop Pressure sensors fail.

7.4.2 Common Failures and Causes

Failure	Reason	Solution
AIR T High	Bad vent condition, Oil shortage etc.	Check the vent condition and lubricant amount etc.
Temperature 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
Pressure Sensor Failure	Cable off, Sensor failure or the cable connect reversed	Check the wiring and pressure converter
Open Phase	Power open phase or the contactor terminal failure	Check the power and contactors
Overload	Voltage too low, tubes block, 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 failure or the internal open loop of the motor	Check the power, contactor and the motor
Wrong Phase Sequence	Reversed phase sequence or open phase	Check the wiring
Overload during start	Master start time set to less than the star delta delay time	Reset the master start time to be longer than star delta delay + 2 seconds
Main Contactor shakes frequently	The emergency button loose, controller reset by interference	Check the wiring; if the coil of contactor connect with surge absorber or not

7.5 Electric Schematic Diagram




Outlet Temp.
CT1 input
Outlet Pressure
Fan Contactor
Main Motor Contactor
Load Solenoid Valve
KM2
KM1
KV
Controller
MAM890
Phase Sequence
Energency Stop
JT-1
JT-2
QF3
TC
QF1
QF2
KM2
KM1
CT1
XT
QS
L1
L2
L3
PE
3~ 460V, 60Hz
M2
Fan Motor
3~ 460V, 60Hz
M1
Main Motor
3~ 460V, 60Hz

8 Microprocessor control system for AG-15A,AG-20G

8.1 Basic Operation

8.1.1 Button explanation

Fig. 7-2

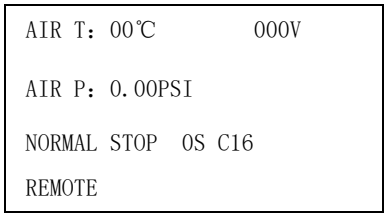
Start Button	(1)When compressor is at stop status, press this button to start the compressor. (2)When compressor is set as master (No.1) in block mode ,press this button to start the compressor and activate block mode function at the same time.
Stop Button	(1)When the compressor is at running status, press this button to stop the compressor. (2)When compressor is set as master (No.1) in block mode ,press this button to stop compressor and block mode function as well. (3)When compressor is at stop status, long press this button to display software edition.
Set Button /Loading / unloading Button	(1)When the compressor is at running status ,press this button to load, unload. (2)When the compressor is at setting mode, press this button after modification to confirm and save the modified data.
Move down button / Decreasing button	(1)When viewing the menu, press this button to move downward the cursor. (2)When modifying data, press this button to decrease the data at current position.
Move up button /Increasing button	(1)When viewing the menu, press this button to move upward the cursor . (2) When modifying data, press this button to increase the data at

	current position .
 Shift button /Enter button	(1)When modifying data, press this button to move to the next data bit; (2)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	(1)When modifying data, press this button to exist data setting mode; (2)When viewing the menu, press this button to return to previous menu; (3)When the controller is at failure stop status, long press this button to reset.

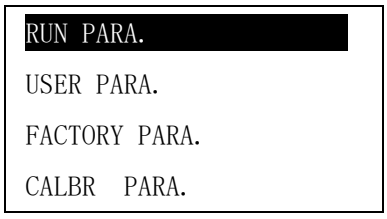
8.1.2 Status Display and Operation

The display screen will show as below after power on:

After 5 seconds, the menu will switch as below:

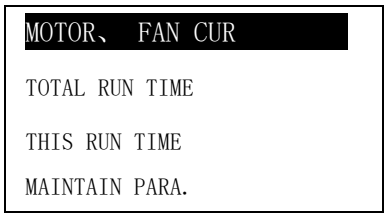


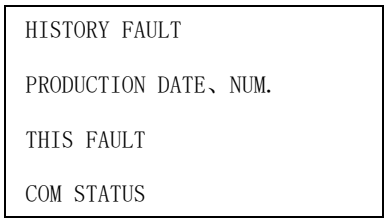
Press “  ” to enter into Selection Menu:



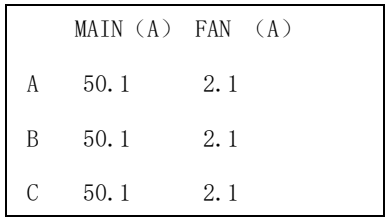
8.1.3 Operating Parameter and Menu

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





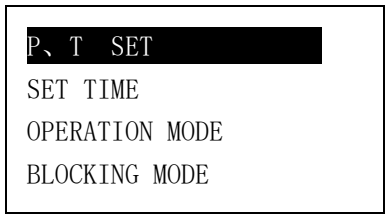
Move the cursor to the corresponding menu item, press "  **" to check the specific parameter. Such as viewing "MOTER FAN CUR ", move the cursor to the " MOTER FAN CUR " menu item, press the "**  **", switch to the item of motor , fan data .**

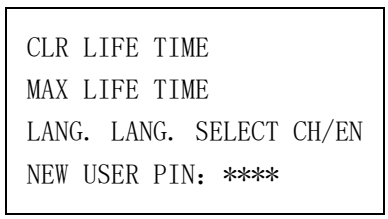


Press the "  **" to return to the previous menu or the main menu. If no operation at the current menu for 120 Seconds , controller will automatically return to the main menu and turn off the backlight simultaneously.**

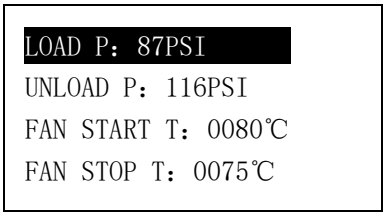
8.1.4 User Parameter View and Modification:

In first menu, press the "  **" and "**  **" to move the cursor to the "USER PARA." item, press the "**  **" to switch to the following menu:**

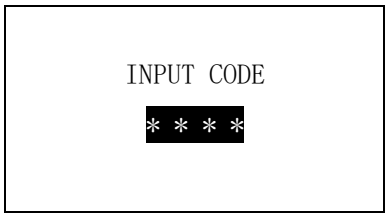




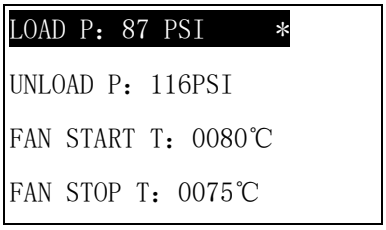
Move the cursor to the "P、T SET " item, then press “ ” to switch to the following menu:



Move the cursor to the “LOAD P” item, 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 first bit of password.Press the “ ”, 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 loading pressure 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 to 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 .

8.1.5User Parameter Sheet and Function

First menu	Second menu	Preset Data	Function
SET P. T.	LOAD P.	87PSI	(1)In AUTO LOADING, 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.	116PSI	(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
	FAN START T	0080℃	Fan will start if discharge air temperature is above this set data
	FAN STOP T	0070℃	Fan will stop if discharge air temperature is below this set data
TIME SET	MASTER DELAY	0008S	Set the master start time, record time when master is activated, controller will not start overload protection during this time to avoid stopping the master by impulse starting current
	FAN DELAY	0006S	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.
	STAR DELAY	0006S	Time from star start to delta start.
	LOAD DELAY	0002S	Unloading in this set time after enter delta running
	UNLOAD DELAY	0600S	When unloading continuously, compressor will automatically stop and enter to standby status if over this set time
	STOP DELAY	0010S	For NORMAL STOP operation, compressor will stop after it continuously unloading over this set time
	START DELAY	0100S	Machine can be restarted only over this set time at any case(after NORMAL STOP, STANDBY or FAILURE STOP)

First menu	Second menu	Preset Data	Function

OPERATION MODE PRESET	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	(1)When set as the MANU: only when the pressure is above "unloading pressure", compressor will unload automatically. For any other case, the Loading/Unloading function can only be executed by pressing "loading/unloading" key. (2)When set as AUTO ,the loading/ unloading function can be executed by the fluctuation of air pressure automatically
	COM MODE	PROHIBIT /COMP./BLOCK	(1)When set as PROHIBIT, the communication function is invalid. (2)When set as COMP. ,compressor function as a slave and is able to communicate with computer or DCS 3.When set as BLOCK, compressor can net control
	COM ADDRESS	0001	Set the communication ADD in block mode or when communicate with monitoring center. This ADD is unique for every controller in net
BLOCKING MODE SETTING	BLOCK MODE	MASTER/SLAVE	(1)When service as master in BLOCK. Master controls slave, the COM ADDRESS should be No.1 (2)When service as slave in BLOCK, slave is controlled by master
	TURN TIME	0099 Hours	When master pressure is between BLOCK LOAD P and BLOCK UNLOAD P, master determine slave work alternatively over this set time .
	BLK NUMER	0000	Number of air compressors in block net
	BLK MIN	00.00PSI	In BLOCK, one compressor will start or load when pressure is below this set data
	BLK MAX	00.00PSI	In BLOCK mode, one compressor will stop or unload when pressure is above this set data
	BLK DELAY	0050S	In BLOCK mode, when master sends two commands continuously, second command signal delays for this set data,
CLR LIFE TIME	OIL FILTER	0000H	Record total running time of oil filter, if changing new oil filter, the data should be reset by manual operation.

	O/A SEPARATOR	0000H	Record total running time of O/A separator. If changing new O/A separator, the data should be reset by manual operation
	AIR FILTER	0000H	Record total running time of air filter .If changing new air filter, the data should be reset by manual operation
	LUBE	0000H	Record total running time of lube. If changing lubricate ,the data should be reset by manual operation
	GREASE	0000H	Record total running time of grease. If changing new grease, the data should be reset by manual operation
	BELT	0000H	Record total running time of belt. If changing new belt, the data should be reset by manual operation
MAX LIFE TIME RESET	OIL FILTER	500H	(1)Alarm prompts when total running time of oil filter is above the set data . (2)Set this data to “0” to clear oil filter running time
	O/A SEPARATOR	2000H	(1)Alarm prompts when total running time of O/A separator is above the set data. (2)Set this data to “0” to clear O/A separator running time
	AIR FILTER	500H	(1) Alarm prompts when total running time of air filter is above the set data. (2)Set this data to “0” to clear air filter running time
	LUB	500H	(1)Alarm prompts when total running time of lubricate is above the set data. (2)Set this data to “0” to clear lubricate running time.
	GREASE	2000H	(1)Alarm prompts when total running time of grease is above the set data. (2)Set this data to “0” to clear grease running time
	BELT	0H	(1)Alarm prompts when total running time of belt is above the set data. (2)Set this data to “0” to clear belt running time .
LANG.SEL	EN/CH	EN	(1)Set to “EN” , Display in English (2)Set to “CH” , Display in Chinese
NEW USER PIN	****	****	User could modify the user password by old user password or factory password

8.2 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 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 display HIGH TEMPERATURE when controller detects the discharge air temperature higher than ALARM T set data in MANUFACTORY PARA.

8.3 Controller Protection

8.3.1 Motor Protection

MAM-880 air compressor controller provides overload, open phase, current unbalance, high voltage, low voltage protection for motor and overload protection for fan

Electronic failure	Failure Display	Reason
Overload	Display “MOTOR/FAN OVER LOAD”	Overload, bearing wear and other mechanical failure
Open phase	Display “MOTOR OPEN PHASE”	Power supply, contactor and open phase of motor
Unbalance	Display “MOTOR UNBLANCE”	Poor contact of contactor, inside open-loop of motor
High voltage	Display“ HIGH VOLTAGE”	High supply voltage
Low voltage	Display “LOW VOLTAGE”	Low supply voltage

8.3.2 Protection of Air Temperature High

When discharge air temperature is above the high limit of set temperature, the controller will send out the alarm to shut down the machine and This fault displays HIGHT T.

8.3.3 Protection of Air Compressor Non-reversing

When compressor stops and three-phases 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.

8.3.4 Protection of High Pressure

When the discharge air pressure is above the MAX LIM P, the controller will send out the alarm to shut down the machine and THIS FAULT displays HIGH P.

8.3.5 Protection of Sensor Failure

When pressure sensor or temperature sensor is disconnected, the controller will send out the alarm to shut down the machine and THIS FAULT displays **SENSOR FAULT.

8.3.6 Low Temperature Protection

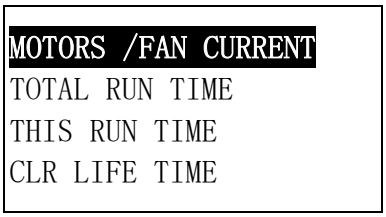
When discharge air temperature is below LOW T PRO in manufacturing parameter, THIS FAULT displays P SENSOR FAULT two minutes after compressor turns on, the controller will send out the alarm to shut down the machine .

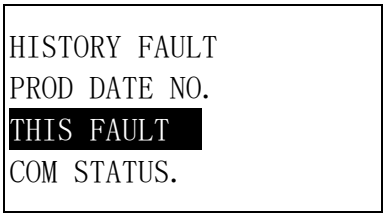
8.4 Troubleshooting

8.4.1 This Fault Review

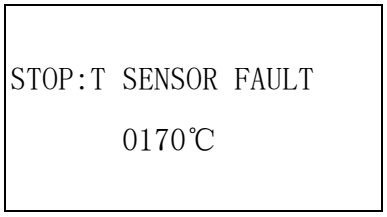
Failure stop caused by the external parts of controllers may be removed by checking THIS FAULT or HISTORY FAULT , method is shown as below:

Press "  "to move the cursor to "RUN PARAMETER" menu, then press "  " , the secondary menu would be prompted out:





Move cursor to THIS FAULT press "  " to switch to the following menu:

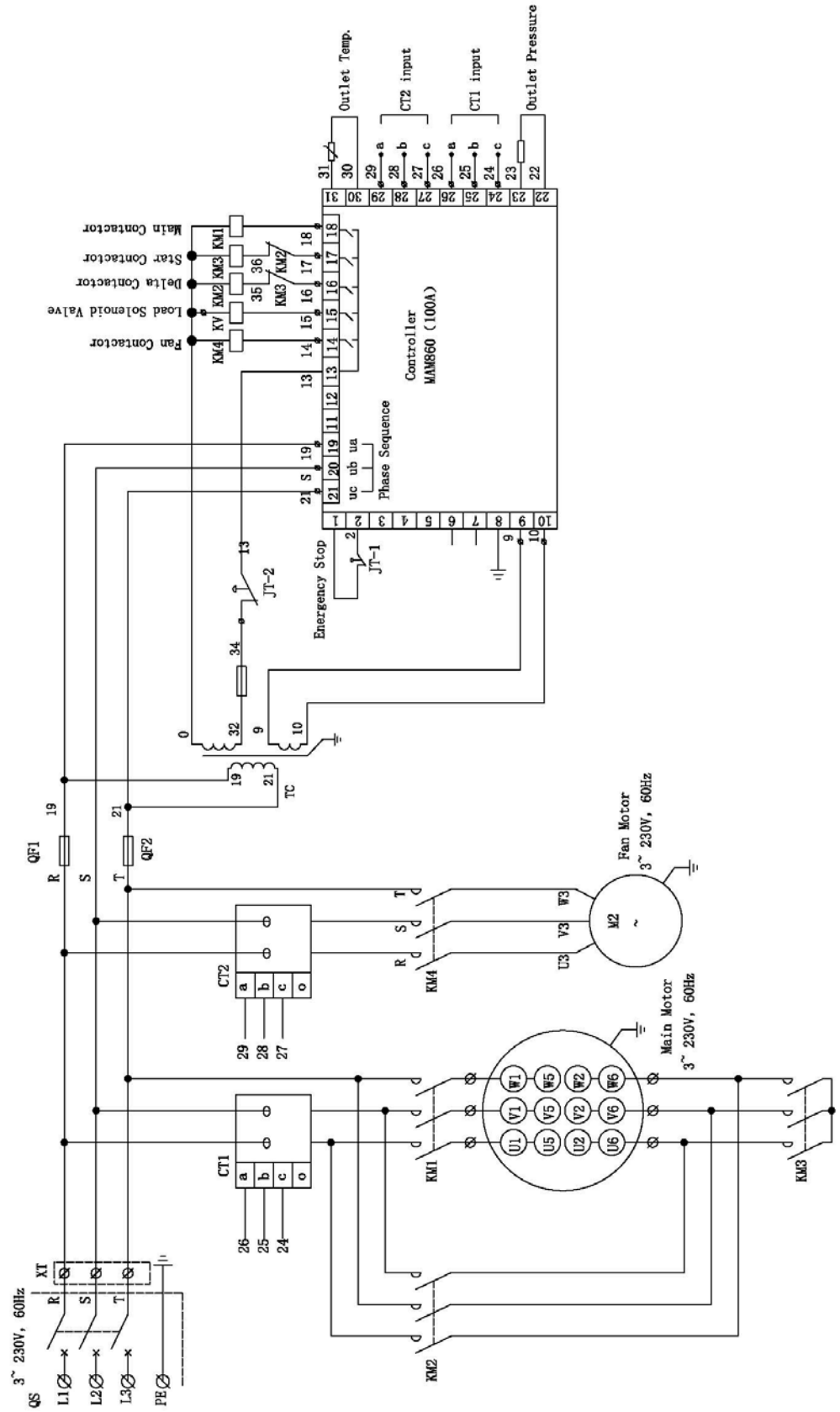


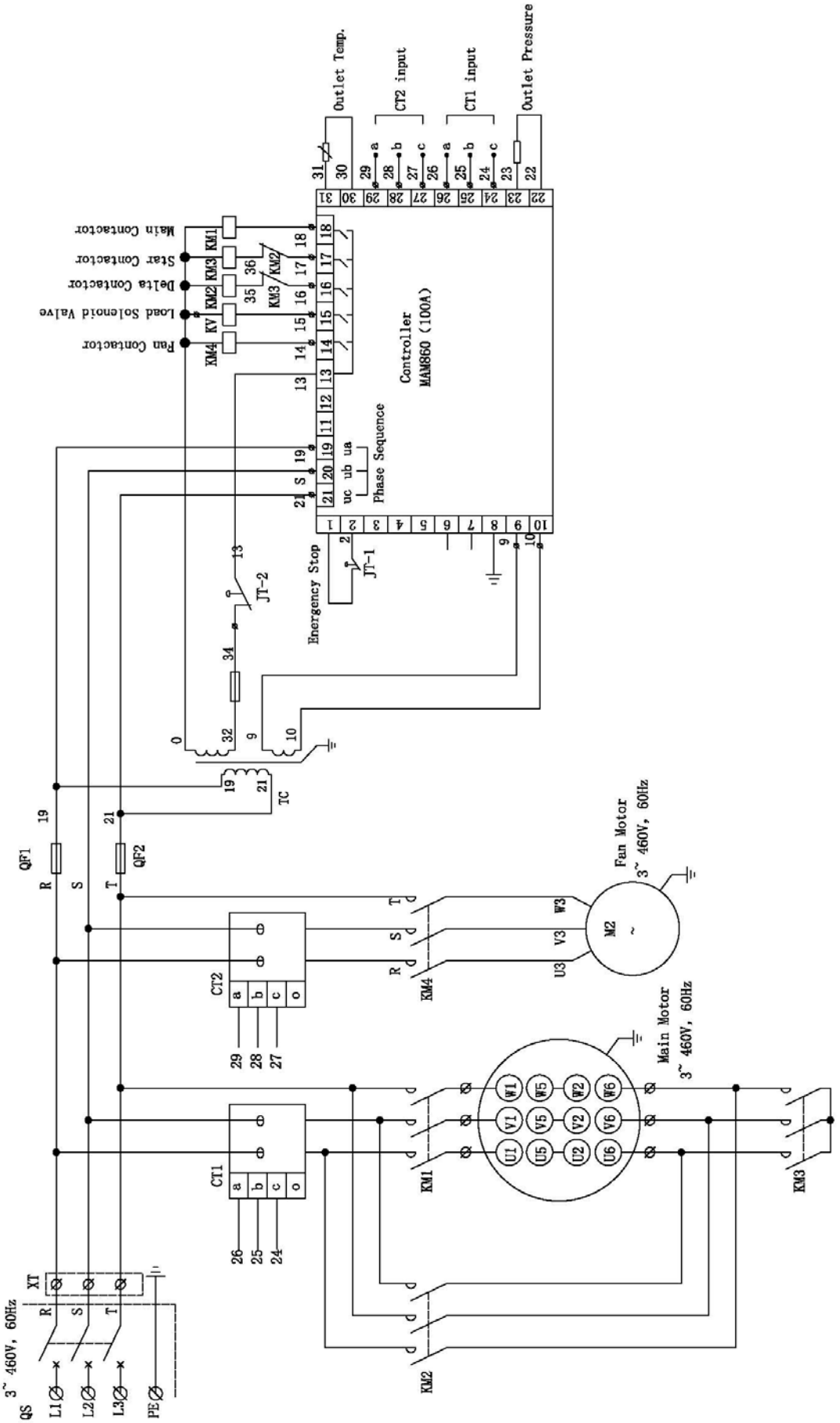
User can reset the error according to the following information.

8.4.2 Common Failures and Causes

Failure	Reason	Solution
AIR T High	Bad vent condition, Oil shortage etc.	Check the vent condition and lubricant amount etc.
Temperature 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
Pressure Sensor Failure	Cable off, Sensor failure or the cable connect reversed	Check the wiring and pressure converter
Open Phase	Power open phase or the contactor terminal failure	Check the power and contactors
Overload	Voltage too low, tubes block, 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 failure or the internal open loop of the motor	Check the power, contactor and the motor
Wrong Phase Sequence	Reversed phase sequence or open phase	Check the wiring
Overload during start	Master start time set to less than the star delta delay time	Reset the master start time to be longer than star delta delay + 2 seconds
Main Contactor shakes frequently	The emergency button loose, controller reset by interference	Check the wiring; if the coil of contactor connect with surge absorber or not

8.5 Electric Schematic Diagram




Outlet Temp.
CT2 input
CT1 input
Outlet Pressure
Main Contactor
Star Contactor
Delta Contactor
Load Solenoid Valve
Fan Contactor
Controller
MAM860 (100A)
Phase Sequence
Energency Stop
JT-1
JT-2
TC
QF1
QF2
CT2
CT1
Fan Motor
3~ 460V, 60Hz
Main Motor
3~ 460V, 60Hz
KM1
KM2
KM3
KM4
XT
QS
3~ 460V, 60Hz
L1
L2
L3
PE

9 Trouble-shooting List

Trouble	Cause	Shooting Action
1. Non-be started	(1)Miniature circuit breaker trips out (2)Power supply phase sequence reversely contact (3)Operation button poorly contacts (4)Emergency Stop button not reset (5)Motor malfunction (6)Electric Wiring loose (7)Remote contact false contact (8)Bare compressor malfunction	(1)Check up the return circuit and switch in (2)Reset the Phase sequence (3)Check up and then replace. (4) Reset the button (5)Check up and then servcing (6)Check up and then re-connect (7)Replace switch or jumper wire (8)Manually rotate the Bare compressor, and if not successfully, turn to GANEY service center for help
2. Operating current too high, & miniature circuit breaker trip out frequently	(1)Discharge pressure too high (2)Lubricating oil spec incorrect (3)Oil-air Separator cartridge block (4)Power supply voltage abnormity (5)Ambient fierce shock & vibration (6)Bare compressor malfunction (7)Circuit junctions poorly contact (8)Solenoid valve circuit open while loading (9)Current transformer incorrect sets	(1)Check up the pressure gauge, and regulate the pressure set-value (2)Check up Oil spec, and replace (3)Replace the Cartridge (4)Regulate Power supply system (5)Far from vibration source or vibration-absorbing measure. (6)Manually rotate Bare compressor, and if not successfully, turn to service center for help (7)Check up and maintain (8) Replace the solenoid coil (9)Follow the Rating value to reset
3. Discharge temperature always too high	(1) Lubricating oil insufficient (2)Cooling water insufficient (3)Ambient temperature high (4)Dust-filter blocked (5)Lubricating oil spec incorrect (6)Oil filter block (7)Oil cut-off valve malfunction (8)Fan motor malfunction (9)Thermocouple sensor wiring loose (10)Oil cooler blocked	(1)Check up the oil-level gauge, the pointer should be in green area (2)Check up inlet & outlet pipe temperature, and increase the cooling water flow. (3)Check up the room ventilation, and strength the airflow (4) cleaning & dust abatement (5) Check up Oil spec, and replace (6)Replace oil filter (7)Replace the valve (8)Check up or replace fan motor (9)Check up & replace accordingly (10)Servcing the oil cooler
4. While machine stops, a large of oil spray or oil overflow from air filter	(1)Oil cut-off valve leakage (2)Discharge check-valve leakage (3)Suction check-valve leakage (4) Unloading valve inadequate shut	(1)Servcing and replace (2)Servcing and replace (3)Servcing and replace (4) Servcing

Next>>

Trouble	Cause	Shooting Action
5.In low pressure, the machine cannot be normally loaded	(1)The loading pressure incorrect (2)Controlling pipe blocked (3)Pressure-vent valve pipe blocked (4)Pressure-control switch incorrect setting or malfunction (5)Unloading valve false operates (6)Control pipe serious leakage (7)Minimum-pressure valve false operates	(1)Adjust the pressure value (2)Clean the Pipe (3)Regulate the discharge flow rate (4)Check up, regulate or replace with a new switch (5)Disassemble clean, and then fill in lubricating grease (6)Check up the leakage point and lock (7)Check up, regulate, and replace with a new valve
6.While in high pressure, the machine cannot automatically operate the unloading, or output excess pressure	(1)Unloading pressure incorrect set (2)Unloading valve false operates (3)Control pipes blocked (4)Pressure-vent valve pipe malfunction (5)Seal washer under unloading valve gets damaged (6)The diameter of the Outside pipe is small	(1)Regulate the pressure value (2)Disassemble, clean and fill in lubricant grease (3)Clean the pipe (4)Regulate the flow rate (5)Replace the washer (6) Apply the larger-diameter pipes
7. Large Oil exhaustion	(1)Oil content in the compressed air is high (2)Apparatus and pad has oil leakage	(1)Refer to following “high oil content” (2)Lock in, or replace the defects
8. High Oil contents in the Compressed air	(1)Excessive oil in Oil-air Separator (2) Oil returning-pipe blocked, damaged, or loose (3)Oil-air Separator cartridge cracked (4)Assembly loose (5)Min. pressure valve does not work (6)Operate in high air-discharge temperature (7) Incorrect oil	(1)Drain up the surplus oil (2)Clean oil-return immersion lens and replace the damaged pipe (3)Replace with a new cartridge (4)Tighten all apparatus and pads (5)Clean or replace (6)Lower discharge temperature (7)Apply exclusive Lubricant for air compressor
9.The system air displacement is lower than normal value	(1)Air filter cartridge blocked (2)Suction valve false operates (3)Oil-air Separator Cartridge blocked (4)Pressure control incorrect set (5)Air-collector control block, safety valve or other pipe leakage (6)Bare compressor malfunction (7)min pressure valve malfunction	(1)Clean or replace (2)Disassemble, clean, fill in lubricating grease (3)Check up and replace (4)Regulate the setting (5)Check up and Maintain (6)Manually rotate Bare compressor, and if not successfully, turn to service center for help (7)Check up and maintain
10.Frequent conversion of load-unload	(1)Pipe leakage (2)Pressure differential for loading and unloading set too small (3)Air exhaustion not stable	(1)Check up the leaking point and lock in (2)Reset value (general pressure differential is no less than 0.1Mpa) (3)Larger the tankage of air tank