USER MANUAL

For Dry Type Oil Free Air Compressor Series

www.sollant.com

Contents

1. Safety Precautions

Please carefully read though the manual and follow the instructions during the operation before using SOLLANT air compressor, to avoid hazardous events and prevent machines being damaged.

1.1 General Precautions

The carrying, installation, running, operation, maintenance and inspection of the equipment must be performed by well-trained person.

(1) If the user changes the equipment on their own and result in personal injury and equipment failure or damage, which is outside the scope of the company's quality assurance, we are not liable for it.

(2) Please strictly comply with the safety regulations of local governments and field operations standard when installing "SLTOF" series air compressors. For the occasions of breathing or food processing and so on, that directly or indirectly into the body, you must set the appropriate filters and dryer after the compressor, the compressed air can not be used directly inhaled breathing machine.

(3) This machine is an air compressor, not available for compressing flammable gas, toxic gas, and corrosive gas.

(4) Once an emergency occurs, shut down immediately to prevent personal injury and machine damage.

(5) When the compressor stopped, close the shut-off valve on exhaust pipe and discharge water. Please read the page on a long shutdown instructions when it is long-term shutdown,.

(6) Strictly comply with the limit values specified in the manual and always remain within the limit values while using, don’t arbitrarily change. In addition, to prevent failure, proper inspection, maintenance is necessary.

1.2 Electrical Safety

(1) Once the air compressor power up, it will be very dangerous, only qualified electricians and electrical engineers are allowed to perform the installation.. The operators shall perform the safety operations strictly in accordance with the operation way specified in this manual under national regulations and safety code.

(2) Do not open the door when power on because of the electrical shock hazzard.

(3) Users and installation engineer shall provide ground wire connection and install protective circuit for compressor units under national electrical standards.

(4) Each compressor shall be installed with an exclusive breaker, which shall comply with the correspondent NFB capacity. For detailed information,please find in the instructions of Chapter

3.7.

(5) Make sure the power is turned off before any maintenance to avoid accidents. There shall be a warning label saying “No switching on” hanging on the power switch.

1.3 Driving Components

(1) Do not open soundproof enclosure before the air compressor complete shutting down.

(2) Do not dismount the model until the motor and fan are stopped, and make sure power is totally shut off.

(3) Do not wear excessive loose clothes during maintenance to avoid accidents.

1.4 Key Points of High Temperature and High Pressure

(1) Air compressor might contain high pressured fluid inside the components or pipelines, make sure the fluid is completely out of the machine before dismounting. Do not point the high pressured fluid to any person for avoiding any injury.

(2) The compressed air provided by the air compressor is only for industrial purpose. Do not breathe the compressed air under any circumstances, otherwise, it may cause bodily injury, disease or death.

2. Inspection and Handling

Please carefully read this chapter to ensure the rights of the customers. Handling shall be implemented as the manner mentioned in section 2.4 to avoid accidents and damage to the unit.

2.1 Product Warranty of Compressors

SOLLANT Screw Air Compressors are all conducted under the strict quality management and performance test before delivery. The warranty period of the compressor shall be 18 months from the date of production of the compressor or 12 months from the date of formal commissioning of the compressor, except special noted (according to the terms of the product warranties). During the product warranty period, any quality issue and damage caused by manufacturing reasons, SOLLANT will provide free service for the products after confirmation. Any other incontrollable factors such as delivering, striking, natural disasters and wars etc., or the machine is not maintaining accordingly to the instructions, or not using SOLLANT original consumables and lubrication oil, or using random service man not from or appointed by SOLLANT, warranty will not cover these faults.

To all of our clients, during the operation, if the issues occur, please contact SOLLANT directly or our appointed service agency for help. Do not troubleshoot by yourself without any instruction, which may make the machine more damaged.

2.2 Check of Specifications and Model

Please check whether the nameplate specifications (see Fig. 2.1) of this air compressor conform to the requirements of your order.

OIL FREE AIR COMPRESSOR

Product Model	:	Product ID :		
Serial Number	:			
Max. Working Pressure	:	bar	psi	MPa
Free Air Delivery	:	m³/min	cfm	l/s
Motor Power	:	kW	hp	
Voltage	:	V	Ph	Hz
Dimensions	:	* *	mm	
Weight	:	kg		
Date of Manufacture	:	/ 20		
Manufacturer	:.Shanghai Sollant Energy Saving Technology Co., Ltd.			

SOLLANT Group CE Sollant manufacturer and exporter

Fig. 2.1

Note:

Model: prepared as per SOLLANT's in-plant model

Model specifications: prepared as per national standard JB/T2589-86

2.3 Inspection of Accessories and Appearance

Please check whether spare and accessory parts are all ready after receiving the air compressor. If there is any quality problem, please contact us immediately. All SOLLANT air compressors shall be attached with the followings:

(1)One copy of operation manual;

(2)One copy of Warranty;

(3)Two keys to the door.

2.4 Handling Precautions

Please choose proper forklift or crane for handling based on the weight of the air compressor. Please do not stand below the air compressor and keep at a safe distance as far as possible during hoisting.

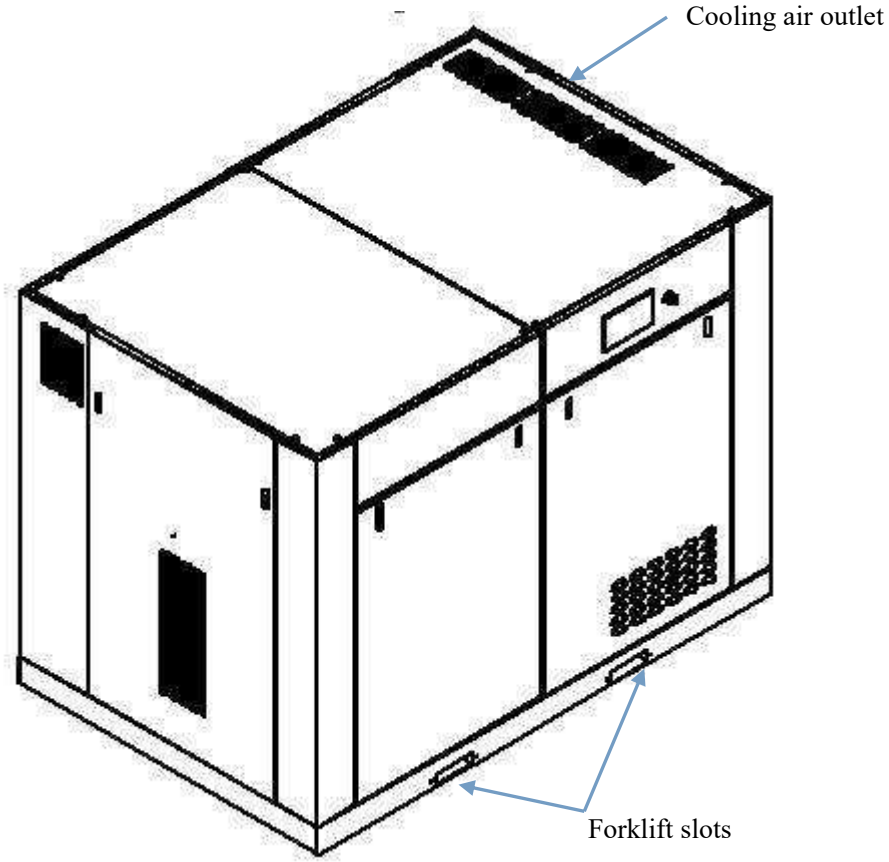


Fig. 2.2

Notice: it is not allowed to place any items on the cooler over the metal plate, and the cooler shall not be covered to avoid tripping from high temperature of the unit.

This series of SOLLANT Compressor all adopt direct coupling driven method. Installing form of motor is B35, which utilize flexible coupling to transmit power and movement, enhance the rolling torque, and ensure the compensation of relative displacement of the two bearings. The run-out tolerance, which is about the motor flange seam allowance to motor spindle radial circular and the motor flange fitting surface to motor spindle end round face, are listed in the table 2.1 as follow. When the ambient temperature is 45℃, the maximum temperature of the motor's front cover should be ≦95℃.

Diameter of Flange seam allowance(mm)	Circular run-out tolerance(mm)
60~95	0.0800
>95~230	0.1000
>230~450	0.1250
>450~680	0.1600

Fig. 2.1

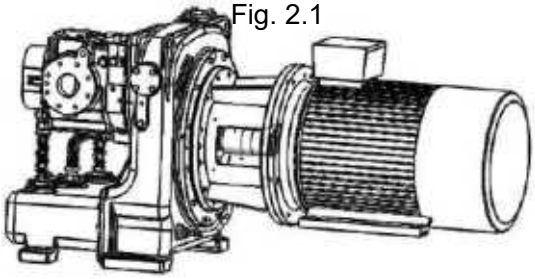


Fig. 2.3

3. Installation

Please carefully read this chapter before installation to ensure the proper installation and reliable operation of the air compressor.

3.1 Environment Requirements

(1) The air compressor shall be installed indoors where it is well ventilated and lit other than the places with high dust, high humidity, etchant gas, metallic dust, direct radiation of sunlight or direct rainwater.;

(2) The range of ambient temperature is 2℃~45℃.

(3) The air compressor shall be kept away from boilers and equipment which may emit heat, and shall be equipped with awnings with favorable ventilation environment while being installed outdoors.

(4) The ventilating fans around and over the air compressor shall set apart at least 900 mm maintenance space (see Fig. 3.1).

(5) The altitude shall be less than 1000 m.

(6) The relative humidity shall be less than 85%.

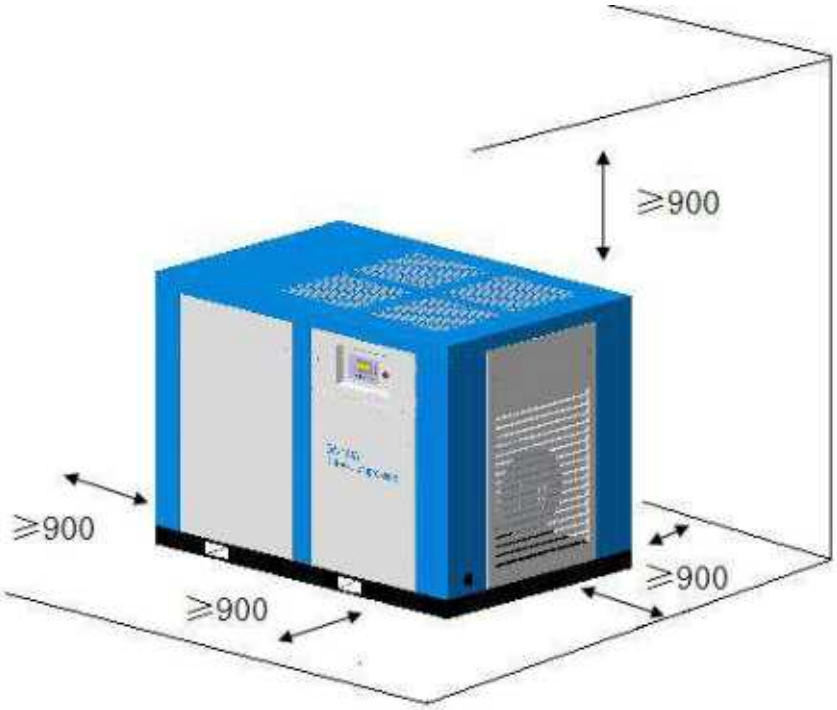


Fig. 3.1

3.2 Installation Location Requirements

Screw air compressor can be installed on any smooth and horizontal floor which may sustain the weight of the air compressor. There is no need for any special foundation. The air compressor shall be fixed

with foundation bolts and rubber blanket to reduce the vibration while being installed on the steel frame, ships or vehicles.

3.3 Ventilation and Cooling Requirements

No matter the air compressor is installed indoors or outdoors, good ventilation shall be ensureed to avoid heat short cycle or interaction effect from heat extraction of the machines, so the locations of vent pipes, ventilating fans and compressors must be considered (there are typically three ways, see Fig. 3.1)

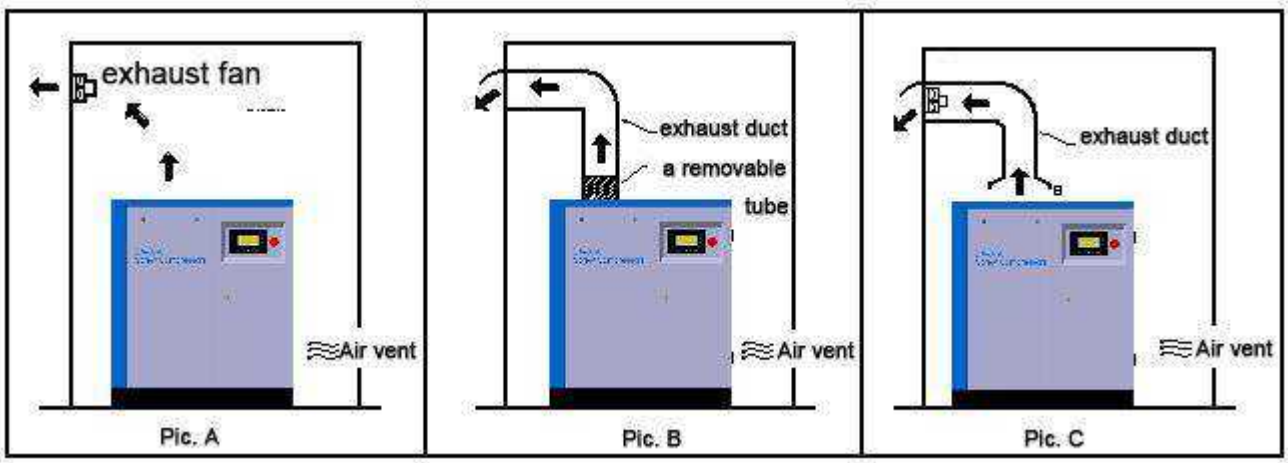


Fig. 3.2

Note:

(1) Pic. A: When there is no request for exhaust duct, refer to Table 3.1 Ventilation Rate (1) for the recommended exhaust air rate, and please install the ventilating fans as high as possible.

(2) Pic. B: While using exhaust duct without the ventilating fans, the exhaust air rate of the compressor and the pressure loss in the exhaust duct shall be calculated. When the pressure loss is less than 20Pa, there is no need to install ventilating fans and the dismountable exhaust air hose shall be directly installed at the air outlet of the compressor. (It is recommended that customers should use the ventilation design of Fig. A and Fig. C best).

(3) Pic. C: When the pressure loss in the exhaust duct is higher than 20Pa, ventilating fans shall be installed additionally. Please refer to Table 3.1 Ventilation Rate (2) for the recommended exhaust air rate of ventilating fans. Pay note the pressure loss in the exhaust duct and exhaust temperature increasing while choosing ventilating fans.

3.4 Warning

The compressed air and electricity are dangerous.

Prior to any operation on the air compressor, it shall be ensured that:

1.The power has been cut off with the switch locked and the notice plate hung;

2.All the pressure within the entire air compressor system shall be relieved.

(1) It is prohibited to dismount all kinds of caps and mounting or dismounting any joint or device while the air compressor is running since the high temperature fluid and the compressed air in the air compressor may cause severe personal injury and even death.

(2) It will bring high-voltage danger in the electric cabinet when starting up the motor of the air compressor, therefore all installations shall be implemented in accordance with the accepted laws and regulations. It shall be ensured that the system voltage can be cut off by disconnecting the switch manually and the no-fuse switch shall be installed on the power supply line leaded to the air compressor before running the electrical system. The person responsible for equipment installation shall provide proper found connection, maintenance space and lightning arrester for all electrical parts.

(3) The air compressor cannot be operated under the exhaust pressure which is greater than that specified by the nameplate of the air compressor, otherwise the motor will overload which may cause the tripping of the motor.

(4) The air compressor and auxiliary equipment shall only be cleaned with safe cleanser.

(5) The manual stop valve (separate-type) shall be installed in the exhaust pipeline. If the safety valve is installed between the stop valve and the air compressor, the safety valve shall have adequate capacity to release the maximum continuous air flow of the air compressor.

(6) Once any pressure is released through the safety valve due to over-high pressure in the system, the reason shall be promptly found out.

(7) The air tank of post treatment equipment of the air compressor shall be installed and maintained in accordance with the regulations of Monitoring Specification for Pressure Vessel issued by Ministry of Labor of the People's Republic of China.

(8) The indication stickers on the control panel and this operation manual shall be carefully read according to each standard before starting up the air compressor.

(9) Various cover plates and casings shall be re-installed after completing daily maintenance.

(10) Notice: when the shield plate of the unit is open, the air compressor shall not be started up.

Warning 

No taking the above mentioned safety advice may cause mechanical faults, property damages, serious personal injuries and even death. Any intake and exhaust pipe connected to the inlet/outlet connections must take vibration, pulse, temperature, maximum pressure, resistance to corrosion and chemical resistance into concern.

3.5 Suggestions for Pipeline

3.5.1 Pipeline

The first stage water outlet and the second stage water outlet outside of the compressor should be connected with suitable size of pipe.

Key point: The drainage device shall be inclined downward in order to work normally.

Notice:

(1) A length of drain pipe (transparent hose) shall be placed in the drain pipeline for easily inspecting the operation of the automatic drain valve.

(2) The drainage site should be at least 5 meters away from the compressor unit.

(3) The drain-pipe should be connected separately from other pipes of other machines.

Key point: The diameter of the exhaust pipeline shall be kept at least as big as that of exhaust connection pipeline in the casing of the air compressor. All pipelines and joints shall apply to the maximum operating temperature of the unit, and the nominal pressure shall be kept at least the same high with that of the oil-gas separator of the air compressor. It is important to check over each joint dimension, proper length and dimension of the pipe. Besides that, the number and category of the joints and valves shall be considered to reach the maximum efficiency of the air compressor. It is important to comprehensively consider the air system of the whole plant to ensure the safety of the entire system while installing new air compressors. Condensate water will be generated in the air pipeline during air compression. Since vapor in the environment will be concentrated during inflating, it will be cooled in the posterior air pipeline and become condensate water. The water in the compressed air shall be drained in the whole pipeline system, therefore every customer shall pay more attention to the above issues during the use of the air compressor, the design of the pipeline system and daily maintenance. The common problems caused by water are as follows:

(1) The water of the internal system of the air compressor may emulsify the lubricating oil and the air compressor will be scaled and stuck.

(2) The water in the pipeline of the internal system of the air compressor will contribute to poor conditions as corrosion scale formation and even worse situations.

(3) The instrument is obstructed,

(4) The control valve is stuck,

(5) There is a risk for air pipeline outdoors to freeze under low temperature environment,

Any problem above may lead to suspending production of the part or whole plant. The compressed-air dryers of post treatment equipment may reduce the concentration of vapor to prevent the air pipeline

forming liquid water. The combined use of the dryer and the filter, the after-cooler and the automatic drain valve can effectively improve the air quality in the air system. Using two types of dryers, i.e. refrigerated dryer and regenerative dryer can solve the problem of containing water in the outside air system of the compressor. When the dew point requirement of the compressed air pressure is 1℃ to 4℃, the refrigerated dryer can be applied generally. However when it is required to keep the dew point below 1℃, the regenerative dryer shall be used. Please contact local branch or appointed distributor of SOLLANT, which may help you choose the proper dryer.

Note: the rotary air compressor cannot be connected to a reciprocating air compressor system without pulsation isolation device (e.g. sharable air tank).It is recommended that two different types of air compressors should be connected to a common air tank via individual air pipeline.

A shut-off valve and a drain valve shall be installed for each air compressor in front of the sharable air tank during parallel (selective assembly) installation of several air compressors in the plant.

Notice:

The drainage function of drainage devices of each post treatment device (equipment) in the external system of the air compressor shall be inspected regularly to make sure that the external system in the whole air compressor can operate normally.

3.5.2 Suggestions for Piping of Air Pipeline

(1) According to the size of the air outline, choose the same or larger size pipes to connect the air outlet and air receiver tank to reduce the pressure drop.

(2) Using flange between the air outlet and air receiver tank, will facilitate further maintenance. Add a shut off(close to the side of air receiver tank), to isolate the system without any leakage and reduce energy consumption.

(3) Flexibility of the pipes should be taken into consideration to avoid resonance of the pipes as much as possible during the installation. Air pipelines should have a slope at least 1/100 to make sure the condensed water can running out smoothly.

(4) Add an air dryer after the air receive tank to make sure the compressed air is dry enough to supply the using equipment, because the moist compressed air affect the performance of the using equipment.

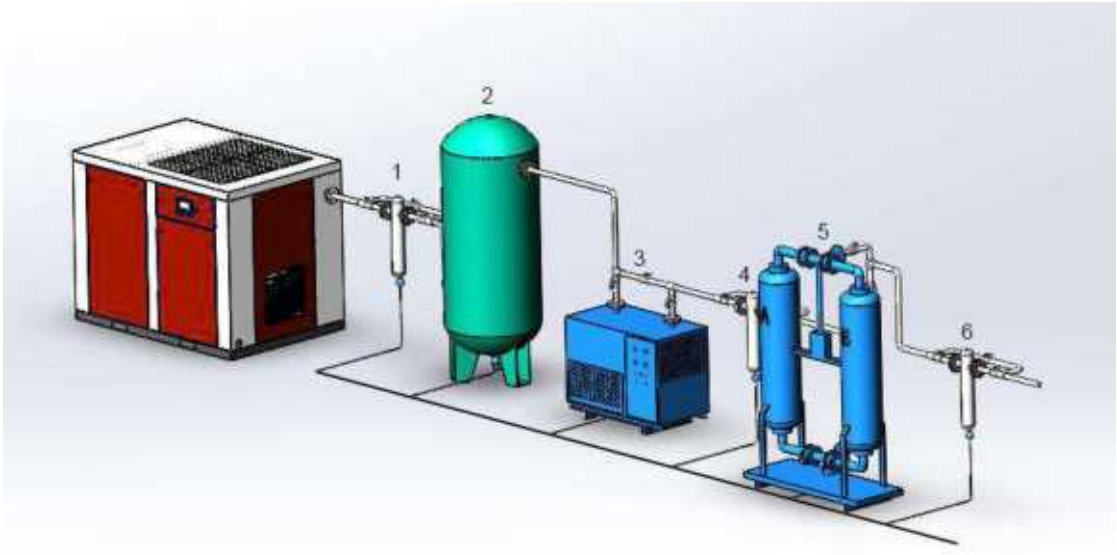


Fig. 3.3

The numbers in the Fig. respectively indicate the following meanings:

1.Pre-filter
2. Air receiver
3. Refrigerated dryer
4.Oil remover filter
5.Adsorption drier
6.Particulate filter

3.6 Electric Appliances Installation Precautions and Control System

3.6.1 Regulations on electric appliances installation preparatory measures

Before proceeding with the electrical installation, we recommend that you review the safety precautions in this manual by first looking at the air compressor nameplate or motor nameplate. The nameplate lists the working pressure, the maximum discharge pressure, and the characteristics and power of the motor. Make sure that the circuit voltage matches the voltage specified on the nameplate of the air compressor. Open the electric cabinet and make sure all electrical connections are correct and secure. Verify that the control transformer supply voltage correctly. Check if the motor and control circuit are firmly connected and close the electric cabinet.

Please refer to the JB6213.5-92 national standard and the following listed specifications, select the appropriate specifications of the main power line, grounding wire and no fuse switch (NFB) to ensure the safety of electrical appliances. The power cord safety current is set when the peripheral temperature is 35°C, the operating temperature is less than 55°C, and the cable length is within 20 meters based on the 600V PVC wire. When the power cord cannot meet the above conditions, the specifications of the power cord should be increased so that the pressure drop cannot exceed the limit and the air compressor cannot be started, or even an electrical hazard may occur.

(1) The air compressor is best to use an isolated power system, especially to avoid parallel use with other different power consumption systems, that may cause overload due to excessive voltage drop or three-phase

current imbalance or Protection device trips, pay special attention to this request for high-power air compressors.

(2) Air compressors must verify the correctness of their voltage when distributing power. The ground wire of the air compressor should be erected, and the ground wire must not be directly connected on the air or cooling water pipes.

(3) The air compressor must connect a wire to the ground to prevent danger due to leakage.

(4) Limited to the size of the electric cabinet, cable should not be too thick. If the cross-sectional area of the power cable is large, using two or more power cables instead of one. When using multiple power cords, each power cord must be three-phase balanced, otherwise it may cause cable overheating and unbalanced composite voltage. The input supply voltage should be kept within ±10% of the rated voltage, and the three-phase voltage difference must be within 3%. The air compressor must have the correct ground wire, otherwise, it may causing interference. If this issue cannot be improved, the controller may cause fluctuations of temperature, current, and pressure values.

kW / **Specifications**	45	55	75	90	110	132	160	185	200
Full-load current (A)	98	119	167	195	235	280	336	377	432
Sectional area of the power line (mm^2)	35	50	70	90	120	150	185	240	240
Sectional area of the earthing wire (mm^2)	25	25	35	50	70	70	95	120	120
Breaker NFB(Fixed Speed)	200	225	300	300	400	400	500	500	600
Breaker NFB(VSD)	125	150	200	225	250	400	400	500	500

kW / **Specifications**	220	250	280	315	355	400	450	500
Full-load current (A)	460	521	588	655	738	830	854	949
Sectional area of the power line (mm^2)	150*2	150*2	185*2	185*2	240*2	240*2	300*2	300*2
Sectional area of the earthing wire (mm^2)	150	150	185	185	240	240	300	300
Breaker NFB(Fixed Speed)	700	800	1000	1000	1200	1200	1600	1600
Breaker NFB(VSD)	500	600	700	800	900	1000	1200	1200

Note:

(1) The voltage specifications are 380V and 50/60Hz.

(2) When the ground wire and the power line of the movable electric appliance are both placed in the hose or cable, the wire diameter shall be the same with the power line.

3.6.2 Driving motor

The correct rotating of the air compressor drive motor is counterclockwise from the drive end. When checking the air compressor motor rotating, the motor jog time should be as short as possible. Press the "Emergency Stop" button immediately after pressing the start button. If the motor rotates incorrectly, the main switch shall be placed in the disconnected state, and the signboard shall be locked and hang the sign of “Forbidden to switch on and someone is working” plate. Open the electric control box door and change any two connectors (R, S, T) on the starter, close and tighten the electric cabinet door, and check the motor rotating again.

3.6.3 Fan motor

Observe whether the fan exhausts air to outside. If the direction is not correct, turn the main power switch off. Lock and hang up the signboard, "Forbidden to switch on and someone is working." Please change any two terminals on the contactor of the fan, then close the locking electric cabinet and check the direction.

3.6.4 Electrical circuit

The electrical control of the air compressor consists of two systems, including the internal control system and the part of the startup disk. The startup disk is the Y-△startup control used in general machinery field. The control part is the electronic control. The electronic control part will not be presented thoroughly in this chapter due to the complicated internal circuit and control. If there is any loss or fault, please contact the customer service center of SOLLANT.

4. Introduction to the System

4.1 Overall System

The air compressor is driven by motor and the complete internal and external systems of the air compressor are composed of the screw air compressor unit compressed by two stage and post treatment device (air reservoir, dryer and filter) of the external system.

4.2 The main components of unit

There are rotors supported by rolling bearings in the air end of two stage compressor. The first stage compressor (low pressure compression unit) and the second stage compressor (high pressure compression unit) rotors are driven by a motor, each of which increases to the most suitable speed with separate accelerator.

The internal system of air compressor unit consists of the following main components:

4.3 System schematic diagram and introduction

4.3.1 Air System

Air inhaled from the back of noise enclosure, through the suction filter and suction regulating valve, and compressed to about 0.30MPa (3.0bar) in the first stage compression, and compressed to a specific pressure in the second stage compression.

The temperature of outlet compressed air from first and second stage compressor is very high, so there are inter cooler and after cooler to cool the high temperature air. In addition, the compressor body is also at a high temperature and is cooled by the lubricant oil. The air delivery is adjusted by air intake valve on upstream of the first stage compressor. Air consumption is tested by the pressure changes detected by exhaust-side air pressure sensor, and air delivery is regulated by the intake valve with automatic switch.

4.3.2 Oil Line System

Bearings, speed increase gears and synchronous gear need to be lubricated by oil. The Lubricating oil is drawn by the oil pump from the fuel tank, then through oil cooler, compressor casing, oil filters and be sent to where needed.

4.3.3 Capacity Adjustment Method

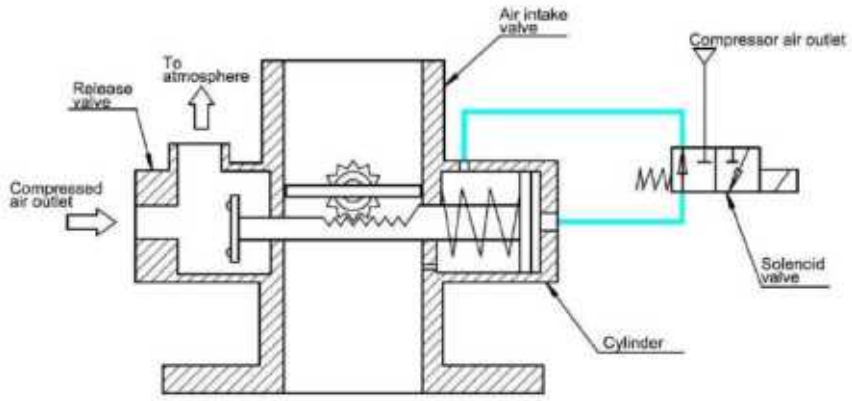


Fig. 4.5

1. Inlet valve unloading/stopping state

As shown in the figure above, the solenoid valve is in a de-energized state, and the two sides of the diaphragm cylinder are connected through the solenoid valve. Under the action of the return spring, the diaphragm cylinder drives the valve plate to rotate through the gear, closing the intake valve and opening the relief valve at the same time.

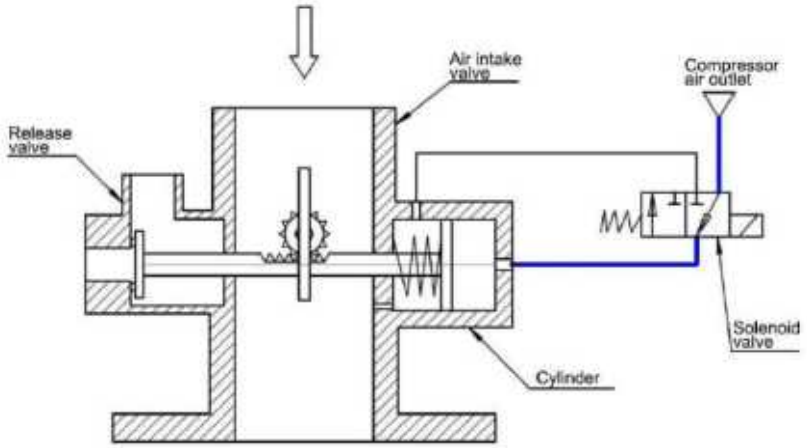


Fig. 4.6

2. Loading state of intake valve

As shown in the figure above, the solenoid valve is energized, and the diaphragm cylinder has no spring cavity connected to the exhaust end of the main engine. The diaphragm cylinder drives the valve plate to rotate through gears, opening the intake valve and closing the relief valve at the same time.

5. Operation of Controller

Fig. 5.1

5.1 Key Description

 ——Start

When the compressor is in standby mode, press it to start the compressor;

When communication is on-line mode and communication address is 1, press this button to start the air compressor, and simultaneously start joint control.

 ——Stop

When the compressor is running, press it to stop the compressor;

When communication is on-line mode and communication address is 1, press this button to stop the air compressor, and simultaneously stop joint control, the host does not send a command to the slave.

 ——Enter, Load/Unload

The button acts as loading and unloading when compressor is running;

When the display interface input focus in the digital input box, and the input box is in edited mode, press to exit edited mode and save modified data of the user;

When the display interface input focus on the feed button, press to perform the corresponding function.

 ——Return/Reset

When fault shutdown, long press 5 seconds to reset the fault;

Under setting mode, press to exit setting mode and return to viewing mode.

In parameter view mode, press to return to the previous page;

 ——Left

When the display interface input focus in the digital input box, and in the data view mode, press this key to enter the data edited mode, the lowest data starts to blink;

When the display interface input focus in the digital input box, and the data in the edited mode, press to move the editing position to the previous one of current data.

When the focus of the display interface in the parameter setting and display button, press this button to modify the current parameters and save.

When the focus display interface in the paging button, press this key to move the current focus to the previous button.

 ——Right

When the display interface input focus in the digital input box, and in the data view mode, press this key to enter the data edited mode, the highest data starts to blink;

When the display interface input focus in the digital input box, and the data in the edited mode, press to move the editing position to the next one of current data.

When the focus of the display interface in the parameter setting and display button, press this button to modify the current parameters and save.

When the focus display interface is in the paging button, press this key to move the current focus to the next button.

 ——Down

When the display interface of current focus element in the data view mode, press this key to move the input focus to the next element.

When the display interface input focus in the digital input box, and the data in the edited mode, press to decrease the current data.

When the current interface is in operating parameter display, press this button to switch to the next operating parameter interface.

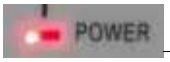
 ——Up

When the display interface of current focus element in the data view mode, press this key to move the input focus to the previous element.

When the display interface input focus in the digital input box, and the data in the edited mode, press to increase the current data.

When the current interface is in operating parameter display, press this button to switch to the previous operating parameter interface.

5.1.1 Indicator Description

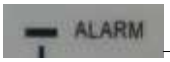


——Power

Lights on after controller energized

——Run

When the compressor motor is running, lights on



——Alarm

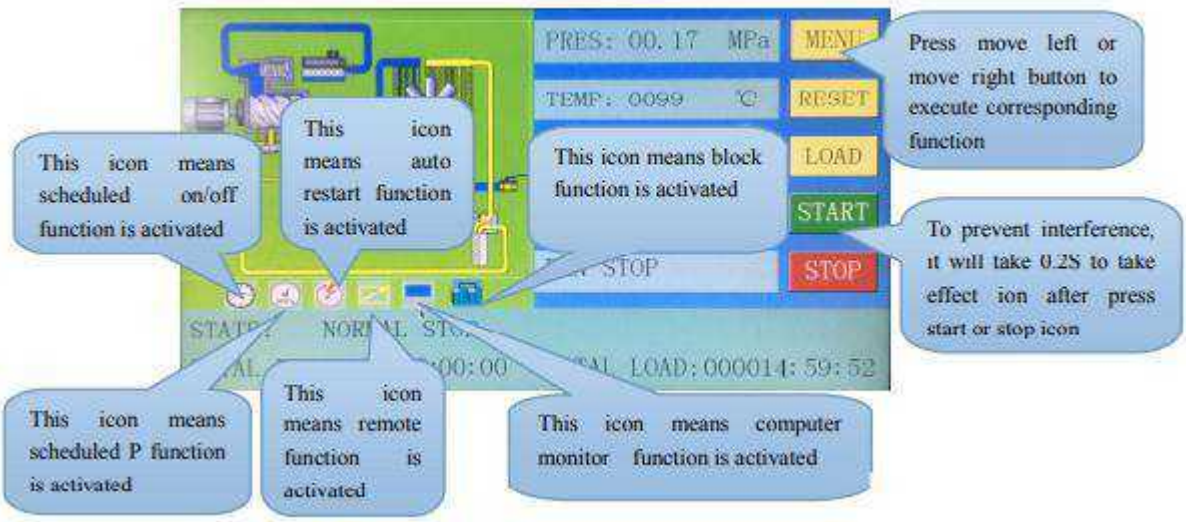
Lights flashing when warning; the lights keep on when the compressor stops; the lights are off after the fault is cleared and reset.

5.2 Contents of Controller

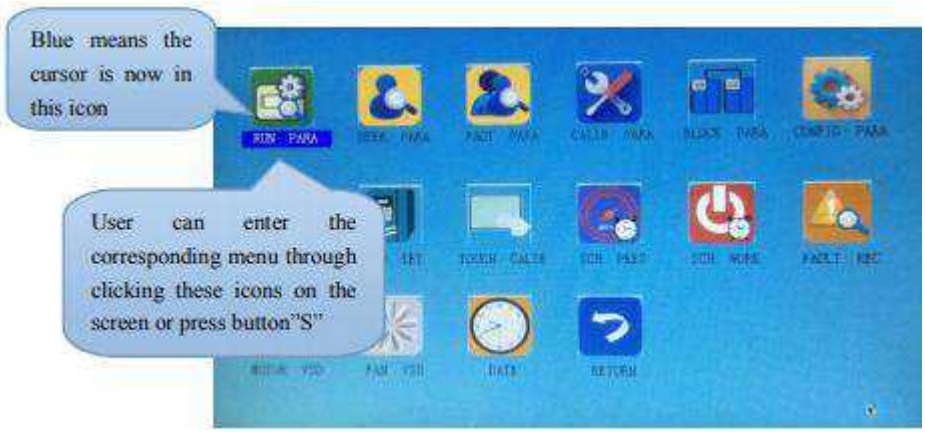
5.2.1 State and display

The logo “SOLLANT” will be on the panel after touch screen is power on, and the below interface will be displayed after a time delay.

A five-seconds delay later, the below parameter interface will follow:



User can enter the below menu through clicking MENU icons on the screen or press button“ > ”



5.3 View of operation parameter

Click"RUN PARAMETER" to check the running parameters and set:

Menu	Original Value	Function
Second stage discharged air pressure	00.25MPa	To display the second stage discharged air pressure
Second stage discharged air temperature	-0025℃	To display the discharged air temperature
First stage discharged air pressure	00.00 MPa	To display the first stage discharge air pressure
First stage discharged air temperature	-0050℃	To display the first stage discharged air temperature
Oil filter service time	0020H	Oil filter accumulated using time
Oil mist filter service time	0020H	Oil mist filter accumulated using time
Air filter service time	0020H	Air filter accumulated using time
Lubricating oil service time	0020H	Lubricating oil accumulated using time
Lub service time	0020H	Lub accumulated using time
Factory No.	12345678	
Main motor current	A：000.0A B：000.0A C：000.0A	To display the main motor current
Fan motor current	A：000.0A B：000.0A C：000.0A	To display the fan motor current
Date of production	2016-12-01	
Single running time	0000：00：00	To display the single running time
Single loading time	0000：00：00	To display the single loading time
Version	CK0135M0010	
Check word	0000 0000	

5.4 User parameter

User data is used to store the air compressor parameters set by the user. The user needs to verify the password when modifying user parameters.

The main functions and roles in the table below:

Menu	Initial Setting	Functional Description
Loading pressure （MPa)	00.65	1. Loading mode is set to auto, when the compressor is in automatically unloaded operating state, the compressor automatically loads when pressure is lower than this value. 2. When the air compressor is shut down for long time, the pressure is lower than this value, the operation conditions are met, and the controller automatically starts the air compressor operation.
Unloading pressure （MPa)	00.80	1. The pressure is higher than this value, and in a loading operation state, which controlling air compressor unloading operation. 2. "Loading pressure" setting data can not be higher than this value. "Unloading pressure" is limited by the manufacturer's parameter “Unloading pressure limit".
Fan Startup T	80℃	When the air compressor is running, when the exhaust temperature is higher than the set value here, the fan is controlled to operate.
Fan Stop T	70℃	When the air compressor is running, when the exhaust temperature is lower than the set value here, stop the fan operation.
Air end startup delay (S)	0008	Set the main motor start-up time, the beginning of time when the air end starts, within this time, the air end is not current overload protection.
Fan startup delay (S)	0003	Set the fan start-up time, the beginning of time when the fan starts, within this time, the fan is not current overload protection.
Star-delta delay (S)	0006	The delay time of air end star-delta reduced voltage start-up
Loading delay (S)	0002	After the air end is running, the delay loading time.
Unloading delay time (S)	0600	Maximum permitted time of continuous unloading for compressor, automatically stop after running over time.
Stop delay (S)	0010	When normal shutdown, the compressor is immediately unloading, then stops after the set time of unloading operation.
Restart delay (S)	0100	After normal shutdown, overtime downtime or fault shutdown, the need to set the time delay to restart the compressor.
Drain open delay (S)	0002	Automatic control of drainage, continuous drain time (standby)
Drain close delay (min)	0060	Automatic control of drainage, drain interval time(standby)
Soft start delay (S)	0006	After this delay time, into the loading delay time. (This parameter only functions when the type is set to soft start).

Loading method	automatic/manual	Manual mode: Automatic unloading when the pressure is higher than "unloading pressure"; with key to control the loading and unloading in other cases. Auto mode: The controller automatically controls compressor loading and unloading according to set pressure, loading and unloading pressure.
Start and Stop	Local/Remote	Local mode: No function for remote start terminal Remote mode: Remote start terminal is available **NOTE: When there is a hardware input terminal that is set to "Remote Start Available", the start-stop mode is determined by the hardware status. It is for remote when terminal is closed, and local when disconnection, and the set here is not available.**
Operation mode	Power frequency/variable frequency soft start/air end	Choose the air compressor models according to user needs. With reference to the corresponding electrical wiring diagram depending on the selected compressor model.
Telecommunication address	0001	Communication available for the computer or linkage, the telecommunication address of the controller.
Backlight brightness adjustment	0001	Adjust the backlight brightness, the higher the value, the stronger the brightness. (1 ~ 4 grade adjustable brightness)
Telecommunication address	Ban/linkage/computer	When set to ban, the communication does not work; When set to communication, as a slave compressor, to communicate with an external device according to MODBUS RTU protocol, the baud rate: 9600; Data format: 8N1; Parity: Even parity When set to linkage, multiple air compressors can run with the network.
Pressure unit	MPa/PSI/BAR	When set to MPa, Parameters display unit related to pressure is MPa. When set to PSI, Parameters display unit related to pressure is PSI. (Standby) When set to BAR, Parameters display unit related to pressure is BAR. (Standby)
Temperature unit	℃/℉	When set to ℃, Parameters display unit related to temperature is ℃. When set to ℉, Parameters display unit related to temperature is ℉. (Standby)
Language selection	Chinese/English	When set to Chinese, display interface is Chinese; When set to English, display interface is English; (Standby)
User password	****	Users can modify the password by using the old user password or reset passwords of manufacturers.

Sleep backlight brightness	0007	Unattended operation for setting the controller for a long time, it is the display of backlight brightness.
System low pressure protection delay:	0060 S	After start delay time, detecting if system pressure is lower than the set value to shutdown system.

5.5 Factory parameter

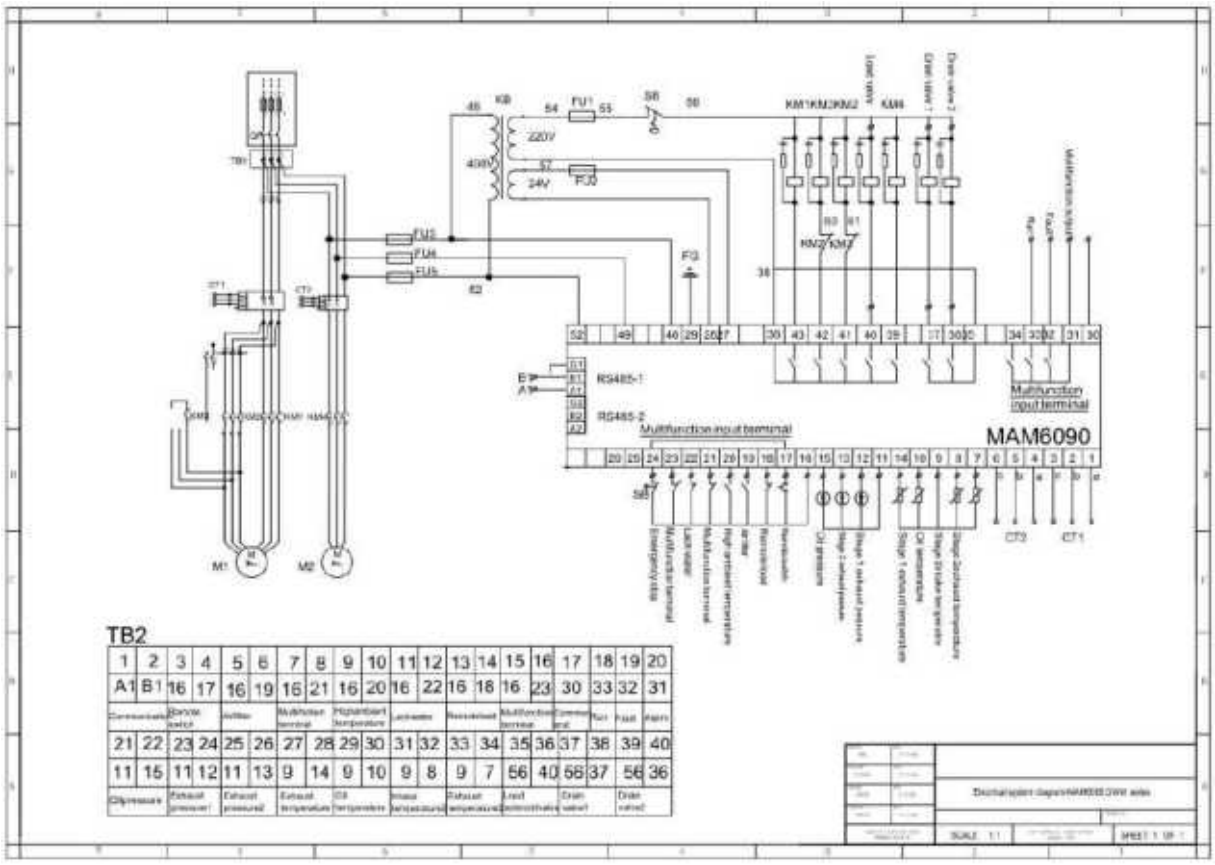
Factory Parameters use to store related data set by air compressor factory, users view or modify the parameters of the manufacturers, who need to verify the password. The main functions as follows:

Menu	Initial Setting	Description
Air end rated current（A）	Air end current is more greater than 1.2 times of setting value	Air end current is more greater than 1.2 times of setting value, according to the overload inverse time delay trip.
Fan rated current（A）	Fan current is more greater than 1.2 times of setting value	Fan current is more greater than 1.2 times of setting value, according to the overload inverse time delay trip.。
Second compression discharge warning temperature	105	Second compression discharge temperature higher than the setting temperature, warning prompt
Second compression discharge stop temperature	110	Second compression discharge temperature higher than the setting temperature, fault stop
First compression discharge warning temperature	105	First compression discharge temperature higher than the setting temperature, warning prompt
First compression discharge stop temperature	115	First compression discharge temperature higher than the setting temperature, fault stop
Second compression discharge stop temperature	0.9	Second compression discharge temperature higher than the setting temperature, fault stop
First compression high discharge pressure warning (MPa)	1	First compression discharge pressure higher than the setting pressure, warning prompt
Max unloading pressure (MPa)	0.85	The item is the max value of unloading pressure in the user's parameter, unloading pressure≤ the setting pressure

Current imbalance	6	When (Max phase current/min phase current)≥(1+(setting value/10)), imbalance protect the compressor, air compressor fault stop, that is , air end imbalance. When the setting value≥15, prohibition unbalance protection
Break phase protection time	2	Setting break phase protection time≥20s, prohibition break phase protection function.
Reset history faults	****	Input “8888”, after confirming, clean the history faults records
Too long time warning, stop(Hours)	0	Wearing parts warning, over the setting time, fault stop.
Max time（Hour）	0	When the compressor cumulative operation time exceeds the set value, and the air compressor is shut down, the fault alarm display "wrong."
Factory password 2:		The manufacturer set a password which can be modified.
Too high voltage (V)	410	When the controller detecting the voltage is higher than the setting value, stop and protection, reported the voltage is too high. When setting to 0000, over voltage function is disabled.
Too low voltage (V)	350	When the controller detecting the voltage is lower than the setting value, stop and protection, reported the voltage is too low. When setting to 0000, low voltage function is disabled.
Communication overtime (S)	2	The controller continuously does not receive the correct data over the setting time, communication is interrupted.
Communication interruptions (S)	20	The controller continuously does not receive the correct data over the setting time, communication is interrupted.
Communication resumes	15	After communication interruption, it lasts over the setting times, received correct data, its states communication back to normal.
Timing start and stop function	Start/Prohibition	Setting start: timing of start and stop is valid. Setting Prohibition: timing of start and stop is invalid.
Time sharing pressure function:	Start/Prohibition	Set to open: Time sharing pressure function is valid. Set to close: Time sharing pressure function is invalid.
Total running time (H):	00010 H:00min	Modifying the total running time of air compressor.
Total loading time (H):	00009 H:00min	Modifying the total loading time of air compressor.
Low temperature protection (℃)	-50	When turned on, the temperature is lower than the setting value, suggesting that the temperature is too low, not allowed

		to open; After open 2 minutes, the temperature is below the setting value, reported a temperature sensor wouldn't work, stop.
Cutting power, restart	Start/Prohibition	Whether open the cutting power and restart function.
Compression element power factor of normal frequency compressor	1.72	Setting the factor to calculate the power of compression element
Normal frequency Electricity of compression element (kW.H)	0	Setting or modifying the normal frequency electricity of compression element
Fan power factor of normal frequency compressor	1.72	Setting the factor to calculate the power of fan
Normal frequency Electricity of fan (kW.H)	0	Setting or modifying the normal frequency electricity of fan
Frequency selection	50Hz	Setting power frequency
Oil separator pressure difference warning (MPa)	0.15	When the air compressor is loaded and operated, when the air supply pressure and the oil- gas barrel pressure are both greater than 0.5MPa, at the same time, the system detects the oil and gas barrel pressure-exhaust pressure-line pressure resistance> differential pressure warning value, the system warning.
Oil separator pressure difference stop (MPa)	0.2	When the air compressor is loaded and operated, when the air supply pressure and the oil-gas barrel pressure are both greater than 0.5MPa, at the same time, the system detects the oil and gas barrel pressure-exhaust pressure-line pressure resistance> differential pressure stop value, the system stop.
Pipeline piezoresistive (MPa)	0.05	Pipe pressure resistance
Rear bearing warning temperature (°C)	0	When the rear bearing shaft temperature is higher than the set temperature, the warning prompt
Rear bearing stop temperature (°C)	1	When the rear bearing shaft temperature is higher than the set temperature, the fault will be stopped.
Serial No.	12345678	Serial No. of manufacturer
Date	2018-1-1	Manufacturing date

5.6 Schematic Wiring Diagram



5.7 Control Operation

5.7.1 Press key “ ” to start: (Y—△ start).

The main motor cannot start by pressing key “ ” for there are five minutes for self-inspection after the controller is powered on. Press key “ ” to start the main motor after self-inspection. The startup process of the main motor: KM3 powered on, KM1 powered on Enter into Y startup state delay time-out (Y—△ transfer time), KM3 powered off (KM2, KM3 interlocking), KM2 powered on, △ operating and startup completed. All solenoid valves are powered off to achieve empty startup during startup.

5.7.2 Automatic operation control:

A, When motor enter delta status, LOAD DELAY starts, controller will load automatically after LOAD DELAY.

B, If air pressure is detected higher than UNLOADING P set,15 terminal opens, loading valve is de-energized, and air compressor starts unloading, also starts EMPTY LONG STOP time record ,if unloading time exceed EMPTY LONG STOP set, compressor will enter STANDBY mode; if compressor loading again within “EMPTY TIME” set(when pressure is below LOADING P or receiving load

command),compressor will reset “EMPTY LONG STOP”.

C, In STANDBY mode, controller start automatically if pressure detected is below LOADING

5.7.3 Normal stop:

The draining solenoid valves are powered off by pressing “  ”. The motor contactor is powered off after delaying for a while, and then the main motor and the fan motor stop running. The motors can be restarted only by pressing “  ”.

5.7.4 Frequent startup resistance control

The motor cannot be immediately started up with the motor stopping running for stop by pressing “  ”, for a too long empty and a fault. It requires some delay. Under each shutdown state, the time display window of the controller displays the remaining delay time (such as 199 seconds). The motor can be started up only when the delay time turns to zero.

5.7.5 Accidental shutdown and emergency shutdown

The controller will immediately shut down the motor when an electrical fault or high-temp exhaust occurs to the unit. The motor can only be restarted up when fault is cleared. Press the emergency switch for emergency shut down.

5.8 Warnings and Prompts

Failure	State display	Indicator light	State of air compressor
Service time of air filter expired	Service life of air filter	Alarm indicator light of air filter lit up	Alarm without shutdown
Service time of oil filter expired	Service life of oil filter	Alarm indicator light of oil filter lit up	Alarm without shutdown
Service time of oil separator expired	Service life of oil separator	Alarm indicator light of oil separator lit up	Alarm without shutdown
Service time of lubricating grease expired	Filling lubricating oil in the motor bearings		Alarm without shutdown
Service time of lubricating oil expired	Service life of lubricating oil		Alarm without shutdown
Low ambient temperature	Ambient temperature too low		Alarm without shutdown
High ambient temperature	Ambient temperature too		Alarm without shutdown

	high		
First stage exhaust temperature higher than alarm value	High-temp exhaust alarm	Indicator light of high-temp exhaust lit up	Alarm and shutdown
Second stage exhaust temperature higher than alarm value	High-temp exhaust alarm	Indicator light of high-temp exhaust lit up	Alarm and shutdown
Second stage intake air temperature is higher than the alarm value	High-temp intake alarm	Indicator light of high-temp intake lit up	Alarm and shutdown
Oil temperature is higher than the alarm value	High-temp oil alarm		Alarm and shutdown
First stage exhaust pressure higher than alarm value	High-pressure exhaust alarm		Alarm and shutdown
Second stage exhaust pressure higher than alarm value	High-pressure exhaust alarm		Alarm and shutdown
Oil pressure lower than alarm value	Low-oil pressure alarm		Alarm and shutdown
Oil pressure higher than alarm value	High-oil pressure alarm		Alarm and shutdown
Temperature sensor disconnected	Temperature sensor disconnected	Sensor trouble light lit up	Alarm and shutdown
Pressure sensor disconnected	Pressure sensor disconnected	Sensor fault light lit up	Alarm and shutdown
Motor overloaded	The main motor shut down due to overload	Indicator light for overload of main motor lit up	Alarm and shutdown with startup delayed
Fan overloaded	The fan shut down due to overload	Indicator light for overload of fan lit up	Alarm and shutdown
Exhaust pressure higher than limit value	Shutdown for too excessive pressure		Alarm and shutdown
Phase sequence error, default phase	Shutdown for phase sequence error	Indicator light for phase sequence error lit up	Alarm and shutdown

5.9 Safety Protection

5.9.1 Motor Protection

The controller of the air compressor is equipped with short-circuit, stalling, overload, default phase and imbalance protection.

Electrical failure	Controller fault display	Cause
Short-circuit	Short-circuit of main motor or fan	Short-circuit or set error of nominal current
Stalling	Stalling of main motor or fan	Overload, bearing wear or other mechanical failures
Overload	Overload of main motor or fan	Overload, bearing wear or other mechanical failures
Default phase	Default phase of main motor or fan	Default phase of power supply, contactor and motor
Imbalance	Current unbalance of main motor or fan	Poor contact of contactor, internal open loop of motor

5.9.2 Temperature protection

Exhaust temperature protection: when the exhaust temperature is higher than the set value, the controller will alarm and shut down the motor, while the display show that the exhaust temperature is too high.

Air inlet temperature protection: The controller will warning and stop the compressor when the inlet air temperature is higher than the high limit of the setting value and the monitor will show high air inlet temperature.

5.9.3 Anti-reversal protection of air compressor

When the phase sequence of the three-phase power supply connected to the air compressor are different from the controller's setting, indicating phase dislocation and the controller cannot start up the motor. Change two phase power cords and observe the rotation of the motor.

5.9.4 Overpressure protection of pressure supply

When the exhaust pressure is higher than the upper pressure limit, the controller will alarm and shut down the motor while the display shows that the exhaust pressure is too high.

5.9.5 Sensor failure protection

When the pressure sensor or temperature sensor is disconnected, the controller will alarm, shut down the motor and indicate sensor failure.

5.10 Operation of inverter

For details on the operation and troubleshooting of the inverter, refer to the instruction manual of the inverter.

6. Function Description of System Components

6.1 Air Filter

The air filter is a kind of dry paper filter to filtrate the air entering the compressor. The filtration efficiency has direct effects on the service time of the lubricating oil, oil filter, oil separator and body bearing. If that the air inlet filter is blocked, the air intake will decrease, thus affecting the air supply. SOLLANT service staff will suggest changing a new product based on the inlet dust and the service time displayed on the controller at every onsite inspection. With the controller set to the longest service time, when the controller displays a warning message, the air inlet filter of the air compressor unit shall be replaced with a new one.

6.2 Intake air relief valve

Intake air relief valve can reduce the torque required to start the compressor and can save energy when the system is unloading. Mechanically coupled and hydraulic control functions of intake valve and relief valve can ensure system stability. When in full load operation, the application of oil pressure makes the control cylinder "opened" state. At this time, the suction inlet valve is open, and relief valve is closed. Once the oil pressure is released, the system enters the unloading operation: the control cylinder returns due to the spring action. This time the suction inlet valve is closed and the relief valve opens.

6.3 First stage air end

Preliminary compression for the air mainly from air filter and enable compressor to achieve the prepared desired pressure that customers need. Mainly composed by female and male screw rotors, suction side bearings, discharge side bearings, timing gears, seals and so on.

6.4 Second stage air end

The air mainly from the intercooler is compressed to a pressure of customer needs, which is mainly composed by female and male screw rotors, suction side bearings, discharge side bearings, timing gears, seals and so on.

6.5 Safety Valve

An air compressor in abnormal operation or pressure sensor failure may result in a continuous increase of the pressure in the oil-gas barrel. When the pressure increases to the setting value, the safety valve on the oil-gas barrel will automatically open to discharge pressure and eject the lubricating oil so as to reduce the pressure in the oil-gas barrel and ensure the safety use of the unit. In order to avoid accidents, the set pressure of the safety valve has been adjusted before delivery and nobody shall adjust it at any circumstances.

6.6 Venturi tube muffler

Air compressor will produce high-frequency vibration during operation, which makes the compressor pipeline big noise. The use of venturi tube can greatly eliminate this high-frequency vibration, efficiently lower noise of air compressor unit.

6.7 Inter Cooler

It is used to cool down compressed air of first stage, controlling inlet air temperature of second stage, which can avoid high inlet temperature which may result in high temperature of second stage, protecting the second stage air end. Therefore, be sure to keep cooler clean during routine maintenance to ensure the cooling effect.

6.8 After Cooler

The cooler is used to cool the second stage outlet air temperature. When the efficiency of the cooler is reduced for blocking or scales, the system may be halted for high exhaust temperature. So it shall be cleaned during daily maintenance to ensure cooling effect.

6.9 Oil line safety valve

It is used to adjust the pressure of lubricating oil into the air end, to ensure that the air compressor runs perfectly, and the compressed air is absolutely oil-free.

Note: The lubricating oil may flows into the compressed air chamber host when the oil pressure is high. The low oil pressure may make the lubricating required by air end parts not reach normal lubrication effect. If the pressure of oil occurs high or low alarms, please adjust this safety valve to achieve a normal oil pressure.

6.10 Oil Cooler

The cooler is used to cool the lubricating oil. When the efficiency of the cooler is reduced for blocking or scales, the system may be halted for high exhaust temperature. So it shall be cleaned during daily maintenance to ensure cooling effect.

6.11 Oil Filter

As a paper filter, the oil filter is used to remove the impurities in the oil to improve the lubrication effect and reduce its damage to the compressor bearing and some parts. The SOLLANT service staff will measure the pressure valve in front and at the back of the oil filter, observe the quality of the lubricating oil at every on site inspection. The staff may suggest changing a new product based on the synthetic judgment. With the controller set to the longest service time, when the controller displays a warning message, the oil filter of the air compressor unit shall be replaced with a new one. If the blocked parts are not replaced, the lack of oil in the lubricating oil pipeline system may cause the exhaust temperature to be too high, or shorten the service time of the key parts, components or bearing.

In some severe cases, the compressor may be burned out.

6.12 Oil mist separator

It's made of a kind of compressed compound material with main characteristics of good oil mist separating effect, less pressure loss (almost 0). It's mainly used for separating the oil mist inside of the compressor oil tank and release the pressure inside of the tank.

6.13 Exhaust Temperature Sensor

The sensor is used to detect the exhaust temperature of the compressor and send the message to the controller to maintain the normal operation. If that the exhaust temperature is detected too high, the controller may shut down the air compressor to prevent the parts from being damaged.

6.14 Pressure Sensor

The compressor is equipped with a pressure sensor to send the message to the controller for process and judgment to ensure the normal operation of the air compressor in a perfect protection.

7. Operation Guide

7.1 Inspection before operation

(1) Be sure to install the drain valve and the exhaust pipe flange of the end cap and other components;

(2) Be sure to remove the red transport bracket on air end and main motor, otherwise will increase the vibration of the air compressor, increasing noise, resulting in damage to the air compressor air end.

(3) Check the couplet pipeline to compressor unit and make sure the diameter is less than the air compressor flange connection;

(4) Check if the electrical wiring is correct, whether cables and circuit breakers to meet the requirement. The specifications of cable and circuit breaker is shown below table 3.1;

(5) Check the manual valve is open or closed;

(6) Check the monitor set point;

(7) Keep the ambient temperature not higher than 42ºC;

(8) Check if the oil level is normal (check the oil level is between the upper and lower limits while running).

7.2 Startup and shutdown checks and precautions

Startup:

(1) Close the main power, and then close the control room cabinet circuit breaker;

(2) After the power supply, "stop" lights of the controller is on;

(3) To confirm the selection of local control, press the "start" button to start the main motor;

(4) About the rotation direction of the motor, wiring within the unit have been confirmed when the air compressor was in factory. So please confirm whether the oil pressure rises properly {0.18MPa (1.8bar) above} (rotation in the opposite direction while the supply pressure does not rise) when the oil pressure does not rise, stop it immediately cut off the power. Exchange any 2 of the 3 wire (for maintenance, commissioning after inside wiring restructuring of air compressor can not use this method, remove the cover panel on the right side of the sound, after the adoption of the engine (to start or stop) to determine whether the anti-load side of the fan motor to turn counterclockwise rotation direction of the pump is also to be confirmed); when the pressure of supply oil is low, open the oil valve, rotate oil line valve clockwise to make oil pressure normal.

(5) Running for 30 minutes under 0.40MPa (4.0bar) discharge pressure, and then plus 0.1MPa (1.0bar) for air compressor every 15 minutes, and observe if the oil pressure, oil temperature, exhaust

pressure and exhaust temperature are within the normal range.

(6) Check the operation performance under settings in the loading / unloading pressure, capacity adjustment period (unloading → loading → unloading) should be more than 23 seconds.

Shutdown:

(1) Press the "Stop" button to stop the motor;

(2) Turn off the power after motor stopped completely;

(3) If the air compressor stop more than 24 hours, it should unload more than 5 minutes before shutdown (the screen on the controller setting "operating state 2" can be converted to manual unloading). The above operation must be carried out in order to prevent corrosion of the compressor shell and the rotor.

8. Maintenance and Repair

Any dismounting shall be implemented after the motor and the fan having been stopped completely and make sure the power is cut off. A signboard shall be set on the starter at the maintenance of the air compressor with the words of “warning: under overhaul, no driving”. The maintenance of pressure parts shall be started after the internal compressed air is exhausted completely.

8.1 Air Filter

The air filter shall be replaced when the maintenance indicator light is lit up. The service time is determined by the quality of the ambient air, usually 3000 hours. The air inlet filter has a direct effect on the service life of the lubricating oil filter and oil separator. The air filter can be replaced as follows: dismount the fixing bolt of the air inlet filter and replace with a new product. Note that the sealing gasket of the inlet filter shall stick close to the permanent seat.

8.2 Lubrication of Motor Bearing

The oil filling bearing shall be periodically filled with lubricating oil according to the Instructions for use of the motor or the following table.

(a)Supplementary amount and interval table of lubricating grease

Power (kw)	Initial filling amount (g) Note (1)	Supplementary amount (g) Note (2)	Supply interval for operating for 24h per day (h)
18.5	100	30	1500
22	100	30	1500
30	100	30	1500
37	100	30	1500
45	200	30	1500
55	200	30	1500
75	200	30	1500
90	200	30	1500
110	200	40	1500
132	200	40	1500
160	200	40	1500
185	200	40	1500
200	250	50	1500
220	250	50	1500
250	250	50	1500
280	250	50	1500
315	250	50	1500

Table 7.2

Note:

(1) The initial filling amount refers to the new filling amount after the bearing is dismounted and cleaned. The bearing is 1/3 filled while the others are filled into the bearing cap (the filling is complete when the motor is delivered).

(2) The filling amount refers to the amount of the lubricating grease filled into the bearing at every interval. Please fill timely according to the running time of the unit.

(3) Note: more supplementary cannot extend the supply period. Please do as the specification given in above table.

(4) The bearing may be overheated and the lubricating grease may be leaked for the stirring resistance when the lubricating grease deposits at the outlet of the exhausting point of lubricating grease storage. Please open the cap to clean the lubricating grease (once after filling 2-3times).

(5) The fuel quantity shall conform to the standard value. The motor may be damaged in case of excess.

(6) The grease shall be changed according to the size of the motor, the operation condition and working condition. The change interval and filling amount shall comply with the filling label on the motor.

(b) The lubricating greases in the following specification have been filled when delivering. Please use the lubricating grease with the same quality and specification to ensure the service time of the bearing.

Marketability	Biggest lubricating grease manufacturer, easy to buy
Allowable temperature	Generally, the lubricating grease is –20℃～120℃, the others out of this range shall use low or high temperature grease.
For high-speed and major diameter bearing	For good resistance to pressure (oil film strength).The hard ones are better. For better voice, vibration and exhaust effect, the soft ones are better.(avoid using Silicon grease)
Load resistance	For high load belt and gear, the one with good resistance to pressure is better. (avoid using Silicon grease)
Water resistance	Avoid using Na or Ca grease under high humidity condition.
Consistency	The soft ones are better in terms of the temperature increase which is determined by the lubricity and exhaust effect when filling under creak, abnormal vibration and cold environment for the similar hardness.
Lubricity	Please use the grease with good lubricity and select the grease based on its strengths and weaknesses.

Make sure use the specified brand, mixing different brands can seriously damage the motor bearings. Do not use grease that has been stored for more than 2 years. When the grease is

stratified, mix well before use. During use, Foreign matter should be avoided from mixing with grease. After use, it should be sealed and stored in a cool, ventilated place.

8.3 Compressor Bearing

The compressor bearing is a consumable (change once per 80,000 working hours). The noise and vibration may be high when operating because the service time is shortened for a combination of normal or abnormal wear, the inlet quality, lubricating oil quality and oil filtration effect. The SOLLANT service staff will decide whether to change the bearing in case of this condition.

8.4 Compressor Bearing

The lubricating oil of the rotary screw air compressor, as a kind of special oil, shall not be used mixing with other oils without specified by the SOLLANT; otherwise the air compressor may be seriously damaged. When changing the oil, the old oil in the system shall be completely removed, otherwise the service time of the new oil may be shortened. The oil filter and oil separator shall also be changed when changing the lubricating oil.

All oil needs to be changed after running 8000 hours or over a year(whichever occurs first). Before the initial oil change, samples need to collected once every six months to confirm within the oil change period(see oil change standard) or within one year (8000 hours) , the oil is well.

Oil level is changing constantly when you run and stop compressor, because oil circulates in the tube path while operating. Make sure the oil level remained between upper and lower limit while running, excessive filling of the oil may cause shaft power increasing, the rise of oil temperature, so do not add excessively.

Oil change standard:

Item		Testing method	Oil change standard	Test description
Oil change standard	Total oxide	JIS-K2501	≥1.0mgKOH/g	When the total acidity exceeds 0.5mgKOH / g, the oxidation will accelerate. Samples need to be collected periodically to control its value to prevent this phenomenon. Total oxide represents the deterioration level of the oil.
	Dynamic viscosity	JIS-K2283	More than 10% of the new oil value when 40 ℃	If the oil metamorphism, it is the oxidation that leads to the viscosity increase, thereby generating jelly to make lubricating deterioration.
	Water content	JIS-K2275	≥0.1% (Volume ratio)	≥0.1% of water content would weaken the function of oil-water separation, and to accelerate deterioration.
	Insolubles	ASTM-D893	≥0.2g	Test can make us know the oil deterioration

		Microporous filter (0.8μ)	≥5mg/100ml	and content of jelly, carbon, rust, metal powder formed by decomposition. To prevent oil deterioration, bearing damage caused by foreign objects can be measured.
	Surface tension	ASTM-D971	≤15dyne/cm ≥30dyne/cm	

8.5 Oil filter

The service time of the filter is 8000 hours based on the maintenance instruction and varies with the working condition, dust, inlet filter efficiency, the daily clean and maintenance of the unit. However, the filter shall be replaced in case of a poor filtration efficiency to avoid damaging the body.

The filter is replaced as follows: disassemble and assemble the lubricating oil filter with a special tool to avoid deforming the enclosure and affecting the function. The oil receiver shall be placed under the filter to receive the spilled lubricating oil when dismounting. The lubricating oil filter shall be cleaned before installation and the sealing gasket shall be applied with the lubricating oil before lock-in.

8.6 Pipe Joint

The linkage of all pipe joints of the compressor shall be regularly inspected as well as the wearing-off and crack of the hose. The gasket, O-ring or hose shall be replaced according to the problem, or applied with sealant. When maintaining or dismounting the parts, the parts shall be relocked in case of any loose ones and resealed if necessary. The SOLLANT service staff will suggest whether to buy a repair kit as appropriate to replace the necessary accessories and hose.

8.7 Inlet Release Valve

Regularly dismount the valve plate of the inlet valve to remove deposits and apply to grease or change the connecting rod to ensure the sensitivity of air volume control.

8.8 Safety Valve

(1) The safety valve has been adjusted before delivery. Do not adjust it anymore.

(2) The effectiveness of the safety valve shall be regularly tested by applying the air compressor pressure to the corresponding opening pressure and verifying no blocking.

8.9 Draining Solenoid Valve

(1) In case of a frequent operation of the unload and load of the air compressor, please set an appropriate load/unloading pressure according to the air consumption, otherwise the service time of the draining solenoid valve will be reduced by half.

(2) The abnormal movement of the draining solenoid valve has a direct effect on the normal use. Therefore, a periodic inspection is very necessary.

(3) The draining solenoid valve shall be regularly inspected for:

A.particulate matters in the solenoid valve (disassemble it to inspection);

B.normal pickup of the coil rod of the energized solenoid valve (touch the coil rod with a tool like electro-probe);

C.normal operation of the unload and load (voice of switchover).

8.10 Heat Control Valve

The by-pass of heat control valve closes while the oil temperature is high, on the contrary it will open in normal circumstances. Check the valve whether it is normal.

8.11 Cooler

1.Air Cooler

After using for a while, the heat dissipation of the flow through cooler may become poor because dirt and dust attached to the surface, thus increasing the exhaust temperature. So it shall be regularly cleaned to blow the dust with the high pressure air. It is important to strengthen the cooling capacity. The ambient air quality may affect the maintenance period.

2.Water cooler

(1) Please confirm the below before using the water cooler:

A.If there are any leaking parts between the pipe connections before starting the hydraulic system.

B.Does the two fluid valves cooler open?

C.Is there any leaking on the sealing place of each flanges?

D.Any leaking on the output or plug?

E.Suggest that there should be a device specially treating the cooling water. Otherwise you have to dismantle the cooler in regular time, cleaning the inside parts.

(2) After the above jobs finished, it can start. Pay full attentions on vibrations, start it below the normal working pressure. Do the daily cleaning job and check regularly. While installing outdoor, there should be the canopy and notice the influence of the quality of ventilation.

A.The regular checking should be done at least one time within half a year or one year.

B.Dismantle the return water covering, the inside dirty condition of cooler tube can be clearly viewed.

C.The cooling water may be freezing in low temperature environment in Winter that resulting the internal cracking of cooler. Therefore, forming the good habit that drain the water on each stopped time is necessary.

(3) In order to control the corrosion and protection against leaking, please clean, break down,assemble and check in regular time.

(a)Way to break down

Completely close in and out end cap of the two fluid, stop it. Drain the two fluid from the pipe connection parts and oil cooler. In order to be convenient for the re-assembly, please make the mark of connection part. Unpack the outside connected part, make the oil cooler in the free condition that can be broke down. Untighten the nut on the stand, take off the dead ring, move the oil cooler to some place that is easy for operation(it also can be cleaned and checked if don't take off cooler). Unpack the water cover in the side of water-return and water-inlet, take out the sealing element and sealing joint(steel), upright the cooling element and tank, pull up the outer barrel. While pulling up, the barrel should be pure vertical that can avoid to hurt the sealing face of flexible tube sheet. The breaking down job finished after the outer barrel is pulled out, then please completely clean the in and out side of the cooling tube, the in side of barrel, the connections and the in and out end of oil. You can use the cleaning oil, steaming, heat kerosene, cleaning agent, etc depending on the pollution level. If it is very dirty in the cooling tube, you can use the nylon brush or iron bar, don't hurt the sealing surface while cleaning. When you use the liquids with moisture to clean, you should do the fully drying job to remove the water after cleaning. (Note: try to avoid dismantling the cooling element if no special need).

(b)Assembly method

Assembly job can be done against dismouting sequence, and change new sealing ring at the same time. Install well the sealing ring in the tube, assemble it. Take back the assemblied oil cooler to the old place, use the ring to fix it on the stand.

(c)The pressure checking must be done after the checking and assembly job finished. And the sequence is shown below: add the oil in the tube, close the oil position in one side. Give some pressure in 10kg/cm2G for 5 minutes, then enhance the pressure to 15kg/cm2G,keep this condition for 20-30minutes. Confirm the pointer of pressure gauge point to the 15kg/cm2G, then drain out the oil, take back to the place as before.

8.12 Electric Insulation

The insulation value of the compressor motor and fan motor shall be regularly tested to prevent the motor burning out without any warning. The lowest safe insulation value is 500V, 5MΩ. The reason for insulation degradation shall be identified and handled as soon as possible.

8.13 Periodic Inspection and Cleaning

The air compressor shall be periodically tested and cleaned as per the parts in the Air Compressor Periodic Maintenance Table after running for a while. The SOLLANT service staff or the qualified service staff of the specified regional maintainer will provide periodic inspection and cleaning services for above working.

8.14 Long-term Shutdown Precautions

1. Disconnect leakage circuit breaker, turn off the stop valve on the exhaust pipe;

2. Do not place the air compressor outside;

3. Stop within a month

(1) With about 5 minutes no-load operation, and then shut down;

(2) With 10 minutes no-load operation once a week;

4. Stop more than a month

(1) Before stop:

☆ Disconnect the exhaust pipe before stopping, with about 5 minutes to vent.

★ Drain lubricating oil, and inject 250mL anti-rusting oil to the oil tank (see next page), cover the oil and gas discharge cleaner with a plastic bag and seal the opening of plastic bag. (If did not cover the oil and gas discharge cleaners, anti-rust oil gasification will accelerate the vaporizing, which will greatly shorten the validity of oil gasification)

★ Completely close the main valve of condensate water discharge system and the exhaust stop valve. (If the exhaust pipe has been removed, sealed with a cover flange) With a plastic bag covering suction port of insulation cover inside the compressor. (Which is effectively for preventing rust oil vaporizing) and then remove the first stage exhaust thermocouples, poured into 300 ml volatile corrosion-inhibitor (see next page), and then loaded a first exhaust thermocouples (Pay attention not to damage the thermocouple when assembly and disassembly) The gasification of rust inhibitor can be replaced by a silica gel bag. But it needs to be replaced once every two months. Remember to make the external marks to show that silica gel bags placed within the system.

(2) Stop

★Every three months, the gasification of anti-rusting oil and anti-corrosion-inhibitor should be filled according to the methods described above.

(3) Restart:

☆ Replace all the oil in tank with new oil.

☆ Open the main valve of condensate water discharge system and the exhaust pipe stop valve. Confirm the removal of plastic bag on oil gas cleaner and air compressor suction port.

5. The gasification of anti-rusting oil:

JIS K2246 NP-20 or equivalent amount of oil: 250 ml Sample: Ferroguard 1009

Importer: UNITED SPECIAL CHEESE CO. Manufacturer: LONCO LABORATORIES CO.

6. The volatile corrosion-inhibitor:

JIS K2246 NP-18 or equivalent amount of corrosion-inhibitor: 300 mL

Sample：Belzon MA-10

Manufacturer: DAIWA CHEMICAL INDUSTRIES CO.,LTD

9. Safety Protection and Warning Device

9.1 Motor Overload Protection

There are two main motors in air compressor system, including air compressor main driving motor and cooling and circulating fan motor. For main motors, in the normal condition, the running current shall not exceed the setting value of micro-computerized controller due to voltage drop, three-phase imbalance and etc. When the running current of the more exceeds the upper limit defined by electrical protection device, the micro-computerized controller will automatically cut off the power and shut down the motor where the air compressor will be unable to start up unless reconnected to power supply. For reset, just press down the set switch with your hand.

Warning:

Voltage fluctuation shall be controlled ≤(-10%～+10%) and imbalance between phases shall not exceed 3%, otherwise the temperature within the motor will sharply increase. For example, when the imbalance of voltage reaches 3.5%, the temperature of the motor will increase approximately 25%.

Reasons for general motor overload:

(1) Manual misoperation: voluntarily adjust exhaust pressure, inappropriate system adjustment and etc.

(2) Mechanical failures: internal wear and tear of the motor, under-phased running of the motor, safety valve's failure to actuate, system setting failures, obstruction of oil separator and etc.

If the motor is found overloaded in the process of running, please contact maintenance supplies of SOLLANT or specified region, go for inspection and clarify the reason of overload, otherwise the burnout of the motor which will cause a lot of troubles for in-situ air requirements and maintenance fees.

9.2 Protection for Over-temperature of Exhaust

The highest exhaust temperature set by the system is 105oC, where the system will automatically cut off the power when it exceeds 105oC.Generally, many reasons can result in over-temperature of exhaust, among which the most common one is the failure of oil cooler. For air cooled oil cooler, if the fins are obstructed by dust which makes the cooling air fail to pass through the cooler freely, the temperature of lubricating oil will gradually increase and result in shutting down. Therefore, it is necessary to utilize the low pressure air to remove the dust on the fins every once in a while. For failure to blow off the obstruction on the fins, cleansing solution or solvent is recommended. The designed highest temperature of the air compressor is 45℃ where the exhaust temperature will increase with the ambient temperature, so it's important to select a region of low ambient temperature and good ventilation to place the air compressor.

9.3 Setting and Description of Other Protection and Warning

See the introduction given in Section 5.6 and 5.7 of this manual.

9.4 Failure Causes and Troubleshooting

When there is a fault, warning (alarm), the motor stops immediately and fault stop light will be on, monitor screen displays failure causes, you should promptly take appropriate measures (see 5.6), and then restart the compressor. The compressor controller stores the four latest fault records.

Fault	Causes	Solution
Main motor current overload	The pressure setting is wrong.	The air compressor must be operated for not less than 20 minutes
	Frequent start and stop	Check the pressure fluctuations, do not continue to occur. The air compressor must be operated for not less than 20 minutes.
	Power supply fault	Stop, check voltage drop, voltage fluctuation, phase loss and reverse phase
	Motor Fault	Stop, check the motor constant is greater than 10MΩ (Contact with De Nair Sales when it is not available)
Motor winding temperature is high (optional)	Frequent start and stop	Check the pressure fluctuations, do not continue to occur. The air compressor must be operated for not less than 20 minutes.
	The pressure setting is wrong.	The air compressor must be operated for not less than 20 minutes
	Power supply fault	Stop, check voltage drop, voltage fluctuation, phase loss and reverse phase
	Motor Fault	Stop, check the motor constant is greater than 10MΩ (Contact with De Nair Sales when it is not available)
Auxiliary motor failure	Power supply fault	Stop, check voltage drop, voltage fluctuation, phase loss and reverse phase
	Motor Fault	Stop, check the motor constant is greater than 10MΩ (Contact with De Nair Sales when it is not available)
	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
Dryer Failure (*1) (over current or voltage drop is too large)	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
	High ambient temperature	The ambient temperature should be lower than 45℃, and the engine room ventilation improves the air condition.
	Condensation fins blocked	Stop， clean the condensation fins
	The pressure setting is wrong.	The air compressor must be operated for not less than 20 minutes
	Power supply fault	Stop, check voltage drop, voltage fluctuation, phase loss and reverse phase
	The dryer motor Fault	Stop, check the motor constant is greater than 10MΩ (Contact with De Nair Sales when it is not available)
Start delay	Check the starter cabinet	
	Check wiring	
	Contact with SOLLANT Sales	
	Check the oil level	

Low oil pressure	Check the pressure relief valve setting	
	Check the oil filter element	
First stage discharge temperature is high	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
	High ambient temperature	The ambient temperature should be lower than 45℃, and the engine room ventilation improves the air condition.
	Check the intercooler blockage	
Second stage suction temperature is high	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
	High ambient temperature	The ambient temperature should be lower than 45℃, and the engine room ventilation improves the air condition.
	Check intercooler blockage	
Second stage discharge temperature is high	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
	High ambient temperature	The ambient temperature should be lower than 45℃, and the engine room ventilation improves the air condition.
	Check intercooler blockage	
High oil temperature	Dust net blocked	Need to clean the dust net, remove the filter to vacuum or wash with water
	High ambient temperature	The ambient temperature should be lower than 45℃, and the engine room ventilation improves the air condition.
	Check intercooler blockage	
	Check the oil filter element	
External fault	External fault signal	
Monitor failure (CPU)	Power off and then power on, press the reset button	
	Contact with SOLLANT Sales	
Sensor failure	Contact with SOLLANT Sales	

9.5 Maintenance, Repair and Parts Replacement Guide

Table of Cycles for Periodic Maintenance of Air Compressor

○Clean ◎Adjust/Check ●Replace

Item	Content	Daily	weekly	500Hr Monthly	1500Hr Quarterly	3000Hr Half-year	6000Hr Annually	12000Hr Two-year	18000Hr Three-year	30000Hr Five-year	Remark
Indicator light of instrument board	Visually inspect the abnormity of indicator light	◎									
Exhaust temperature (℃)	Check	◎									
Oil level	Check	◎									
transparent hose and core sleeve	Check/replace	◎									
Inlet connection hose	Check/replace	◎						●			
Pipeline (rubber/ metal)	Check/replace	◎						●			
electric insulation	Check/replace						◎				
Pipeline connection	Check						◎				
Oil Frog filter	Check/replace					◎	●				

Cooler	clean/check		○				◎				
Cooling fan	Clean		○								
Pre-filter screen	Clean		○								
Air filter element	Clean/Check/Replace		○		◎	●					500hrs first maintenance
Oil filter	Check/replace		○			◎	●				500hrs first maintenance
Air compressor lubrciant oil	Check/replace					◎	●				500hrs first maintenance
Motor	filling grease				◎						
Solenoid valve	Clean/Check/Replace		○			◎		●			
Safety valve	Check/replace						◎	●			
Draining solenoid valve	Check/replace						◎	●			
Oil Pressure adjust valve	Check/replace						◎	●			

Pressure Sensor	Verify and check/ replace						◎		●		
Temperature Sensor	Verify and check/ replace						◎		●		
Non-return Valve	Check/replace							◎	●		
Compressor seal	Check/replace					◎				●	
Inlet valve	Check/replace								◎	●	
Compressor bearing	Check/replace									◎	
Compressor first stage	Check/replace									◎	
Compressor second stage	Check/replace									◎	
Remark											
◆ This maintenance cycle is a recommended period and shall be modified according to different actual environments and working conditions.											
◆The maintenance sysle will be shorter according to operating environment and condition.											
◆The listed replace cycle is based on condition below:											
◆6000hrs running for a year											
◆Environment temp. not higher than 45ºC											
◆Yearly average temp not higher than 30º											

Specifications are subject to change without notice.