


# Index

1. SAFETY INSTRUCTION .....	2
2. INSTRUCTION OF INSTALLATION.....	3
2.1. INSTRUCTION OF CONVEYING .....	3
2.2. LAYOUT OF INSTALLATION.....	3
2.3. SCHEME FOR INSTALLATION .....	5
2.4. INSTALLATION REQUEST .....	5
2.5. HOW TO MAKE A SCHEME FOR COMPRESSED AIR SUPPLY .....	6
2.6. DESIGN OF AIR VOLUME .....	6
3. SYSTEM STRUCTURE, FLOW CHART AND FUNCTION .....	8
3.1. MAIN STRUCTURE AND WORKING THEORY. ....	8
3.2. FLOW CHART OF COMPRESSOR .....	9
3.3. DIAGRAM FOR THE PARTS (SEE APPENDIX) .....	10
4. ELECTRIC CONTROL SYSTEM AND CIRCUIT.....	10
4.1. THE REQUIREMENTS FOR LOW-VOLTAGE ELECTRICITY POWER AND PERIPHERY CONNECTION .	10
4.2. ELECTRIC CONTROL SYSTEM AND CIRCUIT (SEE APPENDIX).....	12
4.3. FUNCTION OF CONTROL SYSTEM .....	12
5. PIPE INSTALLATION .....	13
5.1. THE REQUIREMENT OF PIPING INSTALLATION .....	13
5.2. PRINCIPLE FOR PIPING.....	14
5.3. HOW TO SELECT PIPE SIZE .....	15
5.4. CONNECTING AND LAYOUT OF PIPE .....	16
6. HOW TO OPERATE .....	17
6.1. BEFORE FIRST STARTING .....	17
6.2. FIRST STARTING .....	18
6.3. FUNCTION BUTTON AND INDICATOR .....	18
6.4. NORMAL OPERATION .....	23
7. PERIODIC CHECK AND MAINTENANCE.....	24
7.1. MAINTENANCE STANDARD TABLE .....	24
7.2. HOW TO USE AND REPLACE LUBRICANT OIL .....	25
7.3. ADJUSTMENT OF CONTROL DEVICE .....	26
7.4. MAINTENANCE AND REPLACEMENT FOR SOME PARTS .....	27
7.5. MAINTENANCE OF SCREW AIR COMPRESSOR .....	29
8. TROUBLE SHOOTING.....	30
9. MAINTENANCE RECORD .....	34
10. APPENDIX .....	34
10.1 Electric Control System and Circuit	
10.2 Diagram for the Parts	
10.3 Flow chart of compressor	

# 1. Safety Instruction

In order to operate the compressor properly and safely, please read carefully and follow the instructions prior to its use.

- 1.1. Keep inflammable materials away from the compressor and pipes when welding pipe. Do not let welding sparks into the compressor unit.
- 1.2. Electric wires must be connected with the suitable switchboard which equipped with fuse and earthing. Install lightning conductor if necessary.
- 1.3. First time installation should be handled by our authorized technician.
- 1.4. Pay high attention for right rotation of airend when first starting or changing wiring.
- 1.5. Never let the compressor working with the pressure higher than the rating data.
- 1.6. Never start the compressor when it is with broken parts, not in proper order, when malfunction is detected or suspected. Put a visible sign on the unit to avoid further damage.
- 1.7. Put a visible sign of “Under Maintenance” or “ Do Not Turning On” on the  electric power switch box before doing inspection or maintenance.
- 1.8. Before doing any service work, turn off the unit, switch the power off, relief of all pressure and waiting the unit cooling.
- 1.9. Using non-corrosive impregnant to clean the parts. Never use flammable or volatile detergent.
- 1.10. After work on a period of time, checking the safety system such like the safety valve annually.
- 1.11. Always use original spare parts, lubricant oil and operating materials provided by us. Never use two different brands of lubricant oil together.
- 1.12. Operating by the skilled workers who familiar with this instruction, Always follow the working and safety instruction.
- 1.13. Never use the compressor as a respiratory appliance. To reach the breath quality, the compressed air should be filtered by additional devices.

- 1.14. To close the door of the unit when running. Be attention for high temperature parts or rotating parts when opening the door for checking or maintenance.
- 1.15. Do not weld the pressure container in the screw unit case. Never use fire as a lighting to check the unit or the inner of pressure container.

## **2. Instruction of installation**

### **2.1. Instruction of Conveying**

- 2.1.1. For safety conveying, please pay attention to the G.W. of the unit.
- 2.1.2. Ensure the balance when using crane. Put a protection to prevent the enclosure from damaged.
- 2.1.3. Using soft pad when forklift is used to convey the compressor. Ensure that the forks grip underneath the slot of the compressor.

### **2.2. Layout of Installation**

- 2.2.1. Installation on burthen center of the floor. Do the best to shorten the pipe and electric wire so as to avoid the loose of pressure and to save the electricity.
- 2.2.2. Considering the rationality of electricity and water supply when programming the compressor room.
- 2.2.3. Considering and layout more space for any predictable future increase of air devices.
- 2.2.4. To avoid the abrasion, corrosive or explosion, the room for compressor should be far away the place with explosion, poison, dust or corrosive. And the compressor should be installed in the low position with minimum yearly frequency wind direction (LPWMYF) if the compressor using in the place with bad condition as above. The following list shows a minimum distance from the baneful sources:

Sources	Wind direction	Horizontal Dist.(m)
Flammable gas	any	$\geq 20$
Smoke exhaust	<b>LPWMYF</b>	$\geq 50$
Dust	Adverse direction	$\geq 50$
	Vail wind direction	$\geq 20$

2.2.5. The compressor will release high heat discharge, specially in the summer. A good ventilation, free of sunshine room is necessary.

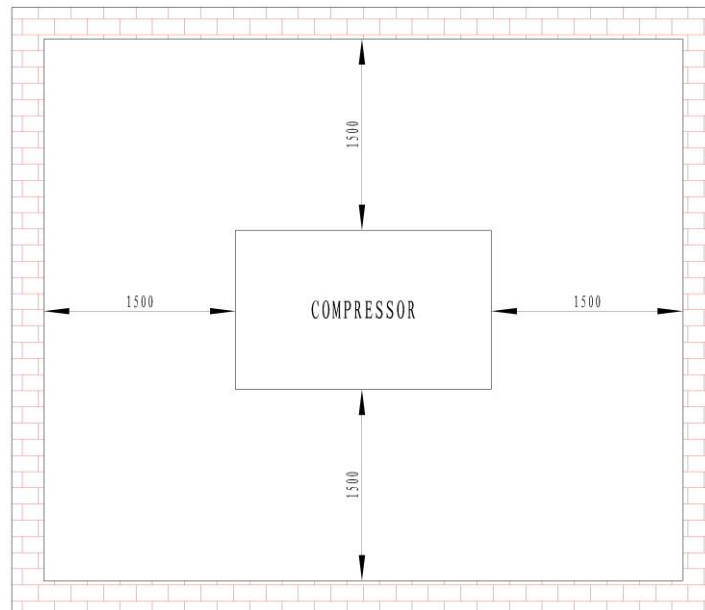
2.2.6. Forbidden rain directly and the compressor should not be settled in the open air.

2.2.7. The room of compressor should be better detached. The minimum clearance of fireproof workshop is from 10-18 meter according to the different fire resistance grade.

<div>Fire resistance</div> <div>Space between</div> <div>Fire resistance</div>	First and second grade	third grade	forth grade
First and second grade	10	12	14
third grade	12	14	16
forth grade	14	16	18

## 2.3. Scheme for installation

**Minimum 1500mm distance between wall and compressor**



## 2.4. Installation Request

- 2.4.1. Enough space to carry out maintenance.
- 2.4.2. Room ground should be cement. A 150mm high cement flat base is better for compressor. Horizontal degree of the base should not be more than 0.5/10000(mm). The grooves should be around the base for replacement of lubricant oil.
- 2.4.3. The compressor must be put on the base properly without any vibration
- 2.4.4. For less noise please using sound absorption material on the wall if possible. Hard surface of the wall such like ceramic tile is not recommended.
- 2.4.5. The compressor room must be clean, dry, cool and well ventilated. The ambient temperature should be controlled within  $-5^{\circ}\text{C}$  -  $40^{\circ}\text{C}$ .
- 2.4.6. Keep the room away from inflammable, combustible or explosive gas and corrosive material. Keep away from powder of metal, cement and other dust.
- 2.4.7. For the wind cooled device, well ventilated in the compressor room is very important. It's necessary to take wind direction into considering when arrange the exhaust device.

## 2.5. How to make a scheme for compressed air supply

Please consider the layout of air requirement; working pressure, air quality grade, technical and economic factor. We commend the following schemes:

### 2.5.1. General compressed air supply station:

Build one compressed air supply station for all the users in the factory. This scheme is most used for middle and small scale factory or the large scale factory with concentrated air requirement devices.

### 2.5.2. Section compressed air supply station

When the factory scale is very large, the compressed air requirement is large and the devices are decentralized, for pressure loose caused by long pipe net, we suggest using this method. The different section stations are connected with the pipes and can be used to be backup each other. Please design in advance for all stations.

### 2.5.3. On spot supply

Using for small volume requirement. Using the compressor on site to supply air.

### 2.5.4. Combined method

In some large factories, their main requirements of compressed air are centralized. But they still have some minor requirements which are dispersed. Or in some factories their air requirement is not balanced in different time.

## 2.6. Design of air volume

### 2.6.1. Calculating from average consume of compressed air:

$$Q_2 = \sum Q_0 K (1 + \Phi_1 + \Phi_2 + \Phi_3) \text{ m}^3/\text{h}$$

$Q_2$ : Design volume ( $\text{m}^3/\text{h}$ )

$Q_0$ : Sum of average consume for each device or workshop ( $\text{m}^3/\text{h}$ )

$K$ : Not equally for different device, max. modulus 1.2 – 1.4

$\Phi_1$ : Pipe leakage modulus.

Pipe:	<1km	<1.5km	>2km
Modulus:	0.1	0.15	0.2

$\phi_2$ : Device abrasion modulus: 0.15 – 0.2

$\phi_3$ : Inexpectant modulus: 0.1

#### 2.6.2. Calculating from maximum consume of compressed air:

$$Q_2 = \sum Q_{\max} K_2^1 (1 + \phi_1 + \phi_2 + \phi_3) \text{m}^3/\text{h}$$

$\sum Q_{\max}$ : Sum of maximum consume for each device or workshop (m<sup>3</sup>/h).

$K_2^1$ : using modulus in same period (from experience or similar project)

$\phi_1, \phi_2, \phi_3$ : Same as 2.3.1

#### 2.6.3. Calculating from combined design volume:

$$Q_2 = (Q_1 + \sum Q_0)(1 + \phi_1 + \phi_2 + \phi_3) \text{m}^3/\text{h}$$

$Q_1$ : maximum compressed air volume need by the main devices.

$\sum Q_0$ : average consume volume from the other devices.

This method can be used in the factory which has large, consume device or  $Q_0$  and  $Q_1$  are with big difference.

The above three methods can be chosen according to the customer's experience, specific requires for different industries or conventional practice.

Please add 8%-10% or 15%-20% air consume design when using heat filter or non-heat filter in air clean system.

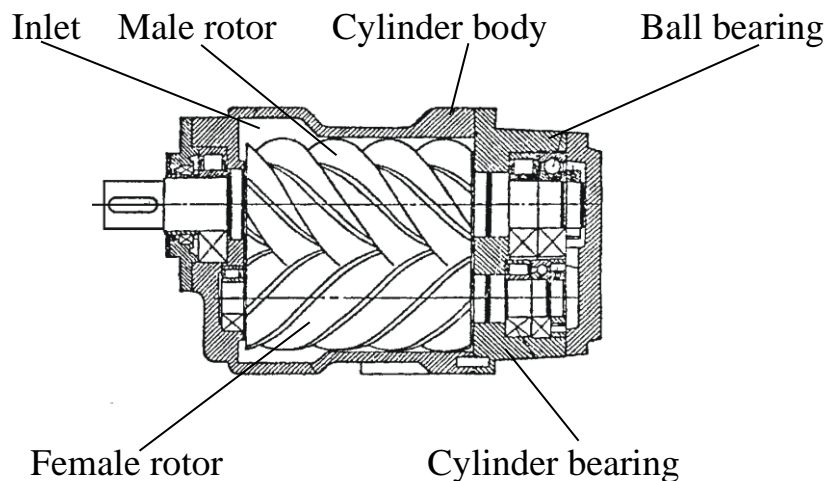
Altiplano Modulus Revise Table

Altitude (m)	0	305	610	914	1219	1524	1829	2134	2438
Modulus	1.0	1.03	1.07	1.10	1.14	1.17	1.20	1.23	1.26

### 3. System structure, flow chart and function

#### 3.1. Main Structure and working theory.

Sketch map of air end



Working theory

Intake, compressing and discharge



Intake:

There is an air room formed between the rotors and the screw shell. When the rotors rotate, fresh air is taken in from the suction port.

Compressing

Fresh air going into the hermetic room between the rotors and screw shell and



stopping intake due to the rotation of the rotors. Continually rotation of the rotors caused the hermetic room being smaller so the air is compressed.

## Discharge

When air pressure reaches the specified discharge level, the compressed air going into the air/oil separator through discharge port and then repeat this process.

## 3.2. Flow chart of compressor

(see appendix)

Compressor contains air system, lubricant system and cooling system.

### 3.2.1. Air flow system

Air been sucked into filter and going into intake control valve after filtering the dust in the air filter. Then it would be compressed in the airend. The compressed air mixed with oil goes into air/oil separator. Then separated compressed air is discharged via pressure control valve, post cooler, air/water separator and air outlet. Separated oil had been kept in the air/oil separator which connecting with lubricant system.

### 3.2.2. Lubricant system:

This system contains air/oil separator, by-pass valve, oil cooler and oil filter. Lubricant oil inside air/oil separator goes into oil pipe effected by compressed air, through by-pass valve, oil cooler and oil filter. Then the oil has been divided 2 ways, one way is injected to airend, the other way is introduced to bearing set. After those 2 parts oil flow again into the airend with compressed air, the oil is discharged to air/oil separator and after being separated, it stays in the air/oil separator for next working cycle.

### 3.2.3. Cooling system

There are two kinds of air compressor: wind cooled and water cooled. The wind-cooled type compressor is forced cooled by cooling system which contains cooling fan, oil cooler, and air cooler. Cooled air is taken into oil

cooler and air cooler through the fan to make the oil and compressed air cooling. Be sure to maintain and clean the fan and cooler periodically.

The water-cooled system is different from wind-cooled type by using water to cool down the oil and air. Water supply should be installed by the user. Please pay attention for the water treatment.

### **3.3.Diagram for the parts (see appendix)**

## **4. Electric control system and circuit**

### **4.1. The requirements for low-voltage electricity power and periphery connection**

- 4.1.1. The power supply is AC, three phases. According different areas' request, we provide different voltage/Hz motor such like 380V/50Hz, 220V/60Hz, 415V/50Hz, 460V/60Hz and high voltage like 10000V.
- 4.1.2. The decline of voltage should be not more than  $\pm 5\%$  and the discrepancy among each phase must be within  $\pm 3\%$ . A phase sequence protector is necessary.
- 4.1.3. The power supply must be installed with a disconnecting switch to prevent short circuit or lack of phase.
- 4.1.4. Checking the secondary circuit fuse and choose the proper non-fuse switch according to the compressor power.
- 4.1.5. Below table indicates the dimension of the wire for 380v/50Hz. Please re-calculate for the different voltage and frequency, or consult us.

Electric power wire (copper) size : 380–415V/50Hz

Compressor HP/KW	Volt. (V)	Freq. (Hz)	Max.Curr. (A)	Wire Size (mm <sup>2</sup> )
20/15	380	50	35	10
30/22	380	50	50	16
40/30	380	50	67	25
50/37	380	50	86	35
70/55	380	50	128	60
100/75	380	50	165	80
125/90	380	50	179	125
150/110	380	50	217	150
175/132	380	50	242	185
220/160	380	50	292	240
270/200	380	50	348	300
340/250	380	50	433	400
430/315	380	50	544	400

Electric power wire (copper) size : 220–230V/60Hz

Compressor HP/KW	Volt. (V)	Freq. (Hz)	Max.Curr. (A)	Wire Size (mm <sup>2</sup> )
7.5/5.5	220	60	20	10
10/7.5	220	60	27	10
15/11	220	60	38	16
20/15	220	60	51	16
25/18.5	220	60	62	25
30/22	220	60	73	25
40/30	220	60	99	35
50/37	220	60	123	50
60/45	220	60	148	70
75/55	220	60	180	95
100/75	220	60	241	120
125/90	220	60	288	150
150/110	220	60	349	185
175/132	220	60	419	300

- 4.1.6. Using the individual electric system if possible. Too big voltage drop or non-balance among each phase will touch off the compressor protection device.
- 4.1.7. Earthing is necessary. Never do earthing by wire to air pipe or water pipe. Please follow the local regulations if it is more strict than above request.

## **4.2. Electric control system and circuit (see appendix)**

### **4.3. Function of control system**

#### **4.3.1. Start the compressor**



When connecting with electricity power, please check if it is with adverse phase. This compressor is equipped with adverse phase protecting device. Motor will be not started if phase is adverse. Please adjust the phase sequence again when adverse phase. When “ON” button pressed, the compressor starts with “Y” mode, then runs with “  $\Delta$  ” mode.

Starting with loading (pressure gauge or panel showing that there is pressure inside the compressor) will cause large current occurring and damage the parts.

#### **4.3.2. Loading regulation during running**

There is an automatic regulator in the controlling system. Air pressure will be rising when compressed air requirement is decreasing. When pressure reaching rated upper limit, the solenoid valve will receive a signal to close the intake valve. Meanwhile the compressor can only suck few of air to ensure the minimum necessary pressure for lubricant oil, and the solenoid valve release the air in the air/oil separator to make the system running without loading. When pressure decreased to rated low limit, all controlled valves will reposition again to make the system running again with full loading. After compressor running with unloading and the pressure can not decrease to rated low limit within 10 minutes, the system will stop automatically and will be stand-by.

#### 4.3.3. Stop



Press “OFF” for stopping the compressor. The motor will stop after minutes of discharging. If no “OFF” button on the panel, please press the URGENT STOP button when the compressor is discharging. “URGENT STOP” button is only for emergency case otherwise the lubricant oil may be spit from the air inlet.

#### 4.3.4. The compressor will stop automatically when fault detected.

##### 4.3.4.1. Phase sequence protection:

Compressor can not start when wrong phase sequence. Adjust any 2 wires then restart.

##### 4.3.4.2. High temperature protection:

The system will switch off if discharge temperature is over rated figure (Default figure is 105 °C). Meanwhile the panel will show “overheat stop”. Many factors will cause the high temperature but the most popular reason is that dust covered oil cooler.

##### 4.3.4.3. High discharge pressure protection

The system will stop automatically when system pressure is over the rated level. Meanwhile the “discharge pressure high” will be shown on the panel.

##### 4.3.4.4. Overload protection:

System will stop automatically when motor overload. Meanwhile “overload” will be shown on the panel.

##### 4.3.4.5. Maintenance alarm (optional function)

System will alarm when air filter, oil filter or oil separator is blocked. Then you must change a new one.

## 5. Pipe Installation

### 5.1. The requirement of Piping installation

#### 5.1.1. Outlet of compressor has thread for connecting with air supply pipe directly.

Please refer to the measure of product

- 5.1.2. In order to economize electricity consumption, an suitable receiver with enough capacity air receiver is recommended. For convenient check and maintenance, for avoiding compressed air back flow, a stop valve must be fixed between air receiver and compressor. Be sure a safety valve must be fixed on the receiver.
- 5.1.3. To avoid the condensate flowing into the compressor, discharge pipe and lateral pipe must be jointed from over the main pipe.
- 5.1.4. Shorten pipe, decreasing the quantity of elbow and valve by all means to avoid pressure loss.

## **5.2.Principle for piping**

Compressing air piping system should not only cover all demands for volume, pressure and quality of air but also being considered the reliability, saving energy, saving cost and easy maintenance.

### **5.2.1. Considering pressure**

- 5.2.1.1. To design the piping according to highest pressure device. The other devices with low-pressure requirement can be adjust by decreasing pressure on the spot. There are two kinds of pressure level (0.6MPa and 0.3MPa) using in general machinery plant, for example, piping system can be designed to 0.6MPa then using regulator valve on the sub-piping to meet the demand of 0.3MPa pressure devices.
- 5.2.1.2. Designing several piping system with different pressure levels to meet the various requirement for pressure in different workshops.

### **5.2.2. Considering air quality**

- 5.2.2.1. Adopting a non-treated compressed air supply piping system. Then fixing oil, moisture or/and dust filtering device on the spot for some devices with special air quality request.
- 5.2.2.2. Adopting two piping system in some areas, one supplying non-treated

compressed air, another one supplying dry, oil free or/and clean air.

### 5.2.3. Considering loading

Some pneumatic devices require large compressed air instantaneously such as forging hammering machine, pneumatic sand blowing in foundry factory, etc). Adopting a special piping system for them or fix an air receiver near these devices to abirritate the system loading and steady the pressure.

## 5.3. How to select pipe size

Compressed air will be decreased by friction in beeline pipe, resistance from the places where there are valve, elbow and pipe diameter changing. Pressure decrease can be calculated by following table:

Air pressure decrease (kg/cm<sup>2</sup> – 100m)

Flow m3/min	Diameter of pipe (inch)							
	1/2	3/4	1	1 1/2	1 3/4	2	2 1/2	3
0.8	5.87	1.23	0.339	0.085	0.038			
1.0	9.16	1.92	0.53	0.134	0.059	0.0157		
1.6	23.5	4.90	1.36	0.343	0.152	0.0428		
1.8	62.0	6.20	1.72	0.434	0.192	0.0541		
2.0		7.66	2.12	0.536	0.237	0.0668	0.0177	
2.2		9.26	2.56	0.649	0.287	0.0808	0.0214	
2.4		11.0	3.15	0.772	0.342	0.0967	0.0255	
2.6		12.9	3.58	0.906	0.401	0.113	0.0299	
3.0		17.2	4.77	1.21	0.533	0.150	0.0398	0.0168
Flow m3/min	Diameter of pipe (inch)							
	3/4	1	1 1/2	1 3/4	2	2 1/2	3	3 1/2
3.4	22	6.13	1.55	0.684	0.193	0.0511	0.0203	
3.8		7.66	1.94	0.855	0.241	0.0636	0.0264	
4.2		9.35	2.36	1.05	0.295	0.078	0.0311	
4.4		10.3	2.54	1.15	0.323	0.0855	0.0341	0.0158
4.8		12.2	3.09	1.36	0.385	0.102	0.0406	0.0189
5.0		13.3	3.35	1.48	0.418	0.111	0.044	0.0204
5.5		16.0	4.06	1.79	0.505	0.134	0.0533	0.0244
6.0		19.1	4.82	2.13	0.601	0.159	0.0654	0.299

Flow m <sup>3</sup> /min	Diameter of pipe (inch)							
	1 1/2	2	2 1/2	3	3 1/2	4	5	
6.5	2.50	0.709	0.187	0.0744	0.0346			
7.0	2.90	0.815	0.217	0.0863	0.0401			
7.5	3.33	0.940	0.249	0.0990	0.0460			
8.0	3.79	1.0	0.283	0.113	0.0524	0.0247		
8.5	4.28	1.21	0.319	0.127	0.0590	0.0309		
9.0	4.80	1.35	0.358	0.143	0.0662	0.0347		
9.5	5.35	1.51	0.399	0.159	0.0738	0.0386		
10	5.93	1.67	0.442	0.176	0.0818	0.0428		
11	7.17	2.02	0.535	0.203	0.099	0.0518	0.0165	
12	8.53	2.40	0.637	0.254	0.118	0.0616	0.0196	
13	10.0	2.82	0.747	0.298	0.138	0.0723	0.0230	
14	11.6	3.76	0.995	0.396	0.184	0.0963	0.0306	

Note: ① Actual pressure decrease=table figure x length of pipe/100 x (pressure gauge figure + 1)

② Piping pressure decrease should plus the decrease from elbow, valve, pipe diameter change, tee and etc. These figure can be found by relevant technical manual.

## 5.4. Connecting and layout of pipe

- 5.4.1. Pipes connected by welding. But in the place which they connect with device and valve or which need disassembly very often, should use union joint or flanged joint. Adopting union joint when pipe diameter is no more than DN25, flanged joint when pipe diameter is more than DN25.
- 5.4.2. Design a gradient more than 2/1000 and drain valve fixed on low position for pipes which using for a system without any treatment for compressed air so as to drain out water and oil. Piping should be better if it is designed with less elbow and valves, short and straight.
- 5.4.3. Underground pipes should be more than 0.7m deep but no limit for dry and clean air pipes
- 5.4.4. Ensure the pressure gauge and airflow measurement meter can be easy recognized by operator. Pressure indicator should be fall in range of 1/3 –1/2 of dial plate.



- 5.4.5. After finishing installation of piping system, please do test job including pressure intension and pressure sealed. Qualified after test by 1.05-1.50 times of design pressure. Water pressure testing is not recommended.
- 5.4.6. Different users require different level of dry and clean of compressed air. Ideal configuration is water/air separator + air receiver + front filter + air dryer + high precision filter.
- 5.4.7. Air receiver is a kind of pressure container which must equipped with full safety associates such as safety valve, pressure gauge, drain valve. And it must be licensed and tested periodically by local authority.

## **6. How to operate**

### **6.1. Before first starting**

- 6.1.1. Check the lubricate volume in oil separator tank and ensure the level of oil is between upper limit and lower limit.
- 6.1.2. Make sure earthing properly and it must be accordance with local safety standard.
- 6.1.3. Check if all pipes are connected through and all joints are screwed down properly.
- 6.1.4. Check the electricity power, the pressure and all shows on the panel are right. Ensure the compressor starting without loading.
- 6.1.5. If the first test is long time after buying date please fill about 0.5kgs of lubricant oil into intake of airend and then turn airend by hand for several rounds to avoid damage of compressor. Pay attention to avoid any matter dropping into airend.
- 6.1.6. Operating valves according to the request of piping technics and make sure the discharge valve is open.
- 6.1.7. Ensure the operator is on the safe position before starting.

6. 1. 8. Turn off the drain valve.

## 6.2. First starting

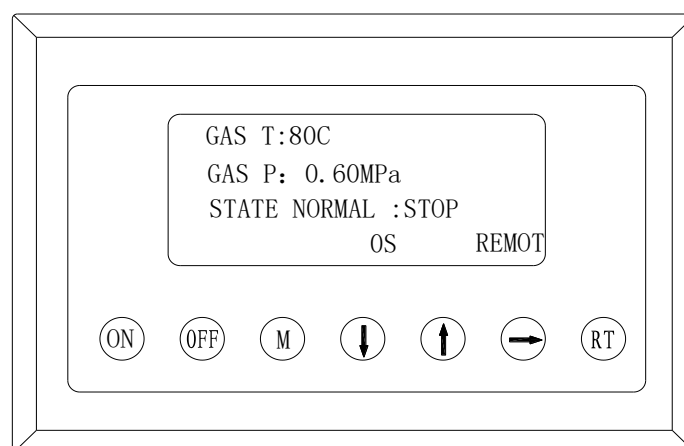
6. 2. 1. Switch on firstly and check if it has a right phase sequence, if the panel display is right. The compressor cannot start if phases reversed. For more safety please check again the rotary direction after press “ON”. Can easily feeling the air filter sucking air by one finger if it is with right phase sequence. If not, cut off the electricity power, exchange the other two wires. Remember: compressor strictly prohibit to reversal.
- 6.2.2. After the compressor starting, look into all meters and panel, be sure the temperature and noise is normal, check if it has any oil leakage. Stop the compressor in case of any abnormal.
- 6.2.3. After press “OFF”, the compressor will still run a several minutes for unloading.

**WARNING:** PRESS “URGENT STOP” ONLY IN CASE OF EMERGENCY AND RESTART AGAIN AT LEAST 2 MINUTES LATE.

## 6.3. Function button and indicator

6.3.1. Control panel explanation for the model of EAS-10 to EAS-75

6.3.1.1. Function button and indicator



ON——start: press this button can start the motor

OFF——stop: press this button can stop the motor.

M——Setting:after modify the data and then press this button to confirm the data input.

↑——Up: press this button to modify figure when modify data, to choose when select.

↓——Down: press this button to modify figure when modify data, to choose when select.

→——Shift /confirm: It's the shift button when revising data and the confirm button when doing menu selection

RT——return/restore: return to the last menu when operating and restore when stop with fault.

#### 6.3.1.2. Status indication and operation

Display as follows after electrifying

welcome  
  
\*\*\*\*\*compressor

Display the following  
interface after 5 minutes

GAS T: 20℃  
GAS P: 0.60Mpa  
STATE:NORMAL STOP  
NEAR

Press “↓” to enter into selection interface

**RUN PARAMETER**  
CALENDER  
CUSTOMER PARAMETER  
FACTORY PARAMETER

### a. Look at the run parameter

press “↓” or “↑” to shift the black scroll bar to “run parameter”, then press the confirmed button “→”:

MOTOR CURRENT
TOTAL RUN TIME
THIS RUN TIME
MAINTENANCE PARAMETER
HISTORY FAULT
PRODUCTION DATE、NUM
THIS FAULT

Press “→”:

current(A):	R	S	T
main motor:	56.1	56.2	56.0
fan motor:	4.1	4.1	4.1

Press the “RT” button to return upper menu. When stop operate then it will return automatically to the main interface.

Using “↓”、“↑” “→” “RT” to see the run time, maintenance parameter, historical faults, he date to leave factory, spot faults, etc.

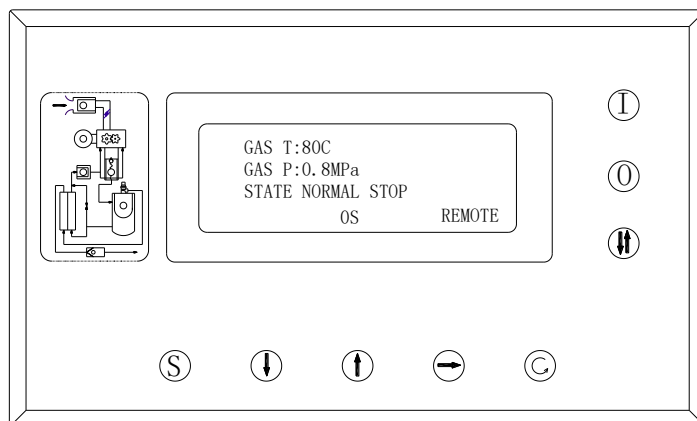
### b. Calendar:

press “↓” or “↑” to “calendar” then press “→”:

PRESENT TIME
2004.02.22
Wed.
12H 46M 59S

Adjust the date and the time when compressor stops. method : press “↓” or “↑” to the corresponding interface then press “→” to confirm ,when figure blinks, use “↓” and “↑” to revise, finally to press “M” for conservation.

### 6.3.2. The panel for EAS-100 and above:



I——starting: press this button to run

O——stopping: press this button can stop the compressor

S——setting: after revising the data, press this button to confirm

↑——up: press this button to modify figure when modify data, to choose when select.

↓——down: press this button to modify figure when modify data, to choose when select.

→——Shift /confirm: It's the shift button when revising data and the confirm button when doing menu selection, keep pressing this button a few seconds to switch “on-off”, “stepless”, “automatic” when compressor stops.

↓↑——manual load/uninstall: when press this button on manual mode, can increase or decrease loading in a certain pressure range.

↶——return/restore: return to the last menu when operating and restore when fault stop.

Display as follows after electrifying

welcome

\*\*\*\*\*compressor

Display the following  
interface after 5 minutes

GAS T: 20°C  
GAS P: 0.60Mpa  
STATE:NORMAL STOP  
NEAR

Press “↓” to enter into selection interface

**RUN PARAMETER**  
CALENDER  
CUSTOMER PARAMETER  
FACTORY PARAMETER

#### 6.3.2.1. Look at the run parameter

Press “↓” or “↑” to shift the black scroll bar to “run parameter”, then press the confirmed button “→”:

**MOTOR CURRENT**  
TOTAL RUN TIME  
THIS RUN TIME  
MAINTENANCE PARAMETER  
HISTORY FAULT  
PRODUCTION DATE、NUM  
THIS FAULT

Press “→”:

current(A):	R	S	T
main motor:	56.1	56.2	56.0
fan motor:	4.1	4.1	4.1

Press the “RT” button to return upper menu. When stop operate then it will return automatically to the main interface.

Using “↓”、“↑” “→” “RT” to see the run time, maintenance parameter,

historical faults, he date to leave factory, spot faults, etc.

#### 6.3.2.2. Calendar

Press “↓” or “↑” to “calendar” then press “→”:

<b>PRESENT TIME</b>
2004.02.22
Wed.
12H 46M 59S

Adjust the date and the time when compressor stops. method : press “↓” or “↑” to the corresponding interface then press “→” to confirm ,when figure blinks, use “↓” and “↑” to revise, finally to press “S” for conservation.

### 6.4. Normal Operation

6. 4. 1. Before starting, open drain valve a little to drain away the water in air/oil separator, then screw down the drain valve and open discharge valve.

6. 4. 2. Starting: Switch on the power supply then press “ON”.

6. 4. 3. Stop: press “OFF”. Compressor will still run a several minutes for unloading.

If the compressor is not running for long time, please switch off electricity power and close the discharge valve.



This compressor can restart automatically. Never do any maintenance or checking work when compressor is still with electricity power connection. Never touch the fan for the compressors which have independent automatically cooling fan system. Press “OFF” button on the panel and then after compressor stops, switch off the main switch of power, if do some checking or maintenance.

When the electricity break off, the compressor will stop abruptly, then remember to turn off the electric power to avoid the burning when current coming.

## 7. Periodic check and maintenance

### 7.1. Maintenance Standard Table

Periodic Time	Running Time	Maintenance Item
Daily	8 hours	Check lubricant oil level, panel display, drain water, check temperature and noise.
Weekly	80 hours	Check leakage and clean whole unit. Check the belt tension for new machine.
3 months	500 hours	Check the vacuum counter of air filter and clean. For new compressor: replace oil filter and lubricant oil.
Yearly	1000 hours	Check safety valve by hand. Clean cooler. Check and clean temperature valve and electric device.
	2000 hours	Replace air filter element, oil filter and oil. Check and adjust the tension of belt. Change new belt if can not make adjust properly. Tighten all bolts. Clean cooler.
	3000 hours	Check By-pass valve. When pressure gap indicator glows or oil pressure is higher than compressed air pressure, please check and replace air/oil separator. Add lubricant to motor bearing. Clean cooler.
	5000 hours	Replace air filter element. Replace oil filter and lubricant oil. When pressure gap indicator glows or oil pressure is higher than compressed air pressure, please check and replace air/oil separator. Clean cooler.
	10000 hours	Replace nylon pipe, belt, oil level gauge, solenoid and O rings.
	20000 hours	Replace bearing, bearing seal, deadening, rubber pipe or any parts if necessary.

**Note:** Maintenance time is subject to first reaching one between periodic time and running time.



## 7.2. How to use and replace lubricant oil

Lubricant oil is very important for the performance of compressor. Any mistake or wrong operation on oil may cause damage of compressor.

Ensure to obey the following rules of oil using:

### 7.2.1. Always using original lubricant oil special for screw compressor.

Supply from us.

### 7.2.2. How to use lubricant oil

7.2.2.1. Never use mixed oil from different brand and models. Never use regeneration oil or fake oil. Always use the model recommended by the producer of air compressor.

7.2.2.2. The lubricant oil should be anti-oxidation, anti-foaming, corrosion and abrasion resistance, good water separation, high flash point and low inclining point.

7.2.2.3. Always use the oil which is within guarantee period otherwise it may damage compressor, even self-ignite.

7.2.2.4. Obey the replacement period. And please check the status periodically according to the circumstance and operation condition every 3 to 6 months in first 2 years, such like mucosity, acid number, water, flash point and impurity and so on.

7.2.2.5. Please make a “system cleaning” after using 2 years. “System cleaning” herein is to change lubricant oil continuously 2 times; second cleaning is 6 hours after first cleaning and running.

7.2.2.6. Always replace oil filter together with lubricant oil.

### 7.2.3. Some factors affecting oil change time:

7.2.3.1. Bad ventilation, high circumstance temperature.

7.2.3.2. High moisture or rainy season

7.2.3.3. Circumstance with dust.

7.2.3.4. Using mixed oil.

#### 7.2.4. Steps of oil changing:

- 7.2.4.1. Starting compressor firstly then stop it after the temperature rising.
- 7.2.4.2. After discharge pressure decreased to zero, close the stop valve which is near discharge outlet; open the drain valve of air/oil separator and drain out oil in the tank. Pour few new oil into the replenish port when turning the rotor by hand in right direction for full cleaning.
- 7.2.4.3. Drain away oil inside the oil cooler and the other oil pipes.
- 7.2.4.4. When the oil tank is completely emptied, close the drain valve again. Pour new oil into the replenish port. Please pour a little more than proper level because that there is no oil in all oil pipes and oil cooler.
- 7.2.4.5. Re-fasten the cap of the oil port then turn power on and check oil level. If the oil is not enough, please stop the compressor again and pour more until it reach the proper level.

### 7.3. Adjustment of control device

#### 7.3.1. To adjust the safety valve:

Generally the user does not need to adjust safety valve because its release pressure is set up to 1.1 times of rated discharge pressure before packing. If the user has skilled technician who must make some adjustment, please loosen the nut on the safety valve for release air. Screw the bolt clockwise to adjust the higher release pressure, counterclockwise to adjust the lower release pressure. Ensure fasten the nut after adjustment.

#### 7.3.2. To adjust the pressure switch (for some models only)

Do not adjust the pressure switch for rated pressure otherwise it may cause compressor damaged. The users can adjust the gap of pressure according to their operating and requirement. Screw the bolt counterclockwise can increase the gap.



Note: Do not adjust the safety valve and pressure switch, as they all have

been fixed before leaving factory. Any damage, or/and losing of compressor, properties is in account of yourself.

Please contact authorized professional people for any necessary adjustment.

## **7.4. Maintenance and replacement for some parts**

### **7.4.1. To replace the element of Air/oil Separator.**

If finding oil consuming increased more, please check oil filter and oil pipes to find if they are blocked. If the oil consuming is still abnormal high after cleaning relevant parts, please replace the air/oil separator. If pressure gap between two ends of element of air/oil separator is more than 0.15Mpa, it means that separator element is malfunction or air flow is short circuit, please replace the separator element.

General replacement period is 3000-4000 hours but will shorten if using compressor in bad condition.

Replacement steps:

#### **7.4.1.1. outer type separator**

- a. For outer type separator, please stop compressor and close discharge outlet, open drain valve, ensure system pressure is zero.
- b. Remove the oil separator and change a new one

#### **7.4.1.2. inner type separator**

- a. For inner type separator, please stop compressor, close discharge outlet, open drain valve, ensure system pressure is zero .
- b. Dismantle the pipes on top of air/oil tank; dismantle the pipes between min. pressure valve and cooler,
- c. Remove oil return pipe and bolt on the top of air/oil tank, now you can open the tank and replace the inner separator.
- d. After replacement, please assembly the above parts or pipes in reverse sequence.

Warning: Pay attention to prevent any stuff drops into oil tank when doing replacement.



Pay attention for static electricity releasing. Please connecting the inner metal net to the oil tank shell so as to prevent explode caused by accumulative static electricity.

#### 7.4.2. Replace the **Oil Filter**

Replace the oil filter periodically to prevent compressor from stopping by air discharge temperature rising, most important is to prevent the bearing from serious abrasion. Before fix new oil filter, put some oil on gasket. After fix properly, screw 3/4 loop again by hand. Check during operation if it leaks or not.

#### 7. 4. 3. Clean the **Air Filter**

To replace element of air filter every 1500 hours – 2000 hours when the negative pressure over 0.63kg or something block in the air filter. Shorten replacement period if compressor operating in heavy dust circumstance.

Stop compressor before change a new one.

Clean element of air filter: Take out element and pat it to remove larger and most of dust. Clean element with air-blow with 0.2MPa pressured air from inside. Do not reuse the filter element if it has a lot oil or grease which is cannot be cleaned or the filter element damage even though it's just a small hole.

#### 7. 4. 4. Clean the **cooler**

7. 4. 4. 1. Clear away the dust by reversed compress air. If dust sticks on the cooling air side of the cooler, it should be cleaned right away, or it may deteriorate by its heat exchange and causes compressor stop by high temperature.

7. 4. 4. 2. Disassembly of water cooler: A: close passageway of the two liquids. B :let out the liquid and then clean the cooler and the joint pipes. C: Tear down the outside join parts .D: make marks before disassembly, tear down the water-return top then take out the “o” ring and the airproof valve; E :draw out the pipe gently, at that time the disassembly is finished.

7.4.4.3. Assembly of **water cooler** ∴ please assembly the above parts or pipes in reverse sequence.

7.4.5. Adjust the **belt**

7.4.5.1. After first 8 hours operation, please check if the belt tension is lowered and ask your dealer or our service station to do the tension adjustment if needed. And be sure to adjust it every 1500 hours.

7.4.5.2. Ensure to stop the compressor and switch off the power before adjustment. To screw downwards the bolt on top of mount of motor until the belt tension is fall within the range of allowance.

7.4.5.3. Replace the belt set fully; Never replace only one part of belts. Never make any lubricant oil drops on the belt.

7.4.5.4. Don't use the hard object to install the belt, and period of time later should be adjusted.

7.4.6. Drain water

Drain away water before starting. Open drain valve on the bottom of air/oil separator, close it until oil is out. The bottom of oil tank should be drained away the dirt.

## **7.5. Maintenance of screw air compressor**

7.5.1. Steps for the unused compressor

7.5.1.1. Keep the working circumstance dry, keep surface of motor clean, and keep wind cooling fan away from dust and some kind of fibriform matter.

7.5.1.2. Change the place of rotor every three months to prevent bearing rustiness.

7.5.1.3. Make pipe line and circuitry clean, insulated and in order.

7.5.1.4. Safety devices such like safety valve, fuse, automatic protection device must be in good condition. Anti-explode, arrester and earthing device must be accord with safety regulations.

7.5.1.5. Equipments and working circumstance should be clean and non-oil. The pipeline and circuitry should be reliably

## 8. Trouble Shooting

Trouble Symptoms	Possible Reason	Solutions
Fail to start	Fuse burned	Check and replace
	Electric phase lack or start button contact no good	Check, fix or replace
	Wrong setting or malfunction of pressure switch	Re-setting or replace
	Motor overload or damaged	Wait motor cool, fix or replace
	Conductor malfunction	Check, fix or replace
	No reposition from malfunction	Wait 2 minutes for reposition or Press emergency button
	Airend malfunction	Check
Can not compress air	Min. pressure valve leakage	Check and fix
	Intake valve blocked on “off” position or its small hole blocked.	Check, fix or replace
	Solenoid malfunction	Check circuit and solenoid, or replace
	Air filter blocked seriously	Clean or replace filter element
Fail to unloading, with pressure when unloading, or safety valve release	Intake valve malfunction	Check and fix
	Solenoid malfunction	Fix or replace
	Air/oil filter blocked	Clean element or replace it
	Safety valve setting changed or malfunction	Reset or replace
	Air/oil separator blocked	Replace
Discharge volume and pressure lower than rated figure	Air filter element blocked	Clean or change air filter element
	Oil or air leakage in system	Check and fix
	Intake valve motion not right	Check and fix
	Air requirement exceed discharge volume	Check the devices connected on the air supply system
	Solenoid malfunction	Check and fix or replace
Compressor stop due to discharge pressure exceed rated figure	Pressure transmitter malfunction or interfere by the unwonted signal	Check and fix, or change
Discharge temperature too high	Lubricant oil is too less	Add oil
	Dirty on oil cooler surface	Clean it

<b>Trouble Symptoms</b>	<b>Possible Reason</b>	<b>Solutions</b>
	Cooling fan or fan motor not working	Check and fix it
	Oil filter blocked	Replace it
	By-pass valve malfunction	Fix or replace it
	Temperature display malfunction	Fix or replace it
	Environment too hot	Decrease environment temperature, improve ventilation
	Oil filter blocked	Replace a new one
Lubricant oil coming out from air intake valve	Emergency stop without unloading	Avoid emergency stop
	Intake valve malfunction	Check and fix it
	Solenoid malfunction	Fix or replace it
	Min. pressure valve malfunction	Fix or replace it
Compressed air containing lot of oil, excessive lubricant oil consumption	Oil return pipe or nozzle blocked	Remove and clean
	Air/oil separator element damaged	Replace
	Spring of Min. pressure valve malfunction	Adjust the spring or replace it
	Oil pipes/ Oil seal leakage	Check and fix
	Oil level is too high	Drain out some oil until oil level back to proper position
	PLC malfunction	Check PLC indicator light of input and output according to electric circuit diagram
Conversion between Full loading and Unloading frequently	By-pass valve malfunction	Fix or replace it
	PLC malfunction	Check PLC indicator light of input and output according to electric circuit diagram
	Air pipe system leakage	Check and fix
	Gap between working pressure and unloading pressure is too small	Resetting pressure gap
	Min. pressure valve airproof no good	Check and seal it
Overload protect	Air requirement not stable	Increasing air receiver/tank volume
	Discharge pressure too high	Re-adjust pressure control system
	Airend malfunction	Check and fix airend
	Main motor bearing abrasion	Check and replace





check if the fault is come from motor itself or overload or/and too low protection configuration. Be sure to operate compressor after fix the problem

- c. Grease the motor bearing when working and complement the grease which produced by ESSO when operation 2000H. Quantity is:

$$G_p = 0.005DB$$

GP=grease quantity, g

D=outer diameter of bearing , mm

B=width of bearing, mm

- d. Temperature rising will cause grease aging accelerated. Every 15°C increasing from 70°C, interval of adding grease must be halved. The interval can be enlarge if the temperature is lower than 70°C but can not be exceed of 3000 hours.

# 9. Maintenance record

Date	Time	Pressure	Temperature	Oil filter	Air/oil separator	Air filter	Cooler	Remarks

# 10. Appendix