

SCREW AIR COMPRESSOR MANUAL

PLEASE READ THIS MANUAL CAREFULLY BEFORE USE

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Chapter 1: General Rules & Specifications

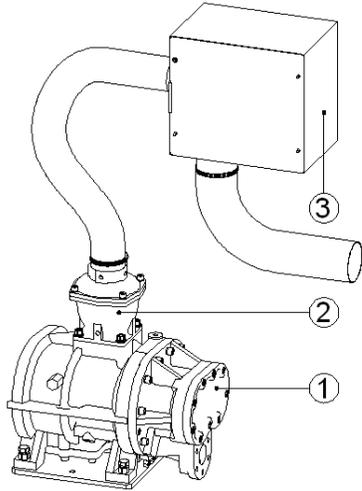
1.1 Instruction

The oil-injected screw air compressor has the characteristics of reliable running performance, few wearing parts, low vibration, low noise, and high efficiency. During the compression process, the compressor continuously sprays lubricating oil into the compression chamber and bearings by virtue of its own pressure difference. Lubricating oil has four main functions:

- Lubrication: Lubricating oil can form an oil film between the rotors, avoiding contact between the rotors and reducing friction.
- Sealing: The oil film produced by lubricating oil can seal the compressed air and improve the volumetric efficiency of the compressor.
- Cooling: Because the lubricating oil absorbs a large amount of compression heat, the compression process is close to isothermal compression, which reduces the specific power of the compressor.
- Environmental protection: Lubricating oil can reduce the noise caused by high-frequency compression.

1.2 Structure

The oil-injected screw compressor used by our company is a double-shaft positive displacement rotary compressor. The air inlet opens at the upper end of the casing, and the exhaust outlet opens at the lower part. A pair of high-precision main (male) and auxiliary (female) rotors are installed horizontally and parallel to the inside of the casing. The main (male) rotor has five shapes. The secondary (female) rotor has six shaped teeth. The diameter of the main rotor is larger, and the diameter of the auxiliary rotor is smaller. The teeth form a spiral shape and surround the outer edge of the rotor, and the two tooth shapes mesh with each other. The two ends of the main rotor and the auxiliary rotor are respectively supported by bearings, each of the intake ends has a roller bearing, and the exhaust end has two symmetrically installed tapered roller bearings. The body is divided into two types, one is a belt drive type, the other is a direct drive type. The direct drive system uses a coupling to combine the motor power source with the main body, and then a set of high-precision speed-increasing gears. Increase the speed of the main rotor. The belt drive type does not have a speed-increasing gear, and two pulleys made in proportion to the speed drive the power through the belt.

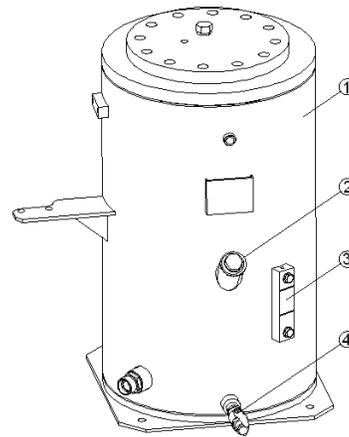


- Power System (Motor & Air End)

①	Air End
②	Inlet Valve
③	Air Filter

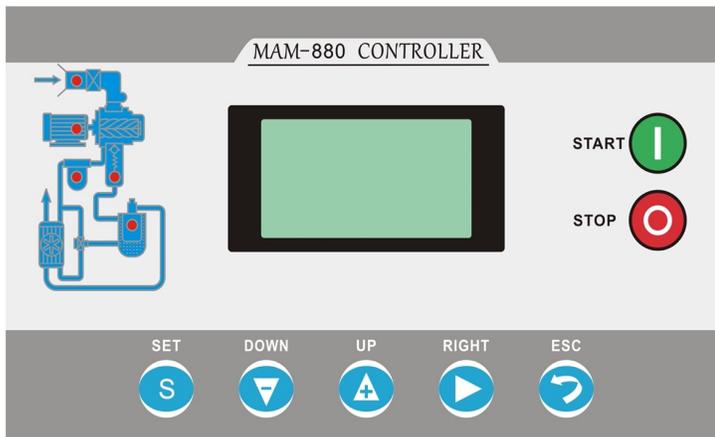
- Air & Oil Separator System (Oil Separator)

①	Air/Oil Separator
②	Fluid Fill Port
③	Oil Mirror
④	Oil Drain Valve

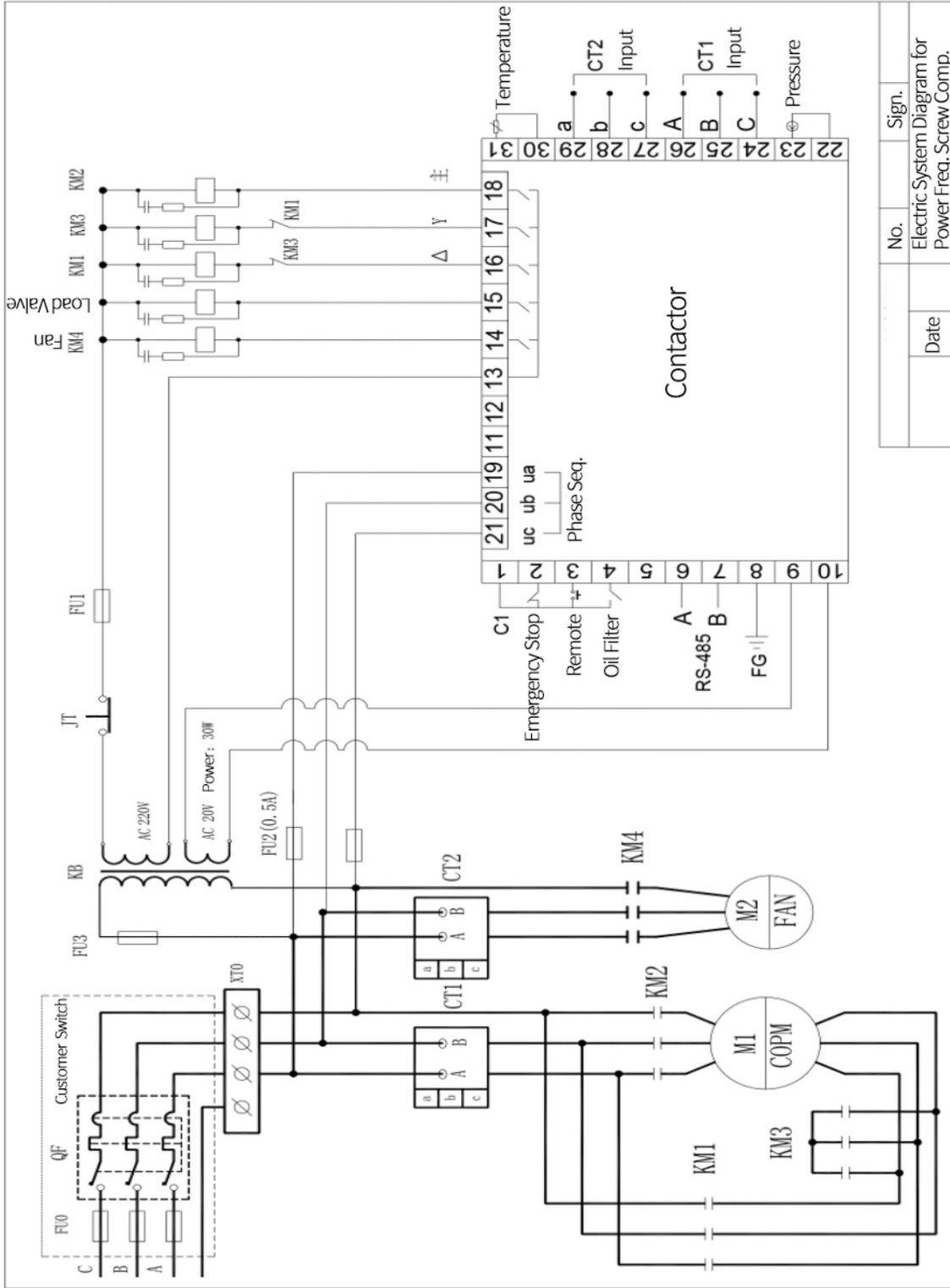


- Cooling System (Cooler & Fans)

- Intelligent Control System (Controller)

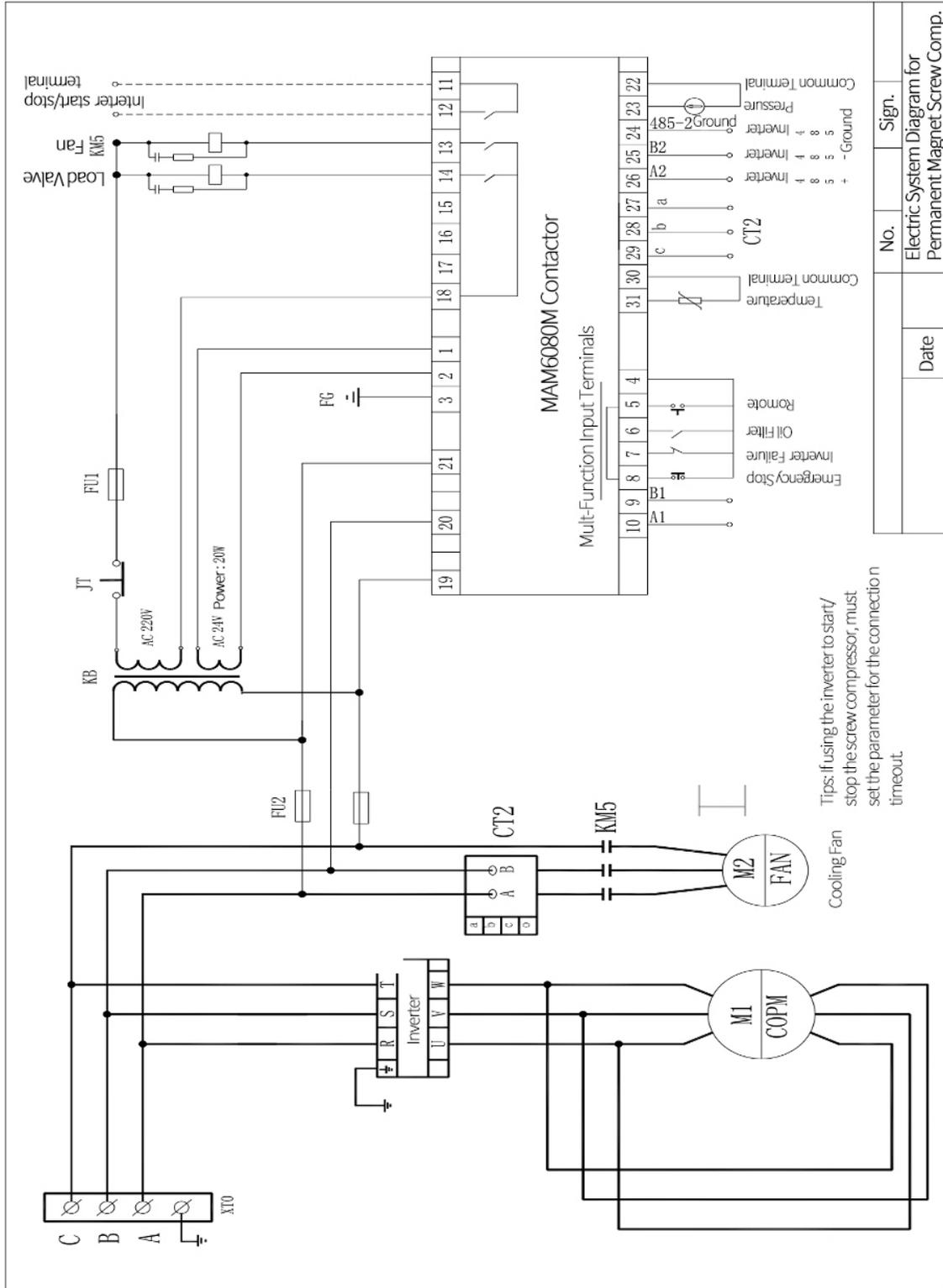


- Electric System (Power Frequency Screw Compressor)



No.	Sign.
Date	

- Electric System (Permanent Magnet Screw Compressor)



1.3 Principles of Air Compressing

First Step: Inhalation process

The suction port on the intake side of the screw type must be designed so that the compression chamber can fully inhale, while the screw compressor does not have an intake and exhaust valve group. The intake only depends on the opening and closing of a regulating valve. When the rotor rotates, the tooth groove space of the main and auxiliary rotors has the largest space when it is turned to the opening of the inlet end wall. Currently, the tooth groove space of the rotor is the same as the free air at the inlet because the air in the tooth groove during exhaust. When the exhaust is exhausted, the tooth groove is in a vacuum state. When it is turned to the air inlet, the outside air is sucked in and flows into the tooth groove of the main and auxiliary rotors along the axial direction. When the air fills the entire tooth groove, the air inlet side end surface of the rotor turns away from the air inlet of the casing, and the air between the tooth grooves is closed. The above is [intake process].

Second Step: The process of sealing and conveying

When the main and auxiliary rotors are inhaled, the peaks of the main and auxiliary rotors are sealed with the casing. At this time, the air is closed in the tooth groove and no longer flows out, that is, [closed process]. The two rotors continue to rotate, the tooth crest and the tooth groove coincide at the suction end, and the anastomotic surface gradually moves to the exhaust end. This is the [transport process].

Third Step: Compression and fuel injection process

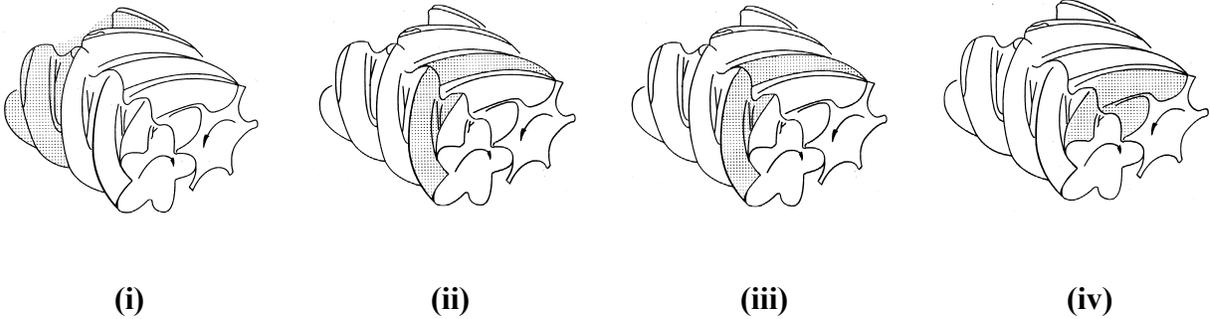
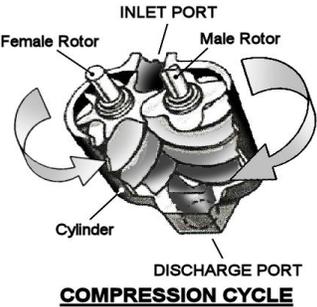
During the conveying process, the meshing surface gradually moves to the exhaust end, that is, the tooth groove space between the meshing surface and the exhaust port gradually decreases, the gas in the tooth groove is gradually compressed, and the pressure increases, which is the [compression process]. At the same time of compression, the lubricating oil is sprayed into the compression chamber and mixed with air due to the pressure difference.

Fourth Step: Exhaust process

When the meshing end surface of the rotor turns to communicate with the exhaust port of the casing, (the pressure of the compressed gas is the highest at this time) the compressed gas begins to be discharged until the meshing surface of the tooth peak and the tooth groove moves to the exhaust end surface. The tooth groove space between the meshing surface of the rotor and the exhaust port of the casing is zero, and the [exhaust process] is completed. At the same time, the length of the tooth groove between the meshing surface of the rotor and the intake port of the casing reaches the longest. The exhalation process is going on again.

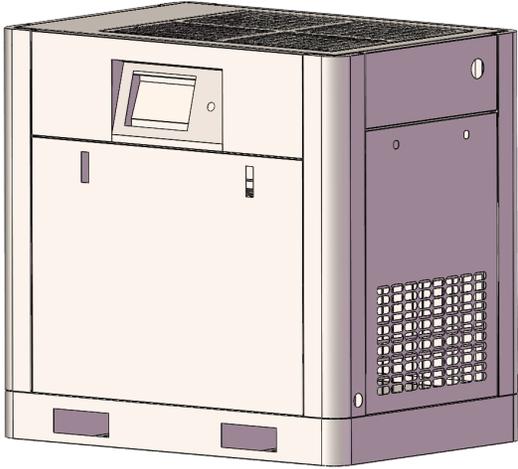
The Compression Cycle

- i) Inhalation process
- ii) Sealing and conveying process
- iii) Compression and fuel injection process
- iv) Exhaust process



1.4Parameters

Nascent Machinery Company is manufacturing the screw air compressor models with power ranging from 10 hp to 500 hp (7.5 kw to 400 kw). These direct driven compressors have standard full load pressure rating from 110 psi, 125 psi, 150 psi and 175 psi, 220 psi (0.8Mpa,1.0Mpa,1.3Mpa, and 1.6Mpa).



Parameters Configuration Table

Model	Pressure	Capacity	Motor	Outlet Thread	Noise	Weight	Dimensions
	Mpa	m ³ /min	kw		dB(A)	kg	mm
SH10-8	0.8	1.1	7.5	G 1/2	65	180	870×600×80
SH15-8	0.8	1.8	1	G 3/4	65	310	1080×750×1020
SH20-8	0.8	2.3	15	G 3/4	68	330	1080×750×1020
SH30-8	0.8	3.6	22	G 1	70	430	1080×850×1210
SH40-8	0.8	5.0	30	G 1-1/2	70	630	1340×1000×1300
SH50-8	0.8	6.1	37	G 1-1/2	70	650	1340×1000×1300
SH60-8	0.8	7.5	45	G 1-1/2	70	700	1340×1000×1300
SH75-8	0.8	9.25	55	G 2	70	950	1630×1150×1400
SH100-8	0.8	12	75	G 2	75	1300	1800×1250×1650
SH120-8	0.8	16	90	G 2	85	1400	1900×1300×1650
SH150-8	0.8	20	110	G 2-1/2	85	1700	2000×1350×1790
SH175-8	0.8	23	132	G 2-1/2	85	1700	2000×1350×1790

Chapter 2: Security

Thank you for choosing our Screw Compressor. Please read this instruction manual carefully before using the compressor. This manual must be kept in the safe place for future reference. We provide maintenance service for air-cooled rotary screw compressors. A certified technician is required to ensure compressors maintenance is safely handled. By following the instructions in this manual, the user will minimize possibility of an accident throughout the useful life of this equipment.

2.1 SAFETY ALERT SYMBOLS

Key hazards are used throughout this manual. The level of hazards seriousness is symbolized as follows:



This symbol identifies immediate hazards which **will** result in severe personal injury, death or substantial property damage.



This symbol identifies hazards or unsafe practices which **could** result in personal injury, death, or substantial property damage.



This symbol identifies immediate electrical hazards which **will** result in severe personal injury, death or substantial property damage.



This symbol identifies hazards or unsafe practices which **could** result in personal injury or substantial property damage.



This symbol identifies immediate hot surface hazards which **will** result in severe personal injury.



NOTICE

Identifies important installation, operation or maintenance information which is not hazard related.

2.2 SAFETY PRECAUTIONS

Do not modify the compressor or controls in any way except with factory approval. While not specifically applicable to all types of compressors with all types of prime movers, most of the precautionary statements contained herein are applicable to most compressors and the concepts behind these statements are generally applicable to all compressors.



Failure to follow any of these precautions may cause severe personal injury and property loss.

2.3 PRESSURE

1. When remove the oil filter or unscrew the oil separator, you must turn off the screw compressor until the pressure reach zero.
2. Before change pipes, valves, joints, as well as the related parts, you should eliminate internal pressure.
3. Don't change the pressure settings without authorization.
4. Don't remove or change the safety valve.
5. Under any circumstances, don't sit in the front of the compressed air outlet. It might cause personal injury.

2.4 FIRE AND EXPLOSION

1. Should immediately clean up any spill of lubricants and other flammable and explosive materials.
2. Keep the flammable and explosive items away from the air compressor. Do not use flammable material for cleaning purposes.
3. Do not operate the compressor in a hazardous environment unless the compressor has been specially designed for that environment.
4. Wear personal protective equipment including safety goggles and clothing during servicing the compressor.
5. Never use a flammable or toxic solvent for cleaning the air filter or any parts.
6. Air compressor should be in a great ventilated environment. Otherwise, the surrounding air temperature will rise.

2.5 Protection of rotating machine

Keep hands, arms, and cloths away from the rotating coupling and fans of the compressor. Do not remove any guards or cabinet panels or attempt to service any compressor part while the compressor is operating.

2.6 HOT SURFACES

Do not touch any hot surface and parts during the compressor's operation. Keep all body parts away from oil separator, steel pipes, air end and cooler. Wear personal protective equipment including gloves while servicing the compressor.

2.7 PROPER COMPRESSED AIR APPLICATIONS

The compressed air will cause severe injury or death if used for breathing, medicine, food processing, etc. Air used for those purposes must meet OSHA and applicable industry regulations. This compressor is designed for use in the compression of normal atmospheric air only. No other gases, vapors or fumes should be exposed to the compressor intake, nor processed through the compressor. Keep away from the compressed air outlet thread. Use compressed air for cleaning purpose, the operator must wear protective equipment.

2.8 ELECTRICAL SHOCK

1. Do not attempt to operate the compressor with a known unsafe condition.
2. Tag the compressor and render it inoperative by disconnecting and turn off all power at the source or otherwise disabling its prime mover so others who may not know of the unsafe condition cannot attempt to operate it until the condition is corrected.

2.9 Operation

1. Air compressor acoustic enclosures optimize the structural design of the cooling air flow (under normal circumstances, the door was opened, should not boot).
2. Open-air compressor cannot work unless the provision of specialized equipment to maintain the open.
3. If the air compressor leakage, do not start up. Please contact customer service immediately.



NOTICE

- Follow all maintenance procedures and check all safety devices on schedule.
- Use the correct compressor fluid at all time
- Do not rely on the discharge check valve to isolate the compressed air service line
- Keep panels always closed and stay away from hot surfaces to prevent hazards



NOTICE

These instructions, precautions and descriptions cover SH series air compressors. As a service to our customers, we often modify or construct packages to the customer’s specifications. This manual may not be appropriate in those cases.

Every effort has been taken to ensure complete and correct instructions have been included in this manual. However, possible product updates and changes may have occurred since printing this manual. Compressor reserves the right to change specifications without incurring any obligation for equipment previously or subsequently sold.

2.10 OIL GUIDE

Screw compressors are filled & tested with lubricant. Refer *Figure in 1.2* for filler port, oil mirror, quarter-turn valve location on the reservoir. The compressor is filled with the manufacturer’s recommended quantity of Total fluid. Inspection of the reservoir fluid level during installation or operation is recommended.



Do not use different fluid. Using different fluid will void compressor’s warranty.

OIL CHANGE RECOMMENDATIONS

DAILY CHECK	OIL CHANGE	OIL FILTER CHANGE	OIL SEPARATOR CHANGE
Discharge of condensed water in oil pump check oil level	First Time 500 hours Afterwards 2000 hours	First Time 500 hours Afterwards 2000 hours	Every 2000 hours

Chapter 3: Preparation & Installation

3.1 COMPRESSOR MOUNTING, SUPPORT AND LOCATION

Compressor should be located on a flat surface in a clean and well-ventilated area. The location must have sufficient access for maintenance equipment and lifting vehicle. Four feet (4') of clearance around the compressor is recommended for daily inspection and easy access to all compressor components. The area must have sufficient lighting for technicians to safely operate the compressor as well as perform maintenance work. The location should be free from standing water.

The compressor's base must be securely bolted to the floor with lag bolts. Rubber pad with 5 - 15mm thickness or pliable material should be placed under the bottom of the base if floor surface is uneven or irregular. A stationary compressor will prevent accidents such as broken piping or electrical connections. Do not over tighten the lag bolts because this may cause the frame to twist or bind which could result in possible breakage of fluid coolers, piping, and the reservoir.



Brand new compressor has “Orange Color” shipping bracket installed under aired assembly. Please remove the bracket after the unit is installed.

NOTICE!



Removal or paint over of safety labels will be a safety hazard. This could result in personal injury or property damage. Warning signs and labels should be conspicuous and on a bright legible surface. Do not remove any warning, caution or instructional material attached with unit.

3.2 VENTILATION AND COOLING

Ambient temperature should not exceed 40°C (104°F). High ambient temperatures may result in high air temperature shutdown.



Do not install and operate compressor if the ambient temperature is below 5°C (41°F). Pre-heat option must be installed with the unit for lower ambient temperatures.

NOTICE!

The compressor air inlet must be in the opposite direction to other compressors or heat generating equipment. The object is to avoid hot air being drawn into the system. Do not block the exhaust air from cooler or fan. Hot exhaust air must be vented outside through a duct to prevent high ambient room temperature. The compressor room must be properly ventilated to avoid compressor high temperature shutdown.



Maintain clean & fresh air, dust free, metal particle free and chemical vapor free in the compressor's room. Housing the compressor within a poorly ventilated enclosure will cause higher operating temperature.



Under no circumstances should a compressor be installed in an area exposed to toxic, volatile, or corrosive atmosphere, nor should toxic, volatile, or corrosive agents be stored near the compressor.

All models are intended for indoor installation; however, it is possible, with certain modifications, to accommodate some outdoor locations. Models with standard enclosure are water-resistant but not watertight. Shelter is needed to protect the unit from rain, snow, and freezing temperatures. An optional weather hood or air grille could be installed to protect compressor against blowing rain and snow as well as cabinet heater additions if ambient temperature will be below 5°C (41 F).

3.3 PIPING CONNECTION

Before installation, review the complete air systems layout, which includes compressor(s), receiver tank, dryer(s), line filter(s), pipe size, water drain and isolator valves. Never join pipes or fittings by soldering. Never use PVC pipe or non-genuine rubber hose in the air system. Use flexible connections to prevent pipe load from being transmitted to the compressor. Never use a different pipe size other than the manufacturer specification for the compressor unit.

A service line shut off valve must be installed after the compressor air outlet connection with a pressure relief valve installed to release compressed air to the atmosphere. For a single compressor and air receiver tank, manual shut off valves are typically being installed. A union connector must be installed after the ball valve (quarter turn, shut off valve) at the compressed air outlet. This will allow unit isolation for maintenance.



Release system pressure by opening manual pressure relief valve prior to servicing. Failure to relieve system pressure could result in death or serious injury and property damage.

The compressor after-cooler comes with an automatic condensate drain. The drain line should be installed to remove the condensate during compressor operation.

A receiver tank should be installed if compressed air demands fluctuate. Service line piping is recommended to be sized to match the compressor's discharge connector. All piping & fittings should be rated to withstand greater pressure than the discharge pressure. Isolation valves & drain valves are installed to isolate the compressor when service is required. These valves should have water drip legs with the drain direction facing downward to the floor. Piping should all line up properly with an adequate loop radius or bend radius given for easy installation and to prevent bending stress, flow restriction and damage due to thermal expansion. Piping support brackets must be mounted independent of the compressor and motor. This will avoid damage caused by vibration.

Pressure relief valves are sized to protect the system. Never change the pressure setting or tamper with the valve. Only the valve manufacturer and their authorized representatives are allowed to make such changes.



Pressure relief valves are used to protect system integrity in accordance with safety standards. Failure to provide properly sized valves will result in death or serious injury.

Pressure relief valves are installed prior to any potential blockage point such as shutoff valves, heat exchangers and discharge silencers. Ideally, the valve should be threaded directly into the

pressure point it is sensing, not connected with tubing or pipe. Always direct discharge from relief valves to a safe area away from personnel.

3.4 OIL MIRROR INSPECTION

Inspect the level of oil mirror when the compressor is in shutting down. Oil level is indicated on the mirror of the oil separator. The maximum oil level is at the top red-mark. Add oil until it reaches the top red-mark line. The minimum oil level is at the bottom red-mark, which means the oil must reaches the bottom red-mark line in working mode.

3.5 ELECTRICAL REQUIREMENT

Before installation, the electrical supply should be checked for adequate wire size and capacity. User must comply with national & local electrical codes. The codes specify the surrounding clearance requirement for the electrical panel. Wiring work should be undertaken only by a qualified electrician in compliance with OSHA, national or local electrical code. SH compressor provides wiring diagrams for user reference. Refer to the electrical control schematic in the parts manual for wiring diagrams. Genuine fused disconnect switch or circuit breaker should be purchased from the manufacturer. Any unreasonable voltage imbalance (5%) between phases must be eliminated and low voltage problems must be corrected to prevent excessive current draw. Air compressors must be grounded in accordance with applicable codes, regulations, and requirement.



Screw compressor would like to emphasize the importance of providing adequate grounding for air compressors. The common practice of grounding units to a building's structural steel may not provide adequate grounding protection, as paint and corrosion build-up may exist.



All electrical supply cables must be adequately sized to prevent overheating due to current draw.



Enclosure panels and drive grille must be fastened in place before starting the compressor and never removed before lock out / tag out of the main power supply.

A starter hole is provided for an incoming power connection. If a different location for the starter hole is needed, the certified technician must make sure to keep control box clean after the hole is created. The original hole must be capped if another hole is used. Inspect incoming voltage to match the compressor's specification. Inspect motor starter and overload heater sizes. Check all electrical connections L1-L2-L3 for tightness and cleanliness.

3.6 MOTOR ROTATION INSPECTION

Motor rotation must be checked after the wiring has been installed. Operating the compressor in incorrect rotation will result in severe damage to the compressor and warranty coverage will be voided. Motor rotation can be viewed through the opening in the drive grille. The drive motor end of the compressor is marked with an arrow noting the proper rotation.

To inspect rotors rotation, pull out the "EMERGENCY STOP" button and press once, quickly press the "START" and "STOP" button in sequence, allowing the motor to turn 2 or 3 revolutions. Observe the drive shaft for correct direction. If reverse rotation is observed, disconnect the power supply, reverse power input leads at the motor starter. Recheck for proper rotation.

3.7 FAN ROTATION INSPECTION

Fan motor rotation should be inspected. SH compressors use an axial fan for cooling. Fan rotation is inspected through an arrow shaped observation hole above the fan motor. The fan must rotate in the direction indicated by the arrow.



NOTICE! Always inspect fan rotation through the observation hole. Never assume the fan rotation is correct based on the induced air flow across the coolers. A centrifugal fan can pull the airflow across the coolers when rotating in either direction; however, incorrect rotation will cause high discharge temperature.

Chapter 4: Operation

4.1 ROUTINE OPERATION



CAUTION

Provisions should be made to have the instruction manual readily available to the operator and maintenance personnel. If, for any reason, any parts of the manual become illegible or if the manual is lost, have it replaced immediately. The instruction manual should be read periodically to refresh one's memory. This may prevent a serious accident.

Before compressor start up, inspect fluid level in reservoir. After starting up, observe the control panel screen for operation status. Ensure the compressor is running at its optimum level.

Close the service valve to plant air distribution system. Allow pressure to build up within the reservoir until compressor fully unloads. Press the stop button.



NOTICE

Always close the service valve when compressor is not being used. It prevents back pressure from the service line and avoids leakage due to check valve failure.

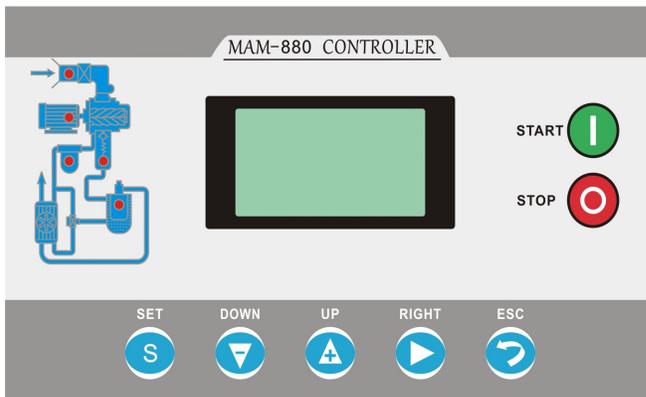


NOTICE

Emergency shutdown. Press the emergency stop button or pull the circuit breaker at the main power terminal.

CONTROLLER

Standard screw compressor is equipped with microprocessor control panel.



Control panel buttons explanation:



— Start Button:

1. When compressor is at stop status, press this button to start the compressor.
2. When compressor is set as master (No.1) in block mode, press this button to start the compressor and activate block mode function at the same time.



— Stop Button:

1. When the compressor is at running status, press this button to stop the compressor.
2. When compressor is set as master (No.1) in block mode, press this button to stop compressor and block mode function as well.

When compressor is at stop status, long press this button to display software edition.



— Set Button / Loading / Unloading Button:

1. When the compressor is at running status, press this button to load, unload.
2. When the compressor is at setting mode, press this button after modification to confirm and save the modified data.



— Move down button / Decreasing button:

1. When viewing the menu, press this button to move downward the cursor.
2. When modifying data, press this button to decrease the data at current position.



— Move up button / Increasing button:

1. When viewing the menu, press this button to move upward the cursor.
2. When modifying data, press this button to increase the data at current position.



— Shift button / Enter button:

1. When modifying data, press this button to move to the next data bit.
2. When select menu, press this button to switch to submenu. If no submenu available, the controller will shift to data setting mode.



— Return button / Reset button:

1. When modifying data, press this button to exist data setting mode.
2. When viewing the menu, press this button to return to previous menu.
3. When the controller is at failure stop status, long press this button to reset.

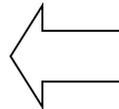
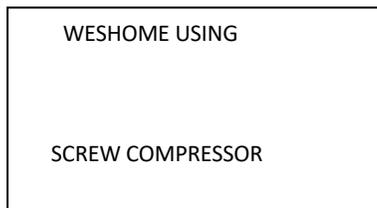
4.2 CONTROL PANEL

Functions of Controller:

- English/Chinese display
- All-round protection against short-circuits, locking, phase failure, overload, and imbalance for the motor.
- Control function: start, stop and operation of motor.
- Protection function: prevent rotor reverse rotation.
- Measure and control temperature.
- Automatically adjust loading rate and control system pressure balance.
- Selection of interlocking and independent operating modes

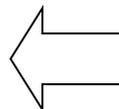
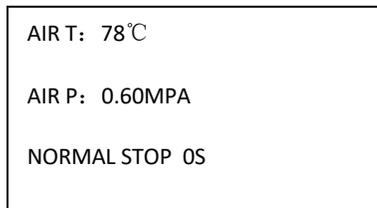
4.3 STATUS AND DISPLAY

The display screen will show as below after power on:



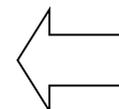
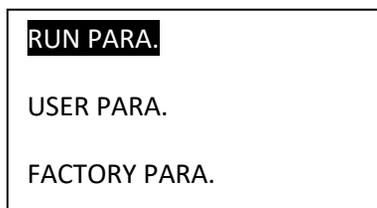
After power on, show this menu

After 5 seconds, the menu will switch as below:



Main menu

Press “” to enter Selection Menu:



Level 1 Menu

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

MOTOR、 FAN CUR
TOTAL RUN TIME
THIS RUN TIME

HISTORY FAULT
PRODUCTION DATE、 NUM.
THIS FAULT

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

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

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

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

P、 T SET
SET TIME
OPERATION MODE

CLR LIFETIME
MAX LIFETIME
LANG. LANG. SELECT CH/EN

Move the cursor to the “P’ T SET” item, then press “  ” to switch to the following menu:

LOAD P: 00.62 MPa
UNLOAD P: 00.78MPa
FAN START T: 0080℃

Move to cursor to the “LOAD P” item, then press “  ” to switch to the following menu which requires to input the user password (code: 1988).

INPUT CODE

In this menu, press “  ” or “  ” to modify the input code. Press the “  ” to confirm the input code and the menu will switch to the following menu after verification:

LOAD P: 00.62 MPa *
UNLOAD P: 00.78MPa
FAN START T: 0080℃

The upper right corner with “ * ”
indicate the verification of the password

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

4.4 CUSTOMER SET & FUNCTIONS

First menu	Second menu	Preset Data	Function
SET P. T.	LOAD P.	00.65MPa	1. In AUTO LOADING, compressor will load if pressure is below this set data 2. In STANDBY mode, compressor will start if the pressure is below this set data
	UNLOAD P.	00.78Mpa	1. Compressor will unload automatically if air pressure is above this set data 2. This data should be set above LOAD P, also should be set below ULD LIM P
	FAN START T	0088°C	Fan will start if discharge air temperature is above this set data
	FAN STOP T	0078°C	Fan will stop if discharge air temperature is below this set data
	STAR DELAY	0006S	Time from star start to delta start.
	LOAD DELAY	0002S	Unloading in this set time after enter delta running
	UNLOAD DELAY	0600S	When unloading continuously, compressor will automatically stop and enter to standby status if over this set time
	STOP DELAY	0010S	For NORMAL STOP operation, compressor will stop after it continuously unloading over this set time
	START DELAY	0100S	Machine can be restarted only over this set time at any case (after NORMAL STOP, STANDBY or FAILURE STOP)
OPERATION MODE PRESET	ON/OFF MODE	LOCAL/REMOTE	Machine can be restarted only over this set time at any case (after NORMAL STOP, STANDBY or FAILURE STOP)
	LOAD MODE	AUTO/MANU	1. When set as LOCAL, only the button on the controller can turn on and turn off the machine. 2. When set as REMOTE mode, both the button on the controller and the remote-control button can turn on and off the machine;

	COM MODE	PROHIBIT /COMP./BLOCK	<p>1. When-set-as-PROHIBIT, the communication function is invalid.</p> <p>2. When set as COMP., compressor function as a slave and can communicate with computer or DCS</p> <p>3. When set as BLOCK, compressor can net control</p>
	COM ADDRESS	0001	Set the communication ADD in block mode or when communicate with monitoring center. This ADD is unique for every controller in net

MAX LIFETIME PRESET	O/A SEPARATOR	2000H	<p>1. Alarm prompts when total running time of O/A separator is above the set data.</p> <p>2. Set this data to “0” to clear O/A separator running time</p>
	AIR FILTER	2000H	<p>1, Alarm prompts when total running time of air filter is above the set data.</p> <p>2, Set this data to “0” to clear air filter running time</p>
	LUB	2000H	<p>1. Alarm prompts when total running time of lubricate is above the set data.</p> <p>2. Set this data to “0” to clear lubricate running time.</p>
	GREASE	2000H	<p>1. Alarm prompts when total running time of grease is above the set data.</p> <p>2. Set this data to “0” to clear grease running time</p>
	BELT	9999H	<p>1. Alarm prompts when total running time of belt is above the set data.</p> <p>2. Set this data to “0” to clear belt running time.</p>
LANG.SEL	EN/CH	EN	<p>1. Set to “EN”, Display in English</p> <p>2. Set to “CH”, Display in Chinese</p>
NEW USER PIN	****	****	User could modify the user password by old user password or factory password

4.5 Manufacturer Parameters

The difference of the FACTORY PARAMETERS and the CUSTOMER PARAMETERS is that the FACTORY PARAMETERS cannot be modified unless you have the initial password from the manufacturer. The modification method of the FACTORY PARAMETER is the same as that of the CUSTOMER PARAMETER. The main functions of the parameters are as the following table.

PARAMETER	Initial Data	Function
MOTOR CUR	Maximum motor overload data /1.2	When the current of motor is more than 1.2 times of the set data, the unit will stop for overload feature.
FAN CUR	Maximum fan overload data/1.2	When the current of fan is more than 1.2 times of the set data, the unit will stop for overload feature.
ALARM T.	105°C	When discharge air temperature reaches this set data, compressor will alarm
STOP T.	110°C	When the discharge air temperature reaches this set data, compressor will alarm and stop
STOP P.	1.00MPa	When pressure reaches this set data, compressor will alarm and stop
MAX U.L.	0.80MPa	This data is the maximum of UNLOADING P. The UNLOADING P in the customer parameter must be set no higher than this data.
RUN TIME	000100Hours	Modify the TOTAL RUN TIME
LOAD TIME	000095Hours	Modify the TOTAL LOAD TIME
CLR FAULT	****	Input the password 8888 and press “set “button to clear all the history failure record.
CUR UN.BAL.	0006	MAX-MIN \geq SET*MIN/10, respond time is 5s If the set data \geq 15, the unbalance protection will be invalid.

Functions and Technical Parameters

- 1) Switching value: 9 ways of Switching value input; 10 ways of relay switching value input.
- 2) Analog quantity: 2 Pt100 temperature input; 2 ways of 4~20mA transferred input; 2 groups of 3 phase current input (Match with CT)
- 3) Input voltage of phase sequence: 3 phase 380V/220V.
- 4) Working Power of the controller: AC20V,50HZ,40VA
- 5) Display measuring Range
 - a) Oil Temperature of Oil: —20~150°C; Accuracy: ±1°C.
 - b) Air Temperature: —20~150°C Accuracy: ±1°C.
 - c) Running Time: 0~999999Hours.
 - d) Current Display Measuring Range: 0~999.9A.
 - e) Pressure: 0~1.60Mpa, Accuracy: 0.01Mpa.
- 6) Phase sequence Protection: When the wrong phase sequence is detected by the protector, it activates for the time $\leq 2s$.
- 7) Motor Protection: This control unit has the following 5 basic protection functions to the motor and fan.
 - a) Rotor Lock protection: After the starting of the motor, if the working current reaches 4
 - b) or 8 times of the set value, the protection activates. The activate time is less than 0.2s.
 - c) Lack phase protection: Any of the phase lack, the protection activates and the activate time is the setting time.
 - d) Unbalance Protection: the current difference between any of the two phases reaches the percentage of the setting value, the protection activates and the activate time is less than 5s.
 - e) Overload anti-time limitation protection (time unit: s): See the following table. The multiple= $I_{\text{actual value}} / I_{\text{Set Value}}$.

When the running current of the motor is in 1.2 ~3.0 times of the set value, the overload multiple and action delay time will be accordance with the following table.

$I_{\text{act}}/I_{\text{set}}$	≥ 1.2	≥ 1.3	≥ 1.5	≥ 1.6	≥ 2.0	≥ 3.0
Time Para						
Action time	60	48	24	8	5	1

- 8) Temperature Protection: When the actual detected temperature is higher than the set temperature, the protection activates and the activate time $\leq 2s$.
- 9) The output relay contactor capacity: 250V 5A. The lifetime of the contactors: 500000 times of running.
- 10) The current display tolerance < 1.0%.
- 11) RS—485 communication.

Text Display connector terminals:

There are five connect terminals and one D type display cabal connector which are relatively used for the display connector, RS—485 communication interface and 24V Power input

Controller Connect Terminals:

The display panel relates to the controller using communication cabals. 23, 24 and 25 are the phase sequence input terminals; 7 and 9 are the Air Exhaust Temperature Input terminals; CT1 is the host mutual inductor; CT2 is the fan mutual Inductor. 32 is the common port COM1 of the relay output; 27 controls the main contactor; 28 controls the star contactor; 29 controls the angel contactor; 30 is the loading magnetic valve; 31 controls the Fan; 34 controls the Load release valve; 37 is the running indicator; 38 is the Failure indicator; 39 is the Alarm indicator; 40 is COM2; 42 is the simulated ground (Earth); 43 and 44 are the AC20V power source.

Attention: the magnetic coil must be connected to the surging absorber when wiring.

4.6 Control Principles (Refer to the Electric schematic circuit)

1) Local Automatic control

(ON/OFF mode: Beside Machine; Loading method: Automatic)

a) Press 'I' to start: (Y— Δ Starting)

When the controller is powered on, it will perform a 3S self-checking. Press the 'I' button cannot start the machine until the self-checking is completed. The starting process of the host will be as the following: KM3 is powered on, KM2 is Powered on \rightarrow Y type Starting \rightarrow Time Delay finish (Y— Δ converting time) , KM3 loss power (KM1 and KM3 interlocked), KM1 is powered on \rightarrow Motor runs in Δ type and the Starting is completed. the load magnetic Valves are without power during the whole starting process to ensure the load free starting.

b) Automatic Running Control:

When the motor is started to run in Δ state and load the magnetic valve with power applied after a certain period of delay. Then the air compressor will be applied with air pressure to increase the pressure in the air tank. When the air pressure reaches the value over the set unload pressure (unload pressure value), the loading magnetic valve will lose power and the release magnetic valve is applied with power to run the air compressor with load free. If in the specified time (load free running period) the air pressure turns to be lower than the set load pressure (LOAD PRESSURE VALUE), the load magnetic valve obtains power and the release magnetic valve losses power, the air compressor will apply normal pressure to increase the pressure in the air tank. If the pressure in the air tank is not drop down to the load pressure limit within the empty free running time, the controller will automatically stop the running of the motor to perform the automatic stop of machine

for over time empty free running. Only when the pressure drops to the load pressure limit, the motor could restart according to the normal starting process, and it runs repeatedly in this way.

c) **Manual Load/unload at the automatic status**

At the automatic status, the unit will stay in the unload state, press the button's to load, if the pressure is higher than the unload pressure, the load magnetic valve will inch once and then return to the unload status; if the pressure is lower than the unload pressure, the load magnetic valve will be applied with power and will not stop running and return to the unload state until the air supply pressure becomes higher than the unload pressure. When the unit is at the load state, press the button 'S' to unload. If the pressure is higher than the load pressure, the load magnetic valve will loss the power and return to the load state till the air supply pressure becomes lower than the load pressure. If the pressure is lower than the load pressure, the unload function is disable.

d) **Normal Stopping:**

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

e) **Frequency starting to prevent control**

The motor cannot be started immediately unless after a while of time delay after stopped by pressing '⊙' button or stopped due to failure. Whenever the situation is, this controller will display the remaining count down of the time delaying (such as 90s). The motor can only be started when the time display is 0.

2) Remote Automatic Control (ON/OFF mode: Remote; Load mode: Automatic)

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

3) Local Manual Control (On/Off mode: beside machine; Load mode: Manual)

The Starting and stopping control is the same as the automatic control, the only difference is that when the starting procedure finished in this mode, the machine is at the load free state and will be loaded by pressing the button 'S'. When the air supply pressure is higher than the unload pressure, the unit will load automatically, if the button 'S' is not pressed to load, the unit will be running at the load free state till load free stop. During the unload process, press the button 'S' to load and during the process of loading, press the button 'S' to unload

4) Remote Manual Control (On/Off Mode: Remote; Load mode: Manual)

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

4.7 Emergency stop

When there is any electronic failure or high air temperature failures occurred during the running process, the controller would stop the motor immediately. The motor can only be restarted after the failures are cleared. Any emergency occurred, please press down the emergency stop button to cut off the power supply of the controller and contactor power.

4.8 Alarm and Notices

- 1) Text Display tips
 - a) Air filter Alarm tips
 - i) Check the alarm using the switch signal
 - ii) The controller can display the message on the text display to remind the operator that 'the air filter is blocked' by checking the pressure difference switch operating state.
 - b) Set the running time alarm of the air filter
 - c) The Text displays 'AIR LIFE END' when the using time of the air filter terminates.
- 2) Oil Filter alarm tips
 - a) Check the alarm using the switch signal
The controller can display the message on the text display to remind the operator that 'OIL BLOCK' by checking the pressure difference switch operating state.
 - b) Set the running time alarm of the oil filter
The Text displays 'OIL LIFE END' when the using time of the oil filter terminates.
- 3) Oil separator alarm tips
 - a) Check the alarm using the switch signal
The controller can display the message on the text display to remind the operator that 'O/A BLOCK' by checking the pressure difference switch operating state.
 - b) Set the running time alarm of the oil separator
The Text displays 'O/A LIFE END' when the using time of the oil separator terminates.
- 4) Lubricate Oil alarm tips
The Text displays 'LUBE LIFE END' when the using time of the lubricate oil terminates.
- 5) Lubricate Grease alarm tips
The Text displays 'GREASE LIFE END' when the using time of the lubricate grease terminates.

6) Main Controller Tips

Item	Meaning and Functions	Lights Status
POWER	Controller Power on	PWR Lights
RUN	Controller run	RUN Lights
Failure	Detect failure and stop the unit	ERR Blinking
Input Switching Value	Terminal 20~12 Input switching value activate	IN00~08 lights, but if there is no function at the input point, no light
Output Switching Value	Terminals 27,28,29,30,31,35,36,37,38 and 39 output switching value activate	OUT00~09 lights
Data Save	Set Data and save time	PWR blinking once

4.9 SAFETY PROTECTION

1) Motor Protection

MAM air compressor controller can perform the short-circuit protection, rotor lock protection, overload protection, Phase Lacking Protection and Unbalance Protections to the motor.

2) Air Exhaust overheat protection

When the air exhaust temperature is higher than the set limited unload temperature, the controller will alarm and stop the machine. Local Failure display 'Air Exhaust High Temperature'.

3) Reverse running protection of the air compressor

When the phase sequence of the power connected to the air compressor is not conforming to the set of the controller, the local failure displays 'Wrong phase sequence' and as a result the controller cannot start the motor. It is needed to check and alternate any two of the phase sequences and investigate the motor rotation direction.

4) Over Pressure protection

When the pressure of the air exhaust is higher than the set stop pressure of the controller, the controller will alarm and stop the machine, the local failure displays 'Pressure too high'.

5) Sensor Failure Protection

When the cable of the pressure sensor or the temperature sensor is broken, the controller will alarm and stop the machine and the local failure displays '** sensor failure'.

6) Interlock Protection

The Host is running, and the air exhaust temperature reaches the Fan starting temperature, but the Fan does not run, the controller alarm, the local failure displays Fan is stopped.

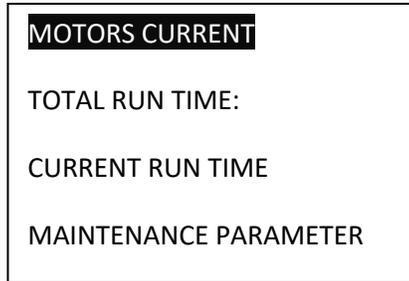
7) Interlock Protection

The Host is running, and the air exhaust temperature reaches the Fan starting temperature, but the Fan does not run, the controller alarm, the local failure displays Fan is stopped.

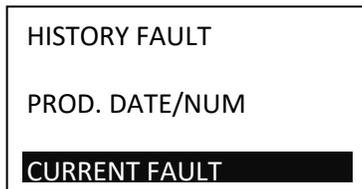
Electronic failure	Failure Display	Possible Causes
Short-Circuit	Local Failure display 'Host or Fan short-circuited'	Short-circuited or the rated current is wrongly set
Rotor lock	Local Failure display 'Host or Fan Rotor Locked'	Overloaded, Bearing wear off or other mechanic Failures
OVERLOAD	Local Failure display 'Host or Fan Overloaded'	Overloaded, Bearing wear off or other mechanic Failures
Phase Lack	Local Failure display 'Host or Fan Phase Lacking'	Phase lacking occurred to the Power or the connectors
Unbalance	Local Failure display 'Host or Fan current unbalance'.	Contactors are not contacted correctly or the motor inner parts open.

4.10 Common Failures & Solutions

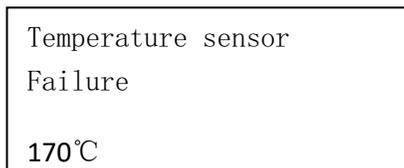
The failures caused by the peripheral equipment's of the controller could be investigated by queering from the local failure record or the history failure record to find out the failure causes and solves the relative problem. The detailed method is as the following:

Press the button '

A screenshot of a menu titled "MOTORS CURRENT" with a black highlight bar over the title. Below the title are four menu items: "TOTAL RUN TIME:", "CURRENT RUN TIME", and "MAINTENANCE PARAMETER".

Press the button '

A screenshot of a menu with three items: "HISTORY FAULT", "PROD. DATE/NUM", and "CURRENT FAULT". The "CURRENT FAULT" item is highlighted with a black bar.

Press '

A screenshot showing the failure cause details: "Temperature sensor Failure" and "170°C".

Check the Temperature sensor to confirm if there is any line broken or damage of this equipment.

COMMON FAILURE AND THE CAUSES:

Failure	Reason	Solution
AIR T High	Bad vent condition, Oil shortage etc.	Check the vent condition and lubricant amount etc.
Temperature Sensor Failure	Cable off or PT100 failure	Check the wiring and PT100
AIR P HIGH	Pressure too high or the pressure sensor failure	Check the pressure and the pressure converter
Pressure Sensor Failure	Cable off, Sensor failure or the cable connect reversed	Check the wiring and pressure converter
Open Phase	Power open phase or the contactor terminal failure	Check the power and contactors
Overload	Voltage too low, tubes block, bearing wear off or other mechanical failure or wrong set data etc.	Check the set data, voltage, bearings, tubes, and other mechanical system.
Unbalance	Power unbalance, contactor failure or the internal open loop of the motor	Check the power, contactor, and the motor
Wrong Phase Sequence	Reversed phase sequence or open phase	Check the wiring
Overload during start	Master start time set to less than the star delta delay time	Reset the master start time to be longer than star delta delay + 2 seconds
Main Contactor shakes frequently	The emergency button loose, controller reset by interference	Check the wiring if the coil of contactor connects with surge absorber or not

Screw compressor requires the minimum amount of inspection and maintenance. The controller and indicator alert the operator to perform required maintenance or repair unit problems.

Chapter 5: Maintenance

5.1 LUBRICATING OIL GUIDE & CHANGE

Screw compressors are filled & tested with Total lubricant. Refer *Figure in 1.2* for filler port, oil mirror, quarter-turn valve location on the reservoir. The compressor is filled with the manufacturer's recommended quantity of Total fluid. Inspection of the reservoir fluid level during installation or operation is recommended.

Screw compressor utilizes a pressurized fluid drain. Use the following procedure to drain and replace the compressor fluid.

- i) Press the emergency stop button and remove the right-side cabinet panel (if applicable).
- ii) Check the pressure gauge reading on reservoir and wait until reservoir pressure drops to approximately 0.05Mpa (7psi).
- iii) Close the 1/4 turn valve on the blow-down valve.
- iv) Remove the drain plug and attach the 1/4 NPT barb fitting and drain tube (supplied with the unit) to the drain on the oil/air separator tank.
- v) Slowly open the 1/4 turn valve on the drain of oil/air separator tank. The pressure remaining in the tank will force the fluid out. When air begins to escape from the tank, close the valve.
- vi) After closing the valve, remove the tubing and barb fitting and reinstall the drain plug.
- vii) Remove the plug from the fluid fill port and refill the reservoir with the appropriate amount of Total 4000 fluid.
- viii) Before starting the compressor opens the 1/4 turn valve on the blow-down valve to ensure the blow-down valve functions correctly.



NOTICE

The 1/4 turn valve on the blow-down valve **MUST** be open for the unit to blow down during regular unit operation.



CAUTION

Do not use different fluid. Using different fluid will void compressor's warranty.

5.2 AIR FILTER

The standard air filter is a single stage, dry type element. Air filter maintenance should be performed when the maintenance gauge shows red with the compressor running full load, or every 2,000 hours, or once a year, whichever comes first. Daily cleaning of the filter element is common

in dirty conditions. If dirty conditions exist, it is advisable to relocate the intake air to an outside source. Each time the filter is serviced, inspect the filtered air side of the air cleaner canister and the suction manifold for dirt. If dirt is found, determine the cause and correct. Always make sure all gaskets, threaded connections, flange connections, and hose connections between the air filter and air compressor-are airtight. Dirty filters result in reduced airflow and can distort the element and allow dirt to bypass the filter element.



NOTICE

Intake filtration equipment supplied from the factory may not be adequate for extremely dirty applications or some forms of dust or vapors. It is the customer's responsibility to provide adequate filtration for those conditions. Warranty will be voided if inadequate filtration causes a failure.

5.3 OIL FILTER

The fluid filter is a spin on, full flow unit. Replacement of the filter requires spinning off the cartridge and replacing it with a new one. The initial filter change should occur after the first 500 hours of operation. During normal service, the filter cartridge should be replaced under the following conditions:

- ◆ As indicated by the fluid filter maintenance indicator when the fluid is at normal operating temperature
- ◆ Every 2,000 hours



NOTICE

The fluid filter maintenance indicator may read high upon start up on cool mornings due to sluggish fluid creating higher than normal differential pressures. Monitor indicator after the fluid warms up.

5.4 CORE OF AIR/OIL SEPARATOR

The core of air/oil separator is using coalescent filter element. Replacement requires unbolting and lifting the separator cover and replacing it with a new one. The air/oil separator should be replaced as indicated in the maintenance schedule or as follows:

- ◆ Change if oil leakage
- ◆ Every 2000 hours

5.5 MAINTENANCE SCHEDULE

This Schedule is intended to be used as a guideline only. Depending on the specific operating conditions of screw air compressor, maintenance requirements may vary. The instructions in this section will give more details about determining when specific service should be performed.

First 500 hours	Check fluid filter and fluid level
Every 500 hours	Drain water from air/oil separator tank. Check oil mirror Clean air filter Clean after-cooler fins. Check for loose oil and air tubing, electrical wiring connection.
Every 1000 hours	Clean air filter or replace with new one. Clean after-cooler fins.
Every 2000 hours	Replace air filter, oil filter, core of oil separator Replace core of lubricating oil Check oil level Check safety valve
Every 6000 hours	Clean after-cooler fins Check oil mirror
Every 6000 hours	Replace air/oil separator Replace lubricating oil, grease Check equipment power supply and earth-grounding.

Chapter 6: Troubleshooting

Information below is a troubleshooting guideline; it describes symptoms and possible cause. Do not assume that these are the only faulty condition that may occur.

Table 6-1: TROUBLE SHOOTING GUIDE		
Symptom	Possible Cause	Solution
Fail to Start	Power failure	Check power supply to the unit
	Low incoming voltage	Check voltage and power source or contact local power company.
	Fuse blown	Replace Fuse
	Faulty start switches	Check the switch for malfunction or loose connection.
	Emergency button	Reset emergency button
	Motor starter overload tripped	Check motor starter wiring before removing motor. Remove motor and have tested at motor manufacturer repair center.
	Loose wire connections	Check all wiring terminals for contact and tightness
	Air End failure	Contact a local authorized distributor.
Compressor shuts down during loaded condition	High ambient temperature	Make fresh air intake openings or install ducts to discharge the hot air.
	Low incoming voltage	Check voltage and power source or contact local power company.
	High operating pressure	Reset, check line pressure, and ensure it does not exceed the compressor's maximum operating pressure.
	Low fluid level	Top-up fluid
	PSH controller indicate separator requires maintenance	Replace separator element.
Line pressure rises above unload pressure set point	Control system air leakage causing loss of pressure	Check for leak
	Plugged air filter	Replace air filter element
	Air Intake valve stuck open	Remove the intake hose and check the inlet valve for proper operation
	Defective blow-down valve	Check the receiver tank to ensure that it is exhausting air to the atmosphere when the solenoid opens - repair or replace if necessary.

Table 6-1: TROUBLE SHOOTING GUIDE (Continued)

Symptom	Possible Cause	Solution
Compressor does not reload when service line pressure drops to reset	Faulty solenoid	Repair or replace as necessary
	Loose wiring connection	Check and tighten wiring terminals
	Faulty proportional valve	Orifice plugged. Clean or replace as necessary
	Jammed air inlet valve assembly	Check and repair air inlet valve
	Faulty air pressure sensor	Repair or replace as necessary
High air discharge temperature	Low Fluid Level	Check oil level
	Incorrect fluid brand	Check oil code number, replace as necessary
	High ambient temperature	Check air exhaust, reduce room temperature.
	Plugged oil filter	Change oil filter
	Plugged internal aftercooler	Chemical cleaning for after-cooler
	Dusty after-cooler fins	Chemical wash for after-cooler fins
	Fan motor setting	Adjust
	Temperature sensor failure	Check and replace as necessary
	Loose wire	Check and tighten
Low air capacity delivery	Plugged air filter	Clean air filter or replace with new element
	Air Intake valve failure	Remove the intake hose and check the inlet valve for proper operation
	Separator failure	Replace separator element
	Faulty indirect proportional valve	Adjust or replace as necessary
	Faulty solenoid	Repair or replace as necessary
	Faulty safety valve	Repair or replace as necessary
Excessive oil carries over in discharge compressed air.	High oil level	Check oil level
	Plugged oil orifice valve	Clean or replace as necessary
	Low discharge pressure	Adjust
	Air/oil separator element failure	Clean or replace as necessary
	Minimum pressure valve malfunction	Check for leaking, replace as necessary
Loading function Failure	Solenoid valve failure	Check and replace as necessary
	Pipe leak	Check and replace as necessary
	Proportional valve failure	Check and replace as necessary
	Air Intake valve stuck open	Remove the intake hose and check the inlet valve for proper operation
	Minimum pressure valve failure	Check for leaking, replace as necessary

Table 6-1: TROUBLE SHOOTING GUIDE (Continued)		
Symptom	Possible Cause	Solution
Unloading failure at working pressure, causing safety valve to release pressure	Pressure loading setting	Adjust as necessary
	Solenoid valve failure	Check and replace as necessary
	Plugged air/oil separator	Check and replace as necessary
	Air Intake valve stuck open	Remove the intake hose and check the inlet valve for proper operation
	Safety valve failure	Repair or replace as necessary
	PSH controller failure	Check and replace as necessary
Compressor air discharge pressure below normal operating settings	Plugged air filter	Clean or replace as necessary
	Air Intake valve stuck closed	Remove the intake hose and check the inlet valve for proper operation
	Plugged air/oil separator	Check or replace as necessary
	Indirect proportional valve setting	Adjust or replace as necessary
	Solenoid valve failure	Check and replace as necessary
	Safety valve failure	Check and replace as necessary
Short period of load/unload	Pipe leak	Check and replace as necessary
	Pressure setting	Change setting above 1Bar
	Receiver tank too small	Check or increase volume of receiver tank
	Air flow into the main network restricted	Increase pipe size. Checks filter cartridge failure.
Oil vapor leak from air filter when compressor stops	Air inlet valve failure	Check and replace as necessary
	Minimum pressure valve failure	Check for leaks and replace as necessary
	Pressure relief valve failure	Check and replace as necessary
Excessive Fluid Consumption	Different oil is being used.	Use SH genuine fluid.
	Separator element damaged	Check and replace as necessary.
	Oil level too high	Drain off oil until the correct level.
	Fluid foaming	Drain off oil and change
	Oil return line or orifice clogged	Clean and replace as necessary.

Selection of transformer:

- The general star triangle starts, transformer capacity for more than 3 times the motor rated power.
- When using the soft start, transformer capacity of more than 2.5 times rated power.
- The use of frequency converter transformer capacity of more than 1.5 times the motor rated power.
- Use direct startup, transformer capacity of more than five times the motor rated power.

Standard Terms and Conditions

These terms and conditions govern the sale of Products (“Rotary Screw Air Compressors and parts”) and provisions of services by NASCENT Compressor Co., Ltd. (Seller) and its authorized representative or buyer. These terms and conditions (“Agreement”) take precedence over Buyer’s supplemental or conflicting terms and conditions to which notice of objection is hereby given. Neither Seller’s commencement of performance or delivery shall be deemed or construed as acceptance of Buyer’s supplemental or conflicting terms and conditions. NASCENT Compressor’s failure to object to conflicting or additional terms will not change or add to the terms of this agreement. Buyer’s acceptance of the Products and/or Services from Seller shall be deemed to constitute acceptance of the terms and conditions contained herein.

Orders: All orders placed by Buyer are subject to acceptance by Seller. Orders may not be canceled or rescheduled without Seller’s written consent. All orders must identify the products, unit quantities, part numbers, applicable prices and requested delivery dates of the Products being purchased. Seller may at its sole discretion allocate Product among its Buyer. Seller may designate certain Products and Services as non-cancelable, non-returnable and the sale of such Products shall be subject to the special terms and conditions contained in Seller’s Customer Acknowledgement or Non-Returnable Product Form, which shall prevail and supersede any inconsistent terms and conditions contained herein or elsewhere.

Prices: The prices of the Products are those prices specified on the front of the invoice or contained within an agreed written contract. Price quotations shall automatically expire in thirty (30) days from the date issued, or as otherwise stated in the quotation.

Taxes: Unless otherwise agreed to in writing by Seller, all prices quoted are exclusive of transportation and insurance costs, duties, and all taxes including federal, state, and local sales, excise and value added, goods and services taxes, and any other taxes. Buyer agrees to indemnify and hold Seller harmless for any liability for tax in connection with the sale, as well as the collection or withholding thereof, including penalties and interest thereon. When applicable, transportation and taxes shall appear as separate items on Seller’s invoice.

Payment: Payment may be made by check, money order, credit card, or wire transfer (all fees are borne by the Buyer). Where Seller has extended credit to Buyer, terms of payment shall be net thirty (30) days from date of invoice, without offset or deduction. On any past due invoice, Seller may impose a monthly interest rate. If Buyer fails to make the required payments the Seller will impose the interest rate each month. If Buyer fails to make each payment when it is due, Seller reserves the right to withdraw credit and thereby suspend or cancel performance under any or all purchase orders or agreements in which Seller has extended credit to Buyer. In the event of default by Buyer, Seller shall be entitled to costs, fees, and expenses including but not limited to recovery of attorney fees, court costs and fees, and collections costs.

Delivery and Title: The locations of shipment delivery will be made according to the Seller and Buyer agreement. Title and risk of loss pass to the Buyer upon delivery of the Product to the carrier. Seller's delivery dates are estimates only and Seller is not liable for delays in delivery or for failure to perform due to causes beyond the reasonable control of the Seller, nor shall the carrier be deemed an agent of the Seller. A delayed delivery of any part of an Order does not entitle Buyer to cancel other deliveries. NASCENT Compressor will comply with various federal, state, and local laws and regulation concerning occupational health, safety, and environment concerns. Buyer has full responsibility to comply with those laws and regulations during the installation and operation of the equipment.

Acceptance / Returns: Shipments will be deemed to have been accepted by Buyer upon delivery of the said shipments to Buyer unless rejected upon receipt. Buyer shall perform all inspections and tests. Buyer deems necessary as promptly as possible but in no event later than 7 days after receipt of Products, at which time Buyer will be deemed to have irrevocably accepted the Products. Any discrepancy in shipment quantity must be reported within 7 days after receipt of Products. Buyer may not return Products without a Return Material Authorization ("RMA") number. RMA's valid for 30 days from the date issued.

Standard Warranty: Buyer will honor Product warranties and indemnities authorized by the manufacturer, including any transferable. 90 days warranty is given for service parts from receipt date. Seller warrants to Buyer that Products purchased hereunder will conform to the applicable manufacturer's specifications for such products and that any value-added work performed by Seller on such Products will conform to applicable Buyer's specifications. If Seller breaches this warranty, Buyer's remedy is limited to (at Seller's election) (1) refund of Buyer's purchase price for such Product (without interest), (2) repair of such Products, or (3) replacement of such Products provided that such Products must be returned to Seller, along with acceptable evidence of purchase within 13 days from date of delivery, transportation charges prepaid. No warranty will apply if the Product has been subject to misuse, neglect, accident, or modification.

Limitation of Liabilities: Buyer shall not be entitled to, and Seller shall not be liable for, loss of profit or revenue, promotional or manufacturing expenses, overheads expenses, business interruption cost, loss of data, removal or reinstallation costs, injury to reputation of buyer, punitive damages, loss of contractor orders or any indirect, special, incidental, or consequential damages of any nature. Buyer's recovery from seller for any claim shall not exceed the purchase price paid for the affected products irrespective of the nature of the claim whether in contract, tort, warranty, or otherwise. Buyer will indemnify, defend, and hold seller harmless from any claims based on (a) Seller's compliance with buyer's designs, specifications, or instructions, (b) Modification of any products by anyone other than Seller, or (c) use in combination with other products not supplied by seller.

Use of Products: Unless otherwise specified. Products sold by Seller are not designed, intended, or authorized for use in life support, life sustaining, nuclear, or other applications in which the failure of such Products could reasonably be expected to result in personal injury, loss of life or catastrophic property damage. If buyer uses or sales the Products for use in any such applications: (1) Buyer acknowledges that such use or sale is at Buyer's sole risk; (2) Buyer agrees that Seller and the manufacturer of the Products are not liable, in whole or in part, for any claim or damage

arising from such use; and (3) Buyer agrees to indemnify, defend and hold Seller and the manufacturer of the Products harmless from and against any and all claims, damages, losses, costs, expenses and liabilities arising out of or in connection with such use or sale.

Force Majeure: Seller is not liable for failure to fulfill its obligations for any accepted Order or for delays in delivery due to causes beyond Seller's reasonable control including, but not limited to, acts of God, natural or artificial disaster, riot, war, strike, delay by carrier, shortage of Product, acts or omissions of other parties, acts or omissions of civil or military authority, Government priorities, changes in law, material shortages, fire, strikes, floods, epidemics, quarantine restrictions, acts of terrorism, delays in transportation or inability to obtain labor, materials or products through its regular sources, which shall be considered as an event of force majeure excusing Seller from performance and barring remedies for non-performance. In an event of force majeure condition, the Seller's time for performance shall be extended for a period equal to the time lost because of the force majeure condition without subjecting Seller to any liability or penalty. Seller may, at its option, cancel the remaining performance, without any liability or penalty, by giving notice of such cancellation to the Buyer.

General: (a) Seller will comply with state law for any dispute from buyer. (b) Buyer may not assign this Agreement without the prior written consent of Seller. Seller or its affiliates may perform the obligations under this Agreement. This Agreement is binding on successor and assigns, (c) Products, including software or other intellectual property, are subject to any applicable rights of third parties, such as patents, copyrights and/or user licenses.

