Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

NORTECH

Air Compressors

Description

Air compressor units are intended to provide compressed air to power pneumatic tools, operate spray guns and supply air for pneumatic valves and actuators. The pumps supplied with these units have oil lubricated bearings. A small amount of oil carryover is present in the compressed air stream.

Applications requiring air free of oil vapor should have the appropriate filter installed. The air compressor units are to be mounted per the instructions provided on a solid floor. Any other use of these units will void the warranty and the manufacturer will not be responsible for problems or damages resulting from such misuse.

Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

⚠ DANGER ***Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.***

⚠WARNING ***Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.***

⚠ CAUTION ***Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.***

⚠ NOTICE ***Notice indicates important information, that if not followed, may cause damage to equipment.***

⚠WARNING ***Do not operate unit if damaged during shipping, handling or use. Damage may result in bursting and cause injury or property damage.***

General Safety

Since the air compressor and other components (material pump, spray guns, filters, lubricators, hoses, etc.) used, make up a high pressure pumping system, the following safety precautions must be observed at all times:

1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local electrical and safety codes.
3. Only persons well acquainted with these rules of safe operation should be allowed to use the compressor.
4. Keep visitors away and NEVER allow children in the work area.
5. Wear safety glasses and use hearing protection when operating the unit.
6. Do not stand on or use the unit as a handhold.
7. Before each use, inspect compressed air system and electrical components for signs of damage, deterioration, weakness or leakage. Repair or replace defective items before using.
8. Check all fasteners at frequent intervals for proper tightness.

⚠ DANGER

Breathable Air Warning

This compressor/pump is NOT equipped and should NOT be used «as is» to supply breathing quality air. For any application of air for human consumption, you must fit the air compressor/pump with suitable in-line safety and alarm equipment. This additional equipment is necessary to properly filter and purify the air to meet minimal specifications for Grade D breathing as described in Compressed Gas Association Commodity Specification G 7.1 – 1966, OSHA 29 CFR 1910. 134 and/or Canadian Standards Association (CSA).

DISCLAIMER OF WARRANTIES

In the event the compressor is used for the purpose of breathing air application and proper in-line safety and alarm equipment is not simultaneously used, existing warranties are void, and Nortech Supply disclaims any liability whatsoever for any loss, personal injury or damage.

⚠WARNING

Motors, electrical equipment and controls can cause electrical arcs that will ignite a flammable gas or vapor. Never operate or repair in or near a flammable gas or vapor. Never store flammable liquids or gases in the vicinity of the compressor.

General Safety (Con't)

⚠WARNING

Never operate compressor without a beltguard. This unit can start automatically without warning. Personal injury or property damage could occur from contact with moving parts.

9. Do not wear loose clothing or jewelry that will get caught in the moving parts of the unit.

⚠ CAUTION

Compressor parts may be hot even if the unit is stopped.

10. Keep fingers away from a running compressor; fast moving and hot parts will cause injury and/or burns.

11. If the equipment should start to vibrate abnormally, STOP the engine/motor and check immediately for the cause. Vibration is generally and indication of trouble.

12. To reduce fire hazard, keep engine/motor exterior free of oil, solvent, or excessive grease.

⚠WARNING ***An ASME code safety relief valve with a setting no higher than 200 psi for two-stage compressors MUST be installed in the air lines or in the tank for this compressor. The ASME safety valve must have sufficient flow and pressure ratings to protect the pressurized components from bursting. The flow rating can be found in the parts manual. The maximum safe pressure rating for the pump is 150 psi. The safety valve in the intercooler does not provide system protection.***

⚠ CAUTION ***Maximum operating pressure is 150 psi for two-stage compressors. Do not operate with pressure switch or pilot valves set higher than 150 psi.***

13. Never attempt to adjust ASME safety valve. Keep safety valve tree from paint and other accumulations.

⚠ DANGER

Never attempt to repair or modify a tank! Welding, drilling or any other modification will weaken the tank resulting in damage from rupture or explosion. Always replace worn, cracked or damaged tanks.

⚠ NOTICE ***Drain liquid from tank daily.***

14. Tanks rust from moisture build-up, which weakens the tank. Make sure to drain tank regularly and inspect periodically for unsafe conditions such as rust formation and corrosion.

15. Fast moving air will stir up dust and debris which may be harmful. Release air slowly when draining moisture or depressurizing the compressor system.

SPRAYING PRECAUTIONS

⚠WARNING

Do not spray flammable materials in vicinity of open flame or near ignition sources including the compressor unit.

16. Do not smoke when spraying paint, insecticides, or other flammable substances.

17. Use a face mask/respirator when spraying and spray in a well ventilated area to prevent health and fire hazards.

18. Do not direct paint or other sprayed material at the compressor. Locate compressor as far away from the spraying area as possible to minimize over-spray accumulation on the compressor.

19. When spraying or cleaning with solvents or toxic chemicals, follow the instructions provided by the chemical manufacturer.

⚠WARNING

Risk of injury. Do not direct air stream at body

Installation

⚠WARNING

Disconnect, tag and lock out power source then release all pressure from the system before attempting to install, service, relocate or perform any maintenance.

⚠ CAUTION ***Do not lift or move unit without appropriately rated equipment. Be sure the unit is securely attached to lifting device used. Do not lift unit by holding onto tubes or coolers. Do not use unit to lift other attached equipment.***

⚠ CAUTION ***Never use the wood shipping skids for mounting the compressor.***

Install and operate unit at least 24" from any obstructions in a clean, well ventilated area. The surrounding air temperature should not exceed 100°F. This will ensure an unobstructed flow of air to cool compressor and allow adequate space for maintenance.

⚠ CAUTION ***Do not locate the compressor air inlet near steam, paint spray, sandblast areas or any other source of contamination.***

NOTE: If compressor operates in a hot, moist environment, supply compressor pump with clean, dry outside air. Supply air should be piped in from external sources.

TANK MOUNTING

The tank should be bolted into a flat, even, concrete floor or on a separate concrete foundation. Vibration isolators should be used between the tank leg and the floor.

When using isolator pads, **do not draw bolts tight.**

Allow the pads to absorb vibrations. When isolators are used, a flexible hose or coupling should be installed between the tank and service piping.

⚠WARNING

Failure to properly install the tank can lead to cracks at the welded joints and possible bursting.

PIPING

⚠WARNING ***Never use plastic (PVC) pipe for compressed air. Serious injury or death could result.***

Any tube, pipe or hose connected to the unit must be able to withstand the temperature generated and retain the pressure. All pressurized components of the air system must have a pressure rating higher than or equal to the 200 psi. ASME safety valve setting.

Installation (Con't)

Incorrect selection and installation of any tube, pipe or hose could result in bursting and injury. Connect piping system to tank using the same size fitting as the discharge port.

INSTALLING A SHUT-OFF VALVE

A shut-off valve should be installed on the discharge port of the tank to control the air flow out of the tank. The valve should be located between the tank and the piping system.

⚠WARNING ***Never install a shut-off valve between the compressor pump and the tank. Personal injury and/or equipment damage may occur. Never use reducers in discharge piping.***

When creating a permanently installed system to distribute compressed air, find the total length of the system and select pipe size from the chart. Bury underground lines below the frost line and avoid pockets where condensation can gather and freeze.

MINIMUM PIPE SIZE FOR COMPRESSED AIR LINE

	Length Of Piping System			
CFM	25'	50'	100'	250'
20	3/4"	3/4"	3/4"	1"
40	3/4	1	1	1
60	3/4	1	1	1
100	1	1	1	11/4

Apply air pressure to the piping installation and make sure all joints are free from leaks BEFORE underground lines are covered. Before putting the compressor into service, find and repair all leaks in the piping, fittings and connections.

WIRING

⚠WARNING ***All wiring and electrical connections must be performed by a qualified electrician. Installations must be in accordance with local and national codes.***

⚠ CAUTION ***Overheating, short circuiting and fire damage will result from inadequate wiring.***

Wiring must be installed in accordance with National Electrical Code and local codes and standards that have been set up covering electrical apparatus and wiring. These should be consulted and local ordinances observed. Be certain that adequate wire sizes are used, and that:

1. Service is of adequate ampere rating.
2. The supply line has the same electrical characteristics (voltage, cycles and phase) as the motor.
3. The line wire is the proper size and that no other equipment is operated from the same line. The chart gives minimum recommended wire sizes for compressor installations.

Recommended wire sizes may be larger than the minimum set up by local ordinances. If so, the larger size wire should be used to prevent excessive line voltage drop. The additional wire cost is very small compared with the cost of repairing or replacing a motor electrically «starved» by the use of supply wires which are too small.

MINIMUM WIRE SIZE USE 75°C COPPER WIRE

	Single Phase	Three Phase	
HP	230V	208/230V	460/575V
5	8 AWG	12 AWG	14 AWG
7.5	8 AWG	10 AWG	12 AWG
10	6 AWG	8 AWG	12 AWG
15	N/A	6 AWG	10 AWG
25	N/A	3 AWG	8 AWG

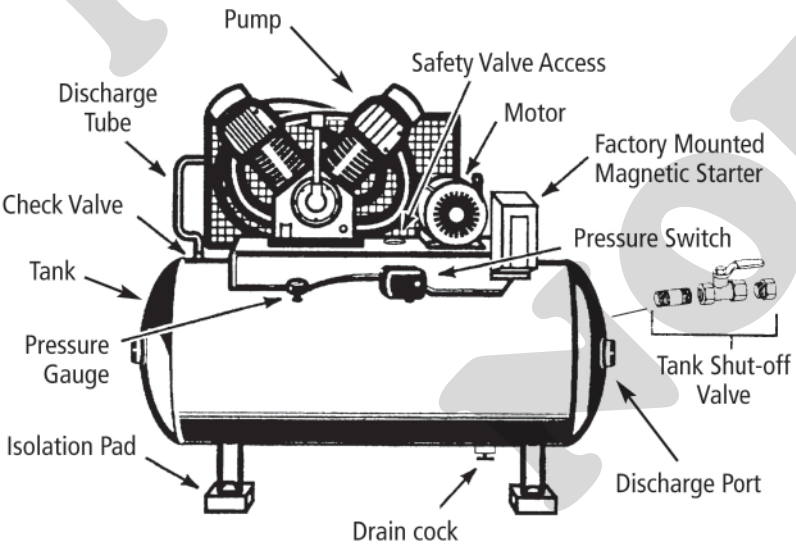


Figure 1 – Horizontal Unit Identification

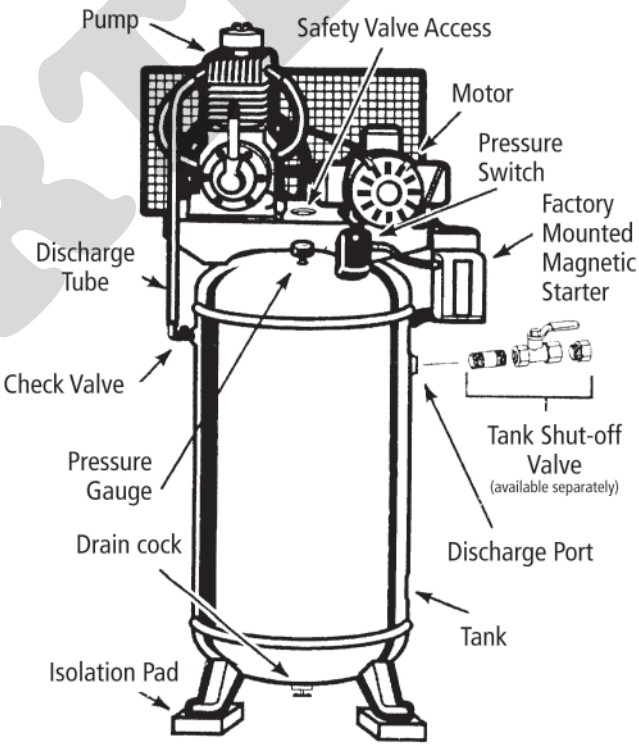


Figure 2 – Vertical Unit Identification

Installation (Con't)

GROUNDING

⚠ DANGER

Improperly grounded electrical components are shock hazards. Make sure all the components are properly grounded to prevent death or serious injury.

This product **must** be grounded. Grounding reduces the risk of electrical shock by providing an escape wire for the electric current if short circuit occurs. This product must be installed and operated with a power cord or cable that has a grounding wire.

MOTOR HOOKUP AND STARTER INSTALLATION

Motors with frame sizes 184T, 215T, 254T or 284T DO NOT have built-in overload protection. A magnetic starter is required. See wiring diagram.

To change to the alternate voltage on three phase motors with 230/460 ratings:

1. Rewire motor per data plate on motor or instruction sheet.
2. Check electric rating of magnetic starter and replace thermal overload elements or magnetic starter as required. The voltage and amperage ratings are listed on the motor nameplate.

DIRECTION OF ROTATION

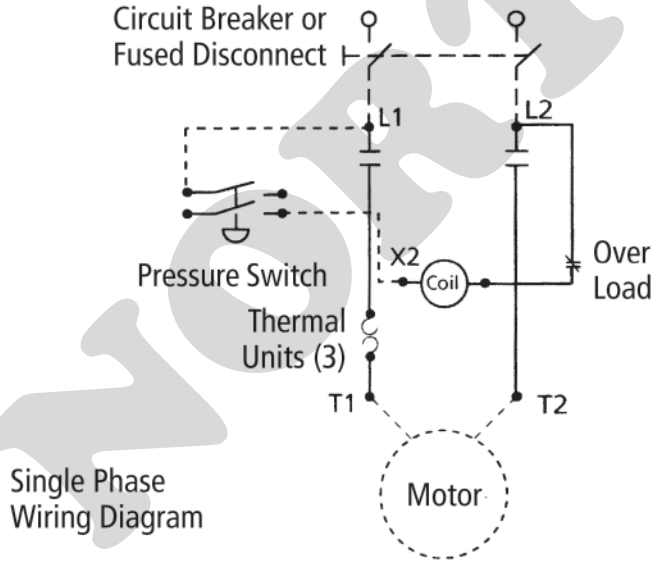
NOTE: Improper rotation will result in reduced unit life.

The direction of rotation must be counterclockwise (as shown by the arrow on the flywheel) while facing the flywheel side of the pump. The motor nameplate will show wiring information for counterclockwise rotation.

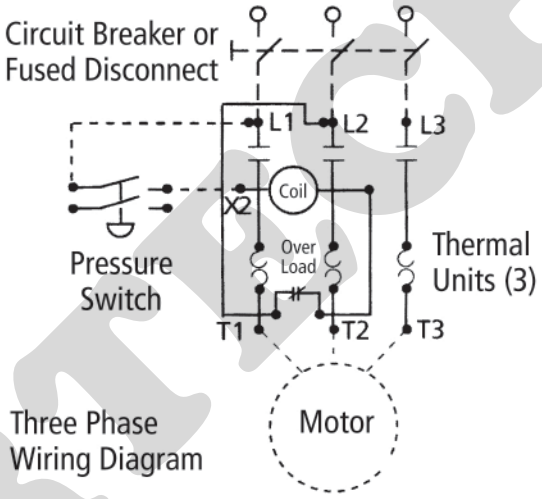
The proper direction is very important.

The direction of rotation of 3 phase motors can be reversed by interchanging any two motor-line leads. For single phase motors, refer to the motor nameplate.

IMPORTANT: Check motor rotation before operating the compressor.



Single Phase
Wiring Diagram



Three Phase
Wiring Diagram

For Motor Frame Sizes 184T, 215T, 254T or 284T. Refer to Motor Nameplate

NORTECH

Operation

All lubricated compressor pumps discharge some condensed water and oil with the compressed air. Install appropriate water/oil removal equipment and controls as necessary for the intended application.

⚠ NOTICE ***Failure to install appropriate water/oil removal equipment may result in damage to machinery or workpiece.***

LUBRICATION

⚠ CAUTION Fill pump with single-viscosity, ISO 100 (SAE 30), non-detergent, compressor oil. A synthetic oil (SAE 5W30) may also be used. Add oil only through the oil fill plug. Pouring oil into any other orifice will cause oil to leak and spray out during operation. Fill to the center of the sight gauge (see Figure 3).

⚠ CAUTION ***Use of automotive engine oil will cause carbon deposits to build up on the valves. This will shorten the life expectancy and will require more frequent service to the valves. Do not use ATF hydraulic fluid, two-cycle oil or any oil treatment product. Do not use diester synthetic oil.***

OIL PUMP OPERATION (FOR PRESSURE LUBRICATED PUMPS ONLY)

Oil pump operation must be verified before compressor is put into service.

1. Run the compressor for 2 minutes and turn the oil filter counter clock-wise until oil leaks out between the filter and the housing surface.

2. If no oil leaks out, turn compressor OFF and prime the oil pump.

3. Loosen brass nuts on oil pickup tube. Remove top brass nut and carefully disengage tube elbow from oil pump housing.

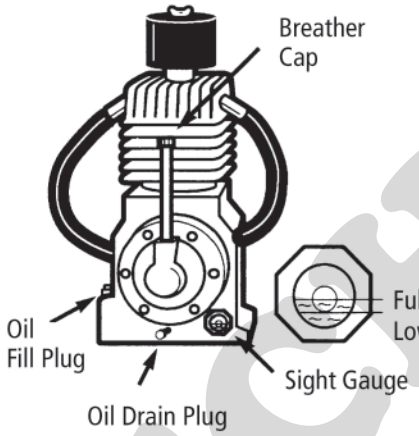


Figure 3 – Oil Fill Diagrams

4. Squirt a liberal amount of oil into fitting hole to prime oil pump. Reassemble making sure not to crush tube by overtightening nuts. System must be air tight to work.

5. Repeat Step 1.

RECOMMENDED BREAK-IN PERIOD

The compressor should be run continuously for one hour to allow proper seating of the piston rings.

1. Open drain cock completely and run the compressor for 60 minutes (See Figure 4).

Figure 4 – Opening Drain Cock

2. Turn off the compressor and close drain cock. The compressor is now ready for use.

If the compressor is run under humid conditions for short periods of time, the humidity will condense in the crankcase and cause the oil to look creamy. Oil contaminated by condensed water will not provide adequate lubrication and must be changed immediately. Using contaminated oil will damage bearings, pistons, cylinders and rings and is not covered under warranty. To avoid water condensation in the oil, periodically run the compressor with tank pressure near 150 psi by opening the drain cock or an air valve connected to the tank or hose. Run the pump for an hour at a time at least once a week or more often if the condensation reoccurs.

IMPORTANT: Change oil after first 50 hours of operation.

PRESSURE SWITCH, START – STOP

NOTE: This compressor has a maximum operating pressure of 175 PSI. Do not alter pressure settings on control components above this limit.

The compressor unit starts and stops based on preset pressure switch settings. The pressure switch contains an unloader which is a small valve that vents air to allow the motor to start easily (See Figure 5).

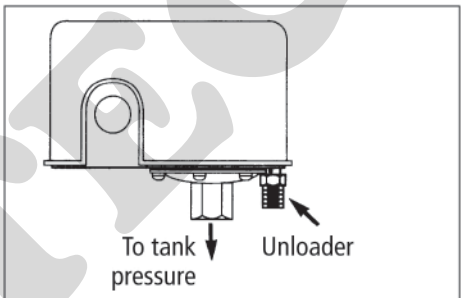


Figure 5 – Pressure Switch

Operation (Con't)

CONTINUOUS RUN OPERATION

To convert to continuous run operation a separate unloading device must be installed by the user between the pump and the tank. The existing check valve must be removed.

CRANKCASE BREATHER

During severe operating conditions or initial start-up, some oil may accumulate at the crankcase breather opening. This is normal and will diminish as the pump accumulates run time and the piston rings become fully seated.

Maintenance

⚠WARNING

Disconnect, tag and lock out power source then release all pressure from the system before attempting to install, service, relocate or perform any maintenance.

In order to maintain efficient operation of the compressor system, check the air filter and oil level before each use. The ASME safety valve should also be checked daily (See Figure 6). Pull ring on safety valve and allow the ring to snap back to normal position. This valve automatically releases air if the tank pressure exceeds the preset maximum. If air leaks after the ring has been released, or the valve is stuck and cannot be actuated by the ring, the ASME safety valve must be replaced.

⚠ DANGER

Do not attempt to tamper with the ASME safety valve.

Figure 6

TANK

⚠ DANGER

Never attempt to repair or modify a tank! Welding, drilling or any other modification will weaken the tank resulting in damage from rupture or explosion. Always replace worn, cracked or damaged tanks.

MAINTENANCE SCHEDULE

Operation	Daily	Weekly	Monthly	3 Months
Check Safety Valve	●			
Drain Tank (See Figure 4)	●			
Check Oil Level	●			
Check Air Filter	●			
Check Intercooler (two-stage Compressors only)		●		
Clean Unit Components			●	
Check Belt Tightness				●
Change Oil (See Figure 3)				●
Change Oil Filter (Pressure lubricated pumps only)				●

⚠ NOTICE ***Drain liquid from tank daily.***

The tank should be carefully inspected at a minimum of once a year. Look for cracks forming near the welds. If a crack is detected, remove pressure from tank immediately and replace.

COMPRESSOR LUBRICATION

See Operation. Add oil as required. The oil and oil filter should be changed every three months or after every 500 hours of operation; whichever comes first.

AIR FILTER

Never run the compressor pump without an intake air filter nor with a clogged intake air filter. Use compressed air to blow the filter clean. Do not wash or oil the element. If it cannot be blown clean, the filter must be replaced. Operating compressor with a dirty filter can cause high oil consumption and increase oil contamination in the discharge air.

INTERCOOLER (TWO-STAGE COMPRESSORS ONLY)

⚠WARNING ***Intercooler fins are sharp, always wear gloves and use care when you clean or work near the intercooler.***

Weekly, check the intercooler to be sure all fittings are secure and tight. Blow all dirt, dust and other accumulations from the intercooler fins.

COMPONENTS

Turn off all power and use light air pressure to blow dust and foreign material from cylinder head, motor, fan blades, air lines, intercooler and tank on a monthly basis.

BELTS

⚠WARNING ***Lock out and tag the power then release all pressure from the tank to prevent unexpected movement of the unit.***

Check belt tension every 3 months. Adjust belt tension to allow 3/8 to 1/2" deflection with normal thumb pressure. Also, align belts using a straight edge against the face of the flywheel and touching the rim on both sides of the face. The belts should be parallel to this straight edge.

Air Compressors

Troubleshooting Chart

Symptom	Possible(s) Cause(s)	Corrective Action
Motor hums and runs slowly or not at all	1. Low voltage or not voltage 2. Shorted or open motor winding 3. Defective check valve or unloader valve 4. Defective pressure switch – contacts will not close	1. Check with voltmeter, check overload relay in magnetic starter or reset switch on motor. If overload or reset switch trips repeatedly, find and correct the cause. See next item 2. Replace motor 3. Replace check valve or unloader valve 4. Repair or replace pressure switch
Reset mechanism cuts out repeatedly or fuses blow repeatedly	1. Pressure switch set too high 2. Faulty check valve, air bleeds 3. Wrong fuse size or magnetic starter heaters 4. Defective motor	1. Adjust or replace 2. Clean or replace faulty valve 3. Be sure that fuses and heaters are rated properly 4. Replace motor
Excessive noise in operation	1. Loose pulley, flywheel, belt, belt guard, etc. 2. Lack of oil in crankcase 3. Compressor floor mounting loose	1. Tighten 2. Check for damage to bearings, replenish oil 3. Shim and tighten
Milky oil in oil reservoir	Water condensing in crankcase due to high humidity	Pipe air intake to less humid air source. Run pump continuously for one hour
Excessive oil consumption or oil in air lines	1. Be sure there is a problem 2. Restricted air intake 3. Wrong oil viscosity 4. Worn piston rings 5. Oil leaks 6. Scored cylinder	1. Diagnose oil contamination problems by testing the discharge air or measuring oil consumption from the crankcase 2. Clean or replace air filter 3. Drain oil. Refill with oil of proper viscosity 4. Replace rings 5. Tighten bolts, replace gaskets or o-rings 6. Replace cylinder
Water in discharge air	Excessive water in tank	Drain tank
Air blowing out of inlet	Broken first stage inlet valve (two-stage unit)	Replace valve assembly
Insufficient pressure	1. Air demand too high 2. Leaks or restrictions in hoses or piping 3. Slipping belts	1. Limit air usage 2. Check for leaks or restriction in hose or piping 3. Tighten belts
Tank does not hold pressure when compressor is off and shutoff valve is closed	1. Faulty check valve 2. Check all connections and fitting for tightness 3. Check tank for cracks or pin holes	1. Clean or replace faulty valve **⚠ DANGER** ***Do not disassemble check valve with air in tank*** 2. Tighten 3. Replace tank. Never repair a damaged tank
Excessive belt wear. (Light dust from start is normal. Worn belts separate at layers)	1. Pulley out of alignment 2. Belts too tight or too loose	1. Realign motor pulley 2. Adjust tension
Tank pressure builds slowly	1. Dirty air filter 2. Blown cylinder head gasket 3. Worn/broken intake/discharge valves 4. Air leaks	1. Clean or replace filter element 2. Install new gasket 3. Install new valve plate assembly 4. Tighten joints
Tank pressure builds up quickly on compressor	Excessive water in tank	Drain tank, check speed. See Performance table
ASME safety valve pops open while compressor is running	1. Wrong pressure switch setting 2. Defective ASME safety valve	1. Adjust to lower pressure (150 psi maximum for two-stage unit) (See Operation) 2. Replace valve