

**Summary Report for Individual Task  
551-88L-3051  
Troubleshoot an Air System  
Status: Approved**

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DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

DESTRUCTION NOTICE: None

**Condition:** Aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, troubleshoot an air compressor and air system using the troubleshooting procedures contained in the vessel specific technical manual. While wearing appropriate PPE, (i.e. hearing protection, Nitrile gloves, eye protection, etc..) with no injuries and/or damage to equipment.

**Standard:** The Soldier knows the troubleshooting procedures of the air system, and can correctly conduct troubleshooting procedures pertaining to the air receivers, air compressor, and air compressor dehydration group.

**Special Condition:** None

**Special Standards:** None

**Special Equipment:**

**Safety Level:** High

**MOPP:**

**Task Statements**

**Cue:** None

**DANGER**

None

**WARNING**

None

**CAUTION**

None

**Remarks:** None

**Notes:** None

### Performance Steps

1. Demonstrate basic knowledge for troubleshooting procedures of the air systems.

a. The following applies to troubleshooting concerning functions of the air system from the compressors to the service equipment. It does not include any equipment beyond the service equipment connections.

b. Always start with troubleshooting instructions found in the vessels technical manuals, and if required, continue with the instructions below.

## WARNING

Always ensure affected systems have been secured, locked out and tagged out to prevent accidental energizing of equipment that can result in the entanglement of limbs and clothing in moving parts. Performing maintenance with systems energized may result in death or serious injury to personnel or equipment damage. Failure to follow this warning may result in injury or death to personnel.

2. Demonstrate basic knowledge for troubleshooting incorrect air receiver and air system pressure.

a. Excessive air receiver pressure.

(1) Possible causes.

(a) Inaccurate pressure gauge.

(b) Defective pressure switch.

(2) Actions to take.

(a) Replace gauge.

(b) Set or replace switch.

b. Air receivers will not come up to pressure.

(1) Possible causes.

(a) Compressors not running.

(b) Misaligned piping system.

(c) Leaks in the piping system.

\_1\_ Open drains.

\_2\_ Eductors in use.

\_3\_ Leaking piping.

(d) Air filter clogged.

- (e) V-belt tension improper.
- (f) Defective unloader pilot valve.
- (g) Defective or misadjusted pressure switch.
- (h) Inaccurate pressure gauge.

(2) Action to take.

- (a) Start air compressors.
- (b) Ensure piping system is aligned correctly.
- (c) Find and repair leaks.
- (d) Clean or replace air filter.
- (e) Adjust v-belt tension, (refer to Figure 551-88L-3051\_01).

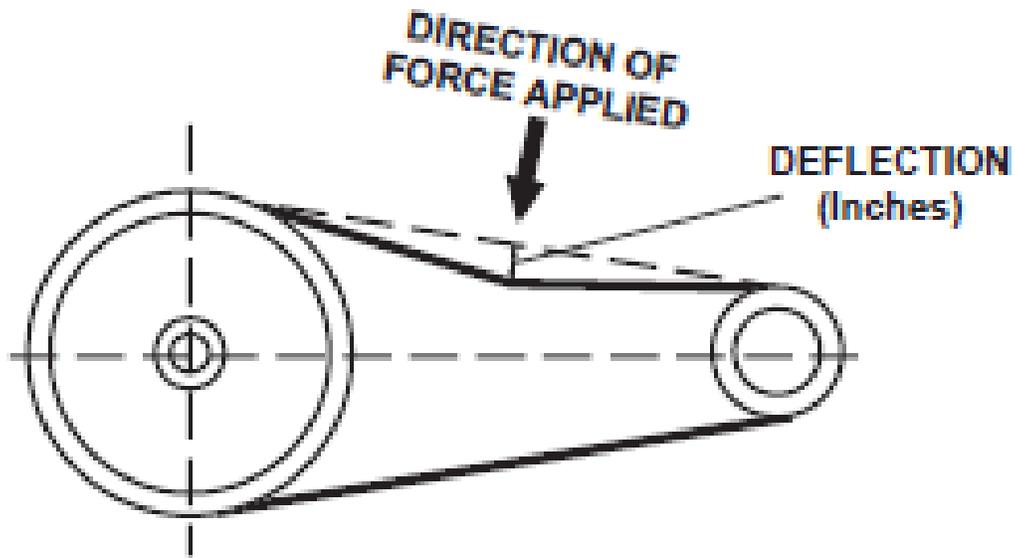


Figure 551-88L-3051\_01  
V-belt tension

- (f) Replace unloader pilot valve.
- (g) Adjust or replace pressure switch.
- (h) Replace pressure gauge.

c. Ships service air pressure at serviced equipment above maximum allowable pressure.

(1) Possible causes.

- (a) Piping system not correctly aligned.

(b) Ships service air regulator misadjusted.

(2) Actions to take.

(a) Check and correct piping system alignment.

(b) Adjust the ships service air regulator, (refer to Figure 551-88L-3051\_02).

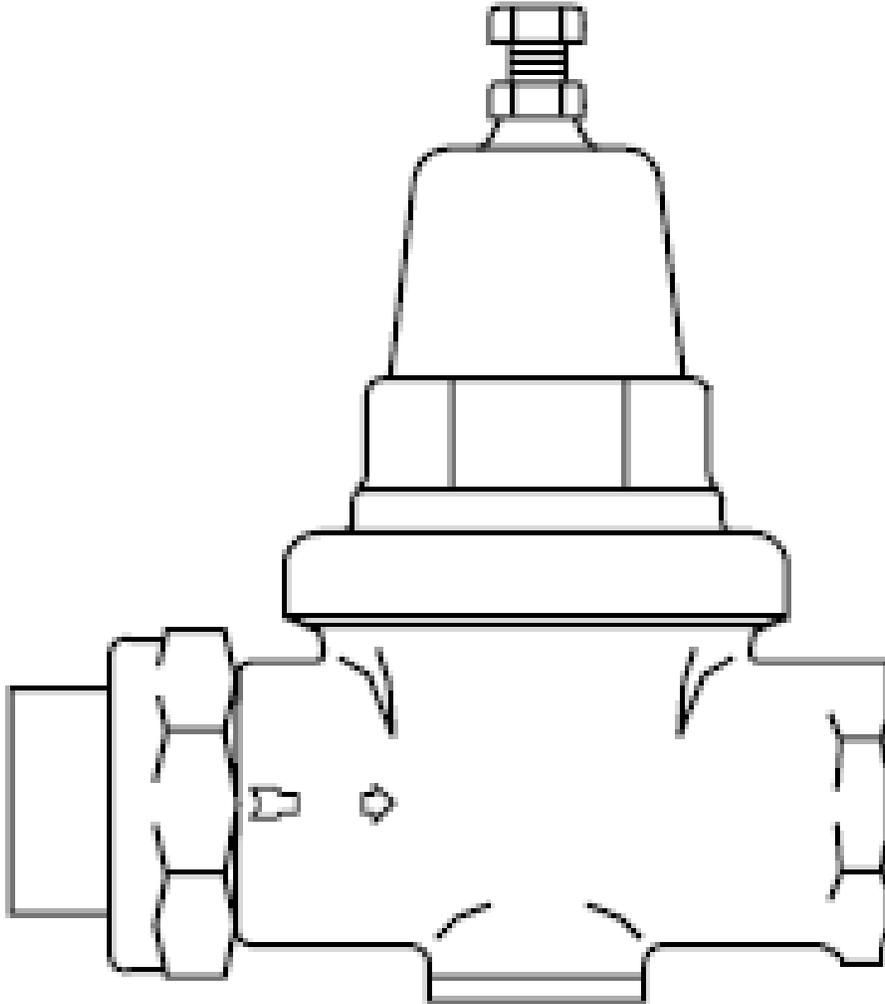


Figure 551-88L-3051\_02  
Air regulator

d. Starting air pressure at serviced equipment above maximum allowable pressure.

(1) Possible causes.

(a) Piping system not correctly aligned.

(b) Ships service air regulator misadjusted.

(2) Action to take.

(a) Check and correct piping system alignment.

(b) Adjust ships service air regulator.

e. Ships service air pressure at serviced equipment below minimum allowable pressure.

(1) Possible causes.

(a) Compressors not running.

(b) Misaligned piping system.

(c) Leaks in the piping system.

(d) Air being heavily used.

(e) Ships service air regulator misadjusted.

(2) Actions to take.

(a) Start compressors.

(b) Ensure piping system is aligned correctly.

(c) Find and repair leaks.

(d) Lessen air usage.

(e) Adjust ships service air regulator.

f. Starting air pressure at serviced equipment below minimum allowable pressure.

(1) Possible causes.

(a) Compressors not running.

(b) Misaligned piping system.

(c) Leaks in the piping system.

(d) Starting air regulator misadjusted.

(2) Actions to take.

(a) Start compressors.

(b) Ensure piping system is aligned correctly.

(c) Find and repair leaks.

(d) Adjust starting air regulator.

3. Demonstrate basic for troubleshooting the air compressor, (refer to Figure 551-88L-3051\_03).

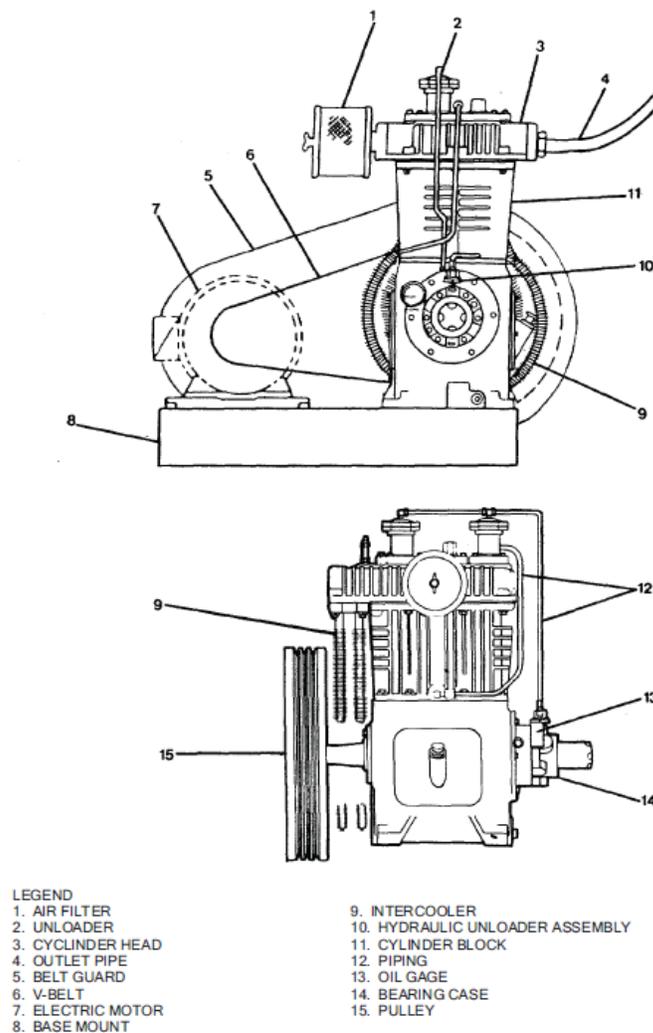


Figure 551-88L-3051\_03  
Air compressor assembly

a. Compressor knocks during operation.

(1) Possible causes.

- (a) Improper oil level.
- (b) Excessive air receiver pressure.
- (c) Loose suction or discharge valve.
- (d) Loose pulley.
- (e) Worn connecting rod bearings.
- (f) Worn crankshaft bearings.

(g) Worn piston pin bushings.

(2) Actions to take.

(a) Add oil to the proper level, (refer to Figure 551-88L-3051\_04).

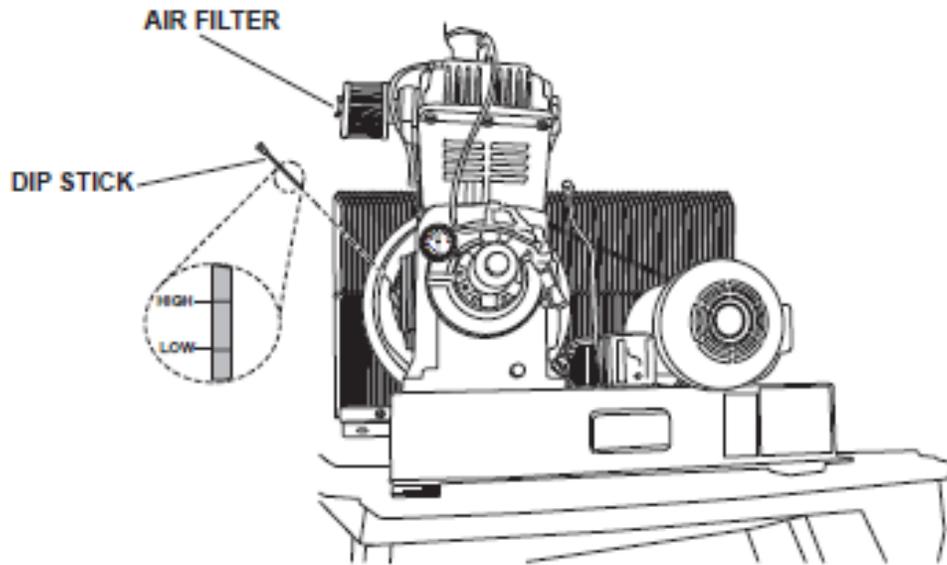


Figure 551-88L-3051\_04  
Oil Dipstick

(b) Perform Step 2.a. of this ITAR.

(c) Tighten valves.

(d) Tighten pulley clamp screws, (refer to Figure 551-88L3051\_05).

## Pulley Clamp Screws

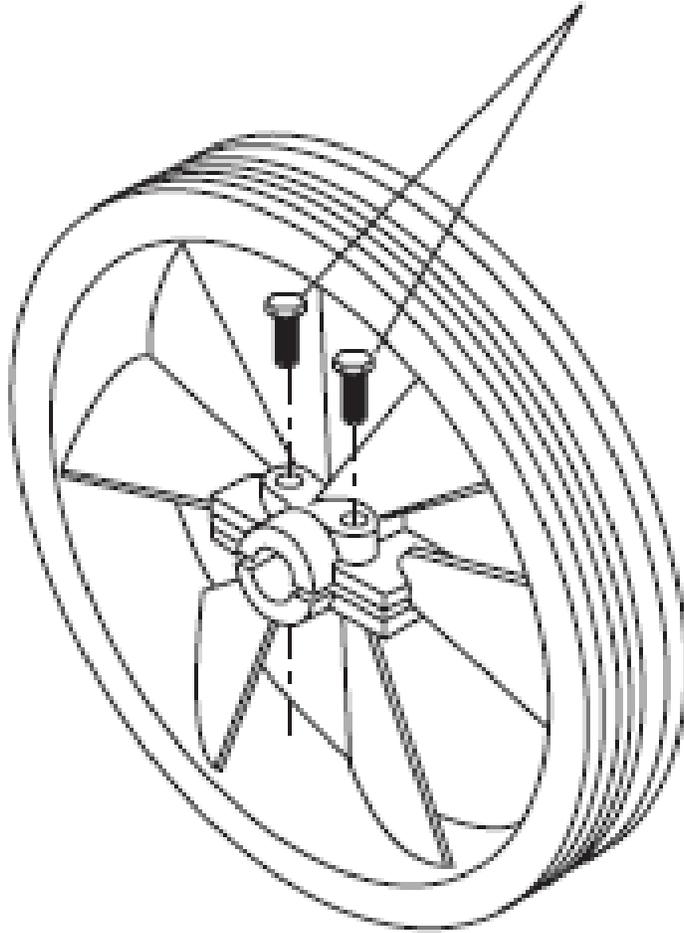


Figure 551-88L-3051\_05  
Pulley clamp screws

- (e) Replace connecting rod bearings, (refer to Figure 551-88L-3051\_06).
- (f) Replace crankshaft bearings.
- (g) Replace piston pin bushings.

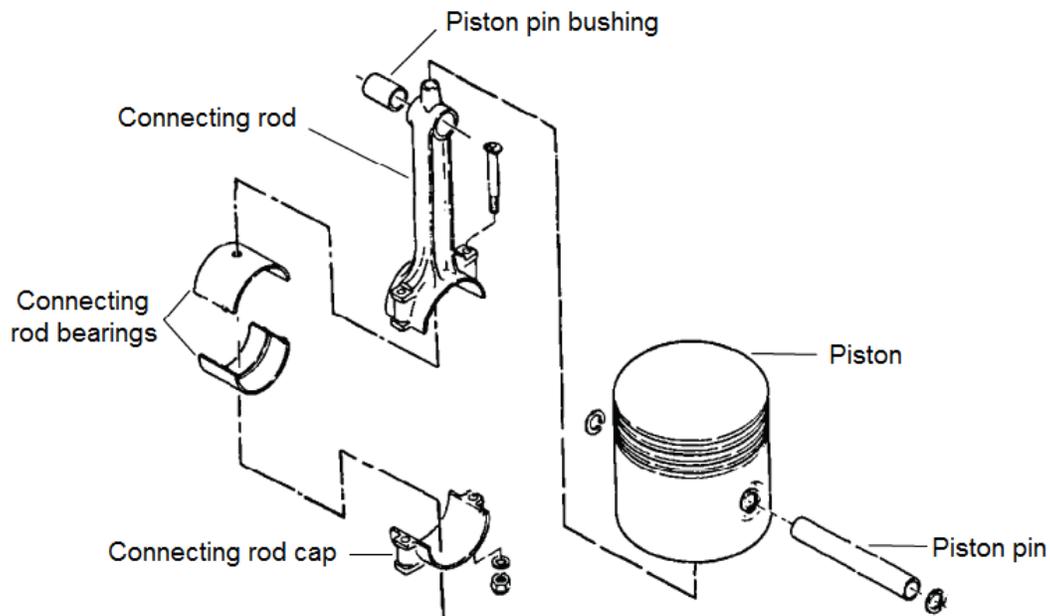


Figure 551-88L-3051\_06  
Piston assembly

b. Compressor loads and unloads excessively.

(1) Possible causes.

- (a) Incorrect speed due to belt slipping.
- (b) Excessive system air leakage from fittings, piping, or air receivers.
- (c) Misadjusted unloader pilot valve.
- (d) Defective unloaders.

(2) Actions to take.

- (a) Tighten V-belt.
- (b) Locate and repair leaks.
- (c) Adjust the unloader pilot valve.
- (d) Repair or replace unloaders, (refer to Figure 551-88L-3051\_07).

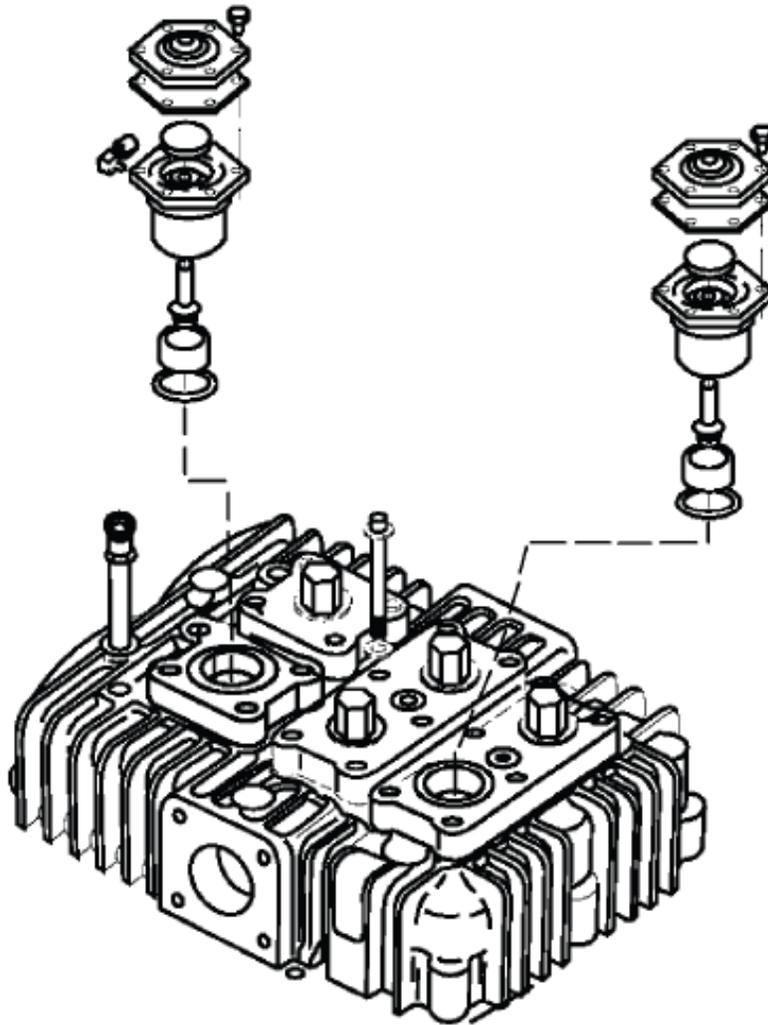


Figure 551-88L-3051\_07  
Unloader assemblies

c. Compressor overheats.

(1) Possible causes.

- (a) Excessive system leakage.
- (b) Inadequate lubrication.
- (c) Inadequate ventilation.
- (d) Defective discharge valves.
- (e) Clogged intercooler.
- (f) Clogged air filter.
- (g) Excessive air receiver pressure.

(2) Actions to take.

- (a) Tighten all fittings and connections.
- (b) Add oil.
- (c) Remove any ventilation obstructions.
- (d) Replace discharge valves, (refer to Figure 551-88L-3051\_08).

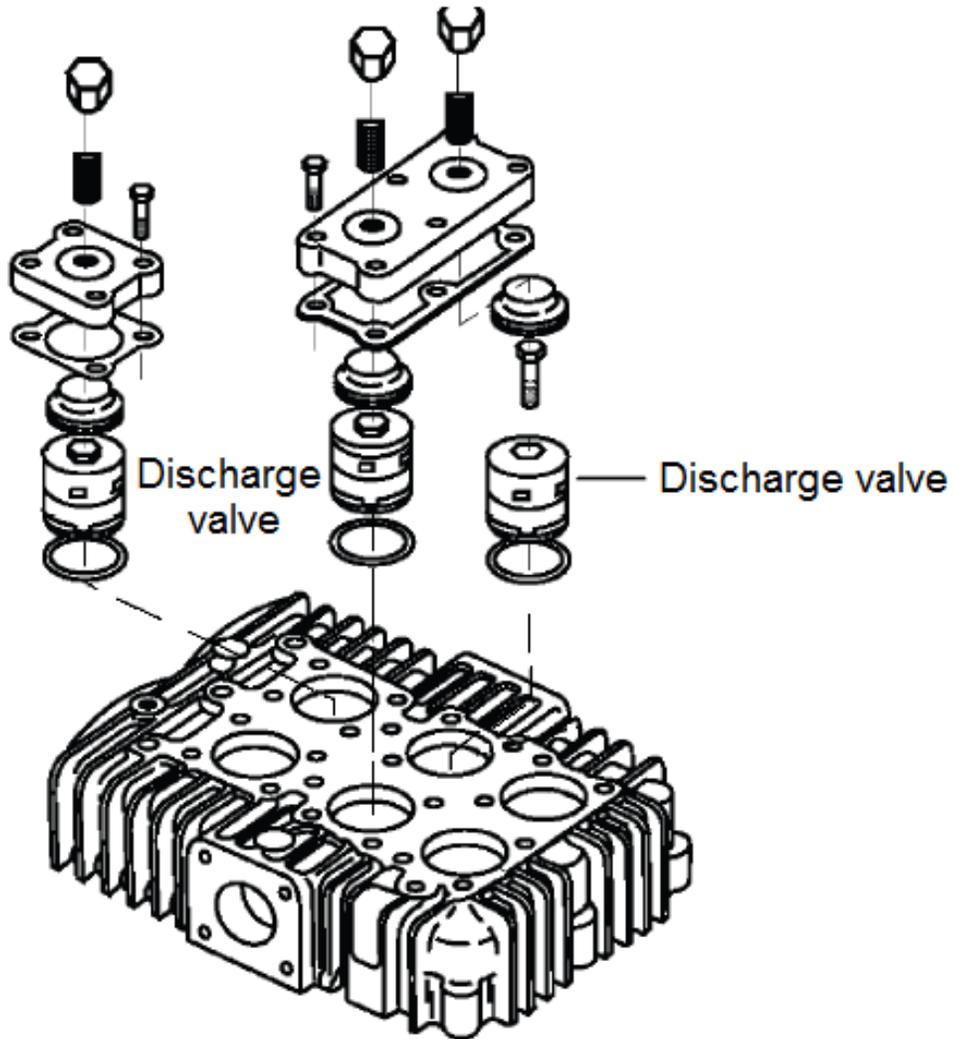


Figure 551-88L-3051\_08  
Discharge valves

- (e) Replace intercooler.
  - (f) Clean or replace air filter.
  - (g) Perform Step 2.a. of this ITAR.
- d. Excessive belt wear or jumps off the sheave.
- (1) Possible causes.

(a) Motor and compressor pulley misalignment, (refer to Figure 551-88L-3051\_09).

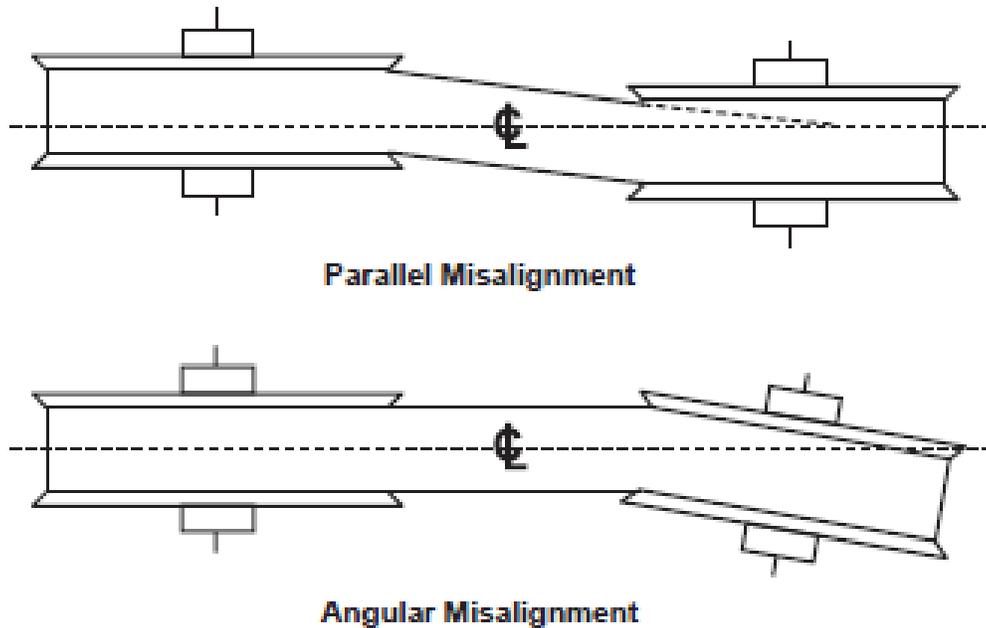


Figure 551-88L-3051\_09  
Pulley misalignment

- (b) Incorrect V-belt tension.
- (c) Compressor pulley wobbling.
- (d) Damaged or rough pulley grooves.

(2) Actions to take.

- (a) Align pulleys.
- (b) Adjust V-belts.
- (c) Tighten or replace compressor pulley.
- (d) Replace pulley.

e. Excessive oil consumption.

(1) Possible causes.

- (a) Overheating of compressor due to inadequate or loss of lubrication.
- (b) Restricted air intake.
- (c) Improper oil viscosity.
- (d) Worn piston rings.

(e) Bent or twisted connecting rod.

(2) Actions to take.

(a) Shut down and allow compressor to cool.

\_1\_ Check for and correct oil leaks.

\_2\_ Lubricate compressor.

(b) Clear air intake.

(c) Change oil using correct viscosity.

(d) Repair piston.

(e) Repair connecting rod.

f. Compressor vibrates excessively.

(1) Possible causes.

(a) Incorrect V-belt tension.

(b) Loose compressor or motor.

(c) Loose pulley.

(d) Piping insecurely mounted in its hangers.

(e) Excessive discharge pressure.

(f) Faulty compressor valves.

(2) Actions to take.

(a) Adjust V-belt tension.

(b) Tighten all mounting bolts.

(c) Tighten pulley bolts.

(d) Securely mount the piping.

(e) Adjust or replace pressure switch.

(f) Repair or replace valves.

g. Compressor fails to start.

(1) Possible causes.

- (a) Proper operating procedures not followed.
- (b) Is the air pressure below the set compressor starting pressure.
- (c) Is the power on.
- (d) Loose or broken power wire.
- (e) Thermal overload tripped.
- (f) Correct power at motor.
- (g) Defective motor.

(2) Actions to take.

- (a) Perform correct operating procedures.
- (b) Compressor will not start until air pressure drops below the set compressor starting pressure.
- (c) Turn on power.
- (d) Connect or replace wire.
- (e) Reset thermal overload.
- (f) Restore correct power.
- (g) Repair or replace motor.

h. Low discharge pressure and air delivery.

(1) Possible causes.

- (a) Open drain valves.
- (b) Leaks in the plant air system.
- (c) Leaking safety valve.
- (d) Slipping V-belts.
- (e) Restricted air inlet filter or suction line.
- (f) Defective pressure gauges.
- (g) Leaking head gasket.
- (h) Loose or defective suction or discharge valves.

- (i) Defective hydraulic unloader.
- (j) Worn piston rings or loose pistons.
- (k) Clogged intercooler.

(2) Actions to take.

- (a) Close valves.
- (b) Secure all fittings and connections.
- (c) Replace valve.
- (d) Adjust V-belts.
- (e) Remove restriction from inlet filter or suction line.
- (f) Replace pressure gauges.
- (g) Replace head gasket.
- (h) Replace valves.
- (i) Replace hydraulic unloader.
- (j) Repair piston.
- (k) Replace intercooler.

i. Compressor oil pressure low.

(1) Possible causes.

- (a) Low oil level in crankcase.
- (b) Clogged oil filter.
- (c) Oil leaks.
- (d) Plugged oil sump strainer.
- (e) Defective oil pressure gauge.
- (f) Improper oil viscosity.
- (g) Incorrect assembly of bearing carrier.

(2) Actions to take.

- (a) Add oil to the proper level.
- (b) Replace oil filter.
- (c) Repair leaking components.
- (d) Remove bearing carrier group, clean sump strainer and change oil, (refer to Figure 551-88L-3051\_10).

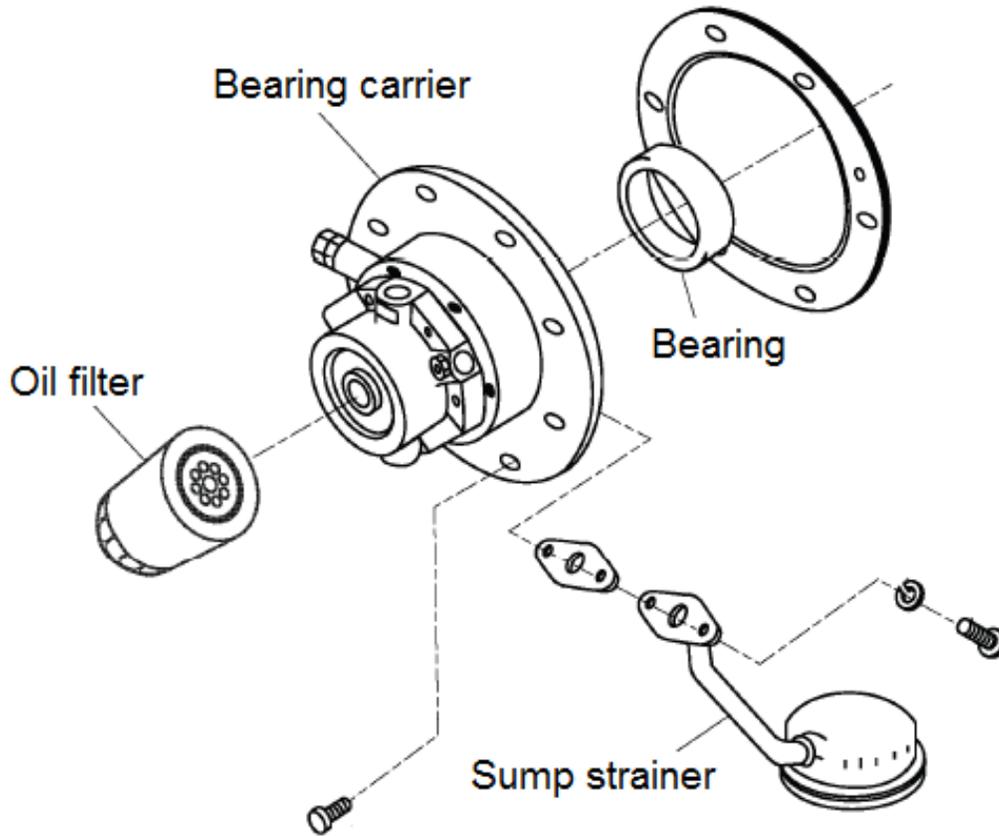


Figure 551-88L-3051\_10  
Bearing carrier group

- (e) Replace gauge.
- (f) Change oil using correct viscosity.
- (g) Remove bearing carrier and reassemble.
  - \_1\_ Verify correct placement of gaskets.
  - \_2\_ Repair bearing carrier.
- j. Motor stalls or circuit breaker trips repeatedly.
  - (1) Possible causes.
    - (a) Improper voltage to the motor.

- (b) Defective motor.
- (c) Incorrect V-belt tension.
- (d) Excessively high air pressure in the receivers.

(2) Actions to take.

- (a) Check for proper voltage, with a multimeter, at the motor controller.
- (b) Repair or replace motor.
- (c) Adjust V-belt tension.
- (d) Perform Step 2.a. of this ITAR.

4. Demonstrate basic knowledge for troubleshooting the air compressor dehydration piping group, (refer to Figure 551-88L-3051\_11).

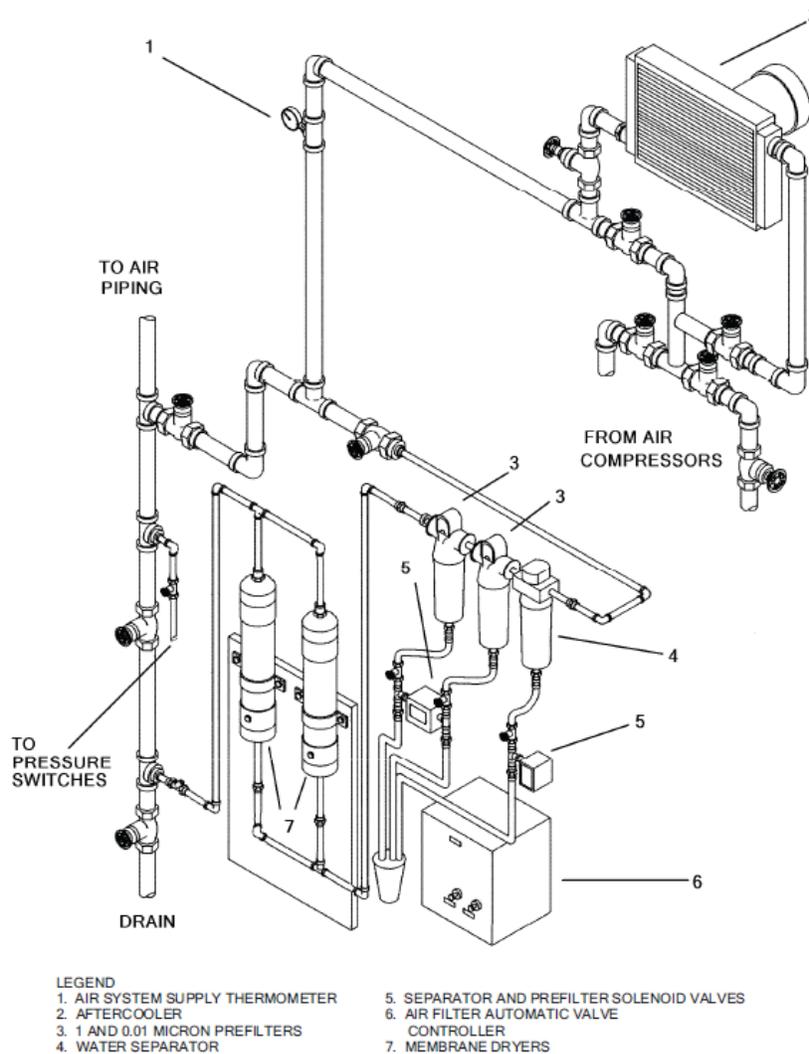


Figure 551-88L-3051\_11  
Air dehydration piping group

a. Automatic drain valve does not drain.

(1) Possible causes.

- (a) Automatic drain globe valves closed.
- (b) Auto drain on air receivers circuit breaker set to "OFF".
- (c) No 110 voltage at the terminals inside the automatic drain valve.
- (d) Drain time and drain interval improperly set.
- (e) Defective automatic drain valve.

(2) Actions to take.

- (a) Open the automatic drain globe valves.
- (b) Set the circuit breaker to "ON".
- (c) Repair the wiring between the circuit breaker and the automatic drain valve.
- (d) Properly set the drain time and drain interval settings, (refer to Figure 551-88L-3051\_12).

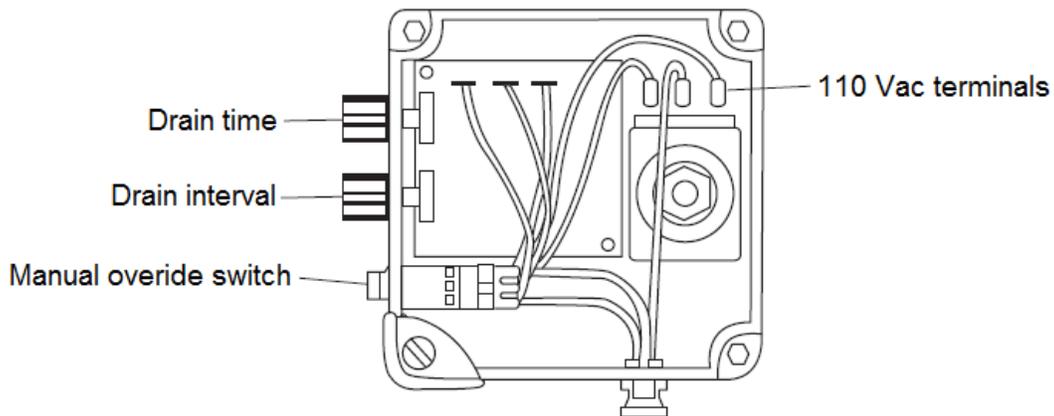


Figure 551-88L-3051\_12  
Drain valve settings

- (e) Replace the automatic drain valve.

b. Automatic drain valve drains continuously.

(1) Possible causes.

- (a) Dirty automatic drain valve.
- (b) Defective automatic drain valve.

(2) Actions to take.

- (a) Disassemble and clean the automatic drain valve.

(b) Replace the automatic drain valve.

c. Excessive moisture in air system.

(1) Possible causes.

(a) Solenoid valve "OFF" time improperly set.

(b) Defective solenoid valve.

(c) Water separator clogged.

(d) Prefilter contains moisture.

(e) Membrane dryers contain moisture.

(f) Membrane dryer contains oil.

(2) Actions to take.

(a) Reduce "OFF" time of solenoid valve, (refer to Figure 551-88L-3051\_13).

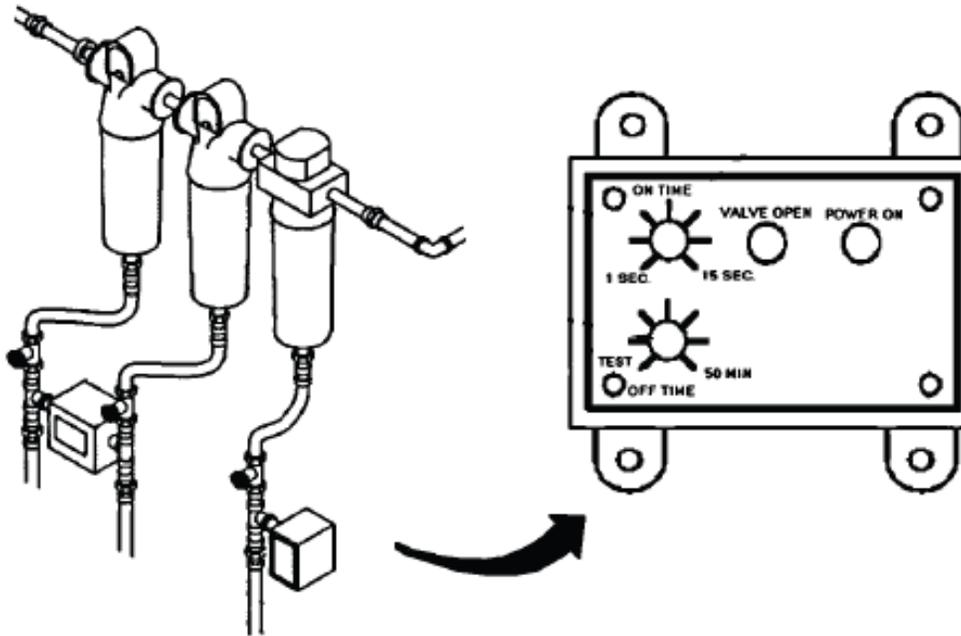


Figure 551-88L-3051\_13  
Solenoid valve

(b) Replace solenoid valve.

(c) Clean and dry water separator, (refer to Figure 551-88L-3051\_14).

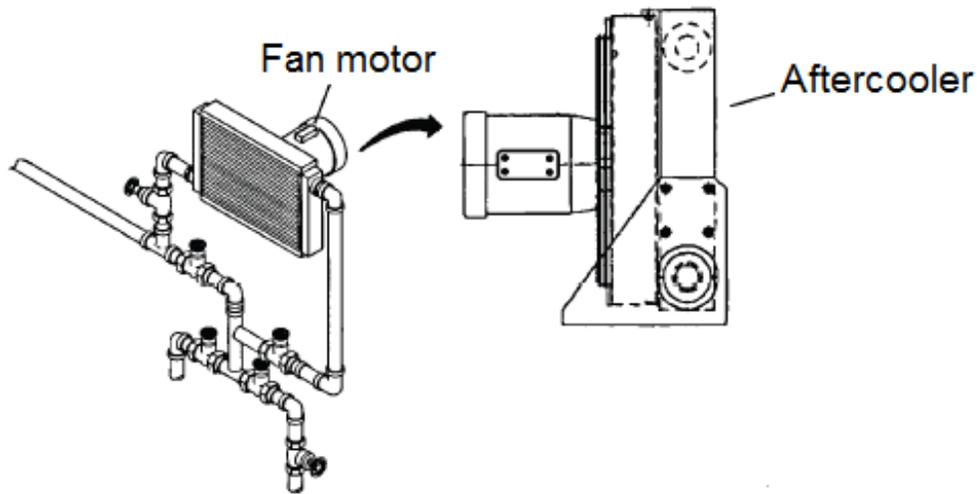


Figure 551-88L-3051\_14  
Water separator

(d) Clean prefilter.

(e) Dry membrane dryer with liquid free low pressure air.

(f) Replace membrane dryers.

d. Excessive vibration in after cooler, (refer to Figure 551-88L-3051\_15).

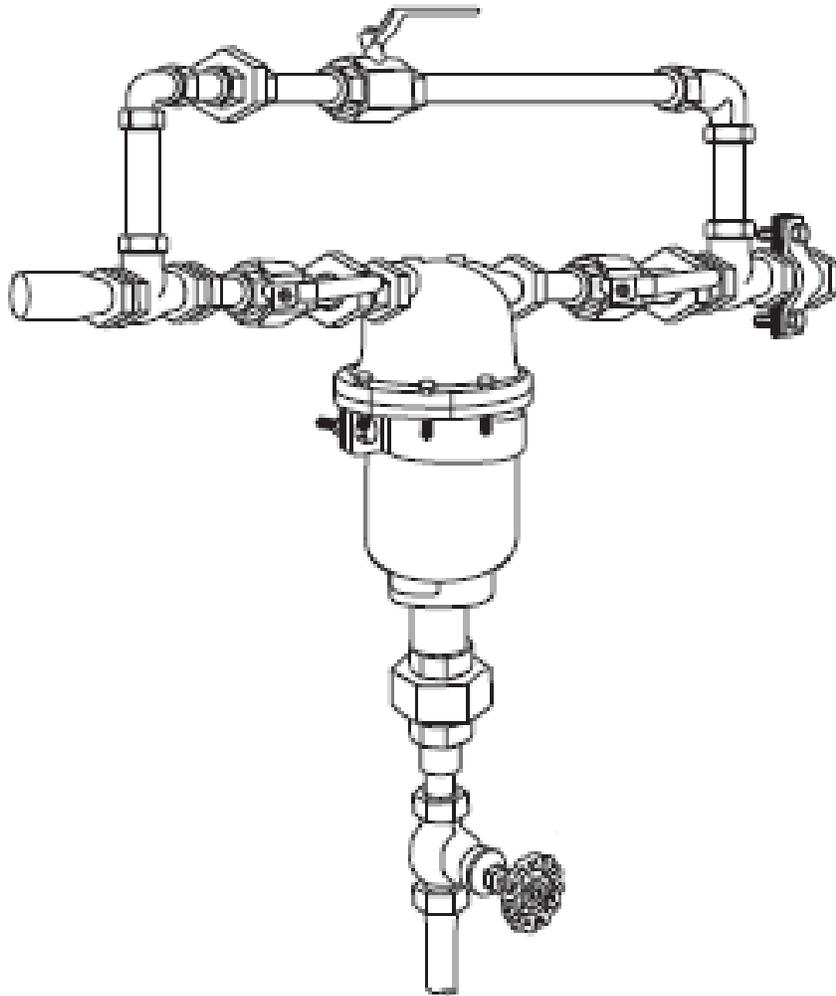


Figure 551-88L-3051\_15  
After cooler assembly

(1) Possible causes.

- (a) Loose components.
- (b) Fan blades damaged or misshapen.

(2) Actions to take.

- (a) Tighten loose components.
- (b) Replace after cooler.

e. High differential pressure in prefilters.

(1) Possible causes.

- (a) Filter elements contain moisture.
- (b) Filter elements contain debris.

(2) Actions to take.

(a) Dry or replace filter elements.

(b) Clean or replace filter elements.

f. High air supply inlet temperature.

(1) Possible causes.

(a) Aftercooler coils air flow restricted.

(b) Aftercooler fan not operating properly.

(2) Actions to take.

(a) Service aftercooler.

(b) Repair or replace aftercooler fan.

g. Water in the moisture separator.

(1) Possible causes.

(a) Solenoid valve not operating properly.

(b) Water separator contains moisture and debris.

(2) Actions to take.

(a) Test and adjust water separator solenoid valve.

\_1\_ Reduce "OFF" time of solenoid valve.

\_2\_ Replace solenoid valve.

(b) Clean and dry water separator.

(Asterisks indicates a leader performance step.)

**Evaluation Preparation:** None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Demonstrated basic knowledge for troubleshooting procedures of the air systems.			
2. Demonstrated basic knowledge for troubleshooting incorrect air receiver and air system pressure.			
a. Excessive air receiver pressure.			
b. Air receivers will not come up to pressure.			
c. Ships service air pressure at serviced equipment above maximum allowable pressure.			
d. Starting air pressure at serviced equipment above maximum allowable pressure.			
e. Ships service air pressure at serviced equipment below minimum allowable pressure.			
f. Starting air pressure at serviced equipment below minimum allowable pressure.			
3. Demonstrated basic for troubleshooting the air compressor.			
a. Compressor knocks during operation.			
b. Compressor loads and unloads excessively.			
c. Compressor overheats.			
d. Excessive belt wear or jumps off the sheave.			
e. Excessive oil consumption.			
f. Compressor vibrates excessively.			
g. Compressor fails to start.			
h. Low discharge pressure and air delivery.			
i. Compressor oil pressure low.			
j. Motor stalls or circuit breaker trips repeatedly.			
4. Demonstrated basic knowledge for troubleshooting the air compressor dehydration piping group.			
a. Automatic drain valve does not drain.			
b. Automatic drain valve drains continuously.			
c. Excessive moisture in air system.			
d. Excessive vibration in after cooler.			
e. High differential pressure in prefilters.			
f. High air supply inlet temperature.			
g. Water in the moisture separator.			

**Supporting Reference(s):**

Step Number	Reference ID	Reference Name	Required	Primary
	TM 55-1905-223-24-8	UNIT, INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE INSTRUCTIONS FOR AIR COMPRESSOR FOR LANDING CRAFT UTILITY (LCU) (NSN 1905-01-154-1191) (REPRINTED W/BASIC INCL C1-2) (THIS IT	No	No
	TM 55-1915-209-24&P	UNIT, INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR COMPRESSED AIR SYSTEM MODEL NUMBER QR 25 350 P/N 52201-101 (REPRINTED W/B	No	No
	TM 55-1925-286-13&P	OPERATOR, UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR	No	No

**Environment:** None

**Safety:** In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

**Prerequisite Individual Tasks :** None

**Supporting Individual Tasks :**

<b>Task Number</b>	<b>Title</b>	<b>Proponent</b>	<b>Status</b>
551-88L-2045	Maintain an Air System	551 - Transportation (Individual)	Approved
551-88L-1029	Demonstrate Basic Knowledge of an Air System	551 - Transportation (Individual)	Analysis

**Supported Individual Tasks :**

<b>Task Number</b>	<b>Title</b>	<b>Proponent</b>	<b>Status</b>
551-88L-2045	Maintain an Air System	551 - Transportation (Individual)	Approved
551-88L-1029	Demonstrate Basic Knowledge of an Air System	551 - Transportation (Individual)	Analysis

**Supported Collective Tasks :**

<b>Task Number</b>	<b>Title</b>	<b>Proponent</b>	<b>Status</b>
N/A	N/A	Not Selected	Obsolete