ATLAS COPCO MOBILE AIR COMPRESSOR
EQUIPMENT MAINTENANCE DESCRIPTION (IRI-MM01-EMD)

INDUSTRIAL RESOURCES, INC.

A TRAINING SERVICES COMPANY

November 24, 2003

PREFACE

This Training Equipment Maintenance Description (EMD) has been designed to assist you in meeting the requirements of Module (IRI-MM01) of the Mechanical Maintenance Training Program. It contains information about the Atlas Copco Mobile Air Compressor. This includes function, quantity of parts, location of parts, description of the physical construction of the part, and description of the operation of the part, equipment preventive and corrective maintenance, and references.

You should review each chapter objective. In doing so you will be better prepared to learn the required information. You should also inspect the equipment, identifying its components and controls. Should you have additional question about the equipment, ask your supervisor.

A separate document, Air Compressor Equipment Maintenance Procedure (IRI-MM01-EMP), covers detailed maintenance of the Atlas Copco Mobile Air Compressor.

ATLAS COPCO MOBILE AIR COMPRESSOR

TRAINING EQUIPMENT MAINTENANCE DESCRIPTION

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1.0 Introduction

Chapter Objectives:

Describe the functions of the Air Compressor.

1. State, from memory, the functions of the Air Compressor equipment.
2. Draw a simplified arrangement of the Air Compressor. Describe the flow path and how the Air Compressor is operated and maintained.
3. List the normal Air Compressor operating parameters.

1.1 Equipment Function

The function/purpose the mobile air compressor is to supply compressed air for grounds operations when and where necessary.

1.2 Equipment Description

The mechanical distribution section uses a mobile/portable air compressor for its compressed air needs around the campus (**Figure 1**).

Figure 1 – Atlas Copco Mobile Air Compressor

Manufactured by Atlas Copco, the Model XAS90JD is an oil injected rotary screw type compressor and is driven by a John Deere Model 4045D 4-cyl diesel engine. The compressor produces 185 CFM of free air as indicated in **Figure 1**.

The unit is completely self-contained and is moved from job site to job site as needed.

1.2.1 Equipment Data

Compressor

Manufacturer	Atlas Copco
Model	XAS90JD
Type	Oil Injected Rotary Screw
Capacity (Flow)	185 CFM
Rated Pressure	90-psi

Engine

Manufacturer	John Deere
Model	4045D
Type	4-cylinder Diesel
Speed	2250-RPM
Power Output	45 HP

1.3 Equipment Connections and Interface

Other than pneumatic tooling, there are no connections and/or interface with other Mechanical Distribution Section equipment.

2.0 Equipment Major Parts

Chapter Objectives:

Describe how the equipment parts perform their function:

1. Draw from memory a diagram of the equipment showing major parts
2. State from memory, the names and functions of the major parts
3. Describe the location of the major parts

The major parts of the Mobile Air Compressor are as follows:

1. Carriage/Frame
2. Compressor
3. Drive Engine
4. Fuel Tank

2.1 Carriage/Frame

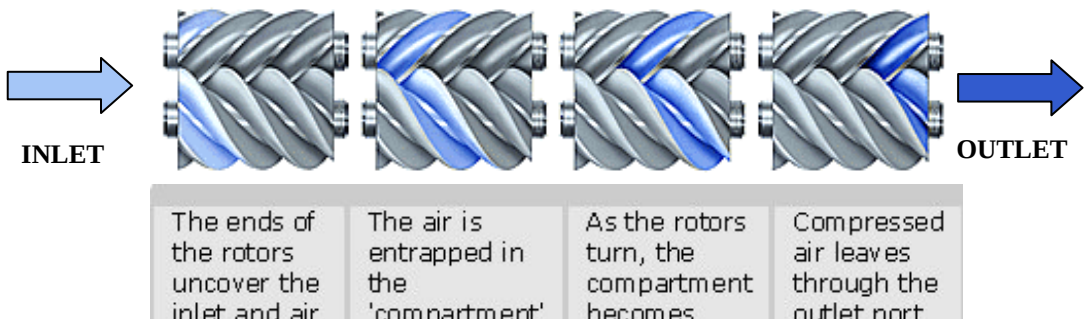
The carriage or frame (trailer) supports all of the remaining compressor components and, with its axle and suspension, allow the movement of the unit from place to place. The frame is constructed of channel iron (steel) and is capable of supporting the components for extended periods at normal highway traffic speeds.

An integral part of the framework, the component enclosure (top and sides) as seen in **Figure 1** protect the components from the environment as well as offering "noise reduction" when the unit is in service and, critically directed air flow (cooling) while the unit is running.

2.2 Compressor

The Atlas Copco rotary air compressor supplies 185 CFM of free air at 90-psi when the unit is in service and does so more efficiently and quieter than a reciprocating compress can achieve.

The operating principal of the rotary screw compressor is simple as demonstrated in **Figure 2**.



Two (2) helicoidally screws, one (1) with four (4) lobes and the other with six (6) flutes, turn into each other. The first screw [four (4) lobes] turns 50 percent faster than the six (6) flute screw. Air is drawn in between the rotors and the housing and is compressed. Injected oil seals the clearances and lubricates the rotors to minimize wear. The compressor has a capacity of approximately two (2) gallons of oil for injection into the operating screws.

The compressor is equipped with 2¾-inch discharge valves to which quick connect couplings are attached for ease of use.

2.3 Drive Engine

Manufactured by John Deere, the 4-cyl diesel engine (**Figure 3**) drives the rotary air compressor at a constant speed of 2250-rpm. The engine is water cooled and naturally aspirated (no turbo charger).

The engine is equipped with an electric starting system consisting of a DC starting motor and wet cell storage battery. Controls for the engine/compressor are simple and include an ON-OFF switch, a momentary contact starting switch, an hour meter and an air pressure gauge as seen in **Figure 4**.

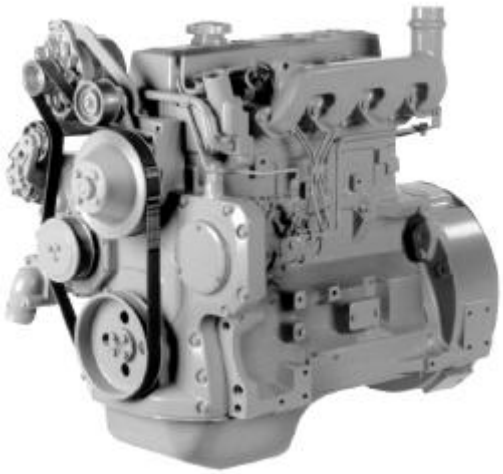


Figure 3 – John Deere 4-cyl Diesel Engine, Typical

Figure 4 – Air Compressor Control Panel

To start the engine, move the red toggle switch upwards to the “ON” position and press the “Engine Start” button. Release the “Engine Start” button as soon as the engine starts.

Additionally, the engine is equipped with a battery charging system (alternator), water pump and a fuel delivery system which includes a fuel pump, fuel filter, carburetor and applicable fuel piping (tubing).

2.4 Fuel Tank

The unit is equipped with a polyurethane fuel tank (**Figure 5**) with a capacity of approximately 19 gallons of diesel fuel.

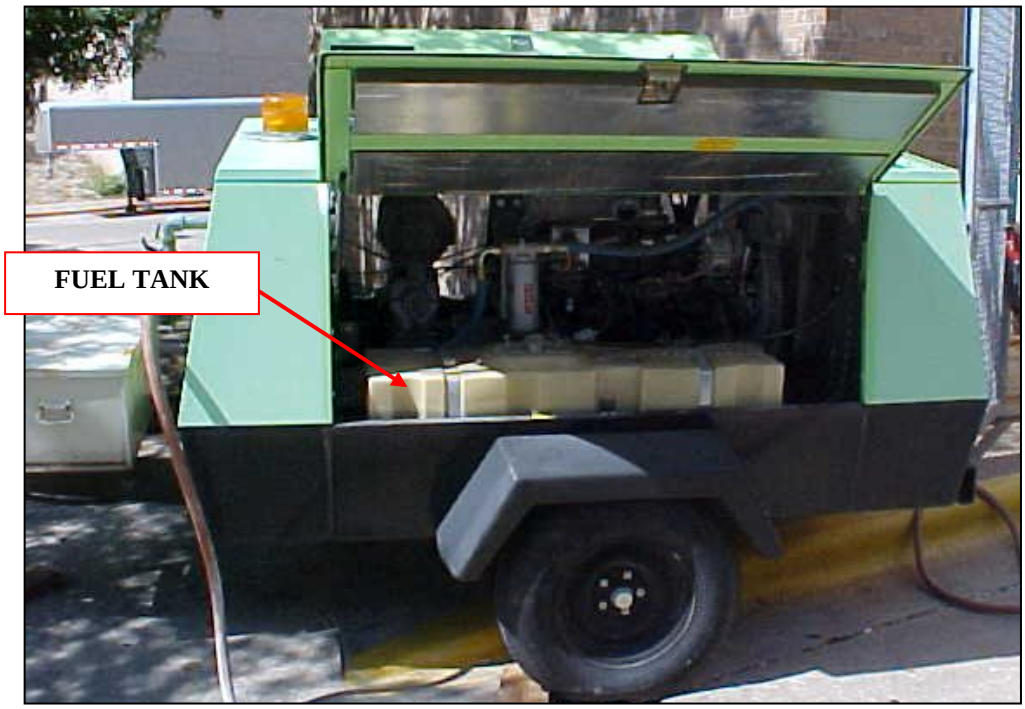


Figure 5 – Fuel Tank

3.0 Equipment Preventive and Corrective Maintenance

3.1 Preventive Maintenance

Prior to each use:

1. Check engine and compressor oil levels.
2. Check fuel level.
3. Drain water and sediment from fuel filter (if necessary).

Weekly

1. Service the air filter elements.
2. Check the fuel system for leaks.
3. Check the regulating system.
4. Lubricate the ball joint and pivot point of the speed regulator.

Periodic

1. Change the engine oil every 200 hours of operation.

3.2 Corrective Maintenance

For Mechanical Distribution Section personnel, corrective maintenance is limited to changing the fan belt or replacing the battery when necessary. All other problems would be resolved by calling a certified service/repair facility.

4.0 References

Atlas Copco Model XAS90JD Instruction Manual

ATLAS COPCO MOBILE AIR COMPRESSOR

TRAINING EQUIPMENT MAINTENANCE PROCEDURE (UTA-MM01–EMP)

INDUSTRIAL RESOURCES, INC.

A TRAINING SERVICES COMPANY

November 24, 2003

PREFACE

This Training Equipment Maintenance Training Procedure (EMP) has been designed to assist you in meeting the requirements of Module IRI-MM01 of the Mechanical Maintenance Training Program. It contains information pertaining to maintenance of the Industrial Resources, Inc., Atlas Copco Mobile Air Compressor. This includes purpose, precautions, limits and setpoints, procedures and references for maintaining equipment.

You should also inspect the equipment, identifying its components and controls. Should you have additional question about the equipment maintenance, ask your supervisor.

ATLAS COPCO MOBILE AIR COMPRESSOR

TRAINING EQUIPMENT MAINTENANCE PROCEDURE

TABLE OF CONTENTS

I. Purpose

This procedure provides information and guidance for the correct and safe use and maintenance of the Atlas Copco Mobile Air Compressor.

II. Precautions, Limitations, and Setpoints

A. Prior to starting the unit, check engine and compressor oil levels and add oil as necessary.

B. Check fuel level.

C. Check air filter vacuum indicators and service filters if necessary

D. Attach air line(s) to the “closed” valve(s).

III. Procedure

The following procedures provide detailed instructions for conducting routine operations, as well as preventive and corrective maintenance on the Atlas Copco Mobile Air Compressor Unit.

A. <u>Starting Compressor Unit</u>

__1. Move the red ON/OFF switch to the “ON” position.

__2. Press the “Engine Start” button and hold until the engine has started.

__3. Release the “Engine Start” button as soon as the engine starts.

__4. Allow engine to warm up if necessary depending on conditions.

B. During Normal Operations

__1. Check vacuum indicators and service air filter elements as necessary. (If red part shows fully out, service filter)

__2. Check air temperature at outlet of compressor.

__3. Check loading and unloading pressures.

C. Shutting Off Compressor Unit

__1. Close air compressors outlet valves.

__2. Allow engine to run at an idle for approximately 2 to 3-minutes.

__3. Move red ON/OFF switch to the "OFF" position.

__4. Fill fuel tank at the end of the days operations.

D. Preventive Maintenance

Weekly

__1. Service air filter elements.

__2. Check regulating system.

__3. Check for fuel and oil leaks.

__4. Check air pressure in tires.

__5. Lubricate ball joint and pivot points of speed regulator.

Periodic

__1. Change oil in diesel engine every 200 hours of operation.

E. Corrective Maintenance

Corrective maintenance on this equipment is limited.

Change Serpentine Belt

__1. Disconnect the ground cable from the units' battery.

__2. Release idler pulley pressure on belt.

__3. Remove old belt.

__4. Install new belt.

__5. Tension belt with idler pulley.

__6. Reconnect battery ground cable.

Change Engine Oil

__1. Disconnect the battery ground cable.

__2. Place an appropriate sized drain pan under the engine.

__3. Remove the engines oil drain plug.

__4. Remove and replace the spin on oil filter with a new one.

__5. When engine has stopped draining, replace the drain plug.

__6. Fill engine with new oil to the “Full” level on the engines dip stick.

__7. Reconnect the battery ground cable.

__8. Start and run the unit momentarily to ensure oil circulates and there are no oil leaks.

__9. Shut engine off and recheck oil level.

ATLAS COPCO MOBILE AIR COMPRESSOR

TRAINING EQUIPMENT JOB PERFORMANCE MEASURE (UTA-MM01–JPM)

INDUSTRIAL RESOURCES, INC.

A TRAINING SERVICES COMPANY

November 24, 2003

Mechanical Technician (IRI-MM01-JPM)

Performance Measure: Air Compressor

Name: _____

All Parts Satisfactorily Completed:

_____ _____
(Supervisor's Signature) (Date)

Supervisor's Comments: _____

_____

_____

_____

References:
- Training Module IRI-MM01

Materials Needed:
- Pencil and Clipboard
- Equipment Maintenance Description – Air Compressor (IRI-MM01-EMD)
- Equipment Maintenance Procedure – Air Compressor (IRI-MM01-EMP)
- Associated Maintenance Checklist, Charts, Parts List, Technical Manuals

Safety/Environmental:
- Wear hard hats, safety glasses, safety toe shoe, and ear plugs as required.
- Discuss environmental hazards associated with performing maintenance of the equipment.
- Discuss any safety precaution that must be observed while performing the procedure.

Note: Always observe all plant safety rules in accordance with Safety and Health Procedures and all Federal, State and/or Local TOSHA Standards.

Part A: Locate Equipment

Locate and identify the following equipment and major components.

1. Atlas Copco XAS 90 Portable Air Compressor Unit
2. Instrument Panel
3. Fuel Tank
4. Diesel Engine
5. Compressor
6. Battery

Satisfactorily Completed _____

Part B: Controls/Breakers

Locate and identify the following isolation devices.

1. Instrument Panel

Satisfactorily Completed _____

Part C: Preparation for Maintenance

This is to be performed under direction of the Shop Supervisor.
Demonstrate the following preparation for use of the Air Compressor including:

1. Prior to starting the unit, check engine and compressor oil levels and add oil as necessary.
2. Check fuel level.
3. Check air filter vacuum indicators and service filters if necessary
4. Attach air line(s) to the “closed” valve(s).

Satisfactorily Completed _____

Part D: Operating Procedure

This is to be performed under direction of the Shop Supervisor.
Demonstrate the following operational steps for the safe and efficient operation of the Air Compressor.

Starting Compressor Unit

__5. Move the red ON/OFF switch to the "ON" position.
__6. Press the "Engine Start" button and hold until the engine has started.
__7. Release the "Engine Start" button as soon as the engine starts.
__8. Allow engine to warm up if necessary depending on conditions.

During Normal Operations

1. Check vacuum indicators and service air filter elements as necessary.
2. Check air temperature at outlet of compressor.
3. Check loading and unloading pressures.

Shutting Off Compressor Unit

1. Close air compressors outlet valves.
2. Allow engine to run at an idle for approximately 2 to 3-minutes.
3. Move red ON/OFF switch to the "OFF" position.
4. Fill fuel tank at the end of the days operations.

Satisfactorily Completed _____

Part E: Preventive Maintenance

This is to be performed under direction of the Shop Supervisor.
Demonstrate the steps on the Air Compressor required to perform the following preventive maintenance tasks.

Weekly

1. Service air filter elements.
2. Check regulating system.
3. Check for fuel and oil leaks.
4. Check air pressure in tires.
5. Lubricate ball joint and pivot points of speed regulator.

Periodic

1. Change oil in diesel engine every 200 hours of operation.

Satisfactorily Completed _____

Part F: Corrective Maintenance

This is to be performed under direction of the Shop Supervisor.
Demonstrate the steps on the Air Compressor required to perform the following corrective maintenance.

Change Serpentine Belt

1. Disconnect the ground cable from the units' battery.
2. Release idler pulley pressure on belt.
3. Remove old belt.
4. Install new belt.
5. Tension belt with idler pulley.
6. Reconnect battery ground cable.

Part F: Continued

Change Engine Oil

1. Disconnect the battery ground cable.
2. Place an appropriate sized drain pan under the engine.
3. Remove the engines oil drain plug.
4. Remove and replace the spin on oil filter with a new one.
5. When engine has stopped draining, replace the drain plug.
6. Fill engine with new oil to the "Full" level on the engines dip stick.
7. Reconnect the battery ground cable.
8. Start and run the unit momentarily to ensure oil circulates and there are no oil leaks.
9. Shut engine off and recheck oil level.

Satisfactorily Completed _____

Part G: Personnel and Equipment Safety

Performed all aspects of the JPM using safe operating practices and following plant safety and environmental procedures.

Satisfactorily Completed _____

ATLAS COPCO MOBILE AIR COMPRESSOR
TRAINING EQUIPMENT MAINTENANCE PROCEDURE (UTA-MM01-Q)
TEST QUESTIONS

INDUSTRIAL RESOURCES, INC.

A TRAINING SERVICES COMPANY

November 24, 2003

1. (IRI-MM01-Q) The portable air compressor is an Atlas Copco Model _____.
   A. XA 90 JD
   B. XAS 90 D
   C. XAS 90 JD
   D. AS 90 JD

2. (IRI-MM01- Q) The compressor is a _____ type compressor.
   A. rotary vane
   B. rotary screw
   C. reciprocating
   D. Wenkel

3. (IRI-MM01- Q) Prior to shutting the compressor unit down, it should run unloaded (valves closed) for approximately _____.
   A. 2 to 3-minutes
   B. 4 to 5-minutes
   C. 3 to 5-minutes
   D. 5 to 10-minutes

4. (IRI-MM01- Q) The first step in any corrective maintenance is to _____.
   A. check with supervision
   B. bring the unit to the shop area
   C. disconnect the battery ground cable
   D. disconnect the battery positive cable

5. (IRI-MM01- Q) Oil is changed in the unit engine every _____ of operation.
   A. 500 hours
   B. 300 hours
   C. 100 hours
   D. 200 hours

6. (IRI-MM01- Q) The rated flow capacity for the air compressor is _____ of free air.
   A. 90 CFM
   B. 185 CFM

C. 135 CFM
D. 150 CFM

7. (IRI-MM01- Q) The drive engine normal operating speed (RPM) is _____.
A. 2250-rpm
B. 3700-rpm
C. 3250-rpm
D. 3000-rpm

8. (IRI-MM01- Q) The rated capacity of the fuel tank is _____.
A. 25 gallons
B. 21 gallons
C. 19 gallons
D. 20 gallons

9. (IRI-MM01- Q) The last step at the end of the compressors use for the day is to _____.
A. bring the unit back to the shop
B. fill the fuel tank
C. check all fluid levels
D. drain the fuel filter

10. (IRI-MM01- Q) The compressor has a capacity of approximately _____ of oil for injection into the operating screws.
A. 1-gallon
B. 5-gallons
C. 3-gallons
D. 2-gallons