

Air System Operation

AIR COMPRESSOR THEORY OF OPERATION

Air Compressor Description

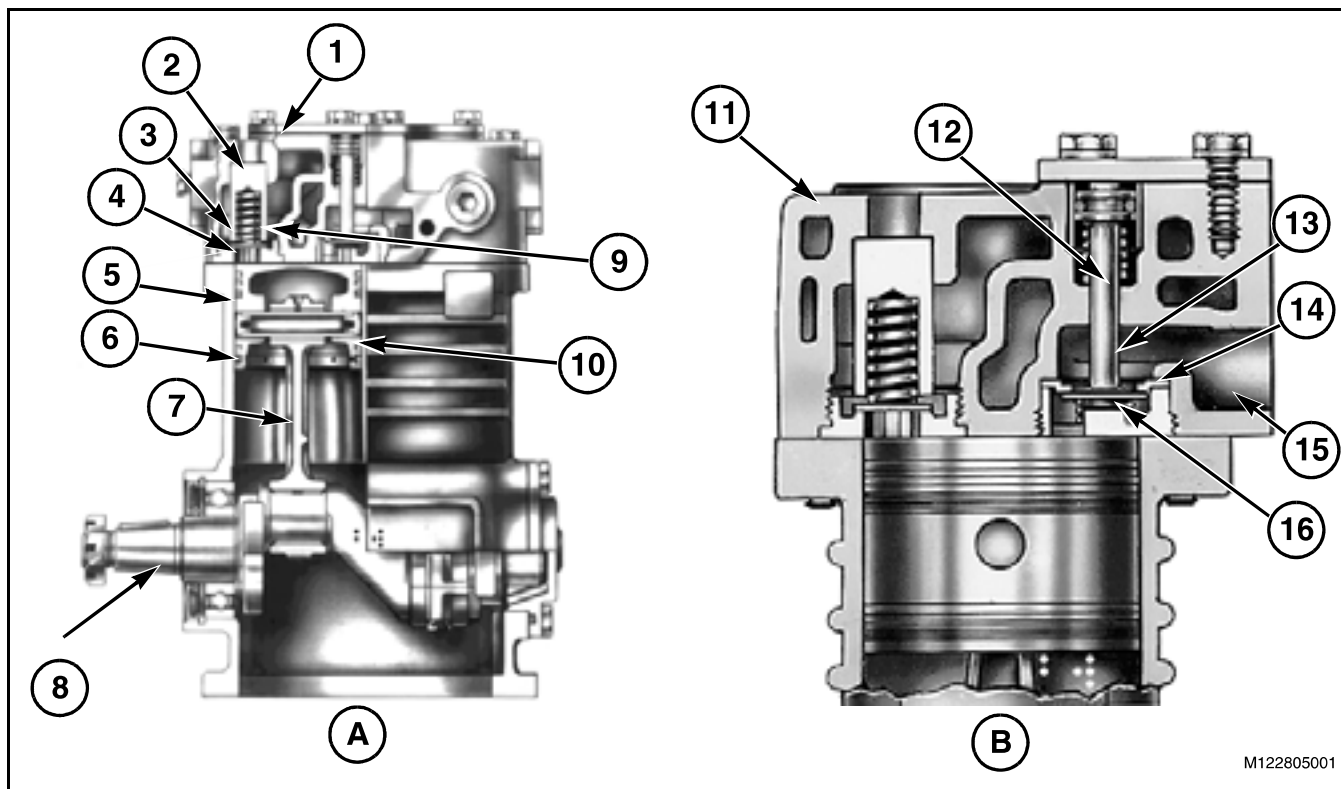


FIG. 1

FIG. 1: Air Compressor.

- (A) Cross Section of Air Compressor
- (B) Cross Section of Cylinder Head
- (1) Unloader Cover
- (2) Discharge Valve Stop
- (3) Discharge Valve
- (4) Discharge Valve Seat
- (5) Crankcase
- (6) Piston Rings
- (7) Connecting Rod
- (8) Crankshaft
- (9) Discharge Valve Spring
- (10) Piston
- (11) Cylinder Head
- (12) Unloader
- (13) Inlet Valve
- (14) Inlet Valve Seat
- (15) Inlet
- (16) Inlet Valve Spring

The function of the air compressor is to provide and maintain air under pressure to operate devices in the air system. The air compressor is a two cylinder single stage, reciprocating compressor with a rated displacement of 374 liters/min (13.2 ft³/min) at 1250 RPM.

The compressor assembly consists of two major subassemblies, the cylinder head and the crankcase. The cylinder head is an iron casting which houses the inlet, discharge, and unloader valving. The cylinder head contains the air inlet port and is designed with both top and side air discharge ports. Three water coolant ports provide a choice of coolant line connections. Governor mounting surfaces are provided at both the front and the rear of the cylinder head. The head is mounted on the crankcase and is secured by six cap screws. The compressor is designed such that the cylinder head can be installed in one of two positions which are 180 degrees apart. The crankcase houses the cylinder bores, pistons, crankshaft and main bearings, and provides the flange or base mounting surface.

Air Compressor Operation

The compressor is driven by the engine and is operating continuously while the engine is running. Actual compression of air is controlled by the compressor unloading mechanism and the governor. The governor which is mounted on the compressor maintains the system air pressure to a preset maximum and minimum pressure level.

Air Intake and Compression (Loaded)

FIG. 2: During the down stroke of the piston (1), a slight vacuum is created between the top of the piston and the cylinder head, causing the inlet valve (2) to move off its seat and open. Atmospheric air is drawn through the air strainer and the open inlet valve (4) into the cylinder.

NOTE: The discharge valve (3) remains on its seat. Atmospheric air is drawn through the air strainer and the open inlet valve (4) into the cylinder.

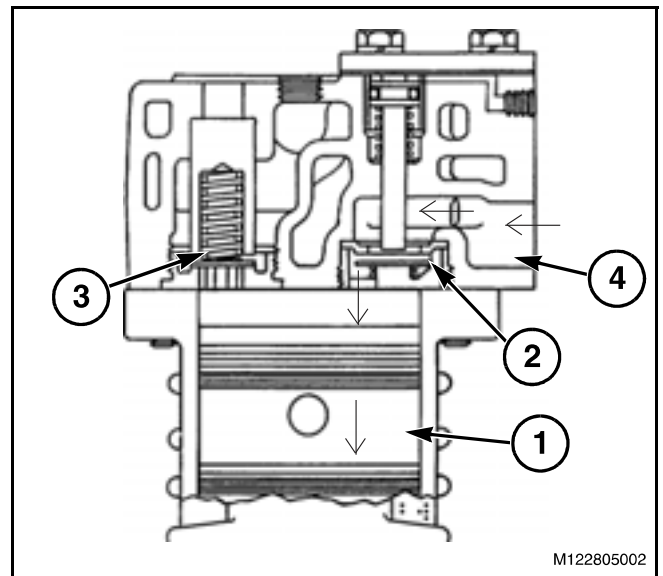


FIG. 2

FIG. 3: As the piston (1) begins its upward stroke, the air that was drawn into the cylinder on the down stroke is being compressed. Air pressure on the inlet valve (2) plus the force of the inlet spring, returns the inlet valve to its seat and closes. The piston continues the upward stroke and compressed air pushes the discharge valve (3) off its seat and air flows by the open discharge valve, into the discharge line and to the reservoirs. As the piston reaches the top of its stroke and starts down, the discharge valve spring and air pressure in the discharge line returns the discharge valve to its seat. This prevents the compressed air in the discharge line from returning to the cylinder bore as the intake and compression cycle is repeated.

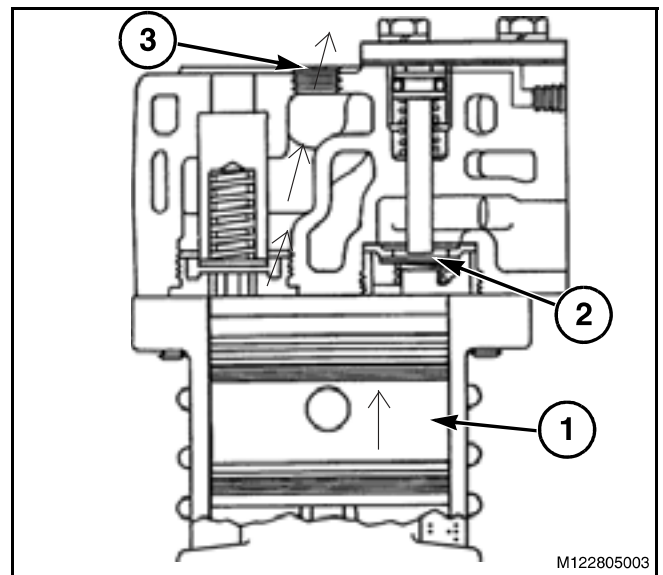


FIG. 3