

General Information

The Cummins 18.7 cfm compressor is used on the ISM and N14 engine. This compressor is a single cylinder engine-driven, piston-type compressor that supplies compressed air to operate air powered actuators on the vehicle. The compressor is geared directly to the engine which serves to operate the compressor and any accessory that is connected on the rear flange. The compressor will deliver air out of the exhaust port when the unloader port is at atmospheric pressure and will stop air delivery when the unloader port is pressurized to the system pressure between 100 to 125 psi (689 to 862 kPa). A governor determines the "cut-in" (start of pumping) and "cut-out" (termination of pumping) of the compressor by supplying the proper control signal to the unloader port. The governor is sensing the pressure in the air supply tank or "wet tank." If the output air pressure is inadvertently blocked or required to exceed 250 psi (1724 kPa), the compressor will stop air delivery. The air will be recycled within the compressor and no mechanical harm will be done.

Air Compressor Removal and Installation

Removal

1. Park the vehicle on a level surface and apply the parking brakes. Shut down the engine. Chock the rear tires.

**DANGER**

Before tilting the cab or returning the cab to the normal operating position, read the instructions and hazard notices in [Section 60.15](#). Failure to follow these instructions could cause the cab to fall and hit or crush a person, which will result in severe injury or death.

2. Tilt the hood or cab.
3. Drain the air reservoirs.

**WARNING**

Wear goggles when using compressed air to clean or dry parts, as permanent harm to eyes could result from flying debris.

4. Using a cleaning solvent, remove road dirt and grease from the outside of the air compressor, then dry the air compressor with compressed air.
5. Drain the radiator coolant below the level of the air compressor. See [Group 20](#) for instructions.
6. On Century Class conventionals, loosen the constant-torque hose clamps at both ends of the charge air cooler outlet air piping. Remove the piping to access the air compressor.
7. Marking their locations and positions, disconnect all air, coolant, and oil lines attached to the air compressor and governor. Remove the cushion clamps and tie straps as needed to move the lines out of the way. See [Fig. 1](#) and [Fig. 2](#).
8. Disconnect the wire to the fuel shutoff valve (if equipped). Remove the fuel pump and gasket; refer to the engine shop manual or rebuild manual for instructions.
9. Remove the air compressor.
 - 9.1 Remove the air governor and mounting gasket from the compressor.
 - 9.2 Remove the compressor rear support bracket, if equipped.

Note: On Argosy COE vehicles, the compressor is mounted on an alignment stud. The stud is at the top of the compressor mounting and allows the compressor to hang in place as you're removing or installing it. The stud is threaded and a nut is installed to secure the compressor.

- 9.3 Support the air compressor, and remove the bolts that attach it to the auxiliary drive housing, accessory drive, or timing gear plate. Remove the compressor, gasket and splined coupling.
- 9.4 Lift or lower the air compressor out of the engine compartment.
- 9.5 Remove and discard the air compressor mounting gasket, and clean the mating surfaces.

Installation

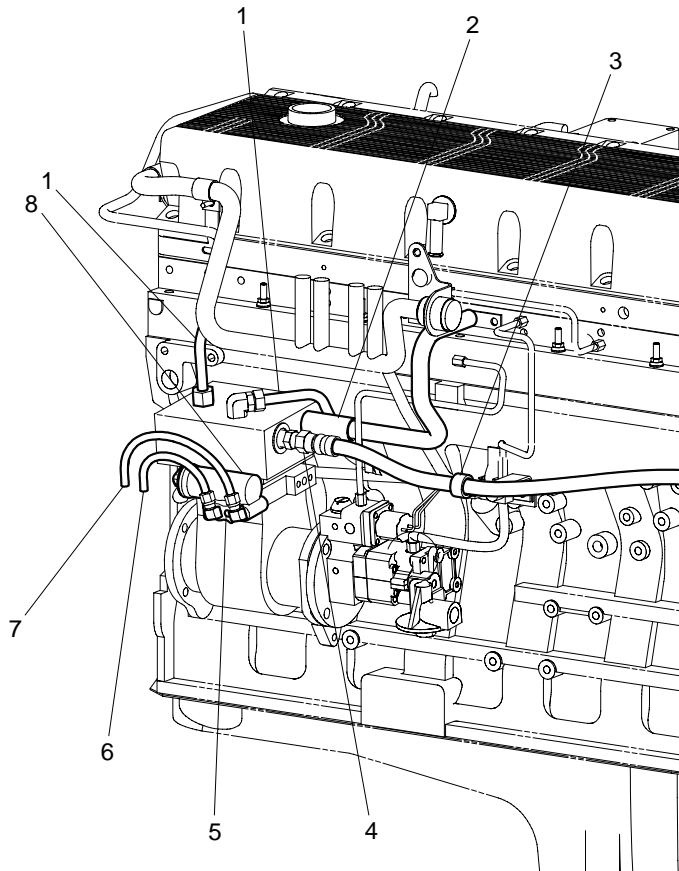
IMPORTANT: Be sure the gasket surfaces are cleaned and not damaged.

1. Install the air compressor.

Note: On Argosy COE vehicles, the compressor is mounted on an alignment stud. The stud is at the top of the compressor mounting and allows the compressor to hang in place as you're removing or installing it. The stud is threaded and a nut is installed to secure the compressor.

- 1.1 Install the splined coupling (if equipped) and a new compressor gasket. Hold the compressor in place, and install the bolts that attach it to the auxiliary drive housing, accessory drive, or timing gear plate. Refer to the engine shop manual or rebuild manual for final torque specification.
 - 1.2 Install the compressor support bracket if equipped.
 - 1.3 Using a new air governor mounting gasket, install the air governor on the compressor.
2. Using a new gasket install the fuel pump on the air compressor. Connect the wire to the fuel shutoff valve (if equipped). Refer to the engine

Air Compressor Removal and Installation



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|--------------------------|-------------------------------|
| 1. Coolant Line | 5. Air Governor Mounting Bolt |
| 2. Compressor Air Inlet | 6. Line to Air Dryer |
| 3. Cushion Clamp | 7. Line to Wet Tank |
| 4. Compressor Air Outlet | 8. Air Governor |

Fig. 1, Air Compressor Removal, ISM

shop manual or rebuild manual for final torque specification.

3. Identify and connect all air, coolant, and oil lines to the compressor and governor. Secure the lines as needed with cushion clamps and tie straps.
4. On Century Class conventionals, install the charge air cooler outlet air piping. Tighten the constant-torque hose clamp screws 45 lbf-in (500 N-cm).
5. Fill the engine cooling system. See [Group 20](#) for instructions.
6. Operate the engine and check for leaks.

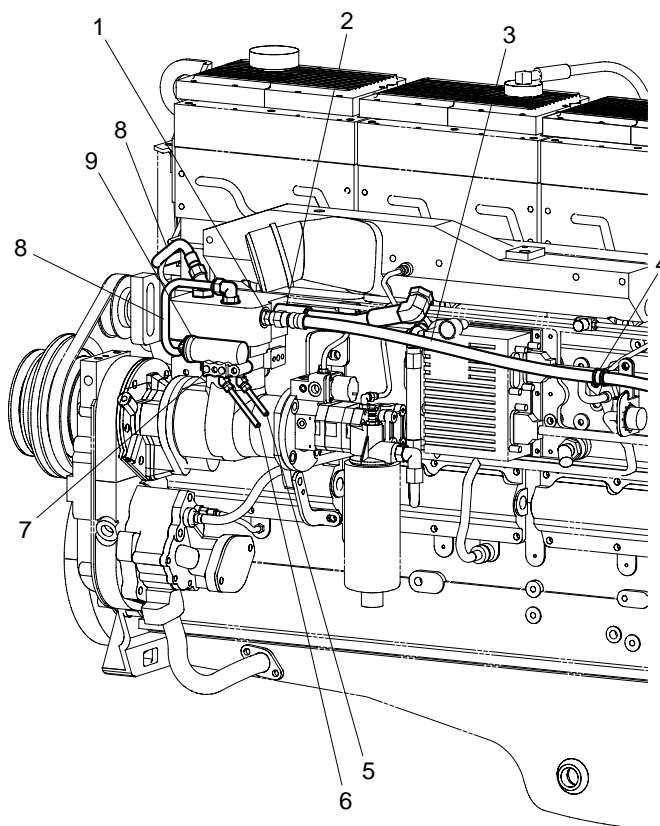
7. Remove the chocks from the rear tires.

DANGER

Before tilting the cab or returning the cab to the normal operating position, read the instructions and hazard notices in [Section 60.15](#). Failure to follow these instructions could cause the cab to fall and hit or crush a person, which will result in severe injury or death.

8. Return the hood or cab to the operating position.

Air Compressor Removal and Installation



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1. Compressor Air Outlet Fitting
2. Compressor Air Inlet Hose
3. Compressor Air Outlet Hose
4. Cushion Clamp
5. Line to Wet Tank

6. Line to Air Dryer
7. Air Governor Mounting Bolt
8. Coolant Line
9. Air Governor

Fig. 2, Air Compressor Removal, N14

Cylinder Head Replacement

Replacement

1. Park the vehicle on a level surface and apply the parking brake. Shut down the engine. Chock the rear tires.
2. Drain the air from all air reservoirs.
3. Remove the compressor from the vehicle. See [Subject 100](#) for instructions.
4. Mount the compressor on a suitable holding fixture.

! WARNING

Wear goggles when using compressed air to clean or dry parts, as permanent harm to eyes could result from flying debris.

5. Using a cleaning solvent, remove road dirt and grease from the outside of the compressor, then dry the compressor with compressed air.
6. Remove the cylinder head assembly, from the crankcase.
 - 6.1 Scribe an alignment mark across the cylinder head and the crankcase, for assembly alignment.

IMPORTANT: Do not use a marking method, such as chalk, that can be wiped off during assembly.

NOTE: There is no need to remove the smaller screws.

- 6.2 Note the positions of any attached components, then remove the four M8 cylinder head capscrews. Discard the capscrews. See [Fig. 1](#).
 - 6.3 Tap the cylinder head with a soft mallet to break the gasket seal. Remove the cylinder head assembly and discard the gasket. See [Fig. 2](#). Note the position of the ports with respect to the crankcase for reassembly.
 - 6.4 Remove the coolant and air fittings for reuse. Discard the original cylinder head.
7. Clean the crankcase.
 - 7.1 Rotate the crankshaft until the piston is at the top of the cylinder bore.

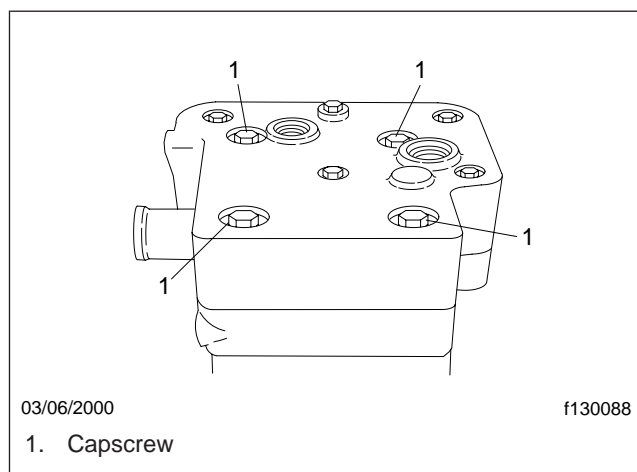


Fig. 1, Cylinder Head Capscrews

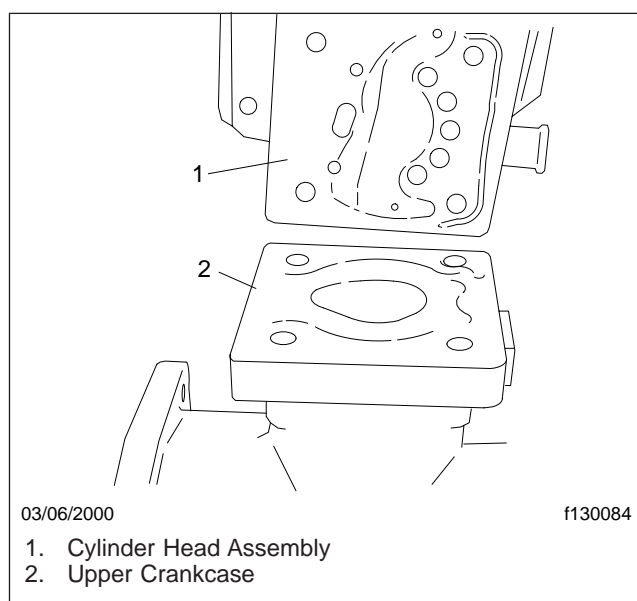


Fig. 2, Cylinder Head Removal

NOTE: Avoid the use of abrasive products similar to Scotch Brite® because of damage and abrasive grit left behind.

- 7.2 Remove any accumulated carbon and varnish by carefully scraping and light application of solvents. Avoid getting debris and solvents into the clearance between the piston and bore. Avoid the use of abrasive products similar to Scotch Brite because of damage and abrasive grit left behind.

Cylinder Head Replacement

⚠ WARNING

Wear goggles when using compressed air to clean or dry parts, as permanent harm to eyes could result from flying debris.

- 7.3 Using compressed air, blow dirt particles or gasket material from all cylinder cavities.
8. Inspect the top crankcase surface. It should be smooth and free of scratches to enable resealing on assembly.
9. Transfer the alignment marks from the original cylinder head to the replacement cylinder head.
10. Install the coolant and air fittings on the replacement cylinder head.
11. Install the cylinder head on the compressor crankcase.
 - 11.1 Position the sliding valve and the guide pins in the correct direction to enter the larger diameters in the valve body and crankcase.
 - 11.2 Align the marks on the cylinder head and crankcase.
 - 11.3 Using a new cylinder head gasket, position the gasket and head assembly on the crankcase.

Note: You should find five cover bolts loosely holding the head assembly together.

- 11.4 Install new capscrews.

⚠ CAUTION

A torque angle gauge and inch pound torque wrench must be used to perform the torque-turn capscrew tightening sequence. The tightening sequence in Table 1 must be followed to prevent damage to the cylinder head assembly.

- 11.5 Tighten the capscrews using the bolt tightening sequence in Table 1.

Bolt Tightening Sequence*			
Step	Bolt	Torque: lbf-in (N-cm)	Rotation Degrees
1	A	177 to 221 (2000 to 2500)	—

Bolt Tightening Sequence*

Step	Bolt	Torque: lbf-in (N-cm)	Rotation Degrees
2	B	177 to 221 (2000 to 2500)	—
3	C	177 to 221 (2000 to 2500)	—
4	D	177 to 221 (2000 to 2500)	—
5	A	—	85 to 105
6	B	—	85 to 105
7	C	—	85 to 105
8	D	—	55 to 75
9	E	48 to 58 (540 to 660)	—
10	F	48 to 58 (540 to 660)	—
11	G	48 to 58 (540 to 660)	—
12	H	48 to 58 (540 to 660)	—
13	I	48 to 58 (540 to 660)	—
14	E	—	85 to 105
15	F	—	85 to 105
16	G	—	85 to 105
17	H	—	85 to 105
18	I	—	85 to 105

* See Fig. 3 for Bolt Locations

Table 1, Bolt Tightening Sequence

12. Install the compressor. See [Subject 100](#) for instructions.
13. Fill the engine cooling system. See [Group 20](#) for instructions.
14. Operate the engine and check the compressor operation. Make sure there are no coolant or air leaks.
15. Remove the chocks from the rear tires.

Cylinder Head Replacement

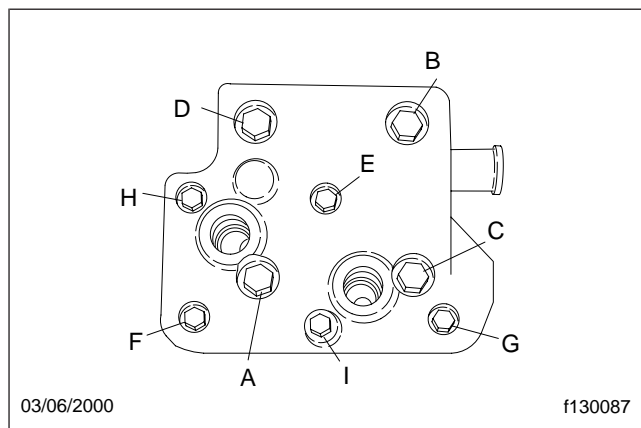


Fig. 3

Troubleshooting Tables

Problem—Excessive Oil Passage

Problem—Excessive Oil Passage	
Possible Cause	Remedy
Restricted air intake.	Check engine air filter and replace if necessary. Check compressor air inlet for kinks and excessive bends. Repair as needed.
Restricted oil return hole in front of compressor.	Remove compressor and check the oil return hole for restrictions. Repair as needed.
Defective or worn seal in the rear bearing cap.	Replace seal.
Compressor runs loaded an excessive amount of time.	Check air lines and connections for leakage. Check for a defective governor or restricted line. Replace the governor if necessary. Repair or replace lines and connections until leakage is eliminated.
Back pressure from the engine crankcase.	Check for excessive engine crankcase pressure. Repair or replace ventilation components as necessary. NOTE: An indication of crankcase pressure is a loose or partially lifted dipstick.
Excessive engine oil pressure.	Check the engine oil pressure with a test gauge, and compare the reading to the engine specification. Do not restrict the compressor oil supply line.
Malfunctioning compressor.	Replace the compressor after making certain none of the preceding conditions exist.

Problem—Noisy Compressor Operation

Problem—Noisy Compressor Operation	
Possible Cause	Remedy
Loose drive coupling or gear (as indicated).	Inspect the fit of the drive coupling and gear on the compressor crankshaft. Tighten or replace the components. If the crankshaft keyway is damaged, replace the compressor.
Compressor cylinder head or discharge line restrictions.	Inspect the compressor discharge port and discharge line for carbon build-up. If carbon is detected, remove the carbon and check for proper coolant flow to the compressor. Inspect the discharge line for kinks and restrictions. Replace the discharge line as necessary.
Compressor internal engine components damaged or worn.	Replace the compressor.

Problem—Excessive Build-Up and Recovery Time

Problem—Excessive Build-Up and Recovery Time	
Possible Cause	Remedy
Restricted air intake.	Check engine air filter and replace if necessary. Check compressor air inlet for kinks and excessive bends. Repair as needed.

Troubleshooting

Problem—Excessive Build-Up and Recovery Time	
Possible Cause	Remedy
Restricted discharge or compressor discharge cavity.	Inspect the compressor discharge port and line for restrictions and carbon build-up. If carbon is detected, remove the carbon. Check for proper cooling to the compressor. Inspect the discharge line for kinks and restrictions. Replace the discharge line as necessary.
Slipping drive components.	Check for faulty drive gears and coupling, and replace as necessary.
Excessive air system leakage (not including the air compressor).	Check all valves, air lines, and connections for leakage. Repair or replace valves and lines until leakage is eliminated.
Unloader piston seized.	Check the operation of the unloading mechanism. Check for corrosion and contamination of unloader pistons. Check for correct operation of the compressor air governor. If the governor is operating properly, replace the compressor.
Damaged compressor rings, valves, and gaskets.	Replace the compressor.

Problem—Compressor Fails to Unload

Problem—Compressor Fails to Unload	
Possible Cause	Remedy
Malfunctioning governor.	Check the setting with an accurate test gauge. Repair or replace the air governor.
Unloader air lines from governor damaged.	Inspect the air lines to and from the governor for kinks or restrictions. Repair or replace the air lines.
Faulty or worn unloader piston or bore.	Replace the compressor.

Problem—Air in Water System/Water in Air System

Problem—Air in Water System/Water in Air System	
Possible Cause	Remedy
Internal gasket leakage.	Replace the compressor.
Internal casting porosity.	Replace the compressor.