SPENCER MANUFACTURING.

COLDBUSTER MARK IV

Chapter 2
Maintenance
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Section 1: Servicing

1. Initial Maintenance

After the first 50 hours of operation, change the engine oil and filter and check all fluid systems for leaks.

2. Periodic Maintenance

At the beginning of each heating season, or at least once a year, all of the procedures listed in Table 2-1 should be performed. During times of regular operation, maintenance schedule should be as outlined in Table 2-1 (references to Ford manual are section 1, chapter 5).

WARNING: SURGE TANK FILLER CAP GETS HOT DURING OPERATION. ALLOW UNIT TO COOL BEFORE REMOVING.

Hours of Operation	Procedure to be performed
Daily	Check engine oil level (see Ford Manual)
Daily	Check engine coolant level (see Ford Manual)
Daily	Visually inspect tires for proper inflation and wear
Daily	Check air intake filter for blockage
100	Change engine oil and filter (see Ford Manual)
100	Check exhaust system for leaks and/or deterioration
100	Check blower plenum & duct for leaks and/or deterioration
400	Check battery and clean terminals
400	Change fuel filter (see Ford Manual)
400	Change engine intake air filter
400	Change spark plugs,
400	Check all fluid system fittings and hoses for leaks
400	Check all fasteners for tightness

Table 2-1. Periodic Maintenance Schedule

See chapter 1 section 3 for fluid capacities and types.

A. Parking Brake System

The brake system can be adjusted by rotating the threaded shaft and its clevises to either increase or decrease the brake bar pressure on the tire tread surface.

B. Electrical System

Check all electrical connections for tightness and corrosion.

C. Lubrication

There is one grease zerk fitting on the undercarriage (see figure 1), one on the air delivery duct valve plate shaft boss, and one on the rear blower shaft bearing, which has a remote lubrication hose and fitting. Access to the remote grease fitting is inside the left front door.

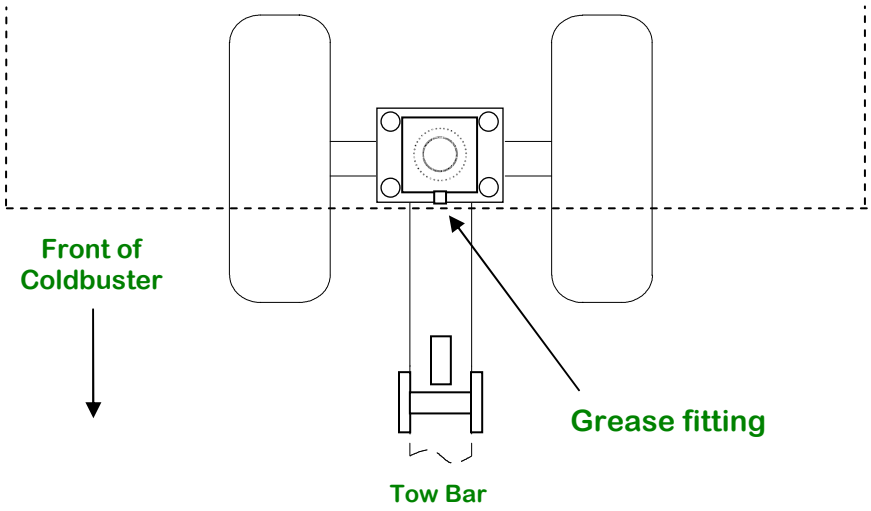

Figure 2-1. Grease Fitting on Undercarriage

Section 2: Troubleshooting

1. General Troubleshooting Table

The table below lists solutions to commonly encountered problems and is provided as an aid to troubleshooting the unit. Note that only probable causes are listed. It is impossible to identify every conceivable fault that could occur.

Symptom	Probable Causes
1. Engine won't turn over.	1.Battery dead. 2. Dirty battery terminals. 3. 25 amp circuit breaker tripped. 4. Master switch not in "on" position. 5. Faulty switch. 6. Computer malfunction; contact local Ford distributor.
2. Engine turns over slowly.	1. Low battery voltage…recharge/replace battery as needed.

3. Engine turns over but won't start.	1. Unit out of fuel. 2. No spark to the spark plugs. Check electrical system; contact local Ford Service Dealer for computer analysis if necessary.
4. Engine runs, but little or no air is produced at any setting of air control	1. Air intake filter clogged. 2. Blower not spinning; check key in the blower shaft.
5. Engine runs for a while, then stops.	1. Unit out of fuel. 2. Engine overheated. Check coolant level. 3. Low oil pressure. Check engine oil.
6. No heat is produced.	1. Engine thermostat is stuck open. Replace thermostat.

Table 2-2. General Troubleshooting

Section 3: Overhaul/Major Repair

This chapter contains instructions for removal and installation of the major components of the Coldbuster Mark IV.

WARNING: EXCEPT FOR BRAKE SYSTEM WORK, PARKING BRAKE SHOULD BE SET BEFORE PROCEEDING WITH ANY MAINTENANCE OR REPAIR WORK.

1. Brake System

WARNING: WHEELS MUST BE PROPERLY BLOCKED BEFORE DISCONNECTING BRAKES. (see figures 3 and 4).

A. Disassembly and Assembly

(1) Disengage brakes by lowering towbar.

(2) Remove the adjustment threaded shaft from the towbar.

(3) Remove clevis bolt that attaches the towbar to the steering suspension.

(4) Replace missing, broken, or otherwise damaged parts like pivot pins, the threaded shaft and clevises, and perform any necessary adjustment and cleaning.

(5) Install the towbar by replacing the clevis bolt attaching the towbar to the steering suspension.

(6) Re-install the threaded shaft and clevis onto the towbar.

(7) Adjust the brakes so the towbar, when in the fully upright and locked position, applies even and consistent pressure on both front tires.

2. Blower Heat Exchanger

A. Removal

(1) Drain coolant into suitable container by removing the drain plug at the bottom of the exhaust heat exchanger (see figure 5). Open drain petcock located on the tube behind the fuel fill panel. Access the petcock through the left front engine compartment door.

(2) Remove top and left rear plenum panels. The plenum panels are sealed with paintable acrylic caulking at assembly. Pry one corner loose to break the seal on the rest of the panel.

(3) Disconnect coolant hoses from heat exchanger.

(4) Remove the 10 mounting bolts and remove heat exchanger through top of plenum.

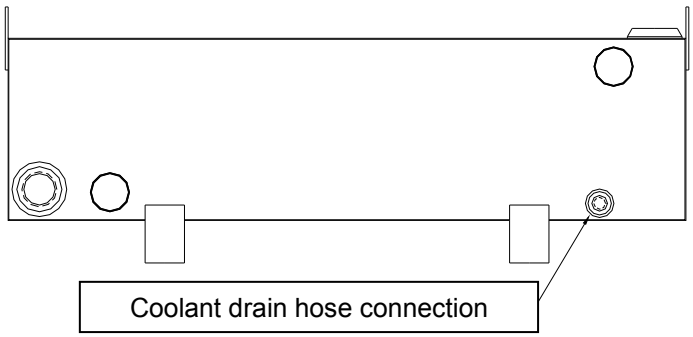

Figure 2-5: Exhaust heat exchanger drain

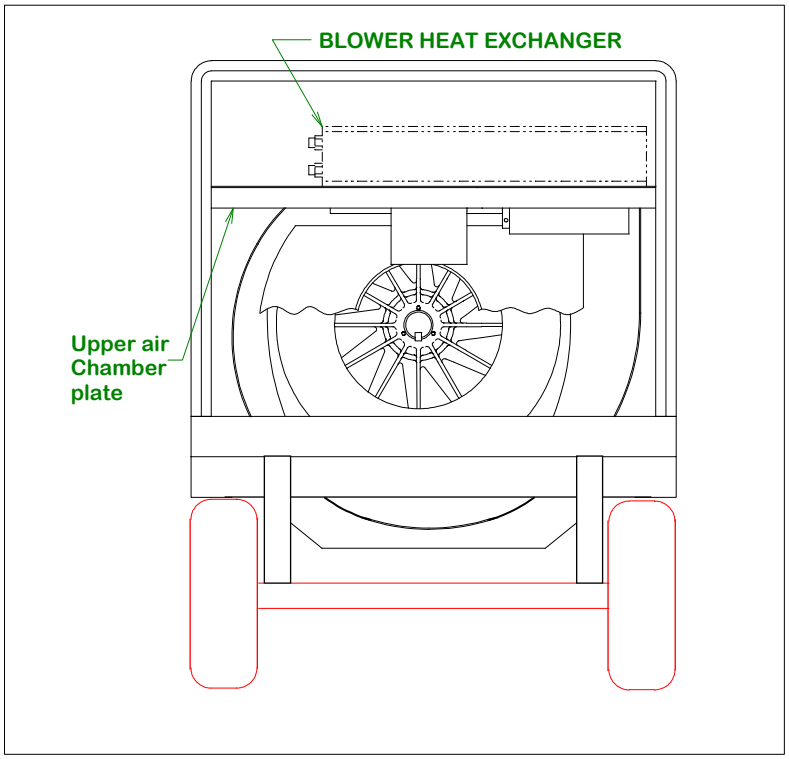

Figure 2-6: Blower Heat Exchanger Location

B. Installation

(1) Re-mount heat exchanger in plenum.

(2) Reconnect coolant hoses.

(3) Fill exhaust heat exchanger and the remainder of the coolant system at the surge tank with coolant to within 1/2" (13mm) of top.

(4) Start unit and open drain petcock to vent air out of the system. Add makeup coolant to the surge tank as necessary.

(5) Reinstall radiator cap and bring system up to operating temperature (195ºF, 90ºC).

(6) Check for leaks at connections to blower heat exchanger.

(7) Shut down unit.

(8) Apply a bead of paintable acrylic sealant to the frame surface mating with the top rear plenum panel and reinstall panel.

3. Blower Wheel

A. Removal

(1) Remove the 12” duct assembly.

(2) Remove the duct chamber lower plate.

(3) Remove fan chamber inlet plate.

(4) Remove the three locking bolts in the taper lock bushing.

(5) Remove the taper lock bushing by reinstalling two of the bolts in the threaded holes in the bushing. This will push the blower wheel forward toward the shallow part of the taper. In some cases where the bushing has been attached for many years, it may be necessary to heat the blower to break it loose from the bushing.

(6) Slide the bushing off the shaft.

(7) Remove blower wheel by dropping it down into the belly of the blower housing and tilting the top of the blower out.

B. Reassembly

CAUTION: The blower spins at high RPM. If it has been modified or damaged in any way **it MUST be rebalanced** before it is reinstalled. Running the Coldbuster with an unbalanced blower could result in damage to the heater or injury to the operator.

(1) Install blower wheel by reversing the removal instructions above.

(2) Install taper lock bushing. Only finger tighten the bolts. Do not install the key.

(3) Install fan chamber inlet plate. Ensure the blower can rotate freely without hitting anything.

(4) Install the key in the drive shaft and taper lock bushing. Tighten the three bushing bolts. As you do so the blower will pull away from the engine. Recheck the blower clearance.

(5) Install duct chamber lower plate.

(6) Install 12” duct assembly.

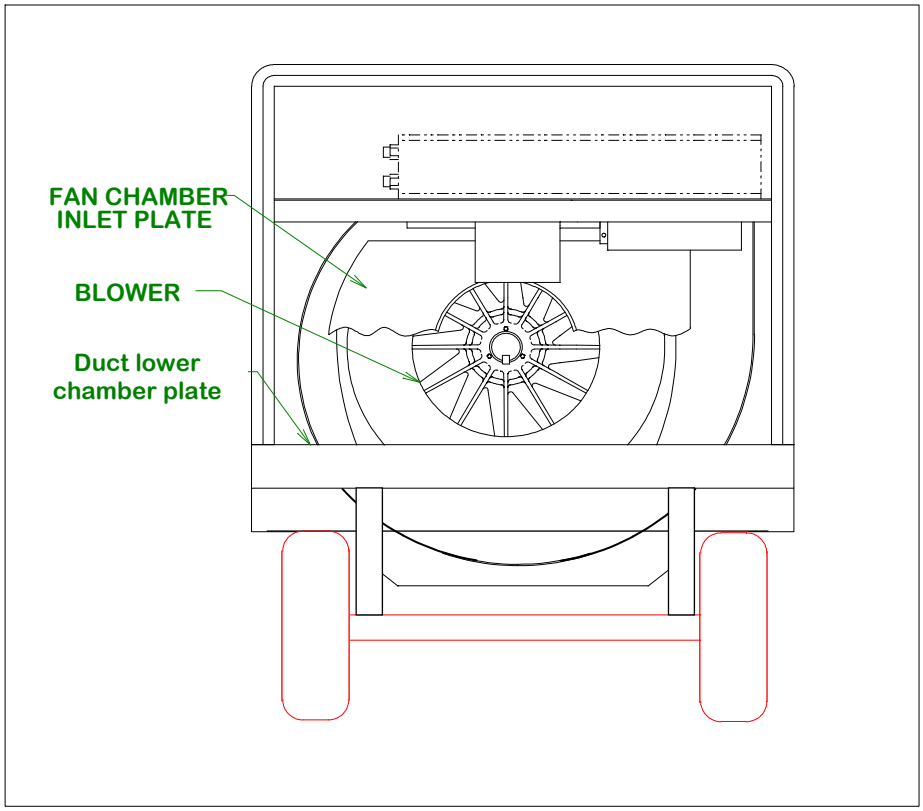

Figure 2-7: Blower Wheel Removal

4. Rear Drive

A. Removal

(1) Remove blower wheel per section 2 above.
(2) Unbolt the fuel fill cover to reach the nuts on the drive access cover plate.
(3) Unbolt the drive access cover and remove it out the blower housing inlet.
(4) Unbolt the four bearing mounting bolts. Loosen the two set screws on the shaft
(5) Disconnect the bearing remote lubrication line and slide the bearing off the shaft
(6) Unbolt the flywheel housing cover plate and pull the cover off.
(7) Remove the rubber block drive hub and shaft assembly.
(8) Unbolt the outer drive plate from the flywheel

B. Installation

(1) Bolt the outer drive plate to the flywheel

(2) Slide the rubber block drive hub and shaft assembly into the outer drive plate.

(3) Install the flywheel housing cover plate.

(4) Reinstall the lubrication line, bearing, drive access cover, and fuel fill cover.

(5) Reinstall the blower wheel per 2B above.

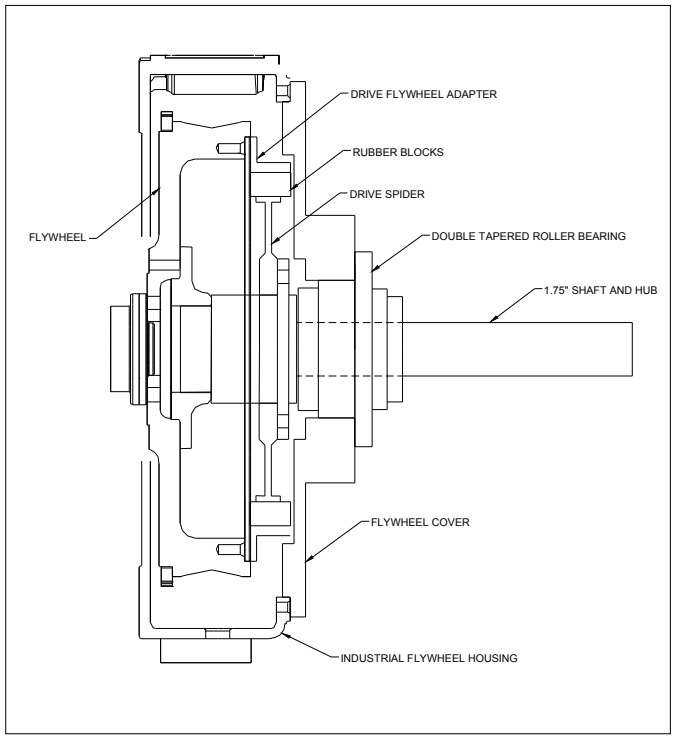

Figure 2-8: Rubber Block Drive

5. Engine and Rear Drive

A. Engine and Drive Removal

(1) Disconnect the both battery cables.

(2) Drain coolant (see section 2-3-2-A-1).

(3) Remove the muffler rain cap, front roof panel and center roof panel.

(4) Remove the center removable frame bar.

(5) Disconnect fuel supply line at the filter by pulling the supply line clip and removing the hose quick disconnect

(6) The wiring harnesses are all supplied with plug in connectors, except for the fuse box. Disconnect the gray and black harness connector from the electronic control module (ECM). A small flat bladed screwdriver can be used to lift the plastic tangs on the connectors.

(7) Unbolt the fuse box mounted on the ECM plate. Use a 7/16" shallow socket.

(8) Disconnect the main harness connector between the engine and the control panel. Use a 10mm socket.

(9) Disconnect the 6 pin and 2 pin connectors between the engine and the control panel. This can be done by carefully lifting the tabs with the small screwdriver.

(10) Unbolt the exhaust system either at the manifolds or the single connection between the "Y" and the catalytic converter. If the exhaust is disconnected at the manifolds, the oxygen sensor in each header pipe must be removed.

(11) Either remove the blower wheel and drive access cover as described above or remove the taper lock bushing so the drive shaft can slide out of the blower.

(12) Disconnect the clamp holding the rear bearing remote lube fitting.

(13) Rig a suitable lifting sling to engine lifting eyes.

(14) Remove the four center engine mount bolts. The mounts themselves will stay bolted to the frame.

(15) Slide engine forward to clear blower and remove.

B. Engine and Drive Installation

(1) Lift the engine and drive assembly over the open heater and lower it into the engine compartment. As the engine clears the frame roll the cart forward until the engine mounts align with the mounting holes.

(2) Adjust the mounting to insure the drive shaft clears the hole in the drive access cover.

(3) Install and secure the four motor mount bolts.

(4) Reinstall the blower wheel, exhaust system, and skin panels.

(5) Snap all the wire harness connectors together.

(6) Reconnect the fuel line.

(7) Fill with 50/50 water / antifreeze mixture. Bleed the system per section
Connect battery cables and start the engine.