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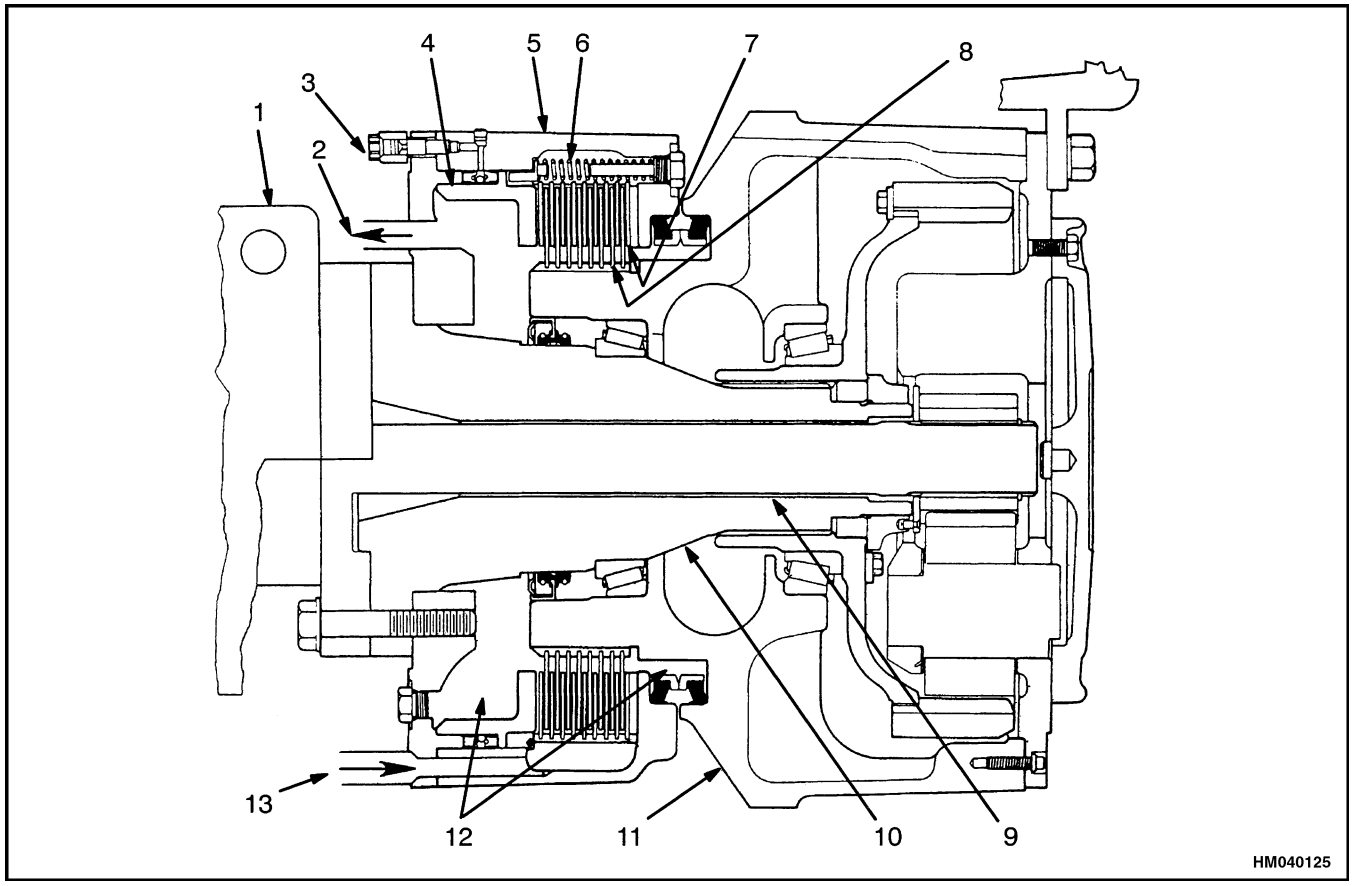
This section is for the following models:

HR45-27, HR45-31, HR45-40S, HR45-36L, HR45-40LS, HR45-45LSX [C227]

General

This section describes the operation and replacement procedures for some components of the park brake and service brake system. See Figure 1.

Repair of the oil cooled service brakes are described separately in **Service Brake** 1800 SRM 1038.



1. AXLE HOUSING
2. COOLING OIL RETURN LINE
3. BRAKING PRESSURE LINE
4. PISTON
5. BRAKE HOUSING
6. RETURN SPRING
7. STATIONARY DISCS
8. FRICTION (ROTATING) DISCS
9. AXLE SHAFT
10. SPINDLE
11. HUB
12. COOLING OIL
13. COOLING OIL SUPPLY

Figure 1. Service Brake

SERVICE BRAKES

At each drive wheel is an oil cooled brake assembly. The brake assembly has friction discs that rotate with the wheel, and stationary discs that are connected with the axle housing. A piston, moved by oil pressure from the brake system, pushes the discs together for braking. A separate oil system circulates oil through the sealed case to cool the discs, which are heated during braking. See Figure 1.

Oil pressure for the service brake system is supplied by port ACC2 of the L90LS valve, which directly connects with an accumulator. See Figure 2. Maximum brake oil pressure is 200 bar (2901 psi). A fully charged accumulator allows applying the service brakes a few times, in case oil pressure supply is interrupted, for instance when the engine is stalled. The accumulator is fully charged at 175 bar (2538 psi) or higher. The accumulator is empty at 145 bar (2103 psi) or lower.

Oil pressure is admitted to the service brakes by the brake relay valve. Another accumulator is fitted close to the relay valve for immediate response. The brake relay valve receives pilot oil from the brake pedal valve, when the brake is depressed.

When the brake pedal is moved, micro-switch S139 sends a signal to the APC200 transmission control system to declutch the transmission. When the relay valve has admitted more than 5 bar (72.5 psi) oil pressure to the service brakes, pressure switch S17 will switch on the brake lights.

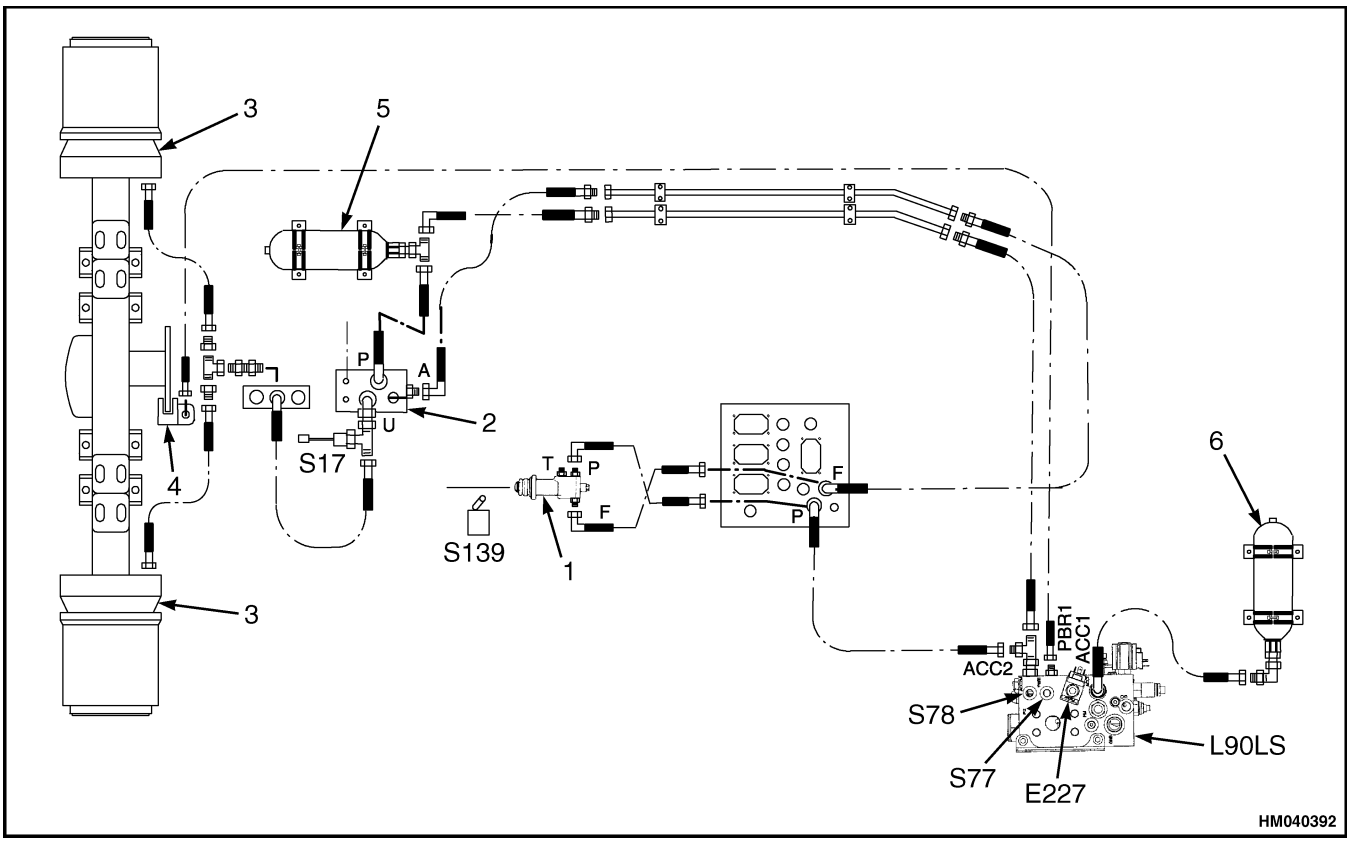
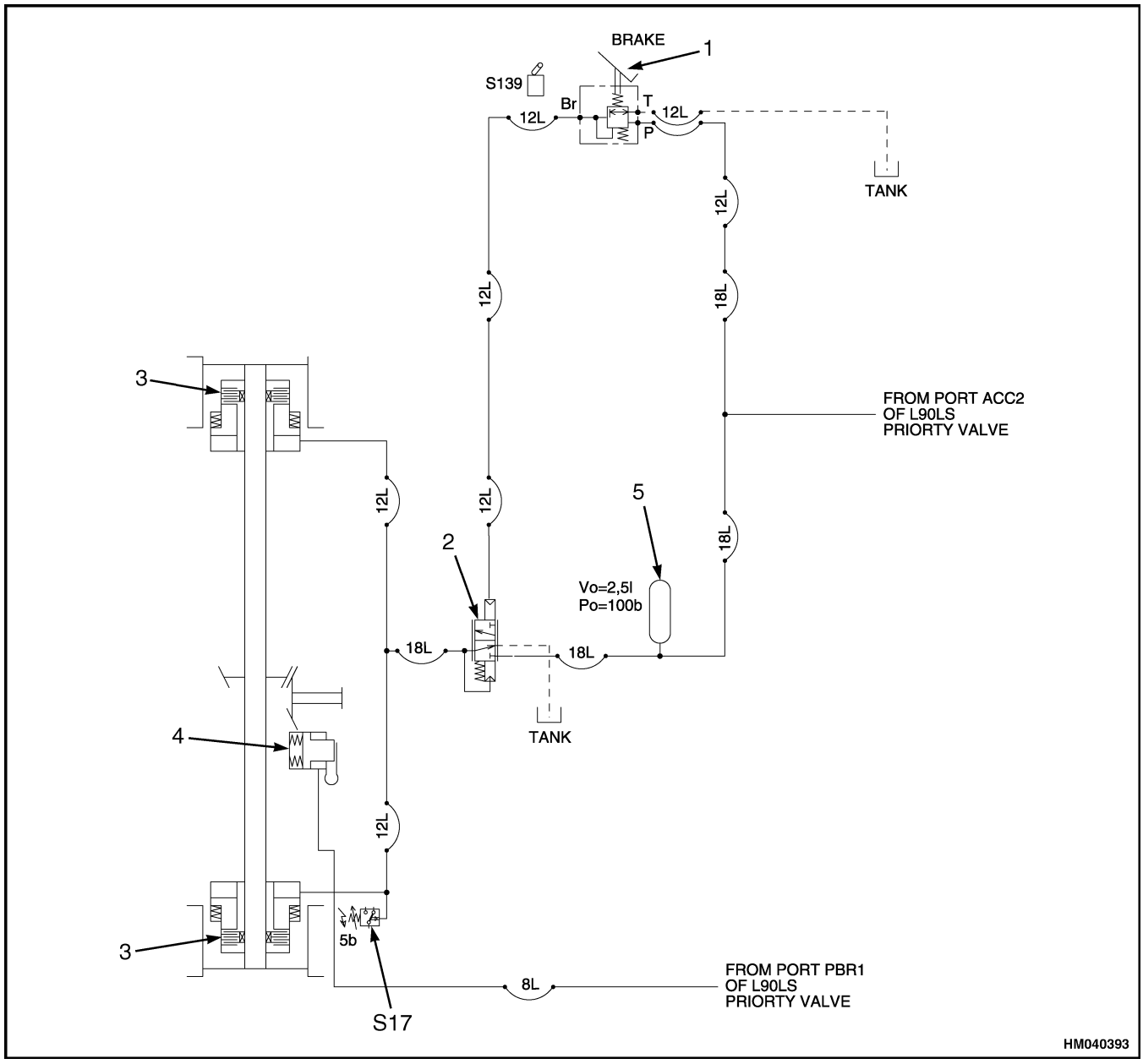


Figure 2. Brake System (Sheet 1 of 2)



1. BRAKE PEDAL VALVE
2. BRAKE RELAY VALVE
3. PARK BRAKE CALIPER
4. SERVICE BRAKE
5. SERVICE BRAKE ACCUMULATOR
6. L90LS ACCUMULATOR

Figure 2. Brake System (Sheet 2 of 2)

PARKING BRAKE

The parking brake system uses a disc brake that is installed on the rear of the differential. See Figure 2. The spring applied caliper is installed on the differential housing and the brake disc is fitted on the pinion shaft. When the brake caliper is pressurized, oil will move the piston against spring pressure, causing the parking brake to release.

The operation of the parking brake is controlled by solenoid valve E227, which is fitted on the L90LS valve. When solenoid E227 is not activated, parking brake pressure is drained to the tank, causing the parking brake to apply. When solenoid E227 is activated, oil pressure will release the parking brake.

Solenoid E227 is primarily controlled by the parking brake switch on the instrument panel. E227 will always deactivate when the key switch is turned to **OFF**.

E227 will NOT deactivate when a gear is selected while the engine is still running. E227 can always be activated by applying the parking brake switch.

Port ACC2M in the L90LS valve has pressure switch S77 that sends a signal to the APC200 transmission controller when a pressure of 105 bar (1523 psi) has been reached.

BRAKE COOLING SYSTEM

The brake cooling system is a separate system with a separate oil tank. The 12 cc brake cooling pump provides a continuous flow of oil through the brake radiator, brake filter, and service brakes. The radiator for the brakes is included in an assembly together with the radiator for the hydraulic system. The radiator assembly has a fan motor, driven by the 12 cc brake cooling pump. See Figure 3.

When the radiator assembly is cold, oil in the brake cooling system mainly flows through the radiator. Due to the low resistance of the cooler, only some of the oil follows the parallel line through the fan motor. This will cause the fan to always turn at some speed, when the engine is running.

When either temperature switch (S86 and/or S87) in the radiator assembly for brakes and hydraulic lines has activated solenoid E13, the brake cooling oil is forced to first pass the fan motor and then the brake radiator. An initially slow fan speed will result in a pressure peak at sudden closure of solenoid E13. To absorb this pressure peak, the 100 bar (1450 psi) relief valve opens and allows a gradual increase of the fan speed.

The bypass valve in the line leading to the fan motor is to prevent cavitation in case the engine speed drops quickly, while the quickly rotating fan tends to remain at the same speed.

The bypass valves fitted in the radiators protect them against too high of pressures.

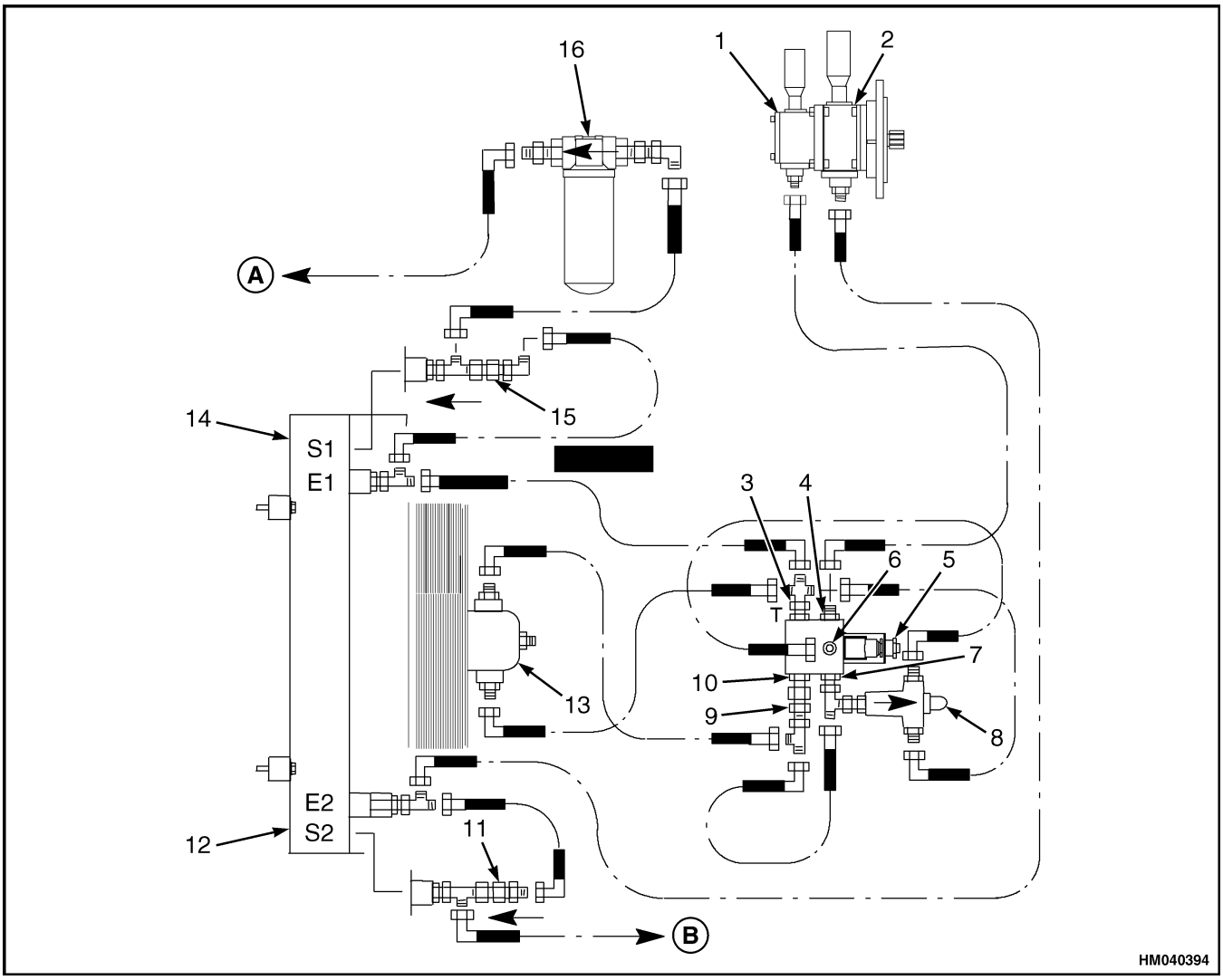
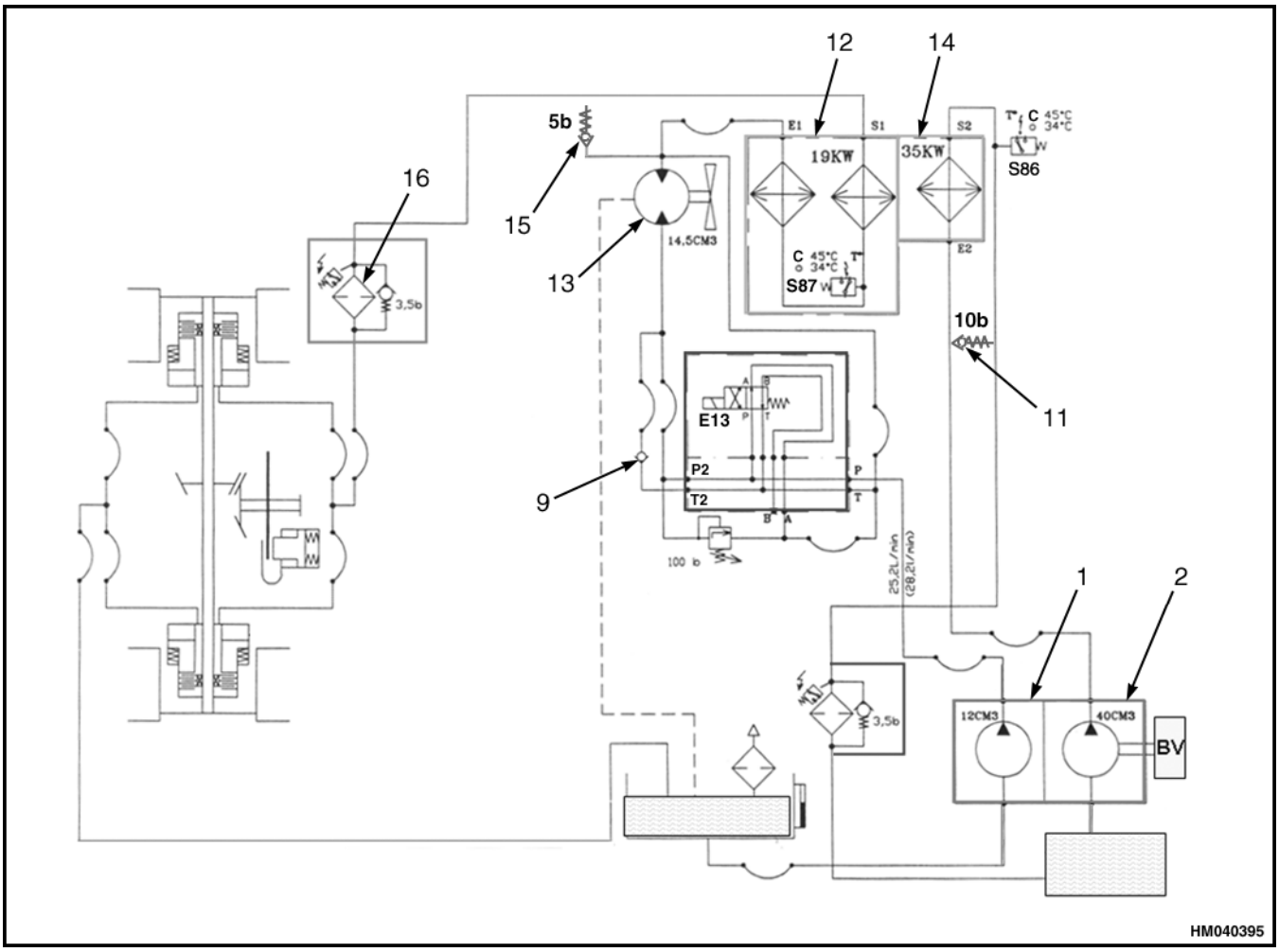


Figure 3. Brake Cooling System (Sheet 1 of 2)

(More Content includes: Brake system, Capacities, and specifications, Frame, Hydraulic, System, Industrial battery, Main control, Valve, Mast repair, Fasteners, Schematics diagrams, Steering axle, Steering system, Wire harness repair And more)



A. TO DRIVE AXLE

1. 12 CC BRAKE COOLING PUMP
2. 40 CC HYDRAULIC COOLING PUMP
3. PORT T1
4. PORT P1
5. SOLENOID VALVE E13
6. PORT A
7. PORT 2
8. 100 bar (1450 psi) RELIEF VALVE

B. TO HYDRAULIC FILTER

9. BYPASS VALVE
10. PORT T2
11. 10 bar (145 psi) RADIATOR BYPASS VALVE
12. HYDRAULIC MOTOR
13. FAN MOTOR
14. BRAKE RADIATOR
15. 5 bar (72.5 psi) RADIATOR BYPASS VALVE
16. BRAKE FILTER

Figure 3. Brake Cooling System (Sheet 2 of 2)

Accumulator Replacement

WARNING

The accumulator has a pressure charge and can cause an injury if the pressure is released too fast. Follow the manufacturer's instructions during removal and installation.

Before disconnecting any hydraulic lines, release pressure from the hydraulic circuit as follows:

- **Shut off the engine and completely lower the boom. Install blocks at the wheels to prevent the vehicle from moving.**
- **Operate the brake pedal until the hydraulic pressure is released.**

1. Put tags for identification on the lines. Slowly disconnect hydraulic lines from accumulator to release any pressure slowly. Put caps on open lines. Remove accumulator.
2. Follow the manufacturer's instructions during installation of the new accumulator. Tighten bracket nuts. Connect lines. Pre-charge the brake accumulator to 100 bar (1450 psi).
3. Operate system and check for leaks.

Parking Brake Caliper Repair

REMOVE

1. Put blocks in front and back of tires so vehicle cannot move. See Figure 4.
2. Remove cotter pin and tighten nut to release parking brake. See Figure 5.

WARNING

Before disconnecting any hydraulic lines, release pressure from the hydraulic circuit as follows:

- **Shut off the engine and completely lower the boom. Install blocks at the wheels to prevent the vehicle from moving.**
- **Operate the brake pedal until the hydraulic pressure is released.**

3. Release pressure from accumulator. Disconnect hydraulic line at caliper. Put cap on open line.

WARNING

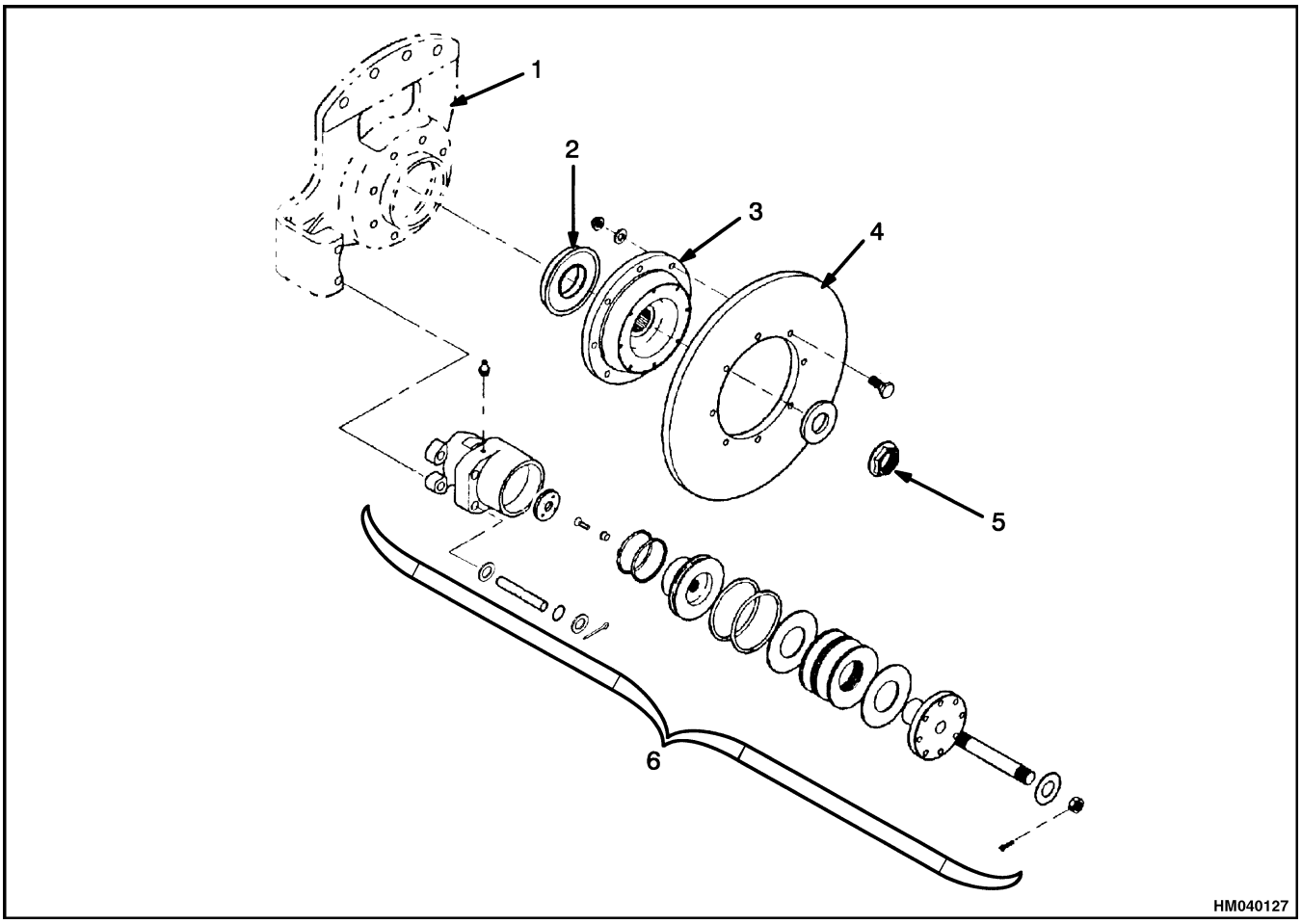
Brake linings can contain dangerous fibers. Breathing the dust from these linings can be a cancer or lung disease hazard. Do not make dust! Do not clean brake parts with compressed air or by brushing. Use vacuum equipment approved for brake dust or follow the cleaning procedure in this section. When calipers are removed, do not make dust.

Do not sand, grind, chisel, hammer, or change linings in any way that will make dust. Any changes to linings must be done in a restricted area with special ventilation. Protective clothing and a respirator must be used.

4. Remove pins that hold caliper to bracket. Remove caliper and brake linings.

DISASSEMBLE

1. Remove nut from stud. See Figure 5. Carefully remove cover from caliper housing. Remove washers and springs from housing.
2. Pull piston from bore.



1. CALIPER MOUNT
2. OIL SEAL
3. ROTOR FLANGE
4. ROTOR
5. NUT AND WASHER
6. CALIPER ASSEMBLY

Figure 4. Parking Brake Assembly

CLEAN

1. Do not release brake lining dust from brake linings into air.

2. Use a solvent approved for cleaning of brake parts to wet the brake lining dust. Follow instructions and cautions of manufacturer for use of the solvent. If a solvent spray is used, spray at a distance so dust is not released into air.

3. When brake lining dust is wet, clean parts. Put any cloth or towels in a plastic bag or an airtight container while they are still wet. Put a DANGEROUS FIBERS warning label on plastic bag or airtight container.

4. Any cleaning cloths that will be washed must be cleaned so brake lining fibers are not released into air.