LeeBoy

OPERATIONS, MAINTENANCE, AND PARTS MANUAL

CHALLENGER V BROOM

Manual No. 38474-04
For Units With Serial No. 53962 and higher
Revised: 11-21-2008

Disclaimer

All information, illustrations and specifications in this manual are based on the latest information available at the time of publishing. The illustrations used in this manual are intended as representative reference views only. Moreover, because of our continuous product improvement policy, we may modify information, illustrations and/or specifications to explain and/or exemplify a product, service or maintenance improvement. We reserve the right to make any change at any time without notice.

LeeBoy

Introduction 1

Safety 2

General Information 3

Specifications 4

Component Location 5

Operation 6

Maintenance 7

Troubleshooting 8

Electrical 9

Illustrated Parts List (IPL) 10

NOTES

Section 1
INTRODUCTION

Thank you for purchasing the LeeBoy Challenger V Broom. We wish you many years of safe and efficient operation of your broom.

This manual is an important part of the broom and should be kept with the machine at all times in the dedicated storage container on the broom. Even though you may be familiar with similar equipment, you MUST read and understand this manual before operating this unit. Reading the manual will help you and others avoid injury and help prevent any damage to the broom. If this manual becomes lost or damaged, contact your authorized LeeBoy dealer immediately to order a replacement. See *CONTACT INFORMATION on page 3-3*.

This manual is intended as a guide for the safe and efficient use of the broom. This manual covers the procedures for proper operation and maintenance of the broom. This manual contains information that was available at the time of printing.

NOTES

Section 2
SAFETY

Page

Safety 2-1

SAFETY PRECAUTIONS 2-3

LOCATION OF SAFETY DECALS 2-6

This manual provides important information to familiarize you with safe operating and maintenance procedures. Even though you may be familiar with similar equipment, you MUST read and understand this manual before operating this unit.

Safety is everyone's business and is one of your primary concerns. Knowing the guidelines covered in this section will help ensure your safety, the safety of those around you, and the broom's proper operation.

LOOK FOR THESE SYMBOLS WHICH POINT OUT ITEMS OF EXTREME IMPORTANCE TO YOUR AND YOUR COWORKERS' SAFETY. READ AND UNDERSTAND THOROUGHLY. HEED THE WARNING AND FOLLOW THE INSTRUCTIONS.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, *could* result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, *could* result in minor or moderate injury.

NOTICE

Indicates a situation which can cause damage to the equipment, personal property and/or the environment, or cause the broom to operate improperly.

NOTE: Indicates a procedure, practice, or condition that should be followed in order for the vehicle or component to function in the manner intended.

SAFETY PRECAUTIONS

⚠ CAUTION

The safety messages that follow have CAUTION level hazards.

Pre-Operation Hazard

- Never permit anyone to install or operate the machine without proper training.

- Read and understand this Operation Manual before operating or servicing the engine to ensure that safe operating practices and maintenance procedures are followed.
- Safety signs are additional reminders for safe operating and maintenance techniques.
- Contact LeeBoy or an authorized LeeBoy dealer for additional training.
- Make sure you are aware of licenses, laws and regulations that may be required or in effect where the machine is operated.

⚠ WARNING

The safety messages that follow have WARNING level hazards.

Crush Hazard

Keep bystanders away from work area before and during operation.

Modification Hazard

Never modify the machine without written consent of the manufacturer. Any modification can affect the safe operation of the machine.

Exposure Hazard

Always wear personal protective equipment, including appropriate clothing, gloves, work shoes, and eye and hearing protection, as required by the task at hand.

Explosion Hazard

- While the engine is running or the battery is charging, hydrogen gas is being produced and can be easily ignited. Keep the area around the battery well-ventilated and keep sparks, open flame and any other form of ignition out of the area.
- Always disconnect the negative (-) battery cable before servicing the equipment.
- Do not start the engine by shorting the starter circuit or any other starting method not stated in this manual. Only use the starting procedure as described in this manual to start the engine.
- Never charge a frozen battery. Always slowly warm the battery to room temperature before charging.

Fire and Explosion Hazard

- Diesel fuel is flammable and explosive under certain conditions.
- Never use a shop rag to catch the fuel.
- Wipe up all spills immediately.
- Never refuel with the engine running.
- Store any containers containing fuel in a well-ventilated area, away from any combustibles or sources of ignition.

Fire Hazard

- Have appropriate safety equipment available. Have all fire extinguishers checked periodically for proper operation and/or readiness.
- Always read and follow safety-related precautions found on containers of hazardous substances like parts cleaners, primers, sealants and sealant removers.
- Undersized wiring systems can cause an electrical fire.

⚠ WARNING

The safety messages that follow have WARNING level hazards.

Exhaust Hazard

All internal combustion engines create carbon monoxide gas during operation and special precautions are required to avoid carbon monoxide poisoning:

- Never block windows, vents or other means of ventilation if the machine is operating in an enclosed area.
- Always ensure that all connections are tightened to specifications after repair is made to the exhaust system.

Entanglement / Sever Hazard

- Verify there are no people, obstacles or other equipment near the machine before starting the engine. Sound the horn as a warning before starting the engine.
- Always stop the engine before beginning service.
- If the engine must be serviced while it is operating, remove all jewelry, tie back long hair and keep hands, other body parts and clothing away from moving/rotating parts.
- Verify that all machine guards and covers are attached properly to the machine before starting the engine. Do not start the engine if any guards or covers are not properly installed on the machine.
- Always turn the start switch to the OFF position after operation is complete and remove the key from the switch. Keep the key in your possession when the machine is not operating.
- Attach a “Do Not Operate” tag near the key switch while performing maintenance on the equipment.
- Never operate the engine while wearing a headset to listen to music or radio because it will be difficult to hear the warning signals.
- Always start the engine or operate the controls while you are seated in the operators seat.

Alcohol and Drug Hazard

Never operate the engine while under the influence of alcohol or drugs, or when ill.

Piercing Hazard

- Avoid skin contact with high-pressure hydraulic fluid or diesel fuel spray caused by a hydraulic or fuel system leak such as a broken hydraulic hose or fuel injection line. High-pressure hydraulic fluid or fuel can penetrate your skin and result in serious injury. If you are exposed to high-pressure hydraulic fluid or fuel spray, obtain prompt medical treatment.
- Never check for a hydraulic fluid or fuel leak with your hands. Always use a piece of wood or cardboard. Have your authorized LeeBoy dealer or distributor repair the damage.

Flying Object Hazard

Always wear eye protection when cleaning the machine with compressed air or high-pressure water. Dust, flying debris, compressed air, pressurized water or steam may injure your eyes.

Coolant Hazard

Wear eye protection and rubber gloves when handling engine coolant. If contact with the eyes or skin should occur, flush eyes and wash immediately with clean water.

Burn Hazard

- Some of the engine surfaces become very hot during operation and shortly after shutdown.
- Keep hands and other body parts away from hot engine surfaces.
- Handle hot components with heat-resistant gloves.

⚠ CAUTION

The safety messages that follow have CAUTION level hazards.

Poor Lighting Hazard

Ensure that the work area is adequately illuminated. Always install wire cages on portable safety lights.

Tool Hazard

Always use tools appropriate for the task at hand and use the correct size tool for loosening or tightening machine parts.

Slip Hazard

- Immediately clean up any spilled liquid on the shop floor.
- Clean up accumulated dirt and debris on the shop floor at the end of each shift.

Communications Hazard

- Follow the policies and instructions established by your employer and authorities having jurisdiction. The policies have been developed to protect you and your co-workers from needless personal injury.
- Post signs to alert people that are not authorized to be in the shop that they must stay out of the work area.
- If you must run the engine during maintenance procedures, make sure you have a helper to keep bystanders clear of the machine and make observations of moving parts as requested by the operator.

NOTICE

The safety messages that follow have NOTICE level hazards.

Any part which is found defective as a result of inspection or any part whose measured value does not satisfy the standard or limit must be replaced.

Always tighten components to the specified torque. Loose parts can cause equipment damage or cause it to operate improperly.

Only use replacement parts specified. Other replacement parts may affect warranty coverage.

Follow the guidelines of the EPA or other governmental agencies for the proper disposal of hazardous materials such as engine oil, diesel fuel and engine coolant. Consult the local authorities or reclamation facility.

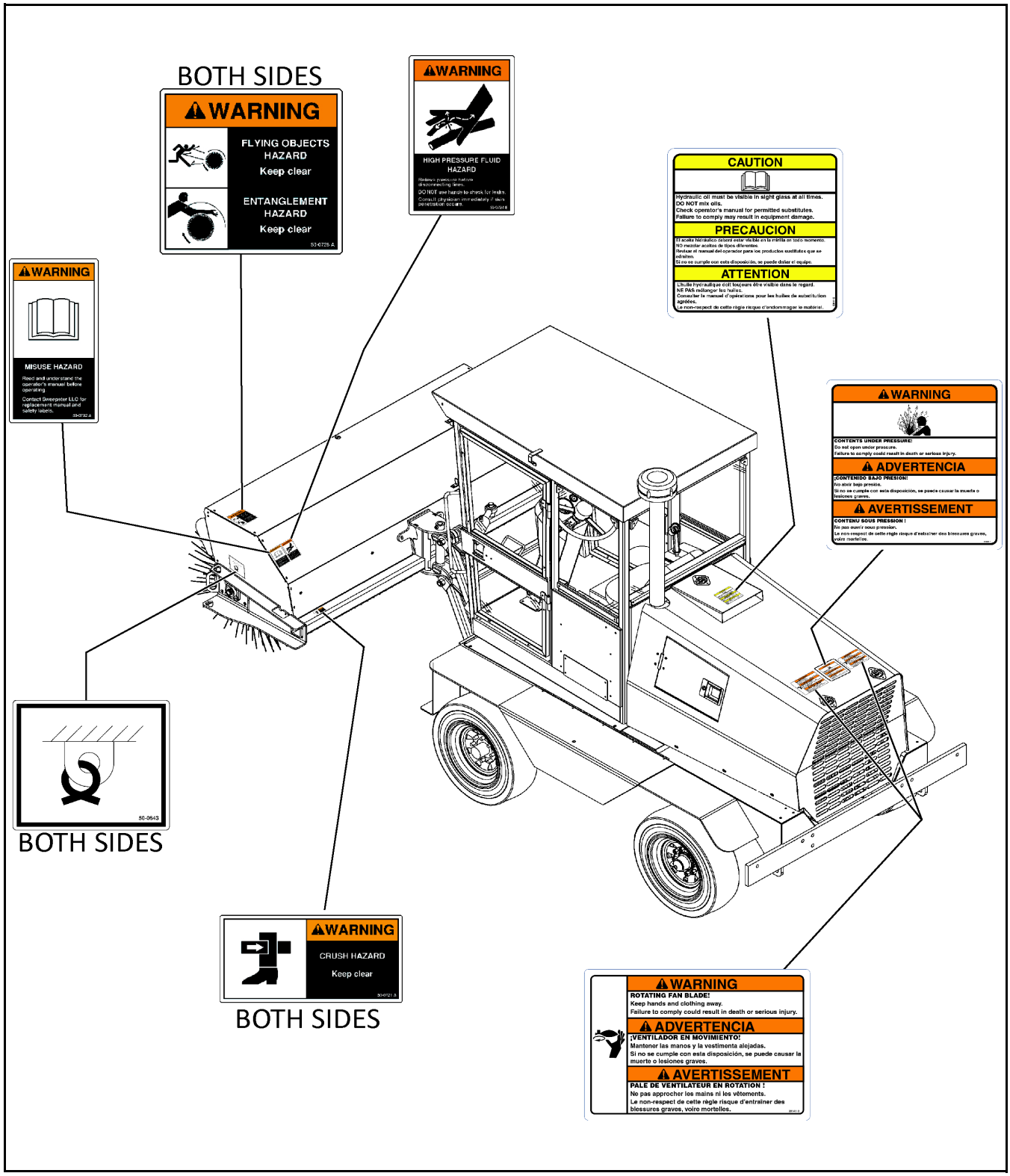
Clean all accumulated dirt and debris away from the body of the machine and its components before you inspect the machine or perform preventive maintenance procedures or repairs. Operating a machine with accumulated dirt and debris will cause premature wear of machine components. Accumulated dirt and debris also hinders effective machine inspection.

Retrieve any tools or parts that may have dropped inside of the machine to avoid improper machine operation.

Never dispose of hazardous materials by dumping them into a sewer, on the ground, or into groundwater or waterways.

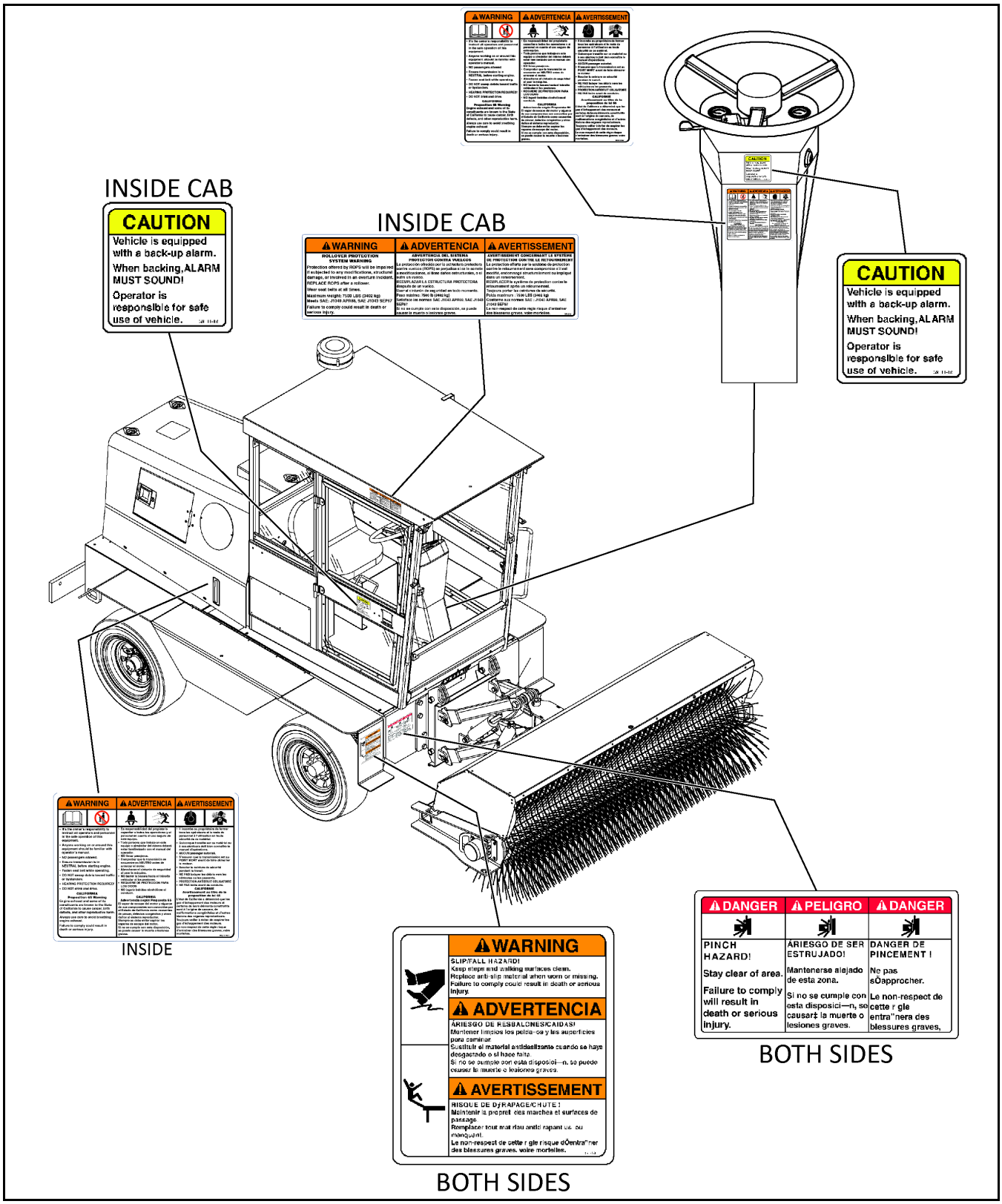
If any alert indicator illuminates during machine operation, stop the engine immediately. Determine the cause and repair the problem before continuing to operate the machine.

LOCATION OF SAFETY DECALS



Left Side Safety Decals and Decal Locations

Figure 2-1



Right Side Safety Decals and Decal Locations

Figure 2-2

NOTES

Section 3
GENERAL INFORMATION

Page

GENERAL INFORMATION 3-1

VT LEEBOY LIMITED WARRANTY
Policy and Procedures 3-2
- Warranty 3-2
- Limitations 3-2
- Items Not Covered 3-2
- Other Warranties 3-2

CONTACT INFORMATION 3-3

Record of Ownership 3-3

Nameplates 3-4
- Broom Nameplates 3-4
- Engine Nameplate 3-4

VT LEEBOY LIMITED WARRANTY POLICY AND PROCEDURES

Warranty

1. If a defect in material or workmanship is found and the authorized Dealer is notified during the warranty period, VT LeeBoy will repair or replace any part or component of the unit or part that fails to conform to the warranty during the warranty period.
2. The warranty date will begin upon online registration of the unit by the Dealer and will expire after twelve (12) months have passed.
3. Manufacturers' Warranties:

   Engines and truck chassis are warranted by their manufacturers and may have warranty coverage that differs from that of VT LeeBoy.
4. Replacement parts furnished by VT LeeBoy are covered for the remainder of the warranty period applicable to the unit or component in which such parts are installed.
5. VT LeeBoy has the right to repair any component or part before replacing it with a new one.
6. All new replacement parts purchased by a VT LeeBoy Dealer will carry a six-month warranty.

Limitations

VT LeeBoy has no obligation under this warranty for:

1. Any defects caused by misuse, misapplication, negligence, accident or failure to maintain or use in accordance with the most current operating instructions.
2. Unauthorized alterations.
3. Defects or failures caused by any replacement parts or attachments not manufactured by or approved by VT LeeBoy.
4. Failure to conduct normal maintenance and operating service including, without limitation, providing lubricants, coolant, fuel, tune-ups, inspections or adjustments.
5. Unreasonable delay, as established by VT LeeBoy, in making the applicable units or parts available upon notification of a service notice ordered by same.
6. Warranty Responsibility:

   The warranty responsibility on all engines and/or truck chassis rests with the respective manufacturer.
7. Warranty and Parts Support:

   VT LeeBoy may have support agreements with some engine and/or truck chassis manufacturers for warranty and parts support.

Items Not Covered

VT LeeBoy is not responsible for the following:

1. Costs related to travel time, mileage or overtime other than as covered under the Warranty Section, Item 1, of this document.
2. Costs related to transporting the product to and from the place at which warranty work is performed.
3. Air freight charges related to transporting repair parts to the place at which warranty work is performed.
4. All used units or used parts of any kind.
5. Repairs due to normal wear and tear or brought about by abuse or lack of maintenance of the equipment, except for premature failures, conveyor chains, poly-track pads, track rails, and rubber track and tires.
6. Attachments not manufactured or installed by VT LeeBoy.
7. Liability for incidental or consequential damages of any type including, but not limited to, lost profits or expenses of acquiring replacement equipment.
8. Miscellaneous charges.

Other Warranties

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESSED, STATUATORY AND IMPLIED WARRANTIES APPLICABLE TO UNITS, ENGINES, OR PARTS WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE. IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY OR ALLEGED NEGLIGENCE OR LIABILITY WITHOUT FAULT, SHALL VT LEEBOY BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOSS OF PROFIT OR REVENUE, COST OF CAPITAL, COST OF SUBTITUTED EQUIPMENT, FACILITIES OR SERVICES, DOWNTIME COSTS, LABOR COSTS OR CLAIMS OF CUSTOMERS, PURCHASERS OR LESSEES FOR SUCH DAMAGES.

CONTACT INFORMATION

For information regarding parts and repairs about your LeeBoy product, first contact the dealer you purchased your product from.

If you have a persistent problem your dealer is unable to resolve, contact LeeBoy directly.

Record dealer information in the space provided.

For additional information about LeeBoy, please visit our website at www.leeboy.com.

If you do not have web access, you can contact LeeBoy at:

VT LeeBoy, Inc.
500 Lincoln County Parkway Ext.
Lincolnton, NC 28092
Phone: (704) 966-3300
Fax Sales: (704) 483-5802

Sales Representative: _____

Dealership Name: _____

Dealership Address: _____

Dealership Phone: _____

RECORD OF OWNERSHIP

Please fill out the following information and use it when you need to contact LeeBoy for service, parts or literature.

Broom Model Number: _____

Broom Serial Number: _____

Engine Model Number: _____

Engine Serial Number: _____

Date of Purchase: _____

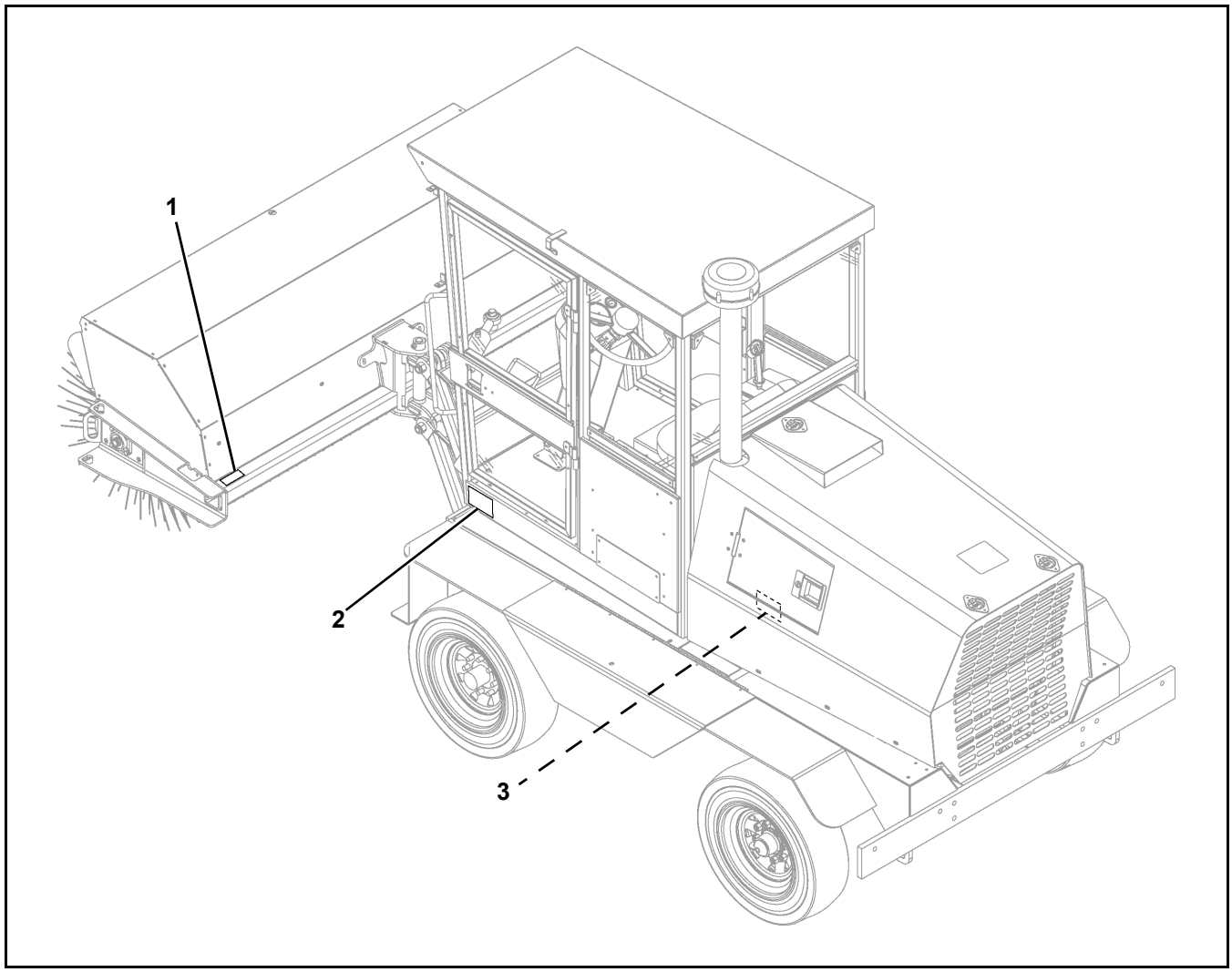
NAMEPLATES

Broom Nameplates

Nameplates **(Figure 3-1, 1)** & **(Figure 3-1, 2)** contain the specific model number and serial number used to identify the components for any parts or service information.

Engine Nameplate

The engine nameplate **(Figure 3-1, 3)** contains the specific model number and serial number used to identify the engine for any parts or service information.



Broom Nameplate Location

Figure 3-1

1 – Sweepster Broom Nameplate
2 – Challenger V Nameplate
3 – Engine Nameplate

Section 4
SPECIFICATIONS

Page

SPECIFICATIONS 4-1

GENERAL INFORMATION 4-2

ENGINE 4-2

ELECTRICAL SYSTEM 4-2

HYDRAULIC SYSTEM 4-2

SPECIFICATIONS 4-3

GENERAL INFORMATION

The descriptions and specifications provided in this section are applicable to the Challenger V Broom. This section contains a description of how the major components operate. It also includes specifications for the major system components. Included in this section are machine weights, dimensions, performance, and major system specifications for the LeeBoy Challenger V Broom.

ENGINE

The Challenger V Broom uses a Caterpillar 3044T four-cylinder, water cooled diesel engine to drive the hydraulic pump and the auxiliary pump for steering and broom control.

A fuel lift pump mounted on the tank inside the engine compartment draws diesel fuel from the fuel tank. The fuel tank is mounted behind the operator's platform.

An air cleaner mounted on the top of the engine filters intake air before use by the engine. The air cleaner removes fine particles such as dust, sand, chaff, and lint from the air.

A pre-cleaner mounted on top of the air cleaner assembly removes larger particles of dirt and debris before the air enters the air filter elements. The pre-cleaner relieves the load on the air filter elements and allows longer intervals between servicing. The materials trapped by the pre-cleaner are deposited in the pre-cleaner bowl.

As air is taken into the air cleaner assembly, a cyclone type action deposits some of the fine particles in the evacuator mounted on the bottom of the air cleaner housing. The evacuator is held closed during engine operation by suction. When the engine is shut off the weight of the debris helps to open the rubber flaps allowing the debris to fall out. The rubber flaps can also be squeezed together for cleaning.

Primary and secondary fuel filters remove contaminants from the diesel fuel before the fuel flows to the injection pump for injection into the engine combustion chamber.

A radiator mounted at the rear of the broom cools the engine. As coolant flows through the radiator, airflow from the engine-driven fan removes heat from the coolant.

Refer to the engine manufacturer's manual for a complete description of the engine.

ELECTRICAL SYSTEM

The electrical system is powered by a 12-volt battery mounted inside the a fender mounted battery box.

The battery produces 12 volts DC and maintains 1050 cold cranking amperes (CCA). An engine-mounted alternator capable of 63 amperes charging capacity keeps the battery charged during normal operation.

The battery charge rate can be monitored using a voltmeter mounted in the instrument panel.

HYDRAULIC SYSTEM

The LeeBoy Challenger V Broom is a fully hydrostatic, self-propelled unit. The Hydrostatic Drive System and Hydraulic System, which powers the steering and broom drive, have one common oil reservoir.

Hydrostatic Drive System

This system propels the broom forward and reverse with dynamic braking. The system consists of a variable displacement pump driven off the rear of the diesel engine. This pump provides power to a fixed displacement motor. The motor drives a mechanical front axle through a drive shaft.

Hydrostatic Drive Control

Control for the Drive System is provided by a manually operated lever at the driver's platform, located on the right side of the seat. A neutral position, which activates a neutral start switch, is included between forward and reverse directions of the control lever. This provides for easy and safe starting of the broom.

NOTICE **Machine components can be damaged when decelerating or changing direction rapidly. Doing so may cause excess heat and pressure in the hydrostatic drive system.**

Steering & Broom Hydraulic System

A hydraulic pump, which is directly connected to the Hydrostatic System pump, provides hydraulic flow to a manifold. This manifold has a priority flow divider which provides priority flow to the steering system and the broom lift and swing valves at approximately 5 gallons per minute. Excess flow from the pump provides power for the broom drive motor. The steering flow ALWAYS receives the priority flow so it is always powered.

Steering

Steering is performed by a hydraulically powered orbital system and operated by a steering wheel. In the event of a hydraulic power failure, the machine can still be steered.

Broom Control

The broom drive speed is regulated by the engine speed. Broom lift, swing, and forward/reverse are controlled by push buttons on the travel control lever. The buttons operate solenoid controlled hydraulic valves.

SPECIFICATIONS

The specifications provided in this section are applicable to the Challenger V Broom. Included in this section are machine weights, dimensions, performance, and torque values for both metric and standard inch fasteners.

Table 4-1. Engine

ITEM	SPECIFICATION
Model:	Caterpillar 3044T
Type:	4 Cycle Diesel, Water Cooled
Number of Cylinders:	Four
Bore & Stroke:	94 mm (3.7 in.) x 120 mm (4.72 in.)
Displacement:	3.33 L (203 cu. in.)
Power@2500 RPM:	63 kW (85 HP)
Idle Speed:	1000 RPM
Engine Oil Type:	15W-40
Oil Filter Type:	988671-03
Cooling Type:	Water Cooled
Cooling Capacity:	15 liters (4 gal)
Fuel Type:	Diesel
Fuel Filter Type:	988671-02
Air Filter Type, Primary (Dry-Type):	P/N 38385-01
Air Filter Type, Secondary (Cartridge):	P/N 38385-02

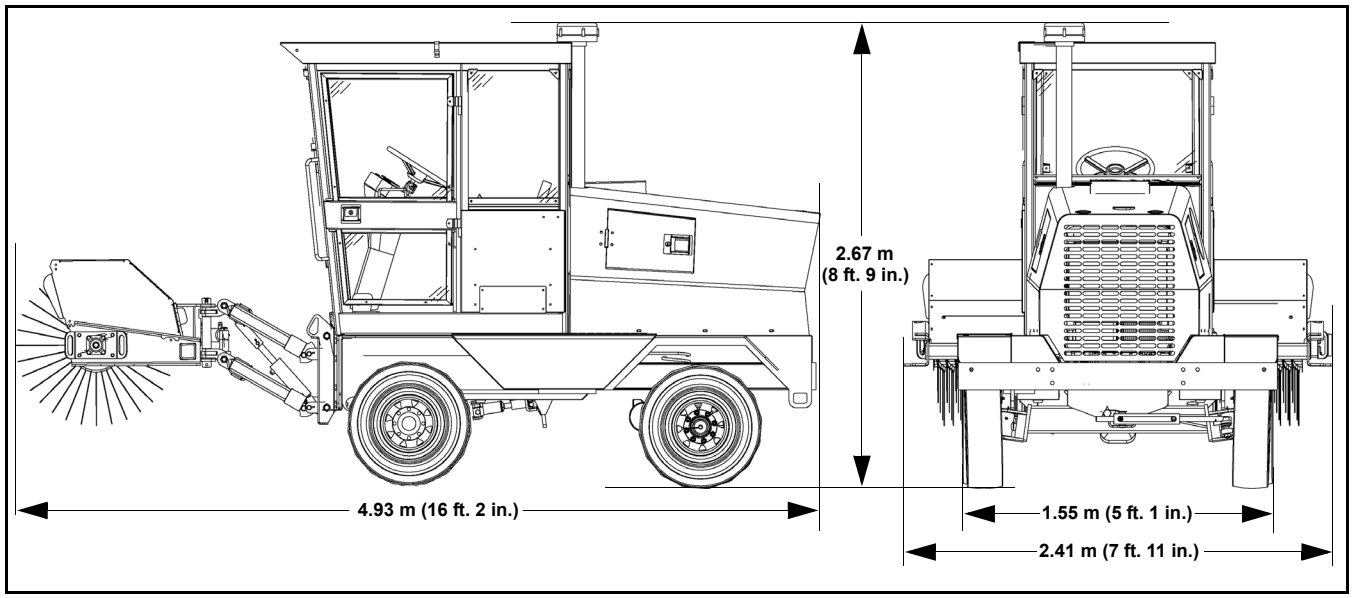
Table 4-2. Electrical

ITEM	SPECIFICATION
Battery Number Per Machine:	One Maintenance Free
Ampere Hour Rating:	1050 CCA
Voltage:	12V
Alternator Voltage:	12V, Negative Ground
Output Amperage:	63 Amps

Table 4-3. Dimensions

ITEM	SPECIFICATION
Weight:	3,402 kg (7,500 lb)
Overall Length (with water tank):	5.92 m (19 ft. 5 in.)
Overall Length (without water tank):	4.93 m (16 ft. 2 in.)
Overall Height:	2.67 m (8 ft. 9 in.)
Overall Width (Broom at 40°):	2.41 m (7 ft. 11 in.)

ITEM	SPECIFICATION
Tread Width (Front and Rear):	1.55 m (5 ft. 1in.)
Wheelbase:	1.73 m (5 ft. 8 in.)
Turning Radius (Inside):	91 cm (3 ft.)
Turning Radius (Outside):	3.33 m (10 ft. 11in.)
Ground Clearance:	30 cm (12 in.)



Outline Dimensions Drawing

Figure 4-1

Table 4-4. Drive System Specifications

ITEM	SPECIFICATION
Transmission:	Hydrostatic
Steering:	Hydraulic, Orbital Motor, 14 LPM (3.7 GPM) priority flow at 10342 kPa (103 bar, 1500 psi)
Rear Axle:	Heavy-Duty, Truck-Type, Oscillating
Tires:	8 x 16.5 Bias, 8 Ply, Load E, Highway Tread
Tire Inflation Pressure	345 kPa (3.45 bar, 50 psi)
Travel Speed (Infinitely Variable):	0 to 35 km/h (0 to 22 mph)
Hydrostatic Pump Model and Manufacturer:	Sauer/Danfoss Series 90
Hydrostatic Pump Displacement:	75 cc (4.57 CIR)
Hydrostatic Motor Model and Manufacturer:	Sauer/Danfoss Series 90
Hydrostatic Motor Displacement:	100 cc (6.1 CIR)
Hydraulic Fluid:	Citgo A/W All-Temp VG32
Hydraulic Return Filter:	10-Micron Spin-On Cartridge (P/N 72543)
Hydraulic Charge Filter:	7-Micron Spin-On Cartridge (P/N 34463)
Hydraulic Strainer:	In-Tank (P/N 33148)

ITEM	SPECIFICATION
Hydraulic Oil Cooler:	Flow-Thru
Front Axle, Differential, Full-Float:	7.17:1 Ratio
Brakes:	Drum-Type Hydraulic, Duo-Servo

Table 4-5. System Capacity

ITEM	SPECIFICATION
Fuel:	132 L (34.8 gal)
Engine Lube Oil:	8 L (8.4 qt)
Hydraulic Oil Reserve:	90.9 L (24 gal)
Torque Hubs:	2.78 L (94 oz) Each

Table 4-6. Broom Operating System

ITEM	SPECIFICATION
Pump (Gear-Type):	91 LPM (24 GPM), 20684 kPa (207 bar, 3,000 psi)
Motor (Gerotor-Type):	Direct Drive
Broom Core (Welded Steel):	25 cm x 2.13 m (10 in. x 7 ft.)
Broom Filler (Wafer-Type):	25 cm x 92 cm (10 in. x 36 in.)
Broom Cover (Steel):	140°, Full Length
Broom Speed:	200 RPM maximum, Variable w/Engine RPM
Broom Angle:	40°, Left or Right
Down Pressure Control:	Hydraulic, Fully Adjustable
Broom Watering System:	Poly Tank, 1@ 284 liters (150 gallons), Strainer, 12 Volt Diaphragm-Type Pump

Table 4-7. Cab Specifications

ITEM	SPECIFICATION
ROPS Cab:	OSHA & SAE Certified
Windshield Wiper (Front):	12 Volt, 2-Speed
Defroster Fan (Front):	12 Volt, Variable Speed
Seat:	Padded with Seat Belt
Horn:	12 Volt, Automotive-Type
Back-up Alarm:	97 db +/- 4 db at 122 cm (4 ft.)
Air Conditioning:	6,448 Watt (22,000 Btu/Hr) Capacity
Heater:	8,793 Watt (30,000 Btu/Hr) Capacity
Lights:	Turn Indicators, Tail Lights, Work Lights, Stop Lights
Mirrors:	West Coast
Instrumentation:	Oil Pressure, Coolant Temperature, Fuel Gauge, Voltmeter, Hourmeter, and Tachometer

Table 4-8. Optional Equipment

ITEM	SPECIFICATION
Defroster Fan (Rear):	12 Volt, Variable Speed
Windshield Wiper (Rear):	12 Volt, 2-Speed
Windshield Washer (Front or Rear):	12 Volt
Seat:	Suspension, Adjustable, with Seat Belt
Mirrors:	Inside Rear View
Engine Pre-Cleaner:	Standard or Turbo-Type
Instrumentation:	Hydraulic Oil Temperature, Engine Warning Light/Buzzer

Table 4-9. Lubricant Types

ITEM	SPECIFICATION
Engine Oil:	15W-40
Hydraulic Oil:	Citgo A/W All-Temp VG32
Grease:	Shell Avania EP Grease or Equivalent
Chains:	Chain Lube

Section 5
COMPONENT LOCATION

Page

Component Location 5-1
- Instrument Panel 5-2
- Steering Console 5-4
- BROOM Control Console 5-6
- Heat & Air Conditioning Controls 5-8
- Windshield Wiper, Defrost & Dome Light Controls 5-10
- Defroster Fan & ACCessory Fuse Panel 5-12
- Hydraulic Broom Lift Lock 5-13

INSTRUMENT PANEL

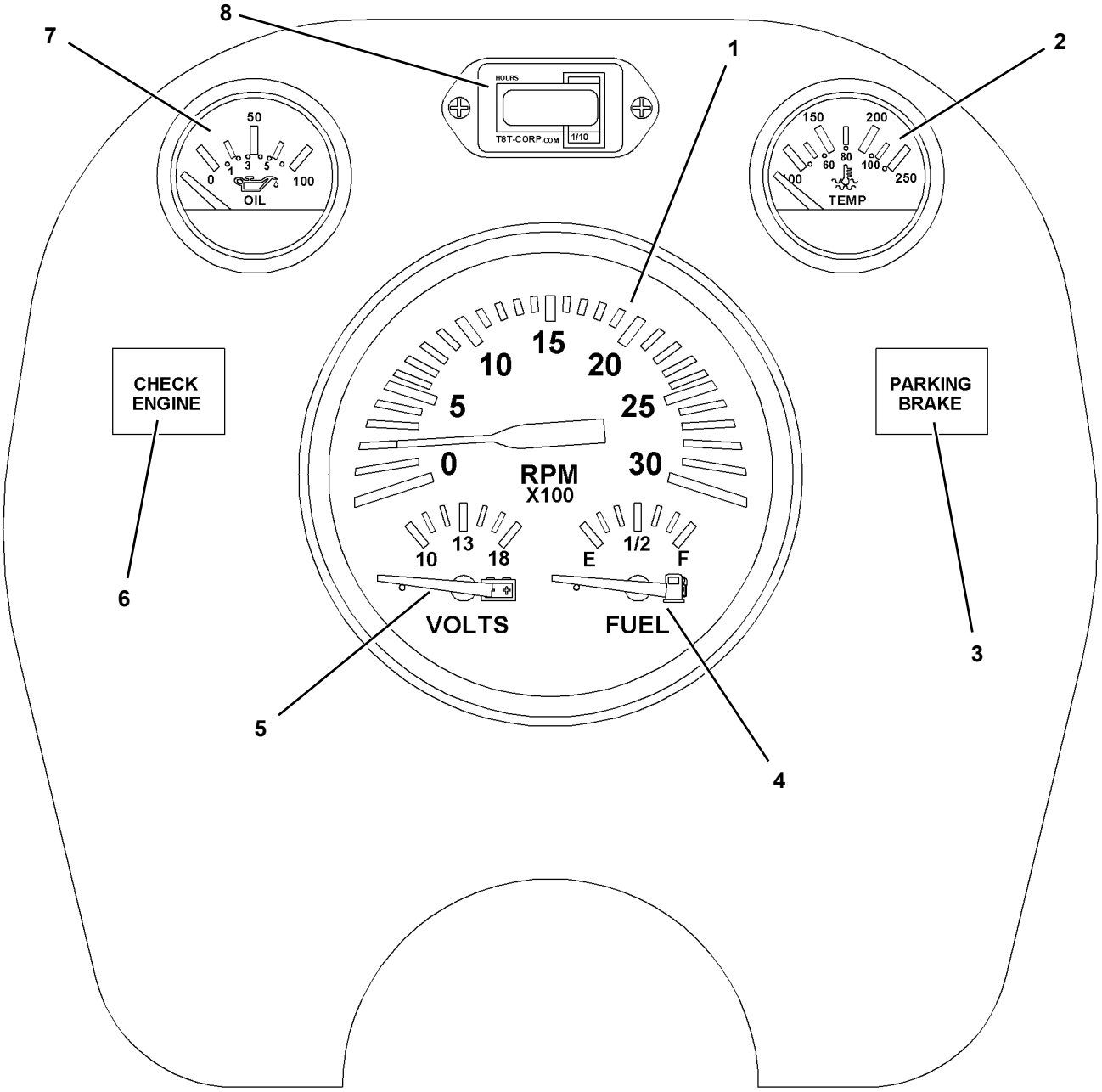


Figure 5-1

1 – Tachometer
2 – Temperature Gauge
3 – Park Brake Light
4 – Fuel Gauge
5 – Voltmeter
6 – Check Engine Light
7 – Oil Pressure Gauge
8 – Hour Meter

Tachometer (1)

Displays engine speed in revolutions per minute (RPM).

Temperature Gauge (2)

Displays engine coolant temperature.

Park Brake Light (3)

(Red Warning Light) Indicates that park brake is set.

Fuel Gauge (4)

Displays fuel level in the fuel tank.

Voltmeter (5)

Displays the condition of the battery charging system.

Check Engine Light (6)

(Red Warning Light) Indicates engine malfunction. Check major components and fluid levels. Service immediately.

Oil Pressure Gauge (7)

Displays engine oil pressure in pounds per square inch (psi).

Hour Meter (8)

Displays total machine work hours.

STEERING CONSOLE

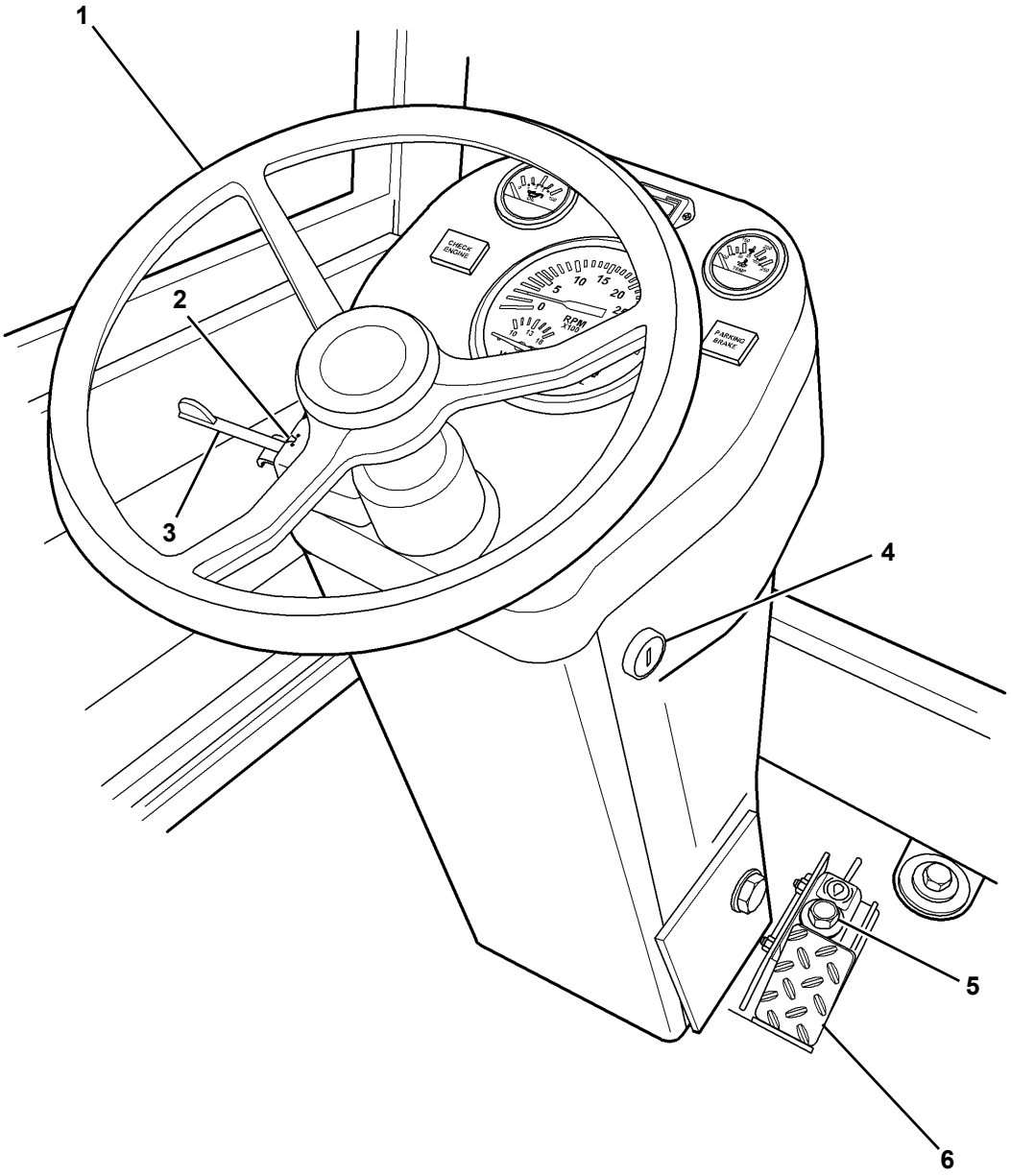


Figure 5-2

1 – Steering Wheel
2 – Directional Arrows
3 – Turn Signal Switch
4 – Ignition Switch
5 – Brake Master Cylinder
6 – Service Brake Pedal

Steering Wheel (1)

Controls right and left steering function of the rear wheels.

Directional Arrows (2)

(Green Flashing Light) Indicates left/right turn as selected with Turn Signal Switch.

Turn Signal Switch (3)

Activates the left and right turn signals. Switch up for right turn, switch down for left turn.

Ignition Switch (4)

Used to start and stop the engine and activate switched power circuits.

Brake Master Cylinder (5)

Pressurizes the brake system.

Service Brake Pedal (6)

Used to slow and stop the machine.

BROOM CONTROL CONSOLE

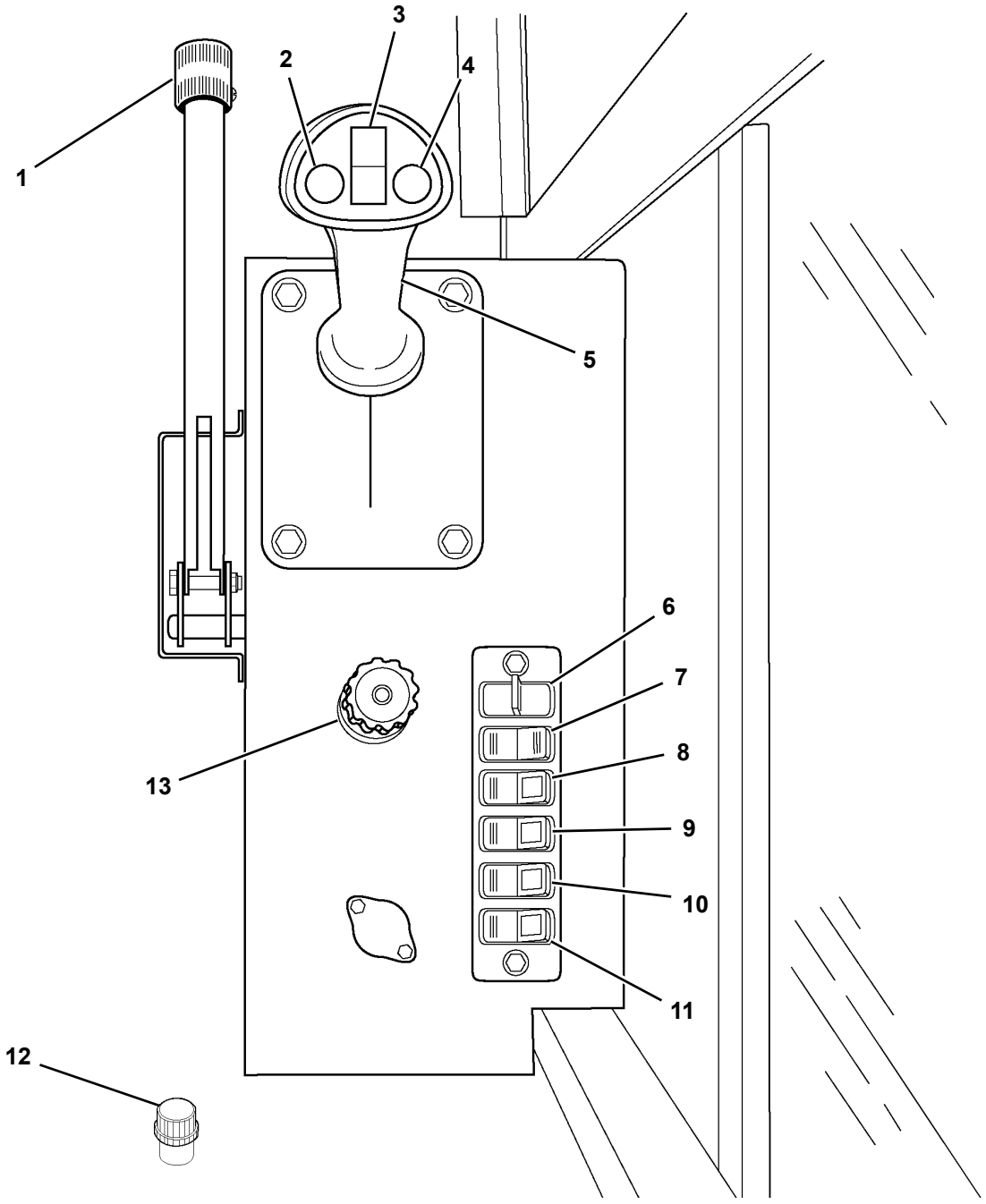


Figure 5-3

1 – Park Brake Lever
2 – Broom Swing LT Switch
3 – Broom Lift/Float Control
4 – Broom Swing RT Switch
5 – Joystick / Transmission Selector Lever
6 – Broom FWD/REV Control
7 – Horn Switch
8 – Broom Watering System Switch
9 – Beacon Light Switch
10 – Rear Light Switch
11 – Front Light Switch
12 – Broom Down Pressure Control
13 – Throttle Control Knob

Park Brake Lever (1)

Raise to set park/emergency brake. Lower lever to release.

Broom Swing LT Switch (2)

INCREMENTAL (Push Button) Controls broom swing to the left.

Broom Lift/Float Control (3)

FORWARD/BACK (Rocker Switch) Controls broom lift and float.

Broom Swing RT Switch (4)

INCREMENTAL (Push Button) Controls broom swing to the right.

Joystick / Transmission Selector Lever (5)

Controls speed and direction of machine travel. Reverse position activates the backup alarm.

Broom FWD/REV Control (6)

FORWARD/BACK (Rocker Switch) Controls forward and reverse rotation of broom.

Horn Switch (7)

Press and hold to sound the horn.

Broom Watering System (8)

Press to activate broom watering system.

Beacon Light Switch (9)

Controls cab-mounted strobe beacon light. Warns traffic of slow moving equipment.

Rear Lights Switch (10)

Activates rear work lights.

Front Lights Switch (11)

Activates front work lights.

Broom Down Pressure Control (12)

(LEFT/RIGHT knob) Controls hydraulic pressure suspending the broom.

Throttle Control Knob (13)

(PUSH/PULL and LEFT/RIGHT knob) Controls engine RPM, with center push-button.

HEAT & AIR CONDITIONING CONTROLS

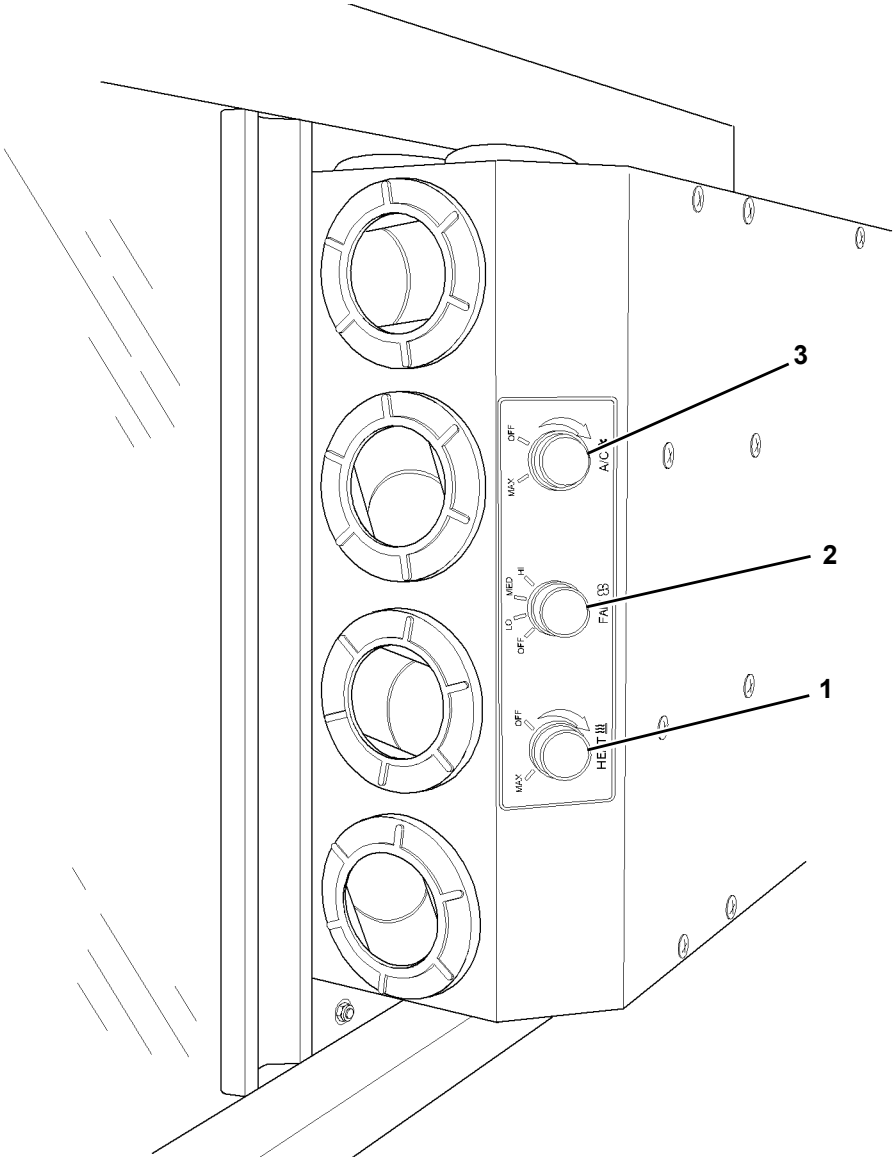


Figure 5-4

1 – Heater Control Knob
2 – Blower Fan Control
3 – Air Conditioning Control

Heater Control Knob (1)

(LEFT/RIGHT knob) Clockwise rotation to adjust heat.

Blower Fan Control (2)

(4-Position knob) Controls blower fan for heater and air conditioning.

Air Conditioning Control (3)

(LEFT/RIGHT knob) Clockwise rotation to control temperature.

WINDSHIELD WIPER, DEFROST & DOME LIGHT CONTROLS

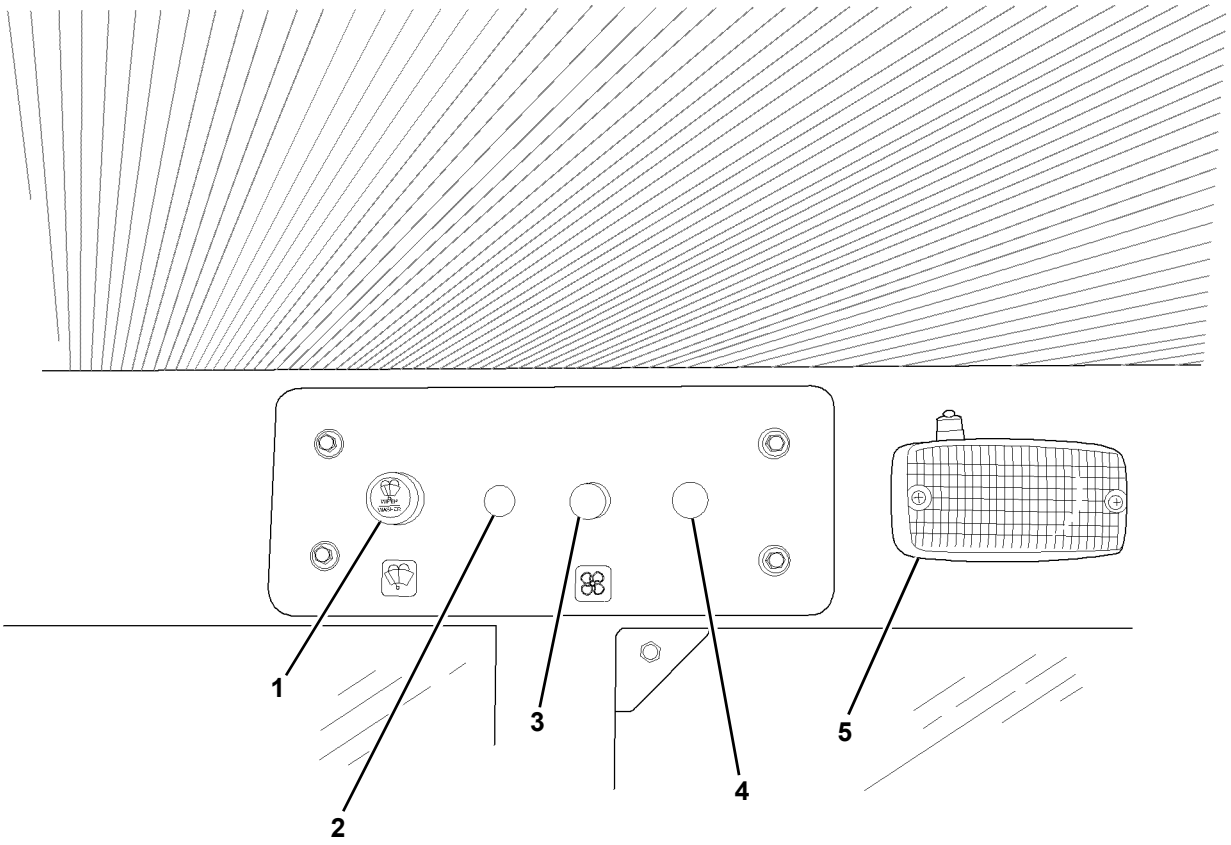


Figure 5-5

1 – Windshield Wiper and Washer Knob
2 – Option
3 – Defroster Fan
4 – Option
5 – Dome Light

Windshield Wiper and Washer Knob (1)

(HIGH/LOW wiper with push-to-wash) Controls front windshield wiper and washer.

Option (2)

(HIGH/LOW wiper with push-to-wash) Controls rear windshield wiper and washer.

Defroster Fan (3)

(HIGH/MED/LOW knob) Controls front cab-mounted windshield defroster fan.

Option (4)

(HIGH/MED/LOW knob) Controls rear cab-mounted windshield defroster fan.

Dome Light (5)

ON/OFF (Push Button) Lights cab interior with push button switch on top.

DEFROSTER FAN & ACCESSORY FUSE PANEL

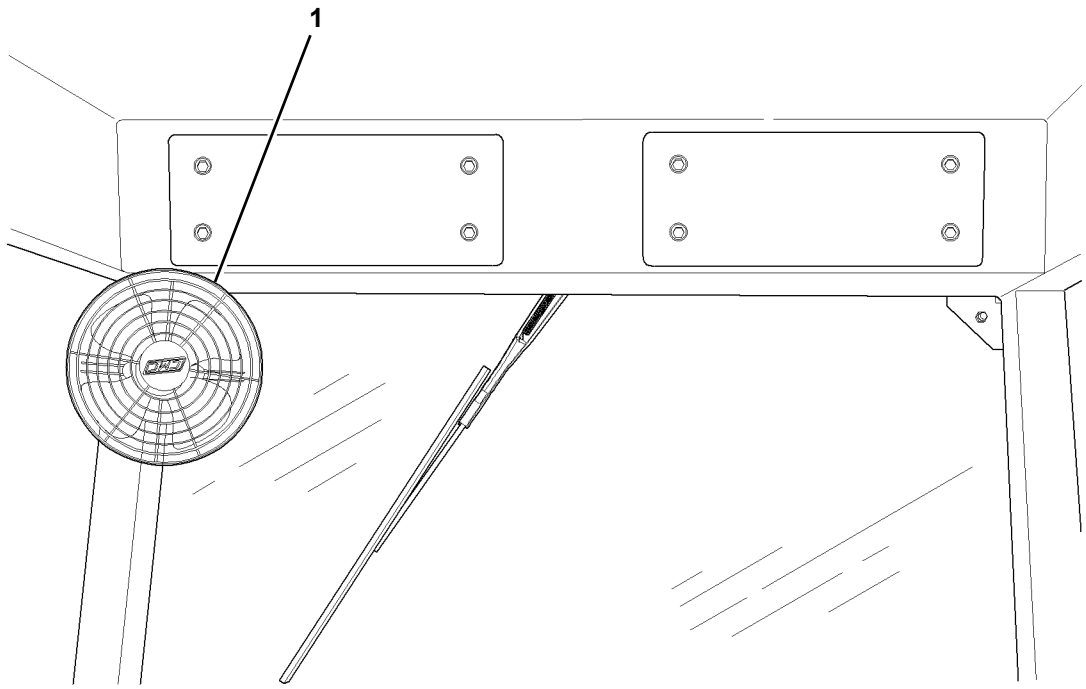


Figure 5-6

1 – Front Cab-Mounted Windshield Defroster Fan

Front Cab-Mounted Windshield Defroster Fan (1)

Directed toward front window to defrost the windshield.

HYDRAULIC BROOM LIFT LOCK

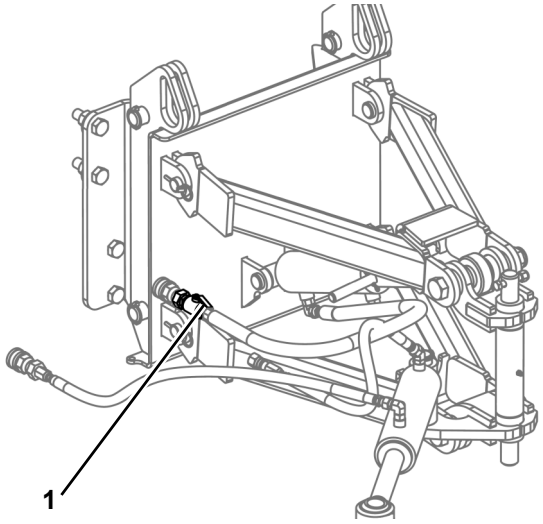


Figure 5-7

1 – Hydraulic Broom Lift Lock

Hydraulic Broom Lift Lock (1)

Locks the broom in the raised position to prevent damage during shipping. When valve handle is perpendicular to hose, lift cylinder is locked. Rotate valve parallel to hose to unlock.

NOTES

Section 6
OPERATION

Page

OPERATION 6-1
- PRE-OPERATION 6-2
  - Pre-Operation Checklist 6-2
- STARTING THE ENGINE 6-2
  - Preliminary 6-2
  - Engine Start-Up & Operation 6-2
  - Stopping the Engine 6-3
  - SYSTEM CONTROLS 6-3
- BROOM OPERATION 6-4
  - BROOM SWING SWITCHES 6-4
  - BROOM LIFT/FLOAT CONTROL SWITCH 6-4
  - BROOM DOWN PRESSURE CONTROL 6-4
  - BROOM FORWARD/REVERSE CONTROL SWITCH 6-4
  - BROOM SPEED 6-4
- SWEEPING GUIDELINES 6-5
- Dust Supression System 6-5
- TRANSPORTING THE BROOM 6-5
  - Machine Tie Downs 6-6

Before operating the Challenger V Broom, read the following safety information and review **Safety, Section 2**.

⚠ DANGER The safety messages that follow have DANGER level hazards.

Operation Hazards

- Never allow anyone who is not properly trained to operate this machine. Only authorized personnel who are properly trained in the operation of the machine can operate the Challenger V Broom.
- Do not operate a machine that requires repairs or scheduled maintenance. Put an information tag on the instrument panel that says “DO NOT OPERATE.” Remove the key from the ignition switch. Repair all damage at once and perform routine maintenance. Minor damage can result in major system failure.

PRE-OPERATION

Before starting or operating the machine, it is important to READ, UNDERSTAND, and FOLLOW all Operating instructions, Danger, Warning, and Caution messages in this section, as well as all Safety information contained in **Section 2** of this manual. The following pre-operation checklist is provided to ensure efficient and safe operation of the Challenger V Broom.

Pre-Operation Checklist

Check the following areas before operating the machine and each time thereafter:

1. Recommended fluid types and required quantities are listed in Specifications, **Section 4** of this manual. Replace fluids as detailed in the *Periodic Maintenance Schedule on page 7-4* of this manual. Check the following:
   - Check ENGINE OIL. Add if low. Be careful not to overfill.
   - Check HYDRAULIC OIL RESERVOIR. Add if low.
   - Check ENGINE DIESEL FUEL TANK. Fill if low.
   - Check ENGINE COOLANT LEVEL at radiator. Fill if low.
   - Check BRAKE FLUID at Brake Master Cylinder. Fill to 1" below top.
2. Check the Engine Air Filter Indicator. Clean or replace filters if indicator shows red or 50.8 cm (20 in.) of restriction.
3. Check engine belts and hoses for wear or fraying. Replace any that show signs of wear, cuts or abrasion.
4. Check park/emergency brake adjustment. See *AXLES AND BRAKES on page 7-19*, for adjustment instructions.
5. Disengage the hydraulic broom lift lock. **(Figure 5-7)**
6. Check Tire Pressure. Maintain even pressure in all four tires at 345 kPa (3.45 bar, 50 psi).
7. Make sure cab windows are clean and pressurizer air filters are clean.
8. Check the machine for loose bolts.
9. Check for signs of leaking hoses. Refer to *HYDRAULIC SYSTEM CHECKS on page 7-16*.
10. Check engine manufacturer's manual for pre-operation information.

STARTING THE ENGINE

Preliminary

Before starting the engine:

1. Check fuel level.
2. Check fuel lines, and tank for leaks.
3. Check engine crankcase oil level.

NOTICE Engine malfunction and failure can result from inadequate oil levels. Add oil whenever necessary.

4. Check hydraulic oil level. Oil level is determined by sight gauge on the hydraulic tank on the left side of unit.
5. Refer to *engine operator’s manual* for instructions when starting engine for the first time. Follow engine manufacturer's recommendations for fuel and oil.

Engine Start-Up & Operation

⚠ WARNING Death or serious injury can result from an operator unfamiliar with this machine. Know the location and function of the controls before operation. See Component Location, Section 5.

1. Place the Transmission Selector Lever **(Figure 5-3, 5)** in the neutral position. A Neutral Start Switch has been installed to prevent operation of the engine starter when the transmission is not in neutral.
2. Apply the park/emergency brake **(Figure 5-3, 1)**.

⚠ WARNING Death or serious injury can result by starting the machine when not in neutral. Be sure the park brake is applied and the Transmission Selector Lever (Figure 5-3, 5) is in the neutral position before starting the machine. Sudden movement of the machine can throw an operator from the machine.

3. Set the Engine Throttle **(Figure 5-3, 13)** to one-half speed by holding the center button depressed and pulling on the knob.
4. Turn the Ignition Switch key **(Figure 5-2, 4)** to activate the engine starter. As soon as the engine starts, release the switch.

NOTICE Starter can be damaged by continuously cranking. Do not crank engine for more than 30 seconds at a time. Allow starter to cool down for two minutes between attempts. If engine will not start refer to Troubleshooting, Section 8 or engine operation manual for solutions. If problem persists contact your LeeBoy Dealer.

5. As soon as the engine starts, move the Engine Throttle **(Figure 5-3, 13)** to idle by holding the button depressed and pushing the knob fully down.

NOTICE Machine may be damaged if oil pressure is not shown after machine startup. If no oil pressure is shown on the gauge in 15 seconds, shut down the engine and determine the cause.

6. Check the gauges on the instrument panel **(Figure 5-1)** for proper readings, and make the necessary corrections.
7. Adjust the position of the seat and mirrors for the operator's convenience.
8. When the engine is warm and running properly, fasten the seat belt and familiarize yourself with the operation of the controls.

⚠ WARNING Death or serious injury can result if seat belt is not worn. Always wear a seat belt when operating the machine.

NOTICE Engine may suffer damage from extended idling. Never idle the engine for more than 10 minutes.

NOTICE Drive system and brakes may be damaged if operated with the park/emergency brake engaged. Before moving the machine, be sure the park/emergency brake is released.

Stopping the Engine

1. Throttle back to idle by pressing and holding either THROTTLE **(Figure 5-3, 13)** switch in the down position until idle speed is reached.
2. Turn ignition key on instrument panel counter-clockwise (CCW) to the OFF position and remove key.

SYSTEM CONTROLS

⚠ WARNING Death or serious injury can result from an operator unfamiliar with this machine. Know the location and function of the controls before operation. See Component Location, Section 5.

ENGINE THROTTLE

The Engine Throttle **(Figure 5-3, 13)** is a knob with a center push-button. It is located on the control panel to the right of the driver's seat.

Hold the button down while pulling or pushing the knob to increase or decrease throttle. Once the button is released the operator can fine-tune the engine RPM by turning the knob clockwise to increase throttle or counterclockwise to decrease throttle.

When first operating this machine, set the throttle to 1/2 or 3/4 open until you are familiar with the functions of the controls.

TRANSMISSION SELECTOR LEVER

The hydrostatic Transmission Selector Lever **(Figure 5-3, 5)** is on the control panel on the operator's right side. With some experience, an operator should be able to operate this control along with the throttle to make the forward or reverse movement smooth and fluid-like. Placing the joystick in reverse activates the Back Up Alarm.

SERVICE BRAKE PEDAL

The foot-operated Service Brake Pedal **(Figure 5-2, 6)** is on the right side of the steering wheel console. The service brake may be overpowered by the hydrostatic drive. Always return the Transmission Selector Lever **(Figure 5-3, 5)** to neutral as the service brakes are applied.

STEERING WHEEL

The Steering Wheel **(Figure 5-2, 1)** is located in front of the operator's seat. Remember that steering takes priority over broom operations (rotation, lift and swing) when both are attempted at the same time.

STOPPING & BRAKING

Most operators seldom use the foot brake. Instead they use the throttle and hydrostatic transmission to slow down, stop and change directions.

The operator must become accustomed to using the hydrostatic transmission to assist in braking. This is best done by moving the Transmission Selector Lever **(Figure 5-3, 5)** into the neutral position before applying the service brake.

⚠ WARNING Death or serious injury may result if sufficient stopping distance is not available. Familiarize yourself with the machine, its braking system, and the job site before operation.

⚠ WARNING A runaway machine may cause death or serious injury. Before dismounting from the machine, place the Transmission Selector Lever in neutral, turn off all accessories, set the park brake, shut OFF the engine, and remove the ignition key.

BROOM OPERATION

Broom operation controls are located on the broom control console **(Figure 5-2)**. The Challenger V Broom is equipped with the following broom operating controls:

BROOM SWING SWITCHES

The Broom Swing Switches **(Figure 5-3, 2 & 4)** are the push button switches to the far left and right on the joystick. Push the switches in gradual momentary adjustments to swing the broom left or right. Hold the button down to move the broom to its full swing position.

BROOM LIFT/FLOAT CONTROL SWITCH

The Broom Lift/Float Control Switch **(Figure 5-3, 3)** is the forward/back switch located at the left center of the joystick. It has three positions:

1. Up - Pushing fully forward lifts the broom carrier. When pressure on the switch is released, the switch automatically returns to the HOLD position.
2. Hold - This position holds or “locks” the broom carrier at the height used in the last UP or DOWN operation of the Broom Lift/Float Control Switch.
3. Down - Pushing back on the switch moves the broom carrier down towards the ground. This is a detented position. When the switch is in this position, the broom is in the FLOAT position.

BROOM DOWN PRESSURE CONTROL

The Broom Down Pressure Control **(Figure 5-3, 12)** controls the amount of hydraulic pressure needed to keep the broom suspended over the work surface. Turn the valve clockwise to increase pressure and counterclockwise to decrease pressure.

NOTICE Broom damage will result from excessive down pressure. For best results, operate in the FLOAT position. Use the Broom Down Pressure Control knob to correct excessive down force.

NOTE: It is important to understand that by decreasing the hydraulic pressure suspending the broom, you are increasing the down force. Broom "down force" control only works with the Broom Lift/Float Control Switch in the DOWN, or FLOAT position.

BROOM FORWARD/REVERSE CONTROL SWITCH

The Broom Forward/Reverse Control Switch **(Figure 5-3, 6)** is the forward/back switch located at the right center of the joystick. It has three positions:

1. Down - This is the normal sweeping position. Pushing the switch down causes debris to be pushed out in front of the broom.
2. Off - The center position turns the broom rotation OFF.
3. Up - Pushing forward on the switch pushes debris to the rear of the broom.

BROOM SPEED

Broom speed is controlled by changing the engine's RPM. This is done by adjusting the Engine Throttle **(Figure 5-3, 13)**.

SWEEPING GUIDELINES

For best sweeping results, observe the following guidelines:

1. Sweep only with the tips of the broom bristles. This will provide maximum “flick” sweeping action. Control of sweeping action can be obtained by using the Broom Down Pressure Control knob.
2. For most normal sweeping operations, the FLOAT position works best. Practice will help the operator achieve the most effective operation of the broom.
3. For heavy sweeping, slow the ground speed and increase the broom RPM by increasing the engine RPM. The right combination of ground speed and broom speed will correct ineffective sweeping.
4. To get an ideal broom height setting, sprinkle some sand under the broom. Place the transmission in neutral and set the park brake. Engage the broom by moving the Broom Forward/Reverse Control Switch **(Figure 5-3, 6)**.
5. Move the Broom Forward/Reverse Control Switch to center, the OFF position. When the broom is raised, there should be a 2" to 4" wide clean swath under the entire length of the broom.

NOTICE **Broom may be damaged if stored improperly. Ensure broom is completely raised and safety stop is engaged during storage to prevent a flat spot from forming on the broom bristles.**

DUST SUPRESSION SYSTEM

In certain conditions, it may be necessary to sweep using the Dust Supression System to control dust. This system consists of one 150 gallon poly tank, an electric pump, and corrosion resistant nozzles and piping system. The pump is turned on by a switch on the side panel **(Figure 5-3, 8)**.

TRANSPORTING THE BROOM

When transporting the machine on a flat bed vehicle, the vehicle must be capable of carrying the machine safely in all driving situations.

1. Clean the machine using a pressure washer. Remove all loose gravel, mud or debris from wheels, frame, and broom.
2. Make sure the combined height of the truck, trailer and loaded broom meet height restrictions for the local area, including bridges, overpasses, and overhead obstructions.
3. Park the transport vehicle on a level surface and set the park brake.
4. Install chocks or blocks against truck and trailer wheels.
5. Use a ramp or loading dock. Make sure the ramp weight capacity will support the machine and has a low angle of rise to the trailer bed.
6. Load the machine on the trailer bed by driving straight on, centered on the trailer. The broom center-line must be over the center-line of the trailer.
7. Set the park brake and block broom wheels in both directions to prevent rolling.
8. Using the Broom Swing Switches **(Figure 5-3, 2 & 4)**, center the broom.
9. Using the Broom Lift/Float Control Switch **(Figure 5-3, 3)**, raise the broom to its full upright position.
10. Engage the hydraulic broom lift lock **(Figure 5-7)**.

⚠ WARNING **Death or serious injury can result from machine breaking loose during transport. Ensure machine is properly secured to transport trailer.**

NOTICE **Machine damage can result from machine breaking loose during transport. Ensure machine is properly secured to transport trailer.**

NOTE: Fasten chains or cables to machine frame. Do not place chains or cables over or against hydraulic lines, hoses or electrical harnesses.

11. Secure the machine to the trailer using the four tie-downs located on each side at the front and rear of the machine’s main frame **(Figure 6-1)**.
12. Idle the engine at 1/2 speed (RPM) for 3 to 5 minutes.
13. Place engine throttle at slow idle.
14. Place ignition switch in the OFF position and remove the key.
15. Cover the exhaust opening with heavy gauge plastic to prevent dust and moisture from entering the engine.

NOTE: Remove the plastic cover from the exhaust before operating the broom.

Machine Tie Downs

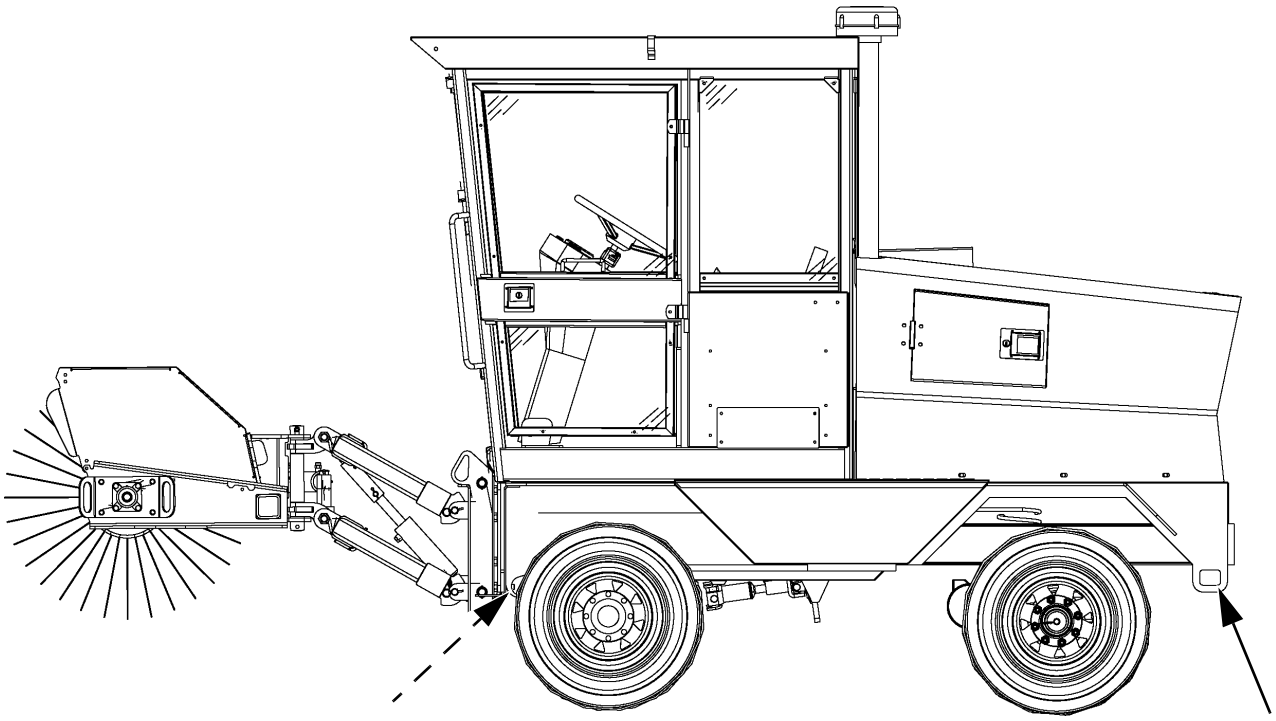


Figure 6-1

Section 7
MAINTENANCE

Page

MAINTENANCE 7-1
- GENERAL INFORMATION 7-3
- ROUTINE MAINTENANCE 7-3
  - General Information 7-3
  - Machine Lubrication 7-3
- Periodic Maintenance 7-4
  - Periodic Maintenance Schedule 7-4
  - TIGHTENING FLARE TYPE TUBE FITTINGS 7-5
  - TIGHTENING O-RING FITTINGS 7-6
  - TORQUE SPECIFICATIONS FOR STANDARD INCH FASTENERS . 7-7
  - TORQUE SPECIFICATIONS FOR METRIC FASTENERS 7-8
- MAINTENANCE SCHEDULE 7-9
  - GENERAL INFORMATION 7-9
  - PREPARING THE MACHINE FOR MAINTENANCE 7-9
  - CHECKS AND ADJUSTMENTS 7-9
- ENGINE MAINTENANCE 7-9
  - NEUTRAL START SYSTEM 7-9
  - COLD WEATHER STARTING 7-10
  - ENGINE BELTS 7-10
  - FUEL AND FLUIDS 7-10
  - AIR INTAKE SYSTEM 7-11
  - RADIATOR AND COOLANT 7-12
  - BATTERY 7-12
- ELECTRICAL MAINTENANCE 7-13
  - LIGHTING 7-14
- HYDRAULIC SYSTEM MAINTENANCE 7-14
  - HYDRAULIC FLUID 7-14
  - HYDRAULIC OIL REQUIREMENTS 7-15
  - HYDRAULIC RESERVOIR 7-15
  - HYDRAULIC SYSTEM CHECKS 7-16
  - PUMPS AND MOTORS 7-16
  - ADJUSTING PRIORITY RELIEF VALVE 7-16
  - ADJUSTING BROOM DRIVE RELIEF VALVE 7-17
- BROOM SYSTEM MAINTENANCE 7-18
  - Broom Watering System 7-18
- CHASSIS & RUNNING GEAR MAINTENANCE 7-18

DRIVE SHAFT AND TRANSFER CASE 7-18
TIRES AND WHEELS 7-18
AXLES AND BRAKES 7-19
STORAGE 7-19
PREPARING FOR LONG TERM STORAGE 7-19
PERIODIC MAINTENANCE DURING STORAGE 7-20
REMOVING THE MACHINE FROM STORAGE 7-20
DECAL INSTALLATION 7-21

GENERAL INFORMATION

This section gives the necessary procedures for routine and general maintenance on the Challenger V Broom. Before starting any Maintenance program on the machine, it is important to READ, UNDERSTAND, and FOLLOW all Maintenance instructions, Danger, Warning, and Caution messages in this section, as well as all information contained in **Safety, Section 2**.

⚠ DANGER Death or serious injury can result if maintenance instructions, Danger, Warning, and Caution messages are not observed.

NOTE: By following a careful service and maintenance program for your broom, you will ensure many years of trouble free operation.

PROPERLY MAINTAINED EQUIPMENT IS SAFE EQUIPMENT! The user of this product is responsible for inspecting the machine daily, and for having parts replaced or repaired when continued use would cause damage or excessive wear to other parts. General daily inspection of the broom should include inspection for missing guards, loose bolts, fluid leaks, worn or damaged hoses and debris or dirt accumulations which could cause a potential service or safety problem.

ROUTINE MAINTENANCE

General Information

Maintenance must be a planned program that includes periodic machine inspection and lubrication procedures.

The maintenance program must be done based on the machine's "Operating Hours" recorded on the hour meter, or on a "Periodic Schedule" which is done at daily, weekly, monthly or yearly intervals.

NOTE: When performing any routine maintenance such as 50, 100, 250, 500, or 1000 hours, always include previous routine maintenance hours to the higher hourly schedule.

Machine Lubrication

Proper lubrication is necessary to maintain the machine at top efficiency. Refer to *Periodic Maintenance Schedule on page 7-4*.

PERIODIC MAINTENANCE

Periodic Maintenance Schedule

Table 7.1 - Periodic Maintenance Schedule

System	Item	10 hour Daily	Initial 50 hours Weekly	Initial 100 hours	100 hours Monthly	250 hours Quarterly	500 hours Semi Annually
Engine Oil and Filter	Check oil level	X					
	Replace engine oil and oil filter cartridge		X			X	
Engine Air Filters	Check primary air filter		X				
	Check secondary air filter		X				
	Replace primary air filter				X		
	Replace engine air filter					X	
Engine Belts	Check drive belts				X	X	
Cooling	Check coolant level	X					X
	Replace coolant						X
Fuel	Check engine fuel filter	X					
	Replace engine fuel filter						X
Hydraulic	Check hydraulic oil level	X					
	Check hydraulic return filter	X					
	Check hydraulic charge filter	X					
	Replace hydraulic oil			X			X
	Replace hydraulic return oil filter			X			X
	Replace hydraulic charge filter			X			X
	Clean hydraulic strainer			X			
	Replace hydraulic strainer						X
Chassis and Running Gear	Lubricate driveshaft lubrication fittings	X					
	Lubricate steering axle pivot				X		
	Lubricate steering axle king pins				X		
	Lubricate steering axle tie rods				X		
	Lubricate drive shaft				X		
	Replace transfer case oil			X			X
	Replace drive axle oil			X			X
	Re-pack steering axle bearings						X
Brakes	Check brake fluid at master cylinder	X					
	Check brake linings						X
Broom Watering System	Check, clean as needed	X					
	Check watering system strainer, clean as needed	X					
Lighting	Check and repair as needed	X					

TIGHTENING FLARE TYPE TUBE FITTINGS

1. Check the flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second, tighten the swivel nut to the torque shown in **Table 7-2.**

Table 7.2 - Flare Type Tube Fittings

Tube Size OD	Nut Size Across Flats	Torque Value		Recommended Turns to Tighten (After Finger Flats Tightening)	
(in)	(in)	(N•m)	(lb-ft)	(Flats)	(Turns)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

TIGHTENING O-RING FITTINGS

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown in **Table 7-3.**
6. Tighten while holding body of fitting with a wrench.

Table 7.3 - O-Ring Fittings

Tube Size OD	Nut Size Across Flats	Torque Value		Recommended Turns to Tighten (After Finger Flats Tightening)	
(in)	(in)	(N•m)	(lb-ft)	(Flats)	(Turns)
3/8	1/2	8	6	2	1/3
7/16	9/16	12	9	2	1/3
1/2	5/8	16	12	2	1/3
9/16	11/16	24	18	2	1/3
3/4	7/8	46	34	2	1/3
7/8	1	62	46	1 1/2	1/6
1 1/16	1-1/4	102	75	1	1/4
1 3/16	1-3/8	122	90	1	1/6
1 5/16	1-1/2	142	105	3/4	1/8
1 5/8	1-7/8	190	140	3/4	1/8
1 7/8	2-1/8	217	160	1/2	1/12

TORQUE SPECIFICATIONS FOR STANDARD INCH FASTENERS

The following table gives the correct torque values for standard fasteners and is intended as a guide for average applications involving typical stresses and machined surfaces. Values are based on physical limitations of clean, plated and lubricated hardware. Check tightness of bolts periodically, using this table as a guide. When using locking fastener, increase torque values by 5%

⚠ CAUTION Machine damage can occur if replacement hardware is not identical to original hardware. Always replace original hardware with that of equal grade. When an individual torque value is specified, it should be followed instead of values given in this table.

Table 7.4 - Torque Specifications for Standard Inch Fasteners

Size	Thread	Capscrews: SAE Grade 5				Capscrews: SAE Grade 8			
		Torque lb-ft		Torque N•m		Torque lb-ft		Torque N•m	
		Dry	Lubed	Dry	Lubed	Dry	Lubed	Dry	Lubed
1/4	20 UNC	8	6	11	9	12	9	16	12
	28 UNF	10	7	13	10	14	10	19	14
5/16	18 UNC	17	13	24	18	25	18	33	25
	24 UNF	19	14	26	20	27	20	37	28
3/8	16 UNC	31	23	42	31	44	33	59	44
	24 UNF	35	26	47	36	49	37	67	50
7/16	14 UNC	49	37	67	50	70	52	95	71
	20 UNF	55	41	75	56	78	58	105	79
1/2	13 UNC	75	57	100	77	105	80	145	110
	20 UNF	85	64	115	86	120	90	165	120
9/16	12 UNC	110	82	145	110	155	115	210	155
	18 UNF	120	91	165	125	170	130	230	175
5/8	11 UNC	150	115	205	155	210	160	285	215
	18 UNF	170	130	230	175	240	180	325	245
3/4	10 UNC	265	200	360	270	375	280	510	380
	16 UNF	295	225	405	300	420	315	570	425
7/8	9 UNC	430	320	580	435	605	455	820	615
	14 UNF	475	355	640	480	670	500	905	680
1	8 UNC	645	485	875	655	910	680	1230	925
	14 UNF	720	540	980	735	1020	765	1380	1040
1-1/8	7 UNC	795	595	1080	805	1290	965	1750	1310
	12 UNF	890	670	1210	905	1440	1080	1960	1470
1-1/4	7 UNC	1120	840	1520	1140	1820	1360	2460	1850
	12 UNF	1240	930	1680	1260	2010	1500	2730	2050
1-3/8	6 UNC	1470	1100	1990	1490	2380	1780	3230	2420
	12 UNF	1670	1250	2270	1700	2710	2040	3680	2760
1-1/2	6 UNC	1950	1460	2640	1980	3160	2370	4290	3210
	12 UNF	2190	1650	2970	2230	3560	2670	4820	3620

TORQUE SPECIFICATIONS FOR METRIC FASTENERS

The following table gives the correct torque values for standard fasteners and is intended as a guide for average applications involving typical stresses and machined surfaces. Values are based on physical limitations of clean, plated and lubricated hardware. Check tightness of bolts periodically, using this table as a guide. When using locking fastener, increase torque values by 5%.

⚠ CAUTION Machine damage can occur if replacement hardware is not identical to original hardware. Always replace original hardware with that of equal grade. When an individual torque value is specified, it should be followed instead of values given in this table.

Table 7.5 - Torque Specifications for Metric Fasteners

Nominal Size & Pitch	Class 8.8 (Grade 5 Equivalent)				Class 10.9 (Grade 8 Equivalent)			
	Torque lb-ft		Torque N•m		Torque lb-ft		Torque N•m	
	Dry	Lubed	Dry	Lubed	Dry	Lubed	Dry	Lubed
M4 x 0.7	2.27	1.70	3.07	2.30	2.27	2.31	4.17	3.13
M5 x 0.8	4.58	3.43	6.20	4.65	6.22	4.67	8.43	6.33
M6 x 1	7.75	5.83	10.5	7.9	10.60	7.97	14.3	10.8
M8 x 1.25	18.89	14.17	25.6	19.2	18.95	19.26	34.8	26.1
M10 x 1.25	39.11	29.52	53.0	40.1	53.87	40.59	73.0	55.0
M12 x 1.75	64.94	48.71	88.0	66.0	88.56	66.42	120.0	90.0
M14 x 2	103.32	77.49	140.0	105.0	140.22	107.01	190.0	145.0
M16 x 2	162.36	121.77	220.0	165.0	221.40	166.05	300.0	225.0
M20 x 2.5	317.34	236.16	430.0	320.0	428.04	321.03	580.0	435.0
M24 x 3	516.12	409.59	740.0	555.0	754.38	557.19	1010.0	755.0
M27 x 3	797.04	597.78	1080.0	810.0	1084.86	811.80	1470.0	1100.0
M30 x 3.5	1084.86	811.80	1470.0	1100.0	1476.00	1107.00	2000.0	1500.0

MAINTENANCE SCHEDULE

GENERAL INFORMATION

Preventive maintenance on the Challenger V Broom will provide years of trouble-free operation. Adjustments can be performed in the field with ordinary hand tools. Engine preventive maintenance, other than oil, air, and fuel filter changes, is not covered in this section. Refer to the engine manufacturer's manual for engine service information.

NOTE: Changing oil and cleaning the broom should only be done in a designated area that can contain the oil and chemicals involved in any maintenance requirement. These by-products should be discarded in accordance with environmental regulations.

⚠ CAUTION Machine damage can occur if replacement fasteners is not identical to original. Do not substitute fasteners of any kind unless the fasteners are equal in size and grade to original equipment. See pages *7-7* and *7-8* for torque specifications.

NOTE: When performing any routine maintenance such as 50, 100, 250, 500, or 1000 hours, always include previous routine maintenance hours to the higher hourly schedule.

PREPARING THE MACHINE FOR MAINTENANCE

When performing maintenance, perform the following steps before leaving the operator's seat, unless the maintenance procedure instructs otherwise.

1. Park the machine on a flat even surface.
2. Place transmission selector lever in neutral.
3. Engage park brake.
4. Turn off broom drive.
5. Run engine at 1/2 speed (RPM) for 3 to 5 minutes.
6. Reduce engine speed to slow idle.
7. Lower all attachments to ground level.
8. Place ignition key in OFF position.

⚠ WARNING Death or serious injury can result if engine is running during maintenance. If the engine must be running to service a component, place transmission in neutral, apply park brake, block wheels, and use extreme caution.

CHECKS AND ADJUSTMENTS

1. Check the machine for indications of oil leakage around oil lines, hoses, and fittings.
2. Tighten fittings as necessary. Replace hoses and fittings as needed. See pages *7-5* and *7-6* for torque specifications.
3. Check and empty the precleaner bowl. Clean the bowl and dry with a lint free cloth.
4. Check air intake hoses from the engine to the air cleaner assembly, and from the air cleaner assembly to the precleaner. Replace worn or damaged hoses and tubes. Tighten or replace loose and damaged clamps.

ENGINE MAINTENANCE

⚠ WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Challenger V Broom while it is in motion or while the engine is running. If the engine must be running to service a component, place transmission in neutral, apply park brake, block wheels, and use extreme caution.

In addition to the following maintenance recommendations, consult the engine manufacturer's manual for detailed instructions. A copy of this manual was provided with your Challenger V Broom at the time of its shipment from the factory. If additional copies are needed, they can be obtained from your local dealer.

NEUTRAL START SYSTEM

A Neutral Start Switch has been installed to prevent operation of the engine starter when the transmission is not in neutral. To check this system:

1. Set the park brake.
2. Place transmission selector lever in the forward position.
3. Turn ignition key to START. Starter must not crank the engine. If starter cranks engine, release key. Do not operate machine.
4. Repeat test with the transmission in reverse.

⚠ CAUTION Death or serious injury can result from starting the machine when not in neutral. Do not operate machine if starter cranks the engine while transmission is in any gear except neutral. See local dealer for Neutral Start System repair.

5. Place transmission in neutral and turn ignition switch to START. Starter should crank engine.

COLD WEATHER STARTING

In cold weather, it may be necessary to use the glow plugs as a starting aid. Use the following steps.

1. Turn the ignition key to the ACC position and wait 3 to 5 seconds.
2. Turn the key to start the engine.

ENGINE BELTS

1. Check the diesel engine belt(s) for excessive wear, fraying, and cracking every 250 service hours. Auxiliary V-belt drives should be inspected every 100 hours.
2. Adjust engine belt(s) as required to provide proper tension. Consult the engine manufacturer's manual for correct tensioning instructions and specifications.
3. Your Challenger V Broom is equipped with an air conditioner with a V-belt drive. For proper operation, it is important to keep this belt tensioned properly.

⚠ DANGER Death or serious injury can result from entanglement in moving parts. Always shut down engine before adjusting belts.

4. When installing new belts, always shorten the distance between pulley centers so the belt can be installed without force. Never roll the belt over a pulley and never pry it with a tool such as a screw driver. This will damage and shorten belt life.

⚠ CAUTION Death or serious injury can result from entanglement in moving parts. Keep belt guards in place at all times.

FUEL AND FLUIDS

Keep the fuel tank full to prevent condensation from forming. Fill the fuel tank at the end of each day.

Fuel Requirements

Use clean, good quality ASTM No. 2-O or No. 2-D climatized diesel fuel. If the broom will be used often in cold weather (below 20° F), blended fuels or No. 1 diesel fuel is recommended to prevent gelling of the fuel filters. Using No. 1 diesel fuel may reduce the engine performance by approximately 10%.

NOTICE Machine system can be damaged by the use of contaminated fuel. Water or dirt can cause severe damage to engine components.

Caterpillar Fuel Filter and Water Separator

Caterpillar diesel engine injection systems use fuel for lubrication of close tolerance internal engine parts. Proper maintenance of the fuel filters and the fuel tank is required for continued top performance, and to prevent damage to internal engine components.

The engine fuel filter and water separator are located on the left side of the engine. A drain valve is provided on the bottom of the water separator **(Figure 7-1)**.

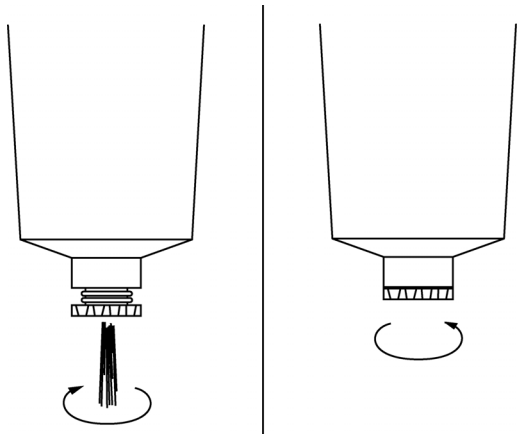


Figure 7-1

NOTE: Turn valve counter clockwise to drain. Turn valve clockwise to close.

1. Before operating the engine, use the valve to drain a small quantity of fuel from the water separator into a clean, clear container.

NOTE: This is a necessary daily routine to prevent damage to internal engine components.

2. If water or contaminants are found in the fuel you drained, DO NOT attempt to start the engine. Continue to drain fuel into the container until it runs clear.
3. If large amounts of contamination are found, drain the fuel tank until the lines run clear. Replace the filters. Fill new filters with fresh clean fuel and install.

The engine manufacturer's manual provided with your broom contains more detailed information on fuel system maintenance procedures.

Crankcase Oil

1. Check the engine crankcase oil level daily, prior to each day's use of the broom. Park the machine on a level surface when checking the oil to assure accurate measurements. When checking oil while the engine is warm, wait until the engine has been OFF for at least five minutes. This allows oil to drain back to the crankcase.

2. The oil dipstick is located on the side of the engine. If the oil measures below the “L” mark on the dipstick, add a small amount of 15W-40 oil. After adding oil, recheck the level with the dipstick and make sure it doesn't measure above the "H" mark.

NOTICE **Engine can be damaged from operation with inadequate oil levels. Never operate the engine with the oil level below the "L" (Low) mark or above the "H" (High) mark.**

3. Engine crankcase oil and oil filter should be changed after the first 50 hours of service and every 250 hours or every 3 months thereafter.

Brake Master Cylinder

Check fluid level daily and fill to 25 mm (1 in.) below top with D.O.T. 3 approved commercial brake fluid. Check hydraulic system for leaks if the brake cylinder is frequently low.

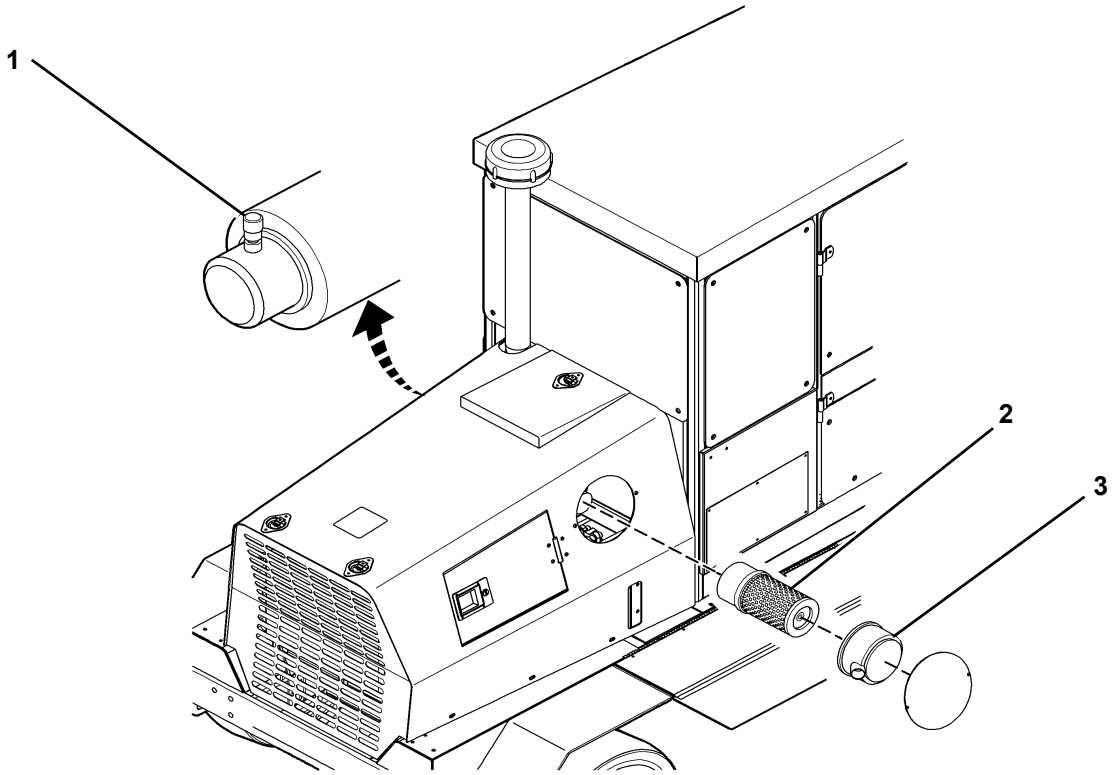


Figure 7-2

1 – Air Restriction Indicator
2 – Primary Element Assembly
3 – Cover Assembly

AIR INTAKE SYSTEM

The heavy-duty engine air cleaner is mounted inside the engine compartment. A restriction indicator is mounted on the outlet side of the air cleaner assembly housing, near the large inlet tube to the engine **(Figure 7-2, 1)**.

1. Prior to daily operation, inspect all air intake system components for damage, cracked hoses or loose clamps.

NOTE: To prolong engine life and prevent dust and contaminants from entering the engine, check hoses and hose clamps daily. Replace cracked hoses and tighten loose hose clamps.

2. Inspect the restriction indicator **(Figure 7-2, 1)** several times daily during operation. If the red indicator flag on the restriction indicator is visible, the air cleaner element must be replaced.

NOTE: Be sure to clean the inside of the air cleaner body assembly BEFORE removing the safety element to prevent introducing contaminants into the system.

- Before replacing any new element to the air filter housing, wipe the inside of the housing with a damp cloth. Reset the restriction indicator. Be sure not to introduce any contaminants into the engine intake tube.
- When replacing body assembly or rubber adaptors, torque the T-clamp bolts to 5.65 N•m (50 lb-in.).

3. DO NOT replace the filter elements until the maintenance interval has been reached or the restriction indicator flag is visible.
4. Replace the primary filter elements monthly or every 100 service hours. Replace the safety element quarterly or every 250 hours.
5. The air precleaner should not require maintenance or service unless visible damage is apparent.

NOTICE Engine can be damaged if operated without an air cleaner. Never operate engine without an air cleaner as destruction of internal engine components will occur.

RADIATOR AND COOLANT

NOTICE Engine damage can occur if radiator is blocked. Failure to do so can cause overheating and premature failure of the engine and its components.

1. Check the engine radiator daily for rocks and debris.

⚠ WARNING Serious injury can result from flying debris. Wear eye protection when using compressed air.

2. Use compressed air to remove rocks or debris from the radiator.

⚠ WARNING Serious injury can result from hot coolant coming into contact with skin causing serious burns. Do not remove the radiator cap when engine is hot. Add coolant to the radiator only when the engine is stopped and fully cooled.

3. Check radiator coolant level prior to each day's use of the broom. When the engine is cold, the coolant level should cover the radiator core. When the engine is warm, the coolant level should be at the bottom of the filler tube.
4. Refill the cooling system when necessary with 50% water and 50% ethylene-glycol antifreeze.
5. Seasonally, or after every 500 service hours, flush the cooling system. Any good commercial automotive cooling system cleaning solution can be used.

Prepare the coolant as recommended by the engine manufacturer and refill according to the previous procedure.

BATTERY

The Challenger V Broom is factory equipped with a maintenance-free battery that is sized to provide efficient starting for the diesel engine on the machine. With proper care, the battery will provide years of trouble-free service.

⚠ CAUTION Death or serious injury can result from electric shock. When welding on the machine, always turn the machine off and remove the battery ground (-) cable.

1. Starting an engine depends heavily upon good cranking speed. It is important that the battery is fully charged and that all cables and terminals are clean and properly connected to the battery.

NOTE: A maintenance free battery should rarely require additional electrolyte.

2. Keep the top of the battery clean. When necessary, wash with a baking soda solution (1 part baking soda to 4 parts water) and rinse with fresh water. DO NOT allow the soda solution to enter the battery cells.
3. Inspect the cables, clamps and hold-down bracket regularly. Clean and apply a light coating of grease when needed. Replace corroded or damaged parts.

⚠ CAUTION Death or serious injury can result from electric shock. When servicing the battery, always disconnect the battery ground (-) cable first. Always reconnect the positive (+) battery cable first.

4. If the battery becomes discharged repeatedly, check the electrical charging system. If the engine is difficult to start or the battery seems weak, clean and check the terminal connections. If the problem continues, use a battery tester and check voltage and current draw.
   - Shut down engine and remove ignition key.
   - Place the positive (red) multimeter lead on the positive (+) battery terminal, and the negative (black) multimeter lead on the grounded (-) battery terminal.

- With the multimeter set at 12 VDC, the battery must show a charge of at least 12 volts. If necessary, charge the battery or perform a load test.
- Start the engine.
- With an operator in the operator's seat, check the battery charge level. The multimeter should read at least 13.5 volts.
- If the multimeter does not indicate minimum charge, check the machine's charging system.

⚠ WARNING Death or serious injury can result from explosions due to explosive gas around the battery. Sparks or flame can ignite this gas causing an explosion. Always shut off the battery charger before disconnecting cables from the battery terminals.

Always wear eye protection when servicing batteries. Caustic solutions can cause serious eye injuries.

5. If the broom is to be stored for more than 30 days, remove the battery from the broom and store it in a cool, dry place. During storage, keep the battery fully charged and check the level of the electrolyte regularly.

⚠ CAUTION When removing or replacing the battery, always disconnect the battery ground (-) cable first. Always reconnect the positive (+) battery cable first.

NOTE: When replacing the battery, discard the old battery properly.

The alternator supplies electrical current for charging the battery and electrical power to the electronic controls. The built-in regulator controls the voltage output. If the wires must be disconnected from the alternator, mark them so they can be reconnected properly.

NOTICE Never polarize an alternator. Never ground alternator terminals or circuits.

NOTICE Always disconnect the battery before disconnecting or connecting the alternator. Never disconnect the alternator with it operating. Be sure wiring is properly connected before connecting the battery.

ELECTRICAL MAINTENANCE

⚠ CAUTION When servicing the electrical system, always disconnect the battery ground (-) cable first. Always reconnect the positive (+) battery cable first.

The Challenger V Broom's electrical system is protected from overload damage by fuses. If an electrical component fails to operate, check the fuse panel first to make sure that a fuse is not blown. The fuse panel is located on the right hand side of the machine behind the panel **(Figure 7-3, 1)**.

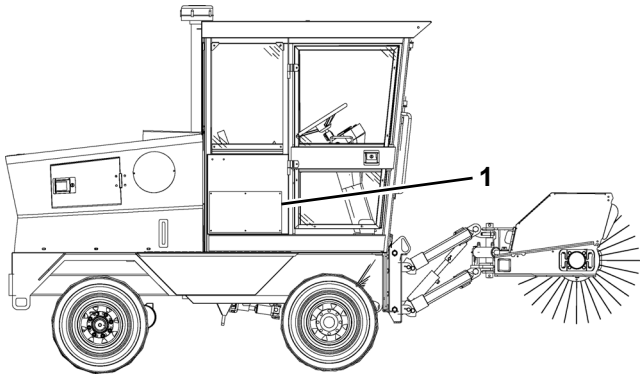


Figure 7-3

1 – Fuse Box Panel

Fuses that blow may be replaced but will continue to blow until the cause of the overload is found and corrected. Refer to **Figure 7-4** for replacement fuse sizes.

NOTICE Damage to the electrical system and fire can occur from improper fuse replacement. Always replace a blown fuse with the same rating as specified. Never replace with a higher amperage rating.

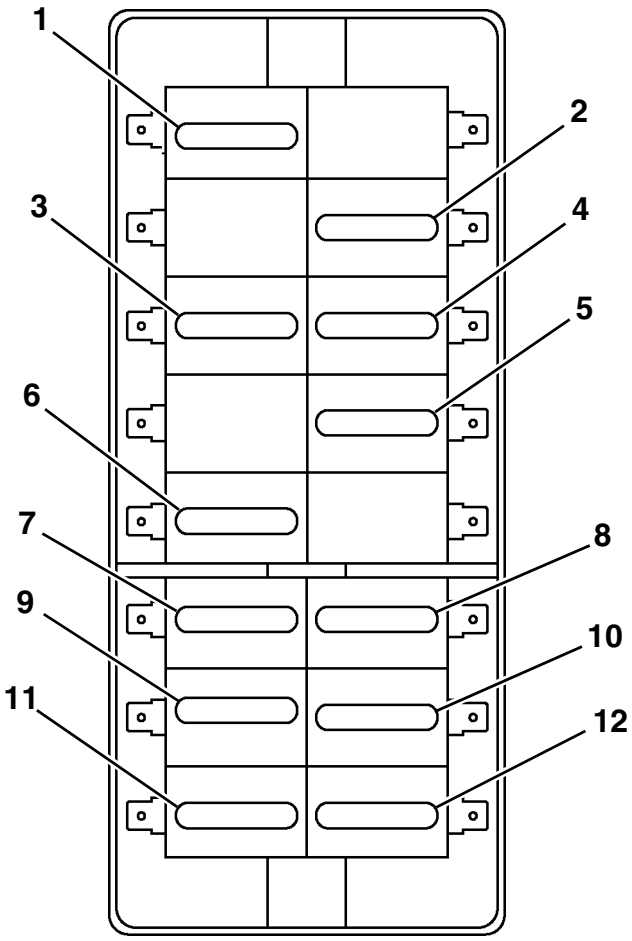


Figure 7-4

1 – Fuel Pump - 15 A
2 – Fan - 10 A
3 – Heater and A/C - 20 A
4 – Water Pump - 15 A
5 – Wipers - 15A
6 – Joystick / Backup - 10 A
7 – Work Lights - 10 A
8 – Horn/Broom - 10 A
9 – Brake Lights - 10 A
10 – Lights - 15 A
11 – Turn Signals / Hazards - 10 A
12 – Beacon - 5 A

LIGHTING

1. Inspect lights daily for proper operation.
2. If a light or group of lights does not function:
   - Check the fuse panel for a blown fuse **(Figure 7-4)**.
   - Examine all visible wiring connections, making sure that they are securely fastened.
   - If the light(s) still does not work, remove the lens from the light and inspect the bulb(s), replacing any that appear damaged or discolored.
   - Check lighting mounts for proper grounds.
   - If the trouble is not located, inspect the wiring harnesses for damage. Wiring schematics are provided in **ELECTRICAL, Section 9** to assist in troubleshooting the broom's electrical system.
3. If broken wires are found, it is recommended that they be soldered together and covered by a shrink wrap type of plastic covering (preferred) or electrician's tape to prevent contamination of the solder joint by moisture.
4. After making repairs to a wiring harness on the broom, always replace or repair the protective loom which covers the wiring to prevent future damage to the wiring harness. Examine the routing of the harness and make sure it is not subjected to the type of excessive movement which causes broken wiring.

HYDRAULIC SYSTEM MAINTENANCE

⚠ WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Challenger V Broom while it is in motion or while the engine is running. If the engine must be running to service a component, place transmission in neutral, apply park brake, block wheels, and use extreme caution.

Your Challenger V Broom consists of a variable displacement Sauer/Danfoss Series 90 pump and motor which provide drive power for the broom. A gear-type hydraulic pump is directly connected to the Sauer/Danfoss pump, and provides operational pressure for the power steering, broom lift, broom swing and broom drive.

A 25 gallon hydraulic reservoir and filter(s) complete the Hydraulic System **(Figure 7-5)**. This manual contains general system maintenance guidelines. Detailed service and maintenance information is available directly from the hydraulic component manufacturers.

HYDRAULIC FLUID

Your machine was factory filled with Citgo All-Weather All-Temp VG32 hydraulic oil, a multi-grade anti-wear oil for use in equipment where wide temperature ranges are encountered. Its features include excellent pour point depression, high viscosity index, and resistance to oxidation, foaming and corrosion, as well as protection against pump component wear. It is highly

recommended for use in mobile and other hydraulic equipment in heavy-duty all-weather service. It meets the FMC Hi-Performance, Hydraulic Oil Grade 22-32 requirements.

Citgo A/W All-Temp VG32 has a pour point of -30° F (-34° C) and a maximum hydraulic reservoir temperature of 160° F (72° C). It will loose one half its life for every 20° F (-7° C) rise in the ambient temperature. Oil life above 200° F (94° C) is in excess of 1000 hours. However, hydraulic oil maintenance intervals should be followed.

Contact your authorized dealer for more details on hydraulic oils, or if you are considering an alternative oil due to availability or climate.

NOTICE **Machine performance can be affected if the wrong hydraulic oil is used. Use only as indicated by *Lubricant Types* on page *4-6*.**

HYDRAULIC OIL REQUIREMENTS

NOTICE **Substandard performance or hydraulic component failure can occur if mixed manufacturers or grade weights of hydraulic oil are used. Use only as indicated by *Lubricant Types* on page *4-6*.**

1. Be sure hydraulic oil selection is compatible with your hydraulic system.
2. Be sure to use mineral base hydraulic oil.
3. Be sure hydraulic oil selection assistance is from a reputable supplier.

Hydraulic oil must provide anti-wear properties that meet or exceed those found in the API (American Petroleum Institute) classification SD, SE or CC crank case oil.

Hydraulic oil viscosity must not fall below 70 SUS (13 cs) in the reservoir under the most adverse conditions. The best viscosity rating is 80–300 SUS (17 cs–65 cs). The viscosity rating at the lowest expected start-up temperature should not exceed 10,000 SUS (2158 cs).

Hydraulic oil must have rust and oxidation inhibitors that will maintain chemical stability. When changing the hydraulic oil with oil other than the specific factory fill oil, the hydraulic system must be completely drained. Be sure to purge or drain all hoses, cylinders, valves, motors and pumps of hydraulic oil. All hydraulic oil filters must also be changed at this time.

HYDRAULIC RESERVOIR

The hydraulic reservoir is located on the right side of the machine. The fill cap is on top of the reservoir. The hydraulic reservoir has a sight gauge on the right side used to monitor hydraulic oil levels **(Figure 7-5, 1)**.

1. Check the level of hydraulic oil prior to each day's operation of the machine. Hydraulic oil should be visible in the sight gauge **(Figure 7-5, 1)**. If not, fill the tank until oil is visible in the sight gauge.
2. The fill cap strainer **(Figure 7-5, 2)** should be cleaned each time hydraulic oil is added or changed.

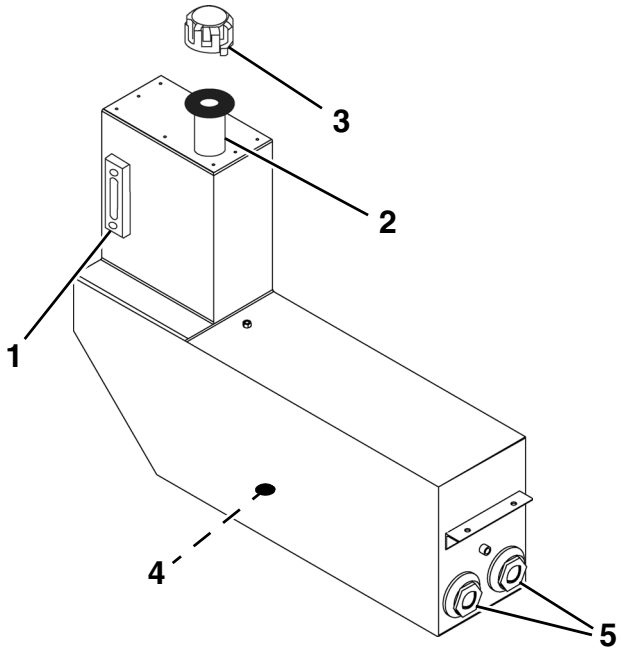


Figure 7-5

1 – Sight Gauge
2 – Fill Cap Strainer
3 – Fill Cap
4 – Drain Plug
5 – Suction Strainers

NOTICE **Machine performance can be affected if foreign material enters the hydraulic system. Use extreme caution when removing the filler cap to ensure no foreign material enters the tank.**

3. The filler cap **(Figure 7-5, 3)** should be padlocked, when possible, to eliminate tampering.

4. Condensation that may build up in the hydraulic system is capable of clogging the filter elements. This can lead to insufficient hydraulic fluid at the pump which will degrade performance. Clogged filter elements can damage the hydraulic pump and other system components.
5. Warm the hydraulic system to 100° F (38° C) and check filter indicators on the return filter and the charge filter. The filters are located on the left side of the machine. If the filter indicators are in the RED, the filter elements should be replaced. See *Periodic Maintenance Schedule on page 7-4*.

NOTE: Use only genuine LeeBoy replacement parts. Other parts could be substandard and cause hydraulic system failure. The use of other than approved filter elements will void the warranty on hydraulic components.

6. Drain and replace hydraulic oil and filter after the first 100 hours of service, and after every 500 hours of service or annually, whichever comes first. Drain the hydraulic oil by removing the plug **(Figure 7-5, 4)**. For convenience, a customer supplied drain hose can be attached to drain fluid into a container.
7. The suction strainer **(Figure 7-5, 5)** should be removed and cleaned at the 500 hour service interval or whenever the hydraulic oil is changed.

HYDRAULIC SYSTEM CHECKS

Before each day's use, inspect the Challenger V Broom for hydraulic leaks. Check weekly to make sure that all hose fittings are secure and tight.

⚠ WARNING Hydraulic fluid under pressure will pierce the skin and cause serious injury. Never use your hand to locate hydraulic leaks, use a piece of wood or cardboard to locate leaks. If hydraulic oil has pierced the skin, get immediate medical attention.

⚠ WARNING Hydraulic fluid under pressure will pierce the skin and cause serious injury. Always wear eye protection when inspecting for leaks in the hydraulic system.

1. If leaking fluid is found, it is probably on the pressure side of the hydraulic system. Find and repair the leaking component before starting the broom.
2. Leaks on the suction side of the hydraulic system are more difficult to find. This condition is serious since air or dirt introduced into the hydraulic system causes rapid component wear and eventual failure. Some symptoms of suction leakage are:
   - Foaming of hydraulic oil
   - Sluggish hydraulic system operation
   - Unusual noise in hydraulic pump or motor
   - If a suction side leak is suspected, verify that all reservoir connectors and fittings are properly tightened.
   - If the problem persists, replace the defective hose assembly or fitting.

⚠ WARNING Temporary repairs to hydraulic hoses will fail and can cause serious injury. Never attempt to repair hydraulic hoses with tape, clamps, or cements.

3. The operator should inspect the broom during operation for hydraulic leaks which may only be noticeable while the unit is running.

PUMPS AND MOTORS

The hydraulic pump and motor generally require no regularly scheduled maintenance. Frequent inspection for leaks will indicate the need for service of these components.

ADJUSTING PRIORITY RELIEF VALVE

The priority flow divider in the hydraulic manifold is set to supply the power steering with approximately 5 GPM (19 LPM) of hydraulic flow. This flow goes to the steering circuit before any other circuit.

The Priority Relief Valve controls the maximum operating pressure for the power steering and broom lift and swing circuits. The Priority Relief Valve is located on the top of the valve assembly, attached to the rear of the cab panel.

The following are signs that the Priority Relief Valve needs adjusting:

- Total or partial loss of steering functions or hard steering
- Constant noise from hydraulic pump when using steering or broom lift and swing
- Hydraulic oil overheating

If it becomes necessary to readjust the Priority Relief Valve setting, follow these steps:

⚠ WARNING Death or serious injury can result from improper valve adjustments. Have an experienced technician perform this procedure.

1. Remove the hose from the manifold at port ST.
2. Plumb a 0–34474 kPa (0–345 bar, 0–5000 psi) pressure gauge into the manifold at port ST **(Figure 7-6, 1)**. Parts needed for this, including a pressure gauge, can be obtained from your authorized dealer.
3. Start the engine and warm the hydraulic oil to at least 100° F.
4. Set the park brake and be sure the transmission is in neutral. Use the foot brake as an extra precaution.

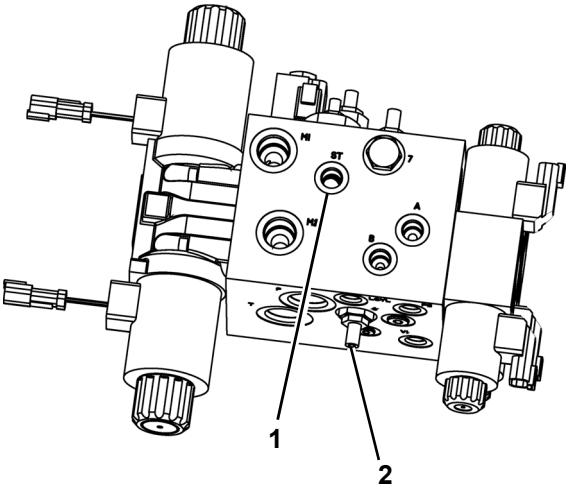


Figure 7-6

1 – ST Port
2 – Relief Pressure Locknut

5. Increase engine speed to 2500 RPM.
6. The pressure gauge should read 10342 kPa+/- 345 (103 bar +/- 3, 1500 psi +/- 50).
7. Adjust relief pressure by removing the locknut **(Figure 7-6, 2)**, and turning the adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure.

NOTE: Turn the adjusting screw in 1/8 turn increments, and repeat steps until correct pressure is obtained.

ADJUSTING BROOM DRIVE RELIEF VALVE

The Broom Drive circuit gets the remaining hydraulic flow after the priority flow divider supplies the power steering. A Broom Drive Relief Valve protects the broom drive circuit. The Broom Drive Relief Valve is located on the top of the valve assembly, attached to the rear of the cab panel.

Adjust the relief valve if:

- Broom stalls frequently
- Broom lacks sweeping power
- There is a constant noise while sweeping

To adjust the Broom Drive Relief Valve:

⚠ WARNING Death or serious injury can result from improper valve adjustments. Have an experienced technician perform this procedure.

1. Remove the hose from manifold port M1 **(Figure 7-7, 1)**.
2. Plumb a 0 to 5000 psi pressure gauge into manifold port M1 **(Figure 7-7, 1)**. Parts needed for this, including a pressure gauge, can be obtained from your authorized dealer.

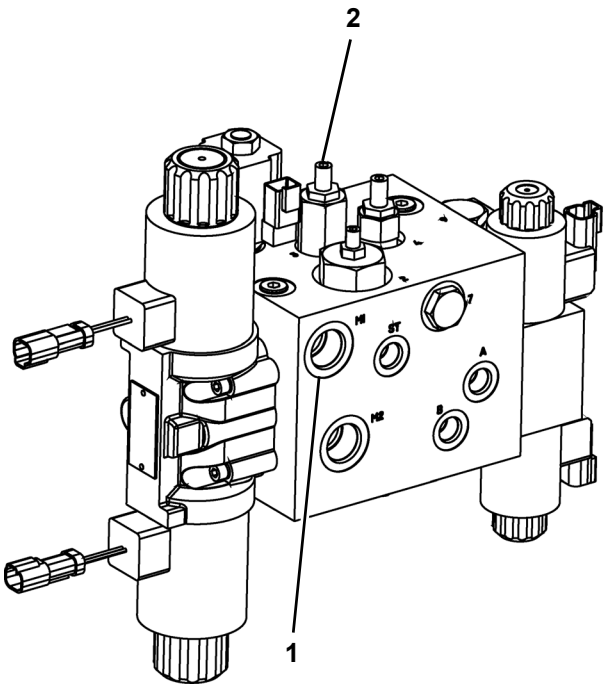


Figure 7-7

1 – M1 Port
2 – Relief Pressure Locknut

3. Start the engine and warm the hydraulic oil to at least 100° F.
4. Set the park brake and be sure the transmission is in neutral. Use the foot brake as an extra precaution.

5. Increase engine speed to 2500 RPM.
6. Using the Broom FWD/REV Control, turn the broom motor ON to engage the control valve.
7. The pressure gauge should read 16547 kPa+/- 345 (165 bar +/- 3, 2400 psi +/- 50).
8. Turn the broom motor OFF.
9. Adjust relief pressure by removing locknut **(Figure 7-7, 2)**, and turning the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

NOTE: Turn the adjusting screw in 1/8 turn increments, and repeat steps until correct pressure is obtained.

BROOM SYSTEM MAINTENANCE

⚠ WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Challenger V Broom while it is in motion or while the engine is running. If the engine must be running to service a component, place transmission in neutral, apply park brake, block wheels, and use extreme caution.

Grease the broom core shaft pillow block bearing and broom lift pivot bushings daily using a multi-purpose grease.

Grease the broom swing bearings with a multi-purpose grease every 250 hours.

Broom Watering System

1. Clean the water system strainer daily to prevent nozzle clogging.
2. Inspect the water system daily to confirm operation of both nozzles.
3. If a nozzle becomes plugged, remove it, clean the nozzle slots, and replace. Be careful not to ream the nozzle opening, as spray pattern will be affected.
4. At the end of each operating season (or more often if required), flush out the line and nozzles.
5. For storage in temperatures below freezing, make sure the water tank, strainer, pump and all lines are completely drained to prevent damage from freezing.

CHASSIS & RUNNING GEAR MAINTENANCE

⚠ WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Challenger V Broom while it is in motion or while the engine is running. If the engine must be running to service a component, place transmission in neutral, apply park brake, block wheels, and use extreme caution.

DRIVE SHAFT AND TRANSFER CASE

1. Check the driveshaft daily for wear and loose bolts.
2. Grease the driveshaft universal joints and slip yoke every 100 hours of service using a multi-purpose grease.
3. Check the lube level in the Transfer Case every 100 hours. The lube should be up to the middle plug level. Add if necessary.

TIRES AND WHEELS

1. Check tires with an accurate gauge prior to each day's use. Tires should be inflated to 345 kPa (3.4 bar, 50 psi) when tires are cold. Repair or replace damaged tires to provide safe operation of the broom.

NOTICE Machine damage can result if broom is operated with less than four wheels and tires installed Never operate the Challenger V Broom with less than four wheels and tires installed.

⚠ WARNING Serious injury can result from over inflating the tires. Never exceed tire manufacturer's maximum recommended inflation pressure.Tires should be inflated to 345 kPa (3.4 bar, 50 psi) when tires are cold.

2. Protect tires from contact with petroleum products and chemicals.

NOTICE Machine damage can result if machine is towed with the drive shaft connected. The drive shaft must be removed prior to towing, unless equipped with gearbox disconnect.

3. Wheel lug nuts should be checked for tightness weekly. Torque to 115 N•m (85 lb-ft).

4. Visually inspect the wheels for damage prior to each day's use of the broom. Replace bent or cracked wheels.

AXLES AND BRAKES

⚠ WARNING Death or serious injury can result from improperly supporting a raised machine. Do not lie under the machine while it is supported only by a jack. Use jackstands on a solid surface to prevent tipping of the machine when it is raised. Block the remaining wheels to prevent rolling of the machine when it is raised.

1. Grease king pin bushings, tie rod ends, steering cylinder rod end and steering axle pivot bushings every 100 hours of service with a good quality chassis lube.
2. Steering axle wheel bearings should be removed, inspected, and repacked with a high quality axle bearing grease after every 500 service hours or seasonally.
3. To reinstall bearings and hub, tighten the retaining nut until the wheel drags during hand rotation. Then back off the nut 1/8 of a turn and bend over the locking tab or install the cotter pin, depending on the design configuration.
4. Check the lube level in the drive axle every 500 hours or seasonally. The lube should be at the plug hole. Add if necessary.
5. Inspect and adjust brake pad linings in brake drums after every 500 hours of operation or seasonally. Remove wheel and hub. Inspect brake pad linings for excessive wear and proper operation. Linings should be replaced if they are 1/16" thick or less in the thinnest spot.

NOTICE Machine damage can occur from improper brake adjustments. Have adjustments done by a qualified technician.

6. Check brake fluid level daily. When filling the brake fluid reservoir, only fill to 1 inch below the top of the fill neck. To prevent fluid from leaking out of the cap vent hole, locate the hole toward the rear of the machine when replacing the cap.

Adjusting Park Brake (Method 1)

1. Loosen screw **(Figure 7-8, 1)**.
2. Rotate knob **(Figure 7-8, 2)** clockwise to tighten brake cable; counter-clockwise to loosen.
3. When desired tension is reached, retighten screw **(Figure 7-8, 2)**.

Adjusting Park Brake (Method 2)

⚠ CAUTION Serious injury to you or others could result from an improper adjustment. This procedure should only be performed by a qualified service technician.

1. Loosen jam nuts that lock the bracket against the brake cable.
2. Turn threads until all the slack is out of the park brake cable.
3. Retighten the jam nuts.

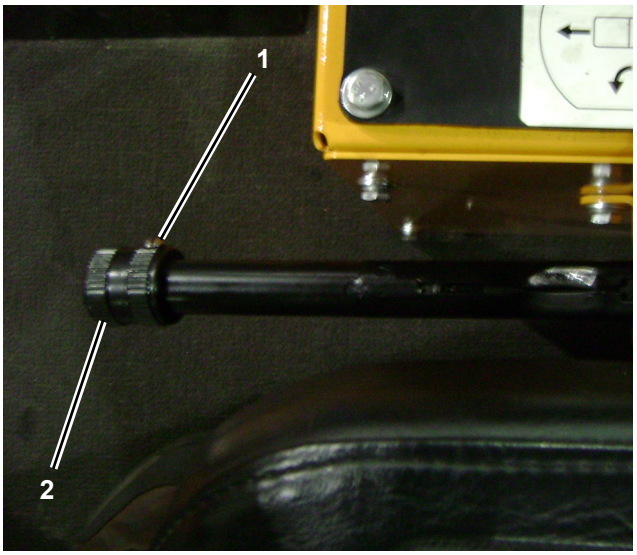


Figure 7-8

1 – Screw
2 – Knob

STORAGE

PREPARING FOR LONG TERM STORAGE

A stored machine requires as much periodic maintenance as a machine at work. Stored units must receive periodic scheduled maintenance.

1. Clean the machine, especially paint chipped areas to prevent rusting.
2. Inspect the machine thoroughly and repair worn or damaged parts.
3. Retract all hydraulic cylinders, as far as possible.
4. Coat with grease or rust inhibitor all exposed cylinder rods, seals, and o-rings to prevent cracking.

NOTICE **Some rust inhibitors can destroy painted surfaces. Do not spray rust inhibitor on painted surfaces.**

5. Lubricate all grease points. Make sure all grease cavities are filled with grease. See *Periodic Maintenance Schedule on page 7-4* for complete list.
6. Remove alternator belt.
7. Remove the battery and store in a cool, dry place.
8. Check air filter restriction gauge. Clean the air cleaner assembly and precleaner. Replace air filter elements if restricted.
9. Top up all fluid levels to minimize condensation forming inside the tanks.
10. Check engine oil level and fill as necessary.
11. Perform specific gravity test on engine coolant. Drain and replace or fill coolant reservoir as needed to prevent freeze damage.
12. Check hydraulic oil sight gauge and fill as necessary.
13. Inspect all air and hydraulic hoses, couplers, fittings and cylinders. Tighten any loose fittings and replace any hoses that are worn.
14. Check all safety decals. Replace any decals that are damaged or illegible. Refer to *DECAL INSTALLATION on page 7-21*.
15. Use the hydraulic broom lift lock to secure broom in the raised position **(Figure 7-9)**. This will prevent a flat spot from forming on the broom bristles.

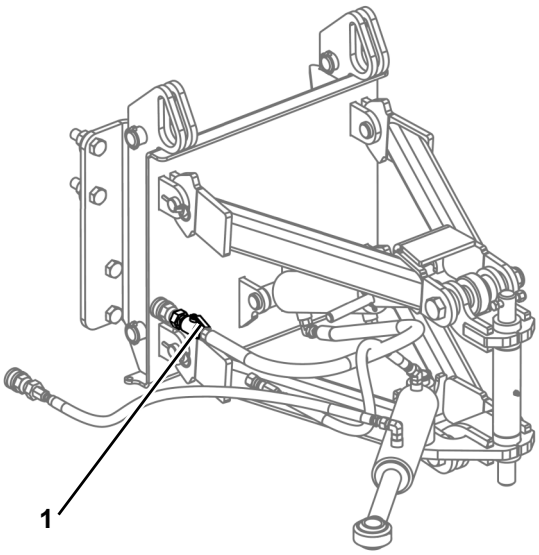


Figure 7-9

1 – Hydraulic Broom Lift Lock

16. Place transmission lever in neutral, idle the engine a few minutes before shutting it down, and set the park/emergency brake.
17. If possible, raise and support machine with tires off the ground, or park machine on a hard surface to prevent tires from freezing to ground.
18. Remove ignition key, lock any optional panels, cab doors, and spare tire. Cover seat with plastic, and place a DO NOT OPERATE tag on the steering wheel.
19. Store machine in a dry, protected area. If stored outside, cover with waterproof material.

PERIODIC MAINTENANCE DURING STORAGE

If a unit will not be used for more than two months, refer to *Periodic Maintenance Schedule on page 7-4* , and follow procedures for 100-Hours interval, as well as these preventive maintenance procedures:

1. Keep battery fully charged and check the level of the electrolyte regularly.
2. Check for water in hydraulic fluid. Any machine that is stored for an extended period in a climate that has a wide range of temperatures and/or humidity, will develop condensation on the inside of the tank walls. Check the hydraulic fluid on a regular basis for possible moisture contamination.

NOTICE **Hydraulic oil that is contaminated, must be drained, the filter elements replaced and the tank refilled with LeeBoy approved fluid. Failure to do this could result in premature failure of the pumps and/or motors.**

3. Start and run the engine until it is warm. Cycle all hydraulic and/or hydrostatic functions until all components are warm and the hydraulic fluid is up to operating temperature.
4. After the machine is warmed up, grease all pivot points.

REMOVING THE MACHINE FROM STORAGE

1. Follow steps above in Periodic Maintenance During Storage.
2. Refer to *Periodic Maintenance Schedule on page 7-4* , check all fluid levels, belt tensions, and bolt torques.
3. Replace alternator belt.
4. Replace battery. Refer to *BATTERY on page 7-12* for additional instructions.

5. Clean grease or rust inhibitor from all exposed cylinder rods, seals, and o-rings.
6. Disengage hydraulic broom lift lock.

DECAL INSTALLATION

1. Be sure that the installation area is clean and dry. Use hot soapy water and dry the area thoroughly before installing decals.
2. Determine the exact position by taking measurements and test fitting before you remove the backing paper.
3. For decals with no top protection paper, determine the decal location and remove the smallest portion of the split backing paper.
4. Align the decal over the specified area and carefully press the small portion with the exposed adhesive backing into place.
5. Peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
6. Small air pockets can be pierced with a pin and smoothed out using the piece of decal backing paper.
7. If the decal has a protective top paper, use hot soapy water on the surface to which the decal is being applied. Leave wet. After determining the location, remove the backing paper and soak the decal in clean soapy water before application. This will help prevent air bubbles in the finished decal.
8. Smooth the decal into place with a sponge and check for air bubbles. Small air pockets may be pierced with a pin and smoothed out. When the decal is completely smoothed out, carefully remove the top paper.

NOTES

Section 8
TROUBLESHOOTING

Page

Troubleshooting 8-1
GENERAL INFORMATION 8-2
Troubleshooting Charts 8-2

GENERAL INFORMATION

The troubleshooting chart below identifies the most common symptoms of failure. Use this chart to help identify the failed component.

For specific engine and hydraulic problems not covered here, see the Engine or Hydraulic Pump and/or Motor Manufacturer's manual.

NOTICE **ANY UNAUTHORIZED REPAIR WILL VOID THE WARRANTY. Do not attempt to service or repair major components such as the engine, hydrostatic pump or motor unless authorized to do so by your ROSCO dealer.**

TROUBLESHOOTING CHARTS

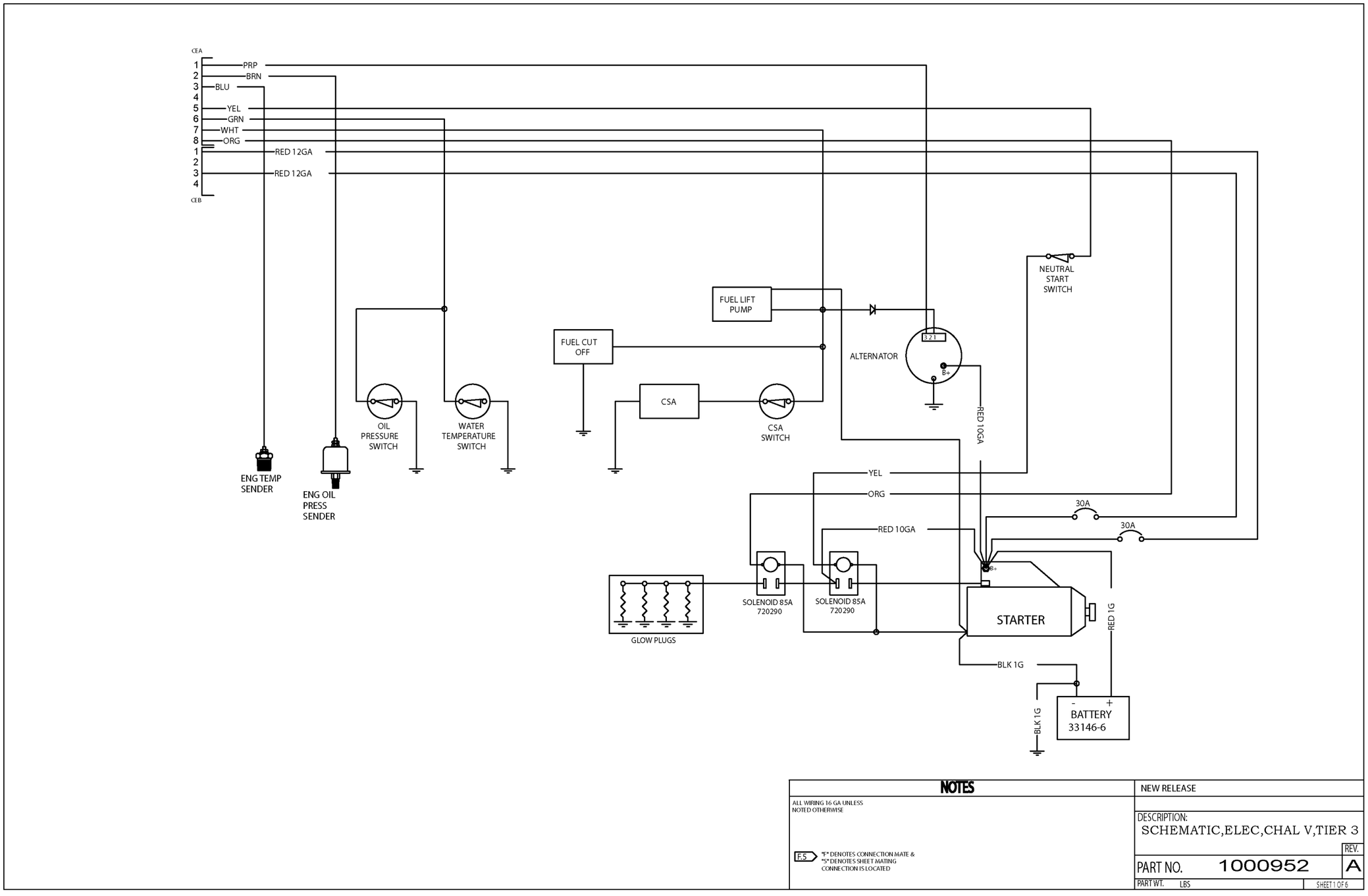
SYMPTOM	CAUSE	REMEDY
Engine doesn't crank.	Battery weak or dead.	Charge or replace battery.
	Neutral start switch not activated.	Put direction control lever in neutral.
	Faulty ignition switch.	Replace.
	Faulty start solenoid.	Replace.
	Faulty starter.	Repair or replace.
Engine cranks but won't start.	No fuel in tank.	Add fuel to tank.
	No voltage to fuel shutoff solenoid.	Voltage should be 9 volts with the ignition switch in the ON or START position.
	No fuel to injector pump.	Check fuel supply system.
	Fuel connections loose on suction side of injector pump.	Tighten all fuel filter fittings and connections from fuel tank to injector pump.
	Fuel filter plugged or restricted.	Replace fuel filter.
	Intake or exhaust system restricted.	Check for and remove restrictions.
Engine difficult to start, or won’t start.	Engine cranking speed too low.	Clean battery terminal connections. Charge or replace battery.
	Insufficient fuel supply to injector nozzles.	Check fuel system. Clean or replace fuel filter.
	Fuel solenoid defective.	Check/replace defective fuel solenoid. See engine manufacturer’s manual.
Engine difficult to start, or won’t start (continued).	Fuel filter plugged.	Replace fuel filter.
	Air in the fuel system.	Check for air leaks in the low pressure side of the fuel system. Prime fuel system. See engine manufacturer's manual.
	Fuel supply contaminated.	Verify by operating engine with a known fuel quality.
	Intake air system restricted.	Check for and remove restrictions.

SYMPTOM	CAUSE	REMEDY
Unit doesn't move with engine running, or moves in one direction only.	Park brake engaged.	Release park brake.
	Broom rotation control valve is bypassing oil at low pressure.	Repair or replace relief valve cartridge(s).
	Damaged hydrostatic pump.	Repair or replace hydrostatic pump.
	Damaged hydrostatic motor.	Repair or replace hydrostatic motor.
Unit jerks when operating in Forward or Reverse.	Fast movement of direction control handle.	Move handle slowly when changing speed and/or direction.
	Park brake not disengaged.	Release park brake. Check for binding park brake cable(s).
	Engine speed set too low.	Run engine at higher RPM.
	Low hydraulic fluid level.	Fill reservoir with correct fluid until visible in sight gauge.
	Air leaking into hydraulic system.	Tighten or replace hoses, fittings and/or filter(s).
	Hydrostatic pump is malfunctioning.	Repair or replace pump.
Engine power output is low.	Operating engine at high altitude.	De-rate engine power output for altitudes above 10,000 feet.
	Air intake piping restricted.	Remove restrictions.
	Air cleaner element dirty.	Clean or replace air cleaner elements.
	Fuel suction line or filter restricted.	Check fuel line for restrictions. Replace fuel filter element(s).
	Fuel return system restricted.	Correct restricted fuel return system.
	Fuel quality poor.	Verify by operating with a known fuel quality.
	Fuel transfer pump malfunctioning.	Replace fuel transfer pump. See engine manufacturer's manual.
	Throttle improperly adjusted.	Adjust throttle controls.
	Injector malfunctioning.	Replace injector. See engine manufacturer's manual.
Engine won't shut off.	Electrical wiring fault supplying power to fuel solenoid when key is in OFF position.	Repair wiring.
	Faulty diode in engine wire harness at alternator.	Check diode wire connection and/or replace diode.
	Injection pump fuel solenoid inoperative.	Check solenoid for defects or foreign material inhibiting proper operations.
	Engine operating on fumes drawn into air intake.	Locate and isolate the source of fumes.
	Low idle set too high.	Set idle to specifications.

SYMPTOM	CAUSE	REMEDY
Broom stalls or lacks power.	Broom drive relief valve set too low or defective.	Adjust relief valve to 2500 psi. Replace if defective. See *PUMPS AND MOTORS on page 7-16*.
	Sweeping with too much down pressure.	See *BROOM DOWN PRESSURE CONTROL on page 6-4*.
	Ground speed too fast.	Pull back on joystick and increase engine RPM to increase broom speed.
Steering is difficult.	Low hydraulic fluid level.	Add fluid to proper level. See *HYDRAULIC SYSTEM MAINTENANCE on page 7-14*.
	Hydraulic filters contain contamination.	Check filter(s) for contamination and replace if necessary. See *HYDRAULIC SYSTEM MAINTENANCE on page 7-14*.
	Hydraulic pump priority relief valve set incorrectly.	Check relief valve setting. It should be 1500 psi. Adjust setting if necessary. See *PUMPS AND MOTORS on page 7-16*.
	Worn hydraulic pump.	Check for worn pump and repair or replace.
	Worn steering orbital motor.	Check for worn steering orbital motor and repair or replace.
	Worn steering cylinder.	Repair or replace steering cylinder.
Hydraulic system overheats (temperature above 200° F).	Low hydraulic fluid level.	Fill with correct fluid until visible in sight gauge.
	Defective temperature gauge or sender giving wrong temperature reading.	Replace gauge or sender.
	Broom drive relief valve set too low or defective.	Adjust relief valve to 2500 psi. Replace if defective. See *PUMPS AND MOTORS on page 7-16*.
	Excessive ambient air temperature and high duty cycle.	Operate unit at slower ground speed and maximum engine RPM during hot weather.
	Plugged fins on fluid cooler.	Clean fins and correct any other problems with cooling air flow.
	Hydrostatic pump bypass valve defective or open.	Repair or replace. If valve is open, turn valve clockwise until seated and torque to 9.5–14 Nm (7–10 lb-ft). Over torquing will damage valve.
	Worn hydrostatic pump.	Repair or replace.

SYMPTOM	CAUSE	REMEDY
Engine oil pressure is low.	Electrical power not being supplied to gauge.	Check fuse.
	Incorrect oil level. Too high or too low.	Check for leaks. Add or drain engine oil. Check dipstick calibration.
	Oil filter plugged.	Change oil filter.
	Oil diluted with fuel.	Replace fuel injector, fuel transfer pump and/or injection pump.
	Oil diluted with coolant.	See authorized engine repair facility.
	Incorrect oil specifications	Change oil. Check oil specifications. See *ENGINE MAINTENANCE on page 7-9*. See engine manufacturer's manual.
	Oil pressure sender or gauge malfunctioning.	Replace oil pressure sender or gauge.
	Coolant level too low.	Add coolant.
Engine coolant temperature above normal.	Radiator fins damaged or obstructed.	Inspect radiator fins. Clean, repair or replace.
	Collapsed or restricted radiator hose.	Inspect hoses. Replace if necessary.
	Loose fan drive belt.	Check belt tension and tighten if necessary.
	Cooling fan shroud damaged or missing.	Inspect shroud. Repair, replace or install as needed.
	Incorrect or malfunctioning radiator cap.	Check the radiator cap. Replace if necessary.
	Temperature gauge or sender malfunctioning.	Repair or replace sender and/or gauge.
	Thermostat stuck in closed position.	Test thermostat. Replace if necessary.
	Dirt, scale or rust in the cooling system.	Clean cooling system.
Alternator not charging.	Loose wiring or faulty connection.	Repair or replace loose wiring or connector.
	Diode at alternator loose or faulty.	Tighten connection or replace diode.
	Alternator belt loose or broken.	Adjust or replace belt.
	Alternator malfunctioning.	Replace alternator.
Instrument gauges don't work.	Faulty gauge or sender.	Replace gauge or sender.
	Alternator not charging.	Repair wiring or replace alternator.
	Faulty wiring.	Replace wiring or connector.

NOTES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RED 12GA
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ENG OIL PRESS SENDER
OIL PRESSURE SWITCH
WATER TEMPERATURE SWITCH
FUEL CUT OFF
FUEL LIFT PUMP
CSA
CSA SWITCH
ALTERNATOR
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NEUTRAL START SWITCH
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YEL
ORG
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30A
30A
GLOW PLUGS
SOLENOID 85A 720290
SOLENOID 85A 720290
STARTER
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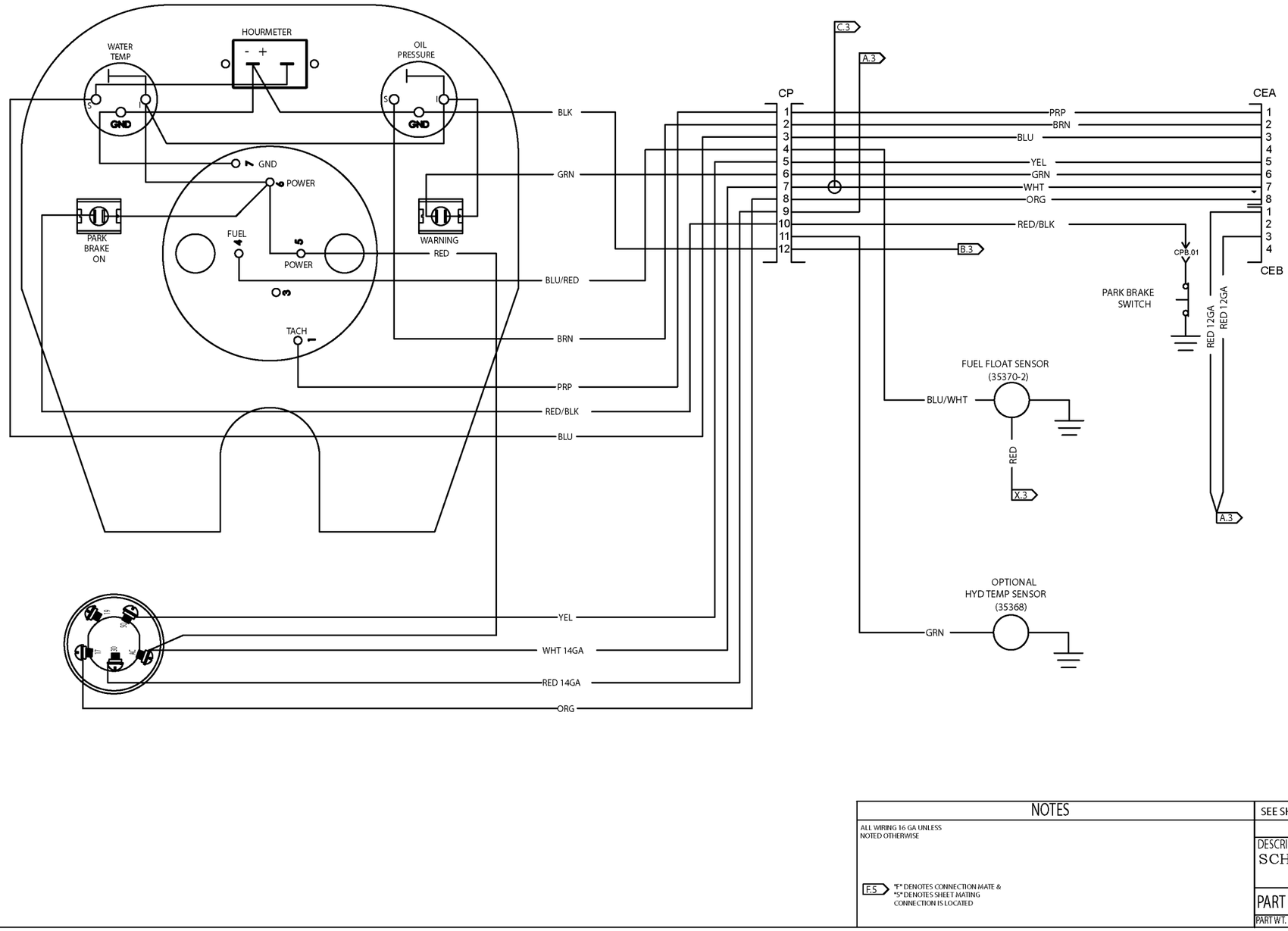

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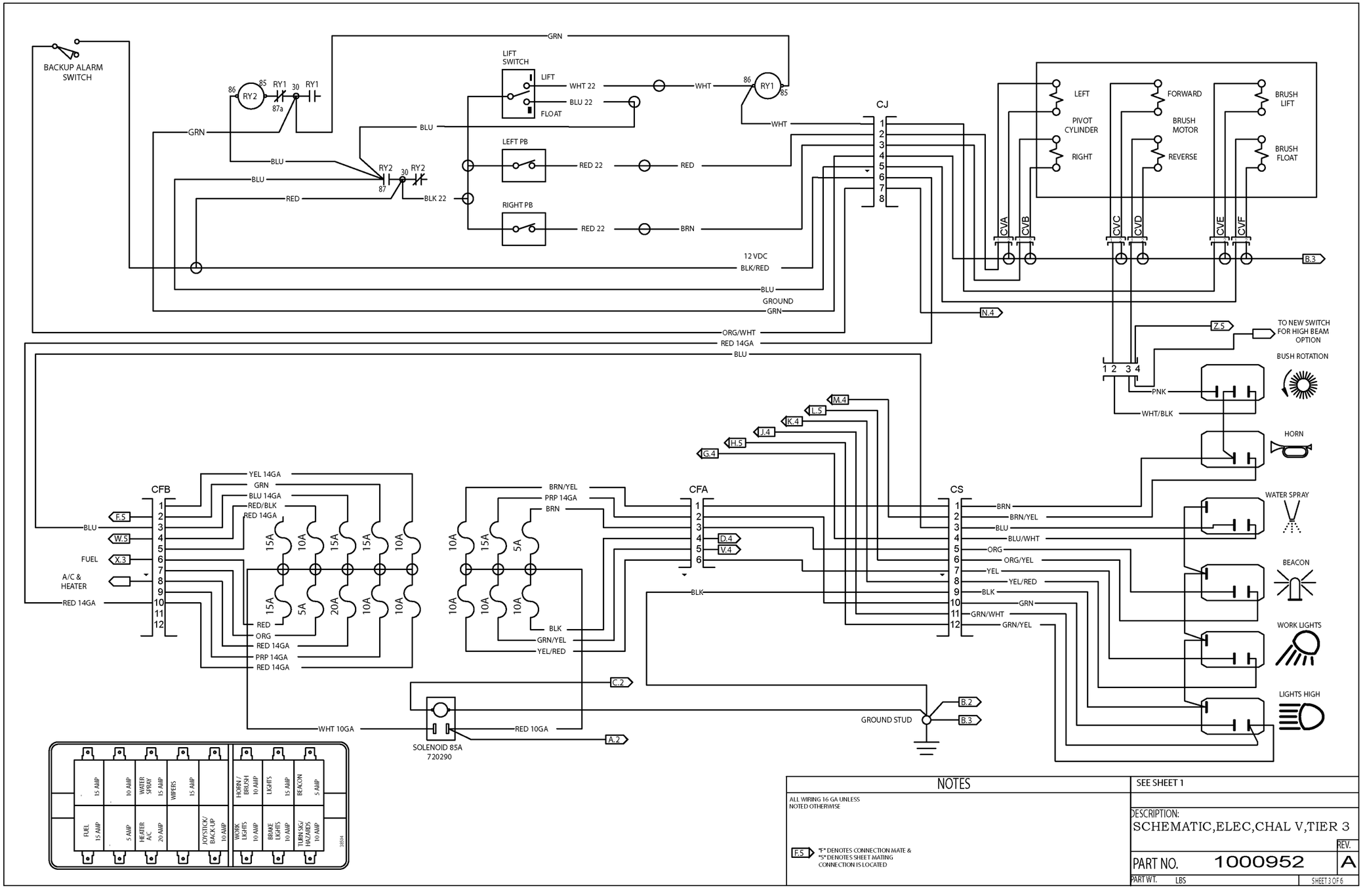
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PNK
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J.4
H.5
G.4
CFB
CFA
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GRN
BLU 14GA
RED/BLK
RED 14GA
F.5
W.5
X.3
BLU
FUEL
A/C & HEATER
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15A
10A
5A
20A
BRN/YEL
PRP 14GA
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LIGHTS 15 AMP
BEACON 5 AMP
FUEL 15 AMP
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WORK LIGHTS 10 AMP
BRAKE LIGHTS 10 AMP
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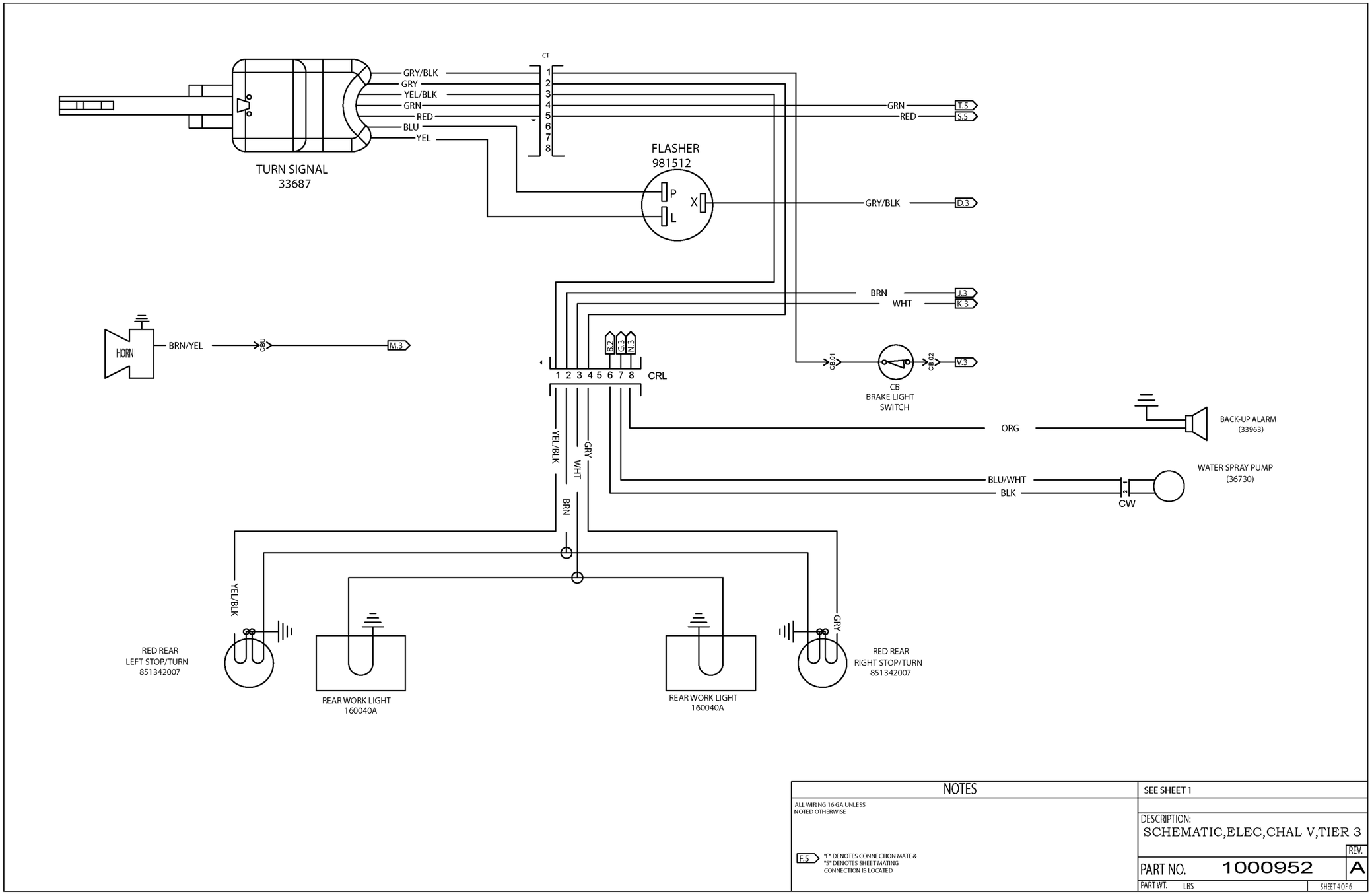

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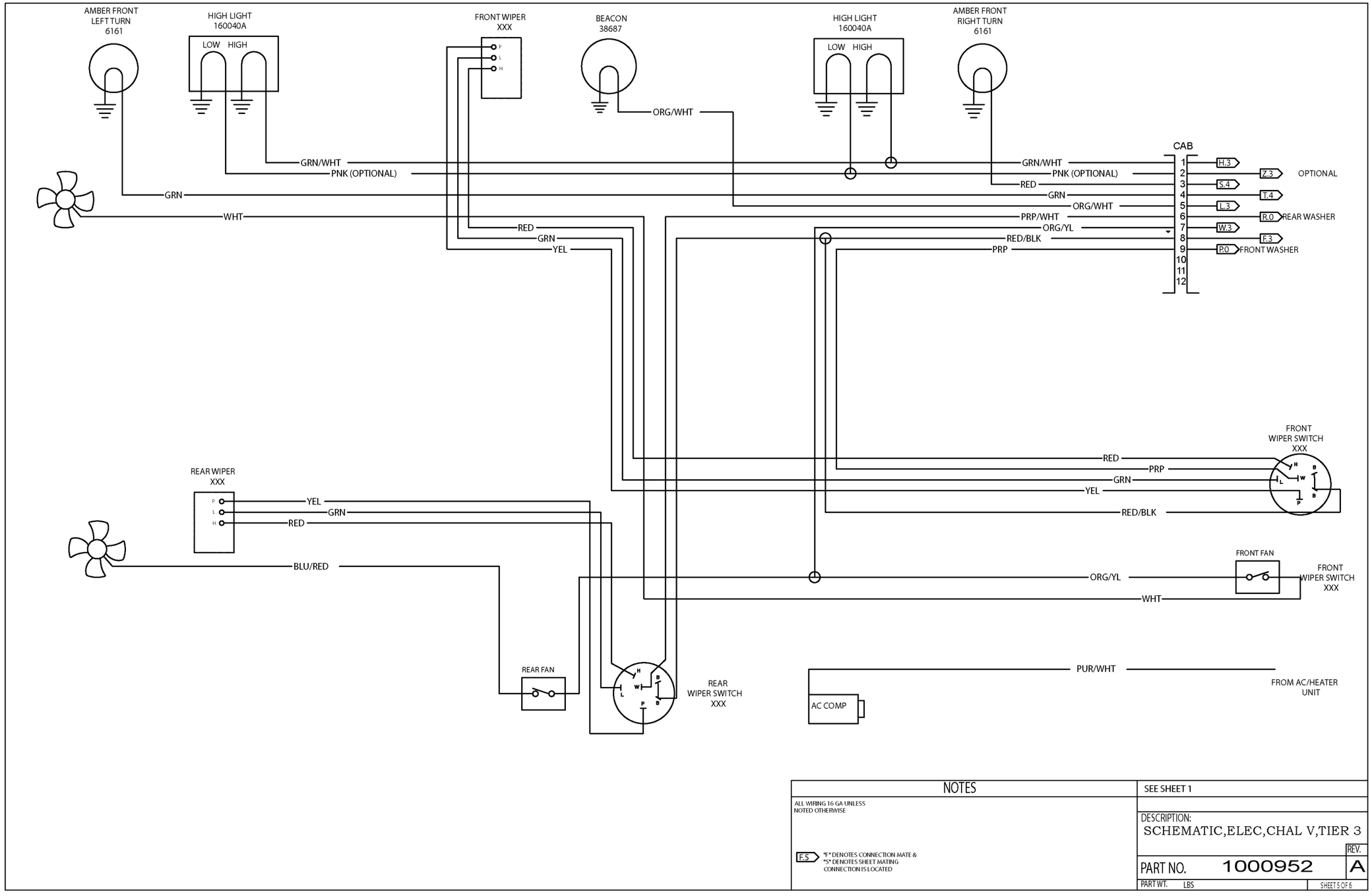
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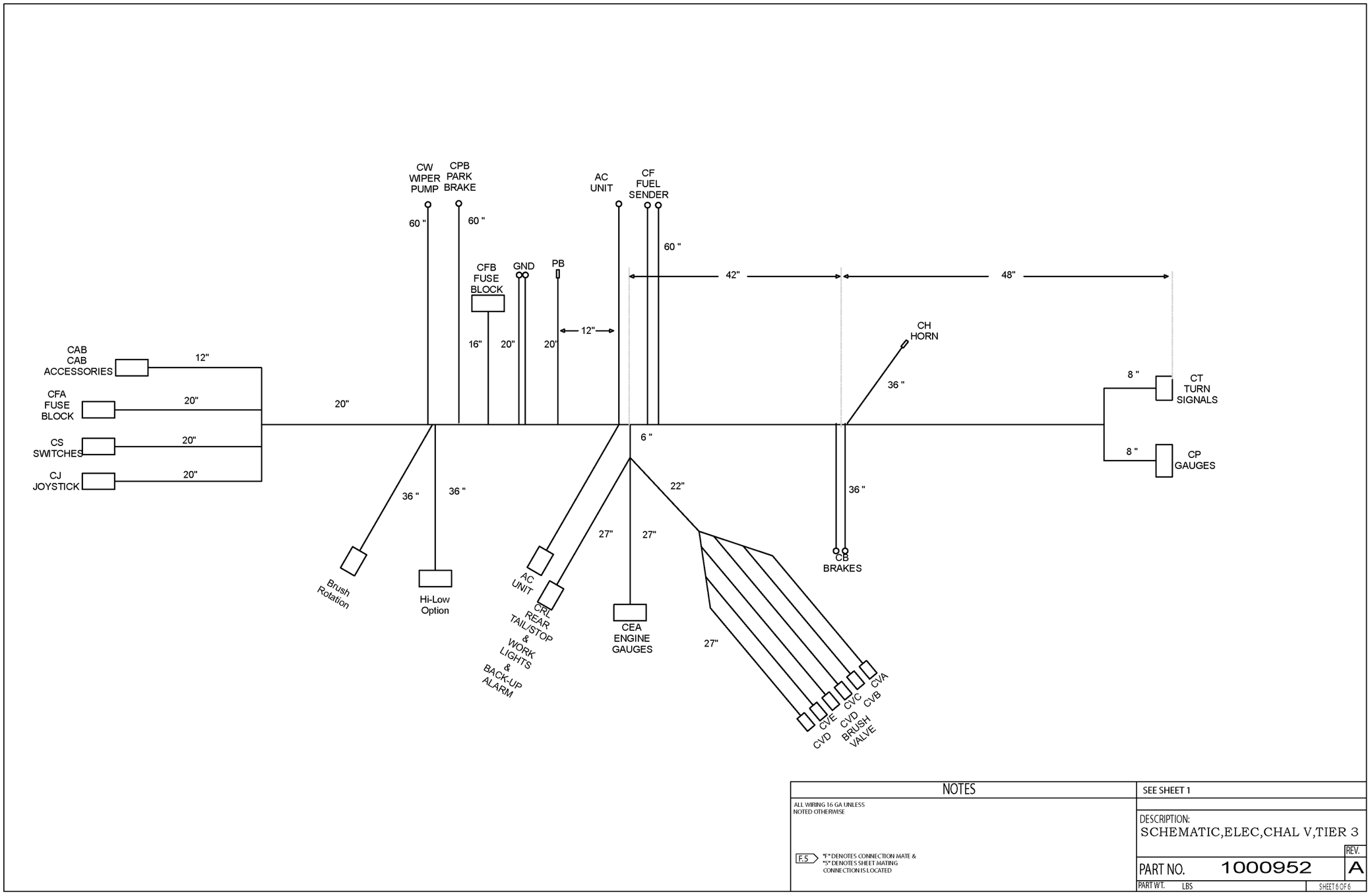

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Section 10
ILLUSTRATED PARTS LIST

Page

Illustrated Parts List 10-1

Illustrated Parts List 10-3
Introduction 10-3
Numerical Index 10-3
Equipment Designator Index 10-3
Detailed Parts List 10-3

Chassis
Frame 10-4
Drive Axle Assembly 10-6
Drive Shaft Assembly 10-8
Axle Assembly, Steering 10-10

Broom
Brush Head Frame 10-12
Core Assembly 10-14
Shaft Assembly 10-16
Hydraulic Assemblies 10-18
Motor Mount Assemblies 10-20
Brush Head Labels 10-22
Lift Linkage 10-24

Dust Suppression
Water Spray Tank And Mounting 10-26
Dust Suppression System 10-28

Engine And Covers
Engine Subassembly, Caterpillar 10-30
Exhaust Group, Caterpillar 10-32
Air Cleaner, Caterpillar 10-34
Engine Cover Assembly 10-36
Fuel Tank Assembly 10-38
Radiator/cooler Assembly 10-40
Air Conditioning/heater Group 10-42
Cab Air Conditioning/heater Kit (1 Of 2) 10-44
Cab Air Conditioning/heater Kit (2 Of 2) 10-46

Cab
Cab Frame, Glass And Door 10-48
Cab Door Hold And Striker 10-50
Windshield Wiper Panel 10-52
Windshield Wiper Motor 10-54
Entrance Door Assembly 10-56
Standard Seat 10-58

Optional Spring Seat 10-60
Steering Wheel Assembly 10-62
Controls
Control Handle And Throttle Linkage 10-64
Instrument Panel 10-66
Fuse Panel Sub-assembly 10-68
Cab Lights And Mirrors
Lights And Mirrors 10-70
Brakes
Park Brake 10-72
Hydraulic Brake 10-74
Optional Dual Master Cylinder 10-76
Hydraulics
Brush Hydraulics And Manifold 10-78
Steering Orbitrol And Manifold 10-80
Hydrostatic Pump And Motor 10-82
Hydraulic Filter And Cooler Hoses 10-84
Hydraulic Tank 10-86
Miscellaneous
Final And Miscellaneous Groups 10-88

ILLUSTRATED PARTS LIST

Introduction

This Illustrated Parts List (IPL), as part of the Component Maintenance Manual, is intended for use in identifying and requisitioning replacement parts.

Numerical Index

A numerical index is provided to supplement the detailed parts list. Part number arrangement begins at the extreme left-hand position and continues from left to right, one position at a time. The order of precedence is as follows: Letters A through Z; Numerals 0 through 9. The alpha “O” shall be considered as a numeric zero. Each part number provides a reference to its appearance in the IPL by figure and item number.

Equipment Designator Index

If equipment designators are used in place of part numbers at any place in the IPL, an Equipment Designator Index is provided listing all equipment designators listed in the illustrated parts list.

Detailed Parts List

How to Use the IPL

1. The item number corresponds to the item number shown for the part in the illustration.
2. Parts with item numbers (•) are not illustrated.
3. Parts with Quanities of (AR) are “As Required”.
4. Part quantities listed are for one component or subcomponent. For example, if the parts list shows two platform assemblies, the quantities shown for the parts in the platform assembly is for one platform assembly.
5. If standard parts (those with AN, MS, NAF, NAS prefixes) are used the standard part number is listed in the part number column.
6. When a Vendor Code cannot be obtained from the H4-1 and H4-2 Cataloging Handbook, the manufacturer’s full name and address is included in the parts list. Government standard parts, such as, AN, MS, NAF, and NAS parts are not identified with a Vendor Code.
7. If a company other than LeeBoy is referred to as the original manufacturer of some other parts, these parts may carry the original manufacturers part number or a LeeBoy part number. These manufacturers are identified by an appropriate vendor code following the nomenclature. If the part number in the part number column is a LeeBoy part number, the original manufacturer’s part number is given after his vendor code. Vendor codes are in accordance with the current issue of Cataloging Handbook “Commercial and Government Entity” (H4-1 and H4-2) and are preceded by the capital letter “V”.

Frame Illustration

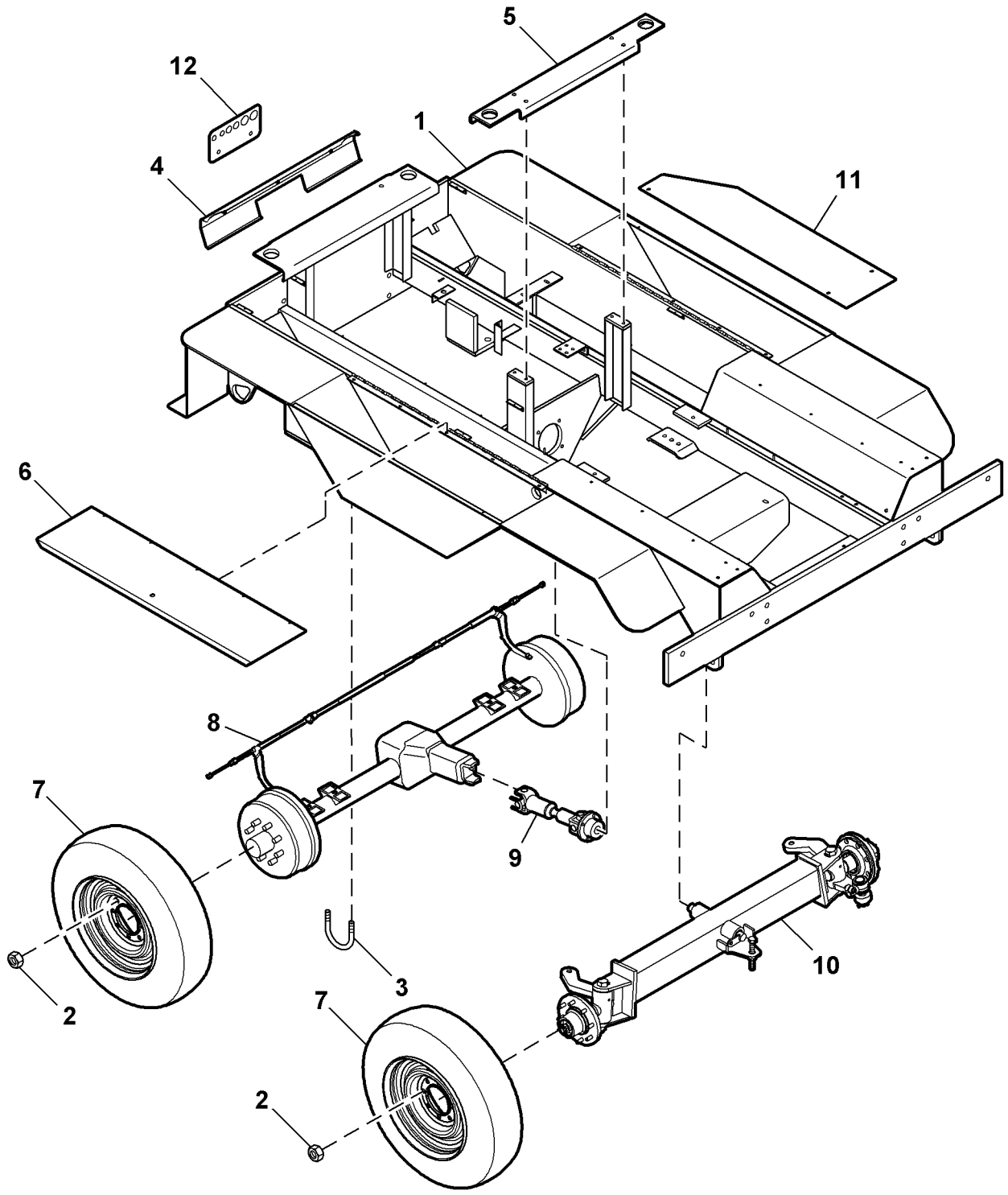

Figure 10-1

Frame Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1001033	1	Frame, W/m	
2	620520	32	Nut, Lug	.500-20
3	35339	4	U-bolt, Drive Axle	
4	987451	1	Cover	Front
5	987211	1	Rear Cab Mount, W/m	
6	987681	2	Toolbox Lid, W/m	
7	340010A	4	Tire & Wheel	8 Lug, 16.5x8.75
8	26259	1	Drive Axle Assy	(See Figure 10-2 For Breakdown)
9	38518	1	Driveshaft	Challenger II (See Figure 10-3 For Breakdown)
10	27060	1	Axle Assy, Steering	Challenger II (See Figure 10-4 For Breakdown)
11	987455	2	Plate, Tank Cover	
12	989824	1	Bulkhead, Hydraulic, Mount	
•	91464	4 GAL	Oil, Gear Lube, Ls	
•	81002	4	Cap Screw, Hex Head	.500-13x1.00, Gr8
•	81141	4	Washer, Flat	SAE, .500, Hardened
•	80040	8	Nut, Hex	.500-13
•	80164	12	Washer, Lock	.500
•	81141	8	Washer, Flat	SAE, .500, Hardened
•	81113	8	Cap Screw, Hex Head	.500-1 3x1.50, Gr8
•	80168	12	Washer, Lock	.750
•	80061	8	Nut, Hex	.750-16
•	80698	8	Washer, Flat	SAE, .750
•	80460	4	Cap Screw, Hex Head	.750-1 6x2.00, Gr5
•	80185	10	Cap Screw, Hex Head	.250-20x1.00, Gr5
•	80970	20	Washer, Flat	SAE, .250
•	80160	10	Washer, Lock	.250
•	80036	10	Nut, Hex	.250-20

• Item Not Illustrated

Drive Axle Assembly Illustration

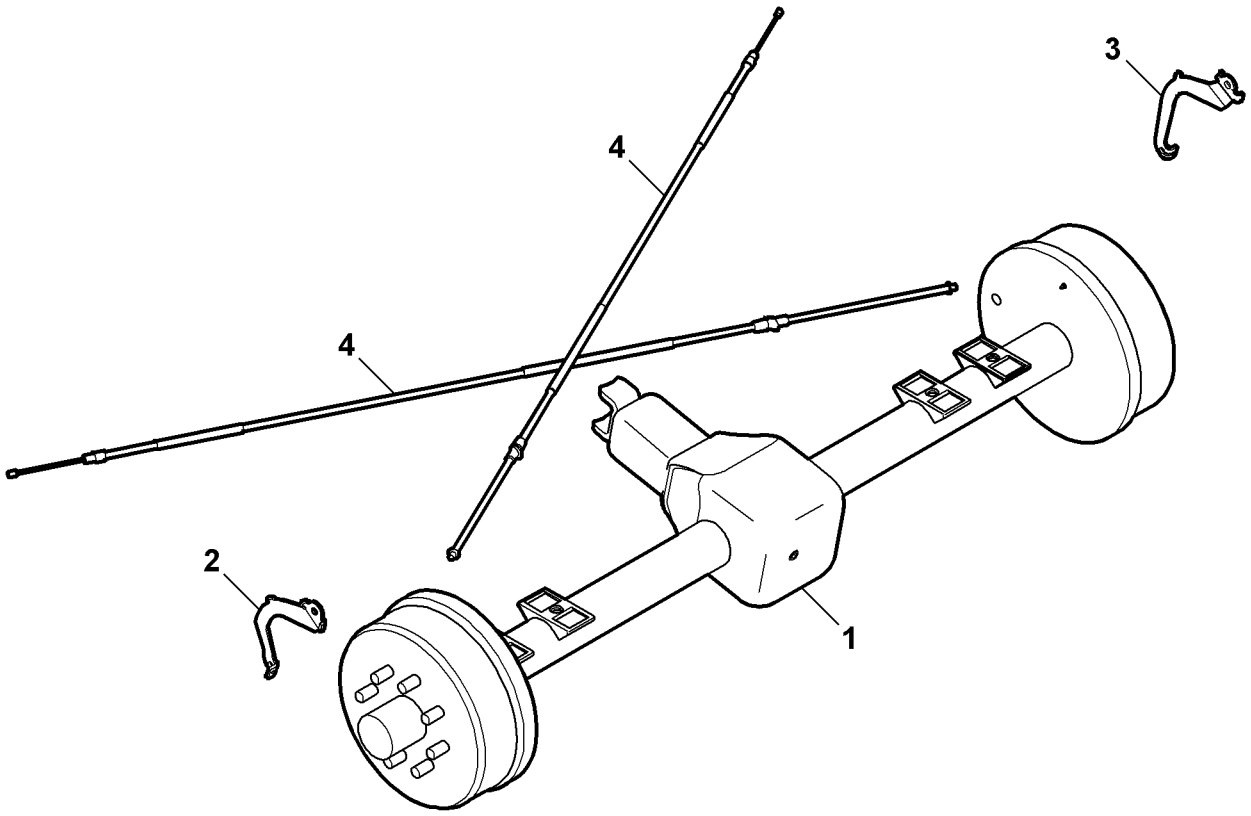

Figure 10-2

Drive Axle Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	26983	1	Drive Axle, W/m	
2	38329	1	Lever, Park Brake	
3	38330	1	Lever, Park Brake	
4	38342	2	Cable, Park Brake	

Drive Shaft Assembly Illustration

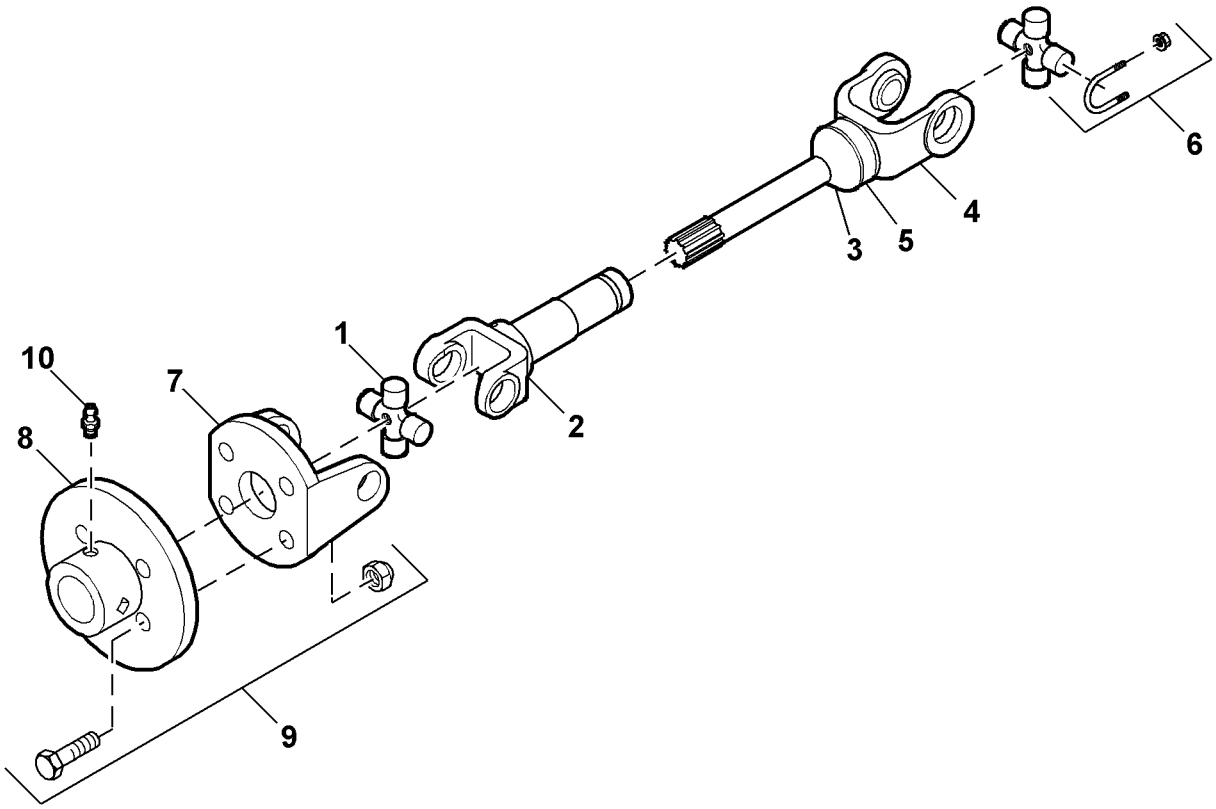

Figure 10-3

Drive Shaft Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	38518-01	2	Universal Joint	
2	38518-02	1	Slip Yoke	
3	38518-03	1	Stub Shaft	
4	38518-04	1	Tube Yoke	
5	38518-05	1	Tubing	
6	38518-06	1	U-bolt Kit	
7	38518-07	1	Flange Yoke	
8	38518-08	1	Flange	1.26 x 14 Spline
9	38518-09	1	Hardware Kit	
10	38518-10	1	Set Screw	.375-16 x 1.00

Axle Assembly, Steering Illustration

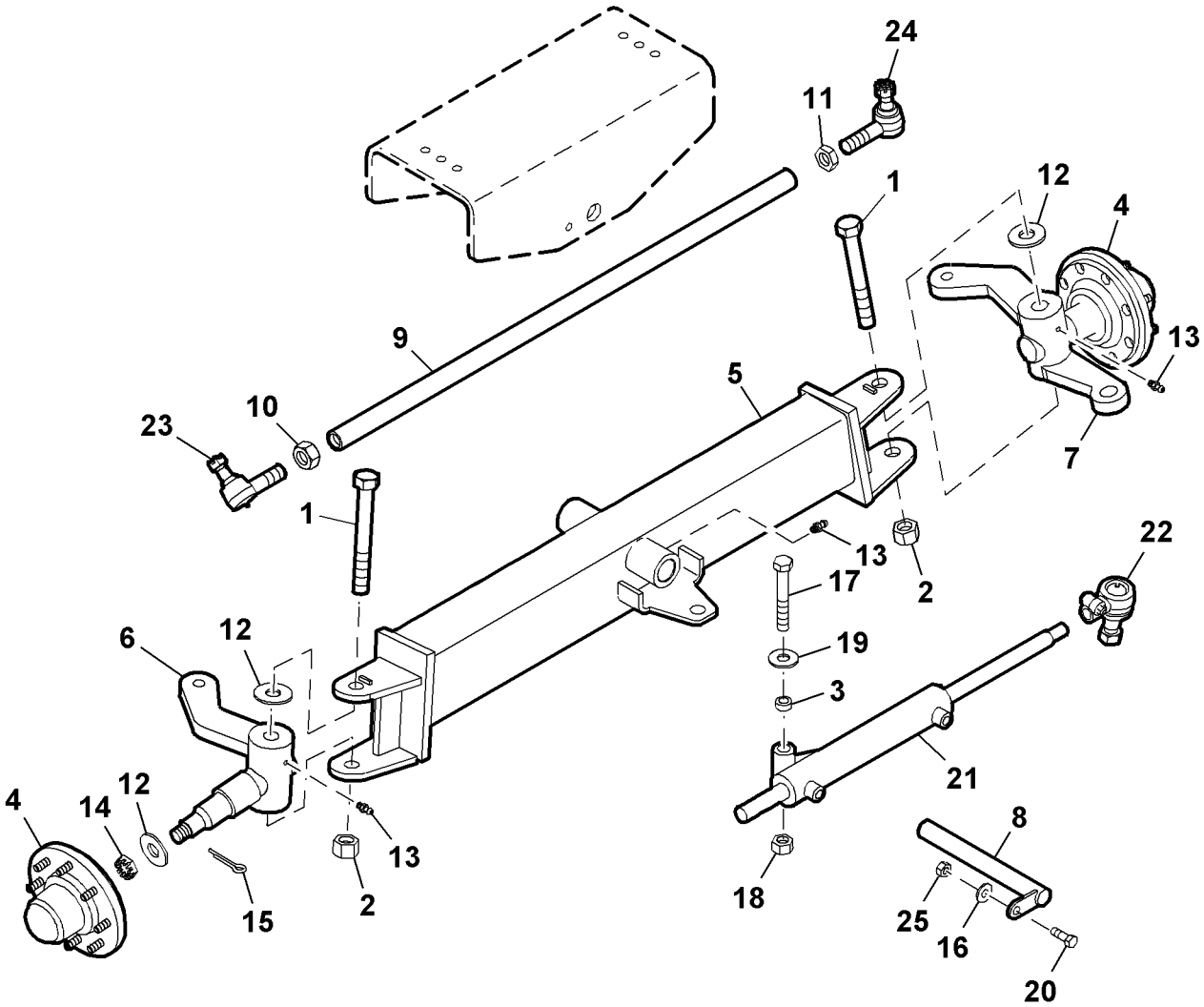

Figure 10-4

Axle Assembly, Steering Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	81184	2	Cap Screw, Hex Head	1.000-8x8.0, Gr5
2	80359	2	Nut, Flexloc	1.000-8, Full, Lt
3	16935	1	Sleeve, Steering Cyl Mount	
4	38303	2	Hub Assy, Wheel	8 On 6.50
	38303-02	1	Hub, Wheel, Idler	
	610210	1	Bearing Cone	
	340180	1	Bearing Cone, Wheel Hub	Outer
	38303-05	1	Bearing Cup	
	33187	1	Seal	
	620200	1	Dust Cap	635 Tandem Axle
	38303-03	1	Wheel Stud	1/2-20
	620520	8	Nut, Lug	.500-20
5	27051	1	Steering Axle, W/m	
6	27056	1	Spindle, W/m	R.H.
7	27059	1	Spindle, W/m	L.H.
8	20724	1	Shaft, Pivot, Front Axle, W/m	
9	27053	1	Tie Rod Tube	
10	21113	1	Nut, Hex, Jam	1.00-16, R.H.
11	21114	1	Nut, Hex, Jam	1.00-16, L.H.
12	80149	4	Washer, Flat	USS 1.000
13	33684	3	Fitt, Lube, Str	02mp, Short, Zerk
14	31713	2	Nut, Spindle	6bf
15	80332	2	Pin, Cotter	.125x1.50
16	80144	1	Washer, Flat	USS .500
17	80839	1	Cap Screw, Hex Head	.750-10x5.00, Gr5
18	80357	1	Nut, Flexloc	.750-1 0, Full, Lt
19	80147	1	Washer, Flat	USS .750
20	71627	1	Cap Screw, Hex Head	.500-13x1.50, Gr5
21	36754	1	Cyl, Hyd, Steering	2.00x10.75x1.00 Rod
	36754-03	AR	Kit, Seal, Cylinder	
22	36755	1	Ball Joint, Steering Cyl End	
23	36756	1	Ball Joint	R.H.
24	36757	1	Ball Joint	L.H.
25	80354	1	Nut, Flexloc	.500-1 3, Full, Lt

Brush Head Frame Illustration

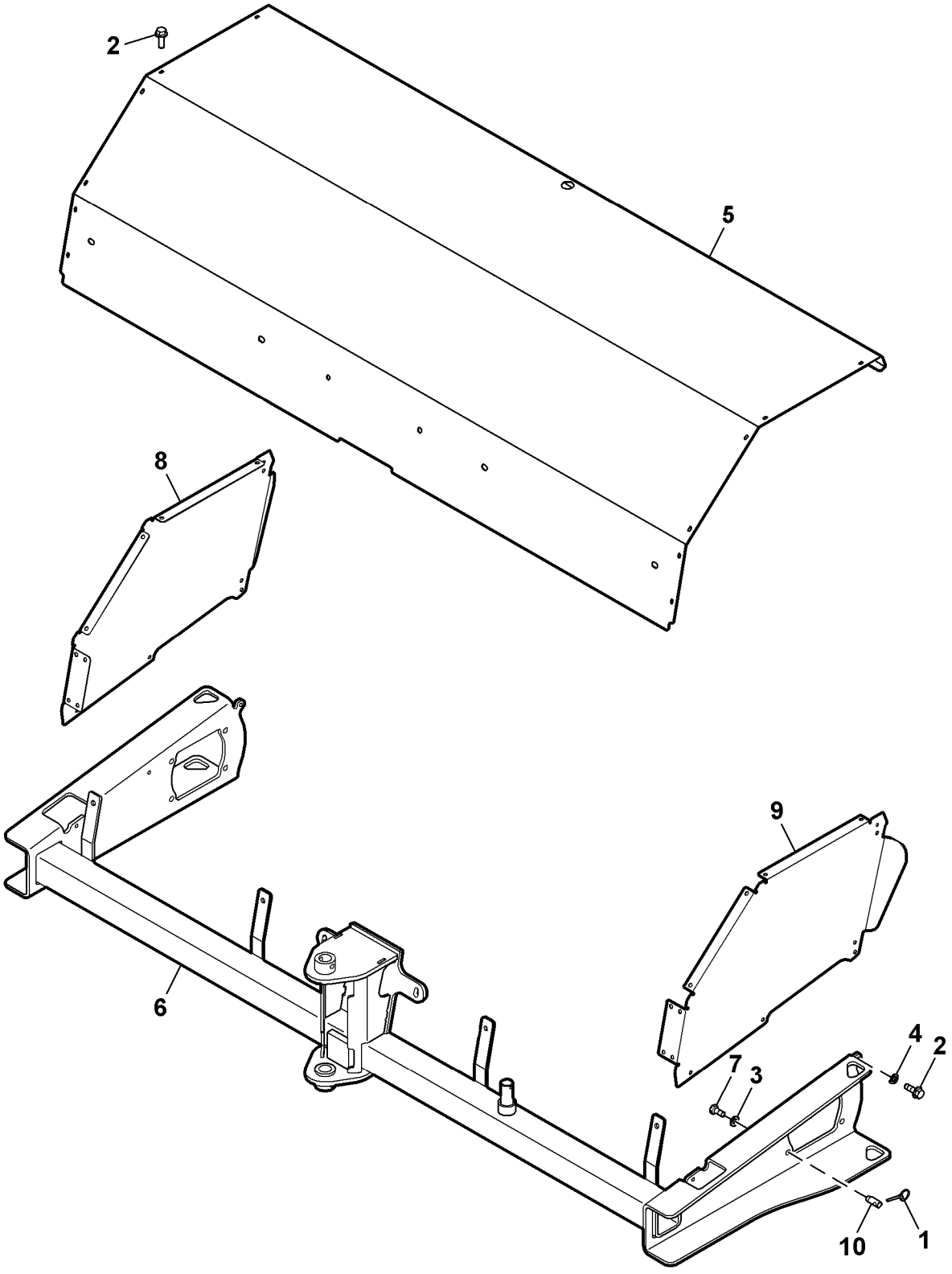

Figure 10-5

Brush Head Frame Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-21	8	Pin, L Inch	1/4
2	989272-25	18	Screw, Hfh	Cl10.9, M6-1 X 20
3	989272-35	8	Washer, Lock	M10
4	989272-43	6	Washer, Fender	Cl8.8, M6
5	989272-66	1	Sheet, Hood	7 Ft
6	989272-63	1	Frame, Brush	7 Ft
7	989272-50	8	Screw, Hhc	Cl10.9, M10-1.5x16mm
8	989272-64	1	Sheet, Hood	L.H.
9	989272-65	1	Sheet, Hood	R.H.
10	989272-67	8	Stud, Mounting, Motor	

Core Assembly Illustration

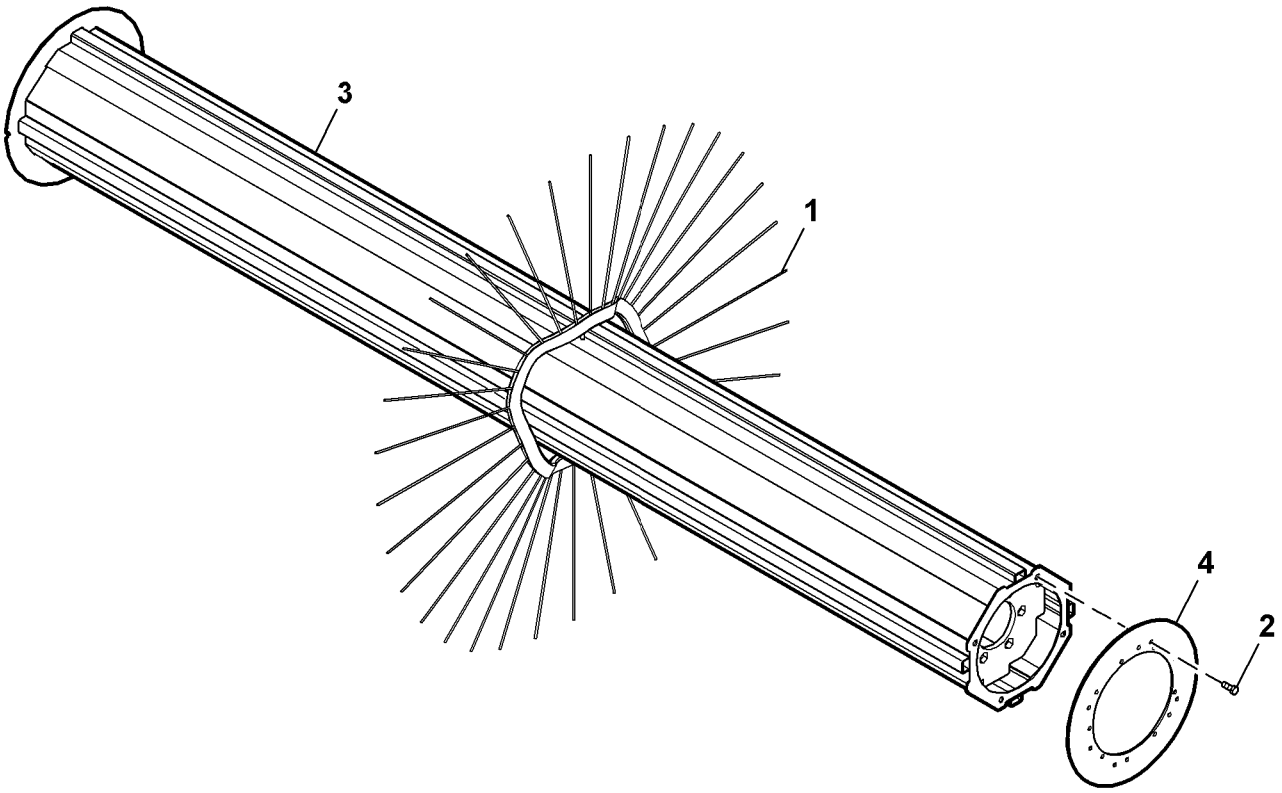

Figure 10-6

Core Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-02	1	Section, Set, 36, Poly	
2	989272-33	6	Screw, Hhc	Cl10.9, M6-1x30mm
3	989272-77	1	Core	
4	989272-57	1	Plate, Hat, Core, 10	

Shaft Assembly Illustration

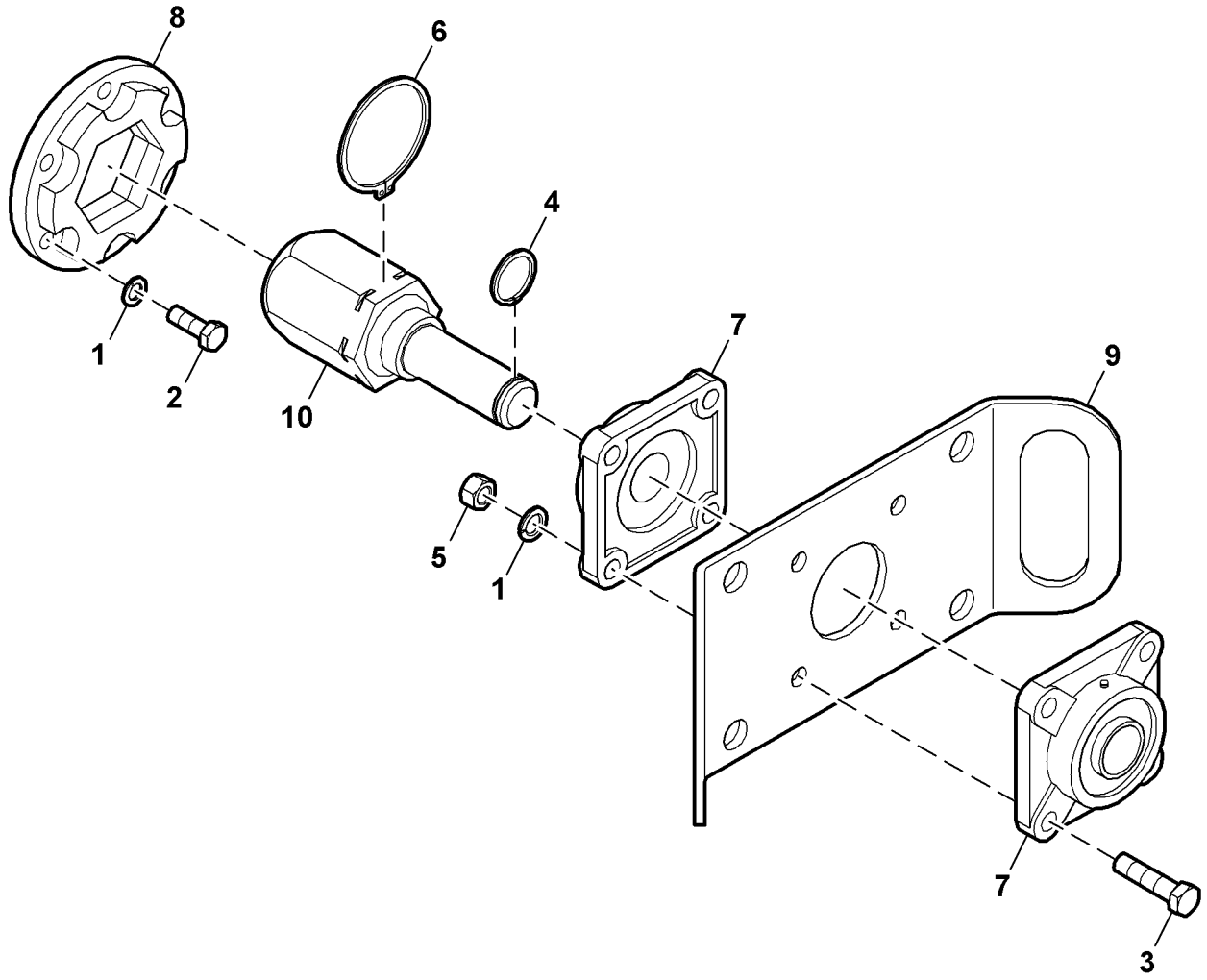

Figure 10-7

Shaft Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-35	10	Washer, Lock	M10
2	989272-36	6	Screw, Hhc	Cl10.9, M10-1.5 X 30mm
3	989272-38	4	Screw, Hhc	Cl10.9, M10-1.5 X 50mm
4	989272-41	1	Ring, Snap	
5	989272-42	4	Nut, Hex	Cl10, M10-105
6	989272-45	1	Ring, Retaining	2.75
7	989272-55	2	Bearing	1 1/4, 4 Bolt
8	989272-56	1	Hex Plate With Doubler	
9	989272-70	1	Plate, Mounting, Bearing	
10	989272-71	1	Hub, Hex	2 1/2, Single Motor

Hydraulic Assemblies Illustration

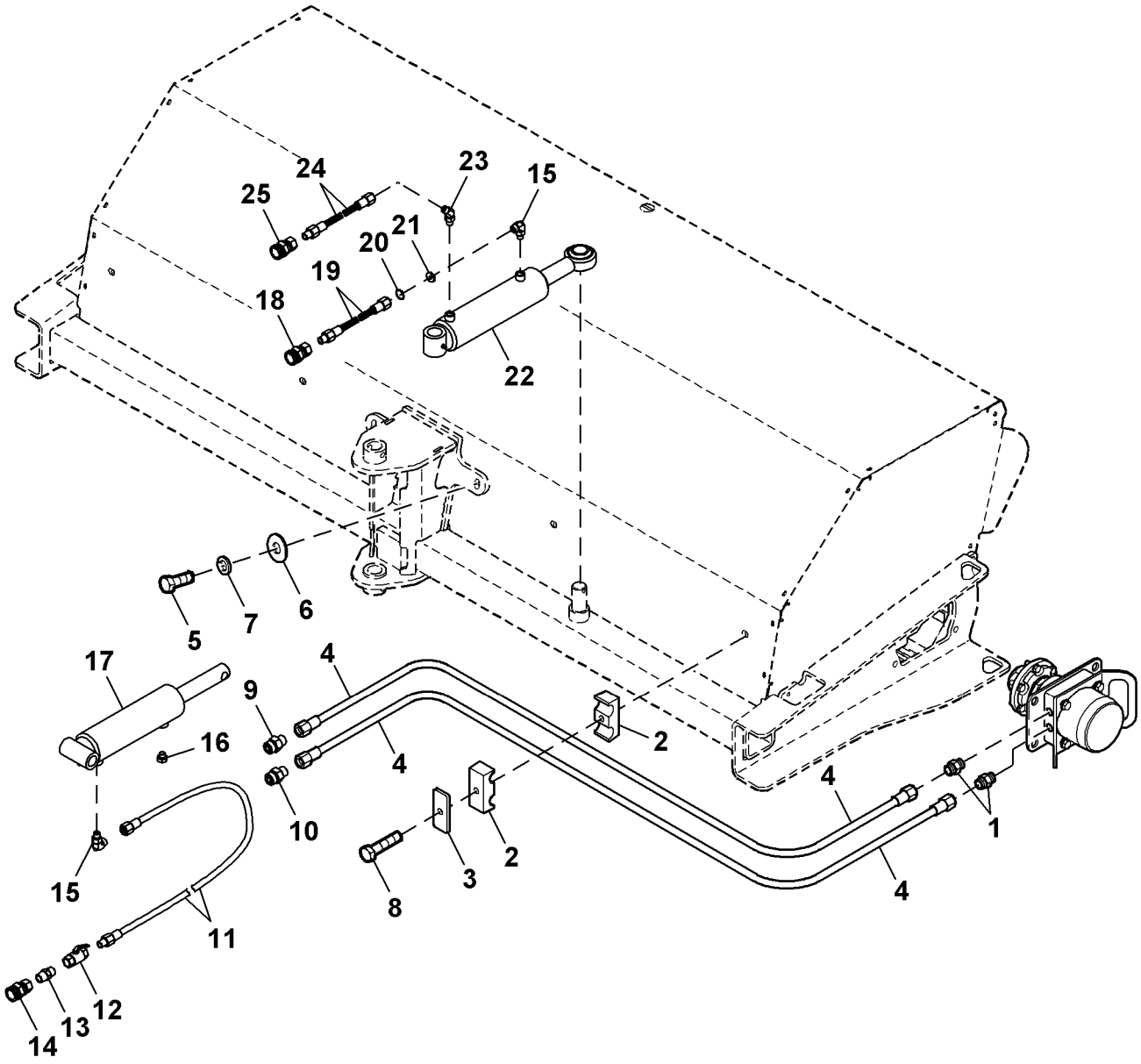

Figure 10-8

Hydraulic Assemblies Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-03	2	Fitting, Adapter, Hp	7/8mor, 5/8mfs
2	989272-84	4	Hose Cradle	
3	989272-83	2	Cover Plate	
4	989272-12	2	Hose	.50 X 102 10ff 12md
5	989272-37	4	Screw, Hhc	Cl10.9, M10-1.5 X 35mm
6	989272-34	6	Washer, Flat	Cl8.8, M10
7	989272-35	6	Washer, Lock	M10
8	989272-85	2	Screw, Hhc	M8-1.25 X 65mm Cl10.9
9	989272-18	1	Quick Disconnect	8pp F 12mp
10	989272-20	1	Quick Disconnect	8pp M 12fp
11	989272-13	1	Hose	.38 X 47 6ff 8mb
12	03-1392	1	Valve Ball, Br	8fp-8fp
13	03-1022-7	1	Fitting	8mp-8mp 1/2ff-s
14	989272-17	1	Quick Disconnect	8pp F 8fp
15	989272-05	2	Fitting, 90º Elbow, Hp	9/16mor 3/8mfs
16	989272-04	1	Fitting, Vent, Hex W/screen	9/16-18mor
17	989272-09	1	Cylinder, Hydraulic	2 1/2 Bore, 6 3/4 Stroke, 1 3/8 Rod
18	989272-16	1	Quick Disconnect	6pp F 6fp
19	989272-14	1	Hose	.38 X 39 6ff 6mb
20	989272-08	1	O-ring Face Seal	3/8 SAE6
21	989272-07	1	Plate Hydraulic Orifice	.046
22	989272-10	1	Cylinder, Hydraulic	2 1/2 Bore, 7 1/5 Stroke, 1 3/8 Rod
23	03-2115	1	Fitting, 45° Elbow	9/16mor 3/8mfs
24	989272-15	1	Hose	.38 X 30 6ff 6mb
25	989272-19	1	Quick Disconnect	6pp M 6fp

Motor Mount Assemblies Illustration

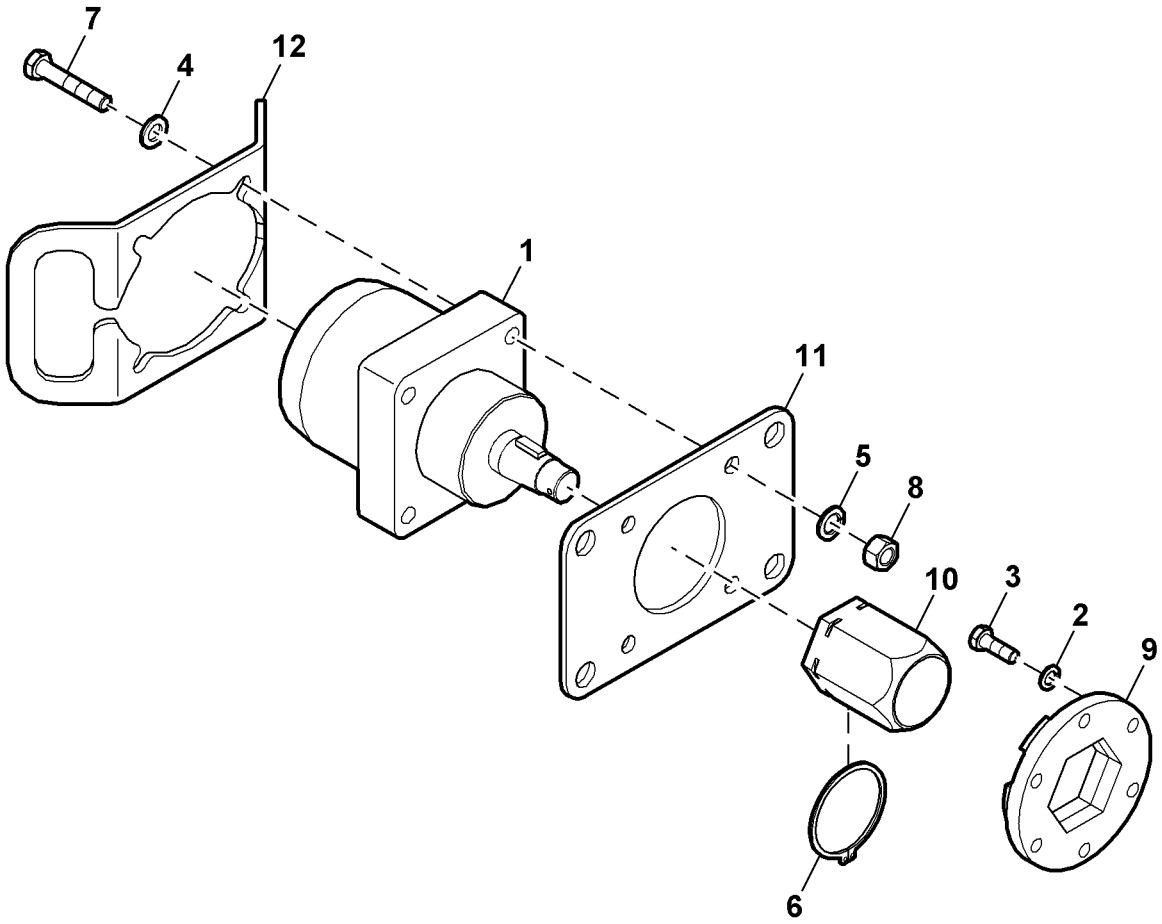

Figure 10-9

Motor Mount Assemblies Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-11	1	Motor, Hydraulic, White	28.3 Cu In
2	989272-35	6	Washer, Lock	M10
3	989272-36	6	Screw, Hhc	Cl10-9, M10-1.5 X 30mm
4	989272-39	4	Washer, Flat	Cl8.8, M12
5	989272-40	4	Washer, Lock	M12
6	989272-45	1	Ring, Retaining	2.75
7	989272-46	4	Screw, Hhc	Cl10.9, M12-1.75 X 65mm
8	989272-49	4	Nut, Hex	Cl10.9, M12-1.75
9	989272-56	1	Hex Plate With Doubler	
10	989272-76	1	Hub, Hex	2 1/2 X 1 1/4, Tapered Bore X 3.56
11	989272-68	1	Plate, Mountng, Motor	
12	989272-69	1	Plate, Handle, Motor	

Brush Head Labels Illustration

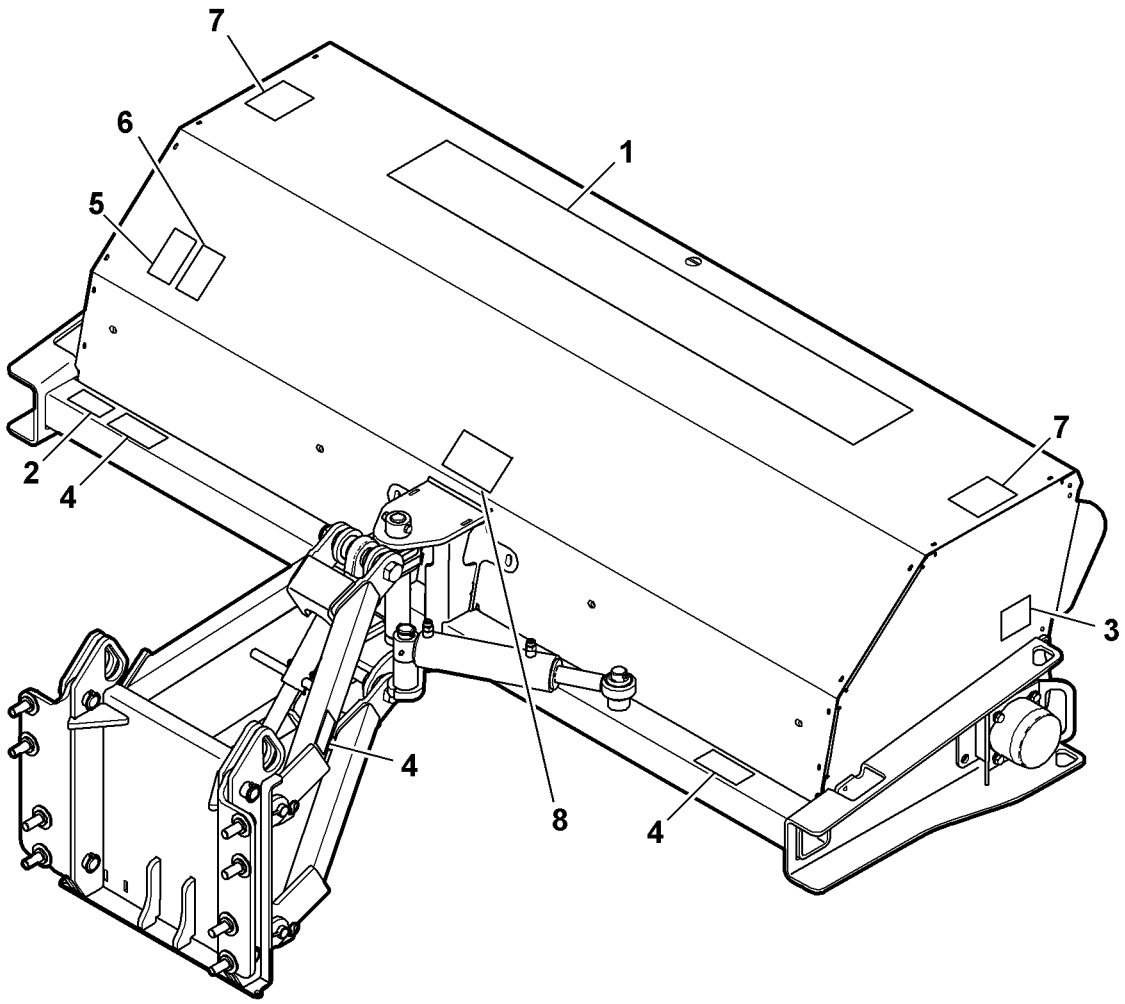

Figure 10-10

Brush Head Labels Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1001709	1	Label	Logo
2	1001709	1	Label	Serial Number
3	1001709	2	Label	Tie Down Point
4	1001709	4	Label, Warning	Crush Hazard
5	1001709	1	Label, Warning	Misuse Hazard
6	1001709	1	Label, Warning	High Pressure Fluid Hazard
7	1001709	2	Label, Warning	Flying Objects And Entanglement
8	1001709	1	Label	Brush Pattern Adjustment

Lift Linkage Illustration

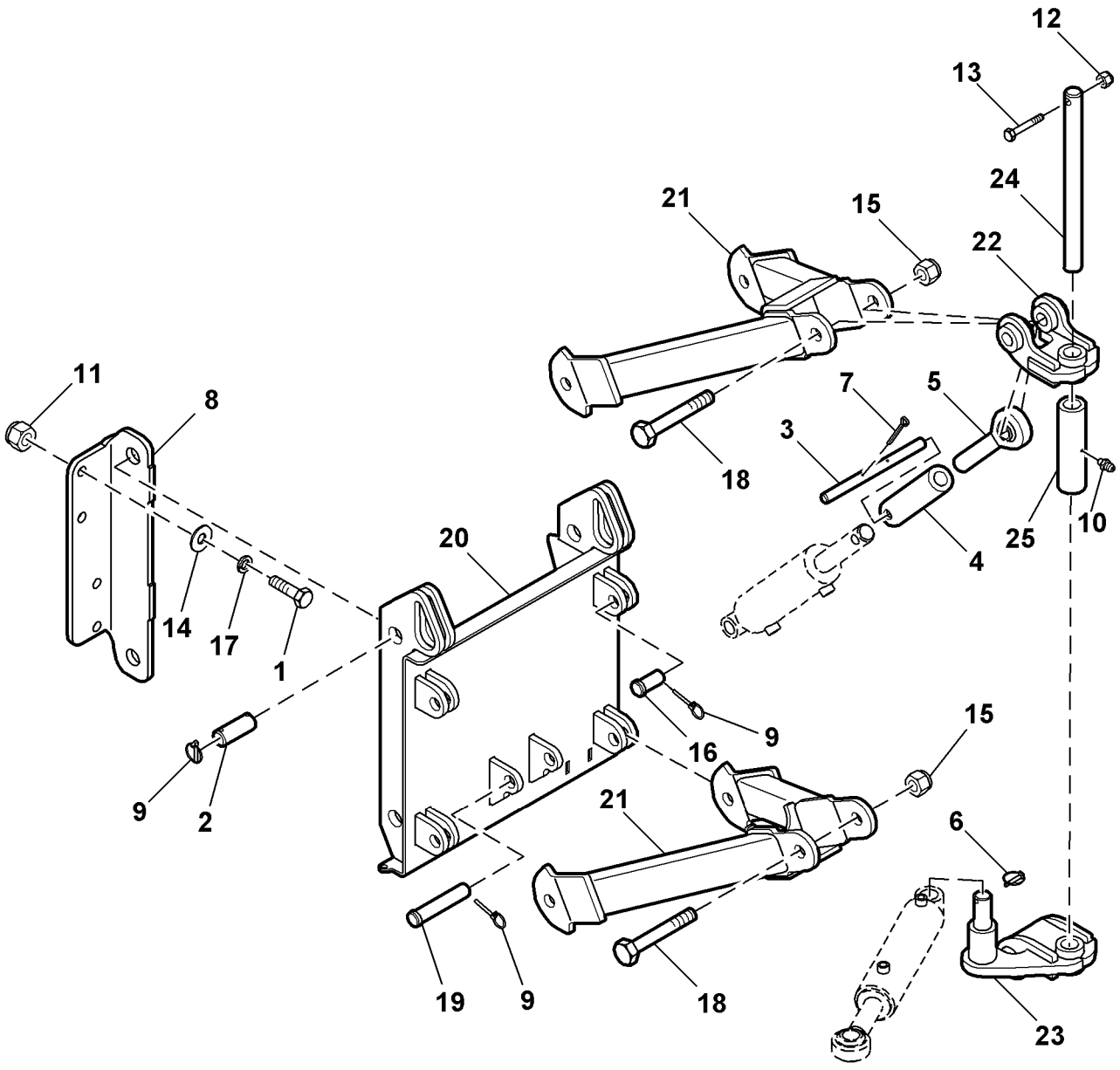

Figure 10-11

Lift Linkage Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-23	8	Screw, Hhc	Gr8, 3/4-10 X 21/2
2	989272-75	2	Pin With Holes	1 1/4 X 4
3	989272-74	1	Rod, Adjustment	
4	989272-73	1	Tube, Adjustment	
5	989272-72	1	Toplink	5.81
6	989272-21	6	Pin, Lynch	1/4
7	989272-22	4	Pin, Cotter	Gr2, 5/32 X 1 1/2
8	989272-91	1	Mounting Plate	R.H.
	989272-90	1	Mounting Plate	L.H.
9	989272-24	5	Pin, Klick	3/16 X 1 5/8
10	989272-28	1	Fitting, Zerk, Self Tapping	1/4-28
11	989272-27	8	Nut, Hex	3/4
12	989272-29	1	Nut, Hex, Hylock	Gr8, 7/16-14
13	989272-30	1	Screw, Hhc	Gr8, 7/16-14 X 2 1/2
14	989272-31	8	Washer, Flat	Gr8, 3/4
15	989272-44	2	Nut, Hex, Nylock	Gr8, 1-8
16	989272-47	4	Pin, Clevis	1 X 2
17	989272-26	8	Washer, Split	3/4
18	989272-48	2	Screw, Hhc	Gr8, 1-8 X 7 1/2
19	989272-54	1	Pin, Clevis	1 X 5
20	989272-78	1	Mounting	Weld Back Plate
21	989272-58	2	Arm	
22	989272-59	1	Pivot	Upper
23	989272-60	1	Pivot	Lower
24	989272-61	1	Pin With Holes	1.25 X 15.53
25	989272-62	1	Bushing With Hole	2 X 1.26 X 7.22

Water Spray Tank And Mounting Illustration

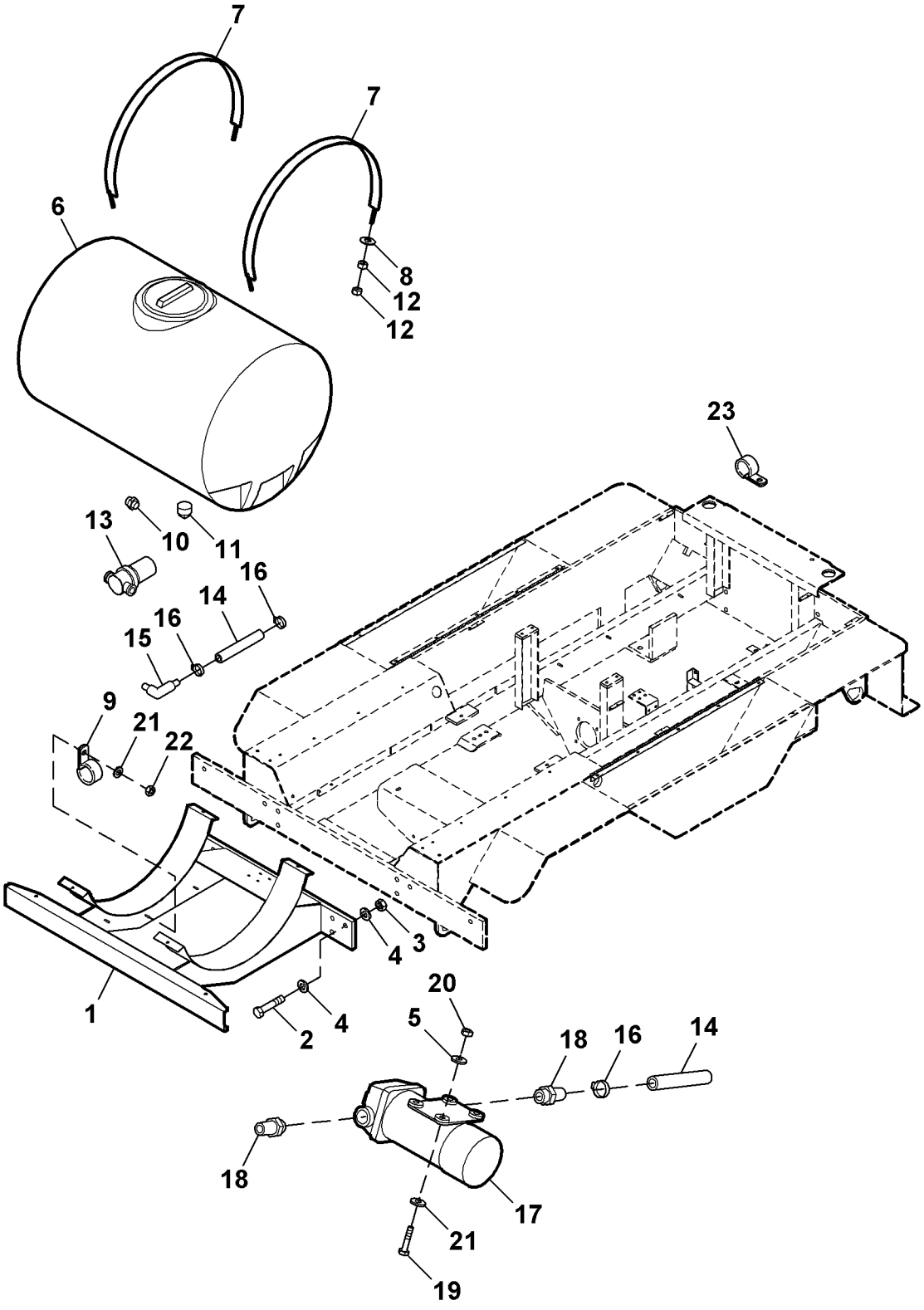

Figure 10-12

Water Spray Tank And Mounting Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	27100	1	Mount W/m, Water Tank	
2	81027	6	Cap Screw, Hex Head	.750-10x3.50, Gr8
3	80043	6	Nut, Hex	.750-10
4	81154	12	Washer, Flat	SAE .750, Hardened
5	871071601	4	Washer, Lock	#10
6	33238	1	Tank, Water, 150gal	
	33238-01	AR	Pipe, Bulkhead	1.25 Fp, Pvc
	33238-02	AR	Pipe, Bulkhead	12 Fp, Pvc
	33238-03	AR	Cover, 10 Inch, Vented, Raven	
7	12488	2	Tank Strap W/m	
8	81155	14	Washer, Flat	SAE.375, Hardened
9	33594-01	7	Clamp, Loop	.50 0d, Rem Cushion
10	70459	1	Fitt, Str	08mp-12mp
11	99293	1	Pipe, Plug	1.50, Sq Head, Mi
12	80038	18	Nut, Hex	.375-16
13	36926	1	Strainer Assy	
14	38579	20	Hose	06, Low Pressure, Push-on
15	70319	1	Fitt, 90°	08mp-08hb, Poly
16	33163	6	Clamp, Hose	# 08
17	36730	1	Pump, Water, Diaphram	
18	36730-02	1	Port Kit	08 Barb X 90, Epdm
19	80891	4	Mach Scr, Ph	#10-32x1.00
20	80494	4	Nut, Hex	#10-32
21	80995	4	Washer, Flat	USS #10
22	80036	7	Nut, Hex	.250-20
23	26484	4	Bracket, Spray Pipe	
•	27824	1	Wiring Harness	Lights, Tail, Extension
•	36341	1	Fuse	15 Amp, Atc
•	871111602	2	Clamp, Insulated Band	3/4”
•	28369	1	Wire Harness	Water Pump
•	35077	4	U-bolt	.250-20, 1.00iw, 1.75il
•	80224	10	Cap Screw, Hex Head	.375-16 X 1.25, Gr5

• Item Not Illustrated

Dust Suppression System Illustration

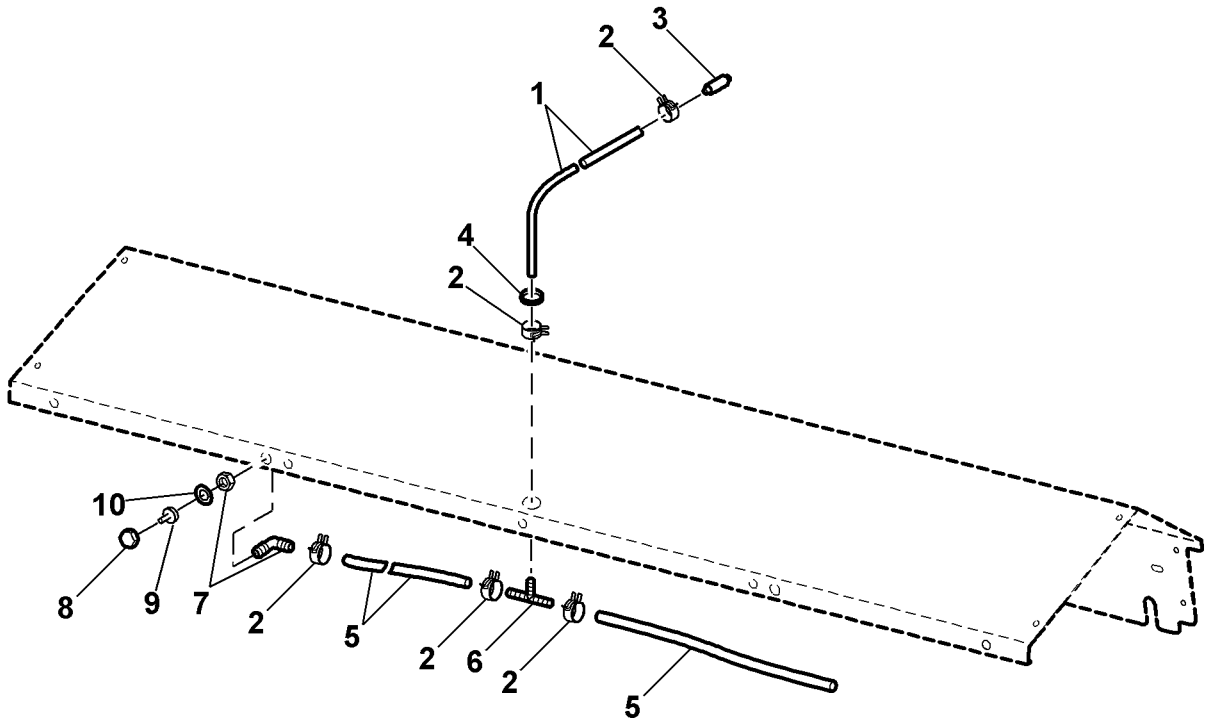

Figure 10-13

Dust Suppression System Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	38579	20	Hose	06, Low Pressure, Push On
2	1001616-01	6	Clamp, Spring	5/8 Hose
3	36882	1	Valve, Check	08hb, 5 Psi,poly
4	1001616-02	1	Grommet, Rubber	
5	1001616-03	2	Hose, Clear, Vinyl	3/8” X 1.75’
6	1001616-04	1	Fitting, Barb, Tee, Nylon	3/8”
7	1001616-05	2	Nozzle, Elbow, Without Clamp	
8	1001616-06	2	Nozzle, Cap, Nylon	
9	1001616-07	2	Nozzle, Tip, Brass	
10	1001616-08	2	O-ring	#8 Face Seal
•	1001616	1	Dust Suppression (Complete Kit)	

• Item Not Illustrated

Engine Subassembly, Caterpillar Illustration

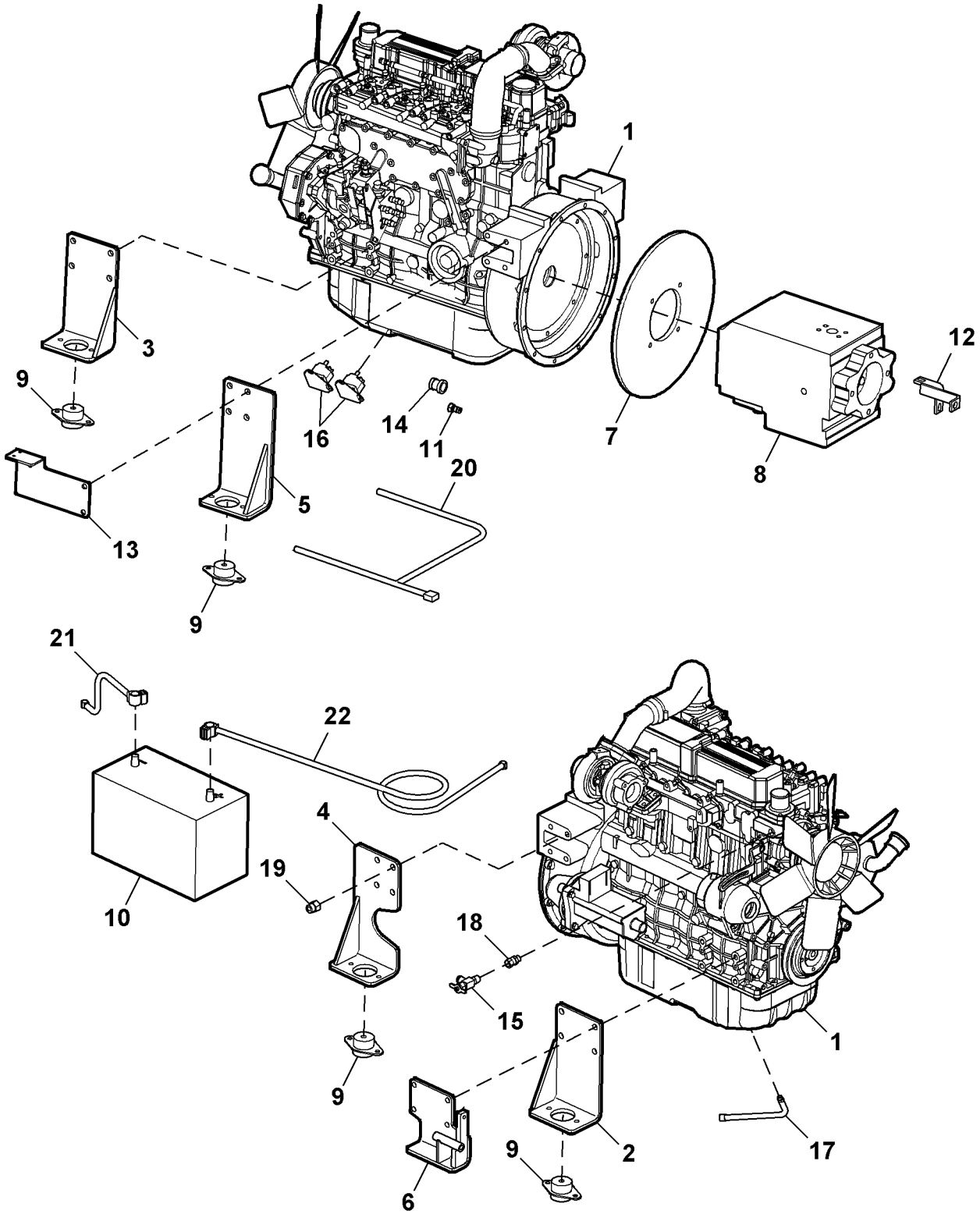

Figure 10-14

Engine Subassembly, Caterpillar Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	988671	1	Engine	CAT, 3044t, 80 Hp
2	987086	1	Mount, Eng, W/m	Rear, L.H.
3	987085	1	Mount, Eng, W/m	Rear, R.H.
4	987084	1	Mount, Eng, W/m	Front, L.H.
5	987083	1	Mount, Eng, W/m	Front, R.H.
6	987077	1	Mount, Eng/compressor, W/m	
7	986264	1	Drive Pl Assy	SAE#4, C Mt
8	38321	1	Pump, Hyd, Piston	4.57 Cir
9	39082	4	Mount, Isolation	425#
10	33146-6	1	Battery	12v, 1000 Crk Amps
11	72689	1	Fitt, Test	06mb-02pd
12	1000495	1	Bracket, Pump Cable, W/m	
13	983185	1	Brkt, Throttle, Cable	CAT/per3.3
14	99552	1	Pipe, Red	08fp-06fp, Mi
15	35546	1	Valve, Heater Shutoff	
16	38954	2	Relay, Starter	
17	986686	1	Kit, Oil Drain	CAT
18	6274	1	Fitt, Str	06mp-06fpx
19	986687	1	Kit, Fittings, Lift Pump	CAT
20	1000290	1	Harness, Engine	CAT 3.3
21	400020	1	Cable, Battery, Neg	16", Eye/post
22	852510	1	Cable, Battery, Pos	44", Eye/post
•	5804	1	Cable, Battery, Neg	13", Eye/eye
•	37005	1	Switch, Temp	220° F, No, 1/4p
•	39081	1	Sender, Press, Oil	1-150 Psi, Hd

• Item Not Illustrated

Exhaust Group, Caterpillar Illustration

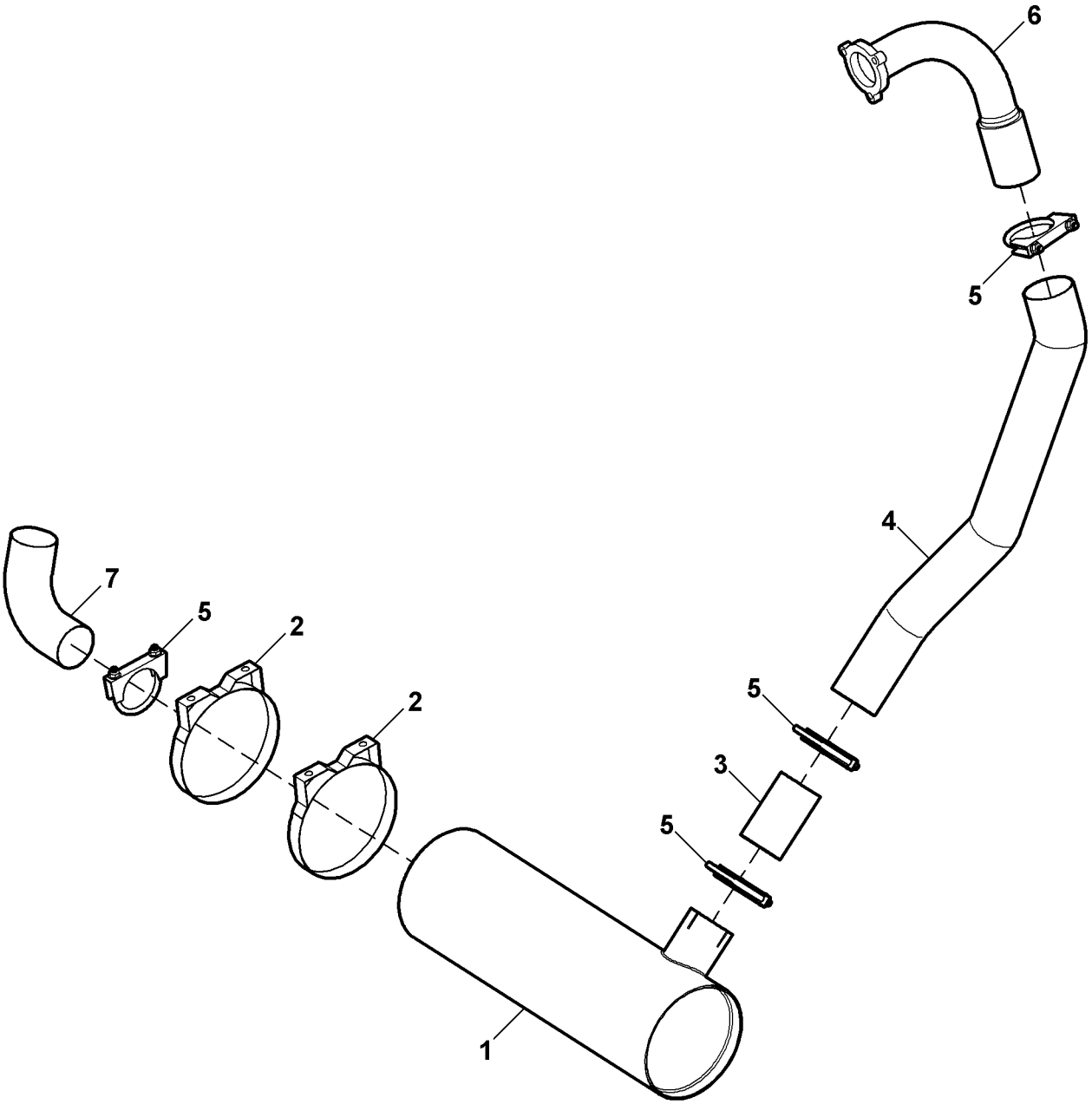

Figure 10-15

Exhaust Group, Caterpillar Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	34074	1	Muffler	2-1/2” Id Side Inlet
2	34033	2	Clamp, Air Cleaner Mount	6.5”id
3	19287-02	1	Tubing	2.50 Od X 16 Ga X 4
4	988381	1	Tube, Flex, Exhaust	2.50 X 22.00
5	33312	4	Clamp, Muffler	.3125 X 2.5
6	986387	1	Adapter, Exhaust	CAT
7	36117	1	Elbow, Exhaust, 90°	2.5” Od
•	38380	1	Hanger, Exhaust	

• Item Not Illustrated

Air Cleaner, Caterpillar Illustration

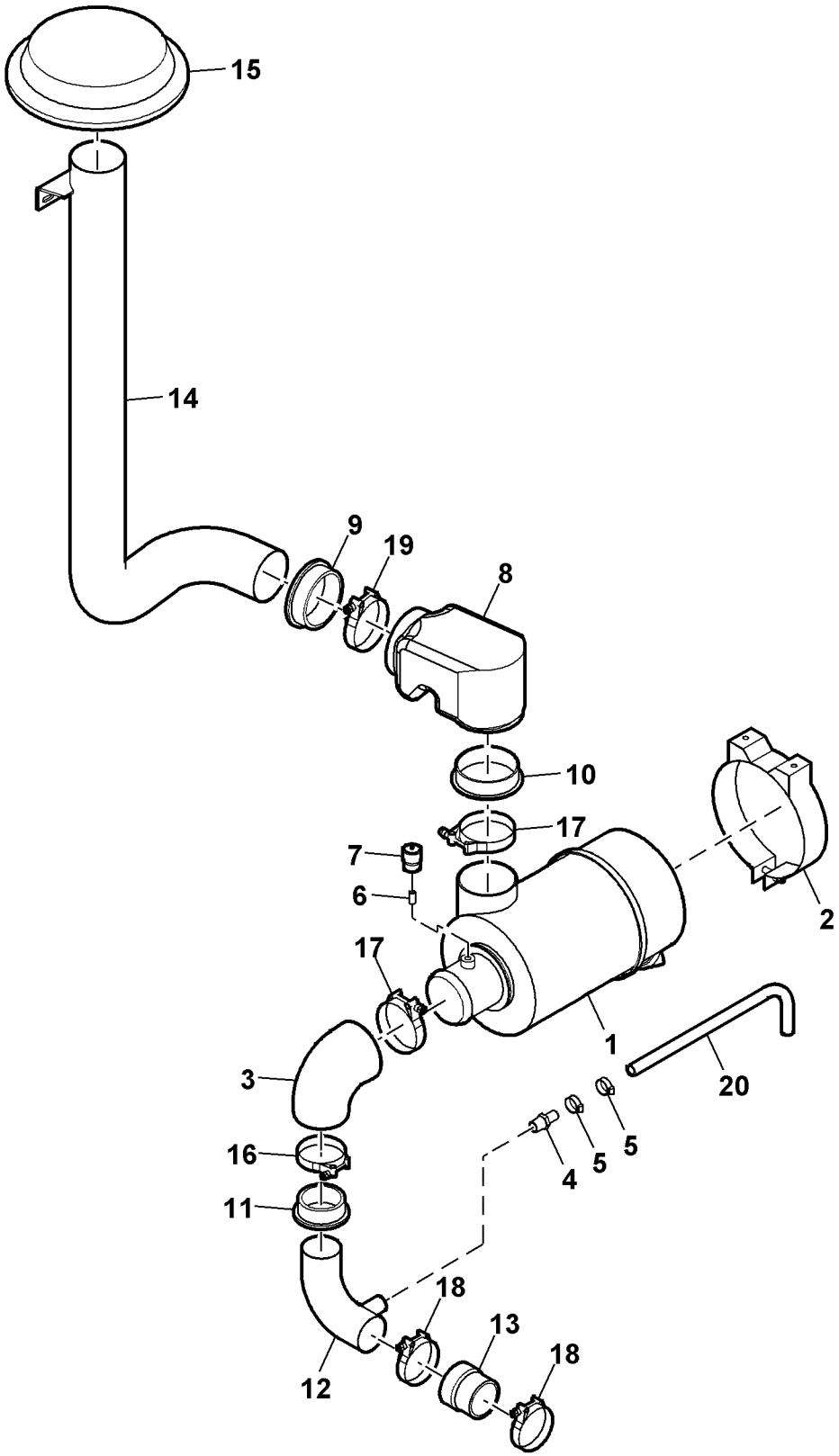

Figure 10-16

Air Cleaner, Caterpillar Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	38385	1	Air Cleaner Assy	
2	38386	1	Mounting Band	8.13 Id
3	171170	1	Elbow, Rubber, 90º	3.50 X 3.00 Id
4	70755	1	Fitt, Str	08mp-08hb
5	33164	2	Clamp, Hose	# 10
6	99610	1	Pipe, Nipple	.125 Xclose
7	171220	1	Indicator, Air Filter Service	
8	987484	1	Elbow, Rubber, Cobra	4.0” X 4.0”
9	987485	1	Adapter, Rubber	4.0” X 3.5”
10	37587-2	1	Insert, Rubber	4.00 To 3.75
11	38830	1	Adptr, Rubber, Insert	3.00 X 2.50
12	987295	1	Tube W/ Adapter	2.5”, W/m
13	987486	1	Reducer, Rubber	2.5” X 2.25”
14	987488	1	Tube, Intake, W/m	
15	37587	1	Pre-cleaner	4.00 Id
16	171090	2	Clamp, T-bolt	3.00 Nominal
17	171190	1	Clamp, T-bolt	3.50 Nominal
18	36045	1	Clamp, T-bolt	2.50 Nominal
19	36870	2	Clamp, T-bolt	4.50 Nominal
20	6352	1	Hose	08, Push-on, 250
•	984932	1	Insert	4x3.5, Reducer
•	80038	2	Nut, Hex	.375-16
•	80162	4	Washer, Lock	.375
•	80226	4	Cap Screw, Hex Head	.375-1 6x1.50, Gr5
•	80996	6	Washer, Flat	SAE, .375
•	987686	1	Connector	3.50” Id-od

• Item Not Illustrated

Engine Cover Assembly Illustration

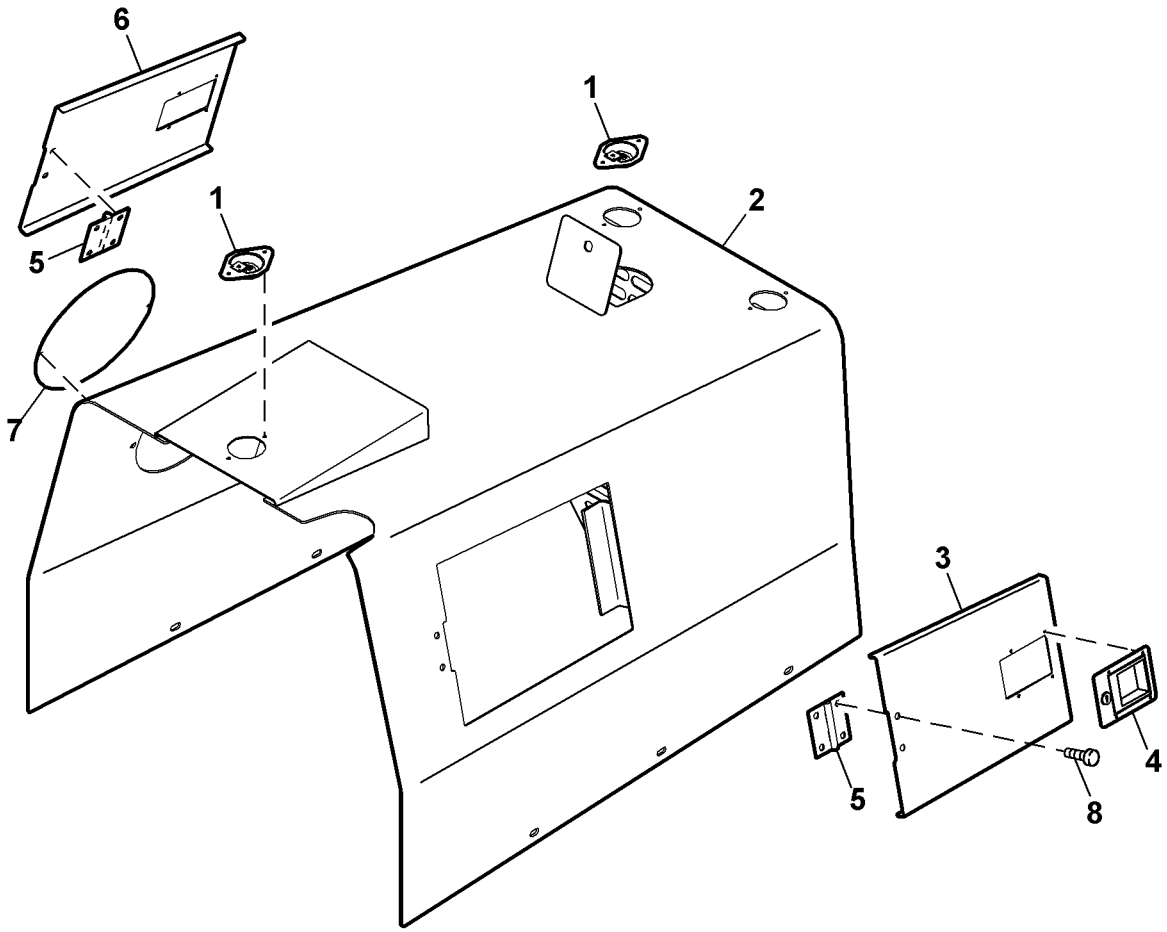

Figure 10-17

Engine Cover Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1001057	3	Ring, Recessed, Lifting	500#
2	1000890	1	Cover, Engine	
3	1000883	1	Plate, Cover	L.H.
4	160450	2	Latch, Engine Access Panel Door	
5	147-876	2	Weld Hinge	4”
6	1000882	1	Plate, Door	R.H.
7	1000884	1	Cover, Air Filter	
8	1001710	8	Bolt, Button Head	

Fuel Tank Assembly Illustration

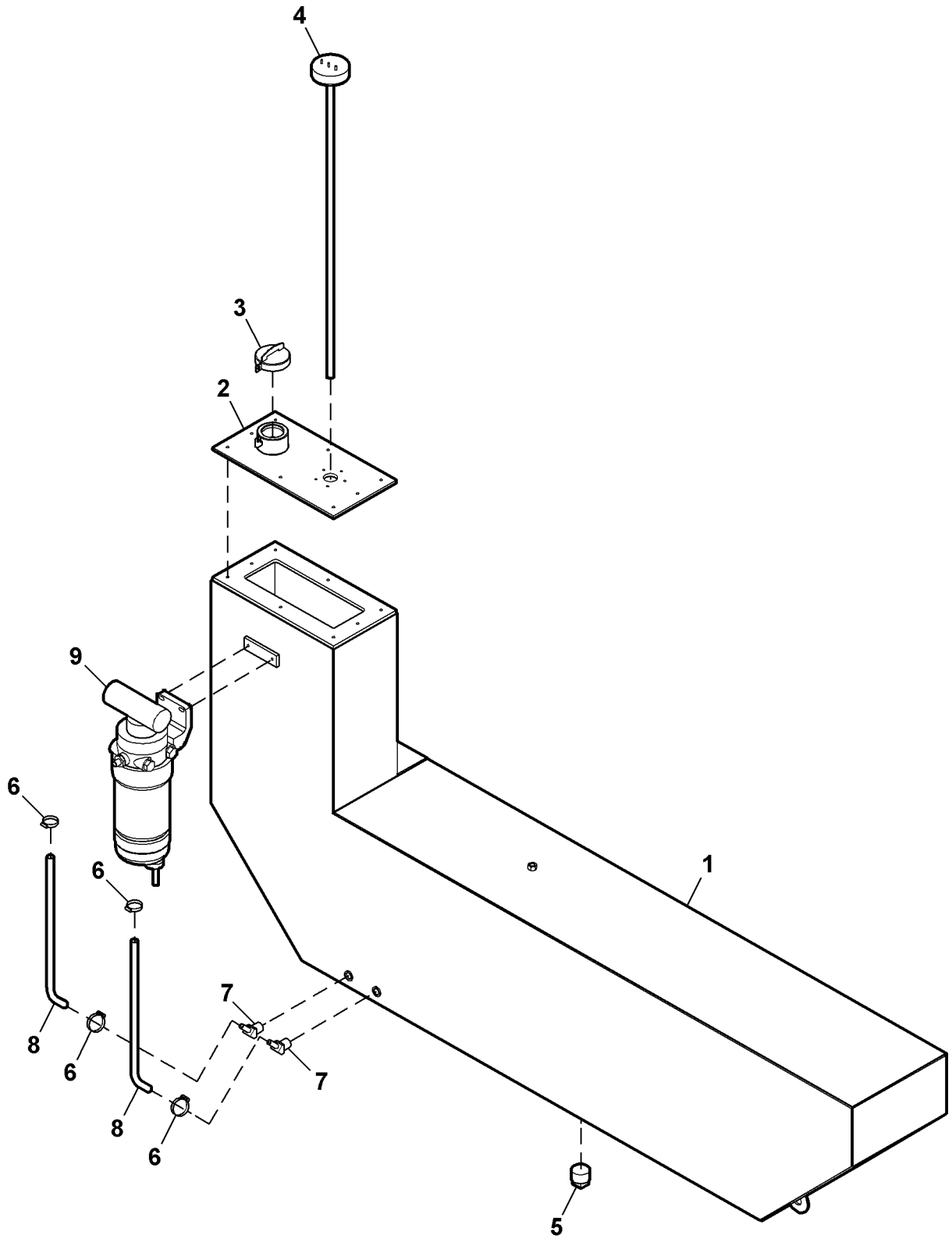

Figure 10-18

Fuel Tank Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1000261	1	Tank W/m, Fuel	
2	1000205	1	Cover, Fuel Tank, W/m	
3	36105	1	Cap, Fuel, W/lock Lug	
4	38373	1	Sending Unit, Fuel Level	
5	99539	1	Pipe, Plug	16mp, Sq Head, Mi
6	33162	4	Clamp, Hose	# 06
7	72369	2	Fitt, 45°	04mp-05hb, Crimped
8	71812	8	Hose	05, Fuel, Non Push-on
9	984909-13	1	Fuel/water Separator Pump	CAT
•	987501	1	Mount, Fuel Lift Pump	

• Item Not Illustrated

Radiator/cooler Assembly Illustration

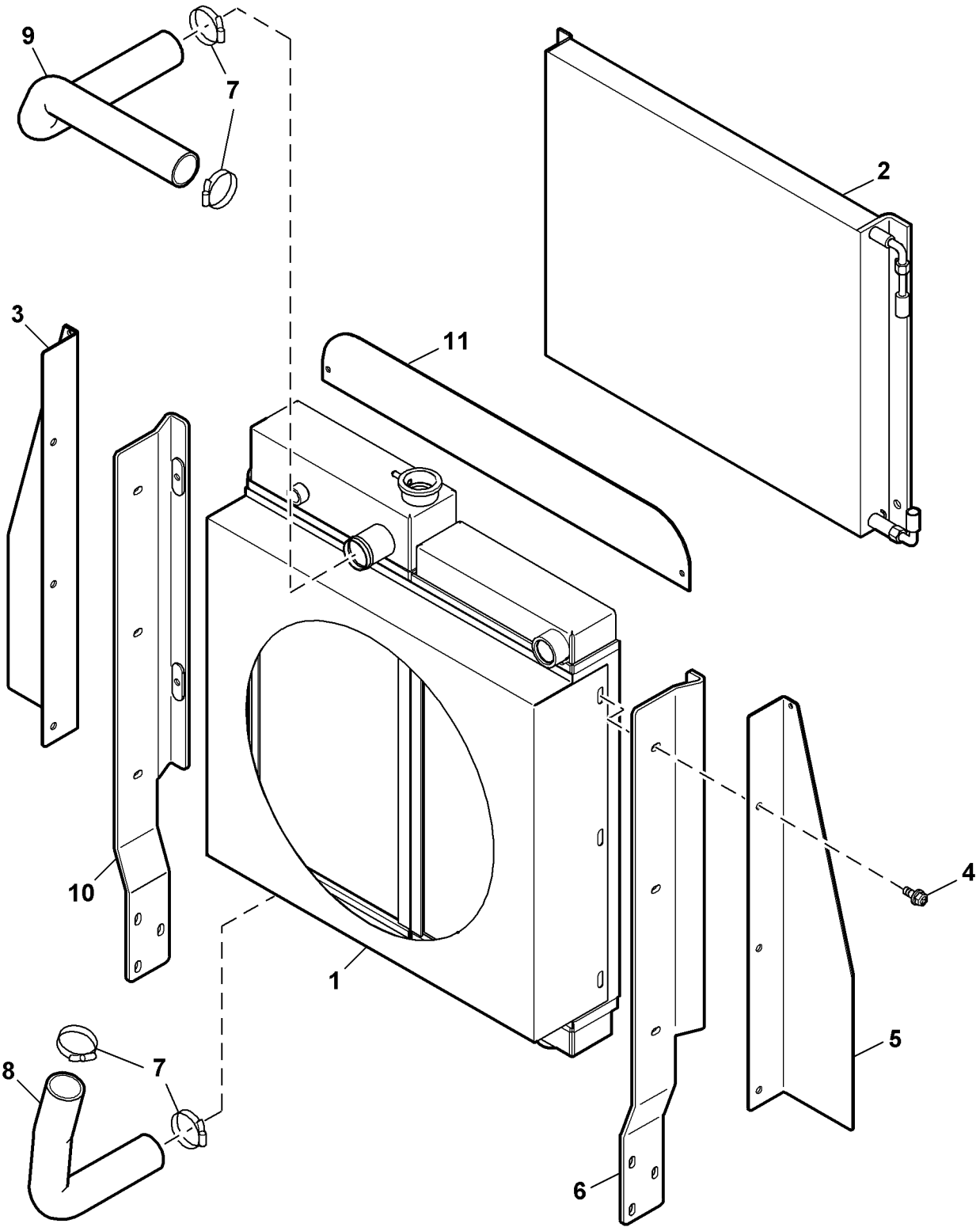

Figure 10-19

Radiator/cooler Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1000831	1	Rad/oil Cooler	CAT 3.4 Qt Tier 3
2	36745-06	1	Condensor Assembly	
3	1001164	1	Plate, Support, Rad	R.H.
4	80802	6	Cap Screw, Hex Head	
5	1001165	4	Plate, Support, Rad	L.H.
6	1000425	1	Radiator Mount	L.H.
7	230240	4	Clamp, Hose	#28 (2-1/8”)
8	988352	1	Hose, Flex	1.75 X 1.75 X 16.0
9	170071A	1	Hose, Radiator	Upper, 685b/3000
10	1000424	1	Radiator Mount	R.H.
11	1001163	1	Plate, Support, Rad	Top
•	73150	1	Fitting, Straight	08mb-06fb
•	80038	4	Nut, Hex	.375-16
•	80162	4	Washer, Lock	.375
•	81155	8	Washer, Flat	SAE .375, Hardened
•	910150	1	Valve, Drain, Cock	.250 Npt

• Item Not Illustrated

Air Conditioning/heater Group Illustration

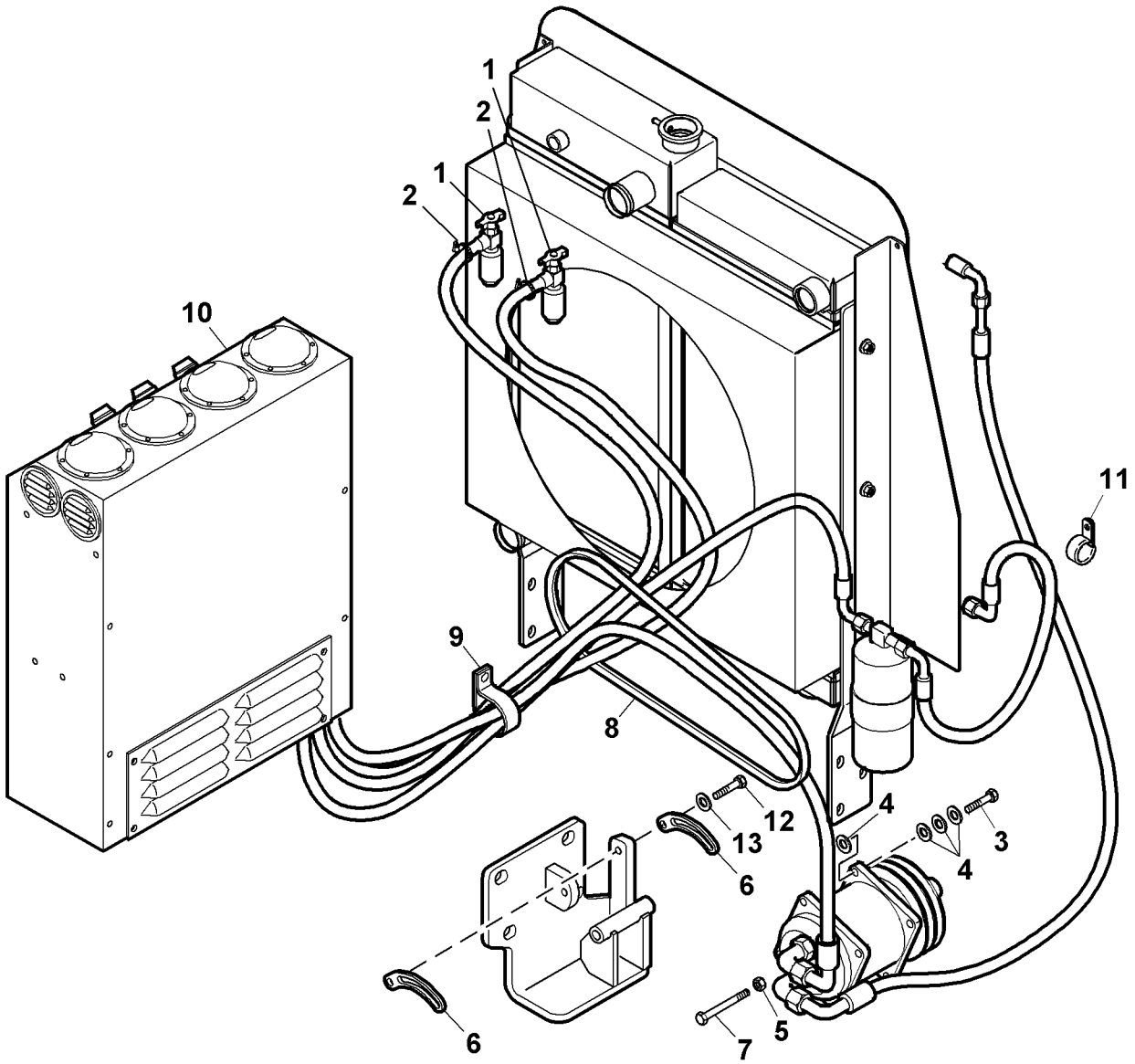

Figure 10-20

Air Conditioning/heater Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	35546	2	Valve, Heater Shutoff	
2	33164	4	Clamp, Hose	# 10
3	80230	1	Cap Screw, Hex Head	.375-16 X 2.00, Gr5
4	80142	4	Washer, Flat	USS .375
5	80038	1	Nut, Hex	.375-16
6	26778	2	Bracket, A/C Compressor	
7	71617	1	Cap Screw, Hex Head	.375-1 6 X 5.00, Gr5
8	1001690	1	V Belt	4l 38.00 X .500
9	36894	1	Clamp, Loop	2.00 Od, Plstc Cover
10	38653	1	Cab Air Cond/heater Kit	
11	33595	1	Clamp, Loop	1.00 Od, Rem Cushion
12	80221	1	Cap Screw, Hex Head	.375-16x1.00, Gr5
13	80162	2	Washer, Lock	.375
•	TF10199	12	Hose, Heater	.625 Id
•	35138	1	Conn, Sealed, Shroud	2-pin
•	36164	2	Term, Sealed Conn	16-14 Ga, Male
•	36166	1	Seal, Cable	18-16 Ga
•	36342	1	Fuse, Blade	20amp, Atc-20
•	38106	0.12	Refrigerant, Oil	
•	38105	0.09	Refrigerant	R134a Freon
•	80352	1	Nut, Flexloc	.375-1 6, Full, Lt
•	80192	16	Cap Screw, Hex Head	.250-20 X .75, Gr5
•	80140	2	Washer, Flat	USS .250
•	80160	2	Washer, Lock	.250
•	80350	8	Nut, Flexloc	.250-20, Full, Lt
•	81072	4	Cap Screw, Hex Head	.250-20 X 3.50, Gr5
•	80036	2	Nut, Hex	.250-20
•	81006	10	Washer, Flat	USS .188
•	80194	1	Cap Screw, Hex Head	.250-20 X 1.50, Gr5
•	80224	2	Cap Screw, Hex Head	.375-16 X 1.25, Gr5
•	80226	1	Cap Screw, Hex Head	.375-16 X 1.50, Gr5
•	80474	2	Washer, Flat	M10
•	80937	2	Cap Screw, Hex Head	M08 X 1.25 X 20mm, Cl12.9

• Item Not Illustrated

Cab Air Conditioning/heater Kit (1 Of 2) Illustration

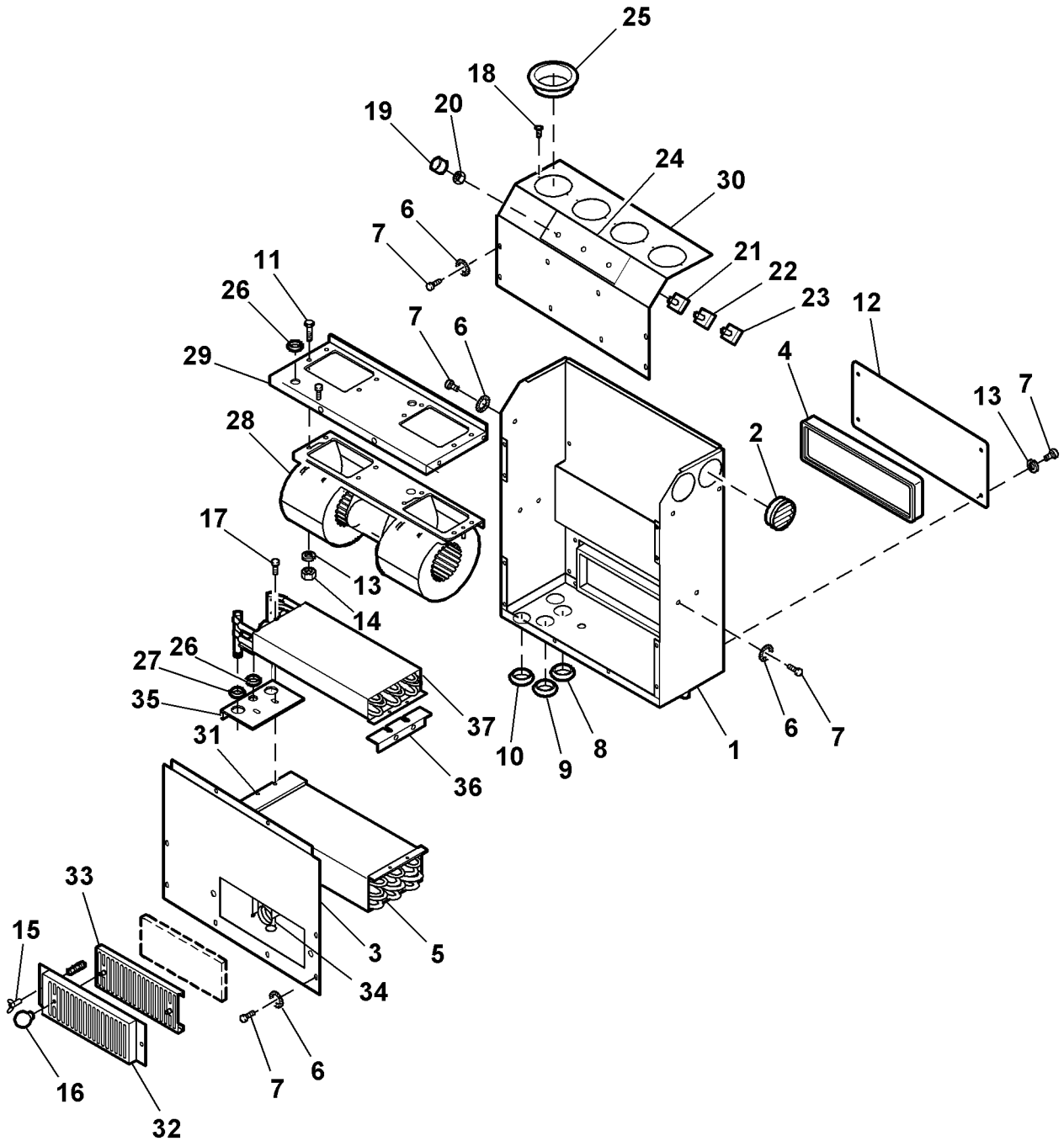

Figure 10-21

Cab Air Conditioning/heater Kit (1 Of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	38653-04	1	Housing	
2	36745-17	2	Louvers	
3	36745-25	1	Cover	Bottom
4	38653-01	1	Filter Element, Cab Air	
5	38653-05	1	Coil, Assy, Evap.	
6	N/A	22	Washer, Ext. Tooth	
7	N/A	26	Screw	1/4-20, Truss Head
8	38606-16	1	Grommet	
9	38606-15	1	Grommet	
10	38525-34	2	Grommet	
11	N/A	8	Bolt	1/4-20
12	38653-02	1	Louver Door	
13	80160	12	Washer, Lock	.250
14	80036	8	Nut, Hex	.250-20
15	36745-36	2	Fastener, Turn	1/4
16	37645-20	2	Knobs	
17	N/A	4	Screw, Whizlock	1/2-24,#10
18	N/A	8	Screw, Flat Head	3/4-#6
19	36745-21	3	Knobs	
20	38525-22	3	Nut, Mounting Control	
21	36749-03	1	Cable, Rotary Control	
22	36745-18	1	Switch, Fan	
23	36745-19	1	Cold Control	
24	36745-22	1	Decal	
25	36745-16	4	Louvers	
26	38653-09	3	Grommet	
27	38653-08	2	Grommet	
28	36745-13	1	Blower	
29	36745-26	1	Blower Plate	
30	36745-24	1	Cover	Top
31	36749-04	1	Cable, Rotary Control	
32	36745-29	1	Cover, Recirc.	
33	36745-30	1	Filter Holder, Recirc.	
34	36749-01	1	Valve, Water	
35	38653-07	1	Bracket, Coil	R.H.
36	38653-06	1	Bracket, Coil	L.H.
37	36749-02	1	Coil, Heater	

Cab Air Conditioning/heater Kit (2 Of 2) Illustration

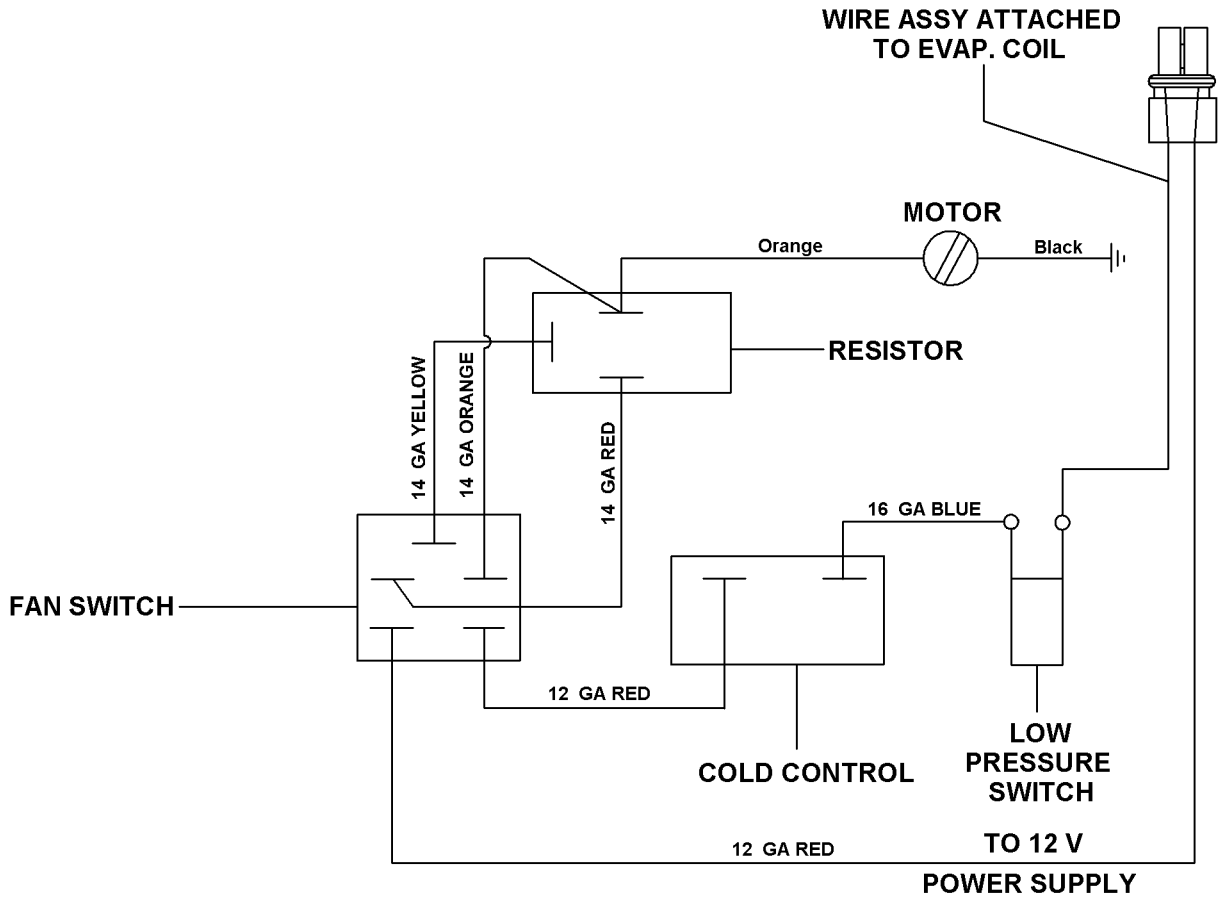

Figure 10-22

Cab Air Conditioning/heater Kit (2 Of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
•	36745-01	1	Hose, Comp-conden	13/32
•	36745-02	1	Hose, Comp-evapor	1/2
•	36745-03	1	Hose, Evapor-dryer	5/1 6
•	36745-04	1	Hose, Dryer-conden	5/1 6
•	36745-05	1	Compressor Assy	
•	36745-06	1	Condenser Assy	
•	36745-07	1	Receiver Dryer	
•	36745-08	1	Clamp, Receiver Dryer	
•	36745-09	1	Switch, High Pressure	
•	36745-10	2	O-ring	#10
•	36745-11	2	O-ring	#8
•	36745-12	4	O-ring	#6
•	36745-32	1	Valve, Thermal Expansion	
•	36745-34	1	Switch, Low Pressure	

• Item Not Illustrated

Cab Frame, Glass And Door Illustration

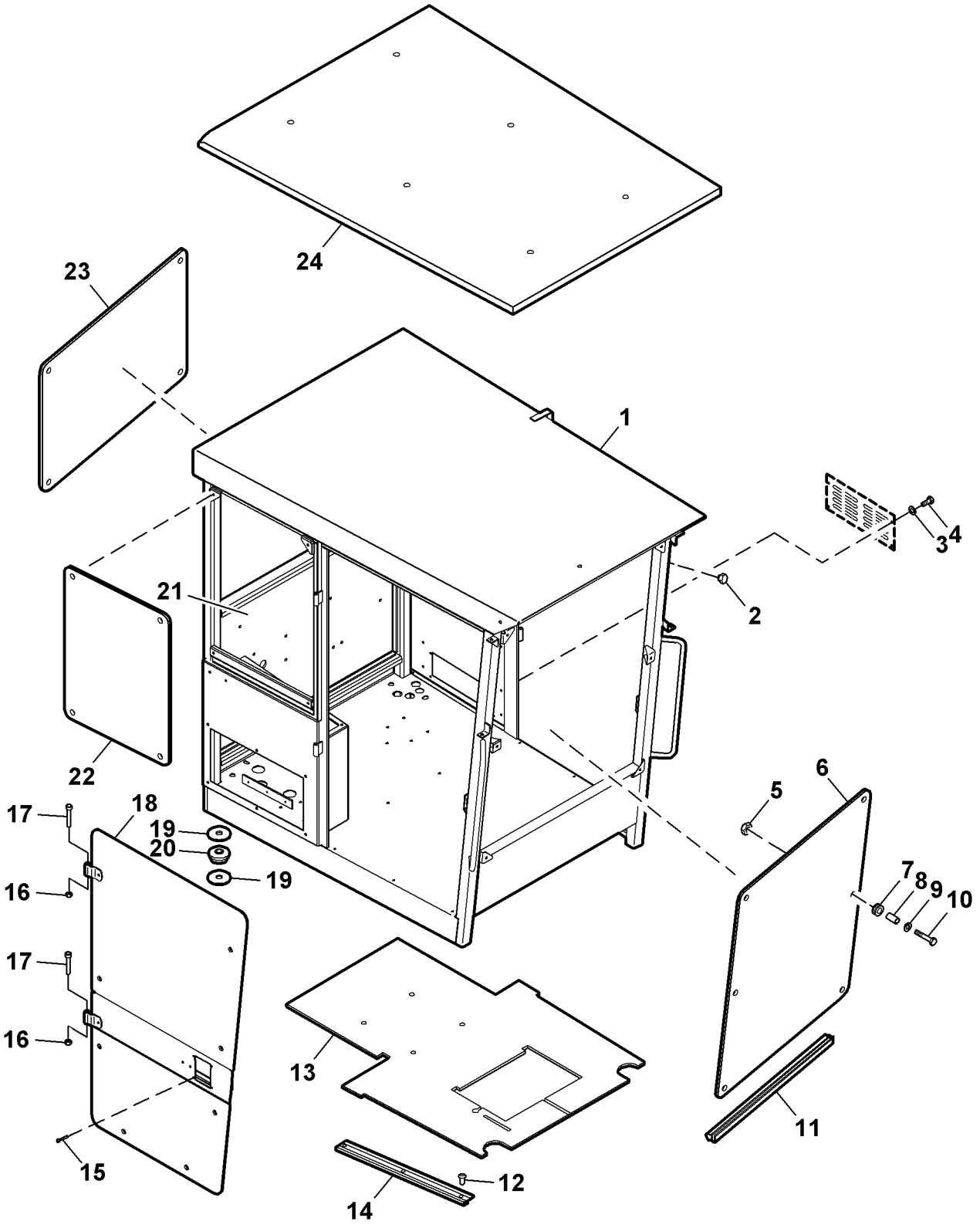

Figure 10-23

Cab Frame, Glass And Door Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1000959	1	Cab, W/m	2 Door
2	35136-21	2	Plug, Hole	.312, Flush Mt, Plstc
3	80140	4	Washer, Flat	USS, .250
4	80192	4	Cap Screw, Hex Head	.250-20 X .75, Gr5
5	81275	18	Nut, Acorn	.250-20, Ss
6	36688-04P	1	Glass, Window	Front
7	36688-17	18	Grommet	.250
8	36688-16	18	Bushing, Nylon	
9	81278	20	Washer, Flat	.250 X 1.00, Ss
10	81277	18	Csbhs	.250-20 X .88, Ss
11	36688-18	44	Seal, Window	
12	81282	6	Csbhs	.250-20 X 1.25, Ss
13	1000287	1	Floormat	
14	36688-07	2	Sill, Door	
15	987456	2	Plate, Cab Access Cover	
16	80352	4	Nut, Flexloc	.375-1 6, Full, Lt
17	80882	4	Cap Screw, Hex Head	.375-16 X 4.75, Gr8
18	36688-41	1	Assy, Door, Entrance	R.H.
	36690R	1	Assy, Door	L.H.
19	36073	12	Washer	.80 X 3.25 X. 1 88thick
20	36072	4	Mount, Rubber, Tube Form	
21	36688-15	1	Foam, Rear Panel	
22	36688-02P	2	Glass, Window	Side
23	36688-05P	1	Glass, Window	Rear
24	36688-12	1	Headliner	
•	985514	1	Kit, Cab, Insulation	
•	38462	0.17	Adhesive, Aerosol Spray, Can	
•	35136-11	1	Plug, Hole	1.50, Flush Mt, Plstc
•	35136-17	1	Plug, Hole	3.50, Flush Mt, Plstc

• Item Not Illustrated

Cab Door Hold And Striker Illustration

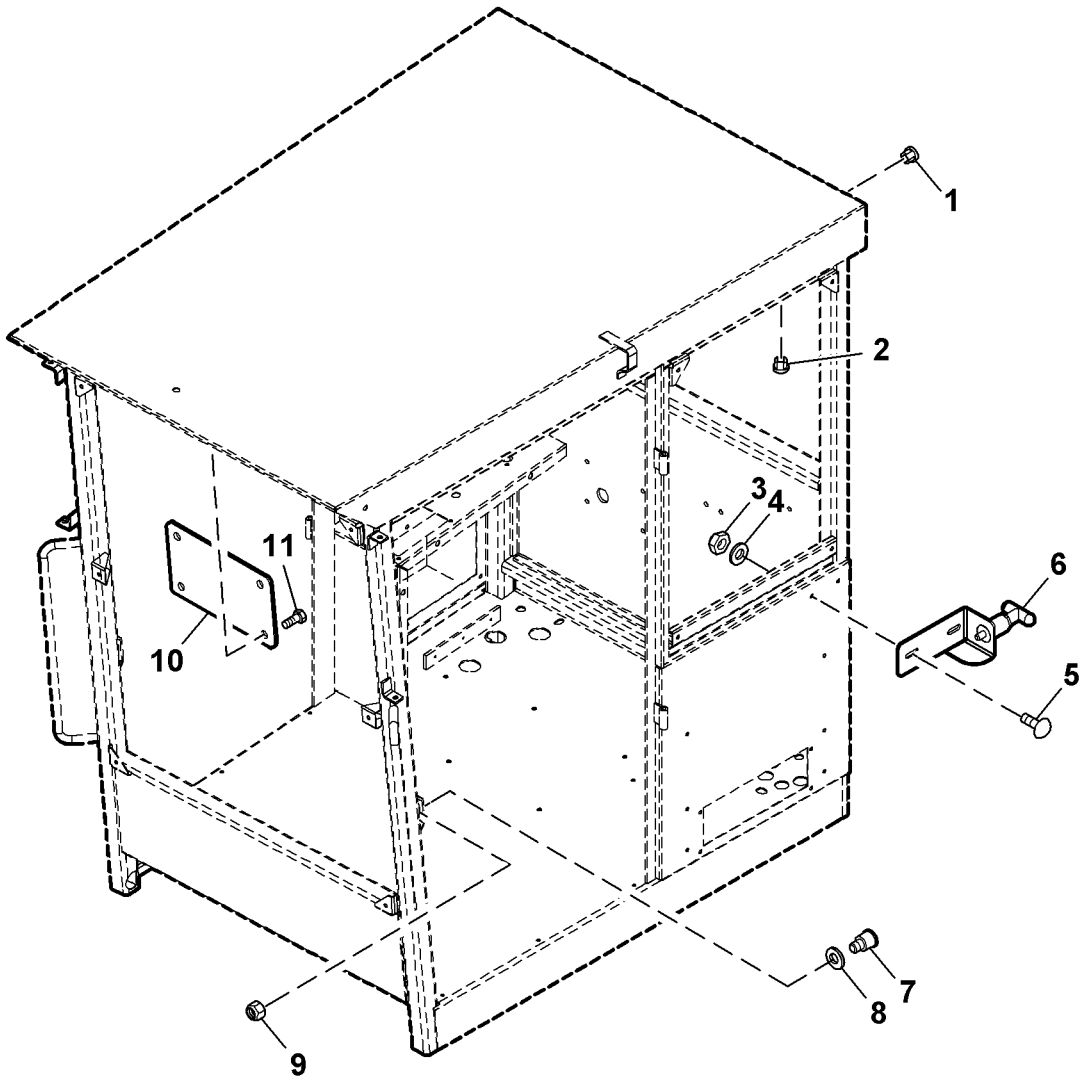

Figure 10-24

Cab Door Hold And Striker Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	35136-3	2	Plug, Hole	.375, Flush Mt, Plstc
2	35136-5	7	Plug, Hole	.625, Flush Mt, Plstc
3	80350	5	Nut, Flexloc	.250-20, Full, Lt
4	81278	20	Washer, Flat	.250 X 1.00, Ss
5	81277	6	Csbhs	.250-20 X .75, Ss
6	1000838	2	Door Hold	
7	36688-49	2	Striker, External Thread	
8	80142	3	Washer, Flat	USS, .375
9	36688-52	3	Nut, Centerlock	.438-14
10	36688-08	1	Cover, Plastic	
11	80322	4	Screw, Self-tapping, Hex Head	.250-20 X .50

Windshield Wiper Panel Illustration

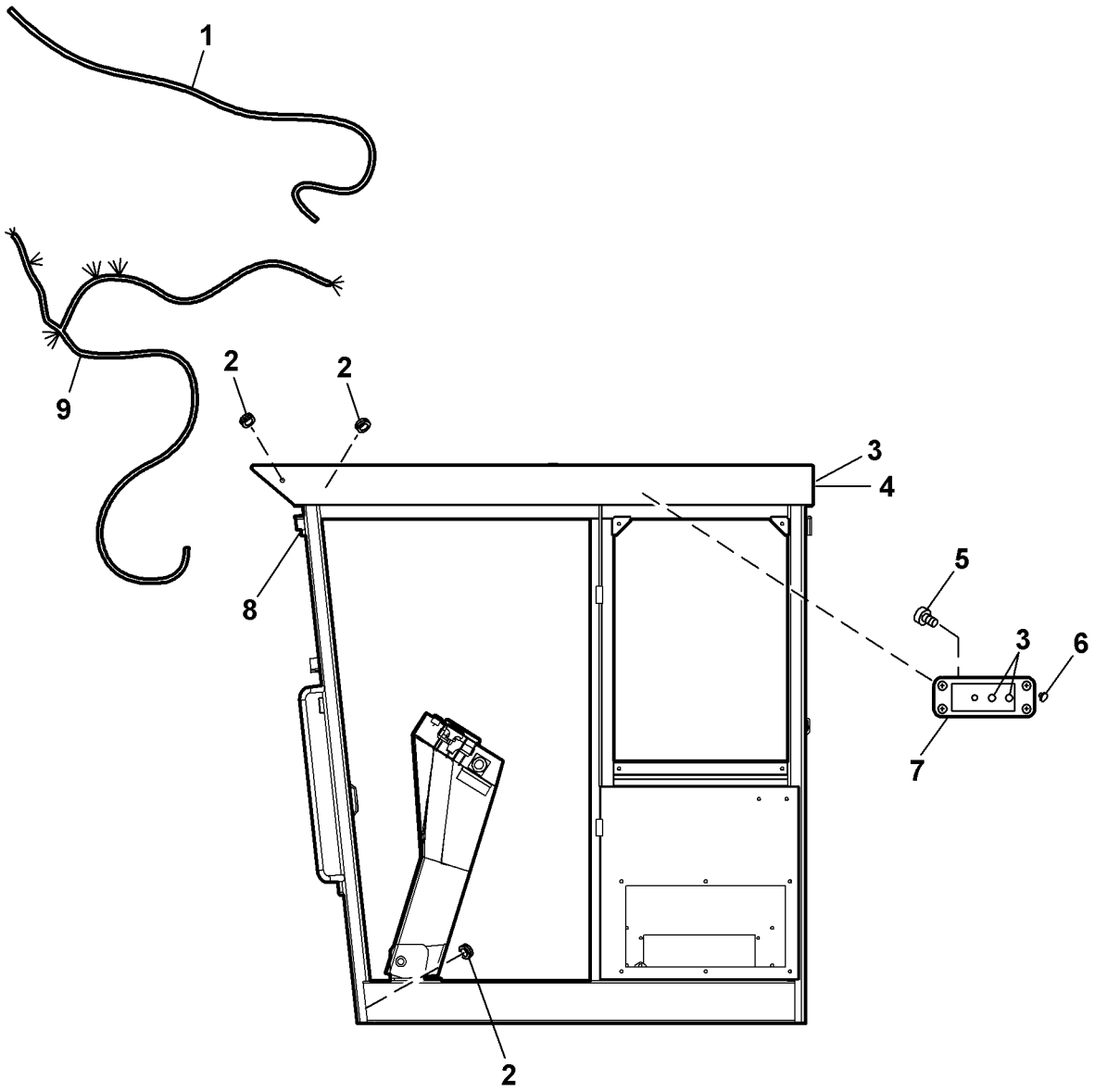

Figure 10-25

Windshield Wiper Panel Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	35550	3	Hose, Windshield Washer	.188id
2	36688-54	3	Grommet	.94id, 1.12hole, Snap In
3	35136-5	7	Plug, Hole	.625, Flush Mt, Plstc
4	35136-4	2	Plug, Hole	.500, Flush Mt, Plstc
5	853090	1	Switch, Wiper/washer	
6	80322	17	Scr, Slftpg, Hh	.250-20 X .50
7	36688-09	1	Cover, Side Access	
8	29262	1	Bracket, Fuse Block	
9	1001045	1	Wire Harness	Cab

Windshield Wiper Motor Illustration

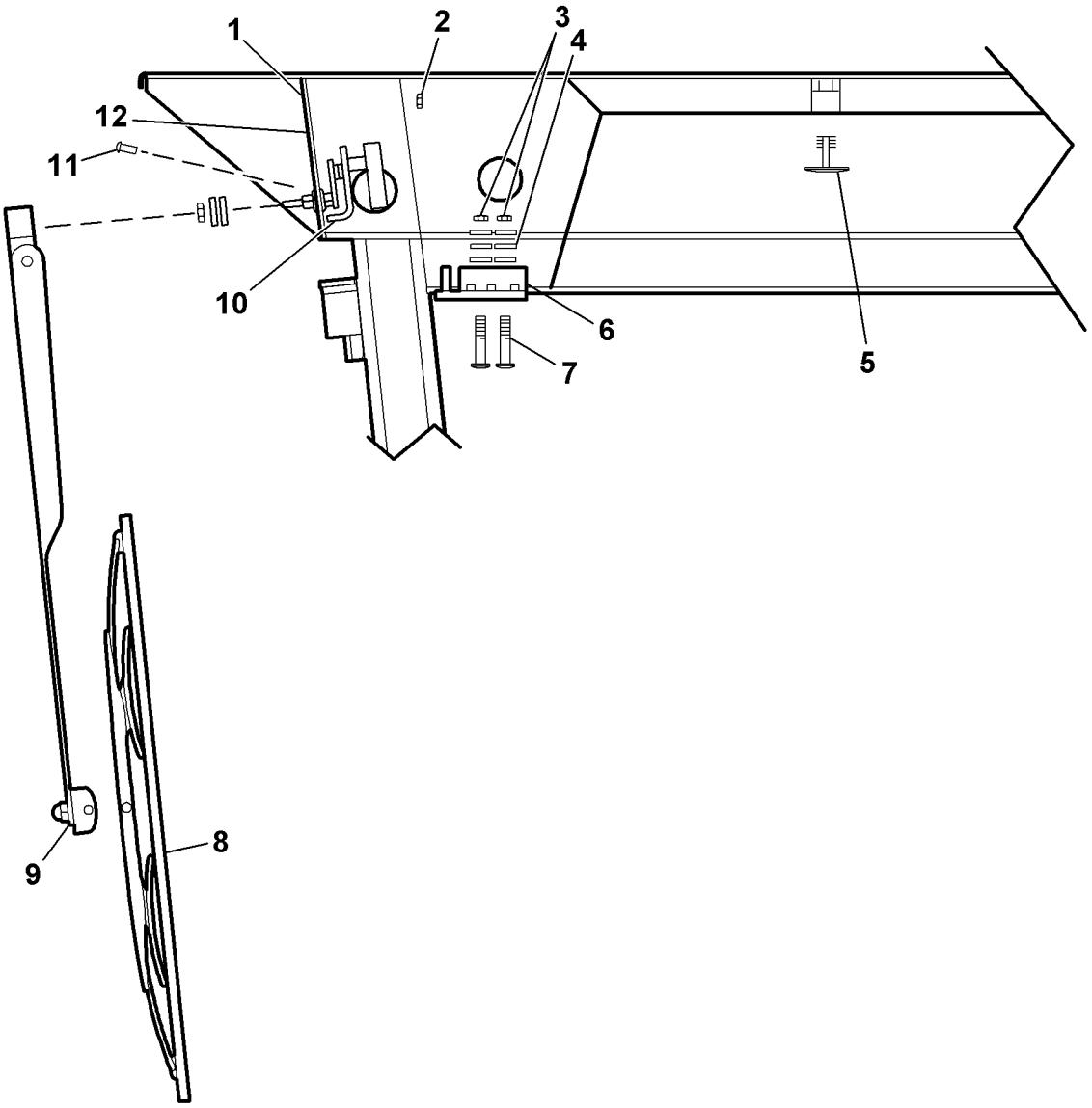

Figure 10-26

Windshield Wiper Motor Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	35136-5	7	Plug, Hole	.625, Flush Mt, Plstc
2	80350	5	Nut, Flexloc	.250-20, Full, Lt
3	80824	3	Nut, Hex	#10-24
4	871071601	6	Washer, Lock	#10
5	36688-43	6	Fastener, X-mas Tree	1.00 In
6	36695	1	Fuse Block	6 Gang, Atc
7	81281	2	Csbhs	10-24 X 1.50, Ss
8	151190	1	Blade, Wiper	
9	151180	1	Arm, Windshield Wiper	
10	151170	1	Motor, Windshield Wiper	
11	81277	6	Csbhs	.250-20 X .75, Ss
12	35136-4	2	Plug, Hole	.500, Flush Mt, Plstc
•	36340	1	Fuse	10 Amp, Atc
•	38462	.17	Adhesive, Aerosol Spray, Can	
•	33707	.0011	Sealant, Silicone, Clear	
•	21166		Rear Windshield Wiper	
•	33744	1	Arm, Wiper	
•	33744-01	1	Blade, Wiper	
•	36741	1	Wiper Motor, 2-speed	
•	853090	1	Switch, Wiper/washer	
•	36747	1	Fuse	4 Amp, Atc
•	80140	1	Washer, Flat	USS,.250
•	80192	1	Cap Screw, Hex Head	.250-20 X .75, Gr5
•	80350	1	Nut, Flexloc	.250-20, Full, Lt
•	21167		Windshield Washer, Front Or Rear	
•	33745-1	1	Washer, Tank And Pump	
•	35465-07	1	Grommet, Insulation	.750id
•	36687	4	Csbhs	.312-18 X .75, Black Finish
•	36753	1	Washer Nozzle & Tee Kit	
•	80037	4	Nut, Hex	.312-18
•	80141	4	Washer, Flat	USS, .31 3
•	35550	11	Hose, Windshield Washer	.188id

• Item Not Illustrated

Entrance Door Assembly Illustration

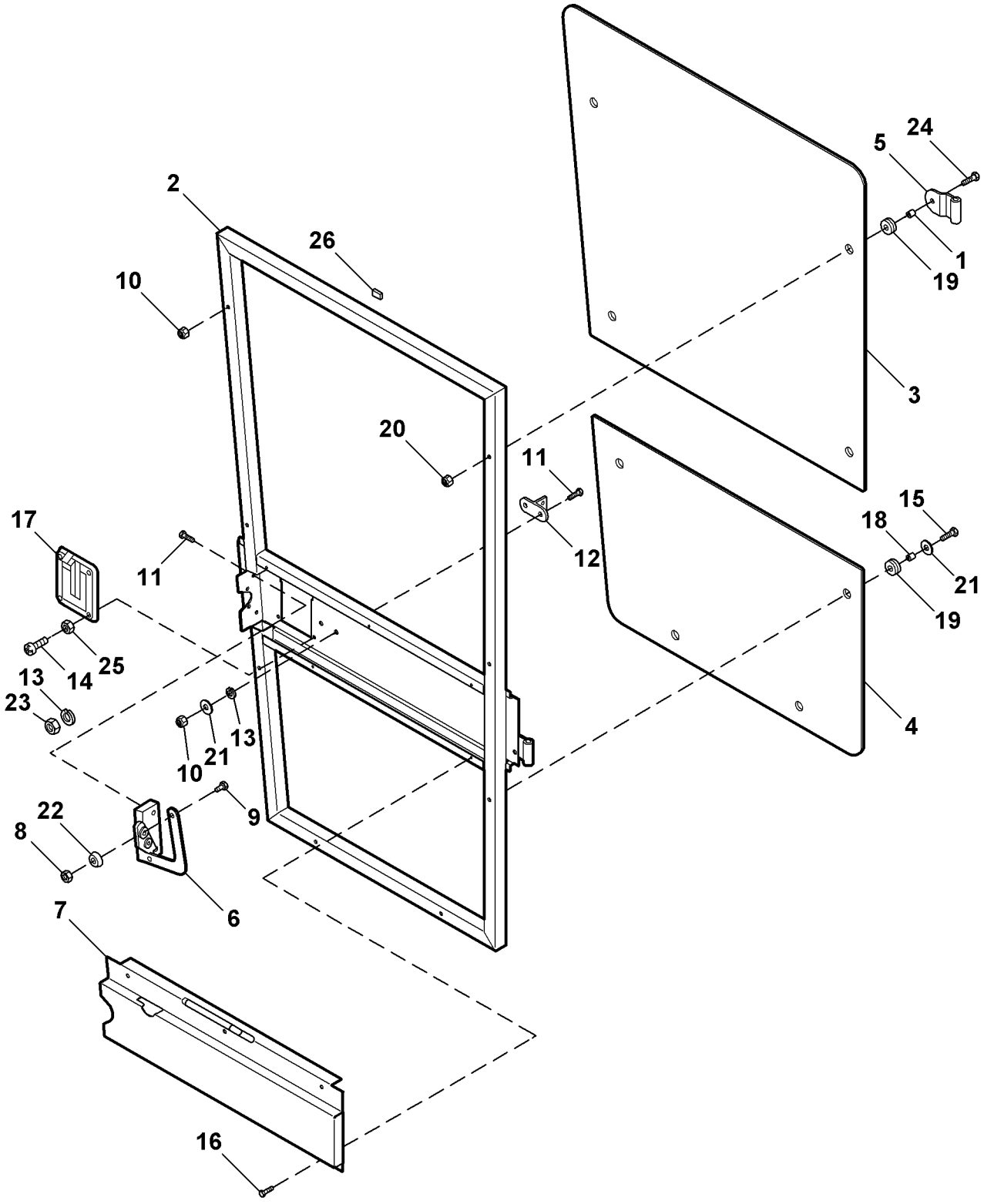

Figure 10-27

Entrance Door Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	27481	1	Bushing	.334 Id X .500 Od
2	36688-23	1	Door, W/m	R.H.
3	36688-03	1	Glass, Door	Upper
4	36688-06P	1	Glass, Door	Lower
5	36688-39	1	Hinge, Painted	Left
6	36688-25	1	Cam Latch	R.H.
7	36688-27	1	Latch Cover W/m	R.H.
8	80824	1	Nut, Hex	#10-24
9	871052400	1	Mach Scr, R.H.	#10-24 X .50
10	80350	10	Nut, Flexloc	.250-20, Full, Lt
11	81106	4	Csbhs	.250-20 X .75, Ss
12	984390	1	Door Hold	
13	80160	6	Washer, Lock	.250
14	81262	1	Shldr Scr	.500 X .625 X .375-16
15	81279	7	Csbhs	.250-20 X 2.00, Ss
16	80322	5	Scr, Slftpg, Hh	.250-20 X .50
17	36688-31	1	Paddle Latch	
	36688-32	1	Key, Paddle Latch	
18	36688-16	7	Bushing, Nylon	
19	36688-17	8	Grommet	.250
20	80351	1	Nut, Flexloc	.31 2-1 8, Full, Lt
21	81278	9	Washer, Flat	.250 X 1.00, Ss
22	36688-55	1	Knob, Inside Release	
23	80036	6	Nut, Hex	.250-20
24	81280	1	Csbhs	.31 2-1 8 X 2.25, Ss
25	80038	1	Nut, Hex	.375-16
26	73064	5	Rubber Strip, Sponge	.250 X .50
•	36688-18	14	Seal, Window	
•	19871	1	Seal, Door	
•	33707	.0011	Sealant, Silicone, Clear	

• Item Not Illustrated

Standard Seat Illustration

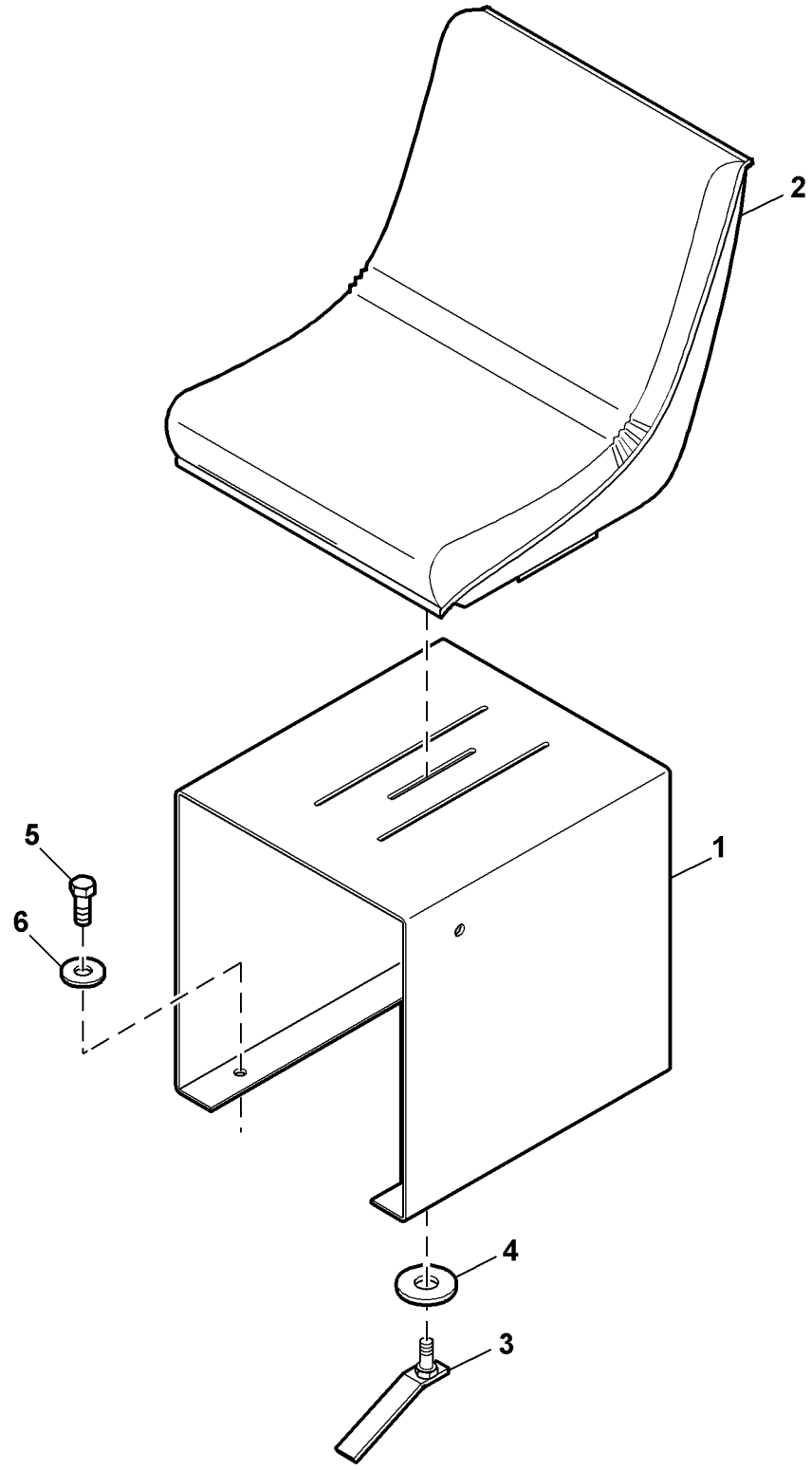

Figure 10-28

Standard Seat Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	24511	1	Pedestal, Std Seat	
2	6576	1	Seat, Black, Plain	
3	14039	1	Seat Adjustment Lever Weldment	
4	80144	1	Washer, Flat	USS, .500
5	80237	4	Cap Screw, Hex Head	.438-1 4 X 1.50, Gr5
6	80143	4	Washer, Flat	USS, .438
•	80142	4	Washer, Flat	USS, .375
•	80162	4	Washer, Lock	.375
•	80226	4	Cap Screw, Hex Head	.375-16 X 1.50, Gr5
•	80233	2	Cap Screw, Hex Head	.437-14 X 1.00, Gr5
•	80353	2	Nut, Flexloc	.438-14, Full, Lt

• Item Not Illustrated

Optional Spring Seat Illustration

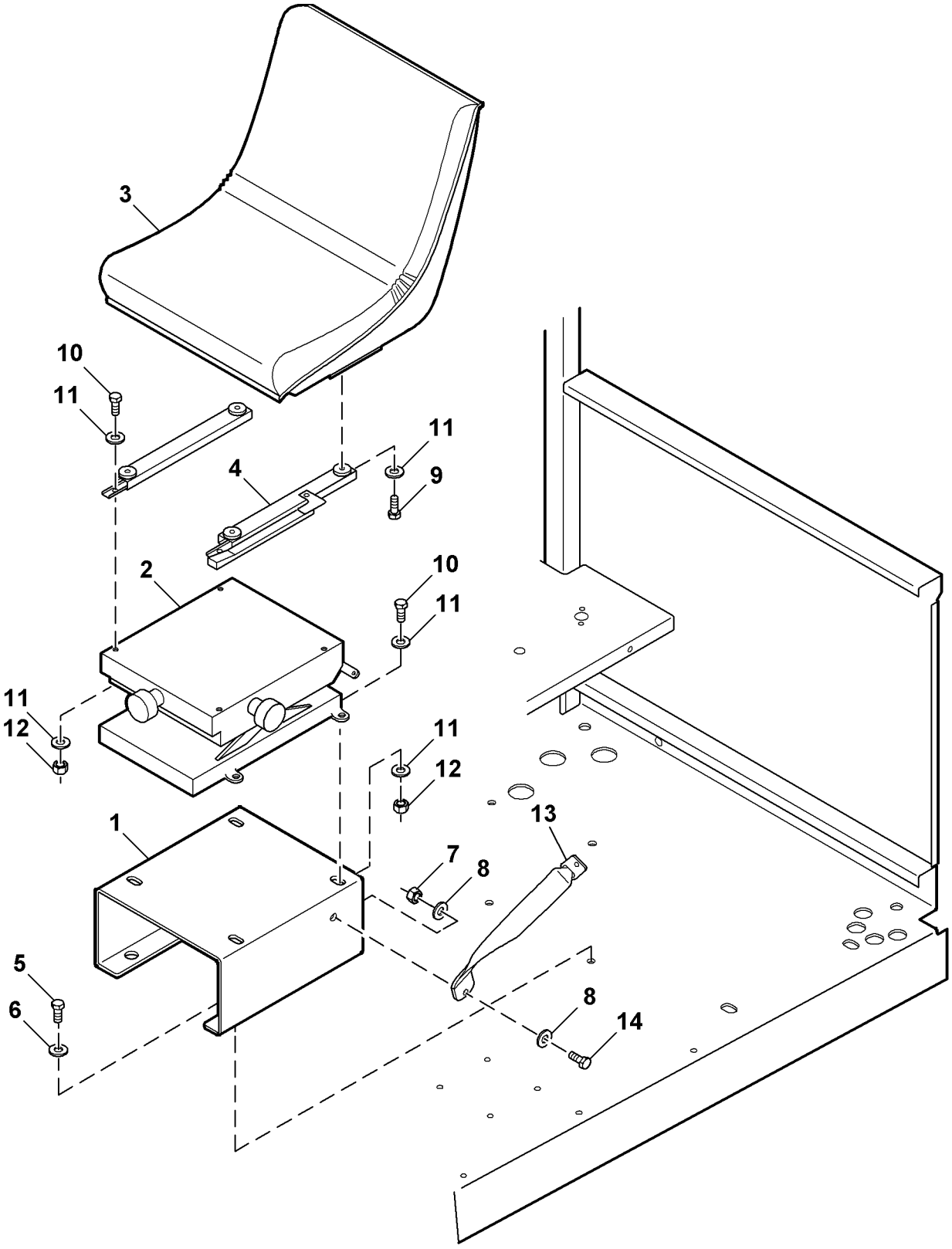

Figure 10-29

Optional Spring Seat Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	25037	1	Pedestal, Spring Seat	
2	140600	1	Seat, Suspension, Low Profile	
3	360010B	1	Seat Assy, Black, W/armrest	
4	72527-01	1	Slider Set, Seat Base	
5	80237	4	Cap Screw, Hex Head	.438-1 4 X 1.50, Gr5
6	80143	4	Washer, Flat	USS, .438
7	80039	2	Nut, Hex	.438-14
8	80143	4	Washer, Flat	USS, .438
9	80207	4	Cap Screw, Hex Head	.312-18 X .75, Gr5
10	80208	8	Cap Screw, Hex Head	.312-18 X 1.00, Gr5
11	80141	20	Washer, Flat	USS, .313
12	80351	8	Nut, Flexloc	.31 2-1 8, Full, Lt
13	37982	1	Seat Belt	12.0
14	80233	2	Cap Screw, Hex Head	.438-14 X 1.00, Gr5
•	72527-03	4	Spacer, Seat Slide, Plastic	

• Item Not Illustrated

Steering Wheel Assembly Illustration

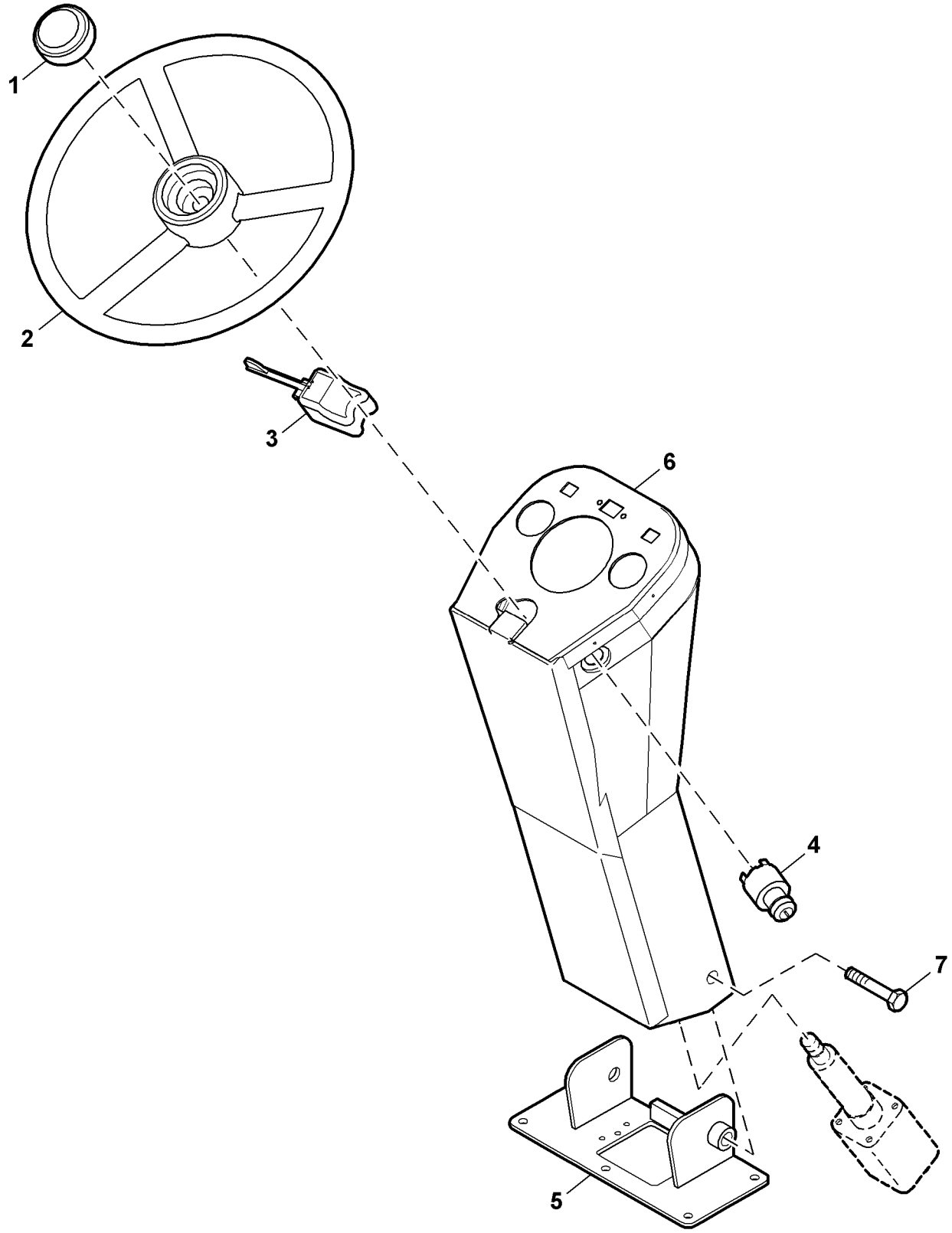

Figure 10-30

Steering Wheel Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	300010	1	Cap, Steering Wheel	
2	300030	1	Steering Wheel	17.00, 36 Spline
3	33687	1	Turn Signal W/hazard	7-wire
4	39146-14	1	Switch, Ignition	
5	1000065	1	Mount, Steering Column	
	1001216	1	Kit, Console Parts	
6	1000109	1	Steering Column Assembly	
7	1001711	2	Bolt	

Control Handle And Throttle Linkage Illustration

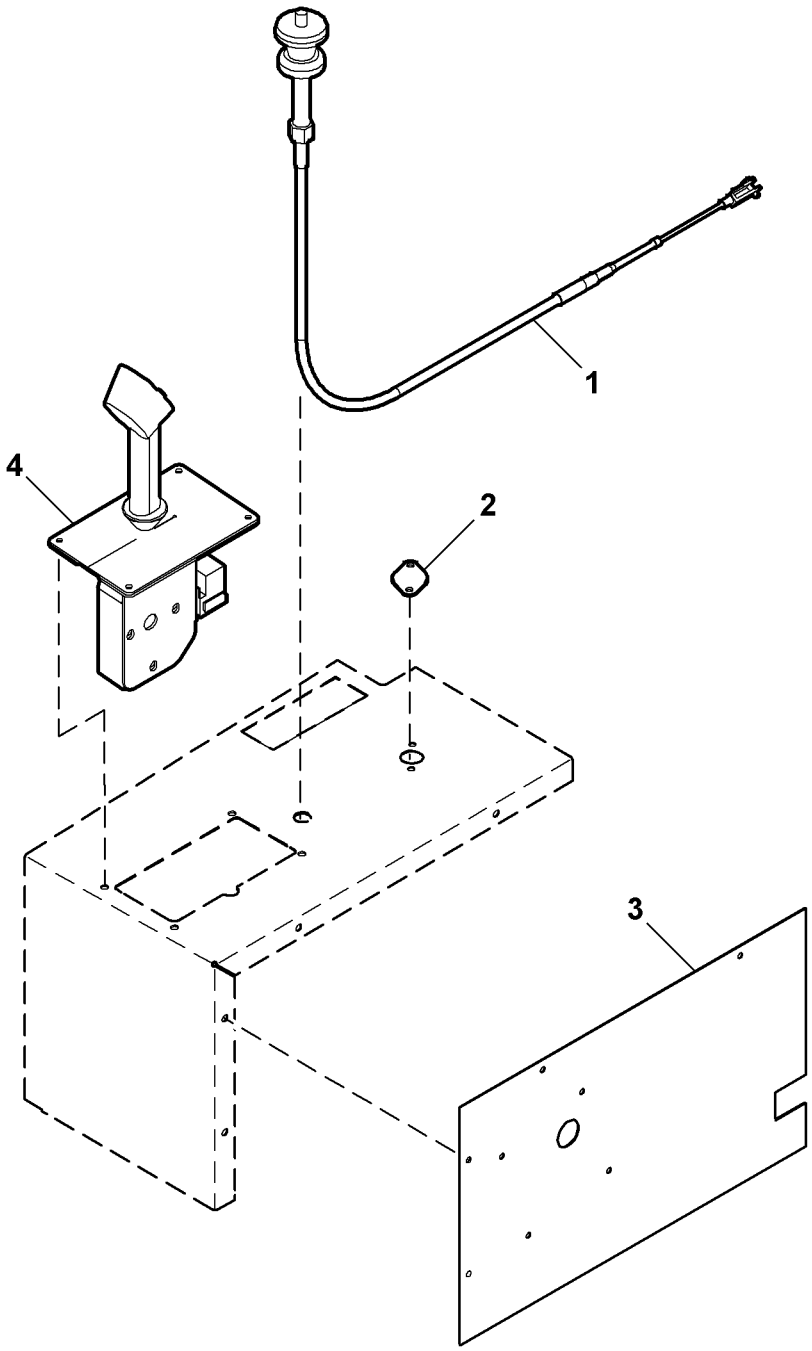

Figure 10-31

Control Handle And Throttle Linkage Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	26166	1	Throttle Cable Assy	
	350050	1	Clevis	.250-28
	38532	1	Cable, Throttle, Vernier	3 X 75
	38534	1	Clamp, Cable	40 Series
	38535	1	Shim, Cable Clamp	40 Series
2	987662	1	Plate, Console, Needle Vlv, Cover	
3	1000552	1	Console, Side Cover	
4	1000191	1	Joystick	
•	80192	6	Cap Screw, Hex Head	.250-20 X .75, Gr5
•	80208	4	Cap Screw, Hex Head	.312-18 X 1.00, Gr5
•	80219	2	Cap Screw, Hex Head	.375-16 X .75, Gr5
•	80226	1	Cap Screw, Hex Head	.375-16 X 1.50, Gr5
•	80037	4	Nut, Hex	.312-18
•	80140	2	Washer, Flat	USS, .250
•	80161	4	Washer, Lock	.312
•	33963	1	Alarm, Back Up	

• Item Not Illustrated

Instrument Panel Illustration

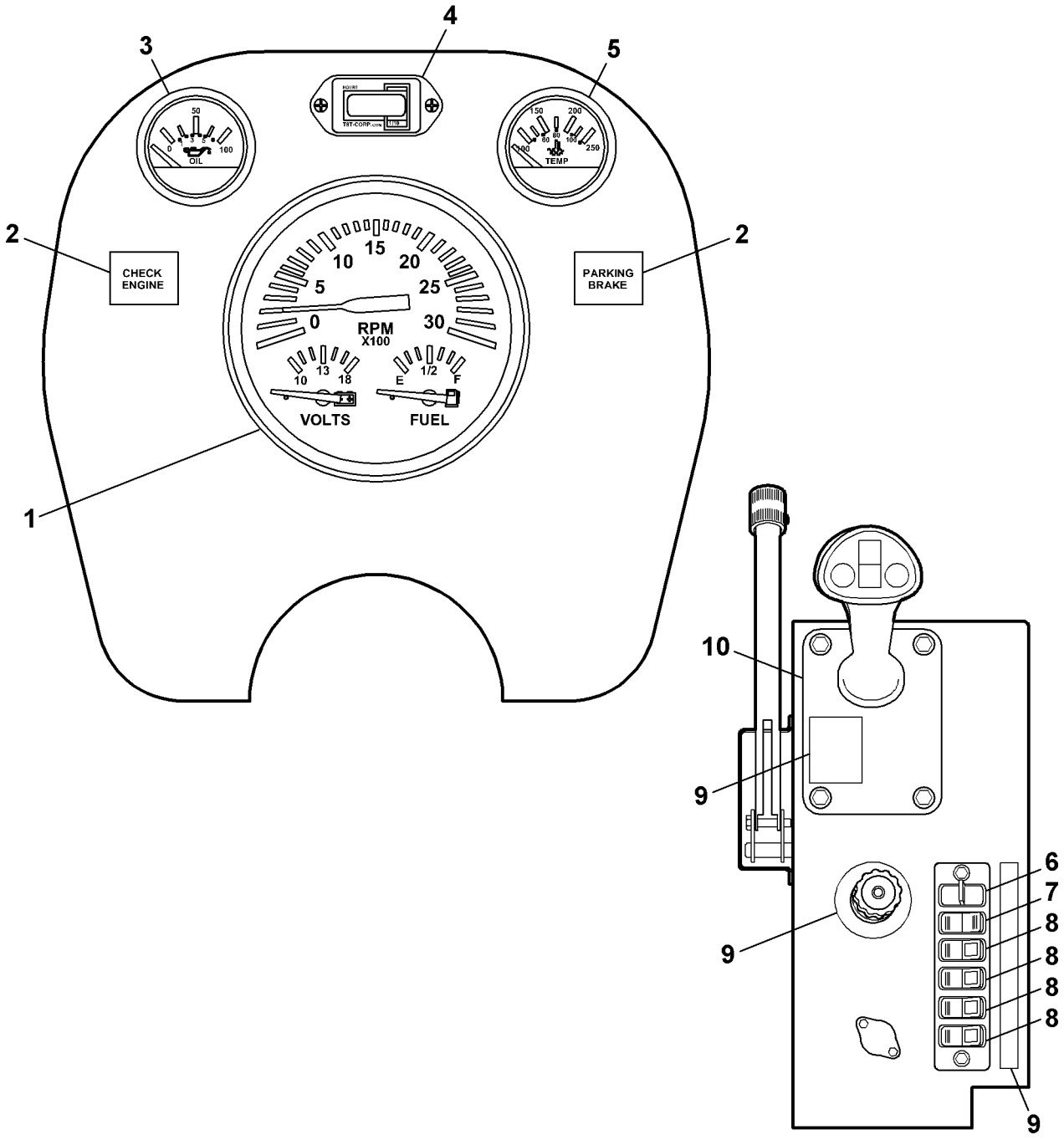

Figure 10-32

Instrument Panel Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989959	1	Tachometer	
2	39140-10	2	Lights, Euro, Smoked Lens, Green/red Filter	
3	989961	1	Gauge, Oil Pressure	
4	39140-07	1	Hourmeter, Digital	
5	989960	1	Gauge, Water Temp	
6	39140-11	1	Rocker, Paddle, On-off-on	N.i., Dpdt
7	39140-13	1	Rocker, On-off	N.i., Spst
8	39140-12	4	Rocker, On-off	Red W.i., Spst
9	1001040	1	Decal Kit, Joystick	
10	1000188	1	Rubber, Cover, Joystick	
•	21168	1	Defroster Fan Group, Single	
•	33271-5	.05	Wire	16 Ga, White
•	35425	1	Defroster Fan Assy	12 Volt
•	35426	1	Switch, Defroster Fan	
•	35465-06	1	Grommet, Insulation	.375id
•	36348	1	Term, Push-on	.25, M18-1 4, Slv
•	36739	1	Conn, 1 Way, Male, Locking	
•	36747	1	Fuse	4 Amp, Atc
•	70953	1	Conn, Male Terminal	
•	851390204	1	Term, Ring	16-14 Ga, #10 Stud
•	21169	1	Defroster Fan Group, Dual	
•	33271-5	1	Wire	16 Ga, White
•	35425	2	Defroster Fan Assy,	12 Volt
•	35426	2	Switch, Defroster Fan	
•	35465-06	2	Grommet, Insulation	.375id
•	36348	2	Term, Push-on	.25, M18-1 4, Slv
•	36739	1	Conn, 1 Way, Male, Locking	
•	36340	1	Fuse	10 Amp, Atc
•	70953	1	Conn, Male Terminal	
•	851390204	3	Term, Ring	16-14 Ga, #10 Stud
•	720110	1	Horn	12v

• Item Not Illustrated

Fuse Panel Sub-assembly Illustration

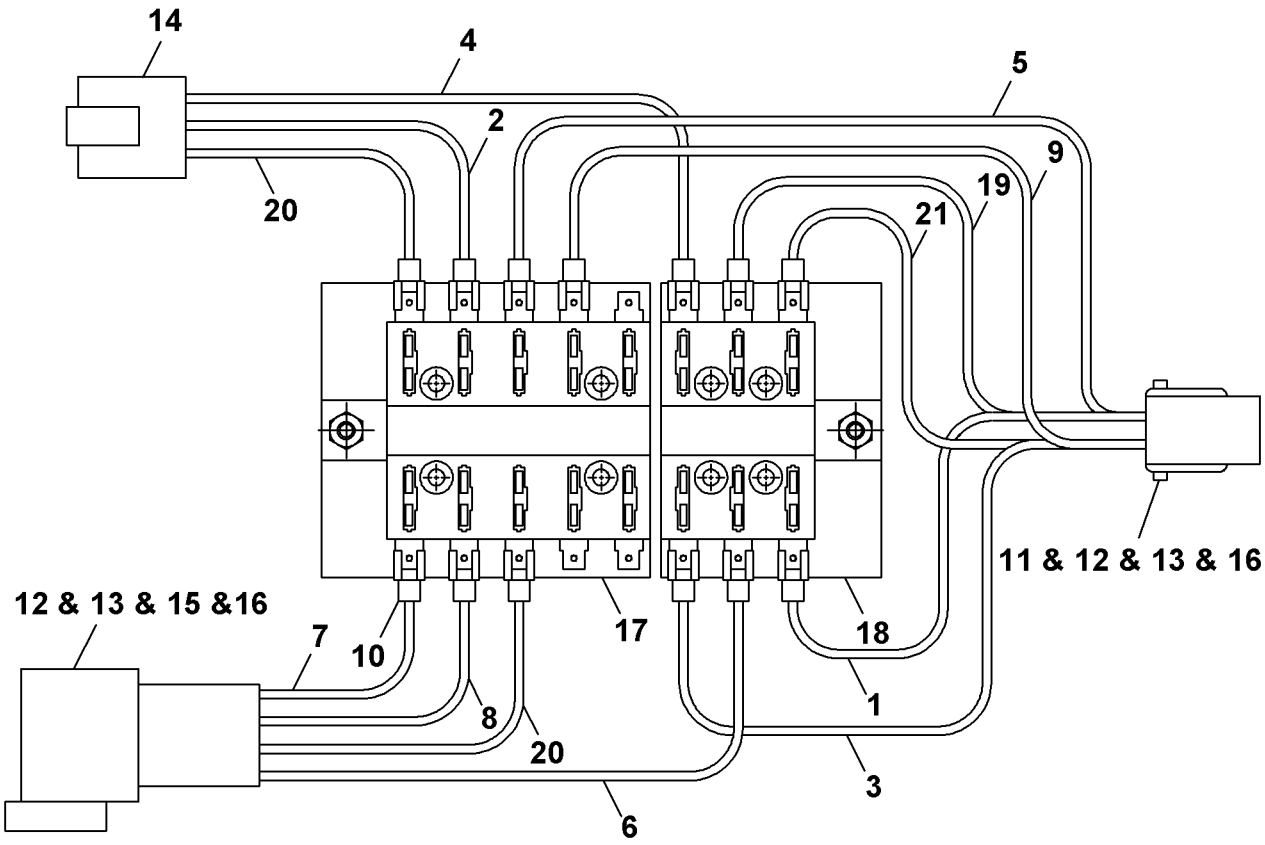

Figure 10-33

Fuse Panel Sub-assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	33271-1	1	Wire	16 Ga, Black
2	33271 -12	1	Wire	16 Ga,r Ed/black Stripe
3	33271-14	1	Wire	16 Ga, Yellow/red Stripe
4	33271-15	1.25	Wire	16 Ga, Brown/yellow Stripe
5	71062	1.25	Wire	14 Ga, Blue
6	33271-19	1.33	Wire	16 Ga, Green/yel Stripe
7	33271-5	1	Wire	16 Ga, White
8	33271-6	1	Wire	16 Ga, Orange
9	33271-4	1.25	Wire	16 Ga, Green
10	33600	13	Term, Push-on	.25, Fem, 16-14 Ga
11	36163	1	Connector, Sealed, Tower	6-pin
12	36165	13	Term, Sealed Conn	16-14 Ga, Fem
13	36166	10	Seal, Cable	18-16 Ga
14	36300	1	Connector, Sealed, Tower	3-pin
15	36352	1	Connector, Sealed, Tower	4-pin
16	36623	3	Seal, Cable	14 Ga
17	36694	1	Fuse Block	10 Gang, Atc
18	36695	1	Fuse Block	6 Gang, Atc
19	35174	1	Wire	14 Ga, Purple
20	71065	2	Wire	14 Ga, Red
21	33271-3	1.25	Wire	16 Ga, Brown

Lights And Mirrors Illustration

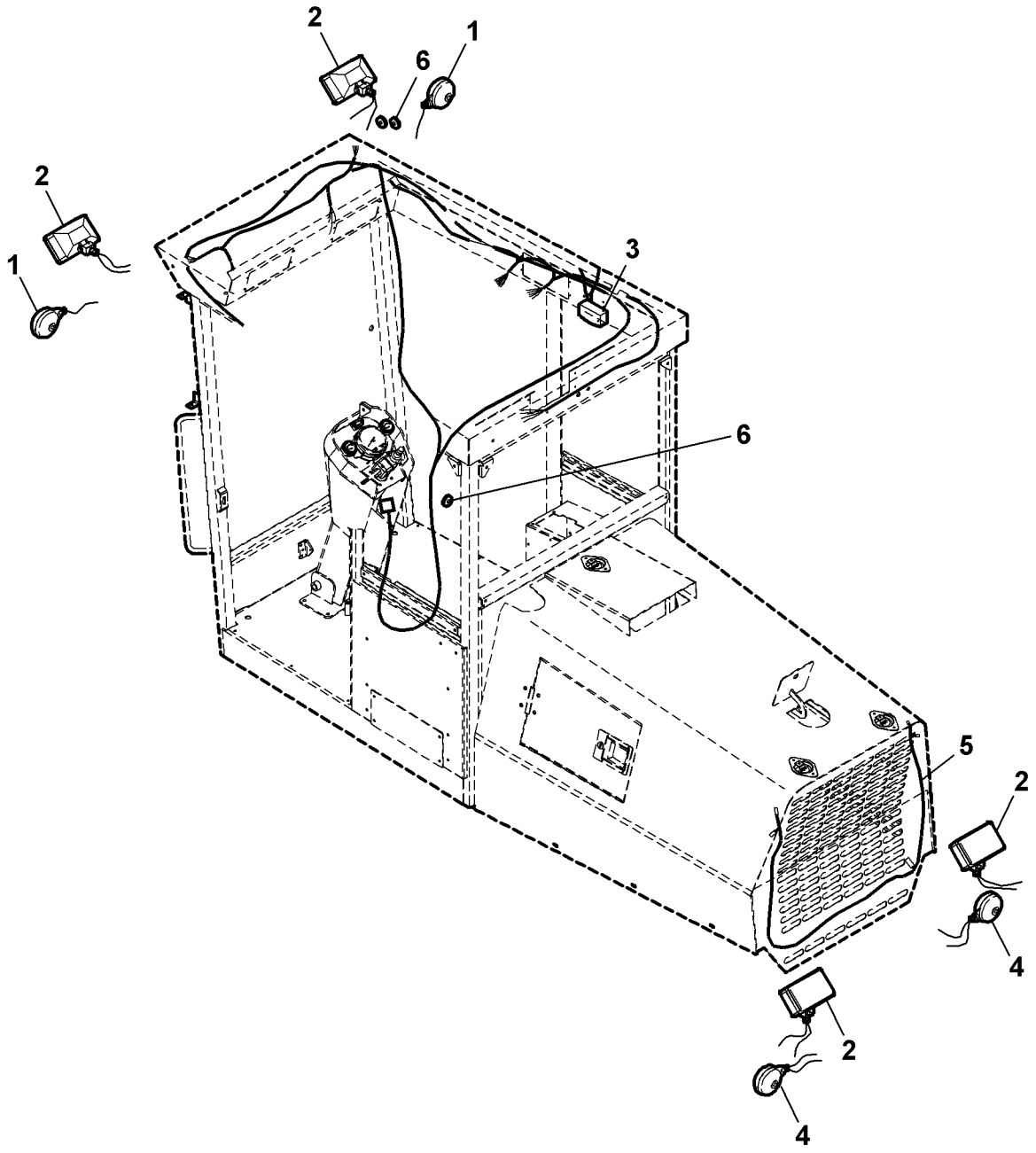

Figure 10-34

Lights And Mirrors Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	6161	2	Light, Turn Signal	Amber
2	160040A	4	Work Light	
3	38840	1	Light, Dome	
4	851342007	2	Light, Turn/brake	Red
5	988781	1	Wire Harness	Rear/work Lights
6	35465-06	3	Grommet, Insulation	.375id
•	27824	1	Wiring Harness	Ext, Lights, Tail
•	35213	1	Holder, Wire Tie, Adhesive Back	
•	36165	4	Term, Sealed Conn	16-14 Ga, Fem
•	36166	4	Seal, Cable	18-16 Ga
•	36340	1	Fuse	10 Amp, Atc
•	36349	7	Term, Push-on	.25, Fem, 1 8-14, Sl
•	36746	1	Fuse	5 Amp, Atc
•	70953	6	Conn, Male Terminal	
•	72135	2	Term, Ring	12-10 Ga, .500 Stud
•	851390204	3	Term, Ring	16-14 Ga, #10 Stud
•	38687	1	Light, Strobe	Amber, 8j, 80sfpm
•	21176	1	Mount, Warning Light Group	
•	16962	1	Mount, Riser, Strobe Light	
•	35465-06	2	Grommet, Insulation	.375id
•	36746	1	Fuse	5 Amp, Atc
•	80140	4	Washer, Flat	USS, .250
•	80141	4	Washer, Flat	USS, .31 3
•	80161	4	Washer, Lock	.312
•	80192	4	Cap Screw, Hex Head	.250-20 X .75, Gr5
•	80202	4	Cap Screw, Hex Head	.31 2-1 8 X .50, Gr5
•	80350	4	Nut, Flexloc	.250-20, Full, Lt
•	25703	1	Mirror Group	7 X 16, West Coast
•	38057	1	Mirror	7 X 16, West Coast
•	80219	2	Cap Screw, Hex Head	.375-1 6 X .75, Gr5
•	80142	4	Washer, Flat	USS, .375
•	80352	2	Nut, Flexloc	.375-1 6, Full, Lt

• Item Not Illustrated

Park Brake Illustration

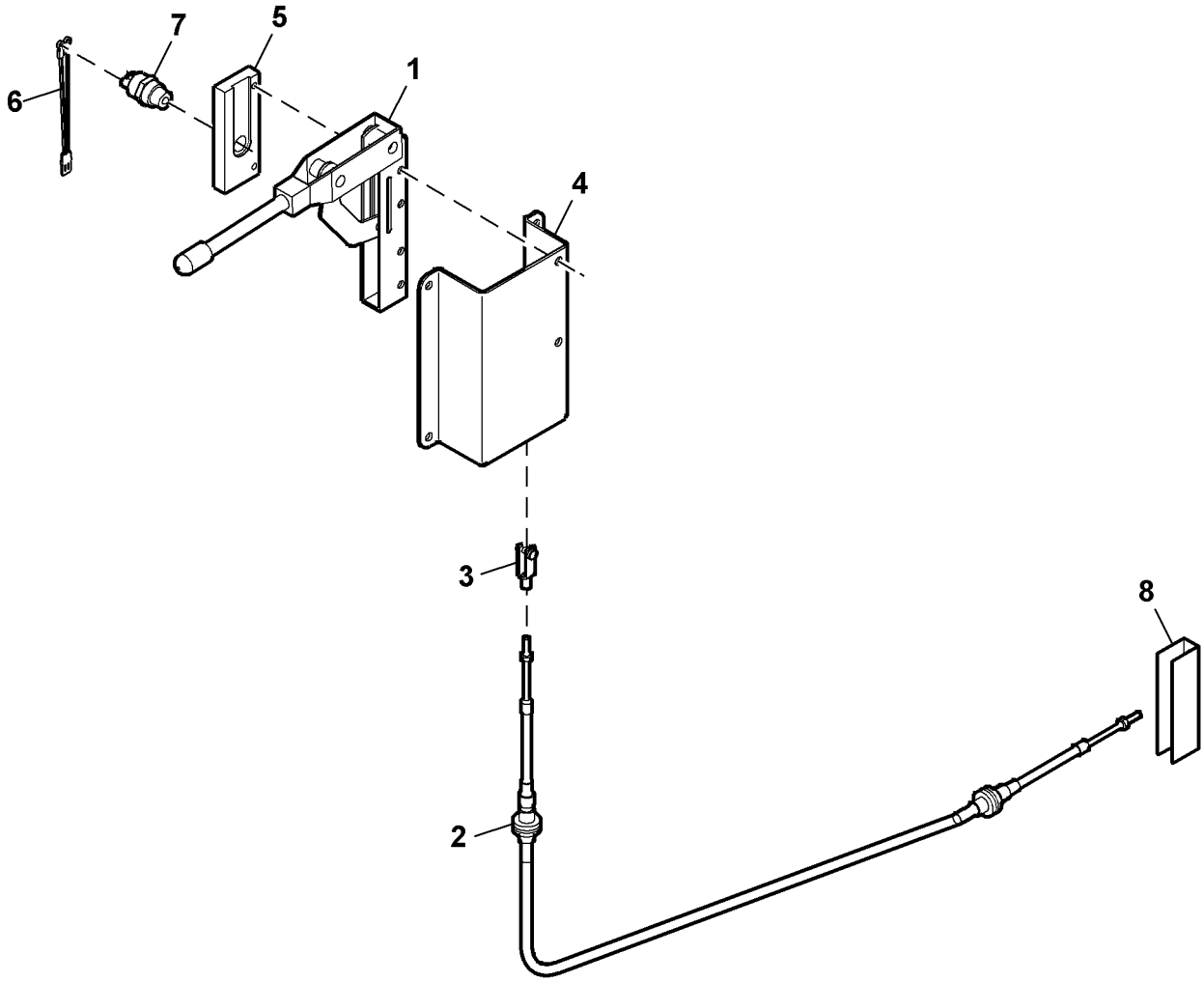

Figure 10-35

Park Brake Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	34299	1	Lever, Brake	12 In Handle
2	36797	1	Cable, Park Brake	68.25
3	6427	1	Clevis	.313-24 Unf W/pin
4	21217	1	Bracket, Brake Lever	
5	21218	1	Mount, Brake Switch	
6	27503	1	Wire Harness	Park Brake
7	951091224	1	Switch, Safety Start	
8	38359	1	Brake Cable Equalizer	
•	80208	4	Cap Screw, Hex Head	.312-18 X 1.00, Gr5
•	80214	2	Cap Screw, Hex Head	.31 2-1 8 X 2.25, Gr5
•	80351	3	Nut, Flexloc	.31 2-1 8, Full, Lt
•	80141	6	Washer, Flat	USS, .313
•	80161	6	Washer, Lock	.312

• Item Not Illustrated

Hydraulic Brake Illustration

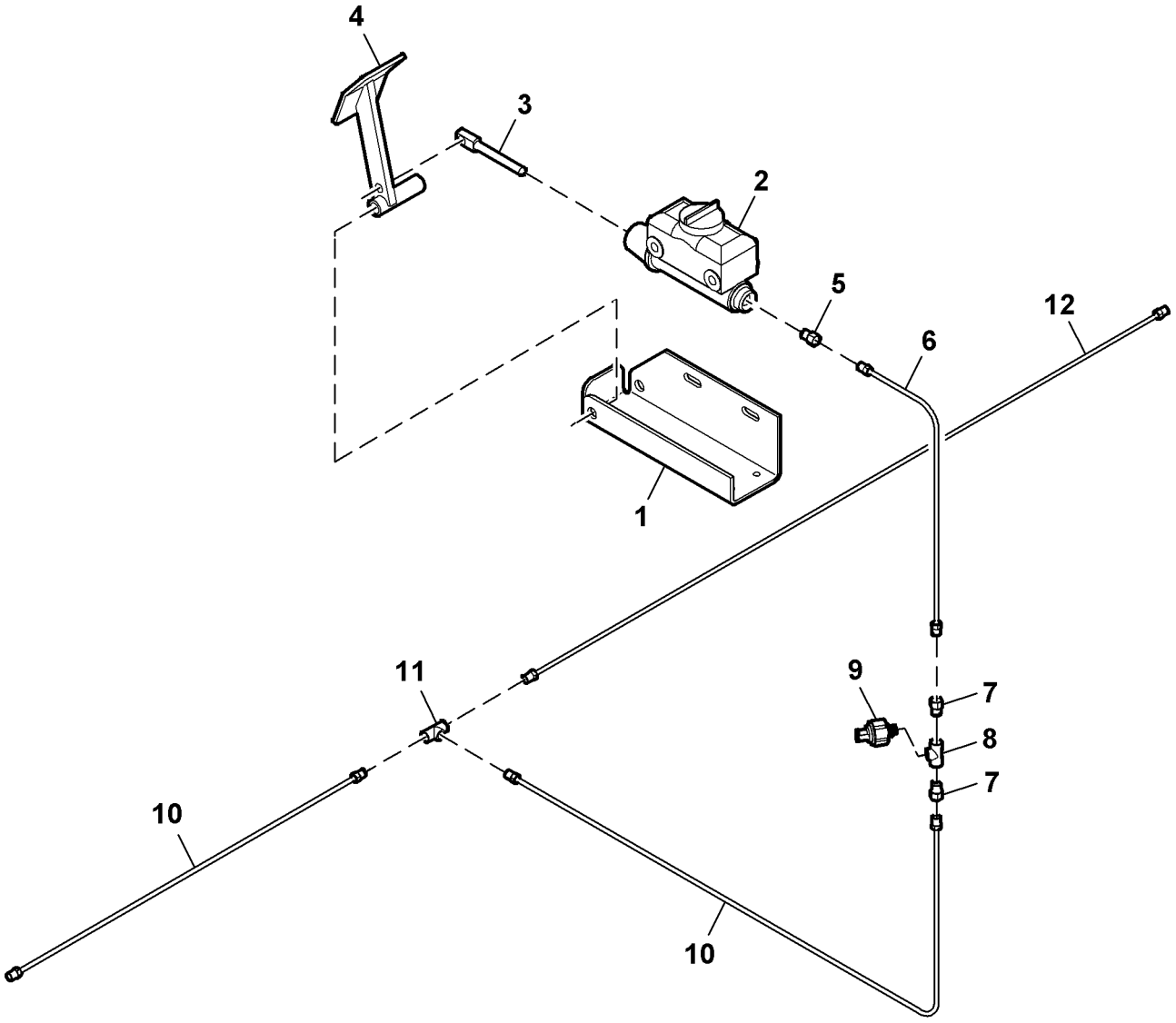

Figure 10-36

Hydraulic Brake Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	28649	1	Bracket, Brake Pedal/cylinder	
2	38314	1	Master Cyl, Brake	
3	28647	1	Pushrod, Brake	
4	28650	1	Brake Pedal, W/m	
5	38277	1	Fitt, Master Cyl Adaptor	
6	33953-15	1	Brake Line	.188 X 15
7	39059	2	Fitt, Str	02mp-03iff, Brass
8	33557	1	Fitt, Tee	02fm, Brass
9	32131	1	Switch, Stop Lamp, Hyd Type, No	
10	33953-20	2	Brake Line	.188 X 20
11	33949	1	Fitt, Tee	03iff, Brass
12	33953-40	1	Brake Line	.188 X 50
•	871111605	2	Clamp, Insulated Band	1/2”
•	80226	2	Cap Screw, Hex Hea	.375-1 6 X 1.50, Gr5
•	71620	2	Cap Screw, Hex Hea	.375-1 6 X 3.00, Gr5
•	90707	0.125 GL	Fluid, Brake	
•	80038	2	Nut, Hex	.375-16
•	80093	1	Nut, Hex, Jam	.500-20
•	80095	1	Nut, Hex, Jam	.625-18
•	80162	2	Washer, Lock	.375

• Item Not Illustrated

Optional Dual Master Cylinder Illustration

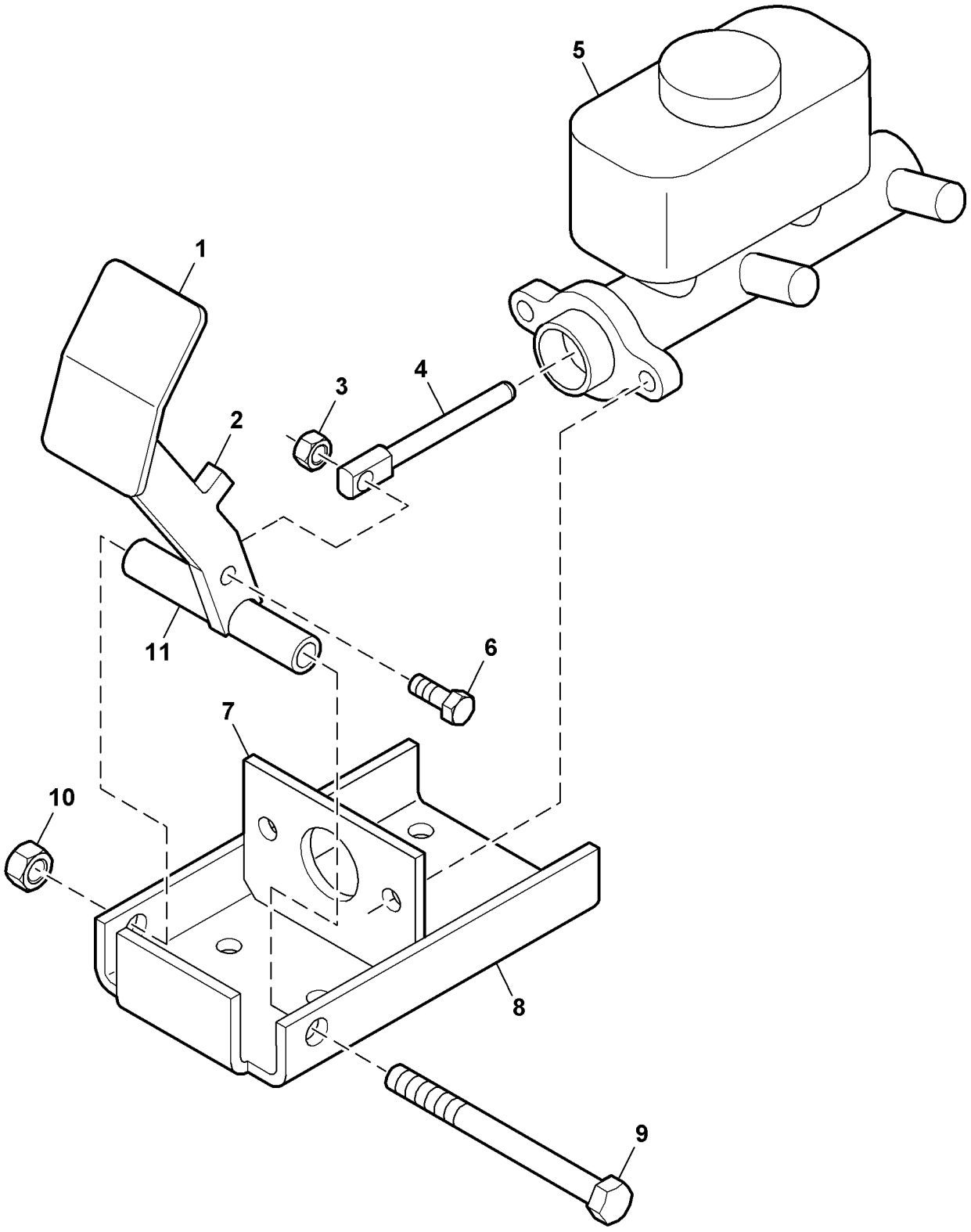

Figure 10-37

Optional Dual Master Cylinder Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	9375	1	Pedal, Brake	
2	986340	1	Lever, Pedal, Mount	
3	80038	1	Nut, Hex	.375-16
4	986337	1	Rod, Push, Dual, Mas, Cyl	
5	35343	1	Master Cyl, Brake,dual	
6	80224	1	Cap Screw, Hex Head	.375-16 X 1.25, Gr5
7	986336	1	Plate, Cyl, Mount	
8	986334	1	Plate, Base, Dual, Master, Cyl	
9	80815	1	Cap Screw, Hex Head	.500-13 X 5.50, Gr5
10	80354	1	Nut, Flexloc	.500-13, Full, Lt
11	986339	1	Shaft, Pedal, Base	
•	34068	1	Adapter	
•	34956	1	Fitting, Straight	03mhb-03iff
•	80014	1	Nut, Hex	1.750-5, Gr2
•	R339L	1	Spring	L.H.
•	R339R	1	Spring	R.H.

10

• Item Not Illustrated

Brush Hydraulics And Manifold Illustration

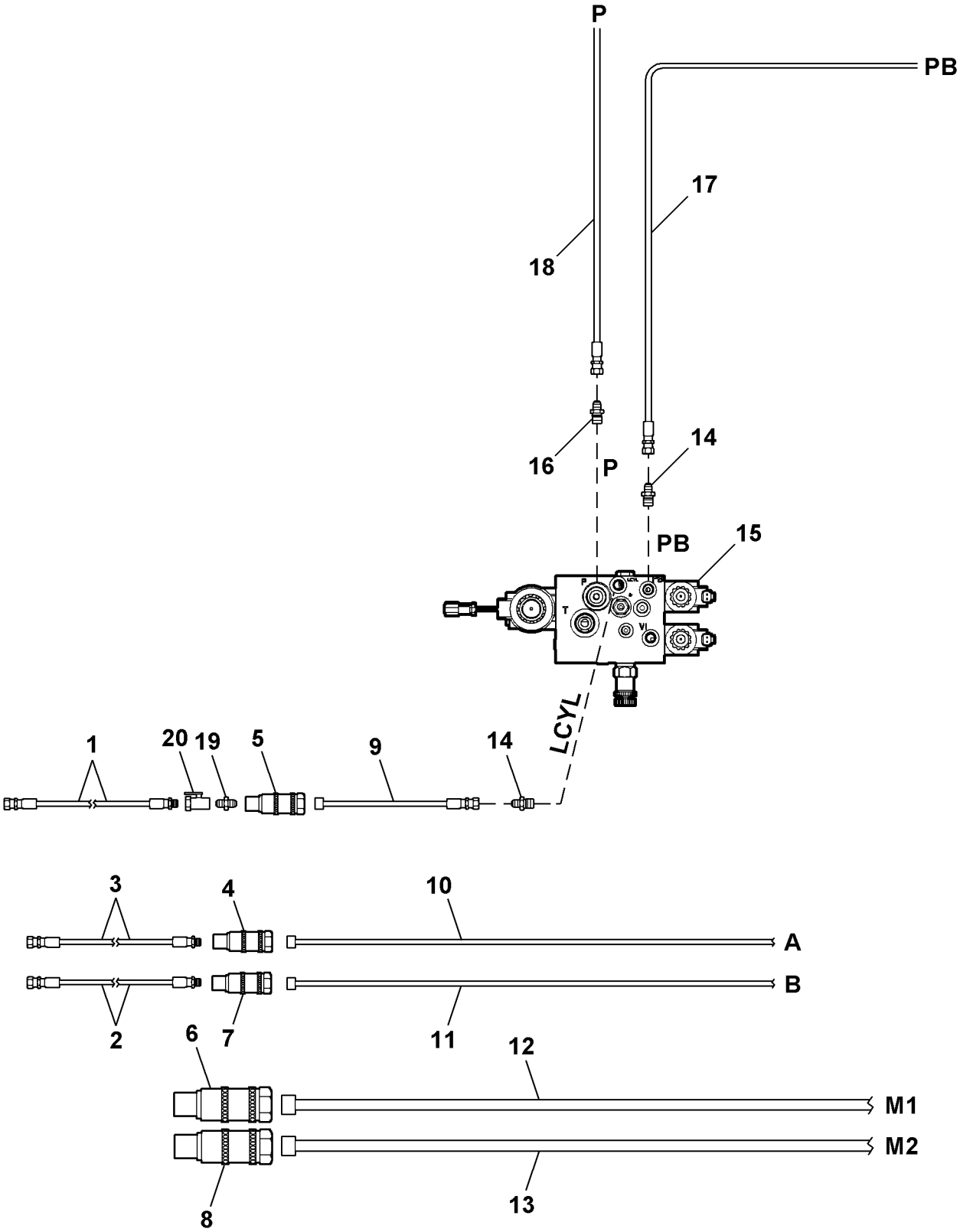

Figure 10-38

Brush Hydraulics And Manifold Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	989272-13	1	Hose	.38 X 47 6ff 8mb
2	989272-14	1	Hose	.38 X 39 6ff 6mb
3	989272-15	1	Hose	.38 X 30 6ff 6mb
4	989272-16	1	Quick Disconnect	6pp F 6fp
5	989272-17	1	Quick Disconnect	8pp F 8fp
6	989272-18	1	Quick Disconnect	8pp F 12mp
7	989272-19	1	Quick Disconnect	6pp M 6fp
8	989272-20	1	Quick Disconnect	8pp M 12fp
9	987521-09	1	Hose	6mk3k-6fjx-(Be)-21”
10	987521-06	1	Hose	6mk3k-6mp-6fjx90m-1 25”
11	987521-05	1	Hose	6mk3k-6fjx-6fjx90m-1 35”
12	987521-07	1	Hose	12mk3k-12fjx-12fjx-0s-1 71”
13	987521-08	1	Hose	12mk3k-12fjx-12fjx-0s-1 72”
14	987521-43	2	Fitting, Straight	6400-6-6
15	986972	1	Manifold, Hyd, Brush Control	
16	987521-40	1	Fitting, Straight	6400-12-12
17	987521-11	1	Hose	6m3k-6fjx-(Be)-90”
18	987521-15	1	Hose	12g2-12fjx-(Be)-40”
19	03-1022-7	1	Fitting	8mp-8mp 1/2ff-s
20	03-1392	1	Valve Ball, Br	8fp-8fp
•	1001642	1	Hose Kit, Chal V	

• Item Not Illustrated

Steering Orbitrol And Manifold Illustration

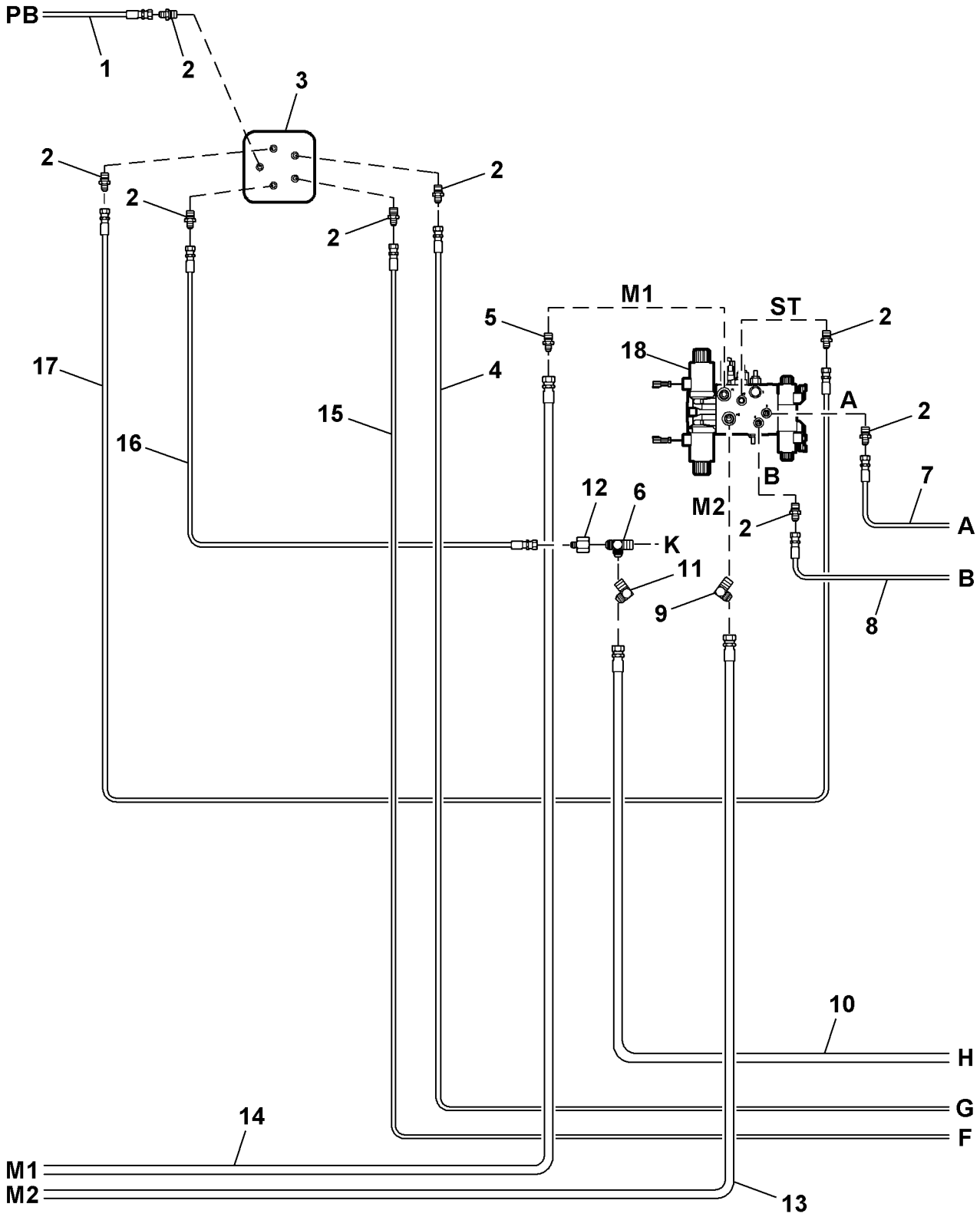

Figure 10-39

Steering Orbitrol And Manifold Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	987521-11	1	Hose	6m3k-6fjx-(Be)-90”
2	987521-43	11	Fitt, Str	6400-6-6
3	39045	1	Motor, Hyd, Power Steering	
4	987521-13	1	Hose	6m3k-6fjx-(Be)-1 29"
5	987521-35	2	Fitt, Str	6801-12-10
6	987521-48	2	Fitt, Tee	6602-12-12-12
7	987521-06	1	Hose	6mk3k-6mp-6fjx90m-1 25"
8	987521-05	1	Hose	6mk3k-6fjx-6fjx90m-1 35"
9	987521-34	2	Fitt, 90°	6400-12-10
10	987521-16	1	Hose	1 6g1 -1 6fjx-1 2fjx-86”
11	987521-50	2	Fitt, 90°	6500-12-12
12	987521-49	2	Fitt, Reducer	2406-12-8
13	987521-08	1	Hose	1 2mk3k-1 2fjx-1 2fjx90s-1 72
14	987521-07	1	Hose	1 2mk3k-1 2fjx-1 2fjx90s-1 71
15	987521-14	1	Hose	6mk3k-6fjx-(Be)-1 29"
16	987521-12	1	Hose	6m3k-6fjx-8fjx-90”
17	987521-10	1	Hose	6mk3k-6fjx-6fjx90s-96”
18	986972	1	Manifold, Hyd, Brush Control	
•	1001642	1	Hose Kit, Chal V	

• Item Not Illustrated

Hydrostatic Pump And Motor Illustration

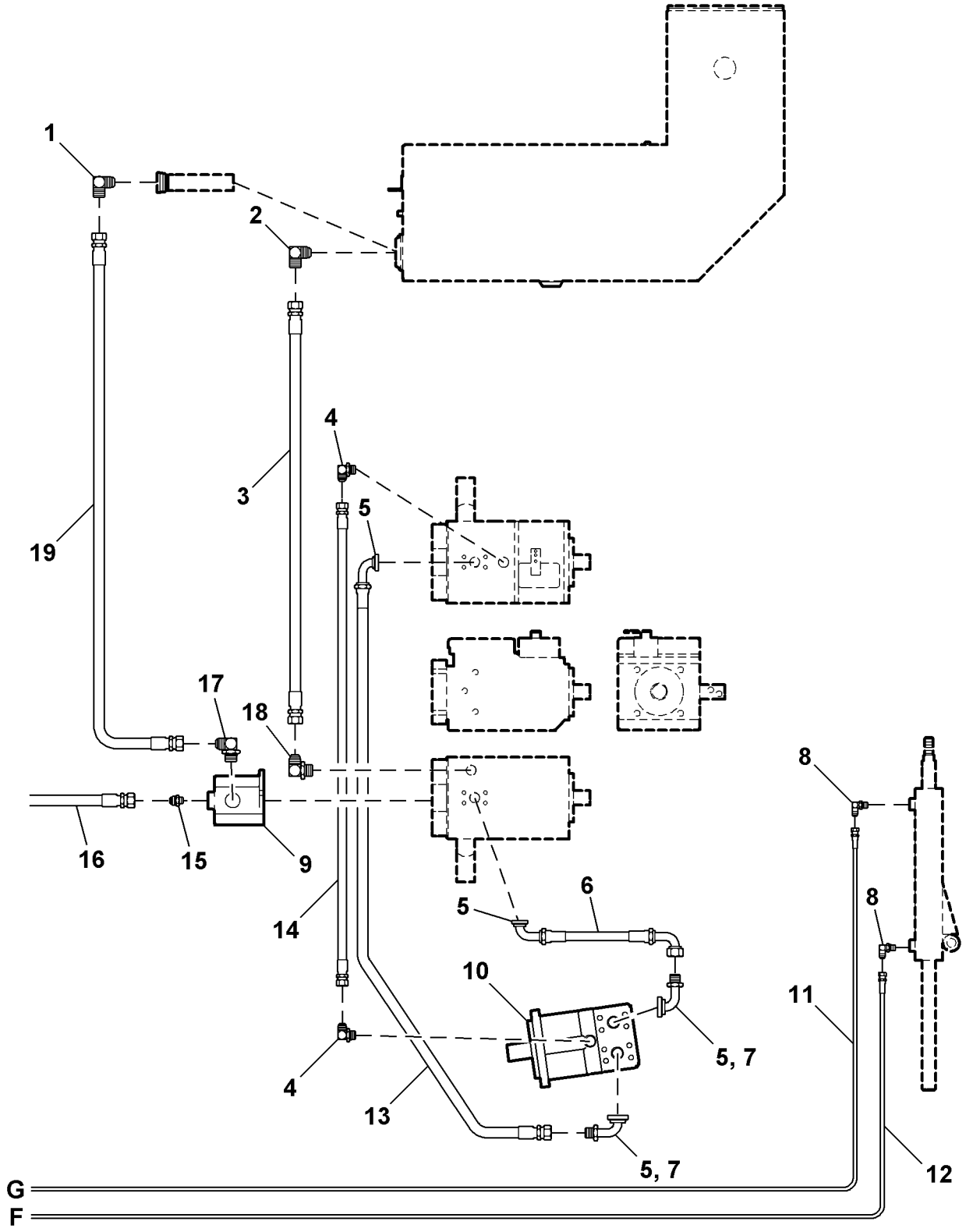

Figure 10-40

Hydrostatic Pump And Motor Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	987521-31	1	Fitt, 90°	2501-20-20
2	987521-30	1	Fitt, 90°	2501-16-20
3	987521-23	1	Hose	1 6gmv-1 6fjx-(Be)-49”
4	987521-37	2	Fitt, 90°	6801-12-12
5	987521-39	4	Fitting	16fhhs
6	987521-24	1	Hose	1 6g6k-1 6flh90-1 6fjx90-48”
7	987521-42	2	Fitt, 90°	16flh6k-16mj90
8	987521-32	2	Fitt, 90°	2501-6-8
9	38323	1	Pump, Hyd, Gear	2.3 Cir, Cw
10	38514	1	Motor, Hyd	100cc
11	987521-13		Hose	6m3k-6fjx-(Be)-1 29
12	987521-14		Hose	6mk3k-6fjx-(Be)-1 29
13	987521-25	1	Hose	1 6g6k-1 6flh90-1 6fjx-52”
14	987521-21	1	Hose	1 2g1 -1 2fjx-(Be)-29”
15	987521-29	1	Fitt, Str	6801-12-16
16	987521-15	1	Hose	1 2g2-1 2fjx-(Be)-40”
17	987521-28	1	Fitt, 90°	6801-20-20
18	987521-38	1	Fitt, 90°	6801-16-16
19	987521-22		Hose	20gmv-20fjx-(Be)-44
•	1001642	1	Hose Kit, Chal V	
•	80038	4	Nut, Hex	.375-16
•	80162	16	Washer, Lock	.375
•	80221	16	Cap Screw, Hex Head	.375-16 X 1.00, Gr5
•	80996	20	Washer, Flat	SAE, .375
•	91500	AR	Oil, Hyd	Iso68, Purchase Locally

• Item Not Illustrated

Hydraulic Filter And Cooler Hoses Illustration

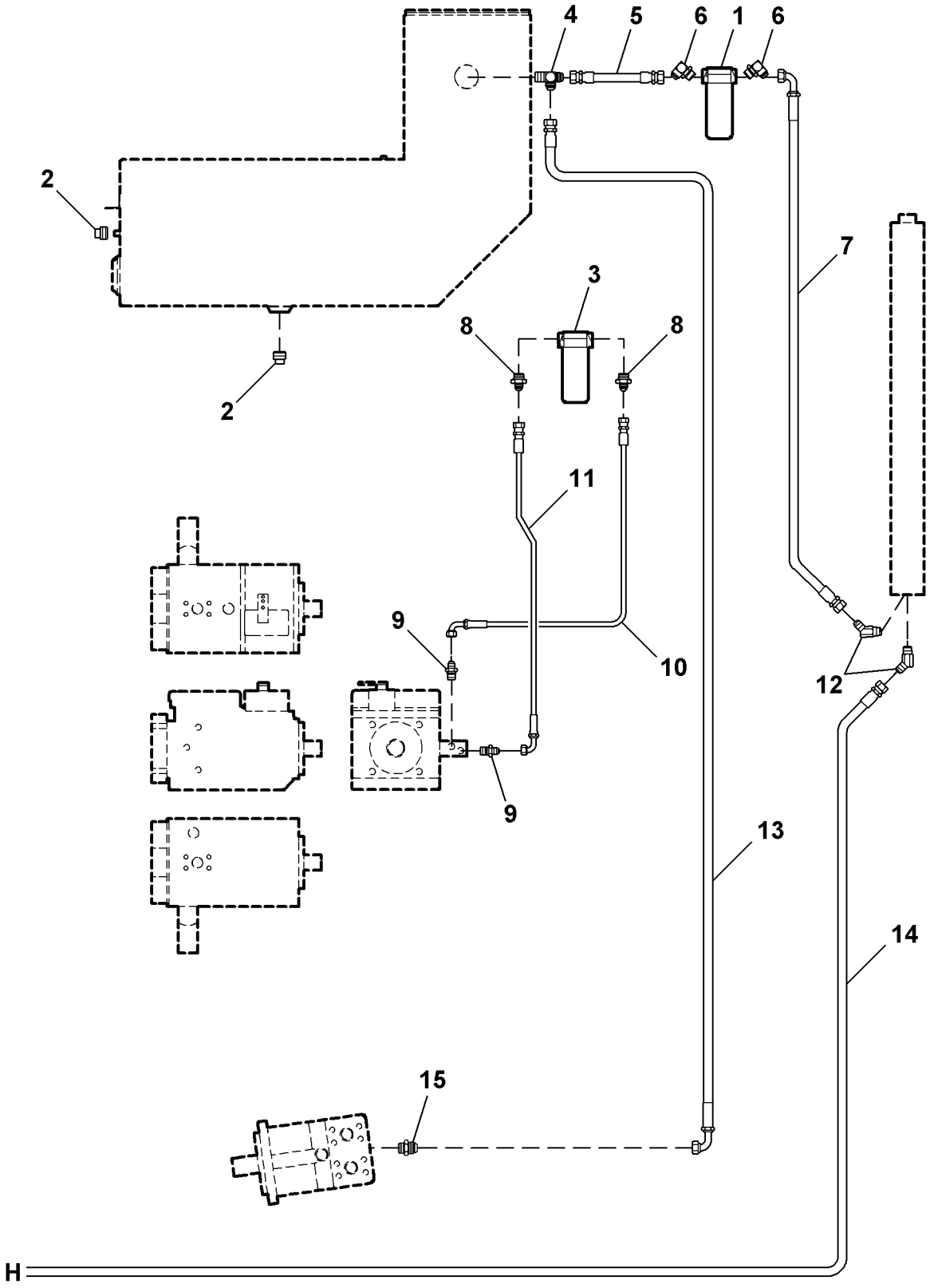

Figure 10-41

Hydraulic Filter And Cooler Hoses Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	72543	1	Filter Assy, Hyd Return	
	38327-01	1	Filter Element	
	25646	1	Support, Filter	(For 72543)
2	987521-60	2	Pipe Plug	5406-hhp-16
3	34463	1	Filter Assy, Hyd Return	
	34464	1	Filter Element	
	15984	1	Support, Filter	
4	987521-57	1	Fitt, Tee	2605-16-16-16
5	987521-26	1	Hose	1 6g2-1 6fjx-(Be)-33”
6	987521-56	2	Fitt, 90°	6801-16-20
7	987521-17	1	Hose	1 6g1 -1 6fjx-(Be)-86”
8	987521-55	2	Fitt, Str	6400-10-12
9	987521-36	2	Fitt, Str	6400-10-10
10	987521-20	1	Hose	1 0g2-1 0fjx-1 0fjx90m-45”
11	987521-19	1	Hose	1 0g2-1 0fjx-1 0fjx90m-45”
12	987521-27	2	Fitt, 45°	6802-16-16
13	987521-18	1	Hose	1 2g2-1 2fjx-1 2fjx90m-28”
14	987521-16	1	Hose	1 6g1 -1 6fjx-1 2fjx-86”
15	987521-40	3	Fitt, Str	6400-12-12
•	1001642	1	Hose Kit, Chal V	
•	80038	4	Nut, Hex	.375-16
•	80162	16	Washer, Lock	.375
•	80221	16	Cap Screw, Hex Head	.375-16 X 1.00, Gr5
•	80996	20	Washer, Flat	SAE, .375
•	91500	AR	Oil, Hyd	Iso68, Purchase Locally
•	38482	1	U-bolt	.375-16, 4.00iw, 3.00il
•	37271	6	Loom, Split, Convoluted	.625

• Item Not Illustrated

Hydraulic Tank Illustration

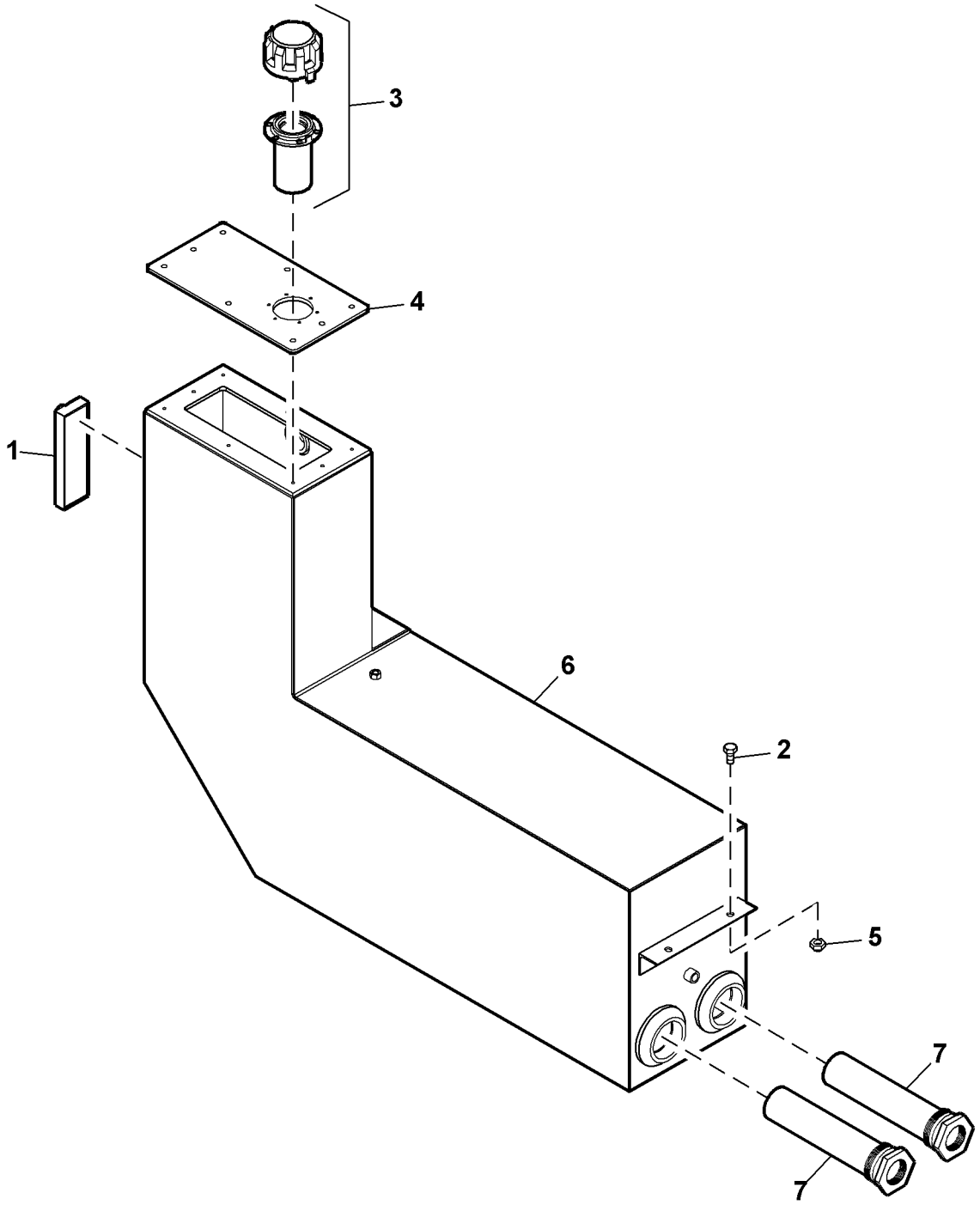

Figure 10-42

Hydraulic Tank Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	500070	1	Gauge, Sight Level/temp	
2	80787	4	Cap Screw, Hex Head	.250-20 X 2.50, Gr5
3	987527	1	Cap W/strainer	5 Psi
4	1000206	1	Cover Plate, Hydraulic Tank	
5	80350	4	Nut, Flexloc	.250-20
6	1000260	1	Hydraulic Tank	
7	33148	2	Strainer, Suct	2npt, 25gpm, 100me

Final And Miscellaneous Groups

Item No.	Part Number	Qty.	Description	Remarks
	987491	1	Final Group	
•	33963	1	Alarm, Back Up	
•	72313	1	Hold Down, Battery	
•	720110	1	Horn	12v
•	987499	1	Kit, Decal, Decorative	
•	39141	1	Kit, Decal, Rb48/swpro/chal	
•	35355	1	Plate, Serial Number, LeeBoy	
•	17898	1	Smv Sign Group	
•	730-3050	1	Seat Belt, W/hardware	2.00
•	4684102	24	Strip, Abrasive	4” X 60’roll, Blk
•	985234	1	Manual-pak Case	1 0.5 X 1 3.5 X 2.5
	984626	1	Paint Group, Chal V	
•	853240	1 GAL	Catalyst, Topcoat	
•	853220	4.5 GAL	Paint, Yellow, LeeBoy Topcoat	
•	981666	1 GAL	Paint, Black, Urethane, H-solid	
•	853230	2.25 GAL	Paint, White, Primer	
	987912	1	Kit, Filter, Chal V	
•	72543	1	Filter Assy, Hyd Return	
•	34463	1	Filter Assy, Hyd Charge	
•	38385-01	1	Air Filter, Primary	
•	38385-02	1	Air Filter, Safety	
•	38653-01	1	Filter Element, Cab Air	
•	984909-01	1	Filter, Fuel/water, Element,	3044t
•	984909-02	1	Filter, Oil	3044t
	1000705	1	Opt, Radio, Am/fm, W/spk’r And Antenna	
•	981366	1	Assy, Radio Box	
•	984487	1	Antenna, Am/fm	
•	988664	1	Speaker, Marine	6.5” 2-way
•	P204619	1	Radio, Am/fm Cassette	

• Item Not Illustrated

NOTES

ALPAHBETICAL PARTS INDEX

Description	Part Number	Figure Number	Item No.	Page Number
Adapter	34068	10-37	•	10-76
Adapter, Exhaust, Cat	986387	10-15	6	10-32
Adapter, Rubber, 4.0”x3.5”	987485	10-16	9	10-34
Adhesive, Aerosol, Spray Can	38462	10-23	•	10-48
Adhesive, Aerosol, Spray Can	38462	10-26	•	10-54
Adptr, Rubber, Insert, 3.00x2.50	38830	10-16	11	10-34
Air Cleaner Assy	38385	10-16	1	10-34
Air Filter, Primary	38385-01		•	10-88
Air Filter, Safety	38385-02		•	10-88
Alarm, Back Up	33963	10-31	•	10-64
Alarm, Back Up	33963		•	10-88
Antenna, Am/fm	984487		•	10-88
Arm	989272-58	10-11	21	10-24
Arm, Windshield Wiper	151180	10-26	9	10-54
Arm, Wiper	33744	10-26	•	10-54
Assy, Door	36690r	10-23		10-48
Assy, Door, Entrance	36688-41	10-23	18	10-48
Assy, Radio Box	981366		•	10-88
Axle Assy, Steering	27060	10-1	10	10-4
Ball Joint	36756	10-4	23	10-10
Ball Joint	36757	10-4	24	10-10
Ball Joint, Steering Cyl End	36755	10-4	22	10-10
Battery, 12v, 1000 Crk Amps	33146-6	10-14	10	10-30
Bearing Cone	610210	10-4		10-10
Bearing Cone, Wheel Hub	340180	10-4		10-10
Bearing Cup	38303-05	10-4		10-10
Bearing,1 1/4	989272-55	10-7	7	10-16
Blade, Wiper	151190	10-26	8	10-54
Blade, Wiper	33744-01	10-26	•	10-54
Blower	36745-13	10-21	28	10-44
Blower Plate	36745-26	10-21	29	10-44
Bolt	1001711	10-30	7	10-62
Bolt,1/4-20	N/a	10-21	11	10-44
Bolt, Button Head	1001710	10-17	8	10-36
Bracket, A/c Compressor	26778	10-20	6	10-42
Bracket, Brake Lever	21217	10-35	4	10-72
Bracket, Brake Pedal/cylinder	28649	10-36	1	10-74
Bracket, Fuse Block	29262	10-25	8	10-52
Bracket, L.H. Coil	38653-06	10-21	36	10-44
Bracket, Pump Cable, W/m	1000495	10-14	12	10-30

Description	Part Number	Figure Number	Item No.	Page Number
Bracket, R.H. Coil	38653-07	10-21	35	10-44
Bracket, Spray Pipe	26484	10-12	23	10-26
Brake Cable Equalizer	38359	10-35	8	10-72
Brake Line,.188x15	33953-15	10-36	6	10-74
Brake Line,.188x20	33953-20	10-36	10	10-74
Brake Line,.188x50	33953-40	10-36	12	10-74
Brake Pedal, W/m	28650	10-36	4	10-74
Brkt, Throttle, Cable, Cat/per3.3	983185	10-14	13	10-30
Bulkhead, Hydraulic, Mount	989824	10-1	12	10-4
Bushing With Hole,2 X 1.26 X 7.22	989272-62	10-11	25	10-24
Bushing,.334 Idx.500 Od	27481	10-27	1	10-56
Bushing, Nylon	36688-16	10-23	8	10-48
Bushing, Nylon	36688-16	10-27	18	10-56
Cab Air Cond/heater Kit	38653	10-20	10	10-42
Cab, W/m, 2 Door	1000959	10-23	1	10-48
Cable, Battery, Neg,1 3",eye/eye	5804	10-14	•	10-30
Cable, Battery, Neg,1 6",eye/post	400020	10-14	21	10-30
Cable, Battery, Pos,44",eye/post	852510	10-14	22	10-30
Cable, Park Brake	38342	10-2	4	10-6
Cable, Park Brake,68.25	36797	10-35	2	10-72
Cable, Rotary Control	36749-03	10-21	21	10-44
Cable, Rotary Control	36749-04	10-21	31	10-44
Cable, Throttle, Vernier,3 X 75	38532	10-31		10-64
Cam Latch	36688-25	10-27	6	10-56
Cap Screw, Hex Head	80802	10-19	4	10-40
Cap W/strainer,5 Psi	987527	10-42	3	10-86
Cap, Fuel, W/lock Lug	36105	10-18	3	10-38
Cap, Steering Wheel	300010	10-30	1	10-62
Catalyst, Topcoat	853240		•	10-88
Clamp, Air Cleaner Mount,6.5"id	34033	10-15	2	10-32
Clamp, Cable	38534	10-31		10-64
Clamp, Hose,# 06	33162	10-18	6	10-38
Clamp, Hose,# 08	33163	10-12	16	10-26
Clamp, Hose,# 10	33164	10-16	5	10-34
Clamp, Hose,# 10	33164	10-20	2	10-42
Clamp, Hose,#28 (2-1/8")	230240	10-19	7	10-40
Clamp, Insulated Band,1/2"	871111605	10-36	•	10-74
Clamp, Insulated Band,3/4"	871111602	10-12	•	10-26
Clamp, Loop,.50 0d, Rem Cushion	33594-01	10-12	9	10-26
Clamp, Loop,1.00 Od, Rem Cushion	33595	10-20	11	10-42
Clamp, Loop,2.00 Od, Plstc Cover	36894	10-20	9	10-42

Description	Part Number	Figure Number	Item No.	Page Number
Clamp, Muffler,.3125x2.5	33312	10-15	5	10-32
Clamp, Receiver Dryer	36745-08	10-22	•	10-46
Clamp, Spring,5/8 Hose	1001616-01	10-13	2	10-28
Clamp, T-bolt,2.50 Nominal	36045	10-16	18	10-34
Clamp, T-bolt,3.00 Nominal	171090	10-16	16	10-34
Clamp, T-bolt,3.50 Nominal	171190	10-16	17	10-34
Clamp, T-bolt,4.50 Nominal	36870	10-16	19	10-34
Clevis,.250-28	350050	10-31		10-64
Clevis,.313-24 Unf W/pin	6427	10-35	3	10-72
Coil, Assy, Evap.	38653-05	10-21	5	10-44
Coil, Heater	36749-02	10-21	37	10-44
Cold Control	36745-19	10-21	23	10-44
Compressor Assy	36745-05	10-22	•	10-46
Condenser Assy	36745-06	10-22	•	10-46
Condensor Assembly	36745-06	10-19	2	10-40
Conn,1 Way,male, Locking	36739	10-32	•	10-66
Conn,1 Way,male, Locking	36739	10-32	•	10-66
Conn, Male Terminal	70953	10-32	•	10-66
Conn, Male Terminal	70953	10-32	•	10-66
Conn, Male Terminal	70953	10-34	•	10-70
Conn, Sealed, Shroud,2-pin	35138	10-20	•	10-42
Connector,3.50” Id-od	987686	10-16	•	10-34
Connector, Sealed, Tower, 3-pin	36300	10-33	14	10-68
Connector, Sealed, Tower, 4-pin	36352	10-33	15	10-68
Connector, Sealed, Tower,6-pin	36163	10-33	11	10-68
Console, Side Cover	1000552	10-31	3	10-64
Core	989272-77	10-6	3	10-14
Cover Plate	989272-83	10-8	3	10-18
Cover Plate, Hydraulic Tank	1000206	10-42	4	10-86
Cover, Bottom	36745-25	10-21	3	10-44
Cover,10 Inch, Vented, Raven	33238-03	10-12		10-26
Cover, Air Filter	1000884	10-17	7	10-36
Cover, Engine	1000890	10-17	2	10-36
Cover, Front	987451	10-1	4	10-4
Cover, Fuel Tank, W/m	1000205	10-18	2	10-38
Cover, Plastic	36688-08	10-24	10	10-50
Cover, Recirc.	36745-29	10-21	32	10-44
Cover, Side Access	36688-09	10-25	7	10-52
Cover, Top	36745-24	10-21	30	10-44
Csbhs,.250-20x.75,ss	81277	10-24	5	10-50
Csbhs,.250-20x.75,ss	81277	10-26	11	10-54

Description	Part Number	Figure Number	Item No.	Page Number
Csbhs,.250-20x.75,ss	81106	10-27	11	10-56
Csbhs,.250-20x.88,ss	81277	10-23	10	10-48
Csbhs,.250-20x1.25,ss	81282	10-23	12	10-48
Csbhs,.250-20x2.00,ss	81279	10-27	15	10-56
Csbhs,.31 2-1 8x2.25,ss	81280	10-27	24	10-56
Csbhs,.312-18x.75, Black Finish	36687	10-26	•	10-54
Csbhs,10-24x1.50,ss	81281	10-26	7	10-54
Cshh,.250-20 X 1.50, Gr5	80194	10-20	•	10-42
Cshh,.250-20 X 2.50, Gr5	80787	10-42	2	10-86
Cshh,.250-20x.75, Gr5	80192	10-20	•	10-42
Cshh,.250-20x.75, Gr5	80192	10-23	4	10-48
Cshh,.250-20x.75, Gr5	80192	10-26	•	10-54
Cshh,.250-20x.75, Gr5	80192	10-31	•	10-64
Cshh,.250-20x.75, Gr5	80192	10-34	•	10-70
Cshh,.250-20x1.00, Gr5	80185	10-1	•	10-4
Cshh,.250-20x3.50, Gr5	81072	10-20	•	10-42
Cshh,.31 2-1 8x.50, Gr5	80202	10-34	•	10-70
Cshh,.31 2-1 8x2.25, Gr5	80214	10-35	•	10-72
Cshh,.312-18x.75, Gr5	80207	10-29	9	10-60
Cshh,.312-18x1.00, Gr5	80208	10-29	10	10-60
Cshh,.312-18x1.00, Gr5	80208	10-31	•	10-64
Cshh,.312-18x1.00, Gr5	80208	10-35	•	10-72
Cshh,.375-1 6x.75, Gr5	80219	10-34	•	10-70
Cshh,.375-1 6x1.50, Gr5	80226	10-16	•	10-34
Cshh,.375-1 6x1.50, Gr5	80226	10-31	•	10-64
Cshh,.375-1 6x1.50, Gr5	80226	10-36	•	10-74
Cshh,.375-1 6x3.00, Gr5	71620	10-36	•	10-74
Cshh,.375-1 6x5.00, Gr5	71617	10-20	7	10-42
Cshh,.375-16 X 1.25, Gr5	80224	10-12	•	10-26
Cshh,.375-16 X 1.25, Gr5	80224	10-20	•	10-42
Cshh,.375-16 X 1.25, Gr5	80224	10-37	6	10-76
Cshh,.375-16 X 1.50, Gr5	80226	10-20	•	10-42
Cshh,.375-16 X 1.50, Gr5	80226	10-28	•	10-58
Cshh,.375-16x.75, Gr5	80219	10-31	•	10-64
Cshh,.375-16x1.00, Gr5	80221	10-20	12	10-42
Cshh,.375-16x1.00, Gr5	80221	10-40	•	10-82
Cshh,.375-16x1.00, Gr5	80221	10-41	•	10-84
Cshh,.375-16x2.00, Gr5	80230	10-20	3	10-42
Cshh,.375-16x4.75, Gr8	80882	10-23	17	10-48
Cshh,.437-14 X 1.00, Gr5	80233	10-28	•	10-58
Cshh,.438-1 4x1.50, Gr5	80237	10-28	5	10-58

Description	Part Number	Figure Number	Item No.	Page Number
Cshh,.438-1 4x1.50, Gr5	80237	10-29	5	10-60
Cshh,.438-14x1.00, Gr5	80233	10-29	14	10-60
Cshh,.500-1 3x1.50, Gr8	81113	10-1	•	10-4
Cshh,.500-13 X 5.50, Gr5	80815	10-37	9	10-76
Cshh,.500-13x1.00, Gr8	81002	10-1	•	10-4
Cshh,.500-13x1.50, Gr5	71627	10-4	20	10-10
Cshh,.750-1 6x2.00, Gr5	80460	10-1	•	10-4
Cshh,.750-10x3.50, Gr8	81027	10-12	2	10-26
Cshh,.750-10x5.00, Gr5	80839	10-4	17	10-10
Cshh,1.000-8x8.0, Gr5	81184	10-4	1	10-10
Cssh, M08x1.25x20mm, Cl12.9	80937	10-20	•	10-42
Cyl, Hyd, Steering,2.00x10.75x1.00 Rod	36754	10-4	21	10-10
Cylinder, Hydraulic,2 1/2 Bore, 6 3/4 Stroke, 1 3/8 Rod	989272-09	10-8	17	10-18
Cylinder, Hydraulic,2 1/2 Bore, 7 1/5 Stroke, 1 3/8 Rod	989272-10	10-8	22	10-18
Decal	36745-22	10-21	24	10-44
Decal Kit, Joystick	1001040	10-32	9	10-66
Defroster Fan Assy, 12 Volt	35425	10-32	•	10-66
Defroster Fan Assy, 12 Volt	35425	10-32	•	10-66
Defroster Fan Group, Dual	21169	10-32	•	10-66
Defroster Fan Group, Single	21168	10-32	•	10-66
Door , W/m	36688-23	10-27	2	10-56
Door Hold	1000838	10-24	6	10-50
Door Hold	984390	10-27	12	10-56
Drive Axle Assy	26259	10-1	8	10-4
Drive Axle, W/m	26983	10-2	1	10-6
Drive Pl Assy, SAE#4, C Mt	986264	10-14	7	10-30
Driveshaft	38518	10-1	9	10-4
Dust Cap	620200	10-4		10-10
Dust Suppression (Complete Kit)	1001616	10-13	•	10-28
Elbow, Exhaust,90,2.5” Od	36117	10-15	7	10-32
Elbow, Rubber,90º,3.50x3.00 Id	171170	10-16	3	10-34
Elbow, Rubber, Cobra,4.0”x4.0”	987484	10-16	8	10-34
Engine, Cat, 3044t,80 Hp	988671	10-14	1	10-30
Fastener, Turn, 1/4	36745-36	10-21	15	10-44
Fastener, X-mas Tree,1.00 In	36688-43	10-26	5	10-54
Filter Assy, Hyd Charge	34463		•	10-88
Filter Assy, Hyd Return	72543	10-41	1	10-84
Filter Assy, Hyd Return	34463	10-41	3	10-84
Filter Assy, Hyd Return	72543		•	10-88
Filter Element	38327-01	10-41		10-84
Filter Element	34464	10-41		10-84

Description	Part Number	Figure Number	Item No.	Page Number
Filter Element, Cab Air	38653-01	10-21	4	10-44
Filter Element, Cab Air	38653-01		•	10-88
Filter Holder, Recirc.	36745-30	10-21	33	10-44
Filter, Fuel/water, Element,3044t	984909-01		•	10-88
Filter, Oil, 3044t	984909-02		•	10-88
Final Group	987491			10-88
Fitt, 90 ,6500-12-12	987521-50	10-39	11	10-80
Fitt, Reducer,2406-12-8	987521-49	10-39	12	10-80
Fitt,45 ,04mp-05hb, Crimped	72369	10-18	7	10-38
Fitt,45 ,6802-16-16	987521-27	10-41	12	10-84
Fitt,90 ,08mp-08hb,poly	70319	10-12	15	10-26
Fitt,90 ,16flh6k-16mj90	987521-42	10-40	7	10-82
Fitt,90 ,2501-16-20	987521-30	10-40	2	10-82
Fitt,90 ,2501-20-20	987521-31	10-40	1	10-82
Fitt,90 ,2501-6-8	987521-32	10-40	8	10-82
Fitt,90 ,6400-12-10	987521-34	10-39	9	10-80
Fitt,90 ,6801-12-12	987521-37	10-40	4	10-82
Fitt,90 ,6801-16-16	987521-38	10-40	18	10-82
Fitt,90 ,6801-16-20	987521-56	10-41	6	10-84
Fitt,90,6801-20-20	987521-28	10-40	17	10-82
Fitt, Lube, Str,02mp, Short, Zerk	33684	10-4	13	10-10
Fitt, Master Cyl Adaptor	38277	10-36	5	10-74
Fitt, Str ,02mp-03iff, Brass	39059	10-36	7	10-74
Fitt, Str ,6400-10-10	987521-36	10-41	9	10-84
Fitt, Str ,6400-10-12	987521-55	10-41	8	10-84
Fitt, Str ,6400-12-12	987521-40	10-41	15	10-84
Fitt, Str ,6400-6-6	987521-43	10-39	2	10-80
Fitt, Str ,6801-12-10	987521-35	10-39	5	10-80
Fitt, Str ,6801-12-16	987521-29	10-40	15	10-82
Fitt, Str, 06mp-06fpx	6274	10-14	18	10-30
Fitt, Str,08mp-08hb	70755	10-16	4	10-34
Fitt, Str,08mp-12mp	70459	10-12	10	10-26
Fitt, Tee ,02fm, Brass	33557	10-36	8	10-74
Fitt, Tee ,03iff, Brass	33949	10-36	11	10-74
Fitt, Tee ,2605-16-16-16	987521-57	10-41	4	10-84
Fitt, Tee ,6602-12-12-12	987521-48	10-39	6	10-80
Fitt, Test ,06mb-02pd	72689	10-14	11	10-30
Fitting,16fhhs	987521-39	10-40	5	10-82
Fitting,8mp-8mp 1/2ff-s	03-1022-7	10-8	13	10-18
Fitting,8mp-8mp 1/2ff-s	03-1022-7	10-38	19	10-78
Fitting, Adapter, Hp,7/8mor, 5/8mfs	989272-03	10-8	1	10-18

Description	Part Number	Figure Number	Item No.	Page Number
Fitting, Barb, Tee, Nylon,3/8”	1001616-04	10-13	6	10-28
Fitting, Elbow 45 9/16mor 3/8mfs	03-2115	10-8	23	10-18
Fitting, Elbow, Hp,90º 9/16mor 3/8mfs	989272-05	10-8	15	10-18
Fitting, Straight,03mhb-03iff	34956	10-37	•	10-76
Fitting, Straight,08mb-06fb	73150	10-19	•	10-40
Fitting, Straight,6400-12-12	987521-40	10-38	16	10-78
Fitting, Straight,6400-6-6	987521-43	10-38	14	10-78
Fitting, Vent, Hex W/screen,9/16-18mor	989272-04	10-8	16	10-18
Fitting, Zerk, Self Tapping,1/4-28	989272-28	10-11	10	10-24
Flange Yoke	38518-07	10-3	7	10-8
Flange,1.26x14 Spline	38518-08	10-3	8	10-8
Floormat	1000287	10-23	13	10-48
Fluid, Brake	90707	10-36	•	10-74
Foam, Rear Panel	36688-15	10-23	21	10-48
Frame, Brush	989272-63	10-5	6	10-12
Frame, W/m	1001033	10-1	1	10-4
Fuel/water Separator Pump	984909-13	10-18	9	10-38
Fuse Block,10 Gang, Atc	36694	10-33	17	10-68
Fuse Block,6 Gang, Atc	36695	10-26	6	10-54
Fuse Block,6 Gang, Atc	36695	10-33	18	10-68
Fuse,10 Amp, Atc	36340	10-26	•	10-54
Fuse,10 Amp, Atc	36340	10-32	•	10-66
Fuse,10 Amp, Atc	36340	10-34	•	10-70
Fuse,15 Amp, Atc	36341	10-12	•	10-26
Fuse,4 Amp, Atc	36747	10-26	•	10-54
Fuse,4 Amp, Atc	36747	10-32	•	10-66
Fuse,5 Amp, Atc	36746	10-34	•	10-70
Fuse,5 Amp, Atc	36746	10-34	•	10-70
Fuse, Blade,20amp, Atc-20	36342	10-20	•	10-42
Gauge, Oil Pressure	989961	10-32	3	10-66
Gauge, Sight Level/temp	500070	10-42	1	10-86
Gauge, Water Temp	989960	10-32	5	10-66
Glass, Door	36688-03	10-27	3	10-56
Glass, Door	36688-06p	10-27	4	10-56
Glass, Window	36688-04p	10-23	6	10-48
Glass, Window	36688-02p	10-23	22	10-48
Glass, Window	36688-05p	10-23	23	10-48
Grommet	38606-16	10-21	8	10-44
Grommet	38606-15	10-21	9	10-44
Grommet	38525-34	10-21	10	10-44
Grommet	38653-09	10-21	26	10-44

Description	Part Number	Figure Number	Item No.	Page Number
Grommet	38653-08	10-21	27	10-44
Grommet,.250	36688-17	10-23	7	10-48
Grommet,.250	36688-17	10-27	19	10-56
Grommet,.94id,1.12 Hole, Snap In	36688-54	10-25	2	10-52
Grommet, Insulation,.375id	35465-06	10-32	•	10-66
Grommet, Insulation,.375id	35465-06	10-32	•	10-66
Grommet, Insulation,.375id	35465-06	10-34	6	10-70
Grommet, Insulation,.375id	35465-06	10-34	•	10-70
Grommet, Insulation,.750id	35465-07	10-26	•	10-54
Grommet, Rubber	1001616-02	10-13	4	10-28
Hanger, Exhaust	38380	10-15	•	10-32
Hardware Kit	38518-09	10-3	9	10-8
Harness Ext, Lights, Tail	27824	10-34	•	10-70
Harness, Engine, Cat 3.3	1000290	10-14	20	10-30
Harness, Lights, Tail, Extension	27824	10-12	•	10-26
Headliner	36688-12	10-23	24	10-48
Hex Plate With Doubler	989272-56	10-7	8	10-16
Hex Plate With Doubler	989272-56	10-9	9	10-20
Hinge, Painted	36688-39	10-27	5	10-56
Hold Down, Battery	72313		•	10-88
Holder, Wire Tie, Adhesive Back	35213	10-34	•	10-70
Horn,12v	720110	10-32	•	10-66
Horn,12v	720110		•	10-88
Hose Cradle	989272-84	10-8	2	10-18
Hose Kit	1001642	10-41	•	10-84
Hose Kit, Chal V	1001642	10-38	•	10-78
Hose Kit, Chal V	1001642	10-39	•	10-80
Hose Kit, Chal V	1001642	10-40	•	10-82
Hose,.38 X 30 6ff 6mb	989272-15	10-8	24	10-18
Hose,.38 X 30 6ff 6mb	989272-15	10-38	3	10-78
Hose,.38 X 39 6ff 6mb	989272-14	10-8	19	10-18
Hose,.38 X 39 6ff 6mb	989272-14	10-38	2	10-78
Hose,.38 X 47 6ff 8mb	989272-13	10-8	11	10-18
Hose,.38 X 47 6ff 8mb	989272-13	10-38	1	10-78
Hose,.50 X 102 10ff 12md	989272-12	10-8	4	10-18
Hose,05, Fuel, Non Push-on	71812	10-18	8	10-38
Hose,06, Low Pressure, Push On	38579	10-13	1	10-28
Hose,06, Low Pressure, Push-on	38579	10-12	14	10-26
Hose,08, Push-on,250	6352	10-16	20	10-34
Hose,1 0g2-1 0fjx-1 0fjx90m-45”	987521-20	10-41	10	10-84
Hose,1 0g2-1 0fjx-1 0fjx90m-45”	987521-19	10-41	11	10-84

Description	Part Number	Figure Number	Item No.	Page Number
Hose,1 2g1 -1 2fjx-(Be)-29”	987521-21	10-40	14	10-82
Hose,1 2g2-1 2fjx-(Be)-40”	987521-15	10-40	16	10-82
Hose,1 2g2-1 2fjx-1 2fjx90m-28”	987521-18	10-41	13	10-84
Hose,1 2mk3k-1 2fjx-1 2fjx90s-1 71	987521-07	10-39	14	10-80
Hose,1 2mk3k-1 2fjx-1 2fjx90s-1 72	987521-08	10-39	13	10-80
Hose,1 6g1 -1 6fjx-(Be)-86”	987521-17	10-41	7	10-84
Hose,1 6g1 -1 6fjx-1 2fjx-86”	987521-16	10-39	10	10-80
Hose,1 6g1 -1 6fjx-1 2fjx-86”	987521-16	10-41	14	10-84
Hose,1 6g2-1 6fjx-(Be)-33”	987521-26	10-41	5	10-84
Hose,1 6g6k-1 6flh90-1 6fjx-52”	987521-25	10-40	13	10-82
Hose,1 6g6k-1 6flh90-1 6fjx90-48”	987521-24	10-40	6	10-82
Hose,1 6gmv-1 6fjx-(Be)-49”	987521-23	10-40	3	10-82
Hose,12g2-12fjx-(Be)-40”	987521-15	10-38	18	10-78
Hose,12mk3k-12fjx-12fjx-0s-1 71”	987521-07	10-38	12	10-78
Hose,12mk3k-12fjx-12fjx-0s-1 72”	987521-08	10-38	13	10-78
Hose,20gmv-20fjx-(Be)-44	987521-22	10-40	19	10-82
Hose,6m3k-6fjx-(Be)-1 29	987521-13	10-40	11	10-82
Hose,6m3k-6fjx-(Be)-1 29"	987521-13	10-39	4	10-80
Hose,6m3k-6fjx-(Be)-90”	987521-11	10-38	17	10-78
Hose,6m3k-6fjx-(Be)-90”	987521-11	10-39	1	10-80
Hose,6m3k-6fjx-8fjx-90”	987521-12	10-39	16	10-80
Hose,6mk3k-6fjx-(Be)-1 29	987521-14	10-40	12	10-82
Hose,6mk3k-6fjx-(Be)-1 29"	987521-14	10-39	15	10-80
Hose,6mk3k-6fjx-(Be)-21”	987521-09	10-38	9	10-78
Hose,6mk3k-6fjx-6fjx90m-1 35"	987521-05	10-39	8	10-80
Hose,6mk3k-6fjx-6fjx90m-1 35”	987521-05	10-38	11	10-78
Hose,6mk3k-6fjx-6fjx90s-96”	987521-10	10-39	17	10-80
Hose,6mk3k-6mp-6fjx90m-1 25"	987521-06	10-39	7	10-80
Hose,6mk3k-6mp-6fjx90m-1 25”	987521-06	10-38	10	10-78
Hose, Clear, Vinyl,3/8” X 1.75’	1001616-03	10-13	5	10-28
Hose, Comp-conden, 13/32	36745-01	10-22	•	10-46
Hose, Comp-evapor, 1/2	36745-02	10-22	•	10-46
Hose, Dryer-conden,5/1 6	36745-04	10-22	•	10-46
Hose, Evapor-dryer,5/1 6	36745-03	10-22	•	10-46
Hose, Flex,1.75 X 1.75 X 16.0	988352	10-19	8	10-40
Hose, Heater,.625 Id	Tf10199	10-20	•	10-42
Hose, Radiator,685b/3000	170071a	10-19	9	10-40
Hose, Windshield Washer,.188id	35550	10-25	1	10-52
Hose, Windshield Washer,.188id	35550	10-26	•	10-54
Hourmeter, Digital	39140-07	10-32	4	10-66
Housing	38653-04	10-21	1	10-44

Description	Part Number	Figure Number	Item No.	Page Number
Hub Assy, Wheel	38303	10-4	4	10-10
Hub, Hex,2 1/2	989272-71	10-7	10	10-16
Hub, Hex,2 1/2 X 1 1/4, Tapered Bore X 3.56	989272-76	10-9	10	10-20
Hub, Wheel, Idler	38303-02	10-4		10-10
Hydraulic Tank	1000260	10-42	6	10-86
Indicator, Air Filter Service	171220	10-16	7	10-34
Insert,4x3.5, Reducer	984932	10-16	•	10-34
Insert, Rubber,4.00 To 3.75	37587-2	10-16	10	10-34
Joystick	1000191	10-31	4	10-64
Key, Paddle Latch	36688-32	10-27		10-56
Kit, Decal, Rb48/swpro/chal	39141		•	10-88
Kit, Cab, Insulation	985514	10-23	•	10-48
Kit, Console Parts	1001216	10-30		10-62
Kit, Decal, Decorative	987499		•	10-88
Kit, Filter, Challenger	987912			10-88
Kit, Fittings, Lift Pump, Cat	986687	10-14	19	10-30
Kit, Oil Drain, Cat	986686	10-14	17	10-30
Kit, Seal, Cylinder	36754-03	10-4		10-10
Knob, Inside Release	36688-55	10-27	22	10-56
Knobs	37645-20	10-21	16	10-44
Knobs	36745-21	10-21	19	10-44
Label, Brush Pattern Adjustment	1001709	10-10	8	10-22
Label, Logo	1001709	10-10	1	10-22
Label, Serial Number	1001709	10-10	2	10-22
Label, Tie Down Point	1001709	10-10	3	10-22
Label, Warning, Crush Hazard	1001709	10-10	4	10-22
Label, Warning, Flying Objects And Entanglement	1001709	10-10	7	10-22
Label, Warning, High Pressure Fluid Hazard	1001709	10-10	6	10-22
Label, Warning, Misuse Hazard	1001709	10-10	5	10-22
Latch Cover W/m	36688-27	10-27	7	10-56
Latch, Engine Access Panel Door	160450	10-17	4	10-36
Lever, Brake,12 In Handle	34299	10-35	1	10-72
Lever, Park Brake	38329	10-2	2	10-6
Lever, Park Brake	38330	10-2	3	10-6
Lever, Pedal, Mount	986340	10-37	2	10-76
Light, Dome	38840	10-34	3	10-70
Light, Strobe, Amber, 8j,80sfpm	38687	10-34	•	10-70
Light, Turn Signal, Amber	6161	10-34	1	10-70
Light, Turn/brake, Red	851342007	10-34	4	10-70
Lights, Euro, Smoked Lens, Green/red Filter	39140-10	10-32	2	10-66
Loom, Split, Convoluted,.625	37271	10-41	•	10-84

Description	Part Number	Figure Number	Item No.	Page Number
Louver Door	38653-02	10-21	12	10-44
Louvers	36745-17	10-21	2	10-44
Louvers	36745-16	10-21	25	10-44
Mach Scr, R.H.,#10-32x1.00	80891	10-12	19	10-26
Mach Scr, R.H.,#10-24x.50	871052400	10-27	9	10-56
Manifold, Hyd, Brush Control	986972	10-38	15	10-78
Manifold, Hyd, Brush Control	986972	10-39	18	10-80
Manual-pak Case, 1 0.5x1 3.5x2.5	985234		•	10-88
Master Cyl, Brake	38314	10-36	2	10-74
Master Cyl, Brake,dual	35343	10-37	5	10-76
Mirror Group,7x16	25703	10-34	•	10-70
Mirror,7x16	38057	10-34	•	10-70
Motor, Hyd, Power Steering	39045	10-39	3	10-80
Motor, Hyd,100cc	38514	10-40	10	10-82
Motor, Hydraulic, White,28.3 Cu In	989272-11	10-9	1	10-20
Motor, Windshield Wiper	151170	10-26	10	10-54
Mount W/m, Water Tank	27100	10-12	1	10-26
Mount, Brake Switch	21218	10-35	5	10-72
Mount, Eng, W/m	987086	10-14	2	10-30
Mount, Eng, W/m	987085	10-14	3	10-30
Mount, Eng, W/m	987084	10-14	4	10-30
Mount, Eng, W/m	987083	10-14	5	10-30
Mount, Eng/compressor, W/m	987077	10-14	6	10-30
Mount, Fuel Lift Pump	987501	10-18	•	10-38
Mount, Isolation,425#	39082	10-14	9	10-30
Mount, Riser, Strobe Light	16962	10-34	•	10-70
Mount, Rubber, Tube Form	36072	10-23	20	10-48
Mount, Steering Column	1000065	10-30	5	10-62
Mount, Warning Light Group	21176	10-34	•	10-70
Mounting Band,8.13 Id	38386	10-16	2	10-34
Mounting Plate	989272-91	10-11	8	10-24
Mounting Plate	989272-90	10-11		10-24
Mounting, Weld Back Plate	989272-78	10-11	20	10-24
Muffler,2-1/2” Id Side Inlet	34074	10-15	1	10-32
Nut, Hex,jam,.500-20	80093	10-36	•	10-74
Nut, Hex,jam,.625-18	80095	10-36	•	10-74
Nozzle, Cap, Nylon	1001616-06	10-13	8	10-28
Nozzle, Elbow, Without Clamp	1001616-05	10-13	7	10-28
Nozzle, Tip, Brass	1001616-07	10-13	9	10-28
Nut, Acorn,.250-20,ss	81275	10-23	5	10-48
Nut, Centerlock,.438-14	36688-52	10-24	9	10-50

Description	Part Number	Figure Number	Item No.	Page Number
Nut, Flexloc,.250-20	80350	10-42	5	10-86
Nut, Flexloc,.250-20, Full, Lt	80350	10-34	•	10-70
Nut, Flexloc,.250-20, Full, Lt	80350	10-20	•	10-42
Nut, Flexloc,.250-20, Full, Lt	80350	10-24	3	10-50
Nut, Flexloc,.250-20, Full ,lt	80350	10-26	2	10-54
Nut, Flexloc,.250-20, Full, Lt	80350	10-26	•	10-54
Nut, Flexloc,.250-20, Full, Lt	80350	10-27	10	10-56
Nut, Flexloc,.31 2-1 8, Full, Lt	80351	10-27	20	10-56
Nut, Flexloc,.31 2-1 8, Full, Lt	80351	10-29	12	10-60
Nut, Flexloc,.31 2-1 8, Full, Lt	80351	10-35	•	10-72
Nut, Flexloc,.375-1 6, Full, Lt	80352	10-20	•	10-42
Nut, Flexloc,.375-1 6, Full ,lt	80352	10-23	16	10-48
Nut, Flexloc,.375-1 6, Full, Lt	80352	10-34	•	10-70
Nut, Flexloc,.438-14, Full, Lt	80353	10-28	•	10-58
Nut, Flexloc,.500-1 3, Full, Lt	80354	10-4	25	10-10
Nut, Flexloc,.500-13, Full, Lt	80354	10-37	10	10-76
Nut, Flexloc,.750-1 0, Full, Lt	80357	10-4	18	10-10
Nut, Flexloc,1.000-8, Full, Lt	80359	10-4	2	10-10
Nut, Hex,.250-20	80036	10-1	•	10-4
Nut, Hex,.250-20	80036	10-12	22	10-26
Nut, Hex,.250-20	80036	10-20	•	10-42
Nut, Hex,.250-20	80036	10-21	14	10-44
Nut, Hex,.250-20	80036	10-27	23	10-56
Nut, Hex,.312-18	80037	10-26	•	10-54
Nut, Hex,.312-18	80037	10-31	•	10-64
Nut, Hex,.375-16	80038	10-12	12	10-26
Nut, Hex,.375-16	80038	10-16	•	10-34
Nut, Hex,.375-16	80038	10-19	•	10-40
Nut, Hex,.375-16	80038	10-20	5	10-42
Nut, Hex,.375-16	80038	10-27	25	10-56
Nut, Hex,.375-16	80038	10-36	•	10-74
Nut, Hex,.375-16	80038	10-37	3	10-76
Nut, Hex,.375-16	80038	10-40	•	10-82
Nut, Hex,.375-16	80038	10-41	•	10-84
Nut, Hex,.438-14	80039	10-29	7	10-60
Nut, Hex,.500-13	80040	10-1	•	10-4
Nut, Hex,.750-10	80043	10-12	3	10-26
Nut, Hex,.750-16	80061	10-1	•	10-4
Nut, Hex,#10-24	80824	10-26	3	10-54
Nut, Hex,#10-24	80824	10-27	8	10-56
Nut, Hex,#10-32	80494	10-12	20	10-26

Description	Part Number	Figure Number	Item No.	Page Number
Nut, Hex,1.750-5, Gr2	80014	10-37	•	10-76
Nut, Hex,3/4	989272-27	10-11	11	10-24
Nut, Hex, Cl10,m10-105	989272-42	10-7	5	10-16
Nut, Hex, Cl10.9, M12-1.75	989272-49	10-9	8	10-20
Nut, Hex, Hylock, Gr8,7/16-14	989272-29	10-11	12	10-24
Nut, Hex, Jam,1.00-16	21113	10-4	10	10-10
Nut, Hex, Jam,1.00-16	21114	10-4	11	10-10
Nut, Hex, Nylock, Gr8,1-8	989272-44	10-11	15	10-24
Nut, Lug,.500-20	620520	10-1	2	10-4
Nut, Lug,.500-20	620520	10-4		10-10
Nut, Mounting Control	38525-22	10-21	20	10-44
Nut, Spindle,6bf	31713	10-4	14	10-10
O-ring Face Seal 3/8 SAE6	989272-08	10-8	20	10-18
O-ring,#10	36745-10	10-22	•	10-46
O-ring,#6	36745-12	10-22	•	10-46
O-ring,#8	36745-11	10-22	•	10-46
O-ring,#8 Face Seal	1001616-08	10-13	10	10-28
Oil,gear Lube,ls	91464	10-1	•	10-4
Oil, Hyd, Iso68	91500	10-40	•	10-82
Oil, Hyd, Iso68	91500	10-41	•	10-84
Opt, Radio, Am/fm, W/spk'r And Antenna	1000705			10-88
Paddle Latch	36688-31	10-27	17	10-56
Paint Group, Challenger	984626			10-88
Paint, Black, Urethane, H-solid	981666		•	10-88
Paint, White, Primer	853230		•	10-88
Paint, Yellow, LeeBoy Topcoat	853220		•	10-88
Pedal, Brake	9375	10-37	1	10-76
Pedestal, Spring Seat	25037	10-29	1	10-60
Pedestal, Std Seat	24511	10-28	1	10-58
Pin With Holes,1 1/4 X 4	989272-75	10-11	2	10-24
Pin With Holes,1.25 X 15.53	989272-61	10-11	24	10-24
Pin, Clevis,1 X 2	989272-47	10-11	16	10-24
Pin, Clevis,1 X 5	989272-54	10-11	19	10-24
Pin, Cotter,.125x1.50	80332	10-4	15	10-10
Pin, Cotter, Gr2,5/32 X 1 1/2	989272-22	10-11	7	10-24
Pin, Klick,3/16 X 1 5/8	989272-24	10-11	9	10-24
Pin, L Inch,1/4	989272-21	10-5	1	10-12
Pin, Lynch,1/4	989272-21	10-11	6	10-24
Pipe Plug,5406-hhp-16	987521-60	10-41	2	10-84
Pipe, Bulkhead,1.25 Fp, Pvc	33238-01	10-12		10-26
Pipe, Bulkhead,12 Fp, Pvc	33238-02	10-12		10-26

Description	Part Number	Figure Number	Item No.	Page Number
Pipe, Nipple,.1 25 X Close	99610	10-16	6	10-34
Pipe, Plug,1.50, Sq Head, Mi	99293	10-12	11	10-26
Pipe, Plug,16mp, Sq Head, Mi	99539	10-18	5	10-38
Pipe, Red,08fp-06fp, Mi	99552	10-14	14	10-30
Pivot	989272-59	10-11	22	10-24
Pivot	989272-60	10-11	23	10-24
Plate Hydraulic Orifice .046	989272-07	10-8	21	10-18
Plate, Base, Dual, Master, Cyl	986334	10-37	8	10-76
Plate, Cab Access Cover	987456	10-23	15	10-48
Plate, Console, Needle Vlv, Cover	987662	10-31	2	10-64
Plate, Cover	1000883	10-17	3	10-36
Plate, Cyl, Mount	986336	10-37	7	10-76
Plate, Door	1000882	10-17	6	10-36
Plate, Handle, Motor	989272-69	10-9	12	10-20
Plate, Hat, Core,10	989272-57	10-6	4	10-14
Plate, Mounting, Bearing	989272-70	10-7	9	10-16
Plate, Mountng, Motor	989272-68	10-9	11	10-20
Plate, Serial Number, Leeboy	35355		•	10-88
Plate, Support, Rad	1001164	10-19	3	10-40
Plate, Support, Rad	1001165	10-19	5	10-40
Plate, Support, Rad	1001163	10-19	11	10-40
Plate, Tank Cover	987455	10-1	11	10-4
Plug, Hole,.312,flush Mt,plstc	35136-21	10-23	2	10-48
Plug, Hole,.375,flush Mt,plstc	35136-3	10-24	1	10-50
Plug, Hole,.500,flush Mt,plstc	35136-4	10-25	4	10-52
Plug, Hole,.500,flush Mt,plstc	35136-4	10-26	12	10-54
Plug, Hole,.625,flush Mt,plstc	35136-5	10-24	2	10-50
Plug, Hole,.625,flush Mt,plstc	35136-5	10-25	3	10-52
Plug, Hole,.625,flush Mt,plstc	35136-5	10-26	1	10-54
Plug, Hole,1.50,flush Mt,plstc	35136-11	10-23	•	10-48
Plug, Hole,3.50,flush Mt,plstc	35136-17	10-23	•	10-48
Port Kit,08 Barb X 90,epdm	36730-02	10-12	18	10-26
Pre-cleaner,4.00id	37587	10-16	15	10-34
Pump, Hyd, Gear,2.3 Cir,cw	38323	10-40	9	10-82
Pump, Hyd, Piston,4.57 Cir	38321	10-14	8	10-30
Pump, Water, Diaphram	36730	10-12	17	10-26
Pushrod, Brake	28647	10-36	3	10-74
Quick Disconnect,6pp F 6fp	989272-16	10-8	18	10-18
Quick Disconnect,6pp F 6fp	989272-16	10-38	4	10-78
Quick Disconnect,6pp M 6fp	989272-19	10-8	25	10-18
Quick Disconnect,6pp M 6fp	989272-19	10-38	7	10-78

Description	Part Number	Figure Number	Item No.	Page Number
Quick Disconnect,8pp F 12mp	989272-18	10-8	9	10-18
Quick Disconnect,8pp F 12mp	989272-18	10-38	6	10-78
Quick Disconnect,8pp F 8fp	989272-17	10-8	14	10-18
Quick Disconnect,8pp F 8fp	989272-17	10-38	5	10-78
Quick Disconnect,8pp M 12fp	989272-20	10-8	10	10-18
Quick Disconnect,8pp M 12fp	989272-20	10-38	8	10-78
Rad/oil Cooler	1000831	10-19	1	10-40
Radiator Mount	1000425	10-19	6	10-40
Radiator Mount	1000424	10-19	10	10-40
Radio, Am/fm Cassette	P204619		•	10-88
Rear Cab Mount, W/m	987211	10-1	5	10-4
Rear Windshield Wiper	21166	10-26	•	10-54
Receiver Dryer	36745-07	10-22	•	10-46
Reducer, Rubber,2.5”x2.25”	987486	10-16	13	10-34
Refrigerant, Oil	38106	10-20	•	10-42
Refrigerant, R134a Freon	38105	10-20	•	10-42
Relay, Starter	38954	10-14	16	10-30
Ring, Recessed, Lifting,500#	1001057	10-17	1	10-36
Ring, Retaining,2.75	989272-45	10-7	6	10-16
Ring, Retaining,2.75	989272-45	10-9	6	10-20
Ring, Snap	989272-41	10-7	4	10-16
Rocker, On-off,n.i.,spst	39140-13	10-32	7	10-66
Rocker, On-off,red W.i.,spst	39140-12	10-32	8	10-66
Rocker, Paddle, On-off-on,n.i.,dpdt	39140-11	10-32	6	10-66
Rod, Adjustment	989272-74	10-11	3	10-24
Rod, Push, Dual, Mas, Cyl	986337	10-37	4	10-76
Rubber Strip, Sponge,.250x.50	73064	10-27	26	10-56
Rubber, Cover, Joystick	1000188	10-32	10	10-66
S M V Sign Group	17898		•	10-88
Scr, Slftpg,hh,.250-20x.50	80322	10-25	6	10-52
Scr, Slftpg,hh,.250-20x.50	80322	10-27	16	10-56
Screw,1/4-20,truss Head	N/a	10-21	7	10-44
Screw, Flat Head,3/4-#6	N/a	10-21	18	10-44
Screw, Hfh,cl10.9, M6-1 X 20	989272-25	10-5	2	10-12
Screw, Hhc,cl10-9, M10-1.5 X 30mm	989272-36	10-9	3	10-20
Screw, Hhc,cl10.9, M10-1.5x16mm	989272-50	10-5	7	10-12
Screw, Hhc,cl10.9, M12-1.75 X 65mm	989272-46	10-9	7	10-20
Screw, Hhc,cl10.9, M6-1x30mm	989272-33	10-6	2	10-14
Screw, Hhc,cl10.9,m10-1.5 X 30mm	989272-36	10-7	2	10-16
Screw, Hhc,cl10.9,m10-1.5 X 35mm	989272-37	10-8	5	10-18
Screw, Hhc,cl10.9,m10-1.5 X 50mm	989272-38	10-7	3	10-16

Description	Part Number	Figure Number	Item No.	Page Number
Screw, Hhc, Gr8 3/4-10 X 21/2	989272-23	10-11	1	10-24
Screw, Hhc, Gr8,1-8 X 7 1/2	989272-48	10-11	18	10-24
Screw, Hhc, Gr8,7/16-14 X 2 1/2	989272-30	10-11	13	10-24
Screw, Hhc, M8-1.25 X 65mm Cl10.9	989272-85	10-8	8	10-18
Screw, Self-tapping, Hex Head.250-20 X .50	80322	10-24	11	10-50
Screw, Whizlock,1/2-24,#10	N/a	10-21	17	10-44
Seal	33187	10-4		10-10
Seal, Cable,14 Ga	36623	10-33	16	10-68
Seal, Cable,18-16 Ga	36166	10-20	•	10-42
Seal, Cable,18-16 Ga	36166	10-33	13	10-68
Seal, Cable,18-16 Ga	36166	10-34	•	10-70
Seal, Door	19871	10-27	•	10-56
Seal, Window	36688-18	10-23	11	10-48
Seal, Window	36688-18	10-27	•	10-56
Sealant, Silicone, Clear	33707	10-26	•	10-54
Sealant, Silicone, Clear	33707	10-27	•	10-56
Seat Adjustment Lever Weldment	14039	10-28	3	10-58
Seat Assy, Black,w/armrest	360010b	10-29	3	10-60
Seat Belt,12.0	37982	10-29	13	10-60
Seat Belt,2.00 W/hardware	730-3050		•	10-88
Seat, Black, Plain	6576	10-28	2	10-58
Seat, Suspension, Low Profile	140600	10-29	2	10-60
Section, Set,36, Poly	989272-02	10-6	1	10-14
Sender, Press, Oil,1-150 Psi,hd	39081	10-14	•	10-30
Sending Unit, Fuel Level	38373	10-18	4	10-38
Set Screw,.375-16x1.00	38518-10	10-3	10	10-8
Shaft, Pedal, Base	986339	10-37	11	10-76
Shaft, Pivot, Front Axle, W/m	20724	10-4	8	10-10
Sheet, Hood	989272-66	10-5	5	10-12
Sheet, Hood	989272-64	10-5	8	10-12
Sheet, Hood	989272-65	10-5	9	10-12
Shim, Cable Clamp	38535	10-31		10-64
Shldr Scr,.500x.625x.375-16	81262	10-27	14	10-56
Sill, Door	36688-07	10-23	14	10-48
Sleeve, Steering Cyl Mount	16935	10-4	3	10-10
Slider Set, Seat Base	72527-01	10-29	4	10-60
Slip Yoke	38518-02	10-3	2	10-8
Spacer, Seat Slide, Plastic	72527-03	10-29	•	10-60
Speaker, Marine,6.5” 2-way	988664		•	10-88
Spindle, W/m	27056	10-4	6	10-10
Spindle, W/m	27059	10-4	7	10-10

Description	Part Number	Figure Number	Item No.	Page Number
Spring	R339l	10-37	•	10-76
Spring	R339r	10-37	•	10-76
Steering Axle, W/m	27051	10-4	5	10-10
Steering Column Assembly	1000109	10-30	6	10-62
Steering Wheel,17.00,36 Spline	300030	10-30	2	10-62
Strainer Assy	36926	10-12	13	10-26
Strainer, Suct,2npt, 25gpm, 100me	33148	10-42	7	10-86
Striker, External Thread	36688-49	10-24	7	10-50
Strip, Abrasive,4”x60’roll, Blk	4684102		•	10-88
Stub Shaft	38518-03	10-3	3	10-8
Stud, Mounting, Motor	989272-67	10-5	10	10-12
Support, Filter	25646	10-41		10-84
Support, Filter	15984	10-41		10-84
Switch, Defroster Fan	35426	10-32	•	10-66
Switch, Defroster Fan	35426	10-32	•	10-66
Switch, Fan	36745-18	10-21	22	10-44
Switch, High Pressure	36745-09	10-22	•	10-46
Switch, Ignition	39146-14	10-30	4	10-62
Switch, Low Pressure	36745-34	10-22	•	10-46
Switch, Safety Start	951091224	10-35	7	10-72
Switch, Stop Lamp, Hyd Type, No	32131	10-36	9	10-74
Switch, Temp,220 F, No, 1/4p	37005	10-14	•	10-30
Switch, Wiper/washer	853090	10-25	5	10-52
Switch, Wiper/washer	853090	10-26	•	10-54
Tachometer	989959	10-32	1	10-66
Tank Strap W/m	12488	10-12	7	10-26
Tank W/m, Fuel	1000261	10-18	1	10-38
Tank, Water,150gal	33238	10-12	6	10-26
Term, Push-on,.25,fem,1 8-14,sl	36349	10-34	•	10-70
Term, Push-on,.25,fem,16-14 Ga	33600	10-33	10	10-68
Term, Push-on,.25,m, 18-1 4,slv	36348	10-32	•	10-66
Term, Push-on,.25,m, 18-1 4,slv	36348	10-32	•	10-66
Term, Ring,12-10 Ga,.500 Stud	72135	10-34	•	10-70
Term, Ring,16-14 Ga,#10 Stud	851390204	10-32	•	10-66
Term, Ring,16-14 Ga,#10 Stud	851390204	10-32	•	10-66
Term, Ring,16-14 Ga,#10 Stud	851390204	10-34	•	10-70
Term, Sealed Conn,16-14 Ga,fem	36165	10-33	12	10-68
Term, Sealed Conn,16-14 Ga,fem	36165	10-34	•	10-70
Term, Sealed Conn,16-14 Ga,male	36164	10-20	•	10-42
Throttle Cable Assy	26166	10-31	1	10-64
Tie Rod Tube	27053	10-4	9	10-10

Description	Part Number	Figure Number	Item No.	Page Number
Tire & Wheel,16.5x8.75	340010a	10-1	7	10-4
Toolbox Lid, W/m	987681	10-1	6	10-4
Toplink,5.81	989272-72	10-11	5	10-24
Tube W/ Adapter,2.5", W/m	987295	10-16	12	10-34
Tube Yoke	38518-04	10-3	4	10-8
Tube, Intake, W/m	987488	10-16	14	10-34
Tube, Adjustment	989272-73	10-11	4	10-24
Tube, Flex, Exhaust,2.50 X 22.00	988381	10-15	4	10-32
Tubing	38518-05	10-3	5	10-8
Tubing,2.50 Od X 16 Ga X 4	19287-02	10-15	3	10-32
Turn Signal W/hazard,7-wire	33687	10-30	3	10-62
U-bolt Kit	38518-06	10-3	6	10-8
U-bolt,.250-20, 1.00iw, 1.75il	35077	10-12	•	10-26
U-bolt,.375-16, 4.00iw, 3.00il	38482	10-41	•	10-84
U-bolt, Drive Axle	35339	10-1	3	10-4
Universal Joint	38518-01	10-3	1	10-8
V Belt,4l 38.00x.500	1001690	10-20	8	10-42
Valve Ball, Br 8fp-8fp	03-1392	10-8	12	10-18
Valve Ball, Br 8fp-8fp	03-1392	10-38	20	10-78
Valve, Check,08hb,5 Psi, Poly	36882	10-13	3	10-28
Valve, Drain, Cock,.250 Npt	910150	10-19	•	10-40
Valve, Heater Shutoff	35546	10-14	15	10-30
Valve, Thermal Expansion	36745-32	10-22	•	10-46
Valve, Water	36749-01	10-21	34	10-44
Vlv, Heater Shutoff	35546	10-20	1	10-42
Washer Nozzle & Tee Kit	36753	10-26	•	10-54
Washer, Flat,m10	80474	10-20	•	10-42
Washer, Flat, SAE,.375	80996	10-40	•	10-82
Washer,.80x3.25x. 1 88thick	36073	10-23	19	10-48
Washer, Ext. Tooth	N/a	10-21	6	10-44
Washer, Fender,cl8.8,m6	989272-43	10-5	4	10-12
Washer, Flat,.250x1.00,ss	81278	10-23	9	10-48
Washer, Flat,.250x1.00,ss	81278	10-24	4	10-50
Washer, Flat,.250x1.00,ss	81278	10-27	21	10-56
Washer, Flat, Cl8.8, M10	989272-34	10-8	6	10-18
Washer, Flat, Cl8.8, M12	989272-39	10-9	4	10-20
Washer, Flat, Gr8,3/4	989272-31	10-11	14	10-24
Washer, Flat, SAE .375, Hardened	81155	10-19	•	10-40
Washer, Flat, SAE .750, Hardened	81154	10-12	4	10-26
Washer, Flat, SAE,.250	80970	10-1	•	10-4
Washer, Flat, SAE,.375	80996	10-16	•	10-34

Description	Part Number	Figure Number	Item No.	Page Number
Washer, Flat, SAE,.375	80996	10-41	•	10-84
Washer, Flat, SAE,.500, Hardened	81141	10-1	•	10-4
Washer, Flat, SAE,.500, Hardened	81141	10-1	•	10-4
Washer, Flat, SAE,.750	80698	10-1	•	10-4
Washer, Flat, SAE.375, Hardened	81155	10-12	8	10-26
Washer, Flat,USS .188	81006	10-20	•	10-42
Washer, Flat,USS .250	80140	10-20	•	10-42
Washer, Flat,USS .375	80142	10-20	4	10-42
Washer, Flat,USS .438	80143	10-28	6	10-58
Washer, Flat,USS .500	80144	10-4	16	10-10
Washer, Flat,USS .500	80144	10-28	4	10-58
Washer, Flat,USS .750	80147	10-4	19	10-10
Washer, Flat,USS #10	80995	10-12	21	10-26
Washer, Flat,USS 1.000	80149	10-4	12	10-10
Washer, Flat,USS, .375	80142	10-28	•	10-58
Washer, Flat,USS, .438	80143	10-29	6	10-60
Washer, Flat,USS,.250	80140	10-23	3	10-48
Washer, Flat,USS,.250	80140	10-26	•	10-54
Washer, Flat,USS,.250	80140	10-31	•	10-64
Washer, Flat,USS,.250	80140	10-34	•	10-70
Washer, Flat,USS,.31 3	80141	10-26	•	10-54
Washer, Flat,USS,.31 3	80141	10-34	•	10-70
Washer, Flat,USS,.313	80141	10-29	11	10-60
Washer, Flat,USS,.313	80141	10-35	•	10-72
Washer, Flat,USS,.375	80142	10-24	8	10-50
Washer, Flat,USS,.375	80142	10-34	•	10-70
Washer, Flat,USS,.438	80143	10-29	8	10-60
Washer, Lock,.250	80160	10-1	•	10-4
Washer, Lock,.250	80160	10-20	•	10-42
Washer, Lock,.250	80160	10-21	13	10-44
Washer, Lock,.250	80160	10-27	13	10-56
Washer, Lock,.312	80161	10-31	•	10-64
Washer, Lock,.312	80161	10-34	•	10-70
Washer, Lock,.312	80161	10-35	•	10-72
Washer, Lock,.375	80162	10-16	•	10-34
Washer, Lock,.375	80162	10-19	•	10-40
Washer, Lock,.375	80162	10-20	13	10-42
Washer, Lock,.375	80162	10-28	•	10-58
Washer, Lock,.375	80162	10-36	•	10-74
Washer, Lock,.375	80162	10-40	•	10-82
Washer, Lock,.375	80162	10-41	•	10-84

Description	Part Number	Figure Number	Item No.	Page Number
Washer, Lock,.500	80164	10-1	•	10-4
Washer, Lock,.750	80168	10-1	•	10-4
Washer, Lock,#10	871071601	10-12	5	10-26
Washer, Lock,#10	871071601	10-26	4	10-54
Washer, Lock,m10	989272-35	10-5	3	10-12
Washer, Lock,m10	989272-35	10-7	1	10-16
Washer, Lock,m10	989272-35	10-8	7	10-18
Washer, Lock,m10	989272-35	10-9	2	10-20
Washer, Lock,m12	989272-40	10-9	5	10-20
Washer, Split,3/4	989272-26	10-11	17	10-24
Washer, Tank And Pump	33745-1	10-26	•	10-54
Weld Hinge,4”	147-876	10-17	5	10-36
Wheel Stud,1/2-20	38303-03	10-4		10-10
Windshield Washer, Front Or Rear	21167	10-26	•	10-54
Wiper Motor,2-speed	36741	10-26	•	10-54
Wire Harness, Cab	1001045	10-25	9	10-52
Wire Harness, Park Brake	27503	10-35	6	10-72
Wire Harness, Rear/work Lights	988781	10-34	5	10-70
Wire Harness, Water Pump	28369	10-12	•	10-26
Wire,14 Ga, Blue	71062	10-33	5	10-68
Wire,14 Ga, Purple	35174	10-33	19	10-68
Wire,14 Ga, Red	71065	10-33	20	10-68
Wire,16 Ga, Black	33271-1	10-33	1	10-68
Wire,16 Ga, Brown	33271-3	10-33	21	10-68
Wire,16 Ga, Brown/yellow Stripe	33271-15	10-33	4	10-68
Wire,16 Ga, Green	33271-4	10-33	9	10-68
Wire,16 Ga, Green/yel Stripe	33271-19	10-33	6	10-68
Wire,16 Ga, Orange	33271-6	10-33	8	10-68
Wire,16 Ga, Red/black Stripe	33271 -12	10-33	2	10-68
Wire,16 Ga, White	33271-5	10-32	•	10-66
Wire,16 Ga, White	33271-5	10-32	•	10-66
Wire,16 Ga, White	33271-5	10-33	7	10-68
Wire,16 Ga, Yellow/red Stripe	33271-14	10-33	3	10-68
Work Light	160040a	10-34	2	10-70