ROSCO

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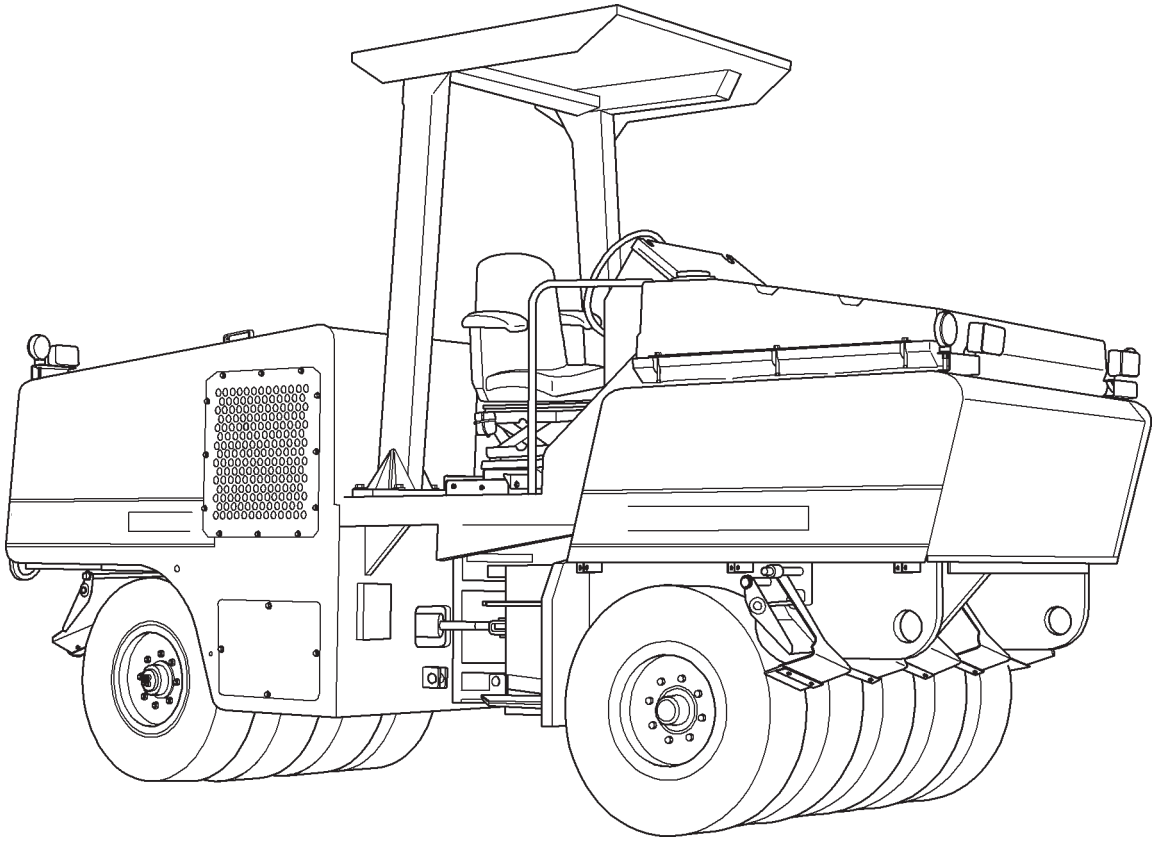
OPERATIONS, MAINTENANCE, AND PARTS MANUAL



ROSCO MODEL TRUPAC 915

Manual No. 36376-05

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.

VT LeeBoy, Inc., VT LeeBoy, LeeBoy, and Rosco are all the same entity and are used interchangeably.

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Section 1
INTRODUCTION

Thank you for purchasing the Rosco Model TruPac 915. We wish you many years of safe and efficient operation of your roller.

READ THIS MANUAL PRIOR TO OPERATING the roller. This manual is an important part of the roller and should be kept with the roller at all times in the dedicated storage container on the roller. 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 roller. If this manual becomes lost or damaged, contact your authorized Rosco 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 roller. This manual covers the procedures for proper operation and maintenance of the roller. This manual contains information that was available at the time of printing.

This manual provides information for use by the equipment operator under the following headings:

Safety—See Section 2 for important safety guidelines information.

General Information—See Section 3 for important warranty, contact, and Roller Nameplate information.

Specifications—See Section 4 for all major system specifications and typical torque value tables.

Component Location—See Section 5 for general overview of controls and major components.

Operation—See Section 6 for control functionality and normal roller operation.

Maintenance—See Section 7 for basic preventive maintenance and repair procedures.

Troubleshooting—See Section 8 for problem descriptions and recommended solution tables.

Electrical—See Section 9 for schematic diagrams of electrical wiring.

Illustrated Parts List—See Section 10 for illustrations, descriptions and part numbers of available service parts.

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Section 2
SAFETY

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 Roller and follow its instructions when operating the Rosco Model TruPac 915.

Safety is everyone's business and is our top concern. Knowing the guidelines covered in this section and in Section 1 will help ensure your safety, the safety of those around you and the roller's proper operation. LOOK FOR THESE SYMBOLS WHICH POINT OUT ITEMS OF EXTREME IMPORTANCE TO THE SAFETY OF YOU AND YOUR COWORKERS. READ AND UNDERSTAND THOROUGHLY. HEED THE WARNING AND FOLLOW THE INSTRUCTIONS. Keep safety labels in good condition. If safety labels become missing or damaged, replacement safety labels are available from your Rosco Dealer.

⚠ 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 Rosco Model TruPac 915 to operate improperly.

NOTE: Indicates a procedure, practice, or condition that should be followed in order for the roller 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 service or operate the Rosco Model TruPac 915 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 and labels are additional reminders for safe operating and maintenance techniques.

• Contact Rosco or an authorized Rosco Dealer for additional training.

• Make sure you are aware of all laws and regulations that are in effect where the roller is operated. Make sure you have all necessary licenses to operate the roller.

⚠ 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 Rosco Model TruPac 915 without written consent of Rosco. Any modification can affect the safe operation of the roller and may cause personal injury or death.

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 roller.

• 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 Rosco Model TruPac 915 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 Rosco Model TruPac 915 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 roller guards and covers are attached properly to the roller before starting the engine. Do not start the engine if any guards or covers are not properly installed on the roller.
- If you must run the engine during maintenance procedures, make sure you have a helper to keep bystanders clear of the roller and make observations of moving parts as requested by the operator.
- 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 roller 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 Rosco Dealer or distributor repair the damage.

Flying Object Hazard

Always wear eye protection when cleaning the Rosco Model TruPac 915 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 Rosco Model TruPac 915 parts.

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 Rosco Model TruPac 915 damage or cause it to operate improperly.

Only use replacement parts approved by Rosco. 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.

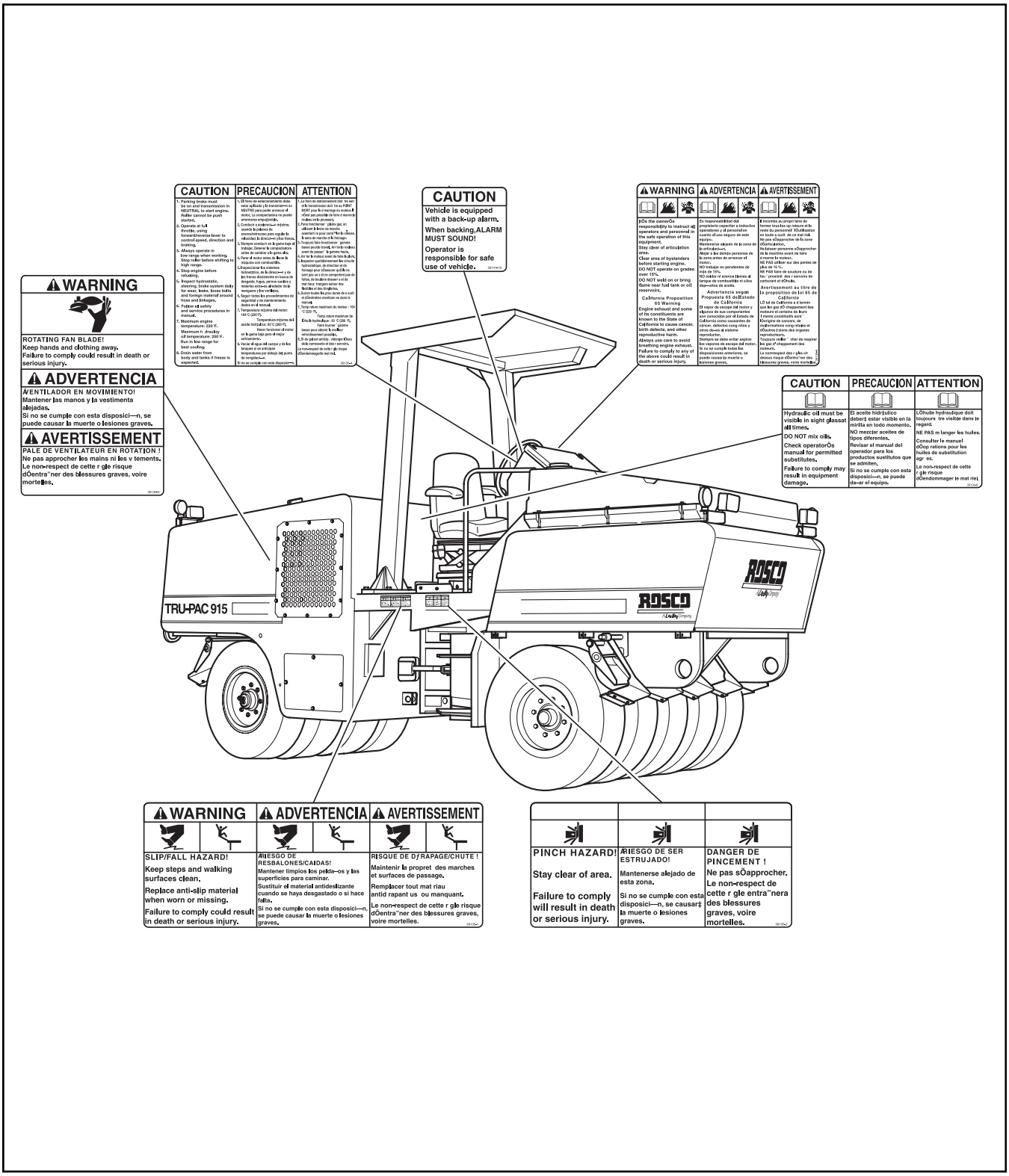
Clean all accumulated dirt and debris away from the body of the roller and its components before you inspect the roller or perform preventive maintenance procedures or repairs. Operating a roller with accumulated dirt and debris will cause premature wear of roller components. Accumulated dirt and debris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

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

Dispose of hazardous materials in accordance with all applicable laws and regulations. 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 roller operation, stop the engine immediately. Determine the cause and repair the problem before continuing to operate the roller.

LOCATION OF SAFETY DECALS



Left Side Safety Labels and Safety Label Locations

Figure 2-1

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Section 3

GENERAL INFORMATION

LIMITED WARRANTY POLICY

Warranty

1. Subject to the limitations, exclusions, and claims procedures set forth herein, Rosco warrants [to the first retail purchaser] that this product will be free from [substantial] defects in materials and workmanship during the warranty period.
2. If a defect in material or workmanship is found, your authorized Rosco Dealer is to be notified during the warranty period. Rosco and its authorized Dealer will repair or replace any part or component of the unit or part that fails to conform to the warranty during the warranty period.
3. The warranty period will begin on the initial start-up, training and delivery of the unit by the Dealer to the customer, and will expire after twelve (12) months following the delivery of the machine to the first retail purchaser.
4. Manufacturers' Warranties: Engines are warranted by their manufacturers and may have warranty coverage that differs from that of Rosco. Rosco does not warrant any engine.
5. Replacement parts furnished by Rosco are covered for the remainder of the warranty period applicable to the unit or component in which such parts are installed.
6. Rosco has the right to repair any component or part before replacing it with a new one.
7. All new replacement parts purchased by a Rosco Dealer will carry a six-month warranty.
8. This Limited Warranty is governed by the laws of the State of North Carolina.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESSED, STATUTORY AND IMPLIED WARRANTIES APPLICABLE TO UNITS, ENGINES, OR PARTS INCLUDING WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE OR AGAINST INFRINGEMENT.

Limitations

Rosco has no obligation 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 Rosco.
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 Rosco, 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 rests with the manufacturer of the engine.
7. Warranty and Parts Support: Rosco may have support agreements with some engine manufacturers for warranty and parts support. However, Rosco does not warrant the engine.
8. This Limited Warranty sets forth your sole remedy in connection with the sale or use of the Rosco product covered by this Limited Warranty.
9. This Limited Warranty extends only to the first retail purchaser, and is not transferable.
10. In the event any portion of this Limited Warranty shall be determined to be invalid under any applicable law, such provision shall be deemed null and void and the remainder of the Limited Warranty shall continue in full force and effect.

Items Not Covered

Rosco is not responsible for the following:

1. All used units or used parts of any kind.
2. Repairs due to normal wear and tear or brought about by abuse or lack of maintenance of the Roller.
3. Attachments not manufactured or installed by Rosco.
4. Liability for incidental or consequential damages of any type including, but not limited to, lost profits or expenses of acquiring replacement equipment.
5. Miscellaneous charges.

Other Limitations

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY OR ALLEGED NEGLIGENCE OR LIABILITY WITHOUT FAULT, SHALL ROSCO BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOSS OF PROFIT OR REVENUE, COST OF CAPITAL, COST OF SUBSTITUTED EQUIPMENT, FACILITIES OR SERVICES, DOWNTIME COSTS, LABOR COSTS OR CLAIMS OF CUSTOMERS, PURCHASERS OR LESSEES FOR SUCH DAMAGES. IN NO EVENT WILL WARRANTY COMPENSATION, OR OTHER DAMAGES AVAILABLE FROM ROSCO, EXCEED THE PURCHASE PRICE OF THE PRODUCT.

CONTACT INFORMATION

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

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

Record dealer information in the space provided. For additional information about Rosco, please visit:

www.leeboy.com

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 Rosco for service, parts or literature.

Roller Model Number: _____

Roller Serial Number: _____

Engine Model Number: _____

Engine Serial Number: _____

Date of Purchase: _____

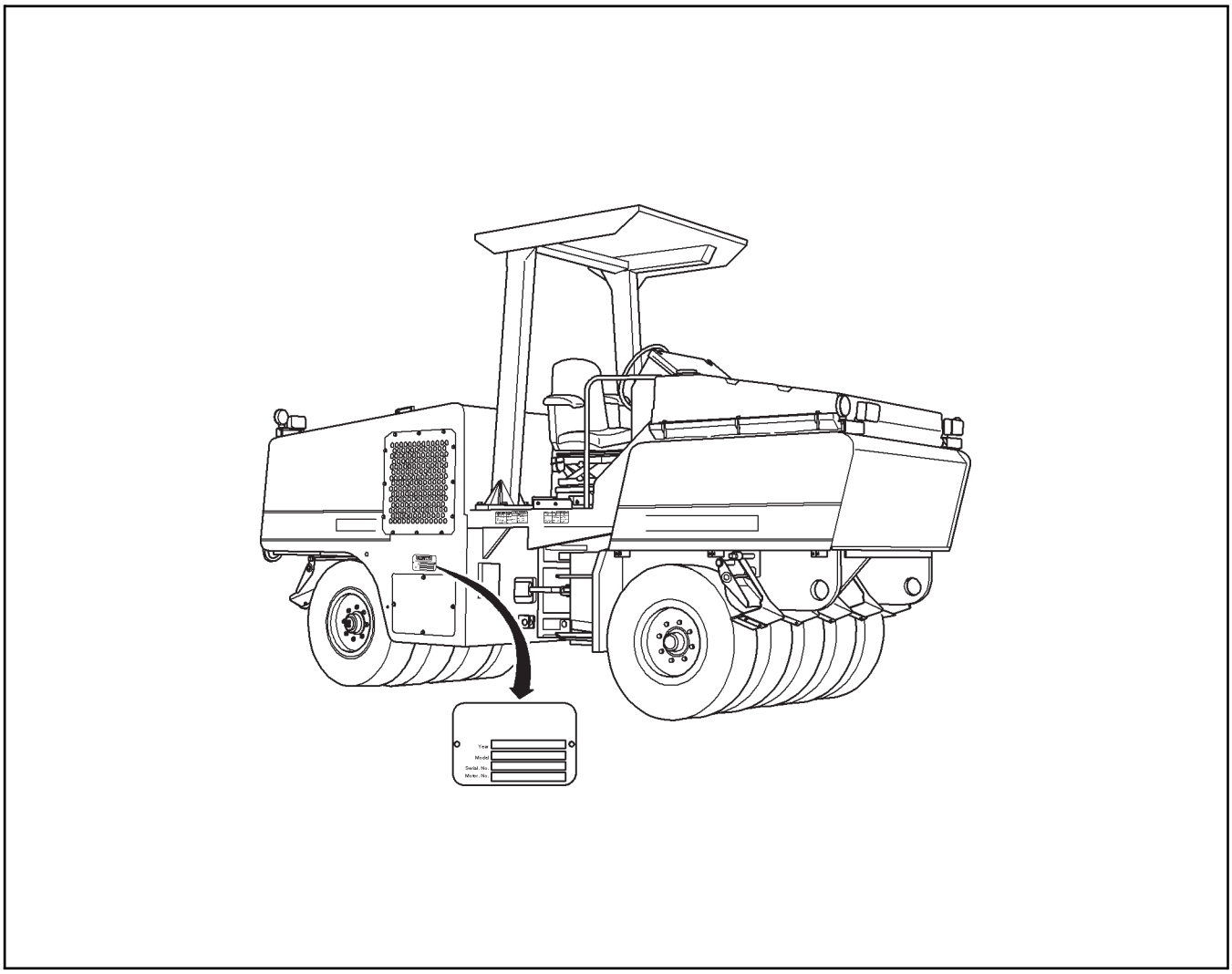
NAMEPLATES

Roller Nameplates

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

Engine Nameplate

The engine nameplate contains the specific model number and serial number used to identify the engine for any parts or service information.



Roller Nameplate Location

Figure 3-1

1 - Serial Number Plate

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Section 4

SPECIFICATIONS

GENERAL INFORMATION

The descriptions and specifications provided in this section are applicable to the Rosco Model TruPac 915. 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 roller weights, dimensions, performance, and major system specifications for the roller.

Engine

The Rosco Model TruPac 915 uses a four-cylinder, water cooled diesel engine coupled to a variable displacement hydrostatic pump. The engine is mounted to the rear of the operating platform and accessible through doors in the engine cover.

A fuel prime pump (CAT engine only) 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 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 950 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 Rosco Model TruPac 915 is a fully hydrostatic, self-propelled unit. The Hydrostatic Drive System propels the machine forward and reverse with dynamic braking. The system consists of a variable displacement pump driven off the rear of the diesel engine. This pump is connected in a closed circuit to a pair of 2-speed wheel motors, directly attached to the rear wheels.

Hydrostatic Drive Control

Control for the Drive System is provided by an electrically operated direction control lever at the driver's platform, located on the right side of the panel. 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 Rosco Model TruPac 915. There is also a toggle switch to engage the Speed Selector

NOTICE **Rosco Model TruPac 915 components can be damaged when decelerating or changing direction rapidly. Doing so may cause excess heat and pressure in the hydrostatic drive system.**

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 Rosco Model TruPac 915 can still be steered.

Braking

The hydrostatic drive system provides dynamic braking action. Braking occurs when the direction control leveer is returned to neutral position.

A secondary park brake is integrated within the wheel motors. A switch on the instrument panel activates the park brake. In addition, the park brake is automatically actiavated when the engine is not running and/or when no hydraulic pressure is available.

SPECIFICATIONS

The specifications provided in this section are applicable to the Rosco Model TruPac 915. Included in this section are roller weights, dimensions, performance, and torque values for both metric and standard inch fasteners.

Table 4-1. Engine

ITEM	SPECIFICATION	
Model	Caterpillar, 3044T	Kubota, V3600-T-E3B
Emission Regulation	Tier 3 / Stage III A	Tier 3 / Stage III A
Type	4 Cycle Diesel, Water Cooled	Vertical 4-Cycle, Liquid Cooled Diesel
Bore & Stroke	94 mm (3.70 in.) x 120 mm (4.72 in.)	98 mm (3.86 in.) x 120 mm (4.72 in.)
Displacement	3.33 L (201 cu. in.)	3.62 L (221 cu. in.)
Combustion System		Direct Injection
Power@2500 RPM	60 kW (80 HP)	63 kW (84.5 HP)
Maximum Engine Speed	2500 RPM	2400 - 2500 RPM
Intake System		Turbocharged
Oil Filter	984909-02	986537-03
Fuel Filter	984909-01	982080-02
Air Filter, Primary (Dry-Type)	38385-01	38385-01
Air Filter, Secondary (Cartridge)	38385-02	38385-02

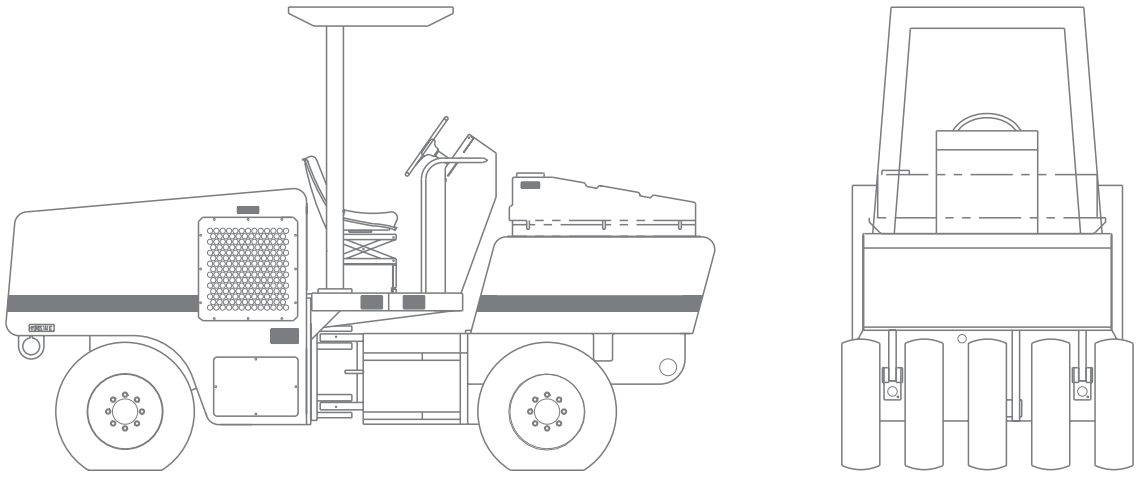
Table 4-2. Electrical

ITEM	SPECIFICATION
Battery	One Maintenance Free
Ampere Hour Rating	950 CCA
Voltage	12V
Alternator Voltage	12V, Negative Ground
Output Amperage	63 Amps

Table 4-3. Dimensions

ITEM	SPECIFICATION
Weight (without ballast)	6,044 kg (13,325 lb)
Weight (fully ballasted)	13,835 kg (30,500 lb)
Overall Length	4.27 m (14 ft 0 in.)
Overall Height (with ROPS)	2.80 m (9 ft. 2 in.)
Overall Height (without ROPS)	2.16 m (7 ft. 1 in.)
Overall Width (Brush at 40°)	2.41 m (7 ft. 11 in.)
Machine Width	1.63 m (5 ft. 4in.)
Rolling Width	1.73 m (5 ft. 8 in.)
Wheelbase	2.54 m (8 ft. 4 in.)

ITEM	SPECIFICATION
Turning Radius (Inside)	2.64 m (8 ft. 8in.)
Ground Clearance	28 cm (11 in.)
Frame Articulation	+ / - 39°
Frame Oscillation	+ / - 10°
Tire Articulation	+ / - 4°



Outline Dimensions Drawing

Figure 4-1

Table 4-4. Drive System Specifications

ITEM	SPECIFICATION
Transmission	Hydrostatic Pump
Steering	Hydraulic, Orbital Motor, 14 LPM (3.7 GPM) priority flow at 10 MPa (103 bar, 1500 psi)
Rear Axle	Heavy-Duty, Truck-Type, Oscillating
Tires	7.5 x 15 Bias, 14 Ply, smooth (9)
Travel Speed - High (Infinitely Variable)	0 to 24 km/h (0 to 15 mph)
Travel Speed - Low (Infinitely Variable)	0 to 12 km/h (0 to 7.5 mph)
Hydrostatic Pump Model and Manufacturer	Sauer/Danfoss Series 90
Hydrostatic Pump Displacement	75 cc (4.57 CIR)
Wheel Motor Model and Manufacturer	Poclain MD11
Wheel Motor Displacement	1050/525 cc (64/32 CIR)
Hydraulic Fluid	Citgo A/W All-Temp VG32
Hydraulic Return Filter	10-Micron Spin-On Cartridge (P/N 72543)

ITEM	SPECIFICATION
Hydraulic Charge Filter	7-Micron Spin-On Cartridge (P/N 34463)
Hydraulic Strainer	In-Tank (P/N 33148)
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	10 L (10.5 qt) CAT, 14.2 L (15 qt) KUBOTA
Hydraulic Oil Reserve	53 L (14 gal)
Axle	2.78 L (94 oz) Each

Table 4-6. Miscellaneous Equipment

ITEM	SPECIFICATION
ROPS System	OSHA & SAE Certified
Seat	Padded with Seat Belt
Horn	12 Volt, Automotive-Type
Back-up Alarm	97 db +/- 4 db at 122 cm (4 ft.)
Instrumentation	Oil Pressure, Coolant Temperature, Fuel Gauge, Voltmeter, Hourmeter, and Hydraulic Temperature

Table 4-7. Optional Equipment

ITEM	SPECIFICATION
FOPS Canopy	OSHA and SAE Certified
Lights Combination	Work Lights, Tail Lights, Turn Signals
Rotating Beacon	12 Volt
Heat Shields (9-Wheel only)	Front and Rear
11-Wheel Roller	Two Additional Rear Tires

Table 4-8. Lubricant Types

ITEM	SPECIFICATION
Engine Oil	15W-40
Hydraulic Oil	Citgo A/W All-Temp VG32
Grease	Shell Avania EP Grease or Equivalent
Axle	Gear Lube 90W

NOTES

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Section 5

COMPONENT LOCATION

INSTRUMENT PANEL

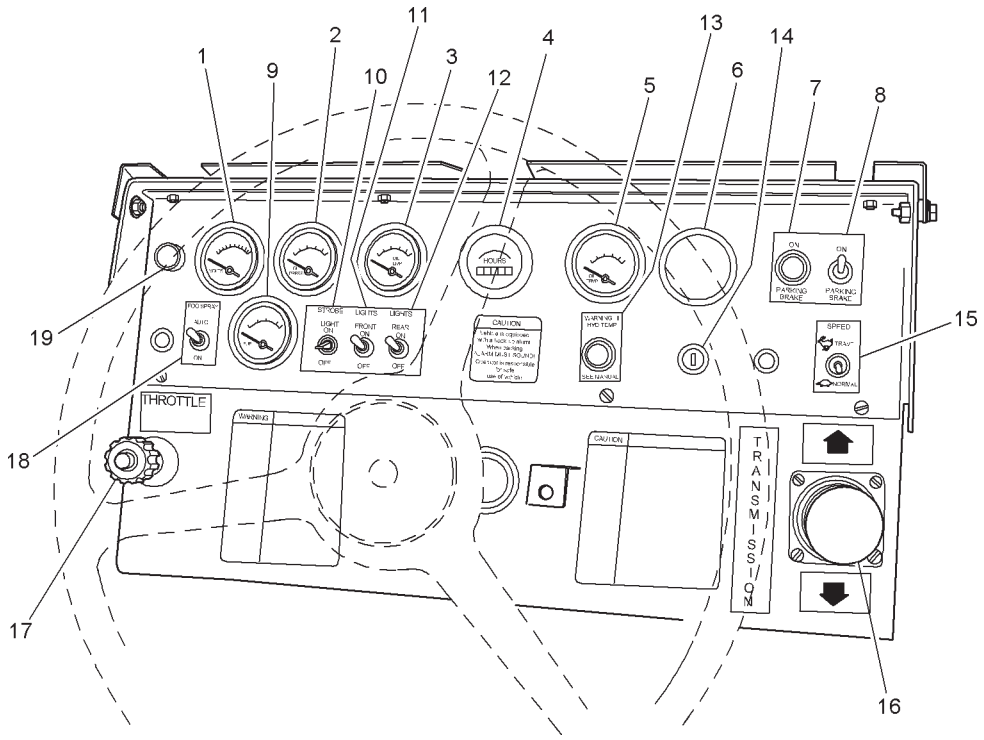

Figure 5-1

1 - Voltmeter
2 - Oil Pressure Gauge
3 - Temperature Gauge
4 - Hour Meter
5 - Oil Temperature Gauge
6 - Tachometer (option)
7 - Park Brake Light
8 - Park Brake Switch
9 - Fuel Gauge
10 - Strobe Light Switch (option)
11 - Front Lights Switch (option)
12 - Rear Lights Switch (option)
13 - Hydraulic Temperature
14 - Ignition Switch
15 - Speed Selector Switch
16 - Direction Control Lever
17 - Engine Throttle
18 - Water Spray Switch
19 - Engine Shut-down Alert (option)

Voltmeter (1)

Displays the condition of the battery charging system.

Oil Pressure Gauge (2)

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

Temperature Gauge (3)

Displays engine coolant temperature.

Hour Meter (4)

Displays total roller work hours.

Oil Temperature Gauge (5)

Displays engine oil temperature.

Tachometer (option) (6)

Displays engine speed in revolutions per minute (RPM).

Park Brake Light (7)

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

Park Brake Switch (8)

(ON/OFF) Activates park brake.

Fuel Gauge (9)

Displays fuel level in the fuel tank.

Strobe Light Switch (option) (10)

Controls ROPS-mounted strobe light.

Front Lights Switch (option) (11)

Activates the head lights.

Rear Lights Switch (option) (12)

Activates the rear lights.

Hydraulic Temperature (13)

Indicates excessive hydraulic temperature. Check components and fluid levels. Service immediately.

Ignition Switch (14)

Used to start and stop the engine, and activate switched power circuits. Activates standard glow-plug feature on Caterpillar engines.

Speed Selector Switch (15)

Controls the speed of the machine.

Direction Control Lever (16)

Controls speed and direction of machine's travel.

Engine Throttle (17)

Controls engine RPM, with center push-button.

Water Spray Switch (18)

Activates the water spray system.

Engine Shut-down Alert (option) (19)

Indicates excessive engine temperature. Engine will shut down. Check components and fluid levels. Service immediately.

NOTES

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Section 6

OPERATION

PRELIMINARY PROCEDURES

⚠ DANGER Operation Hazard! Never allow anyone who is not properly trained to operate this roller. Only authorized personnel who are properly trained in the operation of the roller can operate the Rosco Model TruPac 915.

⚠ DANGER Operation Hazard! Do not operate a roller 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.

⚠ DANGER Operation Hazard! Never leave machine operator station unattended with machine in gear and/or in motion. Operator station is defined as the platform area within arms reach of active control steering box. Operator must remain in operator's station at all times when machine is in gear and/or in motion. Before leaving machine operator station, operator must return joysticks to neutral position and move RUN/STOP switch to STOP position.

Before starting or operating the machine, it is important to READ, UNDERSTAND, and FOLLOW all Operating instructions, Danger, Warning, and Caution messages in this manual as well as all Safety information contained in Section 2 of this manual.

Recommended fluid types and required quantities are listed in Specifications, Section 4 of this manual.

Break-In Procedures

NOTE: Make every effort to become familiar with the feel and sound of the machine.

1. Observe engine operation carefully.
2. Check the engine oil and coolant frequently.
3. Operate engine at normal loads.
4. Check indicators and gauges frequently during operation.
5. Avoid excessive engine idling.
6. Perform 10 hour or daily service.
7. Watch for fluid leaks and repair immediately.
8. Perform service intervals as indicated in Maintenance, Section 7 of this manual.
9. Check engine manufacturer's manual for additional information on engine break-in.

Pre-Start Inspection

INSPECT machine. Have any malfunctioning, broken or missing parts repaired or replaced before using the Roller.

CHECK hydraulic hoses daily for wear and leaks. Replace if damaged.

CHECK that all the instruction and safety labels are in place and readable. These are as important as any other equipment on the machine.

READ and FOLLOW all instruction decals.

WEAR OSHA required safety equipment when running the Roller.

CHECK engine, and hydraulic oil levels. Fill to the correct level as necessary.

FILL the fuel tank with the engine off. NEVER fill fuel tank near an open flame or when smoking.

CHECK for frayed or worn electrical wires and loose or corroded connections.

CHECK tires for wear and damage. Remove any debris lodged between the tires. Maintain tire pressure at recommended levels.

CHECK controls for freedom of movement.

CHECK supports for damage. Repair as necessary.

Engine Operation

Preliminary

Before starting the engine:

1. Check the fuel level. Fill fuel tank daily to avoid condensation.
2. Check the fuel lines and tank for leaks.
3. Check the engine oil level.

NOTICE Failure to maintain correct engine oil level is the greatest single cause of engine failures.

4. Check the hydraulic oil level.

Refer to engine manufacturer's manual for instructions when starting engine for the first time. Follow engine manufacturer's recommendations for fuel and oil.

Engine Start Up

⚠CAUTION Place the Direction Control lever (Figure 3-1, item 2) in the neutral detented position to prevent the machine from moving during start up. The operator or other personnel could be injured if the machine runs into them.

⚠WARNING Do not bypass the neutral start system. If the neutral start system malfunctions, it must be repaired. Failure to do so can cause the machine to jerk and throw an operator from the machine.

NOTICE Do not operate the starter longer than 20 seconds. If the engine does not start, allow the starter to cool for 2 to 3 minutes. Continuous cranking can cause starter failure.

1. Turn ignition switch to START position. Release key when engine starts (see **Figure 5-1**).
2. Operate engine at less-than-normal load and speed until engine reaches normal operating temperatures.
3. Check indicators and gauge operations. All indicator lights (**Figure 5-1**) should be OFF.

NOTICE In the event of a "false start", allow the engine to completely stop before re-starting. If starter is engaged while the flywheel is still rotating, the starter pinion and flywheel ring gear may clash, resulting in damage to the starter or ring gear.

NOTE: In the case of a "false start", the engine develops enough speed to disengage the starter but the flywheel continues to rotate.

NOTICE If the starter does not turn the engine over, shut off the ignition key immediately and make no further attempts to start the engine until the condition is corrected. Refer to Troubleshooting in the Maintenance section of this manual (or the engine manufacturer's manual) for possible solutions. For further analysis, contact your diesel engine service dealer.

Engine Warm Up

NOTE: Allow the engine to warm up for several minutes before moving the Roller. The warm up will give the hydraulic oil time to warm, providing for more efficient operation.

NOTICE Be sure oil pressure is observed within 15 seconds after starting the engine. If no oil pressure is shown on the gauge in 15 seconds, shut down the engine and determine the cause.

Cold Weather Engine Start Up

⚠CAUTION The improper use of starting aids (starting fluid) can cause severe engine damage and personal injury. Read and understand the engine manufacturer's manual before attempting to start the engine using cold weather starting aids.

NOTICE Engines equipped with glow plugs and some turbocharged engines will be damaged when using starting fluid for starting purposes.

See engine manufacturer's manual for information on cold weather starting, starting aids, and other engine operation information.

KUBOTA ENGINE

⚠WARNING Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

The Kubota engine is equipped with glow plugs for use as a starting aid. Use the following steps for starting in cold weather.

1. Turn the ignition key to the left and hold for 10 to 30 seconds, depending on ambient temperature.

NOTICE Do not hold the ignition key in the pre-heat position for more than 60 seconds. Engine damage can occur.

2. Release the ignition key.
3. Turn the ignition key to the right to start the engine.
4. Be sure the engine oil pressure is indicated on the gauge within 15 seconds after starting. Turn the ignition key to the ACC position.

Cold Weather Engine Warm Up

NOTE: If hydraulic oil is cold, hydraulic components move slowly. Do not attempt machine operations until hydraulic components operate normally.

Using Booster Battery - 12 Volt System

1. Make sure the Direction Control lever (**Figure 5-1**, item 16) is in the neutral detented position before using the booster battery to start the engine.

⚠CAUTION A charging battery produces explosive gases. Keep flames and sparks away from battery area. Charge battery in a well ventilated area.

NOTE: The electrical system is 12 volts with negative (-) ground. Use only 12-volt booster battery.

⚠CAUTION Improperly connected jumper cables can produce sparks and explosion. Make sure negative terminals are connected and positive terminals are connected. Never connect negative terminal to a positive terminal. Do not allow vehicles to touch.

2. The battery compartment is located on the right side of the machine, below the radiator compartment.
3. Connect the positive (red) jumper cable to the positive battery post on the booster battery and machine battery.
4. Connect the negative jumper cable to the booster battery negative post and a good ground (frame, bracket or support) away from the battery and engine components.
5. After starting, remain at the control pedestal and have a helper remove the jumper cables from the machine.

Stopping The Engine

1. Park machine on a level surface.
2. Place Direction Control lever in the neutral detented position.
3. Set the park brake.
4. Place ignition switch in the OFF position and remove key.

Adjusting Engine For High Elevation

NOTICE Do not change engine settings to compensate for elevation. An authorized service dealer must service the injection pump.

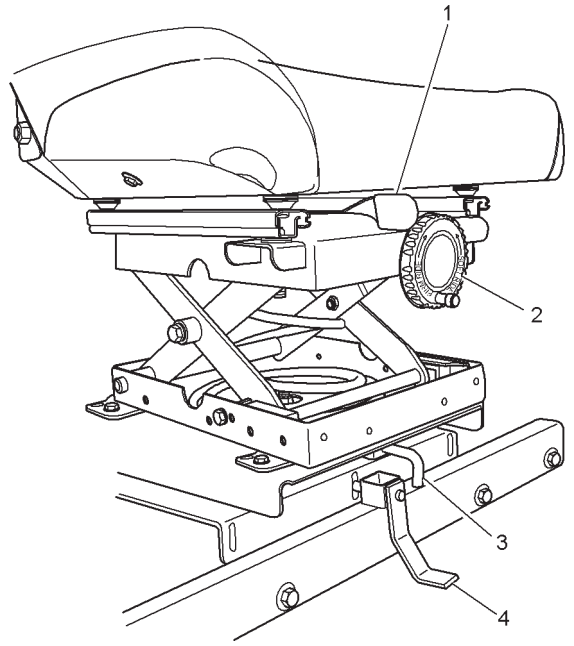
Refer to the engine manufacturer's manual for information on engine specifications and settings. See the local authorized dealer for engine settings and modifications.

DRIVING THE MACHINE

Before driving on public roads, check state and local laws that may apply to construction equipment. Additional lights, mirrors, SMV emblems, or reflectors may be required.

Operator Platform Adjustment

The operator platform can be adjusted forward/backward or left/right in relation to the steering column. In addition, the operator can adjust the seat's suspension for a firm or soft ride. For the operator's added comfort and safety, the seat can swivel to the left or right. The adjustment levers are located directly under the operator platform (**Figure 6-1**).



Operator Platform Adjustment

Figure 6-1

NOTE: The machine operator must be seated to make proper adjustments.

⚠CAUTION Do not adjust the operator platform while the Roller is in motion. Adjustments must be made while the Roller is at rest and with the Direction Control lever in the neutral detented position.

To adjust the platform forward/backward:

1. While seated, push the adjustment lever #1 to the left.
2. Using body weight, slide the platform forward or backward to the desired position.
3. Release the adjustment lever. Insure that the lever has engaged the locking mechanism.

To swivel the platform:

1. While seated, pull the adjustment lever #3 out.
2. Using body weight, turn the platform to a full 90° left or right position.
3. Release the adjustment lever. Insure that the lever has engaged the locking mechanism.

To adjust the platform left/right:

1. While seated, step down hard on the adjustment lever #4 to release the locking pin.
2. Using body weight, slide the platform completely to the left or right position.
3. Release the adjustment lever. Insure that the lever has engaged the locking mechanism.

Item #2 adjusts the suspension of the seat. Turn the wheel to the left for a firmer ride. Turn the wheel to the right for a softer ride.

Engine Throttle

The Engine Throttle (**Figure 5-1**, item 17) is a knob with a center push-button. It is located on the instrument panel to the left of the steering wheel.

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.

Pull the throttle out to the maximum position for all rolling operations.

Directional Control

Travel speed and forward or reverse direction of travel are controlled by the hydrostatic Direction Control lever (**Figure 5-1**, item 16) on the right side of the instrument panel. 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 lever in REVERSE activates the Back Up Alarm.

Speed Selector

The two-speed toggle switch allows the operator to move between high speed or low speed (**Figure 5-1**, item 15). To change from low to high speed, move the toggle to the desired position, and then move the Direction Control lever to neutral. After the desired speed change has been achieved, move the Direction Control lever to FORWARD or REVERSE position.

Generally, high speed is used for travel to and from a job site. Most rolling is done in low speed. However, depending on machine ballasted weight and absence of any inclines at the job site, the operator may choose to roll in high speed.

Braking

If stopping on a grade, the distance needed to come to a stop will be longer, the steeper the grade. Familiarize yourself with the job site so you can anticipate these variables.

The hydrostatic drive system provides dynamic braking action. This braking occurs when the Direction Control lever is returned to neutral from FORWARD or REVERSE position.

The secondary park brake is integrated within the wheel motors. A switch at the upper right side of the instrument panel activates the park brake (**Figure 5-1**, item 8). In addition, the park brake is automatically activated when the engine is NOT running and/or when no hydraulic pressure is available.

During normal operation, dynamic braking is sufficient for stopping the Roller. If for any reason the Roller doesn't stop when the Direction Control lever is returned to neutral, the operator should engage the park brake. After the Roller is brought to a safe stop, inspect and troubleshoot to determine the cause of dynamic braking failure (see **Troubleshooting**).

NOTE: If the park brake has been automatically activated due to hydraulic failure, it will be necessary to manually release the park brake. Refer to Emergency Towing later in this section for steps to complete this procedure.

Parking The Machine

⚠ DANGER Operation Hazard! Never leave machine operator station unattended with machine in gear and/or in motion. Operator station is defined as the platform area within arms reach of control steering box. Operator must remain in operator's station at all times when machine is in gear and/or in motion. Before leaving machine operator station, operator must return Control Lever to neutral position, turn off all accessories, set parking brake switch to ON position, shut off the engine, and remove the ignition key.

Before leaving the machine, perform the following procedures:

1. Park machine on a level surface.
2. Return the Direction Control lever to the neutral detented position.
3. Set the emergency brake to prevent machine from rolling when left unattended.
4. Place ignition switch in the OFF position and remove key.

Setting The Emergency Brake

A switch at the upper right side of the instrument panel activates the park brake (**Figure 5-1**, item 8). In addition, the park brake is automatically activated when the engine is NOT running and/or when no hydraulic pressure is available.

Combating Poor Visibility

Increasingly, asphalt maintenance equipment is being used during poor visibility conditions, such as fog, smog and at night. Usage during this and other similar conditions presents safety hazards to the workers, bystanders and passing traffic.

To help combat these hazards, the equipment must be equipped with front and rear lighting options. They must also be equipped with shielded, rotating beacons. The shielding prevents loss of visibility to the operator caused by eyestrain. Use conspicuous tape (reflective) on the sides of all machines that may be used at night.

Also be sure that all personnel wear reflective vests. The use of impact barriers (movable or stationary) to protect workers from traffic and help direct the traffic flow away from road hazards is also recommended.

OPERATING THE MACHINE

Water Spray System

The water spray system provides water to the front and rear tires. The water cools the tires and prevents asphalt from sticking to them during operation. The pressurized water system assures an even spray across the face of the tires.

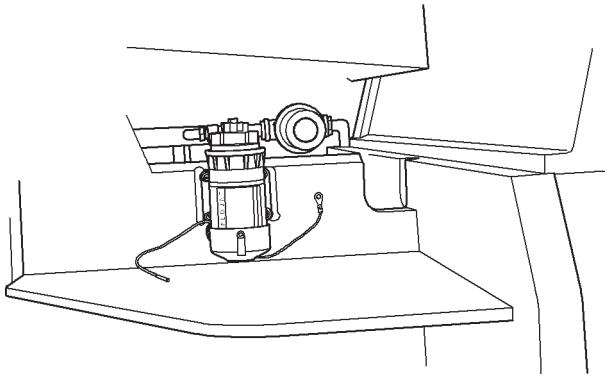
The water spray switch is located on the instrument panel (**Figure 5-1**, item 18). This switch allows the operator to turn the water on and off during operation. In the up position, AUTO, the flow will shut off when the Direction Control lever is moved to the neutral position. In the center OFF position, all flow is stopped. In the down ON position, the flow will continue to wet the tires as long as the toggle is in this position. To achieve the most efficient use of the spray system, use the AUTO position.

The water tank is located at the front of the Roller directly above the front ballast. The water tank fill cap is located on top of the tank. Maintain an adequate supply of water in the tank to insure consistent operation of the spray system.

⚠CAUTION **Do not fill water tank with any liquid other than water or an asphalt release agent. Chemicals can react with heat and asphalt products and cause an explosion.**

NOTICE **To prevent damage to the water system from freezing temperatures, disconnect the strainer from the pump so that the water drains from the water tank and pump.**

NOTE: The water pump and strainer are located under the front step on the right side of the machine (**Figure 6-2**).



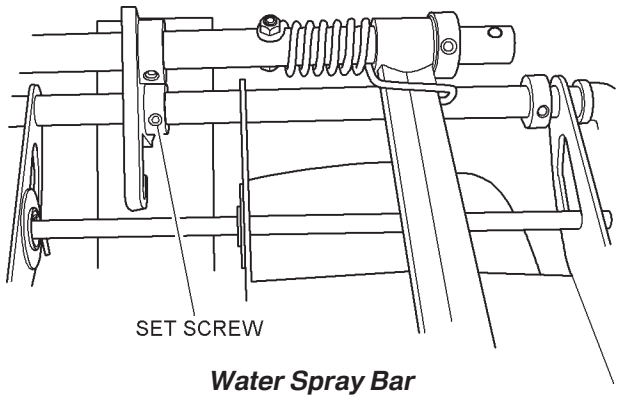
Water Tank Strainer

Figure 6-2

Spray Pattern Adjustment

The water spray pattern may require occasional adjustment. Check spray patterns periodically at both front and rear tires. Use the following procedure to adjust the spray pattern.

1. Use an Allen wrench to loosen the set screws on both the left and right sides of the spray bar (**Figure 6-3**).
2. Direct the spray pattern from the nozzles to insure complete coverage across the width of the Roller tires.
3. Tighten the set screws.



Water Spray Bar

Figure 6-3

Individual spray nozzles can be adjusted by loosening the wing nut at the end of the spray nozzle. Direct the spray pattern as needed, and tighten the wing nut.

Tire Scrapers

Tire scrapers remove asphalt particles and prevent buildup on the tire surfaces. Scrapers are factory adjusted to insure optimal surface tension. Check scraper springs and scraper pads for excessive wear. Replace springs and pads as required.

Scraper Adjustment

The front and rear scrapers see considerable wear during the rolling process. Periodic adjustment and/or replacement may be necessary. Inspect scraper bars, pads, and springs daily to insure reliable surface tension and even scraper surfaces.

Coco Mats

The coco mats provide a more even distribution of water across the face of the tires. This prevents asphalt buildup on the tires. With continued use, they will accumulate asphalt build up. Check the mats periodically and replace them when they show excessive wear or asphalt build up.

Table 6-1 Compaction Weight Table

Ballast Type & Weight	* Tire Pressure	Ply PSI kg/sq/cm	6 ply 60 4.22	12 ply 110 7.78	14 ply 130 9.14	Add Steel Lbs.	** Load Per Tire
(Empty)	GCP	PSI	52.60	71.00	81.20	1131	1600 lb.
6.66 TON		kg/sq. cm	3.70	5.00	5.71	Front	
	CA	SQ. IN.	29.60	22.20	19.40		728 kg.
		sq. cm	191.00	143.23	125.16		
Water	GCP	PSI	56.33	76.33	87.78	2108	2222 lb.
10 TON		kg/sq. cm	3.96	5.37	6.17	Front	
	CA	SQ. IN.	39.11	29.22	25.22	678	1008 kg.
		sq. cm	252.32	181.52	162.71	Rear	
Dry Sand	GCP	PSI	59.00	79.67	91.34	3309	2667 lb.
12 TON		kg/sq. cm	4.15	5.60	6.42	Front	
	CA	SQ. IN.	45.00	33.34	29.34	1560	1210 kg.
		sq. cm	290.32	215.10	189.30	Rear	
Wet Sand	GCP	PSI	62.60	85.40	97.20	7110	3400 lb.
15.25 TON		kg/sq. cm	4.40	6.00	6.83	Front	
	CA	SQ. IN.	54.60	40.00	35.20	4540	1542 kg.
		sq. cm	352.26	258.06	227.10	Rear	

Ballast

Filling the front and rear ballast compartments with water or sand adds weight and allows for greater compaction.

The fill plug for the front ballast is at the left front, inside the operator's compartment. The fill plug for the rear ballast is on top of the ballast compartment, at the left rear side.

A plug for draining the ballast compartments is located at the bottom center of each compartment, just behind the frame.

NOTICE **If using water ballast, use a mixture of 50% water and 50% alcohol, or the equivalent, during freezing temperatures.**

PRINCIPLES OF COMPACTION

There are two reasons for compacting an asphalt surface. The first reason is to obtain the optimum air void to create a durable surface that can withstand the effects of air, water and temperature changes. Air voids are the spaces in the hot mix not filled by either the aggregate particles or the asphalt cement. Optimum air void should be approximately 2% to 8% according to the Asphalt Institute recommendations.

The second reason is to provide a smooth surface that will remain smooth under the pressures of all kinds of traffic.

To accomplish the surface quality mentioned, two conditions must exist. The first condition is having the correct mix temperature. The Asphalt Institute recommends using asphalt that is between 185° F (85° C) and 300° F (150° C). At this temperature, asphalt will aid in forcing the aggregate into a dense mat. As the mix cools, a dense mat becomes harder to achieve.

The second condition is the confinement of the asphalt. Three forces acting on each other achieve confinement. These three forces are: the Roller, the mix, and the sub grade under the mat. When these three forces act on each other with equal resistance, confinement of the asphalt is achieved and compaction is complete.

The Rosco Model TruPac 915 is a nine wheel pneumatic tired Roller. Pneumatic rollers are operated in the intermediate roller position, behind a vibratory or static steel wheel breakdown roller and in front of a static steel wheel finish roller. Pneumatic rollers are sometimes used, however, for initial rolling of the mix as well as occasionally for “finish” rolling. Use of this Roller for base compaction is not recommended due to its lack of traction.

ROLLING TECHNIQUES

NOTICE **Do not change Roller direction with fast movements of the Direction Control lever. Always move the lever from one direction through neutral to the opposite direction with slow movements. This allows the hydraulic system’s dynamic ability to stop the machine at neutral, and prevents damage to the system.**

NOTICE **Operate the engine at full throttle to avoid over-heating the hydrostatic drive system. Rolling speed should be controlled by the position of the Direction Control lever and not with the throttle.**

NOTE: If you notice the engine is lugging down during a heavy pull when the Direction Control lever is in the FORWARD or REVERSE position, move the lever towards neutral to decrease speed and increase torque to the final drive.

For most paving jobs, two or more Rollers are required. Rolling should be continuous until all of the laid mix is thoroughly compacted. At least three coverages should be made.

In general the rolling operation is comprised of three phases and should begin as soon as the hot mix is laid down. The three phases of rolling are:

Breakdown or Initial - This phase provides most of the needed compaction density.

Intermediate - This phase seals the surface.

Finish - This phase removes blemishes from the final surface.

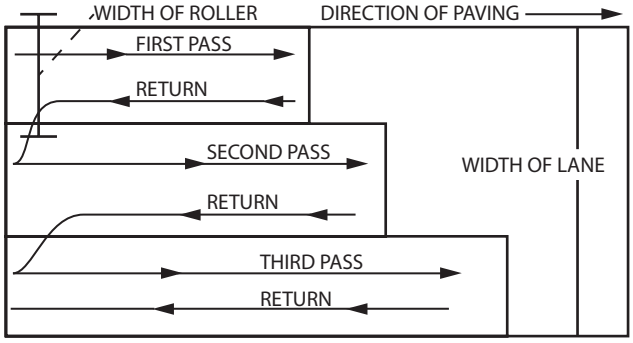
Rolling Pattern

For best results, the rolling pattern and other factors for each Roller should be determined prior to the paving operation using a test strip of the same mix. Travel speed and the number of passes will not be the same for all jobs. Different mix design, lift thickness and lay down temperatures will require different compaction techniques. Various travel speeds can be applied to the test asphalt mat to determine the best combination.

Remember, the best rolling pattern is the one that provides the most uniform coverage and density.

The following general points should be used as guidelines for obtaining the pattern.

1. Keep tires warm to prevent sticking. Use a small amount of non-foaming detergent or water soluble oil on the wetting mats at the beginning of the operation to prevent sticking until the tires warm. **Do not use fuel oil on Roller wheels.** Once Roller wheels are warm, moisten Roller wheels with small amounts of water or asphalt release agent to prevent sticking.
2. Move at a slow, uniform speed, not more that 5 mph (8 km/hr).
3. Keep the Roller in good condition. The unit must be able to be reversed without backlash.
4. Avoid sharp turns and accelerate and decelerate smoothly on a fresh mat. Do not change the pattern unless the mix or lift changes.
5. Do not make sudden changes in direction or line of travel. Sudden changes cause displacement of the asphalt.
6. If displacement occurs, the area must be loosened and the original grade restored before re-rolling.
7. Do not allow heavy equipment (including Rollers) to stand on asphalt until completely set.
8. Keep tire pressures at their recommended psi rating. Do not over-inflate tires, as this causes mix displacement. See chart on Roller for tire pressure to psi ratings.
9. Extend each path further into the mix than the previous path. (**Figure 6-4**)



Rolling Pattern

Figure 6-4

10. Each pass of the Roller should proceed in a straight direction of travel into the mix. Each return pass should be in the same path as the forward path.

Rolling Thick Lifts

1. Start rolling 12 to 15 inches (300 to 375 mm) from the unsupported lower edge.
2. Compact the center material first so there is more stability for the Roller as it moves towards the edges. The un-compacted edge helps with the confinement of the asphalt during the first passes.
3. After the central area of the spread is compacted, the edge may be compacted without lateral movement.

Rolling Thin Lifts

1. Start on the low side with the Roller drum extending 2 to 4 inches (51 to 102 cm) over the edge of the mat. Follow the paver as closely as possible.
2. The second pass should be in reverse direction, staying in the same path as the first pass.
3. Continue in reverse until the machine is on previously compacted material.
4. Then swing over and move forward again as close to the paver as possible.
5. Continue steps 2 through 4 until a full width of the lane is paved, ending in the reverse direction.
6. Swing the Roller over to the low side again to start a new run from the low side.
7. Overlap each pass 3 to 4 inches (75 to 100 mm).

Tire pressure is a key factor in the proper use of a pneumatic roller. Proper use depends in part on the number of plies used in the tires. In general, a 6-ply tire is limited to a tire pressure of 60 psi. A higher tire pressure will result in a more rounded tire surface.

High domed tires tend to slip more easily and cut into the mat surface. A flatter tire profile will displace the mix less and achieve a smoother mat surface.

Tire pressure is normally kept constant for a particular project, but the pressure selected should be dependent on the properties of the mix being compacted and the position of the Roller on the mat.

Compaction Of Base Materials

The Rosco Model TruPac 915 can be used to compact some base materials if special practices and options are used. The TruPac 915 Roller has two drive motors on the rear which are parallel. If one slips, all the hydraulic flow will go to the wheel that is slipping. This allows the machine to become stuck easily when compacting base materials.

The optional Traction Control kit will lock the hydraulic drive so that power is diverted to the non-slipping tires. This greatly improves the ability of the TruPac 915 Roller to compact loose materials. If a machine equipped with the traction kit is used on relatively flat terrain, on material with good traction, it can be used to compact base materials.

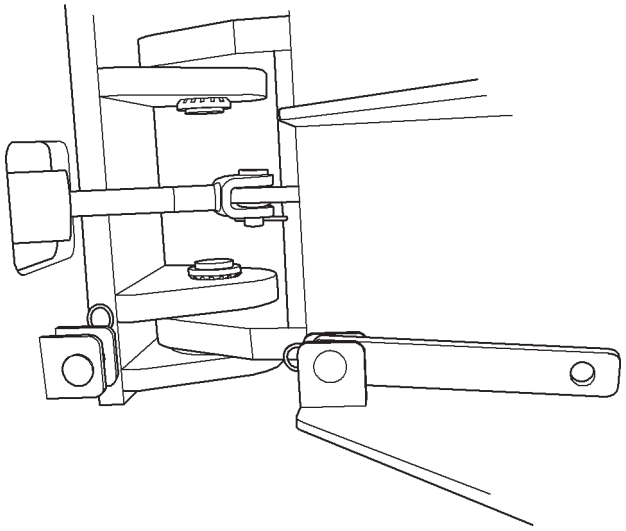
TOWING AND TRANSPORT

NOTICE **Do not tow the Rosco Model TruPac 915 except for machine breakdown, and then only to remove it from a road. Refer to Emergency Towing later in this section.**

Preparing The Machine For Trailer Transport

⚠WARNING **When transporting the Roller on a trailer, use a trailer that is large and heavy enough to handle the Roller in all driving situations.**

1. Clean the machine using a pressure washer. Remove all loose gravel, mud or debris from wheels and frame.
2. Remove ballast from the Roller.
3. Lock the articulation link before attempting to load the Roller on a trailer (**Figure 6-5**).



Articulation Link

Figure 6-5

4. Make sure the combined height of the truck, trailer and loaded Roller meet height restrictions for the local area, including bridges, overpasses, and overhead obstructions. Remove the canopy structure if the machine does not meet height restrictions.
5. Park the transfer vehicle or trailer on a level surface with transmission in park and engine off.
6. Engage the transfer vehicle's emergency brake and use wheel chocks in both directions.

7. 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.

⚠WARNING Be sure loading dock and trailer are the same height. Do not bounce Roller or force Roller to climb over edge. This could cause the Roller to slide off or damage the bearings.

8. Load the machine on the trailer bed by driving straight on, centered on the trailer. The Roller center-line must be over the trailer center-line.

NOTE: Roller should be positioned to insure even distribution of load between trailer axles and trailer hitch.

9. Block Roller tires to prevent Roller from moving forward or backward.
10. Idle the engine at 1/2 speed (RPM) for 3 to 5 minutes.
11. Place engine throttle at slow idle.
12. Place transmission lever in neutral.
13. Place ignition switch in the OFF position and remove the key.
14. Secure the Roller to the trailer at its tie-down points (**Figure 6-6**), using chains rated in excess of Roller weight.
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 machine.

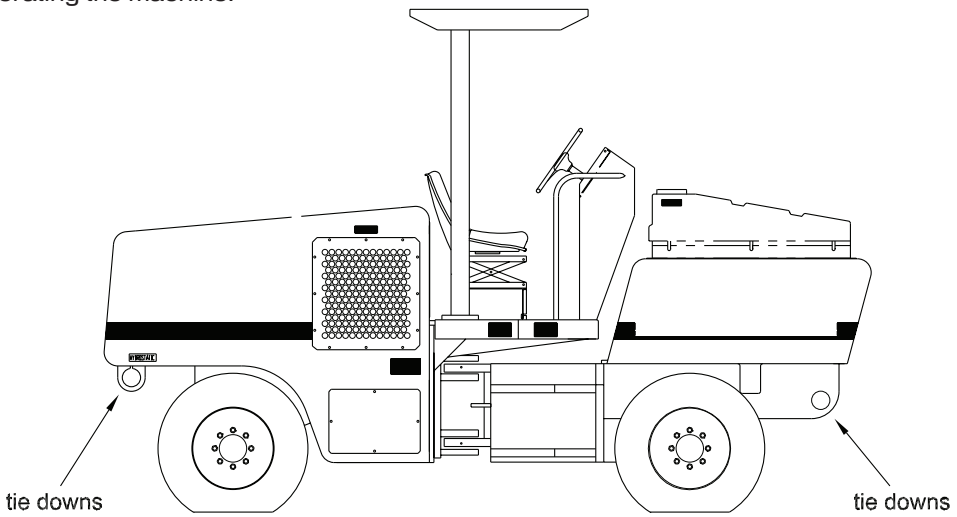
Emergency Towing

NOTICE Do not tow the Rosco Model TruPac 915 **except for machine breakdown, and then only to remove it from a road.**

⚠WARNING To prevent machine runaway, block Roller wheels before manually releasing the park brake.

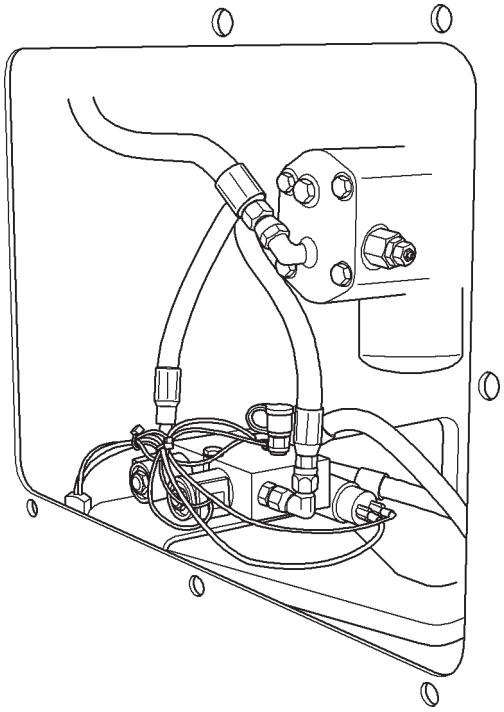
Be sure you understand the following procedure completely before proceeding. If the park brake has been automatically activated due to hydraulic failure, the park brake must be manually released using the steps below. Once the park brake has been manually released, the only way to re-apply it is to release the pressure at the connection outlined in step 2.

1. To manually release the park brake, you must first by-pass the system pump by following the instructions in the service manual supplied with the pump. Do not attempt to operate or run the engine with the pump by-pass activated.
2. The solenoid valve is located inside the access panel on the left side of the machine. Remove the hose attached to the solenoid valve (**Figure 6-7**) coming from the charge pressure (Port #3) on the right side of the valve. Attach a hydraulic hand pump (Enerpac Model P-142 or similar hand pump). The fitting is an SAE 37° JIC male (06 size) with 9/16-18 threads.



Tie Down Points

Figure 6-6



Solenoid Valve

Figure 6-7

3. Turn ignition switch ON and move the brake toggle switch to the OFF position.
4. Using the hand pump, apply pressure to this connection. The brake should begin to release at 140-175 psi. DO NOT EXCEED 250 psi to avoid damaging the system.
5. Release pressure on the hand pump and/or flip the brake toggle switch to the ON position to reapply the brake.
6. Proceed to tow the Roller to the roadside.

NOTES

ROSCO

A LeeBoy Company

Section 7

MAINTENANCE

GENERAL INFORMATION

This section gives the necessary procedures for routine and general maintenance on the Rosco Model TruPac 915. Before starting any Maintenance program on the roller, 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 roller, 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 roller 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 roller 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

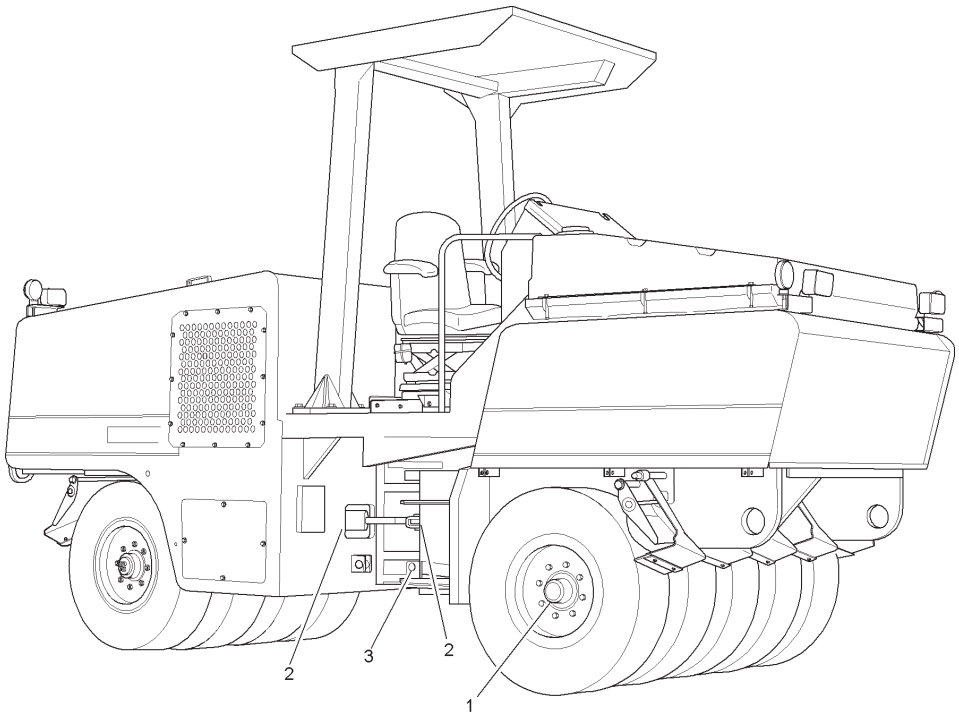
Maintenance must be a planned program that includes periodic Rosco Model TruPac 915 inspection and lubrication procedures.

The maintenance program must be done based on the roller'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 Rosco Model TruPac 915 at top efficiency.



Lubrication Points

Figure 7-1

PERIODIC MAINTENANCE

Periodic Maintenance Schedule

Table 7-1 Periodic Maintenance Schedule

System	Item	10 hour Daily	Initial 50 hours or 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					
	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			X
	Replace hydraulic strainer						X
Lubrication Points	Front wheel bearing (Figure 7-1, Item 1)		X				
	Re-Pack front wheel bearings						X
	Steering cylinder (Figure 7-1, Item 2)				X		
	Articulation joint, (Figure 7-1, Item 3)				X		
	Re-pack rear wheel bearings (11 wheel opt)						X
Water System	Check Watering System Strainer	X					
	Clean Spraybar Line and Nozzles						X
Lighting	Check and repair as needed	X					

TORQUE SPECIFICATIONS

General Information

This section of contains standard torque specifications that may be used on your machine, where applicable. The proper torqueing of bolted connections, where applicable, is an essential part of good preventive maintenance, helping to keep bolts tight, increases joint strength, and improves the fatigue resistance of bolted connections.

Refer to the Maintenance Instructions in Section 7 of this manual for specific requirements. See your authorized dealer for assistance, if required. For maximum machine life and performance, use only genuine manufacturer's replacement parts where available. Metric Fasteners

⚠WARNING The following Table lists torque values for standard hardware and are intended as a guide for average application involving typical stresses and machined surfaces. Values are based on physical limitations of clean, plated and lubricated hardware. In all cases, when an individual torque value is specified, it should be followed instead of values given in this table.

⚠CAUTION Replace original equipment with hardware of equal grade.

Table 7-2 Torque Specifications For Metric Fasteners

	CLASS 8.8 [GRADE 5 EQUIVALENT]				CLASS 10.9 [GRADE 8 EQUIVALENT]			
NOMINAL SIZE & PITCH	TORQUE FT. LBS.		TORQUE N•m		TORQUE FT. LBS.		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	7.90	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

Inch Fasteners

⚠WARNING The following Table lists torque values for standard hardware and are intended as a guide for average application involving typical stresses and machined surfaces. Values are based on physical limitations of clean, plated and lubricated hardware. In all cases, when an individual torque value is specified, it should be followed instead of values given in this table.

⚠CAUTION Replace original equipment with hardware of equal grade.

Table 7-3 Torque Specifications For Standard Inch Fasteners

		CAPSCREWS: SAE GRADE 5				CAPSCREWS: SAE GRADE 8			
SIZE	THREAD	TORQUE FT. LBS.		TORQUE N•m		TORQUE FT. LBS.		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

Hydraulic Fittings

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 7-4. Torque Specifications For Flare Type Tube Fittings**.

NOTE: The torque values shown are based on lubricated connections as in assembly.

Table 7-4 Torque Specifications For Flare Type Tube Fittings

TUBE SIZE OD	NUT SIZE (ACROSS FLATS)	TORQUE VALUE		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)	
(in)	(in)	(N•m)	(lb-ft)	(N•m)	(lb-ft)
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	15	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

Full Torque Nut Coupling Installation

The only completely reliable method of creating a consistent leak free, long lasting connection is to ensure that the coupling is brought to the proper torque.

The best method of ensuring a coupling is brought to the proper torque is to use a torque wrench with crowfoot. To ensure the proper torque is met, use the flats method of torque verification. Flats method may be used alone in situations where a torque wrench is inaccessible or unavailable.

There are 7 steps involved in proper coupling installation:

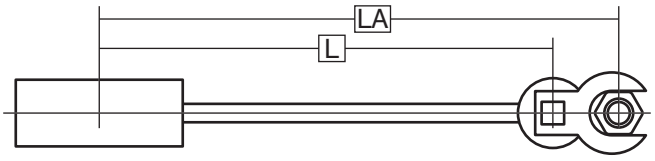
1. Determine the correct torque value for your coupling.

NOTE: Only use the torque values specified from the manufacturer, do not use SAE torque recommendations.

The minimum torque values are adequate for sealing in most applications, and the maximum torque values should never be exceeded.

2. Calculate the correct torque wrench setting using (see ***Equations*** in Section 7-8).

NOTE: The most straight forward method of determining the correct torque setting is to multiply the desired torque by the length of the wrench from the center of the handle to the center of the drive (L) divided by the length of the wrench from the center of the handle to the crowfoot center (LA), (**Figure 7-3**).



Torque Wrench - Crowfoot

Figure 7-3

NOTE: Torque Wrench Setting = Desired Torque * L / LA

3. Ensure that the seal face and threads are clean and in good condition. Do not lubricate coupling threads.

NOTE: O-Rings should be lubricated with light oil, but threads should be completely dry unless making pipe thread connections (interference seal).

Attach the male end of the hose onto the equipment first, since it may be necessary to rotate the entire hose assembly to tighten the male threads. Then route the hose into position while avoiding twisting the hose.

4. Hand tighten the connection by bringing seal face in contact and rotating the nut by hand until it stops.

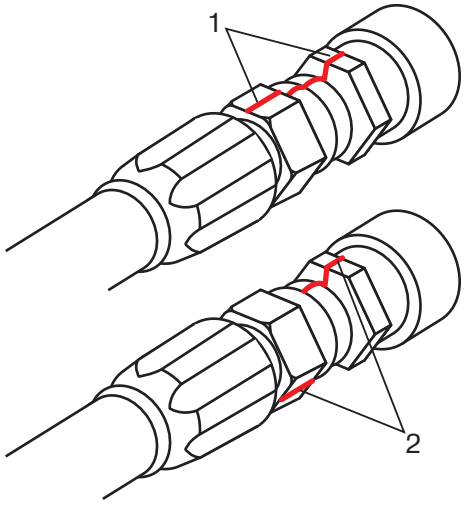
NOTE: By definition hand tight is 0.3-1 ft-lb or when the seal faces are touching and with the threads engaged the hex can no longer be rotated by hand.

5. Mark a line across the coupling nut and backup hex for flats method verification of coupling torque (**Figure 7-4**).

6. Apply a wrench to the backup hex to prevent the coupling and hose from moving while tightening the nut with a torque wrench.

NOTICE **Failure to retain the backup hex during installation will also result in additional clamp load force that could cause damage to the seal face.**

NOTE: The coupling nut must be in motion for an accurate torque reading. If the nut is stopped before final torque value is achieved, it must be loosened and retightened until the torque is attained while the nut is in motion.



Flats Method Tightening

Figure 7-4

1 - Mark Line on Nut

2 - Example 2 Flats difference

7. If a torque wrench cannot fit into the coupling area or if it is unavailable, flats method may be used to ensure that the coupling is properly tightened, as shown in **Figure 7-4**.

NOTE: The mark placed on the nut and backup hex after hand tightening should have rotated 1 to 1.5 flats during final tightening. At this point in time, if desired, the nut and backup hex may be marked to indicate if the coupling loosens over time.

Table 7-5 Torque Specifications For US Style Coupling Terminations

JIC, SAE 45°, ORFS, O-Ring Boss, Gates Adapterless and MegaSeal										
Dash Size	JIC 37°, SAE 45° & MegaSeal (steel)		JIC 37°, SAE 45° & Mega-Seal (steel)		Flat Face O-Ring Seal (Steel)		SAE O-Ring Boss (Steel) & Gates Adapterless ≤ 4000 PSI		SAE O-Ring Boss (Steel) & Gates Adapterless > 4000 PSI	
1/16 Inch	ft-Lb		ft-Lb		ft-Lb		ft-Lb		ft-Lb	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
-3									8	10
-4	10	11	5	6	10	12	14	16	14	16
-5	13	15	7	9					18	20
-6	17	19	12	15	18	20	24	26	24	26
-8	34	38	20	24	32	40	37	44	50	60
-10	50	56	34	40	46	56	50	60	72	80
-12	70	78	53	60	65	80	75	83	125	135
-14					65	80			160	180
-16	94	104	74	82	92	105	111	125	200	220
-20	124	138	75	83	125	140	133	152	210	280
-24	156	173	79	87	150	180	156	184	270	360
-32	219	243	158	175						

Table 7-6 Torque Specifications For DIN 24, DIN 60, and Inverted Cone Style Coupling Terminations

DIN 24, DIN 60, and Inverted Cone			
Size		Torque	
mm		ft-Lb	
Light Series Tube OD	Heavy Series Tube OD	Min	Max
6		7	15
8		15	26
10	8	18	30
12	10	22	33
14	12	26	37
15	14	30	52
	16	30	52
18	20	44	74
22	25	59	89
28	30	74	111
	38	74	162
35		133	184
42		148	221

Table 7-7 Torque Specifications For 4-Bolt Flange Connections

4-Bolt Flanges		
Dash Size	Bolt Size	Torque
1/16 Inch	Inch	ft-Lb
-8	0.31	17
-12	0.38	26
-16	0.44	43
-20	0.50	65
-24	0.63	130
-32	0.75	220

1. Align faces and finger tighten bolts before applying final torque in a pattern. The seal faces must be parallel with even bolt tension to seal properly.
2. Torque values apply to bolts which are plated or coated in light engine oil.
3. Before assembly lubricate O-Ring with light oil (SAE 10W or 20W).

Table 7-8 Torque Specifications For SAE Male Flareless Assembly (MFA)

SAE Male Flareless Assembly (MFA)
After hand tight rotate nut one full turn (8 flats)

Table 7-9 Torque Specifications For NPTF Dry Seal Pipe Threads

NPTF	
Dash Size	Max Torque
1/16 Inch	ft-Lb
-2	20
-4	25
-6	35
-8	45
-12	55
-16	65
-20	80
-24	95
-32	120

1. The torque values obtained from tightening pipe threads can vary considerably depending on thread condition. Adequate sealing can occur at values much lower than the maximum values listed above. Only enough torque to achieve adequate sealing should be used.
2. When using a male tapered pipe thread with a female straight or parallel pipe thread, maximum values are 50% of those listed in the table.
3. If thread sealant is used, maximum values shown should be decreased by 25%.

Table 7-10 Torque Specifications For BSP 30° Inverted Cone and JIS Coupling Terminations

BSP 30° Inverted Cone and JIS		
Dash Size	Torque	
mm	ft-Lb	
1/16 Inch	Min	Max
-2	7	9
-4	11	18
-6	19	28
-8	30	36
-10	37	44
-12	50	60
-16	79	95
-20	127	152
-24	167	190
-32	262	314

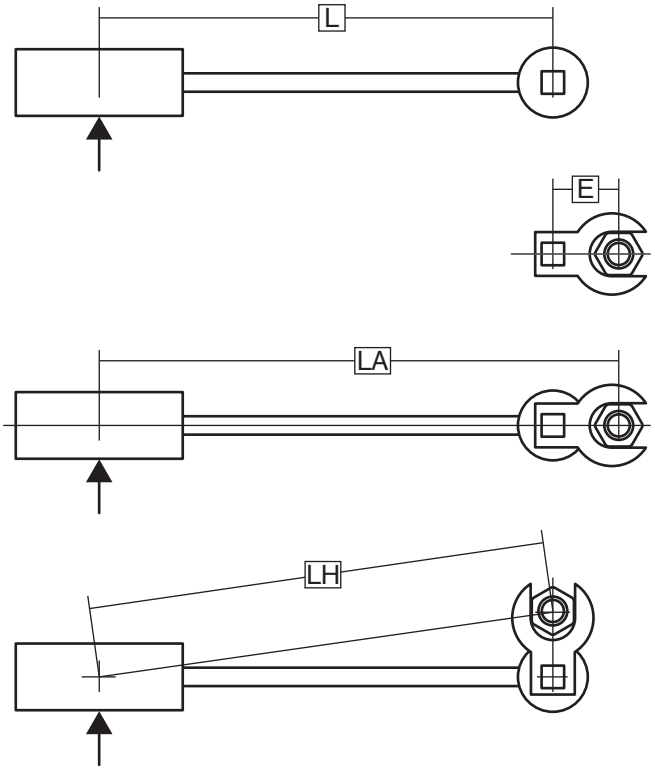
Table 7-11 Flats Method Values For Selected Terminations

Flats Method Values		
Termination Type	Dash Size	Flats
	1/16 Inch	
JIC	4	1.5 - 1.75
JIC	6	1.0 - 1.5
JIC	8	1.5 - 1.75
JIC	10	1.0 - 1.5
JIC	12	1.0 - 1.5
JIC	16	.75 - 1.0
JIC	20	.75 - 1.0
JIC	24	.75 - 1.0
JIC	32	.75 - 1.0
JIS	4	.5 - 1.5

1. Seal faces must be in contact and the fitting fully hand tightened before marking flats.
2. Flats method is most accurate for the first assembly cycle, for multiple disassembly/ assembly cycles torque values are more reliable.
3. Tightening 2 flats or more is analogous to sever over torque and may damage seal faces.

Determining Torque Setting

There are several methods of determining the correct setting on the torque wrench when using a crowfoot. All of the methods involve making the setting proportional to the effective change in length of the wrench multiplied by the desired final torque.



Measurements Needed

Figure 7-5

L = Distance from center of torque wrench handle to the center of socket drive

E = Distance from center of socket drive to the center of crowfoot

LA = Distance from center of torque wrench handle to the center of crowfoot

LH = Distance from center of torque wrench handle to the center of crowfoot, when mounted at 90°

TD = Desired torque at the fitting

TS = Torque setting indicated on wrench

Equations

Equation 1

Torque setting if the crowfoot is palced in line with repsect to the wrench:

$$TS = TD * L / LA$$

or

$$TS = TD * L / (L+E)$$

Equation 2

Torque setting if the crowfoot is placed at 90° with respect to the wrench

$$TS = TD * L / LH$$

or

$$TS = TD * L / \sqrt{(L^2 + E^2)}$$

Equation 3

To estimate the crowfoot size (E)

E = Drive Size * 0.5 + Distance between Drive & Open End + Wrench Size * 0.5774

7

MAINTENANCE SCHEDULE

General Information

Preventive maintenance on the Rosco Model TruPac 915 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 roller 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 **Rosco Model TruPac 915 damage can occur if replacement fastener 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 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 Rosco Model TruPac 915 on a flat even surface.
2. Place Direction Control lever in neutral detented position.
3. Engage park brake.
4. Run engine at 1/2 speed (RPM) without load for 3 to 5 minutes.
5. Reduce engine speed to slow idle.
6. 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 for loose, damaged, missing or corroded parts. Repair or replace as required.
2. Check for damaged, loose, or missing decals. Replace decals as required.

Checking Oil Lines and Fittings

1. Prepare machine for maintenance (**Preparing The Machine For Maintenance**).
2. Check the Rosco Model TruPac 915 for indications of oil leakage around oil lines, hoses, and fittings (see **Torque Specifications**).
3. Tighten fittings as necessary. Replace hoses and fittings as needed.

Checking Air Intake and Fittings

1. Check and empty the pre-cleaner bowl. Clean the bowl and dry with a lint free cloth.
2. Check air intake hoses from the engine to the air cleaner assembly, and from the air cleaner assembly to the pre-cleaner. Replace worn or damaged hoses and tubes.
3. Tighten or replace loose and damaged clamps.

Checking and Adjusting the Drive Belt

NOTE: Refer to the engine manufacturer's manual for additional information on checking and adjusting drive belts.

1. Inspect the belt frequently and replace the belt if stretched, cracked, or dry rotted.
2. Check the belt tension. See the engine manufacturer's manual for tension specifications.
3. If belt is not within specifications, replace the belt.

⚠CAUTION **Keep belt guards in place at all times. Severe personal injury may result from contact with turning belts and pulleys.**

ENGINE MAINTENANCE

⚠WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Rosco Model TruPac 915 while in motion or while 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 Rosco Model TruPac 915 at the time of its shipment from the factory. If additional copies are needed, they can be obtained from your Rosco 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 Direction Control lever in FORWARD position.
3. Turn ignition key to START. Starter must not crank the engine. If starter cranks engine, release key. Do not operate Rosco Model TruPac 915.
4. Repeat test with the FORWARD/REVERSE lever in REVERSE.

⚠CAUTION Death or serious injury can result from starting the Rosco Model TruPac 915 when not in neutral. Do not operate roller if starter cranks the engine while transmission is in any gear except neutral. See your Rosco Dealer for Neutral Start System repair.

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

Checking the Oil

1. Park the machine in a level position and stop the engine.
2. Clean the area around the engine lubrication oil dipstick. Wait five minutes after engine shutdown, before removing the dipstick from the engine and checking the oil level.

NOTE: The above procedure will allow the oil to return to the oil pan and help remove the possibility of filling the engine with too much lubrication oil.

3. Remove the filler cap and add oil as necessary.

Changing the Oil

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. Refer to engine manufacturer's manual.

NOTE: Drain oil while the engine is still warm from operation. Warm oil will flow freely and carry away more impurities.

NOTICE Always make sure the machine is on a level surface when filling and checking oil.

1. Operate the engine until the coolant temperature reaches 140° F (60° C). Shut off the engine.
2. Remove the oil pan drain plug at the bottom of the engine and allow the oil to drain.
3. Reinstall the oil pan drain plug. Make sure it is tightened securely.
4. Clean around the oil filter head, then remove the filter cartridge.

NOTE: For Caterpillar engines, the oil filter is located at the lower front center of the engine, and is accessed by way of the panel behind the driver's seat.

5. Clean the oil filter head gasket surface.
6. Apply a light film of oil to the gasket surface before installing the new filter.
7. Turn the filter clockwise until its rubber gasket contacts the filter head, then tighten the filter an additional 2/3 to 3/4 turn.
8. Fill the engine crankcase with new oil to the upper line on the dipstick. Refer to Section 4, Specifications, or the engine manufacturer's manual for fluid capacities.

NOTICE Always check the level on the dipstick before adding more oil. Too much oil can cause as much engine damage as not enough.

NOTE: After replacing the oil filter cartridge, it may be necessary to start the engine and allow the oil to circulate. Stop the engine, wait a few moments, then recheck the oil level with the dipstick. If it is low, add more oil to the proper level on the dipstick.

9. Start the engine and inspect for leaks at the filter and drain plug.
10. Shut the engine off and re-check the oil level with the dipstick. Wait 5 minutes for the oil to drain down before checking.

FUEL SYSTEM

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

⚠WARNING Diesel fuel is highly explosive. Do not expose fuel to sparks or flames. Do not smoke while performing maintenance on the engine fuel system.

Fuel Requirements

Use clean, good quality ASTM No. 2-O or No. 2-D acclimatized diesel fuel. If the machine 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 engine performance by approximately 10%.

NOTICE Avoid using contaminated fuel. Fuel contaminated by water or dirt can cause severe damage to engine components. Fuel tanks contaminated with water will promote the growth of microbes that form a "slime" that can clog fuel filters and lines.

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 will insure continued top performance and prevent damage to internal engine components.

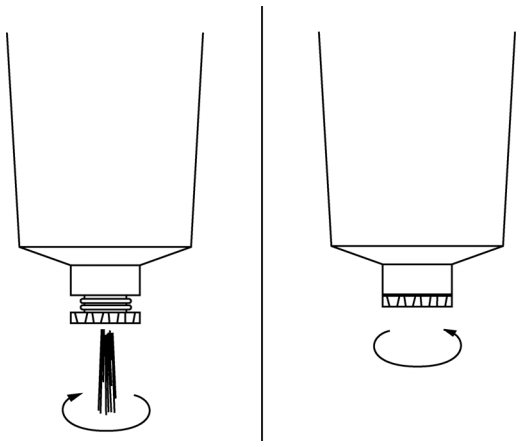


Figure 7-6

The engine fuel filter and water separator are located on the right side of the engine. A drain valve is provided on the bottom of the water separator (**Figure 7-6**). Access is by way of the panel behind the driver's seat.

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

NOTICE 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 machine contains more detailed information on fuel system maintenance procedures.

Changing Engine Fuel Filter

Replace the engine fuel filter semi-annually or every 500 service hours. Refer to Table 7-1, Maintenance Interval Chart, for correct part number.

Refer to the engine manufacturer's manual for additional information on engine service. Use manufacturer's recommendations for engine fuel filter replacement and bleeding the fuel system.

1. Refer to **Preparing The Machine For Maintenance** and park the machine.
2. Allow the engine to cool completely.
3. Locate the fuel filter on your machine's engine.

NOTE: For Caterpillar engines, the fuel filter/ water separator is located at the top right of the engine, and is accessed by way of the panel behind the driver's seat.

⚠WARNING Wear eye protection and chemical resistant gloves when using solvent for cleaning purposes. Some solvent can cause skin irritation and eye damage.

⚠WARNING Wear eye protection when using compressed air for drying or cleaning components. Never point the nozzle at another individual. Use a safety reduction valve to reduce air pressure to a safe level. Compressed air can cause serious personal injury if misused.

4. Using solvent, thoroughly clean the area surrounding the fuel filter. Dry with compressed air.

5. Turn the fuel filter counterclockwise to remove. Clean the mounting surface and remove any loose filter seals on the head-mounting surface.
6. Fill the replacement fuel filters with clean diesel fuel.
7. Lightly lubricate the secondary filter seal with clean engine oil. Turn the filter clockwise until seal contacts filter head. Tighten filter 1/2 to 3/4 additional turn.
8. Using the priming plunger and instructions in the engine manufacturer's manual, fill the filters with fuel and bleed the fuel system.
9. Start engine and check for leaks. Tighten or replace filter as necessary.

Bleeding The Fuel System

Occasionally it may be necessary to bleed, or prime, the fuel system. Bleeding the fuel system is required:

1. After the fuel filter and/or hoses have been removed and replaced.
2. After the fuel tank has become empty.
3. Before using the machine after long storage.

NOTE: Refer to the engine manufacturer's manual for detailed instructions for bleeding (priming) the fuel system.

Cleaning And Checking Fuel Filler Cap

⚠WARNING Wear eye protection and chemical resistant gloves when using solvent for cleaning purposes. Some solvent can cause skin irritation and eye damage.

⚠WARNING Wear eye protection when using compressed air for drying or cleaning components. Never point the nozzle at another individual. Use a safety reduction valve to reduce air pressure to a safe level. Compressed air can cause serious personal injury if misused.

1. Remove filler cap and inspect for damage. Check cap for dirt and clogging.
2. Using solvent, clean cap thoroughly and dry with compressed air.
3. Check filler cap to insure free air flow. Replace if necessary.
4. Install cap.

AIR CLEANER SYSTEM

NOTICE 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.

NOTICE Do not open the air cleaner assembly unless the air filter restriction gauge indicates an air filter restriction, or engine operation indicates possible air filter restriction.

Replacing Engine Air Filter Elements

Replace the primary filter elements monthly or every 100 service hours. Replace the safety element quarterly or every 250 hours. Refer to Table 7-1, Maintenance Interval Chart, for part numbers.

The air pre-cleaner should not require maintenance or service unless visible damage is apparent.

NOTICE Never operate the engine without an air cleaner. Destruction of internal engine components will occur within minutes.

1. Refer to **Preparing The Machine For Maintenance** and park machine.
2. Access to the air cleaner assembly is by way of the panel behind the driver's seat.
3. Before changing the air filter elements, thoroughly clean air cleaner assembly.
4. To change the filter elements, remove the air cleaner end cover by releasing the two spring clips.
5. Clean the air cleaner housing thoroughly. Dry using lint free cloths.
6. Inspect hose clamps and tighten as necessary.
7. Install filter element.
8. Pinch the evacuator valve together and remove dirt from the valve.
9. Install end cover and secure with spring clips. Make sure evacuator valve is located on the bottom of the end cover after installation.

RADIATOR AND COOLANT SYSTEM

NOTICE Check the engine radiator daily for rocks and debris. A partially blocked radiator will reduce the efficiency of the radiator and can cause overheating and premature failure of the engine.

Checking Radiator And Coolant Level

Check radiator coolant level prior to each day's use of the machine. 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.

NOTICE Check the coolant freeze protection level before the start of cold weather. Check with the local authorized dealer for information on freeze protection.

⚠CAUTION Hot engine coolant can cause serious personal injury. Shut off engine. Do not remove radiator filler cap until it is cool to the touch. Slowly loosen filler cap to first stop to relieve pressure before removing cap completely.

1. Refer to **Preparing The Machine For Maintenance** and park the machine.
2. Shut down engine and allow radiator to cool.
3. Open the engine compartment door.
4. Inspect radiator for leaks, dents, cracks and damaged cooling fins. Repair or replace as necessary.
5. Inspect radiator cap for wear and damage. Perform pressure/temperature test if necessary. Replace cap as necessary.
6. Check coolant level in radiator recovery reservoir located on the left side of the radiator.
7. Add coolant to the reservoir as needed with 50% water and 50% ethylene-glycol antifreeze.

Draining, Flushing, And Filling Engine Coolant System

See the engine manufacturer's manual for information on draining and replacing engine coolant, coolant levels, and coolant specifications. Use engine manufacturer's recommendations for coolant service.

The Rosco Model TruPac 915 is filled at the factory with a 50/50 mixture of antifreeze and water to protect down to -34° F (-37° C). Some geographical areas may require special antifreeze or coolant practices. Contact the local authorized dealer for additional information.

⚠CAUTION Hot engine coolant can cause serious personal injury. Shut off engine. Do not remove radiator filler cap until it is cool to the touch. Slowly loosen filler cap to first stop to relieve pressure before removing cap completely.

1. Refer to **Preparing The Machine For Maintenance** and park the machine.
2. Shut down engine and remove ignition key.
3. Allow engine to completely cool before removing radiator cap.

NOTE: Dispose of used coolant properly. Check with local environmental officials for information on disposal procedures. Coolant is extremely poisonous and will cause death if ingested by people or animals.

4. Open radiator petcock and drain coolant into a suitable container. Dispose of coolant properly.
5. Open engine block drain plugs (see engine manufacturer's manual). Drain coolant into a suitable container.
6. Using a good quality coolant system flush product, flush the cooling system using the product directions.
7. Close petcock and engine drains. Fill radiator to full level with 50/50 mixture of antifreeze and water. Contact the local authorized dealer for information on local coolant protection levels.
8. Start engine and run for 15 to 30 minutes to purge air from the engine block. Check coolant recovery tank and fill as necessary.
9. Check recovery tank frequently for proper coolant level.

BATTERY MAINTENANCE

The Rosco Model TruPac 915 is factory equipped with a maintenance-free battery that is sized to provide efficient starting for the diesel engine on the roller. 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 Rosco Model TruPac 915, always turn the roller 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 roller'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.

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

5. If the roller is to be stored for more than 30 days, remove the battery from the roller 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 SYSTEM

⚠WARNING When servicing the electrical system, always remove the battery's ground cable first followed by the positive cable. Generally, if the negative cable is grounded during removal, sparks will not occur. If the positive cable is grounded during removal, sparks will occur and could ignite explosive gases.

When battery is connected, follow these rules:

1. Disconnect negative (-) battery cable when working on or near the alternator.
2. Do not attempt to polarize alternator.
3. Make sure alternator wires are correctly connected before connecting battery terminals.
4. Do not ground alternator output terminal.
5. Do not disconnect or connect alternator wires while battery is connected or while alternator is operating.
6. Connect the battery or booster battery in the correct polarity, [positive (+) to positive (+) and negative (-) to negative (-)].
7. Do not disconnect battery when engine is running and alternator is charging.
8. Disconnect battery cables before connecting battery charger to battery.

⚠WARNING When reconnecting the battery, always reconnect the positive (+) battery cable first.

Fuses

The Rosco Model TruPac 915'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. To access the fuse block, remove the bolts holding the plate located below the instrument panel.

Fuses that blow may be replaced but will continue to blow until the cause of the overload is found and corrected.

⚠CAUTION Replace fuses and circuit breakers with correct amperage to prevent damage from system overload.

Lighting

1. Inspect lights daily for proper operation.
2. If a light or group of lights does not function:

   a. Check the fuse panel located below the instrument panel for a blown fuse.

   b. Examine all visible wiring connections, making sure that they are securely fastened.

   c. 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.

   d. Check lighting mounts for proper grounds.

   e. If the trouble is not located, inspect the wiring harnesses for damage.

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 machine, 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

⚠WARNING Death or serious injury can result from entanglement in moving parts. Do not service the Rosco Model TruPac 915 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 Rosco Model TruPac 915 consists of a variable displacement Sauer/Danfoss Series 90 pump and motor which provide drive power for the brush. A gear-type hydraulic pump is directly connected to the Sauer/Danfoss pump, and provides operational pressure for the power steering, brush lift, brush swing and brush 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 Rosco Model TruPac 915 was factory filled with 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 Rosco Model TruPac 915 performance can be affected if the wrong hydraulic oil is used. Use only as indicated by Lubricant Types in Specifications section.

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 in Specifications section.

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 System Checks

1. Before each day's use, inspect the Rosco Model TruPac 915 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.

2. 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 roller.

3. 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.

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

Checking Hydraulic Oil Level

Check the level of hydraulic oil prior to each day's operation. Hydraulic oil should be visible in the sight gauge. If not, fill the tank until oil is visible in the sight gauge.

1. Refer to PREPARING MACHINE FOR MAINTENANCE and park machine.
2. Make sure all cylinders are retracted.
3. Wait ten minutes for oil to drain after engine has been shut down.
4. Check hydraulic tank sight gauge. The hydraulic oil level should be in the upper half of the sight gauge but never above the upper fill line.
5. Add Citgo A/W All-Temp VG32 hydraulic oil as needed.

NOTICE Use extreme caution when removing the filler cap to prevent any foreign matter from entering the hydraulic reservoir.

6. Clean the fill cap strainer each time hydraulic oil is added or changed.

Checking And Cleaning Hydraulic Reservoir Filler Cap

⚠WARNING Wear eye protection and chemical resistant gloves when using solvent for cleaning purposes. Some solvent can cause skin irritation and eye damage.

⚠WARNING Wear eye protection when using compressed air for drying or cleaning components. Never point the nozzle at another individual. Use a safety reduction valve to reduce air pressure to a safe level. Compressed air can cause serious personal injury if misused.

1. Remove filler cap and inspect for damage. Check cap for dirt and clogging.
2. Use solvent to clean cap thoroughly. Dry with compressed air.
3. Check filler cap to insure free air flow. Replace as necessary.
4. Install cap.

Changing Hydraulic Filters

1. Refer to PREPARING MACHINE FOR MAINTENANCE and park machine.
2. Allow the engine to cool completely.
3. Locate the hydraulic filters by removing the panel behind the driver's seat.
4. Thoroughly clean the filter and filter head with a lint free cloth.
5. Remove the hydraulic reservoir filler cap.
6. Turn the filter bowl counterclockwise to remove. Clean the mounting surface with a lint free cloth and remove any loose filter seals in the filter-head mounting surface.
7. Drain and remove the filter element from the filter bowl.
8. Using solvent, thoroughly clean the bowl. Dry using compressed air.

⚠WARNING Wear eye protection and chemical resistant gloves when using solvent for cleaning purposes. Some solvent can cause skin irritation and eye damage.

⚠WARNING Wear eye protection when using compressed air for drying or cleaning components. Never point the nozzle at another individual. Use a safety reduction valve to reduce air pressure to a safe level. Compressed air can cause serious personal injury if misused.

9. Lightly lubricate the filter bowl seal with clean hydraulic oil.
10. Place element into bowl.
11. Install bowl on filter head and turn clockwise until the seal contacts the mounting surface. Tighten the filter 1/2 to 3/4 additional turn. Tighten filter bowl to 45 ft. lbs. (60.8 Nm) torque.
12. Check hydraulic level in reservoir and fill with Citgo A/W All-Temp VG32 as necessary.
13. Start engine and check for leaks. Tighten or replace filter as necessary.

NOTICE After changing the filter, idle the engine for 3 minutes with the Direction Control lever in neutral and park brake engaged. At the end of this idling period, disengage the park brake and slowly move the Direction Control lever FORWARD and REVERSE. This procedure will remove any air induced into the system by the removal of the filter. Failure to follow this procedure may cause partial or complete failure of the hydraulic pump.

Draining, Flushing, And Filling Hydraulic Oil Reservoir

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 and will degrade performance. Clogged filter elements can damage the hydraulic pump and other system components.

Drain and replace hydraulic oil and filter after the first 100 hours of service, and after every 500 hours of service or seasonally, whichever comes first. The suction strainer should be removed and cleaned at the 500 hour interval or whenever the hydraulic oil is changed.

1. Refer to PREPARING MACHINE FOR MAINTENANCE and park machine.
2. Remove reservoir filler cap.
3. Remove drain plug and drain the hydraulic oil into a suitable container. Dispose of oil properly.
4. Flush hydraulic reservoir completely.
5. Install drain plug.
6. Replace the suction filter.
7. Replace high-pressure filter.
8. Fill hydraulic oil reservoir to proper level.
9. Install filler cap.
10. Start engine and operate hydraulic control levers several times. Check hydraulic oil sight gauge and fill as necessary.

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 Circuit on the hydraulic pump supplies the power steering with approximately 7 GPM (26.5 l) of hydraulic flow. This flow goes to the steering circuit before any other circuit.

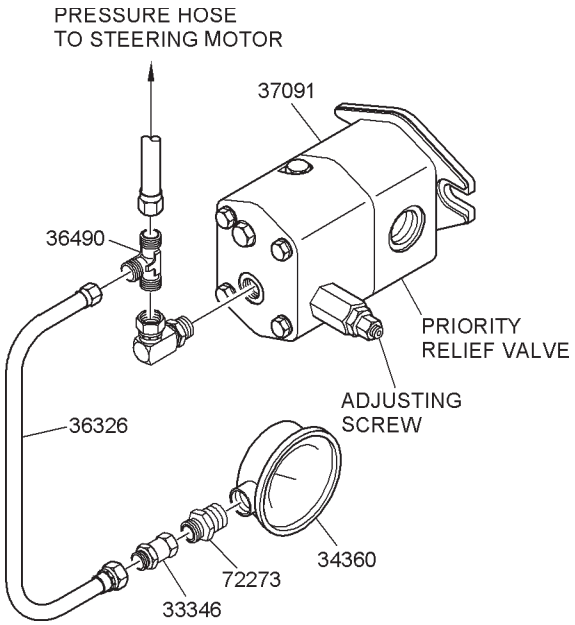
The Priority Relief Valve controls the maximum operating pressure for the power steering. The Relief Valve is located in the hydraulic pump attached to the rear of the hydrostatic pump on the engine flywheel housing.

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

1. Total or partial loss of steering functions or hard steering.
2. Constant noise from hydraulic pump when using steering.
3. Hydraulic oil overheating.

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

1. Plumb a 0 to 5000 psi (352 kg/sq.cm) pressure gauge into the Priority Flow Circuit as shown in Figure 6-8. Parts needed for this, including a pressure gauge, can be obtained from your authorized dealer. Part numbers are listed in **Figure 7-7**.
2. Start the engine and warm the hydraulic oil to at least 100° F (38° C).
3. Set the park brake and be sure the transmission is in neutral. Use the park brake as an extra precaution.
4. Increase engine speed to 2500 RPM.
5. Turn the steering wheel all the way to the left or right until it stops. Continue to hold pressure to the steering wheel until a gauge reading is taken.
6. The pressure gauge should read 1500 +/- 50 psi (105.5 +/- 3.5 kg/sq. cm).
7. Adjust relief pressure by removing the locknut and turning the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.



Setting Priority Relief Valve

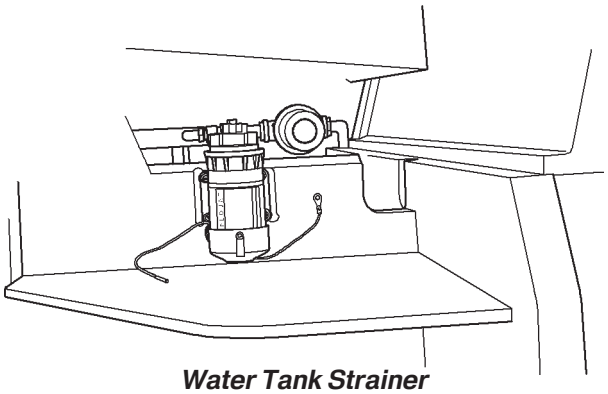
Figure 7-7

WATER SPRAY SYSTEM

⚠CAUTION Do not fill water tank with any liquid other than water or an asphalt release agent. Chemicals can react with heat and asphalt products and cause an explosion.

NOTICE To prevent damage to the water system during freezing temperatures, disconnect the strainer from the hose assembly so that the water drains from the water tank and pump.

The water system is gravity fed. To drain the tank, disconnect the strainer from the hose assembly located under the front step on the right side of the machine (**Figure 7-8**).



Water Tank Strainer

Figure 7-8

Run the water pump for 20 seconds to purge any trapped water.

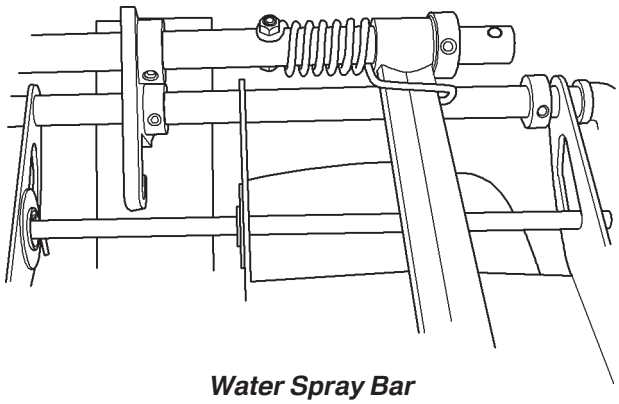
Checking Water Level

The water tank is located at the front of the Roller directly above the front ballast. The water tank fill cap is located on top of the water tank. Maintain an adequate supply of water in the tank to insure consistent operation of the spray system.

The pressurized water system supplies water to the Roller's spray nozzles. The water cools the tires and helps prevent asphalt from sticking to them during operation.

The water spray pattern may require occasional adjustment. Check spray patterns periodically at both front and rear tires. Use the following procedure to adjust the spray pattern.

1. Use an Allen wrench to loosen the set screws on both sides of the spray bar (**Figure 7-9**).



Water Spray Bar

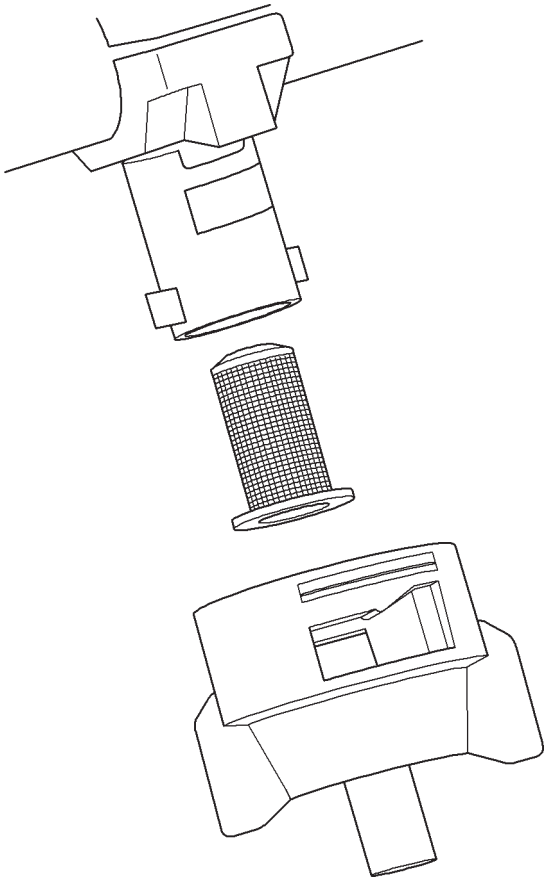
Figure 7-9

2. Direct the spray pattern from the nozzles to insure complete coverage across the width of the Roller tires.
3. Tighten the set screws. Individual spray nozzles can be adjusted by loosening the wing nut at the end of the spray nozzle. Direct the spray pattern as needed, and tighten the wing nut.

Cleaning Water Spray Nozzles

Depending on operating conditions, the water spray nozzles may become clogged or damaged and require cleaning or replacement. Use the following procedure to clean the water spray nozzles:

1. Turn off the engine and set the park brake.
2. Remove the wing nut at the end of the clogged spray nozzle.
3. Disassemble the spray nozzle and remove the inner filter screen cartridge (**Figure 7-10**).



Spray Nozzle Housing

Figure 7-10

4. Clean the interior and exterior of the spray nozzle housing.
5. Using compressed air and a water-soluble cleaning solvent, remove all contaminants from the filter screen cartridge.
6. Reassemble and operate the water spray system to insure proper delivery and spray pattern.

Water Pump Replacement

The water pump supplies a constant flow of water to the water spray bar. The water pump is located under the front step on the right side of the machine.

Follow these steps to replace the water pump.

1. Turn off the engine and set the park brake.
2. Completely drain the water tank.
3. Remove the bolts securing the water pump to the Roller frame.
4. Remove the electrical connector plug from the water pump.
5. Remove the fittings and hoses from the water pump.
6. Remove the water pump from the Roller frame.
7. Install replacement water pump and reattach all fittings, hoses, and hardware to the pump.
8. Check water pump for leaks and proper operation of the spray system.

Scrapers

The tire scrapers are factory adjusted to insure optimal surface tension. Check scraper springs and scraper blades for excessive wear. Replace scraper springs and blades as required.

Coco Mats

The coco mats provide a more even distribution of water across the face of the tires. With continued use, they will accumulate asphalt build up. Check the mats periodically and replace them when they show excessive wear or asphalt build up.

CHASSIS AND RUNNING GEAR

⚠WARNING Do not service the machine 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.

Proper lubrication is necessary to maintain the machine at top efficiency. Refer to the lubrication information in Table 7-1, Maintenance Interval Chart. All lubrication points are shown in Figure 7-1.

Use only good clean lubricants on your Roller. Do not induce contaminants into the system by using open or dirty containers.

Tires And Wheels

1. Check tires for excessive wear, correct tire pressure, and objects embedded in or between the tires.

NOTICE **Never exceed tire manufacturer's maximum recommended inflation pressure.**

2. Protect tires from contact with petroleum products and chemicals.
3. Check tires and wheels for cuts, bubbles, damaged rims, or missing wheel bolts or nuts.
4. Wheel lug nuts should be checked for tightness weekly. Torque to 85 ft. lbs (115 Nm).

Changing The Tires

1. Park the Roller on a flat surface. Turn off the engine and set the park brake.
2. Loosen and remove the lug nuts.
3. Remove bolts and tire.
4. Install repaired or replacement tire on the machine; tighten lug nuts alternately in a star pattern to 85 ft. lbs (115 Nm).

Axles And Brakes

⚠WARNING Securely support chassis when removing the wheels. 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.

Front wheel bearings should be removed, inspected, and repacked with a high quality wheel bearing grease after every 500 service hours or seasonally.

To reinstall bearings and hub, tighten the retaining nut until the wheel drags during hand rotation. Then back off the nut 1/8 turn and bend over the locking tab or install the cotter pin, depending on the design configuration.

The hydrostatic drive system provides dynamic braking action. Maintain the hydraulic system, filters, and fluid levels to insure safe and effective braking.

ROLL OVER PROTECTIVE STRUCTURE

ROPS structures are not intended as external load carrying members. Do not mount attachments such as pull hooks, winches, side booms, etc., without the ROPS manufacturer's approval.

Attachments such as mirrors, fans, heaters, lights etc., should be installed following the manufacturers' guidelines. Typically, these attachments are located in non-critical areas such as roof sheets, enclosure sheet metal or the middle portion of the ROPS legs.

⚠WARNING Do not weld or drill on the ROPS structure. This will degrade the ROPS system's capability and create an unsafe condition as well as expose operators and bystanders to liability damages. Consult the ROPS manufacturer for recertification after adding any attachments to the ROPS structure.

⚠WARNING When users fail to inspect and maintain this equipment, ROPS equipment may become structurally inadequate and may fail during normal operation.

⚠WARNING Do not make modifications to the basic design, such as raising canopy height or relocating ROPS legs. Recertification is required.

Following are some in-service factors that may degrade a ROPS system's energy-absorbing or load carrying capability. These factors can create an unsafe condition as well as expose operators and bystanders to liability damages.

1. Structural damage from vibrations and/or loadings during operations.
2. A corrosive environment.
3. Continued use of the machine after a rollover or accident involving structural damage.
4. Unauthorized modifications.
5. Worn or deteriorated isolation mounts.
6. Replacement bolts having less than the correct grade.
7. Failure to maintain proper bolt torque.

NOTE: With periodic inspections, cracks, loose bolts, damage and other normal wear-and-tear related problems can be corrected before they become serious. Regular periodic inspections during maintenance procedures can ensure that the ROPS is damage free and capable of performing the lifesaving function it is designed for.

Since most ROPS are unique and are employed in different service environments, no specific inspection interval can be recommended. Frequent visual checks of mounting hardware, and inspection in conjunction with regular service intervals is suggested.

⚠CAUTION **Replace missing or damaged hardware with the manufacturer's specified hardware. Re-torque all loose threaded fasteners to the manufacturer's specifications.**

Clean and disassemble the machine as necessary and inspect for cracks in the structure and mounting system. Replace worn or damaged resilient mounts to prevent further damage to the mounting surfaces and to prevent more severe vibration problems.

Cracks are usually associated with weld details and usually show as a line of rust before they appear as a crack. Rust lines should be taken as indications of cracks. Determine the repairability of cracks in the ROPS structure on the basis of the crack details and its effect on the particular design. The manufacturer must be consulted at this step. Some general rules that may be helpful are:

1. Enclosure sheet metal cracks are repairable.
2. Small cracks may be repairable. Consult the ROPS manufacturer.
3. If damaged by rollover, collision or fire, consult the ROPS manufacturer.
4. In all cases, when in doubt, consult the ROPS manufacturer.

Verify that water drainage paths will not trap water. Trapped water can freeze and crack or deform the structure.

Extensive paint peeling should be repaired before rust occurs and weakens the structural integrity.

Check for the presence and operability of a seat belt. The belt should be clean, free of dirt and grease, and the latch should function smoothly.

⚠WARNING **Inspect the ROPS structure following a rollover, collision or fire. Failure to do so can result in serious injury from operating functionally unsound equipment.**

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. Paint chipped or rusty 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 Table 7-1, Maintenance Interval Chart.
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 pre-cleaner. 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. Drain the water system and spraybar lines.
15. If water ballast was used, drain tanks or add antifreeze mix to both front and rear ballast compartments.
16. Check all safety decals. Replace any decals that are damaged or illegible. Refer to Decal Installation in this section.

17. Place transmission lever in neutral, idle the engine a few minutes before shutting it down, and set the park/emergency brake.
18. Remove ignition key and lock any optional panels. 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 Table 4-1, Maintenance Interval Chart, 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, grease all pivot points. See Figure 4-1, Lubrication Points.

Removing The Machine From Storage

1. Follow steps above in Periodic Maintenance During Storage.
2. Refer to Table 7-1, Maintenance Interval Chart. Check all fluid levels, belt tensions, and bolt torques.
3. Replace alternator belt.
4. Replace battery. Refer to Battery Maintenance earlier in this section for additional instructions.
5. Clean grease or rust inhibitor from all exposed cylinder rods, seals, and o-rings.

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

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Section 8

TROUBLESHOOTING

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 does not crank	Battery weak or dead.	Charge or replace battery.
	Neutral start switch not activated.	Put Direction Control lever in neutral.
	Park brake not engaged.	Set the park brake.
	Faulty ignition switch.	Replace switch.
	Faulty start solenoid.	Replace solenoid.
	Faulty starter.	Repair or replace
Engine cranks but does not start, or starts hard	Engine cranking speed too low (below 150 RPM).	Clean battery terminal connections. Charge or replace battery.
	No fuel in tank.	Add fuel to tank.
	Debris or dirt in fuel.	Drain small amount of fuel from tank sump into clean container. Inspect for debris. Drain and flush fuel system and change fuel filter.
	Water in fuel. Water frozen in fuel lines or fuel filter.	Thaw and/or drain water from fuel tank sump and fuel lines. Install new fuel filter.
	Wrong grade of fuel for low ambient temperature. Fuel is gelled in tank or lines.	Warm machine. Drain fuel system and change fuel filter. Refill tank with correct fuel.
	Air entering suction side of fuel system.	Check for bubbles in fuel filter. Tighten connections. Inspect fuel lines for damage.
	Fuel filter plugged or restricted.	Replace fuel filter.
	Fuel tank cap vent is clogged.	Remove cap. Listen for air entering the tank suddenly. Clean and replace cap.
	Intake or exhaust system restricted	Remove restrictions or replace filter elements
	Air in low pressure side of fuel system.	Check for air leaks in the low pressure side of the fuel system. Prime fuel system. See engine manufacturer's manual.

SYMPTOM	CAUSE	REMEDY
Engine cranks but does not start, or starts hard (continued)	No voltage to fuel shut-off solenoid.	Voltage should be 9 volts with the ignition switch in the ON or START position.
	Fuel shut-off valve closed.	Open valve.
	Insufficient fuel supply to injector pump and nozzles.	Check fuel supply system. Clean or replace fuel filter.
	Fuel solenoid is defective.	Check/replace defective fuel solenoid. See engine manufacturer's manual.
	Fuel transfer pump is defective.	Repair or replace fuel transfer pump.
	Injection pump malfunctions.	See your authorized dealer.
	Carbon deposits on injection nozzle orifice.	Clean orifice. Replace nozzle as needed.
	Injection nozzle(s) malfunctions.	See your authorized dealer.
	Worn piston rings. Low compression.	See your authorized dealer.
	Incorrect valve clearances.	Adjust clearance.
	Blown head gasket.	See your authorized dealer.
Engine cranks slowly	Wrong weight oil for low ambient temperature.	Drain and refill with correct weight oil. Change oil filter.
	Loose or dirty connections at battery.	Clean battery posts and cable ends. Reinstall cables.
	Loose or dirty connections at starter.	Clean connections at start relay and starter.
	Battery cables damaged or broken.	Replace cables.
	Battery discharged or failing to take a charge.	Disconnect battery from machine. Recharge battery. If it fails to charge, replace battery. Check alternator output (12 volts), wiring for shorting to ground, and alternator belt tension. Repair or replace components as required.
	Starter motor malfunctions. Seized bushings, bent armature shaft, worn bushings, or armature "dragging".	Check starter current draw. See your authorized dealer for starter repair.
Engine surges, stalls, or operates poorly at slow speed	Air entering suction side of fuel system.	Check fuel filter for air bubbles. Tighten fittings and connections. Inspect lines for damage.
	Fuel tank cap vent is clogged.	Remove cap. Listen for air entering the tank suddenly. Clean and replace cap.
	Water or debris in fuel.	Drain water from sump in fuel tank. Check drained fuel for debris. Drain and flush fuel system. Replace fuel filter.

SYMPTOM	CAUSE	REMEDY
Engine surges, stalls, or operates poorly at slow speed (continued)	Fuel gelled due to low ambient temperature.	Drain fuel system. Refill engine with correct grade fuel. Replace fuel filter.
	Fuel filter is clogged.	Check for debris in fuel system. Replace filter.
	Return line from injection pump to tank is restricted.	Check line for kinks or damage. Check line for debris. Clean with compressed air.
	Air filter elements are clogged.	Clean or replace air filter elements.
	Fuel transfer pump is clogged or defective.	Repair or replace pump. See your authorized dealer.
	Carbon deposits on injection nozzle orifice.	Clean orifice. Replace nozzles as needed.
	Injection pump or nozzle(s) malfunctions.	See your authorized dealer.
	Idle speed set too low.	Check for bent, worn, or loose speed control linkage. Repair as needed. Adjust linkage and reset idle speed.
	Incorrect valve clearance.	Adjust clearance.
	Basic engine malfunction. Leaking head gasket, sticking or burnt valves, incorrect valve clearance or timing, worn or broken piston rings.	See engine manufacturer's manual.
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 line or injection pump line restricted.	Clear restriction with compressed air. Replace line.
	Fuel return system restricted.	Correct restricted fuel return system.
	Water in fuel or wrong grade of fuel.	Drain and flush fuel tank and refill with correct fuel. Replace fuel filter.
	Fuel transfer pump malfunctioning.	Replace fuel transfer pump. See engine manufacturer's manual.
	Throttle improperly adjusted.	Adjust throttle controls.
	Idle speed set too low.	Repair bent, worn, or loose speed control linkage. Adjust and reset idle speed.
	Injector malfunctioning.	Replace injector. See engine manufacturer's manual.

SYMPTOM	CAUSE	REMEDY
Engine power output is low (continued)	Ground speed is too fast.	Pull back on Direction Control lever and increase engine RPM.
	Excessive load.	Reduce load.
	Low charge pressure at hydrostatic pump causing park brake to drag.	See service manual for pump.
	AFC signal line is defective.	See engine manufacturer's manual.
	Internal hydraulic system leakage.	See your authorized dealer.
	Basic engine malfunction. Leaking head gasket, sticking or burnt valves, incorrect valve clearance or timing, worn or broken piston rings.	See engine manufacturer's manual.
Engine emits excessive black or gray exhaust smoke.	Restricted air filter element.	Check and clean or replace air filter elements.
	Incorrect grade of fuel.	Drain and flush fuel tank, and fill with correct grade of fuel. Replace fuel filter.
	Engine overloaded.	Remove load. Run at fast idle to clear the engine.
	Incorrect injection pump timing.	Repair or replace pump. See your authorized dealer.
	Excessive fuel delivery. Injection pump or nozzle(s) malfunctions.	See your authorized dealer.
	Cranking speed too low (below 150 RPM).	Clean battery terminal connections. Charge or replace battery.
	Incorrect grade of fuel.	Drain and flush fuel tank and refill with correct grade of fuel. Replace fuel filter.
	Injection pump or nozzle(s) malfunctions.	See your authorized dealer.
	Basic engine malfunction. Excessive oil consumption.	See engine manufacturer's manual.
Engine noise (abnormal rattle, knock, or squeal)	Low engine oil level.	Fill reservoir to correct level.
	Lightweight engine oil used in high ambient temperatures.	Drain and fill reservoir with correct weight oil.
	Fuel in engine oil.	Drain and refill reservoir with correct oil. Check fuel system to find leakage, and repair leaks.
	Loose or worn hydraulic pump drive coupling.	Repair or replace coupling.
	Injection pump timing is incorrect.	See your authorized dealer.
	Excessive valve clearance.	Adjust clearance.
	Internal engine component wear.	See engine manufacturer's manual.

SYMPTOM	CAUSE	REMEDY
Engine does not shut off	Electrical wiring fault is 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 is faulty.	Check solenoid for defects or foreign material inhibiting proper operation.
	Engine operating on fumes drawn into air intake.	Locate and isolate the source of fumes.
	Low idle set too high.	Set idle to specifications.
Engine oil pressure is low	Electrical power not being supplied to gauge.	Check fuses.
	Incorrect oil level. Too high or too low.	Check for leaks. Add or drain engine oil. Check dipstick calibration.
	Oil filter is clogged.	Change oil filter.
	Oil is diluted with fuel.	Replace fuel injector, fuel transfer pump and/or injection pump.
	Oil is diluted with coolant.	See authorized engine repair facility.
	Incorrect oil specifications.	Change oil. Check oil specifications. See Engine Maintenance in this section. See engine manufacturer's manual.
	Oil pressure sender or gauge is malfunctioning.	Replace oil pressure sender or gauge.
	Oil pressure control valve is faulty.	Repair or replace valve. See your authorized dealer.
	Oil pump intake screen is clogged.	See your authorized dealer.
	Loose oil pump drive gear or worn pump housing.	See your authorized dealer.
	Internal engine component wear.	See engine manufacturer's manual.
Engine overheats	Coolant level too low.	Add coolant.
	Low engine oil level.	Fill to proper level.
	Oil viscosity is too light.	Drain and refill with proper oil.
	Excessive load.	Reduce load.
	Radiator fins damaged or obstructed.	Clean, repair or replace radiator fins.
	Collapsed or clogged radiator hose.	Inspect hoses. Replace if necessary.
	Loose or broken fan drive belt.	Check belt tension and tighten if necessary.
	Cooling fan shroud damaged or missing.	Inspect shroud. Repair, replace or install as needed.
	Dirty or clogged air filter element.	Clean or replace air filter element.

SYMPTOM	CAUSE	REMEDY
Engine overheats (continued)	Hot air off engine is being recirculated.	Check radiator seal and repair or replace.
	Incorrect or malfunctioning radiator cap.	Check the radiator cap. Replace if necessary.
	Temperature gauge or sender is 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.	Flush cooling system with cleaner. Refill with water/antifreeze solution.
	Injection pump timing is incorrect.	See your authorized dealer.
	Water pump is leaking.	Repair or replace water pump. See engine manufacturer's manual.
	Excessive fuel delivery or injection pump malfunction.	See your authorized dealer.
	Hydraulic system overheating.	See "Hydraulic System Overheats".
Oil in coolant, or coolant in oil	Leaking cylinder head gasket or liner packing.	See engine manufacturer's manual.
	Cracked cylinder or block.	See engine manufacturer's manual.
Excessive fuel consumption	Incorrect grade of fuel.	Drain and flush fuel tank, and refill with correct grade. Replace fuel filter.
	Air system is restricted.	Clean or replace air filter elements.
	Fuel system is leaking.	See engine manufacturer's manual.
Starter motor will not turn	Battery discharged or faulty.	Charge or replace battery.
	Battery connections.	Clean and tighten battery connections at battery and starter solenoid.
	Starter motor.	Listen for starter solenoid to click when key is placed in the START position. If solenoid clicks, repair or replace starter motor.
	Starter solenoid.	Check for 12 volts at small solenoid connections when key is place in the START position. If 12 volts is present, replace solenoid.
	Starter rely.	Listen for relay to click when key is placed in the START position. If relay does not click, check wiring. Repair or replace as necessary.
	Starter system circuit breaker.	Check for 12 volts at both sides of the circuit breaker. If 12 volts is not present on either side, check wiring. If 12 volts is available on one side, replace circuit breaker.

SYMPTOM	CAUSE	REMEDY
Starter motor will not turn (continued)	Key switch.	Check for 12 volts at ignition switch terminal "st" when key is placed in the START position. If 12 volts is available, check wiring harness.
	Neutral start switch on pump.	Check for 12 volts on both sides of switch with machine in neutral. If 12 volts is available, check wiring harness. If 12 volts is available on one side only, replace switch.
	Major engine malfunction.	See your authorized dealer.
Starter solenoid chatters	Loose connection at battery or solenoid.	Clean and tighten connections.
	Battery discharged or faulty.	Charge or replace battery.
	Faulty solenoid.	Replace solenoid.
Starter motor turns but will not crank	Starter pinion gear not engaging flywheel ring gear.	Pinion shift mechanism jammed. Repair or replace starter motor.
	Pinion gear teeth broken.	Repair or replace starter motor.
	Flywheel ring gear teeth broken.	Replace ring gear.
Starter motor continues to turn after engine starts	Starter solenoid stuck.	Gently tap solenoid. Replace solenoid if defective.
	Starter pinion gear not disengaging from flywheel.	Gently tap starter motor. Repair or replace starter motor.
	Ignition switch malfunction.	Check for 12 volts at "st" terminal with ignition switch in the ON position. If 12 volts is available, replace ignition switch.
Excessive noise when cranking	Pinion gear teeth broken.	Replace starter motor.
	Flywheel ring gear teeth broken.	Replace ring gear.
	Major engine malfunction.	See your authorized dealer.
No hydraulic power	Low hydraulic/transmission oil level.	Add oil to the hydraulic oil reservoir until visible in the sight gauge.
	Hydraulic filter is clogged.	Replace filter element.
	Hydraulic pumps or pump drive coupling damaged, or excessive leakage in hydraulic system.	See your authorized dealer.
Hydraulic functions are slow	Low hydraulic/transmission oil level.	Add oil to the hydraulic oil reservoir until visible in the sight gauge.
	Air in hydraulic oil. Oil has foamy appearance.	Inspect suction side hoses and fittings to pump for leakage. Tighten fittings or replace hoses and fittings as required.
	Engine RPM is too low.	Inspect speed control linkage for damage. Repair or replace parts as required, and adjust linkage.
	Hydraulic filter is clogged.	Replace filter elements.
	Low pump flow or excessive leakage in system.	See your authorized dealer.

SYMPTOM	CAUSE	REMEDY
Hydraulic functions make chattering noise	Low hydraulic/transmission oil level.	Add oil to the hydraulic oil reservoir until visible in the sight gauge.
	Hydraulic filter restricted.	Replace filter elements.
	Hydraulic filter relief valve stuck open, or setting is too low.	See your authorized dealer.
	Air in hydraulic oil. Suction side leakage.	Tighten fittings and inspect hoses for damage. Replace damaged hoses.
	Worn pump, loose pump drive coupling, loose pump attaching hardware, leakage in hydraulic system (pump remains in stroke), misalignment between pump and engine.	See your authorized dealer.
Hydraulic functions drift or settle	Cylinder or control valve leakage.	See your authorized dealer.
Hydraulic system overheats [temperature above 200° F (93° C)]	Low hydraulic/transmission oil level.	Add oil to the hydraulic oil reservoir until visible in the sight gauge.
	Hydraulic fluid is too thick.	Use SAE 30. This will reduce fluid temperature 20° F (-7° C).
	Excessive load.	Reduce load.
	Defective temperature gauge, or sender giving wrong temperature reading.	Replace gauge or sender.
	Hydraulic pump priority relief valve set incorrectly or defective.	Adjust relief valve [5000 to 5500 psi (351.5 to 386.7 kg/sq.cm)]. Replace if defective. See Pumps and Motors in this section.
	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 7 to 10 ft-lbs (9.5 to 14 Nm). Overtorquing will damage valve.
	Worn hydrostatic pump.	Repair or replace pump.
	Relief valve on pump set too low, or left out when unit was towed.	Adjust setting [5000 to 5500 psi 351.5 to 386.7 kg/sq.cm)]. See service manual for pump.
Foaming hydraulic oil	Oil level is too high or too low.	Adjust oil level to full mark on dipstick.
	Incorrect type of oil.	Drain, flush, and fill the hydraulic oil reservoir with the correct oil Replace the oil filter.
	Pump suction screen restricted.	Clean the screen.
	Air leakage on suction side of pump.	Tighten fittings and inspect hoses for damage. Replace damaged hoses.

SYMPTOM	CAUSE	REMEDY
Battery uses too much water.	Battery is overcharged.	With battery fully charged, check alternator charge rate. Repair or replace alternator.
	Cracked or broken battery case.	Replace battery.
Cracked battery case.	Battery hold down clamps too tight, loose, or missing.	Replace battery and install hold down clamps properly.
Low battery output.	Frozen battery.	Replace battery. Keep battery fully charged during cold weather.
	Low water level.	Fill with distilled water and charge.
	Corroded or loose battery cable connections.	Clean and tighten all connections.
	Broken or loose battery posts.	Replace battery.
Alternator not charging.	Loose, slipping alternator belt.	Replace alternator belt.
	Low alternator output.	Test and replace alternator.
	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 alternator belt.
Alternator charge rate is too high. Battery is hot or boiling.	Alternator malfunctioning.	Load test alternator and replace if necessary.
Noisy alternator	Alternator malfunctioning.	Load test alternator and replace if necessary.
	Bad alternator bearings.	Remove alternator belt and turn alternator by hand. If pulley turns hard, repair or replace alternator.
	Worn drive belt.	Check and replace drive belt if necessary.
Instrument gauges don't work.	Internal alternator malfunction.	Load test alternator and replace if necessary.
	Faulty gauge or sender.	Replace gauge or sender.
	Alternator not charging.	Repair wiring or replace alternator.
	Faulty wiring.	Replace wiring or connector.
Unit does not move, or moves in one direction only.	Park brake engaged.	Release park brake.
	Damaged hydrostatic pump.	Repair or replace hydrostatic pump.
	Faulty charge valve on pump.	Repair or replace charge valve.
	Hydrostatic pump relief valves not seated.	Relief valves are turned out 2 turns when towing the Roller. Turn hex nut cartridge in (clockwise) to seat valve.
	Relief valves are bypassing oil at low pressure.	Repair or replace relief valve cartridges.
	Damaged hydrostatic motor.	Repair or replace hydrostatic motor.
	Insufficient charge pressure.	See "Park Brake Does Not Release".
	Control hardware is loose.	Check tightness of all linkage bolts.

SYMPTOM	CAUSE	REMEDY
Unit does not move, or moves in one direction only (continued)	Control linkage stripped or broken.	Repair or replace linkage.
	Low hydraulic oil level.	Fill reservoir with correct fluid until visible in sight gauge.
	Leaky fitting or broken hose.	Tighten and/or replace.
	No voltage to Direction Control lever.	Check voltage and wiring.
Unit jerks when operating	Fast movement of Direction Control lever.	Move lever slowly when changing speed and/or direction.
	Park brake engaged.	Release park brake. See "Park Brake Does Not Release".
	Engine speed set too low.	Run engine at higher RPM.
	Low hydraulic fluid level.	Fill reservoir with correct fluid until visible in sight gauge.
	Hydraulic oil is too heavy.	Change oil.
	Clogged hydraulic filter.	Clean or replace the filter.
	Air leaking into hydraulic system.	Tighten or replace hoses, fittings and/or filter(s).
	Improper fuel, or dirt in fuel line.	Drain fuel, clean fuel line.
	Hydrostatic pump is malfunctioning.	Repair or replace pump.
Steering is difficult	Low hydraulic/transmission oil level.	Fill reservoir with correct fluid until visible in sight gauge.
	Low steering pressure.	Adjust pressure [1450 to 1600 psi (102 to 112.5 kg/sq.cm)].
	Steering cylinder bypassing oil.	Replace piston seals.
	Hydraulic filters clogged.	Check filter(s) for contamination and replace if necessary. See Hydraulic Maintenance section.
	Hydraulic pump priority relief valve set incorrectly, or defective.	Adjust relief valve [5000 to 5500 psi (351.5 to 386.7 kg/sq.cm)]. Replace if defective. See Hydraulic Maintenance section.
	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.
Water spray system does not work	Water level too low.	Fill the water tank.
	Clogged water spray nozzles.	Remove, clean and reinstall the water spray nozzles.
	Clogged strainer at bottom of tank.	Clean or replace strainer.
	Water pump is defective.	Replace water pump.
	Water pump electrical malfunction.	Check, replace or repair electrical connectors or fuses.
	Faulty pump diaphragm, valves or motor.	Repair or replace.

SYMPTOM	CAUSE	REMEDY
Park brake does not hold	Park brake switch not turned ON.	Turn park brake switch ON.
	Faulty switch or wiring allowing power to brake solenoid valve.	Repair or replace switch or wiring.
	Faulty brake.	Repair or replace brake on wheel motor.
Park brake does not release.	Engine not running.	Engine must be running to release brake.
	Park brake switch is ON.	Turn park brake switch OFF.
	Faulty brake switch.	Replace switch.
	Loose wiring to brake solenoid.	Repair wiring.
	Faulty solenoid on brake valve.	Replace solenoid.
	Low charge pressure to wheel motors.	Adjust charge relief valves on hydrostatic pump to 350 psi (24.6 kg/sq.cm) at neutral. Engine must be at maximum RPM when adjusting charge pressure.
	Faulty hydrostatic pump.	Repair or replace pump.
	Faulty brake.	Repair or replace brake on wheel motor.
Two-speed will not shift to high range (default is low range).	Faulty switch.	Replace switch.
	Faulty relay.	Replace relay.
	Incorrect method of operation.	Shifting allowed only from neutral.
	Loose wiring to solenoid valve.	Repair wiring.
	Faulty solenoid.	Replace solenoid and/or cartridge.

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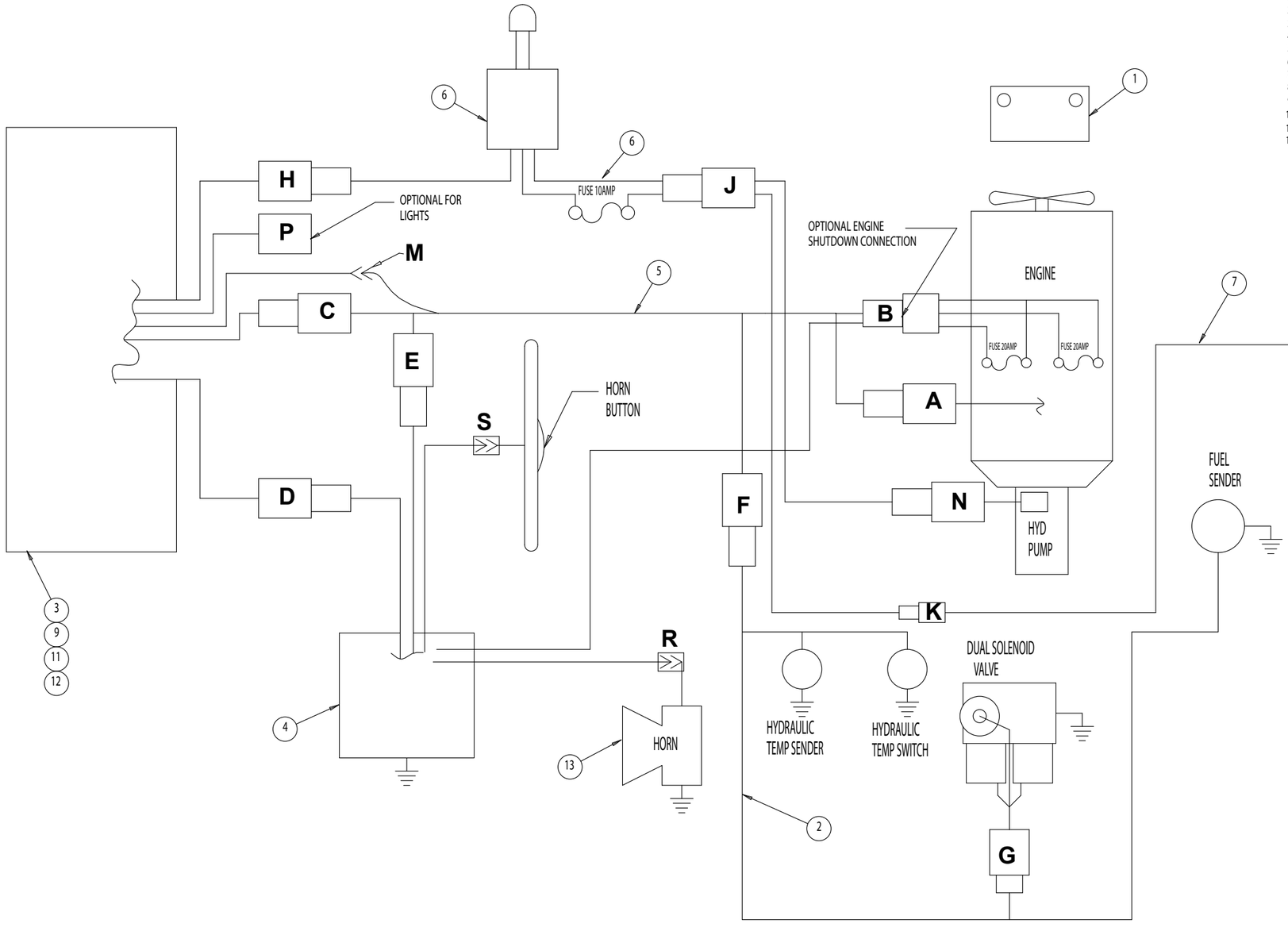
Section 9
SCHEMATICS

NOTES

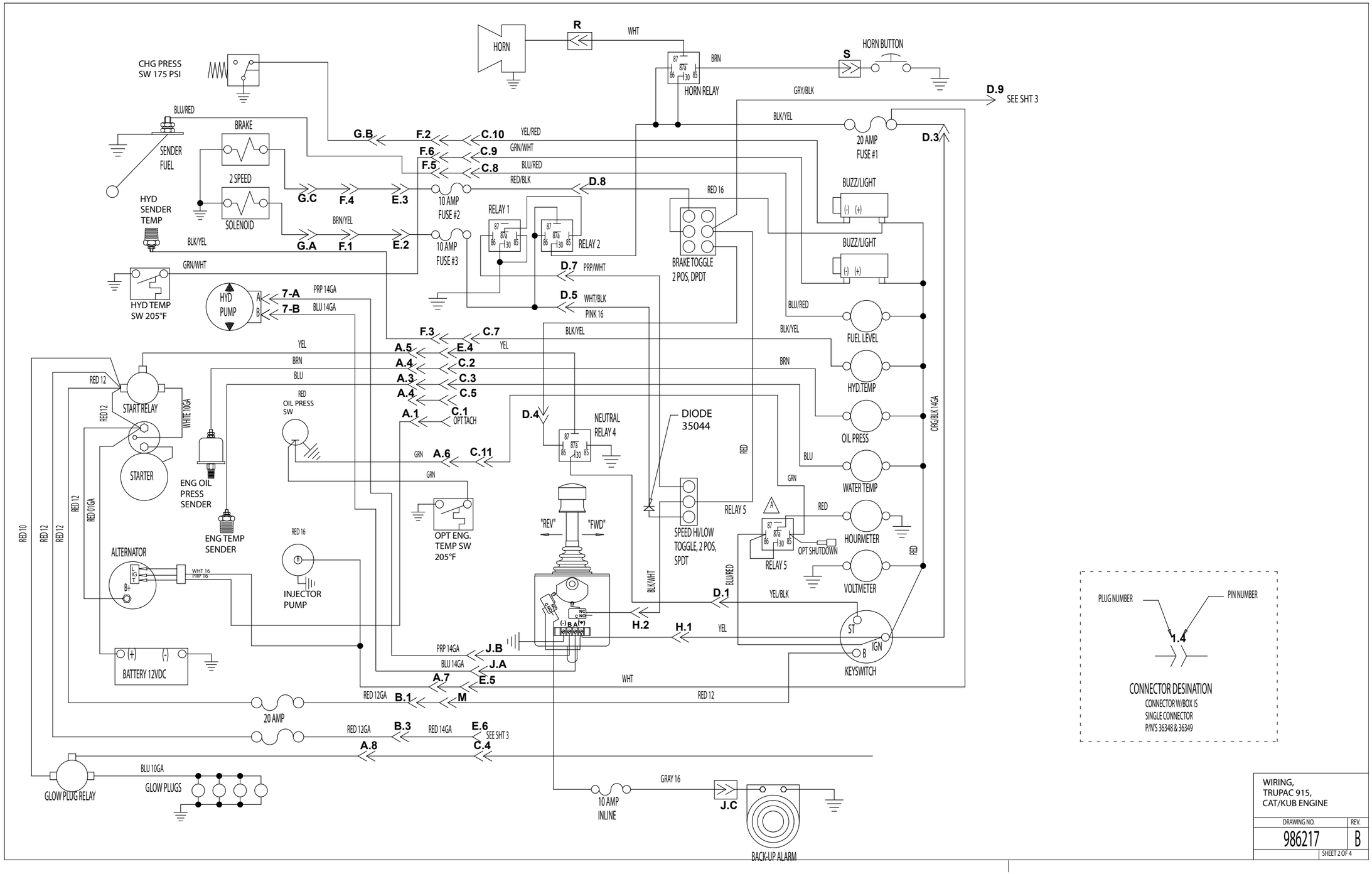
ITEM	PART NO.	QTY.	DESCRIPTION
1	19667	1.00	BATTERY GROUP
2	985778	1.00	HARNESS,HYD CONNECTIONS
3	986221	1.00	INSTRUMENT PANEL ASS'Y T/P
4	985779	1.00	TERMINAL BOARD ASS'Y
5	985780	1.00	HARNESS,CONNECTING,3.3 ENG
6	986213	1.00	HARNESS,CONTROL HANDLE, T/P
7	23474	1.00	HARNESS,BACKUP ALARM
8	33963	1.00	ALARM,BACKUP
9	71716	8.00	MACH SCR,PH,#10-24X.75
11	80824	4.00	NUT,HEX,#10-24
12	871071601	8.00	WASHER,SPLIT LOCK,#10
13	951250115	1.00	KIT,HORN



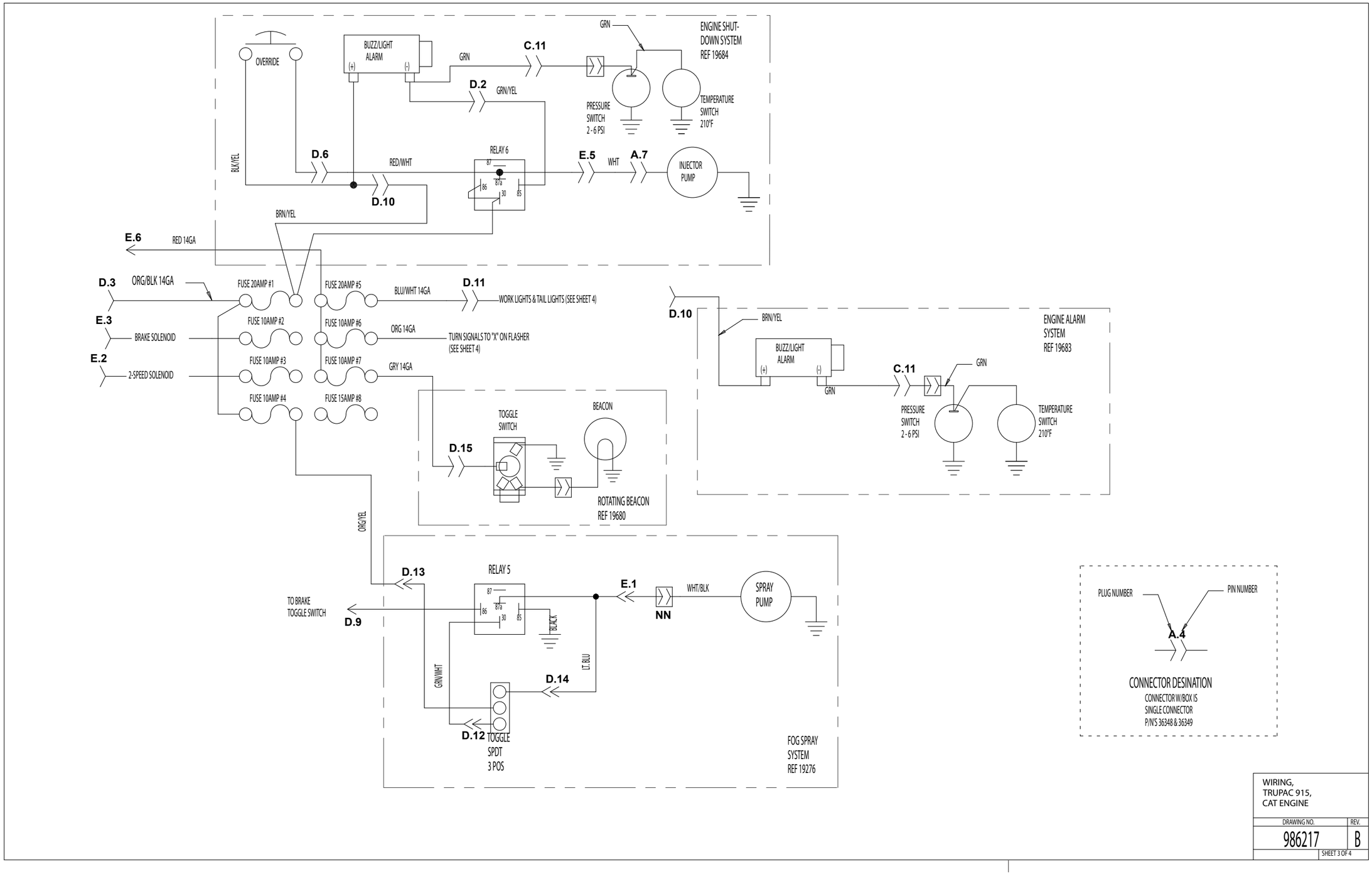
WIRING,
TRUPAC 915,
CAT/KUB ENGINE

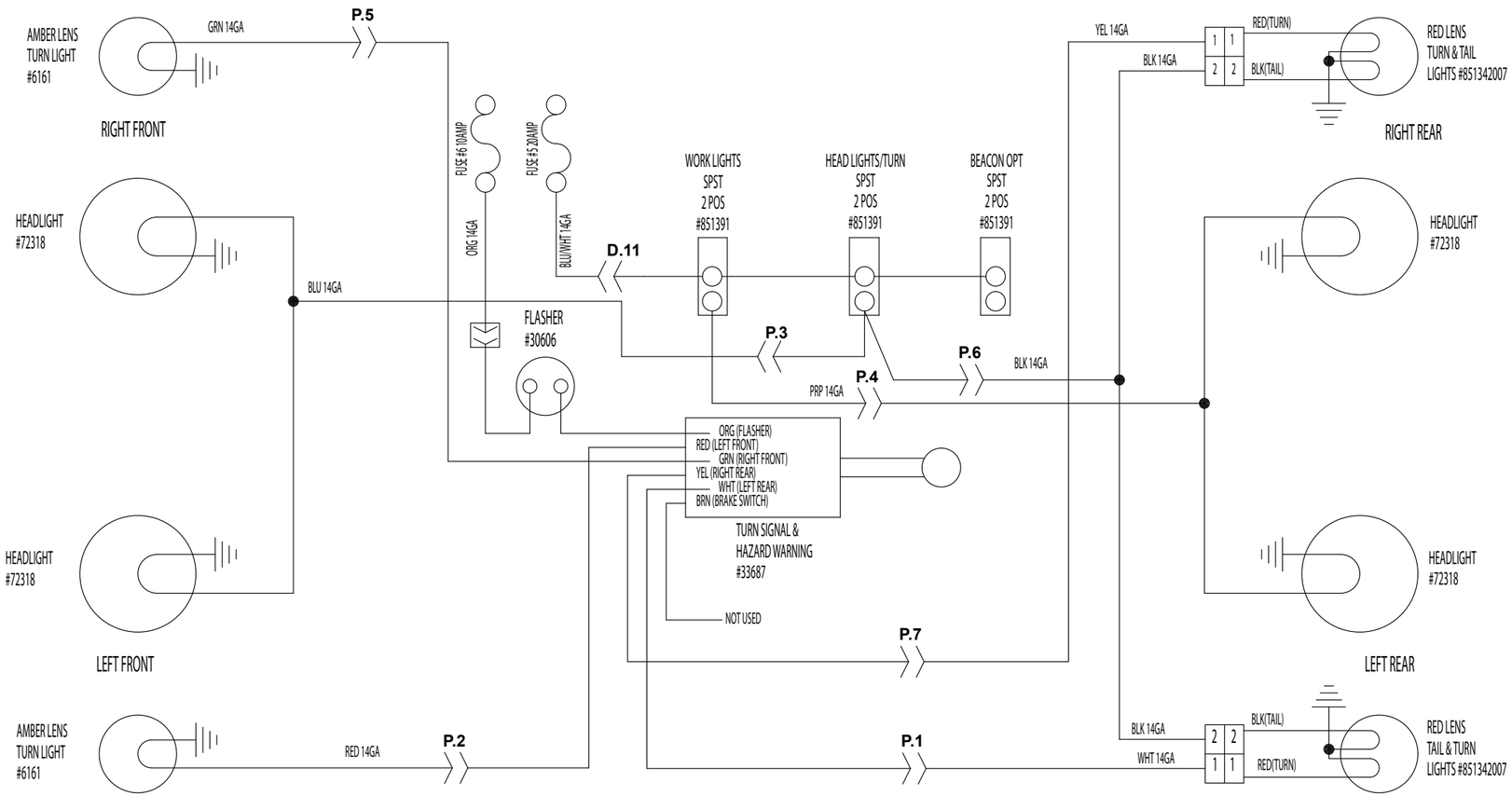
DRAWING NO.	REV.
986217	B
	SHEET 1 OF 4

9


HORN
R
WHT
HORN RELAY
BRN
HORN BUTTON
S
GRY/BLK
D.9
SEE SHT 3
CHG PRESS SW 175 PSI
BLU/RED
SENDER FUEL
BRAKE
2 SPEED
SOLENOID
HYD SENDER TEMP
BLK/YEL
HYD TEMP SW 205°F
GRN/WHT
G.B
F.2
C.10
YEL/RED
F.6
C.9
GRN/WHT
F.5
C.8
BLU/RED
RED/BLK
D.8
G.C
F.4
E.3
10 AMP FUSE #2
BRN/YEL
G.A
F.1
E.2
10 AMP FUSE #3
RELAY 1
RELAY 2
D.7
PRP/WHT
D.5
WHT/BLK
PINK 16
RED 16
BRAKE TOGGLE 2 POS, DPDT
BLK/YEL
20 AMP FUSE #1
D.3
BUZZ/LIGHT
BUZZ/LIGHT
BLU/RED
FUEL LEVEL
HYD.TEMP
OIL PRESS
WATER TEMP
HOURMETER
VOLTMETER
ORG/BLK 14GA
HYD PUMP
7-A
PRP 14GA
7-B
BLU 14GA
F.3
C.7
BLK/YEL
A.5
E.4
YEL
A.4
C.2
BRN
A.3
C.3
BLU
A.4
C.5
A.1
C.1
OPT TACH
D.4
NEUTRAL RELAY 4
DIODE 35044
RED
RED 12
START RELAY
WHITE 10GA
STARTER
RED OIL PRESS SW
GRN
A.6
C.11
ENG OIL PRESS SENDER
ENG TEMP SENDER
OPT ENG. TEMP SW 205°F
GRN
RELAY 5
SPEED HI/LOW TOGGLE, 2 POS, SPDT
OPT SHUTDOWN
RELAY 5
RED
RED 10
RED 12
RED 12
RED 10GA
ALTERNATOR
WHT 16
PRP 16
RED 16
INJECTOR PUMP
"REV"
"FWD"
BLK/WHT
BLU/RED
D.1
YEL/BLK
H.2
H.1
YEL
ST
IGN
B
KEYSWITCH
BATTERY 12VDC
PRP 14GA
J.B
BLU 14GA
J.A
A.7
E.5
WHT
RED 12GA
B.1
M
RED 12
20 AMP
RED 12GA
B.3
RED 14GA
E.6
SEE SHT 3
A.8
C.4
GLOW PLUG RELAY
BLU 10GA
GLOW PLUGS
GRAY 16
10 AMP INLINE
J.C
BACK-UP ALARM
PLUG NUMBER
PIN NUMBER
1.4
CONNECTOR DESINATION
CONNECTOR W/BOX IS
SINGLE CONNECTOR
P/N'S 36348 & 36349
WIRING,
TRUPAC 915,
CAT/KUB ENGINE
DRAWING NO.
986217
REV.
B
SHEET 2 OF 4

9


OVERRIDE
BUZZ/LIGHT ALARM
(+)
(-)
GRN
C.11
D.2
GRN/YEL
GRN
ENGINE SHUT-DOWN SYSTEM REF 19684
PRESSURE SWITCH 2-6 PSI
TEMPERATURE SWITCH 210°F
BLK/YEL
D.6
RED/WHT
RELAY 6
87
87a
86
30
85
E.5
WHT
A.7
INJECTOR PUMP
D.10
BRN/YEL
E.6
RED 14GA
D.3
ORG/BLK 14GA
FUSE 20AMP #1
FUSE 20AMP #5
BLU/WHT 14GA
D.11
WORK LIGHTS & TAIL LIGHTS (SEE SHEET 4)
E.3
BRAKE SOLENOID
FUSE 10AMP #2
FUSE 10AMP #6
ORG 14GA
TURN SIGNALS TO "X" ON FLASHER (SEE SHEET 4)
E.2
2-SPEED SOLENOID
FUSE 10AMP #3
FUSE 10AMP #7
GRY 14GA
FUSE 10AMP #4
FUSE 15AMP #8
TOGGLE SWITCH
BEACON
D.15
ROTATING BEACON REF 19680
ORG/YEL
D.13
RELAY 5
E.1
WHT/BLK
SPRAY PUMP
TO BRAKE TOGGLE SWITCH
D.9
NN
BLACK
LT. BLU
GRN/WHT
D.14
D.12
TOGGLE SPDT 3 POS
FOG SPRAY SYSTEM REF 19276
ENGINE ALARM SYSTEM REF 19683
PLUG NUMBER
PIN NUMBER
A.4
CONNECTOR DESINATION
CONNECTOR W/BOX IS SINGLE CONNECTOR
P/N'S 36348 & 36349
WIRING, TRUPAC 915, CAT ENGINE
DRAWING NO. 986217
REV. B
SHEET 3 OF 4

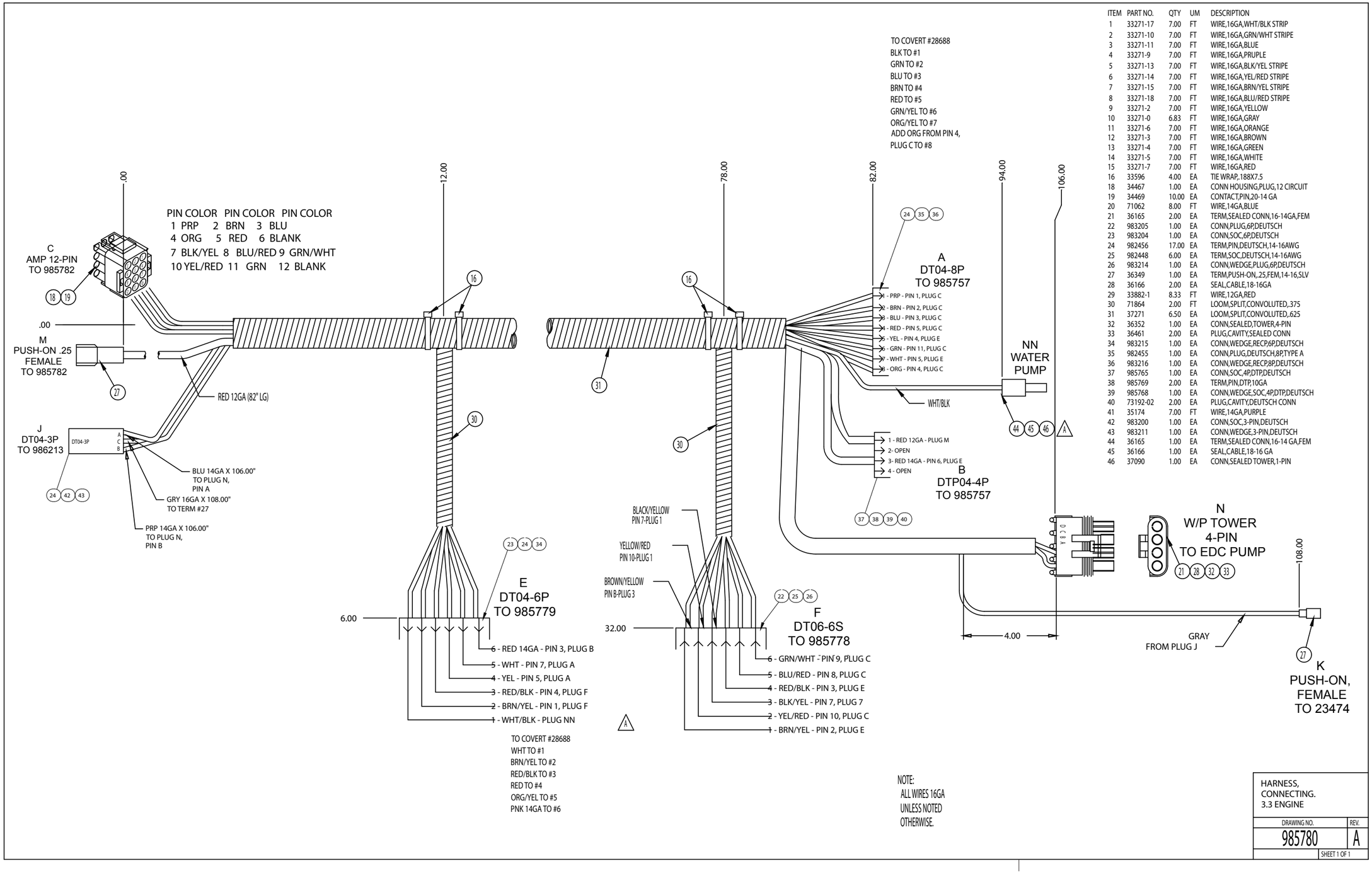


WORKING LIGHT GROUP
REF 19676; HARNESS 24155

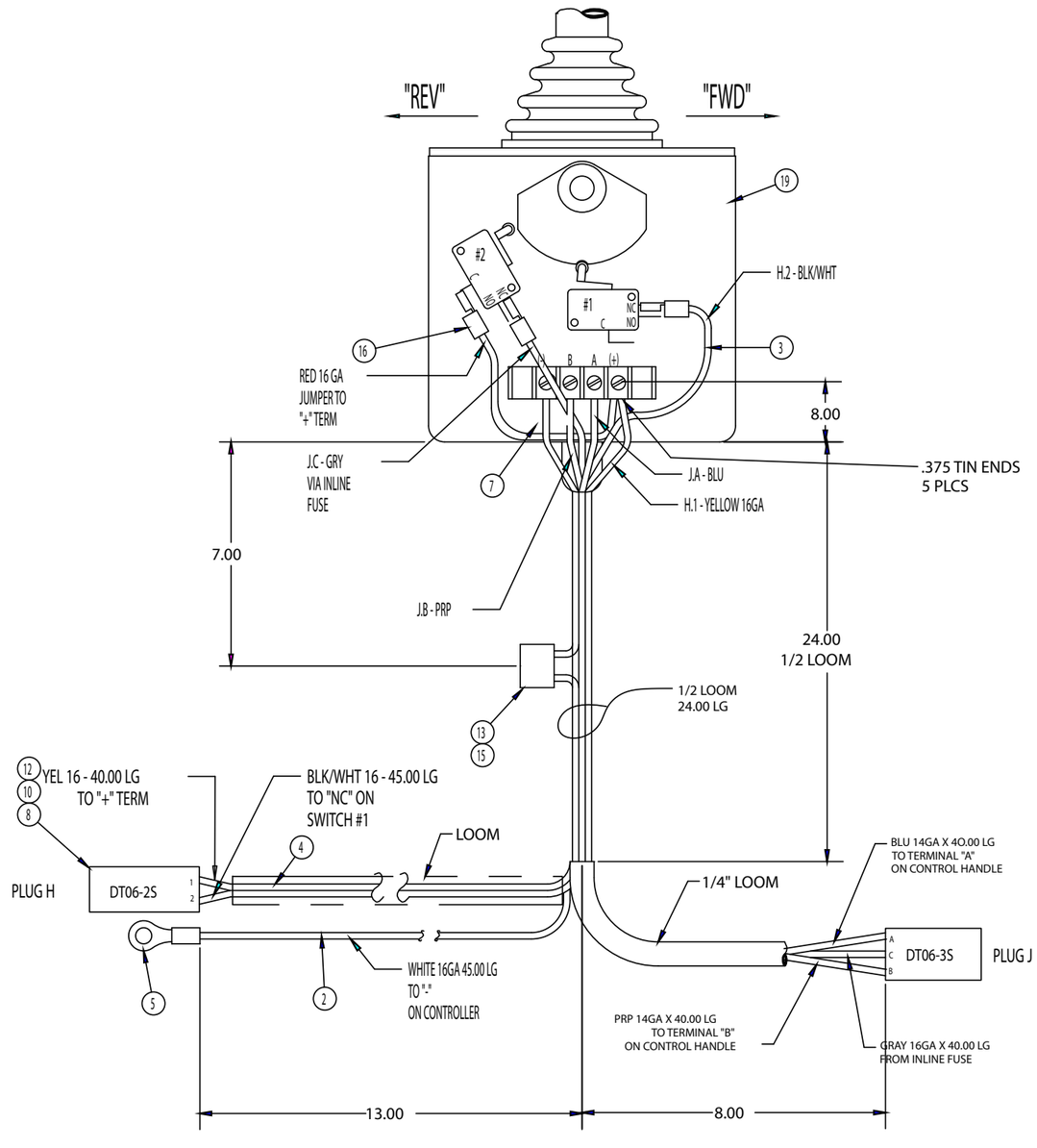
TURN SIGNAL GROUP
REF 19677

WIRING, TRUPAC 915, CAT ENGINE	
DRAWING NO.	REV.
986217	B
SHEET 4 OF 4	

9



ITEM	PART NO.	QTY	UM	DESCRIPTION
1	33271-17	7.00	FT	WIRE,16GA,WHT/BLK STRIP
2	33271-10	7.00	FT	WIRE,16GA,GRN/WHT STRIPE
3	33271-11	7.00	FT	WIRE,16GA,BLUE
4	33271-9	7.00	FT	WIRE,16GA,PRUPLE
5	33271-13	7.00	FT	WIRE,16GA,BLK/YEL STRIPE
6	33271-14	7.00	FT	WIRE,16GA,YEL/RED STRIPE
7	33271-15	7.00	FT	WIRE,16GA,BRN/YEL STRIPE
8	33271-18	7.00	FT	WIRE,16GA,BLU/RED STRIPE
9	33271-2	7.00	FT	WIRE,16GA,YELLOW
10	33271-0	6.83	FT	WIRE,16GA,GRAY
11	33271-6	7.00	FT	WIRE,16GA,ORANGE
12	33271-3	7.00	FT	WIRE,16GA,BROWN
13	33271-4	7.00	FT	WIRE,16GA,GREEN
14	33271-5	7.00	FT	WIRE,16GA,WHITE
15	33271-7	7.00	FT	WIRE,16GA,RED
16	33596	4.00	EA	TIE WRAP,.188X7.5
18	34467	1.00	EA	CONN HOUSING,PLUG,12 CIRCUIT
19	34469	10.00	EA	CONTACT,PIN,20-14 GA
20	71062	8.00	FT	WIRE,14GA,BLUE
21	36165	2.00	EA	TERM,SEALED CONN,16-14GA,FEM
22	983205	1.00	EA	CONN,PLUG,6P,DEUTSCH
23	983204	1.00	EA	CONN,SOC,6P,DEUTSCH
24	982456	17.00	EA	TERM,PIN,DEUTSCH,14-16AWG
25	982448	6.00	EA	TERM,SOC,DEUTSCH,14-16AWG
26	983214	1.00	EA	CONN,WEDGE,PLUG,6P,DEUTSCH
27	36349	1.00	EA	TERM,PUSH-ON,.25,FEM,14-16,SLV
28	36166	2.00	EA	SEAL,CABLE,18-16GA
29	33882-1	8.33	FT	WIRE,12GA,RED
30	71864	2.00	FT	LOOM,SPLIT,CONVOLUTED,.375
31	37271	6.50	EA	LOOM,SPLIT,CONVOLUTED,.625
32	36352	1.00	EA	CONN,SEALED,TOWER,4-PIN
33	36461	2.00	EA	PLUG,CAVITY,SEALED CONN
34	983215	1.00	EA	CONN,WEDGE,RECP,6P,DEUTSCH
35	982455	1.00	EA	CONN,PLUG,DEUTSCH,8P,TYPE A
36	983216	1.00	EA	CONN,WEDGE,RECP,8P,DEUTSCH
37	985765	1.00	EA	CONN,SOC,4P,DTP,DEUTSCH
38	985769	2.00	EA	TERM,PIN,DTP,10GA
39	985768	1.00	EA	CONN,WEDGE,SOC,4P,DTP,DEUTSCH
40	73192-02	2.00	EA	PLUG,CAVITY,DEUTSCH CONN
41	35174	7.00	FT	WIRE,14GA,PURPLE
42	983200	1.00	EA	CONN,SOC,3-PIN,DEUTSCH
43	983211	1.00	EA	CONN,WEDGE,3-PIN,DEUTSCH
44	36165	1.00	EA	TERM,SEALED CONN,16-14 GA,FEM
45	36166	1.00	EA	SEAL,CABLE,18-16 GA
46	37090	1.00	EA	CONN,SEALED TOWER,1-PIN

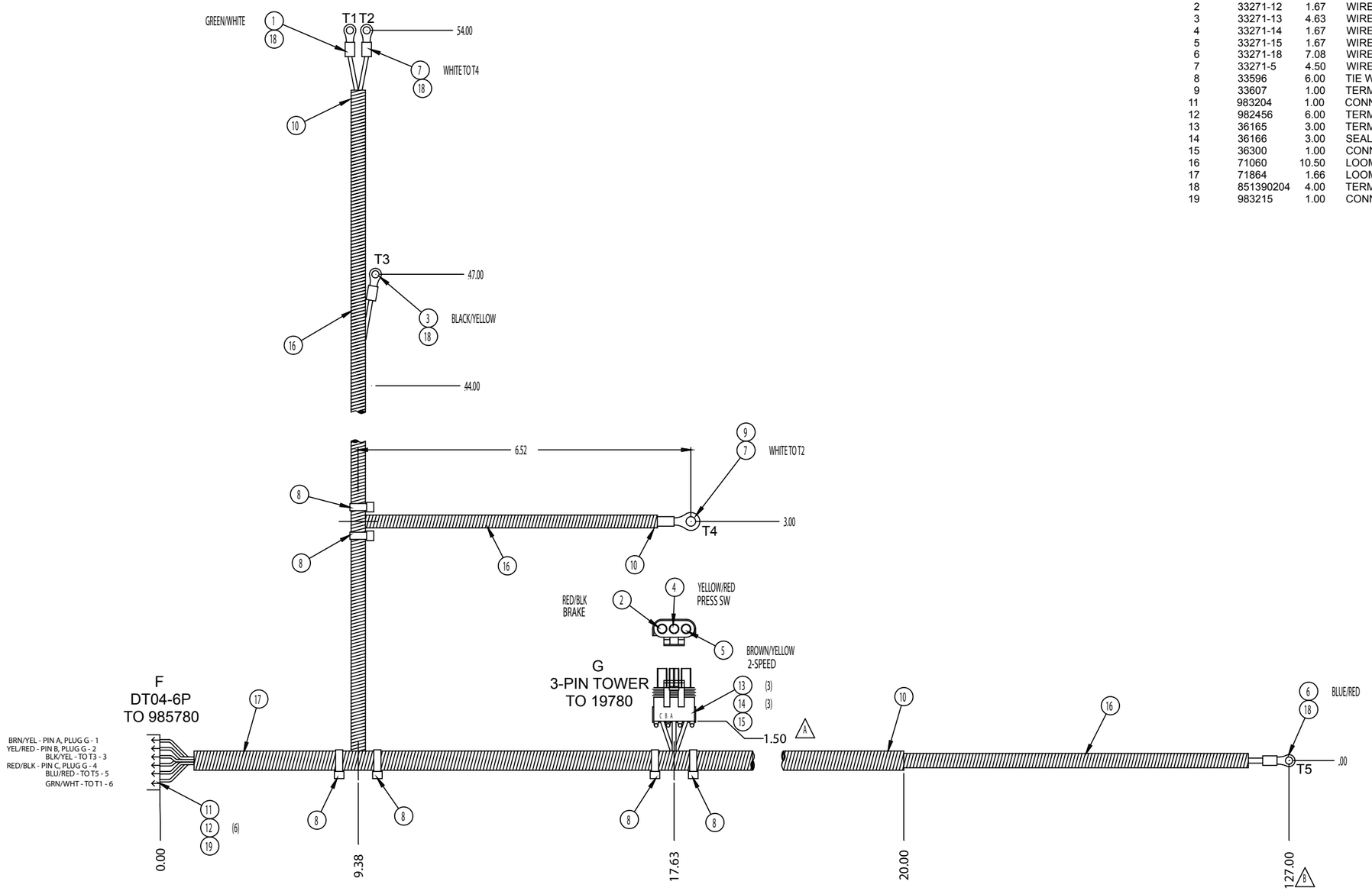


ITEM	PART NO.	QTY.	DESCRIPTION
1	33271-0	3.08	WIRE,16 GA,GRAY
2	33271-5	3.00	WIRE,16 GA,WHITE
3	33271-28	3.08	WIRE,16 GA,BLK/WHT
4	33271-2	2.92	WIRE,16 GA,YELLOW
5	33607	1.00	TERM,RING,16-14 GA,.250 STUD
6	35174	3.08	WIRE,14 GA,PURPLE
7	71062	3.08	WIRE,14 GA,BLUE
8	993199	1.00	CONN,PLUG,2-PIN,DEUTSCH
10	982448	5.00	TERM,SOC,DEUTSCH
11	983201	1.00	CONN,PLUG,3-PIN,DEUTSCH
12	983208	1.00	TERM,WEDGE,2-PIN,DEUTSCH
13	36340	1.00	FUSE,BLADE,10AMP,ATC-10
14	983210	1.00	CONN,WEDGE,3-PIN,DEUTSCH
15	37118	1.00	FUSE HOLDER,IN-LINE,BLADE,SEAL
16	73205	3.00	TERM,PUSH-ON,.18FM,16-14GA,INS
17	33589	2.00	LOOM,SPLIT,CONVOLUTED,.500
18	71060	1.00	LOOM,SPLIT,CONVOLUTED,.250
19	72026	1.00	HANDLE,MOBIL CONTROL
20	986214	1.00	HARNESS,ONLY CONTROL HANDLE

NOTE: HARNESS ONLY
P/N 986214 FOR SERVICE

WIRING, CONTROL HANDLE, T/P	
DRAWING NO.	REV.
986213	A
	SHEET 1 OF 1

9

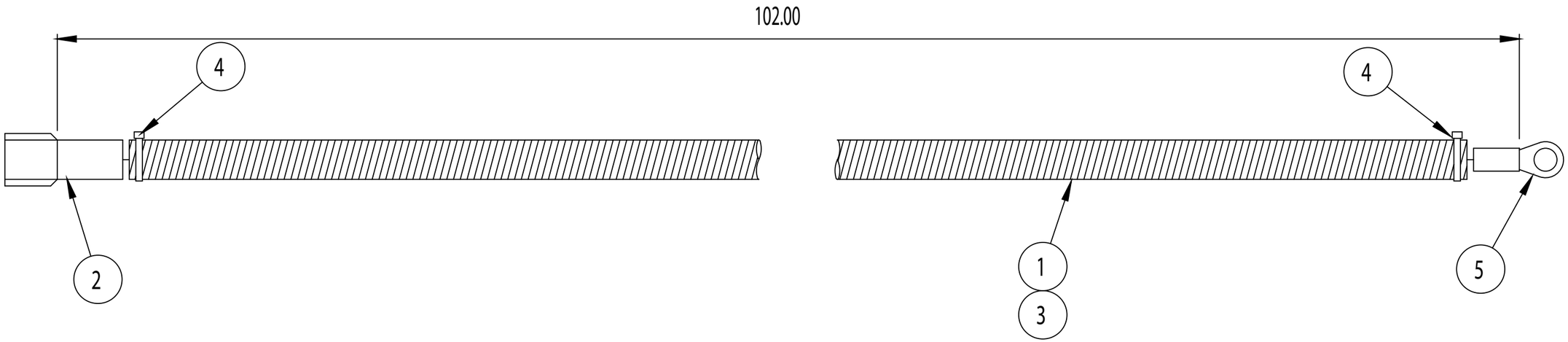


ITEM	PART NO.	QTY.	DESCRIPTION
1	33271-10	5.18	WIRE,16 GA,GREEN/WHITE STRIPE
2	33271-12	1.67	WIRE,16 GA,RED/BLACK STRIPE
3	33271-13	4.63	WIRE,16 GA,BLACK/YELLOW STRIPE
4	33271-14	1.67	WIRE,16 GA,YELLOW/RED STRIPE
5	33271-15	1.67	WIRE,16 GA,BROWN/YELLOW STRIPE
6	33271-18	7.08	WIRE,16 GA,BLUE/RED STRIPE
7	33271-5	4.50	WIRE,16 GA,WHITE
8	33596	6.00	TIE WRAP,.188X7.5
9	33607	1.00	TERM,RING,16-14 GA,.250 STUD
11	983204	1.00	CONN,SOC,6-PIN,DEUTSCH
12	982456	6.00	TERM,PIN,DEUTSCH
13	36165	3.00	TERM,SEALED CONN,16-14 GA,FEM
14	36166	3.00	SEAL,CABLE,18-16 GA
15	36300	1.00	CONNECTOR,SEALED,TOWER,3-PIN
16	71060	10.50	LOOM,SPLIT,CONVOLUTED,.250
17	71864	1.66	LOOM,SPLIT,CONVOLUTED,.375
18	851390204	4.00	TERM,RING,16-14 GA,#10 STUD
19	983215	1.00	CONN,WEDGE,6-PIN SOC,DEUTSCH

HARNESS, HYD/FUEL SYS

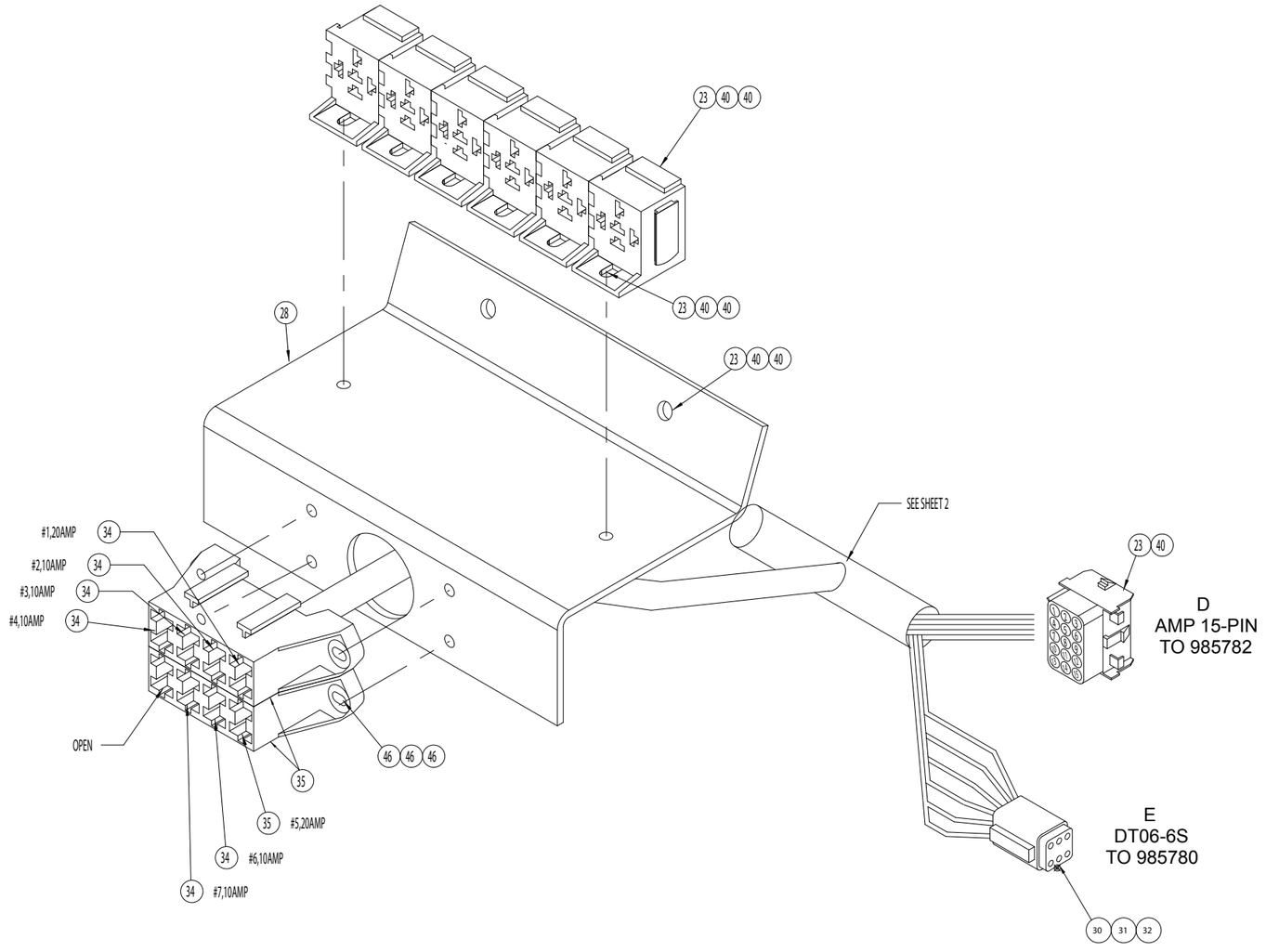
DRAWING NO.	REV.
985778	B
SHEET 1 OF 1	

ITEM	PART NO.	QTY.	DESCRIPTION
1	33271-0	8.50	WIRE,16 GA,GRAY
2	36348	1.00	TERM,PUSH-ON,.25,M,18-14,SLV
3	71060	8.50	LOOM,SPLIT,CONVOLUTED,.250
4	851201417	2.00	TIE WRAP,.094X4.00
5	851390204	1.00	TERM,RING,16-14 GA,#10 STUD



HARNESS, BACKUP ALARM

DRAWING NO.	REV.
23474	A
	SHEET 1 OF 1

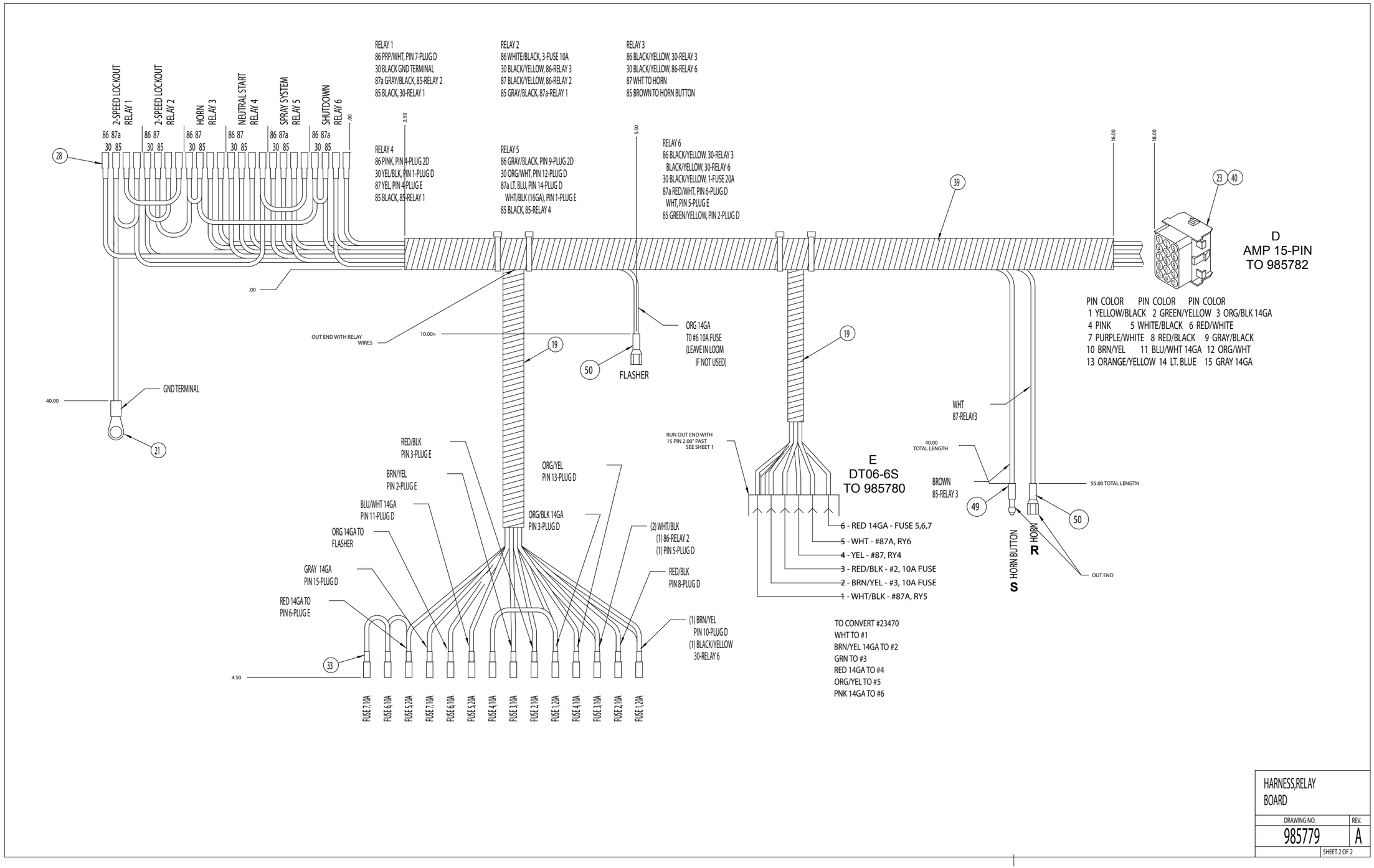


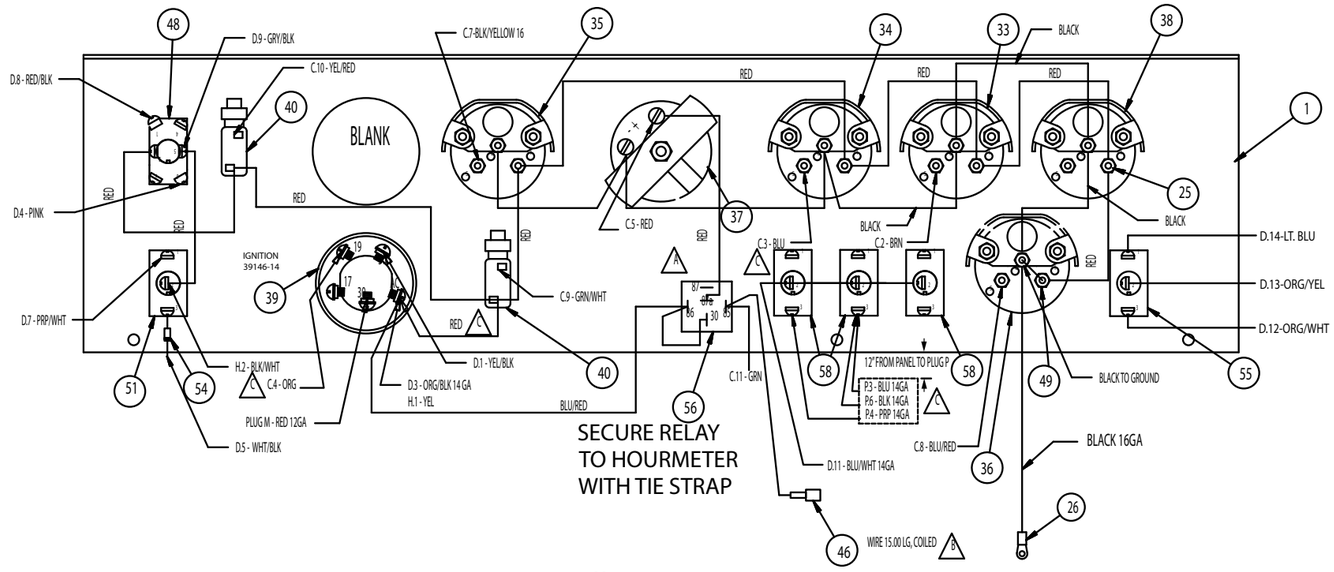
ITEM	PART NO.	QTY.	DESCRIPTION
1	23475	1.00	MOUNT,RELAYS & FUSES
2	33271-0	2.33	WIRE,16 GA,GRAY
3	33271-10	1.25	WIRE,16 GA,GREEN/WHITE STRIPE
4	33271-12	2.00	WIRE,16 GA,RED/BLACK STRIPE
5	33271-13	2.00	WIRE,16 GA,BLACK/YELLOW STRIPE
6	33271-14	1.25	WIRE,16 GA,YELLOW/RED STRIPE
7	33271-15	1.25	WIRE,16 GA,BROWN/YELLOW STRIPE
8	33271-16	1.04	WIRE,16 GA,PURPLE/WHITE STRIPE
9	33271-17	1.33	WIRE,16 GA,WHITE/BLACK STRIPE
10	33271-18	2.00	WIRE,16 GA,BLUE/RED STRIPE
11	33271-19	1.25	WIRE,16 GA,GREEN/YEL STRIPE
12	33271-2	1.25	WIRE,16 GA,YELLOW
13	33271-20	2.42	WIRE,16 GA,GRAY/BLACK STRIPE
14	33271-21	1.25	WIRE,16 GA,ORANGE/YEL STRIPE
15	33271-3	1.25	WIRE,16 GA,BROWN
16	33271-5	3.17	WIRE,16 GA,WHITE
17	33271-7	2.17	WIRE,16 GA,RED
18	33271-8	1.08	WIRE,16 GA,PINK
19	33589	1.00	LOOM,SPLIT,CONVOLUTED,.500
20	33596	2.00	TIE WRAP,.188X7.5
21	33608	1.00	TERM,RING,16-14 GA,.312 STUD
22	34203	2.00	WIRE,14 GA,ORANGE
23	34471	15.00	CONTACT,PIN,20-14 GA
24	35514	.16	TUBING,HEAT SHRINK,.50
25	35568	.16	TUBING,HEAT SHRINK,.750
26	36085	6.00	RELAY,SPDT,40AMP,12VDC
27	36086	6.00	BRACKET,RELAY MOUNT
28	36118-2	20.00	TERM,CRIMP,16-14 GA
29	36157	2.00	BODY,FUSE BLOCK,4 GANG,ATO&ATC
30	983205	1.00	CONN,PLUG,6-PIN,DEUTSCH
31	982448	6.00	TERM,SOC,DEUTSCH
32	983214	1.00	CONN,WEDGE,6-PIN,DEUTSCH
33	36168	14.00	TERM,FUSE BLOCK,12 GA
34	36340	4.00	FUSE,BLADE,10AMP,ATC-10
35	36342	2.00	FUSE,BLADE,20AMP,ATC-20
36	36461	1.00	PLUG,CAVITY,SEALED CONN
37	71062	2.00	WIRE,14 GA,BLUE
38	71716	6.00	MACH SCR,PH,#10-24X.75
39	71870	1.00	LOOM,SPLIT,CONVOLUTED,.750
40	72594	1.00	CONN HOUSING,CAP,15 CIRCUIT
41	80036	2.00	NUT,HEX,.250-20
42	80160	2.00	WASHER,SPLIT LOCK,.250
43	80185	2.00	CSHH,.250-20X1.00,GR5
44	80824	6.00	NUT,HEX,#10-24
45	851201417	6.00	TIE WRAP,.094X4.00
46	871071601	6.00	WASHER,SPLIT LOCK,#10
47	71065	2.00	WIRE,14 GA,RED
48	35163	2.00	WIRE,14 GA,PINK
49	33601	1.00	TERM,BULLET,.156 STD,16-14 GA
50	36349	2.00	TERM,PUSH-ON,.25,FEM,18-14,SLV
51	33271-6	2.00	WIRE,16 GA,ORANGE
52	71862	2.00	WIRE,14 GA,WHITE

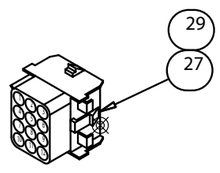
HARNESS,RELAY BOARD

DRAWING NO.	REV.
985779	A
	SHEET 1 OF 2

9

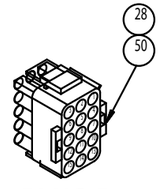

2-SPEED LOCKOUT RELAY 1
2-SPEED LOCKOUT RELAY 2
HORN RELAY 3
NEUTRAL START RELAY 4
SPRAY SYSTEM RELAY 5
SHUTDOWN RELAY 6
86 87a 30 85
RELAY 1
86 PRP/WHT, PIN 7-PLUG D
30 BLACK GND TERMINAL
87a GRAY/BLACK, 85-RELAY 2
85 BLACK, 30-RELAY 1
RELAY 2
86 WHITE/BLACK, 3-FUSE 10A
30 BLACK/YELLOW, 86-RELAY 3
87 BLACK/YELLOW, 86-RELAY 2
85 GRAY/BLACK, 87a-RELAY 1
RELAY 3
86 BLACK/YELLOW, 30-RELAY 3
30 BLACK/YELLOW, 86-RELAY 6
87 WHT TO HORN
85 BROWN TO HORN BUTTON
RELAY 4
86 PINK, PIN 4-PLUG 2D
30 YEL/BLK, PIN 1-PLUG D
87 YEL, PIN 4-PLUG E
85 BLACK, 85-RELAY 1
RELAY 5
86 GRAY/BLACK, PIN 9-PLUG 2D
30 ORG/WHT, PIN 12-PLUG D
87a LT. BLU, PIN 14-PLUG D
WHT/BLK (16GA), PIN 1-PLUG E
85 BLACK, 85-RELAY 4
RELAY 6
86 BLACK/YELLOW, 30-RELAY 3
BLACK/YELLOW, 30-RELAY 6
30 BLACK/YELLOW, 1-FUSE 20A
87a RED/WHT, PIN 6-PLUG D
WHT, PIN 5-PLUG E
85 GREEN/YELLOW, PIN 2-PLUG D
28
39
23
40
D
AMP 15-PIN
TO 985782
PIN COLOR PIN COLOR PIN COLOR
1 YELLOW/BLACK 2 GREEN/YELLOW 3 ORG/BLK 14GA
4 PINK 5 WHITE/BLACK 6 RED/WHITE
7 PURPLE/WHITE 8 RED/BLACK 9 GRAY/BLACK
10 BRN/YEL 11 BLU/WHT 14GA 12 ORG/WHT
13 ORANGE/YELLOW 14 LT. BLUE 15 GRAY 14GA
OUT END WITH RELAY WIRES
10.00>
ORG 14GA
TO #6 10A FUSE
(LEAVE IN LOOM IF NOT USED)
50
FLASHER
19
GND TERMINAL
40.00
21
RED/BLK
PIN 3-PLUG E
BRN/YEL
PIN 2-PLUG E
BLU/WHT 14GA
PIN 11-PLUG D
ORG 14GA TO
FLASHER
GRAY 14GA
PIN 15-PLUG D
RED 14GA TO
PIN 6-PLUG E
ORG/YEL
PIN 13-PLUG D
ORG/BLK 14GA
PIN 3-PLUG D
(2) WHT/BLK
(1) 86-RELAY 2
(1) PIN 5-PLUG D
RED/BLK
PIN 8-PLUG D
(1) BRN/YEL
PIN 10-PLUG D
(1) BLACK/YELLOW
30-RELAY 6
33
4.50
FUSE 7,10A
FUSE 6,10A
FUSE 5,20A
FUSE 7,10A
FUSE 6,10A
FUSE 5,20A
FUSE 4,10A
FUSE 3,10A
FUSE 2,10A
FUSE 1,20A
FUSE 4,10A
FUSE 3,10A
FUSE 2,10A
FUSE 1,20A
RUN OUT END WITH
15 PIN 2.00" PAST
SEE SHEET 1
E
DT06-6S
TO 985780
6 - RED 14GA - FUSE 5,6,7
5 - WHT - #87A, RY6
4 - YEL - #87, RY4
3 - RED/BLK - #2, 10A FUSE
2 - BRN/YEL - #3, 10A FUSE
1 - WHT/BLK - #87A, RY5
TO CONVERT #23470
WHT TO #1
BRN/YEL 14GA TO #2
GRN TO #3
RED 14GA TO #4
ORG/YEL TO #5
PNK 14GA TO #6
WHT
87-RELAY3
40.00
TOTAL LENGTH
BROWN
85-RELAY 3
49
50
55.00 TOTAL LENGTH
OUT END
HORN BUTTON
S
HORN
R
HARNESS,RELAY
BOARD
DRAWING NO.
985779
REV.
A
SHEET 2 OF 2





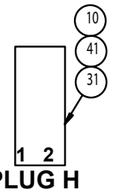
PLUG C

PIN	COLOR	FUNCTION
1	-PRP	-TACH OPTION
2	-BRN	-OIL PRESS
3	-BLUE	-WATER TEMP
4	-ORG	-GLOW PLUG
5	-RED	-HOURMETER
6	-BLANK	-OPEN
7	-BLK/YEL	-HYD TEMP
8	-BLU/RED	-FUEL SENDER
9	-GRN/WHT	-TEMP SWITCH
10	-YEL/RED	-HYD SWITCH
11	-GRN	-SHUTDOWN
12	-BLANK	-OPEN



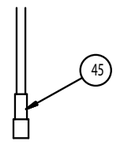
PLUG D

PIN	COLOR	FUNCTION
1	-YEL/BLK	-KEY SWITCH (ST)
2	-GRN/YEL	-SHUTDOWN
3	-ORG/BLK 14GA	-KEY SWITCH(IGN)
4	-PINK	-BRAKE
5	-WHT/BLK	-2 SPEED
6	-RED/WHT	-SHUTDOWN
7	-PRP/WHT	-2 SPEED
8	-RED/BLK	-BRAKE
9	-GRY/BLK	-BRAKE
10	-BRN/YEL	-SHUTDOWN
11	-BLU/WHT 14GA	-LIGHTS
12	-ORG/WHT	-SPRAY
13	-ORG/YEL	-SPRAY
14	-LT BLU	-SPRAY
15	-GRY 14GA	-BEACON

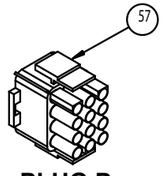


PLUG H

PIN	COLOR	FUNCTION
1	-YEL	-KEY SWITCH (IGN)
2	-BLK/WHT	-2 SPEED



PLUG M



PLUG P

PIN	COLOR	FUNCTION
1	-WHT 14GA	-
2	-BLANK	-OPEN
3	-BLUE 14GA	-HEAD LIGHTS
4	-PRP 14GA	-HEAD LIGHTS
5	-GRN/YLW	-14GA
6	-BLK 14GA	-WORK LIGHTS
7	-YELLOW	-14GA
8	-BLANK	-OPEN
9	-BLANK	-OPEN
10	-BLANK	-OPEN
11	-BLANK	-OPEN
12	--BLANK	-OPEN

NOTE:
1. ALL WIRE 16GA, UNLESS NOTED OTHERWISE.
2. CONNECTOR VIEWS ARE FROM WIRE SIDE OF CONNECTOR
3. PLUG P TO BE 12" LONG FROM PANEL

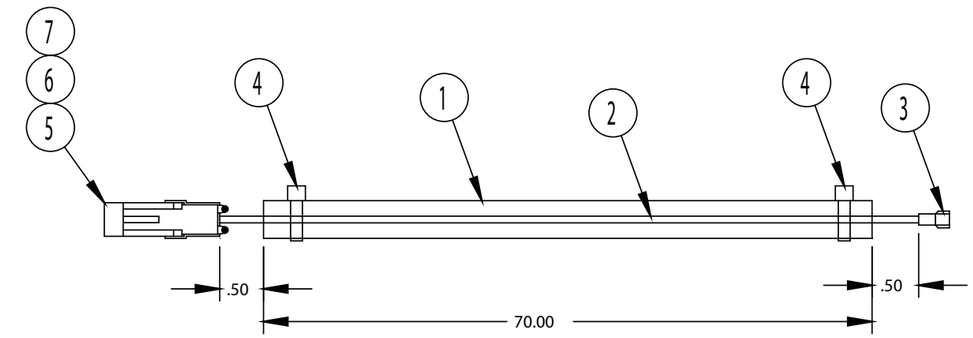
Parts list

Item	Part No.	Qty	Description
1	988331	1.00	PANEL,INSTRUMENT
2	34203	2.08	WIRE,14 GA,ORANGE
3	33271-1	1.47	WIRE,16 GA,BLACK
4	33271-10	1.75	WIRE,16 GA,GREEN/WHITE STRIPE
5	33271-11	1.50	WIRE,16 GA,BLUE
6	33271-12	1.25	WIRE,16 GA,RED/BLACK STRIPE
7	33271-13	1.75	WIRE,16 GA,BLACK/YELLOW STRIPE
8	33271-14	2.33	WIRE,16 GA,YELLOW/RED STRIPE
10	983209	1.00	CONN,WEDGE,2-PIN,DEUTSCH
11	33271-17	2.08	WIRE,16 GA,WHITE/BLACK STRIPE
12	33271-18	2.00	WIRE,16 GA,BLUE/RED STRIPE
13	33271-2	2.08	WIRE,16 GA,YELLOW
14	33271-20	2.50	WIRE,16 GA,GRAY/BLACK STRIPE
15	33271-3	1.58	WIRE,16 GA,BROWN
16	33271-4	1.75	WIRE,16 GA,GREEN
17	33271-5	2.00	WIRE,16 GA,WHITE
18	33271-6	2.42	WIRE,16 GA,ORANGE
19	33271-7	8.75	WIRE,16 GA,RED
20	33271-8	2.08	WIRE,16 GA,PINK
21	33271-9	2.08	WIRE,16 GA,PURPLE
22	33596	6.00	TIE WRAP,.188X7.5
23	33601	1.00	TERM,BULLET,.156 STD,16-14 GA
24	33602	1.00	CONN,BUTT,16-14 GA
25	33620	6.00	TERM,RING,12-10 GA,#10 STUD
26	33608	1.00	TERM,RING,16-14 GA,.312 STUD
27	34468	1.00	CONN HOUSING,CAP,12 CIRCUIT
28	34469	15.00	CONTACT,PIN,20-14 GA
29	34471	12.00	CONTACT,SOCKET,20-14 GA
30	35136-14	1.00	PLUG,HOLE,2.12,FLUSH MT,PLSTC
31	983198	1.00	CONN,SOC,2-PIN,DEUTSCH
33	989961	1.00	GAUGE,OIL PRESS,150PSI,240 OHM
34	989960	1.00	GAUGE,TEMP,WATER
35	35365	1.00	GAUGE,TEMP,OIL
36	1002033	1.00	GAUGE,FUEL
37	35385	1.00	GAUGE,HOUR METER
38	1002034	1.00	GAUGE,VOLTMETER,8-18 V DC
39	39146-14	1.00	SWITCH,IGNITION,
40	36150	2.00	ALARM,BUZZ/LIGHT,RED
41	982456	2.00	TERM,PIN,DEUTSCH
42	36194	1.00	DECAL SET,PANEL SWITCH
43	36201	1.00	DECAL SET,OPTIONAL EQUIPMENT
44	36297	3.00	TERM,PUSH-ON,.25,FEM,12-10,SLV
45	36298	1.00	TERM,PUSH-ON,.25,M,12-10,SLV
46	36349	3.00	TERM,PUSH-ON,.25,FEM,18-14,SLV
47	71861-2	2.42	WIRE,10 GA,RED
48	72086	1.00	SWITCH,TOGGLE,DPDT,2-POS
49	72143	17.00	TERM,RING,22-16 GA,#8 STUD
50	72593	1.00	CONN HOUSING,PLUG,15 CIRCUIT
51	851090624	1.00	SWITCH,TOGGLE,SPDT,2-POS
52	851201417	2.00	TIE WRAP,.094X4.00
53	851390204	2.00	TERM,RING,16-14 GA,#10 STUD
54	35044	1.00	DIODE,3 AMP,PLASTIC
55	851090613	1.00	SWITCH,TOGGLE,SPDT,3-POS
56	36085	1.00	RELAY,SPDT,40A
57	34467	1.00	CONN HOUSING,CAP,12 CIRCUIT
58	851391	3.00	SWITCH,TOGGLE,SPDT

INSTRUMENT PANEL
ASSY,TP915

DRAWING NO.	REV.
988323	C
SHEET 1 OF 1	

Parts list			
Item	Part No.	Qty	Description
1	71060	5.83	LOOM,SPLIT,CONVOLUTED,.250
2	71862	5.91	WIRE,14 GA,WHITE
3	36348	1.00	TERM,PUSH-ON,.25,M,18-14,SLV
4	851201417	2.00	TIE WRAP,.094X4.00
5	37089	1.00	CONNECTOR,SEALED,SHROUD,1-PIN
6	36164	1.00	TERM,SEALED CONN,16-14 GA,MALE
7	36623	1.00	SEAL,CABLE,14 GA

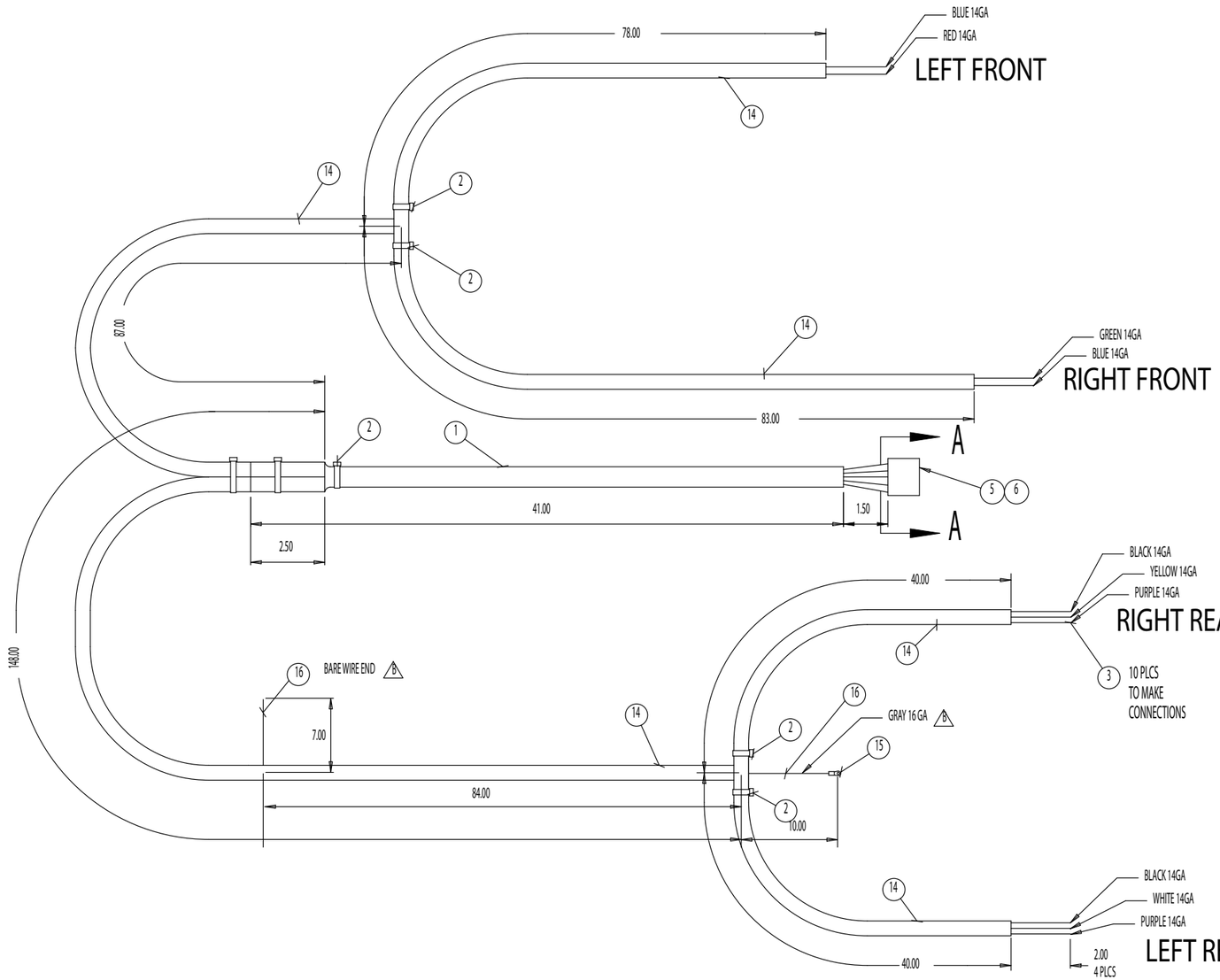


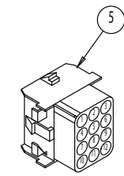
HARNESS,WIRE,
WATER SPRAY PUMP

DRAWING NO.	REV.
28044	A
	SHEET 1 OF 1

9

ITEM	PART NO.	QTY.	DESCRIPTION
1	33589	3.41	LOOM,SPLIT,CONVOLUTED,.500
2	33596	7.00	TIE WRAP,.188X7.5
3	33602	10.00	CONN,BUTT,16-14 GA
4	33620	1.00	TERM,RING,12-10 GA,#10 STUD
5	34468	1.00	CONN HOUSING,CAP,12 CIRCUIT
6	34471	7.00	CONTACT,SOCKET,20-14 GA
7	35174	22.66	WIRE,14 GA,PURPLE
8	71062	24.33	WIRE,14 GA,BLUE
9	71063	17.66	WIRE,14 GA,GREEN
10	71064	22.66	WIRE,14 GA,BLACK
11	71065	17.25	WIRE,14 GA,RED
12	71066	19.83	WIRE,14 GA,YELLOW
13	71862	19.83	WIRE,14 GA,WHITE
14	71864	39.66	LOOM,SPLIT,CONVOLUTED,.375
15	851390204	1.00	TERM,RING,16-14 GA,#10 STUD
16	33271-0	8.50	WIRE,16 GA,GRAY





VIEW A - A

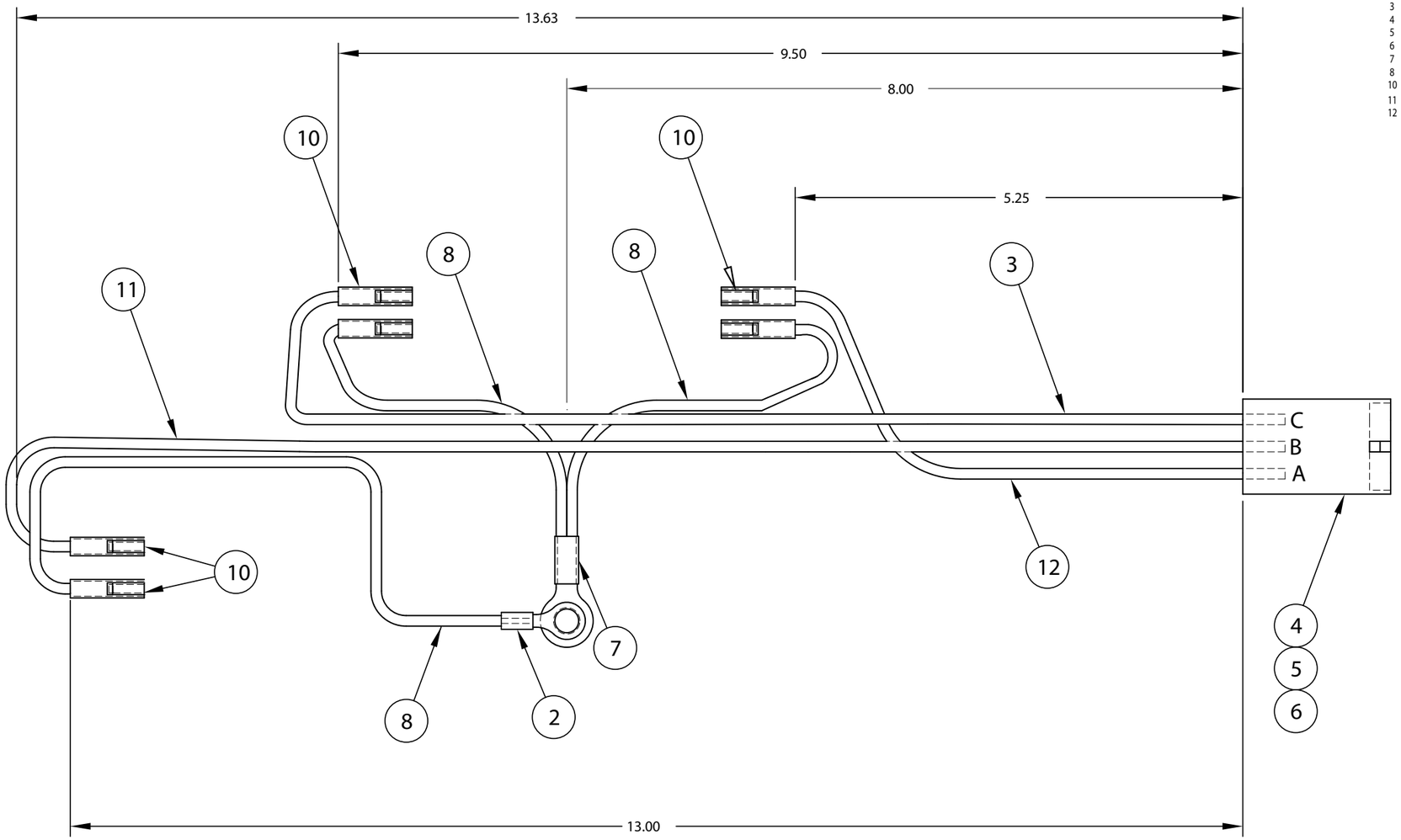
PIN 1 - WHITE 14GA
PIN 2 - RED 14GA
PIN 3 - BLUE 14GA
PIN 4 - PURPLE 14GA
PIN 5 - GREEN 14GA
PIN 6 - BLACK 14GA
PIN 7 - YELLOW 14GA

SEE DRAWING 23459
SHEET 4 OF 4
FOR WIRING DIAGRAM

HARNESS, WORK LIGHTS
AND TURN SIGNALS

DRAWING NO.	REV.
24155	B
	SHEET 1 OF 1

9



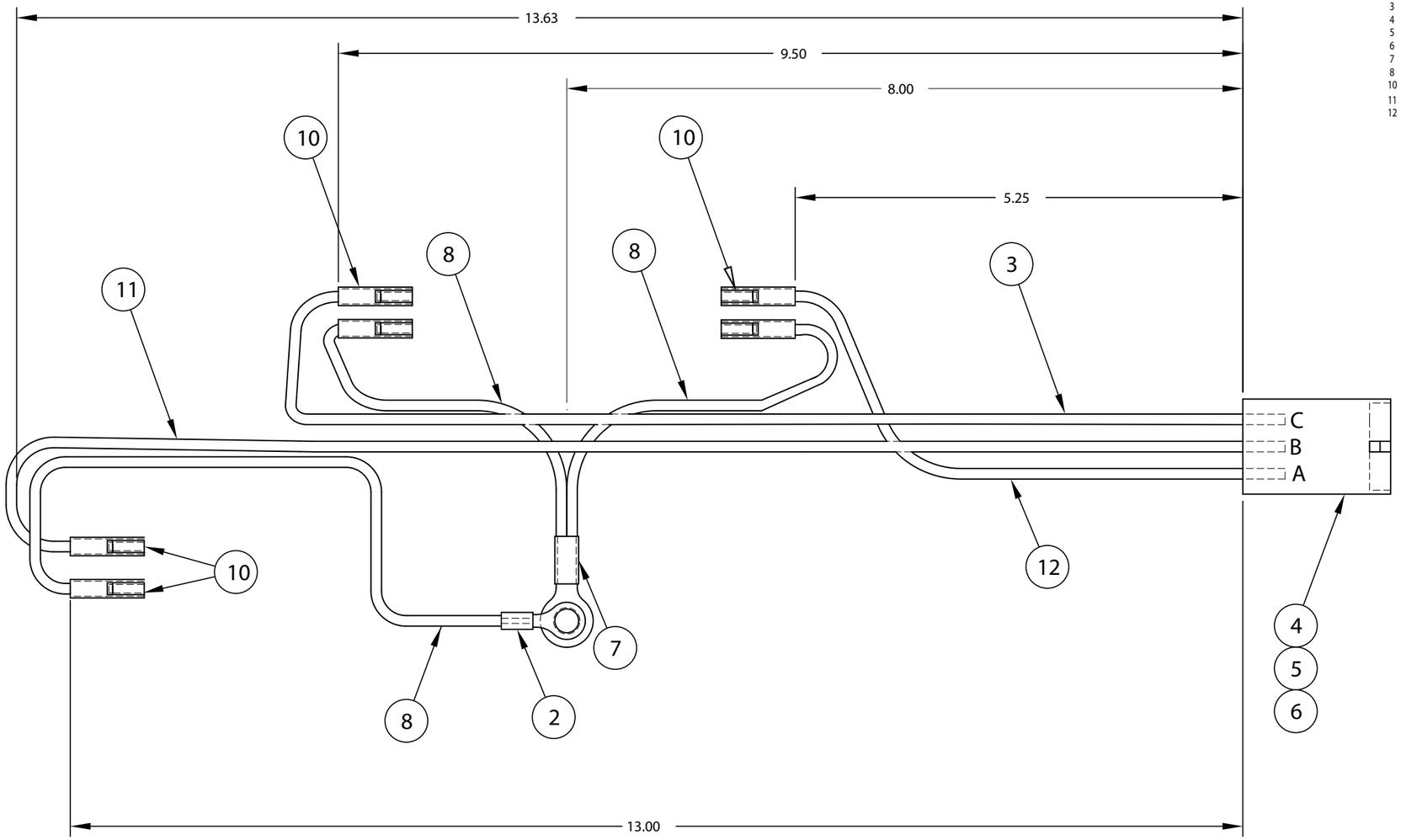
Parts list			
Item	Part No.	Qty	Description
1	33593	2.17	LOOM,SPIRAL CUT,.25 OD,NATURAL
2	33607	1.00	TERM,RING,16-14 GA,.250 STUD
3	33271-7	.92	WIRE,16 GA, RED
4	36350	1.00	CONNECTOR,SEALED,SHROUD,3-PIN
5	36164	3.00	TERM,SEALED CONN,16-14 GA,MALE
6	36166	3.00	SEAL,CABLE,18-16 GA
7	71070	1.00	TERM,RING,12-10 GA,.312 STUD
8	33271-1	1.00	WIRE,16 GA,BLK
10	36349	6.00	TERM,PUSH-ON,.25,FEM,18-14,SLV
11	33271-14	1.00	WIRE,16 GA,YELLOW/RED STRIPE
12	33271-11	.50	WIRE,16 GA,BLU

HARNESS,DUAL VALVE,TRUPAC

DRAWING NO.	REV.
1000346	A
	SHEET 1 OF 1

9

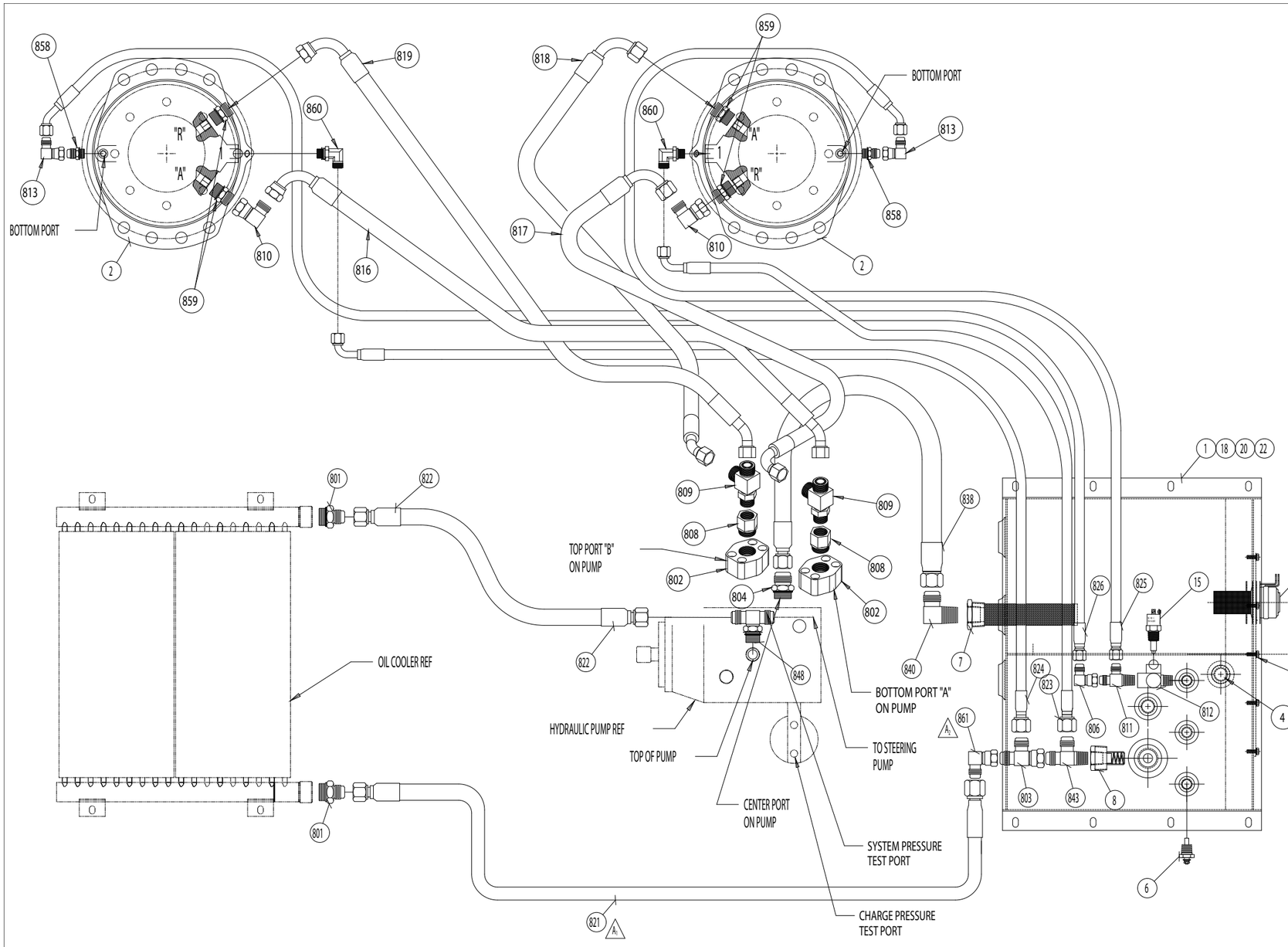
Parts list			
Item	Part No.	Qty	Description
1	33593	2.17	LOOM,SPIRAL CUT,.25 OD,NATURAL
2	33607	1.00	TERM,RING,16-14 GA,.250 STUD
3	33271-7	.92	WIRE,16 GA, RED
4	36350	1.00	CONNECTOR,SEALED,SHROUD,3-PIN
5	36164	3.00	TERM,SEALED CONN,16-14 GA,MALE
6	36166	3.00	SEAL,CABLE,18-16 GA
7	71070	1.00	TERM,RING,12-10 GA,.312 STUD
8	33271-1	1.00	WIRE,16 GA,BLK
10	36349	6.00	TERM,PUSH-ON,.25,FEM,18-14,SLV
11	33271-14	1.00	WIRE,16 GA,YELLOW/RED STRIPE
12	33271-11	.50	WIRE,16 GA,BLU



HARNESS,DUAL VALVE,TRUPAC

DRAWING NO.	REV.
1000346	A
	SHEET 1 OF 1

9



ITEM	PART NO.	QTY.	DESCRIPTION
1	19161	1.00	TANK,HYD,16 GAL
2	29405	2.00	GRP,WHEEL MOTOR,DUAL
3	19780	1.00	SCHEM,SOLENOID VALVE
4	31886	1.00	GAUGE,SIGHT,12NPT
5	33118	1.00	NUT,HEX,.813-20
6	35367	1.00	SENDER,TEMP GAUGE,08 MP
7	36123	2.00	STRAINER,SUCTION 15GPM 100MESH
8	36124	1.00	INDUCER,BACK PRESSURE,15PSI
9	36127	1.00	ORBITROL,STEERING,17.9 CIR
10	36128	1.00	COLUMN,STEERING,6.00 W/WIRE
11	36129	2.00	CYL,HYD,3.00X10.00
12	36130	1.00	KIT,HORN,STEERING WHEEL CENTER
13	23523	1.00	COVER,HYD TANK T/P
14	39175	1.00	KIT,HOSE/FITT,T/P915,SAE
15	36343	1.00	SWITCH,TEMP,210 DEG F,08 MP
16	37680	1.00	FILLER,HYD FLUID,10 PSI
17	6436	1.00	STEERING WHEEL
18	80142	8.00	WASHER,TYPE A PLAIN,.375
19	80197	2.00	CSHH,.250-20X2.25,GR5
20	80224	8.00	CSHH,.375-16X1.25,GR5
21	80350	2.00	NUT,FLEXLOC,.250-20,FULL,LT
22	80352	8.00	NUT,FLEXLOC,.375-16,FULL,LT
23	81161	12.00	WASHER,WEATHER SEAL,#10
24	99600	1.00	PIPE,NIPPLE,12XCLOSE
25	X259	1.00	FILTER ASSY
26	21306	4.00	PIN,CLEVIS,1.00 DIA,W/ZERK
27	80336	4.00	COTTER PIN,.188X1.50
28	80192	12.00	CSHH,.250-20X.75,GR5
30	99293	1.00	PIPE,PLUG,1.50MP,SQ HD,MI
31	33707	.36	SEALANT,SILICONE,CLEAR
37	RES1001	.00	HYDRAULIC SPECIFICATIONS

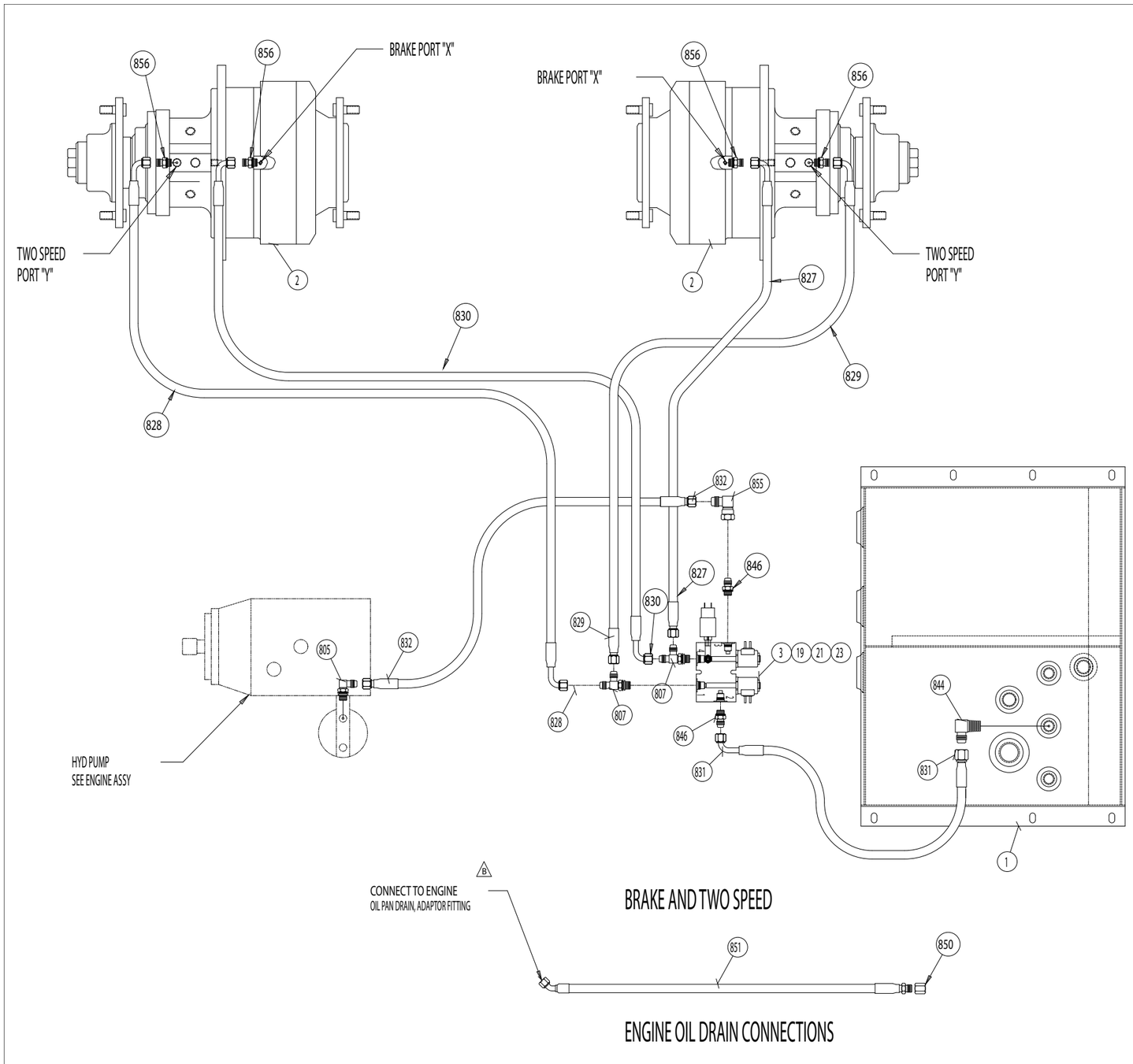
NOTE: ALL HYDRAULIC CONNECTIONS AND FLUID INSTALLATION PER SPECIFICATIONS RES1001

SEE SHEET 2 FOR 800 SERIES NUMBERS, INCLUDED IN HOSE KIT, ITEM 14

HYDRAULIC GROUP, T/P915, 3.3 ENGINE

DRAWING NO.	REV.
29406	B
SHEET 1 OF 3	

9



BRAKE AND TWO SPEED

ENGINE OIL DRAIN CONNECTIONS

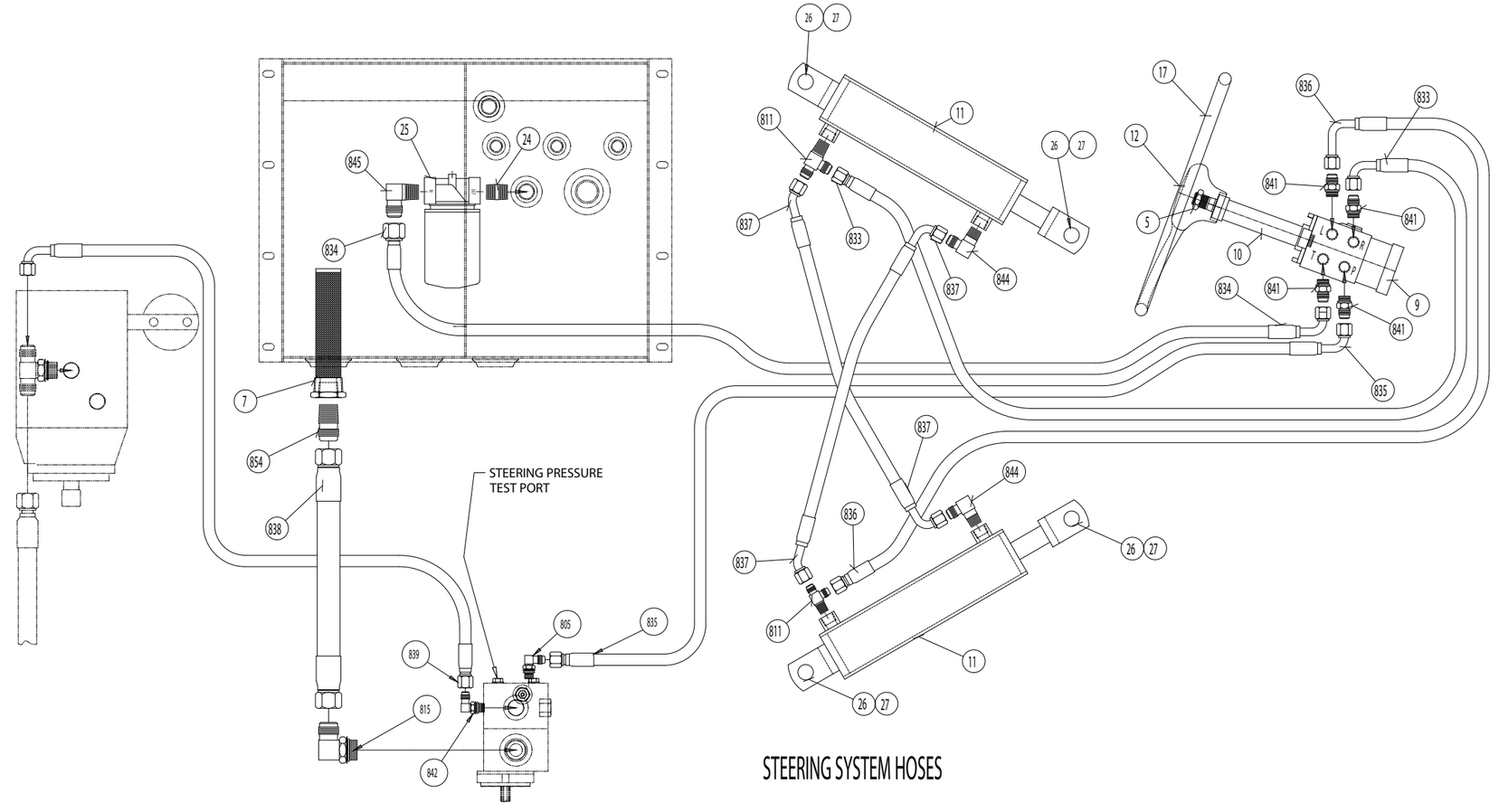
39175
HOSE KIT

ITEM	PART NO.	QTY.	DESCRIPTION
801	31149	2.00	FITT,STR 12MJ-16MB
802	37952	2.00	FITT,BLOCK 16SF-16OF
803	33160	1.00	FITT,TEE 12MJ-12FJX-12MJ
804	33887	1.00	FITT,STR 16MJ-16MB
805	33892	2.00	FITT,90 06MJ-06MB
806	33900	1.00	FITT,90 08MJ-08FJX
807	35494	2.00	FITT,TEE 06MJ-06MB-06MJ
808	37953	2.00	FITT,STR 16MB-12FB
809	37954	2.00	FITT,TEE 12MB-12MRS-12MRS
810	37955	2.00	FITT,90 12MRS-12FRS
811	36304	3.00	FITT,TEE 08MJ-08MP-08MJ
812	36305	1.00	PIPE,TEE,08MP-08FP-08FP,STL
813	37956	2.00	FITT,90 08MRS-08FRS
815	X319	1.00	FITT,90 16MJ-16MB
816	37959-054.	1.00	HOSE,12,12OF4-12OF9,6000
817	37957-024.	1.00	HOSE,12,12OF9-12OF9,6000
818	37958-033	1.00	HOSE,12,12OF4-12OF9,6000
819	37960-062.	1.00	HOSE,12,12OF4-12OF9,6000
A 821	72560-068	1.00	HOSE,12,12FJX-12FJX,1250
822	72560-076	1.00	HOSE,12,12FJX-12FJX,1250
823	37965-055	1.00	HOSE,08,12FJ-08OF9,3000
824	37965-088.	1.00	HOSE,08,12FJ-08OF9,3000
825	37962-068.	1.00	HOSE,08,08FJ-08OF4
826	37962-089.	1.00	HOSE,08,08FJ-08OF4,3000
827	37963-037	1.00	HOSE,06,06FJ-06OF9,3000
828	37964-083.	1.00	HOSE,06,06FJ9-06OF9,3000
829	37963-042	1.00	HOSE,06,06FJ-06OF9,3000
830	37964-087.	1.00	HOSE,06,06FJ9-06OF9,3000
831	36325	1.00	HOSE ASSY 3000PSI,-06 x 30.00
832	72550-018	1.00	HOSE,06,06FJX-06FJX,3000
833	36327	1.00	HOSE ASSY 2500PSI,-08 x 94.00
834	36328	1.00	HOSE ASSY 2500PSI,-08 x 97.50
835	38950-105	1.00	HOSE,08,06FJX-08FJ90,2500
836	36330	1.00	HOSE ASSY 2500PSI,-08 x 94.00
837	36331	2.00	HOSE ASSY 2500PSI,-08 x 23.50
838	38873-027	2.00	HOSE,16,16FJ-16FJ,250
839	72558-013.	1.00	HOSE,12,12FJX-12RJ90,1250
840	6466	1.00	FITT,90 16MJ-16MP
841	70062	4.00	FITT,STR 08MJ-08MB
842	71775	1.00	FITT,90 12MJ-12MB
843	72314	1.00	FITT,TEE 12MJ-12MP-12MJ
844	X161	3.00	FITT,90 08MJ-08MP
845	X180	1.00	FITT,90 08MJ-12MP
846	X217	2.00	FITT,STR 06MJ-06MB
848	72566	1.00	FITT,TEE 12MJ-12MJ-12MB
850	38949	1.00	FITT,CAP 10FJ
851	38948-048	1.00	HOSE,10,10MJ-10FJX45,150 PSI
B 853	--	.00	--
854	6345	1.00	FITT,STR 16MJ-16MP
855	X387	1.00	FITT,90 06MJ-06FJX
856	39173	4.00	FITT,STR 06MB-06MRS
858	39172	2.00	FITT,STR 08MB-08MRS
859	39171	4.00	FITT,STR 12MB-12MRS
860	39174	2.00	FITT,90 08MB-08MRS
A 861	X365	1.00	FITT,90 12MJ-12FJX

HYDRAULIC GROUP,
T/P915,
3.3 ENGINE

DRAWING NO.	REV.
29406	B
	SHEET 2 OF 3

9

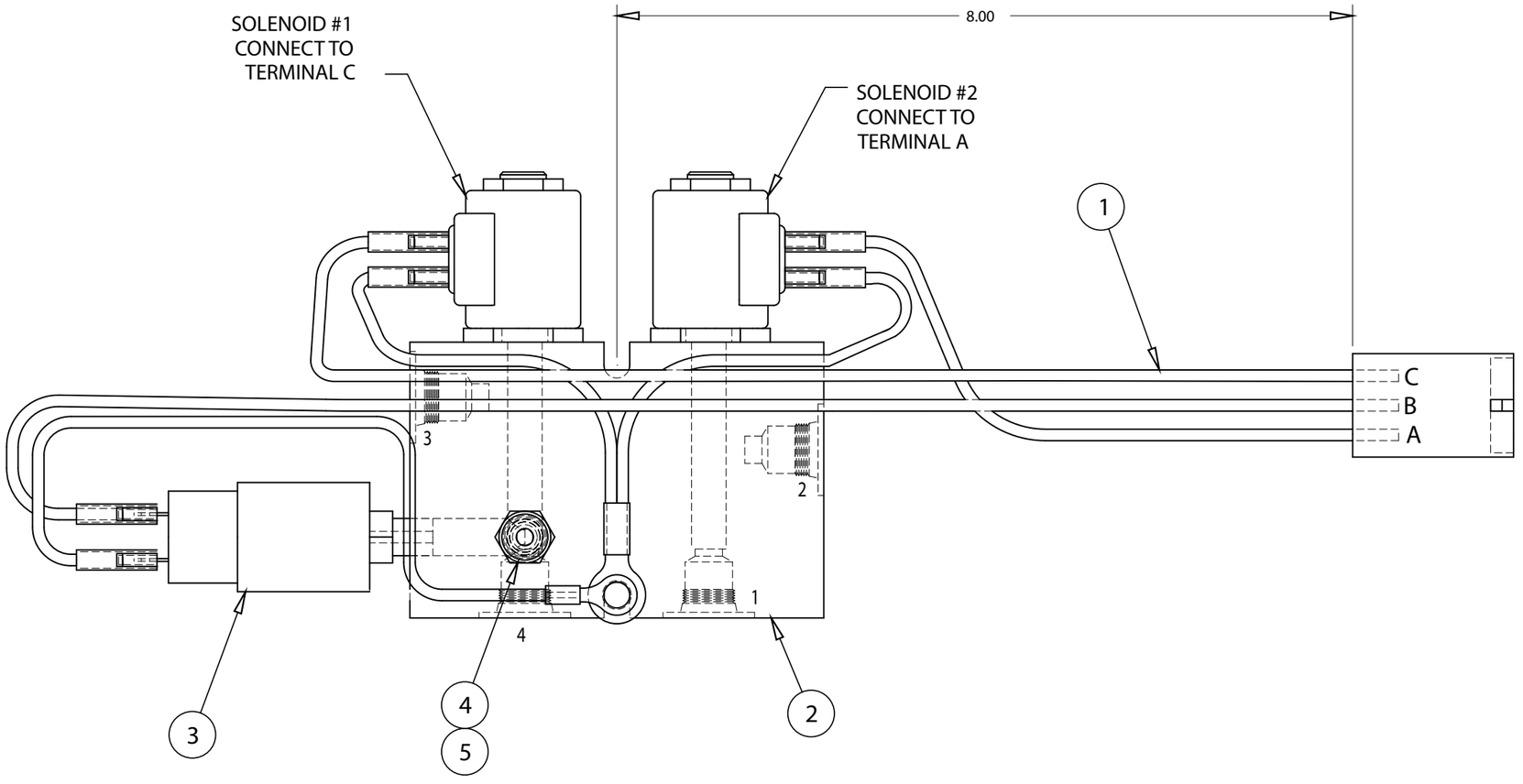


STEERING SYSTEM HOSES

SEE SHEET 2
FOR HOSE KIT
800 SERIES NUMBERS

HYDRAULIC GROUP, T/P915, 3.3 ENGINE	
DRAWING NO. 29406	REV. B
SHEET 3 OF 3	

Parts list			
Item	Part No.	Qty	Description
1	1000346	1.00	HARNESS,DUAL VALVE,TRUPAC
2	36071	1.00	VLV,HYD,SOLENOID,DUAL 3 WAY
3	37490	1.00	SWITCH,PRESSURE,175 PSI,NC,10A
4	72702	1.00	FITT,TEST 02MP-02PD
5	72372	1.00	FITT,PLUG 02PD,DUST



SCHEM,SOLENOID VALVE

DRAWING NO.	REV.
19780	E
	SHEET 1 OF 1

9

ROSCO

A LeeBoy Company

Section 10

ILLUSTRATED PARTS LIST (IPL)

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 Quantities 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 Rosco is referred to as the original manufacturer of some other parts, these parts may carry the original manufacturers part number or a Rosco 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 Rosco 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".

Quick Reference Guide - Kubota Filters and Service Items

Item No.	Part Number	Qty.	Description	Remarks
•	987912	1	Kit, Filter	
•	72543	1	Filter Assy, Hyd Return	
•	34463	1	Filter Assy, Hyd Charge	
•	38385-01	1	Air Filter, Primary	
•	38385-02	1	Air Filter, Safety	
•	986537-03	1	Filter, Oil	
•	982080-02	1	Filter, Fuel	
•	986537-31	1	Filter, Fuel Pre-Filter	
•	1001166-03	1	Starter	
•	1001166-04	1	Alternator	
•	1001166-05	1	Engine Belt	
•	X260	1	Hyd Steering	
•	34464	1	Hyd Element	Charge
•	33291	1	Fuel Filter	Inline
•	1001736-19	1	Fuel/Water Filter	DOT only
•	72026	1	Control Handle	See breakdown

Quick Reference Guide - Caterpillar Filters and Service Items

Item No.	Part Number	Qty.	Description	Remarks
•	988546	1	Kit, Filter, TP CAT	
•	72543	1	Filter Assy, Hyd Return	
•	34463	1	Filter Assy, Hyd Charge	
•	38385-01	1	Air Filter, Primary	
•	38385-02	1	Air Filter, Safety	
•	988671-03	1	Filter, Oil	
•	988671-09	1	Starter	
•	988671-10	1	Alternator	
•	988671-06	1	Engine Belt	
•	X260	1	Hyd Steering	
•	34464	1	Hyd Element	Charge
•	988671-05	1	Fuel Filter	Inline
•	984909-01	1	Fuel/Water Filter	
•	988671-01	1	Heater Element	
•	72026	1	Control Handle	See breakdown

Overview

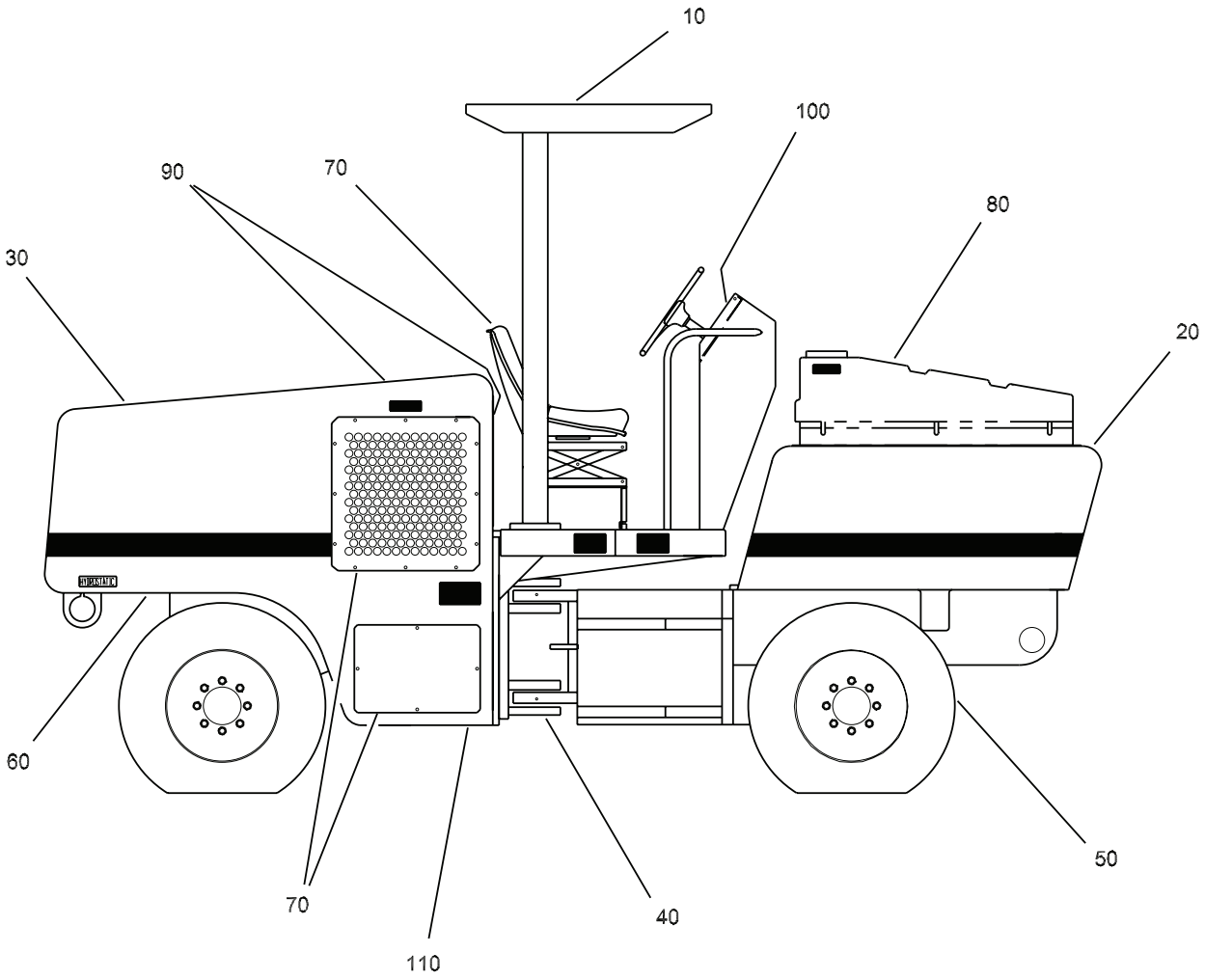


Figure 10-1

Overview List

Item No.	Part Number	Qty.	Description	Remarks
1	28698		TOP ASSEMBLY	
10	19678SRV	1	CANOPY GROUPS	(See page 10-7)
-20	19242	1	FRONT FRAME	
-30	22125	1	REAR FRAME	
40	27719	1	YOKE	(See Fig 10-2)
50	19674	1	WHEEL AND TIRE GRPS	(See Fig 10-3 to 10-8)
60	19591SRV	1	OPTIONAL HEAT SHIELD GRP	(See Fig 10-9)
70	28699	1	COVER & PANEL GROUPS	(See Fig 10-11)
80	19276SRV	1	WATER SYSTEM , COCOA MATS	(See Fig 10-12 to 10-13)
90	28488	1	ENGINE & COMPONENTS	(See pages 10-37 to 10-55)
100	986320	1	INSTRUMENTS & WIRING	(See pages 10-57 to 10-59)
110	29406	1	HYDRAULICS GROUP	(See page 10-61)

NOTES

Canopy Groups Parts List

Item No.	Part Number	Qty.	Description	Remarks
-2	TBD	1	CANOPY GROUPS	
-1	19678SRV	1	•ROPS GROUP	
			ATTACHING PARTS	
-101	36255	1	••ROPS,TRUPAC ROLLER	
-102	81074	8	••CSHH,1.000-8X3.75,GR8	
-103	81075	8	••NUT,STOVERS 1.00-8, GR C	
-104	81076	16	••WASHER,FLAT,SAE,1.000,HARDENED	
-105	730-3050	1	••SEAT BELT,2.00 W/HARDWARE	
			-----*-----	
-2	19678-01SRV	1	•SUNROOF GROUP	
			ATTACHING PARTS	
-201	19914	1	••CANOPY,SUNROOF	
-202	19928	2	••CLAMP,SUNROOF	
-203	80142	6	••WASHER,FLAT,USS,.375	
-204	80224	6	••CSHH,.375-16X1.25,GR5	
-205	80352	6	••NUT,FLEXLOC,.375-16,FULL,LT	
			-----*-----	
-3	36256	1	•OPTIONAL FOPS GROUP	
			ATTACHING PARTS	
-301	36256	1	••FOPS,TRUPAC ROLLER	
-302	19914	1	••CANOPY,SUNROOF	
-303	19928	2	••CLAMP,SUNROOF	
-304	80142	6	••WASHER,FLAT,USS,.375	
-305	80224	6	••CSHH,.375-16X1.25,GR5	
-306	80352	6	••NUT,FLEXLOC,.375-16,FULL,LT	
			-----*-----	

Yoke Assembly

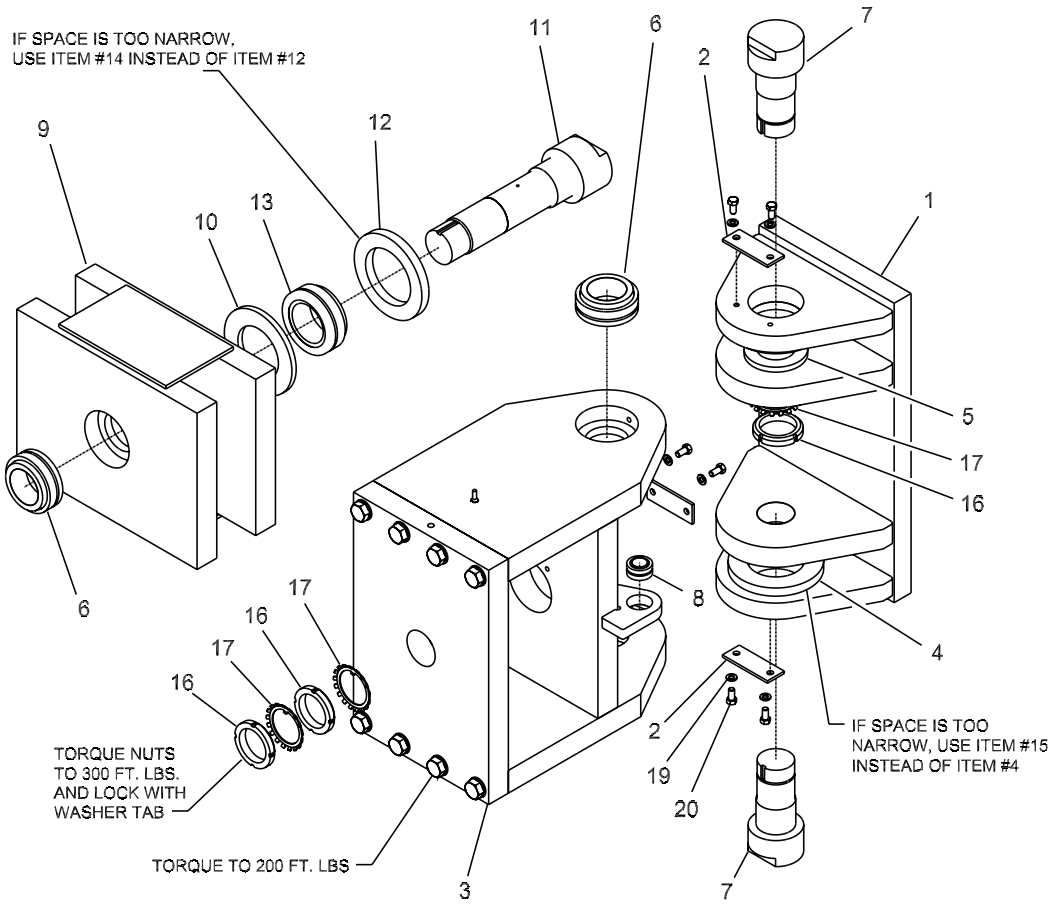


Figure 10-2

Yoke Assembly Parts List

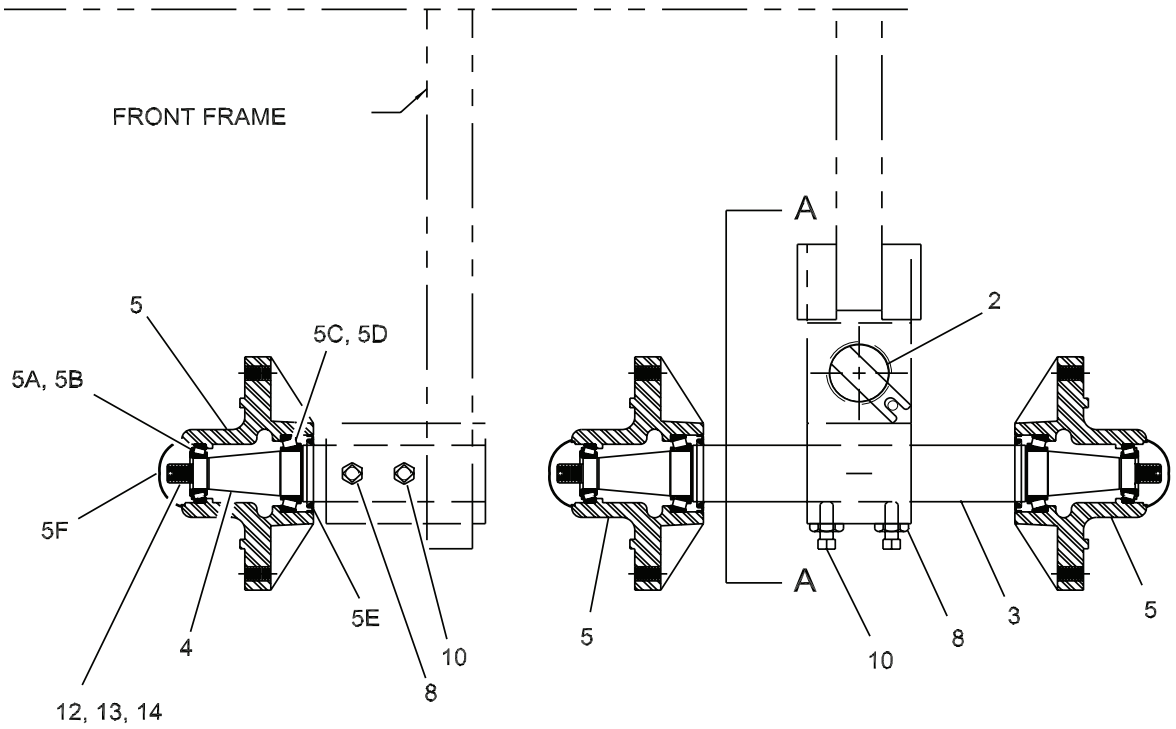
Item No.	Part Number	Qty.	Description	Remarks
3	27719	1	YOKE ASSEMBLY	
1	19215	REF	•YOKE,DEAD END	Part of Rear Frame
2	19239	3	•PIN RETAINER	
3	19220	1	•YOKE,LIVE END	
4	36404	2	•SEAL,FELT,.63T,3.60ID x 6.00OD	
5	36405	2	•SEAL,FELT,.38T,2.40ID x 4.00OD	
6	36140	2	•BEARING,SPHERICAL 2.50 ID	
7	27718	2	•PIN,YOKE,DEAD END,TIMKEN NUT	
8	36138	2	•BEARING,SPHERICAL 1.00 ID	
9	19243	REF	•YOKE PLATE,FRONT	Part of Front Frame
10	36407	1	•SEAL,FELT,.38T,3.60ID x 6.00OD	
11	27717	1	•PIN,YOKE,LIVE END,TIMKEN NUT	
12	36406	1	•SEAL,FELT,.63T,4.00ID x 6.00OD	
13	36141	1	•BEARING,SPHERICAL 2.75 ID	
-14	36408	1	•SEAL,FELT,.50T,4.00ID x 6.00OD	
-15	36409	1	•SEAL,FELT,.50T,3.60ID x 6.00OD	
16	38671	4	•NUT,SPL,2.36-18	
17	210170A	4	•WASHER,LOCK,TANG STYLE	
-18	5039	3	•FITT,LUBE,90,02MP	
19	80162	6	•WASHER,LOCK,.375	
20	80219	6	•CSHH,.375-16X.75,GR5	
TBD	19503	1	ARTICULATION LOCK LINK	

NOTES

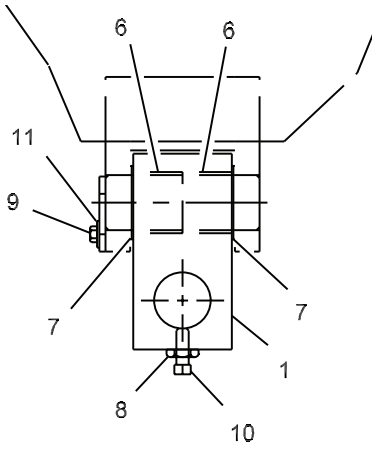
Wheel & Tire Groups Parts List

Item No.	Part Number	Qty.	Description	Remarks
-4	TBD	1	WHEEL AND TIRE GROUPS	
-1	19268	1	•FRONT AXLE ASSEMBLY	(See Fig 10-3)
-2	19674	1	•WHEEL GROUP, 14 PLY	
-3	29405	1	•WHEEL MOTOR	(See Fig 10-4)
-4	27206SRV	1	•SCRAPER BLADE GROUP	(See Fig 10-5)
-5	27208	1	•COCO MAT GRP, 9-WHEEL	(See Fig 10-6)
-6	27759	1	•OPT 11-WHEEL ASSEMBLY	(See Fig 10-7)
-7	27794	1	•OPT COCO MAT WITH WATER FOR 11-WHEEL	(See Fig 10-7)
-8	27919	1	•OPT TRACTION CONTROL KIT	(See Fig 10-8)

Front Axle Assembly



LEFT SIDE AXLE ASSEMBLY IS SAME AS RIGHT SIDE.



VIEW A-A

HUB INSTALLATION:

1. Install item #5E, grease seal, on back of hub.
2. Pack the inside bearing with item #15, wheel bearing grease. Force grease through and around the rollers.
3. Place item #5C, bearing cup, firmly into the hub.
4. Place item #5D, bearing cone, on the spindle and insure that it is seated against the spindle shoulder.
5. Lubricate grease seal prior to installation.
6. Grease front bearing same as rear and fill hub cavity with grease.
7. Install item #14, flat washer, and spindle nut on spindle. Turn hub as you tighten nut. When a pronounced drag is felt in the bearing, back off nut one complete slot, and install item #13, cotter pin, and item #5F, dust cap.
8. Rotate wheel and insure hub is not binding.

Figure 10-3

Front Axle Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
5	19268	1	FRONT AXLE ASSEMBLY	
1	19183	2	•MOUNT,AXLE	
2	19184SRV	2	•PIN W/M,FRONT AXLE	
3	19211	2	•SPINDLE,DUAL 1.12 OFFSET HUB	
4	19212	1	•SPINDLE,SINGLE 1.12 OFFSET HUB	
5	36136	5	•HUB ASSY,WHEEL,8 ON 8.00	
5A	36136-01	5	••BEARING CUP,INNER	
5B	36136-02	5	••BEARING CONE,INNER	
5C	610230	5	••BEARING CUP,OUTER	
5D	610240	5	••BEARING CONE,OUTER	
5E	36136-03	5	••GREASE SEAL	
5F	340040	5	••DUST CAP	
6	36137	4	•BEARING,COMPOSITE 2.25 ID	
7	36265	8	•WASHER,THRUST,2.25ID,.060T	
8	80076	6	•NUT,HEX,JAM,.500-13	
9	80221	2	•CSHH,.375-16X1.00,GR5	
10	80715	6	•SET SCREW,.500-13X1.50,SQHD	
11	80996	2	•WASHER,FLAT,SAE,.375	
12	81071	5	•NUT,HEX,CASTLE,.750-16 SPL	
13	80332	5	•PIN,COTTER,.125X1.50	
14	81070	5	•WASHER,FLAT,SPL,.750ID	
-15	91210	1.25	•GREASE,WHEEL BEARING	
	19674	1	WHEEL GROUP,14 PLY	
-1	38597	9	•TIRE MOUNTED,7.50-15NHS,14PLY	
-2	81064	32	•NUT,WHEEL,M16X1.5 (REAR)	
-3	36136-05	40	•BOLT,WHEEL,.562X1.12 (FRONT)	
			- ITEM NOT ILLUSTRATED	

Wheel Motor

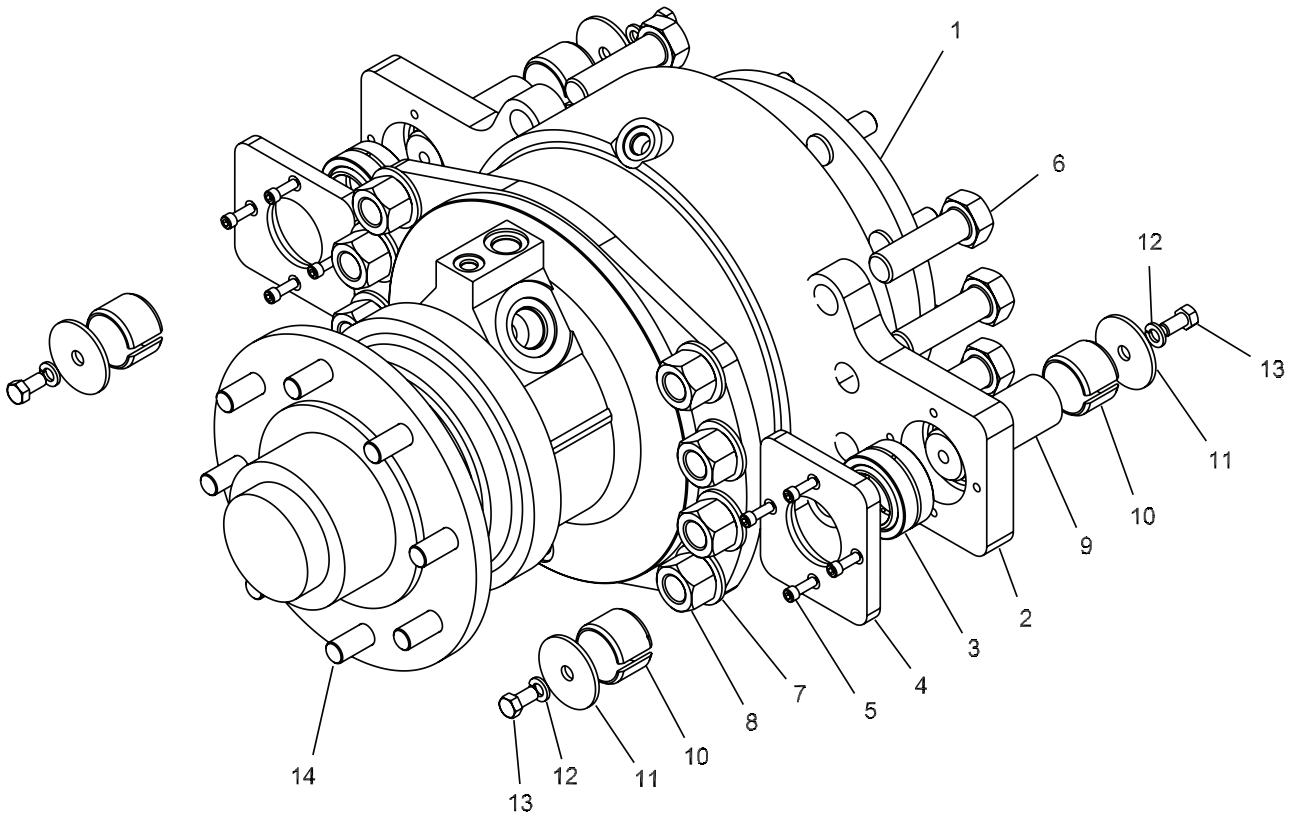
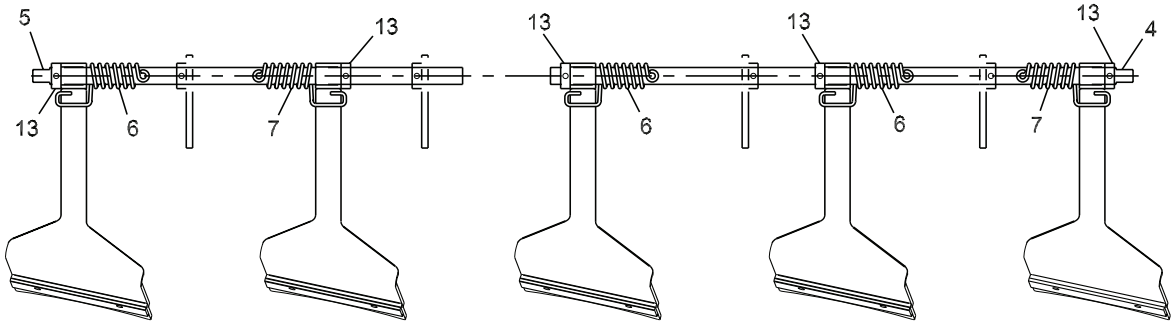


Figure 10-4

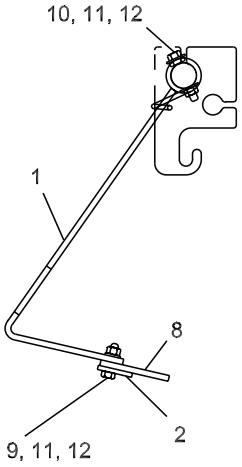
Wheel Motor Parts List

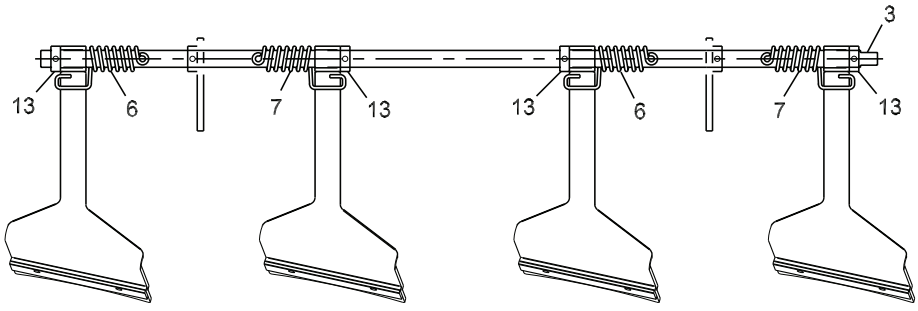
Item No.	Part Number	Qty.	Description	Remarks
6	29405	1	WHEEL MOTOR	
1	39131	1	•MOTOR,HYD,DRIVE,915 TRUPAC	
2	19175	2	•MOUNT,HYD MOTOR	
3	X250	2	•BEARING,SPHER,ID1.50,OD2.4375	
4	19176	2	•COVER,BEARING,HYD MOTOR MOUNT	
5	81057	8	•CSSH,.250-20X.75	
6	81058	8	•CSHH,.875-9X3.00,GR5	
7	81059	8	•WASHER,FLAT,SAE,.875	
8	80358	8	•NUT,FLEXLOC,.875-9,FULL,LT	
9	19182	2	•PIN,HYD MOTOR MOUNT	
10	36144	4	•BUSHING,SPLIT 1.5 ID	
11	19818	4	•WASHER,.44X2.125X.134THICK	
12	80162	4	•WASHER,LOCK,.375	
13	80219	4	•CSHH,.375-16X.75,GR5	
14	36131-02	8	•STUD,WHEEL,M16X1.5	

Scraper Blade Group



FRONT VIEW





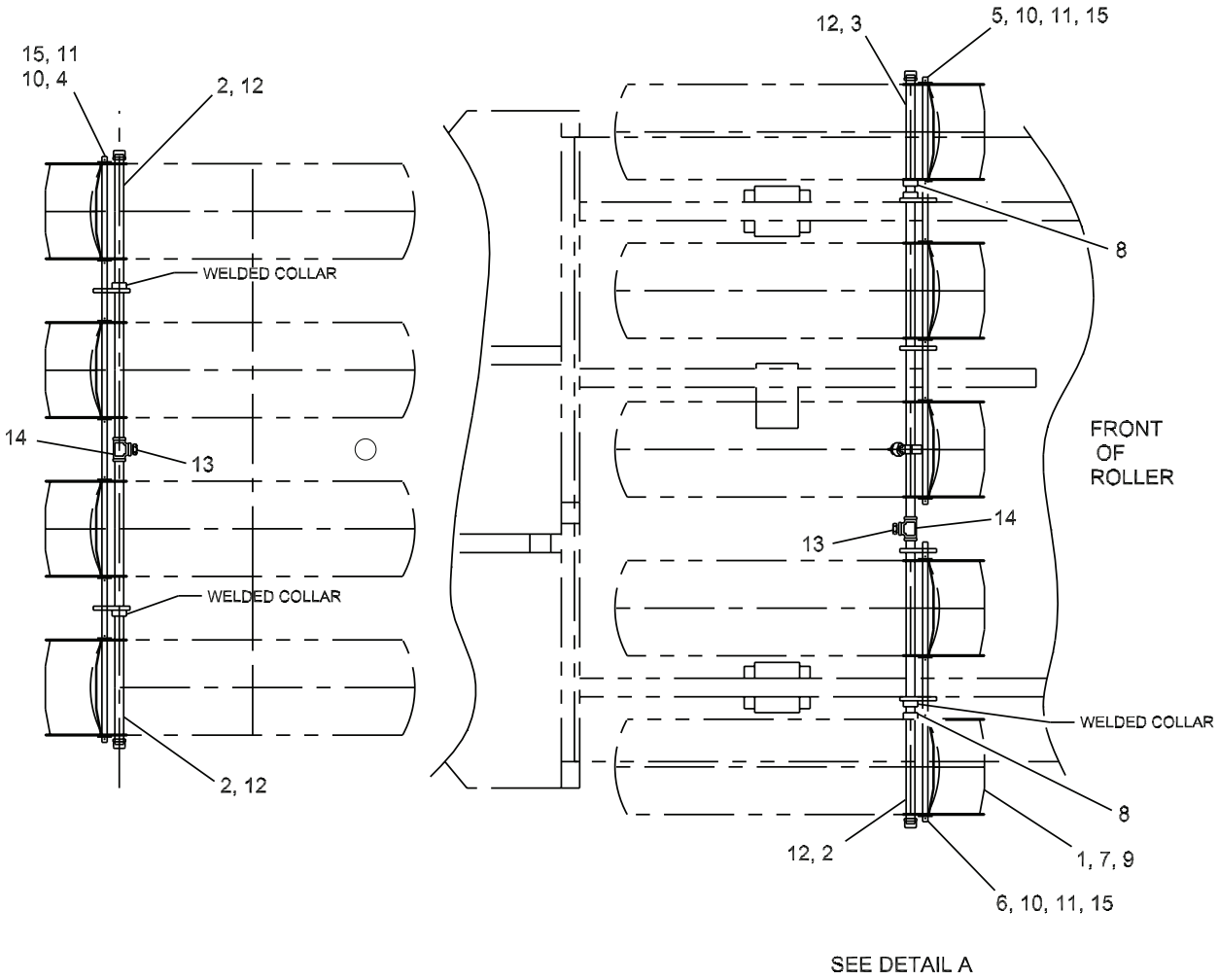
REAR VIEW

Figure 10-5

Scraper Blade Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
7	27206SRV	1	SCRAPER BLADE GROUP	
1	19517	9	•SCRAPER BLADE HOLDER W/M	
2	19524SRV	9	•SCRAPER BLADE,BACK-UP	
3	19530	1	•SCRAPER BLADER ROD,REAR	
4	19531	1	•SCRAPER BLADE ROD,RIGHT,FRONT	
5	19532	1	•SCRAPER BLADE ROD,LEFT,FRONT	
6	36191-1	5	•SPRING,TORSION,RIGHT HAND	
7	36191-2	4	•SPRING,TORSION,LEFT HAND	
8	38595	9	•SCRAPER,TIRE,FLAT CURVE	
9	80206	18	•CSHH,.312-18X1.25,GR5	
10	80211	9	•CSHH,.312-18X1.75,GR5	
11	80351	27	•NUT,FLEXLOC,.312-18,FULL,LT	
12	80963	36	•WASHER,FLAT,SAE,.312	
13	38183	9	•COLLAR,SET,1.125X1.75X.562	

Coco Mats Group



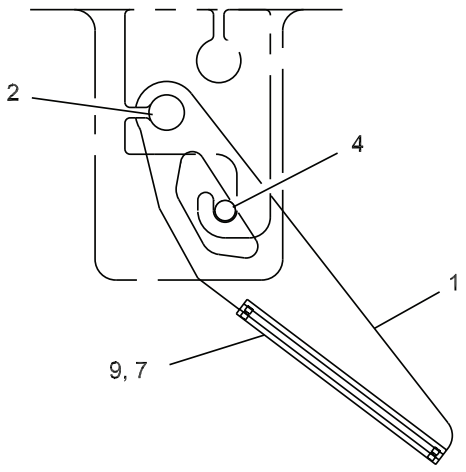
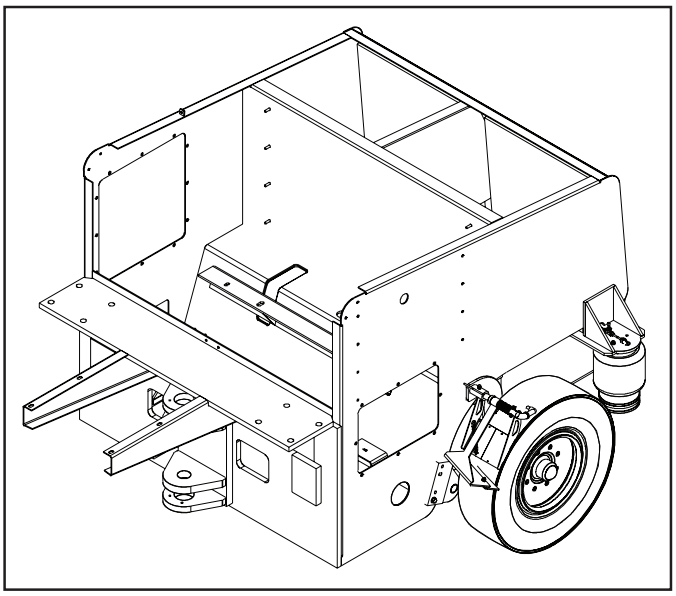


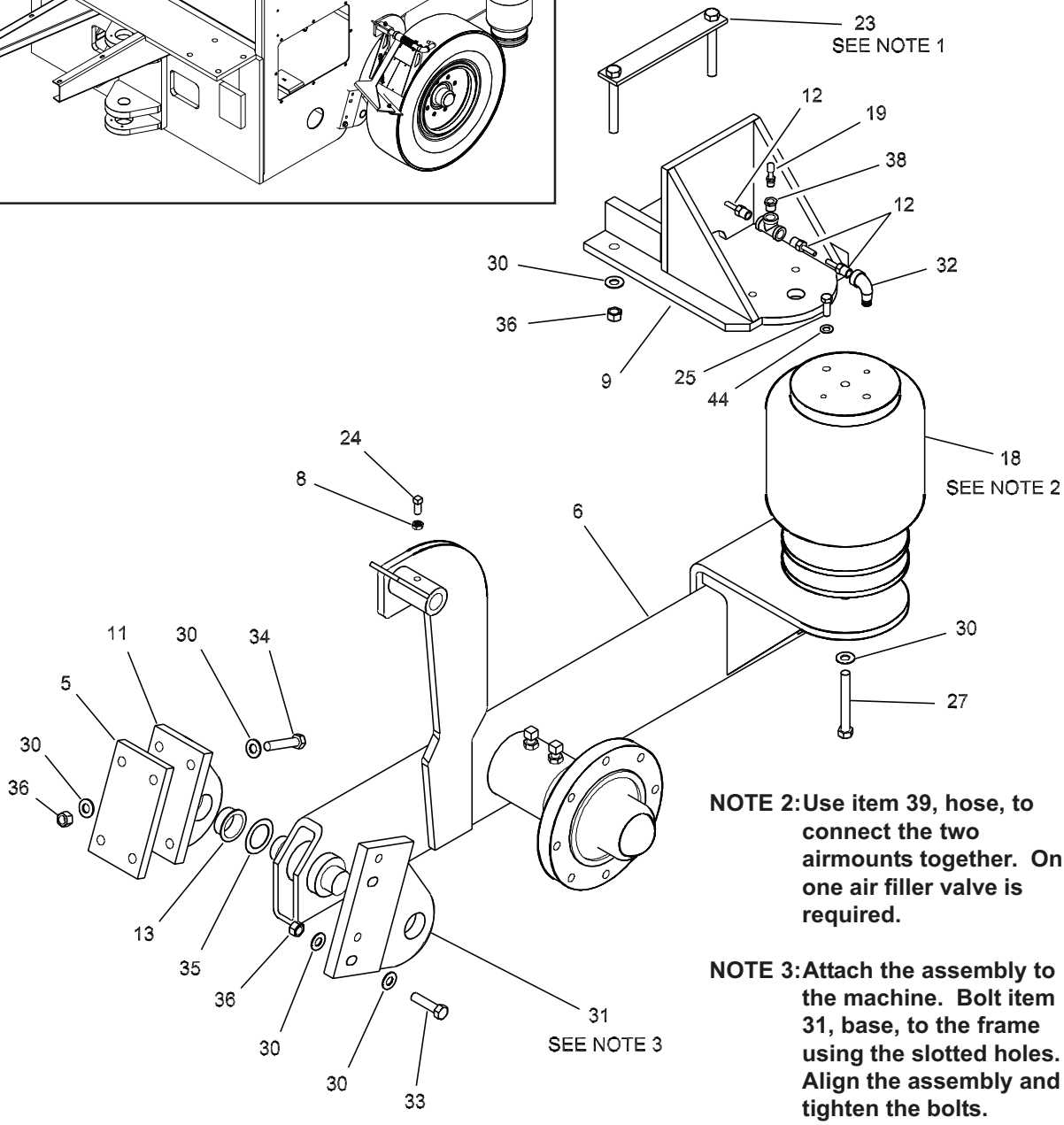
Figure 10-6

Coco Mats Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
8	27208	1	COCO MAT GROUP, 9-WHEEL	
1	27211	9	•HANGER,COCO MAT,FLAT TIRE	
2	19292	3	•PIPE,WATER SPRAY BAR,915	
3	19293	1	•PIPE,SPRAY,08NPTX42.25	
4	19294	1	•ROD,LIFT,.50ODX55.25	
5	19295	1	•ROD,LIFT,.50ODX40.25	
6	19296	1	•ROD,LIFT,.50ODX26.38	
7	19533	9	•COCO MAT,6X9	
8	36173	3	•COLLAR,SET,.88IDX1.38ODX.56	
9	70414	54	•RING,HOG	
10	80144	18	•WASHER,FLAT,USS,.500	
11	80331	18	•PIN,COTTER,.125X1.25	
12	91152	4	•PIPE,CAP,.500,GALV	
13	99537	2	•PIPE,PLUG,08MP,SQ HEAD	
14	99845	2	•PIPE,TEE,08FP,GALV	
15	53175	18	•WASHER,NYLON,.562X2.125X.06THK	

Optoinal 11-Wheel Assembly (1 of 2)





NOTE 1: Apply silicone to bottom of bar to prevent water leakage.

NOTE 2: Use item 39, hose, to connect the two airmounts together. Only one air filler valve is required.

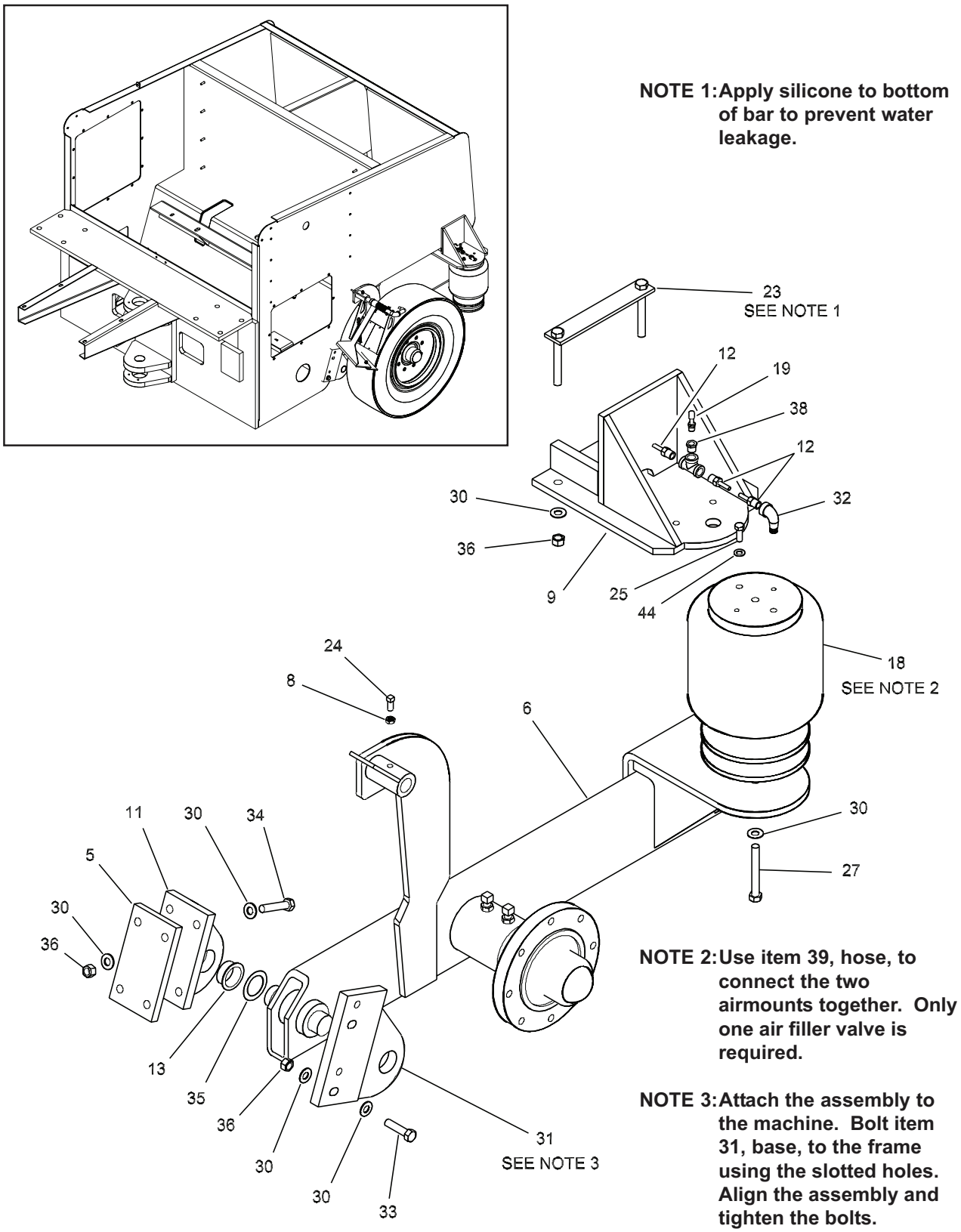
NOTE 3: Attach the assembly to the machine. Bolt item 31, base, to the frame using the slotted holes. Align the assembly and tighten the bolts.

Figure 10-7

Optional 11-Wheel Assembly (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
9	* 27759	1	OPTIONAL 11-WHEEL ASSEMBLY	
-4	36614	4	•WASHER,THRUST,1.50IDX.062	
5	27761	2	•PLATE, SPACER, TIRE BEAM BASE	
6	27769	1	•TIRE BEAM,LH,ASSY	
-7	27783	1	•TIRE BEAM RH,ASSY	
8	80074	2	•NUT,HEX,JAM,.375-16	
9	27785	2	•AIRMOUNT BASE,W/M	
11	28135	2	•BASE,11WHEEL W/M	
12	31167	4	•FITT,STR 04MP-04HB,PUSH-ON	
13	38783	4	•BUSHING,COMPOSITE,1.50 ID,.75	
-14	36191-1	1	•SPRING,TORSION,RIGHT HAND	
-17	38597	2	•TIRE MOUNTED,7.50-15NHS,14PLY	
18	38698	2	•AIRMOUNT,1T14C-1 SERIES	
19	38702	1	•VLV,AIR,FILLER,02NPT	
-20	90772	1	•PIPE,TEE,04FP,300#	
23	27827	2	•CLAMP,AIRMOUNT,W/M	
24	80315	2	•SET SCREW,.375-16X.750,SQHD	
25	80221	4	•CSHH,.375-16X1.00,GR5	
27	80722	2	•CSHH,.500-13X4.00,GR5	
-29	28133	1	•BASE,RH ATTACHMENT,11WHEEL W/M	
30	81141	36	•WASHER,FLAT,SAE,.500,HARDENED	
31	28132	1	•BASE,LH ATTACHMENT,11WHEEL W/M	
32	90763	2	•PIPE,ELBOW,90,.250 STREET,300#	
33	81272	8	•CSHH,.500-13X2.00,GR8	
34	81273	8	•CSHH,.500-13X2.50,GR8	
35	871070828	4	•WASHER,THRUST,1.50IDX.032	
36	80040	20	•NUT,HEX,.500-13	
-37	80219	2	•CSHH,.375-16X.75,GR5	
38	32638	1	•PIPE,BUSH,04MP-02FP,STL	
-39	32882	6	•HOSE,04,PUSH-ON,250	
-40	33164	4	•CLAMP,HOSE,# 10	
-43	38962	1	•DECAL,11-WHEEL INFLATION CHART	
44	80162	4	•WASHER,SPLIT LOCK,.375	

Optional 11-Wheel Assembly (2 of 2)



NOTE 1: Apply silicone to bottom of bar to prevent water leakage.

NOTE 2: Use item 39, hose, to connect the two airmounts together. Only one air filler valve is required.

NOTE 3: Attach the assembly to the machine. Bolt item 31, base, to the frame using the slotted holes. Align the assembly and tighten the bolts.

Figure 10-7

Optional 11-Wheel Assembly (2 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
9	27759	1	OPTIONAL 11-WHEEL ASSEMBLY	
1	19517	2	•SCRAPER BLADE HOLDER W/M	
2	19524SRV	2	•SCRAPER BLADE,BACK-UP	
3	871075201	2	•COLLAR,SET,1.00IDX1.625ODX.625	
10	27793	2	•RND,SCRAPER BLADE SUPPORT	
15	36191-2	1	•SPRING,TORSION,LEFT HAND	
16	38595	2	•SCRAPER,TIRE,FLAT CURVE	
22	80206	4	•CSHH,.312-18X1.25,GR5	
26	80351	6	•NUT,FLEXLOC,.312-18,FULL,LT	
28	80963	8	•WASHER,FLAT,SAE,.312	
41	80212	2	•CSHH,.312-18X2.00,GR5	
-	27919-01	1	KIT,HOSE,11-WHEEL	
	27794	1	OPT COCO MAT W/ WATER, 11-WHEEL	
-101	19533	2	•COCO MAT,6X9	
102	27211	2	•HANGER,COCO MAT,FLAT TIRE	
103	27788	2	•PIPE,COCO MAT,11-WHEEL	
104	71725	4	•ELBOW,PIPE,90,.500,GALV	
105	33164	4	•CLAMP,HOSE,# 10	
106	480010	2	•NOZZLE,ASSY,08 PIPE NYL,90 DEG	
109	6352	4	•HOSE,08,PUSH-ON,250	
110	30081	36	•CHAIN,PROOF COIL,.188	
111	70319	2	•FITT,90 08MP-08HB,POLY	
-112	70414	16	•RING,HOG	
113	70318	2	•FITT,STR 08MP-08HB,BLK POLY	

Optional Traction Control Kit

NOTE 1: Tap into drain lines going to hydraulic reservoir.

NOTE 2: Existing block may need to be removed to install fitting.

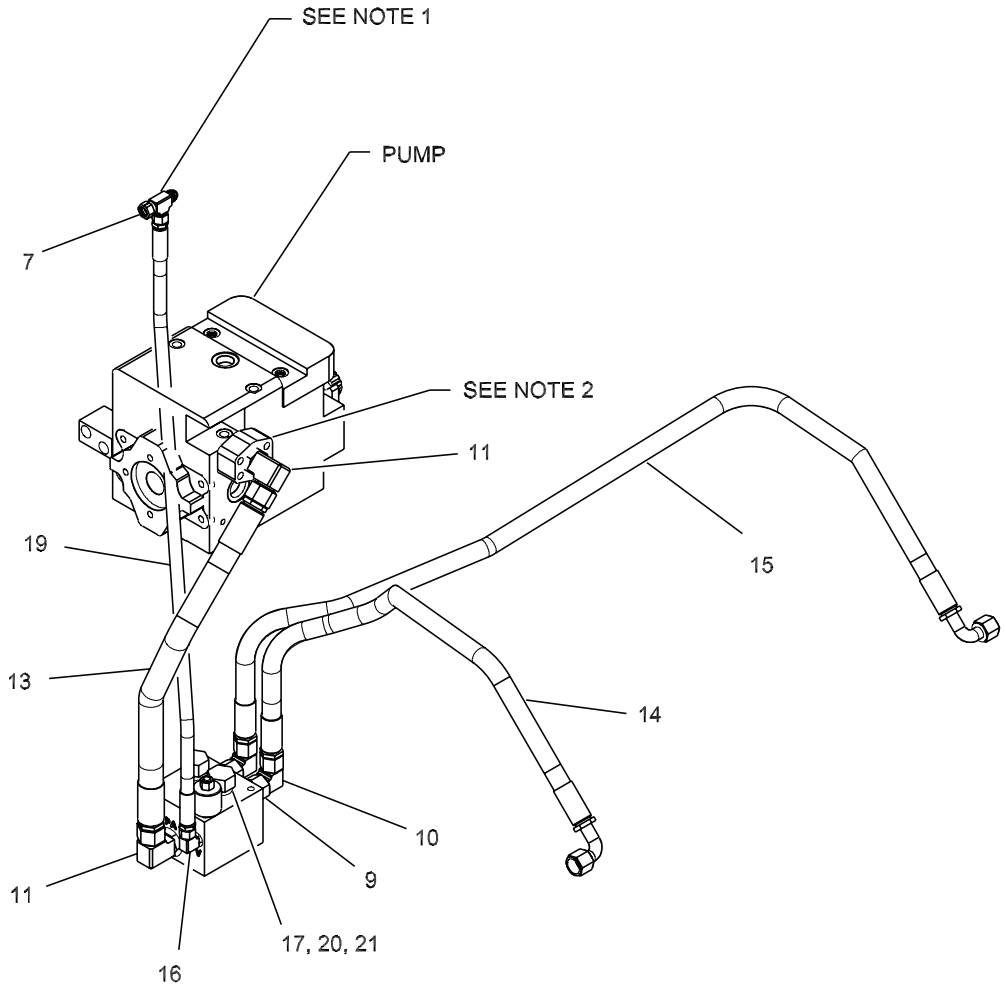


Figure 10-8

Optional Traction Control Kit Parts List

Item No.	Part Number	Qty.	Description	Remarks
10	27919	1	OPTIONAL TRACTION CONTROL KIT	
-1	37118	1	•FUSE HOLDER,IN LINE,ATC	
-2	33271-1	1	•WIRE,16GA,BLACK	
-3	33271-12	1	•WIRE,16GA,RED,BLACK STRIPE	
-4	33271-18	10	•WIRE,16GA,BLUE,RED STRIPE	
-5	33602	3	•CONN,BUTT,16-14 GA	
-6	33609	1	•TERM,RING,16-14 GA,.375 STUD	
7	33898	1	•FITT,TEE 08MJ-08FJX-08MJ	
-8	35123	4	•TERM,RING,16-14 GA,#6 STUD	
9	73039	2	•FITT,STR 16MB-12MRS	
10	37955	2	•FITT,90 12MRS-12FRS	
11	38686	2	•FITT,90 16MB-16MRS	
-12	38728	1	•VLV,HYD,TRACTION CONTROL,48GPM	
13	38730-027	1	•HOSE,16,16OFS-160FS,6000	
14	38731-048	1	•HOSE,12,12OFS-12OF9,6000	
15	38731-071	1	•HOSE,12,12OFS-12OF9,6000	
16	70754	1	•FITT,90 08MJ-06MB	
17	71617	2	•CSHH,.375-16X5.00,GR5	
-18	851391	1	•SWITCH,TOGGLE,SPST,2-POS	
19	72552-046	1	•HOSE,08,08FJX-08FJX,2500	
20	80038	4	•NUT,HEX,.375-16	
21	80996	4	•WASHER,FLAT,SAE,.375	
-22	36340	1	•FUSE,10 AMP,ATC	
-23	36348	1	•TERM,PUSH-ON,.25,M,18-14,SLV	
-24	36349	1	•TERM,PUSH-ON,.25,FEM,16-14,SLV	
-25	38760	1	•DECAL,TRACTION VALVE	

Optional Heat Shield Group

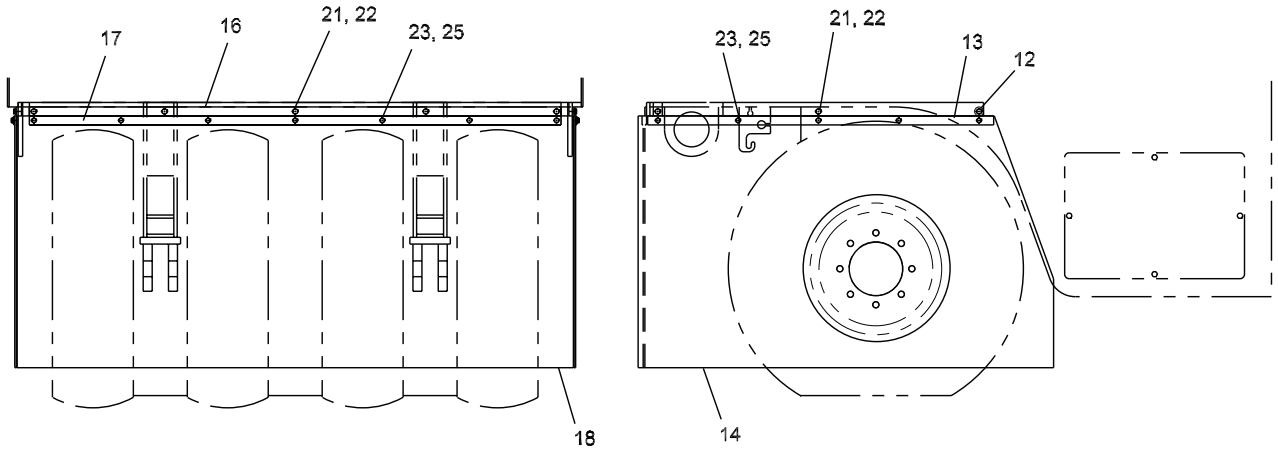
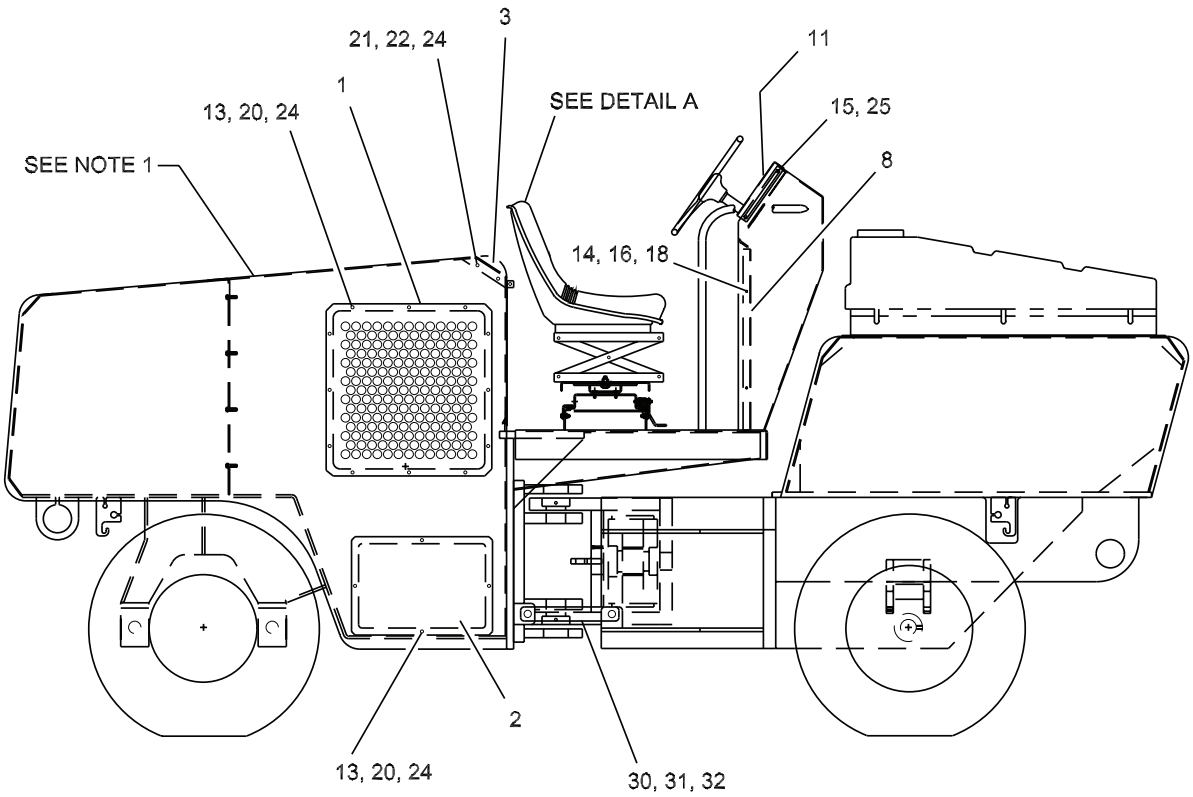


Figure 10-9

Optional Heat Shield Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
11	19591SRV	1	OPTIONAL HEAT SHIELD GROUP	
2	19114	6	•HANGER ROD,FR SIDE CURTAIN	
3	19572SRV	1	•FENDER CURTAIN,W/M,RH	
-4	19589SRV	1	•FENDER CURTAIN W/M,LEFT HAND	
5	19590	2	•FRONT SIDE CURTAIN	
6	19592	2	•CLAMPING BAR,F SIDE CURTAIN	
8	19594	1	•HANGER,FRONT CURTAIN	
9	19595	1	•CLAMPING BAR,FRONT CURTAIN	
10	19596	1	•FRONT CURTAIN	
12	19598	2	•HANGER,REAR SIDE CURTAIN	
13	19599	2	•CLAMPING BAR,REAR SIDE CURTAIN	
14	19607	2	•REAR SIDE CURTAIN	
16	19609	1	•HANGER,REAR CURTAIN	
17	19610	1	•CLAMPING BAR,REAR CURTAIN	
18	19611	1	•REAR CURTAIN	
20	5928	6	•PIN,COTTER,.148,#9	
21	71622	16	•CSHH,.375-16X.88,GR5	
22	80162	16	•WASHER,LOCK,.375	
23	80208	38	•CSHH,.312-18X1.00,GR5	
24	80230	6	•CSHH,.375-16X2.00,GR5	
25	80351	38	•NUT,FLEXLOC,.312-18,FULL,LT	
26	80352	6	•NUT,FLEXLOC,.375-16,FULL,LT	

Cover & Panel Groups (1 of 2)



NOTE 1: Attach chain and sock to inside of engine panel. Secure other end to top stud on fuel tank.

Figure 10-10

Cover & Panel Groups (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
12	28699	1	COVER & PANEL GROUPS	
1	22126	1	•GRILLE,RADIATOR,TRUPAC	
2	19178	1	•COVER,BATTERY COMPARTMENT	
3	19199	1	•HORIZ CROSSMEMBER,R FRAME,W/M	
-4	19202	1	•CROSSMEMBER,VERTICAL	
-5	19219	1	•PANEL,HYD PUMP	
-6	19226	1	•COVER,REAR BALLAST	
-7	28695	1	•ENGINE COVER GRP,3.3 ENGINE	
8	19236	1	•COVER,CONSOLE BOTTOM	
-9	19262	1	•PANEL,REMOVABLE,ENG COMPT	
11	19281	1	•COVER,INSTRUMENT PANEL	
-12	19282	1	•COVER W/M,FRONT BALLAST	
13	988092	24	•INSERT,THR'D,.375-16NC	
14	80036	4	•NUT,HEX,.250-20	
15	80074	2	•NUT,HEX,JAM,.375-16	
16	80140	4	•WASHER,FLAT,USS,.250	
-17	80160	4	•WASHER,LOCK,.250	
18	80192	4	•CSHH,.250-20X.75,GR5	
20	80219	24	•CSHH,.375-16X.75,GR5	
21	80224	8	•CSHH,.375-16X1.25,GR5	
22	80352	8	•NUT,FLEXLOC,.375-16,FULL,LT	
24	80996	32	•WASHER,FLAT,SAE,.375	
25	871020103	4	•CRG BOLT,.375-16X1.00,GR5	
30	19503	1	•LINK,ARTICULATION LOCK	
31	240030	2	•PIN,CLEVIS,1.00X3.25 W/1.5HD	
32	5928	2	•PIN,COTTER,.148,#9	
-35	20616SRV	1	•PANEL,ENGINE REMOVABLE,LH	
-38	70395	2.58	•CHAIN,PROOF COIL,.250	
-39	35403	2.58	•SLEEVE,ABRASION,NYLON,.71ID	
-40	80185	1	•CSHH,.250-20X1.00,GR5	
-41	80140	2	•WASHER,FLAT,USS,.250	
-42	80350	1	•NUT,FLEXLOC,.250-20,FULL,LT	

Cover & Panel Groups (2 of 2)

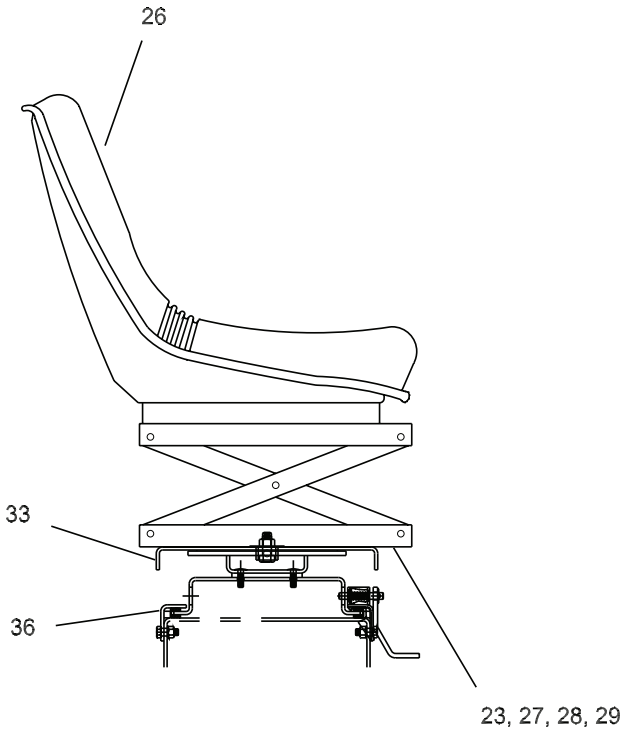


Figure 10-11

Cover & Panel Groups (2 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
12	28699	1	COVER & PANEL GROUPS	
23	80141	32	•WASHER,FLAT,USS,.313	
26	360010B	1	•SEAT ASSY,BLACK,W/ARMREST	
27	140600	1	•SUSPENSION, SEAT	(Low Profile)
28	80208	8	•CSHH,.312-18X1.00,GR5	
29	80351	8	•NUT,FLEXLOC,.312-18,FULL,LT	
33	36371	1	•SWIVEL ASSEMBLY	
36	21575SRV	1	•SLIDING SEAT ASSY	
			ATTACHING PARTS	
-1	21564	1	••PIN,LOCKING	
-2	21566	1	••BASE, SEAT SLIDE	
-3	21569	1	••SLIDE CLAMP W/M, FRONT	
-4	21573	1	••SLIDE CLAMP W/M, REAR	
-5	21706	1	••LATCH,SLIDE RELEASE	
-6	36899	1	••SPRING,COMP .540 DIA X 1.00	
-7	36900	1	••RING,RETAINING EXT .375 SHAFT	
-8	80765	1	••ROLL PIN,.125X.750	
-9	91291-01	4	••WEAR STRIP,POLY 3.88 LG	
			-----*-----	
-	28695	1	ENGINE COVER	

Water System (1 of 2)

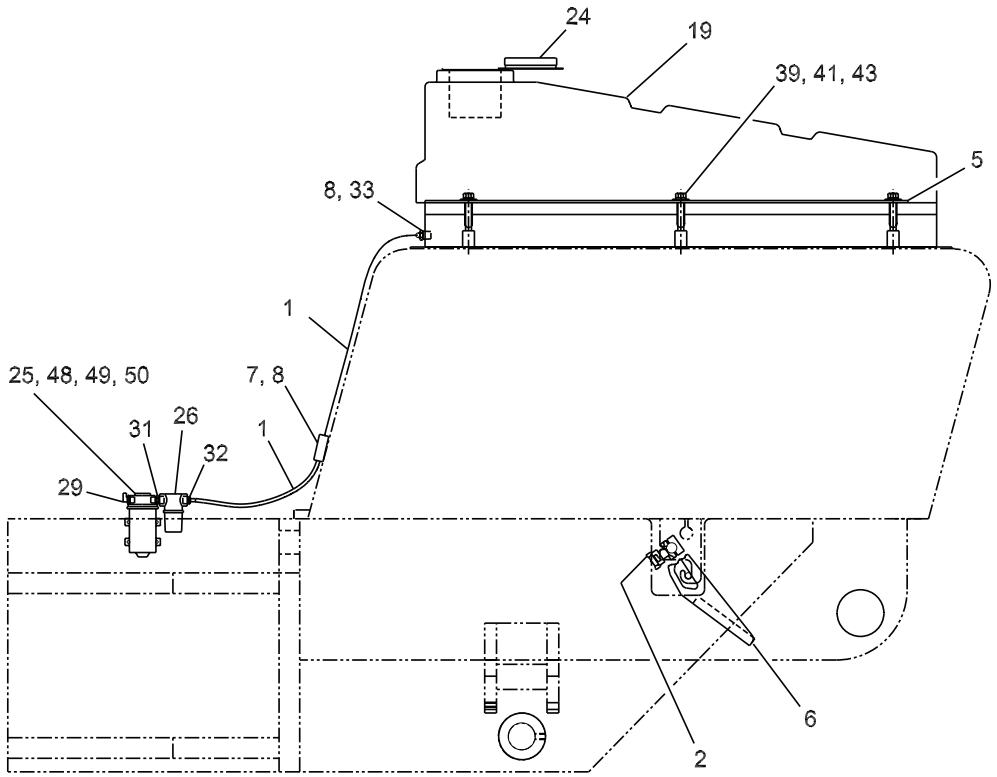
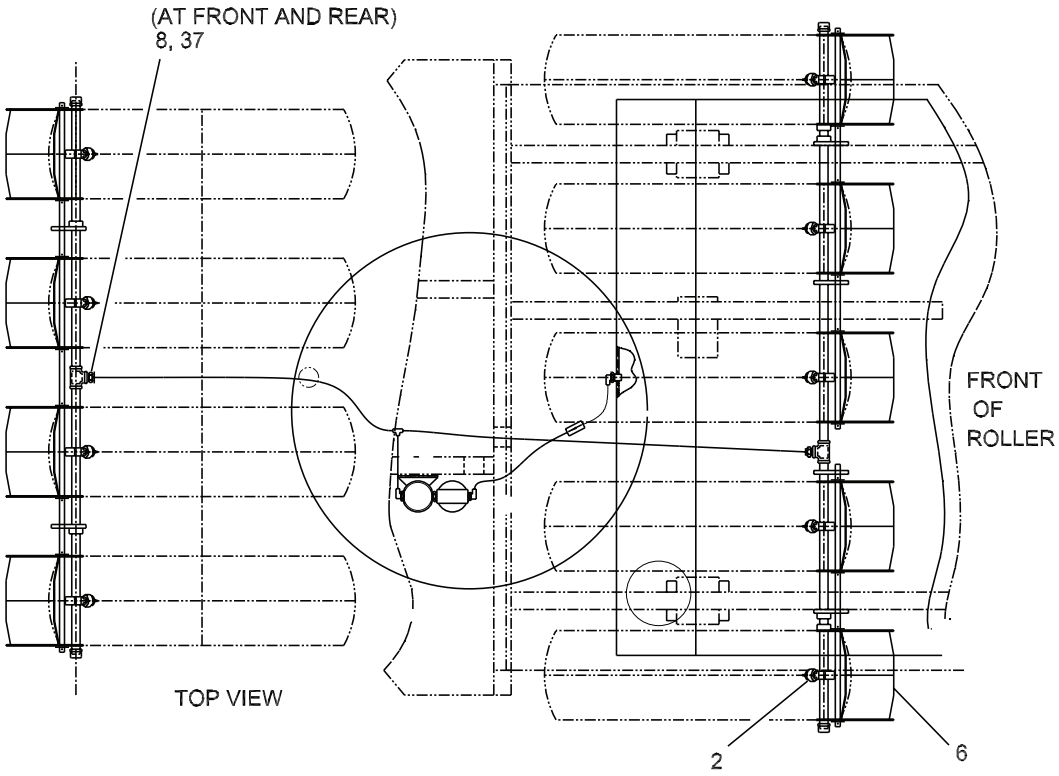


Figure 10-12

Water System (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
13	19276SRV	1	WATER SYSTEM	
1	6352	24	•HOSE,08,PUSH-ON,250	
2	986502	9	•NOZZLE,ASSY,08 PIPE NYL,STR	
5	19675	2	•BAR,CLAMPING	
6	27208	1	•COCO MAT GRP,FLAT TIRE	
7	36883	1	•VALVE,CHECK,.500 HB,5 PSI,POLY	
8	33164	10	•CLAMP,HOSE,# 10	
19	36046SRV	1	•TANK,WATER,100GA,PLASTIC	WHITE
24	36151	1	•FILLER,TANK,4 IN	
25	1005660	1	•PUMP,WATER SPRAY	
26	36926	1	•STRAINER ASSY	
29	72712	1	•FITT,90 06MP-08HB,POLY	
31	36176	1	•PIPE,NIPPLE,.500X.375,PVC	
32	70319	1	•FITT,90 08MP-08HB,POLY	
39	80162	6	•WASHER,LOCK,.375	
41	71619	6	•CSHH,.375-16X3.50,GR5	
43	80142	6	•WASHER,FLAT,USS,.375	
48	28044	1	•HARNESS,WIRE,WATER SPRAY PUMP	
49	36349	1	•TERM,PUSH-ON,.25,FEM,16-14,SLV	
50	33607	1	•TERM,RING,16-14 GA,.250 STUD	

Water System (2 of 2)



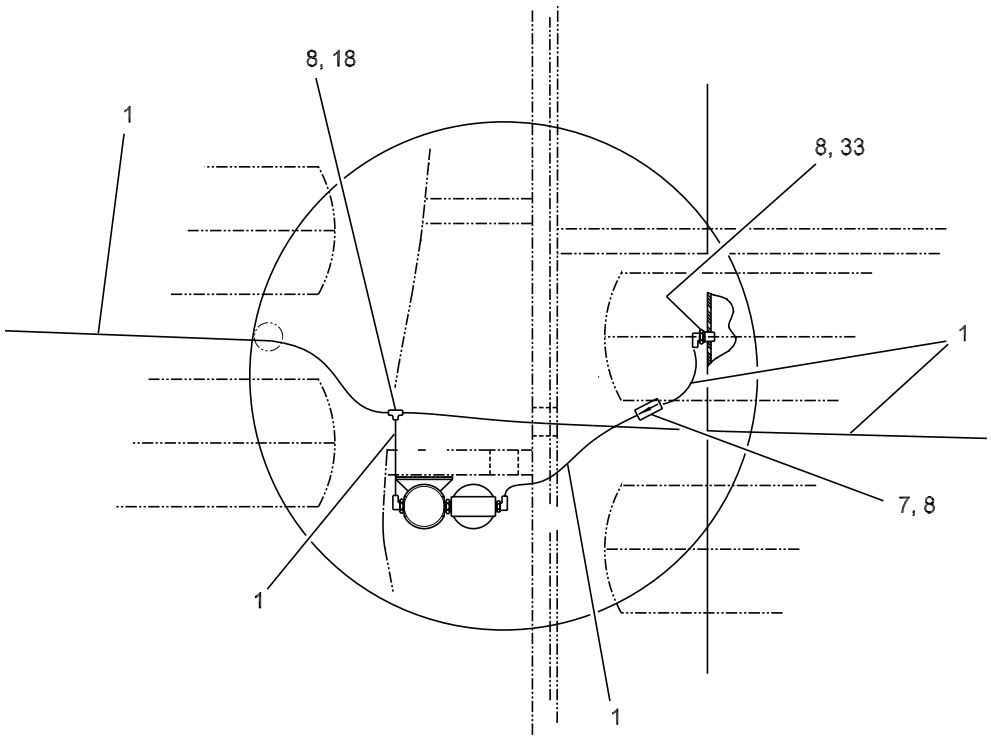


Figure 10-13

Water System (2 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
13	19276SRV	1	WATER SYSTEM	
1	6352	24	•HOSE,08,PUSH-ON,250 PSI	
2	986502	9	•NOZZLE,ASSY,08 PIPE NYL,STR	
6	27208	1	•COCO MAT GRP,FLAT TIRE	(See Fig 10-6)
7	36883	1	•VALVE,CHECK,.500 HB,5 PSI,POLY	
8	33164	10	•CLAMP,HOSE,# 10	
18	35771	1	•FITT,TEE 08HB,POLY	
33	33082	1	•FITT,90 08MP-08HB	
37	70318	2	•FITT,STR 08MP-08HB,BLK POLY	

Kubota Engine & Components

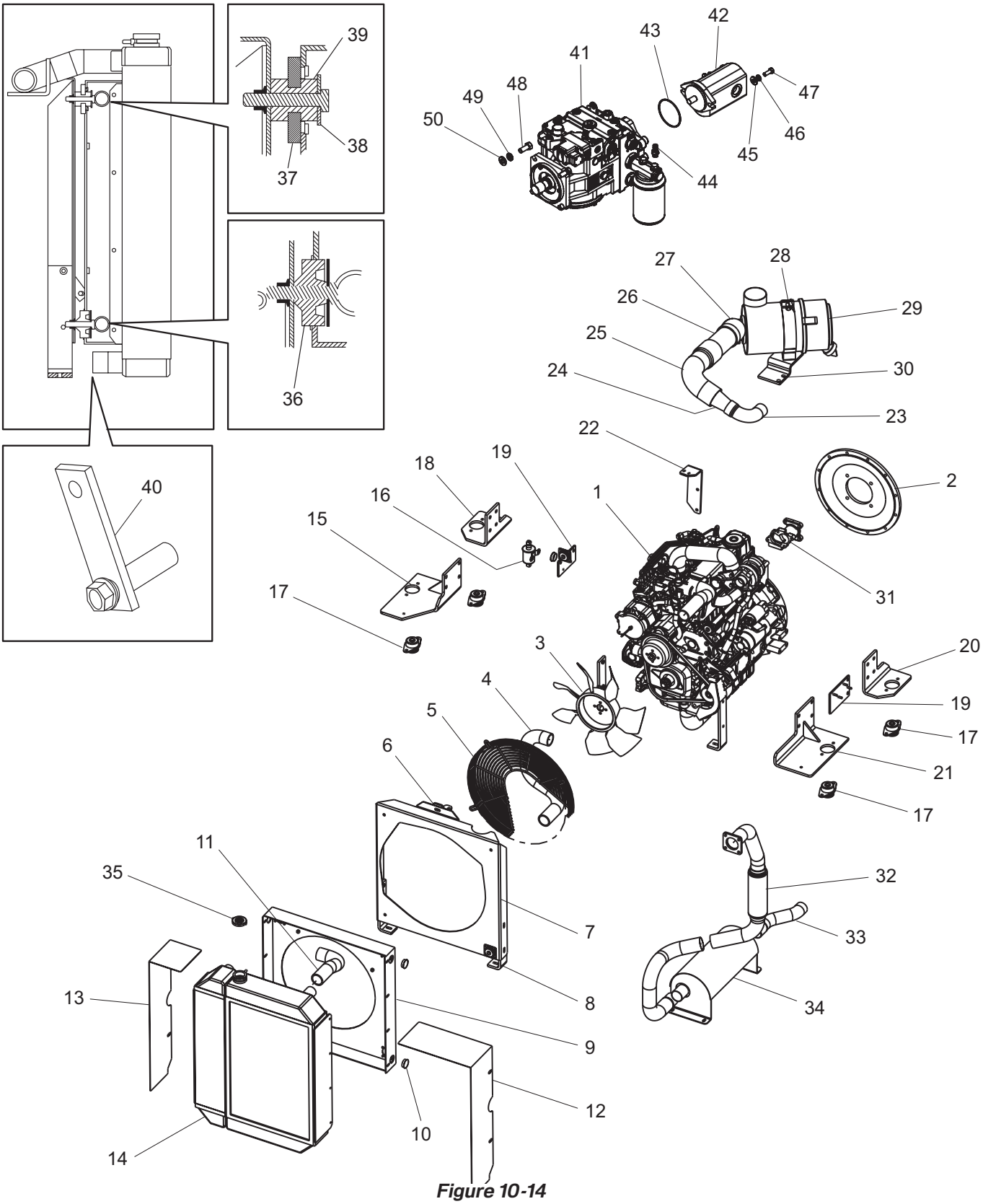


Figure 10-14

Kubota Engine & Components Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1001736	1	ENGINE,KUBOTA,84.5HP	
•	1001166-40	1	Guard, Belt, Kub	
•	1001166-05	1	Engine Belt, Kub	
2	1002184-21	1	PLATE,PUMP MOUNT	Includes two items below
•	1002184-29	1	FLEX PLATE&COUPLING,SAE#4 14T	
•	1002184-30	1	PUMP MOUNT PLATE,SEMI SAE#4	
3	1001736-07	1	BAFFLE,PLATE,LH	
4	1001166-15	1	HOSE,RADIATOR,LOWER	KUBOTA
5	986537-44	1	FAN GUARD	
6	986537-45	1	RADIATOR BRACE	
7	986537-40	1	PLATE,RADIATOR SUPPORT	
8	1001166-48	1	MOUNT,ENG,REAR	KUBOTA
9	986537-40	1	FAN SHROUD	KUBOTA
10	1001166-56	1	PLUG,HOLE COVER,RAD SHROUD	
11	1002006-14	1	HOSE,RADIATOR,UPPER	
12	1001736-07	1	BAFFLE,PLATE,LH	KUBOTA
13	1001736-05	1	BAFFLE,PLATE,RH	KUBOTA
14	988673-13	1	RADIATOR/COOLER ASSY	KUBOTA
15	1001736-04	1	MOUNT,FRONT,FOOT,RH	
16	986537-39	1	PUMP,FUEL,12VDC	KUBOTA
17	1001758	1	MOUNT,ISOLATOR,AXIAL 480#	
18	1001736-03	1	MOUNT,REAR,FOOT,RH	KUBOTA
19	1002184-17	1	PLATE,FUEL PUMP BRKT	
20	1001736-12	1	REAR,MOUNT,FOOT,LH	KUBOTA
21	1001736-14	1	FRONT,MOUNT,FOOT,LH	KUBOTA
22	1002184-19	1	BRKT,THROTTLE	
23	986537-23	1	ELBOW,RUBBER	KUBOTA
24	986537-24	1	AIR FILTER,UPPER REDUCER	
25	1001736-02	1	HOSE,RUBBER,RH	KUBOTA
26	986537-23	1	AIR FILTER,UPPER ELBOW	
27	1001736-01	1	ELBOW,RUBBER,RH	KUBOTA
28	38386	1	MOUNTING BAND,8.13 ID	
29	1003139-03	1	AIR CLEANER ASSY	8.35 BODY,3.75IN,3.50,90,OUT
30	1001736-10	1	AIR,CLEANER,MOUNT	KUBOTA
31	1001736-11	1	REAR,OUT, MUFFLER, FLANGE,LH	KUBOTA
32	1001736-09	1	PIPE,EXH,LH	KUBOTA
33	1001736-15	1	TAILPIPE, LH	KUBOTA
34	1001736-16	1	MUFFLER,LH	KUBOTA
35	1002676-11	1	CAP,RADIATOR	KUBOTA
36	1001166-59	2	ISOLATOR,RAD UPPER MNT	

Kubota Engine & Components

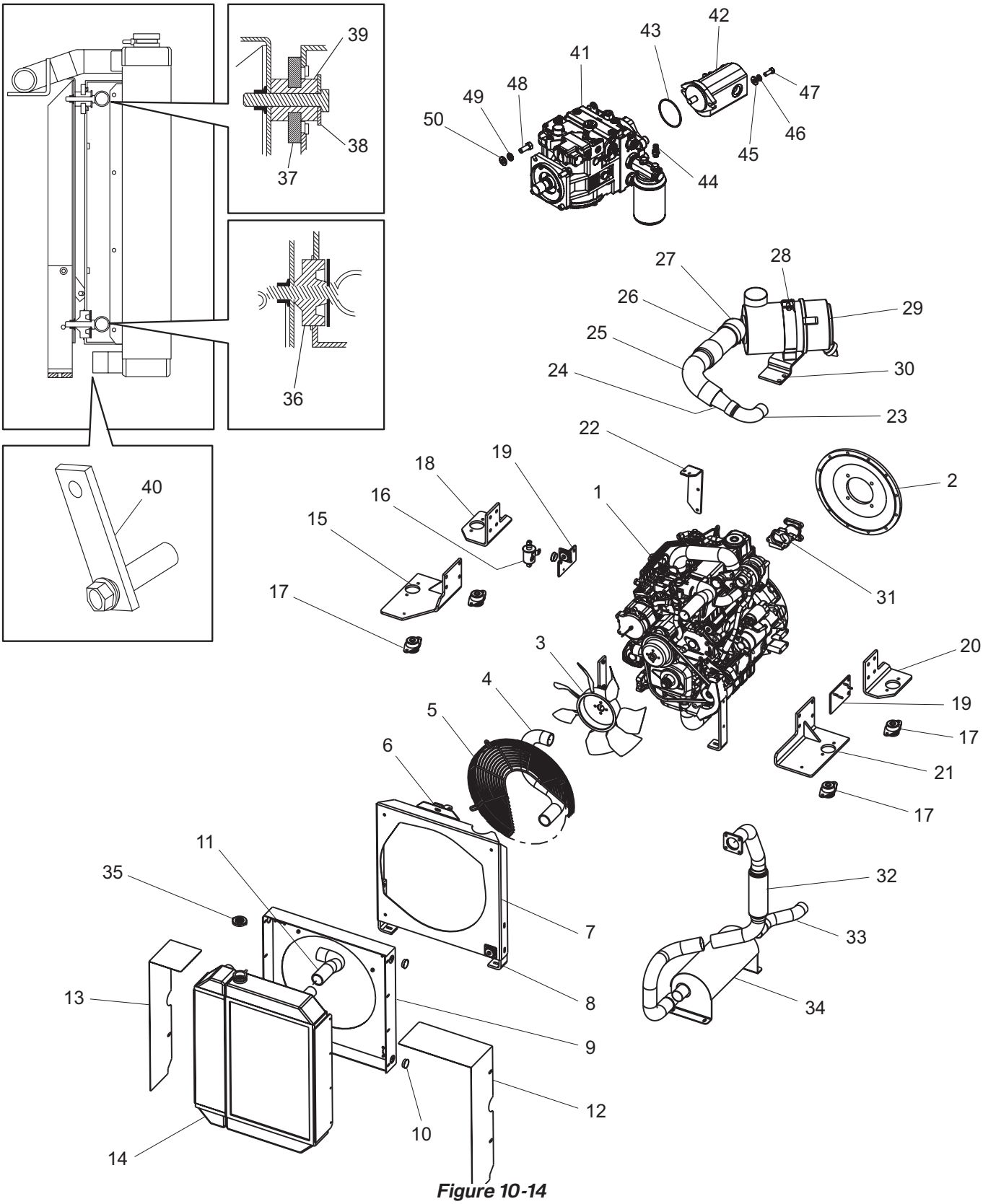


Figure 10-14

Kubota Engine Sub-assembly (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
37	1001166-58	2	PLATE,RAD ISOLATOR MNT	
38	981511	4	Fender Washer	
39	1001166-57	2	ISOLATOR,RAD LOWER MNT	
40	1001166-60	2	BUMPER ASSY,RAD ISOLATOR MNT	
41	36125-04	1	•PUMP,HYD,PISTON,W/EDC	
42	37091	1	•PUMP,HYD,GEAR,1.22 CIR	
43	36808	1	•ORING,3.237 ID X .103,SAE 152	
44	72689	1	•FITT,TEST 06MB-02PD	
45	80142	2	•WASHER,FLAT,USS,.375	
46	80162	10	•WASHER,LOCK,.375	
47	80221	10	•CSHH,.375-16X1.00,GR5	
48	80250	4	•CSHH,.500-13X1.25,GR5	
49	80164	4	•WASHER,LOCK,.500	
50	80695	4	•WASHER,FLAT,SAE,.500	
•	988673-18	1	FITT,90 02MP-05HB	
•	988673-19	1	FITT,STR 02MP-05HB	
•	1000867-10	1	SOLENOID,FUEL,DIODE	
•	1002184-25	1	HARNESS,ENGINE	KUBOTA
•	1001166-65	2	RELAY,12VDC,50AMP	KUBOTA
•	1001166-13	1	TANK,COOLANT RECOVERY	KUBOTA
•	985628	1	ADAPTOR,OIL SENDER	
•	REF	1	FITTING,HOSE CONNECTOR,3/16 - 5/16	
•	985628	1	FITTING,OIL PRESSURE	
•	REF	1	TEE,STREET 1/8	
•	11022	20	WRAP, EXHAUST INSULATING	
•	988169	1	KIT,HOSE OIL DRAIN KUBOTA	REMOTE OIL DRAIN
•	REF	1	FITTING, 3/8-18,OIL PAN, M22-1.5	REMOTE OIL DRAIN
•	1002184-27	1	Sender,Press,0-100 Psi,02Mp | 240-33.5 Ohm	Faria Gauge
•	1002184-28	1	Sender,Temp,100-250 F,06 Mp | 450-29.5	Faria Gauge
•	1001166-03	1	Starter	
•	1001166-04	1	Alternator	
•	1001166-09	1	Glow Plugs	
•	1001753	1	Block Heater	
•	1001166-42	1	Manual, Operators, Kub	
•	1001166-43	1	Manual, Service, Kub	
•	1001166-44	1	Manual, Workshop, Kub	
•	1001166-45	1	Manual, Parts, Kub	
•	REF	A/R	Filters	**Quick Reference Guide - Kubota Filters and Service Items**

Caterpillar Engine and Components

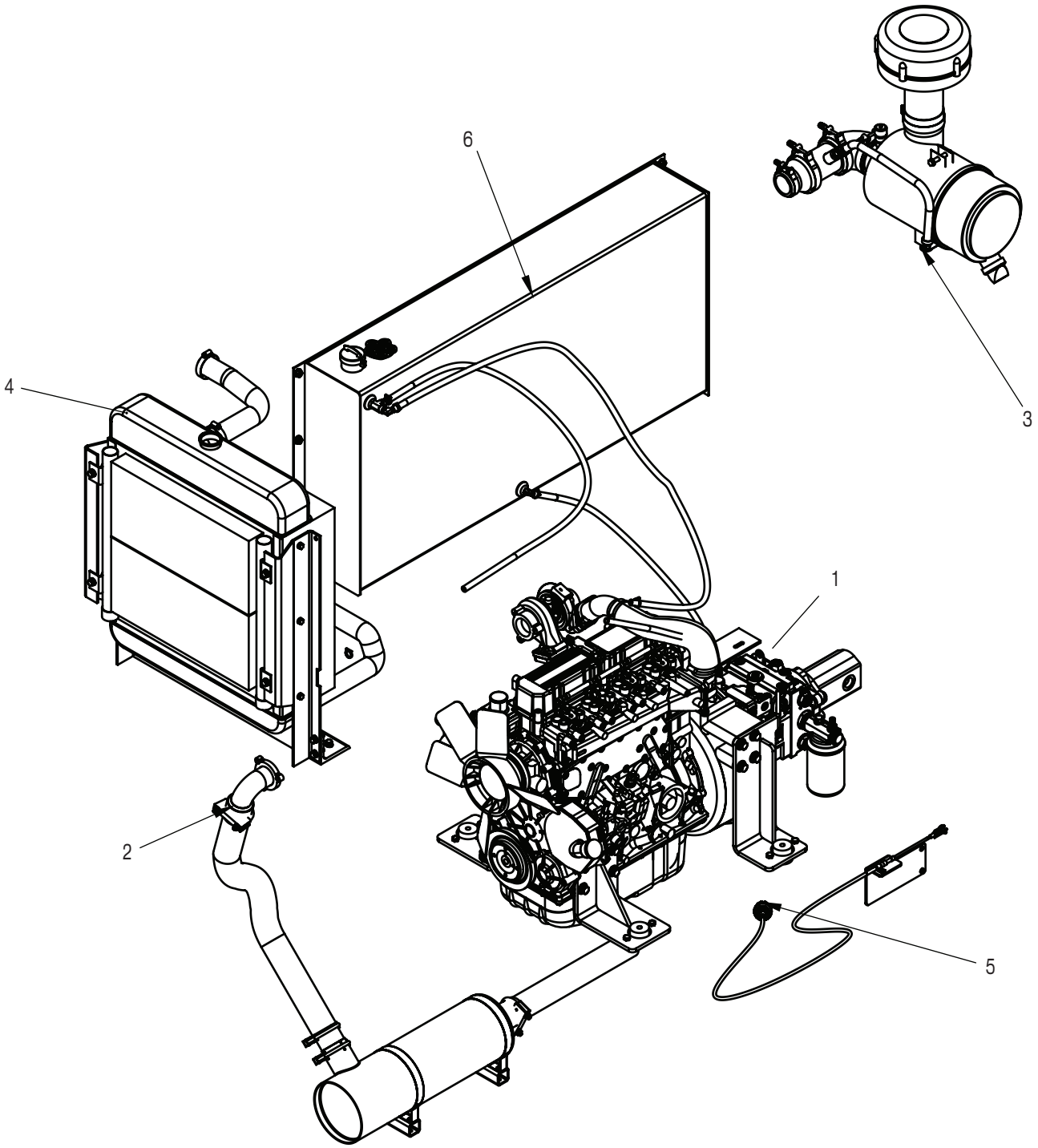


Figure 10-15

Caterpillar Engine and Components Parts List

Item No.	Part Number	Qty.	Description	Remarks
-21	985710	1	CATERPILLAR ENGINE AND COMPONENTS	
1	985709	1	•ENGINE SUB-ASSEMBLY	
2	985750	1	•EXHAUST ASSEMBLY	
3	985725	1	•AIR INTAKE SYSTEM	
4	985714	1	•RADIATOR/OIL COOLER GRP	
5	986385	1	•THROTTLE GROUP	
6	986386	1	•FUEL SYSTEM	
-7	80186	2	•CSHH,.500-13X1.75,GR5	
-8	80354	2	•NUT,FLEXLOC,.500-13,FULL,LT	
-9	80695	4	•WASHER,FLAT,SAE,.500	
-10	38827-01	4	•WASHER,SNUBBING,2.00ODX.450OD	
-11	80353	4	•NUT,FLEXLOC,.438-14,FULL,LT	
-12	80696	4	•WASHER,FLAT,SAE,.438	
-13	80776	4	•CSHH,.437-14X3.00,GR5	

Caterpillar Engine Sub-Assembly (1 of 2)

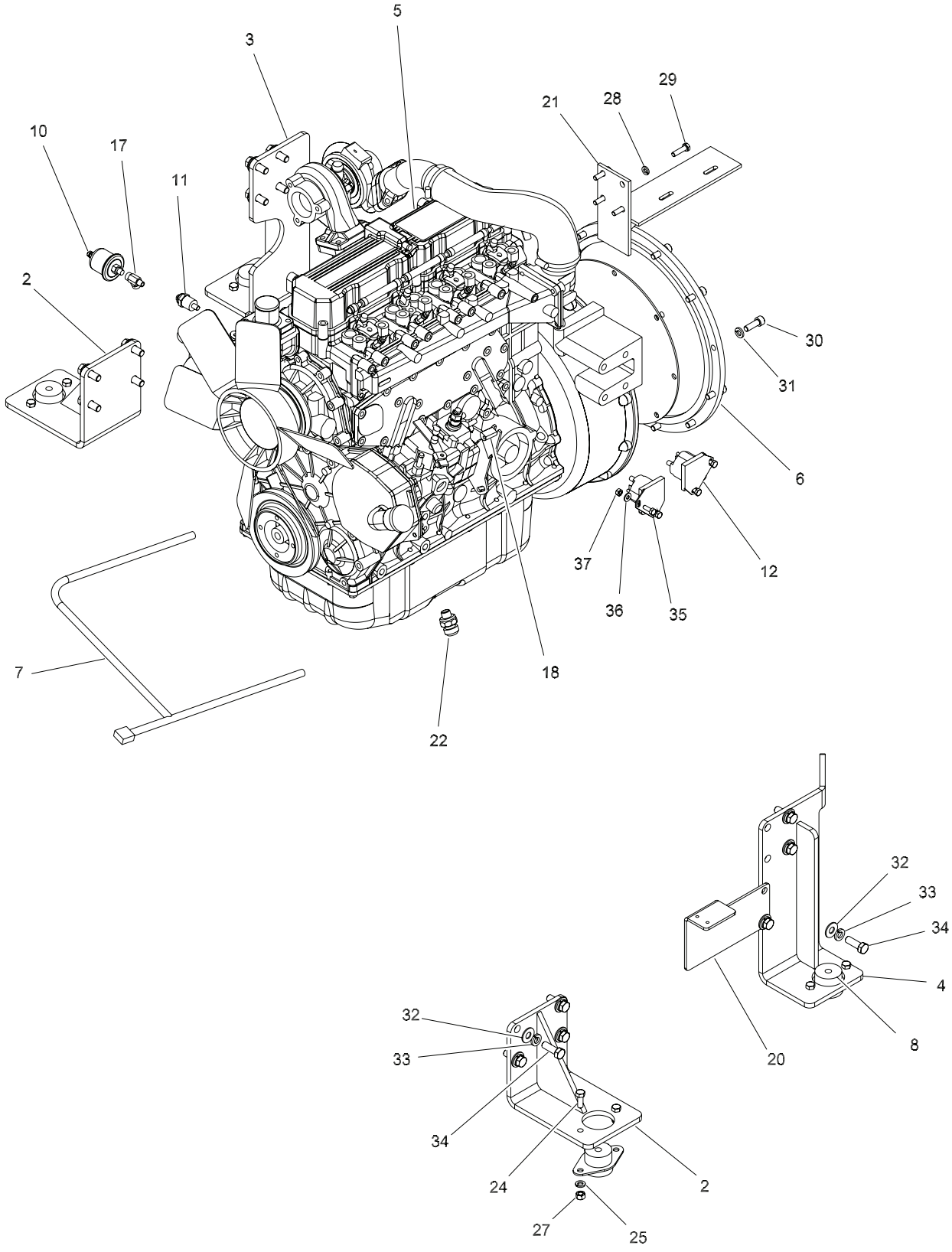


Figure 10-16

Caterpillar Engine Sub-Assembly (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
22	985709	1	CAT. ENGINE SUB-ASSEMBLY	
2	985701	2	•FRONT ENG MOUNT,W/M,CAT	
3	985704	1	•REAR ENG MOUNT,RH,W/M,CAT	
4	985707	1	•REAR ENG MOUNT,LH,W/M,CAT	
5	988671	1	•ENGINE,CAT,3044T,80 HP	
6	986264	1	•DRIVE PL ASSY,SAE#4,C MT,CAT	
7	985757	1	•HARNESS,ENGINE,CAT 3.3	
8	39082	4	•MOUNT,ISOLATION,425#	
10	39081	1	•SENDER,PRESS,OIL,1-150 PSI,HD	
11	35367	1	•SENDER,TEMP GAUGE,08 MP	
12	38954	2	•RELAY,STARTER	
17	36066	1	•FITT,TEE 02MP-02FP-02FP,STL	
18	28700	1	•STOP,THROTTLE,3.3 ENGINE	
20	983185	1	•BRKT,THROTTLE,CABLE,CAT/PER3.3	
21	985717	1	•W/M,MNT,AIR CLEANER,CAT T/P	
22	988515	1	•FITT,STR 16MJ-M10,METRIC	
24	80221	10	•CSHH,.375-16X1.00,GR5	
25	80162	10	•WASHER,LOCK,.375	
27	80038	8	•NUT,HEX,.375-16	
28	80477	4	•WASHER,LOCK,M08	
29	80492	4	•CSHH,M8-1.25X30MM,CL8.8	
30	811320	12	•CSSH,M10-1.50X30MM	
31	80478	12	•WASHER,LOCK,M10	
32	81141	16	•WASHER,FLAT,SAE,.500,HARDENED	
33	80484	16	•WASHER,LOCK,M12	
34	80877	16	•CSHH,M12-1.75X35MM,CL8.8	
35	80192	4	•CSHH,.250-20X.75,GR5	
36	80970	4	•WASHER,FLAT,SAE,.250	
37	80350	4	•NUT,FLEXLOC,.250-20,FULL,LT	

Caterpillar Engine Sub-Assembly (2 of 2)

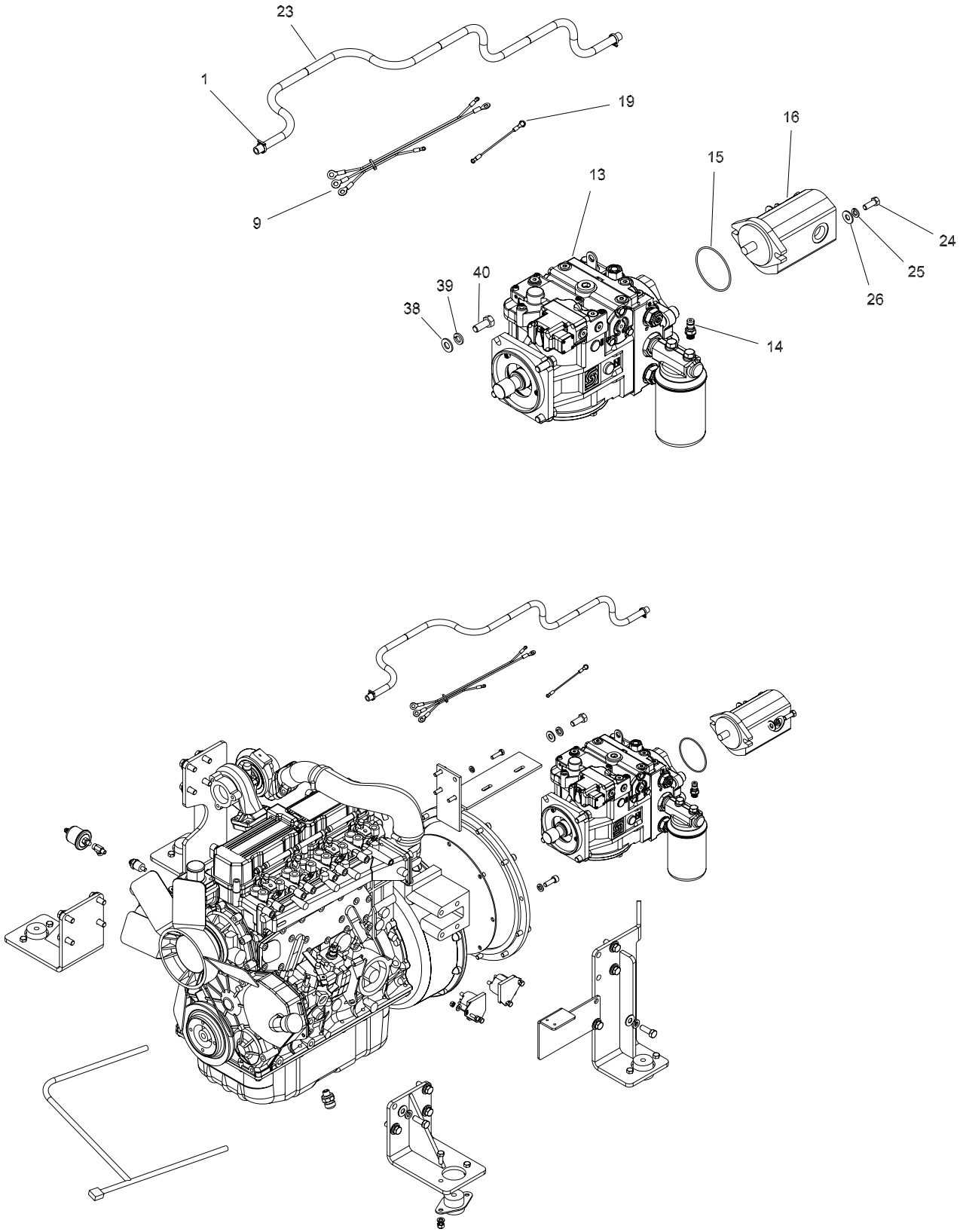


Figure 10-17

Caterpillar Engine Sub-Assembly (2 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
22	985709	1	CAT. ENGINE SUB-ASSEMBLY	
1	33162	2	•CLAMP,HOSE,# 06	
9	28489	1	•HARNESS,STARTER,TRUPAC 3.3	
13	36125-04	1	•PUMP,HYD,PISTON,W/EDC	
14	72689	1	•FITT,TEST 06MB-02PD	
15	36808	1	•ORING,3.237 ID X .103,SAE 152	
16	37091	1	•PUMP,HYD,GEAR,1.22 CIR	
19	28701	1	•WIRE,JUMPER,GROUND	
23	38579	4	•HOSE,06,LOW PRESS PUSH ON	
24	80221	10	•CSHH,.375-16X1.00,GR5	
25	80162	10	•WASHER,LOCK,.375	
26	80142	2	•WASHER,FLAT,USS,.375	
38	80695	4	•WASHER,FLAT,SAE,.500	
39	80164	4	•WASHER,LOCK,.500	
40	80250	4	•CSHH,.500-13X1.25,GR5	
-	REF	A/R	Filters	See **Quick Reference Guide - Caterpillar Filters and Service Items**

Caterpillar Exhaust Assembly

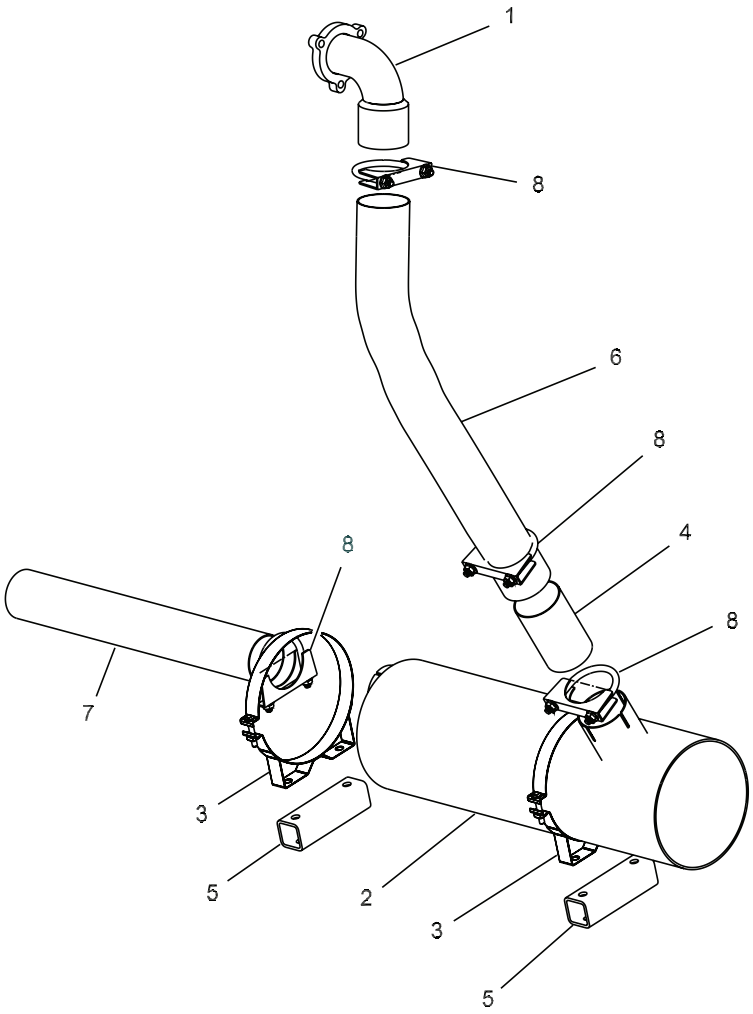


Figure 10-18

Caterpillar Exhaust Assembly Parts List

Item No.	Part Number	Qty.	Description	Remarks
23	985750	1	CATERPILLAR EXHAUST ASSEMBLY	
1	39146-01	1	•WELDMENT,EXHAUST	
2	34074	1	•MUFFLER,2-1/2" ID SIDE INLET	
3	34033	2	•CLAMP,AIR CLEANER MOUNT,6.5"ID	
4	19287-02	1	•TUBING,2.50 OD x 16 GA x 4	
5	21243	2	•SPACER,MUFFLER 4B3.9	
6	27890-01	1	•TUBE,FLEX,2.50IDX33.00	
7	90607-01	1	•TUBE,RND,2.500X16GAX17.13	
8	33312	4	•CLAMP,MUFFLER,.3125X2.5	
-9	71621	4	•CSHH,.375-16X2.75,GR5	
-10	80038	4	•NUT,HEX,.375-16	
-11	80142	4	•WASHER,FLAT,USS,.375	
-12	80162	4	•WASHER,LOCK,.375	

Caterpillar Air Intake System

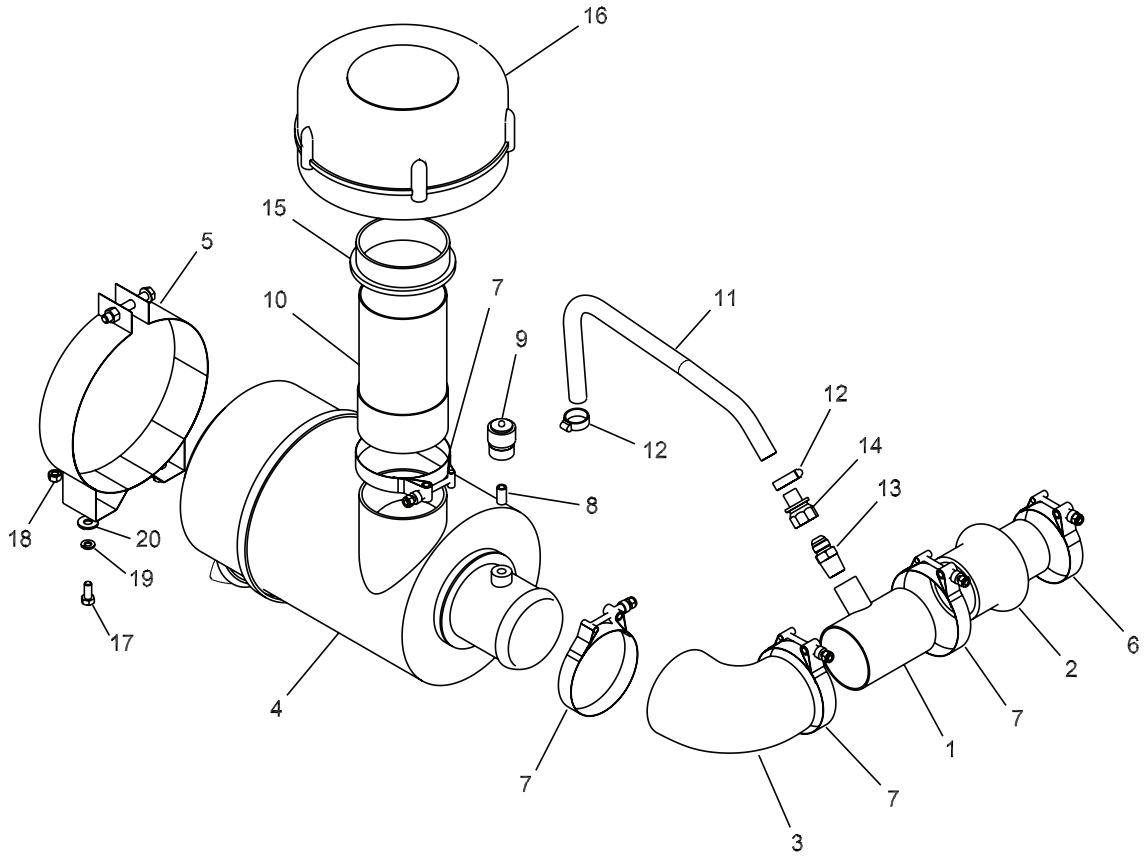


Figure 10-19

Caterpillar Air Intake Parts List

Item No.	Part Number	Qty.	Description	Remarks
24	985725	1	CATERPILLAR AIR INTAKE SYSTEM	
1	986391	1	•TUBE,AIR INTAKE,W/CPL'G	
2	986633	1	•ADPTR,RUBBER RED,3.00-2.00 ID	
3	171170	1	•ELBOW,RUBBER,90,3.50X3.00 ID	
4	38385	1	•AIR CLEANER ASSY	
5	38386	1	•MOUNTING BAND,8.13 ID	
6	36045	1	•CLAMP,T-BOLT,2.50 NOMINAL	
7	171190	4	•CLAMP,T-BOLT,3.50 NOMINAL	
8	99610	1	•PIPE,NIPPLE,.125XCLOSE	
9	171220	1	•INDICATOR,AIR FILTER SERVICE	
10	28690	1	•EXT,AIR INLET,3.75,MOD,3.3 ENG	
11	6352	1	•HOSE,08,PUSH-ON,250	
12	33164	2	•CLAMP,HOSE,# 10	
13	33937	1	•FITT,STR 08MJ-08MP	
14	31109	1	•FITT,STR 08FJX-08HB,PUSH-ON	
15	37587-2	1	•INSERT,RUBBER,4.00 TO 3.75	
16	37587	1	•PRE-CLEANER,4.00ID	
17	80207	2	•CSHH,.312-18X.75,GR5	
18	80037	2	•NUT,HEX,.312-18	
19	80161	2	•WASHER,LOCK,.312	
20	80141	2	•WASHER,FLAT,USS,.313	

Caterpillar Radiator/Oil Cooler Group

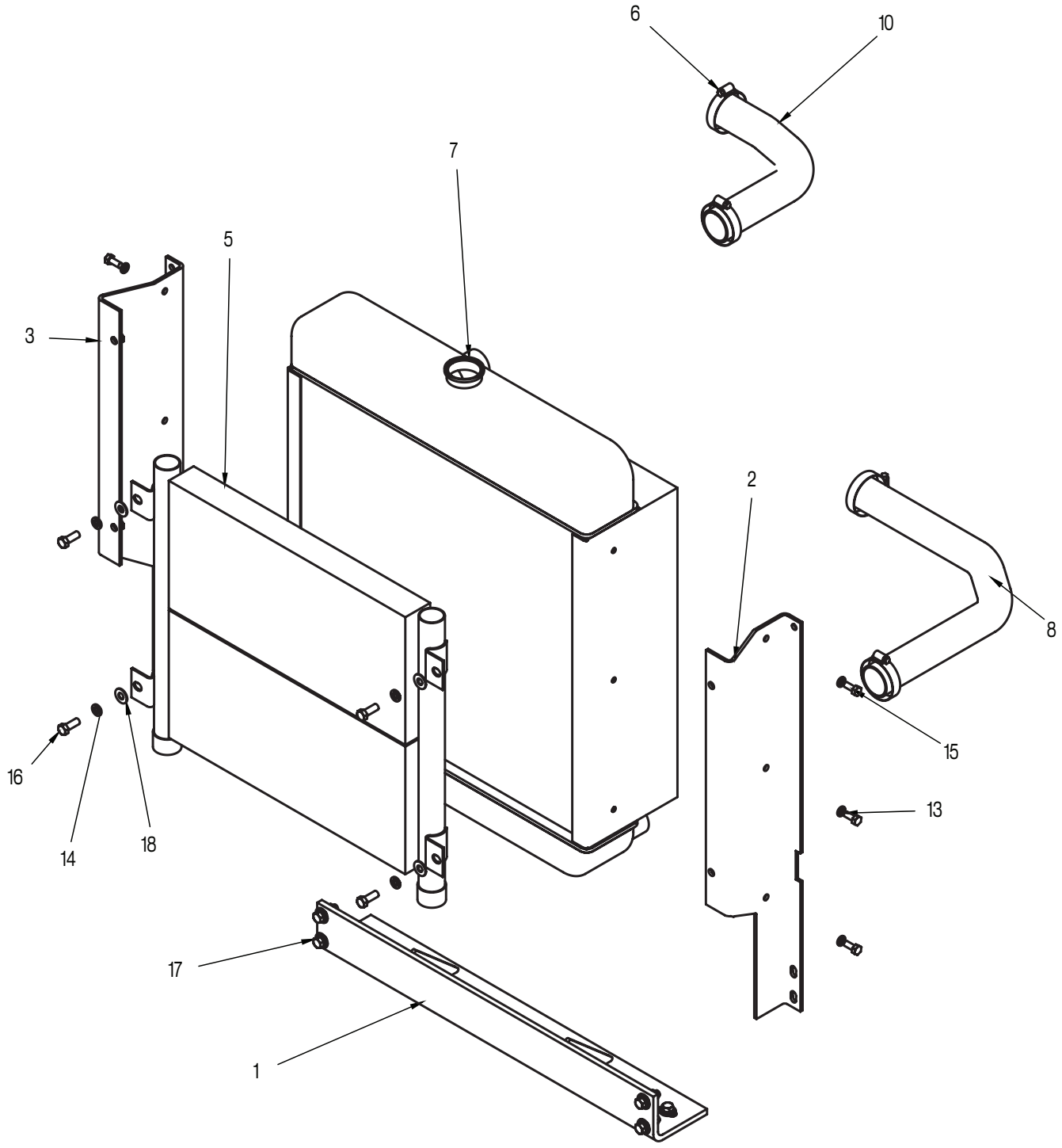


Figure 10-20

Caterpillar Radiator/Oil Cooler Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
25	985714	1	CAT. RADIATOR/OIL COOLER GROUP	
1	21233	1	•RADIATOR BASE W/M,4BTA	
2	28455	1	•RADIATOR SUPPORT W/M,LH,3.3	
3	28456	1	•RADIATOR SUPPORT W/M,RH,3.3	
-4	33168	2	•CLAMP,HOSE,# 24	
5	35423	1	•COOLER,HYD OIL	
6	33170	2	•CLAMP,HOSE,# 32	
7	38784	1	•RADIATOR	
8	170071A	1	•HOSE,RADIATOR,UPPER	
-9	986461	1	•ADAPTER,HOSE,1.5IDX1.25ID	
10	986462	1	•HOSE,FLEX,1.5X1.75X15	
-11	910150	1	•VALVE,DRAIN COCK,.250 NPT	
-12	80038	10	•NUT,HEX,.375-16	
13	80161	6	•WASHER,LOCK,.312	
14	80162	10	•WASHER,LOCK,.375	
15	80207	6	•CSHH,.312-18X.75,GR5	
16	80221	4	•CSHH,.375-16X1.00,GR5	
17	80224	6	•CSHH,.375-16X1.25,GR5	
18	80996	10	•WASHER,FLAT,SAE,.375	
-19	983286	1	•TUBE, AIR INTAKE	
-20	983285	1	•SHROUD, FLAT REDUCING FAN	

Caterpillar Throttle Group

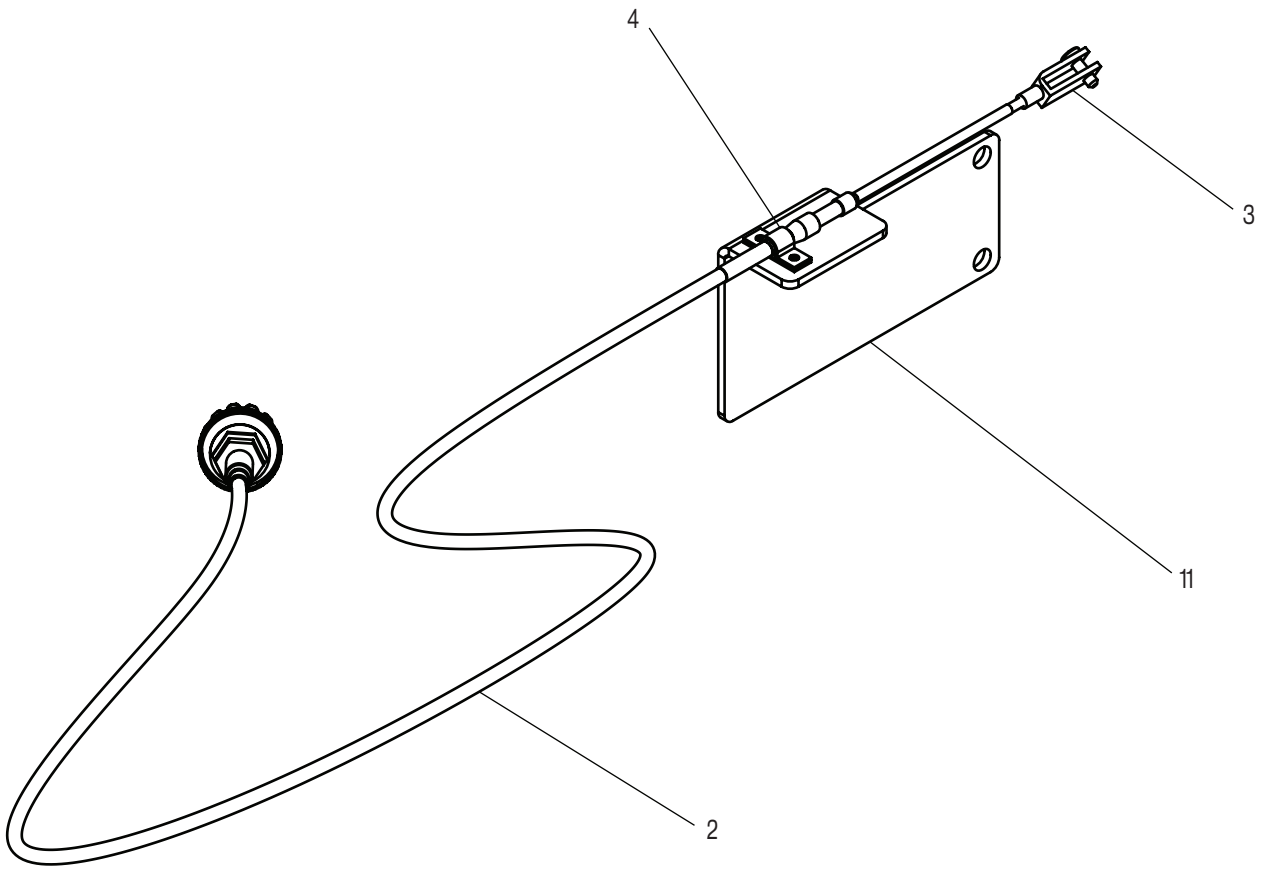


Figure 10-21

Caterpillar Throttle Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
26	986385	1	CATERPILLAR THROTTLE GROUP	
2	37845	1	•CABLE,THROTTLE,VERNIER,3"TX126	
3	37846	1	•CLEVIS,10-32X1.25,W/.250 PIN	
4	37847	1	•CLAMP,CABLE,30 SERIES	
-5	37865	1	•SHIM,CABLE CLAMP, 30 SERIES	
-6	71716	2	•MACH SCR,PH,#10-24X.75	
-9	80995	2	•WASHER,FLAT,USS,#10	
-10	80824	2	•NUT,HEX,#10-24	
11	983185	1	•BRKT,THROTTLE CABLE,CAT	

Fuel System

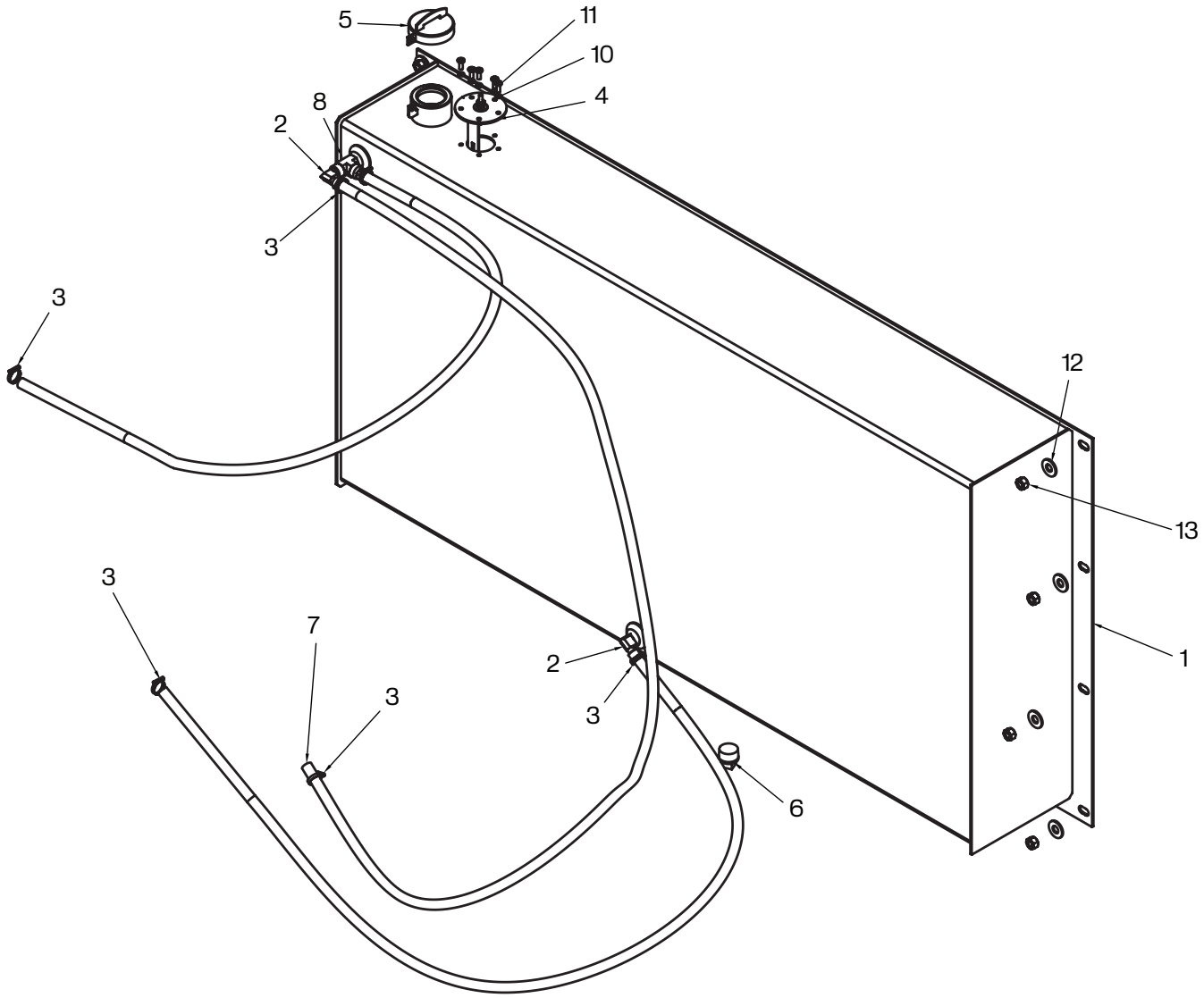


Figure 10-22

Fuel System Parts List

Item No.	Part Number	Qty.	Description	Remarks
27	986386	1	FUEL SYSTEM	KUB/CAT
1	24852	1	•TANK W/M,FUEL,35GAL	
2	38279	2	FITT,90 04MP-05HB	
3	33162	6	•CLAMP,HOSE,# 06	
4	35370-2	1	•SENDER,FUEL LEVEL,24.00 TANK	
5	36105	1	•CAP,FUEL,W/LOCK LUG	
6	99538	1	•PIPE,PLUG,.750,SQ HEAD	
7	986920-05	1	HOSE,06,FUEL,NON-PUSH ON	
8	33154	1	FITT,TEE 04MP-04FP-04FP	
9	33491	1	FITT,STR 04MP-05HB,CRIMPED	
10	80879	5	WASHER,LOCK#10	
11	81150	5	SCR,SELF-TAP,#10-32X.50	
12	80996	8	WASHER,FLAT,SAE,.375	
13	80038	8	NUT,HEX,.375-16	
-	33291	1	FILTER,FUEL,INLINE	
-	986687	1	KIT,FITTINGS,LIFT PUMP	

Instruments and Wiring (1 of 2)

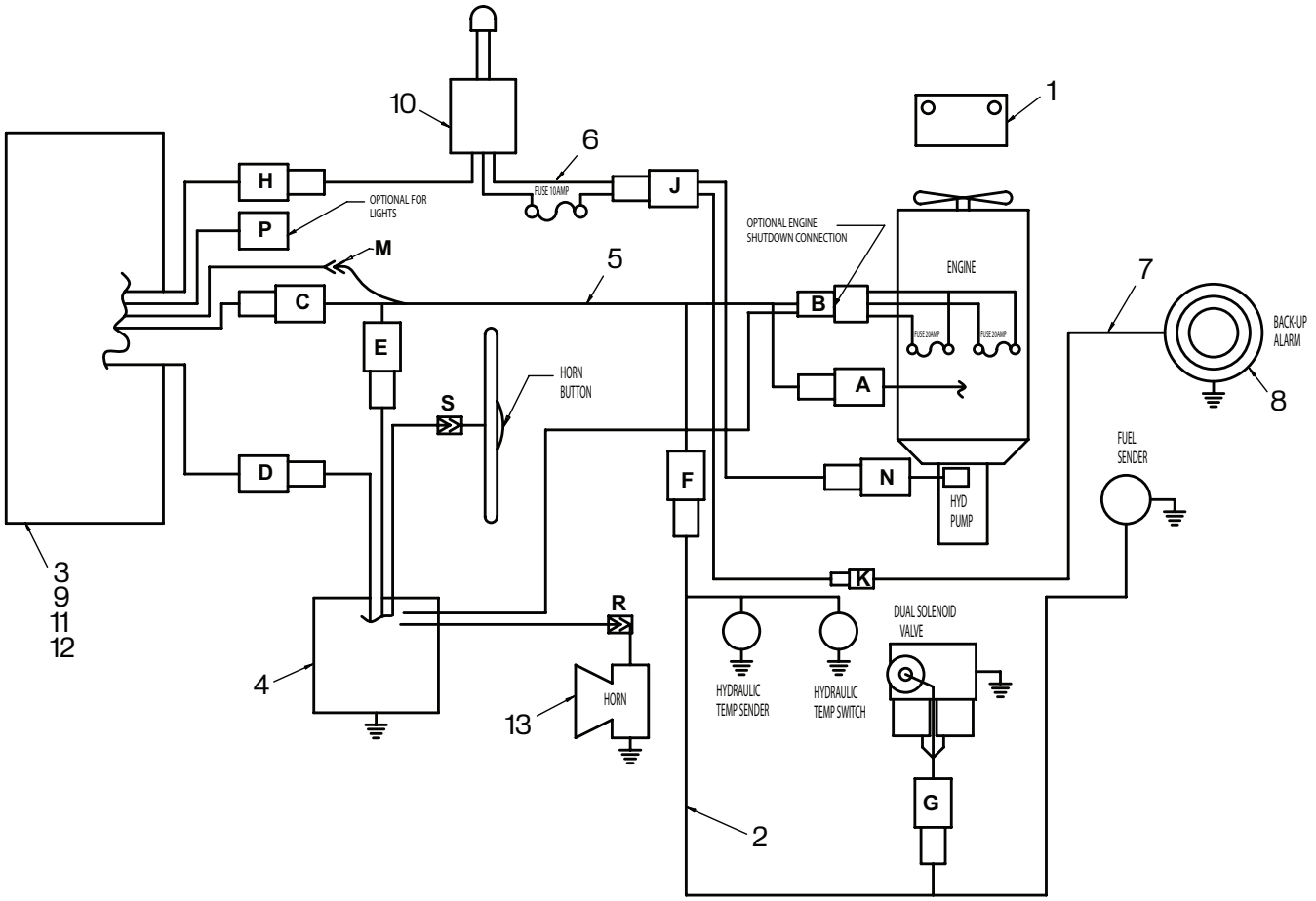


Figure 10-23

Instruments and Wiring (1 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
28	986217	1	WIRING,TRUPAC 915,ENG	(See Schematics)
1	19667	1	BATTERY GROUP	
-101	33146-6	1	•BATTERY,12V,1000 CRK AMPS	Purchase Locally
-102	36339	1	•CABLE,BATTERY,NEG,17",EYE/EYE	
-103	70437	1	•BATTERY BOOT,POS(RED)	
-104	72313	1	•HOLD DOWN,BATTERY	
-105	400020	1	•CABLE,BATTERY,NEG,16",EYE/POST	
-106	852510	1	•CABLE,BATTERY,POS,44",EYE/POST	
-107	31935	2	•NUT,WING,.312-18	
-108	80036	2	•NUT,HEX,.250-20	
-109	80140	2	•WASHER,FLAT,USS,.250	
-110	80160	2	•WASHER,LOCK,.250	
-111	80955	2	•CRG BOLT,.312-18X10.00,GR5	
2	985778	1	•HARNESS,HYD/FULE SYSTEM,TRUPAC	(See Schematics)
3	988323	1	•WIRING,INSTRUMENT PANEL	(See Schematics)
4	985779	1	•HARNESS,RELAY BOARD,TRUPAC	(See Schematics)
5	985780	1	•HARNESS,CONNECTING,ENG	(See Schematics)
6	986213	1	•WIRING,CONTROL HANDLE	(See Schematics)
7	23474	1	•HARNESS,BACK-UP ALARM	
8	33963	1	ALARM,BACK-UP	Includes Item 7
9	71716	16	MACH SCR,PH,#10-24X.75	
10	72026	1	HANDLE,MOBIL CONTROL	(See Schematics)
11	80824	2	•NUT,HEX,.#10-24	
12	871071601	6	•WASHER,LOCK,#10	
13	951250115	1	KIT,HORN	(HORN ONLY)

Instruments and Wiring (2 of 2)

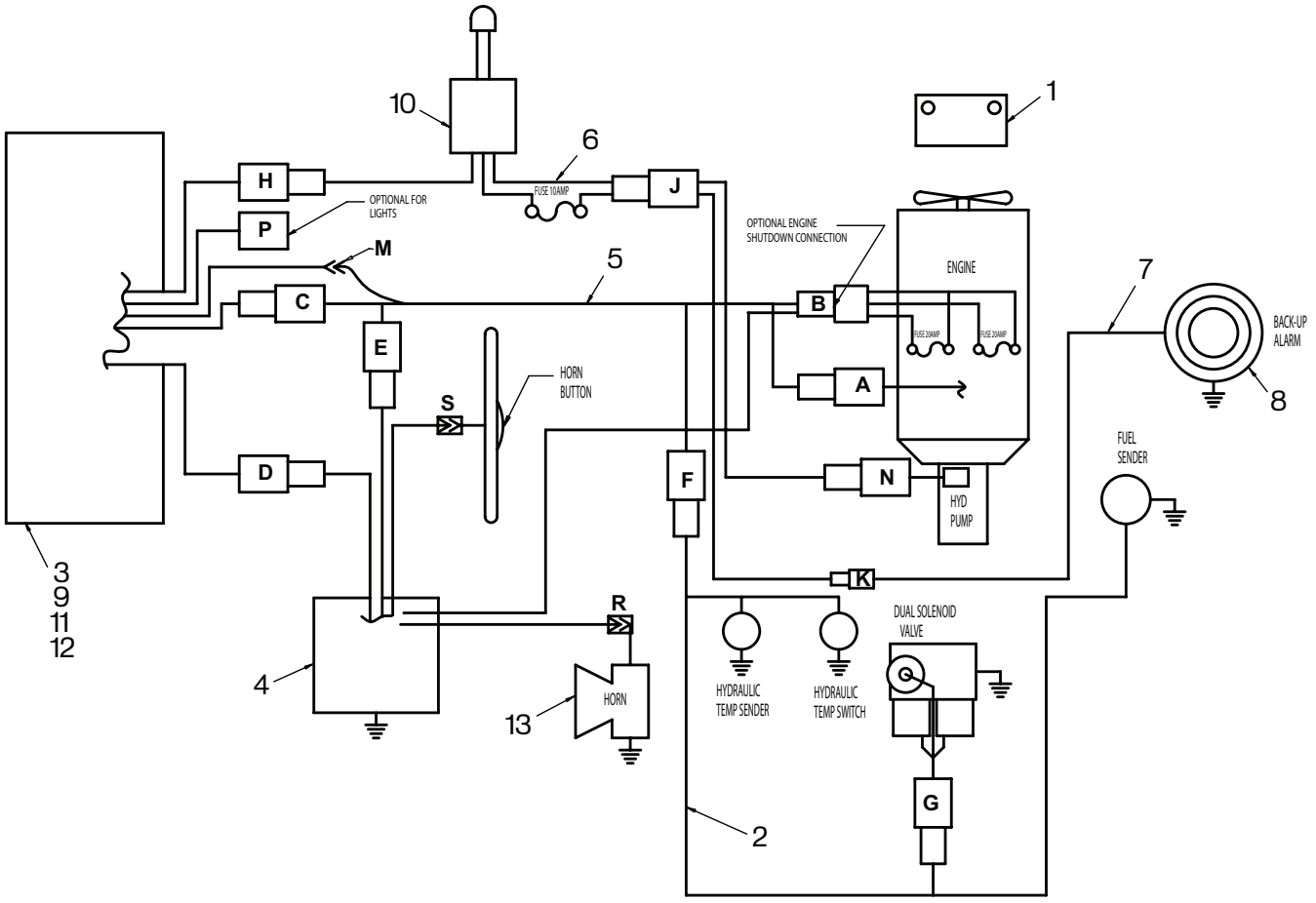


Figure 10-23

Instruments and Wiring (2 of 2) Parts List

Item No.	Part Number	Qty.	Description	Remarks
28		1	INSTRUMENTS AND WIRING	
-14	19680SRV	1	OPTIONAL BEACON LIGHT GROUP	(See Schematics)
-1401	33271-5	15	•WIRE,16GA,WHITE	
-1402	33600	2	•TERM,PUSH-ON,.25,FEM,16-14 GA	
-1403	33602	2	•CONN,BUTT,16-14 GA	
-1404	33607	1	•TERM,RING,16-14 GA,.250 STUD	
-1405	35447	1	•SWITCH,TOGGLE,SPST,LIGHTED	
-1406	36348	1	•TERM,PUSH-ON,.25,M,18-14,SLV	
-1407	36349	1	•TERM,PUSH-ON,.25,FEM,16-14,SLV	
-1408	71060	15	•LOOM,SPLIT,CONVOLUTED,.250	
-1409	210893	1	•BEACON,AMBER,ROTATING LIGHT	
-15	19676SRV	1	OPTIONAL WORK LIGHT,TURN & TAIL	
-1501	24155	1	•HARNESS,WORK LIGHT & TURN SIGNAL	(See Schematics)
-1502	33271-12	1.5	•WIRE,16GA,RED,BLACK STRIPE	
-1503	33435	6	•LIGHT & SOCKET,12V,2.00 GAUGE	
-1504	36157	1	•BODY,FUSE BLOCK,4 GANG,ATO&ATC	
-1505	36168	8	•TERM,FUSE BLOCK,12 GA	
-1506	36342	1	•FUSE,20 AMP,ATC	
-1507	72086	2	•SWITCH,TOGGLE,DPDT,2-POS	
-1508	851390204	1	•TERM,RING,16-14 GA,#10 STUD	
-1509	871111605	26	•CLAMP,INSULATED BAND,1/2"	
-1510	160040A	4	•WORK LIGHT	
-1511	140480	1	•TURN SIGNAL,W/HAZARD,4-WIRE	
-1512	35901	1	•GROMMET,.50IDX.75HOLE	
-1513	6161	2	•LIGHT,TURN SIGNAL,AMBER	
-1514	71900	1	•CONDUIT HANGER,.50	
-1515	851091608	1	•FLASHER,SIGNAL	
-1516	851342007	2	•LIGHT,TURN/BRAKE,RED	

Controls and Gauges

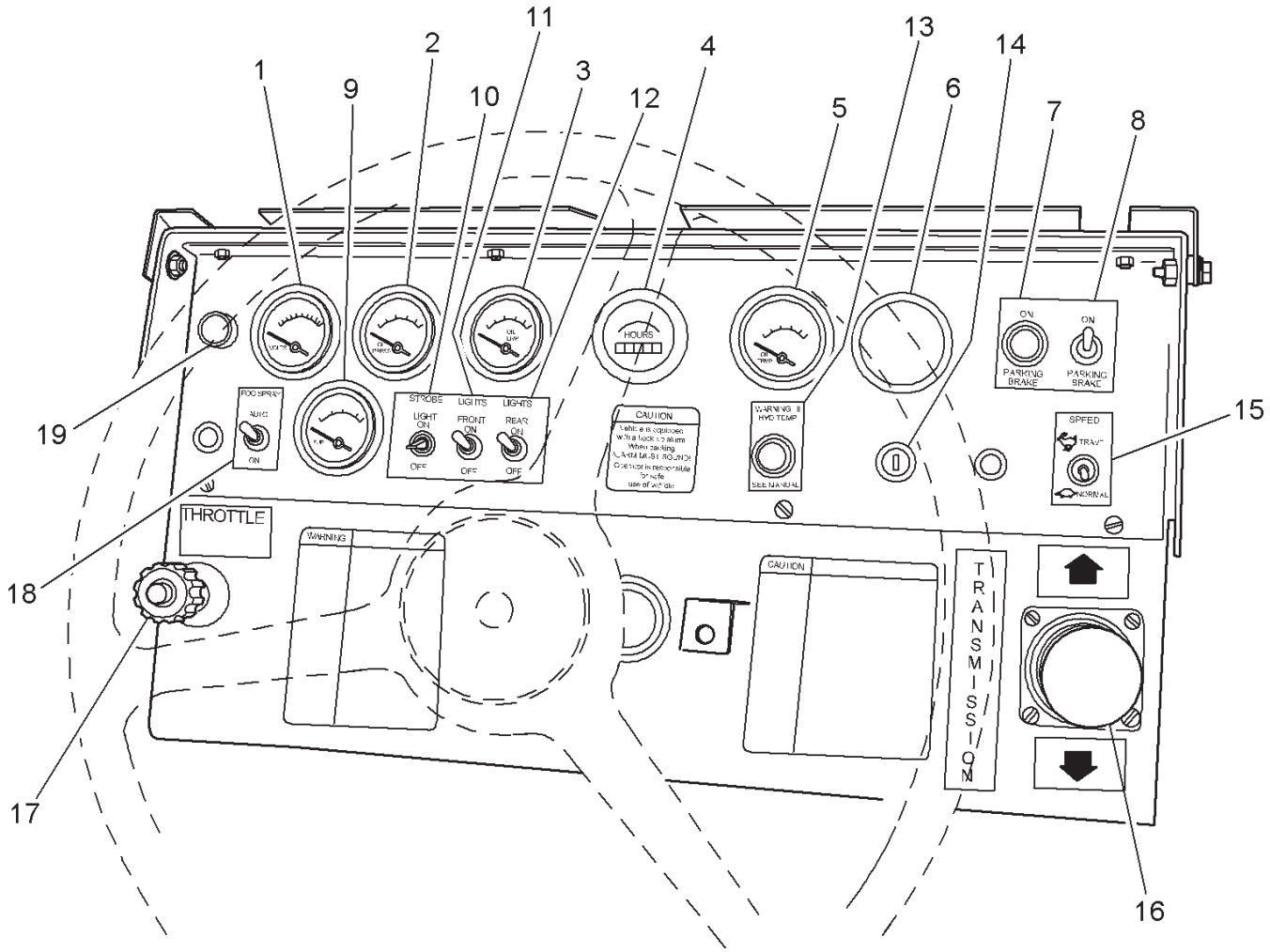


Figure 10-24

Controls and Gauges Parts List

Item No.	Part Number	Qty.	Description	Remarks
1	1002034	1	GAUGE,VOLTMETER,8-18V DC	
2	989961	1	GAUGE,OIL PRESS,150 PSI,240 OHM	
3	989960	1	GAUGE,TEMP,WATER	
4	35385	1	GAUGE,HOUR METER	
5	35365	1	GAUGE,TEMP,OIL	
6	988021-06	1	GAUGE,TACH	DOT option only
7	36150	1	ALARM,BUZZER/LIGHT,RED	
8	72086	1	SWITCH,TOGGLE,DPDT,2-POS	
9	1002033	1	GAUGE,FUEL	
10	851391	1	SWITCH,TOGGLE,SPDT	
11	851391	1	SWITCH,TOGGLE,SPDT	
12	851391	1	SWITCH,TOGGLE,SPDT	
13	36150	1	ALARM,BUZZER/LIGHT,RED	
14	39146-14	1	SWITCH,IGNITION	
-	982008-04	1	IGNITION KEY,REPLACEMENT	
15	851090624	1	SWITCH,TOGGLE,SPDT,2-POS	
16	72026	1	HANDLE,MOBIL CONTROL	
17	37845	1	THROTTLE CABLE	
18	851090613	1	SWITCH,TOGGLE,SPDT,3-POS	
19	REF	1	WARNING LIGHT,OPT	
20	6435	1	STEERING WHEEL,17.00,36 SPLINE	

NOTES

Hydraulic Group Parts List

Item No.	Part Number	Qty.	Description	Remarks
-29	29406	1	HYDRAULIC GROUP	(See Schematics)
-1	19161	1	•TANK W/M,HYD,16GAL,TRUPAC	
-2	29405	2	•GRP,WHEEL MOTOR,DUAL	(See Figure 10-4)
-3	19780SRV	1	•SCHEM,SOLENOID VALVE	(See Schematics)
-4	31886	1	•GAUGE,SIGHT,12NPT	
-5	33118	1	•NUT,HEX,.813-20	
-6	35367	1	•SENDER,TEMP GAUGE,08 MP	
-7	36123	2	•STRAINER,HYD SUCTION,200 MESH	
-8	36124	1	•INDUCER,BACK PRESSURE,15PSI	
-9	36127	1	•MOTOR,HYD,POWER STEERING	
-10	36128	1	•STEERING COLUMN,6.00,W/WIRE	
-11	36129	2	•CYL,HYD,3.00X10.00X1.25 ROD	
-1101	36129-01	A/R	••KIT,SEAL,STEERING CYL	
-12	36130	1	•HORN,STEERING WHEEL CENTER	
-13	23523	1	•COVER,HYD TANK T/P	
-14	39175	1	•KIT,HOSE/FITT,T/P915,SAE	
-15	36343	1	•SWITCH,TEMP,210 DEG F,08 MP	
-16	37680	1	•CAP W/STRAINER,HYD FILLER	
-17	6436	1	•STEERING WHEEL,17.00,36 SPLINE	
-18	80142	8	•WASHER,FLAT,USS,.375	
-19	80197	2	•CSHH,.250-20X2.25,GR5	
-20	80224	8	•CSHH,.375-16X1.25,GR5	
-21	80350	2	•NUT,FLEXLOC,.250-20,FULL,LT	
-22	80352	8	•NUT,FLEXLOC,.375-16,FULL,LT	
-23	81161	12	•WASHER,WEATHER SEAL,#10	
-24	99600	1	•PIPE,NIPPLE,.750XCLOSE	
-25	X259	1	•FILTER ASSY,HYD,DELUXE III	
-26	21306	4	•PIN,CLEVIS,1.00 DIA,W/ZERK	
-2601	210060	1	••PIN,CLEVIS,1.00X2.625 W/1.5HD	
-27	80336	4	•PIN,COTTER,.188X1.50	
-28	80192	12	•CSHH,.250-20X.75,GR5	
-30	99293	1	•PIPE,PLUG,1.50,SQ HEAD,MI	
-31	33707	0.36	•SEALANT,SILICONE,CLEAR	
-37	RES1001	0	•HYD OIL SPECIFICATIONS	
-38	39175	1	KIT,HOSE/FITT,T/P915,SAE	(See Schematics)

NOTES

Miscellaneous Groups Parts List

Item No.	Part Number	Qty.	Description	Remarks
-3	19690	1	DECAL GROUP	
-301	004684102	16.46	•STRIP,ABRASIVE,4"X60'ROLL,BLK	
-302	984900	1	•KIT,DECAL,DECORATIVE,915	
-303	35355	1	•PLATE,SERIAL NUMBER,ROSCO	
-304	36263	1	•DECAL,CIMA,MAX LOAD 3400	
-305	39135	1	•DECAL,SHEET,TRUPAC	
-4	21506	1	SMV GROUP, TRUPAC	
-401	28644	1	•BAR,SMV BRACKET,T/P 915	
-402	35952	1	•DECAL,SMV SIGN COVER	
-403	P70036	1	•SIGN, SLOW MOVING VEHICLE	
-404	80140	4	•WASHER,FLAT,USS,.250	
-405	80185	2	•CSHH,.250-20X1.00,GR5	
-406	80192	2	•CSHH,.250-20X.75,GR5	
-407	80140	4	•WASHER,FLAT,USS,.250	
-408	80350	4	•NUT,FLEXLOC,.250-20,FULL,LT	
-5	985234-01	1	MANUAL-PAK CASE	
-501	71610	4	•MACH SCR,PH,.250-20X.75	
-502	80160	8	•WASHER,LOCK,.250	
-503	81275	4	•NUT,ACORN,.250-20,SS	

ALPHABETICAL PARTS INDEX

Description	Part Number	Figure Number	Item Number
ADAPTER,HOSE,1.5IDX1.25ID	986461	10-20	-9
ADAPTOR,OIL SENDER	985628	10-14	•
ADPTR,RUBBER RED,3.00-2.00 ID	986633	10-19	2
AIR CLEANER ASSY	1003139-03	10-14	29
AIR CLEANER ASSY	38385	10-19	4
Air Filter, Primary	38385-01	QRG-K	•
Air Filter, Primary	38385-01	QRG-C	•
Air Filter, Safety	38385-02	QRG-K	•
Air Filter, Safety	38385-02	QRG-C	•
AIR FILTER,UPPER ELBOW	986537-23	10-14	26
AIR FILTER,UPPER REDUCER	986537-24	10-14	24
AIR INTAKE SYSTEM	985725	10-15	3
AIR,CLEANER,MOUNT	1001736-10	10-14	30
AIRMOUNT BASE,W/M	27785	10-7	9
AIRMOUNT,1T14C-1 SERIES	38698	10-7	18
ALARM,BACK-UP	33963	10-23	8
ALARM,BUZZER/LIGHT,RED	36150	10-24	7
ALARM,BUZZER/LIGHT,RED	36150	10-24	13
Alternator	1001166-04	QRG-K	•
Alternator	988671-10	QRG-C	•
Alternator	1001166-04	10-14	•
ARTICULATION LOCK LINK	19503	10-2	TBD
ATTACHING PARTS		pg 10-7	
ATTACHING PARTS		pg 10-7	
ATTACHING PARTS		pg 10-7	
ATTACHING PARTS		10-11	
BAFFLE,PLATE,LH	1001736-07	10-14	3
BAFFLE,PLATE,LH	1001736-07	10-14	12
BAFFLE,PLATE,RH	1001736-05	10-14	13
BAR,CLAMPING	19675	10-12	5
BAR,SMV BRACKET,T/P 915	28644	PG 10-64	-401
BASE, SEAT SLIDE	21566	10-11	-2
BASE,11WHEEL W/M	28135	10-7	11
BASE,LH ATTACHMENT,11WHEEL W/M	28132	10-7	31
BASE,RH ATTACHMENT,11WHEEL W/M	28133	10-7	-29
BATTERY BOOT,POS(RED)	70437	10-23	-103
BATTERY GROUP	19667	10-23	1
BATTERY,12V,1000 CRK AMPS	33146-6	10-23	-101

Description	Part Number	Figure Number	Item Number
BEACON,AMBER,ROTATING LIGHT	210893	10-23	-1409
BEARING CONE,INNER	36136-02	10-3	5B
BEARING CONE,OUTER	610240	10-3	5D
BEARING CUP,INNER	36136-01	10-3	5A
BEARING CUP,OUTER	610230	10-3	5C
BEARING,COMPOSITE 2.25 ID	36137	10-3	6
BEARING,SPHER,ID1.50,OD2.4375	X250	10-4	3
BEARING,SPHERICAL 1.00 ID	36138	10-2	8
BEARING,SPHERICAL 2.50 ID	36140	10-2	6
BEARING,SPHERICAL 2.75 ID	36141	10-2	13
BLANK PLUG	REF	10-24	6
Block Heater	1001753	10-14	•
BODY,FUSE BLOCK,4 GANG,ATO&ATC	36157	10-23	-1504
BOLT,WHEEL,.562X1.12 (FRONT)	36136-05	10-3	-3
BRKT,THROTTLE	1002184-19	10-14	22
BRKT,THROTTLE CABLE,CAT	983185	10-21	11
BRKT,THROTTLE,CABLE,CAT/PER3.3	983185	10-16	20
BUMPER ASSY,RAD ISOLATOR MNT	1001166-60	10-14	40
BUSHING,COMPOSITE,1.50 ID,.75	38783	10-7	13
BUSHING,SPLIT 1.5 ID	36144	10-4	10
CABLE,BATTERY,NEG,16",EYE/POST	400020	10-23	-105
CABLE,BATTERY,NEG,17",EYE/EYE	36339	10-23	-102
CABLE,BATTERY,POS,44",EYE/POST	852510	10-23	-106
CABLE,THROTTLE,VERNIER,3"TX126	37845	10-21	2
CANOPY GROUPS	19678SRV	10-1	10
CANOPY GROUPS	TBD	pg 10-7	-2
CANOPY,SUNROOF	19914	pg 10-7	-201
CANOPY,SUNROOF	19914	pg 10-7	-302
CAP W/STRAINER,HYD FILLER	37680	PG 10-63	-16
CAP,FUEL,W/LOCK LUG	36105	10-22	5
CAP,RADIATOR	1002676-11	10-14	35
CAT. ENGINE SUB-ASSEMBLY	985709	10-16	22
CAT. ENGINE SUB-ASSEMBLY	985709	10-17	22
CAT. RADIATOR/OIL COOLER GROUP	985714	10-20	25
CATERPILLAR AIR INTAKE SYSTEM	985725	10-19	24
CATERPILLAR ENGINE AND COMPONENTS	985710	10-15	-21
CATERPILLAR EXHAUST ASSEMBLY	985750	10-18	23
CATERPILLAR THROTTLE GROUP	986385	10-21	26
CHAIN,PROOF COIL,.188	30081	10-7	110
CHAIN,PROOF COIL,.250	70395	10-10	-38

Description	Part Number	Figure Number	Item Number
CLAMP,AIR CLEANER MOUNT,6.5"ID	34033	10-18	3
CLAMP,AIRMOUNT,W/M	27827	10-7	23
CLAMP,CABLE,30 SERIES	37847	10-21	4
CLAMP,HOSE,# 06	33162	10-17	1
CLAMP,HOSE,# 06	33162	10-22	3
CLAMP,HOSE,# 10	33164	10-7	-40
CLAMP,HOSE,# 10	33164	10-7	105
CLAMP,HOSE,# 10	33164	10-12	8
CLAMP,HOSE,# 10	33164	10-13	8
CLAMP,HOSE,# 10	33164	10-19	12
CLAMP,HOSE,# 24	33168	10-20	-4
CLAMP,HOSE,# 32	33170	10-20	6
CLAMP,INSULATED BAND,1/2"	871111605	10-23	-1509
CLAMP,MUFFLER,.3125X2.5	33312	10-18	8
CLAMP,SUNROOF	19928	pg 10-7	-202
CLAMP,SUNROOF	19928	pg 10-7	-303
CLAMP,T-BOLT,2.50 NOMINAL	36045	10-19	6
CLAMP,T-BOLT,3.50 NOMINAL	171190	10-19	7
CLAMPING BAR,F SIDE CURTAIN	19592	10-9	6
CLAMPING BAR,FRONT CURTAIN	19595	10-9	9
CLAMPING BAR,REAR CURTAIN	19610	10-9	17
CLAMPING BAR,REAR SIDE CURTAIN	19599	10-9	13
CLEVIS,10-32X1.25,W/.250 PIN	37846	10-21	3
COCO MAT GROUP, 9-WHEEL	27208	10-6	8
COCO MAT GRP, 9-WHEEL	27208	pg 10-11	-5
COCO MAT GRP,FLAT TIRE	27208	10-12	6
COCO MAT GRP,FLAT TIRE	27208	10-13	6
COCO MAT,6X9	19533	10-6	7
COCO MAT,6X9	19533	10-7	-101
COLLAR,SET,.88IDX1.38ODX.56	36173	10-6	8
COLLAR,SET,1.00IDX1.625ODX.625	871075201	10-7	3
COLLAR,SET,1.125X1.75X.562	38183	10-5	13
CONDUIT HANGER,.50	71900	10-23	-1514
CONN,BUTT,16-14 GA	33602	10-8	-5
CONN,BUTT,16-14 GA	33602	10-23	-1403
Control Handle	72026	QRG-K	•
Control Handle	72026	QRG-C	•
COOLER,HYD OIL	35423	10-20	5
COVER & PANEL GROUPS	28699	10-1	70
COVER & PANEL GROUPS	28699	10-10	12

Description	Part Number	Figure Number	Item Number
COVER & PANEL GROUPS	28699	10-11	12
COVER W/M,FRONT BALLAST	19282	10-10	-12
COVER,BATTERY COMPARTMENT	19178	10-10	2
COVER,BEARING,HYD MOTOR MOUNT	19176	10-4	4
COVER,CONSOLE BOTTOM	19236	10-10	8
COVER,HYD TANK T/P	23523	PG 10-63	-13
COVER,INSTRUMENT PANEL	19281	10-10	11
COVER,REAR BALLAST	19226	10-10	-6
CRG BOLT,.312-18X10.00,GR5	80955	10-23	-111
CRG BOLT,.375-16X1.00,GR5	871020103	10-10	25
CROSSMEMBER,VERTICAL	19202	10-10	-4
CSHH,.250-20X.75,GR5	80192	10-10	18
CSHH,.250-20X.75,GR5	80192	10-16	35
CSHH,.250-20X.75,GR5	80192	PG 10-63	-28
CSHH,.250-20X.75,GR5	80192	PG 10-64	-406
CSHH,.250-20X1.00,GR5	80185	10-10	-40
CSHH,.250-20X1.00,GR5	80185	PG 10-64	-405
CSHH,.250-20X2.25,GR5	80197	PG 10-63	-19
CSHH,.312-18X.75,GR5	80207	10-19	17
CSHH,.312-18X.75,GR5	80207	10-20	15
CSHH,.312-18X1.00,GR5	80208	10-9	23
CSHH,.312-18X1.00,GR5	80208	10-11	28
CSHH,.312-18X1.25,GR5	80206	10-5	9
CSHH,.312-18X1.25,GR5	80206	10-7	22
CSHH,.312-18X1.75,GR5	80211	10-5	10
CSHH,.312-18X2.00,GR5	80212	10-7	41
CSHH,.375-16X.75,GR5	80219	10-2	20
CSHH,.375-16X.75,GR5	80219	10-4	13
CSHH,.375-16X.75,GR5	80219	10-7	-37
CSHH,.375-16X.75,GR5	80219	10-10	20
CSHH,.375-16X.88,GR5	71622	10-9	21
CSHH,.375-16X1.00,GR5	80221	10-3	9
CSHH,.375-16X1.00,GR5	80221	10-7	25
CSHH,.375-16X1.00,GR5	80221	10-14	47
CSHH,.375-16X1.00,GR5	80221	10-16	24
CSHH,.375-16X1.00,GR5	80221	10-17	24
CSHH,.375-16X1.00,GR5	80221	10-20	16
CSHH,.375-16X1.25,GR5	80224	pg 10-7	-204
CSHH,.375-16X1.25,GR5	80224	pg 10-7	-305
CSHH,.375-16X1.25,GR5	80224	10-10	21

Description	Part Number	Figure Number	Item Number
CSHH,.375-16X1.25,GR5	80224	10-20	17
CSHH,.375-16X1.25,GR5	80224	PG 10-63	-20
CSHH,.375-16X2.00,GR5	80230	10-9	24
CSHH,.375-16X2.75,GR5	71621	10-18	-9
CSHH,.375-16X3.50,GR5	71619	10-12	41
CSHH,.375-16X5.00,GR5	71617	10-8	17
CSHH,.437-14X3.00,GR5	80776	10-15	-13
CSHH,.500-13X1.25,GR5	80250	10-14	48
CSHH,.500-13X1.25,GR5	80250	10-17	40
CSHH,.500-13X1.75,GR5	80186	10-15	-7
CSHH,.500-13X2.00,GR8	81272	10-7	33
CSHH,.500-13X2.50,GR8	81273	10-7	34
CSHH,.500-13X4.00,GR5	80722	10-7	27
CSHH,.875-9X3.00,GR5	81058	10-4	6
CSHH,1.000-8X3.75,GR8	81074	pg 10-7	-102
CSHH,M12-1.75X35MM,CL8.8	80877	10-16	34
CSHH,M8-1.25X30MM,CL8.8	80492	10-16	29
CSSH,.250-20X.75	81057	10-4	5
CSSH,M10-1.50X30MM	811320	10-16	30
CYL,HYD,3.00X10.00X1.25 ROD	36129	PG 10-63	-11
DECAL GROUP	19690	PG 10-64	-3
DECAL,11-WHEEL INFLATION CHART	38962	10-7	-43
DECAL,CIMA,MAX LOAD 3400	36263	PG 10-64	-304
DECAL,SHEET,TRUPAC	39135	PG 10-64	-305
DECAL,SMV SIGN COVER	35952	PG 10-64	-402
DECAL,TRACTION VALVE	38760	10-8	-25
DRIVE PL ASSY,SAE#4,C MT,CAT	986264	10-16	6
DUST CAP	340040	10-3	5F
ELBOW,PIPE,90,.500,GALV	71725	10-7	104
ELBOW,RUBBER	986537-23	10-14	23
ELBOW,RUBBER,90,3.50X3.00 ID	171170	10-19	3
ELBOW,RUBBER,RH	1001736-01	10-14	27
ENGINE & COMPONENTS	28488	10-1	90
Engine Belt	1001166-05	QRG-K	•
Engine Belt	988671-06	QRG-C	•
Engine Belt, Kub	1001166-05	10-14	•
ENGINE COVER	28695	10-11	-
ENGINE COVER GRP,3.3 ENGINE	28695	10-10	-7
ENGINE SUB-ASSEMBLY	985709	10-15	1
ENGINE,CAT,3044T,80 HP	988671	10-16	5

Description	Part Number	Figure Number	Item Number
ENGINE,KUBOTA,84.5HP	1001736	10-14	1
EXHAUST ASSEMBLY	985750	10-15	2
EXT,AIR INLET,3.75,MOD,3.3 ENG	28690	10-19	10
FAN GUARD	986537-44	10-14	5
FAN SHROUD	986537-40	10-14	9
FENDER CURTAIN W/M,LEFT HAND	19589SRV	10-9	-4
FENDER CURTAIN,W/M,RH	19572SRV	10-9	3
Fender Washer	981511	10-14	38
FILLER,TANK,4 IN	36151	10-12	24
Filter Assy, Hyd Charge	34463	QRG-K	•
Filter Assy, Hyd Charge	34463	QRG-C	•
Filter Assy, Hyd Return	72543	QRG-K	•
Filter Assy, Hyd Return	72543	QRG-C	•
FILTER ASSY,HYD,DELUXE III	X259	PG 10-63	-25
FILTER ELEMENT,AIR,PRIMARY	38385-01	PG 10-64	-203
FILTER ELEMENT,AIR,SAFETY	38385-02	PG 10-64	-204
FILTER ELEMENT,DELUXE III	X260	PG 10-64	-205
FILTER ELEMENT,FUEL/WATER	984909-01	PG 10-64	-206
FILTER ELEMENT,HYD	34464	PG 10-64	-202
Filter, Fuel	982080-02	QRG-K	•
Filter, Fuel Pre-Filter	986537-31	QRG-K	•
Filter, Oil	986537-03	QRG-K	•
Filter, Oil	988671-03	QRG-C	•
FILTER,FUEL,INLINE	33291	PG 10-64	-201
FILTER,FUEL,INLINE	33291	10-22	-
FILTER,OIL,3044T	984909-02	PG 10-64	-207
Filters	REF	10-14	•
Filters	REF		-
FITT,90 02MP-05HB	988673-18	10-14	•
FITT,90 04MP-05HB	38279	10-22	2
FITT,90 06MP-08HB,POLY	72712	10-12	29
FITT,90 08MJ-06MB	70754	10-8	16
FITT,90 08MP-08HB	33082	10-13	33
FITT,90 08MP-08HB,POLY	70319	10-7	111
FITT,90 08MP-08HB,POLY	70319	10-12	32
FITT,90 12MRS-12FRS	37955	10-8	10
FITT,90 16MB-16MRS	38686	10-8	11
FITT,LUBE,90,02MP	5039	10-2	-18
FITT,STR 02MP-05HB	988673-19	10-14	•
FITT,STR 04MP-04HB,PUSH-ON	31167	10-7	12

Description	Part Number	Figure Number	Item Number
FITT,STR 04MP-05HB,CRIMPED	33491	10-22	9
FITT,STR 08FJX-08HB,PUSH-ON	31109	10-19	14
FITT,STR 08MJ-08MP	33937	10-19	13
FITT,STR 08MP-08HB,BLK POLY	70318	10-7	113
FITT,STR 08MP-08HB,BLK POLY	70318	10-13	37
FITT,STR 16MB-12MRS	73039	10-8	9
FITT,STR 16MJ-M10,METRIC	988515	10-16	22
FITT,TEE 02MP-02FP-02FP,STL	36066	10-16	17
FITT,TEE 04MP-04FP-04FP	33154	10-22	8
FITT,TEE 08HB,POLY	35771	10-13	18
FITT,TEE 08MJ-08FJX-08MJ	33898	10-8	7
FITT,TEST 06MB-02PD	72689	10-14	44
FITT,TEST 06MB-02PD	72689	10-17	14
FITTING, 3/8-18,OIL PAN, M22-1.5	REF	10-14	•
FITTING,HOSE CONNECTOR,3/16 - 5/16	REF	10-14	•
FITTING,OIL PRESSURE	985628	10-14	•
FLASHER,SIGNAL	851091608	10-23	-1515
FLEX PLATE&COUPLING,SAE#4 14T	1002184-29	10-14	•
FOPS,TRUPAC ROLLER	36256	pg 10-7	-301
FRONT AXLE ASSEMBLY	19268	10-3	5
FRONT AXLE ASSEMBLY	19268	pg 10-11	-1
FRONT CURTAIN	19596	10-9	10
FRONT ENG MOUNT,W/M,CAT	985701	10-16	2
FRONT FRAME	19242	10-1	-20
FRONT SIDE CURTAIN	19590	10-9	5
FRONT,MOUNT,FOOT,LH	1001736-14	10-14	21
Fuel Filter	33291	QRG-K	•
Fuel Filter	988671-05	QRG-C	•
FUEL SYSTEM	986386	10-22	27
FUEL SYSTEM	986386	10-15	6
Fuel/Water Filter	1001736-19	QRG-K	•
Fuel/Water Filter	984909-01	QRG-C	•
FUSE HOLDER,IN LINE,ATC	37118	10-8	-1
FUSE,10 AMP,ATC	36340	10-8	-22
FUSE,20 AMP,ATC	36342	10-23	-1506
GAUGE,FUEL	1002033	10-24	9
GAUGE,HOUR METER	35385	10-24	4
GAUGE,OIL PRESS,150 PSI,240 OHM	989961	10-24	2
GAUGE,SIGHT,12NPT	31886	PG 10-63	-4
GAUGE,TEMP,OIL	35365	10-24	5

Description	Part Number	Figure Number	Item Number
GAUGE,TEMP,WATER	989960	10-24	3
GAUGE,VOLTMETER,8-18V DC	1002034	10-24	1
Glow Plugs	1001166-09	10-14	•
GREASE SEAL	36136-03	10-3	5E
GREASE,WHEEL BEARING	91210	10-3	-15
GRILLE,RADIATOR,TRUPAC	22126	10-10	1
GROMMET,.50IDX.75HOLE	35901	10-23	-1512
GRP,WHEEL MOTOR,DUAL	29405	PG 10-63	-2
Guard, Belt, Kub	1001166-40	10-14	•
HANDLE,MOBIL CONTROL	72026	10-23	10
HANDLE,MOBIL CONTROL	72026	10-24	16
HANGER ROD,FR SIDE CURTAIN	19114	10-9	2
HANGER,COCO MAT,FLAT TIRE	27211	10-6	1
HANGER,COCO MAT,FLAT TIRE	27211	10-7	102
HANGER,FRONT CURTAIN	19594	10-9	8
HANGER,REAR CURTAIN	19609	10-9	16
HANGER,REAR SIDE CURTAIN	19598	10-9	12
HARNESS,BACK-UP ALARM	23474	10-23	7
HARNESS,CONNECTING,ENG	985780	10-23	5
HARNESS,ENGINE	1002184-25	10-14	•
HARNESS,ENGINE,CAT 3.3	985757	10-16	7
HARNESS,HYD/FULE SYSTEM,TRUPAC	985778	10-23	2
HARNESS,RELAY BOARD,TRUPAC	985779	10-23	4
HARNESS,STARTER,TRUPAC 3.3	28489	10-17	9
HARNESS,WIRE,WATER SPRAY PUMP	28044	10-12	48
HARNESS,WORK LIGHT & TURN SIGNAL	24155	10-23	-1501
Heater Element	988671-01	QRG-C	•
HOLD DOWN,BATTERY	72313	10-23	-104
HORIZ CROSSMEMBER,R FRAME,W/M	19199	10-10	3
HORN,STEERING WHEEL CENTER	36130	PG 10-63	-12
HOSE,04,PUSH-ON,250	32882	10-7	-39
HOSE,06,FUEL,NON-PUSH ON	986920-05	10-22	7
HOSE,06,LOW PRESS PUSH ON	38579	10-17	23
HOSE,08,08FJX-08FJX,2500	72552-046	10-8	19
HOSE,08,PUSH-ON,250	6352	10-7	109
HOSE,08,PUSH-ON,250	6352	10-12	1
HOSE,08,PUSH-ON,250	6352	10-19	11
HOSE,08,PUSH-ON,250 PSI	6352	10-13	1
HOSE,12,12OFS-12OF9,6000	38731-048	10-8	14
HOSE,12,12OFS-12OF9,6000	38731-071	10-8	15

Description	Part Number	Figure Number	Item Number
HOSE,16,16OFS-160FS,6000	38730-027	10-8	13
HOSE,FLEX,1.5X1.75X15	986462	10-20	10
HOSE,RADIATOR,LOWER	1001166-15	10-14	4
HOSE,RADIATOR,UPPER	1002006-14	10-14	11
HOSE,RADIATOR,UPPER	170071A	10-20	8
HOSE,RUBBER,RH	1001736-02	10-14	25
HUB ASSY,WHEEL,8 ON 8.00	36136	10-3	5
Hyd Element	34464	QRG-K	•
Hyd Element	34464	QRG-C	•
HYD OIL SPECIFICATIONS	RES1001	PG 10-63	-37
Hyd Steering	X260	QRG-K	•
Hyd Steering	X260	QRG-C	•
HYDRAULIC GROUP	29406	PG 10-63	-29
HYDRAULICS GROUP	29406	10-1	110
IGNITION KEY,REPLACEMENT	982008-04	10-24	-
INDICATOR,AIR FILTER SERVICE	171220	10-19	9
INDUCER,BACK PRESSURE,15PSI	36124	PG 10-63	-8
INSERT,RUBBER,4.00 TO 3.75	37587-2	10-19	15
INSERT,THR'D,.375-16NC	988092	10-10	13
INSTRUMENTS & WIRING	986320	10-1	100
INSTRUMENTS AND WIRING		10-23	28
ISOLATOR,RAD LOWER MNT	1001166-57	10-14	39
ISOLATOR,RAD UPPER MNT	1001166-59	10-14	36
Kit, Filter	987912	QRG-K	•
Kit, Filter, TP CAT	988546	QRG-C	•
KIT,DECAL,DECORATIVE,915	984900	PG 10-64	-302
KIT,FILTER,TRUPAC	988546	PG 10-64	-2
KIT,FITTINGS,LIFT PUMP	986687	10-22	-
KIT,HORN	951250115	10-23	13
KIT,HOSE OIL DRAIN KUBOTA	988169	10-14	•
KIT,HOSE,11-WHEEL	27919-01	10-7	-
KIT,HOSE/FITT,T/P915,SAE	39175	PG 10-63	-38
KIT,HOSE/FITT,T/P915,SAE	39175	PG 10-63	-14
KIT,SEAL,STEERING CYL	36129-01	PG 10-63	-1101
LATCH,SLIDE RELEASE	21706	10-11	-5
LIGHT & SOCKET,12V,2.00 GAUGE	33435	10-23	-1503
LIGHT,TURN SIGNAL,AMBER	6161	10-23	-1513
LIGHT,TURN/BRAKE,RED	851342007	10-23	-1516
LINK,ARTICULATION LOCK	19503	10-10	30
LOOM,SPLIT,CONVOLUTED,.250	71060	10-23	-1408

Description	Part Number	Figure Number	Item Number
MACH SCR,PH,#10-24X.75	71716	10-23	9
MACH SCR,PH,#10-24X.75	71716	10-21	-6
MACH SCR,PH,.250-20X.75	71610	PG 10-64	-501
Manual, Operators, Kub	1001166-42	10-14	•
Manual, Parts, Kub	1001166-45	10-14	•
Manual, Service, Kub	1001166-43	10-14	•
Manual, Workshop, Kub	1001166-44	10-14	•
MANUAL-PAK CASE	985234-01	PG 10-64	-5
MISCELLANEOUS GROUPS		PG 10-64	-30
MOTOR,HYD,DRIVE,915 TRUPAC	39131	10-4	1
MOTOR,HYD,POWER STEERING	36127	PG 10-63	-9
MOUNT,AXLE	19183	10-3	1
MOUNT,ENG,REAR	1001166-48	10-14	8
MOUNT,FRONT,FOOT,RH	1001736-04	10-14	15
MOUNT,HYD MOTOR	19175	10-4	2
MOUNT,ISOLATION,425#	39082	10-16	8
MOUNT,ISOLATOR,AXIAL 480#	1001758	10-14	17
MOUNT,REAR,FOOT,RH	1001736-03	10-14	18
MOUNTING BAND,8.13 ID	38386	10-14	28
MOUNTING BAND,8.13 ID	38386	10-19	5
MUFFLER,2-1/2" ID SIDE INLET	34074	10-18	2
MUFFLER,LH	1001736-16	10-14	34
NOZZLE,ASSY,08 PIPE NYL,90 DEG	480010	10-7	106
NOZZLE,ASSY,08 PIPE NYL,STR	986502	10-12	2
NOZZLE,ASSY,08 PIPE NYL,STR	986502	10-13	2
NUT,ACORN,.250-20,SS	81275	PG 10-64	-503
NUT,FLEXLOC,.250-20,FULL,LT	80350	10-10	-42
NUT,FLEXLOC,.250-20,FULL,LT	80350	10-16	37
NUT,FLEXLOC,.250-20,FULL,LT	80350	PG 10-63	-21
NUT,FLEXLOC,.250-20,FULL,LT	80350	PG 10-64	-408
NUT,FLEXLOC,.312-18,FULL,LT	80351	10-5	11
NUT,FLEXLOC,.312-18,FULL,LT	80351	10-7	26
NUT,FLEXLOC,.312-18,FULL,LT	80351	10-9	25
NUT,FLEXLOC,.312-18,FULL,LT	80351	10-11	29
NUT,FLEXLOC,.375-16,FULL,LT	80352	pg 10-7	-205
NUT,FLEXLOC,.375-16,FULL,LT	80352	pg 10-7	-306
NUT,FLEXLOC,.375-16,FULL,LT	80352	10-9	26
NUT,FLEXLOC,.375-16,FULL,LT	80352	10-10	22
NUT,FLEXLOC,.375-16,FULL,LT	80352	PG 10-63	-22
NUT,FLEXLOC,.438-14,FULL,LT	80353	10-15	-11

Description	Part Number	Figure Number	Item Number
NUT,FLEXLOC,.500-13,FULL,LT	80354	10-15	-8
NUT,FLEXLOC,.875-9,FULL,LT	80358	10-4	8
NUT,HEX,#10-24	80824	10-21	-10
NUT,HEX,.#10-24	80824	10-23	11
NUT,HEX,.250-20	80036	10-10	14
NUT,HEX,.250-20	80036	10-23	-108
NUT,HEX,.312-18	80037	10-19	18
NUT,HEX,.375-16	80038	10-22	13
NUT,HEX,.375-16	80038	10-8	20
NUT,HEX,.375-16	80038	10-16	27
NUT,HEX,.375-16	80038	10-18	-10
NUT,HEX,.375-16	80038	10-20	-12
NUT,HEX,.500-13	80040	10-7	36
NUT,HEX,.813-20	33118	PG 10-63	-5
NUT,HEX,CASTLE,.750-16 SPL	81071	10-3	12
NUT,HEX,JAM,.375-16	80074	10-7	8
NUT,HEX,JAM,.375-16	80074	10-10	15
NUT,HEX,JAM,.500-13	80076	10-3	8
NUT,SPL,2.36-18	38671	10-2	16
NUT,STOVERS 1.00-8, GR C	81075	pg 10-7	-103
NUT,WHEEL,M16X1.5 (REAR)	81064	10-3	-2
NUT,WING,.312-18	31935	10-23	-107
OPT 11-WHEEL ASSEMBLY	27759	pg 10-11	-6
OPT COCO MAT W/ WATER, 11-WHEEL	27794	10-7	
OPT COCO MAT WITH WATER FOR 11-WHEEL	27794	pg 10-11	-7
OPT TRACTION CONTROL KIT	27919	pg 10-11	-8
OPTIONAL 11-WHEEL ASSEMBLY	* 27759	10-7	9
OPTIONAL 11-WHEEL ASSEMBLY	27759	10-7	9
OPTIONAL BEACON LIGHT GROUP	19680SRV	10-23	-14
OPTIONAL FOPS GROUP	36256	pg 10-7	-3
OPTIONAL HEAT SHIELD GROUP	19591SRV	10-9	11
OPTIONAL HEAT SHIELD GRP	19591SRV	10-1	60
OPTIONAL TRACTION CONTROL KIT	27919	10-8	10
OPTIONAL WORK LIGHT,TURN & TAIL	19676SRV	10-23	-15
ORING,3.237 ID X .103,SAE 152	36808	10-14	43
ORING,3.237 ID X .103,SAE 152	36808	10-17	15
PANEL,ENGINE REMOVABLE,LH	20616SRV	10-10	-35
PANEL,HYD PUMP	19219	10-10	-5
PANEL,REMOVABLE,ENG COMPT	19262	10-10	-9
PIN RETAINER	19239	10-2	2

Description	Part Number	Figure Number	Item Number
PIN W/M,FRONT AXLE	19184SRV	10-3	2
PIN,CLEVIS,1.00 DIA,W/ZERK	21306	PG 10-63	-26
PIN,CLEVIS,1.00X2.625 W/1.5HD	210060	PG 10-63	-2601
PIN,CLEVIS,1.00X3.25 W/1.5HD	240030	10-10	31
PIN,COTTER,.125X1.25	80331	10-6	11
PIN,COTTER,.125X1.50	80332	10-3	13
PIN,COTTER,.148,#9	5928	10-9	20
PIN,COTTER,.148,#9	5928	10-10	32
PIN,COTTER,.188X1.50	80336	PG 10-63	-27
PIN,HYD MOTOR MOUNT	19182	10-4	9
PIN,LOCKING	21564	10-11	-1
PIN,YOKE,DEAD END,TIMKEN NUT	27718	10-2	7
PIN,YOKE,LIVE END,TIMKEN NUT	27717	10-2	11
PIPE,BUSH,04MP-02FP,STL	32638	10-7	38
PIPE,CAP,.500,GALV	91152	10-6	12
PIPE,COCO MAT,11-WHEEL	27788	10-7	103
PIPE,ELBOW,90,.250 STREET,300#	90763	10-7	32
PIPE,EXH,LH	1001736-09	10-14	32
PIPE,NIPPLE,.125XCLOSE	99610	10-19	8
PIPE,NIPPLE,.500X.375,PVC	36176	10-12	31
PIPE,NIPPLE,.750XCLOSE	99600	PG 10-63	-24
PIPE,PLUG,.750,SQ HEAD	99538	10-22	6
PIPE,PLUG,08MP,SQ HEAD	99537	10-6	13
PIPE,PLUG,1.50,SQ HEAD,MI	99293	PG 10-63	-30
PIPE,SPRAY,08NPTX42.25	19293	10-6	3
PIPE,TEE,04FP,300#	90772	10-7	-20
PIPE,TEE,08FP,GALV	99845	10-6	14
PIPE,WATER SPRAY BAR,915	19292	10-6	2
PLATE, SPACER, TIRE BEAM BASE	27761	10-7	5
PLATE,FUEL PUMP BRKT	1002184-17	10-14	19
PLATE,PUMP MOUNT	1002184-21	10-14	2
PLATE,RAD ISOLATOR MNT	1001166-58	10-14	37
PLATE,RADIATOR SUPPORT	986537-40	10-14	7
PLATE,SERIAL NUMBER,ROSCO	35355	PG 10-64	-303
PLUG,HOLE COVER,RAD SHROUD	1001166-56	10-14	10
PRE-CLEANER,4.00ID	37587	10-19	16
PUMP MOUNT PLATE,SEMI SAE#4	1002184-30	10-14	•
PUMP,FUEL,12VDC	986537-39	10-14	16
PUMP,HYD,GEAR,1.22 CIR	37091	10-14	42
PUMP,HYD,GEAR,1.22 CIR	37091	10-17	16

Description	Part Number	Figure Number	Item Number
PUMP,HYD,PISTON,W/EDC	36125-04	10-14	41
PUMP,HYD,PISTON,W/EDC	36125-04	10-17	13
PUMP,WATER SPRAY	1005660	10-12	25
RADIATOR	38784	10-20	7
RADIATOR BASE W/M,4BTA	21233	10-20	1
RADIATOR BRACE	986537-45	10-14	6
RADIATOR SUPPORT W/M,LH,3.3	28455	10-20	2
RADIATOR SUPPORT W/M,RH,3.3	28456	10-20	3
RADIATOR/COOLER ASSY	988673-13	10-14	14
RADIATOR/OIL COOLER GRP	985714	10-15	4
REAR CURTAIN	19611	10-9	18
REAR ENG MOUNT,LH,W/M,CAT	985707	10-16	4
REAR ENG MOUNT,RH,W/M,CAT	985704	10-16	3
REAR FRAME	22125	10-1	-30
REAR SIDE CURTAIN	19607	10-9	14
REAR,MOUNT,FOOT,LH	1001736-12	10-14	20
REAR,OUT, MUFFLER, FLANGE,LH	1001736-11	10-14	31
RELAY,12VDC,50AMP	1001166-65	10-14	•
RELAY,STARTER	38954	10-16	12
RING,HOG	70414	10-6	9
RING,HOG	70414	10-7	-112
RING,RETAINING EXT .375 SHAFT	36900	10-11	-7
RND,SCRAPER BLADE SUPPORT	27793	10-7	10
ROD,LIFT,.50ODX26.38	19296	10-6	6
ROD,LIFT,.50ODX40.25	19295	10-6	5
ROD,LIFT,.50ODX55.25	19294	10-6	4
ROLL PIN,.125X.750	80765	10-11	-8
ROPS GROUP	19678SRV	pg 10-7	-1
ROPS,TRUPAC ROLLER	36255	pg 10-7	-101
SCHEM,SOLENOID VALVE	19780SRV	PG 10-63	-3
SCR,SELF-TAP,#10-32X.50	81150	10-22	11
SCRAPER BLADE GROUP	27206SRV	10-5	7
SCRAPER BLADE GROUP	27206SRV	pg 10-11	-4
SCRAPER BLADE HOLDER W/M	19517	10-5	1
SCRAPER BLADE HOLDER W/M	19517	10-7	1
SCRAPER BLADE ROD,LEFT,FRONT	19532	10-5	5
SCRAPER BLADE ROD,RIGHT,FRONT	19531	10-5	4
SCRAPER BLADE,BACK-UP	19524SRV	10-5	2
SCRAPER BLADE,BACK-UP	19524SRV	10-7	2
SCRAPER BLADER ROD,REAR	19530	10-5	3

Description	Part Number	Figure Number	Item Number
SCRAPER,TIRE,FLAT CURVE	38595	10-5	8
SCRAPER,TIRE,FLAT CURVE	38595	10-7	16
SEAL,FELT,.38T,2.40ID x 4.00OD	36405	10-2	5
SEAL,FELT,.38T,3.60ID x 6.00OD	36407	10-2	10
SEAL,FELT,.50T,3.60ID x 6.00OD	36409	10-2	-15
SEAL,FELT,.50T,4.00ID x 6.00OD	36408	10-2	-14
SEAL,FELT,.63T,3.60ID x 6.00OD	36404	10-2	4
SEAL,FELT,.63T,4.00ID x 6.00OD	36406	10-2	12
SEALANT,SILICONE,CLEAR	33707	PG 10-63	-31
SEAT ASSY,BLACK,W/ARMREST	360010B	10-11	26
SEAT BELT,2.00 W/HARDWARE	730-3050	pg 10-7	-105
SENDER,FUEL LEVEL,24.00 TANK	35370-2	10-22	4
Sender,Press,0-100 Psi,02Mp | 240-33.5 Ohm	1002184-27	10-14	•
SENDER,PRESS,OIL,1-150 PSI,HD	39081	10-16	10
SENDER,TEMP GAUGE,08 MP	35367	10-16	11
SENDER,TEMP GAUGE,08 MP	35367	PG 10-63	-6
Sender,Temp,100-250 F,06 Mp | 450-29.5	1002184-28	10-14	•
SET SCREW,.375-16X.750,SQHD	80315	10-7	24
SET SCREW,.500-13X1.50,SQHD	80715	10-3	10
SHIM,CABLE CLAMP, 30 SERIES	37865	10-21	-5
SHROUD, FLAT REDUCING FAN	983285	10-20	-20
SIGN, SLOW MOVING VEHICLE	P70036	PG 10-64	-403
SLEEVE,ABRASION,NYLON,.71ID	35403	10-10	-39
SLIDE CLAMP W/M, FRONT	21569	10-11	-3
SLIDE CLAMP W/M, REAR	21573	10-11	-4
SLIDING SEAT ASSY	21575SRV	10-11	36
SMV GROUP, TRUPAC	21506	PG 10-64	-4
SOLENOID,FUEL,DIODE	1000867-10	10-14	•
SPACER,MUFFLER 4B3.9	21243	10-18	5
SPINDLE,DUAL 1.12 OFFSET HUB	19211	10-3	3
SPINDLE,SINGLE 1.12 OFFSET HUB	19212	10-3	4
SPRING,COMP .540 DIA X 1.00	36899	10-11	-6
SPRING,TORSION,LEFT HAND	36191-2	10-5	7
SPRING,TORSION,LEFT HAND	36191-2	10-7	15
SPRING,TORSION,RIGHT HAND	36191-1	10-5	6
SPRING,TORSION,RIGHT HAND	36191-1	10-7	-14
Starter	1001166-03	QRG-K	•
Starter	988671-09	QRG-C	•
Starter	1001166-03	10-14	•
STEERING COLUMN,6.00,W/WIRE	36128	PG 10-63	-10

Description	Part Number	Figure Number	Item Number
STEERING WHEEL,17.00,36 SPLINE	6435	10-24	20
STEERING WHEEL,17.00,36 SPLINE	6436	PG 10-63	-17
STOP,THROTTLE,3.3 ENGINE	28700	10-16	18
STRAINER ASSY	36926	10-12	26
STRAINER,HYD SUCTION,200 MESH	36123	PG 10-63	-7
STRIP,ABRASIVE,4"X60'ROLL,BLK	4684102	PG 10-64	-301
STUD,WHEEL,M16X1.5	36131-02	10-4	14
SUNROOF GROUP	19678-01SRV	pg 10-7	-2
SUSPENSION, SEAT	140600	10-11	27
SWITCH,IGNITION	39146-14	10-24	14
SWITCH,TEMP,210 DEG F,08 MP	36343	PG 10-63	-15
SWITCH,TOGGLE,DPDT,2-POS	72086	10-24	8
SWITCH,TOGGLE,DPDT,2-POS	72086	10-23	-1507
SWITCH,TOGGLE,SPDT	851391	10-24	10
SWITCH,TOGGLE,SPDT	851391	10-24	11
SWITCH,TOGGLE,SPDT	851391	10-24	12
SWITCH,TOGGLE,SPDT,2-POS	851090624	10-24	15
SWITCH,TOGGLE,SPDT,3-POS	851090613	10-24	18
SWITCH,TOGGLE,SPST,2-POS	851391	10-8	-18
SWITCH,TOGGLE,SPST,LIGHTED	35447	10-23	-1405
SWIVEL ASSEMBLY	36371	10-11	33
TAILPIPE, LH	1001736-15	10-14	33
TANK W/M,FUEL,35GAL	24852	10-22	1
TANK W/M,HYD,16GAL,TRUPAC	19161	PG 10-63	-1
TANK,COOLANT RECOVERY	1001166-13	10-14	•
TANK,WATER,100GA,PLASTIC	36046SRV	10-12	19
TEE,STREET 1/8	REF	10-14	•
TERM,FUSE BLOCK,12 GA	36168	10-23	-1505
TERM,PUSH-ON,.25,FEM,16-14 GA	33600	10-23	-1402
TERM,PUSH-ON,.25,FEM,16-14,SLV	36349	10-8	-24
TERM,PUSH-ON,.25,FEM,16-14,SLV	36349	10-12	49
TERM,PUSH-ON,.25,FEM,16-14,SLV	36349	10-23	-1407
TERM,PUSH-ON,.25,M,18-14,SLV	36348	10-8	-23
TERM,PUSH-ON,.25,M,18-14,SLV	36348	10-23	-1406
TERM,RING,16-14 GA,#10 STUD	851390204	10-23	-1508
TERM,RING,16-14 GA,#6 STUD	35123	10-8	-8
TERM,RING,16-14 GA,.250 STUD	33607	10-12	50
TERM,RING,16-14 GA,.250 STUD	33607	10-23	-1404
TERM,RING,16-14 GA,.375 STUD	33609	10-8	-6
THROTTLE CABLE	37845	10-24	17

Description	Part Number	Figure Number	Item Number
THROTTLE GROUP	986385	10-15	5
TIRE BEAM RH,ASSY	27783	10-7	-7
TIRE BEAM,LH,ASSY	27769	10-7	6
TIRE MOUNTED,7.50-15NHS,14PLY	38597	10-3	-1
TIRE MOUNTED,7.50-15NHS,14PLY	38597	10-7	-17
TOP ASSEMBLY	28698	10-1	1
TUBE, AIR INTAKE	983286	10-20	-19
TUBE,AIR INTAKE,W/CPL'G	986391	10-19	1
TUBE,FLEX,2.50IDX33.00	27890-01	10-18	6
TUBE,RND,2.500X16GAX17.13	90607-01	10-18	7
TUBING,2.50 OD x 16 GA x 4	19287-02	10-18	4
TURN SIGNAL,W/HAZARD,4-WIRE	140480	10-23	-1511
VALVE,CHECK,.500 HB,5 PSI,POLY	36883	10-12	7
VALVE,CHECK,.500 HB,5 PSI,POLY	36883	10-13	7
VALVE,DRAIN COCK,.250 NPT	910150	10-20	-11
VLV,AIR,FILLER,02NPT	38702	10-7	19
VLV,HYD,TRACTION CONTROL,48GPM	38728	10-8	-12
W/M,MNT,AIR CLEANER,CAT T/P	985717	10-16	21
WARNING LIGHT,OPT	REF	10-24	19
WASHER,.44X2.125X.134THICK	19818	10-4	11
WASHER,FLAT,SAE,.250	80970	10-16	36
WASHER,FLAT,SAE,.312	80963	10-5	12
WASHER,FLAT,SAE,.312	80963	10-7	28
WASHER,FLAT,SAE,.375	80996	10-22	12
WASHER,FLAT,SAE,.375	80996	10-3	11
WASHER,FLAT,SAE,.375	80996	10-8	21
WASHER,FLAT,SAE,.375	80996	10-10	24
WASHER,FLAT,SAE,.375	80996	10-20	18
WASHER,FLAT,SAE,.438	80696	10-15	-12
WASHER,FLAT,SAE,.500	80695	10-14	50
WASHER,FLAT,SAE,.500	80695	10-15	-9
WASHER,FLAT,SAE,.500	80695	10-17	38
WASHER,FLAT,SAE,.500,HARDENED	81141	10-7	30
WASHER,FLAT,SAE,.500,HARDENED	81141	10-16	32
WASHER,FLAT,SAE,.875	81059	10-4	7
WASHER,FLAT,SAE,1.000,HARDENED	81076	pg 10-7	-104
WASHER,FLAT,SPL,.750ID	81070	10-3	14
WASHER,FLAT,USS,#10	80995	10-21	-9
WASHER,FLAT,USS,.250	80140	10-10	16
WASHER,FLAT,USS,.250	80140	10-10	-41

Description	Part Number	Figure Number	Item Number
WASHER,FLAT,USS,.250	80140	10-23	-109
WASHER,FLAT,USS,.250	80140	PG 10-64	-404
WASHER,FLAT,USS,.250	80140	PG 10-64	-407
WASHER,FLAT,USS,.313	80141	10-11	23
WASHER,FLAT,USS,.313	80141	10-19	20
WASHER,FLAT,USS,.375	80142	pg 10-7	-203
WASHER,FLAT,USS,.375	80142	pg 10-7	-304
WASHER,FLAT,USS,.375	80142	10-12	43
WASHER,FLAT,USS,.375	80142	10-14	45
WASHER,FLAT,USS,.375	80142	10-17	26
WASHER,FLAT,USS,.375	80142	10-18	-11
WASHER,FLAT,USS,.375	80142	PG 10-63	-18
WASHER,FLAT,USS,.500	80144	10-6	10
WASHER,LOCK#10	80879	10-22	10
WASHER,LOCK,#10	871071601	10-23	12
WASHER,LOCK,.250	80160	10-10	-17
WASHER,LOCK,.250	80160	10-23	-110
WASHER,LOCK,.250	80160	PG 10-64	-502
WASHER,LOCK,.312	80161	10-19	19
WASHER,LOCK,.312	80161	10-20	13
WASHER,LOCK,.375	80162	10-2	19
WASHER,LOCK,.375	80162	10-4	12
WASHER,LOCK,.375	80162	10-9	22
WASHER,LOCK,.375	80162	10-12	39
WASHER,LOCK,.375	80162	10-14	46
WASHER,LOCK,.375	80162	10-16	25
WASHER,LOCK,.375	80162	10-17	25
WASHER,LOCK,.375	80162	10-18	-12
WASHER,LOCK,.375	80162	10-20	14
WASHER,LOCK,.500	80164	10-14	49
WASHER,LOCK,.500	80164	10-17	39
WASHER,LOCK,M08	80477	10-16	28
WASHER,LOCK,M10	80478	10-16	31
WASHER,LOCK,M12	80484	10-16	33
WASHER,LOCK,TANG STYLE	210170A	10-2	17
WASHER,NYLON,.562X2.125X.06THK	53175	10-6	15
WASHER,SNUBBING,2.00ODX.450OD	38827-01	10-15	-10
WASHER,SPLIT LOCK,.375	80162	10-7	44
WASHER,THRUST,1.50IDX.032	871070828	10-7	35
WASHER,THRUST,1.50IDX.062	36614	10-7	-4

Description	Part Number	Figure Number	Item Number
WASHER,THRUST,2.25ID,.060T	36265	10-3	7
WASHER,WEATHER SEAL,#10	81161	PG 10-63	-23
WATER SYSTEM	19276SRV	10-12	13
WATER SYSTEM	19276SRV	10-13	13
WATER SYSTEM , COCOA MATS	19276SRV	10-1	80
WEAR STRIP,POLY 3.88 LG	91291-01	10-11	-9
WELDMENT,EXHAUST	39146-01	10-18	1
WHEEL AND TIRE GROUPS	TBD	pg 10-11	-4
WHEEL AND TIRE GRPS	19674	10-1	50
WHEEL GROUP, 14 PLY	19674	pg 10-11	-2
WHEEL GROUP,14 PLY	19674	10-3	
WHEEL MOTOR	29405	10-4	6
WHEEL MOTOR	29405	pg 10-11	-3
WIRE,16GA,BLACK	33271-1	10-8	-2
WIRE,16GA,BLUE,RED STRIPE	33271-18	10-8	-4
WIRE,16GA,RED,BLACK STRIPE	33271-12	10-8	-3
WIRE,16GA,RED,BLACK STRIPE	33271-12	10-23	-1502
WIRE,16GA,WHITE	33271-5	10-23	-1401
WIRE,JUMPER,GROUND	28701	10-17	19
WIRING,CONTROL HANDLE	986213	10-23	6
WIRING,INSTRUMENT PANEL	988323	10-23	3
WIRING,TRUPAC 915,ENG	986217	10-23	28
WORK LIGHT	160040A	10-23	-1510
WRAP, EXHAUST INSULATING	11022	10-14	•
YOKE	27719	10-1	40
YOKE ASSEMBLY	27719	10-2	3
YOKE PLATE,FRONT	19243	10-2	9
YOKE,DEAD END	19215	10-2	1
YOKE,LIVE END	19220	10-2	3

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