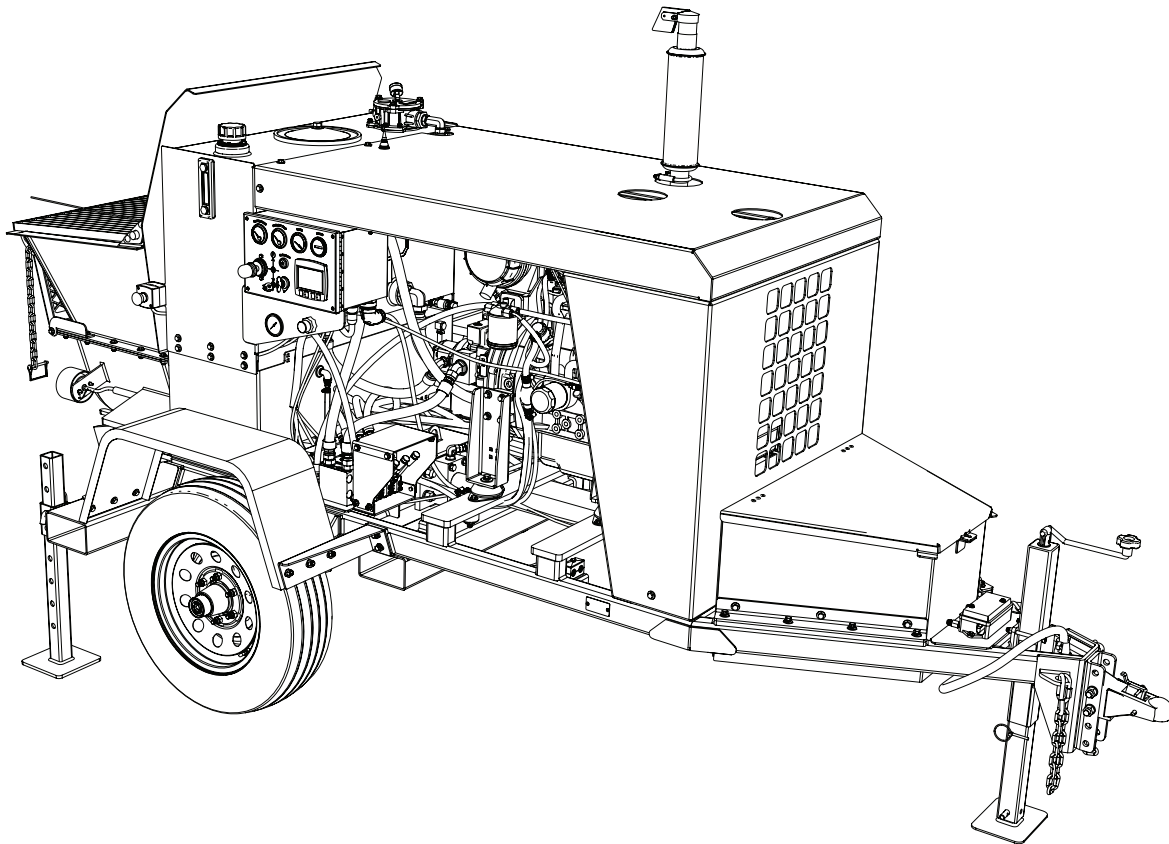


OWNER'S MANUAL

Serial Number _____

MODEL HP-20 HOG PUMP



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OVERVIEW

Introduction

The Model HP-20 Hog Pump is a self-contained, portable, robust machine built to deliver grout, mortar, or concrete on the job site. The system is ruggedly mounted on a sturdy frame complete with a hitch, a drop leg jack, outrigger legs, safety chains, wheels, brakes, and protected rear lighting. The unit is equipped with a front-mounted tool box for storage of clamps, cleanout fittings, and a protective case for the remote control unit.

A 49-hp Caterpillar diesel engine powers the hydraulic pump, driving twin hydraulic cylinders for outstanding pumping capabilities. The HP-20 Hog Pump is capable of unloading 18 cubic yards of material an hour when using a 2-in. diameter line. The fully reversible S-Tube system operates automatically, but can be manually controlled for clearing clogs or simplifying cleanup. The HP-20 Hog Pump handles aggregate up to 3/4-in. diameter, including pea gravel, and is ideal for filling block walls. The hopper can pivot 90 degrees to facilitate quick and efficient cleanup.

The system is controlled and monitored by a Plus+1 micro controller system and includes a digital display for operating conditions and system troubleshooting. A wireless remote control supports one-person operation and the ability to control other units. The well-designed operator control panel includes system gauges, a material flow joystick, engine key start, and engine throttle adjustment controls. Two emergency E-Stop buttons (one on each side of the hydraulic oil tank) are provided for quick machine shut down. In addition to the E-Stops, the hopper grate has an inductive sensor safety switch that shuts the machine down when the grate is lifted. The shutdown event must be acknowledged by using the digital display before machine operation can be resumed.

Before operating the HP-20 Hog Pump, carefully read the information contained in this manual. The manual provides basic guidelines for operator safety, proper operation, and maintenance of the HP-20 Hog Pump. To prevent injury or death, conduct routine maintenance on the HP-20 Hog Pump, do not operate outside of recommended use, and always be aware of the surroundings. Store this manual in the toolbox for easy referencing for operating, cleaning, and maintenance procedures.

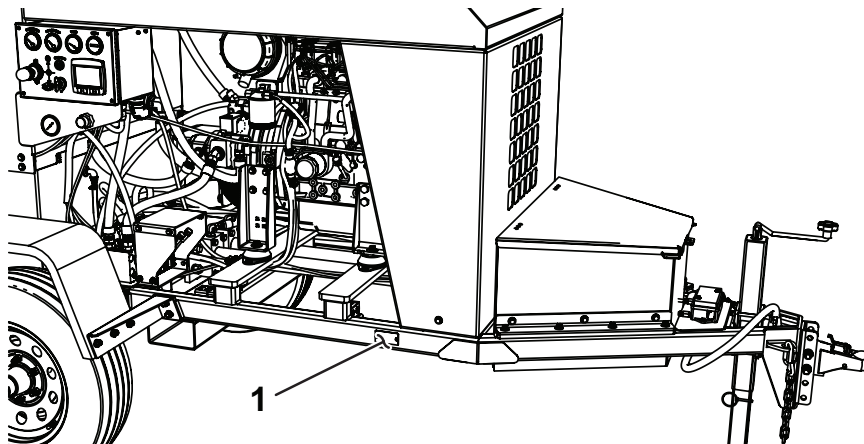


Figure 1 Data Plate

Item	Description
1	Data Plate

A data plate (Figure 1, Item 1) is provided on the operator display side, lower frame of the machine. It is engraved with the unit serial number, the company website (www.ezgmfg.com), and the company toll-free telephone number (1-800-417-9272).

Machine Controls And Locations

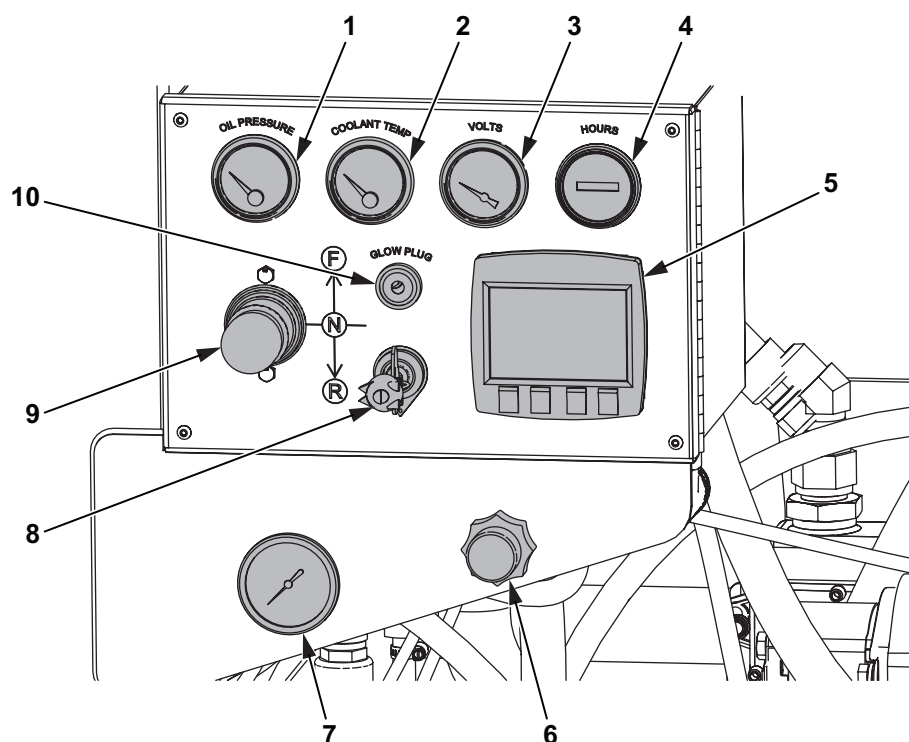


Figure 2 Operator Control Panel

Item	Description
1	Oil Pressure Gauge
2	Coolant Temperature Gauge
3	Voltmeter
4	Hour Meter
5	Digital Display
6	Engine Throttle Control
7	PVG Directional Valve Oil Pressure Gauge
8	Ignition Switch and Key
9	Material Flow Joystick
10	Engine Glow Plug Indicator

The machine operator controls are conveniently located in close proximity for efficient, streamlined operation. The control panel houses gauge instrumentation, the digital display, material flow joystick, engine key start, and throttle control.

OVERVIEW

Description Of Manual

This manual is provided with the HP-20 Hog Pump to inform the equipment owner/operator how to safely operate the machine and become aware of hazards. It also contains important information regarding set up, operation, maintenance, and repair procedures. It is the responsibility of the equipment owner/operator to make sure anyone who operates this machine understands all safety warnings. If you do not understand any items in this manual, please contact the dealer where this product was purchased or the manufacturer at the number listed throughout this manual. If you have any suggestions about how to make this manual easier to understand, contact the manufacturer. Keep this manual available for reference wherever this piece of equipment is being used and make it available to any operators.

General Information

Illustrations throughout this manual are representative and may show details or components that may not be the same as your machine. Continuing machine design improvements may cause changes not included in this manual. The information in this document is subject to change without any prior notice.

California Proposition 65 Warning

Engine exhaust and some of its constituents, and some dust created by power sanding, sawing, grinding, drilling, and other construction activities contain chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm. Some examples of these chemicals are lead from lead-based paints; crystalline silica from bricks, cement and other masonry products; and arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, ALWAYS work in a well-ventilated area and work with approved safety equipment, such as dust masks, specially designed to filter out microscopic particles.

Equipment Specifications and Options

The HP-20 Hog Pump is a rugged machine capable of pumping grout, concrete, or small aggregate (up to 3/4-in. diameter with a recommended 3-in. hose). The Caterpillar 49-hp diesel engine powers the hydraulic pump that drives the cylinders to deliver media a horizontal maximum distance of 800 ft or a vertical distance of 200 ft. The fully reversible S-Tube allows quick dispensing of materials from the 8-cubic foot capacity hopper. The hydraulic cylinders have a 4-in. bore, 30-in. stroke, and develop 650 psi at the piston face. Serial numbers HP20170010 through HP201XXXX are equipped with a 120 VAC hydraulic fluid tank heater for use in cold weather climates/areas.

American National Standards Institute (ANSI) Standards

Throughout this manual, the following key safety words and symbols will be used to alert the reader of potential hazards. Become familiar with these words and their meanings. Take all precautions to avoid the hazards described.



Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



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



Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury and property damage. It may also be used to alert against unsafe practices.



Indicates a potentially hazardous situation which, if not avoided, **MAY** result in property damage. It may also be used to alert against unsafe practices.

To prevent serious injury or death, thoroughly read and understand all aspects of this manual. Ensure safety practices discussed in this chapter are put into practice when operating the HP-20 Hog Pump. This chapter is **NOT** all-inclusive. It is the responsibility of each operator to abide by all other safety precautions implemented by the company, owner of the equipment, and state and federal government.

Required Personal Protective Equipment (PPE)

The use of PPE is critical to safe operation and well-being of the operator. The following PPE and information (this list is not all-inclusive) should be used in the safe operation of the HP-20 Hog Pump:

- Jewelry removed (especially necklaces and rings)
- Long hair tied back
- Close-fitting work clothes that do not hinder movement
- Safety glasses with side shields, or goggles
- Hearing protection
- Safety-toed footwear
- Occupational Safety and Health Administration (OSHA)-approved hard hats
- National Institute for Occupational Safety and Health (NIOSH)-approved ventilation masks when dust is present
- Protective gloves
- Rubber boots and rubber gloves when performing cleanout procedures

SAFETY

General Safety Hazards

General Machine WARNINGS:

WARNING

- Make sure anyone operating the HP-20 Hog Pump is thoroughly familiar with its operation. Keep all unauthorized and untrained personnel, especially children, away from the machine.
- Never operate machine with the safety grate, guards, or safety devices removed or open. Do not alter any safety guards.
- Be sure any clothing you wear does not have strings, fringes, or other external tightening means that could be caught in moving parts.
- Keep all body parts, clothing, jewelry, and solid objects away from all moving parts.
- Never perform any work on the machine while it is running. Before working on or cleaning the unit, turn the ignition key off and disconnect the negative battery cable.
- Never operate the machine when under the influence of alcohol, drugs, or medications.
- Do not use the HP-20 Hog Pump for anything other than its designed purpose of pumping mortar, grout, concrete, or small diameter (up to 3/4-in.) media (pea gravel).
- Stay clear of moving parts while the machine is in operation.
- Operate machine only in a properly vented environment.
- Wear a mask and avoid breathing dust produced while using the machine. Dust may contain crystalline silica and may cause serious health problems.
- Always know the location of nearest fire extinguishers, first aid kit, and phone with first-responder contact numbers in case of emergency.
- Ensure the outrigger legs are pinned and locked in the stowage position before traveling. If the locking device is damaged or worn, it should be repaired immediately and the unit must not be driven until the outrigger legs can be positively locked.

General Machine CAUTIONS:

CAUTION

- Inspect all hoses, fasteners, bolts, and welds for nicks, cracks, cuts, damage, wear, or looseness before each use. Repair as needed.
- Always wear approved PPE, including glasses, hearing protection, hard hats, and ventilation masks when operating the machine.
- Avoid contact with hot hydraulic oil.
- Allow system to cool before performing any repairs or service, such as adding fuel, oil, or coolant.
- Use only factory authorized parts.
- Used lubricants such as engine oil, hydraulic oil, and hazardous waste must be taken to an authorized disposal or recycling center.

Safety Labels

The HP-20 Hog Pump has numerous machine warning, caution, and notice labels located in key areas to warn or inform the operator of potential hazards. For your safety and the safety of others, replace any missing, damaged, or unreadable labels by contacting EZG Manufacturing at 1-800-417-9272.

Machine Emergency Stop (E-Stop) Buttons

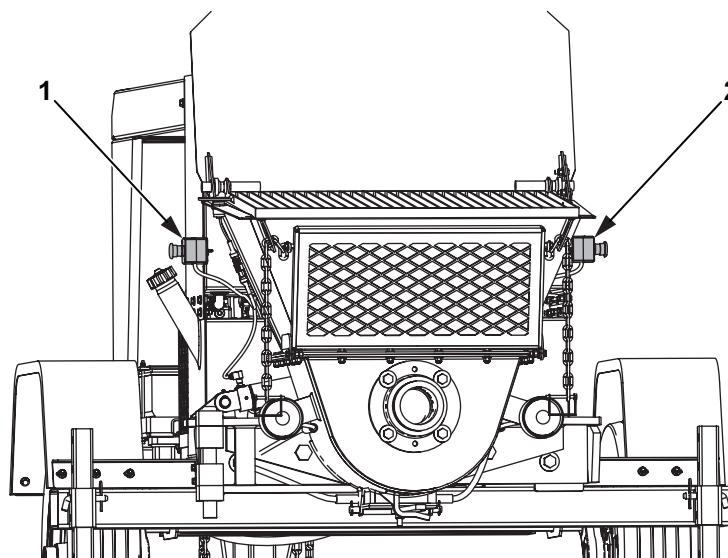


Figure 3 Machine E-Stops

Item	Description
1	E-Stop, Fuel Tank Filler Side
2	E-Stop, Operator Control Panel Side

The HP-20 Hog Pump has been equipped with two E-Stop buttons (Figure 3, Items 1 and 2) that provide quick machine shutdown when pressed. Push the E-Stop button in to stop the machine. Once engaged, they must be acknowledged on the digital display and reset before resuming normal machine operation. The E-stop button must be pulled out to enable the system to restart. An additional E-Stop is located on the remote control unit.

NOTICE

The E-Stops on both sides of the hydraulic oil tank will shut the engine down completely. The E-Stop on the remote control unit will only stop the material pump. It does not shut off the engine.

SAFETY

Hydraulic System Safety

WARNING

The hydraulic system is under pressure and oil may be hot.

- Always allow the machine to cool completely before performing service.
- Always relieve pressure in the hydraulic system before performing service.
- Always use appropriate safety equipment and clothing to protect exposed skin and eyes from high pressure oil.
- Tighten all connections to proper specifications before applying pressure.
- Never use bare hands to check for leaks. Oil under pressure can penetrate the skin, and can cause gangrene within a few hours if not properly removed. Use a piece of cardboard to check for leaks.

Failure to follow appropriate safety precautions may result in death or serious injury.

Electrical Components Safety

WARNING

Always disconnect the negative terminal first and positive terminal last. Connect positive terminal first and negative terminal last. Use care when dealing with live circuits to prevent arcing. Arcing may result in death or serious injury.

Disconnect the battery negative (–) cable before removing or installing electrical components. Always connect the battery negative (–) cable last.

CAUTION

Use care to prevent arcing when working on live circuits or components. Arcing can cause component damage and may ignite flammable materials.

Machine Setup Instructions

Before operating the HP-20 Hog Pump, the machine should be properly set up on the job site. The following procedure provides typical setup instructions.

! WARNING

Do not operate the HP-20 Hog Pump without outrigger legs extended and pinned in place. Failure to comply may result in injury or death.

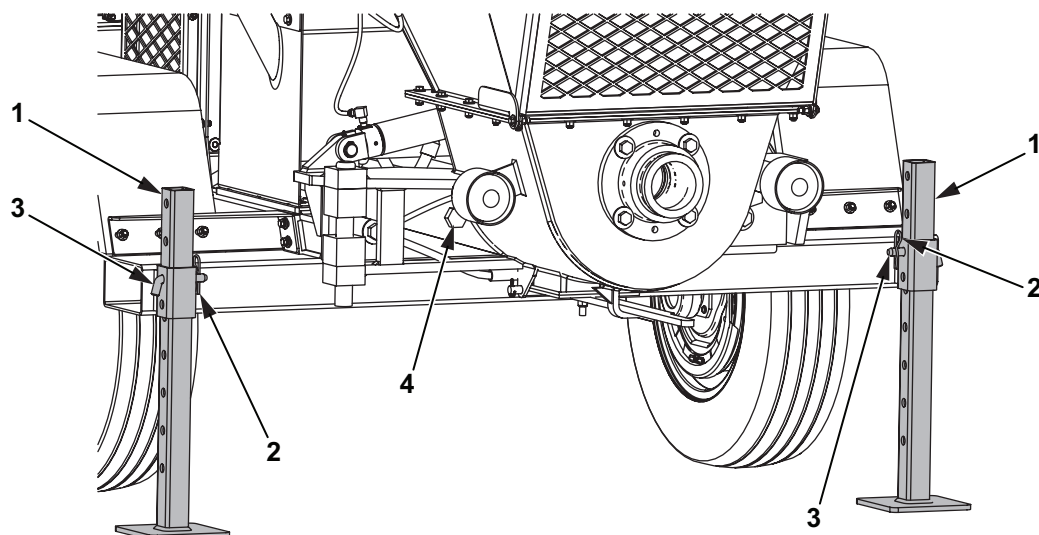


Figure 4 Rear View

Item	Description
1	Outrigger leg
2	Hair Pin
3	Hitch Pin
4	One-Inch Retaining Bolts (Left Side Shown)

! CAUTION

The HP-20 Hog Pump must be stable before operating the machine. Level the machine if placed on a slope or uneven terrain. Failure to comply may result in personal injury or equipment damage.

1. While firmly holding left-hand outrigger leg (Figure 4, Item 1), remove hair pin (Figure 4, Item 2) and hitch pin (Figure 4, Item 3) from outrigger leg.
2. Extend outrigger leg to the ground surface and insert hitch pin through the closest alignment hole.
3. Replace hair pin.

SETUP

4. While firmly holding right-hand outrigger leg, remove hair pin and hitch pin from outrigger leg.
5. Extend outrigger leg to the ground and insert hitch pin through closest alignment hole.
6. Replace hair pin.

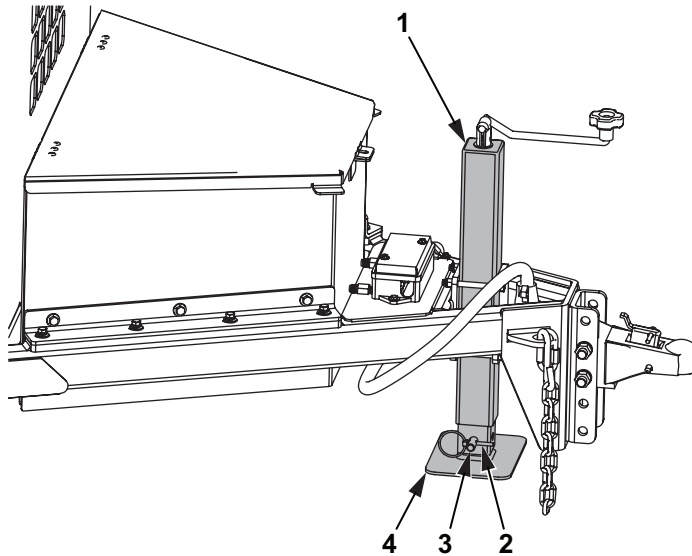


Figure 5 Drop Leg Jack and Foot Plate

Item	Description
1	Drop Leg Jack
2	Detent Clip
3	Keeper Pin
4	Foot Plate

7. While firmly holding the lower part of the drop leg jack (Figure 5, Item 1), remove the foot plate (Figure 5, Item 4), detent clip (Figure 5, Item 2), and keeper pin (Figure 5, Item 3) with attached chain.
8. Lower the drop leg jack until the foot plate contacts the ground.
9. Insert keeper pin through the closest alignment hole and secure with detent clip.
10. Engage electric brake control (if equipped).

CAUTION

Ensure the one-inch retaining bolts that secure the hopper to the frame (Figure 4, Item 4) are tightened prior to operation. Failure to comply may result in personal injury or equipment damage.

Preparing Machine for Operation

Before placing the machine into operation, check/verify the items provided below.

Check all the following:

- Machine is stable
- Engine oil level on dipstick, add oil if required
- Fuel tank level on sight gauge, fill if required
- Engine coolant level, add coolant if required
- Engine coolant hoses and fittings, repair if required
- Engine air filter minder (restriction gauge), change air filter if required
- Fuel hoses and fittings for leaks, repair as required
- Fuel filter, change fuel filter if required
- Fuel/water separator, drain water if required
- Hydraulic oil tank level, add oil if required
- Hydraulic oil tank filter, change filter if indicator is in the red zone
- Hydraulic hoses, cylinders, and fittings for leaks, repair as required

Operating the Machine

WARNING

Appropriate PPE should be worn at all times while operating the HP-20 Hog Pump. Failure to comply may result in injury or death.

WARNING

Do not attempt to make repairs to HP-20 Hog Pump while it is in operation. Failure to comply may cause injury or death.

NOTICE

All E-Stops (including remote control) must be in the pulled out position or pump will not engage.

OPERATION

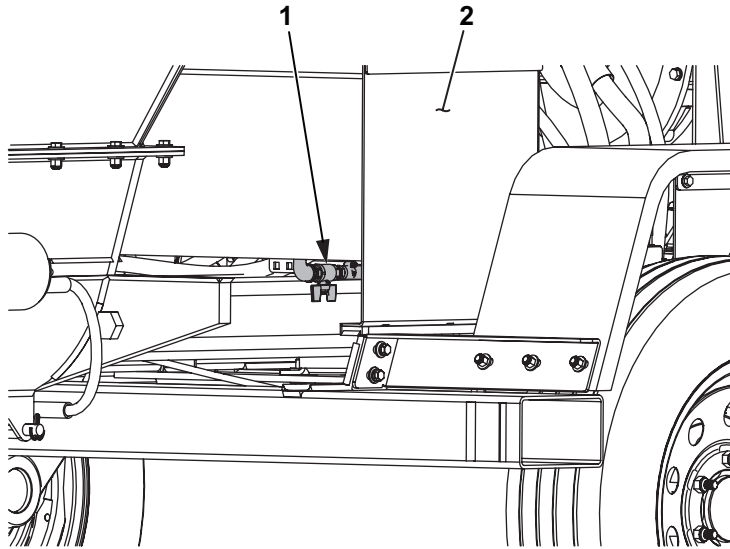


Figure 6 Fuel Tank Shutoff Valve

Item	Description
1	Fuel Shutoff Valve
2	Fuel Tank

1. Turn the fuel tank shutoff valve (Figure 6, Item 1) to the ON position.
2. Turn ignition key (Figure 2, Item 8) to the ON position to check battery voltage. If voltage is below 12.5 volts, charge the battery before attempting to start the engine.

NOTICE

The Caterpillar diesel engine on this machine is equipped with a glow plug starting aid that must be engaged prior to attempting engine start procedures.

3. Turn ignition key (Figure 2, Item 8) to the HEAT position to engage glow plug starting aid. Indicator light will illuminate.

⚠ WARNING

Do not overheat the starter. Crank the engine for 15 seconds, then wait 30 seconds before cranking again. Periodically check the starter temperature. Allow a hot starter to cool down before cranking again.

4. Once the glow plug indicator illuminates bright orange, turn ignition key to start position and crank the engine until it starts.
5. Turn the throttle control knob (Figure 2, Item 6) clockwise to increase engine speed until engine warms up. Reduce engine speed once engine has reached normal operating temperature.
6. Check the operator control panel gauges (Figure 2, Items 1 – 3 and 6) to ensure all readings are within nominal ranges.
7. Check the digital display (Figure 2, Item 5) to ensure no system alarms or warnings are present. If a condition does exist, it must be corrected before proceeding.
8. If operating the HP-20 Hog Pump at weather temperatures below 60° F (16° C), perform the following. If not, continue to step 9.

⚠ WARNING

When operating the HP-20 Hog Pump in weather temperatures below 60° F (16° C), increase hydraulic oil temperature to a minimum of 80° F (27° C) before use. Failure to do so will result in serious damage to the hydraulic cylinder sensor.

- Adjust engine RPM to 50% throttle.

NOTICE

Running the engine without ever engaging the pump and cycling cylinders will not warm the entire system to proper operating temperature.

- Verify the material flow joystick control (Figure 2, Item 9) is in the neutral position.



Figure 7 Flow Scale

- Press Pump Engage on the digital display (Figure 7).
- SLOWLY adjust the material flow joystick forward until the flow scale is one-third full (Figure 7).

OPERATION

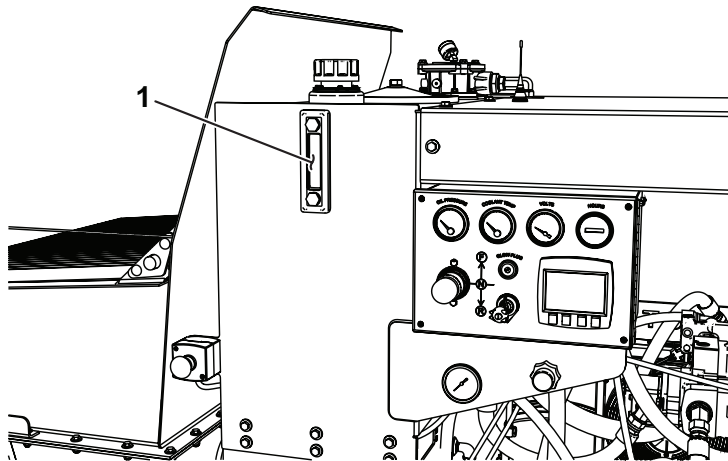


Figure 8 Hydraulic Temperature/level Indicator

Item	Description
1	Hydraulic Temperature/level Indicator

- Continue to run the HP-20 at these settings until the hydraulic temperature/level indicator (Figure 8, Item 1) reaches a minimum of 80° F (27° C).
9. Connect delivery hose to output of hopper assembly.

CAUTION

A primer/slurry product should be introduced into the hopper before the initial concrete/masonry material is added. Halfway fill the hopper with a mix of primer/slurry and water. Allow the pump to cycle several times to prime cylinders and prelubricate the line. Failure to do so could result in damage to equipment.

10. Fill hopper with the media to be pumped.

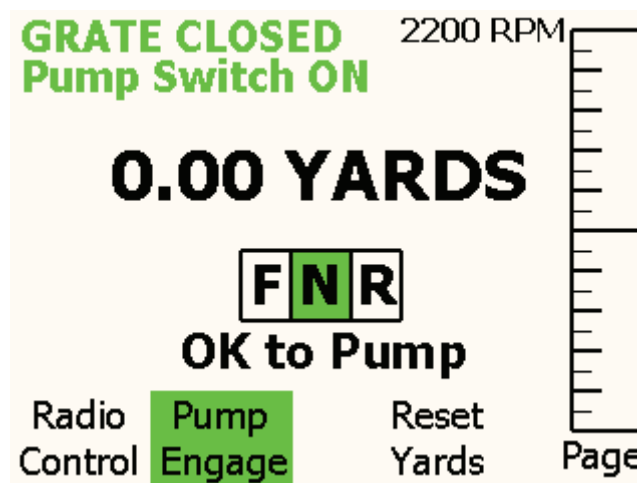


Figure 9 Pump Engage, Digital Display

11. Press Pump Engage on the digital display.
12. Move cylinder joystick control from **N** (Neutral) to **F** (Forward) to begin pumping.

13. Adjust throttle control knob to increase/decrease pumping/delivery speed.

NOTICE

If the hopper grate is open, the pump will not engage, and Pumping Disabled will appear on the display.

NOTICE

When the HP-20 Hog Pump is pumping, the scale on the right side of the display will show yards pumped. Please understand this is a theoretical calculation and should be used for a reference only. It is not designed for material billing purposes.

OPERATION

Running Engine Out of Fuel

NOTICE

To avoid an engine starting problem, the engine fuel level should be checked frequently and not allowed to run dry. In the event the engine is allowed to run completely out of fuel, the procedure provided below must be followed to restart the engine.

1. Fill the fuel tank with fresh fuel.
2. Slowly open the left bleeder nut located on top of the fuel/water separator (Figure 10, Item 3) until fuel emerges, and then close the nut.
3. Slowly open the fuel filter bleeder nut located on top of the fuel filter (Figure 10, Item 1).

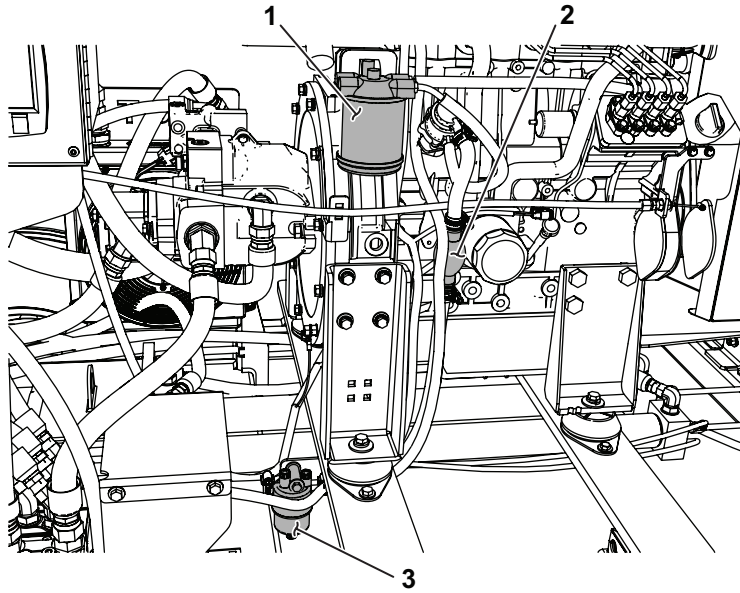


Figure 10 Fuel Primer Bulb

Item	Description
1	Fuel Filter
2	Fuel Primer Bulb
3	Fuel/Water Separator

4. Squeeze the fuel primer bulb (Figure 10, Item 2) until bubble-free fuel is present.
5. When fuel is bubble free, close fuel filter bleeder nut.
6. Follow standard engine starting procedure.

Ambient Temperature Operation

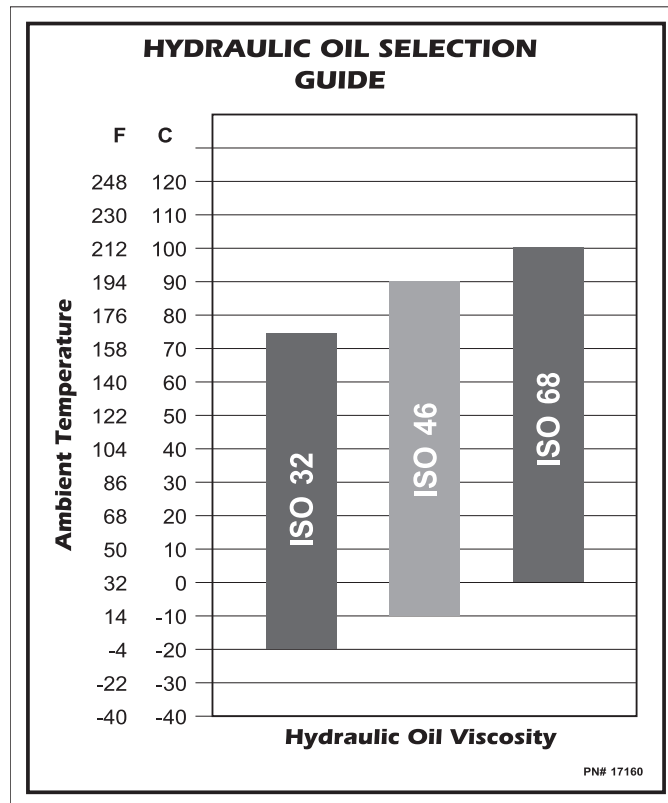


Figure 11 Hydraulic Oil Selection Guide

⚠ CAUTION

Operate the HP-20 with the provided International Organization of Standardization (ISO) 68 hydraulic oil inside of acceptable ambient temperature ranges. Failure to do so could result in damage to equipment.

1. The HP-20 is shipped from the factory with 46 gallons of ISO 68 hydraulic fluid.
2. If ambient temperature operating conditions deviate beyond the minimum and maximum ranges identified for ISO 68 in the chart above (Figure 11), use the hydraulic oil that does fall in the appropriate ambient temperature range.

OPERATION

Machine Shutdown

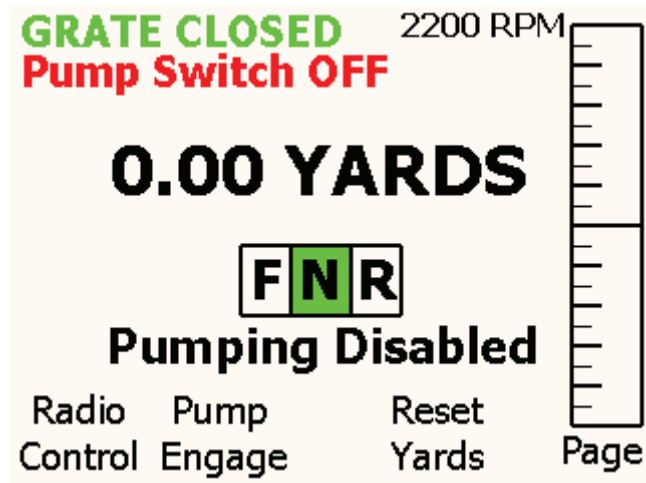


Figure 12 Pump Disengage, Digital Display

1. On the digital display, press Pump Engage to stop the pumping operation.
2. Turn ignition key (Figure 2, Item 8) to the OFF position.
3. Turn the fuel tank shutoff valve (Figure 6, Item 1) to the OFF position.
4. Thoroughly clean the machine (See Cleaning Procedures).

Digital Display

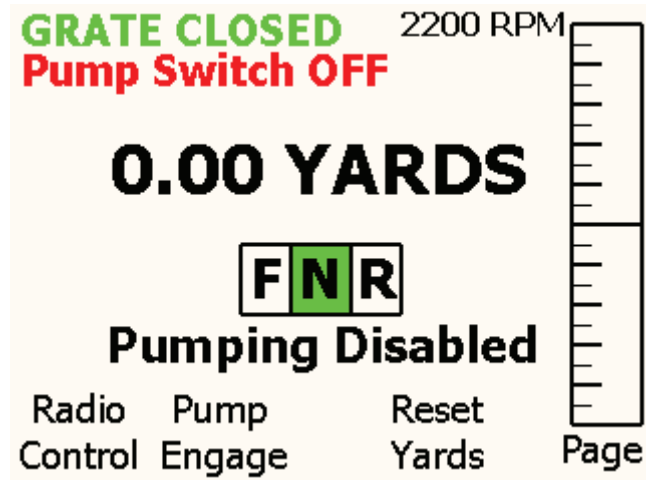


Figure 13 Digital Display

The digital display functions as the hub of communication for the HP-20 Hog Pump. The Controller Area Network (CAN)-based Plus+1 programmable display works in conjunction with the micro controller and wireless remote control. The digital display provides the operator complete control over the machine and provides useful troubleshooting information including system diagnostics. Multiple screens provide information on alarm status, volume of media pumped, and much more. The various screens can be viewed without starting the engine by turning the ignition key to the ON position.

The four soft touch buttons below the display are used to select the corresponding items directly above them (Radio Control, Pump Engage, Reset Yards, Page). When Radio Control and Pump Engage are selected, they

will be illuminated in green. Press and hold Reset Yards for a few seconds to reset the value to zero. Press Page once for System Diagnostics information and press a second time for Engine Information.

Information that appears on the display in red is a quick visual indicator to the operator that a condition has occurred that requires operator attention and/or action.

Additional Display Screens:

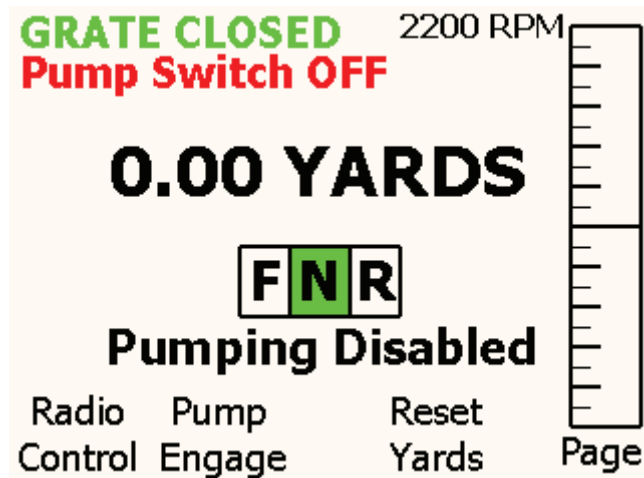


Figure 14 Pumping Disabled, Grate Closed, Pump Switch OFF

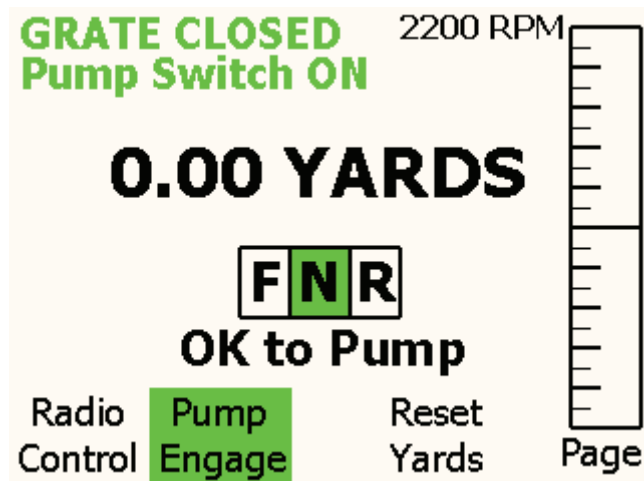


Figure 15 OK to Pump, Pump Switch ON

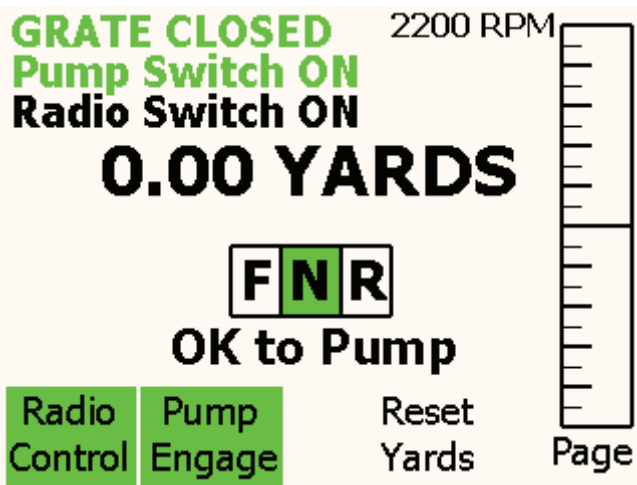


Figure 16 Pump Engaged, Radio On



Figure 17 Pumping Disabled, Radio E-Stop Engaged



Figure 18 Pumping Disabled, Machine E-Stop Engaged

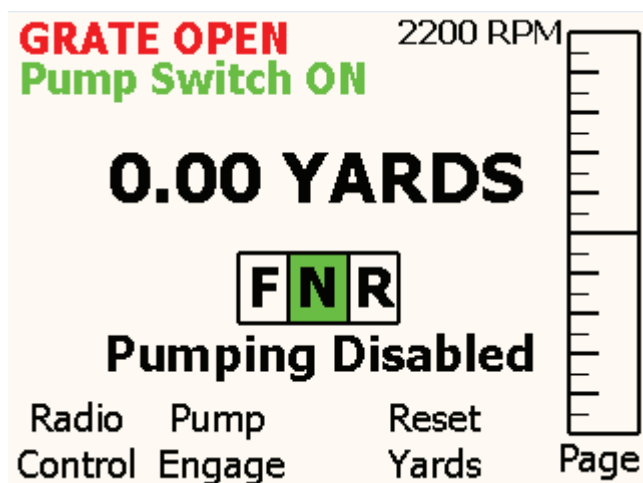


Figure 19 Pumping Disabled, Hopper Gate Is Open



Figure 20 Pumping Disabled, Reset Yards Has Been Selected

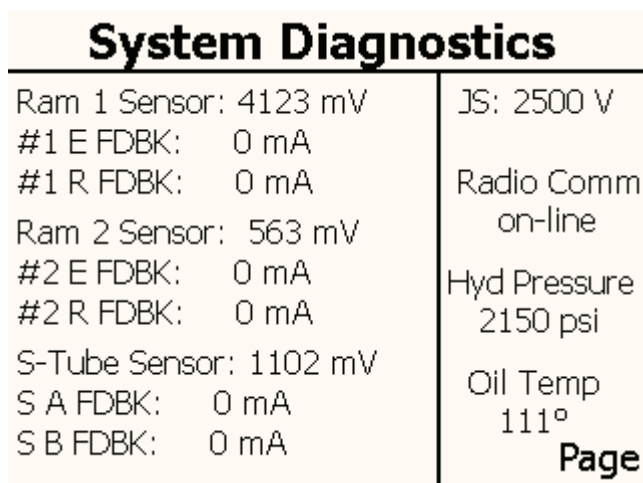


Figure 21 System Diagnostics, Page 1

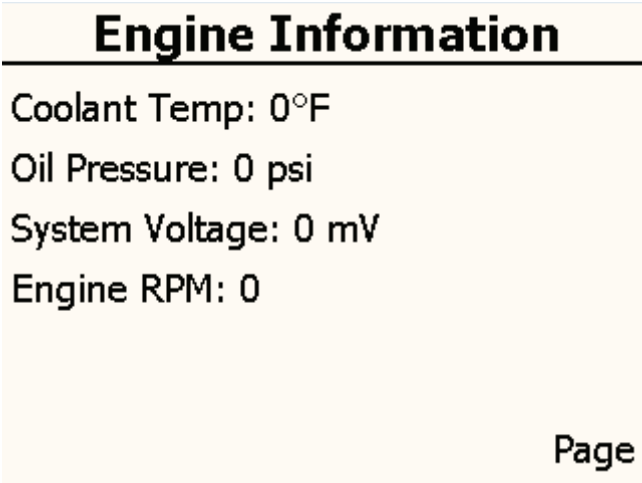


Figure 22 System Diagnostics, Page 2

Wireless Remote Control

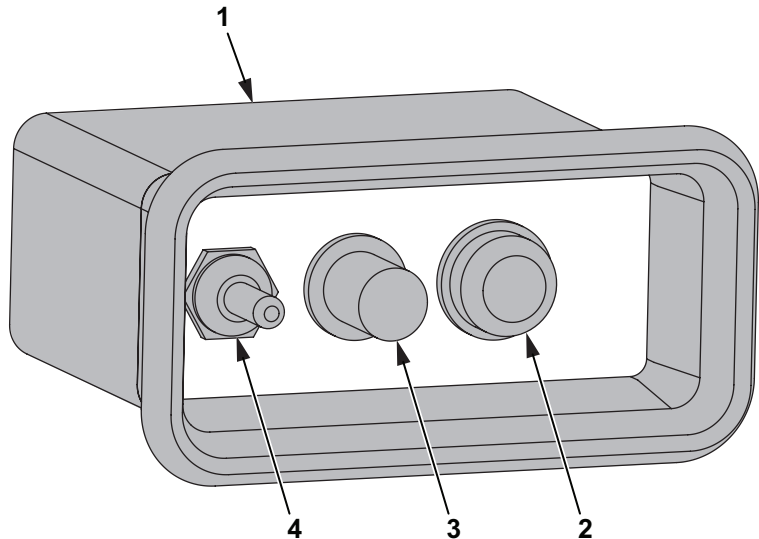


Figure 23 Wireless Remote Control Unit

Item	Description
1	Wireless Remote
2	E-Stop Button
3	Cylinder Speed Control (MIN/MAX)
4	Cylinder Forward/Reverse Control (Toggle Switch)

Description

The wireless remote control system consists of a portable transmitter, receiver, antenna, and supporting equipment. The portable transmitter controls cylinder forward and reverse motion, cylinder speed, and includes an E-Stop button. A rechargeable NiMH battery powers the unit. A green blinking light on the remote indicates communication is occurring between the transmitter and receiver. For serial numbers HP2016001 through HP2018012 wireless remote controls only, if no controls are used on the remote for 25 minutes, the remote will shut off and need to be reset at the digital display (Figure 13) before continuing use.

Operation

1. Pull the E-Stop (Figure 23, Item 2) to the out position.
2. Press Pump Engage button (Figure 13) on the machine display.
3. Press Radio Control button (Figure 13) on the machine display.
4. Move toggle switch for cylinder forward or reverse (Figure 23, Item 4) to desired position.
5. Adjust cylinder speed control (Figure 23, Item 3) for required pumping speed.
6. When finished using the remote control, press the E-Stop button (Figure 23, Item 2).

NOTICE

When the remote control E-Stop is pressed, it will only stop the pump. The engine will continue to run. The remote will remain inactive until it is reset at the digital display (Figure 13). If the hopper grate is opened while using the remote, the same reset procedure must be followed.

DAILY MAINTENANCE

Cleaning Procedures

The HP-20 Hog Pump is a versatile machine built to withstand rugged use, and with proper care and routine maintenance the unit should serve the owner/operator many years of service. It is important to follow standard concrete equipment cleaning practices to ensure longevity. The machine should be cleaned half way through a normal workday or after each use. Wash the machine using plain water with a hose and a brush or a pressure washer. Ensure all concrete or mortar is removed before it dries. Ensure safety equipment is worn to prevent injury from dislodged material. After cleaning machine, lubricate all grease points to displace any grout before it cures.

Main Areas to Clean

The hopper (Figure 24, Item 2), upper grate (Figure 24, Item 1), S-Tube (Figure 25, Item 1), cleanout chute (Figure 24, Item 4), gate gasket, reversing cylinder (Figure 25, Item 2), and all pivot points are areas that require cleaning.

NOTICE

The hopper assembly (including grate, hopper, cleanout chute, and S-Tube) is mounted on a hinge and hinge pin (Figure 24, Item 5) system. Remove two bolts and the assembly can be rotated 90 degrees away from the main framework to allow easy cleaning of components.

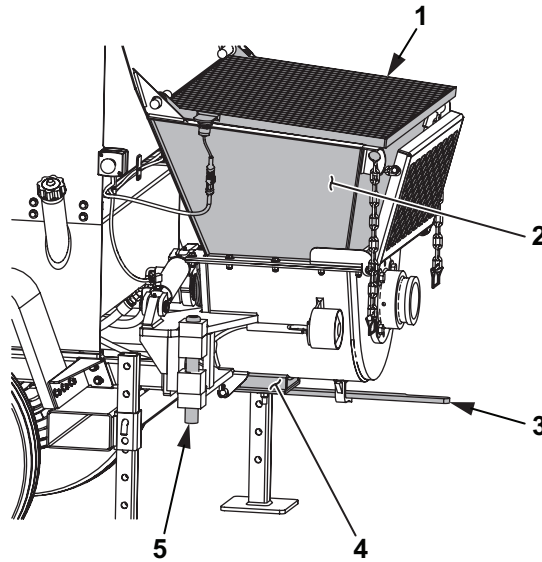


Figure 24 Hopper Assembly

Item	Description
1	Upper Grate
2	Hopper
3	Gate Handle
4	Cleanout Chute
5	Hopper Hinge Pin

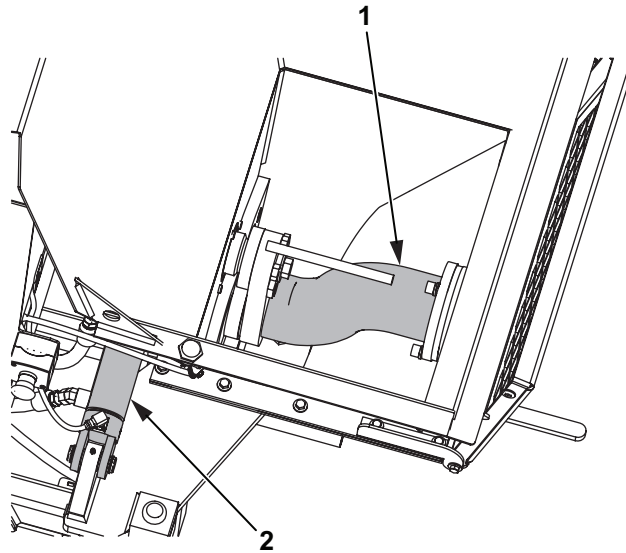


Figure 25 S-Tube

Item	Description
1	S-Tube
2	S-Tube Reversing Cylinder

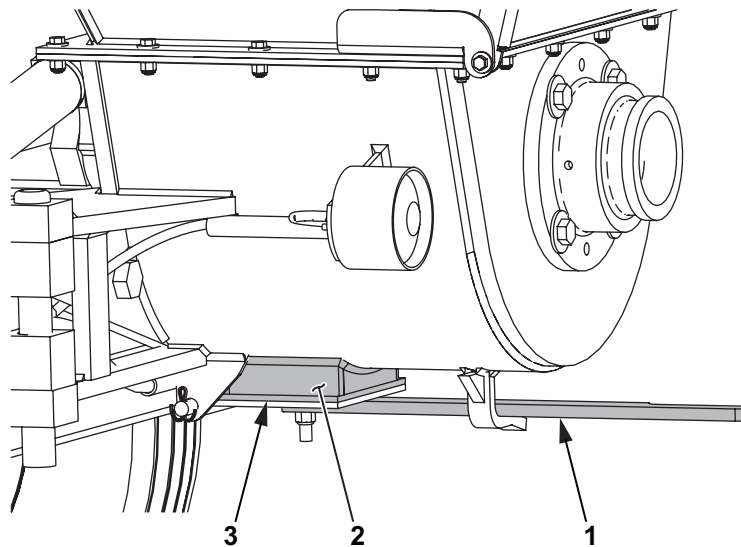


Figure 26 Cleanout Chute

Item	Description
1	Gate Handle
2	Cleanout Chute
3	Gate Gasket

DAILY MAINTENANCE

Cleaning Procedures:

1. Pump as much material as possible out of the delivery system.
2. On the digital display (Figure 2, Item 5), press Pump Disengage to stop the pumping operation.
3. Disconnect the delivery hose from output of hopper assembly.
4. Move the gate handle (Figure 26, Item 1) to the right.
5. Lower the hinged gate and empty hopper for access to the cleanout chute (Figure 26, Item 2).
6. Remove two 1-in. bolts and rotate the hopper assembly 90 degrees away from the frame.
7. Thoroughly flush out the hopper (Figure 24, Item 2), S-Tube (Figure 25, Item 1), and reversing cylinder (Figure 25, Item 2) with water. To aid in cleaning, the reversing cylinder can be moved using the manual controls.
8. Insert water hose into the hopper output and flush out remaining debris.
9. For easier cleanup, it is recommend to apply a thin coat of biodegradable form oil on the inside of the material hopper.
10. Clean delivery hose (refer to delivery hose manufacturer).

NOTICE

If power washing the HP-20 Hog Pump, avoid direct pressure on the decals and safety labels. Promptly replace any decals or safety labels that are missing, damaged, or unreadable.

Maintenance Schedule

! CAUTION

Routine maintenance ensures proper operation of equipment. All warranties are void if maintenance is neglected. Failure to follow any routine maintenance listed in this section may result in equipment damage or failure.

NOTICE

For specific engine maintenance and servicing, please refer to the appropriate engine manufacturer maintenance schedules and service manuals.

A daily, weekly, monthly, and yearly maintenance schedule should be established to prevent damage to the equipment and keep it operating at an optimum level.

Daily:

1. Clean the machine thoroughly (See Cleaning Procedures).
2. Check for loose, broken, or damaged components.
3. Check hydraulic hoses and hydraulic cylinders for leaks.
4. Check for loose, broken, or damaged structural components, such as welds and fasteners.
5. Ensure all safety devices are in place and in good working order and labels are legible.
6. Ensure all electrical components function properly.

7. Check for loose, broken, or damaged bolts and fasteners.
8. Check and grease all grease fittings.
9. Check for damage or wear to hydraulic hoses.
10. Check tire pressure.
11. Ensure hitch safety chains are in place and in good condition.
12. Check hydraulic oil filter indicator gauge.
13. Check hydraulic oil heat exchanger cooling fins for blockages/plugging.
14. Check water box for contamination. If contamination is present, this is an indicator that piston seals need replaced.

NOTICE

EZG Manufacturing recommends biodegradable hydraulic fluid as a water box coolant.

Lubrication

Routine lubrication (using the recommended lubricants) should be performed on key locations to prevent premature equipment failure. Only use EP1-rated (or equivalent) lubricant.

S-Tube actuating cylinder – two fittings, grease once/hour during operation and after daily machine cleanup

S-Tube bearing – two fittings, grease once/hour during operation and after daily machine cleanup

S-Tube outlet – two fittings, grease once/hour during operation and after daily machine cleanup

Hopper pivot pin – two fitting, grease after daily machine cleanup

Trailer wheel bearings – repack bearings and inspect for wear or damage every 12,000 miles or 12 months

Hydraulic Oil Tank

The hydraulic oil tank has a large access cover, fill cap with breather, top-mounted oil return filter (with restriction indicator), internal magnetic suction strainers, a tank-mounted dual purpose sight level/temperature gauge, and a drain valve. A direct current-powered electric heat exchanger with fan maintains oil temperature.

When replenishing the oil, pour fresh oil through a wire mesh strainer (200 mesh or finer) to remove any contaminants. Never use a cloth to strain oil. The lint/fibers are a contaminant harmful to hydraulic systems.

CAUTION

Contaminated hydraulic oil leads to premature system malfunctions and failures. Exercise care when filling the tank or working on fittings to avoid introducing contaminants. Failure to do so could result in damage to equipment.

NOTICE

Ensure all areas in close proximity of the cap, breather, or filter are clean before removing. Always cap or plug open ports and hydraulic lines when disconnecting. Check the oil filter indicator gauge daily. Change the filter if indicator is in the red zone.

DAILY MAINTENANCE

NOTICE

Perform a hydraulic oil analysis (for contamination and oil condition) every 500 hours or monthly.

Oil Filter Change Procedure

1. Ensure the machine is shut down.
2. Ensure oil pressure gauges read zero.
3. Clean the filter housing and cover area with a clean, dry cloth.
4. Remove three screws and top plate. **DO NOT** remove the bottom plate.
5. Remove sealing gasket. Visually inspect gasket for damage and replace if required.
6. Remove filter element and discard.
7. Install new filter.
8. Install new sealing gasket if required.
9. Install cover with three screws.
10. Start the machine and visually inspect for oil leaks. Repair leaks as required.

Daily General Maintenance

Category	Maintenance Operation
Engine	Check engine oil level on dipstick – add oil if required
	Check engine coolant level – add coolant if required
	Check engine coolant hoses and fittings – repair if required
	Check engine radiator cooling fins for blockages/plugging – clean if required
	Check engine air filter minder (restriction gauge) – change air filter if required
	Check engine fan belt condition – replace if required
	Check battery electrolyte, cables, and connections – fill/replace/repair if required
Fuel	Check fuel tank level on sight gauge – fill if required
	Check fuel/water separator – drain water out if required
	Check fuel filter – change fuel filter if required
	Check fuel hoses and fittings for leaks – repair if required
Hydraulic Oil	Check hydraulic oil tank level – add oil if required
	Check hydraulic oil tank filter – change filter if indicator is in the red zone
	Check filler cap/breather condition – clean/replace if required
	Check hydraulic oil heat exchanger cooling fins for blockages/plugging – clean if required
	Check hydraulic hoses, cylinders, and fittings for leaks, damage, or wear – repair as required
Electrical	Check all electrical components for functionality – repair as required
	Ensure all safety devices are working and safety labels are legible – repair/replace if required
Trailer/Frame	Check for loose, broken, or damaged structural components and fasteners – repair as required
	Check and grease all grease fittings
	Ensure hitch safety chains are in place and in good condition – replace if missing/broken
	Check tire air pressure – fill if required
	Check tires for wear/damage – replace if required
	Check wheel lug nuts for tightness – torque to specification if required
	Check jack hand crank for smooth operation – lubricate if required
	Check tail light operation – repair as required
Remote	Check if unit is functional – charge/replace battery if required
	Check antenna condition – replace if broken/missing
	Check plastic case condition – replace if cracked/broken
End of Day	Clean the machine thoroughly (See Cleaning Procedures)
	After machine is dry, spray all concrete/mortar contact areas with a thin coat of oil
	Grease all grease fittings
	Clean delivery lines/components (follow manufacturer's guidelines)

DAILY MAINTENANCE

Maintenance Service Intervals

Item	Interval (Hours)			
	Initial 50	100	250	500
Change engine oil and filter (refer to engine manufacturer's manual)				
Change hydraulic oil filter				
Check hydraulic hoses and fittings for wear/damage				
Check wheel lugs for tightness.				
Change water box oil and check for excess amount of contaminants				
Check hydraulic oil cooler and engine radiator for dirt/debris/clogging				
Check engine fan belt condition				
Check all structural components for integrity				
At the 250 hour interval, perform all the 100 hour interval items and the items listed below				
Send hydraulic oil sample for analysis.				
Change hydraulic oil filter (or when indicator is in the red zone)				
Check hydraulic hoses and fittings for wear/damage				
Check S-Tube and seals for wear				
Check S-Tube reversing cylinder pivot points for wear				
Check all electrical connections for corrosion, clean as needed				
Check fuel hoses/lines for leakage/wear/damage				
Check engine throttle control cable for binding				
Service engine (refer to engine manufacturer's manual)				
Check all decals and safety labels for wear/damage/readability				
Check all gauges for damage/functionality				
Check tire tread for excess wear				
At the 500 hour interval, perform all the 250 hour interval items and the items listed below				
Change hydraulic oil and filter				
Clean hydraulic oil tank and magnetic suction strainers				
Perform detailed examination of all welds/gussets for cracks				
Check wheel bearings for wear and repack				
Check clamps and cleanout fittings for wear/cracks/damage				
Replace hydraulic oil filler cap/breather				

Material Piston Cup, Seal, and O-Ring Replacement

The abrasive nature of concrete, mortar, or other masonry materials ultimately wears parts, components, and seals. Periodically, these parts and components will need repair and/or replacement. The visual indicator for material piston cup (Figure 27, Item 4), seal (Figure 27, Item 1), and O-ring (Figure 27, Item 3) replacement is contamination visible in the water box. The HP-20 Hog Pump has two identical material piston assemblies, but only one is shown below for illustration purposes.

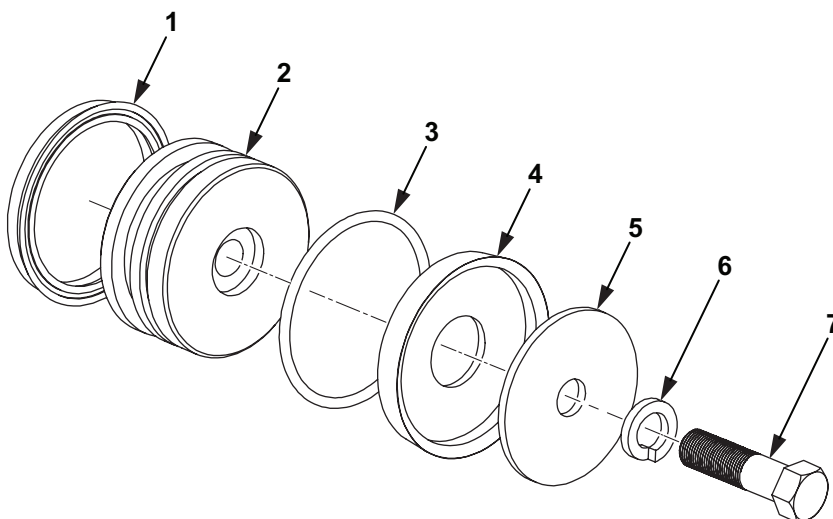


Figure 27 Complete Material Piston Assembly

Item	Description
1	Loaded U-Seal (HP-20)(Cup)
2	Hog Pump Material Piston
3	O-ring 4-in. OD (HP-20)
4	Piston Cup
5	Piston Cup Backup Washer
6	3/4-in. Lock Washer
7	3/4-16 x 3-in. GR8 Bolt

SERVICES

Removal

1. Remove two 1-in. bolts securing hopper assembly front plate to rear frame assembly.
2. Rotate the hopper assembly 90 degrees away from the frame to access material piston assembly.
3. Start the engine.
4. Using the directional control valve handle, fully extend the hydraulic ram. The engine will bog down when the fully extended position is reached. The bolt (Figure 27, Item 7), lock washer (Figure 27, Item 6), piston cup backup washer (Figure 27, Item 5), and piston cup (Figure 27, Item 4) will be extended past the frame for easy access.
5. Turn the engine off.
6. Using an impact tool, remove the 3/4-in. bolt from the material piston (Figure 27, Item 2).
7. Remove lock washer, piston cup backup washer, and piston cup.
8. Discard the piston cup.
9. Start the engine.
10. Using the directional control valve handle, partially retract the hydraulic ram.
11. Turn the engine off.

CAUTION

Exercise care when pulling the material piston out of the cylinder to prevent piston and cylinder rod thread damage. Once loose, the piston may drop out onto the floor, causing damage to equipment or injury to personnel.

12. Insert a hooked end tool (or other suitable tool) into the bore of the material piston and firmly pull the material piston out of the cylinder.
13. Remove and discard the O-ring (Figure 27, Item 3) and loaded seal (Figure 27, Item 1) from the material piston.

Installation

1. Start the engine.

NOTICE

An assistant and a tape measure will be needed to locate the correct position to stop the hydraulic ram for installing the material piston.

2. Have the assistant insert the end of a tape measure into the cylinder bore and make contact with the cylinder rod.
3. Using the directional control valve handle, the machine operator should slowly extend hydraulic ram.
4. Once the cylinder rod starts extending, the assistant should notify the operator to stop extending the ram when the cylinder rod measures 2 1/2-in. from the end plate.
5. Turn the engine off.
6. Liberally coat the O-ring and loaded seal with grease and install on the material piston.

NOTICE

Ensure the loaded seal is oriented correctly on the material piston. The beveled, raised portion of the seal should be facing in the direction of the hopper assembly.

7. Insert the material piston (with seal and O-ring) into the cylinder bore and press the piston in until it contacts the cylinder rod.

NOTICE

The cylinder rod has internal threads for the 3/4-in. bolt. Ensure the cylinder rod is seated into the material piston to prevent cross-threading. It may be necessary to use a drift bar or other tool to align the rod before installing the bolt. Do not damage threads.

8. Start the engine.
9. Using the directional control valve handle, fully extend the hydraulic ram. The engine will bog down when the fully extended position is reached.
10. Turn the engine off.
11. Liberally coat the piston cup with grease.
12. Liberally coat the 3/4-in. bolt with antiseize compound.
13. Install piston cup, piston cup backup washer, lock washer, and 3/4-in. bolt.
14. Tighten the 3/4-in. bolt with an impact tool.
15. Start the engine.
16. Using the directional control valve handle, partially retract the hydraulic ram.

NOTICE

Retract rams from end of stroke. Failure to do so may result in damage to equipment.

-
17. Turn the engine off.
 18. Rotate hopper assembly 90 degrees toward the frame.
 19. Liberally coat the two 1-in. bolts with antiseize compound.
 20. Install two 1-in. bolts securing hopper assembly front plate to rear frame assembly.

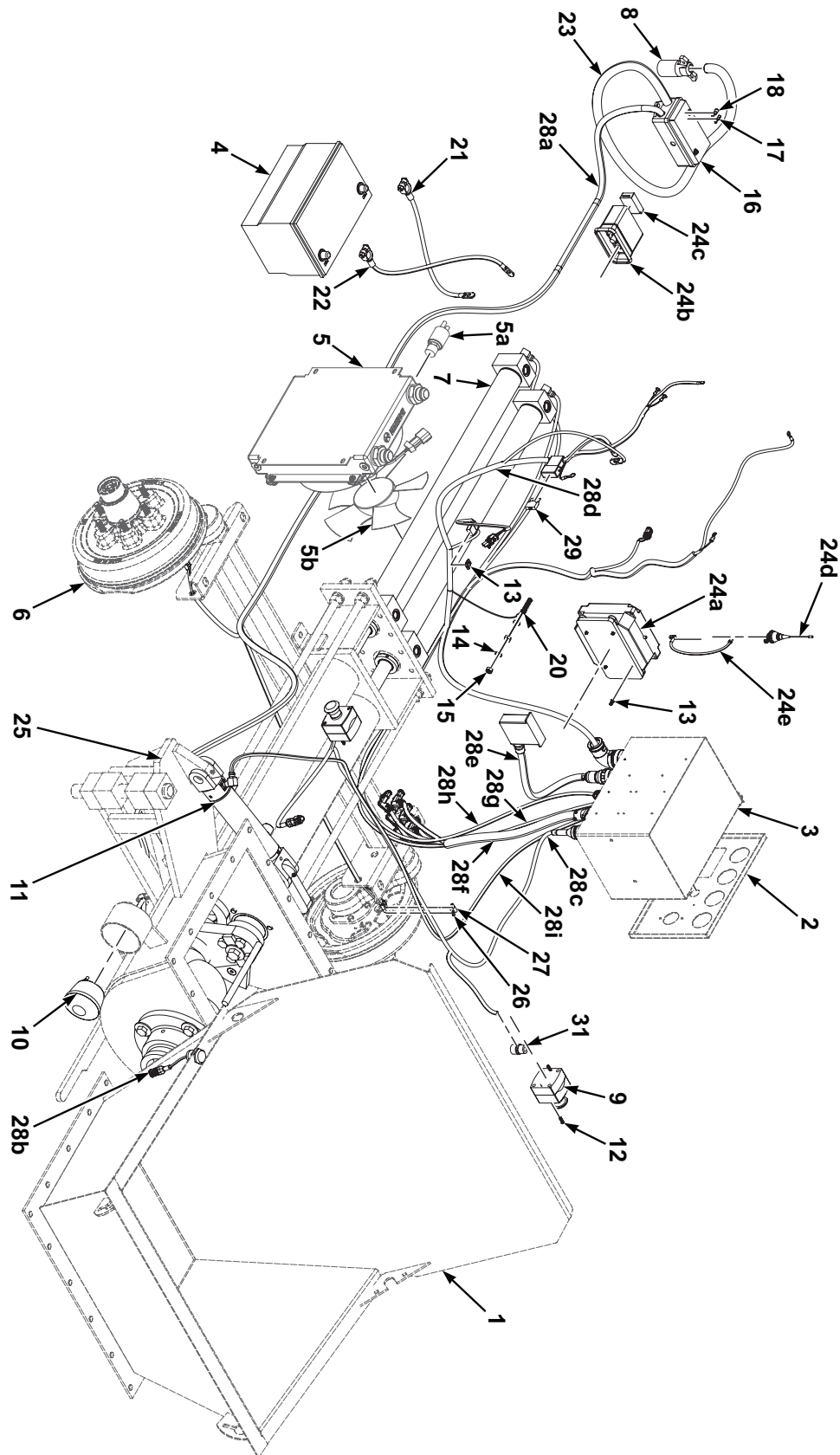


Figure 28 Electric Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-4	Hopper Assembly	1
2	1000-A-9	Front Control Panel Assembly	1
3	1000-A-11	Control Panel Box Assembly	1
4	03-1002	7565 Battery	1
5	03-742	Emmegi Heat Exchanger	1
5a	–	Emmegi Heat Exchanger Thermostat	1
5b	–	Emmegi Heat Exchanger Fan	1
6	07-157	Grout Pump Axle 5100#	1
7	02-723	2 x 31 x 1 3/4-in. Jarp Cylinder w/MTS Sensor	2
8	12-706	Trailer End Connector	1
9	03-5017	Red Pushbutton Yellow Station E-Stop Enclosure	2
10	07-151	EZL Tail Light	2
11	02-724	2 x 5 x 1 1/8-in. Cylinder w-MTS Sensor	1
12	09-3066	8-32 x 3/4-in. SS Hex Round Head Screw	4
13	09-3069	10-32 x 1/2-in. SS Hex Round Head Screw	4
14	09-138	3/8-in. External Tooth Lock Washer SS	2
15	91845A031	3/8-in.-16 Hex Nut SS	2
16	07-155	EZL Junction Box (7Pole)	1
17	03-122	RV14-10Q Insulated Ring Terminal	5
18	03-121	RV10-10Q Insulated Ring Terminal	1
19	MTPNM08	M-Tal M8 x 1.25 Metric Hex Nut (NOT ILLUSTRATED)	1
20	09-3073	3/8-in. x 2-in. Fully Threaded Stud SS	1
21	03-198	15-in. Negative Battery Cable Assembly	1
22	03-199	15-in. Positive Battery Cable Assembly	1
23	03-588	CW04914 Trailer Cable 12-6--1-10	1
24	1000-A-48	Wireless Remote Kit	1
24a	03-192	Radio Remote Control System-Receiver	1
24b	–	Radio Remote Control System-Handheld Controller	1
24c	–	Radio Remote Control System-Handheld Controller Battery	1
24d	03-1009	Remote Antenna (Pump)	1
24e	03-1010	1M Antenna Cable (Pump)	1
25	1000-A-50	Pump Kit w-Light Bracket Assembly	1
26	PM16-157N	16-14 AWG Nylon Male	1
27	PF16-157N	16-Nylon Female	2
28	1-EZG	Grout Pump Wiring Harness Kit (NOT ILLUSTRATED)	2
28a	1000-A-20	Trailer Harness	1
28b	1000-A-32	Cylinder Transducer Harness #1	1
28c	1000-A-30	PVG32 Valve Harness	1
28d	1000-A-28	Radio Receiver Harness	1
28e	1000-A-26	Engine Harness	1
28f	1000-A-22	E-Stop Harness	1
28g	1000-A-21	Safety Grate Proximity Switch Harness	1
28h	1000-A-34	Cylinder Transducer Harness #2	1
28i	1000-A-36	Cylinder Transducer Harness #3	1
29	03-1005	Max-50 Fuse	1
30	03-438	Bussman ATC-15 Fuse (NOT ILLUSTRATED)	1
31	03-569	CG1850 Cord Grip	2

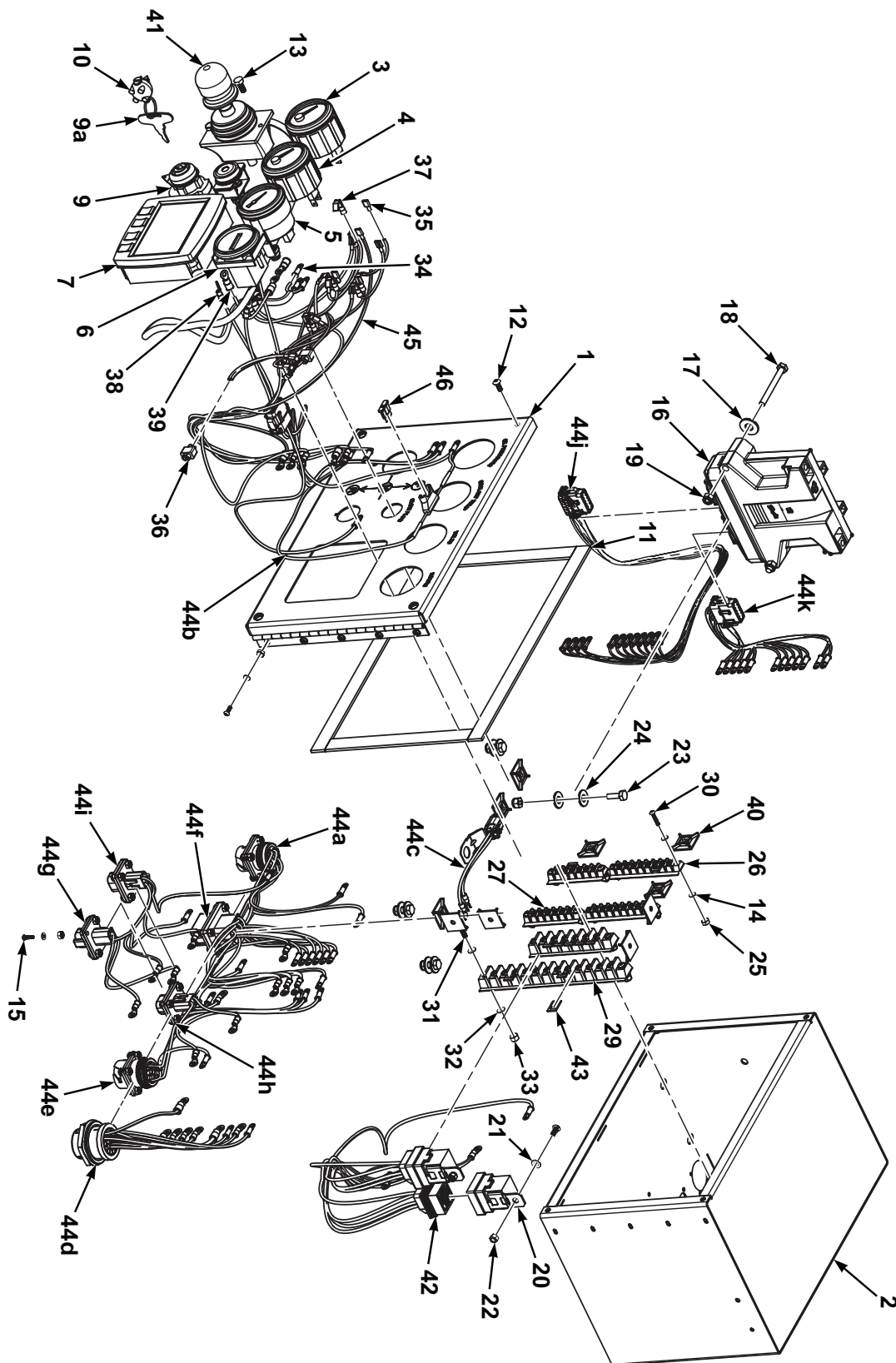


Figure 29 Electrical Box Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-9	Front Control Panel Assembly	1
2	1000-A-11	Control Panel Box Assembly	1
3	03-195	BK7012958 Oil Pressure Gauge	1
4	03-197	BK7012950 Water Pressure Gauge	1
5	03-194	BK7011468 Voltage Meter	1
6	03-196	BK 7011236 Hour Meter	1
7	KSD-1406-DP	Display for Pump PRG 11075900	1
8	198-5310	Caterpillar Diesel Engine 49.6 HP-Glow Plug Indicators (NOT ILLUSTRATED)	1
9	359-6000	Caterpillar Diesel Engine Ignition Switch	1
9a	361-3925	Ignition Key	1
10	20-152	EZ GROUT Corporation Keychain-HOG	1
11	20-182	Neoprene Foam Strip 3/4-in. Wide x 1/8-in. Thick	1
12	09-3069	10-32 x 1/2-in. SS Hex Round Head Screw	6
13	09-3072	M6 x 14mm Hex Head Screw	2
14	09-135	#6 Flat Washer SS	41
15	09-3067	6-32 x 1/2-in. SS Hex Round Head Screw	29
16	03-189	MC024-120 Danfoss Plus 1 Custom Control	1
17	09-105	5/16-in. Flat Washer	2
18	09-3022	1/4-in. -20 x 2 1/2-in. GR5 Bolt	2
19	09-200	1/4-in.-20 Nylon Nut	6
20	03-834	High DC Inrush Current Relay 12V DC	2
21	09-136	#10 Flat Washer SS	2
22	91831A411	SS 10-32 Nylon Nut	2
23	09-322	1/4-in.- 20 x 3/4-in. GR5 Bolt	4
24	09-322	1/4-in. Flat Washer	8
25	09-248	6-32 Nylon Nut	35
26	03-838	Space Saver Terminal Block 8 Circuits 3/8-in.	2
27	03-837	Space Saver Terminal Block 6 Circuits 3/8-in.	2
28	03-836	Space Saver Terminal Block 6 Circuits 9/16-in. (NOT ILLUSTRATED)	1
29	03-835	Space Saver Terminal Block 12 Circuits 9/16-in.	1
30	09-3068	6-32 x 3/4-in. SS Hex Round Head Screw	6
31	09-3066	8-32 x 3/4-in. SS Hex Round Head Screw	6
32	09-137	#8 Flat Washer SS	12
33	09-249	8-32 Nylon Nut	6
34	03-111	Panduit Ring Terminals 3MRV18-6Q	3
35	03-1007	FD14-250C	13
36	03-594	3M 560-B Boxed Wire Tap Crimp	3
37	03-1008	16-14 Vinyl Piggy	10
38	03-122	RV14-10Q Insulated Ring Terminal	3
39	03-121	RV10-10Q Insulated Ring Terminal	6
40	3M06297	1-in. Black Cable Tie Mount	10
41	03-190	Friction Held Joystick w-Center Lock	1
42	03-833	Relay Socket w/Wire Leads	2
43	03-828	1492N49 Terminal Jumper	10
44	1-EZG	Grout Pump Wiring Harness Kit (NOT ILLUSTRATED)	1
44a	1000-A-23	E-Stop Bulkhead Harness	1
44b	1000-A-24	DT-250 Display Harness	1

Item	Part Number	Description	Quantity
44c	1000-A-25	CAN Port Harness	1
44d	1000-A-27	Engine Bulkhead Harness	1
44e	1000-A-29	Radio Receiver Bulkhead Harness	1
44f	1000-A-31	PVG32 Valve Bulkhead Harness	1
44g	1000-A-33	Cylinder Transducer Bulkhead Harness #1	1
44h	1000-A-35	Cylinder Transducer Bulkhead Harness #2	1
44i	1000-A-37	Cylinder Transducer Bulkhead Harness #3	1
44j	1000-A-38	Plus 1 Harness (Black)	1
44k	1000-A-39	Plus 1 Harness (Gray)	1
45	—	HP Jumper Wire	1
46	03-439	Little Fuse ATO-5 Fuse	1

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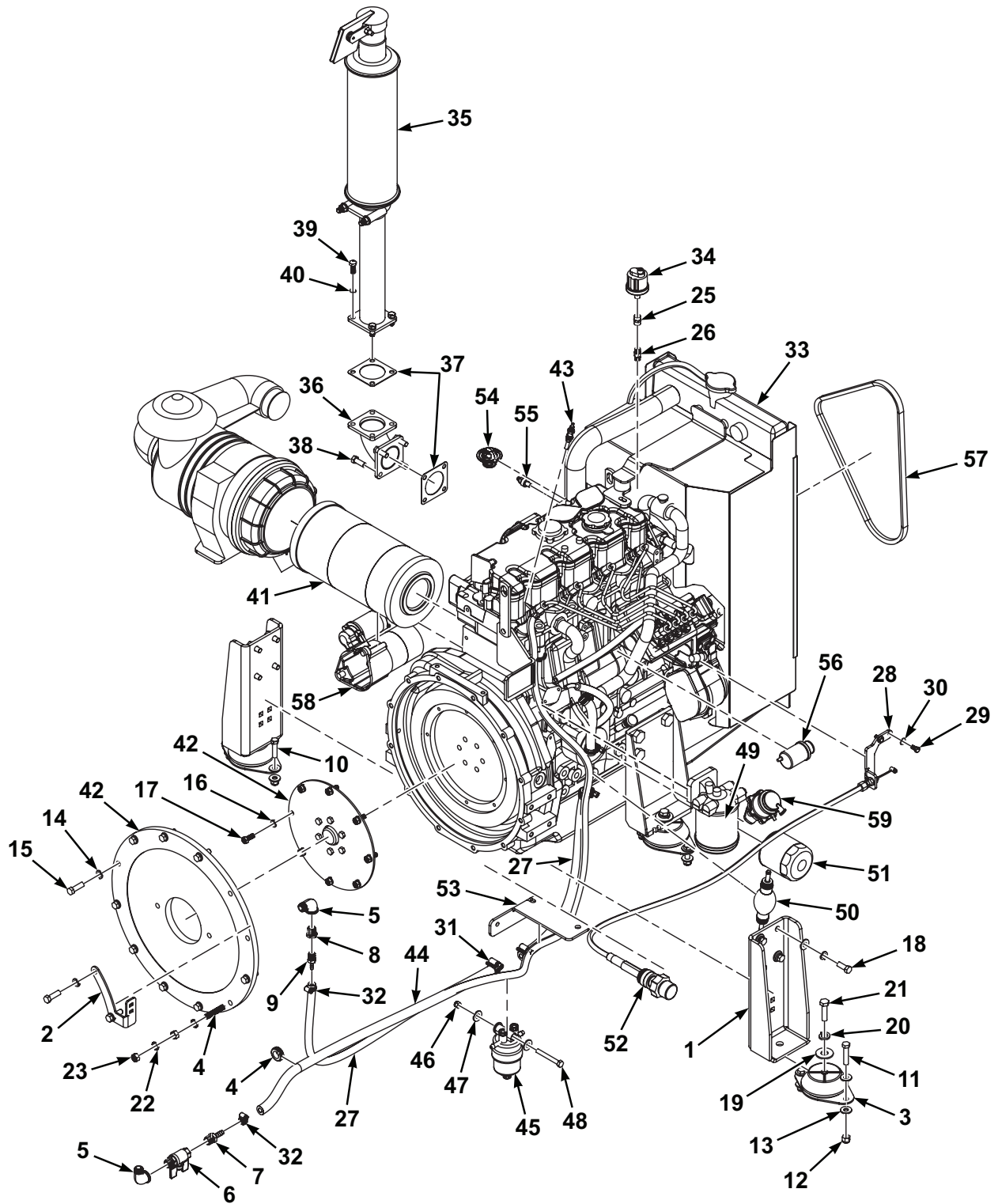


Figure 30 Engine Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-031	Hog Pumper CAT Engine Mount	2
2	1000-070	Hog Pumper Throttle Conduit Mount	1
3	02-804	Grout Pump Vibration Mount	4
4	13-152	Grommet 7/8-in. Hole Dia.	1
5	14-268	3/8-in. Brass 90° Elbow	2
6	20-187	3/8-in. Brass Body Valve w/T-Handle	1
7	14-250	Brass Barbed Hose Fitting (RMH20 Gas)	1
8	14-263	High Pressure Brass Pipe Fitting 3/8-in. x 1/4-in.	1
9	14-265	Brass Barbed Hose Fitting 3/8-in. x 1/4-in.	1
10	09-308	3/8-in.-16 x 2-in. GR5 Bolt	6
11	09-311	3/8-in.-16 x 1 3/4-in. GR5 Bolt	2
12	09-204	3/8-in.-16 Nylon Nut	8
13	09-105	5/16-in. Flat Washer	24
14	09-102	3/8-in. Lock Washer	19
15	09-310	3/8-in.-16 x 1 1/4-in. GR5 Bolt	11
16	09-101	5/16-in. Lock Washer	8
17	09-3074	5/16-in. x 7/8-in. GR8 Hex Head Screw	8
18	09-307	3/8-in.-16 x 1-in. GR5 Bolt	8
19	09-107	1/2-in. Flat Washer	4
20	09-129	1/2-in. GR8 Lock Washer	4
21	09-3076	M10 x 1.5mm Hex Head Screw	4
22	09-138	3/8-in. External Tooth Lock Washer SS	2
23	91845A031	3/8-in.-16 Hex Nut SS	2
24	09-3073	3/8-in. x 2-in. Fully Threaded Stud SS (NOT ILLUSTRATED)	1
25	14-270	High-Pressure Brass Straight Connector 1/8-in. NPTF Female	1
26	14-269	Extreme Pressure Brass Adaptor 1/8-in. BSPT Male x NPT Male	1
27	14-262	3/16-in. Fuel Injection Hose	1
28	1000-056	Hog Pumper Throttle Cable Mount	1
29	09-3072	M6 x 14mm Hex Head Screw	2
30	09-125	#10 Flat Washer	2
31	12-117	Worm-Drive Hose Clamp SS 3/8-in.-7/8-in. ID	5
32	12-118	1/4-in.- 5/8-in. Hose Clamp	2
33	C2.2	Caterpillar Diesel Engine 49.6 HP	1
34	03-195	BK7012958 Oil Pressure Gauge-VDO Sensor	1
35	MP31046	Muffler Assembly	1
36	252-8372	Exhaust Elbow	1
37	435-0208	Exhaust Gasket	2
38	09-307	3/8-in.-16 x 1-in. GR5 Bolt	4
39	91280A532	M8 x 1 1/4-in. mm x 22 mm Hex Head Screw	4
40	91190A550	M8 Lock Washer	4
41	247-1380	Air Cleaner Element	1
42	123958	Fly Wheel Plate Assembly	1
43	172-4585	Glow Plug	1
44	14-261	5/16-in. Fuel Injection Hose	1
45	276-1804	Fuel/Water Separator	1
46	09-202	Fuel/Water Separator Nut	1
47	09-105	Fuel/Water Separator Washer	3
48	09-385	Fuel/Water Separator Bolt	1
49	358-9226	Fuel Filter Element	1

PARTS

Item	Part Number	Description	Quantity
50	197-8540	Primer Bulb	1
51	220-1523	Oil Filter	1
52	MP40254	Throttle Cable Assembly	1
53	1000-054	Hog Pumper Fuel Separator Mount	1
54	249-5541	Temperature Regulator	1
55	03-197	Temperature Switch	1
56	419-7640	Shutoff Solenoid	1
57	438-1597	V-Belt	1
58	423-5606	Starter Motor	1
59	295-4070	Fuel Transfer Pump	1

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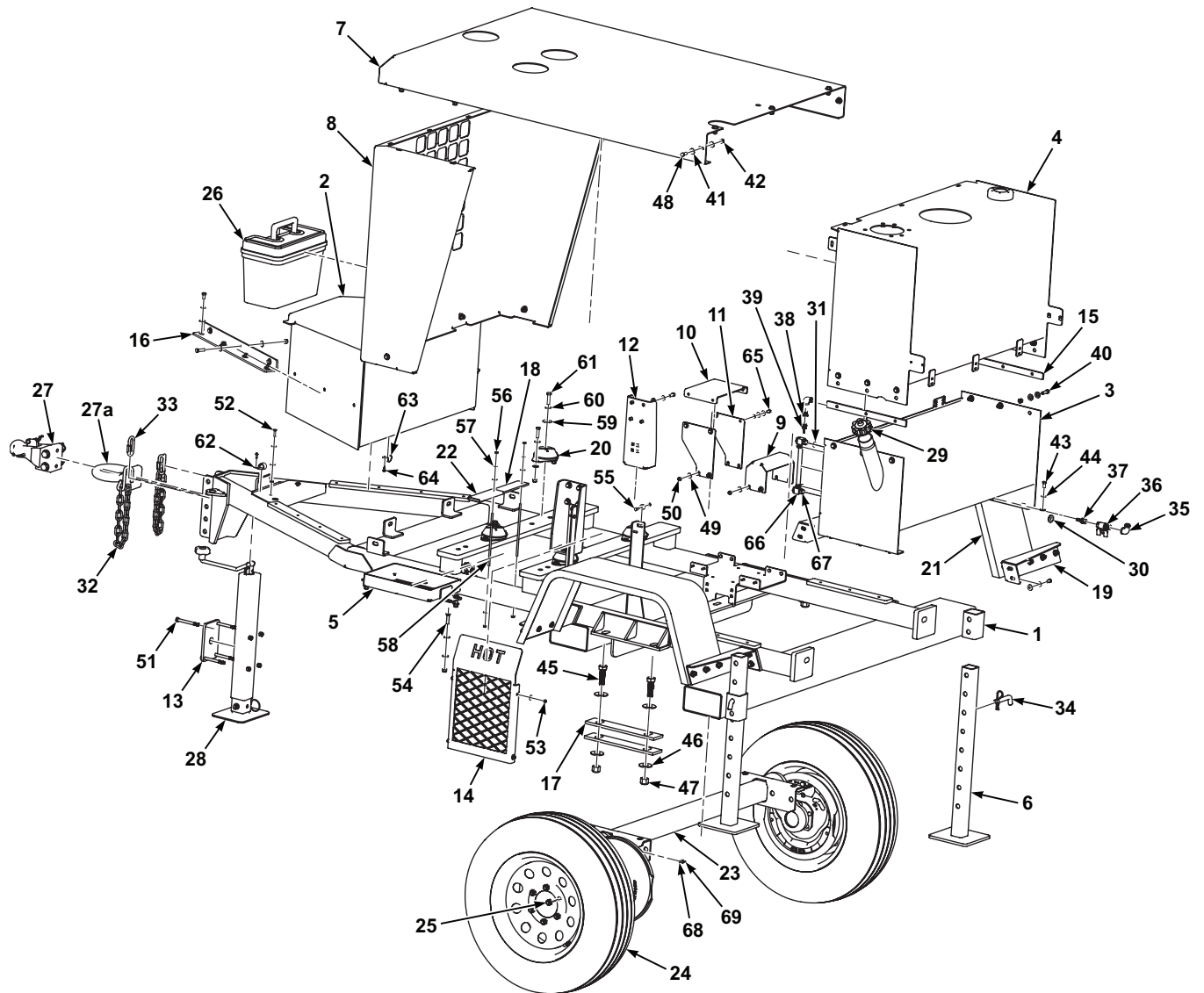


Figure 31 Frame Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-1	Hog Pumper Frame Assembly	1
2	1000-A-2	Hog Pumper Tool Box Assembly	1
3	1000-A-5	Hog Pumper Fuel Tank Assembly	1
4	1000-A-6	Hog Pumper Hydraulic Tank Assembly	1
5	1000-A-8	Hog Pumper Battery Box Assembly	1
6	1000-A-13	Hog Pumper Outrigger Leg Assembly	2
7	1000-012	Hog Pumper Hood Top	1
8	1000-013	Hog Pumper Hood Base	1
9	1000-024	Hog Pumper Coil Guard	1
10	1000-025	Hog Pumper Handle Top	1
11	1000-026	Hog Pumper Handle Guard Side	2
12	1000-031	Hog Pumper CAT Engine Mount	2
13	1000-036-P	Hog Pumper Jack Mount-Painted	1
14	1000-037	Hog Pumper Heat Exchanger Guard	1
15	1000-041	Hog Pumper Oil Tank Support	1
16	1000-050	Hog Pumper Tool Box Mt Angle	2
17	1000-074	Hog Pumper Axle Mount Shim	4
18	1000-079	Hog Pumper Battery Hold Down	1
19	900-007	Fender Mount	4
20	02-804	Grout Pump Vibration Mount	4
21	07-148	EZL Single Axle Fender - Jeep Style	2
22	12-115	1 1/2-in. Blue PVC Lay-Flat Water Discharge Hose	1
23	07-157	Grout Pump Axle 5100#	1
24	07-149	EZL Radial Tire-Wheel 15-in. Silver Mod 6 Lug	2
25	07-134	EZG Lug Nut	12
26	20-185	Plastic Storage Box	1
27	07-168	MDI 2 5/16-in. Channel Style Coupler	1
27a	07-169*	MDI 3-in. Channel Style Pintle (Optional)	1
28	07-172	7K Top Wind Drop Leg Jack Sq. Tube (Pump)	1
29	14-260	2 1/4-in. Vented Gas Cap	1
30	13-152	Grommet 7/8-in. Hole Dia.	1
31	13-159	Square Profile Buna-N O-Ring Dash 113	1
32	07-160	Safety Chain w/S Hook 5K	2
33	09-701	Connecting Link	2
34	09-418	Hitch Pin Assembly	2
35	14-268	3/8-in. Brass 90° Elbow	2
36	20-187	3/8-in. Brass Body Valve w/T-Handle	1
37	14-250	Brass Barbed Hose Fitting (RMH20 Gas)	1
38	14-263	High Pressure Brass Pipe Fitting 3/8-in. x 1/4-in.	1
39	14-265	Brass Barbed Hose Fitting 3/8-in. x 1/4-in.	1
40	09-310	3/8-in.-16 x 1 1/4-in. GR5 Bolt	18
41	09-105	5/16-in. Flat Washer	146
42	09-204	3/8-in.-16 Nylon Nut	61
43	09-355	3/8-in.-16 x 3/4-in. GR5 BOLT	22
44	09-102	3/8-in. Lock Washer	30
45	09-3071	3/4-in.-10 x 2 1/2-in. GR8 Hex Head Screw	4
46	09-128	3/4-in. GR8 Flat Washer	8
47	09-236	3/4-in. Nylon Nut	4
48	09-307	3/8-in.-16 x 1-in. GR5 Bolt	37

Item	Part Number	Description	Quantity
49	09-104	1/4-in. Flat Washer	36
50	09-202	5/16-in.-18 Nylon Nut	12
51	09-3070	3/8-in.-16 x 4-in. Hex Head Screw	4
52	09-301	1/4-in.-20 x 1-in. GR5 All Thread Bolt	2
53	09-200	1/4-in.-20 Nylon Nut	12
54	09-308	3/8-in.-16 x 2-in. GR5 Bolt	10
55	09-322	1/4-in.- 20 x 3/4-in. GR5 Bolt	4
56	09-201	1/4-in.-20 Nut	2
57	09-100	1/4-in. Lock Washer	2
58	09-3032	1/4-in.-20 All Thread Rod x 8 1/4-in.	2
59	09-107	1/2-in. Flat Washer	4
60	09-129	1/2-in. GR8 Lock Washer	4
61	09-3076	M10 x 1.5mm Hex Head Screw	4
62	03-585	SPN34 NEO 3/4-in. Cable Clamp	1
63	03-563	1/2-in. 1-Hole Conduit Strap	2
64	TEKD20	12-3/4-in. Hex Head Self Tapping Screw	3
65	09-341	5/16-in.-18 x 3/4-in. GR5 Bolt	4
66	02-332	Sight Gauge	1
67	12-118	1/4-in.- 5/8-in. Hose Clamp	2
68	PF16-157N	16-Nylon Female	2
69	PM16-157N	16-14 AWG Nylon Male	2

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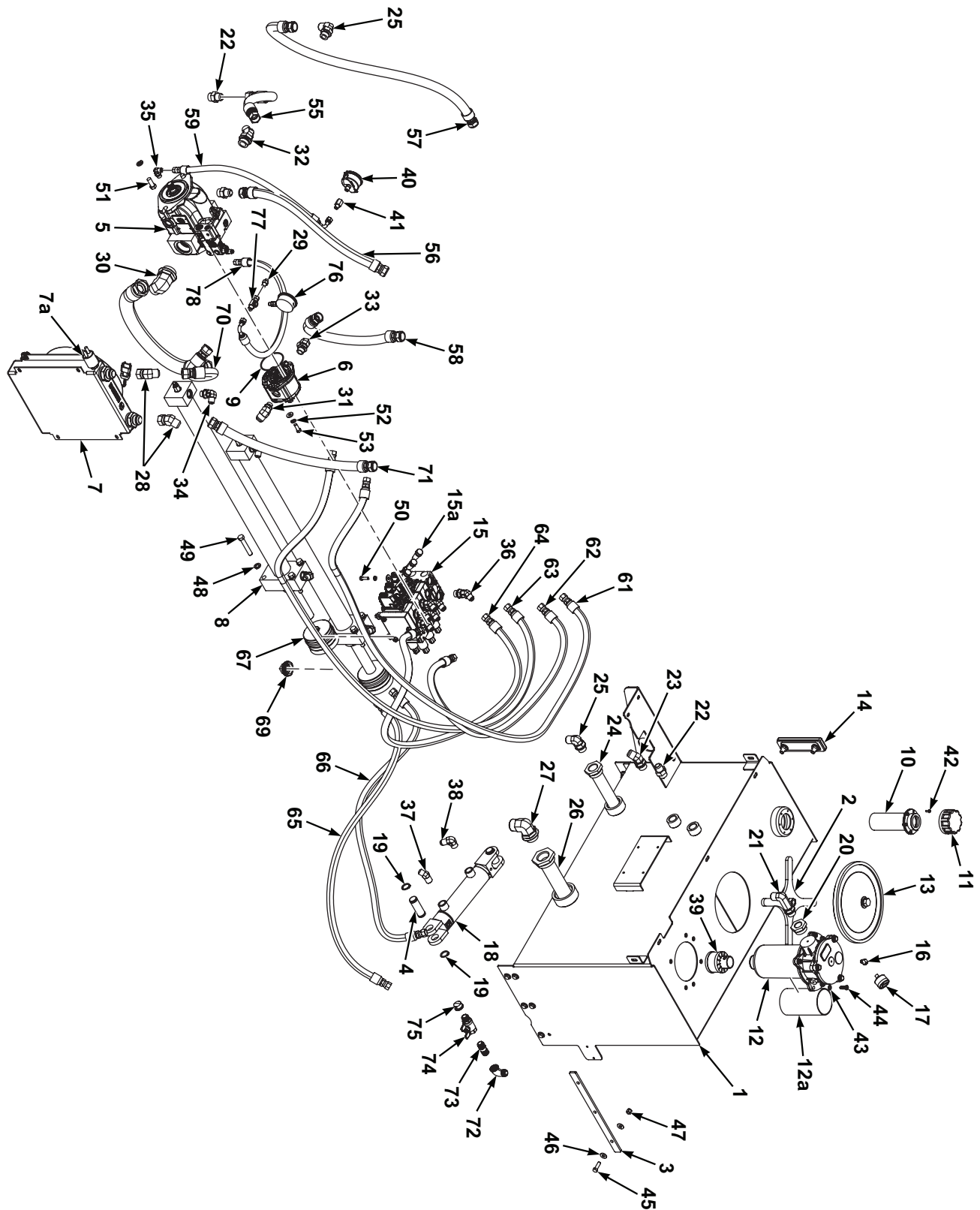


Figure 32 Hydraulic Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-6	Hog Pumper Hydraulic Tank Assembly	1
2	1000-A-7	Tank Spider Assembly	1
3	1000-041	Hog Pumper Oil Tank Support	2
4	1000-511	S-Tube Cylinder Pin	2
5	02-544	Danfoss LS Pump	1
6	02-543	Concentric Gear Pump	1
7	03-742	Emmegi Heat Exchanger	1
7a	–	Emmegi Heat Exchanger Thermostat	1
8	02-723	2 x 31 x 1 3/4-in. Jarp Cylinder w/MTS Sensor	2
9	13-161	1/8-in. Buna-N O-Ring Dash 236	1
10	02-318	Hydraulic Fill Cap Assembly	1
11	02-330	Donaldson Trap Breather	1
12	02-329	MP Filtri Tank Top Filter 10 Micron	1
12a	–	MP Filtri Tank Top Filter 10 Micron Filter	1
13	02-334	Reservoir End Cover 10-in.	1
14	02-321	HYDO HSG-55 Sight Glass	1
15	02-6012	3-Spool Directional Control Valve	1
15a	–	3-Spool Directional Control Valve Handle	3
16	14-271	1/8-in. Brass 45° Elbow	1
17	02-325	VRVA Filter Indicator (RMH20-29)	1
18	02-724	2 x 5 x 1 1/8-in. Cylinder w-MTS Sensor	1
19	98585A121	1-in. External Retaining Ring (10-pkg)	4
20	02-2106	1 1/4-in. ORBM x 3/4-in. ORBF Reducer Expander	1
21	02-2105	3/4-in. JICM to 3/4-in. ORBM 90° Elbow Extra Long	1
22	02-299	3/4-in. Male JIC to 3/4-in. Male O-Ring	3
23	02-259	3/4-in. JICM to 3/4-in. ORM 45° Adapter	1
24	02-328	MP Filtri Suction Strainer #16-#24 O-Ring	1
25	02-201	3/4-in. JICM to 3/4-in. ORM 90° Adapter	2
26	02-331	MP Filtri Suction Strainer #20-#32 SAE O-Ring	1
27	02-2110	1 1/8-in. JICM x 1 1/4-in. ORBM 90° Elbow	1
28	02-2099	3/4-in. JICM x 3/4-in. JICF Swivel 45° Nut Elbow	2
29	02-2063	3/8-in. JICM to 1/4-in. ORBM Straight Adapter	1
30	02-2109	1 1/4-in. JICM x 1 1/2-in. ORBM 90° Elbow	1
31	02-210	3/4-in. JIC to 1/2-in. ORM 45° Adapter	1
32	02-2108	3/4-in. JICM x 1-in. ORBM 45° Elbow	1
33	02-2039	3/4-in. JICM x 5/8-in. ORBM	1
34	02-277	1/2-in. JICM to 1/2-in. ORM 90° Adapter	4
35	02-2026	3/8-in. JICM x 3/8-in. ORBM 90°	2
36	02-279	1/2-in. JICM to 5/8-in. ORBM 45° Adapter	6
37	02-225	1/2-in. JICM- 1/2-in. NPTM 45° Adapter (RMH12/20/29)	1
38	02-251	1/2-in. JICM to 1/2-in. NPTM 90° Adapter	1
39	02-333	MP Filtri Diffuser for Tank Top Filter	1
40	02-335	Pressure Gauge CF-1-P-280-B	1
41	02-2104	3/8-in. JICM x 1/4-in. Female Pipe	1
42	09-352	#10-32 x 1/2-in. Thread Cutting Screw Type F	6
43	09-101	5/16-in. Lock Washer	10
44	09-3074	5/16-in. x 7/8-in. GR8 Hex Head Screw	6
45	09-310	3/8-in.-16 x 1 1/4-in. GR5 Bolt	12
46	09-105	5/16-in. Flat Washer	30

Item	Part Number	Description	Quantity
47	09-204	3/8-in.-16 Nylon Nut	12
48	09-103	1/2-in. Lock Washer	10
49	09-321	1/2-in.-13 x 3-in. GR5 Bolt	8
50	09-342	5/16-in.- 18 x 1-in. GR5 Bolt	4
51	09-316	1/2-in.-13 x 1 1/4-in. GR5 Bolt	2
52	09-102	3/8-in. Lock Washer	2
53	09-307	3/8-in.-16 x 1-in. GR5 Bolt	2
54	1000-A-13	LS Suction to Hyd. Tank (NOT ILLUSTRATED)	1
55	1000-A-14	PVG 32 to LS Pump	1
56	1000-A-15	PVG 32 to Return Line	1
57	1000-A-16	Case Drain	1
58	1000-A-17	Aux Pump Suction Line	1
59	1000-A-40	Gauge Line	1
61	1000-A-42	Cyl. 1 Extend to Pump Side	1
62	1000-A-43	Cyl. 1 Retract to Tank Side	1
63	1000-A-44	Cyl. 2 Extend to Pump Side	1
64	1000-A-45	Cyl. 2 Retract to Tank Side	1
65	1000-A-46	S-Tube Extend to Pump Side	1
66	1000-A-47	S-Tube Retract to Tank Side	1
67	1000-A-49	Complete Piston Assembly	2
69	01-747	1 1/2-in. Galvanized Plug	1
70	1000-A-19	Aux. Pump to Heat Exchanger	1
71	1000-A-18	Heat Exchanger Return Line	1
72	14-267	1/2-in. Brass 90° Elbow	1
73	14-266	Brass Nipple 1/2-in. x 2-in.	1
74	20-186	1/2-in. Brass Body Valve w/T-Handle	1
75	14-264	1/2-in. NPT Brass Cap	1
76	02-310	CF1P-350A-SAE Gauge 0-5000 PSI (RMH)	1
77	02-2033	3/8-in. JICM x 3/8-in. JICF Swivel x 1/4-in. ORB Port	1
78	1000-A-41	Load Sense Line	1
79	1000-A-52	Hydraulic Oil Heater Assembly (NOT ILLUSTRATED) Compatible with S/N (HP20170010 – HP201XXXX)	1

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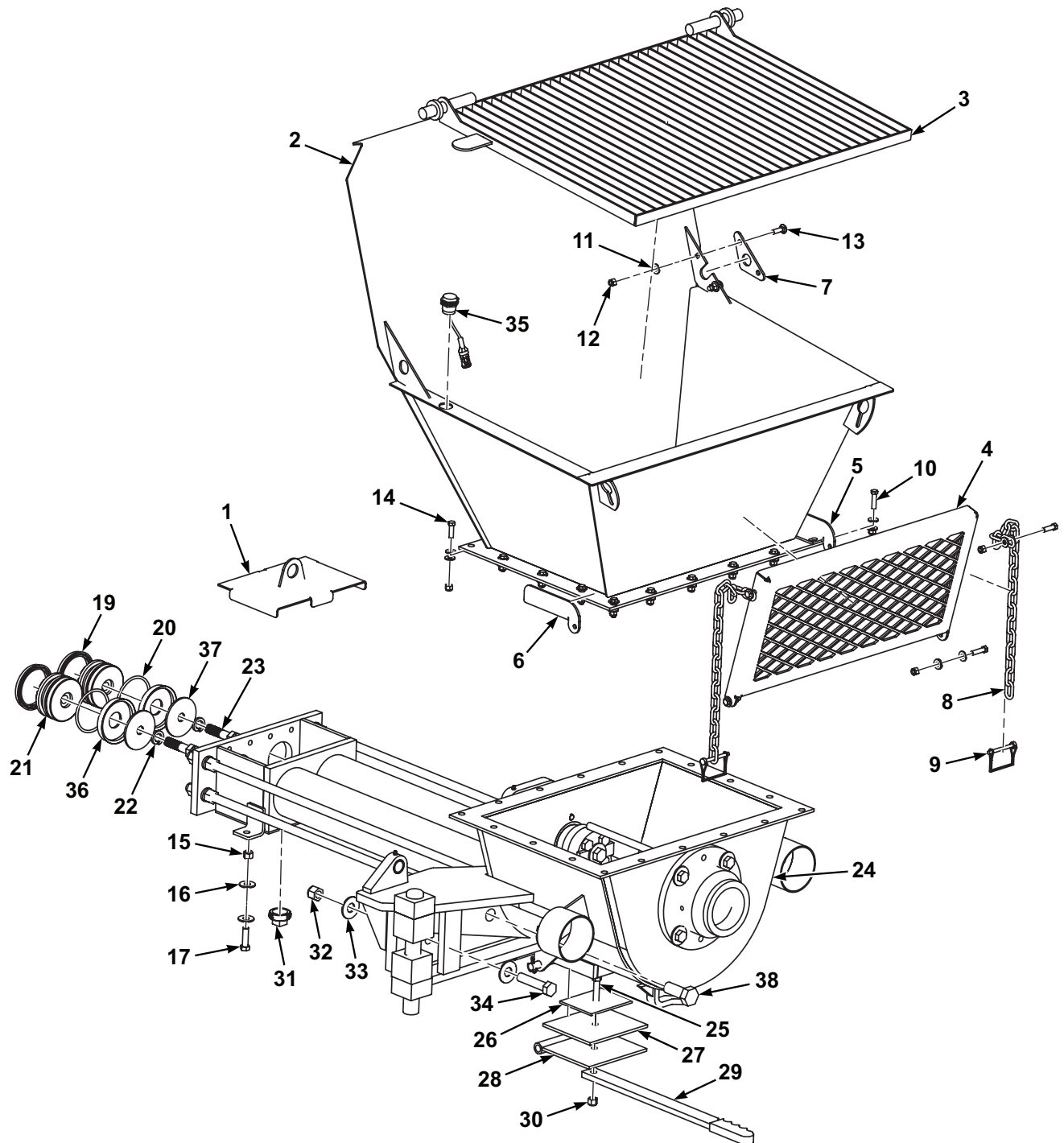


Figure 33 Mechanical Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-3	Water Box Lid Assembly	1
2	1000-A-4	Hopper Assembly	1
3	1000-A-10	Grating Assembly	1
4	1000-057	Hog Pumper Rear Rack	1
5	1000-058	Hog Pumper R.R. Rack Hinge	1
6	1000-059	Hog Pumper L.R. Rack Hinge	1
7	1000-062	Hog Pumper Right Grate Keeper	1
8	07-160	Safety Chain w/S-Hook 5K	2
9	09-407	5/16-in. Latch Pin	2
10	09-308	3/8-in.-16 x 2-in. GR5 Bolt	6
11	09-105	5/16-in. Flat Washer	48
12	09-204	3/8-in.-16 Nylon Nut	24
13	09-373	3/8-in.-16 x 1 1/4-in. Carriage Bolts	2
14	09-310	3/8-in.-16 x 1 1/4-in. GR5 Bolt	16
15	09-208	1/2-in. -13 Nylon Nut	2
16	09-107	1/2-in. Flat Washer	4
17	09-325	1/2-in.-13 x 1 3/4-in. GR5 Bolt	2
18	1000-A-49	Complete Piston Assembly (NOT ILLUSTRATED)	2
19	13-154	Loaded U-Seal (HP20)(Cup)	2
20	13-153	O-Ring 4-in. OD (HP20)	2
21	1000-512	Hog Pumper Material Piston	2
22	09-113	3/4-in. Lock Washer	2
23	09-3065	3/4-16 x 3-in. GR8 Bolt	2
24	1000-A-50	Pump Kit w-Light Bracket Assembly	1
25	09-320	1/2-in.-13 x 2 1/2-in. Bolt	1
26	–	Inner Gate Plate	1
27	P100076	Clean Out Door Gasket	1
28	–	Outer Gate Plate	1
29	Handle	Gate Handle	1
30	09-208	1/2-in.-13 Nylon Nut	1
31	01-747	1 1/2-in. Galvanized Plug	1
32	09-236	3/4-in. Nylon Nut	2
33	09-128	3/4-in. GR8 Flat Washer	4
34	09-3092	3/4-in.-10 x 3 1/2-in. GR5 Bolt	1
35	1000-A-21	Safety Grate Proximity Switch Harness	2
36	–	Piston Cup	2
37	1000-084	Piston Cup Backup Washer	2
38	–	1-in. x 2 1/2-in. GR8 Bolt	2

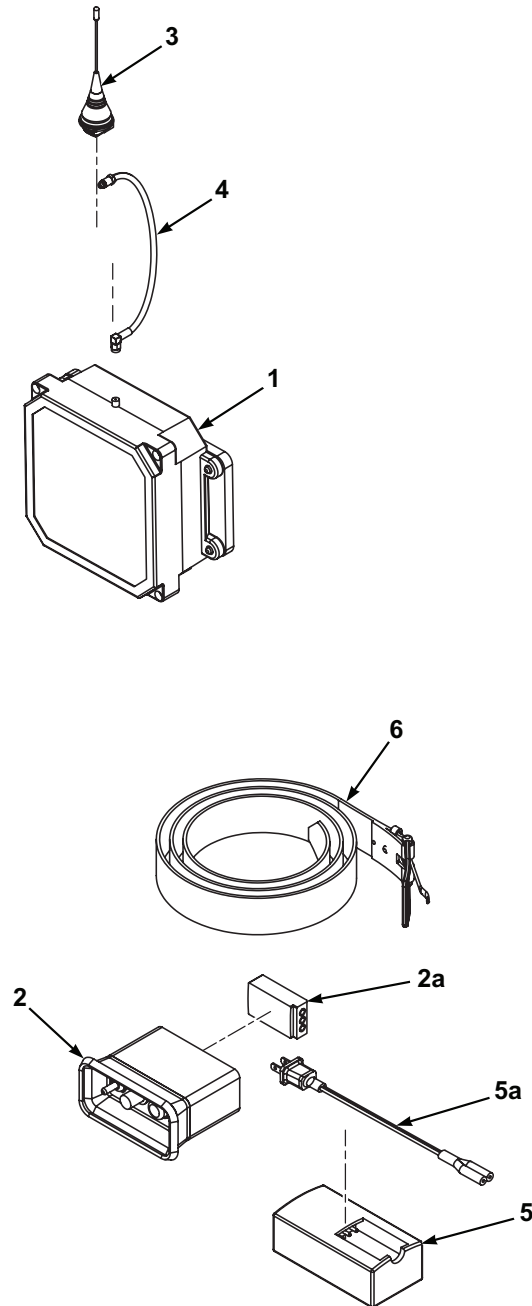


Figure 34 Optional Equipment

Item	Part Number	Description	Quantity
1	03-192	Radio Remote Control System Receiver	1
2	—	Radio Remote Control System-Handheld Control	1
2a	—	Radio Remote Control System Handheld Control Battery	1
3	03-1009	Remote Antenna (Pump)	1
4	03-1010	1M Antenna Cable (Pump)	1
5	—	Radio Remote Control System Charger	1
5a	—	Radio Remote Control System Power Cord	1
6	—	Radio Remote Control System Belt	1

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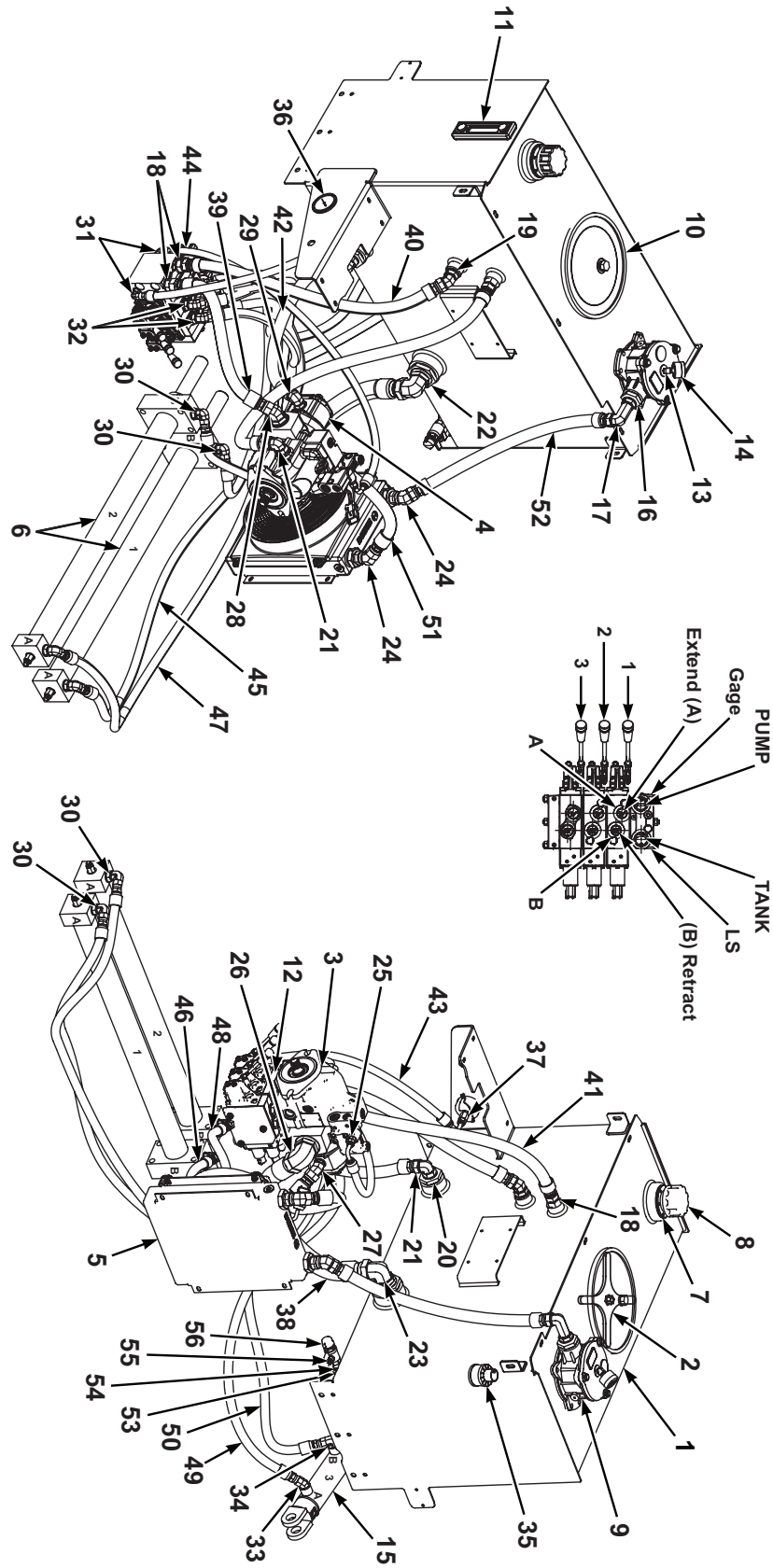


Figure 35 Hydraulic Assembly

PARTS

Item	Part Number	Description	Quantity
1	1000-A-6	Hog Pumper Hydraulic Tank Assembly	1
2	1000-A-7	Tank Spider Assembly	1
3	02-544	Danfoss LS Pump	1
4	02-543	Concentric Gear Pump	1
5	03-742	Emmegi Heat Exchanger	1
6	02-723	2 x 31 x 1 3/4-in. Jarp Cylinder w/MTS Sensor	1
7	02-318	Hydraulic Fill Cap Assembly	1
8	02-330	Donaldson Trap Breather	1
9	02-329	MP Filtri Tank Top Filter 10 Micron	1
10	02-334	Reservoir End Cover 10-in.	1
11	02-321	HYDO HSG-55 Sight Glass	1
12	02-6012	3-Spool Directional Control Valve	1
13	14-271	1/8-in. Brass 45° Elbow	1
14	02-325	VRVA Filter Indicator (RMH20-29)	1
15	02-724	2 x 5 x 1 1/8-in. Cylinder w/MTS Sensor	1
16	02-2106	1 1/4-in. ORBM x 3/4-in. ORBF Reducer Expander	1
17	02-2105	3/4-in. JICM to 3/4-in. ORBM 90° Elbow Extra Long	1
18	02-299	3/4-in. Male JIC to 3/4-in. Male O-Ring	1
19	02-259	3/4-in. JICM to 3/4-in. ORM 45° Adapter	1
20	02-328	MP Filtri Suction Strainer #16-#24 O-Ring	1
21	02-201	3/4-in. JICM to 3/4-in. ORM 90° Adapter	1
22	02-331	MP Filtri Suction Strainer #20-#32 SAE O-Ring	1
23	02-2110	1 1/8-in. JICM x 1 1/4-in. ORBM 90° Elbow	1
24	02-2099	3/4-in. JICM x 3/4-in. JICF Swivel 45° Nut Elbow	1
25	02-2063	3/8-in. JICM to 1/4-in. ORBM Straight Adapter	1
26	02-2109	1 1/4-in. JICM x 1 1/2-in. ORBM 90° Elbow	1
27	02-210	3/4-in. JIC to 1/2-in. ORM 45° Adapter	1
28	02-2108	3/4-in. JICM x 1-in. ORBM 45° Elbow	1
29	02-2039	3/4-in. JICM x 5/8-in. ORBM	1
30	02-277	1/2-in. JICM to 1/2-in. ORBM 90° Adapter	1
31	02-2026	3/8-in. JICM x 3/8-in. ORBM 90°	1
32	02-279	1/2-in. JICM to 5/8-in. ORBM 45° Adapter	1
33	02-225	1/2-in. JICM to 1/2-in. NPTM 45° Adapter (RMH12/20/29)	1
34	02-251	1/2-in. JICM to 1/2-in. NPTM 90° Adapter	1
35	02-333	MP Filtri Diffuser for Tank Top Filter	1
36	02-335	Pressure Gauge CF-1-P-280-B	1
37	02-2104	3/8-in. JICM x 1/4-in. Female Pipe	1
38	1000-A-13	LS Suction to Hydraulic Tank	1
39	1000-A-14	PVG 32 to LS Pump	1
40	1000-A-15	PVG 32 to Return Line	1
41	1000-A-16	Case Drain	1
42	1000-A-17	Auxiliary Pump Suction Line	1
43	1000-A-40	Gauge Line	1
44	1000-A-41	Load Sense Line	1
45	1000-A-42	Cylinder 1 (Extend to Pump Side)	1
46	1000-A-43	Cylinder 1 (Retract to Tank Side)	1
47	1000-A-44	Cylinder 2 (Extend to Pump Side)	1
48	1000-A-45	Cylinder 2 (Retract to Tank Side)	1

Item	Part Number	Description	Quantity
49	1000-A-46	S-Tube (Extend to Pump Side)	1
50	1000-A-47	S-Tube (Retract to Tank Side)	1
51	1000-A-19	Auxiliary Pump to Heat Exchanger	1
52	1000-A-18	Heat Exchanger Return Line	1
53	14-267	1/2-in. Brass 90° Elbow	1
54	14-266	Brass Nipple 1/2-in. x 2-in.	1
55	20-186	1/2-in. Brass Body Valve w/T-Handle	1
56	14-264	1/2-in. NPT Brass Cap	1

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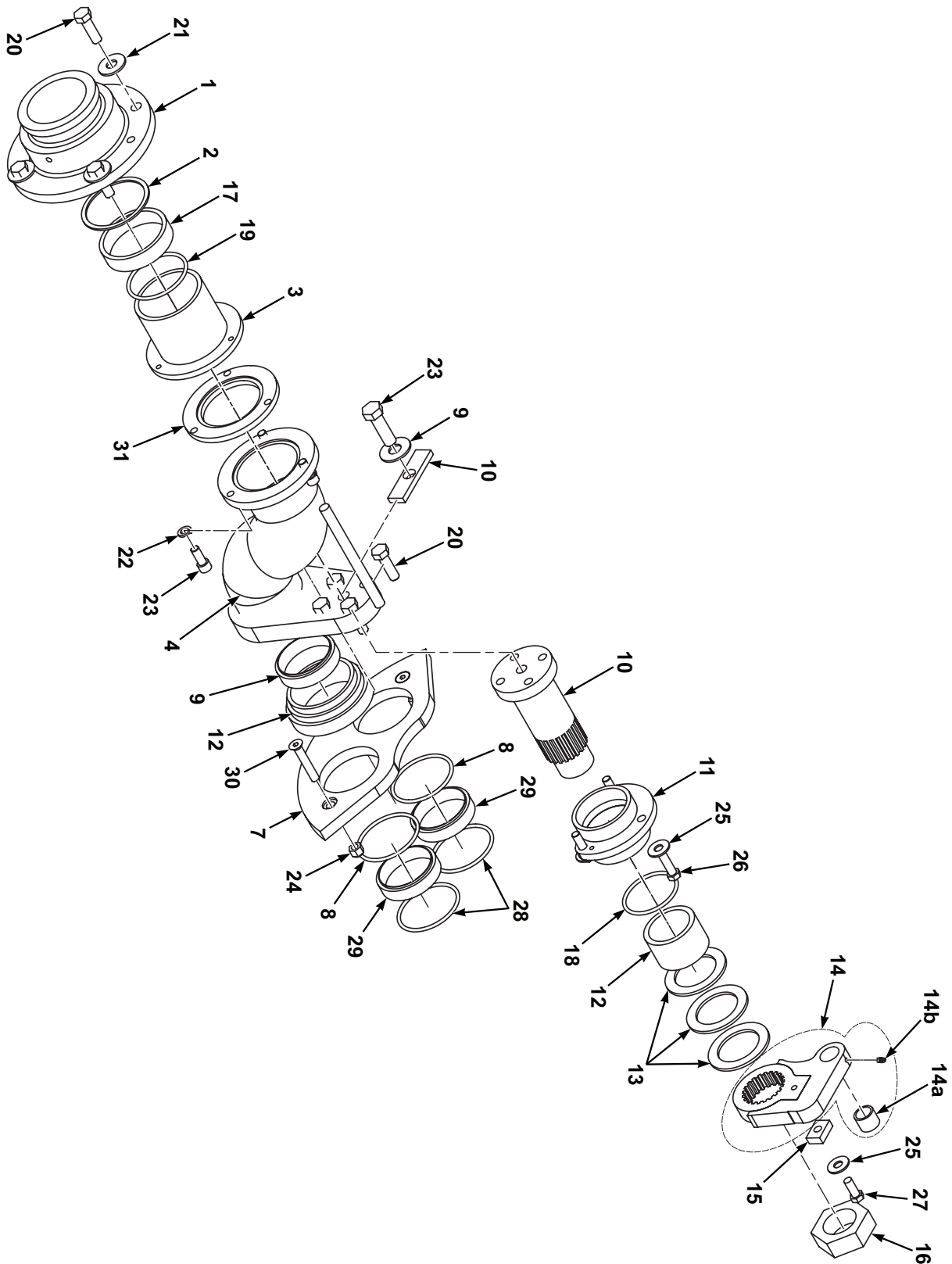


Figure 36 S-Tube Assembly

PARTS

Item	Part Number	Description	Quantity
1	B30246	Tailpipe Housing	1
2	P100073	Seal	1
3	C20137	S-Tube Extension	1
4	C20180	S-Tube	1
5	A40051	Retainer Plate (NOT ILLUSTRATED)	1
6	B30167	Wear Ring (NOT ILLUSTRATED)	1
7	B30150	Wear Plate	1
8	OR348	O-Ring	2
9	P100386	Expansion Band	2
10	B30164	Main Shaft	1
11	B30238	Bearing Housing	1
12	B30352	Bearing	1
13	A40045	Thrustwasher	3
14	1000-A-51	HP20 Crank Arm Assembly	1
14a	15-183	1 1/4-in. OD Brass Bushing	1
14b	09-602	1/4-in.-28 Straight Grease Fitting	1
15	A40064	Retainer Plate	1
16	P100043	Nut	1
17	P100074	Tailpipe Housing Wear Strip	1
18	OR335	O-Ring	1
19	P100080	O-Ring	1
20	09-362	5/8-in.-11 x 2-in. GR8 Bolt	8
21	09-109	5/8-in. Flat Washer	4
22	09-111	3/4-in. Flat Washer	1
23	09-333	3/4-in. x 2 1/2-in. GR8 Bolt	1
24	09-208	1/2-in. -13 Nylon Nut	2
25	09-107	1/2-in. Flat Washer	4
26	09-325	1/2-in.-13 x 1 3/4-in. GR5 Bolt	3
27	—	7/16-in.-14 x 1 1/4-in. GR5 Bolt	1
28	OR346	O-Ring	2
29	A40296	O-Ring Insert	2
30	—	1/2-in.-13 x 2 3/4-in. Flat Head Screw	2
31	—	S-Tube Spacer	1

Emergency Spare Parts

Unexpected machine breakdown and failures in the field result in costly downtime and frustration, especially when no spare parts are available. A simple solution to help offset this situation is to carry a supply of spare emergency parts to minimize the downtime. These spare parts can be stored in the toolbox located at the front of the trailer. Provided below is a sample list (not inclusive) of possible items to carry. Only personal experience based on your own part usage and downtime records will dictate what your particular list will be.

- Fuses
- Hydraulic hose
- Engine fan belt
- Battery (remote control)
- Ignition key

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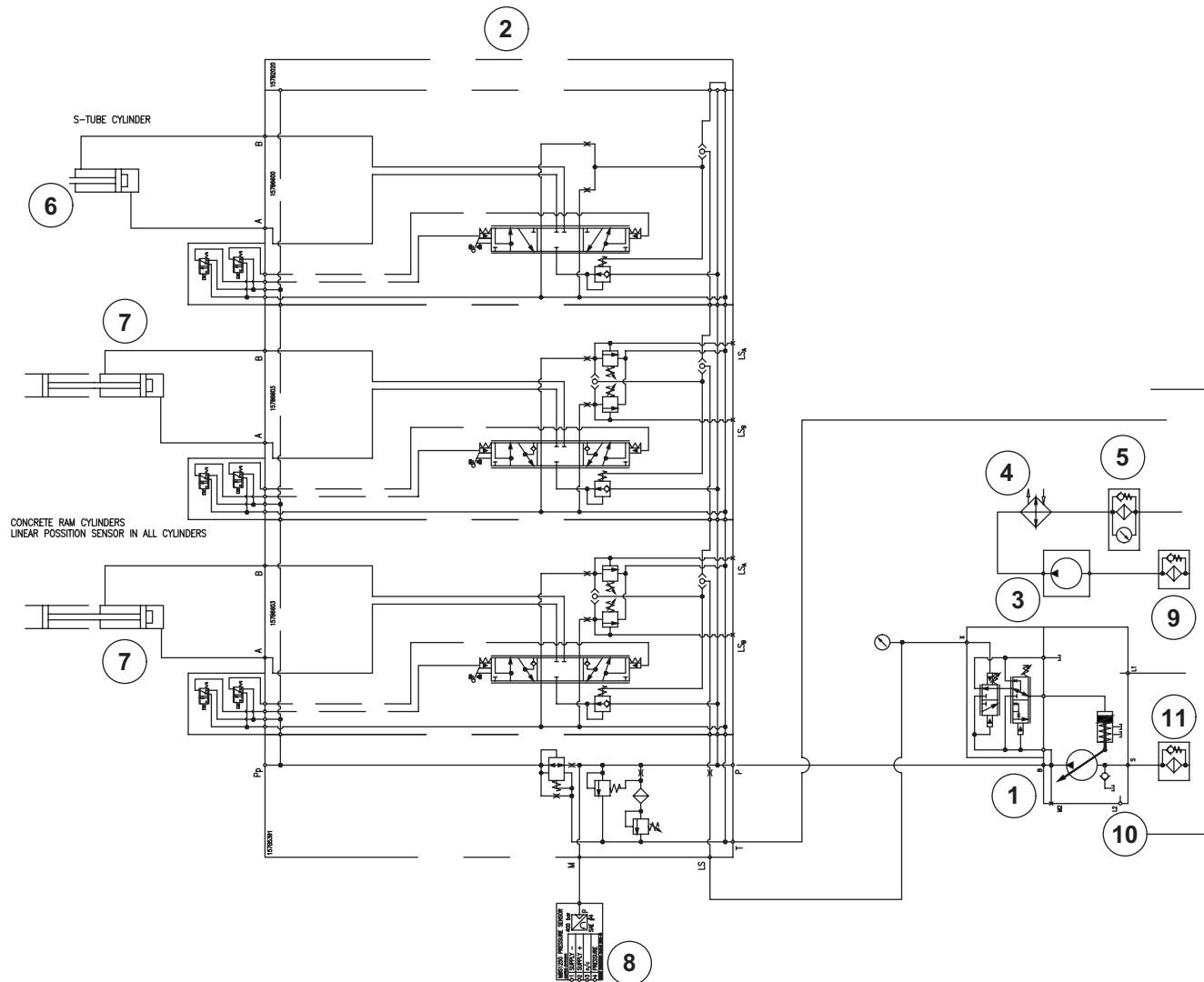


Figure 37 Hydraulic Schematic

Item	Part Number	Description	Quantity
1	02-544	Danfoss LS Pump	1
2	02-6012	3-Spool Directional Control Valve	1
3	02-543	Concentric Gear Pump	1
4	02-325	VRVA Filter Indicator (RMH20/29)	1
5	03-742	Emmegi Heat Exchanger	1
6	02-724	2 x 5 x 1 1/8-in. Cylinder w/MTS Sensor	1
7	02-723	2 x 31 x 1 1/4-in. Jarp Cylinder w/MTS Sensor	2
8	—	Pressure Transducer	1
9	02-328	MP Filtri Suction Strainer #16-#24 O-Ring	1
10	02-330	Donaldson Trap Breather	1
11	02-331	MP Filtri Suction Strainer #20-#32 SAE O-Ring	1

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Limited Warranty

The manufacturer warrants that products manufactured shall be free from defects in material and workmanship that develop under normal use for a period of one year on all products from the date of shipment. The foregoing shall be the exclusive remedy of the buyer and the exclusive liability of the manufacturer. Our warranty excludes normal replaceable wear items, i.e., gaskets, wear parts, seals, O-rings, belts, drive chains, clutches, etc. Any equipment, part, or product which is furnished by the Manufacturer but manufactured by another bears only the warranty given by such other manufacturer. (Manufacturer agrees to furnish free of charge a written description of problem or cause.) Warranty is voided by product abuse, alterations, use of equipment in applications for which it was not intended, use of non-manufacturer parts, or failure to follow documented service instructions. The foregoing warranty is exclusive of all other warranties whether written or oral, expressed or implied. No warranty of merchantability or fitness for a particular purpose shall apply. The agents, dealers, and employees of Manufacturer are not authorized to make modifications to this warranty, or additional warranties binding on the Manufacturer. Therefore, additional statements, whether oral or written, do not constitute warranty and should not be relied upon.

The Manufacturer's sole responsibility for any breach of the foregoing warranty provisions, with respect to any product or part not conforming to the Warranty or the description herein contained, is at its option (a) to repair, replace, or refund such product or parts upon the prepaid return thereof to location designated specifically by the Manufacturer. Product returns not shipped prepaid will be refused (b) as an alternative to the foregoing modes of settlement. The Manufacturer's dealer may repair defective units with reimbursement for expenses. A written description of problem or cause must accompany all warranty claims.

Except as set forth here in above and without limitation of the above, there are no warranties or other affirmation which extend beyond the description of the products on the fact here of, or as to operational efficiency, product reliability, or maintainability or compatibility with products furnished by others. In no event, whether as a result of breach of contract or warranty or alleged negligence, shall the Manufacturer be liable for special or consequential damages including but not limited to: loss of profits or revenue, loss of use of the product or any associated product, cost of capital, cost of substitute products, facilities or services, or claims of customers. Manufacturer does not assume responsibility for any accident due to equipment modification.

No claim will be allowed for products lost or damaged in transit. Such claims should be filed with the carrier within 15 days.

Effective July 20, 2005

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