OPERATION AND PARTS MANUAL

MULTIQUIP MAYCO

STRUCTURAL CONCRETE PUMP
MODEL ST-45HRM CE
(HATZ ENGINE)

Revision #0 (02/23/04)

MULTIQUIP
MULTIQUIP (UK)
HANOVER MILL
FITZROY STREET
ASHTON-UNDER-LYNE
LANCASHIRE, OL7 OTL
UNITED KINGDOM
PH. 0161-339-2223
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Thank you for your purchase of the Mayco/Multiquip ST45 concrete pump. It has been engineered and designed for maximum performance and safety. For long service life and improved reliability, please follow all safety, operating and maintenance instructions referenced in this manual.

This concrete pump is to be soley used for the pumping of concrete and is not intended for any other purpose. The pumping of flammable or combustable materials is strictly prohibited. **NEVER** operate this pump in an explosive environment.

All warranties are voided if the pump is not used for its intended purpose.

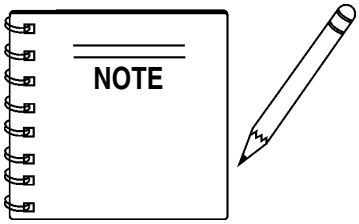
HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

PARTS/SERVICE/WARRANTY
LANCASHIRE, OL7 OLT
UNITED KINGDOM (UK) CALL:
PHONE: 161-339-2223
FAX: 161-339-3226

MAYCO ST-45HRM CE CONCRETE PUMP

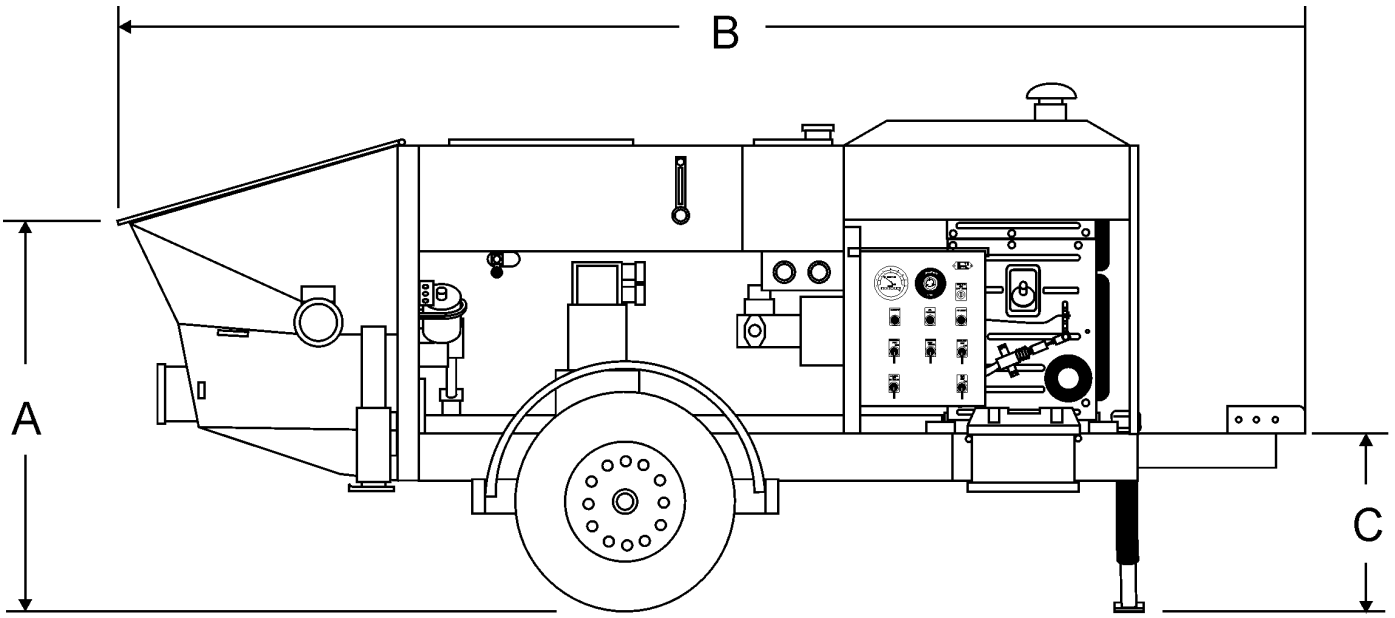
PARTS ILLUSTRATIONS



Specification and part number are subject to change without notice.

Table 1. ST-45 Pump Specifications	
Pumping Method	Reciprocating Piston
Pumping Rate	Up to 34.4 cu. meters per hour* (45 cu. yds. per hour*)
Maximum Aggregate Size	38mm (1-1/2 in. minus)
Vertical Pumping Height	Up to Excess of 76m (250 ft.)
Horizontal Pumping Distance	305m* (1000 ft.)
Cylinder Lubrication Box Capacity	26.5 Liters (7 Gallons)
Hydraulic Fluid Capacity	219 Liters (58 Gallons)
Fuel Tank Capacity	76 Liters (20 Gallons)
Hopper Capacity	283 liters (10 cu. ft.) with optional fwd/rev remixer
Material Hose	76.2 mm, 101.6 mm, 127 mm (3 in., 4 in., 5 in. dia.)
Remote Control (25 ft. cable)	optional
Dimensions	See Page 6
Weight (with fluids)	1,907 kg (4,206 lbs.)
Weight (dry/shipping)	1,832 kg (4,040 lbs.)
* Volume output will vary depending on mix design, slump, line size used and job site condititons	

Table 2. Engine Specifications		
Engine	**Model**	**HATZ 3M41 57HP DIESEL ENGINE**
	Bore X Stroke	102 x 105 mm (4.02 in. x 4.13 in.)
	Compression Ratio	18.7
	Displacement	2,573 cc (157 cu. in)
	Lube Oil Capacity Max/Min	(8.6 L / 5.1 L) 9.1 qt. / 5.4 qt.
	Engine Speed Full Idle	875 rpm ±100
	Battery Type	12 V (88/143 Ah)
	Engine Lubrication	SAE 10W-30 (Oil Grade) SG or SF (Service Class)
	Starting Method	Electric Start
	Dry Net Weight	255 kg (562 lbs.)



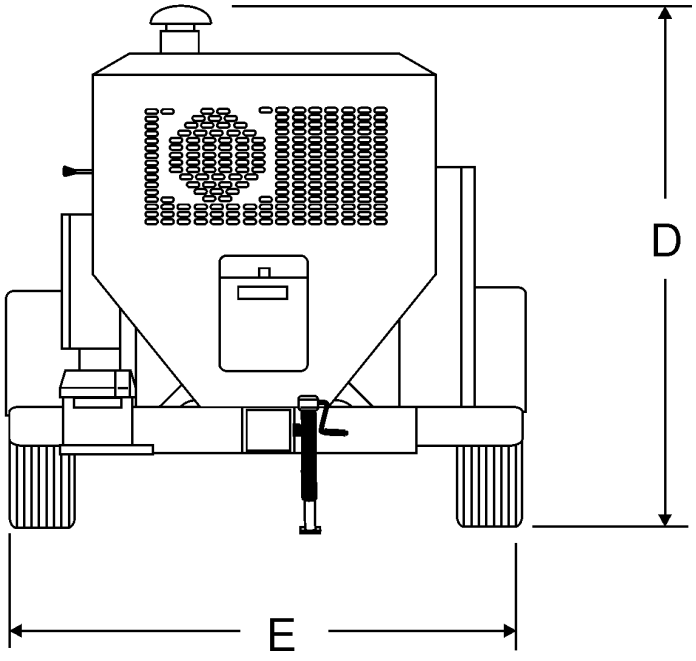


TABLE 3. DIMENSIONS	
REF.	**DIMENSIONS**
A	45 in. (114.3 cm.)
B	162 in. (411.5 cm.)
C	24 in. (61 cm.)
D	73 in. (185.4 cm.)
E	68 in. (172.2 cm.)

Figure 1. ST-45HRM CE Concrete Pump Dimensions

EC Declaration of Conformity

In accordance with EN 45014:1998

We Multiquip (UK) Ltd
of Hanover Mil, Fitzroy Street Ashton Under Lyne OL7 0TL

declare that:

Equipment	Concrete conveying and spraying apparatus
Model name/number	(S/N's 220704 and 220705)

Is in accordance with the following directives:

98/37/EC	The Machinery Directive
89/336/EEC	Electromagnetic Compatibility Directive
2000/14/EC	The noise Emission in the Environment by Equipment for Use Outdoors Directive

has been designed and manufactured to the following specifications:

pr EN 12001:1995	Conveying, spraying and and distributing machines for concrete and mortar – safety requirements.
BS EN 292-2:1991	Safety of machinery. Basic concepts
BS EN 982:1966	Safety of machinery. Safety requirements for fluid power systems and their components. Hydraulics
BS EN 61000-6-4:2001	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments.

Noise measurements have been made in accordance with BS EN ISO 3744:1995 with internal control of production (Schedule 8/Annex V). The declared noise values are as follows:

Measured Sound Power Level	Guaranteed Sound Power Level
103 db (LwA)	106 db (LwA)

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

Signed by: .....

Name: L. Whitelegg

Position

Done at Ashton-Under-Lyne

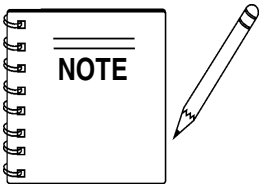
On

CE 02
586/02D1347

ST-45HRM CE CONCRETE PUMP— SAFETY MESSAGE ALERT SYMBOLS

FOR YOUR SAFETY AND THE SAFETY OF OTHERS!

Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the Safety Messages and Operating Instructions could result in injury to yourself and others.



This Owner's Manual has been developed to provide complete instructions for the safe and efficient operation of the **Multiquip Mayco *ST-45HRM CE Structural Concrete*** pump. Refer to the engine manufacturers instructions for data relative to its safe operation.

Before using this concrete pump , ensure that the operating individual has read and understands all instructions in this manual.

SAFETY MESSAGE ALERT SYMBOLS

The three (3) Safety Messages shown below will inform you about potential hazards that could injure you or others. The Safety Messages specifically address the level of exposure to the operator, and are preceded by one of three words: **DANGER**,

DANGER: You **WILL** be **KILLED** or SERIOUSLY injured if you do not follow directions.

WARNING: You **CAN** be **KILLED** or SERIOUSLY injured if you do not follow directions.

CAUTION: You **CAN** be injured if you do not follow directions

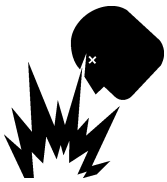
Potential hazards associated with operation of the pump will be referenced with Hazard Symbols which appear throughout this manual, and will be referenced in conjunction with Safety Message Alert Symbols.

HAZARD SYMBOLS

Lethal Exhaust Gases

Diesel engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled. **NEVER** operate this equipment in a confined area or enclosed structure that does not provide ample free flow air.

Explosive Fuel



Diesel fuel is extremely flammable, and its vapors can cause an explosion if ignited. **DO NOT** start the engine near spilled fuel or combustible fluids. **DO NOT** fill the fuel tank while the engine is running or hot. **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system. Store fuel in approved containers, in well-ventilated areas and away from sparks and flames. **NEVER** use fuel as a cleaning agent.

Burn Hazards

Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operations. **NEVER** operate the engine with heat shields or heat guards removed.

Rotating Parts

NEVER operate equipment with covers, or guards removed. Keep ***fingers***, ***hands***, ***hair*** and clothing away from all moving parts to prevent injury.

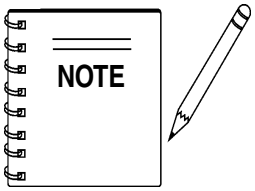
ST-45HRM CE CONCRETE PUMP— SAFETY MESSAGE ALERT SYMBOLS

Accidental Starting

ALWAYS place the **ON/OFF** switch in the **OFF** position. **NEVER** perform maintenance on the unit with the ignition key in the **ON** position.

Over Speed Conditions

NEVER tamper with the factory settings of the engine governor or settings. Personal injury and damage to the engine or equipment can result if operating in speed ranges above maximum allowable.

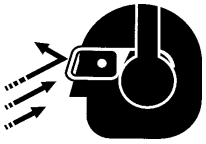


This ***pump***, other property, or the surrounding environment could be damaged if you do not follow instructions.

Respiratory Hazard

ALWAYS wear approved ***respiratory*** protection.

Sight and Hearing hazard



ALWAYS wear approved ***eye*** and ***hearing*** protection.

Equipment Damage Messages

Other important messages are provided throughout this manual to help prevent damage to your concrete pump, other property, or the surrounding environment.

CAUTION:

Failure to follow instructions in this manual may lead to serious injury or even ***death!*** This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

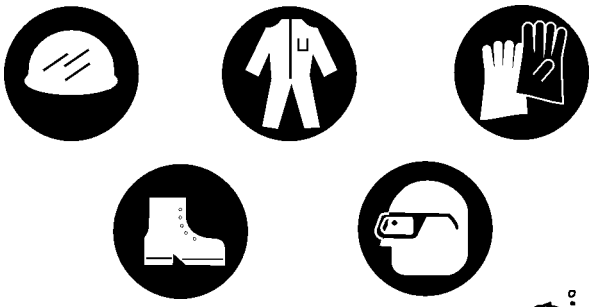
The following safety guidelines should always be used when operating the **MAYCO** ST-45 concrete pump:

GENERAL SAFETY

■ **DO NOT** operate or service this equipment before reading this entire manual.

■ This equipment should not be operated by persons under 18 years of age.

■ **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.

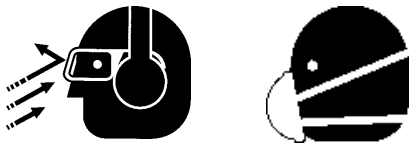


■ **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.

■ **NEVER** operate this equipment under the influence or drugs or alcohol.

■ **ALWAYS** check the machine for loosened threads or bolts before starting.

■ **ALWAYS** wear proper **<u>respiratory</u>** (mask), ***hearing*** and ***eye*** protection equipment when operating the pump .



■ Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.

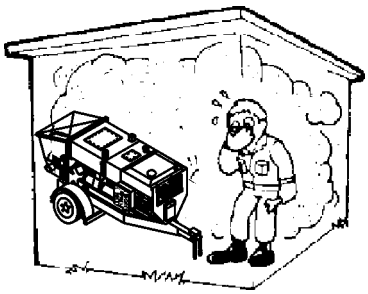
■ Manufacture does not assume responsibility for any accident due to equipment modifications.

■ **NEVER** use accessories or attachments, which are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.

■ **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing engine or pump .

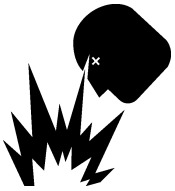
■ **High Temperatures** – Allow the engine to cool before adding fuel or performing service and maintenance functions. Contact with ***hot!*** components can cause serious burns.

■ The engine section of this pump requires an adequate free flow of cooling air. ***NEVER*** operate the pump in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause serious damage to the pump or engine and may cause injury to people. Remember the pump's engine gives off ***DEADLY*** carbon monoxide gas.



■ **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.

■ **ALWAYS** use extreme caution when working with **flammable** liquids. When refueling, **stop the** engine and allow it to cool.



■ **NEVER** ***<u>smoke</u>*** around or near the machine. Fire or explosion could result from ***fuel vapors***, or if fuel is spilled on a ***hot!*** engine.

■ **NEVER** operate the pump in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe ***bodily harm or even death***.

■ Topping-off to filler port is dangerous, as it tends to spill fuel.

ST-45HRM CE CONCRETE PUMP — RULES FOR SAFE OPERATION

- **ALWAYS** remove the ***ignition key*** when leaving the pump unattended.
- **ALWAYS block** the ***wheels*** on the unit when using on a slope.
- **ALWAYS** maintain this equipment in a safe operating condition at all times.
- **ALWAYS** stop the engine before servicing, adding fuel or oil.
- **NEVER** run engine without air filter. Severe engine damage may occur.
- **ALWAYS** be sure the operator is familiar with proper safety precautions and operation techniques before using pump.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children.
- **DO NOT** operate this equipment unless all guards and safety devices are attached and in place.
- **CAUTION** must be exercised while servicing this equipment. Rotating and moving parts can cause injury if contacted.
- Keep all ***inexperienced*** and ***unauthorized*** people away from the equipment at all times.
- Before start-up, check the hopper and remove all foreign matter and debris.
- **DO NOT** use worn or damaged hose couplings, inspect all hoses and couplings for wear. Replace any worn or defective hose or couplings immediately.
- Keep hands out of the hopper when the engine is running.
- **DO NOT** operate unit with the ***hood open***.
- **DO NOT** disconnect hose couplings or nozzle while under pressure. Relieve pressure by manually activating pressure relief valve at manifold.
- Unauthorized equipment modifications will void all warranties.
- Check all fasteners periodically for tightness. Also check towing tongue bolt, lock nut and wheel lug nuts for wear.
- Test the ***pump's ON/OFF*** switch. The purpose of this test is to shut down the engine.
- Refer to the ***HATZ Engine Owner's Manual*** for engine technical questions or information recommended by Multiquip for this equipment. Damage to the equipment and or injury to user may result.

Transporting

- **ALWAYS** shutdown engine before transporting the pump.
- Tighten fuel tank cap securely and close fuel valve to prevent fuel from spilling.
- Drain fuel when transporting pump over long distances or bad roads.

Towing

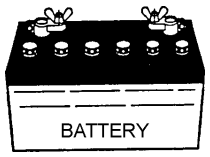
- Before towing, check the hitch and secure the safety chain to the towing vehicle.
- When towing, an adequate safety chain must be fastened to the frame, refer to Towing Guidelines.
- This equipment shall not be towed or operated by individuals who cannot read understand the signs, decals or operating instructions.
- When towing at night, ***always*** have rear tail lights **ON**.
- **DO NOT** tow unit with hopper full of material.
- **DO NOT** tow unit with hoses attached.
- **DO NOT** tow unit in excess of **45 MPH** on highways..

Maintenance Safety

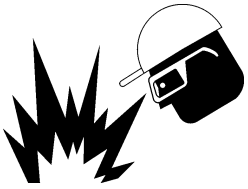
- **NEVER** lubricate components or attempt service on a running pump .
- **ALWAYS** allow the pump a proper amount of time to cool before servicing.
- Keep the pump in proper running condition.
- Fix damage to the pump immediately and always replace broken parts.
- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel and fuel filters.
- **DO NOT** use plastic containers to dispose of hazardous waste.

Battery

The battery contains acids that can cause injury to the eyes and skin. To avoid eye irritation, ***always*** wear safety glasses. Use well insulated gloves when picking up the battery. Use the following guidelines when handling the battery:



1. **DO NOT** drop the battery. There is the possibility of risk that the battery may explode.
2. **DO NOT** expose the battery to open flames, sparks, cigarettes etc. The battery contains combustible gases and liquids. If these gases and liquids come in contact with a flame or spark, an explosion could occur.



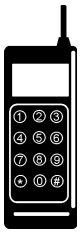
3. **ALWAYS** keep the battery charged. If the battery is not charged a buildup of combustible gas will occur.
4. **ALWAYS** keep battery charging and cables in good working condition. Repair or replace all worn cables.
5. **ALWAYS** recharge the battery in an vented air environment, to avoid risk of a dangerous concentration of combustible gases.
6. In case the battery liquid (dilute sulfuric acid) comes in contact with ***clothing or skin***, rinse skin or clothing immediately with plenty of water.
7. In case the battery liquid (dilute sulfuric acid) comes in contact with your **eyes**, rinse eyes immediately with plenty of water, then contact the nearest doctor or hospital, and seek medical attention.

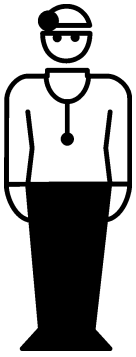
Emergencies

■ **ALWAYS** know the location of the nearest ***fire extinguisher.***

■ **ALWAYS** know the location of the nearest and ***first aid kit.***

■ In emergencies ***always*** know the location of the nearest phone or ***keep a phone on the job site***. Also know the phone numbers of the nearest ***ambulance***, ***doctor*** and ***fire department***. This information will be invaluable in the case of an emergency.

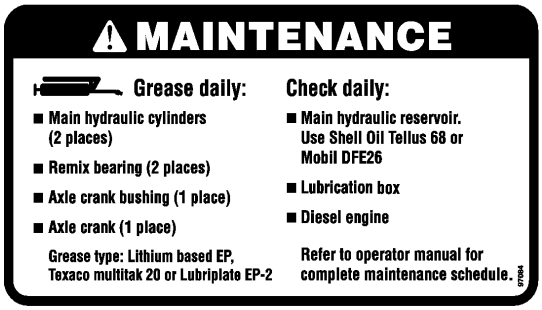




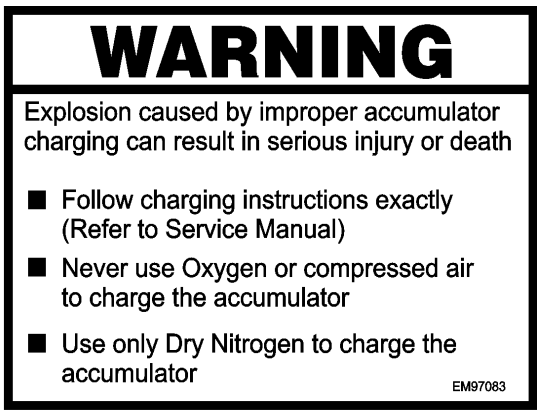
Machine Safety Decals

The ST-45 structural concrete pump is equipped with a number of safety decals. These decals are provided for operator safety and maintenance information. Figure 1 below illustrates these decals as they appear on the machine. Should any of these decals become unreadable, replacements can be obtained from your dealer.

Figure 1. ST-45 Operation and Safety Decals



P/N EM97084

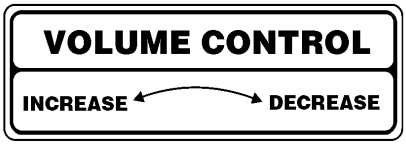


P/N: EM97083

P/N: EM955

P/N: TBD

P/N: TBD



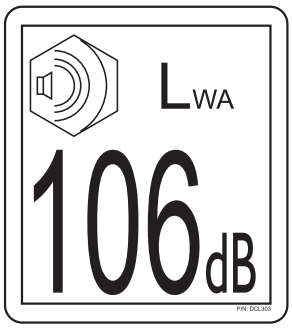
P/N: EM985

P/N: EM995

P/N: EM97071

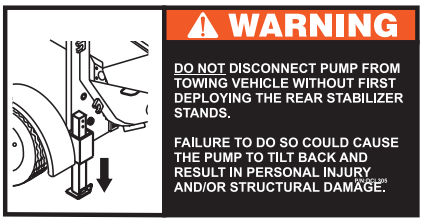
P/N: TBD

Figure 2. ST-45 Operation and Safety Decals



P/N: DCL303

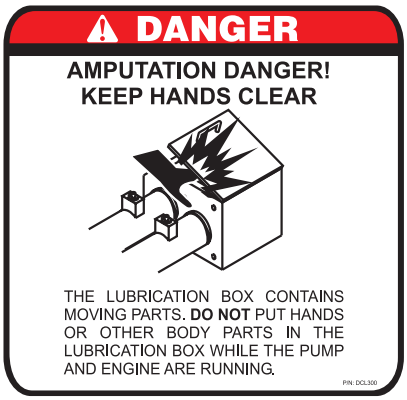
P/N: 36099 (ISO BLUE)



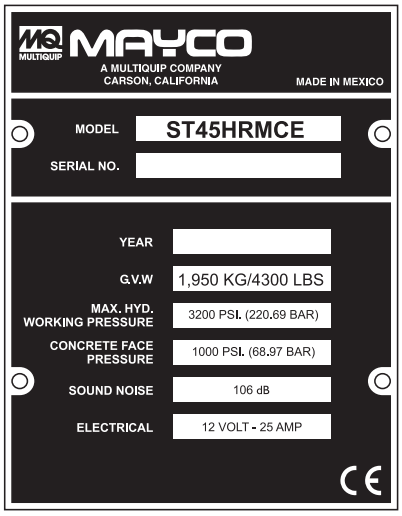
P/N: DCL305

P/N: 35137

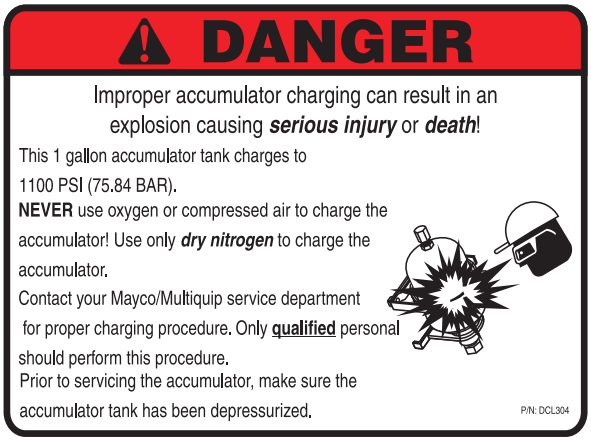
P/N: DCL306



P/N: DCL300



P/N: CONTACT MAYCO MULTIQUIP PARTS DEPT.



P/N: DCL304

Figure 3. ST-45 Operation and Safety Decals

Figure 4 display's the basic hand signals commonly used in concrete pumping operations.

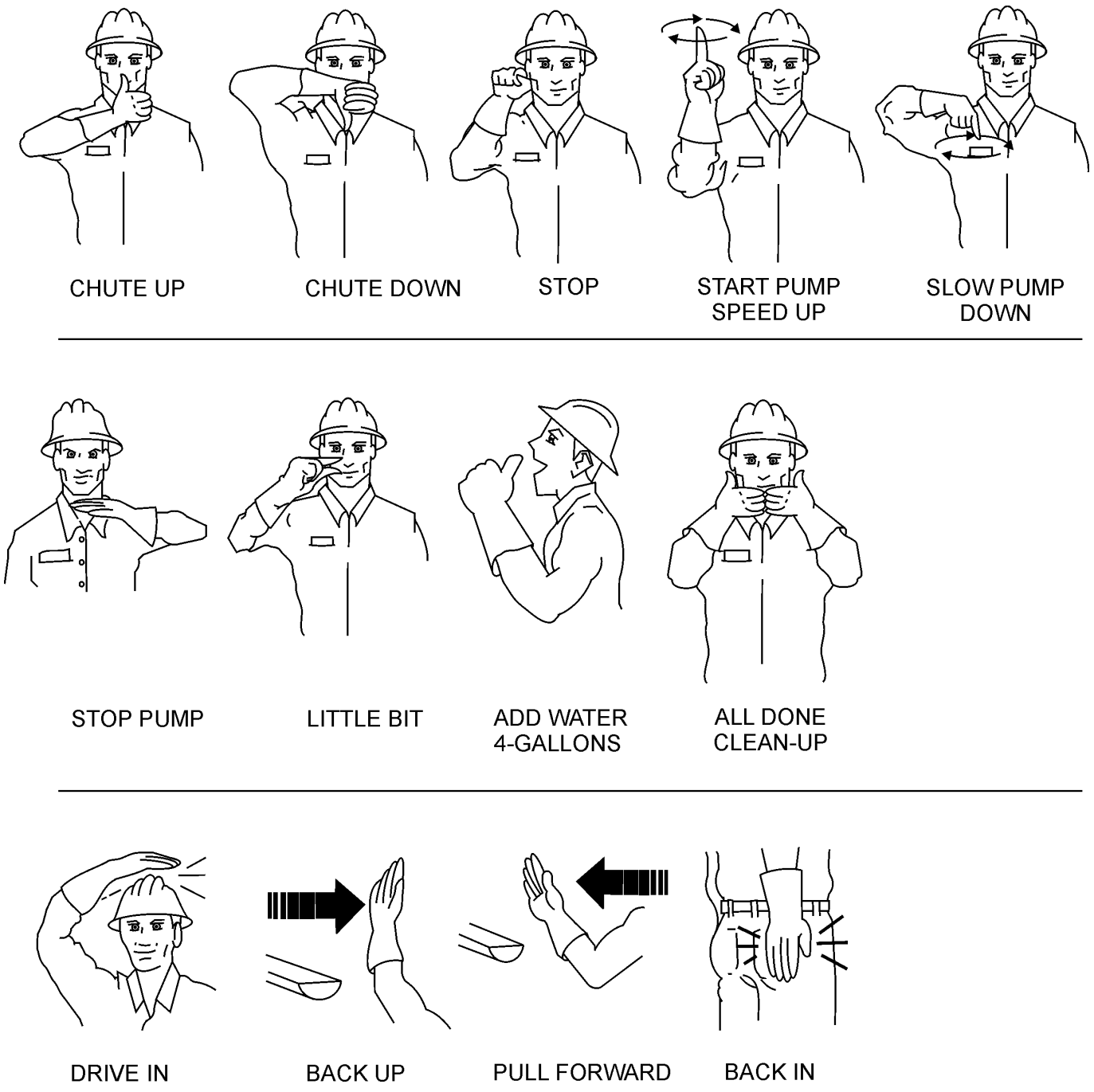


Figure 4 Operation Hand Signals

Concrete Mix Design

Mix design is most important to achieve maximum pumpability. Pumpability is affected by, among other factors, the type and gradation of aggregate used. Natural aggregates make a more workable mix and pump more readily than crushed aggregates. A blend of natural and crushed aggregates will produce a workable mix. The type and gradation of aggregates is equally important for workability as the size and percentage of coarse aggregates in the mix.

The term "aggregates" describes all of the solid materials, from the largest rock to the smallest grain of sand, contained in the concrete mix.

Concrete mixes with a consistency as dry as one-inch slump and as wet as ten-inch slump have been pumped; but for maximum efficiency from the pump, a slump ranging from two to six inches will produce a more workable mix than one that contains more or less water.

The principle of concrete pumping is based on self-lubrication. As it moves through the transfer line, the concrete takes the shape of a plastic cylinder. It is forced through the transfer line on a film of mortar that is self-troweled to the service of the transfer line around its full periphery by the slug of concrete itself.

A slump rating should be used with discretion; it is not always a real indication of the pumpability of the mix. The concrete may be workable in the sense that it will readily flow into place, but the same mix may not respond to pressure. Overly wet mixes tend to separate. In addition to affecting the strength and quality of the concrete, the delivery system will not tolerate separation. Overly dry mixes are similarly unsatisfactory if they lack plasticity and tend to be crumbly. To be properly pumped, the mix must be able to continuously coat the inside of the line with a lubricating seal of mortar.

There are four ways in which this seal can be lost:

1. By pumping excessively wet mixes which do not have enough cohesion to hold together.
2. By pumping harsh undersanded concrete with poorly graded aggregates which can jam together when the pressure becomes too great for the insufficient amount of sand to hold the aggregates apart.
3. By getting a rock pocket, such as mixer tailings, into the pump valve. This rock pocket will have an insufficient coating of mortar and the mix will not be plastic enough to allow the valve to operate or the mix to move in the line.
4. Through excessive bleeding. If the mix is short or fines, but the sand is otherwise fairly well graded, bleeding will not normally create any problems as long as the pump continues operation. But, if the pump is shut down, bleeding can result in a loss of lubrication and blocked erratic flow.

The above are bad concrete practices, regardless of how the mix is to be placed. But, these points do show that special mixes are not always needed, within limits, for pumping concrete. Good aggregate gradation is most important to pump concrete the maximum distance.

The use of admixtures can have a beneficial effect on pumpability. Most of the dispersing agents will fatten, retard bleeding, and increase workability. Thus, the average concrete can be pumped for appreciably longer distances. Air entraining agents will also improve workability, although they cannot be used as a substitute for good gradation of the aggregate. Pumping will not appreciably affect the final air content of the mix. High-early cement tends to give a more readily pumpable mix with superior water retaining qualities. However, if delays are likely to occur, extra care must be exercised due to the faster setting time over regular cement.

The Mayco Model ST-45 will pump a wide variety of concrete pump mixes. But, there are guidelines that must be followed. Use this information in conjunction with the ***Operating Procedures*** (pages 25-29).

Regional Differences

Concrete is made by mixing locally available rock and sand with cement and water. For this reason there are great differences in the pumpability of concrete from one region of the country to another.

It is impossible to define a specific mix for each region that the Model ST-45 be will working in. Therefore, the mixes on pages 64-65 will provide a basic guideline for establishing the proper mix design for your area.

Use this information to specify your requirements to your local ready-mix batch plant, contractor and civil engineer. It may take minor adjustments to make a mix pumpable, so you should explain your needs.

The elements that have to be controlled and consistently maintained by the batch plant are:

1. The sizing and mix percentage of rocks, gap graded from the largest down through the smallest sizes.
2. Sand with a sieve analysis that has the proper percentage of fines, ASTM C33 spec.
3. Sufficient cement to produce the required design strength of the concrete and provide the lubricating binder to pump the concrete through the delivery system.

Use a minimum of:

227 Kg (500 lbs.) of cement/cu yd for 17.2 mPa (2500 p.s.i.) concrete after 28 days.

240 kg (530 lbs.) of cement/cu yd for 20.7 mPa (3000 p.s.i.) concrete after 28 days.

272 kg (600 lbs.) of cement/cu yd for 27.6 mPa (4000 p.s.i.) concrete after 28 days.

4. Admixture pump-aid if necessary.
5. The proper amount of water to make a workable slump and plasticize the mix.

In addition, the Mayco Concrete ST-45HRM CE Pump can be used to pump a large aggregate hard rock as follows:

1. Pea rock 12.7mm (1/2" minus) pump with mixes being as low as 30% rock and 70% sand. (See page 50, for comments on cleaning the pump.)
2. Shortening pea rock when used with an air compressor and nozzle. (See back pages for recommended set-up.)
3. “Mud Jacking”, high pressure grouting.

The following is a brief explanation of how the concrete cylinders, hydraulic cylinders, shuttle tube, valves and hopper work in sequence to pump concrete.

The hydraulic pressure is generated by a variable volume, pressure compensated, axial piston pump that is driven by a diesel engine. The rod sides of the drive cylinders are hydraulically connected together creating a "slave circuit," which allows hydraulic oil to transfer from one piston to the other.

The two part cycling sequence is initiated by an electrical signal generated by two proximity switches located in the drive cylinder. The proximity switches are normally open, magnetically sensing the movement of the main drive cylinder. As the drive cylinder piston head passes the proximity switch, an electrical signal is sent to the solenoid operated pilot valve which in turn directs pilot oil to the four valves controlling the drive cylinder and the shuttle cylinder.

A one-gallon accumulator assists the movement of the shuttle tube. This circuit assures that the shuttle tube will throw with the same intensity of each stroke regardless of how fast the main drive cylinders are cycling.

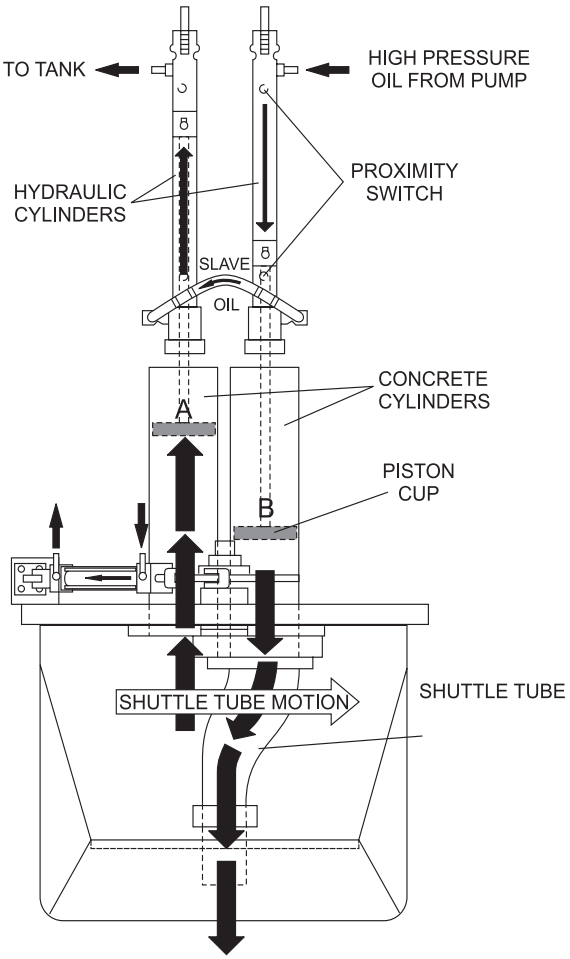


Figure 5. Pumping Cycle 1

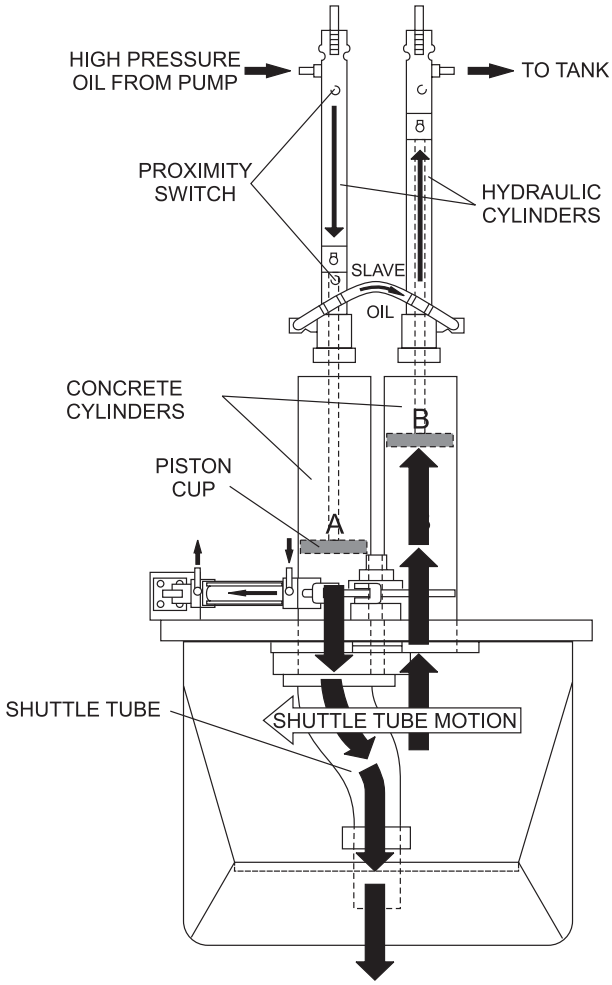


Figure 6. Pumping Cycle 2

In the first cycle, hydraulic pressure is applied to cylinder (**B**), causing the hydraulic piston, which is connected to the concrete piston and piston cup, to discharge concrete into the delivery line (Figure 5).

As one cylinder is discharging concrete, the hydraulic oil from the rod side (**B**) of the drive cylinders is being transferred through the slave circuit causing the opposite cylinder (**A**) to move back on the suction stroke, filling the cylinder with concrete.

The shuttle tube is sequenced to pivot to each concrete cylinder as the drive cylinders stroke to push concrete. As the second cycling sequence begins (Figure 6), the shuttle tube pivots to the opposite cylinder (**A**). The hydraulic piston passes under the proximity switch and sends pressure to the piston, causing it to stroke and discharge concrete into the delivery line. Hydraulic oil is transfered through the slave circuit to cylinder B, causing it to start a suction stroke, refilling it with concrete. The pumping sequence then repeats for the durration of the operation.

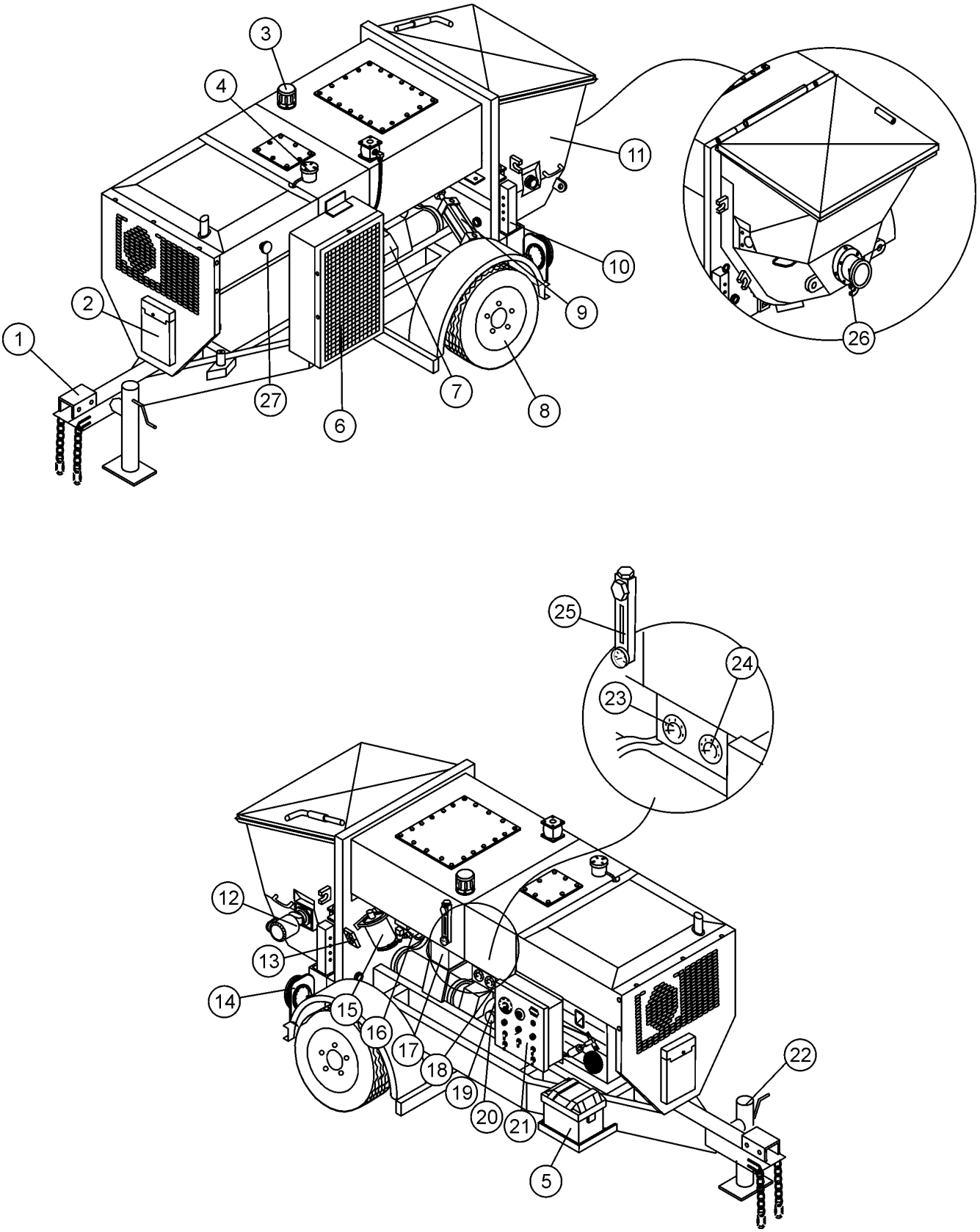


Figure 7. Major Pump Components

Figure 7 illustrates the location of the major components for the ST-45 Structural Concrete Pump. The function of each component is described below:

1. **Tow Hitch Coupler –** See the Towing Information section in this manual.
2. **Documentation Box –** Contains engine and pump operation, parts and maintenance information.
3. **Hydraulic Oil Tank/Cap–** Remove cap to add hydraulic fluid. Fill with Shell Oil Tellus 68, Mobil Oil DFE26 or equavalent if hydraulic oil level is low.
4. **Fuel Tank/Cap –** Fill with #2 diesel fuel. Fuel tank (cell) holds approximately 88 liters (20 gallons). **DO NOT** top off fuel. Wipe up any spilled fuel immediately
5. **Battery –** This unit uses a +12 VDC type battery. ***ALWAYS*** use gloves and eye protection when handling the battery.
6. **Heat Exchanger –** Reduces temperature of the hydraulic oil. The exchanger draws oil from the hydraulic tank through a filter and into the heat exchanger before allowing it to flow into the hydraulic system.
7. **Lubrication Box –** This box is empty when shipped from the factory. Please fill with 7 gallons (26.5 liters) of SAE motor oil for first time use. Also check the dual clean-out point on bottom of lubrication box for a secure tight fit.
8. **Tires** — Tire inflation pressure is the most important factor in tire life. Pressure should be checked before operation. **DO NOT** bleed air from tires when they are hot. Check inflation pressure weekly during use to insure the maximum tire life and tread wear.
9. **Shuttle Cylinder –** Under pressure, the shuttle cylinder shears concrete passing from the concrete cylinder to the delivery line durring the cycle phase. The Accumulator provides the pressure needed to ensure enough force is provided during cycle.
10. **Pump End Jack Stand –** Use this jack stand to level and support the rear end of the pump. **NEVER** deploy on un-level ground and always check for firmness of ground.
11. **Hopper/Hood –** Lift hood to fill. Concrete from a Redi-Mix truck is poured into this hopper. The hopper can hold 283 liters (10 cu. ft) of concrete with optional forward/reverse mixer. **NEVER** put hands or any other parts of you body into the hopper.
12. **Remixer Motor –** Drives the remixer paddles inside the hopper. The motor direction is controled by the remixer control lever.
13. **Lubrication Panel –** This console allows for the remote lubrication of components on the pump.
14. **Rear Running Lights – ALWAYS** check and make sure both the right and left running lights are functioning correctly before towing the pump.
15. **Accumulator –** Stores hydraulic oil under pressure and releases it to the shuttle cylinder and provides the required pressure to activate the hydraulic system.
16. **Remixer Control Lever –** Controls the forward/reverse motion of the hopper remixer paddles.
17. **Manifold –** Aluminum block that controls the flow of hydraulic pressure to the various hydraulic motors and other components required to control the pump.
18. **Hydraulic Pump –** This unit incorporates an axial variable displacement hydraulic piston pump.
19. **Throttle Control Knob –** This is a variable speed type control. Turning the throttle lock (CCW) left unlocks the throttle allowing the throttle control cable to be pulled out to the desired position. Once the desired throttle position (speed) has been achieved, turning the throttle lock to the (CW) right locks it in place. Use the fine tune adjustment knob to fine tune the engine rpm's.

    To place the engine in idle, press the top button inward all the way..
20. **Stroke Volume Control Dial –** Turns CW/CCW to increase or decrease the number of strokes per minute of the pump.
21. **Control Box –** Contains the mechanical and electrical components required to run the pump. See next page for control box description.
22. **Tow End Jack Stand –** Use this jack stand to level and support the tow end of the pump.
23. **Pumping Pressure Gauge –** Used to monitor pressure in the concrete cylinders and shuttle tube.
24. **Accumulator Pressure Gauge–** Used to monitor accumulator pressure. Pressure should read at least 12.1 mPa (1,750 psi) for correct pump operation.
25. **Hydraulic Oil Sight Glass –** Use to determine the amount of hydraulic oil remaining in tank. The sight glass also contains a temperature gauge for monitoring the temperature of the hydraulic oil.
26. **Hopper Discharge Sleeve –** Connect hoses or steel pipes to the discharge sleeve for pouring concrete.
27. **Emergency Stop Button –** Press emergency stop button to stop pump in an emergency. Turn knob counter clockwise to disengage the stop button.

ST-45HRM CE CONCRETE PUMP— CONTROL BOX COMPONENTS

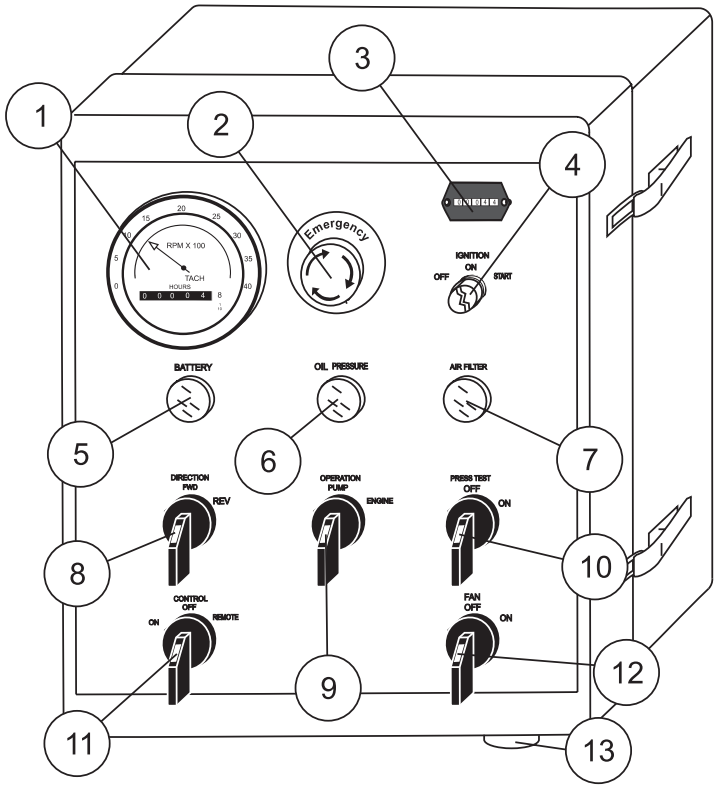


Figure 8. Pump Control Box Components

1. **Engine Tachometer –** Monitors the engine RPM's and hours of operation for the engine.
2. **Emergency Stop Button –** Press emergency stop button to stop pump in an emergency. Turn knob counter clockwise to disengage the stop button.
3. **Hourmeter –** Display's the number of hours the pump has been in use.
4. **Ignition Switch –** Insert the ignition key here to start the engine. Turn the key clockwise to the "**ON**" position, then continue turning clockwise to the "**START**" position and release. To stop the engine turn the key fully counter-clockwise to the "**STOP**" position.
5. **Battery Indicator Lamp–** Indicates a low battery charge. Replace or charge battery. **NEVER** operate the ST-45 when this lamp is on.
6. **Oil Pressure Indicator Lamp–** When lit, indicates correct operational pressure for running the ST-45. **NEVER** operate the ST-45 if this lamp is off.
7. **Air Filter Indicator Lamp –** Indicates the engine air filter is functioning properly. **NEVER** operate the ST-45 if this lamp is off.
8. **Direction Control Switch–** This 2 position switch controls the direction of flow for any mix in the pump. The ***center*** position sets the pumping direction to forward and the ***right most*** position sets the pumping direction to reverse.
9. **Pump Operation Switch–** This 2 position switch controls the operation of the pumping components and engine. The ***center*** position allows the operation of the pump and engine and the ***right most*** position allows only the engine to operate.
10. **Pressure Test Switch–** Activates a self-diagnostic routine which tests the pressure of the pumping system, which can be read on the Pumping Pressure Gauge.
11. **Pumping Control Switch –** This 3-position switch controls the pumping of the pump. The ***left most*** position is for use with the remote control unit, the ***center*** position is for normal pumping operation, and the ***right most*** position (OFF) prevents pumping.
12. **Cooling Fan Switch –** If hydraulic oil temperature exeeds 23.9° C (75° F), set the pump operation switch to engine and turn the cooling fan switch to the right most position to activate cooling fan.
13. **Remote Cable Connector –** Insert the remote control input cable into this connector.

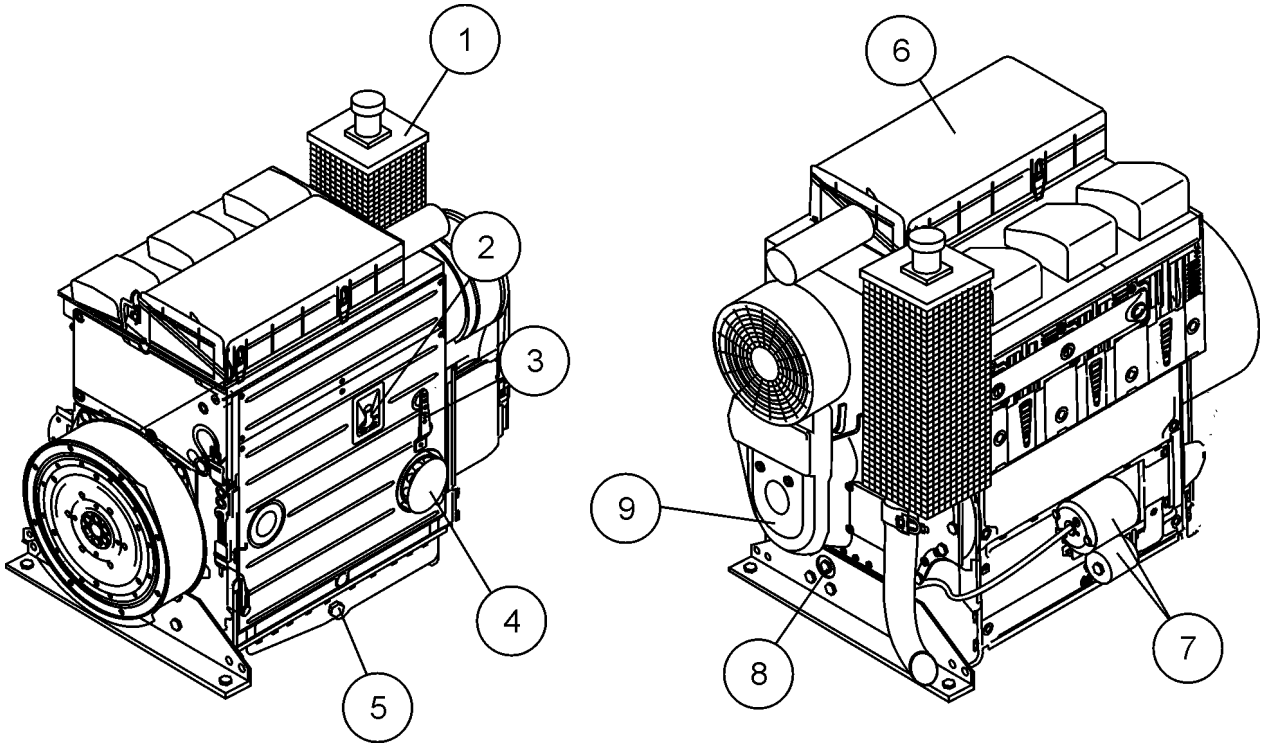
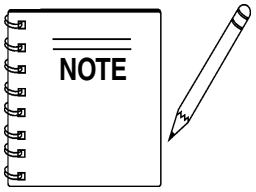


Figure 9. Pump Control Box Components

INITIAL SERVICING

The ***pump's*** engine (Figure 9) must be checked for proper lubrication and filled with fuel prior to operation. Refer to the manufacturers Engine manual for instructions & details of operation and servicing.

1. **Muffler –** Used to reduce noise and emissions. **NEVER** touch the muffler while it is hot! Serious burns can result. **NEVER** operate the engine with the muffler removed.
2. **Dip Stick –** Remove dipstick to determine if the engine oil level is low. If low add oil as specified in Table 4.
3. **Speed Control Lever –** This lever is connected to the throttle control which is located on the side of the engine compartment cover. Use this lever to control engine speed.
4. **Oil Filter –** Prevents dirt and other debris from entering the engine. Service the oil filter as recommended in the maintenance section of this manual.
5. **Side Oil Drain Plug –** Remove this plug to drain engine oil from the engine crankcase. For best results drain engine oil when oil is warm.
6. **Air Filter/Cover –** Prevents dirt and other debris from entering the fuel system. Release the latches on the side of the air filter cover to gain access to filter element.
7. **Starter/Solenoid –** This engine uses a 12 VDC , 2.7kW (3.7 HP) starter motor with solenoid.
8. **Front Oil Drain Plug –** Remove this plug to drain engine oil from the engine crankcase. For best results drain engine oil when oil is warm.
9. **V-Belt Cover –** Remove this cover to gain access to the V-belt. When replacing V-belt , use only recommended type V-belt.

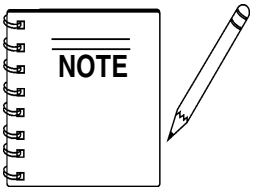


Operating the engine without an air filter, with a damaged air filter, or a filter in need of replacement will allow dirt to enter the engine, causing rapid engine wear.

OPERATING SUGGESTIONS

1. A well-planned location of the pump and routing of the hose before starting a pour may save subsequent moves throughout the job.

2. Before concrete is discharged into the hopper, it is suggested that 11-4 -15.1 liters (3 to 4 gallons) of water be sprayed into the hopper, followed by approximately 18.9 liters (5 gallons) of a creamy cement and water slurry (1/2 bag of cement to 18.9 liters / 5 gallons of water). This procedure lubricates the hose and prevents separation and blockages in the hose.



Getting the concrete to flow through the hose at the start of the pumping cycle can be one of the most critical operations of the pour. (***Manually*** operate the throttle when starting, **NOT REMOTELY**)

CAUTION

If hoses or lines are ***blocked*** for any reason, or if the lines are ***kinked*** when starting up or during the pumping cycle, the pump pressure could straighten out the kink or force out the blockage. This rapid surge of material could cause the lines to ***whip*** or ***move*** in a manner that could cause injury to personnel.

Inspect the lines at all times to prevent the above conditions

3. It is important that once the slurry procedure is completed, and you have started concrete flowing through the hose, do not stop the pour until all the slurry is pumped out and the concrete has reached the end of the hose. The only time to stop the pump at the start is if a blockage occurs.

4. When the pump is stopped for any reason during a pour; e.g., moving hose, waiting for redi-mix truck, the following suggestions are offered:

   A. Leave the hopper full of concrete at the time of shutdown. It is important not to let the ***redi-mix*** driver wash too much water into the hopper, as this could cause separation of the concrete in the hopper.

   B. If the ***shutdown*** period exceeds 2 to 3 minutes, turn off the engine so the vibration does not separate the mix in the hopper which can cause a blockage in the manifold when the pump is started.

   C. If it is necessary to wait 10 minutes or more for another load of concrete, it is wise to start the pump and pump 6 or 8 strokes every 5 minutes to prevent setting of the mix in the system. If waiting time is excessive, it would be wise to wash out the pump and hoses and start over when the new truck arrives.

   D. When pumping stiff mixes and there is waiting time between redi-mix trucks, it is advisable to add some water to the last hopper of material and "hand mix" to ensure an easier start with the following load.

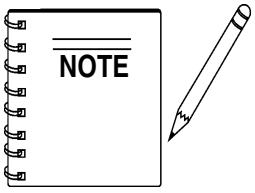
   E. When the pumping job requires a stiffer mix, the following method is suggested for starting: Take a water hose with a nozzle on it and apply water with a fine spray to the concrete as it comes down the redi-mix chute into the pump hopper after the slurry procedure is completed and you are ready to start pumping.

      Using this procedure will make it easier to pump through the clean hose. Note: Once the concrete has reached the end of the hose, do not apply any more water in this manner as this procedure is used for starting only.

   F. Hose sizing is very important: We strongly recommend on harsh mixes, vertical pushes, stiff concrete, shotcrete, long pushes, that a 6.35 cm (2 -1/2") line be used as far as possible. The advantages of using the 6.35 cm (2 -1/2") line are improved pumpability, less pumping pressure and less wear on the pump.

5. Following the pump operation, proper wash out of all materials or "build-up" within the pump manifold and hoses will prevent problems when starting the next job.

6. A thorough inspection of the drive components and greasing of all bearings after each job will ensure adequate lubrication and service to the pump which is normally operating in wet, gritty conditions.



Over-greasing any ***bearing*** on your Mayco pump will not damage the bearing.

WARNING

Common sense tells us that if you drive a truck into a brick wall, something is going to be damaged. The same holds true with your concrete pump. If you repeatedly pull the throttle all the way out and try to force your pump to push through ***blockages*** due to separation of material in the hose or manifold, you will soon have breakdowns and costly repairs which are not covered under warranty. If a blockage occurs, find where it is and clear it before further pumping. **DO NOT** increase the engine speed to clear the blockage. Increasing the engine speed will only compound the problem.

WARNING

It will be necessary at times to move your pump from one job site location to another. Before moving the pump, make sure to pump the remaining concrete out of the hopper. Moving the pump with a ***full hopper*** of concrete can cause severe damage or breakage of the axle and axle springs, excess strain and pressure on the hub and bearing assembly.

Pumping Tips

The effects of heat and excessive time on concrete:

7. Hot concrete, commonly referred to as a hot load, is concrete that has been in the redi-mix truck in excess of 2 to 3 hours. On a hot day, this amount of time is even less. A brief explanation of why heat and time affect concrete:

8. Concrete starts setting by drying up through a chemical reaction. The catalyst to this reaction is heat. When pumping a hot load, it is important to remember that when you have to stop pumping for any reason, add water to the concrete in the hopper and hand mix and move concrete in the hose every 5 minutes. If the shut down time becomes too long, wash out immediately.

Admixtures:

9. Remixtures that are designed into the concrete mix by the redi-mix company or an architectural engineering company. This section lists common admixtures and a brief explanation of their functions:

   A. **Pozzolith 300 –** or the equivalent acts as a water retarder and a lubricant. On a lean mix, long pushes, stiff mixes, and vertical pushes, Pozzolith 300R helps pumpability.

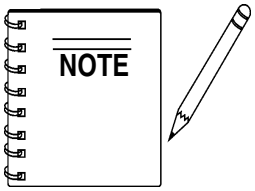
   B. **MBVR –** air entraining, acts as a lubricant.

   C. **Calcium Chloride –** commonly referred to as C.C., is used as an accelerator. When pumping a load with calcium chloride, it is recommended that you wash out if the waiting time between delivery trucks becomes too long.

   D. **Super Plasticizers –** acts as an accelerator. The concrete will look very wet after the super plasticizer is added, but will begin to set up very fast. Wash out immediately if you do not have a truck waiting. Super plasticizers are used mainly on commercial jobs.

   E. **Red Label –** acts as a water retarder and an accelerator. Red label will be used mainly on commercial jobs.

   F. **Fly Ash –** is used to help increase the strength of the concrete and decrease the cement content per yard. This is one of the most common admixtures used.



All admixtures will be shown on the redi-mix concrete ticket. Before starting the pumping job, ask the driver of the redi-mix truck to see the concrete ticket and note the admixtures that exist and take the proper action.

10. When pumping long distance or pumping stiff mixes, you can expect a drop in volume compared to shorter lines and wetter mixes due to the change in valve efficiency or cavitation.

11. Leaking manifold seals or hose coupling gaskets which leak water can cause separation and subsequent jamming at that point.

Priming the Pump and Delivery System with Slurry

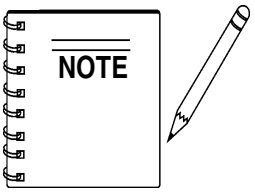
12. It is **CRITICAL** to the successful operation of a concrete pump that the manifold and all delivery hose, pipe and elbows are coated with a film of lubrication **BEFORE** you attempt to pump concrete. Failure to properly prepare the pump and system will result in a “dry pack” of concrete, blocking the shuttle valve tube or delivery line.

   A. With the entire delivery system connected to the pump. Except for the first hose. Pour 18.9 liters (5 gallons) of water into the second hose and push in your clean out ball and reconnect. This will help hold back the prime.

   B. There are several things you can use for the prime. A few examples are Cement and lime at a 50/50 mixture, slick pac, bentonite clay.

C. Mix the prime to the consistency of a smooth batter.

D. Position the first ready-mix truck at the hopper. Check the concrete. **DO NOT** discharge concrete into hopper at this time.



The bentonite is not compatible with concrete. **DO NOT** pump it into the forms. Discharge it out of the formed area.

E. Pour approximately two 18.9 liter (5 gallon) buckets of prime into the first hose and connect it to the pump.

F. With the pump in **FORWARD** at 25-30 strokes per minute, slowly discharge the concrete from the ready-mix truck into the hopper and completely fill it. Keep the pump running continuously until concrete is discharging at the end of the delivery system. If the pump is stopped during this procedure, a blockage may occur.

G. If it is necessary to replace or add a section of delivery system, after the initial lubrication procedure, wet the inside area of the hose, pipe or elbow with 18.9 liters (5 gallons) of water per 7.62 meters (25 ft.) length, before adding it to the system.

Clearing Concrete Blockage

13. Damaged hoses with internal restrictions can cause blockages.

14. If a blockage occurs in a hose, ***walk the hose*** until you find the point of trouble. The hose will be soft immediately past the blockage. If this happens at the start, disconnect the hose at the first coupling past the blockage.

15. Elevate the hose at that point with the blockage area hanging down. Using a hammer, you can pound the down-stream edge of the packed area until it is free to flow. Shake all of the sand and gravel out to the end of the hose. Before reconnecting the hose, start the pump and run a small amount of concrete out to the end of the hose. This will assure that all of the separation is out of the hose.

CAUTION

Use extreme care! The hose line is under ***pressure*** and can cause serious injury.

16. The shuttle tube is plugged if volume at the discharge end of the hose stops, the hose is soft and the hydraulic oil pressure gauge reads 20.7 mPa (3000) psi or more.

    To clear a plug in the shuttle tube, great care must be taken as a dangerous condition will exist from pressure build-up inside the shuttle tube. (With the shuttle valve, the concrete can be pumped in reverse.) Use the following prodedures to clear the shuttle tubes.

WARNING

DO NOT open any of the delivery system joint clamps.

"Reverse" Pumping Procedure

A. Switch the pump into ***reverse***. With pump speed at a medium-slow (approx. 12 strokes per min.) try to pull the "pack" back into the hopper with **5 or 6 reverse strokes**.

B. Remix the concrete in the hopper.

C. Switch the pump into ***forward***. If it is still plugged, repeat "Reversing" procedure three times.

If concrete still does not move, proceed to the Shuttle Tube Inspection Procedure.

Shuttle Tube Inspection Procedure

A. Stop the pump. Switch off the engine.

B The senior or most experienced operator must warn all others to stand at least **6.1 meters (20 feet)** away from the machine and turn their heads to face away from the pump.

CAUTION

Saftey glasses **MUST** be worn at all times when operating the ST-45. Failure to follow saftey guidlines can result in serious injury.

C. The operator will position themself beside the reducing elbow at the pump outlet. Wearing ***safety glasses***, slip the end of a pry bar (61 cm/24" length of reinforcing steel rod) under the latch of the hose clamp and flip it up.

D. Carefully knock the end of the hose away from the reducer.

E. Chip the concrete out of the reducer with the pry bar.

F. Remove the reducer. From the discharge end, chip the concrete out of the shuttle tube with the pry-bar. If concrete cannot be loosened from the outlet of the shuttle tube, remove the clean-out plug on the bottom of the hopper to discharge the concrete.

G. The **senior operator** may then remove the inspection cover plate from the shuttle tube by using a long extension wrench and the 61 cm (24-inch) pry bar.

WARNING

Make sure the accumulator pressure gauge reads **ZERO psi.** prior to performing any maitinance or inspection.

H. Chip the blockage out with the pry-bar.

I. Flush the shuttle tube with water.

J. Replace and seal the inspection cover plate on the shuttle tube.

K. Before resuming operation of the pump, perform the "Reverse" Pumping Procedure to relieve pressure on the shuttle tubes.

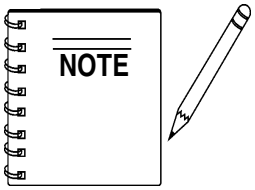
17. If it is necessary to wait 1/2 hour or more for another load of concrete, and to prevent setting of the mix in the system, it is advisable to consider the following factors (***A through D***) affecting the concrete :

    A. How old is the concrete?

    B. Is there an accelerator, calcium chloride, red label, etc., in the concrete?

    C. Temperature of the day, 27° C (80° F), 32° C (90° F)?

    D. How much system you have out and how stiff was the mix you were pumping?



When disconnecting hoses, use EXTREME CAUTION! The hose is under <u>pressure!</u>

If, for any reason, the mix should set up in the system, the following procedure (***E through H***) is suggested:

E. Disconnect the hose from the pump and wash the pump out immediately.

F. Reconnect the hose and fill the hopper with water.

G. Reconnect the hose and fill the hopper with water. **DO NOT** try to push all the concrete out of all of the hose lines at one time.

For example: If you had 61 meters (200 ft.) of system out, you would disconnect each hose. Clean it out by pushing water through the first hose off the pump, then continue progressing through all the hoses, until all the system is clean.

H. If waiting time is excessive, it would be wise to wash out the pump and hoses and start over when the new truck arrives. This can be avoided by being observant to the pump and system, also taking into consideration the above factors (E through H) affecting the mix.

18. **Down-Hill Pumping –** can be difficult on some jobs. The slurry procedure would be the same as explained on the pages titled Operating Suggestions. It is suggested that a sponge 5 cm x 10 cm x 15 cm (2"x 4"x 6") be placed in the hose before the start of pumping. Wet the sponge before placing it in the hose.

    The reason for using the wet sponge is to keep the slurry from running too far ahead of the concrete and so reducing the possibility of separation. When the pump is stopped, the material can flow slowly down, due to gravity, and cause the hose to collapse.

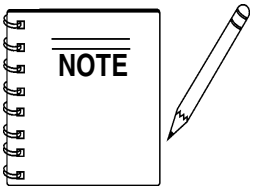
    When pumping is resumed, you can expect blockage at the point of hose collapse. To prevent this from happening, the hose can be "kinked off" at the discharge end when the pump is stopped to prevent the gravity flow of the material in the hose.

    The use of stiffer mixes when pumping down-hill will decrease gravity flow of the material in the hose and will assure a smoother operation between the cam roller bearing and cam plate. As with any job, make sure that the hose and the couplings are in good workable shape.

19. **Vertical Pumping –** When pumping vertically up the side of a building, above 12.2 meters (40 feet), we would recommend the installation of ***steel pipe*** securely fastened at intervals as necessary to support the pipe. Ninety degree, long radius pipe sweeps should be installed at the top and bottom of the steel line.

    Use a 7.62 meter (25 ft.) hose, or short section, off the pump; and for the balance of the horizontal distance to the vertical line, use steel pipe. This type of installation has been satisfactory on many jobs being pumped in excess of 30 meters (100 feet) high. Line pressures are always less using steel pipe as compared to hose.

    When pumping vertically, using ***all hose***, it is recommended not to go higher than 7.62 meters (50 feet) with hose. The hose should be tied off at intervals of 3 meters (10 feet), if possible. Special attention should be given when tieing the hose off at the top as the hose will have a tendency to stretch when filled with concrete. This will increase the possibility of a blockage at the point where the hose is tied off. To avoid this, a long radius of 90 degree elbow is recommended. The suggested place to tie off is on the hose, under the clamp.



*It is strongly recommended that **steel pipe** be used on all vertical pumping for safety and convenience.*

20. **Pulsation –** A slight pulsation of the hose will always be noticeable near the pump. Excessive pulsation of the hose near the pump is normally due to higher than average line pressures caused by stiff, harsh mixes, or extremely long pumping distances.

    The use of 63.5 mm (2-1/2") I.D. hose in these extreme cases reduces line pressures or the addition of slight amounts of water to the mix, if permissible, will permit easier pumping. The use of certain pumping admixtures may help.

    If excessive pulsation exists in the hose, it is advisable to use burlap or some means of wear protection under the hose at points where the hose may wear through the outer cover; e.g. over forms, steel or sharp curbs.

21. **Snap-Joint –** When using Snap-Joint couplings with gaskets to join hose, see that they are washed clean after each job. Keeping the hose ends clean (heavy duty) is very important for the best job setup. A thin coat of grease on the rubber gasket or dipping both coupling and gasket in water before coupling the hose will make for easier installation.

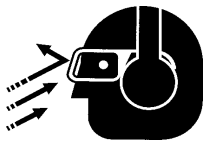
22. **New Pumps –** All new pumps are 'water pressure tested" at the factory This procedure permits a thorough inspection of entire drive system and valving under simulated full load conditions. The pump owner can do the same by making an adapter to couple to the end of the discharge cone: e.g., the use of a standard 51 mm (2-inch) pipe cap with a 9.5 mm (3/8") drilled hole in the center, screwed on to the end of hinged cone or reducer at the pump.

    Fill hopper with water after making sure that all sand and rock have been removed from manifold. Operate pump at full throttle and the 9.5 mm (3/8") diameter hole restriction will create sufficient back pressure to make thorough inspection of all moving parts.

CAUTION

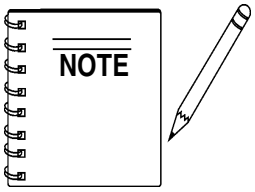
NEVER operate the pump in a confined area or enclosed area structure that does not provide ample ***free flow of air***.

ALWAYS wear approved ***eye*** and ***hearing*** protection before operating the pump .



NEVER place hands or feet inside the ***hopper***. **ALWAYS** shut-down the engine before performing any kind of maintenance on the pump.

NEVER operate the pumps's engine with the engine hood or V-belt cover removed. The possibility exists of ***hands***, ***long hair***, and ***clothing*** becoming entangled with the V-belt, causing injury and bodily harm.



Reference Figures 7 through 9 for the location of any control or component referenced in this section.

Before Starting

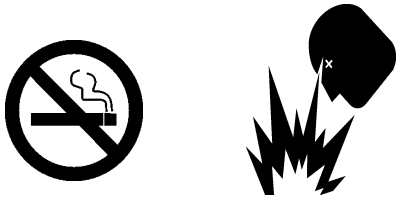
1. Read safety instructions at the beginning of manual.
2. Clean the ***entire pump***, removing dirt and dust, particularly the engine cooling air inlet, and air filter.
3. Check the ***air filter*** for dirt and dust. If air filter is dirty, replace air filter with a new one as required.
4. Check fastening nuts and bolts for tightness.

CAUTION:

Handle fuel safely. Diesel fuel is highly ***flammable*** and can be dangerous if mishandled. **DO NOT** ***smoke*** while refueling. **DO NOT** attempt to refuel mixer if the engine is hot or running. **ALWAYS** allow engine to ***cool*** before refueling.

FUEL CHECK

5. Read the fuel sight tube (Figure 10) on top of the fuel tank to determine if the pump's engine fuel is low .



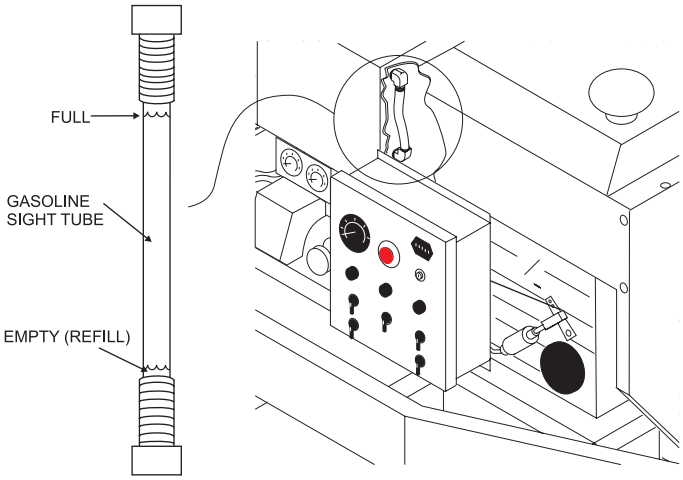


Figure 10. Fuel Sight Tube

6. If fuel is low, remove fuel filler cap and fill with ***#2 diesel fuel*** (Figure 11).

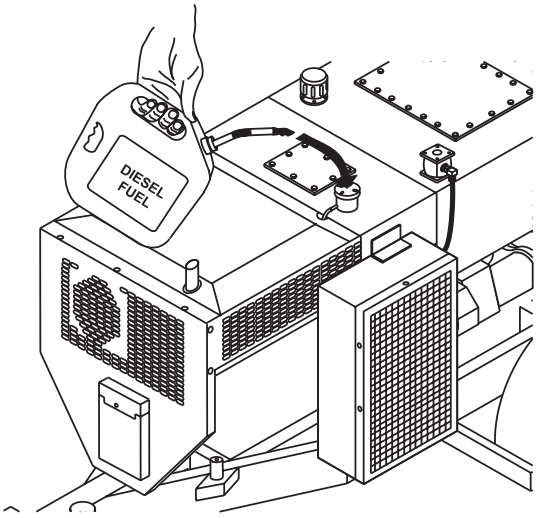


Figure 11. Adding Diesel Fuel

ENGINE OIL CHECK

7. Remove the engine oil dipstick from its holder (Figure 12).

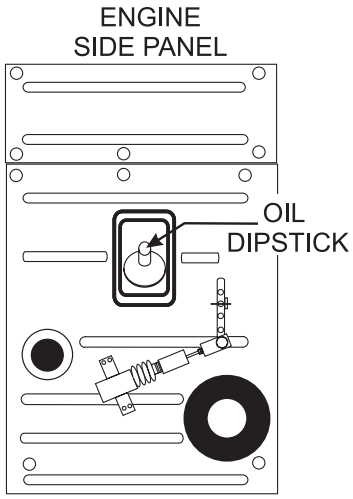


Figure 12. Engine Oil Dipstick

8. Make sure pump is placed on level ground.
9. Pull the engine oil dipstick (Figure 13) from its holder.

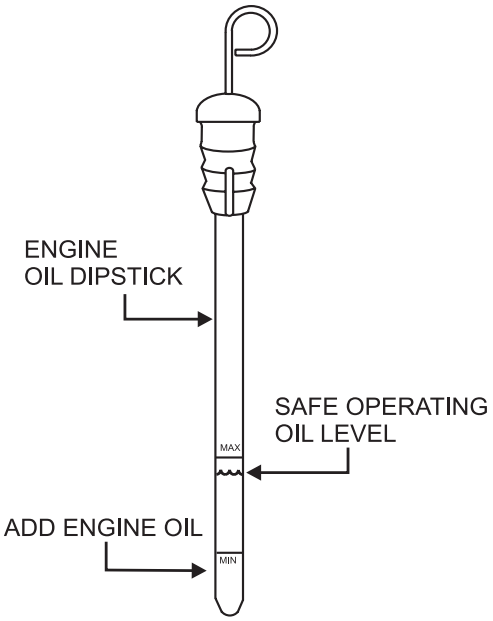
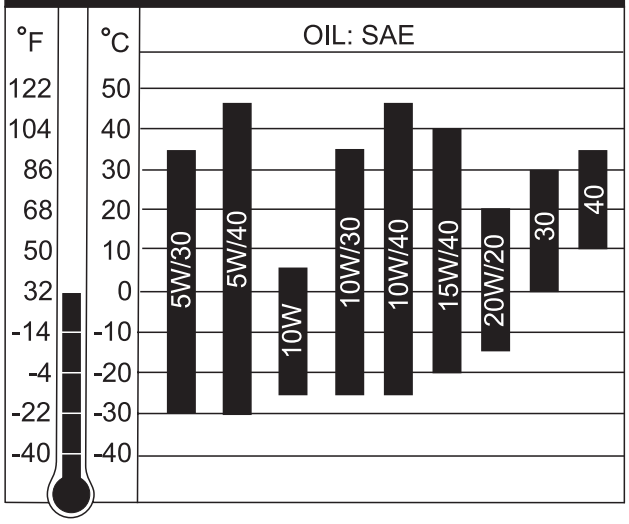


Figure 13. Engine Oil Dipstick

10. Verify that oil level (Figure 13) is maintained between the two notches on the dipstick.
11. If the pump's engine oil is low, fill engine crankcase with lubricating oil through filler hole, but **DO NOT** overfill.
12. The oil listed in Table 4 is recommended to ensure better engine performance. Use class CD or higher grade motor oil.

Table 4. Oil Selection Chart



Hydraulic Oil

13. Determine if the hydraulic oil level is low by observing the level of the oil in the **Hydraulic Oil Sight Glass** (Figure 14).

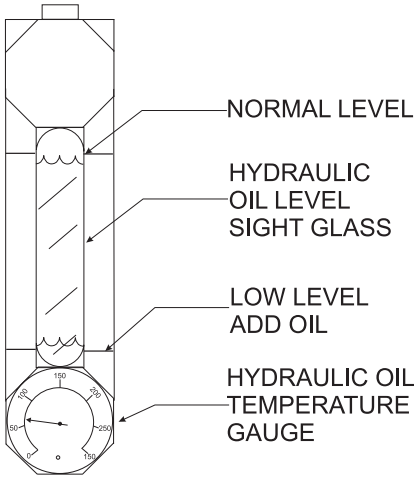


Figure 14. Hydraulic Oil Sight Glass

14. If the hydraulic oil level is low, remove the cap just above the oil level sight glass (Figure 15) and add the correct amount of hydraulic oil to bring the hydraulic oil level to a normal safe operating level. (Use Shell oil Tellus 68 or Mobil oil DFE26).

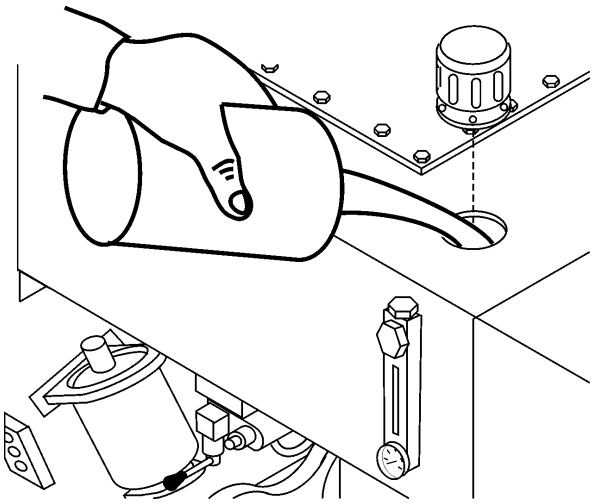


Figure 15. Hydraulic Oil Filler Hole

REAR STABILIZER STAND

To reduce excessive vibration and rocking of the ST-45 Concrete Pump, set the rear stabilizers as follows:

15. Locate both the left and right rear stabilizer stands (Figure 16).

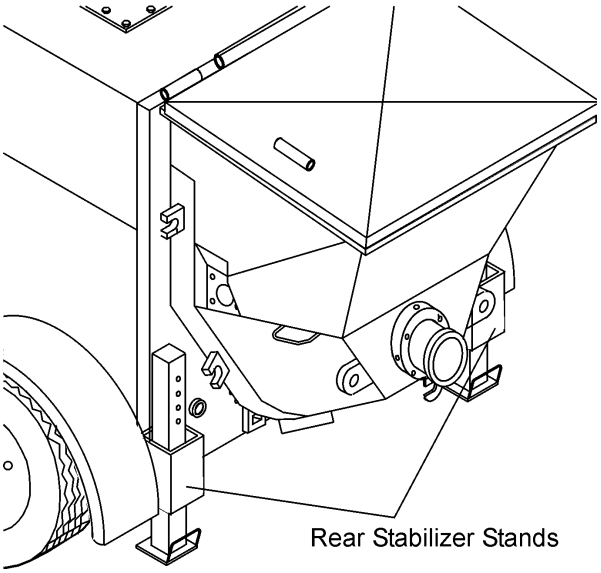


Figure 16. Locatiing Rear Stabilizer Stands

16. Remove the ***cotter pin*** from the handle tee bolt eye, and then ***pull*** the handle tee to release the stabilizer stand (Figure 17).
17. Position both rear stabilizers stands on firm (not loose) ***level*** ground (Figure 18).
18. Align the hole on the stabilizer stand with the hole on the frame body and ***insert*** handle tee bolt.
19. Insert the cotter pin into handle tee bolt eye to lock the stabilizer stand.

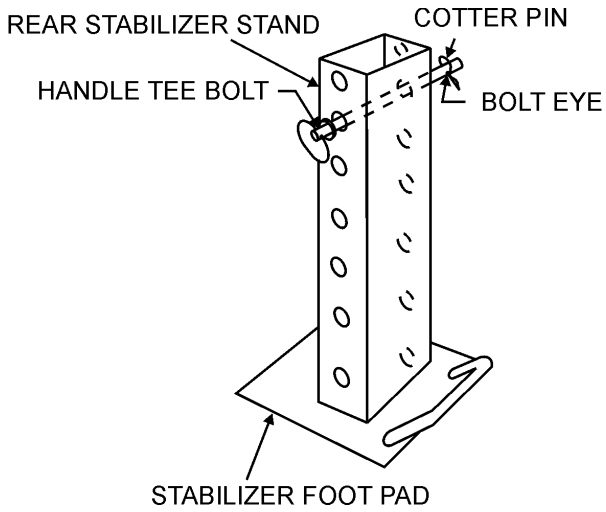


Figure 17. Rear Stablizer Stand

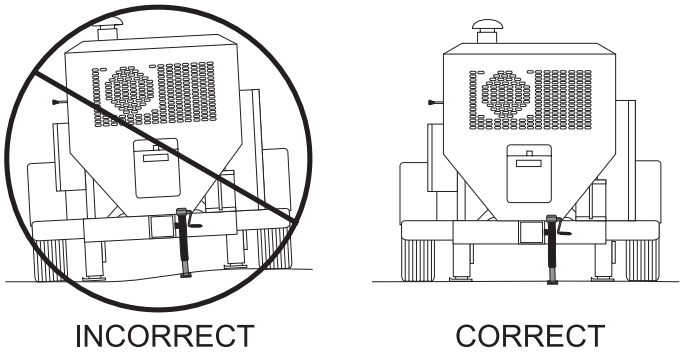


Figure 18. Rear Stablizer Stand Deployment

STARTING

CAUTION :

DO NOT attempt to operate this concrete pump until the Safety, General Information and Inspection sections have been read and understood.

EMERGENCY STOP SWITCH

1. There are 2 emergency stop switches (Figure 19). One is located on the the control box, the other is located on the other side of the pump near the heat exchanger. Both are provided for operator safety. In the event of an emergency, press either stop switch to stop the engine.

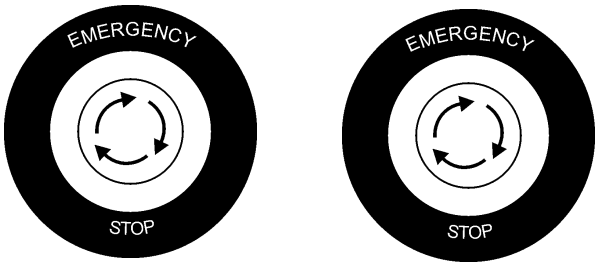


Figure 19. Emergency Stop Switch

2. Turn both Emergency Stop switches counter-clockwise (open). This will allow the engine to start.

NOTE

If either one of the Emergency Stop switches is in the "**CLOSED**" position (stop), the engine will not start. To start the engine, make sure that both Emergency Stop switches are in the "**OPEN**" position (fully extended).

NOTE

Place all switches on the Hydraulic Control Box in the "**OFF**" (**up** position).

IGNITION SWITCH

3. To start the engine, insert the key (Figure 20) into the ignition switch and turn the key to the ON position.

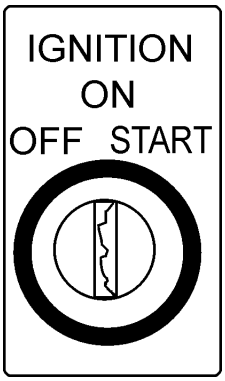


Figure 20. Ignition Switch

4. Observe that the Air Filter and Oil Pressure status indicator lights are "**ON**" (Figure 21). The Battery status indicator light should be "**OFF**."

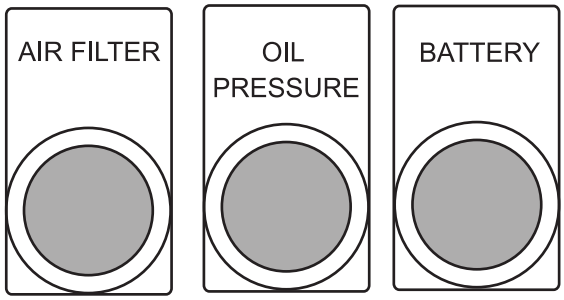


Figure 21. Status Indicator Lights

A. Turn the key to the "**START**" position and listen for the engine to start.

B. In warm weather let engine warm-up for 5 minutes. In cold weather let engine warm-up for 10 minutes.

C. The Air Filter, Oil Pressure and Battery indicator lights (Figure 21) should <u>all</u> be "**OFF**".

NOTE

If any of the status indicator lights referenced in the ignition section (step 4) are "**ON**", turn off the engine. **DO NOT** continue to run the engine.

CONTROL SWITCH

5. Turn the Pump Control switch (Figure 22) to the "**ON**" position, a ***thumping*** sound (cylinder stroke) should be heard. The thumping sound represents the number of strokes per minute (volume) of the pump.

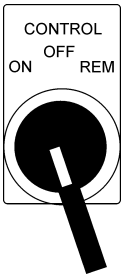


Figure 22. Pump Control Switch

6. Turn the Volume Control (Figure 23), ***lock nut*** counterclockwise (CCW) to release the volume control knob.

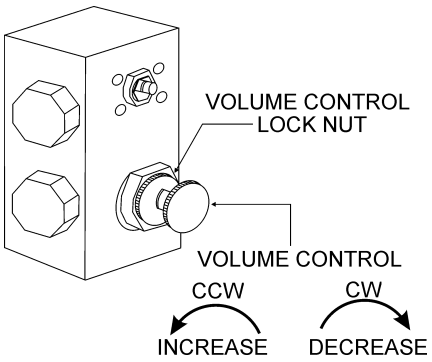


Figure 23. Volume Control

6. Use the volume control, to set the pump volume to approximately **10 strokes per minute**. Turning the volume control clockwise (CW) will ***decrease*** pump volume,and counterclockwise (CCW) will ***increase pump*** volume.

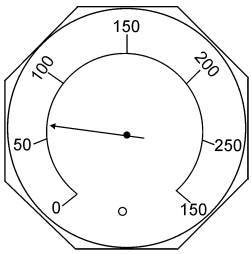
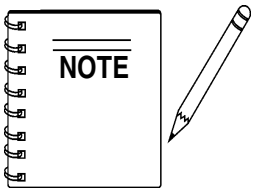


Figure 24. Hydraulic Oil Temperature Gauge

7. Let the pump cycle until the hydraulic oil temperature (Figure 24) is approximately 10°-15.6° C (50°- 60° F)



Use a wristwatch or stop watch to determine the number of pump strokes within 1 minute.

8. While monitoring the tachometer, (Figure 25) use the Engine Throttle Control to set the engine speed to 1500 RPM by following steps 8A-8C.

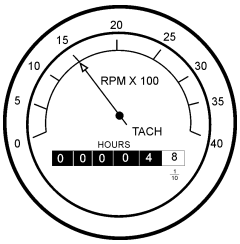


Figure 25. Engine Tachometer

A. Unlock the throttle cable. To unlock the throttle cable, turn the inner most knob counter clockwise (Figure 26.)

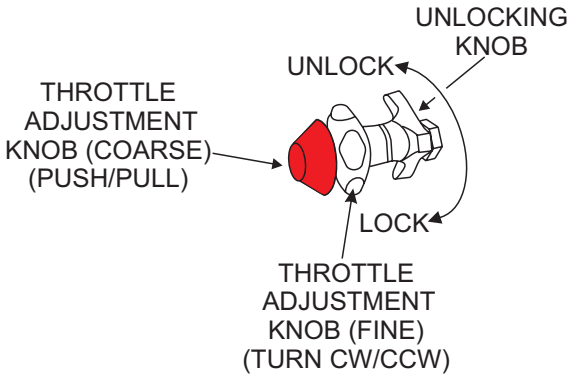


Figure 26. Throttle Control Knob (Un-locking)

B. Push the outermost button, Figure 27 (coarse adjustment) inward, then pull outward until engine RPM reaches desired speed.

C. Turn the unlocking knob (figure 26) clockwise to lock engine RPM in place.

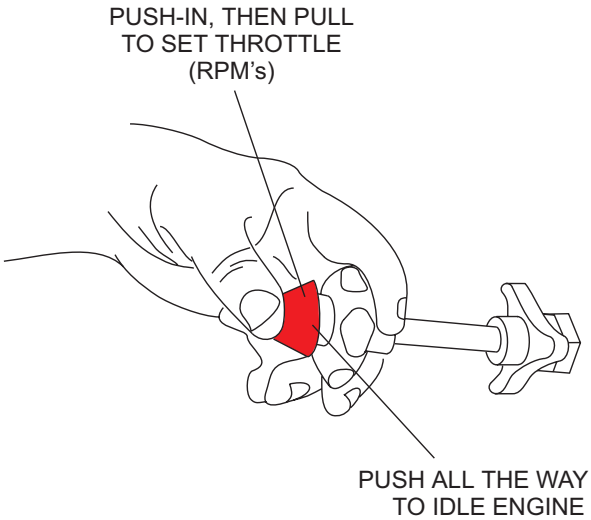


Figure 27. Throttle Control Knob (RPM Adjust)

9. Turn the Control Off switch (Figure 22) to the "**OFF**" position.

ENGINE SPEED

10. Turn the **Operation Pump/Engine** switch to the "**ENGINE**" position (Figure 28).

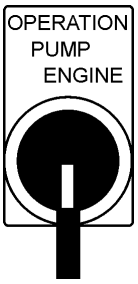
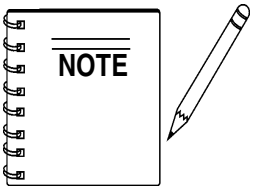


Figure 28. Operation Pump Engine Switch



The pump should not be cycling at this time. Only the **ENGINE** should be running.

11. While monitoring the tachometer (Figure 25), use the **Engine Throttle Control** to set the engine speed to 2550 RPM (maximum speed) using steps 8A-8C
12. The **Accumulator Pressure Gauge** (Figure 29) should read approximately 12.1 mPa (1,750 psi).

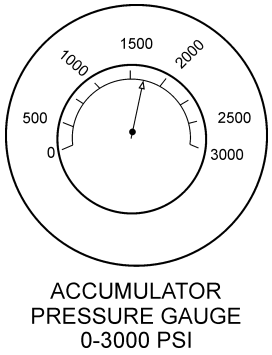


Figure 29. Accumulator Pressure Gauge

COOLING FAN

This section is intended to make sure the fan is working properly. Under normal conditions the fan should be turned on when the hydraulic oil temperature begins to approach 23.9° C (75° F).

CAUTION

If the hydraulic oil temperature exceeds 76.7° C (170° F), **shut down the pump**. **DO NOT** continue to operate the pump. Failure to shut down the pump will result in severe damage to the pump.

13. Make sure the Operation Pump/Engine switch is in the "**ENGINE**" position (Figure 28), and that only the engine is running.
14. Turn the **fan switch** (Figure 30) to the "**ON**" position and listen for fan to start.

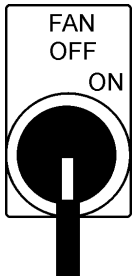


Figure 30. Fan On/Off Switch

15. Turn the **fan switch** to the "**OFF**" position and listen for fan to stop. If machine exceeds 170°F or to cool the machine down, turn the operation switch (Figure 28) back to the "**ENGINE**" position. Run engine at high RPM with cooling fan on for 10 to 15 minutes.

PRESSURE TEST

16. The Pressure Test switch (Figure 31) is a self-diagnostic test switch, that when activated will test the pressure of the system. This switch will be discussed in the maintenance and troubleshooting section of this manual.

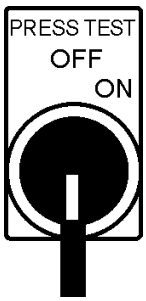


Figure 31. Pressure Test On/Off Switch

HOPPER REMIXER CONTROL

A. Located to the left of the Hydraulic Temperature gauge is the Hopper Remixer Control lever (Figure 32).
B. Turn the Operation Pump/Engine switch to the "**ENGINE**" position (only the engine should be running).

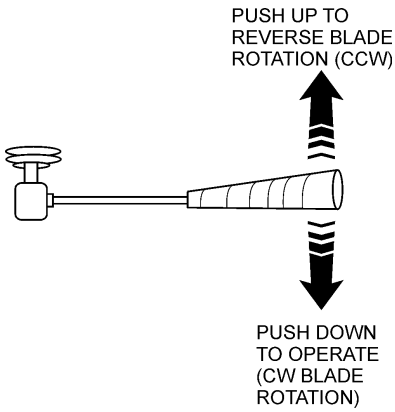


Figure 32. Hopper Remixer Control Lever

C. Push the Hopper Remixer Control lever "**DOWNWARD**" (Figure 32) and observe that the blades (Figure 33) inside the hopper are turning in a clockwise direction (forward).

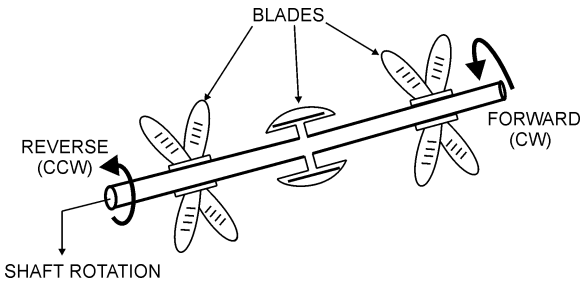


Figure 33. Hopper Remixer Blades (Rotation)

D. Push the Hopper Remixer Control lever "**UPWARD**" (Figure 32) and observe that the blades (Figure 33) inside the hopper are turning in a counter-clockwise direction (reverse).

OPTIONAL RADIO REMOTE CONTROL

14. The MAYCO ST-45 Concrete Pump has a remote control feature that allows the pump to be remotely controlled. If desired, the pump can be operated via a receiver/transmitter method (Figure 34) or a hardwire method, which utilizes a 7.62 meter (25-ft.) extension cable. The manual remote cord (Figure 35) should be installed under the main control box. Contact your MAYCO/MULTIQUIP representative for further information.

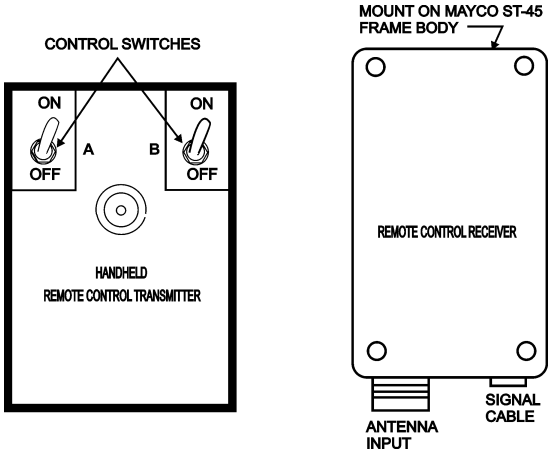


Figure 34. Handheld Receiver/Transmitter

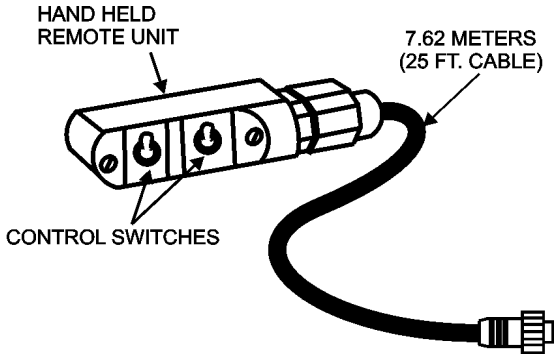


Figure 35. Handheld Remote Cable Unit

CYLINDER LUBRICATION BOX

WARNING

Before checking lubricaton level, stop the engine and remove the engine starter key. We recommend using soluble type oil (water & oil mixture). The oil level should be checked every day prior to pumping. The oil level should be maintained at a height of 12.7 cm (5 inches) or about half the concrete cylinder height.

NOTE

Important Notice! During freezing temperature after pumping, completely drain the water box and cover the hopper. Frozen liquid will restrict the piston travel and cause severe damage to the pump.

15. As the rubber piston cups naturally wear, fine cement particles will accumulate in the box. Once the concrete paste reaches a height of about 1.3 cm (1/2-inch) from the bottom. The box should be drained and cleaned. To clean, remove the drain plug located at the bottom of the box.

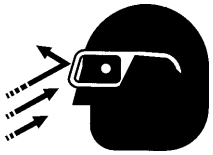
    Once the box is drained, start the engine and stroke the cylinder (keep hands out of box) ten to fifteen times. While stroking, spray water inside of the box to thoroughly clean out all contamination. When the box is clean, replace drain plug, add new lubrication and install the top cover.

Tires/Wheels/Lug Nuts

Tires and wheels are a very important and critical components of the trailer. When specifying or replacing the trailer wheels it is important the wheels, tires, and axle are properly matched.

CAUTION

DO NOT attempt to repair or modify a wheel. **DO NOT** install an inter-tube to correct a leak through the rim. If the rim is cracked, the air pressure in the inter-tube may cause pieces of the rim to explode (break-off) with great force and can cause serious eye or bodily injury.



Tires Wear/Inflation

Tire inflation pressure is the most important factor in tire life. Pressure should be checked cold before operation. **DO NOT** bleed air from tires when they are hot. Check inflation pressure weekly during use to insure the maximum tire life and tread wear.

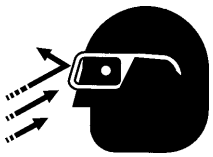
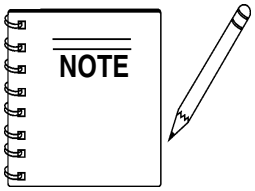


Table 5 (Tire Wear Troubleshooting) will help pinpoint the causes and solutions of tire wear problems.

TABLE 5. TIRE WEAR TROUBLESHOOTING

WEAR PATTERN		CAUSE	SOLUTION
	Center Wear	Over Inflation	Adjust pressure to particular load per tire manufacturer.
	Edge Wear	Under Inflation	Adjust pressure to particular load per tire manufacturer.
	Side Wear	Loss of chamber or overloading.	Make sure load does not exceed axle rating. Align wheels.
	Toe Wear	Incorrect toe-in	Align wheels.
	Cupping	Out-of balance	Check bearing adjustment and balance tires.
	Flat Spots	Wheel lockup & tire skidding.	Avoid sudden stops when possible and adjust brakes.



ALWAYS wear safety glasses when removing or installing force fitted parts. Failure to comply may result in serious injury.

Lug Nut Torque Requirements

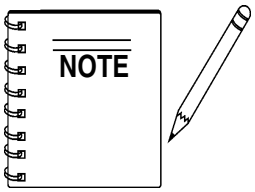
It is extremely important to apply and maintain proper wheel mounting torque on the trailer. Be sure to use only the fasteners matched to the cone angle of the wheel. Proper procedure for attachment of the wheels is as follows:

1. Start all wheel lug nuts by hand.
2. Torque all lug nuts in sequence. See Figure 36. **DO NOT** torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Tables 6 and 9.

Table 6. Lug Nut Torque Requirements

Wheel Size	First Pass N-m/FT-LBS	Second Pass N-m/FT-LBS	Third Pass N-m/FT-LBS
30.5 cm/12"	27.1-33.9/ (20-25)	47.4-54.2/ (35-40)	67.8-88.1/ (50-65)
33.0 cm/13"	27.1-33.9/ (20-25)	47.4-54.2/ (35-40)	67.8-88.1/ (50-65)
35.6 cm/14"	27.1-33.9/ (20-25)	67.8-81.3/ (50-60)	122-162.7/ (90-120)
38.1 cm/15"	27.1-33.9/ (20-25)	67.8-81.3/ (50-60)	122-162.7/ (90-120)
40.6 cm/16"	27.1-33.9/ (20-25)	67.8-81.3/ (50-60)	122-162.7/ (90-120)

3. After first road use, retorque all lug nuts in sequence. Check all wheel lug nuts periodically.



NEVER! use an pneumatic air gun to tighten wheel lug nuts.

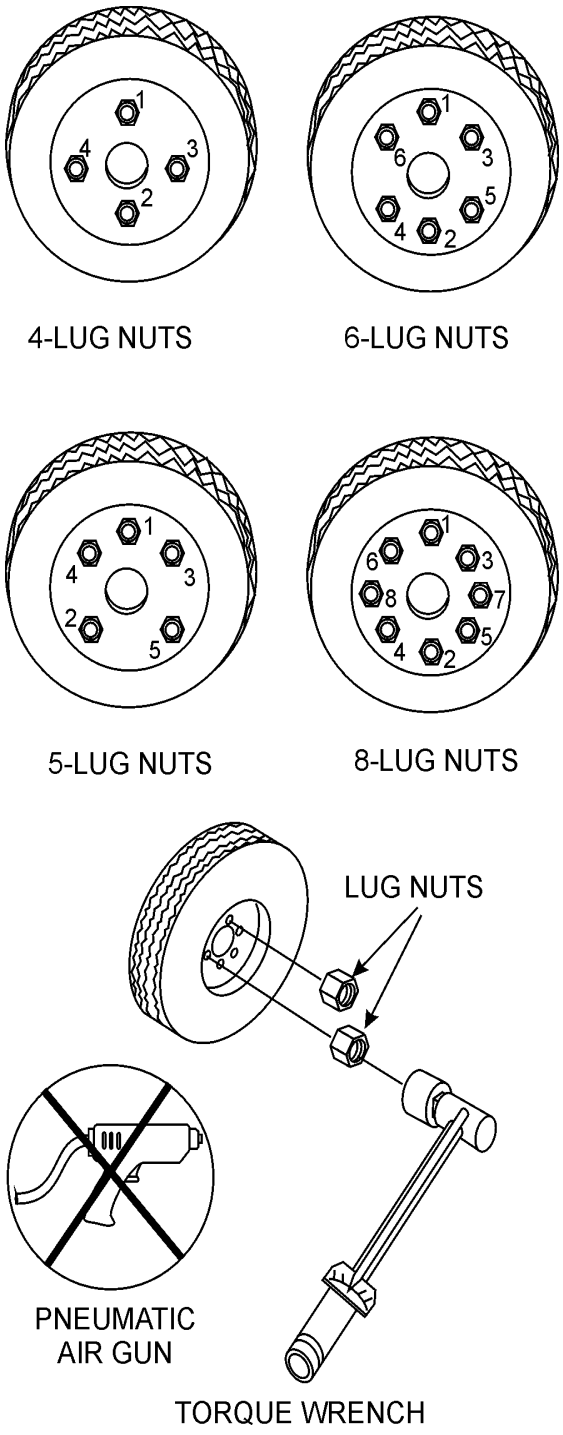


Figure 36. Wheel Lug Nuts Tightening Sequence

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RUNNING GEAR MANUFACTURERS

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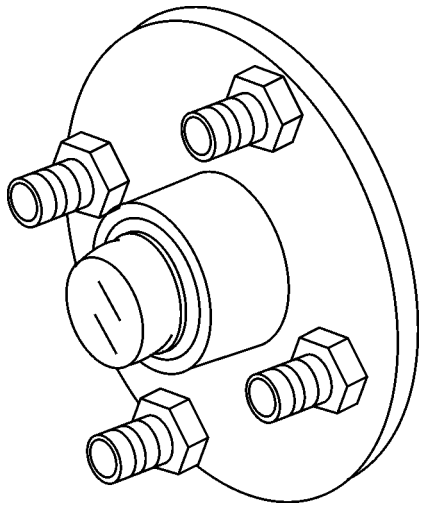
RECOMMENDED MAINTENANCE & SERVICE INFORMATION

T CHASSIS SUSPENSION AXLES AUTO-REVERSE COUPLINGS



GENERAL TRAILER INFORMATION

1.0 GENERAL INFORMATION

In order to maintain the function and safety of your trailer, only original parts of the manufacturers design must be used. Servicing should only be undertaken by qualified personnel.

1.1 TOWING LEVEL

Ideally, the trailer should be towed level (Figure 37) and not with the draw bar leaning up or down excessively. Some countries allow ± 4° from the level (approximately ±100mm) but in others it remains at the discretion of the user for safe operating conditions

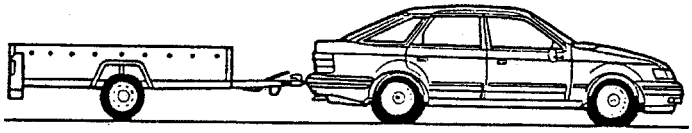


Figure 37. Towing Level

1.2 CAPACITIES

For safety, warranty and legal reasons, **DO NOT** exceed the maximum allowable fully laden mass.

On a trailer's drawbar assembly, there may be 3 ore more labels/ stampings stating the maximum masses and other parameters. It is important to be aware that the label or stamping stating the lowest maximum gross mass overrules all others; generally the label affixed to the body of the trailer by the trailer or plant manufacturer states the actual maximum, as this will allow for wheel and tyre capacities.

1.3 TYRES AND WHEELS

Within the EC, tyres must be marked with a load index (LI) and speed symbol, which designate the maximum carrying capacity per tyre at the maximum speed. See Tables 7 and 8.

For trailer use, car tyres may be given a bonus loading of 5% and commercial van tyres 10% due to the reduced speed limits that apply to trailers (in the UK 97 kmh/60 mph). However, we would generally recommend working within the load index designation to allow for the possibility of operation over the normal speed limitations.

TABLE 8. SPEED SYMBOLS

Speed Symbol	F	G	J	K	L	M	N	P	Q	R
Max MPH	50	56	62	68	75	81	87	93	100	106
Max KMH	80	90	100	110	120	130	140	150	160	170

The maximum tyre pressure marked on the tyre is usually compatible with the load index and speed symbol. If in doubt, check with the manufacturer or with us.

TABLE 7. TYRES LOAD INDEX

LI	Kg	LI	Kg	LI	Kg	LI	Kg	LI	Kg	LI	Kg	LI	Kg
67	307	78	425	89	580	100	800	111	1090	122	1500	133	2060
68	315	79	437	90	600	101	825	112	1120	123	1550	134	2120
69	325	80	450	91	615	102	850	113	1150	124	1600	135	2180
70	335	81	462	92	630	103	875	114	1180	125	1650	136	2240
71	345	82	475	93	650	104	900	115	1215	126	1700	137	2300
72	355	83	487	94	670	105	925	116	1250	127	1750	138	2360
73	365	84	500	95	690	106	950	117	1285	128	1800	139	2430
74	375	85	515	96	710	107	975	118	1320	129	1850	140	2500
75	387	86	530	97	730	108	1000	119	1360	130	1900	141	2575
76	400	87	545	98	750	109	1030	120	1400	131	1950	142	2650
77	412	88	560	99	775	110	1060	121	1450	132	2000	143	2725

1.4 CONNECTION TO TOWING VEHICLE

First, check the compatibility of your 50mm Ball Coupling or Towing Eye with the Towing Jaw/Ball connection on your vehicle. Always fit the breakaway cable or safety chain in a loop, fastening back on itself, to a substantial integral point on the towing vehicle. Ensure that the effective length is as short as possible, but still allows articulation (e.g. for cornering) without applying the brakes or tension through the chains.

WARNING

We **DO NOT** recommend the use of safety chains and a breakaway cable (Figures 38 and 39) at the same time.

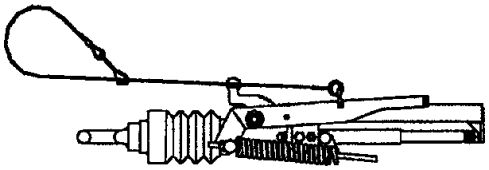


Figure 38. Breakaway Cable

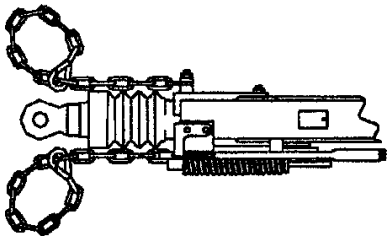
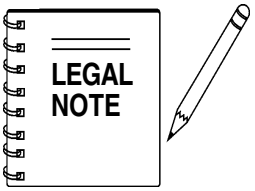


Figure 39. Safety Chains



It is legal to use safety chains up to a maximum gross trailer mass of 1500 kg.

2.0 ROUTINE CHECKS

2.1 VISUAL INSPECTION

Regular visual inspections will usually identify accidental damage if conducted systematically.

2.2 TYRE DAMAGE

It is dangerous to neglect tyre damage, and should a blister, rupture or cut to be detected, exposing the casing, or the tyre suffers a violent impact (e.g. against a curb) such that there is a risk of internal damage, it is advisable to have the tyre examined by ah specialist as soon as possible.

2.3 WHEEL DAMAGE

Wheels damaged or distorted, or having wheel nut/bolt sea tings cracked or deformed must not be repaired or used in service.
Warning: If the wheel is damaged, it is possible that the brake drum, stub axle or complete axle may have been damaged, so investigate further.

2.4 TOWING EYE, BALL HITCH & DRAWBAR ATTACHMENT

Gripping the towing eye or ball in both hands, pull back and forth, up and down, feeling for excessive movement. Replace any parts that are bent or deformed in anyway. Check the attachment of the coupling body to the drawbar and of the drawbar to the trailer/machine.

2.5 HAND BRAKE

Apply hand brake checking operation and effectiveness. If in doubt re-adjust braking system (see section 3.2)

3.0 BRAKING SYSTEM

3.1 WHEEL JACKING

On level ground, with the hand brake lever in the off position and overrun coupling draw tube shaft fully extended forwards, secure one wheel with wheel chocks. Position your jacking device behind the opposite wheel, as near to a main longitudinal chassis member as possible. Lift the wheel clear of the ground and secure with suitable axle stands.

3.2 BRAKING SYSTEM ADJUSTMENT

Where the transmission rod and brake cables are already connected, take the tension out of the system by winding back the nuts on the rod behind the compensator.

It is now possible to begin the setup procedure:

3.3 WHEEL BRAKES

These can be adjusted by means of a 17mm, 19mm, or 24mm AF Spanner (dependant on brake type) on the adjuster bolt head at the rear of the brake back plate. Reference Figures 40A, B and C.

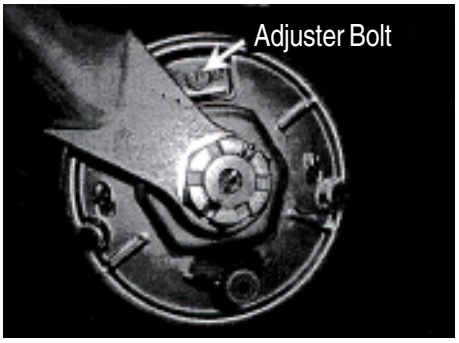
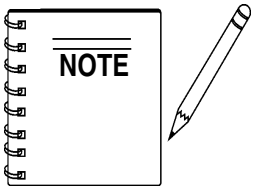


Figure 40A. Adjuster Bolt

Rotate each wheel only in the forward direction of travel, whilst tightening the bolt until the wheel locks. Then, gradually back off the adjuster nut until the wheel can rotate forwards with just a slight resistance/audible brushing of the brake drum on the brake linings (this is best adjusted with the wheel and tyre fitted to the brake drum).



If not already connected, connect the Bowden (sheathed) cables to the brakes.

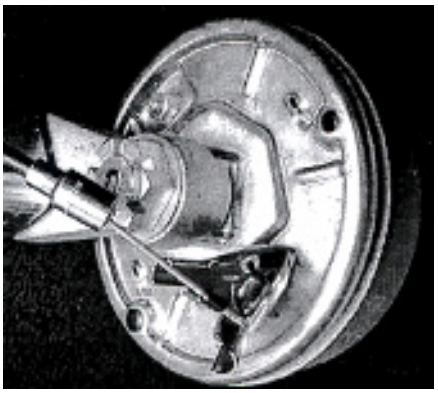


Figure 40B. Connecting Sheated Cable

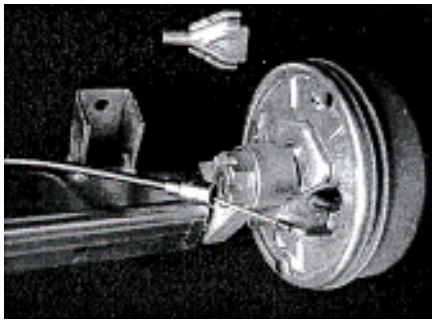


Figure 40C. Connecting Sheated Cable

3.4 COUPLING AND TRANSMISSION SYSTEM

Attach the opposite end of the outer cable to the anchor plate (Figure 41E) on the axle or draw bar, using the nut provided. Connect the inner cables to the compensator, locking the 2 plain nuts together in front of the compensator for each cable. If not already connected, attach the rear end of the brake rod to the compensator center hole.

COUPLINGS WITH HANDBRAKE MOUNTED ON COUPLING BODY (FIGURES 41A-41E)

Use the plain nuts behind the compensator to adjust, until the overrun output lever can be pulled rearwards by firm hand pressure (not loose) a maximum of 14mm (16mm for adjustable height models.) For knott couplings, there should not be any movement

Maintain the compensator at 90° to the draw bar for even distribution of force into each cable. Ensure the cables are not "kinked" or damaged.

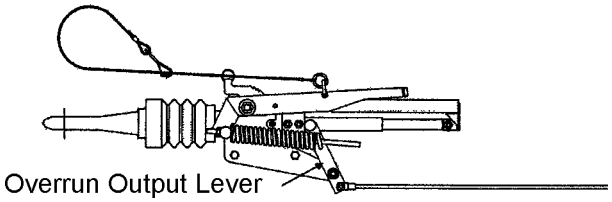


Figure 41A. Meredith & Eyre Fixed Height Coupling up to 2500 kg GVM

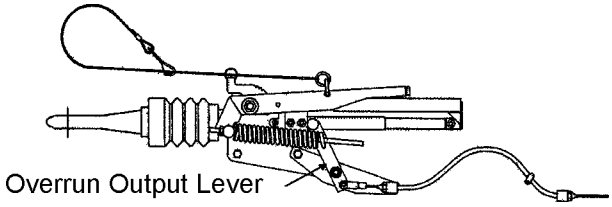


Figure 41B. Meredith & Eyre Fixed Height Coupling up to 2000 kg GVM

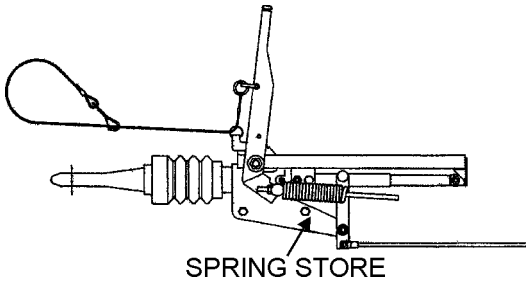


Figure 41C. Meredith & Eyre Handbrake Applied

NOTE

Spring Store now compressed

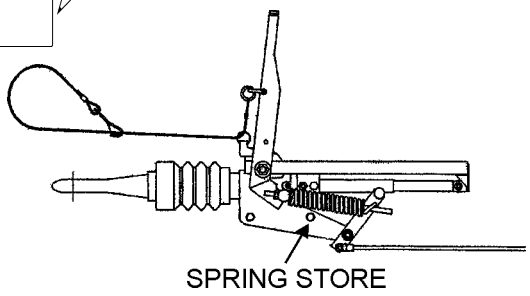


Figure 41D. Meredith & Eyre Handbrake After Automatic Activation In the Reverse Mode

NOTE

Spring Store now extended, handbrake will feel less tensioned.

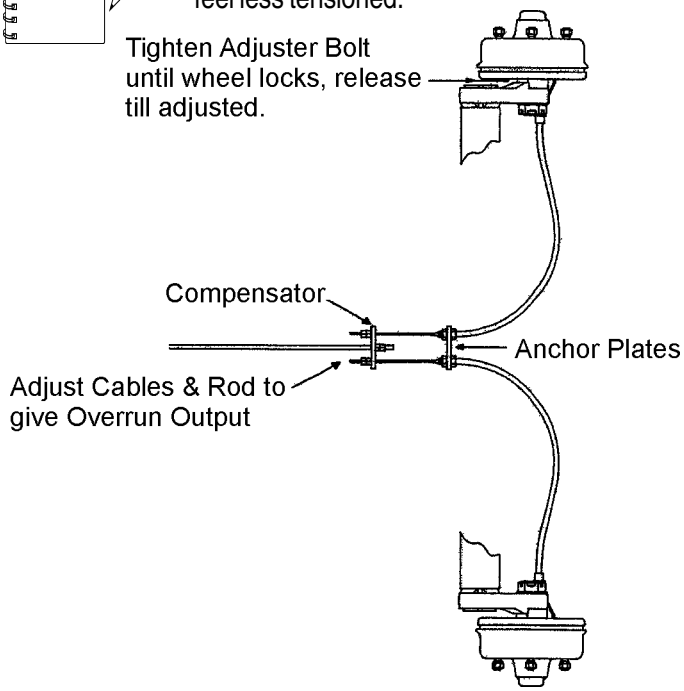


Figure 41E. Connecting Cables to Compensator Handbrake Mounted On Coupling Body

With the handbrake fully off, check that the spring store's overall length is 185 to 190 mm and is not applying a force to the U shaped guide on the side of the overrun lever. Adjusting is by the nut at the front of the assembly. This procedure should only be necessary when replacement parts have been fitted.

COUPLINGS WITH HANDBRAKE MOUNTED ON DRAW BAR (FIGURES 41F-41J)

The setup for the higher capacity couplings is similar to the above, with the exception of the setting of the handbrake spring store, which is more powerful due to the higher transmission force requirements for heavier trailers.

Use the plain nuts behind the compensator to adjust, until the overrun output lever can be pulled rearwards by firm hand pressure to a maximum of 18mm (8mm for adjustable height models).

Maintain the compensator at 90° to the drawbar for even distribution of force into each cable. Ensure the cables are not "kinked" or damaged.

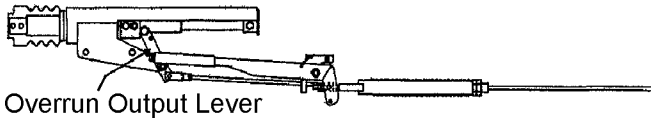


Figure 41F. Meredith & Eyre Fixed Height Coupling 2500 kg to 3500 kg GVM

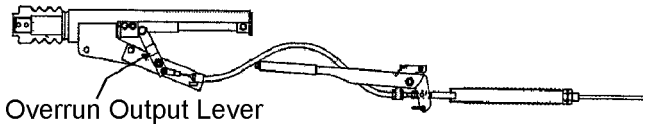


Figure 41G. Meredith & Eyre Fixed Height Coupling 2200 kg to 3500 kg GVM

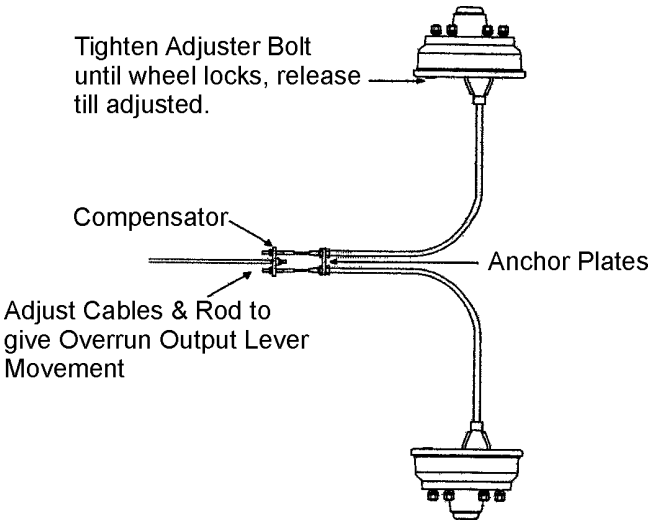


Figure 41H. Connecting Cables to Compensator Handbrake Mounted On Drawbar

With these models, the brake transmission linkage runs through the spring store, which must be set correctly to achieve automatic operation tensioning of the system.

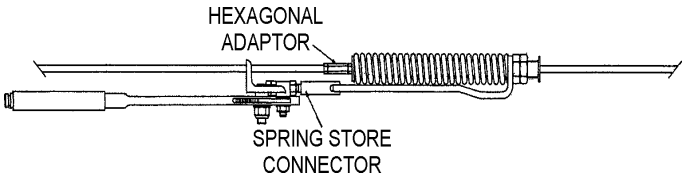


Figure 41I. Meredith & Eyre Fixed Height Coupling 2500 kg to 3500 kg GVM

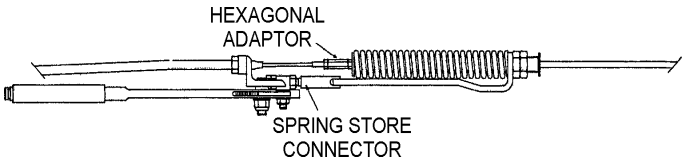


Figure 41J. Meredith & Eyre Fixed Height Coupling 2200 kg to 3500 kg GVM

Leave the handbrake and spring store connector loose while setting the overrun system as previously described. Finally, pull the spring store up to the hexagonal adaptor by sliding the spring and bracket forward. Tighten the three locking nuts on the connector.

3.5 BRAKE PARTS

Brake shoes (Figure 42) are recommended to be replaced when the lining thickness measures less than 2mm, as it is likely that they will be worn out before the next service.

Always replace both brake shoes together, regardless of the lining thickness on the other shoe. It is further advised that brake shoes should be ideally replaces as an axle set to avoid uneven braking from side to side.

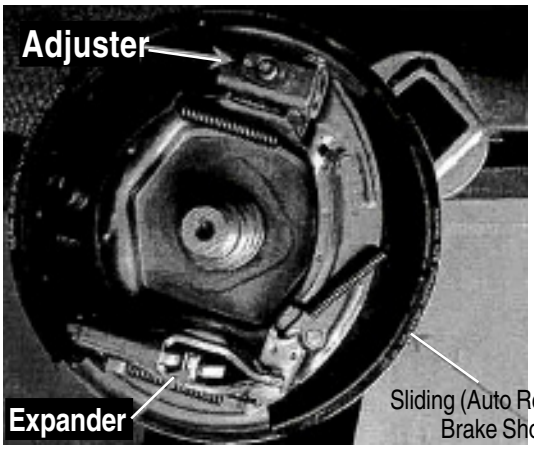
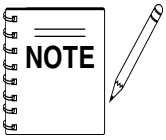


Figure 42. Auto Reverse Back Plate Assembly (Right-Hand Knott 203 x 40)



Please note position of sliding shoe relative to adjuster or expander. To function correctly the brake must be assembled in this way.

Left hand brake is a mirror image.

KNOTT COUPLINGS

Please follow the adjustment instructions in section 3.5, but do not allow for the rearward movement of the overrun output lever, which is only required on Meredith & Eyre couplings. All knott couplings (Figures 43A and 43B) operate in the same manner, so the type of housing, cast A-frame, pressed steel A-frame, or pressed steel square-tube, is irrelevant to the brake servicing.

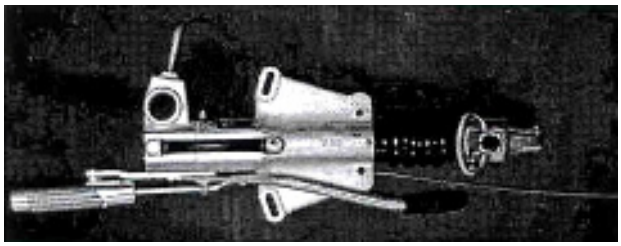


Figure 43A. Knott Cast Body Coupling

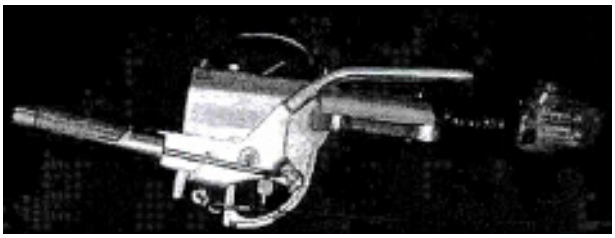


Figure 43B. Knott Cast Body Coupling

4.0 ADJUSTABLE HEIGHT DRAW BARS

4.1 HEIGHT ADJUSTMENT/TIGHTENING JOINTS
the principle of the joints is steel pegs engaging with mating dimples (Figures 44A and 44B), which can be seen between the joint plates.

While securing the assemblies, the equipment should be "rocked" as the joint pins are tightened to allow positive location.

When initially hand tight, they should be further tightened until the next visible "R" pin hole lines up for the insertion of the pin.

For reference only, the actual torque figures if checked would be approximately as follows:

- TYPE A900 135-220 Nm
- TYPE A1600 175-220 Nm
- TYPE A2400 230-300 Nm
- TYPE A3500 410-475 Nm

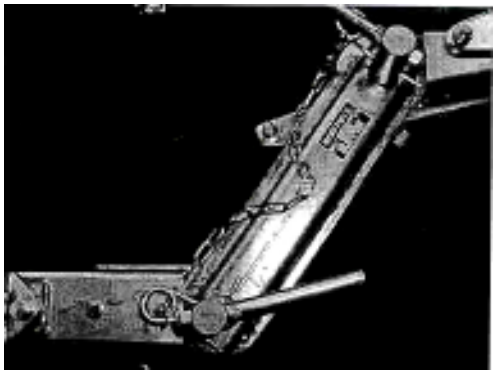


Figure 44A. Adjustable Height Draw Bar

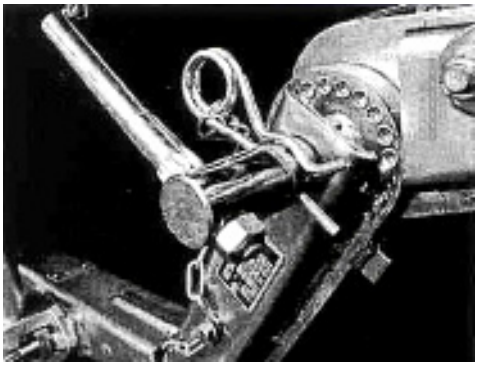


Figure 44B. Adjustable Height Draw Bar

4.1 GREASING ADJUSTABLE JOINTS

There is a grease nipple at each joint pin position

4.2 CLEANING, INSPECTING & ASSEMBLY

Dismantled the joint pins and joints. Check the condition and if serviceable clean, smear with grease and reassemble.

5.0 WHEEL HUB ASSEMBLIES

5.1 INSPECTION

Ensure the brake shoes (if braked) are clear of the drum with no interference. Clean the hub to remove any road debris.

Rotate the hub slowly – there should be no roughness or restriction.

Rotate the hub rapidly – There should be no rumble, rattle or high-pitched noises.

Rock the wheel while holding at the top and the bottom to detect essential bearing endplay. The maximum movement should be 2mm, measured at the wheel rim.

If any clearance or free movement appears to emanate from the suspension, check the axle housing for damage.

WHEEL HUB ASSEMBLIES WITH TAPER ROLLER BEARINGS

In order to re-set, remove the grease cap, split pin and set the slotted nut. See Figure 45.

It is generally accepted that a finger tight slotted nut, will result in a correct setting and running clearance for normal bearing life. Always replace the split pin with a new one when setting is complete and re-fit the grease cap.

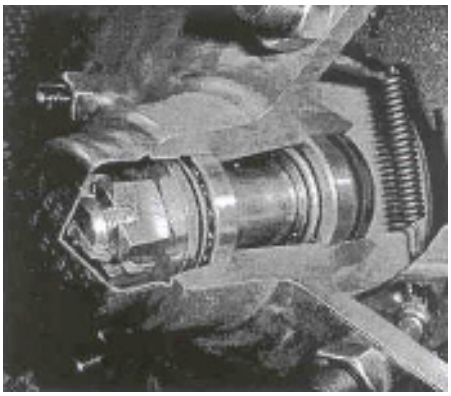


Figure 45. Grease Cap, Split Pin and Slotted Nut Removal

WARNING

It is our experience that the majority of bearing failures are the result of over-tightening of the slotted nut or failure to replace contaminated grease (e.g.: water ingress – especially salt water).

The wheel bearings are greased on assembly at the factory and should be re-greased at a minimum every 38,624 km (24,000 miles) or 2 years with axle grease “ELF Multi 2” or equivalent.

Use the service interval to inspect the bearings for wear/damage. Replace the seal if necessary, lubricating the lip and bore, not the outside diameter.

WARNING

It is as important not to **OVERPACK** the hub with grease, as it is to allow bearings to run dry.

REMOVAL OF HUB/BRAKE DRUM ASSEMBLY

Remove the wheel, grease cap, split pin, slotted nut, and washer and pull the drum off the stub axle. To avoid contamination, take care not to drop the outer bearing cone onto the floor.

5.4 WHEEL HUB ASSEMBLIES WITH UNIT BEARINGS

These hubs require no maintenance, however at intervals of 38,624 km (24,000 miles) or 12 months, the wheel hubs should be checked for side play and the complete hub replaced if necessary.

WARNING

When refitting the hub, always fit a new nut and tighten to a torque of 280Nm (206lbf.ft.)

5.5 WHEEL NUT / STUD TORQUE SETTINGS

TABLE 9. WHEEL NUT/ STUD TORQUE SETTINGS

Wheel Nuts	Nm		Lbf.ft	
	Min.	Max.	Min.	Max.
Wheel Nut 1/2 IN. UNF	70	110	50	80
Wheel Nut 5/8 IN. UNF	135	160	100	120
Wheel Nut M18 X 1.5	245	300	180	220
Wheel Studs				
Wheel Stud M12 X 1.5	65	90	50	65
Wheel Stud M14 X 1.5	120	150	90	110

6.0 OVERRUN COUPLING ASSEMBLY

The coupling is greased on assembly, but will require periodic maintenance to ensure a smooth operation of the braking system.

Re-grease the shaft bearings via the grease nipples (Figure 46), provided at 9,656 km (6,000 miles) or 6-month intervals. Also ensure correct functioning of all pivots, levers, ratchets and the spring store assembly. Grease all points of movement.

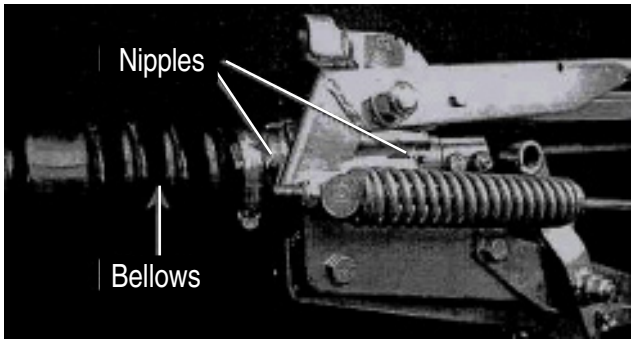


Figure 46. Meredith & Eyre Coupling with Bellows and Shaft Nipples

The hydraulic damper (Figure 47) is sealed and maintenance free but its operation should be checked if braking problems occur. If the damper is to be removed, enclose it in a strong cloth and do not stand directly in line as the damper contains oil and gas under high pressure.

To remove, release the 2 bolts at either end. The damper will need to be slightly pre-compressed to be fitted. This is normal, and ensures that the braking system works efficiently and that the trailer is towed on the drawtube, not on the damper as this would lead to premature failure.

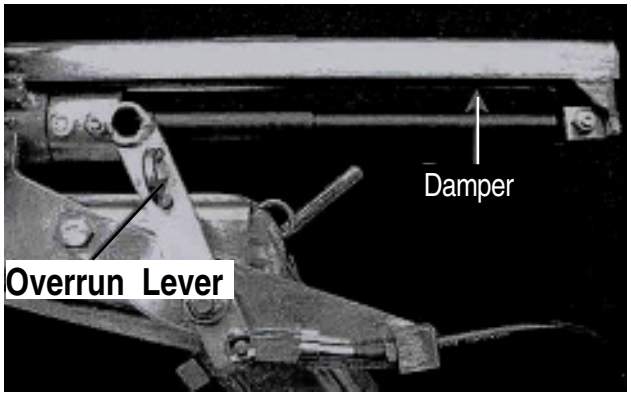


Figure 47. Meredith & Eyre Coupling with Damper and Overrun Output Lever

NOTE

Meredith & Eyre Couplings do not require for the towing ball head or eye to be removed or loosened when replacing

Meredith & Eyre Couplings do not require for the towing ball head or eye to be removed or loosened when replacing a damper

Knott Couplings have the damper attached to the rear bolt of the towing head. These dampers in these couplings require a larger amount of pre-compression when being fitted, so remove the cast L. shaped bracket, which attaches the damper to the rear of the couplings body and reassembly, this onto the new damper before assembly onto the coupling body.

7.0 STUB AXLE / BRAKE BACK PLATE

A number of Meredith & Eyre axles feature a removable stub axle, as shown in Figure 48. This design is unique to Meredith & Eyre and illustrated our desire to keep replacement costs as low as possible.

The large slotted nut on the back of the arm is torqued to 230Nm (170 lbf.ft). Removing this nut will allow the stub axle to be removed. When refitting, if the split pin cannot be fitted after torque setting the slotted nut, tighten the nut further until the next available hole is accessible

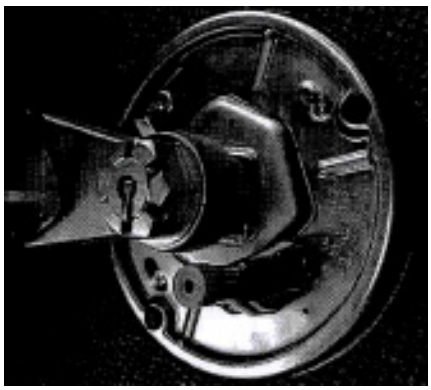


Figure 48. Meredith & Eyre Axle with Removal Stub Axle

The removal of this assembly is only necessary when the stub ale or brake back plate is to be replaced (e.g.: After an accident.) Make a note of how these parts are fitted and the position of thecable holder.

All other brakedrum components are accessed from the front via thegrease cap.

All other axles have a welded stub axle and brake back plate assembly, which cannot be replaced. In the event of damage to a stub axle, it is likely that the whole axle will need to be replaced.

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Brake System Troubleshooting (Table 10) information shown below. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.

TABLE 10. TRAILER BRAKES TROUBLESHOOTING

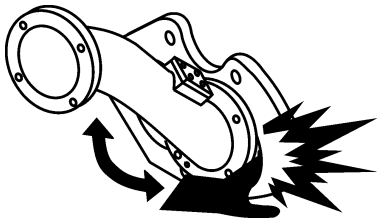
SYMPTOM	CAUSE	SOLUTION
Braking is one-sided	Incorrect brake adjustment at wheel	Adjust brakes
	Brake cable siezed	Free off or replace
	Brake lining contaminated with grease	Replace lining
Braking during mild deceleration	Coupling damper is weak or ineffective	Replace coupling
	Brakes over-adjusted	Adjust brakes
Trailer Brakes snatch when breaking	Brake cable sticking	Free off or replace cable
	Brakes under-adjusted	Adjust brakes
	Coupling damper is weak or ineffective	Replace coupling
	Drawtube sticking	Check over full stroke, lubricate if necessary
Brake Judder	Brake lining contaminated with grease	Replace brake lining
	Failure of bond between brake lining and brake shoe	Repair with new bonding agent
	Distorted or cracked brake drum	Replace brake drum
	Drums have rusty patches on braking surface	Clean with abrasive paper and wipe out
Trailer brakes lock up when reversing	Brakes over-adjusted	Adjust brakes
	Incompatibility between coupling and brakes	Consult manufacturer(s)
Trailer brakes inoperative	Brakes under-adjusted	Adjust brakes
	Brake lining contaminated with grease	Replace brake lining
	Brake cables seized	Free off or replace
	Brake linings worn out	Replace brake linings
Hot Brakes	Brakes over-adjusted	Adjust brakes
	Pull-off springs are stretched/broken	Replace pull-off springs
	Brake cables seized	Replace brake cable
Handbrake will not hol on a slope	Brakes under-adjusted	Adjust brakes
	Incorrect setting of spring store	Adjust spring store

TABLE 11. TORQUE FIGURES BY APPLICATION					
Application	Fastern Size	Nm		Lbf.ft	
		MIN.	MAX.	MIN.	MAX.
70 / 80mm Drawbar to Axle	3/8 in. UNF	40	55	30	40
90 / 100mm Drawbar to Axle	M12	90	90	65	65
Towing Eye Cross Bolts	M10	55	55	40	40
Towing Eye Cross Bolts	M12	75	75	55	55
50mm Ball head Cross Bolts	M12	75	75	55	55
M&E Coupling to 80mm Drawbar	1/2 in. UNF	50	60	35	35
M&E Coupling to 90mm Drawbar	1/2 in. UNF	55	70	40	55
M&E Coupling to 100mm Drawbar	5/8 in. UNF	60	80	45	60
Knott Coupling to Drawbar	M12	60	75	45	55

TABLE 12. GENERAL TORQUE SETTINGS FOR GRADE 8.8 FASTENERS USED WITH SELF-LOCKING NUTS				
Fastener Size	Nm		Lbf.ft	
	Min.	Max.	Min.	Max.
M8 x 1.25	25	25	17	17
M10 x 1.5	50	50	35	35
M12 x 1.75	90	90	65	65
M14 x 2.0	130	130	97	97
M16 x 2.0	200	200	150	150

TABLE 13. ST-45 MAINTENANCE CHECK SCHEDUAL						
	Daily	Hourly	Weekly	Monthly	6-Months	Operational Hours
Engine Oil	X			X		
Engine Air Filter				X		
Fuel Filter				X		
Hydraulic Oil Level	X					500 hrs.
Lubrication Box		X				
Replace Hydraulic Oil						
Clean Hydraulic Filters				X		2100 hrs.
Axle Crank	X					
Grease Shuttle Tube Zerk Points		X				2 hrs
Grease Remix Bearing	X					
Check System Pressure			X			40 hrs.
Check Hardware for Tightness			X			40 hrs.
Check Cutting Ware Ring			X			
Check Trailer Brakes Function	X					
Check Brake Lights	X					
Check Tire Conditions	X					
Inspect Saftey Devices / Decals	X					
Check Wheel Bearings					X	
Check Battery				X		
Inspect Brake Lining					X	
Visually Check for Oil Leaks	X					

DANGER



If you are required to put your hand inside the concrete cylinders or near the shuttle tube. You are at ***EXTREME RISK*** of injury or ***AMPUTATION*** if the engine is running or if pressure is in the hydraulic system.

Prior to performing any maintenance on the pump, stop the engine by turning off the ignition switch and remove the starter key. Place a "**DO NOT OPERATE**" tag over the switch and disconnect the battery. The pressure reading on the accumulator pressure gauge ***MUST*** read **ZERO**. **ALWAYS** relieve the accumulator circuit to zero pressure prior to performing any maintenance on the pump.

CLEANING THE PUMP AND DELIVERY SYSTEM

Cleaning the pump is a very important operation as it determines how the machine will pump the next time it is used.

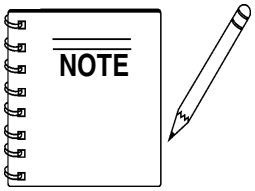
At the end of every pour, or because of long delays during a pour, the pump and delivery system must be thoroughly cleaned by removing all concrete material.

1. Following the "**Clearing Concrete Blockage**" operating procedure on page 26, ensure that there is no blockage in the hose and line or in the shuttle tube (using the **Shuttle Tube Inspection Procedure**, page 26-27). If a blockage exists, clear it.
2. Pump concrete until the opening of the concrete cylinder intake in the hopper is visible.
3. Stop the pump.
4. Carefully disconnect the first hose joint at the shuttle tube discharge elbow.

5. Add water to the hopper. Pump and flush clean the entire hopper, shuttle tube and discharge elbow with water.
6. Scoop out 30.5 cm (12-inches) of concrete from the inboard end of the delivery hose. "Cork Screw" a 15 cm x 15 cm x 20 cm (6" x 6" x 8") sponge into the end of the first hose section. Reconnect the hose to the discharge elbow.
7. Fill hopper with water. Pump until sponge and clean water come out the discharge end of the hose and line system.
8. When the Model ST-45 has been used to pump small aggregate concrete (pea rock, 1.3 cm /1/2-inch or smaller) or mixes with high fines content (60% or more sand) there will be a tendency for hardened concrete to build up on the inside surface of the shuttle tube. Therefore, at the end of every such pour, after the pump and system have been cleaned and the engine shut off, remove the shuttle tube inspection plate (follow the **Shuttle Tube Inspection Procedure**, pages 26-27) and remove all remaining concrete.
9. When the Model ST-45 has been used to pump large aggregate concrete 1.9 -3.8 cm (3/4 to 1-1/2 inches) follow the instructions in step 8 once per week.

WARNING

NEVER use muriatic acid to clean the pump. Acid will dissolve the chrome finish on material cylinder bore and main hydraulic cylinder rods.



Use only a 6.4 cm (2-½") diameter clean-out hook when back-pumping into redi-mix truck. Use a safety chain to secure the clean-out hook to some solid part of the mixer truck to prevent hook from jumping off of the drum. Run the pump at 6 strokes per minute maximum speed.

ENGINE (Hatz Model 3M41 57 HP Diesel)

The ST-45 is equipped with a Model 3M41 57 HP diesel engine. For information concerning the procedure in checking, removing, cleaning, etc. of the various engine parts or any other information on the engine not contained herein, refer to the engine manufacturer's instruction manual.

HYDRAULIC OIL SYSTEM MAINTENANCE

1. When changing the hydraulic oil or topping off the reservoir, use only the following type. (Reservoir capacity is 220 liters/ 58 gal.)

Hydraulic oil: Shell Oil Tellius 68, Mobil DFE 26, Texaco Rand HDC or equavalent.

This Mayco.Multiquip pump is equipped with an in-tank return hydraulic filter with a 10 micron cleanable filter. The element has been designed to remove all particles large enough to cause wear and job break down. Under normal conditions, we recommend replacement every 6 month.

WARNING

DO NOT mix oil brands! This may impair quality.

The most important factor to keep in mind is the effect of cold weather on the hydraulic oil. The viscosity (thickness) of the hydraulic oil will be much heavier.

Always run machine until oil temperature reaches a minimum of 10°C (50°F). before pumping. Damage to the main piston pump will occur if the machine is cycled too fast before the oil temperature reaches the minimum of 10°C (50°F). Cycle the machine at 6-8 strokes per minute at approximately 1/3 throttle.

In areas where the weather normally remains under 10°C (50°F)., use Shell Oil Tellus – 46, or the equivalent. The above steps must be followed or severe damage to the main axial piston pump will be the end result.

2. Lubrication: Grease daily/Hour

- Main hydraulic cylinders - 2 Place
- Remix bearings - 2 Place
- Axle crank - 1 Place
- Suttle cylinders - 2 Place
- "S" tube outlet flange - 3 Place

Grease Type: Lithium Based EP
Texaco Multitak 20
Lubriplate ED-2 or Equavalent

BATTERY MAINTENANCE

Mishandling of the battery shortens the service life of the battery and adds to maintenance cost. When handling the battery do the following:

- Be careful not to let the battery electrolyte come in contact with your body or clothing.
- Always wear ***eye protection*** and ***rubber gloves***, since the battery contains sulfuric acid which burns skin and eats through clothing.
- Always check the battery terminals periodically to ensure that they are in good condition.
- Use wire brush or sand paper to clean the battery terminals.
- Always check battery for cracks or any other damage. If white pattern appears inside the battery or paste has accumulated at the bottom, replace the battery.
- If the pump will not be in operation for a long period of time, store in cool dry place and check the battery charge level every month to maintain the performance of the battery.

CAUTION :

Wear ***safety glasses*** or ***face mask***, **protective clothes,** and **rubber gloves** when working with battery.

- Check the battery regularly and make sure that each electrolyte level is to the bottom of the vent well (Figure 49). If necessary add only distilled water in a well-ventilated area.

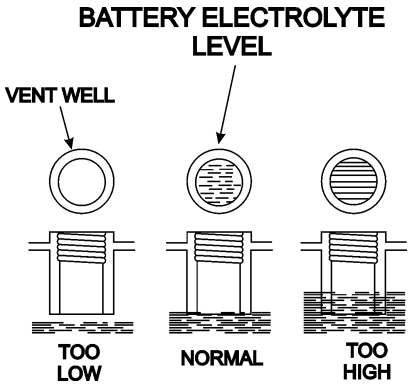
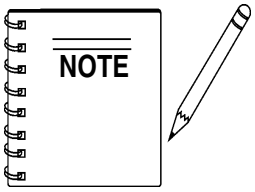


Figure 49. Battery Electrolyte Levels

BRAKE SYSTEM

The brake system should be periodically checked. Look for fluid leaks worn or cracked hoses. Check the reservoir for proper fluid levels. Make sure that all links and pivots are kept lubricated. See Table 13 for troubleshooting tips.

1. Keep all links and pivots lubricated to prevent rusting and ensure ease of operation. Using SAE 30 oil or equavalent, lubricate inside the release handle and inside the actuator body. This can be reached from the underside of the actuator.



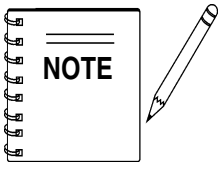
If equipped, lubricate the hitch ball with conventional automotive grease or a lubricant made for hitch balls.

2. Check for any leaks in the brake system. Periodic checks should be made on all hoses to guard against cuts and worn hoses which may cause failure (leaks, rupturing under pressure, and collapsing). Replace defective hoses.

CAUTION

DO NOT fill the master cylinder reservoir with used brake fluid. **DO NOT** fill the reservoir beyond 1.3 cm (1/2-inch) from top. **DO NOT** overfill; brake fluid will damage paint.

3. Check the brake fluid level in the master cylinder reservoir. Keep it filled to within 1.3 cm (1/2-inch) from the top of the reservoir.
4. At the beginning of each year, inspect the brakes for excessive wear, replace the linings if necessary.



Wheel bearings and seals should be inspected and packed at this time.

ST45 PRESSURE SETTING SEQUENCE

To set ***maximum*** pump pressure:

1. With the engine turned "**OFF**", loosen the 6.4 mm (1/4-inch) hydraulic hose attached to the compensator valve located on the top of the Main Delta Q Pump.

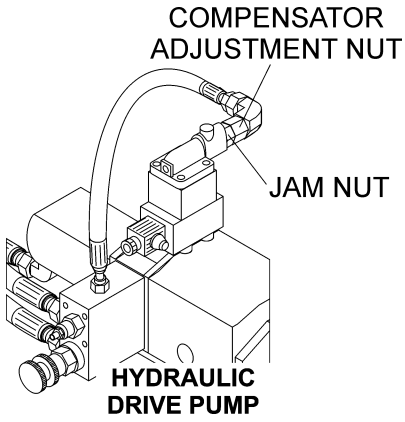


Figure 50. Compensator Valve

2. Loosen the ***jam nut*** located on the end of the compensator valve (Figure 50).
3. Turn the ***compensator adjustment nut*** (Figure 50) ***clockwise*** until tight. Tighten the 6.4 mm (1/4-inch) hose leading to the compensator.
4. Start the engine and loosen the jam nut located on the ***maximum relief valve cartridge*** (Figure 51).
5. Run the engine at maximum RPM (2,550) and turn the volume control knob ***counter-clockwise*** to maximum volume position (Figure 51).

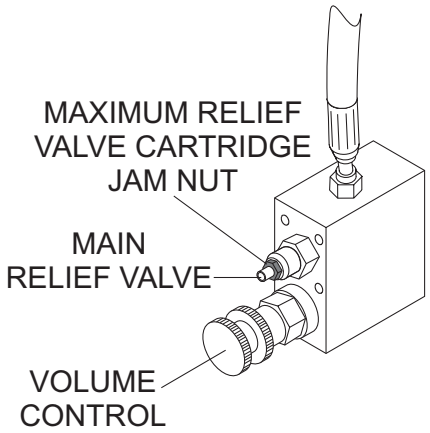


Figure 51. Hydraulic Drive Pump Manifold

6. On the control box, turn the ***pump control switch*** (Figure 22) and the ***test switch*** (Figure 31) to the "**ON**" position. Using an allen wrench, adjust the ***main relief valve*** (Figure 45) to **24.13 mPa (3,500 PSI)**. The reading can be taken from the ***pumping pressure gauge*** (Figure 52).
7. Hold the main relief valve adjusting bolt with a wrench and tighten the jam nut. Using the test switch, double check the pressure reading to make sure the setting has not changed.

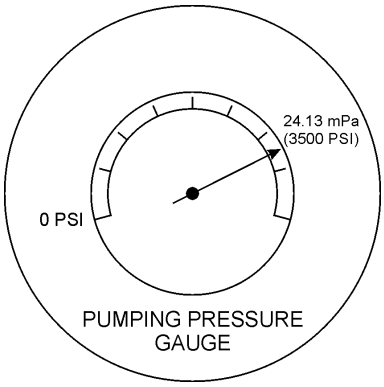


Figure 52. Pumping Pressure Gauge

8. Turn the engine off and loosen the hose from the compensator valve. Loosen the jam nut and turn the ***compensator adjustment nut*** (Figure 50) ***counter-clockwise*** **½ turn**. Tighten the 6.4 mm (1/4-inch) hydraulic hose.
9. Start engine and run at maximum RPM with volume control at maximum volume (fully ***counter-clockwise***). Turn the ***pressure test switch*** (Figure 31) to the "**ON**" position. The pumping pressure gauge should now read **22.75 mPa (3300 PSI)**. It may be necessary to repeat the above steps to achieve the proper pressure settings. After the adjustment, make sure the compensator valve jam nut is locked tight.

CYLINDER LUBRICATION BOX

CAUTION

Before checking lubrication level, stop the engine and remove the ignition key.

1. The lubrication level should be checked everyday prior to pumping and maintained at a height of 12.7 cm (5 inches) or about half the concrete cylinder height. We reccomend a using a soluble type oil (water & oil mixture)

NOTE

Important notice! During freezing temperatures, completely drain the Lubrication Box and cover the hopper after each use. Frozen liquid will restrict the piston travel and cause damage to the pump.

2. As the rubber piston cups naturally wear, fine cement particles will accumulate in the box. Once the concrete paste reaches a height of about ½ inch from the bottom of the box, drain and clean the lubrication box.

CLEANING THE LUBRICATION BOX

1. Remove the top cover and the drain plug (Figure 53) located at the bottom of the box and fully drain the inside of the box.
2. Once the box is drained, start the engine and stroke the cylinder (***keep hands out of box***) ten to fifteen times.
3. While stroking, spray water inside of the box to thoroughly clean out all contamination (Figure 53).
4. When the box is clean replace drain plug, add new lubrication and install the top cover.

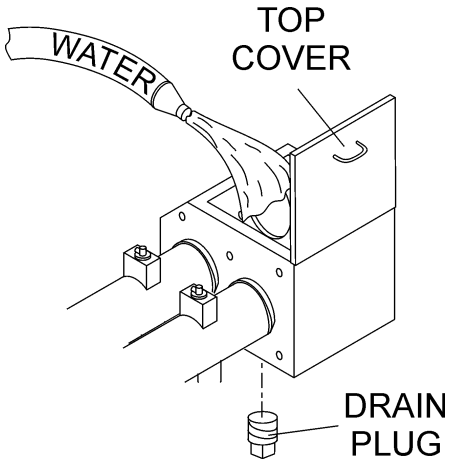
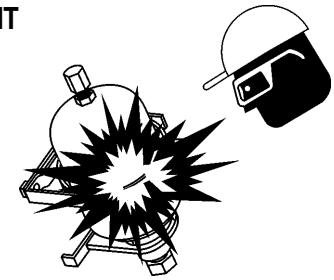


Figure 53. Cleaning the Lubrication Box

ST45 ACCUMULATOR CIRCUIT

DANGER



Improper accumulator charging can result in an explosion causing serious injury or death! **NEVER** use oxygen or compressed air to charge the accumulator! Only qualified personal should perform this procedure. Use only ***dry nitrogen*** to charge the accumulator. Contact your Mayco service department or your local Hydac representative for proper charging procedure.

The accumulator circuit has two functions in the hydraulic system.

- The accumulator circuit furnishes the hydraulic pressure to cycle the shuttle tube.
- The accumulator circuit also furnishes the pilot pressure necessary to activate the hydraulic system.

The accumulator circuit is equipped with a bladder type accumulator (Figure 54) charged with **7.58 mPa (1,100 psi)** of dry nitrogen. The accumulator stores 3.78 liters (1 gallon) of hydraulic oil, which is, under **12.07 mPa (1,750 psi)** of pressure.

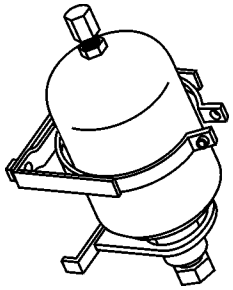


Figure 54. Accumulator

When the pump cycles, a part of the stored oil is released to the shuttle cylinder. This pressure release assures the shuttle tube has enough force to shear the cylinder of concrete passing from the concrete cylinder to the concrete delivery line during the cycle phase.

CHECKING ACCUMULATOR BLADDER PRESSURE

The normal accumulator charge pressure should be approximately **7.58 mPa (1,100 psi)**. To check the accumulator pressure:

1. Start the engine and stroke the pump. The ***accumulator pressure gauge*** (Figure 29) should read **12.07 mPa (1,750 psi)**.
2. To determine the **actual** accumulator PSI, stop the engine and observe the pressure gauge. As the PSI reading slowly decreases, it will reach a point where there will be a sudden drop in the PSI. The PSI reading should be taken just prior to this sudden drop. If you do not read 1100 PSI, the accumulator may require charging or bladder replacement.

SETTING PRESSURE IN THE ACCUMULATOR CIRCUIT

1. Attach a ***20.68 mPa (3,000 psi)test gauge*** (Mayco P/N 98016) to port ***G2*** of the main manifold block (Figure 55).

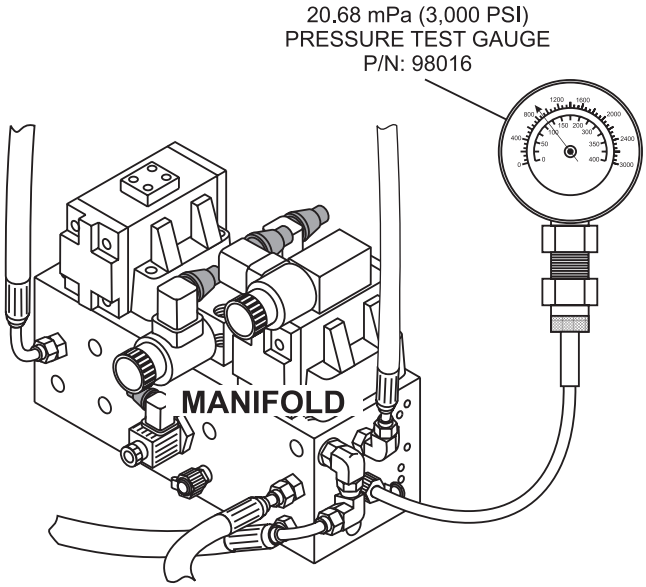


Figure 55. Accumulator Circuit Pressure Test Gauge

2. Loosen the lock nut on the ***unloading valve cartridge*** (Figure 56) and using an allen wrench, turn the adjusting screw ***clockwise*** until it is completely closed.

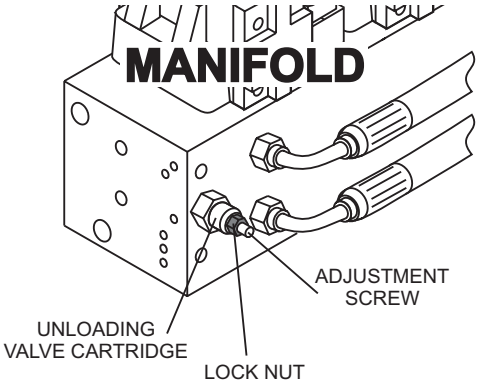


Figure 56. Unloading Valve Cartridge Adjustment

3. Turn the ***pump control switch*** (Figure 22) to the "**ON**" position and run engine at **2,550 RPM**.

4. Loosen the lock nut for the the accumulator circuit ***pilot relief valve cartridge*** (Figure 57), located at port ***G4***. Using an allen wrench, turn the adjusting screw until pressure gauge reads **13.44 mPa (1,950 psi)** and tighten lock nut. Turn the engine off and on several times to make the pressure continues to read 13.44 mPa (1,950 psi).

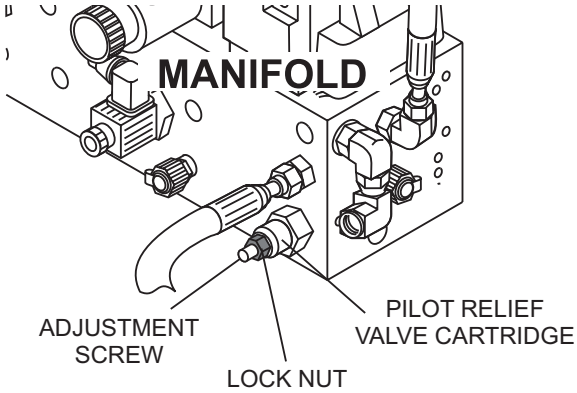


Figure 57. Pilot Relief Valve Cartridge Adjustment

5. Turn the ***unloading valve cartridge*** adjusting screw ***counter-clockwise*** until the pressure reaches 12.07 mPa ***(1,750 psi)*** on the accumulator pressure gauge (Figure 29). Start and stop the pump several times to make sure the accumulator circuit pressure is holding at 12.07 mPa (1,750 psi).

6. Tighten the lock nut on the unloading valve cartridge. Your accumulator circuit pressure should now be properly adjusted.

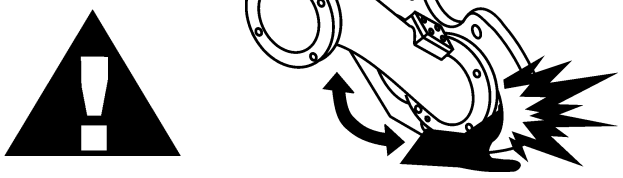
CHANGING THE CONCRETE CYLINDER PISTON CUPS

The Rubber piston cups will occasionally require replacement depending on the following factors.

- The fluid level and cleanliness of the lubrication box.
- The size and type of aggregate.
- The type of concrete being pumped.

It is time to replace the cups when increasingly large particles of sand and cement pass into the lubrication box. Do not allow the cups to become so worn that they begin to pass lubrication into the material cylinders. If the liquid level of the lubrication box becomes to low, the rubber cups will severely deform due to excessive heat. Whenever replacement is due, both cylinder cups should be replaced.

WARNING

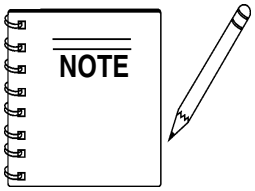


ALWAYS relieve the accumulator circuit to **ZERO** pressure prior to performing any maintenance on the pump.

CYLINDER CUP REPLACEMENT PROCEDURE

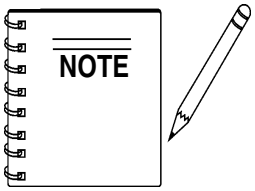
1. Remove the two hydraulic hoses (Hopper Assy., Item 34) connected to the remix motor. Plug the ports with fittings(not provided) to prevent hydraulic hose leakage.
2. Remove the hopper discharge nipple (Hopper Interior Assembly, Item 21) and loosen sleeve seal. Inspect and replace if wear is excessive.
3. Remove the two tie rod nuts (Hopper Attachment, Item 19) and the four eyebolt nuts (Hopper Attachment, Item 22) securing the hopper to the pump frame.
4. Using an approved lifting device, remove the hopper (Hopper Assy, Item 1) using extreme care not to damage the hopper seal (Hopper Assy, Item 2).
5. Start the engine and turn on the pressure test switch (Figure 31). Cycle pump in reverse until hydraulic system obtains maximum pressure, then turn pump and engine off.

   Remove ignition key and disconnect battery. **Think safety!** Check the hydraulic gauges (Figure 29) on pump and make sure accumulator pressure reads zero. One piston should be in the fully discharged position at the end of the concrete cylinder.
6. Remove the three 3/8 – 16 x 3" bolts (Lubrication Pistons Assy, Item 20) from the piston. Remove the front faceplate (Lubrication Pistons Assy, Item 19).
7. Install two the 3/8' 16x3" bolts (Lubrication Pistons Assy, Item 20) back into the piston – do not tighten. Use the two bolts as leverage to remove the rubber piston cup (Lubrication Pistons Assy, Item 17) and rear components.
8. Obtain two 3/8 16x7" full thread studs (these studs will be used to assist in assembly alignment) insert the two studs into the piston adapter P/N 16460. Coat the concrete cylinder with grease.
9. The new "O" ring (Lubrication Pistons Assy, Item 12) must now be modified. Using a sharp knife cut four oil passage grooves into the ring. the grooves should be placed at a distance of 90° apart. The cut should be a v-shaped design, 1.49 mm (0.05 inches) deep and 4.0 mm (0.157 inches) wide at the top.
10. Install the "O" Ring P/N 14407 around the oiler plate (Lubrication Pistons Assy, Item 13). Install the plate into the concrete cylinder utilizing the studs for alignment.
11. Install the felt holder (Lubrication Pistons Assy, Item 14) over the oiler plate. Install felt ring (Lubrication Pistons Assy, Item 15) into felt holder. Install the bronze ring (Lubrication Pistons Assy, Item 16)



Felt ring must be saturated with 30 wt. oil prior to installation.

12. Using silicon sealant place a small bead of sealant material on the front of the rubber piston cup and the rear of the face plate. Install over alignment studs and into concrete cylinders.
13. Insert one 3/8" 16x3" bolt into the open bolt hole, remove the alignment studs one at a time and install the remaining 3/8" 16x3" bolts.



Before installing 3/8" bolt, coat the back of bolt heads with silicon sealant. Torque all three bolts equal at 74.56 N-m (55 ft. lbs.) each.

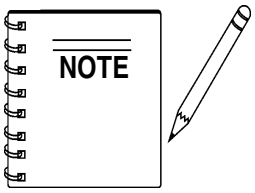
CHANGING THE WEAR PLATE AND RING

Due to the swinging motion of the Nun-plate and the abrasive nature of concrete, it is normal for the cutting ring to wear on the side that shears through the concrete inside the hopper. If the wear ring and wear plate do not fully seat against each other the concrete slurry will pump into the hopper. This condition can be easily observed by the sudden change of the level of concrete inside the hopper during each stroke.

Wear Plate and Ring Replacement Procedure

1. Remove the two hydraulic hoses (Hopper Assy., Item 34) connected to the remix motor. Plug the ports with fittings(not provided) to prevent hydraulic hose leakage.
2. Remove the hopper discharge nipple (Hopper Interior Assembly, Item 21) and loosen sleeve seal. Inspect and replace if wear is excessive.
3. Remove the two tie rod nuts (Hopper Attachment, Item 19) and the four eyebolt nuts (Hopper Attachment, Item 22) securing the hopper to the pump frame.
4. Using an approved lifting device, remove the hopper (Hopper Assy, Item 1) using extreme care not to damage the hopper seal (Hopper Assy, Item 2).
5. Remove the four 1/2" 1-¼ " bolts (Hopper Interior Assy, Item 43) that hold the shuttle tube to the nun-plate and remove shuttle tube (Hopper Interior Assy, Item 41).

   Using two small pry bars remove the rubber energizer ring (Hopper Interior Assy, Item 13B), steel insert ring (Hopper Interior Assy, Item A) and wear ring (Hopper Interior Assy, Item 13).



The energizer ring and wear ring will normally have concrete contamination holding them in position. It will be required to chip some of the concrete loose to better expose the energizer ring.

6. Clean out all concrete build up in and around the nun-plate area with a wire brush.
7. Inspect the wear components for indications of wear. The wear plate (Hopper Interior Assy, Item 52) has two wear surfaces. If it becomes necessary to replace, the plate can be reversed to the opposite side to expose a new flat surface. To replace or reverse the plate, remove the five allen head counter sink bolts. Then remove the two cylinder "O" rings and clean the entire back surface.

Wear Plate Installation

1. Install the two cylinder "O" rings (Hopper Interior Assy, Item 10).
2. Using silicon sealant, coat the circumference of the concrete cylinders, the back of the wear plate and around the five bolt holes. Next, install the wear plate and the five bolts. The bolts must all be equally snugged and tightened to (136-N-m (100 ft. lbs) each.

Wear Ring installation

1. Install the wear ring (Hopper Interior Assy, Item 13) into the nun plate.
2. Install the steel insert ring (Hopper Interior Assy, Item A) inside of the rubber energizer ring (Hopper Interior Assy, Item 13B).
3. Install the energizer ring assembly into the nun-plate.

After installing the above mentioned components the machine can be re-assembled by reversing steps 1 through 5 of the Wear Plate and Ring Replacement Procedure.

EMERGENCY STOP SWITCH FUNCTIONAL TEST

There are 2 emergency stop switches on the ST-45 concrete pump. Follow the procedure below to test the switches to make sure that they are both working correctly.

1. Start the pump as outlined in the start-up procedure.
2. Let the engine run for a few minutes.
3. While the engine is running, press the **RED** emergency stop pushbutton switch on the control box.
4. Verify that the engine has **STOPPED**. If the engine has stopped it can be determined that the emergency stop circuit is functioning correctly.
5. If the engine continues to run after the emergency stop switch has been activated, turn the ignition switch key to the **OFF** position and correct the problem using the wiring diagrams provided in the manual.
6. Pull and turn clockwise the emergency stop switch on the control box. This will allow the engine to be started again.
7. Repeat steps 1 through 5 for the **RED** emergency stop switch on the other side of the pump, located near the heat exchanger.

PROXIMITY SWITCH FUNCTIONAL TEST

There is one proximity switch located near the hopper grate. The purpose of this switch is to stop the engine in the event the grate is lifted during operation of the pump.

Follow the procedure below to test the proximity switch to make sure it is working correctly.

1. Remove the two U-clamps that secure the hopper grate to the hopper. This will allow the grate to be lifted.

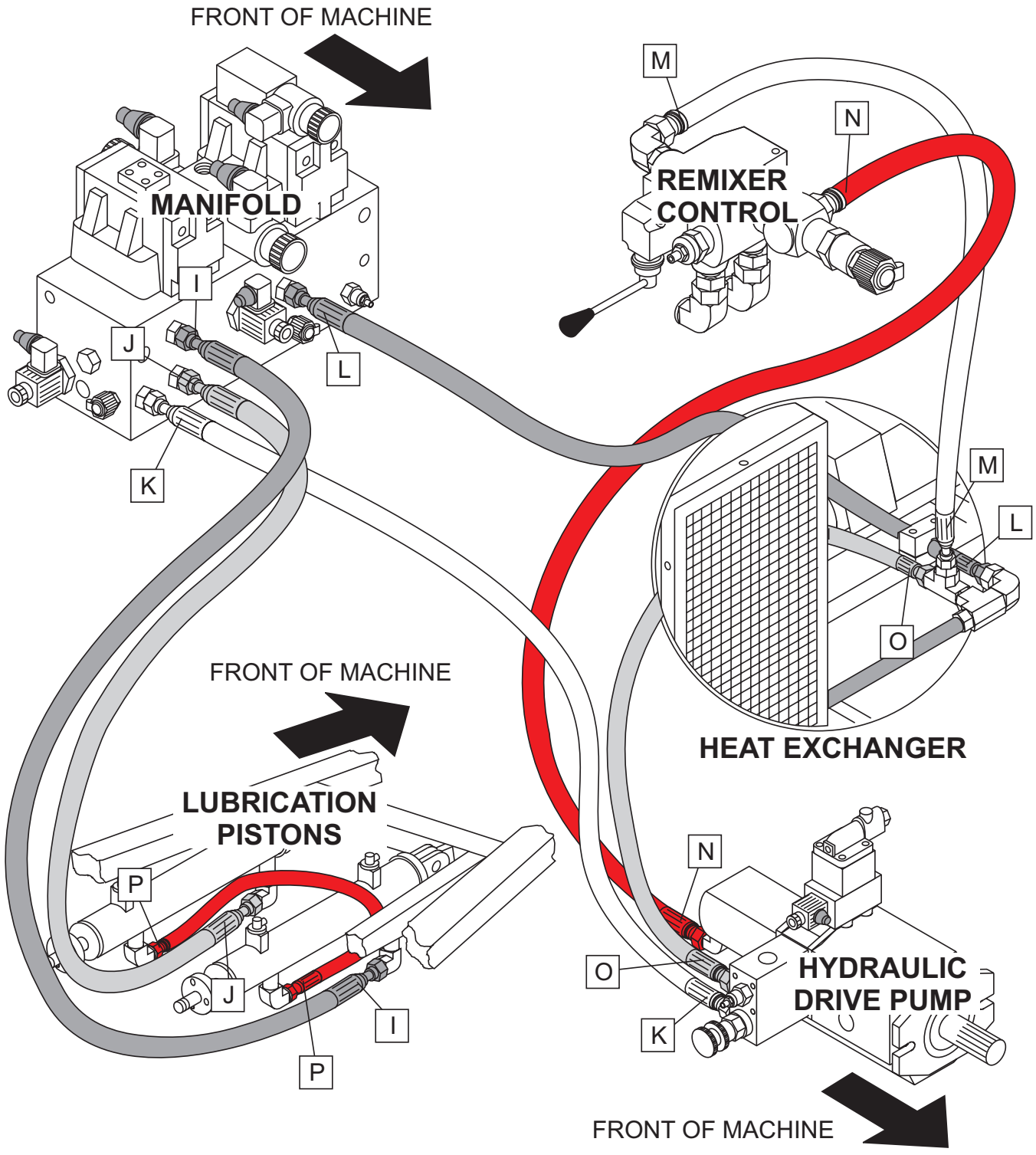
1. Start the pump as outlined in the start-up procedure.
2. Let the engine run for a few minutes.
3. While the engine is running, lift the splash plate, then the hopper **GRATE.**
4. Verify that the engine has **STOPPED**. If the engine has stopped it can be determined that the grate engine stop circuit (proximity switch) is functioning correctly.
5. If the engine continues to run after the grate has been lifted , turn the ignition switch key to the **OFF** position and correct the problem using the wiring diagrams provided in the manual.
6. Re-install the two U-clamps that secure the hopper grate to the hopper.

EXTENDED STORAGE INSTRUCTIONS

The following preventative maintenance is recommended for extended periods of storage.

1. Check brake system for proper fluid level in master cylinder and bleed all lines.
2. Lubricate all links and pivots to prevent any rusting.
3. Remove wheel and drum assemblies and spray a good anti-corrosion compound (CRC formula 5-56) under rubber boot on forward end of brake wheel cylinder. Avoid spraying drum and brake lining.
4. Grease all bearings and reinstall wheel and drum assemblies.
5. Make sure breakaway cable is fully released.
6. After extended storage, refer to the Maintenance Steps listed above to insure that the trailer is ready for towing.

Figure 58 is provided to show the hydraulic hose connections on the ST-45 for reference when performing inspections and maintenance on the pump.



NOTES

HOSES SHADED FOR VISUAL CLARITY.

Figure 58. Hydrauilc Hose Connections

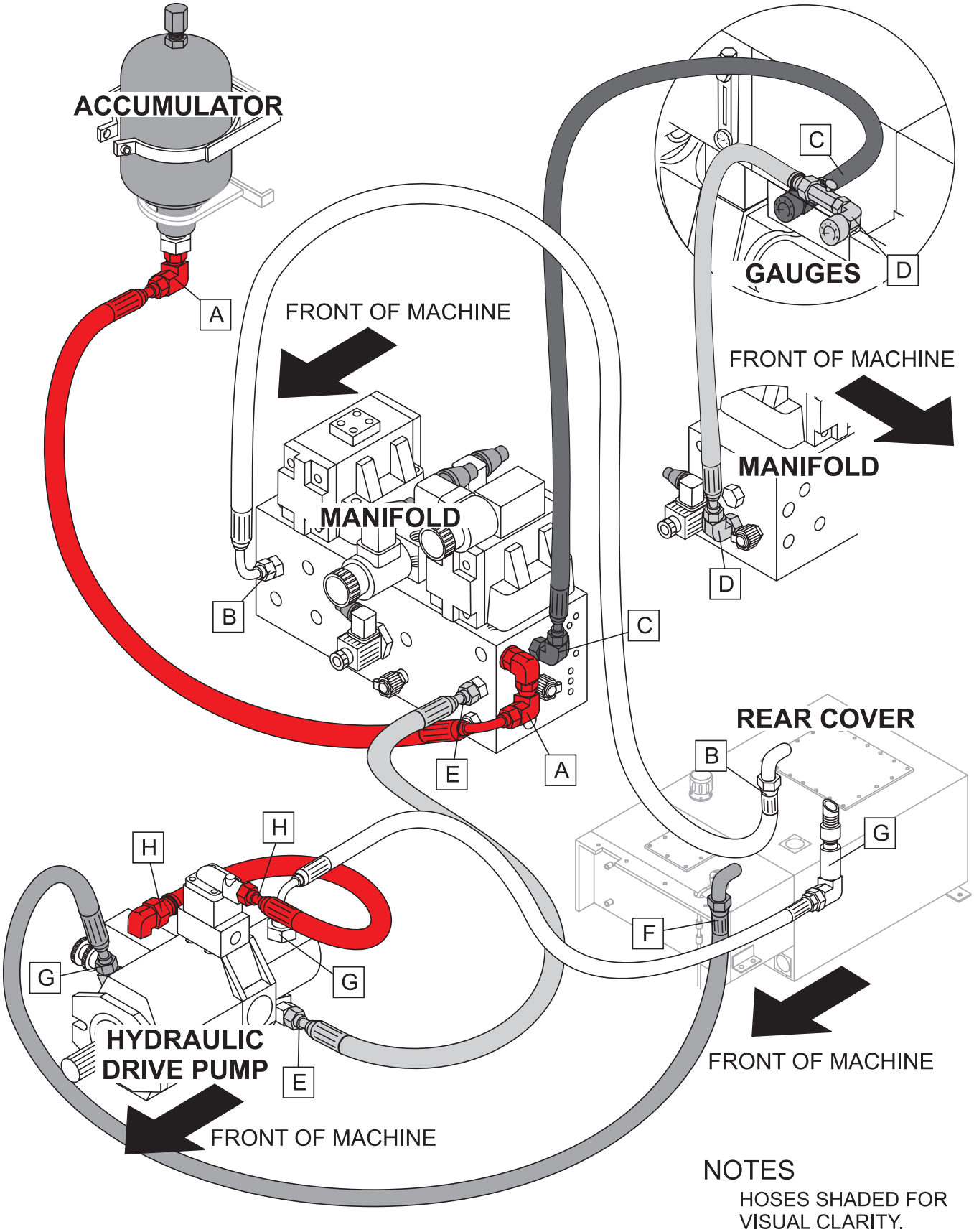
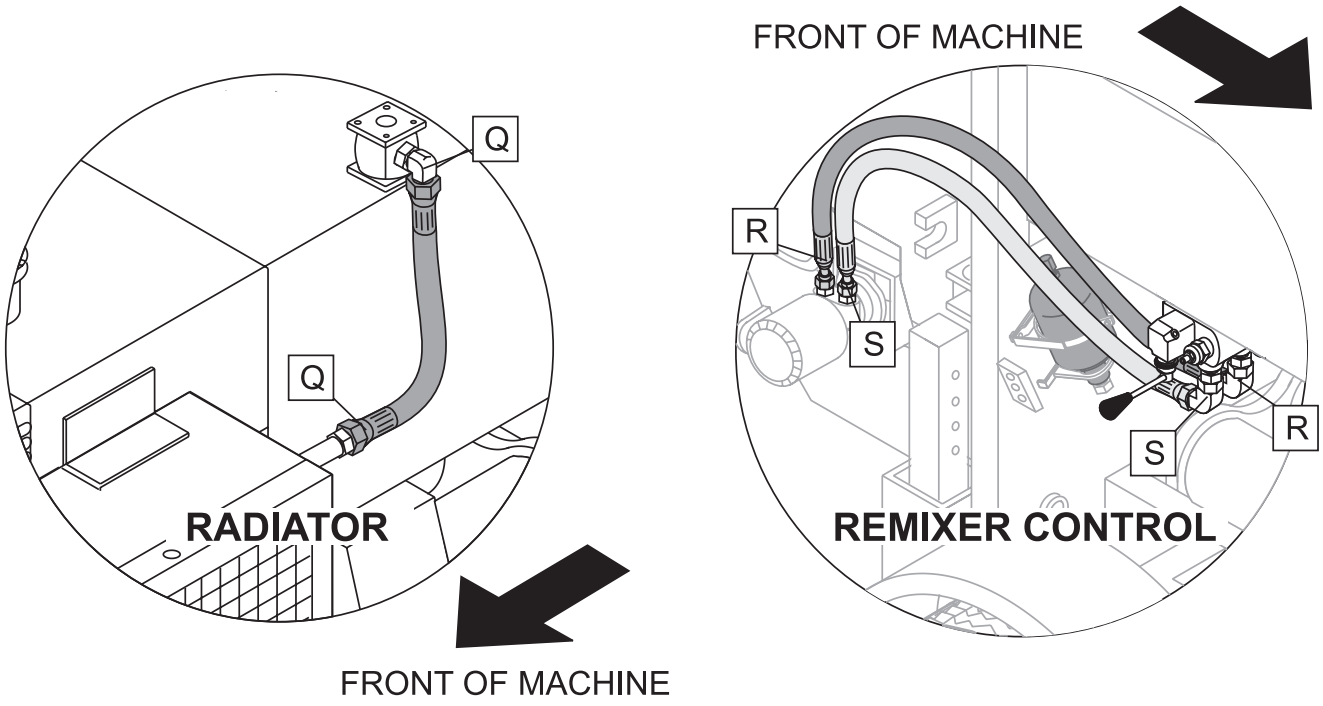
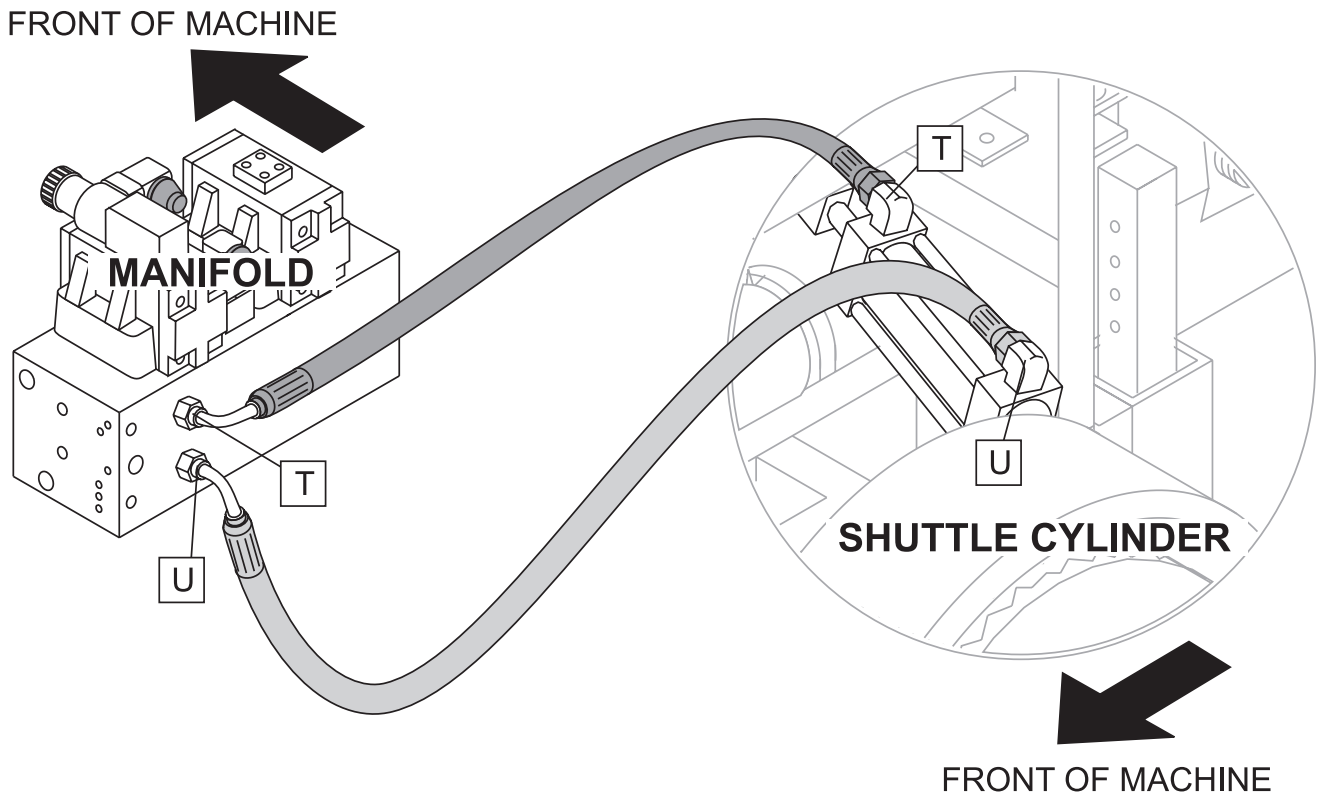


Figure 58. Hydrauilc Hose Connections (Continued)





NOTES

HOSES SHADED FOR VISUAL CLARITY.

Figure 58. Hydrauilc Hose Connections (Continued)

Figure 59 is provided to show the locations and names for the two manifold block ports on the ST-45 for reference when peforming maintenance on the pump.

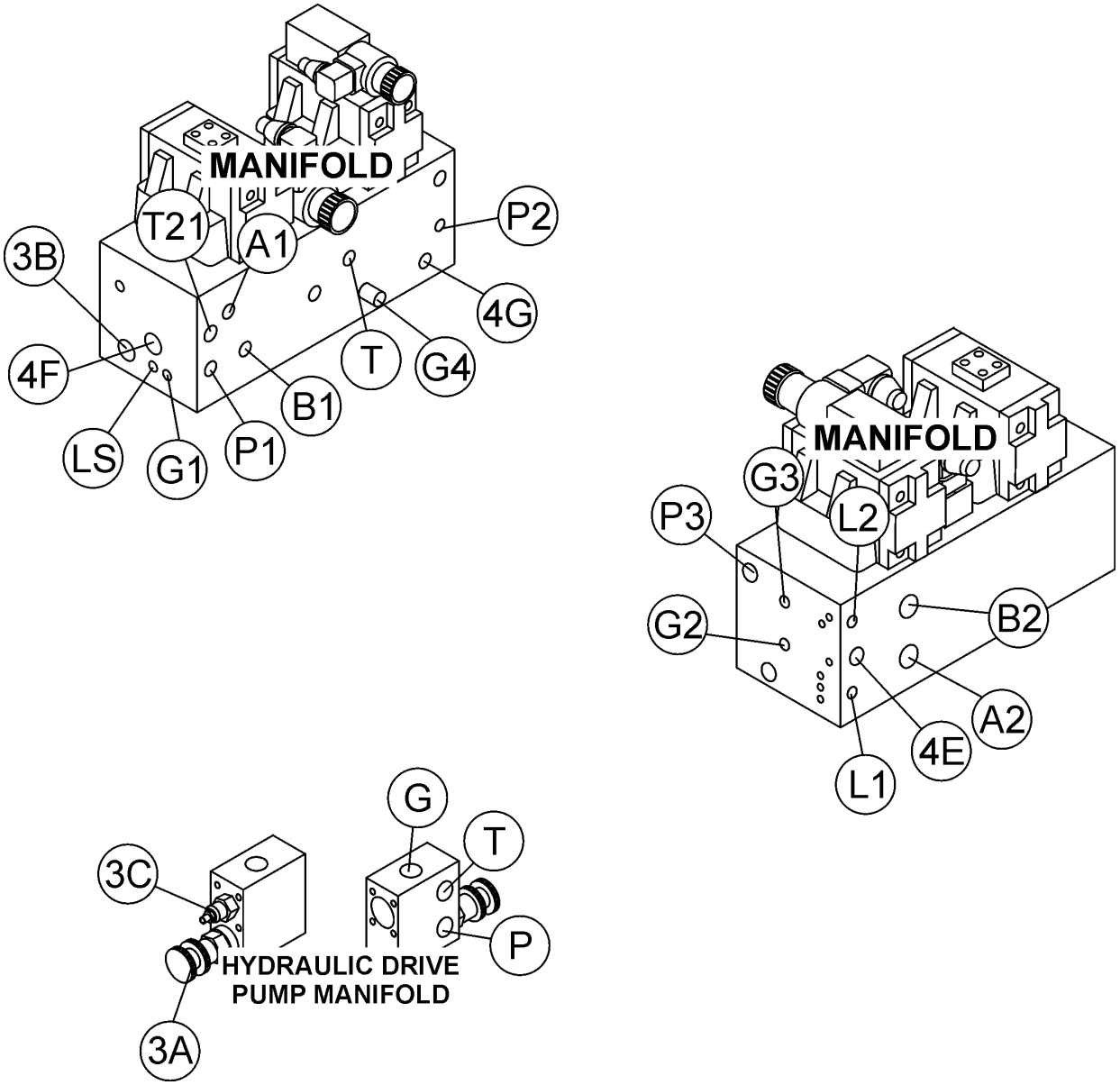


Figure 59. Manifold Ports

NOTE PAGE

APPENDIX — ST-45HRM CE CONCRETE PUMPCONCRETE MIX

The following information has been extracted from actual testing laboratory reports. The purpose of this printing is only to help create a better understanding of the importance of uniform gradation and proportioning of materials which affect pumpability of concrete mixes. These weights and proportions illustrate that when the sieve analysis is ideal, the sand/rock ratio can be adjusted (65% sand 35% rock) and pumpability should be excellent.

EXAMPLE #1 (A California Test Lab. Report)

JOB: Building Foundations (Water Project)

Sacks per cu./yd.	6.5 designed for 2,500 lbs. in 28 days
Sacks per cu./meter.	8.5 designed for 1,134 kg. in 28 days
Liters/Gallons per sack	26.9/7.1
Washed Sand-#200 wash	1.3
Organic matter-OK	
Specific gravity (SSD)	Sand-2.58; Pea Gravel-2.60

Sieve analysis-percent passing

Material	1.5"	1"	3/4"	3/8"	#4	#8	#16	#30	#50	#100	#200
W.C. Sand				100	99.7	79.1	60.4	36.5	14.3	4.0	1.1
Pea Gravel				100	3.0						
% Comb.				100	66	51	39	23	9	3	1.0

3.81 cm =1.5 in. 2.54 cm = 1.0 in. 1.90 cm = 0.75 in. .952 cm = 0.375

DESIGN FOR ONE YARD OF CONCRETE (SATURATED & SURFACE DRY):

Absolute volume of aggregate in one cu. yard: 503 liters (17.78 cu. ft.)

Specific gravity of aggregates in one cu. yard: 2.58

Weight of aggregates in one cu. yard batch: 1,293 kg. (2,850 lbs.)

	%	BATCH	SPEC. GRAVITY	ABS. VOL.
W.C. Sand	65	1800	2.58	327 liters (11.56 cu. ft)
PEA GRAVEL	35	1000	2.60	176 liters (6.22 cu ft.)
WATER 174 liters/46 gal.		1		
CEMENT 6.5 Sack/cu yd		611		
CEMENT 8.5 Sack/cu meter		611		
TOTAL				27.00
ADMIXTURE:		None		
SLUMP		10.2 cm (4-inches)		
REMARKS		This mix designed for pumping		
NOTE:		Due to the availability of well-graded sand as shown in the above sieve analysis, this mix pumped very successfully.		

A.S.T.M. STANDARD SPECIFICATION FOR GRADING AGGREGATE

SCREEN TYPE	U.S.	METRIC	PERCENTAGE PASSING BY WEIGHT
FINE AGGREGATE: Referred to as washed concrete sand.			
3/8" 	3/8"	9.50 mm	100%
#4 	4,760 microns	4.76 mm	95 to 100%
#8 	2,380 microns	2.38 mm	80 to 100%
#16 	1,190 microns	1.19 mm	50 to 85%
#30 	590 microns	.59 mm	50 to 85 %
#50 	297 microns	297μm	10 to 30%
#100 	149 microns	149μm	2 to 10%
3/8 (9.51 mm) PEA GRAVEL AGGREGATE: Referenced to as #4 Rock or Gravel or 1/2" minus (12.7 mm) size			
1/2" 	1/2"	12.70 mm	100%
3/8" 	3/8"	9.51 mm	85 to 100%
#4 	4,760 microns	4.76 mm	10 to 30%
#8 	2,380 micron	2.38 mm	0 to 10%
#16 	1,190 microns	1.19 mm	0 to 5%

APPENDIX — ST-45HRM CE CONCRETE PUMP SLUMP TEST

1. To obtain a representative sample (concrete), take several samples at three or more regular intervals throughout the discharge of the mixer or truck. **DO NOT** take samples at the beginning or end of the discharge.

2. Dampen the inside of the cone and place it on a smooth, moist, nonabsorbent, level surface large enough to accommodate both the slumped concrete and the slump cone. Stand on the "foot pieces" throughout the test procedure to hold the cone firmly in place.

3. Fill the cone 1/3 full by volume (Figure 60-A) and rod 25 times with a 1.3 cm x 61 cm (1/2" diameter x 24" length) bullet-pointed steel rod. (This is a specific requirement which will produce non-standard results unless followed exactly.) Distribute rodding evenly over the entire cross section of the sample.

4. Fill cone another 1/3 (Figure 60-B) which will make the cone 2/3 full by volume. Rod this second layer 25 times with the rod penetrating into, but not through, the first layer. Distribute rodding evenly over the entire cross section of the layer.

5. Fill cone to overflowing (Figure 60-C). Rod this layer 25 times with rod penetrating into but not through, the second layer. Distribute rodding evenly over the entire cross section of this layer.

6. Remove the excess concrete (Figure 60-D) from the top of the cone, using the tamping rod as a screed.

7. Lift the cone vertically (Figure 60-E) with a slow even motion. **DO NOT** jar the concrete or tilt the cone during this process. (Invert the withdrawn cone, and place it next to, but not touching the slumped concrete.

8. Lay a straight edge (Figure 60-F) across the top of the slumped cone. Measure the amount of slump in inches from the bottom of the straight edge to the top of the slumped concrete at a point over the original center of the base . The slump operation must be complete in a maxi

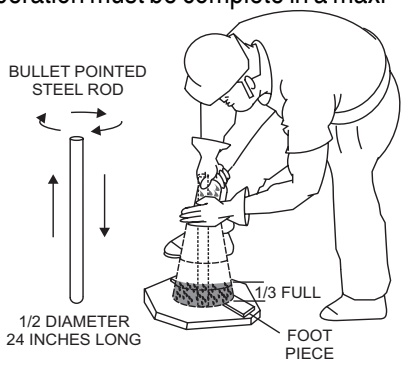


Figure 60-A. Slump Test (1/3 Full)

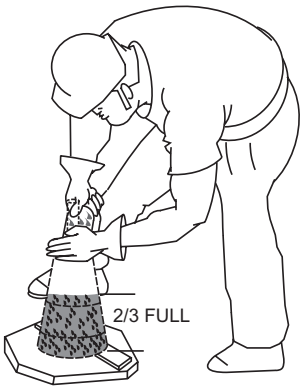


Figure 60-B. Slump Test (2/3 Full)

Figure 60-C. Slump Test (Full-Overflow)

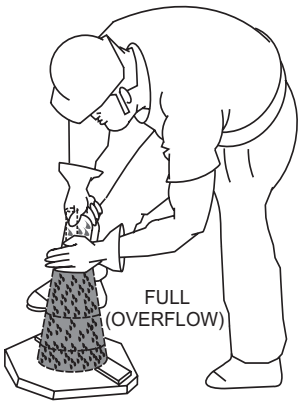


Figure 60-D. Slump Test (Removing Excess Concrete)

Figure 60-E. Slump Test (Cone Invert)

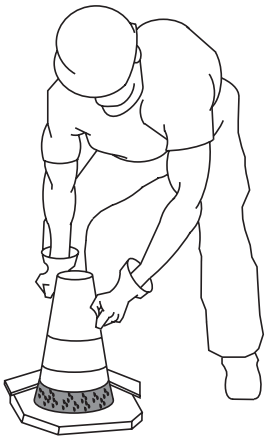


Figure 60-F. Slump Test (Measurement)

ST-45HRM CE CONCRETE PUMP — TROUBLESHOOTING (ENGINE)

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Engine Troubleshooting (Table 14) information shown below and on the proceeding page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.

TABLE 14. ENGINE TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine will not start or start is delayed, although engine can be turned over.	Speed control lever is in "STOP" position?	Set speed control lever to "START" position.
	No fuel reaching injection pump?	Add fuel. Check entire fuel system.
	Defective fuel pump?	Replace fuel pump.
	Fuel filter clogged?	Replace fuel filter and clean tank.
	Faulty fuel supply line?	Replace or repair fuel line.
	Compression too low?	Check piston, cylinder and valves. Adjust or repair per engine repair manual.
	Fuel injector not working correctly?	Repair or replace injector in accordance with engine repair manual.
	Oil pressure too low?	Check engine oil pressure.
	Low starting temperature limit exceeded	Comply with cold starting instructions and proper oil viscosity.
At low temperatures engine will not start.	Fuel separates has inadequate resistance to low temperatures?	Check whether clear (not turbid) fuel emerges from the fuel line (detach from injection pump). If the fuel is turbid or separated, warm up the engine or drain the complete fuel supply system. Refuel with winter grade diesel fuel.
	Engine oil too thick?	Refill engine crankcase with correct type of oil for winter environment.
Engine fires but stops soon as starter is switched off.	Throttle lever in STOP position?	Reposition throttle lever to RUN position.
	Fuel filter blocked?	Replace fuel filter.
	Fuel supply blocked?	Check the entire fuel system.
Engine stops by itself during normal operation.	Fuel tank empty?	Add fuel.
	Fuel filter blocked?	Replace fuel filter.
Low engine power, output and speed.	Fuel tank empty?	Replace fuel filter.
	Fuel filter clogged?	Replace fuel filter.
	Fuel tank venting is inadequate?	Ensure that tank is adequately vented.
	Speed control lever does not remain in selected position?	See engine manual for corrective action.
	Engine oil level too full?	Correct engine oil level?
Low engine power output and low speed, black exhaust smoke.	Air filter blocked?	Clean or replace air filter.
	Incorrect valve clearances?	Adjust valves per engine specification.
	Malfunction at injector?	See engine manual.

ST-45HRM CE CONCRETE PUMP—TROUBLESHOOTING (HYDRAULIC

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Hydraulic System Troubleshooting (Table 15) information shown below and on the proceeding page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.

TABLE 15. HYDRAULIC SYSTEM TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
No hydraulic oil flow from axial piston pump.	Delta "Q" compensator not de-energized when pump is energized?	Check TB1 terminal #17. If this terminal is energized when the pump is turned on, the pump will not cycle because the compensator is dumping controll pressure to the accumulator tank. Check K-3 relay and replace if necessary.
	Volume control not turned open?	Turm volume control valve counter-clockwise to open.
	Hydraulic oil level low?	Fill resevouir to proper level.
	Restricted suction screen?	Clean suction screen.
	Main pressure relief valve open	Remove cartridge. Clean and reset. Replace cartridge if ncessisary.
Drive cylinders will not cycle	Proximity switch is not sending a signal?	This emergency cycle switch, located in the control box, can be used to determine which switch is faulty. Determine malfunctioning proximity switch and replace.
	Pilot cycle valve malfunction?	Turn on pump switch. Check TB1 terminal #35 and #36 to determine if current is flowing to valve. Check detents in valve for proper operation.
	K-4 relay faulty?	Check the proximity switch enclosure.
	Main cycle valve(manifold) faulty?	Check spool or centering springs. Replace or repair as necessary.
Accumulator pressure drops to zero on every cycle	Low nitrogen charge in accumulator bladder?	Re-charge accumulator bladder with nitrogen to 7.58 mPa (1,100 PSI.)
Accumulator pressure is below 12.1 mPa (1750 PSI.)	Unloading valve setting too low?	Adjust unloading valve until 12.1 mPa (1,750 PSI) is reached.
Accumulator pressure is not discharging when switch is turned off	Cartridge at port 4-D on manifold block is not working?	Check solinoid and cartridge. Replace if necessary

ST-45HRM CE CONCRETE PUMP—TROUBLESHOOTING (ELECTRICAL

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Electrical System Troubleshooting (Table 16) information shown below and on the proceeding page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.

TABLE 16. ELECTRICAL SYSTEM TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
After completion of a pumping stroke, pumping pressure gauge indicates high pressure and cycle stops.	Proximity switch is not emitting a radio frequency?	If the hydraulic system is in a maximum pressure condition, pull the toggle on the emergency cycle switch (located inside the control box) towards you. If the pump cycles, replace the proximity switch at the lubrication box. If the pump cycles when you push the toggle down, replace the proximity switch on the towing end of the pump.
Emergency cycle switch does not cycle pump	Faulty K-4 relay?	Use a hot jumper wire. Connect (jumper wire) to terminals #35 and #36 on terminal block #1. When contact is made between these two terminals and the pump cycles. This would indicate that you have a faulty K-4 relay.
Starter switch is activated and pump does not start	Faulty fuses?	Check fuse box in control panel. Replace blown fuses.
		Check fuse link below engine solenoid, next to batter.
Hatz engine will not continue to run after key is released	D-1 diode has failed?	Check D1 diode in control box. Replace if needed with 6 amp diode P/N EGG5815 or equivalent.
Hatz engine will not start	No power to TB-5, conductor #3?	Check and replace K1 relay if necessary
	No power to magnet valve start/stop?	
Engine runs, but no current travels to circuits #32-47	Faulty K-2 relay?	Check and replace K-2 relay if necessary
When pump is turned on, engine RPM's will not increase	K-6 relay not completing the circuit?	Check and replace K-6 relay if necessary
	Open circuit at TB1-24?	
The pump will not reverse when operated by remote control	K-5 relay failure?	Check and replace K-5 relay if necessary
Engine oil pressure light will not de-activate	Oil pressure sending unit failure?	Check and replace sending unit if necessary
Battery charge light wont de-activate	Faulty D-2 diode?	Replace with diode 1U404-C
	Alternator not charging battery?	Check and repair/replace alternator unit.

SHOTCRETE SYSTEM

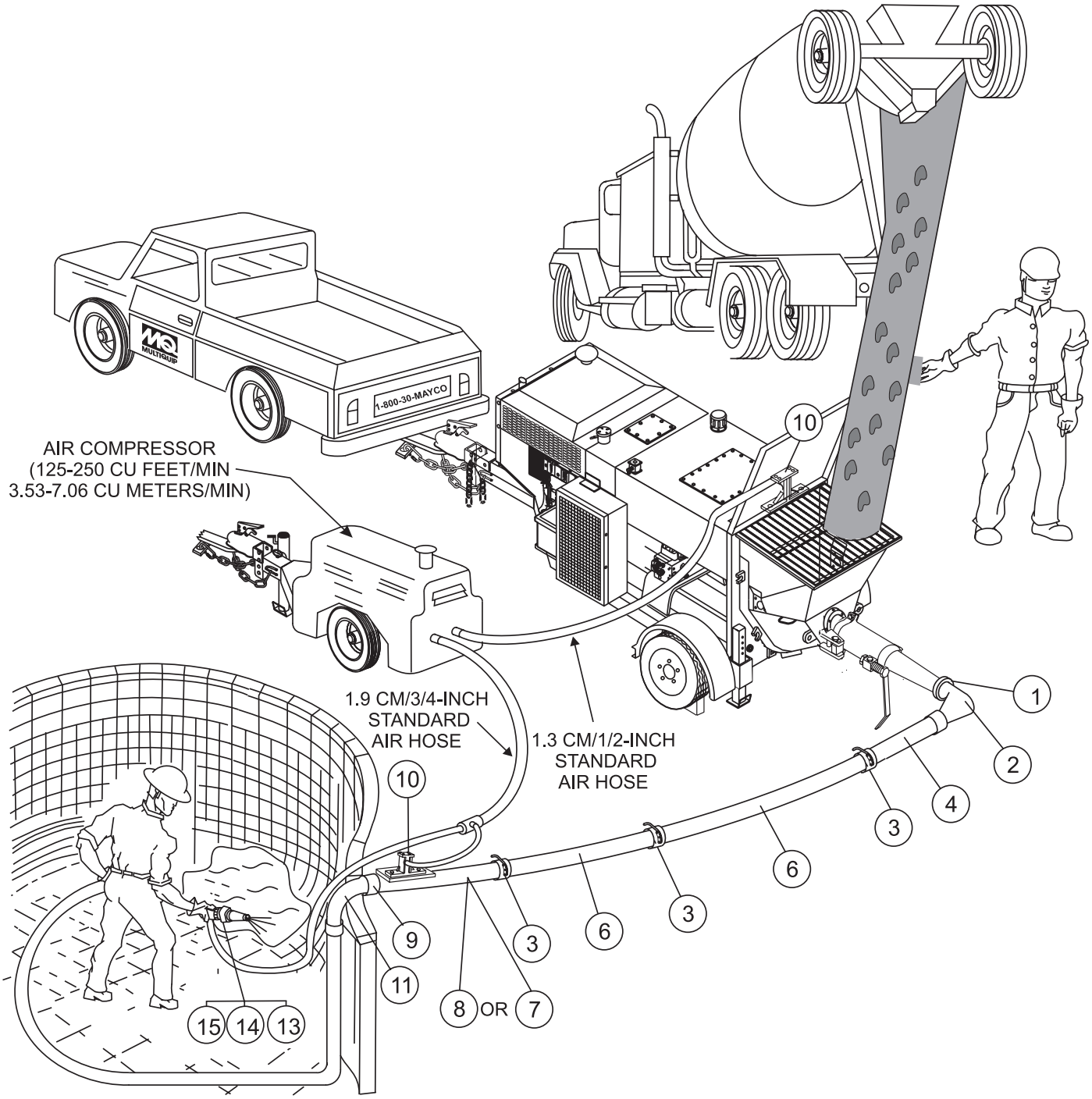


Figure 39. Shotcrete System

RECOMMENDED SHOTCRETE SYSTEM

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM28904	COUPLING, 3" H-D "CF"		
2	EM23946	ELBOW, 3"x90°		
3	EM28903	COUPLING, 2.5" H-D w/GASKET & PIN		
4	EM28005DD	REDUCER, 3"x2.5"x36" H-D ENDS		
5	EM28061	PIPE, 2.5"x120w x 10' H-D		
6	EM24849	HOSE, 2.5"x2"x36" H-D		
7	EM28001DD	REDUCER, 2.5"x2"x36" H-D		
8	EM23815D	REDUCER, 2.5"x2" w/AIR VIBRATOR		
9	EM28902	COUPLING, 2" H-D w/GASKET & PIN		
10	EM23101	AIR VIBRATOR ASSY.		
11	TBD	2"x2" ELBOW		
12	EM24841	HOSE, 2"x25' H-D w/ENDS		
13	EM23808D	NOZZLE ASSEMBLY, 2" H-D		
14	EM23806	NOZZLE TIP, RUBBER 1-3/8"		
15	EM23807	NOZZLE TIP, RUBBER 1.25"		

General recommendations

- If the site will permit, use steel pipe from the pump to the pool perimeter. It will reduce line pressures which is highly recommended.
- The vibrator on the reducer by the pool improves pumpability.
- Turn both air vibrators off whenever the pump is stopped to prevent separation of mix.
- The air vibrators are low consumption (4.2 scfm).
- Leave the air on at the nozzle when the pump is stopped to prevent clogging of air the hoses in the air insert.
- Use item #11 (steel elbow) at the edge of the pool to prevent collapse of the rubber hose, which can cause blockage.

RECOMMENDED SHOTCRETE ACCESSORIES

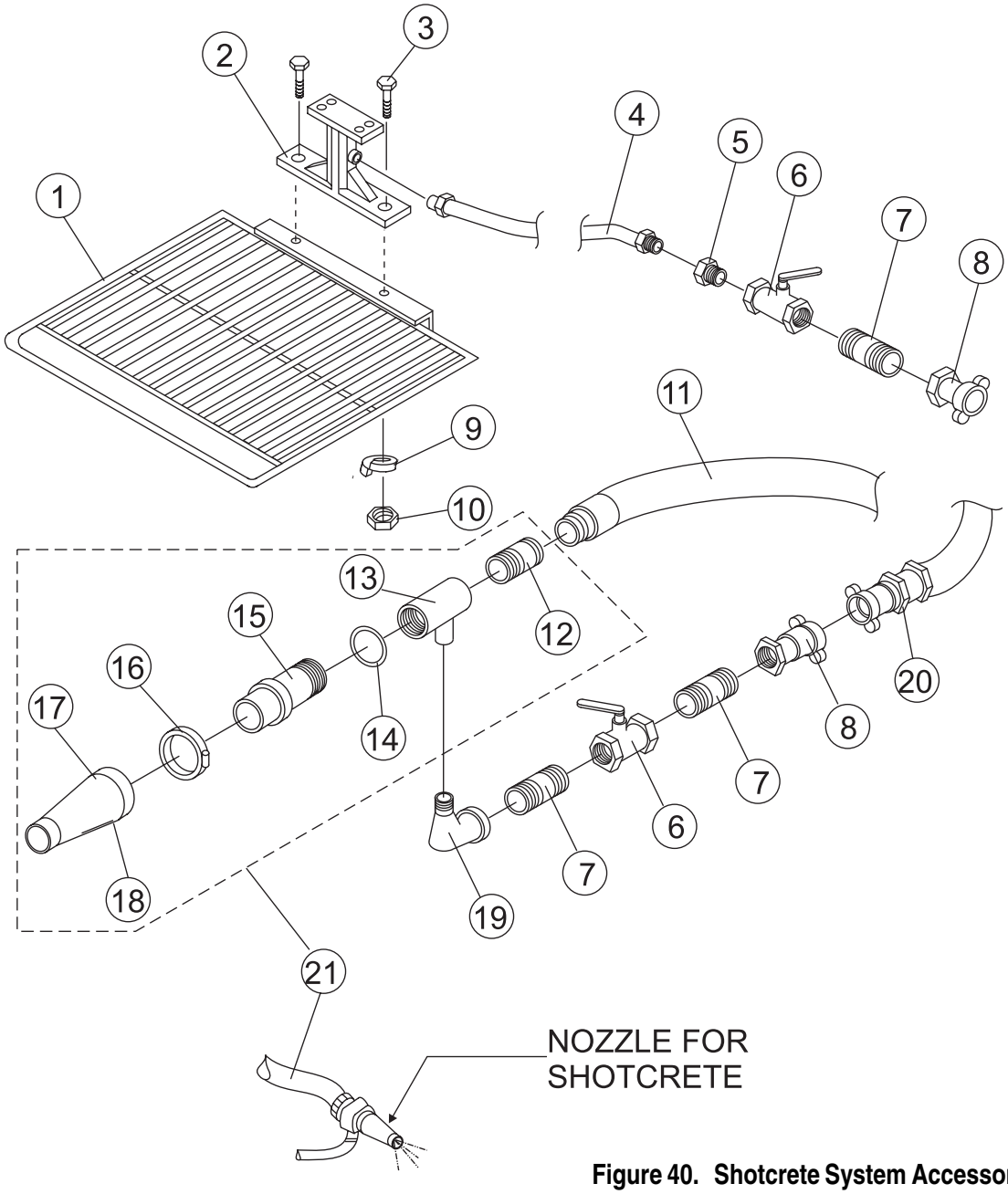


Figure 40. Shotcrete System Accessories

NOTE

Use a 1-3/8" rubber nozzle tip for a wide spray pattern. Use a 1-1/4" rubber nozzle tip for a narrow spray pattern. **DO NOT INSTALL THE NOZZLE AT THE END OF THE HOSE UNTIL THE FIRST MATERIAL HAS PASSED THROUGH THE ENTIRE HOSE LENGTH.**

Disassemble and clean the nozzle assembly thoroughly after each job. Grease all threads before re-assembly. **DO NOT** close the air valve when pumping is stopped as a continued air flow keeps the air passages clean.

APPENDIX — ST-45HRM CE CONCRETE PUMP ACCESSORIES

RECOMMENDED SHOTCRETE ACCESSORIES

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM26107	HOPPER SCREEN	1	W/AIR VIBRATOR MOUNTING
2	EM23101	AIR VIBRATOR	1	
3	EM132	BOLT, 1/2-13X2	2	
4	EM23407	AIR HOSE	1	
5	EM23408	BUSHING	1	
6	EM23411	VALVE	1	
7	EM912073	NIPPLE	2	
8	EM23409	COUPLING	1	
9	EM923346	WASHER, 1/2 LOCK	2	
10	EM406	NUT, HEX 1/2-13	2	
11	EM23818	2"X25' GROOVED HOSE		
11	EM24841	2"X25' RAISED HOSE		
11	EM23845	2"X50' GROOVED HOSE		
12*	EM23802	VIC ADAPTER / EM23802D H.D	1	
13*	EM23803	GUN BODY	1	
14*	EM20816	“O” RING	1	
15*	EM23804	AIR INSERT	1	
16*	EM23805	NOZZLE CLAMP	1	
17*	EM23806	NOZZLE TIP, 1-3/8", SHORT	1	
18*	EM23807	NOZZLE TIP, 1-1/4", LONG	1	
19*	EM911076	STREET ELBOW	1	
20		AIR HOSE		NOT SUPPLIED BY MAYCO
21	EM23808	NOZZLE ASSEMBLY	1	INCLUDES ITEMS W/*

ST-45HRM CE PUMP— EXPLANATION OF CODE IN REMARKS COLUMN

How to read the marks and remarks used in this parts book.

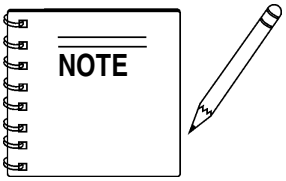
Items Found In the "Remarks" Column

Serial Numbers-Where indicated, this indicates a serial number range (inclusive) where a particular part is used.

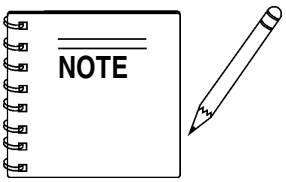
Model Number-Where indicated, this shows that the corresponding part is utilized only with this specific model number or model number variant.

Items Found In the "Items Number" Column

All parts with same symbol in the number column,*****, #, +, %, or <, belong to the same assembly or kit.



If more than one of the same reference number is listed, the last one listed indicates newest (or latest) part available.



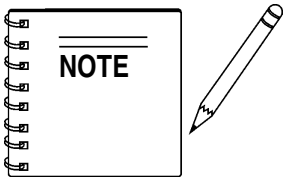
The contents of this catalog are subject to change without notice.

ST-45HRM CE CONCRETE PUMP
1 Units

Qty.	P/N	Description
1	EM16462	FELT HOLDER
4	EM98050	PISTON CUP, ORANGE
4	EM16493	FELT RING
1	EM98033	OIL PLATE
2	EM14408	BRONZE RING
2	EM16145	BUSHING, SWING AXLE (BRONZE)
1	EM98021	WEAR RING
2	EM16816-1	ENERGIZER RING
1	EM16816-2	INSERT RING
2	EM98065	SLEEVE SEAL
1	EM98022	WEAR PLATE
2	EM97024	SWITCH, PROXIMITY
1	EM50417	CUP
1	EM20709-1	SOLENOID
2	EM97050	RELAY
1	EM97048	RELAY
1	EM97036	SWITCH, PUMP CONTROL
1	EM97045	SWITCH, OPERATION PUMP/ENG
1	EM98065	RUBBER RING

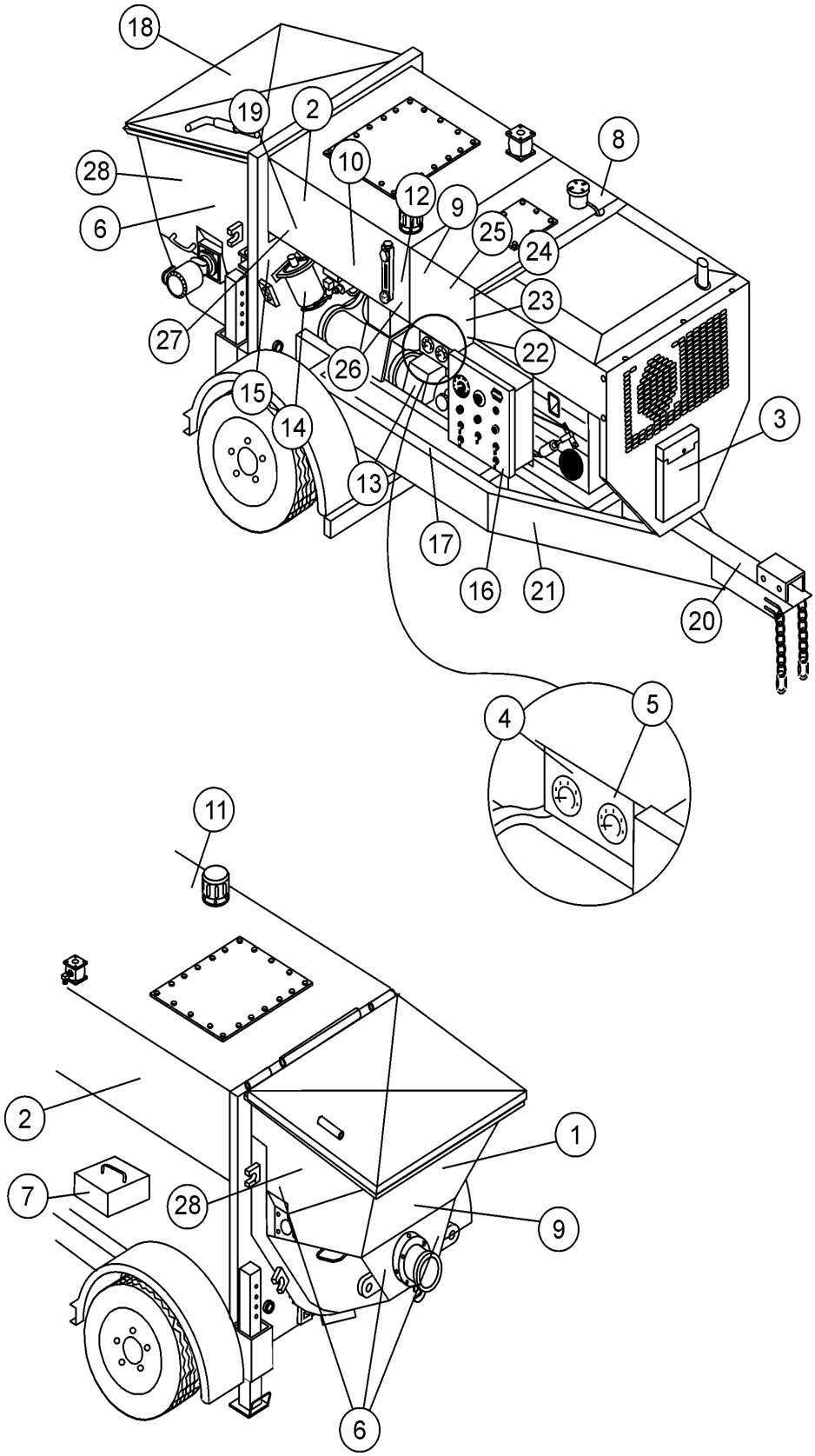
ST-45HRM CE CONCRETE PUMP
3 Units

Qty.	P/N	Description
1	EM16459	PIN
2	EM18801	CONCRETE CYLINDER
2	EM16462	FELT HOLDER
6	EM98050	PISTON CUP, ORANGE
8	EM16493	FELT RING
2	EN98033	OIL PLATE
2	EM14408	BRONZE RING
4	EM16145	BUSHING, SWING AXLE (BRONZE)
3	EM98021	WEAR RING
4	EM16816-1	ENERGIZER RING
2	EM16816-2	INSERT RING
4	EM98065	SLEEVE SEAL
2	EM98022	WEAR PLATE
4	EM97024	SWITCH, PROXIMITY
3	EM50417	CUP
2	EM20709-1	SOLENOID
4	EM97050	RELAY
2	EM97048	RELAY
2	EM97021	SOLENOID
2	EM97036	SWITCH, PUMP CONTROL
2	EM97045	SWITCH, OPERATION PUMP/ENG
1	EM98065	RUBBER RING



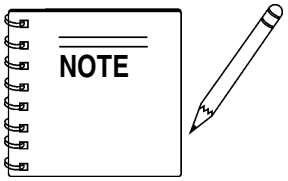
Part numbers on this Suggested Spare Parts List may supercede or replace the P/N shown in the text pages of this book.

DECAL PLACEMENT



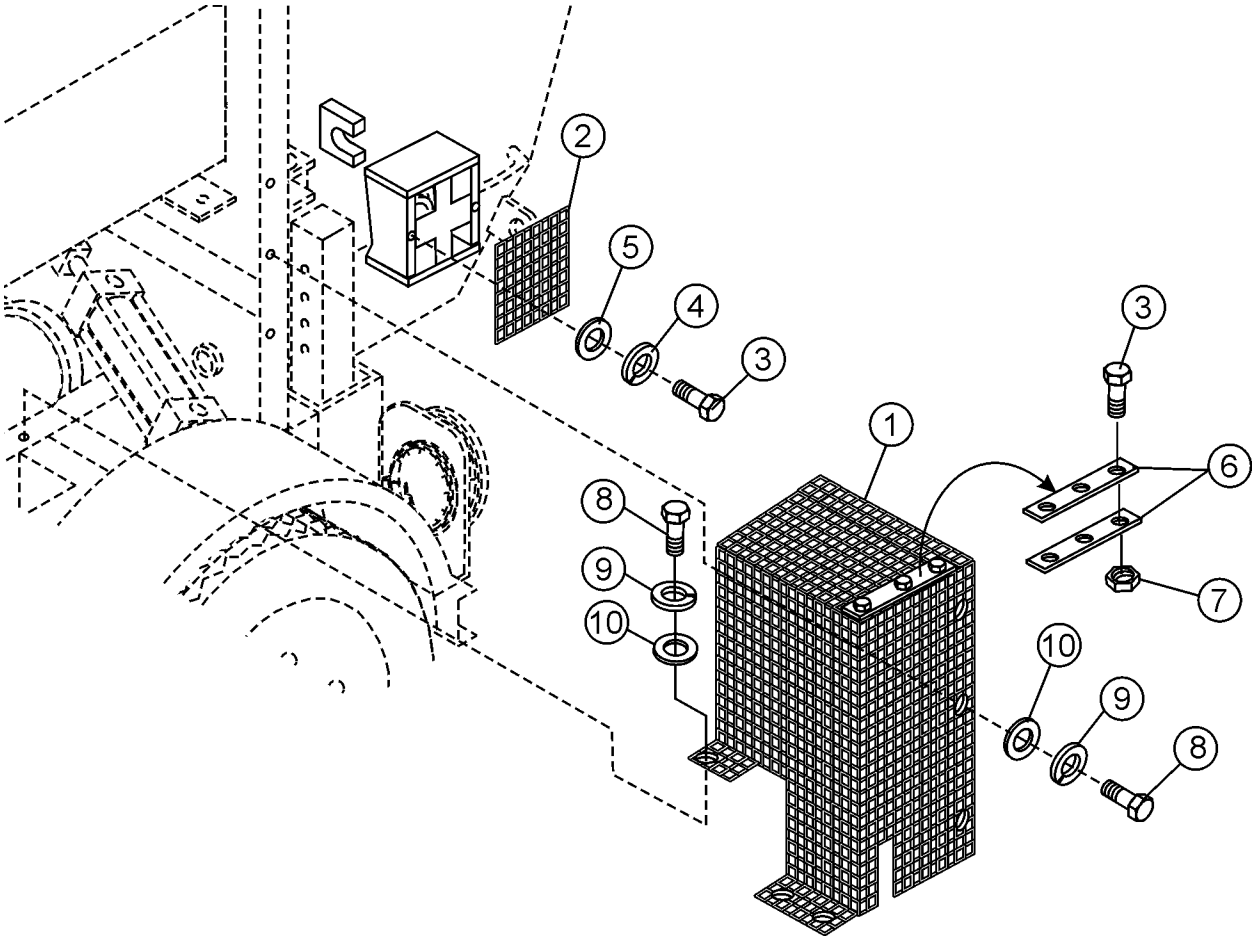
DECAL PLACEMENT

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	511709	DECAL, 800-30-MAYCO	1	
2	EM97082	DECAL, ST-45	2	
3	34536	DECAL, OWNERS MANUAL	1	
4	EM97070	DECAL, ACCUMULATOR PRESSURE	1	
5	EM97070	DECAL, PUMPING PRESSURE DECAL	1	
6	EM93000	DECAL, CAUTION - GREASE 2 HOURS	4	
7	EM98022	DECAL, LUBRICATION BOX	1	
8	EM995	DECAL, DIESEL FUEL ONLY	1	
9	EM97072	DECAL, CAUTION - OP. INSTRUCTIONS	2	
10	TBD	DECAL, HOPPER REXMIXER	1	
11	EM985	DECAL, HYDRAULIC OIL	1	
12	EM97071	DECAL, CAUTION - MINIMUM OIL LEVEL	1	
13	EM97084	DECAL, MAINTENANCE	1	
14	EM955	DECAL, CAUTION - REFER TO MANUAL	1	
15	EM97083	DECAL, WARNING - ACCUM. SAFETY	1	
16	TBD	DECAL, REMOTE OUTLET	1	
17	EM965	DECAL, VOLUME CONTROL	1	
18	TBD	DECAL, SHUTTLE TUBE DANGER	1	
19	EM1023	DECAL, MAYCO	2	
20	DCL305	DECAL, TOWING VEHICLE	1	
21		NAMEPLATE	1	..... CONTACT MQ PARTS DEPT.
22	36999	HELMENT, HAND & FOOT (ISO BLUE)	1	
23	DCL306	DECAL, CE-04	1	
24	35137	DECAL, READ	1	
25	DCL303	DECAL, NOISE LEVEL	1	
26	M91010000	DECAL, HOT PARTS	1	
27	DCL304	DECAL, ACC. CHARGE	1	
28	DCL301	DECAL, DANGER AMPUTATION	2	



All decals are considered safety related. Immediately replace any decal that becomes worn or difficult to read.

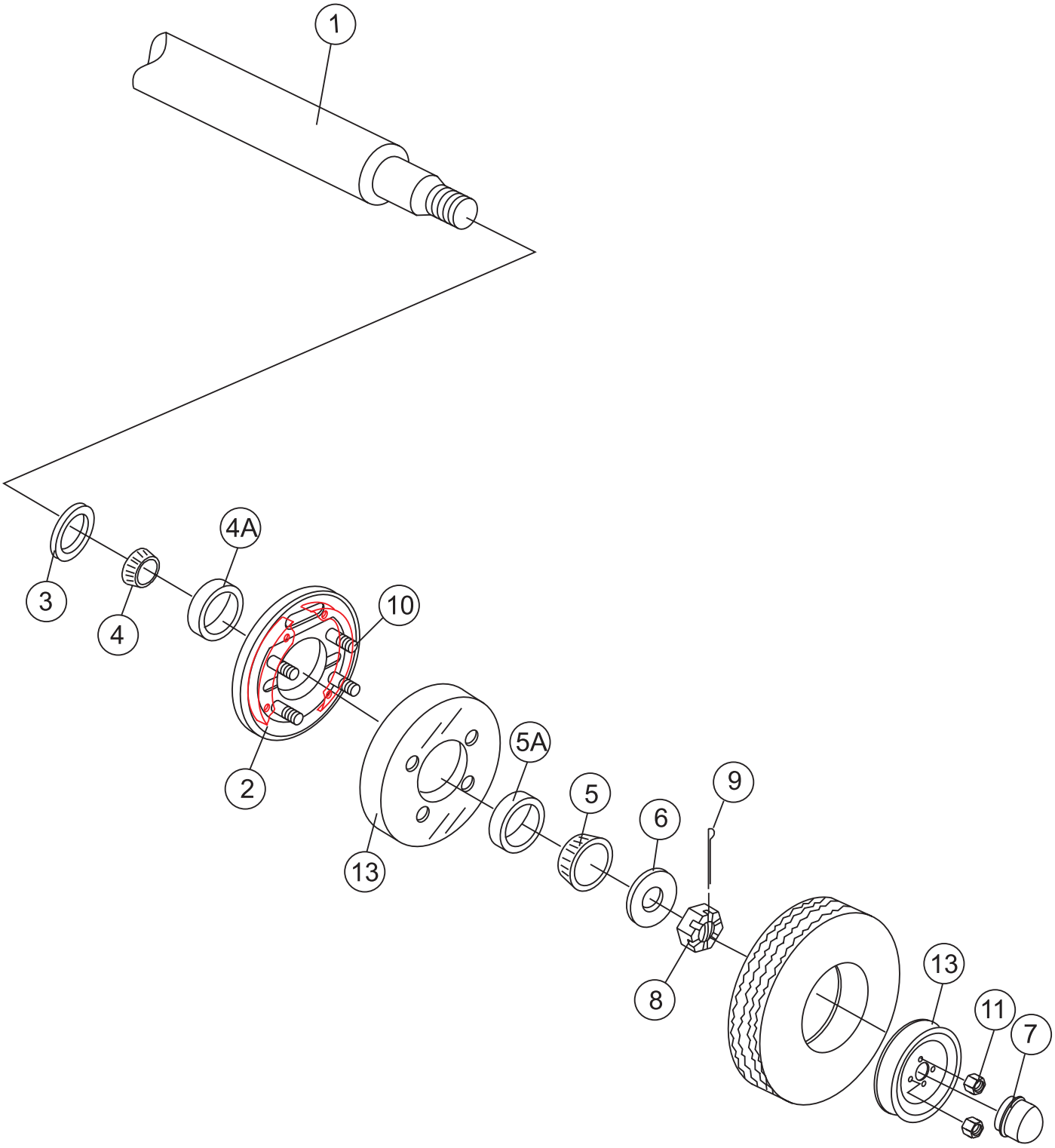
SAFETY GRIDS ASSY.



SAFETY GRIDS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM98201	GRID, SHUTTLE CYL. 22.5" X 9.0 X 14.5"	1	
2	EM98202	GRID, BLADE SHAFT 4.5" X 4.5"	1	
3	EM963003	BOLT 1/4" NC X 3/4"	5	
4	2101402	WASHER, LOCK 1/4" MED	5	
5	EM923057	WASHER, FLAT 1/4"	5	
6	EM98203	GRID SUPPORT BRACKET	2	
7	EM959179	NUT, NYLOCK 1/4-20	3	
8	0161 D	BOLT, HEX 5/16"-18 X 3/4"	6	
9	EM923343	WASHER, LOCK 5/16" MED	6	
10	EM923023	WASHER, FLAT SAE 5/16"	6	

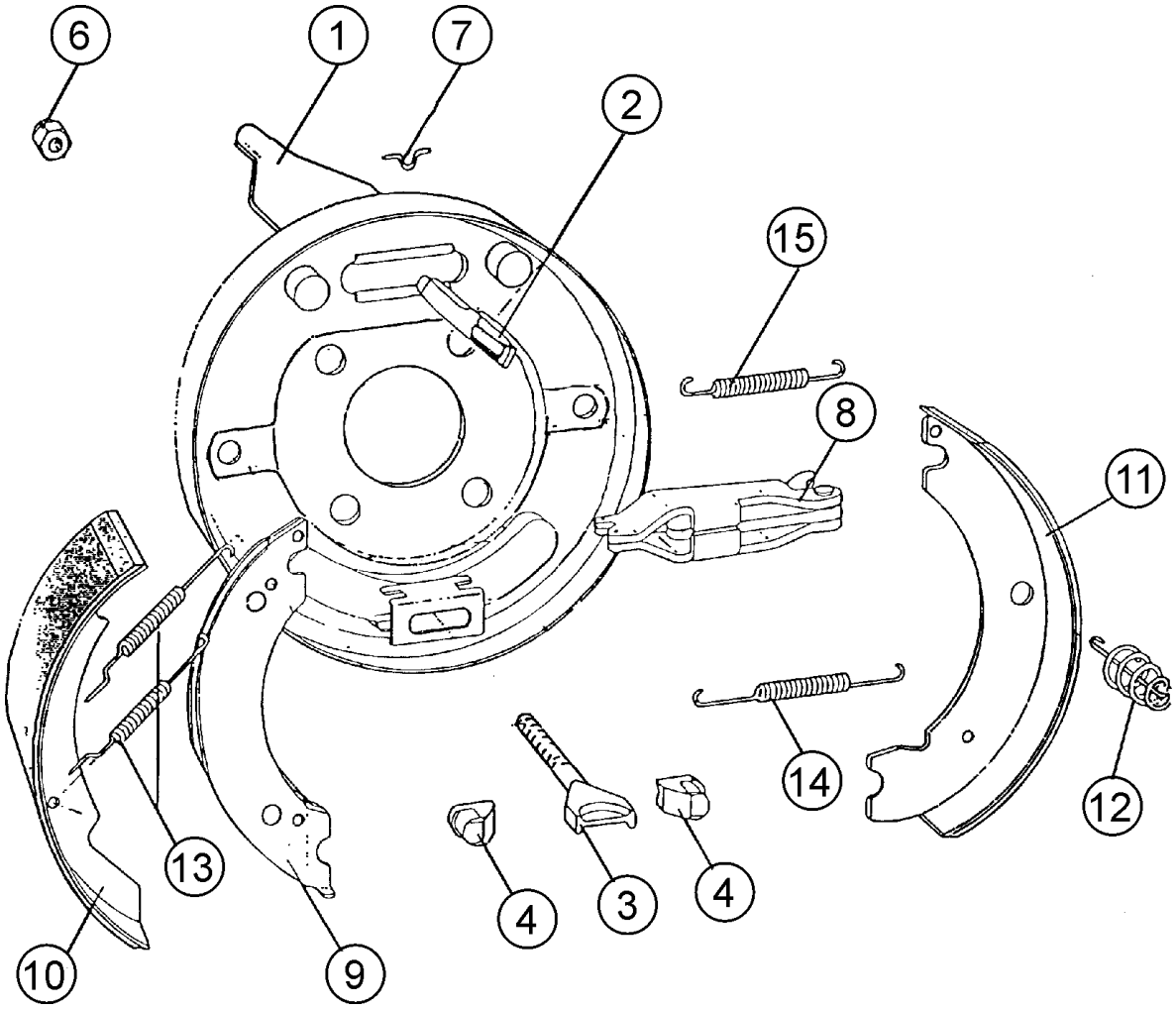
HUB AND DRUM ASSY.



HUB AND DRUM ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	109221	STUB AXLE	1	
2	302261	BRAKE	1	
3	DPSM639010	OIL SEAL	1	
4	368A	INNER BEARING CONE 2”	1	
4A	362A	INNER BEARING CUP 2”	1	
5	501349	OUTER BEARING CONE	1	
5A	501310	OUTER BEARING CUP	1	
6	1053 08	LOAD WASHER 1” T5 HP	1	
7	1061 07	GREASE CAP	2	
8	1” UNF	SLOTTED NUT, 1” UNF	2	
9	3/16” X 1-1/2	COTTER PIN 3/16” X 1-1/2	2	
10	1026 15	WHEEL STUD 1/2” UNF PRESS IN	8	
10	1026 19	WHEEL STUD 5/8” UNF PRESS IN	8	
10	1026 20	WHEEL STUD M18 X 1.5 PRESS IN	8	
11	1027 07	WHEEL LUG NUTS 1/2 UNF 60 CON	8	
11	1027 10	WHEEL LUG NUTS 5/8” UNF 80 CON	8	
11	1027 15 & 16	WHEEL LUG NUTS M18 X 1.5 16 MM RAD	8	
13	1162	HUB AND DRUM ASSY.	2	

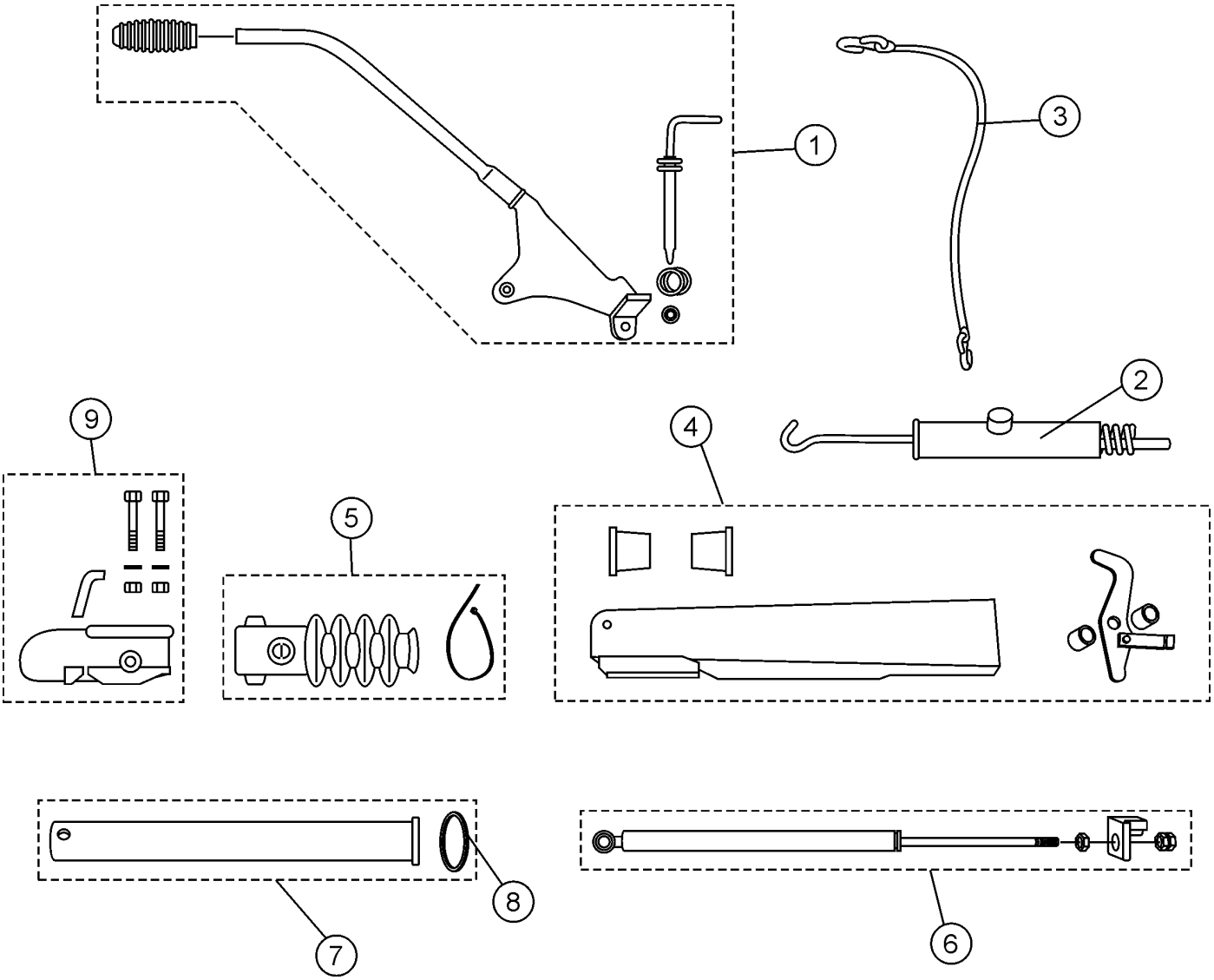
BRAKE COMPONENTS ASSY.



BRAKE COMPONENTS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	33623	HALF SHELL	1	
2	44856	EYELET	1	
3	45439	READJUSTABLE WEDGE	1	
4	35212	ADJUSTER SHOE POST	1	
6	45488	BOLT	1	
7	42860	SPRING BUCKLE	1	
8	43123-1	EXPANDER	1	
9*		SHOE BRACKET ONLY (NO LINING)	1	
10	25455.03	SLIDING SHOE	1	INCLUDES ITEMS W/*
11	24929.03	FIXED SHOE	1	
12	42861.03	SHOE STEADY SPRING (CONICAL)	2	
13*	44445	SPRING (REVERSE SHOE)	2	
14	44444	SPRING	1	
15	44443	SPRING	1	

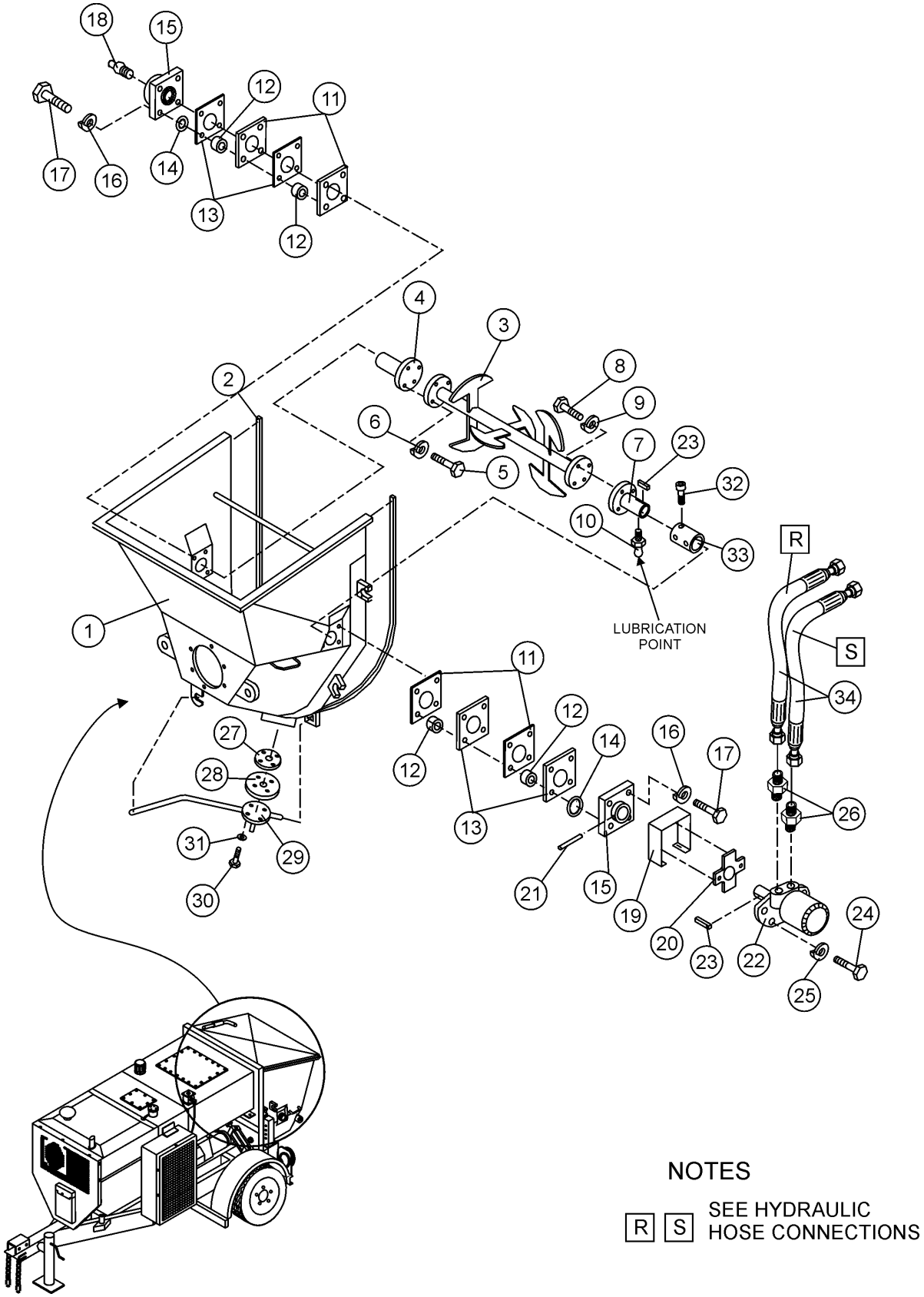
TOWING COUPLER ASSY.



TOWING COUPLER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	87003909	BRAKE LEVER ASSY.	1	
2	98702694	ENERGY STORE	1	
3	56000594	BREAK-AWAY CABLE	1	
4	TBD	BODY ASSY.	1	
5	69004692	BELLOWS	1	
6	87003909	DAMPER	1	
7	98857593	DRAW TUBE W/STOP RING	1	INCLUDES ITEM W/*
8	69001494	STOP RING	1	
9	EM300R56501	COUPLING HEAD	1	

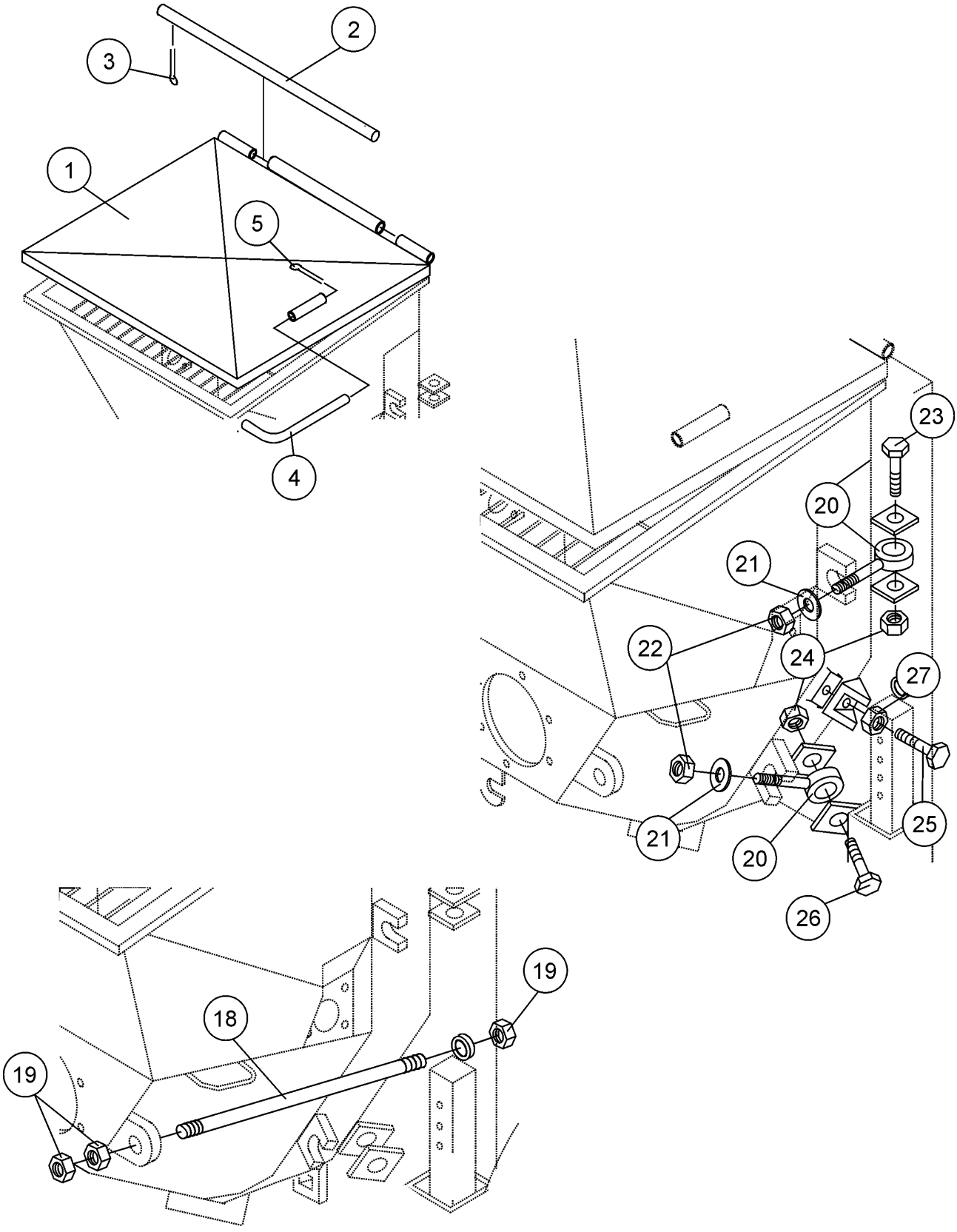
HOPPER ASSY.



HOPPER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM25174	HOPPER ASSY.	1	
2	EM16184	HOPPER SEAL 3/8" X 1/2	1	
3	EM25863	REMIXER, SHAFT	1	
4	EM23305	SHAFT, ADAPTOR	1	
5	EM963610	CAP SCREW	4	
6	0166 A	WASHER, LOCK 3/8"	4	
7	EM25301	SHAFT, DRIVE END	1	
8	EM963610	CAP SCREW	4	
9	0166 A	WASHER, LOCK 3/8"	4	
10	EM916001	GREASE FITTING	1	
11	EM18137	SHAFT GASKET	4	
12	EM18138	SPACER	16	
13	EM181361	SPACER PLATE	4	
14	EM621	1/2" WILLIAMS WASHER	4	
15	EM18135	BEARING FLANGE	2	
16	6109180	LOCK WASHER 1/2"	8	
17	EM492397	BOLT, HEX 1/2"- 13 X 2 1/2"	8	
18	EM916001	GREASE FITTING	1	
19	EM50141	MOUNT, REMIX MOTOR	1	
20	EM501411	MOTOR MOUNT PLATE	1	
22	EM25425	MOTOR, HYDRAULIC REMIX	1	
23	EM750	KEY 1/4" X 3/8" X 1	1	
23	505719	KEY 1/4" SQ.	1	
24	EM963692	CAPSCREW 1/2" X 13 X 1 1/2"	2	
25	6109180	LOCK WASHER 1/2"	2	
26	506203	FITTING	2	
27	EM708601	PISTON CUP HOLDER	1	
28	EM50417	PISTON CUP	1	
29	EM708602	HANDLE	1	
30	492378	BOLT	4	
31	0166 A	WASHER, LOCK 3/8"	4	
32	492465	ALLEN SCREW	4	
33	512791	MOTOR COUPLING	1	
34	EM25483	HOSE	2	

HOPPER ATTACHMENT ASSY.

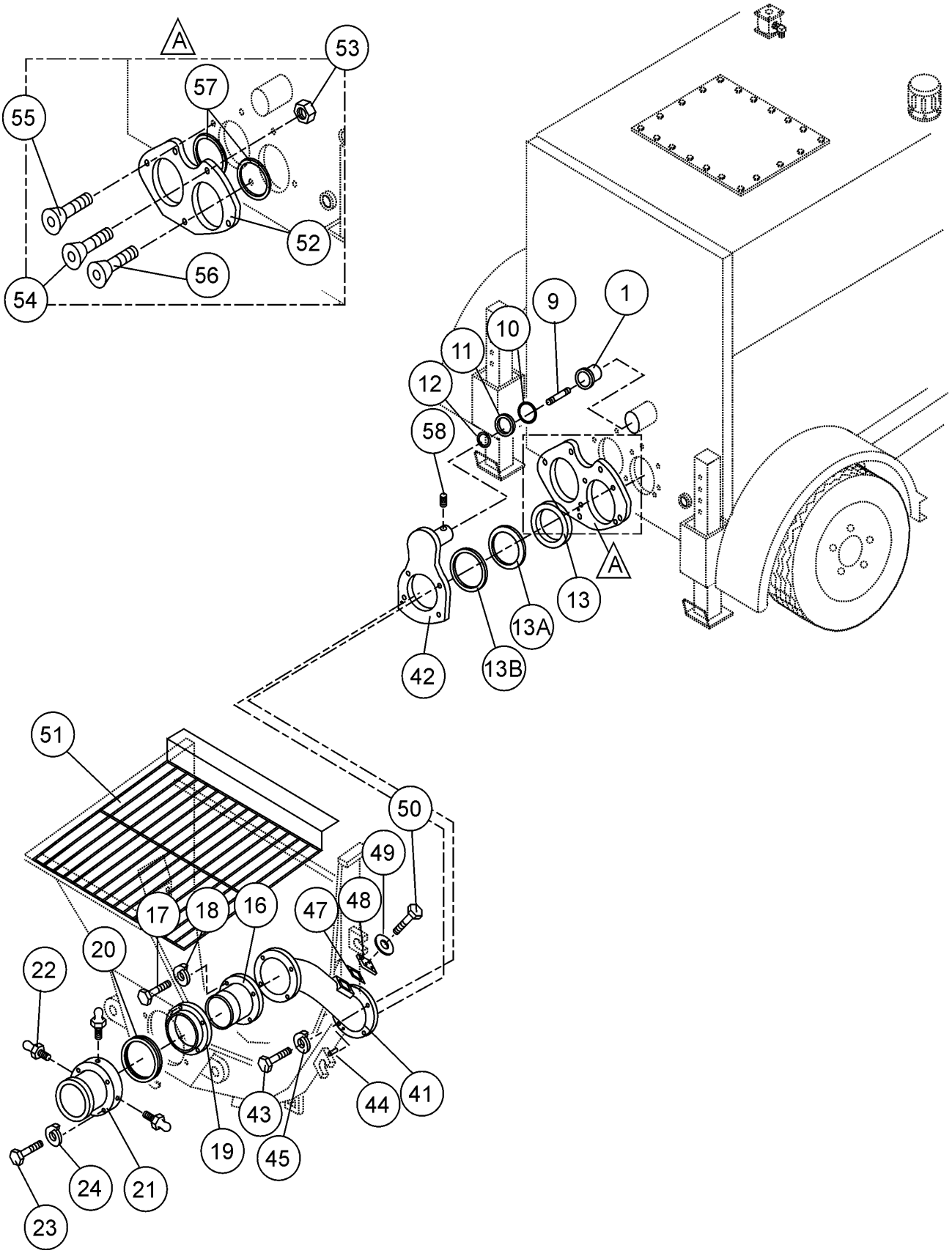


ST-45HRM CE CONCRETE PUMP— HOPPER ATTACHMENT ASSY.

HOPPER ATTACHMENT ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM70134-1	SPLASH PLATE	1	
2	EM16159	HINGE PIN	1	
3	EM491686	COTTER PIN 1/8" x 1-3/4"	2	
4	EM70134-2	SPLASH PLATE PIN	1	
5	EM505723	COTTER PIN 5/32" x 1-1/2"	1	
18	EM16166	ROD TIE, 1"- 8 NC X 28	2	
19	EM505728	NUT, HEX 1" NC	6	
20	EM14165	EYE BOLT	4	
21	EM619	WILLIAMS WASHER 3/4"	4	
22	EM968446	NUT, HEX 3/4"	4	
23	EM505121	BOLT, HEX	4	
24	EM968446	NUT, HEX 3/4"	4	
25	505123	BOLT 1/2" N/C X 2.1/2"	2	
26	EM968446	BOLT 1/2" N/C X 2.1/2"	2	..... REPLACES 492558
27	6109160	NUT, HEX 1/2" X 13	3	

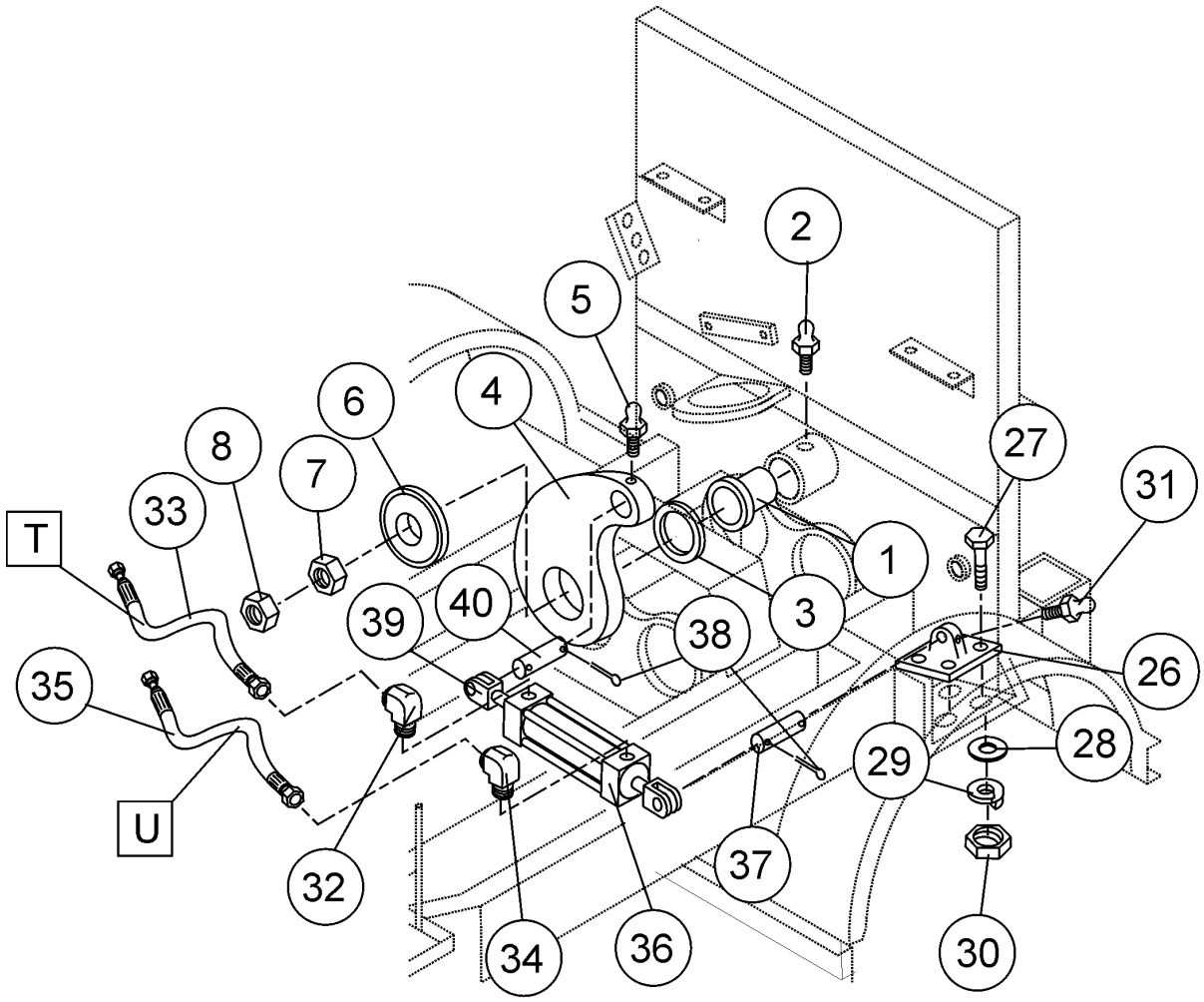
HOPPER INTERIOR ASSY.



HOPPER INTERIOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM16145	SWING AXLE BUSHING	1	
9	EM284	1- 14 X 5 STUD GR8	1	
10	EM16175	O- RING	1	
11	EM16170	SHUTTLE AXLE RING SEAL	1	
12	EM16176	O- RING	1	
13	EM98022	WEAR RING, HARD FACED	1	
13A	EM16816-2	RING, INSERT STEEL	1	
13B	EM16816-1	RING, ENERGIZED RUBBER	1	
14	EM98039	BEVELED RING	4	
16	EM16804	DISCHARGE SLEEVE	1	
17	EM104	BOLT 1/2- 13 X 5	4	
18	EM923348	5/8" LOCK WASHER	4	
19	EM25803	DISCHARGE PLATE BEARING	1	
20	EM98065	SEAL	1	
21	512215	DISCHARGE NIPPLE	1	
22	EM491701	GREASE FITTING	3	
23	EM210	BOLT, HEX 1/2" NC X 3 1/4 G5	6	
24	EM6109180	1/2" LOCK WASHER	6	
41	EM16811	SHUTTLE TUBE	1	
42	EM25843	NUN PLATE	1	
43	EM492393	BOLT, HEX HEAD 1/2" NC X 1 1/4	4	
44	491719	PIN	1	
45	EM923348	5/8 LOCK WASHER	4	
47	EM20816	O- RING	1	
48	EM16802	INSPECTION PLATE	1	
49	EM963102	CAP SCREW, HEX BOLT	4	
50	6109180	1/2" LOCK WASHER	4	
51	EM16188	HOPPER SCREEN	1	
52	EM295	BOLT, COUNTERSUNK 3/4-10 X 2	1	
53	EM969023	NUT LOCK 5/8"	2	
54	EM265	BOLT, FLAT HEAD 5/8"- 11 X 3"	2	
55	EM295	BOLT, FLAT HEAD 3/4"- 10 X 2"	2	
56	EM264	BOLT, HEX SOC 1/2"- 13 X 3"	1	
57	EM16190	"O" RING	2	

SHUTTLE CYLINDER ASSY.



NOTES

T SEE HYDRAULIC

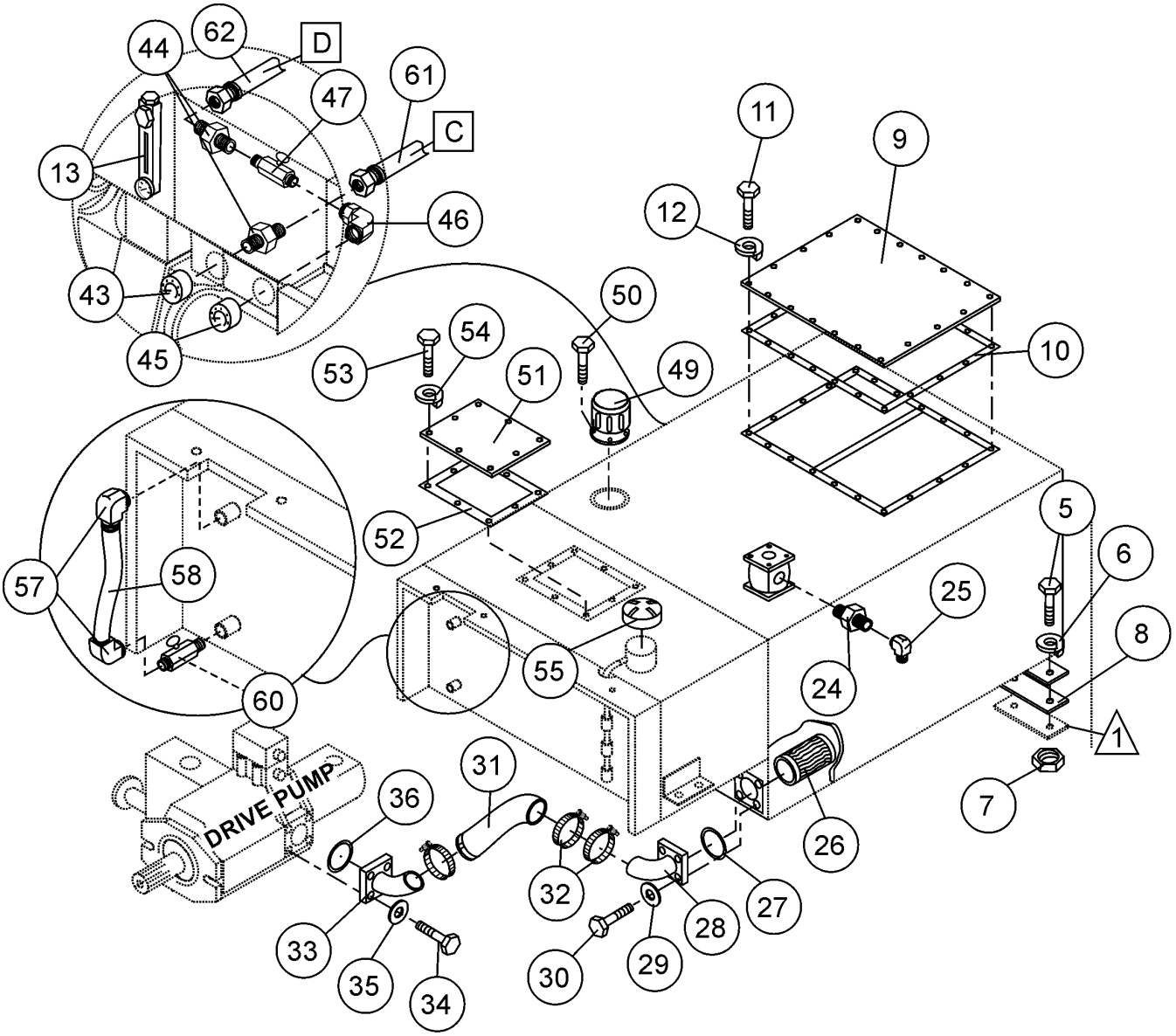
U HOSE CONNECTIONS

SHUTTLE CYLINDER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM16145	SWING AXLE BUSHING	1	
2	510684	GREASE FITTING		
3	EM16169	THRUST WASHER	1	
4	EM25236	SHUTTLE CRANK, SPLINED SHAFT	1	
5	EM505490	GREASE FITTING	1	
6	EM16814	TENSIONER	1	
7	EM458	NUT 1- 14	1	
8	EM417	NUT FLEX LOCK	1	
26	EM254549	PIVOT BRACKET	1	
27	492397	BOLT, HEX 1/2”- 13 X 2 1/2”	4	
28	492600	1/2” FLAT WASHER	4	
29	6109180	1/2” LOCK WASHER	4	
30	492584	1/2” LOCK NUT	4	
31	EM505490	FITTING	1	
32	EM25500	FITTING	1	
33	EM509372	HOSE	1	
34	EM25459	FITTING	1	
35	EM509373	HOSE	1	
36	EM25434	SHUTTLE CYLINDER	1	
37	EM254542	CLEVIS PIN 3/4”	1	BOTTOM OF ITEM 36
38	EM717	COTTER PIN	2	
39	EM254541	FEMALE CLEVIS	2	
40	EM26126	CLEVIS PIN	1	TOP OF ITEM 36

ST-45HRM CE CONCRETE PUMP— FUEL AND HYDRAULIC TANK ASSY.

FUEL AND HYDRAULIC TANK CONNECTIONS ASSY



NOTES

1 PART OF FRAME

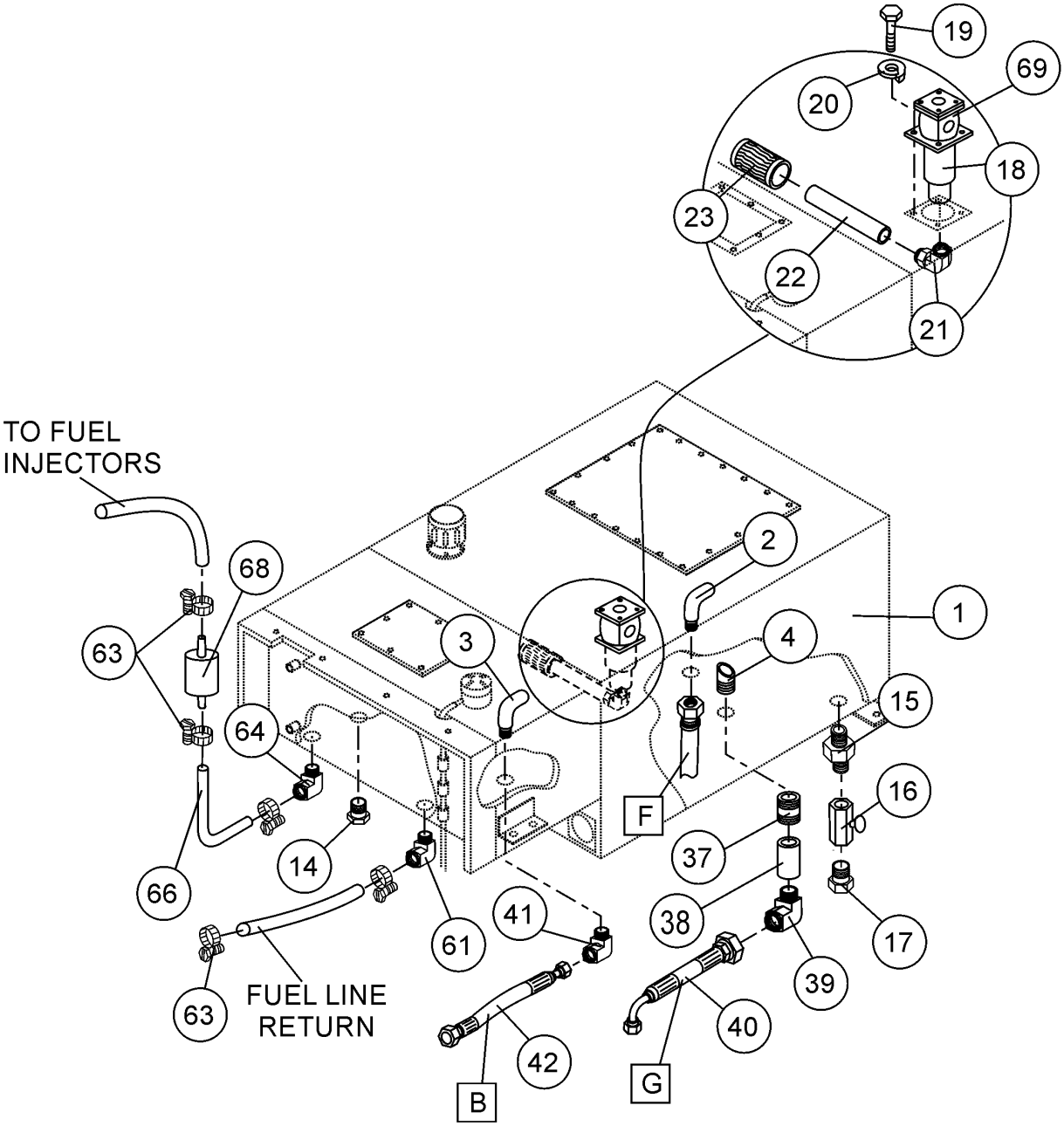
C D SEE HYDRAULIC HOSE CONNECTIONS

ST-45HRM CE CONCRETE PUMP— FUEL AND HYDRAULIC TANK ASSY.

FUEL AND HYDRAULIC TANK CONNECTIONS ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
5	EM963610	BOLT 3/8”	2	
6	3019092	WASHER FLAT 3/8”	2	
7	EM969013	NUT LOCK 3/8”	2	
8	EM25169	GASKET, RUBBER	2	
9	EM251191	TANK COVER PLATE	1	
10	EM25184	RESEVOIR GASKET	1	
11	492364	BOLT HHC 5/16” X 18 X 1”	20	
12	EM923343	WASHER LOCK 5/16” DIAMETER	20	
13	EM16478	SIGHT GAUGE, HYDRAULIC OIL	1	
24	EM16517	BUSHING 912 X 2 RED, REMOVER	1	
25	EM18436	ELBOW, 90 DEGREE MALE	1	
26	EM50424	STRAINER, 2.5 SUCTION	1	
27	EM50466	O- RING	1	
28	EM27441	ELBOW	1	
29	EM635	LOCK 1/2” HI COLLAR	4	
31	EM509437	HOSE	1	
32	EM26471	CLAM 2”	4	
33	EM27442	ELBOW	1	
34	EM963692	BOLT 1/2” UNC X 1- 1/2”	4	
35	EM635	LOCK 1/2”	4	
36	509436	O-RING	1	
43	EM90766	GAUGE 3000 PSI	1	
44	EM25523	ADAPTER 4- 4- GTX- S	1	
45	EM97067	GAUGE 5000 PSI	1	
46	EM491396	ELBOW	1	
47	EM16414	VALVE NEEDLE	1	
49	EM16477	CAP HYDRAULIC OIL TANK	1	
50	492267	BOLT, ALLEN 3/16” DIAMETER	6	
51	511010	COVER PLATE	1	
52	511012	GASKET	1	
53	492357	BOLT HHC 1/4”- 20 X 12	8	
54	2101402	WASHER LOCK 1/4” DIAMETER	8	
55	EM25217	FUEL FILLER CAP- BR	1	
57	20426	90° FITTING	1	
58	508827	HOSE, FUEL GAUGE	1	
60	EM20421	FITTING, BALL END CNTRL, CABLE	1	
61	509517	HOSE	1	
62	509516	HOSE	1	

FUEL AND HYDRAULIC TANK ASSY. (CONTINUED)



NOTES

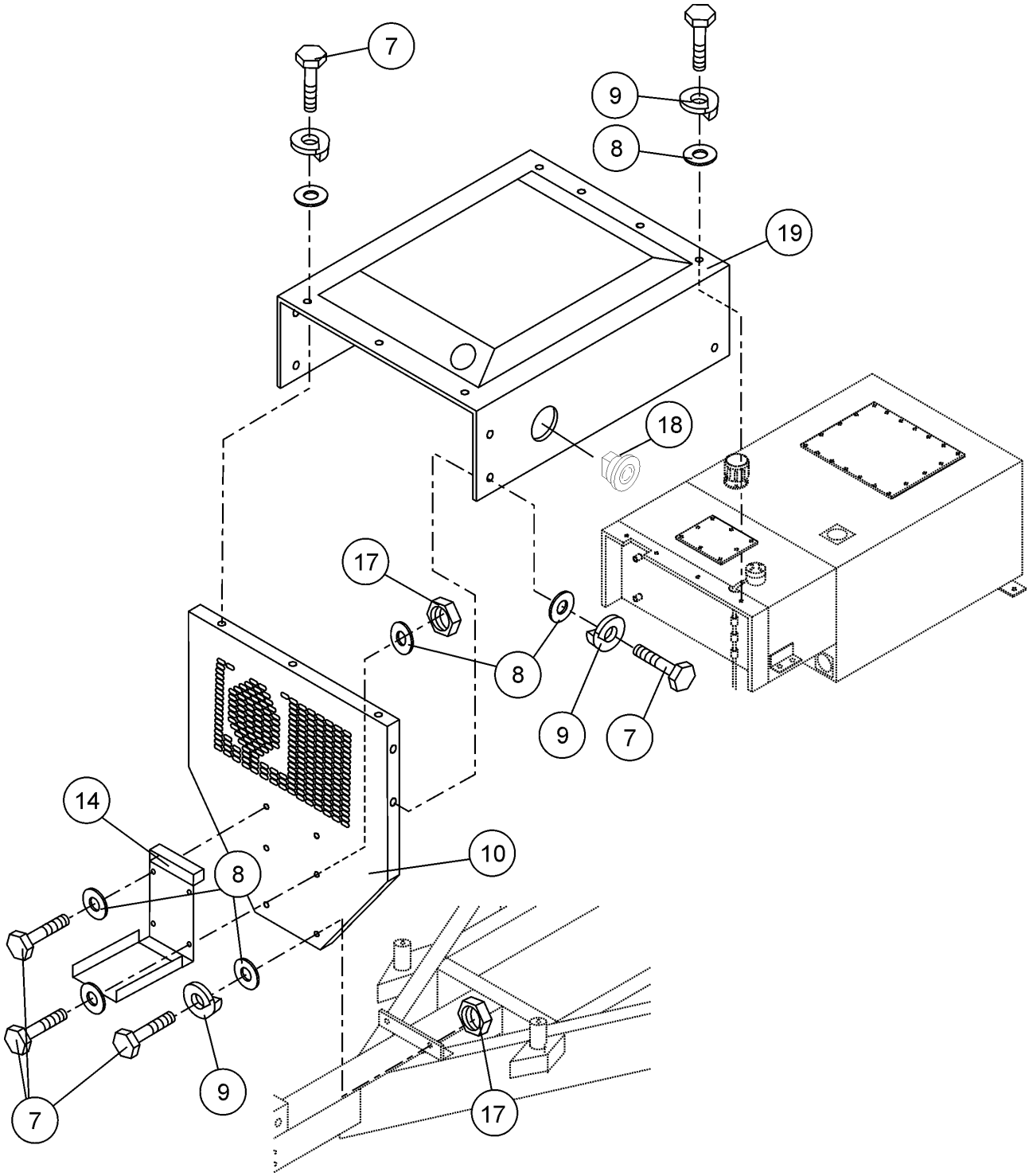
B F G SEE HYDRAULIC HOSE CONNECTIONS

ST-45HRM CE CONCRETE PUMP— FUEL AND HYDRAULIC TANK ASSY.

FUEL AND HYDRAULIC TANK ASSY. (CONTINUED)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	509772	RESERVOIR, FUEL AND HYDRAULIC OIL	1	
2	509786	ELBOW, SUCTION	1	
3	510591	ELBOW	1	
4	491164	SUCTION NIPPLE 3/4”	1	
14	EM18447	PLUG 3/4” PIPE SQ H	1	
15	509369	ADAPTER 1/2- FF- S	1	
16	491237	GATE VALVE 1/2” NPT FEMALE VALVE	1	
17	506094	PLUG 1/2” NPT GALVANIZED	1	
18	16512	RETURN FILTER ASSY.	1	
19	EM963610	CAP SCREW	4	
20	0166A	WASHER, LOCK 3/8” DIAMETER	4	
21	16433	ELBOW	1	
22	16516	TUBE	1	
23	EM16513	DEFUSER	1	
37	510674	NIPPLE 1-1/4” x 2-1/2”	1	
38	509794	COUPLING GALV 1 1/4”	1	
39	EM509795	ELBOW, 1- 1/4 PIPE/ 1- 1/4 JIC	1	
40	510675	HOSE	1	
41	EM510676	ELBOW	1	
42	EM509371	HOSE	1	
61	20426	FITTING	1	
62	512769	HOSE, FUEL	1	
63	506208	CLAMP, HOSE	2	
64	20426	FITTING	1	
68	EM20763	FILTER, FUEL	1	
69	EM165121	RETURN FILTER ELEMENT	1	

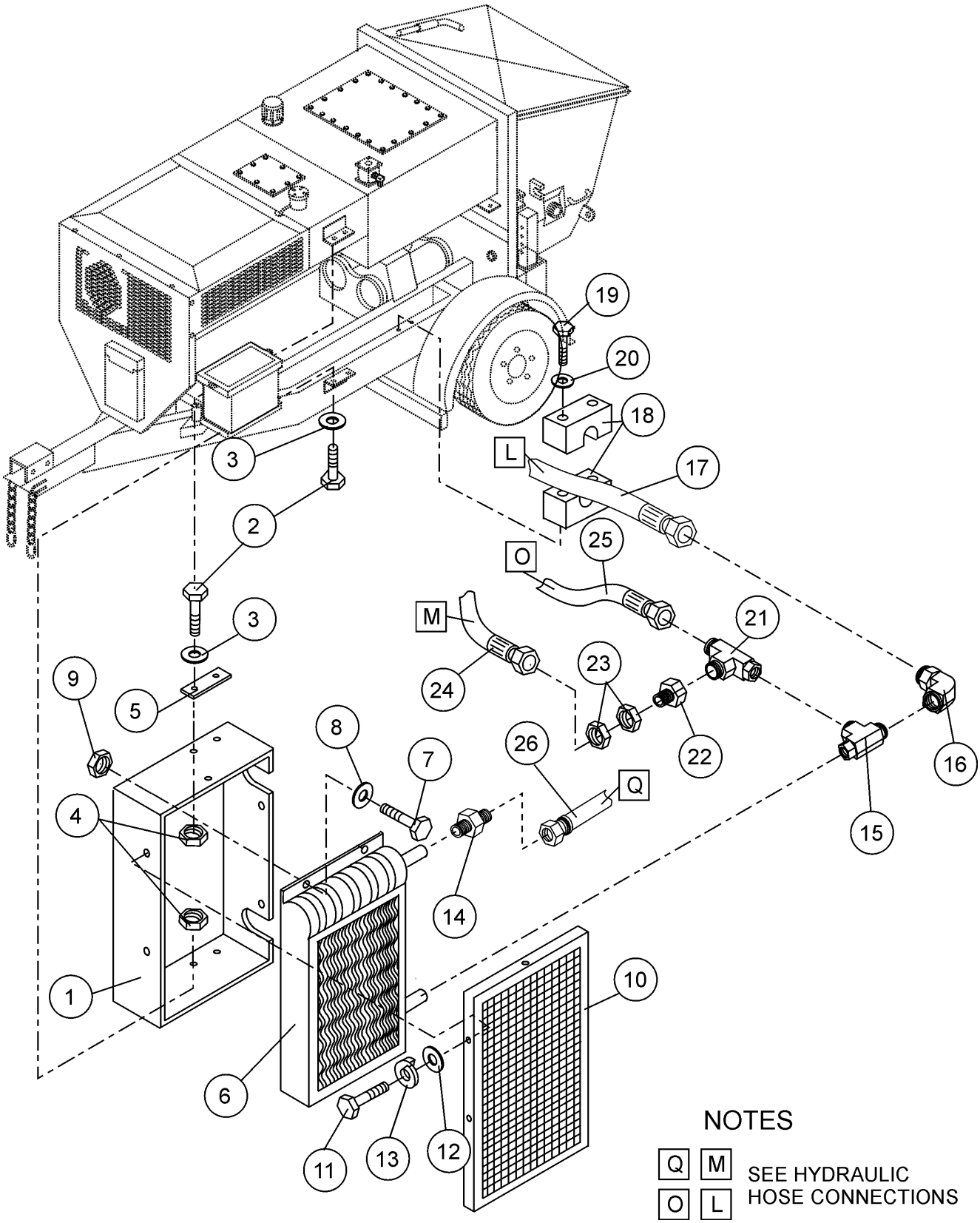
FRONT COVER ASSY.



FRONT COVER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
7	EM963003	BOLT 1/4" NC X 3/4"	19	
8	EM923057	WASHER, FLAT 1/4"	23	
9	2101402	WASHER, LOCK 1/4" DIAMETER	15	
10	EM510271	COVER, FRONT	1	SAFETY ITEM
14	29057	DOCUMENT BOX	1	
17	EM969079	NUT LOCK NYLOC 1/4"	4	
18	EM97063	EMERGENCY STOP SWITCH	1	SAFETY ITEM
19	510687	COVER, TOP	1	SAFETY ITEM

HEAT EXCHANGER ASSY.

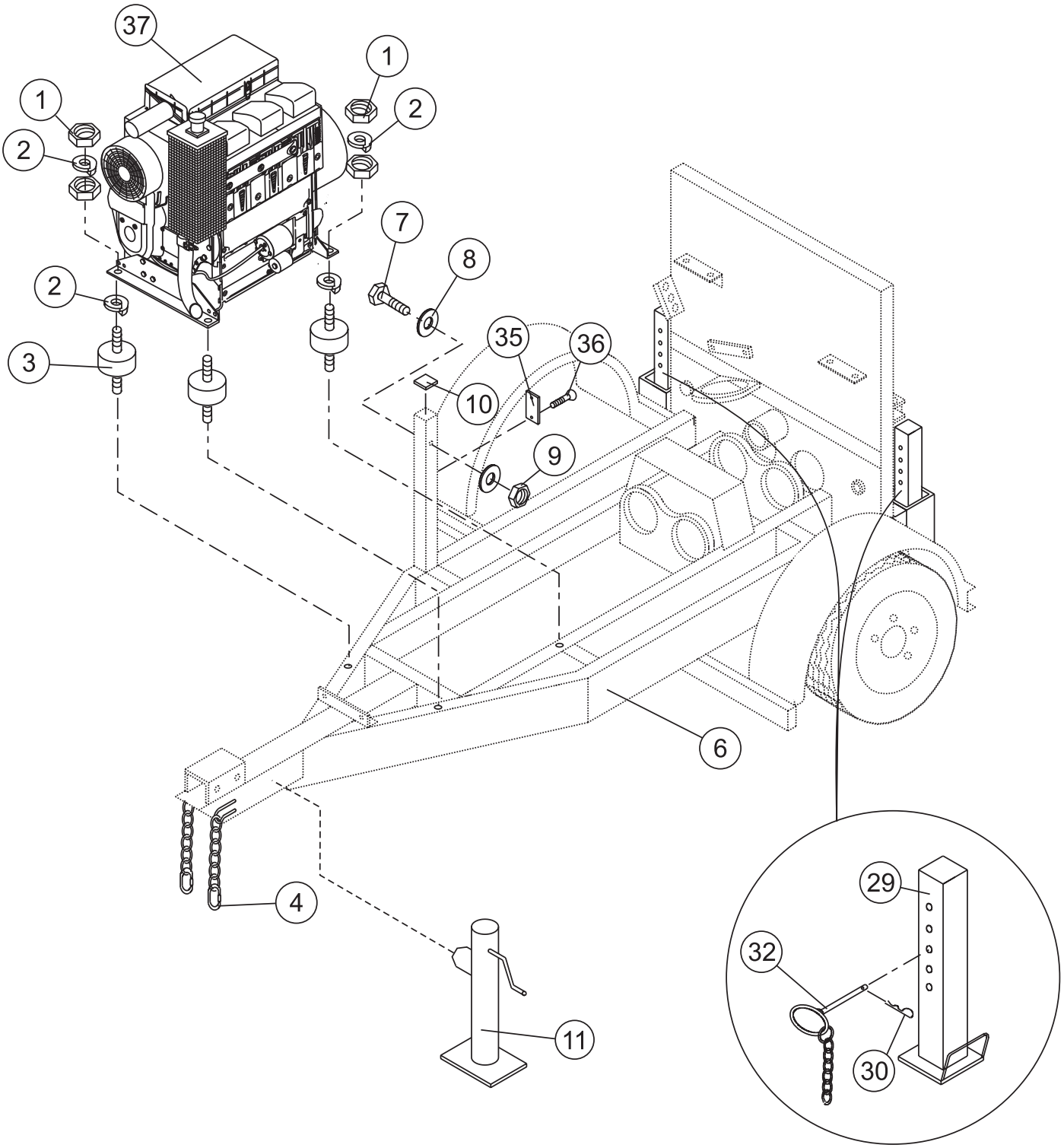


HEAT EXCHANGER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM509802	GUARD, HEAT EXCHANGER	1	
2	EM963610	BOLT 3/8"	4	
3	3019892	WASHER, FLAT 3/8"	6	
4	EM969013	NUT, LOCK 3/8"	4	
5	EM25171	GASKET, RUBBER	1	
6	EM98049	HEAT EXCHANGER	1	
7	492364	SCREW HHC 5/16" X 18 X 1"	4	
8	EM923023	WASHER, FLAT 5/16"	4	
9	2105164	NUT, NYLON 5/16"- 18	4	
10	EM509805	COVER	1	SAFETY ITEM
11	EM963003	BOLT 1/4" NC X 3/4"	6	
12	EM923057	WASHER, FLAT 1/4"	6	
13	2101402	WASHER, LOCK 1/4"	6	
14	EM25498	FITTING, HYDRAULIC	1	
15	EM25566	TEE, FITTING	1	
16	EM509401	ELBOW	1	
17	EM509400	HOSE	1	
18	EM98048	CLAMP	1	
20	EM492625	WASHER LOCK 7/16"	2	
21	EM509344	TEE, FITTING	1	
22	EM509345	FITTING	1	
23	EM509402	NUT	1	
24	EM509378	HOSE, HYDRAULIC	1	
25	EM510984	HOSE, HYDRAULIC	1	
26	EM509374	HOSE, HYDRAULIC	1	

ST-45HRM CE CONCRETE PUMP— ENGINE AND FRAME ASSY.

ENGINE AND FRAME ASSY

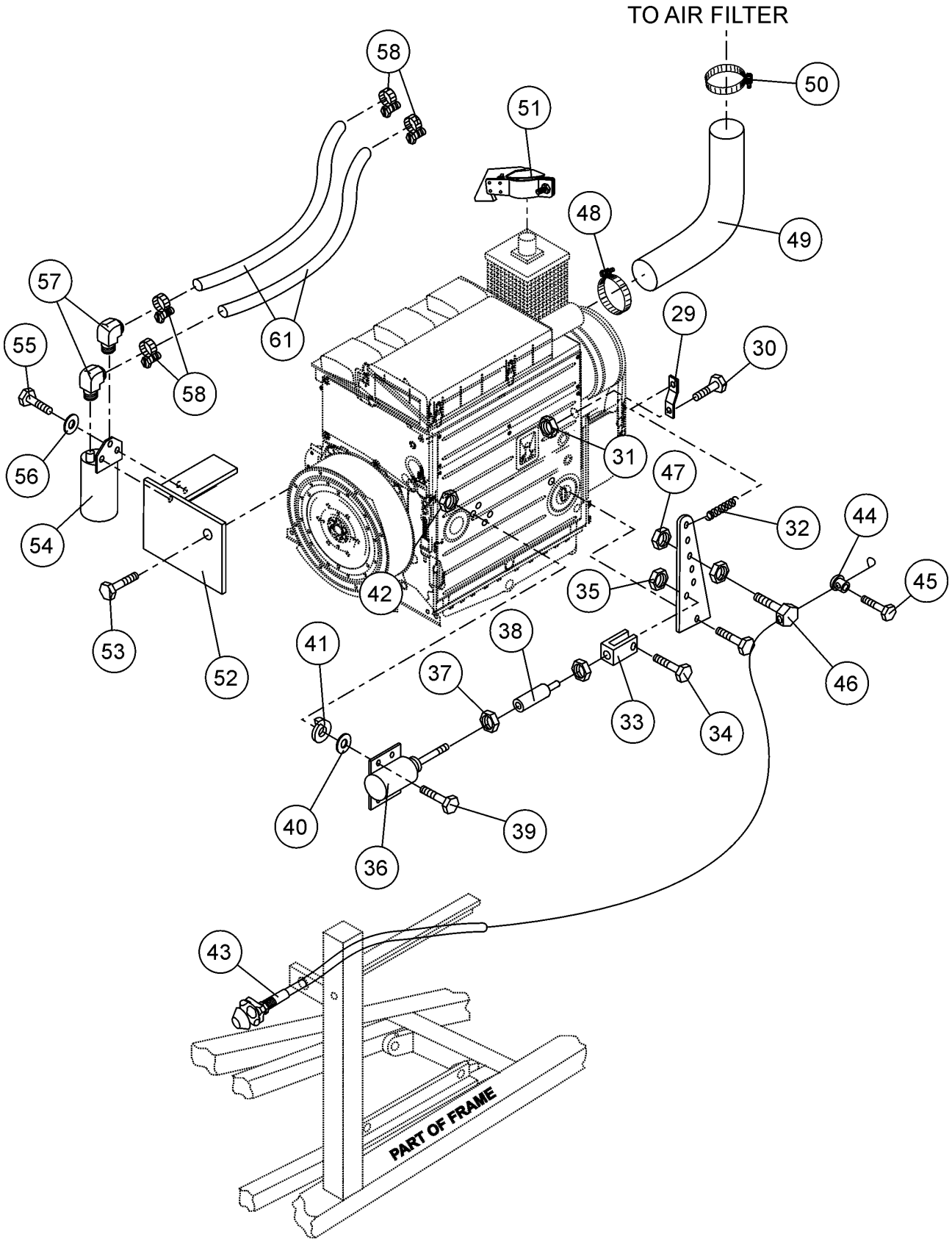


ENGINE AND FRAME ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	020310080	NUT	8	
2	030210250	WASHER, LOCK	8	
3	EM23118	SHOCK MOUNT	4	
4	EM01005	CONNECTOR LINK, CHAIN	2	
6	509405	FRAME, MAIN	1	
7	503117	BOLT, HEX 3/8”	2	
8	3019092	WASHER 3/8”	2	
9	EM969013	NUT, NYLOC	1	
10	508776	RUBBER PAD	1	
11	EM25610	JACK STAND, FRONT	1	
29	EM70186	JACK STAND, REAR	2	
30	EM745	PIN	2	
31	EM744	CLEVIS PIN 1/2” X 4”	2	
32	EM20732	CONNECTOR	2	
35	EM942	TAG, IDENTIFICATION	1	
36	491744	RIVET	2	
37	EM60701	HATZ DIESEL ENGINE 57HP	1	

ST-45HRM CE CONCRETE PUMP—THROTTLE AND WATER FILTER ASSY.

THROTTLE AND WATER FILTER ASSY.

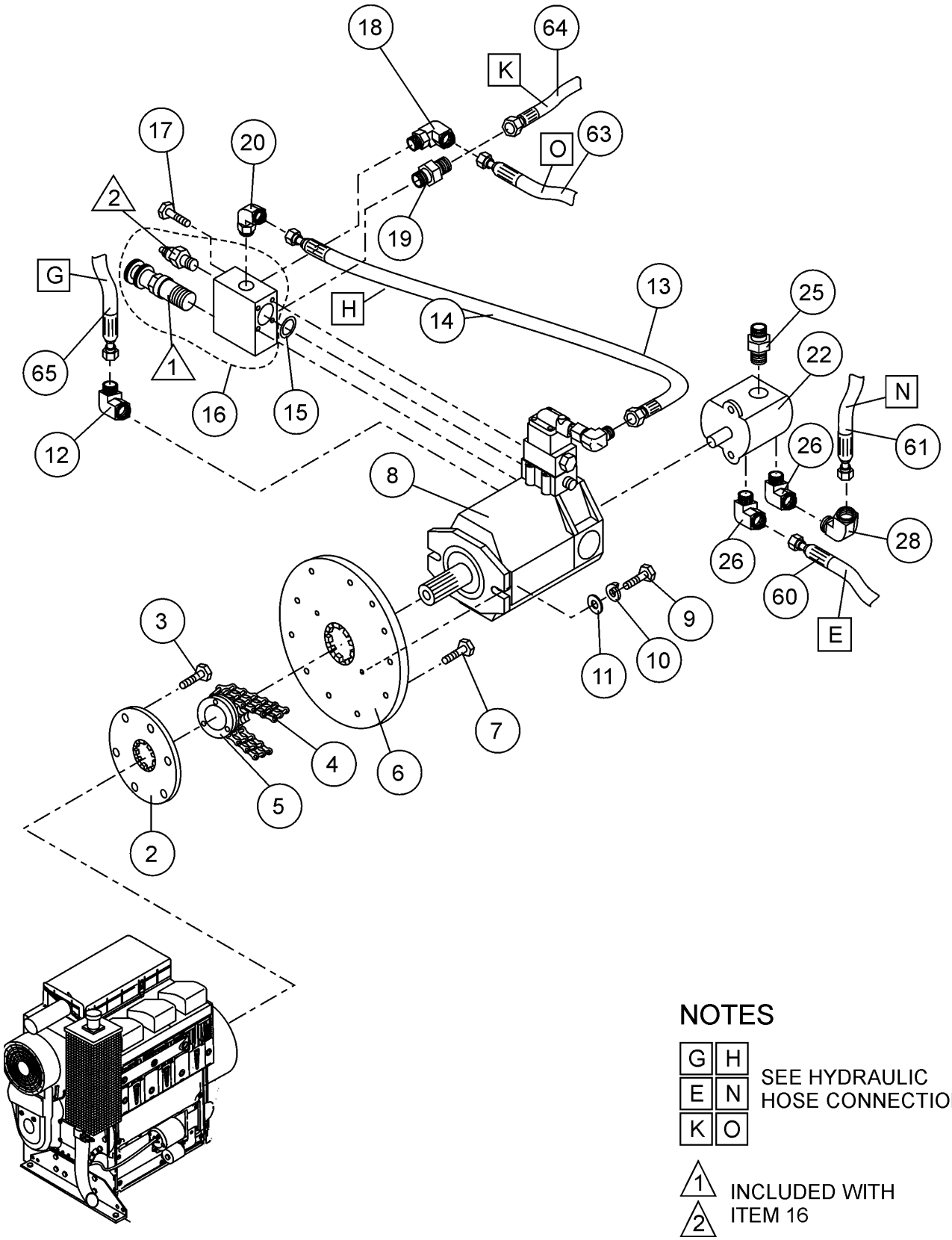


ST-45HRM CE CONCRETE PUMP— THROTTLE AND WATER FILTER ASSY.

THROTTLE AND WATER FILTER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
29	EM509414	BRACKET	1	
31	EM969013	NUT LOCK 3/8”	1	
32	EM509510	SPRING	1	
33	EM959119	CLEVIS YOKE 1/4- 28	1	
34	492357	SCREW HHC 1/4”- 20 X 12	1	
35	EM959179	NUT LOCK NYLOC 1/4”	1	
36	EM207091	KIT, SOLENOID W/BRACKET	1	
37	EM968435	NUT 1/4”- 20” HEX	2	
38	EM26315	SAFETY LINK ASSEMBLY	1	
39	EM963003	BOLT 1/4” NC X 3/4”	4	
40	2101402	WASHER, LOCK 1/4” DIAMETER	4	
41	EM923057	WASHER, FLAT 1/4”	4	
42	492561	NUT, HEX 1/4”- 20	4	
43	510229	CABLE THROTTLE ASSY.	1	
44	EM501102	BUSHING, LOCK	1	
45	EM491089	BOLT	1	
46	492364	SCREW HHC 5/16” X 18 X 1”	1	
47	2105164	NUT NYLON 5/16- 18	2	
48	510732	HOSE CLAMP	1	
49	EM510733	HOSE	1	
50	510725	CLAMP	1	
51	EM510731	CAP, RAIN	1	
52	EM509449	BRACKET	1	
53	EM269	M10 X 30MM SOC HDCS	2	
54	EM16747	FILTER ASSY, WATER SEPERATOR	1	
55	EM963003	BOLT 1/4” NC X 3/4”	3	
56	2101402	WASHER, LOCK 1/4” DIAMETER	3	
57	EM20426	FITTING	4	
58	506208	CLAMP	2	
61	512790	HOSE, FUEL	1	

HYDRAULIC PUMP ASSY.



NOTES

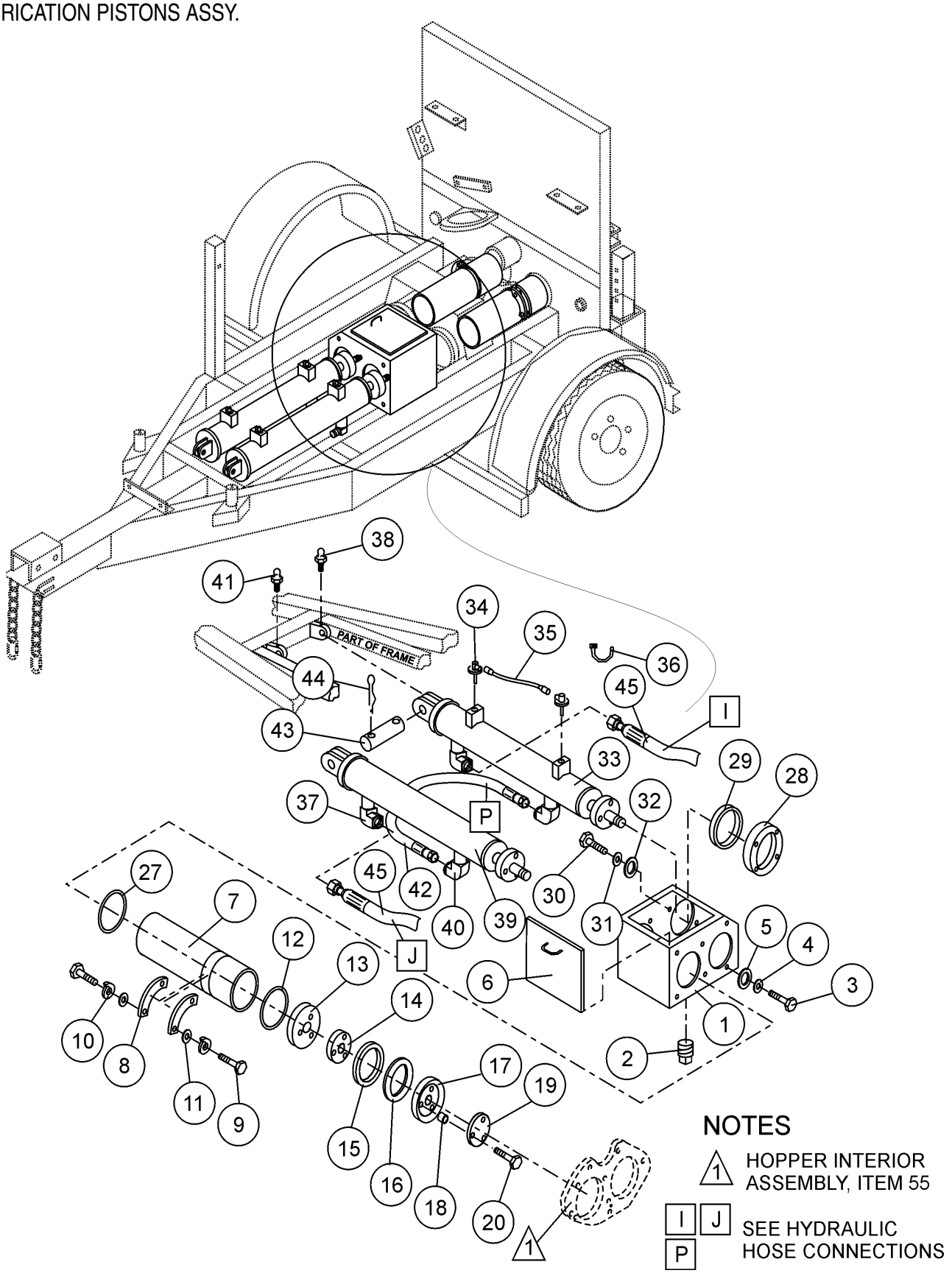
G H E N K O — SEE HYDRAULIC HOSE CONNECTIONS

1 2 — INCLUDED WITH ITEM 16

HYDRAULIC PUMP ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
2	EM16306	COUPLING, ENGINE	1	
3	EM146	BOLT 12 MM X 1" ALLEN HEAD	6	
4	EM16303	COUPLING, CHAIN	1	
5	EM16302	COUPLING, PUMP	1	
6	EM16741	COVER, ENGINE	1	
7	EM162	BOLT 10 X 25MM SOC. HEAD	10	
8	EM98025	PUMP, PISTON	1	
9	EM510902	SCREW	2	
10	EM635	WASHER, LOCK 1/2"	2	
11	492600	WASHER, FLAT 1/2" DIAMETER	2	
12	EM25507	FITTING 8C5 X- S	1	
13	EM25429	ELBOW 6801- 04- 04	1	
14	EM509366	HOSE	1	
15	EM505533	O- RING	1	
16	EM97001	MANIFOLD ASSY.	1	
17	EM509341	BOLT, ALLEN 3/8"- 16 X 5"	4	
18	EM25497	FILTTING	1	
20	EM25429	ELBOW 6801- 04- 04	1	
22	EM97002	PUMP, DUAL GEAR	1	
23	EM963610	CAP SCREW	2	
24	0166 A	WASHER, LOCK 3/8" DIAMETER	2	
25	EM25498	FITTING - ADAPTOR	1	
26	EM16524	FITTING, 90°	1	
28	506195	FITTING, 90°	1	
60	509637	HOSE	1	
61	509370	HOSE	1	
63	510984	HOSE	1	
64	509374	HOSE	1	
65	509371	HOSE	1	

LUBRICATION PISTONS ASSY.

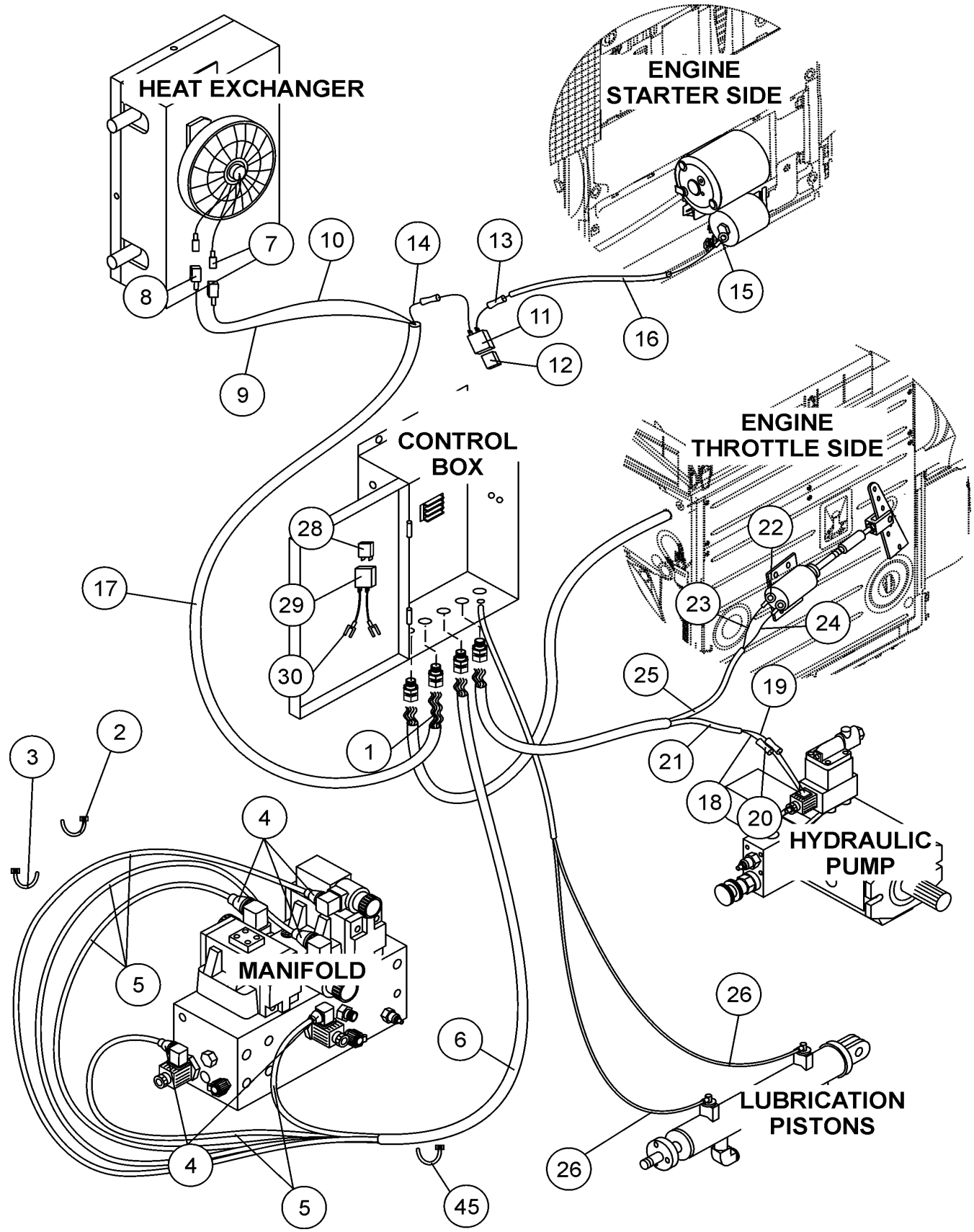


ST-45HRM CE CONCRETE PUMP— LUBRICATION PISTONS ASSY.

LUBRICATION PISTONS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	510749	LUBRICATION BOX	1	
2	EM507895	PLUG	1	
3	492378	BOLT G5 HHCS	6	
4	3019092	WASHER, FLAT 3/8”	6	
5	0166A	WASHER, LOCK3/8” DIAMETER	6	
6	510755	COVER, LUBRICATION BOX	1	
7	EM80801	CYLINDER, CONCRETE	2	
8	EM25110	RETAINER, CYLINDER	4	
9	EM963610	CAP SCREW	8	
10	EM0166A	WASHER LOCK 3/8” DIAMETER	8	
11	3019092	WASHER FLAT 3/8”	8	
12	EM14407	O- RING, OILER PLATE	2	
13	EM98033	OILER PLATE	2	
14	EM16462	FELT HOLDER	2	
15	EM16493	RING, FELT	2	
16	EM14408	RING, BRONZE	2	
17	EM98050	CUP, PISTON- ORANGE	2	
18	EM16465	PISTON CUP SPACER	6	
19	EM16464	FACE PLATE	2	
20	510265	BOLT, HEX HEAD 3/8 NC x 3-1/4 IN GS	6	
27	EM16174	O- RING	2	
28	EM50425	FLANGE, RING	2	
29	EM274351	SEAL LUBE BOX	2	
30	EM492451	BOLT 3/8”- 24 X 1” HEX HEAD	8	
31	3019092	WASHER, FLAT 3/8”	8	
32	EM50443	SEAL, OIL BOX	8	
33	510516	CYLINDER, DRIVE	1	
34	EM97024	SWITCH PROXIMITY	2	
35	EM97025	CABLE PROXIMITY SWITCH	2	
36	504505	WRAP TIE	8	
37	EM25497	FITTING, 90°	2	
38	EM491701	FITTING, GREASE	2	
39	510515	CYLINDER, SLAVE	1	
40	EM25497	FITTING, 90°	2	
42	EM25474	HOSE, HYDRAULIC	1	
43	EM16454	PIN, WRIST	2	
44	505723	PIN, COTTER	4	
45	EM509511	HOSE, HYDRAULIC	2	

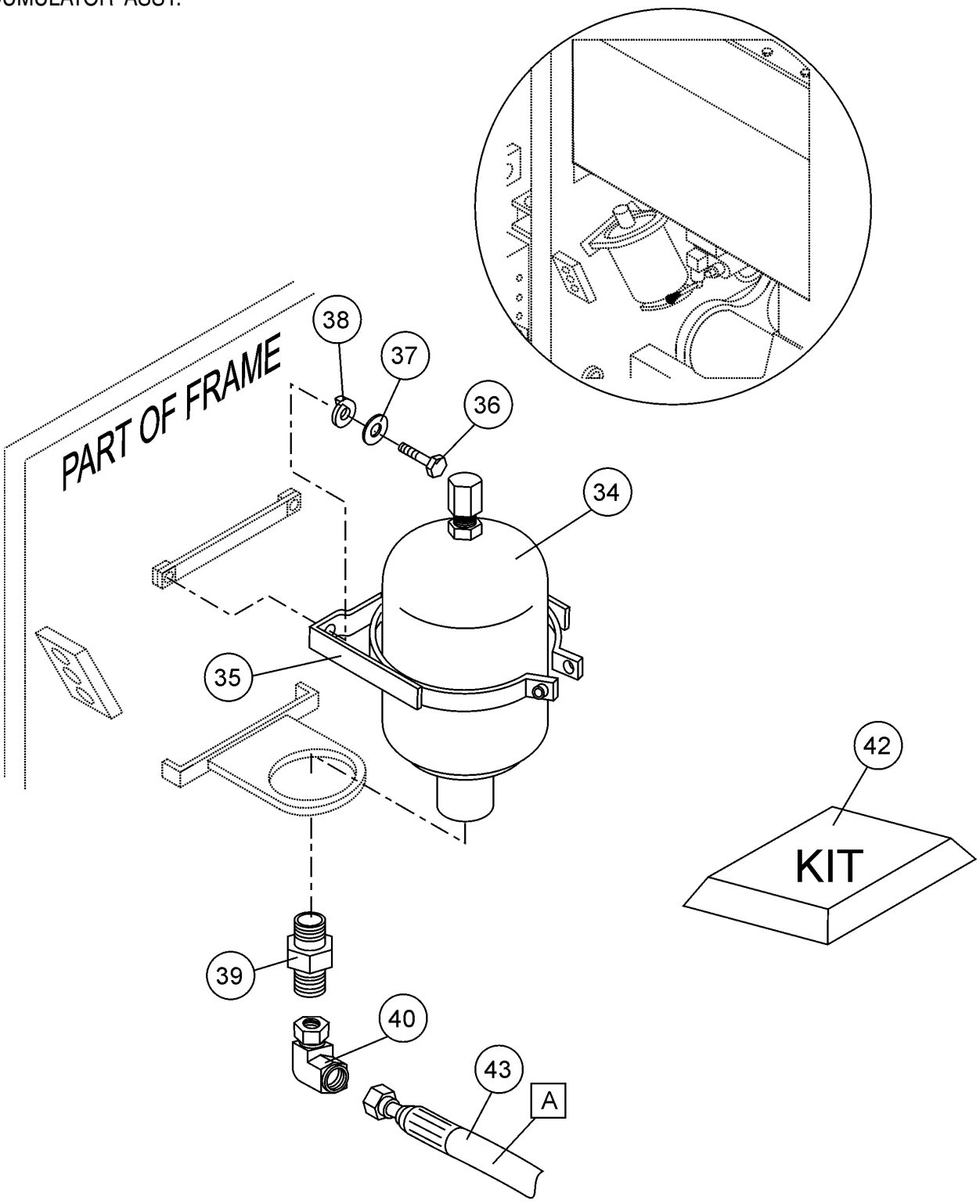
ELECTRICAL SYSTEM ASSY.



ELECTRICAL SYSTEM ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	512759	CABLE HARNESS	1	
2	491028	CABLE WRAP	5	
3	491030	CABLE WRAP	5	
4	EM256073	CONNECTOR BOOT II	5	
5	512760	CONDUCTOR CABLES	5	
6	512761	SHIELD, CABLE	1	
7	505303	TERMINAL CONNECTION	2	
8	508437	TERMINAL CONNECTOR	2	
9	512762	WIRE, HEAT EXCHANGER	1	WHITE
10	512763	WIRE, HEAT EXCHANGER	1	BLUE
11	EM98066	HOLDER, FUSE	1	
12	508632	FUSE 25 AMP	1	
13	508259	CONNECTOR	2	
14	512764	WIRE - 1.5M	1	RED
15	504984	TERMINAL CONNECTOR 3.8”	1	
16	512800	STARTER CONDUCTOR CABLE	1	
17	512801	SHIELD, CABLE	1	
18	512802	WIRE, PUMP	1	BLUE
19	512803	PUMP WIRE	1	
20	508259	CONNECTOR	2	
21	512804	PUMP CONDUCTOR CABLES	1	
22	491894	TERMINAL CONNECTOR	2	BLUE
23	512805	CABLE, SOLENOID	1	RED
24	512806	CABLE, SOLENOID	1	WHITE
25	512807	CABLE, SOLENOID CONDUCTOR	1	
26	EM97025	CABLE, PROXIMITY SWITCH	2	
28	508632	FUSE 25 AMPS	1	
29	508238	BLOCK FUSE	1	
30	505501	FUSE TERMINAL	2	

ACCUMULATOR ASSY.



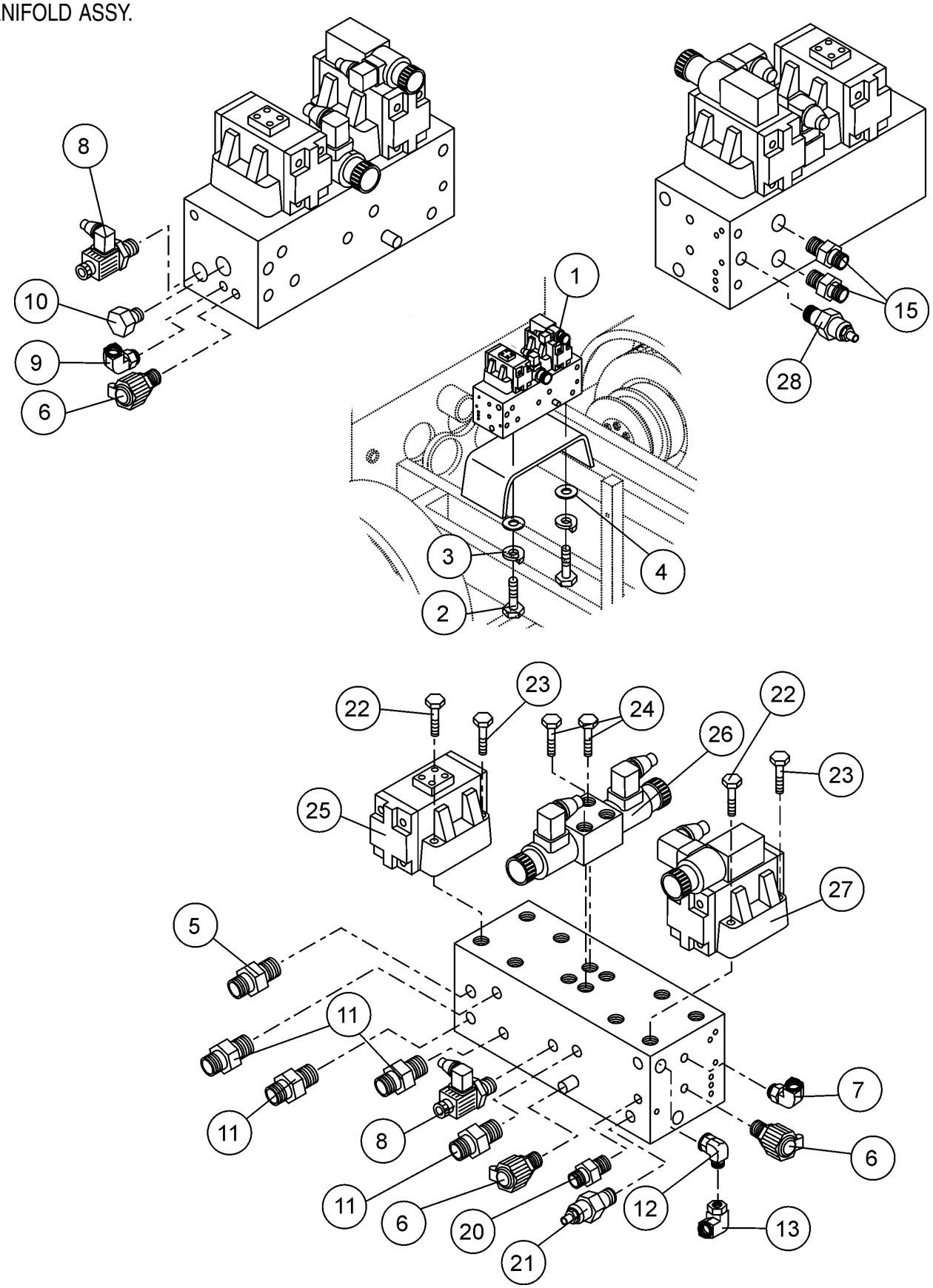
NOTES

A SEE HYDRAULIC HOSE CONNECTIONS

ACCUMULATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
34	EM97015	ACCUMULATOR 1 GALLON	1	
35	EM97016	BRACKET, ACCUMULATOR	1	
36	EM9603055	HHCS 3/8" DIAMETER	2	
37	3019092	WASHER, FLAT 3/8"	2	
38	0166A	WASHER, LOCK 3/8" DIAMETER	2	
39	EM509425	FITTING	1	
40	EM509353	ELBOW	1	
42	EM98009	ACCUMULATOR REPAIR KIT	1	
43	509372	HOSE, ACCUMULATOR	1	

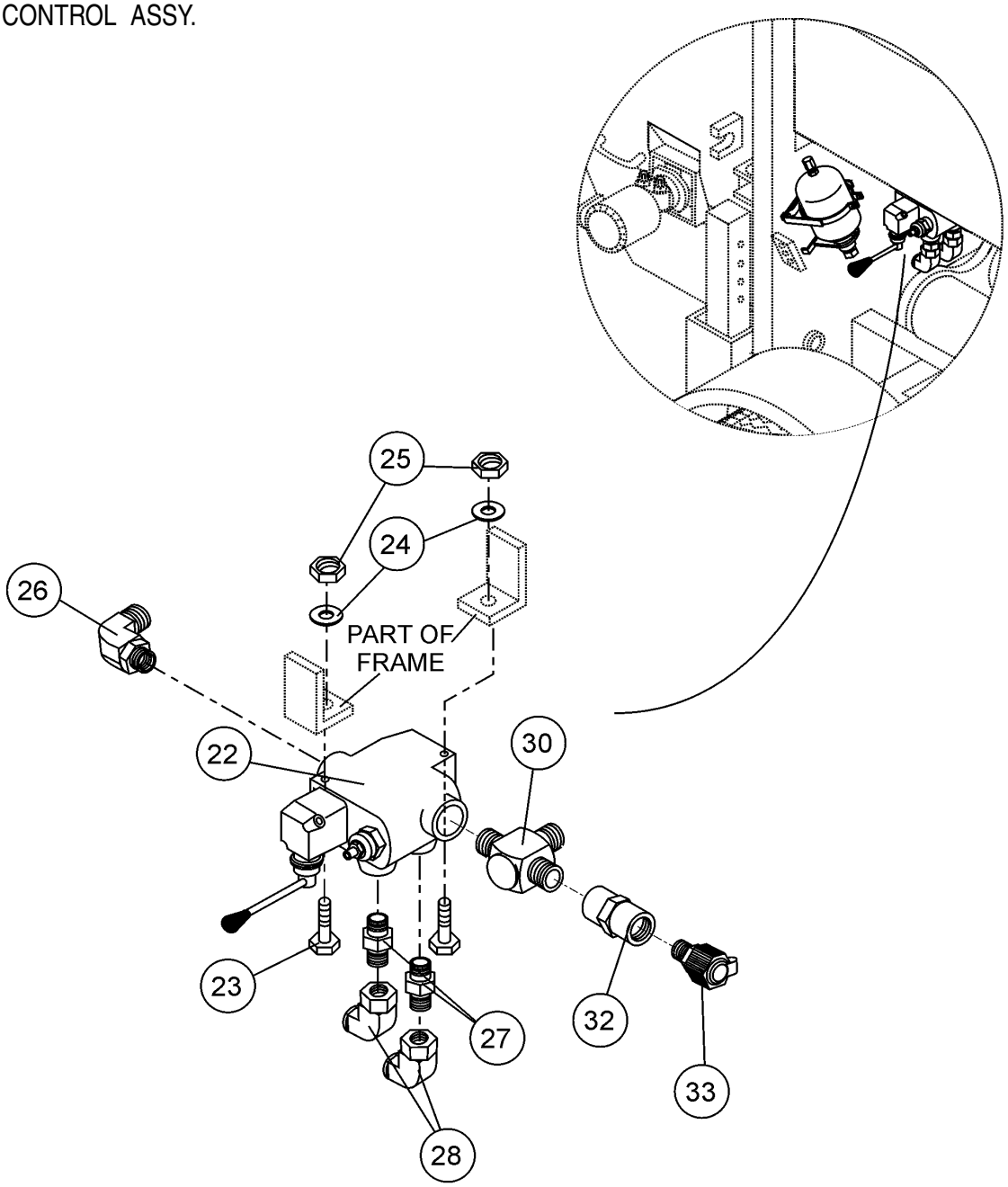
MANIFOLD ASSY.



MANIFOLD ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97000	MANIFOLD ASSY.	1	
2	EM963610	BOLT 3/8”	4	
3	3019092	WASHER, FLAT 3/8”	4	
4	0166 A	WASHER, LOCK 3/8” DIAMETER	4	
5	EM25462	STRAIGHT CONNECTOR 12- 16F5X	1	
6	EM98018	TEST PORT	3	
7	EM25429	ADAPTOR, ELBOW 6801- 04- 04	2	
8	EM98015	TEST PORT	2	
9	EM25429	ADAPTOR, ELBOW	1	
10	EM98006	PLUG	1	
11	EM25498	FITTING, HYDRAULIC	4	
12	EM509352	ADAPTOR, ELBOW	1	
13	EM509353	ADAPTOR, ELBOW	1	
15	EM25462	STRAIGHT CONNECTOR 12- 16F5X	2	
20	EM509398	ADAPTER	1	
21	EM97010	CARTRIDGE, PILOT RELIEF	1	
22	EM50932	SOCKET HEAD 3/8”-NCx2.5”	8	
23	EM196	SOCKET HEAD 1/4”-NCx2.25”	4	
24	EM508804	SOCKET HEAD 10-NCx2”	4	
25	EM97011	DIRECTIONAL CONTROL VALVE	1	
26	EM97002	PILOT VALVE	1	
27	EM97013	DIRECTIONAL CONTROL VALVE	1	
28	EM97008	CARTRIDGE, UNLOADING VALVE	1	

REMIXER CONTROL ASSY.



NOTES

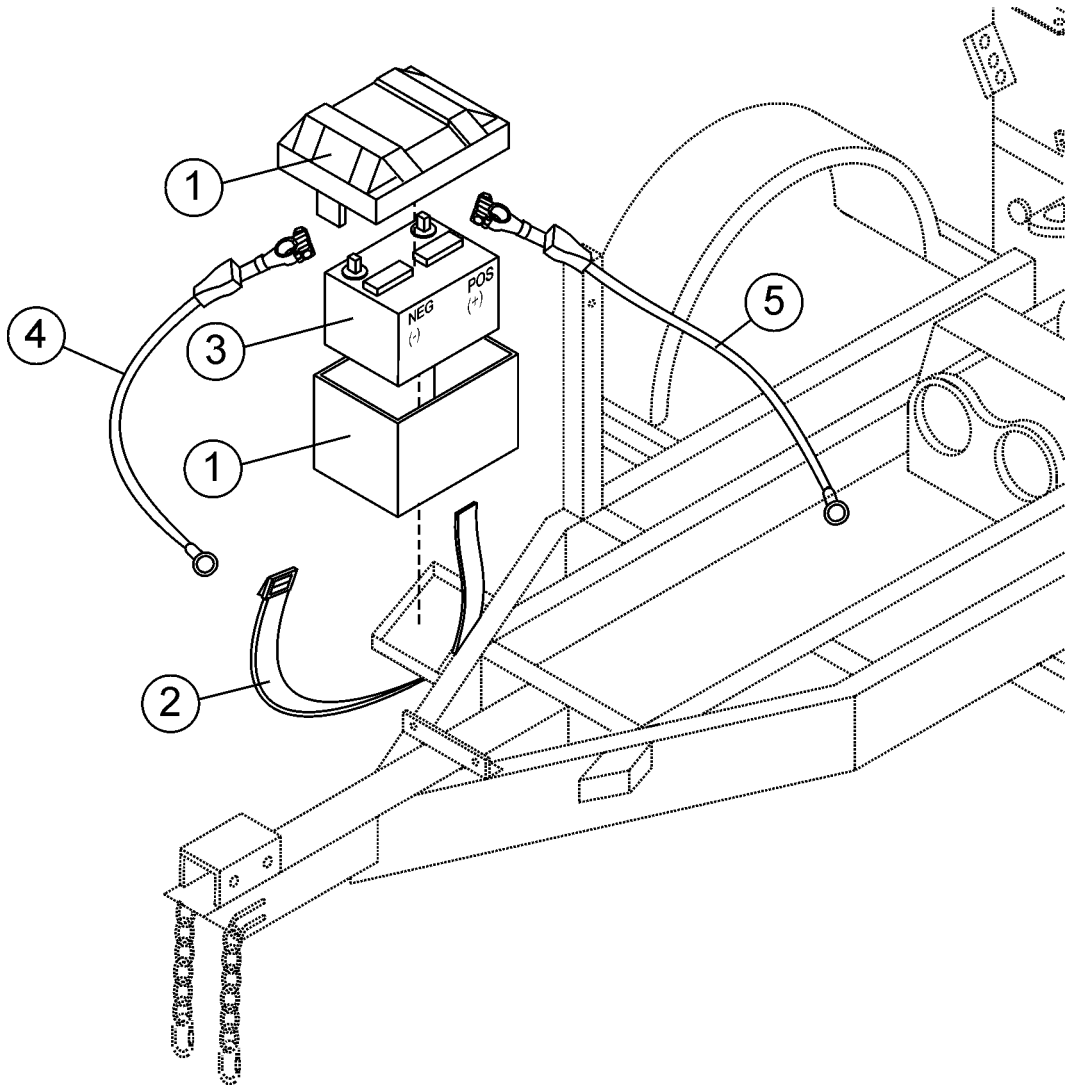
M N R S SEE HYDRAULIC HOSE CONNECTIONS

ST-45HRM CE CONCRETE PUMP— REMIXER CONTROL ASSY.

REMIXER CONTROL ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
22	EM97017	VALVE REMIX W/LEVER	1	
23	EM218	BOLT 5/16”- 18 X 2, 1/2HXHDCS	2	
24	EM923343	WASHER, LOCK 5/16” DIAMETER	2	
25	492553	NUT, HEX 5/16” DIAMETER- NC	2	
26	EM25507	FITTING, 90°	1	
27	EM512655	ADAPTER	2	
28	506195	FITTING, 90°	2	
30	EM25563	TEE, CUSTOM	1	
32	EM98012	ADAPTER GAUGE	1	
33	EM98015	COUPLING, TEST PORT	1	

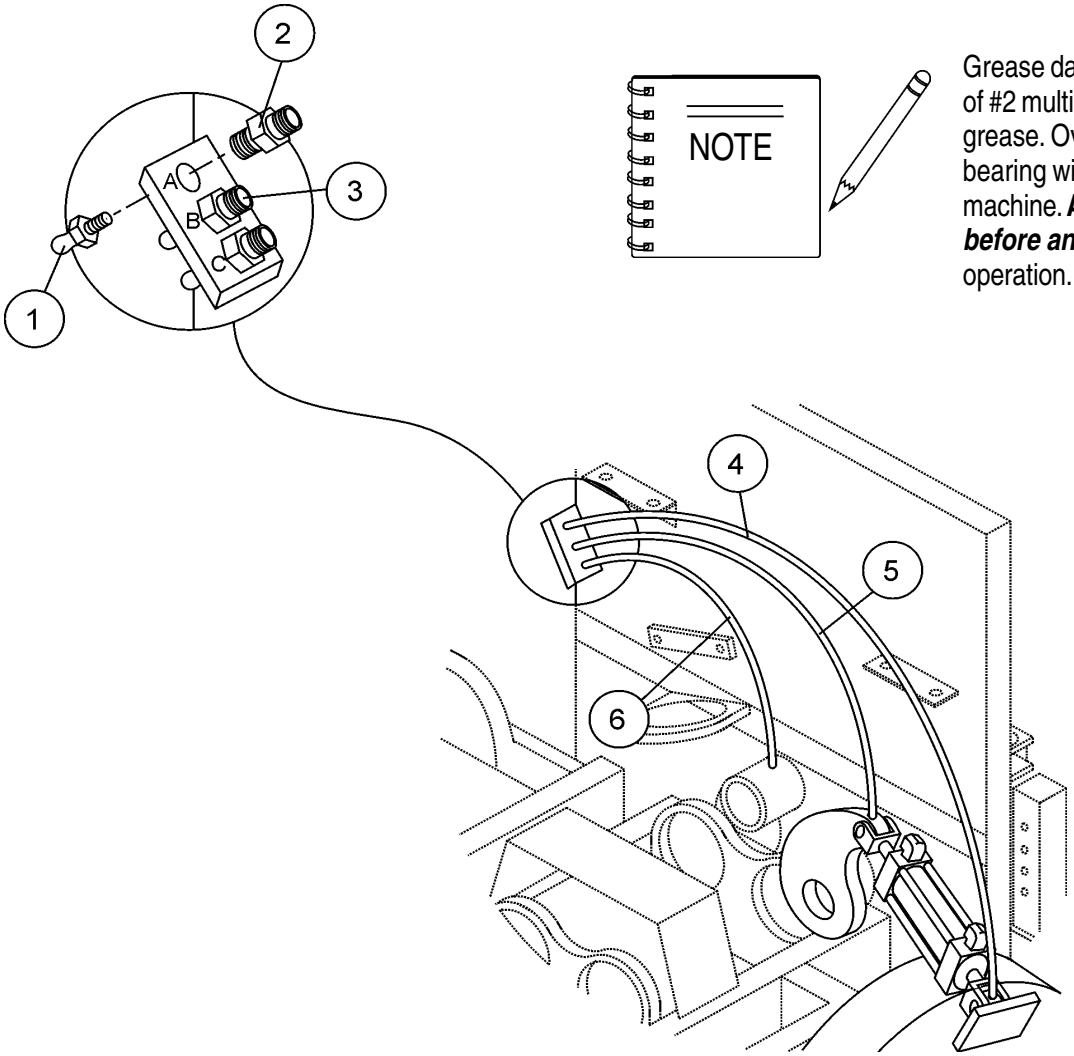
BATTERY ASSY



BATTERY ASSY

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	34506	BATTERY BOX	1	
2	6109100	BATTERY HOLD-DOWN STRAP	1	
3	EM16738	BATTERY	1	
4	EM16707	CABLE, BATTERY NEGATIVE	1	
5	EM509105	CABLE, BATTERY POSITIVE	1	

GREASE POINTS



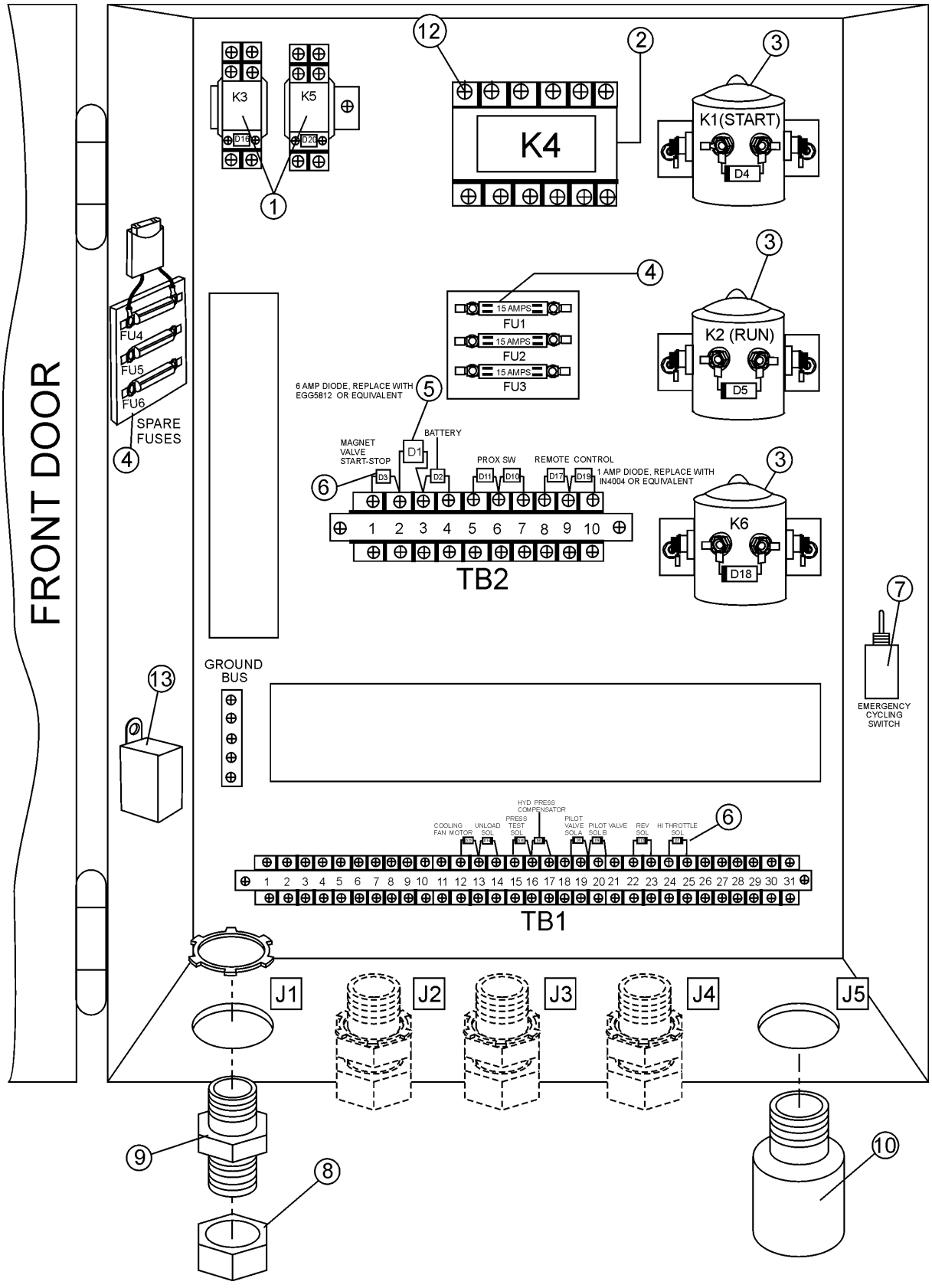
Grease daily, two or three hots of #2 multipurpose automotive grease. Over greasing any bearing will not damage the machine. **ALWAYS** grease ***before and after*** pump operation.

POSITION	LOCATION	LENGTH OF LINES
A	PIVOT BRACKET GREASE POINT	41 in. (1.04 m)
B	AXLE CRANK GREASE POINT	34 in. (.86 m)
C	SWING AXLE BUSHING GREASE POINT	26 in. (.66 m)

GREASE POINTS

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM491701	GREASE FITTING	3	
2	EM208812	CONNECTOIR	2	
3	EM510684	CONNECTOR	3	
4	EM510486	HOSE, PLASTIC	1	
5	EM510487	HOSE, PLASTIC	1	
6	TBD	HOSE, STEEL	1	

CONTROL BOX INTERIOR DOOR ASSY.



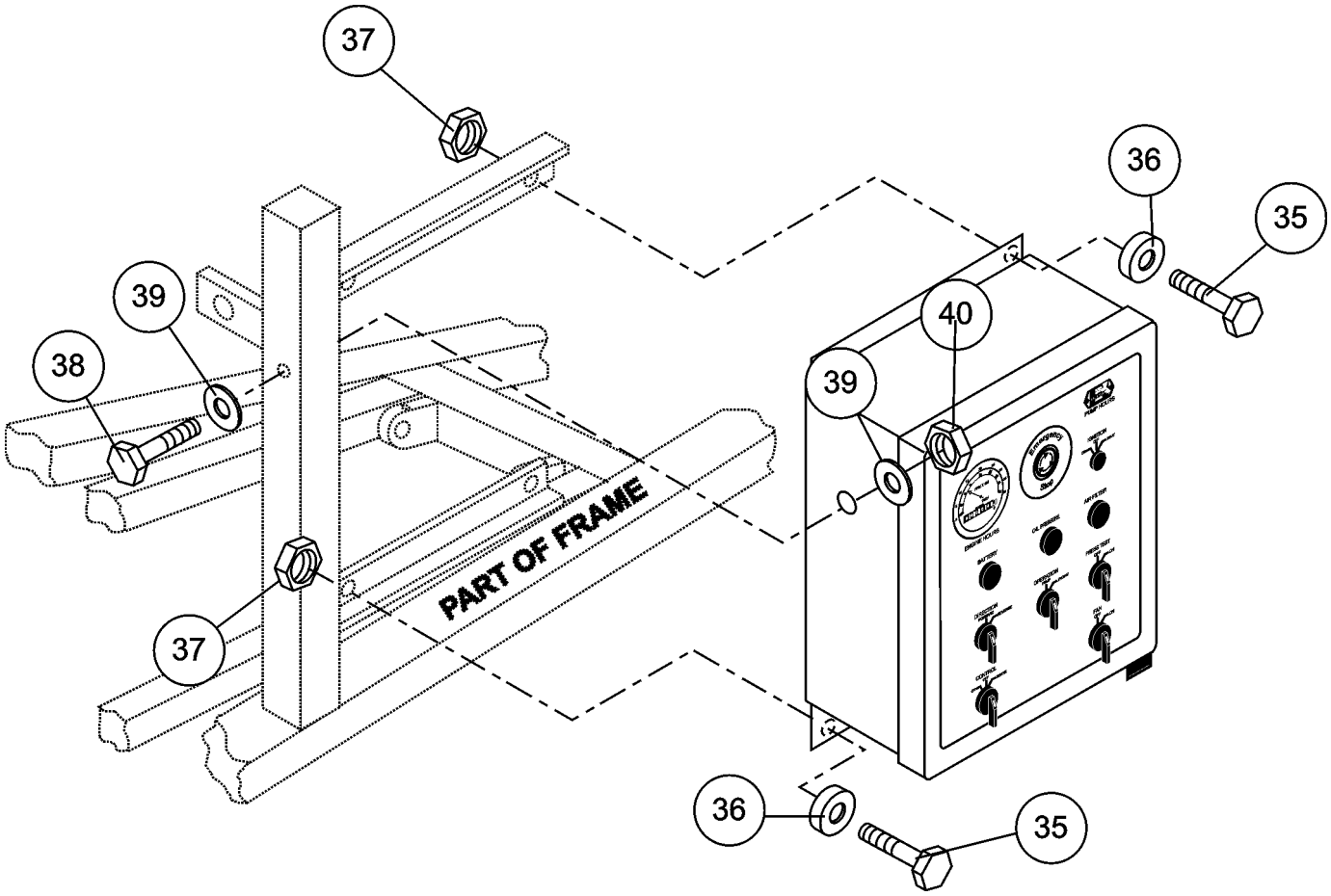
ST-45HRM CE CONCRETE PUMP— CONTRL. BOX INTERIOR DOOR ASSY.

CONTROL BOX INTERIOR DOOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM97050	RELAY , SMALL	2	
2	EM97048	RELAY, LARGE	1	
3	EM97027	SOLENOID, 12 VOLT	3	
4	EM97078	FUSE, 15 AMP	6	
5	EM98001	DIODE, 6 AMP	1	
6	EM98002	DIODE	19	
7	EM40711	SWITCH, EMERGENCY CYCLE	1	
8	TBD	NUT	4	
9	TBD	CONNECTOR	4	
10	EM97068	REMOTE CONTROL RECEPTACLE	1	
12	EM97049	BASE, SOCKET	1	
13	52016	RELAY	1	

ST-45HRM CE CONCRETE PUMP— CONTROL BOX MOUNTING ASSY.

CONTROL BOX MOUNTING ASSY.

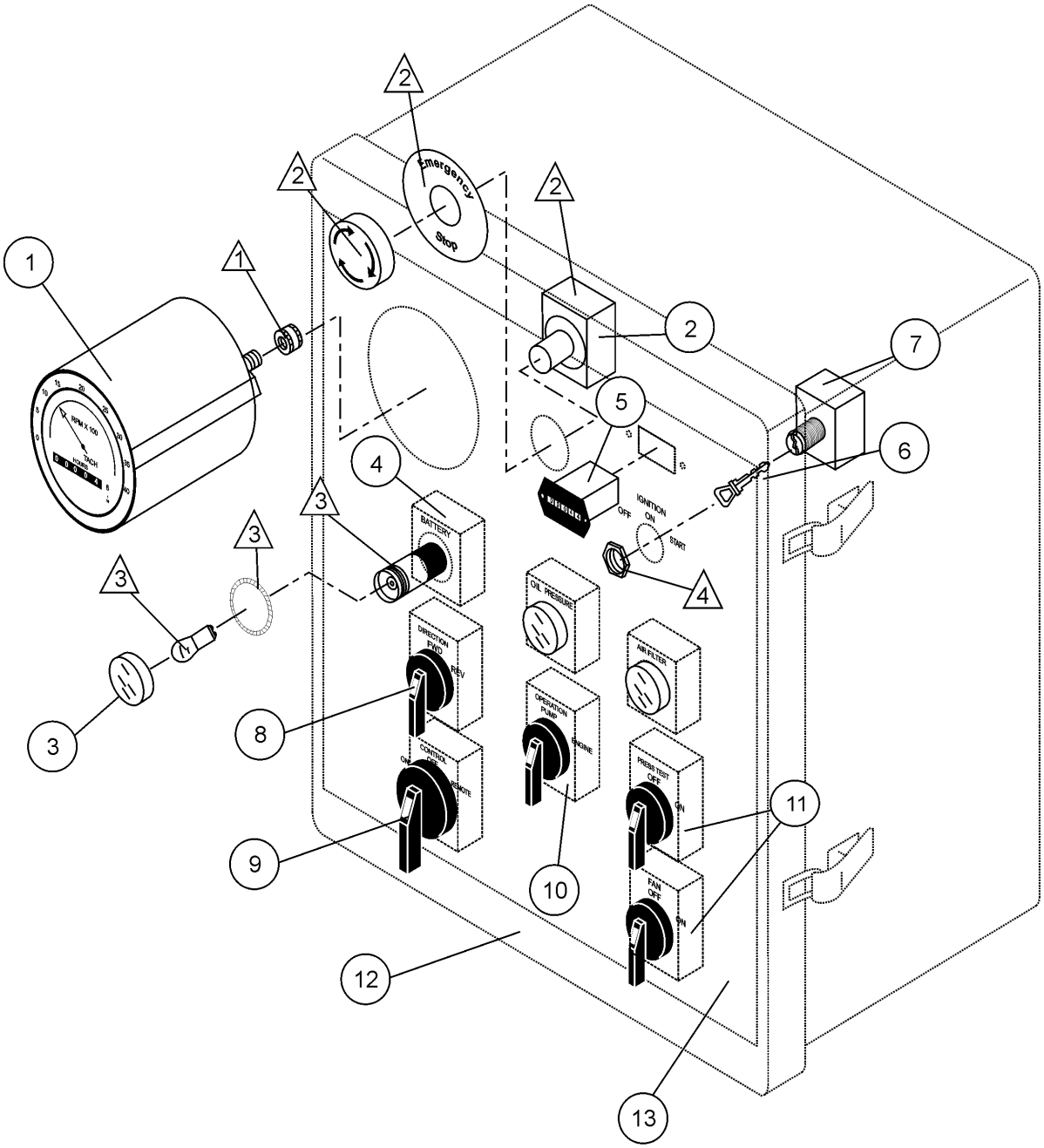


ST-45HRM CE CONCRETE PUMP— CONTROL BOX MOUNTING ASSY.

CONTROL BOX MOUNTING ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
35	492366	SCREW HHC 5/16-18x1-1/2	4	
36	EM510703	SHOCK MOUNT	4	
37	2105164	NUT 3/8 IN.	4	REPLACES 492582
38	EM503112	BOLT HHC 3/8-16x2-3/4	2	
39	3019092	FLAT WASHER	4	REPLACES 492598
40	EM969013	NUT	2	REPLACES 492583

CONTROL BOX ASSY.

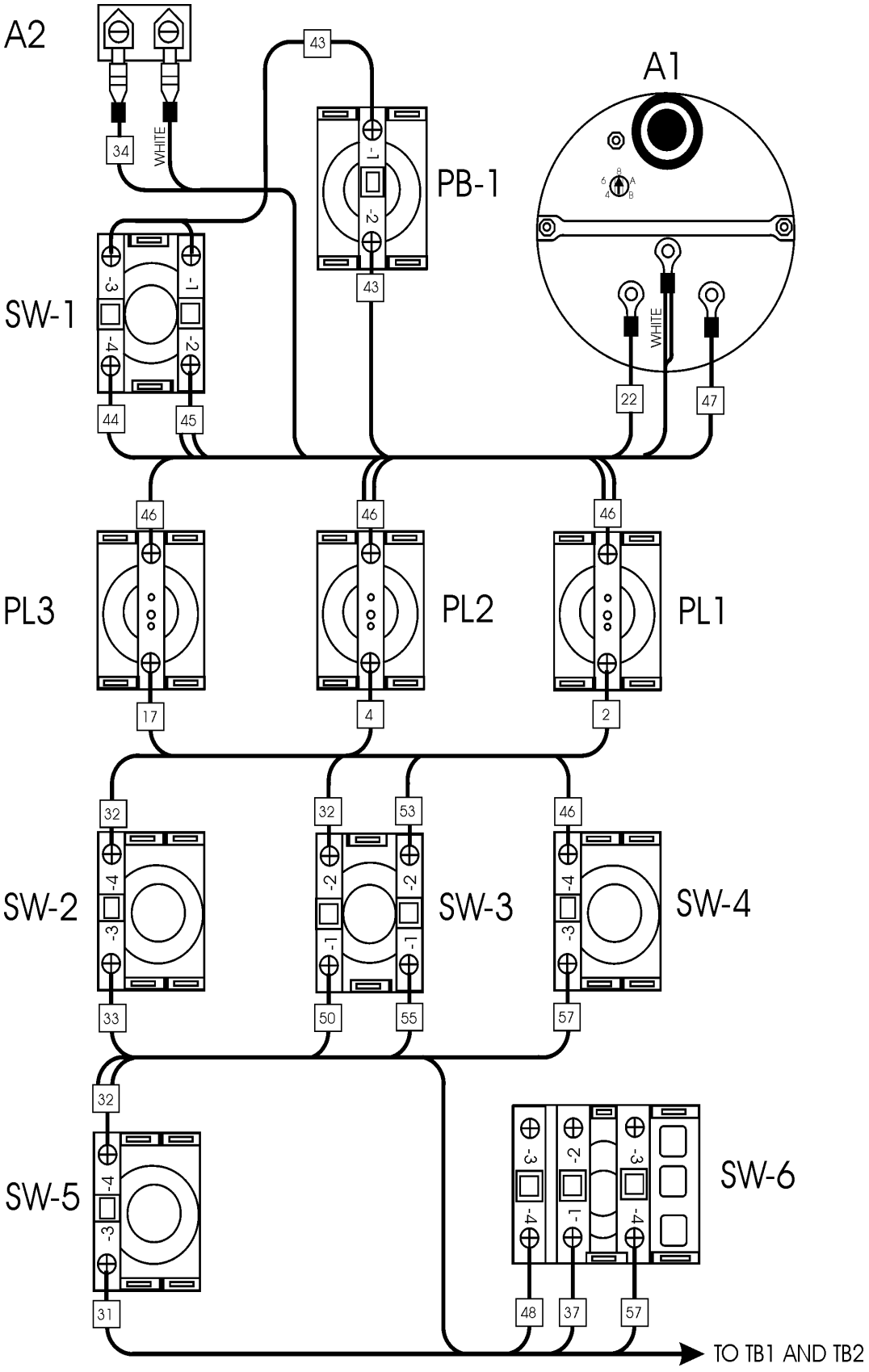


NOTES:

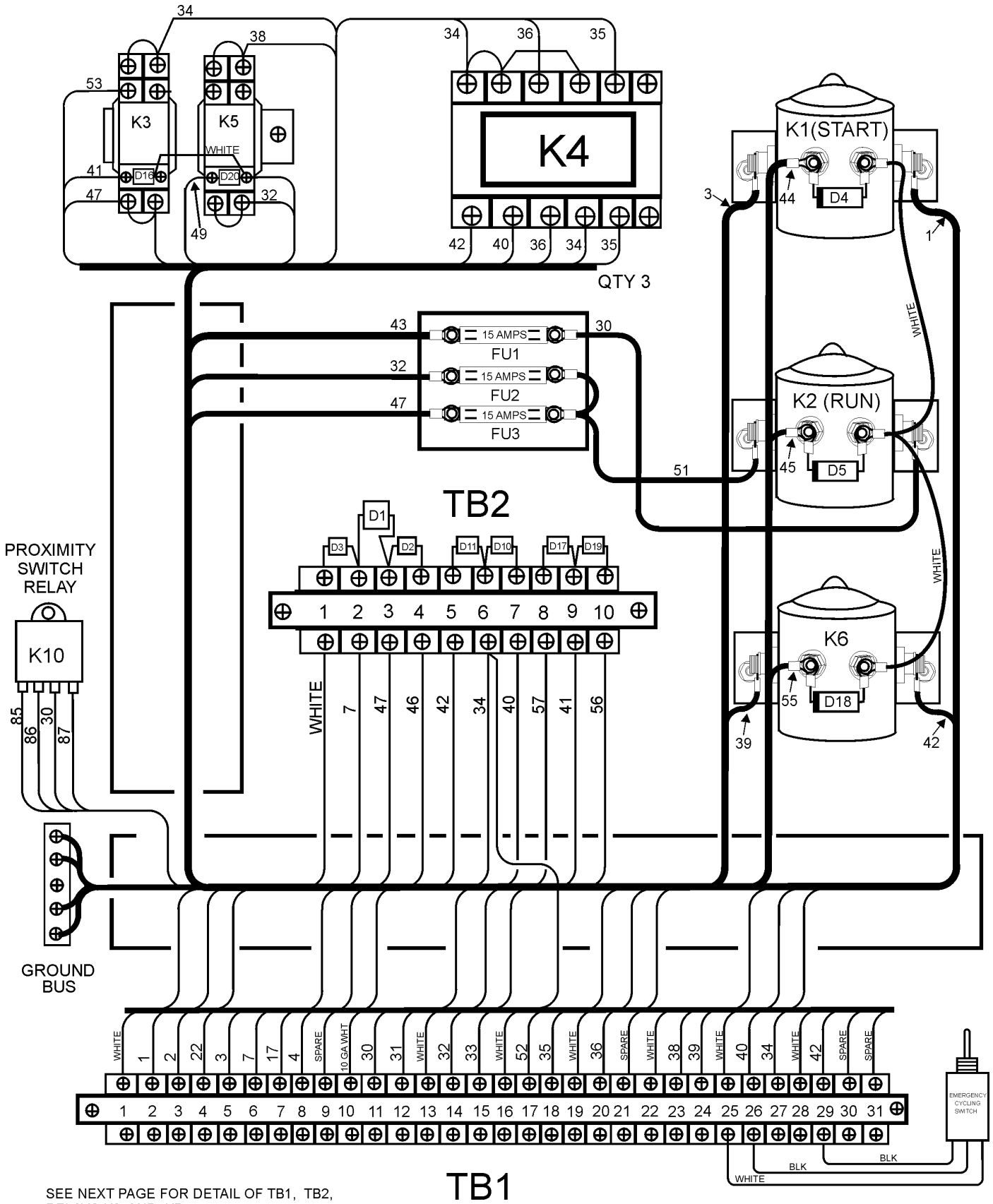
1. INCLUDED WITH ITEM 1, TACHOMETTER P/N EM25704
2. INCLUDED WITH ITEM 2, STOP SWITCH P/N EM97063
3. INCLUDED WITH ITEM 3 LIGHT P/N EM97039
4. INCLUDED WITH ITEM 7 IGNITION SWITCH P/N EM97028

CONTROL BOX ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EM25704	TACHOMETER	1	
2	EM97063	EMERGENCY STOP SWITCH	1	
3	EM97039	LENS, BATTERY, OIL FILTER, AIR FILTER	3	
4	EM97041	CONTACT BLOCK	3	
5	EM97062	HOUR METER	1	
6	EM97028K	KEY, IGNITION	1	
7	EM97028	IGNITION SWITCH W/ KEY	1	
8	EM97030	DIRECTIONAL CONTROL SWITCH	1	
9	EM97036	PUMP CONTROL SWITCH	1	
10	EM97045	OPERATION PUMP/ENGINE SWITCH	1	
11	EM97032	SWITCH, FAN CONTROL, TEST FUNCTION	2	
12	EM97073	CONTROL BOX ASSY, COMPLETE	1	
13	EM98039	PANEL, FACE	1	

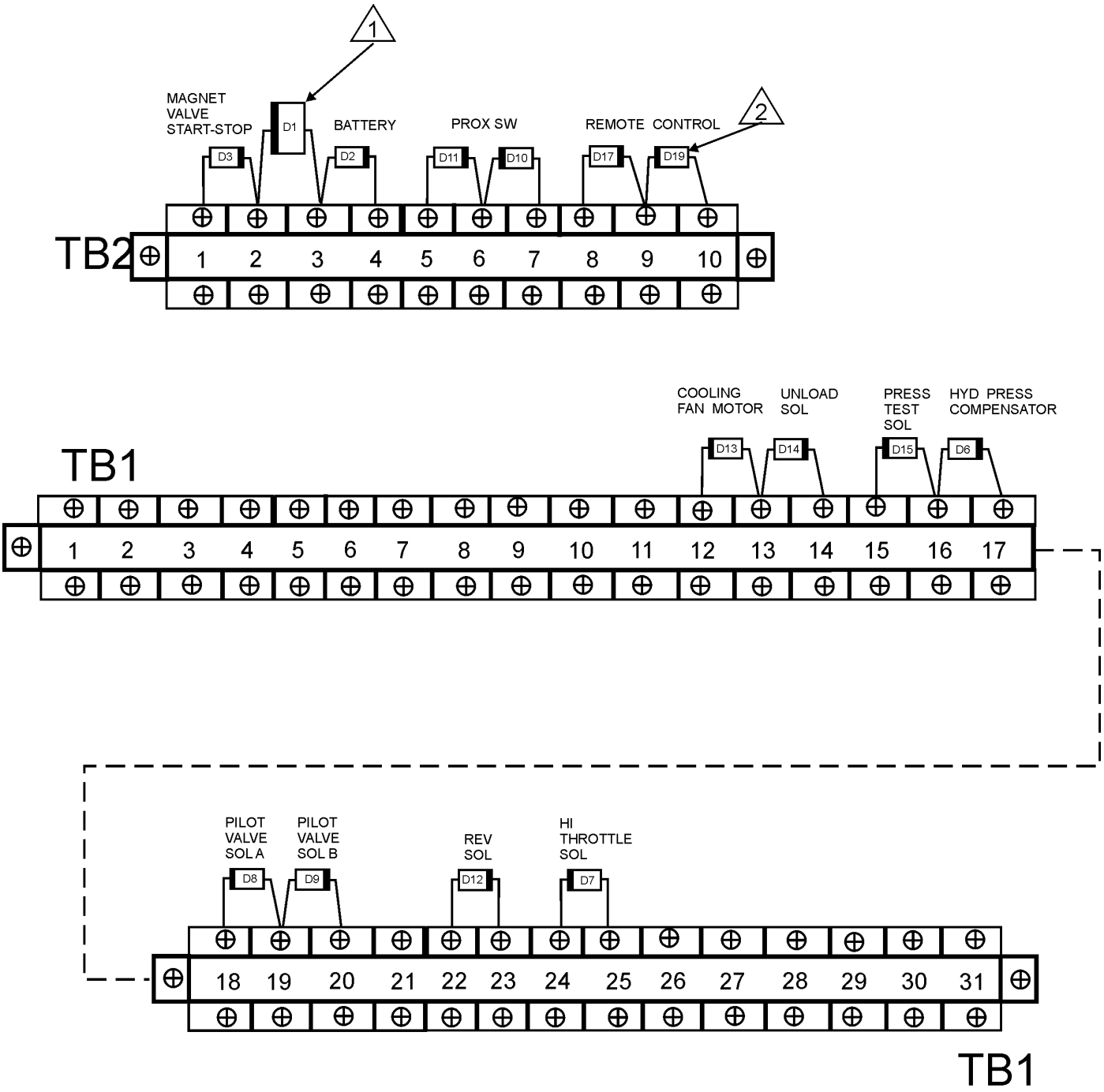


ST-45HRM CE CONCRETE PUMP— CONTROL BOX INTERIOR WIRING



SEE NEXT PAGE FOR DETAIL OF TB1, TB2, RELAYS K3 AND K5

ST-45HRM CE CONCRETE PUMP—TERMINAL BLOCK WIRING DIAGRAM



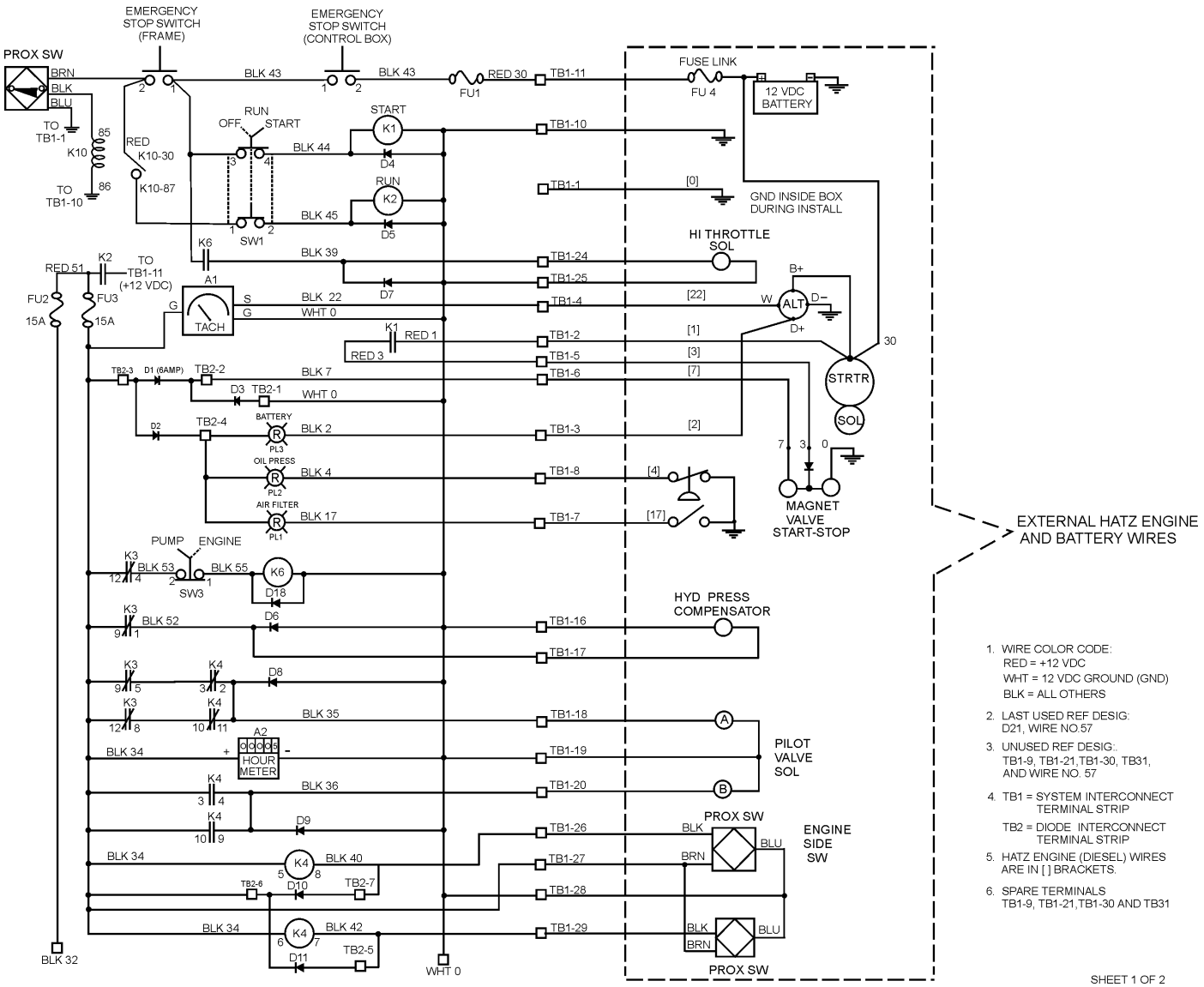
NOTES:

1. DIODE, REPLACE WITH EGG5812 OR EQUIVALENT

2. DIODE, REPLACE WITH IN4004 OR EQUIVALENT

NOTE PAGE

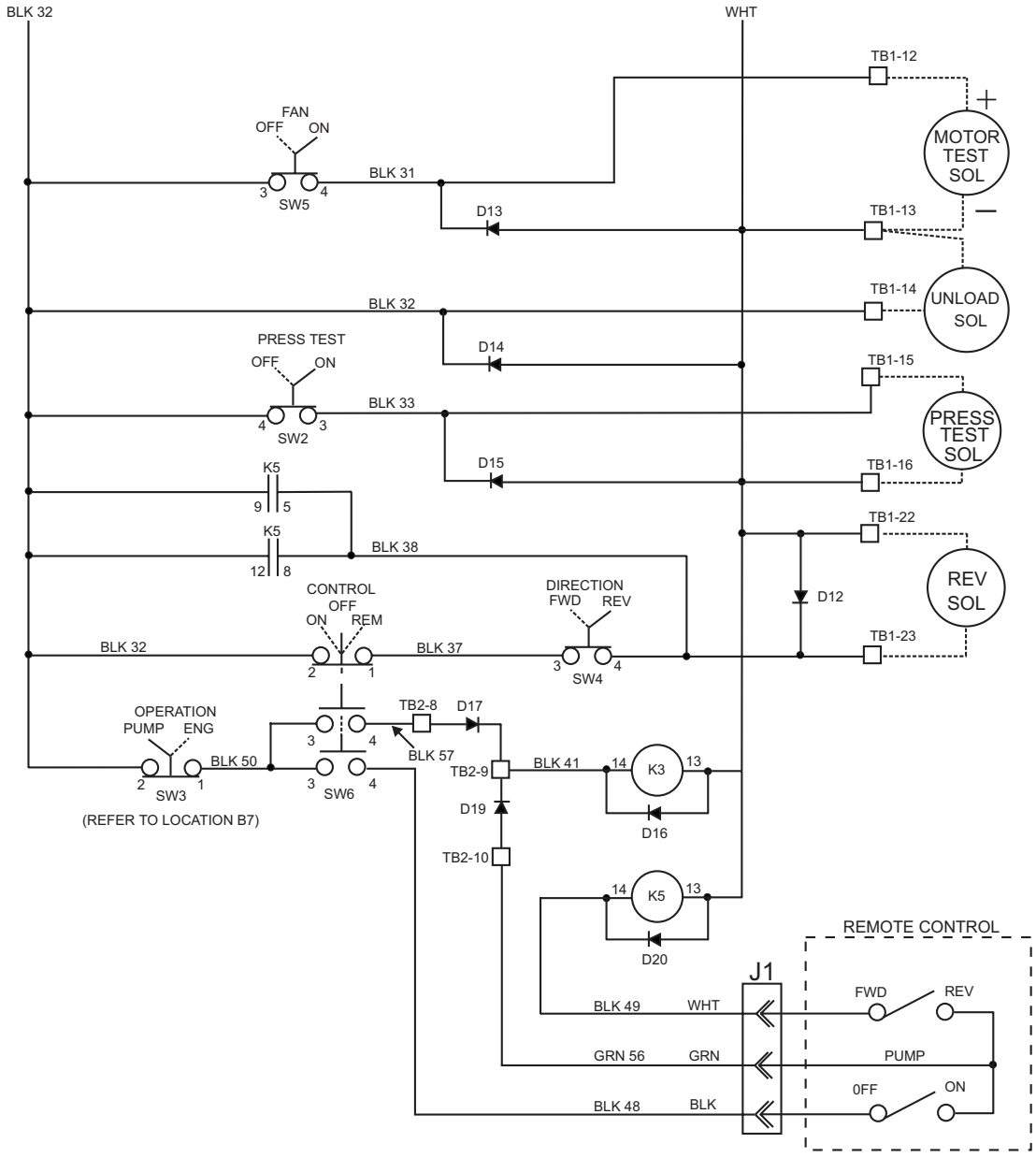
ST-45HRM CE CONCRETE PUMP— CONTROL BOX ELECT. DIAGRAM



1. WIRE COLOR CODE:
   RED = +12 VDC
   WHT = 12 VDC GROUND (GND)
   BLK = ALL OTHERS
2. LAST USED REF DESIG:
   D21, WIRE NO.57
3. UNUSED REF DESIG.:
   TB1-9, TB1-21,TB1-30, TB31, AND WIRE NO. 57
4. TB1 = SYSTEM INTERCONNECT TERMINAL STRIP
   TB2 = DIODE INTERCONNECT TERMINAL STRIP
5. HATZ ENGINE (DIESEL) WIRES ARE IN [ ] BRACKETS.
6. SPARE TERMINALS
   TB1-9, TB1-21,TB1-30 AND TB31

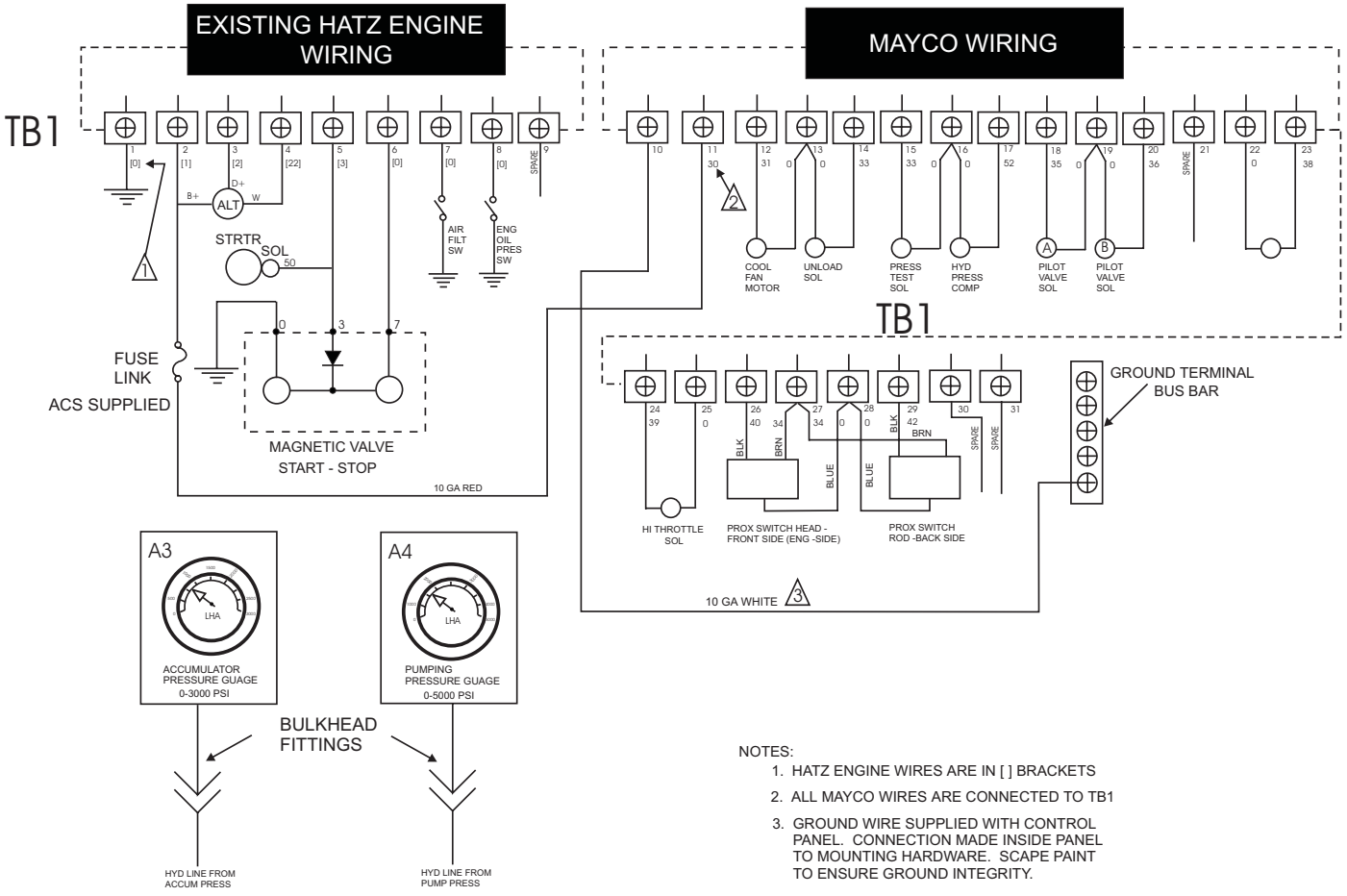
SHEET 1 OF 2

ST-45HRM CE CONCRETE PUMP— CONTROL BOX ELECT. DIAGRAM



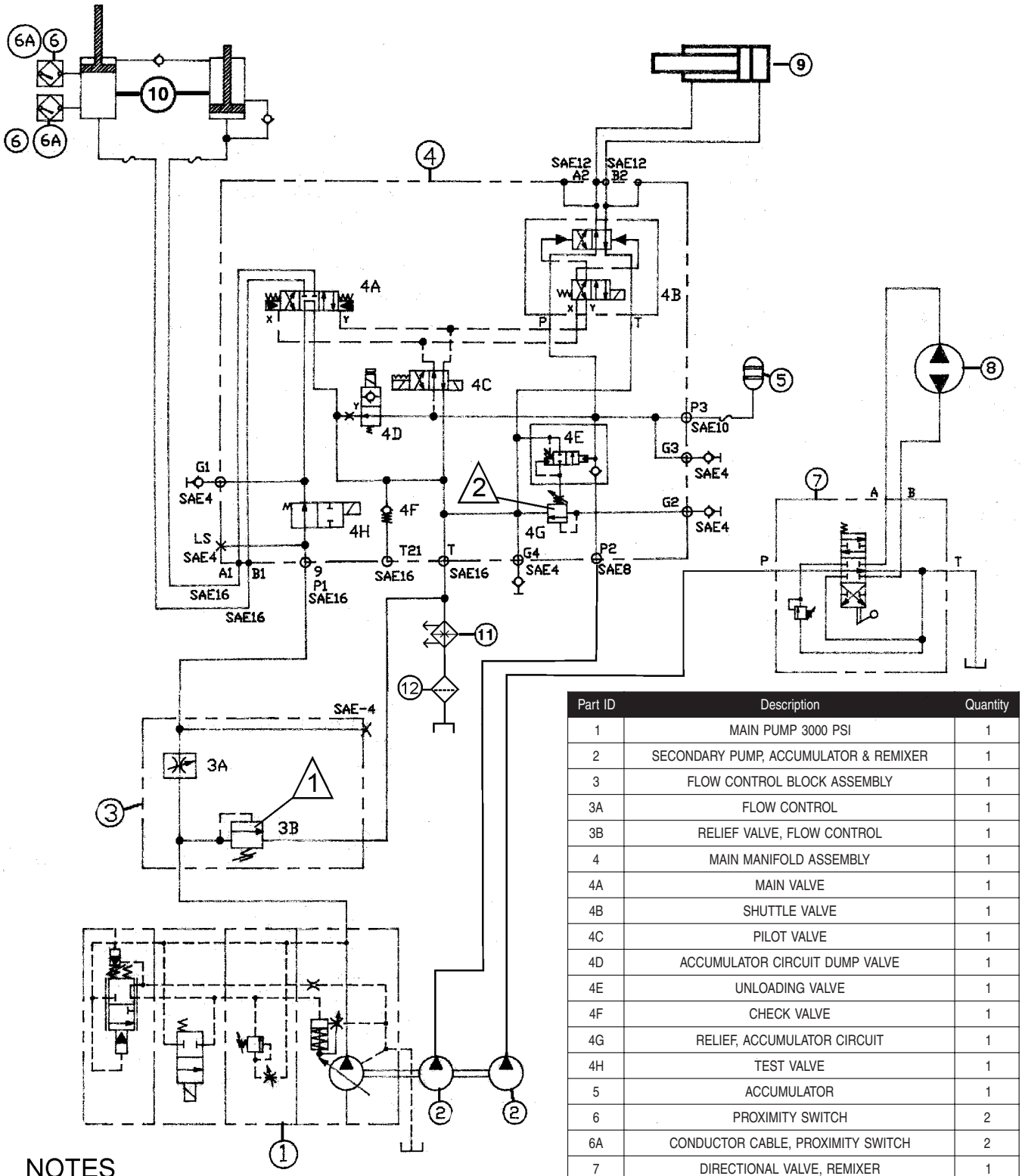
SHEET 2 OF 2

ST-45HRM CE CONCRETE PUMP— CONTROL BOX ELECT. DIAGRAM



NOTES:

1. HATZ ENGINE WIRES ARE IN [ ] BRACKETS
2. ALL MAYCO WIRES ARE CONNECTED TO TB1
3. GROUND WIRE SUPPLIED WITH CONTROL PANEL. CONNECTION MADE INSIDE PANEL TO MOUNTING HARDWARE. SCAPE PAINT TO ENSURE GROUND INTEGRITY.



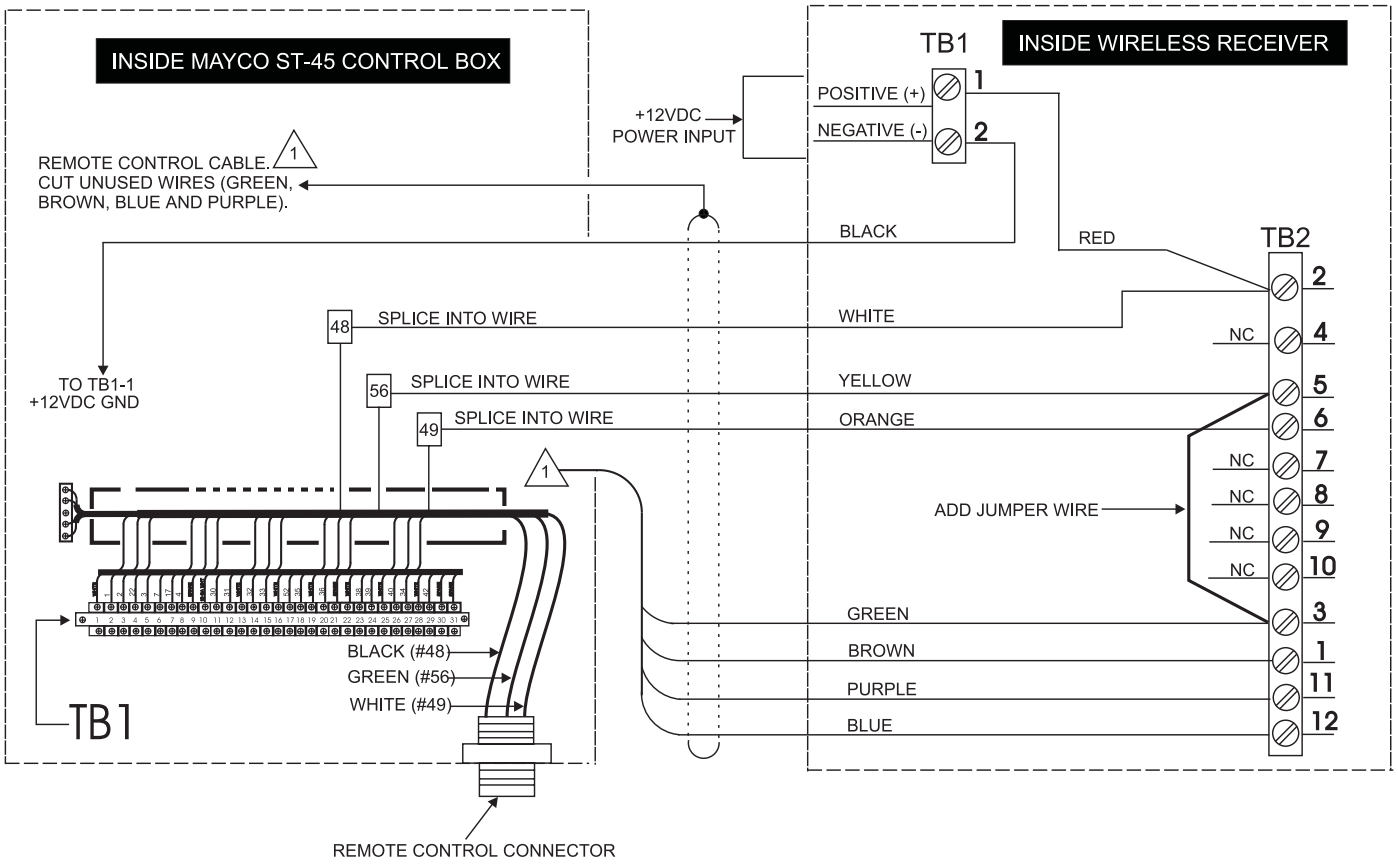
NOTES

PRESSURE SETTINGS FOR THE FOLLOWING RELIEF VALVES:

1 VALVE 3B = 3000 PSI

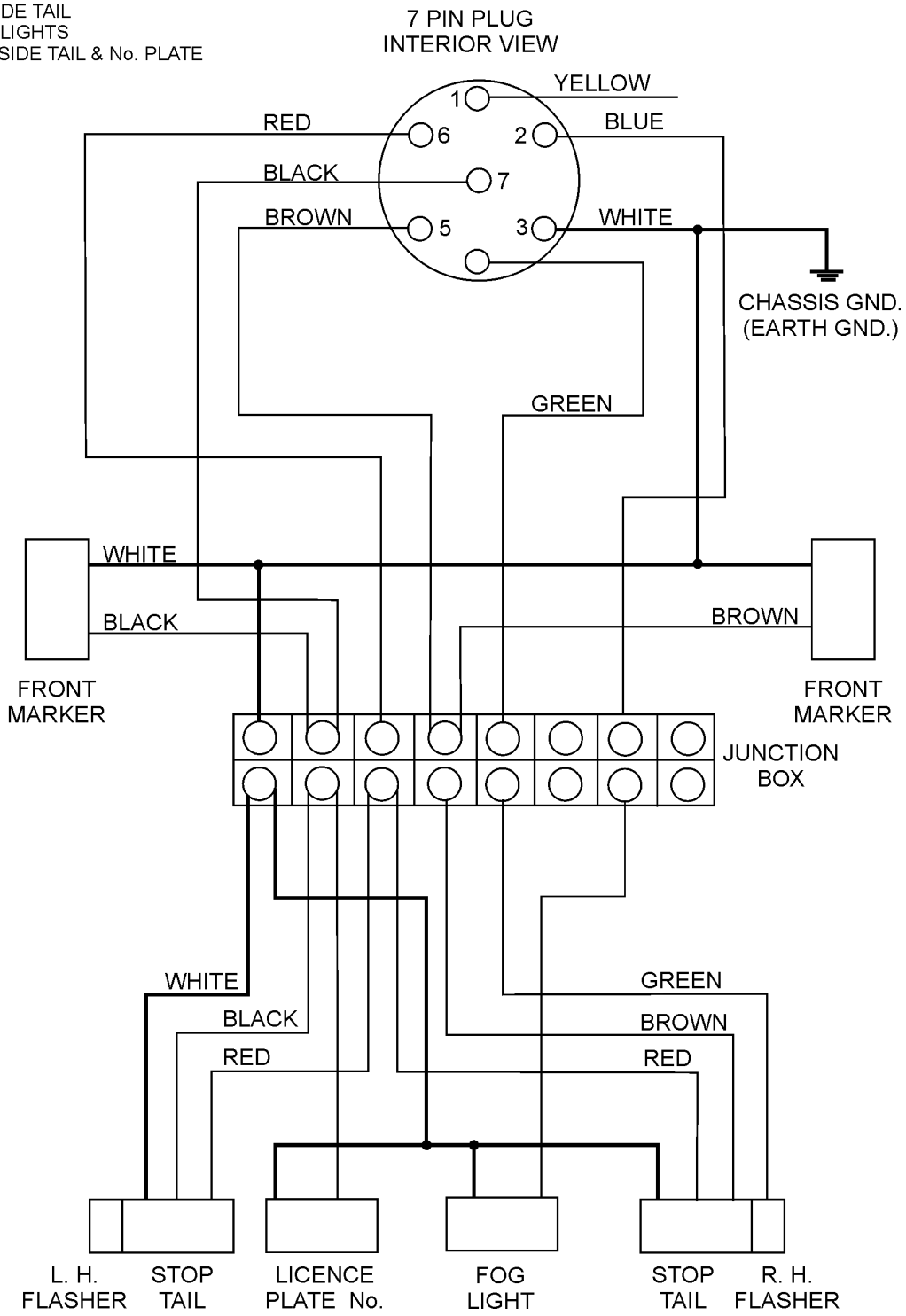
2 VALVE 4G = 1950 PSI

Part ID	Description	Quantity
1	MAIN PUMP 3000 PSI	1
2	SECONDARY PUMP, ACCUMULATOR & REMIXER	1
3	FLOW CONTROL BLOCK ASSEMBLY	1
3A	FLOW CONTROL	1
3B	RELIEF VALVE, FLOW CONTROL	1
4	MAIN MANIFOLD ASSEMBLY	1
4A	MAIN VALVE	1
4B	SHUTTLE VALVE	1
4C	PILOT VALVE	1
4D	ACCUMULATOR CIRCUIT DUMP VALVE	1
4E	UNLOADING VALVE	1
4F	CHECK VALVE	1
4G	RELIEF, ACCUMULATOR CIRCUIT	1
4H	TEST VALVE	1
5	ACCUMULATOR	1
6	PROXIMITY SWITCH	2
6A	CONDUCTOR CABLE, PROXIMITY SWITCH	2
7	DIRECTIONAL VALVE, REMIXER	1
8	MOTOR, REMIXER	1
9	SHUTTLE CYLINDER	2
10	MAIN CYLINDER	1
11	HEAT EXCHANGER	1
12	RETURN FILTER	1



LEGEND

1. YELLOW NEARSIDE INDICATOR (NOT USED)
2. BLUE REAR FOG LAMPS
3. WHITE EARTH GROUND
4. GREEN OFFSIDE INDICATOR
5. BROWN OFFSIDE TAIL
6. RED STOP LIGHTS
7. BLACK NEARSIDE TAIL & No. PLATE



PAYMENT TERMS

Terms of payment for parts are net 10 days.

FREIGHT POLICY

All parts orders will be shipped collect or prepaid with the charges added to the invoice. All shipments are F.O.B. point of origin. Multiquip's responsibility ceases when a signed manifest has been obtained from the carrier, and any claim for shortage or damage must be settled between the consignee and the carrier.

MINIMUM ORDER

The minimum charge for orders from Multiquip is $15.00 net. Customers will be asked for instructions regarding handling of orders not meeting this requirement.

RETURNED GOODS POLICY

Return shipments will be accepted and credit will be allowed, subject to the following provisions:

1. A Returned Material Authorization must be approved by Multiquip prior to shipment.
2. To obtain a Return Material Authorization, a list must be provided to Multiquip Parts Sales that defines item numbers, quantities, and descriptions of the items to be returned.
    a. The parts numbers and descriptions must match the current parts price list.
    b. The list must be typed or computer generated.
    c. The list must state the reason(s) for the return.
    d. The list must reference the sales order(s) or invoice(s) under which the items were originally purchased.
    e. The list must include the name and phone number of the person requesting the RMA.
3. A copy of the Return Material Authorization must accompany the return shipment.
4. Freight is at the sender's expense. All parts must be returned freight prepaid to Multiquip's designated receiving point.
5. Parts must be in new and resalable condition, in the original Multiquip package (if any), and with Multiquip part numbers clearly marked.
6. The following items are not returnable:
    a. Obsolete parts. (If an item is in the price book and shows as being replaced by another item, it is obsolete.)
    b. Any parts with a limited shelf life (such as gaskets, seals, "O" rings, and other rubber parts) that were purchased more than six months prior to the return date.
    c. Any line item with an extended dealer net price of less than $5.00.
    d. Special order items.
    e. Electrical components.
    f. Paint, chemicals, and lubricants.
    g. Decals and paper products.
    h. Items purchased in kits.
7. The sender will be notified of any material received that is not acceptable.
8. Such material will be held for five working days from notification, pending instructions. If a reply is not received within five days, the material will be returned to the sender at his expense.
9. Credit on returned parts will be issued at dealer net price at time of the original purchase, less a 15% restocking charge.
10. In cases where an item is accepted, for which the original purchase document can not be determined, the price will be based on the list price that was effective twelve months prior to the RMA date.
11. Credit issued will be applied to future purchases only.

PRICING AND REBATES

Prices are subject to change without prior notice. Price changes are effective on a specific date and all orders received on or after that date will be billed at the revised price. Rebates for price declines and added charges for price increases will not be made for stock on hand at the time of any price change.

Multiquip reserves the right to quote and sell direct to Government agencies, and to Original Equipment Manufacturer accounts who use our products as integral parts of their own products.

SPECIAL EXPEDITING SERVICE

A $35.00 surcharge will be added to the invoice for special handling including bus shipments, insured parcel post or in cases where Multiquip must personally deliver the parts to the carrier.

LIMITATIONS OF SELLER'S LIABILITY

Multiquip shall not be liable here under for damages in excess of the purchase price of the item with respect to which damages are claimed, and in no event shall Multiquip be liable for loss of profit or good will or for any other special, consequential or incidental damages.

LIMITATION OF WARRANTIES

No warranties, express or implied, are made in connection with the sale of parts or trade accessories nor as to any engine not manufactured by Multiquip. Such warranties made in connection with the sale of new, complete units are made exclusively by a statement of warranty packaged with such units, and Multiquip neither assumes not authorizes any person to assume for it any other obligation or liability whatever in connection with the sale of its products. Apart from such written statement of warranty, there are no warranties, express, implied or statutory, which extend beyond the description of the products on the face hereof.

Mechanical Drive Models

MAYCO PUMP, hereinafter referred to as “Manufacturer’, warrants each new Mayco Pump sold by the manufacturer to be free from defects in material and workmanship, under normal use and service, for a period of one year after the date of delivery to the original retail purchaser. Manufacturer will, at its option, replace or repair at a point designated by the Manufacturer any part or parts which shall appear to the satisfaction of the Manufacturer upon inspection at such point to have been defective in material or workmanship. This warranty does not obligate the Manufacturer to bear any transportation charges or labor charges in connection with the replacement or repair the of the defective parts.

This warranty does not apply to any pump if attempts have been made to pump concrete materials which have separated, to any pump which has been repaired with other than Genuine Mayco Parts, nor to any pump which has been altered, repaired or used in such manner as to adversely affect its performance, nor to normal service or maintenance or where blockages have developed within the pump manifold or placing line or which has been operated in any other manner not recommended by the Manufacturer. Due to the abrasive nature of concrete, Mayco does not cover natural component wear.

THIS WARRANTY AND MANUFACTURER’S OBLIGATION HEREUNDER, IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY AND ALL OTHER OBLIGATIONS OR LIABILITIES INCLUDING SPECIAL OR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES ARISING OUT OF THE FAILURE OF ANY PUMP OR PART TO OPERATE PROPERLY, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Hydraulic Drive Models

MAYCO PUMP, hereinafter referred to as “Manufacturer”, warrants each new Mayco Pump sold by the manufacturer to be free from defects in material and workmanship, under normal use and service, for a period of one year or 2000 hours after the date of delivery to the original retail purchaser. The Manufacturer will, at its option, replace or repair at a point designated by Manufacturer any part or parts which shall appear to the satisfaction of Manufacturer upon inspection at such point to have been defective in material or workmanship. This warranty does not obligate Manufacturer to bear any transportation charges or labor charges in connection with the replacement or repair of the defective parts.

This warranty does not apply to any pump if attempts have been made to pump concrete materials which have separated, to any pump which has been repaired with other than Genuine Mayco Parts, nor to any pump which has been altered, repaired or used in such manner as to adversely affect it’s performance, nor to normal service or maintenance or where blockages have developed within the pump manifold or placing line or which has been operated in any other manner not recommended by the Manufacturer. Due to the abrasive nature of concrete, Mayco does not cover natural component wear.

THIS WARRANTY AND MANUFACTURER’S OBLIGATION HEREUNDER, IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY AND ALL OTHER OBLIGATIONS OR LIABILITIES INCLUDING SPECIAL OR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES ARISING OUT OF THE FAILURE OF ANY PUMP OR PART TO OPERATE PROPERLY, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OPERATION AND PARTS MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

PARTS/SERVICE/WARRANTY
LANCASHIRE, OL7 OLT
UNITED KINGDOM (UK) CALL:
PHONE: 161-339-2223
FAX: 161-339-3226

MULTIQUIP (UK)
HANOVER MILL
FITZROY STREET
ASHTON-UNDER-LYNE
LANCASHIRE, OL7 OTL
UNITED KINGDOM
PH. 0161-339-2223
FAX. 0161-339-3226