



OPERATION, MAINTENANCE AND PARTS MANUAL TRAILER CONCRETE PUMP **01** MODEL **C90S**



REED, provides this manual for the guidance of all owners, operators and servicing personnel in order to obtain the longest possible trouble-free service. It contains data, specifications, warranty, schematics, operating instructions, lubrication procedures, maintenance procedures, illustrated parts breakdown, vendor information, service bulletins, and safety rules.

Serial No.: _____

Date Delivered: _____

Customer: _____

NOTE: Additional copies of this manual (P/N: **87719A**) maybe obtained through the **REED** Parts Department.

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STARTING SERIAL NUMBER: 3.07.1.2699



B AND C SERIES TRAILER MOUNTED CONCRETE PUMPS • ONE • TWO • THREE WARRANTY

REED warrants each of its new Trailer Mounted Concrete Pumps to be free of defects in material and workmanship under normal use and service for a period of One • Two • Three years from date of delivery based on the following conditions:

- One (1) year or 1200 pumping hours whichever comes first
- Two (2) years covering the Solid State Black Box
- Three (3) years covering all structural parts

The **WARRANTY** is issued **ONLY** to the **INITIAL USER**. The warranty period begins when the product is delivered to the initial user or when first put into service, whichever occurs first. Said warranty is void if the machine is subject to misuse, neglect, accident or abuse.

REED'S obligation under this warranty is limited to correcting without charge, at its factory, any parts or parts thereof which shall be returned to its factory, transportation prepaid and upon **REED'S** examination proves to have been originally defective. Correction of such defects by repair or replacement shall constitute fulfillment of all obligations to the initial user. This warranty does not include labor or transportation charges unless specifically identified and authorized in writing by **REED**. Nor does the warranty apply to any unit upon which repairs or unauthorized alterations have been made.

This warranty does not apply to normal maintenance service or to normal replacement of certain machine parts which are subject to normal wear (such as concrete cylinders and wear components, valve mechanisms, delivery systems, hopper grate, etc.) **REED** makes no warranty in respect to trade accessories or outside vendor components, such being subject to the warranties of their respective manufacturers.

THIS IS A LIMITED WARRANTY AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE. In no event shall **REED** be made liable for incidental, general or consequential damage, loss or any expense directly or indirectly related and resulting from use or lack of use caused by delay in delivery, parts failure, or any other causes associated with the product use. No person, firm or corporation is authorized to assume for **REED** any other liability in connection with the sale of **REED** products.



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INTRODUCTION

A major factor in the minds of the operators and maintenance personnel should be use of the machine in a **SAFE** and **PROFICIENT** manner. This can only be accomplished by having a better understanding of the operation and maintenance of the **01 MODEL C90S TRAILER MOUNTED CONCRETE PUMP**.

This manual (Part Number: **87719A**) is provided to assist in accomplishing this goal. It is considered to be a **VALUABLE** tool for our **CUSTOMERS**. It includes an Operation Section, General Maintenance/Repair Procedures and Illustrated Parts Section. Everyone involved with the operation, maintenance and repair of the machine should be given and should take the opportunity to **READ** and thoroughly **UNDERSTAND** all sections of this manual. It is in their **BEST INTEREST** to do so.

The manual covers and is applicable to a **STANDARD EQUIPPED MACHINE**. Depending on the circumstances, it is possible some machines may be supplied with various options and specialized equipment. **REED** has tried to incorporate in the manual the appropriate data for these machines. If by chance, service information is not found, it is suggested you contact the **REED SERVICE DEPARTMENT** who will forward the proper information if available.

All product descriptions, illustrations and specifications found throughout this manual were in effect at the time the manual was released for printing. It should be noted **REED RESERVES THE RIGHT TO MAKE CHANGES IN DESIGN OR TO MAKE ADDITIONS TO OR IMPROVEMENTS IN THE PRODUCT WITHOUT IMPOSING ANY OBLIGATIONS UPON ITSELF TO INSTALL THEM ON PRODUCTS PREVIOUSLY MANUFACTURED**.

NOTE

*If you have not yet done so, please record the **SERIAL NUMBER** of your **01 MODEL C90S** on the cover page of this manual. Throughout this manual, reference may be made to the serial number. When talking to our **SERVICE DEPARTMENT** or **ORDERING PARTS**, use of the serial number will assist us in giving prompt and accurate response and service.*



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PRODUCT DESCRIPTION

The **REED 01 MODEL C90S** is a trailer mounted concrete pump. It's operation encompasses the use of hydraulic and electrical systems employing related components for the specific purpose to pump wet concrete through a delivery system of pipes and hoses. The machine is of rugged construction and durable design enabling the unit to pump even the harshest mixes within it's published ratings and specifications.



The main power source for operation of the concrete pump is provided by use of a Cummins liquid-cooled diesel engine model QSB6.7-220 having a horsepower rating of 220HP at 2000 RPM. The engine is used to drive a direct connected variable displacement axial piston pump and a hydraulic gear pump. The piston pump is used to provide and meet the hydraulic requirements for operation of the pump's material cylinders. The gear pump is used to shift the swing tube and operate the optional remixer if so equipped.

The **01 MODEL C90S** utilizes a swing tube design delivery system. This system incorporates two (2) material cylinders, powered by two (2) hydraulic cylinders that operate alternately. With concrete material in the hopper and the pump operating, one material cylinder retracts which causes the concrete to be sucked or drawn back inside the cylinder tube. At full retraction of the cylinder, a sensor located in the splash box generates a signal. The signal is sent to the hydraulics and electrics of the swing tube circuit, which directs hydraulic fluid to the shift cylinder causing the swing tube to shift over to the fully loaded material cylinder. The piston of the loaded material cylinder is now driven forward, pushing the concrete out through the swing tube and into the delivery lines. The shifting from one cylinder to the other cylinder continuously takes place, providing a continuous flow of material through the delivery piping system. The hopper has a capacity of 14.5 cu ft. (410L) and the material cylinders are 7" inches (175mm) in diameter with a 5 inch (127mm) outlet.

All functions for operation of the concrete pump can be accomplished from the controls located on the right side of the unit. A hand held remote unit is also provided that enables the pump to be started-stopped away from the unit up to a distance of 100 feet (30m).

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SPECIFICATIONS

PERFORMANCE

U.S.

METRIC

- Maximum Theoretical Output
- Maximum Pressure
- Maximum Rated Strokes/Min.

90yd³/hr
1469 PSI
36/Min.

69m³/hr
102 Bar
36/Min.

TECHNICAL DATA

U.S.

METRIC

- Material Cylinders (Dia x Lgth)
- Hydraulic Cylinders (Dia x Lgth)
- Variable Volume Control
- Swing Tube

7" x 42"
4" x 42"
0-Full
7" x 5"

178 x 1067mm
102 x 1067mm
0-Full
178 x 127mm

- Harsh Mix Hopper Capacity
- Outlet Diameter
- Main Hydraulic System Type
- Main Hydraulic System Pressure
- Hydraulic Tank Capacity
- Engine Horsepower
- Fuel Tank Capacity
- Overall Length
- Overall Width
- Overall Height
- Weight(approx.)
(with oil/fuel)

14.5 ft³
5"
Closed Loop
4200 PSI
60 gal
220
39 gal
184"
71"
83"
8750lbs

410L
127mm
Close Loop
294 Bar
227L
164kw
148L
4674mm
1803mm
2104mm
3977Kgs



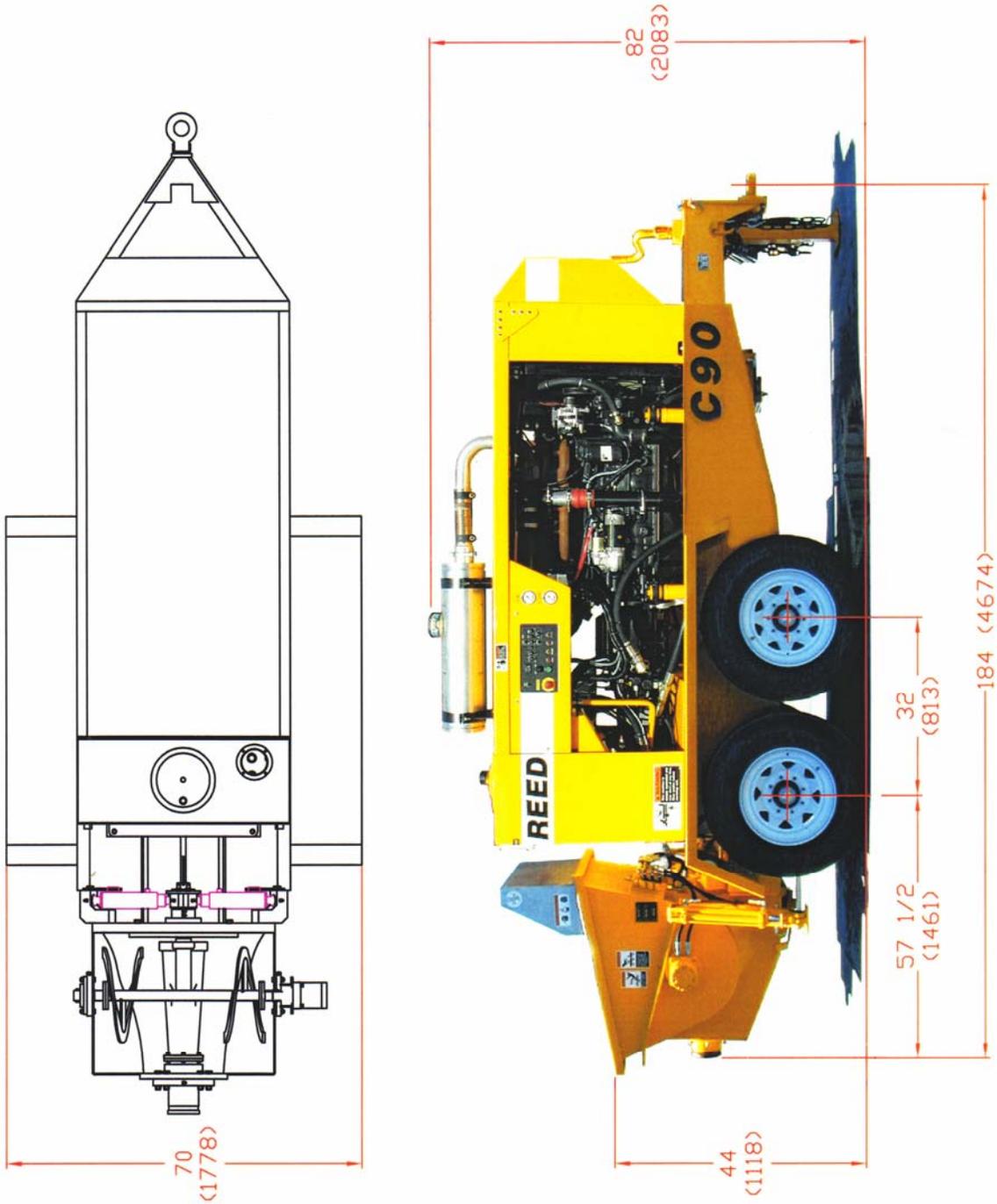
Maximum performance data shown above will vary depending on slump, mix design, pipeline diameter and job site conditions. Maximum output and pressure cannot be achieved simultaneously.



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REED MODEL C90S GENERAL ARRANGEMENT

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SAFETY AWARENESS AND PRECAUTIONS

The **REED 01 MODEL C90S** pump unit is only to be used for the purpose of pumping concrete or other material of a plastic consistency through an arrangement of delivery pipeline or hoses to the designated placement site.

All personnel assigned to operate, repair or troubleshoot the **01 MODEL C90S** must be thoroughly familiar with this Technical Manual (P/N: **87719A**). For the protection of yourself and others around you, it is of utmost importance that the **WORK** is done **SAFELY**. One of the best ways to accomplish this is to fully **UNDERSTAND** and **KNOW** the job you do. If there is any doubt about that what you are doing is **UNSAFE**, even marginally, obtain assistance from other trained/qualified personnel.

During operation, troubleshooting or repair, problems may arise or be encountered that seem singular but may in fact be due to several causes. These need to be sorted out and identified before proceeding with the task at hand. The information contained in this technical manual can be used to assist in the safest and best manner of operating and repairing the **01 MODEL C90S**. However **YOU** and **ONLY YOU**, must take the initiative to make yourself thoroughly familiar with the contents of this manual.

Because your job is to operate the equipment does not prevent you from focusing some attention on the maintenance and troubleshooting aspect of the unit. Just being aware of some tell-tell signs, unusual noises or the ability to make a tweak here or there may enable you to complete the pumping job instead of shutting down and losing all that concrete.

ADVISORY LABEL LOCATION

Cautionary signal word (Warning-Caution) may appear in various locations throughout this manual. Information accented by one of these signal words must be observed to minimize the risk of personal injury to service personnel, or the possibility of improper service methods which may damage the pump or render it unsafe. Additional Notes are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the uses of these use of these advisory labels as they appear throughout the manual:

▲ CAUTION

Directs attention to unsafe practices, which could result in damage to equipment and possible subsequent personnel injury or death if proper precautions are not taken.



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⚠ WARNING

Direct Attention to unsafe practices, which could result in personnel injury or death if proper precautions are not taken.

NOTE

An operating procedure, practice, condition, etc., which is essential to emphasize.

-----T H I N K S A F E T Y ----- T H I N K S A F E T Y -----

No matter how often it is said or pointed out, there are people who have a tendency to **IGNORE** safe operation until it becomes too **LATE**. Don't be this type of person. Keep **SAFETY** utmost in your mind.

The following points out some pretty **COMMON** conditions and situations that you might encounter at one time or another. **BE ALERTED** to these and try to **PREVENT** the inevitable. They may seem simple but are often the **MOST OVERLOOKED**.

- Use only qualified operators who know the machine
- Use only qualified maintenance personnel who understand the systems
- Wear protective equipment and helmets
- Keep work area clear of unauthorized personnel
- Level trailer on uneven terrain or slopes
- Do not operate pump in traffic lanes. Always place cones and barricades around trailer
- Don't clean, lubricate or make adjustments while unit is in operation.
- Keep safety decals and operation instructions legible

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- Do not alter or disconnect safety devices
- Maintain specified tire pressure
- Report items that need attention or require service

⚠ WARNING

***BETTER SAFE THAN SORRY - DON'T TAKE
CHANCES THAT COULD CAUSE INJURY TO YOU
AND/OR OTHERS***

- Never **REMOVE** the hopper grill cover when the pump is in **OPERATION**. It protects against accidental contact with the agitator and other moving parts inside the hopper.
- Never enter the hopper with any parts of your body. It is a **DANGER** area and physical **INJURY** can occur even if the engine is shutdown.
- The concrete delivery system should not be **OPENED** without relieving the pressure. This can be done by reversing the pump and pumping backwards.
- Hydraulic oil systems can be dangerous. Know the circuit you are repairing, it may contain high pressure and injury could occur. If in doubt, stop the machine and allow sufficient time for the oil pressure to zero. Check system pressure gauge.
- Do not pour material into the hopper without having grate in place. Operator must monitor material being dumped into the hopper, keeping a watchful eye out for unmixed or dry material, sticks, pieces of metal and other foreign objects.

**YOUR SAFETY IS OUR UTMOST CONCERN
AND YOUR RESPONSIBILITY**



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SAFETY ALERT DECALS

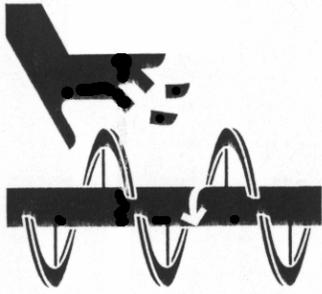
DANGER ----- CAUTION ----- WARNING
decals are designed for your protection. They are placed at appropriate areas on the machine to be constant reminders of the ever-present dangers. Know and adhere to the information they provide.



	<p>! WARNING</p> <p>Keep hands out of waterbox. Stop engine/motor if access is required. Keep guards in place.</p>
--	---

800916

! WARNING



Keep hands out of hopper and valve assembly. See operation manual if access is required.

800917

! WARNING



Do not stand on hopper grates.

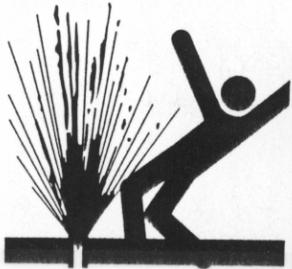
800918



! WARNING

Do not operate at pressures exceeding the rating of the entire material delivery system.

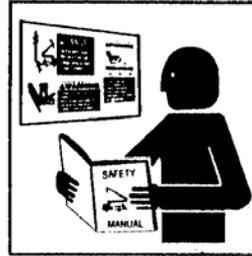
800921



! WARNING

Before opening a blocked pipeline, relieve pressure by reversing pump. See manual.

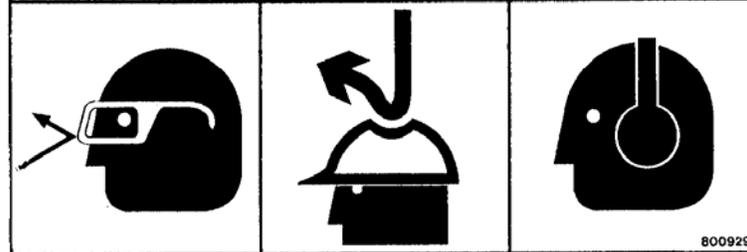
800922



! WARNING
Do not operate this machine without training. Understand the warnings in safety manuals and on decals.

800926

CUIDADO ! WARNING



800929



! WARNING
This machine is remote controlled and may start at any time. Stop engine before servicing unit.

800924



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WARNING

CALIFORNIA PROPOSITION 65

DIESEL ENGINE EXHAUST AND SOME OF ITS CONSTITUENTS ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS AND OTHER REPRODUCTIVE HARM.



THE FILTER ELEMENT INSIDE THIS HOUSING MUST BE REPLACED WITH AN APPROVED TYPE ELEMENT AFTER THE FIRST 50 HOURS OF USE.

FURTHER ELEMENT REPLACEMENTS SHOULD BE MADE AFTER EVERY 500 HOURS OF USE, OR AS NECESSARY. FAILURE TO DO SO MAY RESULT IN SERIOUS DAMAGE TO YOUR MACHINE.

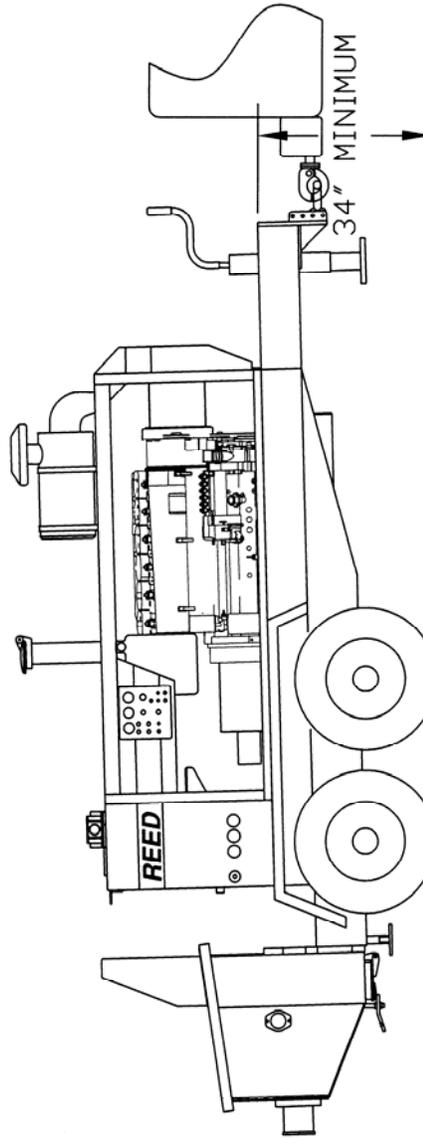
HYDRAULIC OIL

WARNING

RELIEVE PRESSURE BEFORE DISASSEMBLY.

REED		PHONE (909) 287 - 2100	
13822 OAKS AVENUE		FAX (909) 287 - 2140	
CHINO, CA 91710 USA			
MODEL	_____	SERIAL NO.	_____
MATERIAL PRESSURE	_____	PSI	_____ BAR
HYDRAULIC PRESSURE	_____	PSI	_____ BAR
ENGINE / PTO ELECTRIC MOTOR	_____	RPM	_____ VOLTS

PN 86636

PN 86245 TOWING WARNING-DECAL**! WARNING**

- THE TONGUE WEIGHT ON TANDEM AXLE TRAILERS DECREASES AS THE TONGUE IS LOWERED.
- TOWING WITH INSUFFICIENT TONGUE WEIGHT MAY CAUSE INSTABILITY OF THE TRAILER.
- REED C--SERIES MODELS MUST BE TOWED WITH A MINIMUM TONGUE HEIGHT OF 34 INCHES.

PN 86245



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OPERATOR QUALIFICATIONS

Making the choice for an operator is a vital decision as it affects safety and productivity. The **01 MODEL C90S** has been thoroughly inspected and tested by the **REED** Quality Control Department prior to shipment. The design of the unit incorporates several built-in safety features and also allows for an average skilled person to readily become proficient in the safe operation of the **01 MODEL C90S**. The unit is a pressurized material pump and can be potentially **DANGEROUS** in the hands of **UNTRAINED OR CARELESS OPERATORS**.

Knowing the characteristics of the machine and function of the controls are important to **SAFE, PROPER OPERATION** and **USE**.

It is the responsibility of all users to read and comply with the following rules and information designed to promote **SAFETY** and **UNDERSTANDING** of the **01 MODEL C90S** concrete pump.

- The first requirement for any user/operator is to obtain a thorough understanding of the operating characteristics and limitations of the machine. This should not be overlooked regardless of their prior experience with similar type equipment.
- Only **QUALIFIED TRAINED** personnel who have been authorized must be allowed to operate the **01 MODEL C90S**. A Qualified Trained Operator is one who has **READ** and **UNDERSTOOD** the instructions in this manual and is thoroughly familiar with the operating characteristics and limitations of the machine.
- Individuals who cannot **READ** and **UNDERSTAND** the signs, warnings, notices and operating instructions that are part of the job, in the language in which it is printed **MUST NOT BE ALLOWED** to operate the **01 MODEL C90S**.
- Know and follow all cautions, warnings and operating instructions on the machine.
- Repair and adjustments must only be made by **QUALIFIED TRAINED** personnel.
- No modification is to be made to the machine without prior written consent of the **REED** Customer Service Department.
- Attach a **SIGN-OFF** sheet on the unit to enable the operator to report any damage, defects, problems or accidents to his work supervisor.
- Understand and **OBEY** all applicable Local and Government statutes and regulations applying to safe operation and use of material pumping machines.

**AN UNKNOWING OPERATOR IS AN UNSAFE OPERATOR
AND A SORRY OPERATOR**



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PRE-OPERATION INSPECTION

The **CONDITION** of the unit prior to start-up is a very **IMPORTANT** factor as it directly affects the operator's safety as well as those around him. It should be a common practice that the operator performs a general inspection of the **REED 01 MODEL C90S** before each day's operation.

The purpose of the operator's inspection is to keep the equipment in **PROPER** working condition and to **DETECT** any sign of malfunction during normal operations between scheduled maintenance checks.

DOWNTIME is **COSTLY** and can possibly be prevented by taking a few minutes prior to start-up to do a thorough walk-around inspection. This inspection must be performed each day before the unit is operated. Report any damage or faulty operation immediately. Attach a sign, if need be, at the control panel which states ----- **DO NOT OPERATE** ----- . Repair any discrepancies before use.

Some major items to be considered for your inspection include the following:

1. OVERALL MACHINE CONDITION

- External structural damage
- Wheel lug nuts missing or loose
- Brake line wiring, connection
- Condition of tires, pits, tears, cuts, inflation
- Decals, placards, warning signs
- Missing, broken or damaged parts
- Remote switch & cable condition
- Gauges, Throttle control

2. HYDRAULIC SYSTEM

- Loose or damaged hoses, tubing, fittings
- Hydraulic leaks

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- Hydraulic fluid level
- Cleanliness of fluid, filter condition indicator
- Hydraulic valves and control levers
- Hydraulic cylinders

3. HOPPER

- Grate in place not damaged
- Agitator condition
- Drive motor
- Swing tube connection
- Shift cylinders condition
- Outlet Connection

4. ELECTRICAL

- Frayed or broken wires or loose connections
- Condition of switches, lights, connections
- Instruments and gauges - condition

⚠ CAUTION

Defective components, structural damage, missing parts or equipment malfunctions, jeopardize the SAFETY of the operator and other personnel and can cause extensive damage to the machine. A poorly MAINTAINED machine can become the greatest OPERATIONAL HAZARD you may encounter.



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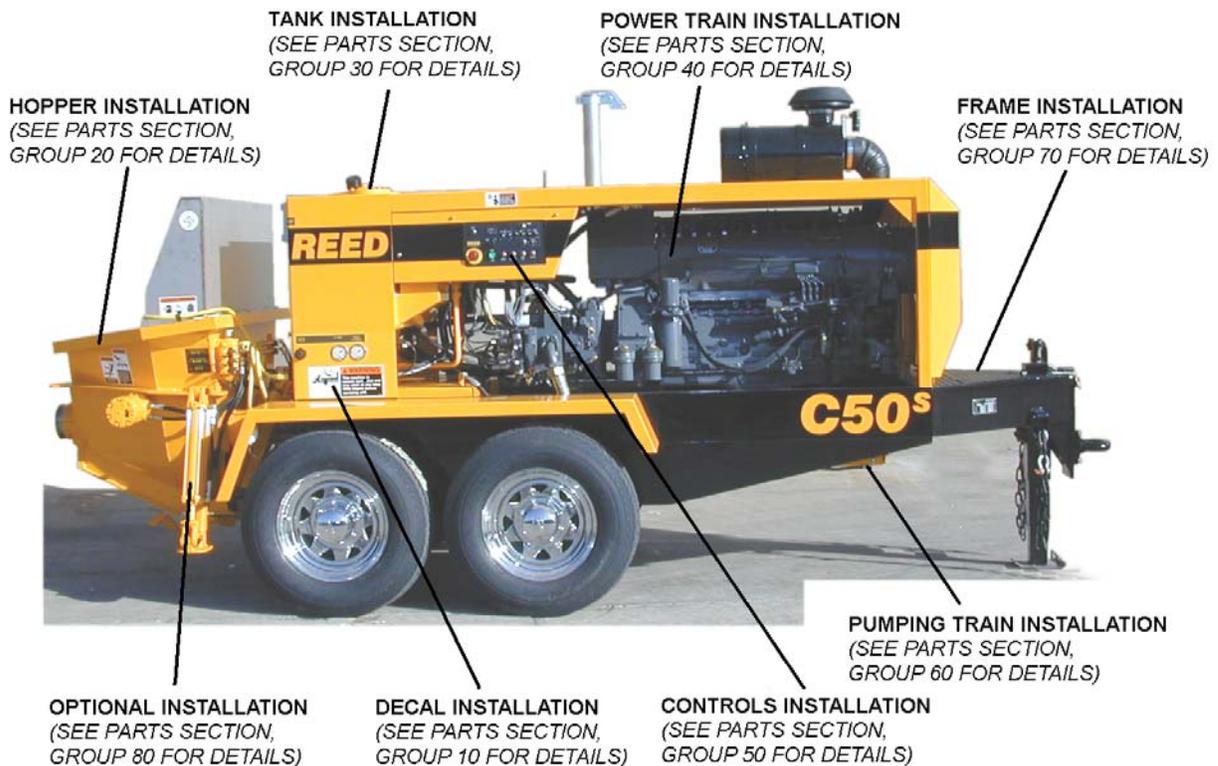
OPER.

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GETTING ACQUAINTED (UNIT FAMILIARIZATION)

As previously indicated, it is important from a **SAFE** operational standpoint that you, the **OPERATOR**, know your machine. This means the function of each control as to what happens when it is activated, how it might interact with other functions and any limitations, which might exist. A **GOOD UNDERSTANDING** of the controls and capabilities will enhance operation and assure maximum operating and efficiency and **SAFETY**.

These next few pages will assist you in **GETTING ACQUAINTED** with the **01 MODEL C90S** concrete pump. Carefully study these.



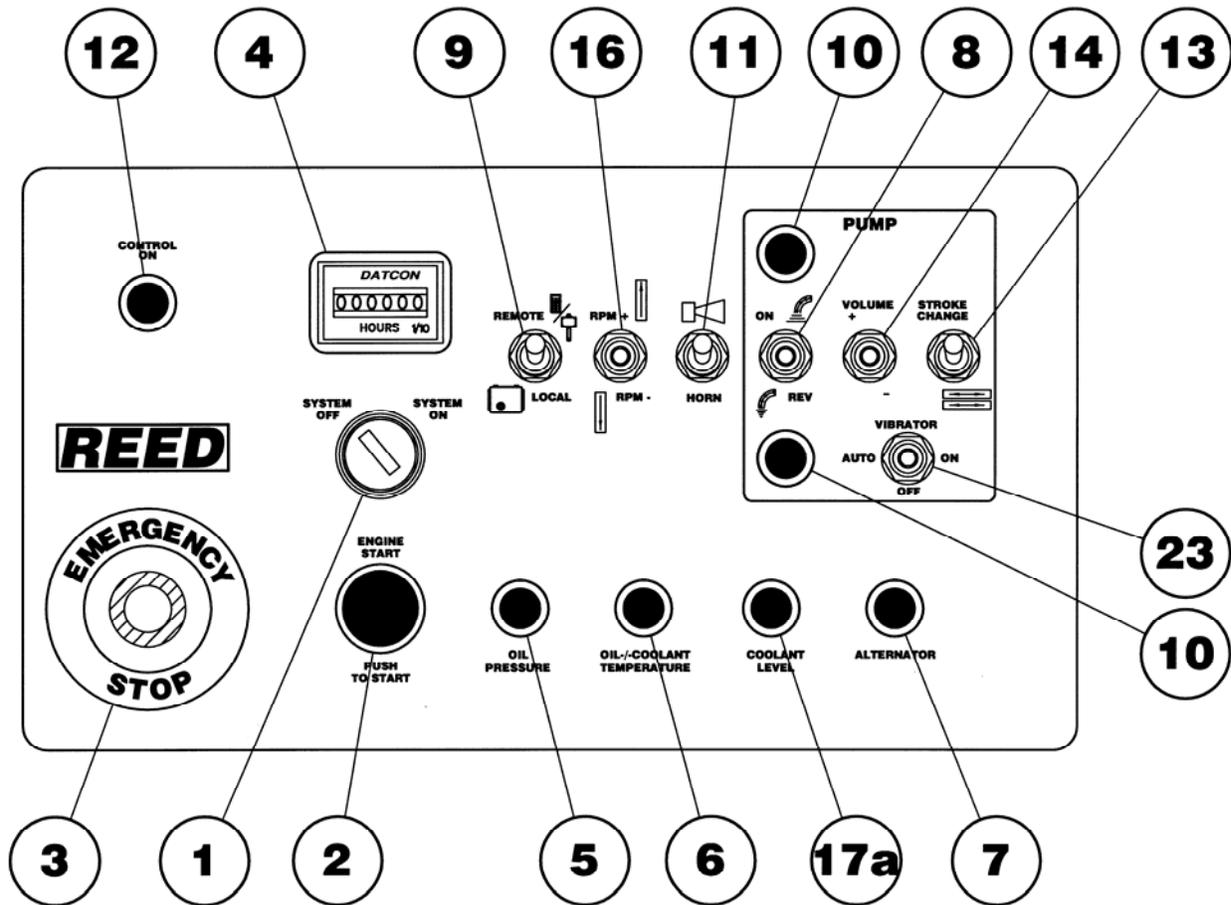
REVISION:



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CONTROL FAMILIARIZATION

The controls for operation of the **01 MODEL C90S** can be found and are located on the right (curb) side of the machine. A control box is provided and contains all the main function instruments, switches, and indicators. Hydraulic gauges and throttle control are on lower portion of hydraulic tank. The volume control is adjacent to the main control. Each location or panel is dedicated to the operation of certain functions. These are noted herein:



1. SYSTEM POWER SWITCH

This is a two (2) position key switch and is used to control the engine. Turn key to **SYSTEM ON** position to energize electrical circuit. Shut down engine by turning key to **SYSTEM OFF** position.

2. ENGINE START SWITCH

The **GREEN BUTTON** is a pushbutton switch. By pushing the button, along with the key switch in the **SYSTEM ON** position, will start the engine.



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3. EMERGENCY STOP

This is an emergency switch and is used to shut down the pump in an emergency situation. It is of the push-pull type. Depress **PUSH** knob in to **STOP** operation. **PULL** knob out to **REACTIVATE** system. **NOTE – The HORN/RESET must be switched one time to restart pump operation.**

4. HOUR METER

This instrument is used to record the number of hours the electric system has been activated. The hourmeter becomes operational when the ignition key is **ON**.

5. LOW OIL INDICATOR-(OIL PRESSURE)

Light, when lit, indicates engine oil level is low and requires attention.

6. OIL /COOLANT TEMPERATURE INDICATOR

Light, when lit, indicates engine temperature has reached a critical temperature and requires attention.

7. ALTERNATOR INDICATOR

Light, when lit, indicates a faulty charging circuit for the battery.

8. PUMP DIRECTION SWITCH

This is a three (3) position toggle switch and is used to control the cycle direction of the concrete pump. **CENTER** position of toggle is **PUMP-OFF**. Move toggle to **UP** position to activate **PUMP-ON AND FORWARD** cycling. Move toggle in **DOWN** position for **REVERSE** cycling



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9. CONTROL SWITCH

This is a two (2) position toggle switch and is used to select the pump control location. Move toggle to **LOCAL** to enable operation of concrete pump from main stationary panel. Move toggle to **REMOTE** for operation using the remote control.

10. INDICATOR LIGHTS

These green lights, located above and below the switches are used, when lit, to indicate the position of the toggles.

11. HORN/RESET

This is a momentary toggle switch and is used to reactivate the control and pump circuit after machine has been shut down using the **EMERGENCY STOP** switch. Once the emergency stop has been depressed it will be necessary to pull out switch and move toggle of **HORN** switch momentary to **RESET** position.

12. CONTROL ON INDICATOR

This is a green indicator light, when lit denotes control circuit is energized.

13. STROKE CHANGE SWITCH

This switch is a two (2) position spring return switch and has two functions. One is A momentary toggle to change stroke from one side to the other to help clear a possible line plug. The other function is when the switch is held **DOWN** and allow for end of stroke. High pressure check or in this instance of equalizing the stroking pistons. The allowance of the spring return sets the machine back in forward stroke.

14. VOLUME CONTROL

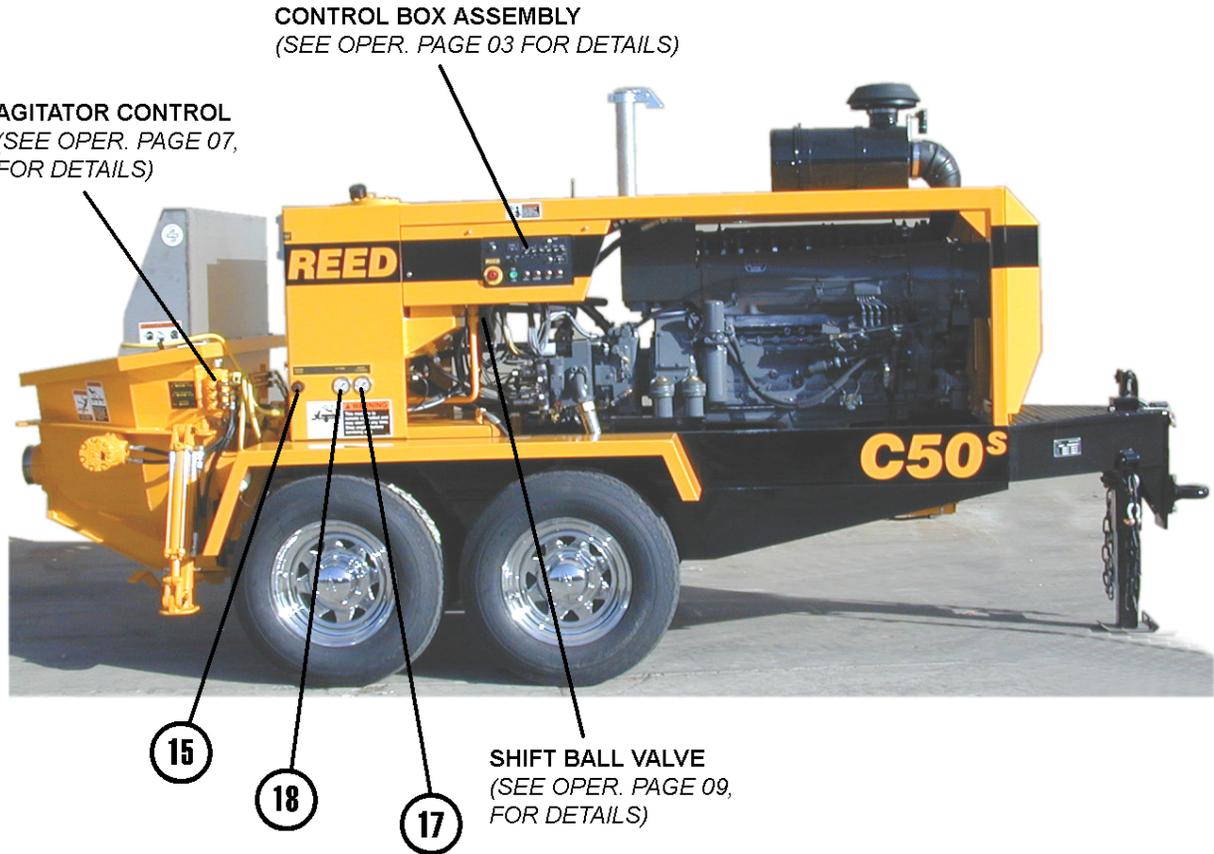
This control is installed on the discharge port of the main hydraulic pump. It is used to adjust volume **OUTPUT** of the material cylinders which in turn is controlled by the hydraulic pump. Flipping toggle switch **UPWARD** will **INCREASE** volume, flipping toggle switch **DOWNWARD** will **DECREASE** volume.

15. THROTTLE CONTROL-CABLE

This is used to adjust the engine RPM. Turn knob **COUNTERCLOCKWISE** to **INCREASE** engine speed. Turn knob **CLOCKWISE** to **DECREASE** engine speed. The control is equipped with a quick release feature which consists of pushing button in center of knob. This releases the throttle allowing engine to return to idle.

16. THROTTLE CONTROL-TOGGLE SWITCH

This is a three (3) position spring centered switch and is used to adjust the engine **RPM**. Toggle **UP** to **INCREASE** engine speed. Toggle **DOWN** to **DECREASE** engine speed. Speed of engine will retained as set until reset.



17a. COOLANT LEVEL INDICATOR

Light, when lit, indicates engine temperature has reached a critical stage and requires attention.

17. PRESSURE GAUGE – 6000 PSI

This hydraulic pressure gauge is used to indicate the main system hydraulic pressure being applied to the hydraulic cylinder pistons of **CYL A OR CYL B** on the forward stroke.

18. PRESSURE GAUGE – 3000 PSI

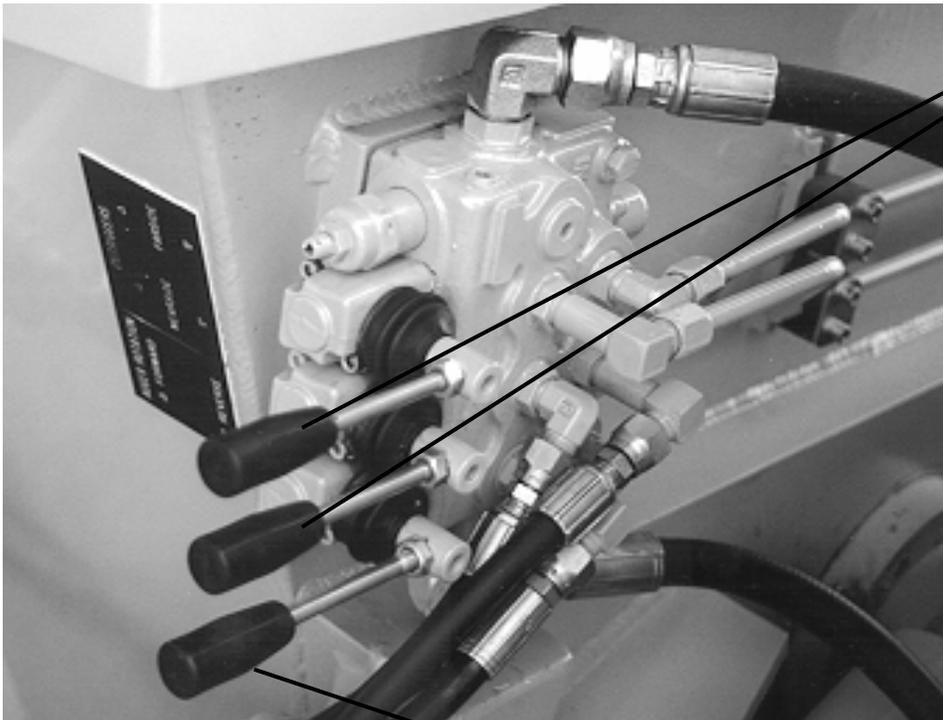
This hydraulic pressure gauge is used to indicate the hydraulic pressure of the swing tube shift accumulator circuit.

⚠ WARNING

DO NOT VARY THE PUMP OUTPUT BY VARYING ENGINE SPEED.

19. AGITATOR CONTROL

The agitator or remixer function is controlled by a manually operated single spool directional control valve. The valve is used to control **ON-OFF** function as well as the rotation direction of the hydraulic motor. With lever in **CENTER** position, the hydraulic flow to the motor is **OFF**.

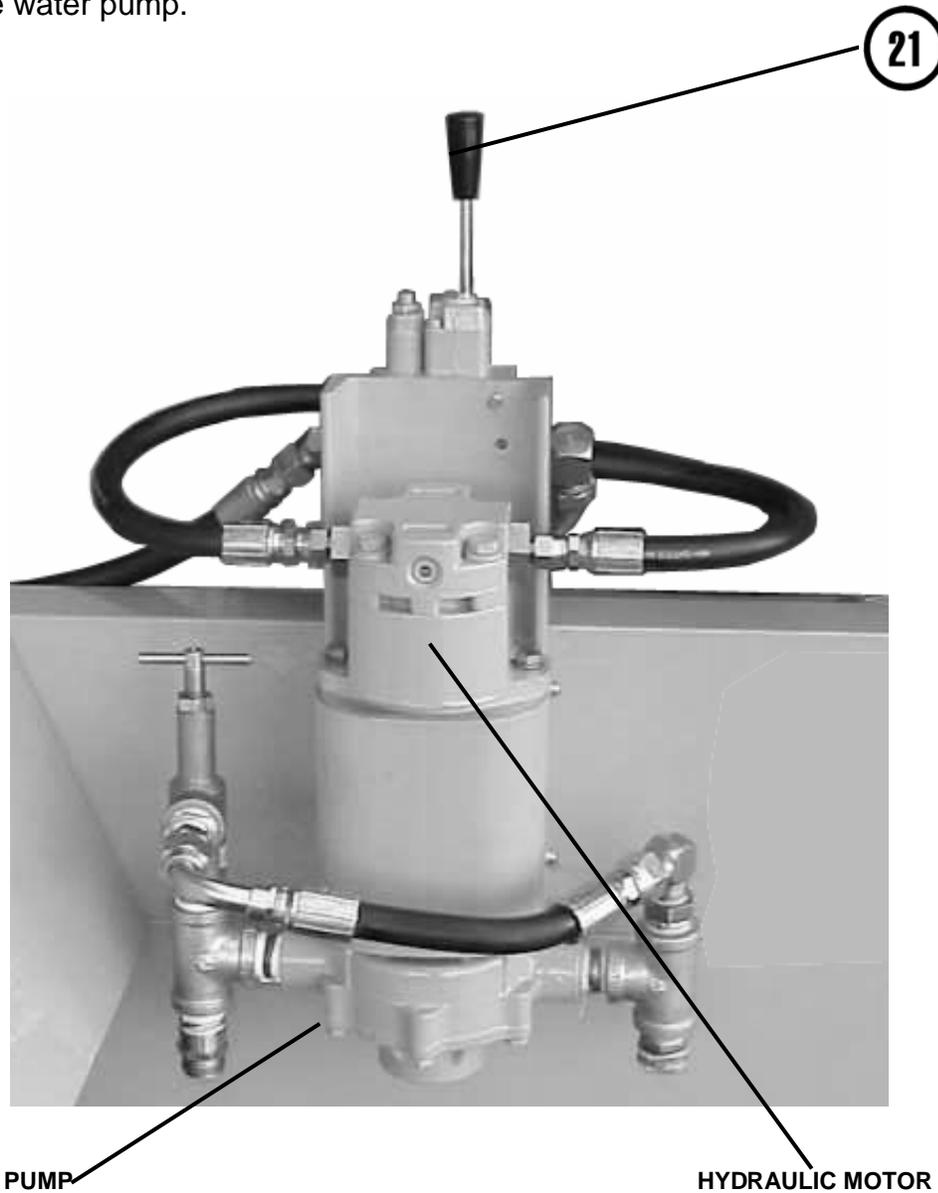


20. OUTRIGGER CONTROL (IF EQUIPPED)

As part of the same valve bank as the agitator, the two (2) additional valve sections are used to control the outriggers. One lever controls the right outrigger; the other controls the left outrigger. Lever in **CENTER** position, the flow is **OFF**.

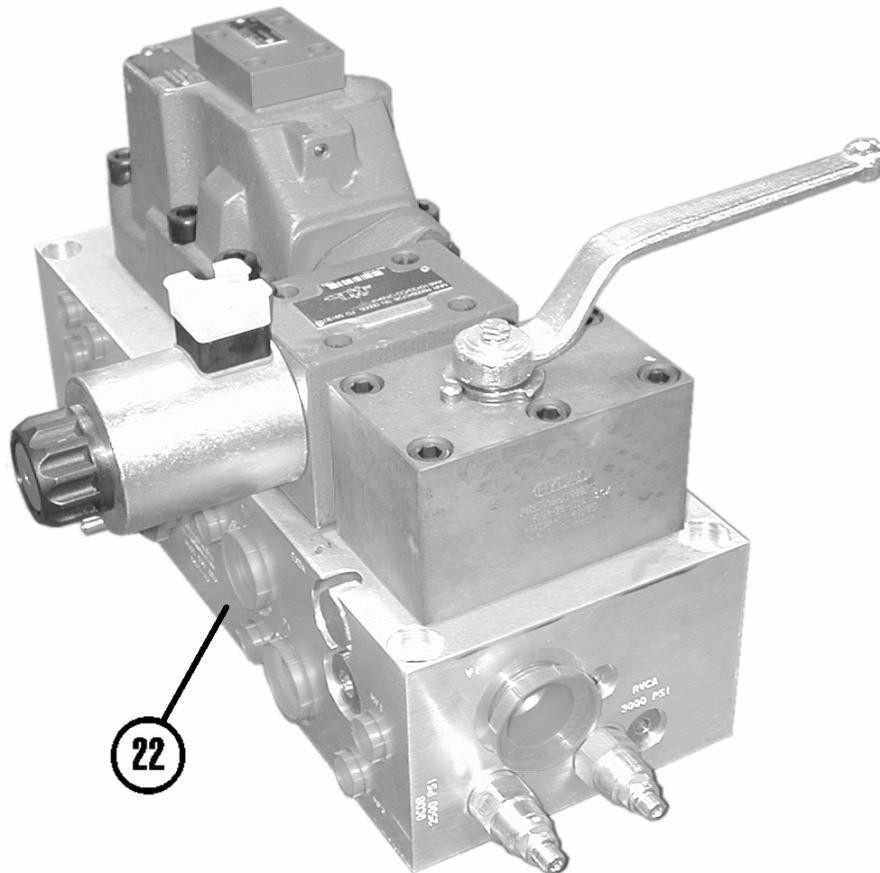
21. WATER PUMP CONTROL – OPTION

This option is operated from the auxiliary circuit. It utilizes a single spool manual directional valve to control the operation of the hydraulic motor. The motor is used to drive the water pump.



22. SHIFT BALL VALVE

This control is located on the swing circuit hydraulic manifold. It is a manual ball valve and is used to control the speed of the S-tube shift. For a hard fast shift, place lever of ball valve in a vertical (12 o'clock) position. This places the valve fully open and allows the flow to bypass the restrictive orifice. This valve position may be used when a harsh material mix is being pumped requiring more power in shifting the S-tube.



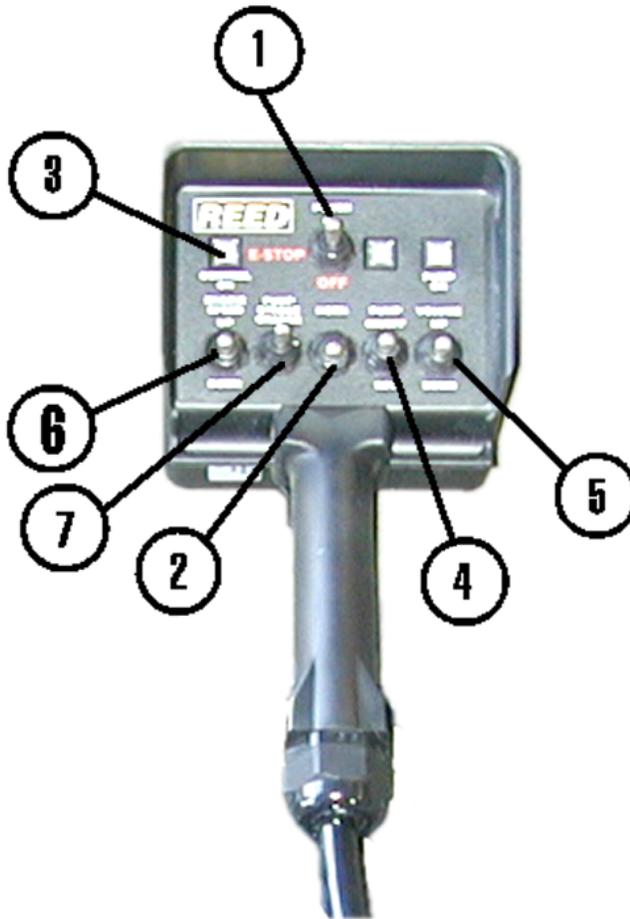
For an easier, slower shift, move the ball valve lever to the 3 o'clock position. This closes the ball valve and directs the fluid through the orifice. This position may be used when a slurry is being pumped or when the machine is being cleaned out.

This unit can be operated with lever in any position from 12 o'clock to 3 o'clock. Eventually, experience will dictate what setting is best.

23. VIBRATOR – OPTION This toggle switch is for vibrator operation.

REMOTE CONTROL FAMILIARIZATION

A remote control pistol grip console is provided and is used to enable the operation of the concrete pump away from the immediate vicinity of the unit. The remote is equipped with an umbilical cord that plugs into the side of the main control box. The console consists of the following functions:



1. POWER ON/OFF - EMERGENCY STOP SWITCH

This is an power on/off and emergency switch, when used will shut down the pump in an emergency situation. It is of the toggle switch type. Move, toggle switch to **E-STOP** to stop operation. Use **HORN** toggle switch to **REACTIVATE** system.

2. HORN/RESET

This is a momentary toggle switch and is used to activate the control and pump circuit after the machine has been shut down using the **EMERGENCY STOP** switch. Once the emergency stop has been depressed, it will be necessary to pull out switch and move toggle of **HORN** switch momentarily to **RESET** position.



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3. INDICATOR LIGHT

This green indicator light will be lit when remote circuit is energized.

4. PUMP SWITCH

This is a three (3) position toggle switch and is used to control the cycle direction of the concrete pump. **CENTER** position of toggle is **PUMP-OFF**. Move toggle to **DOWN** position to turn pump **ON** for **FORWARD** cycle. Move toggle in **UP** position for

5. VOLUME CONTROL

This control is installed on the discharge port of the main hydraulic pump. It is used to adjust volume **OUTPUT** of the material cylinders which in turn is controlled by the hydraulic pump. Flipping toggle switch **UPWARD** will **INCREASE** volume, flipping toggle switch **DOWNWARD** will **DECREASE** volume.

6. THROTTLE CONTROL(ENGINE SPEED)

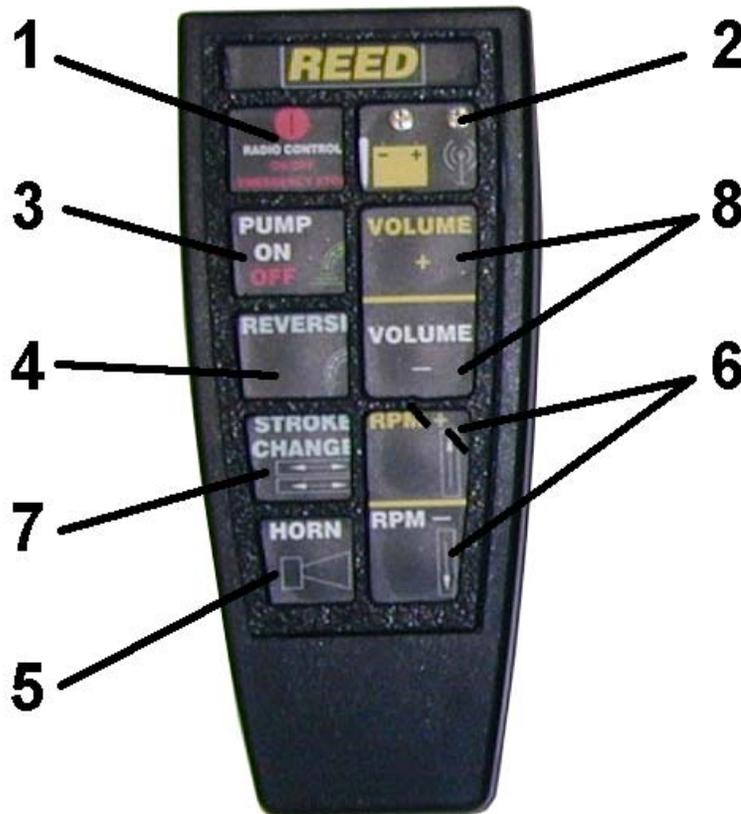
This is a three (3) position spring centered switch and is used to adjust the engine **RPM**. Toggle **UP** to **INCREASE** engine speed. Toggle **DOWN** to **DECREASE** engine speed. Speed of engine will retained as set until reset.



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RADIO REMOTE CONTROL FAMILIARIZATION

A hand held radio remote control unit is provided and used to enable operation of the concrete pump away from the immediate vicinity of the unit. The complete unit consists of a hand held transmitter and a receiver which is located within the control panel.



1. E-STOP SWITCH

This is an emergency switch and is used to shut down the pump in an emergency situation. **DEPRESS OFF** switch to **STOP** operation. **DEPRESS ON** button to re-activate system.

2. POWER LIGHT

This indicator light is used to depict when light is lit that the transmitter is ready for use



3. PUMP SWITCH

This switch is used to control the operation of the concrete pump. **PUSH** green button switch to turn pump **ON**, to start cycling **FORWARD**, pump will cycle normally pumping material out discharge. **PUSH** switch to turn pump **OFF**.

4. PUMP DIRECTION SWITCH

This yellow button switch is used to reverse the pump direction of the unit. Press switch to **REVERSE**, pump drawing material back into hopper.

5. HORN SWITCH

This switch is used to activate the control and pump circuit after the machine has been shut down using E-Stop. Once E-Stop has been depressed, it will be necessary to depress **ON** button. Depress **HORN** switch to re-activate system.

6. THROTTLE CONTROL

Two push button switches control the speed of the engine. The green button switch, function is to **INCREASE** engine speed. The red button switch, function is to **DECREASE** the speed of the engine. The speed of engine will retained as set, until it is reset.

7. STROKE CHANGE SWITCH

Refer to **OPER. SECTION** page 05 for switch's function.

8. VOLUME CONTROL

Refer to **OPER. SECTION** page 05 for switch's function

9. RED BATTERY INDICATOR (Located at top right corner of remote)

This red **BATTERY** indicator turns on momentarily when touchpad key is pressed and turns off if the battery is good.

This indicator will remain on when the battery voltage is low. There is enough power in the battery for about 15 minutes of operation after the light remains on. When this time is up, the red battery will turn off and the transmitter will no longer function properly until the battery has been changed. The transmitter is powered by a 9 volt alkaline battery. The operation time of the battery is determined by both frequency and duration of use.

RADIO REMOTE OPERATION

Before proceeding to start-up and operate the radio remote control, make sure it is safe to do so. Make sure the same safety precautions normally required for safe pump operation are adhered to.

- Place control switch on main panel to **REMOTE** position. The receiver **POWER** light should be lit.
- Press the transmitter **ON** switch. The **POWER** light on transmitter should slowly flash and the receiver **ACTIVE** light should be lit.
- When ready to cycle pump, press the transmitter switch to **PUMP**, and the **DIRECTION** switch to **FORWARD**. The receiver **PUMP** light should be lit. To stop the pump, momentarily press the transmitter switch to **STOP**. **PUMP LED** should go out.
- To change the pump direction to reverse, press the **REVERSE** switch. The reverse **LED** should light.
- Press transmitter **OFF** switch to deactivate radio remote transmitter.

WARNING

Do not leave the transmitter unattended with the pump engine is operating.

TOWING THE TRAILER

The **REED 01 MODEL C90S** material pump although small in stature as compared to larger pumps or construction type equipment, requires the same care and attention in transporting as does the larger heavier equipment. At no time should this be overlooked.

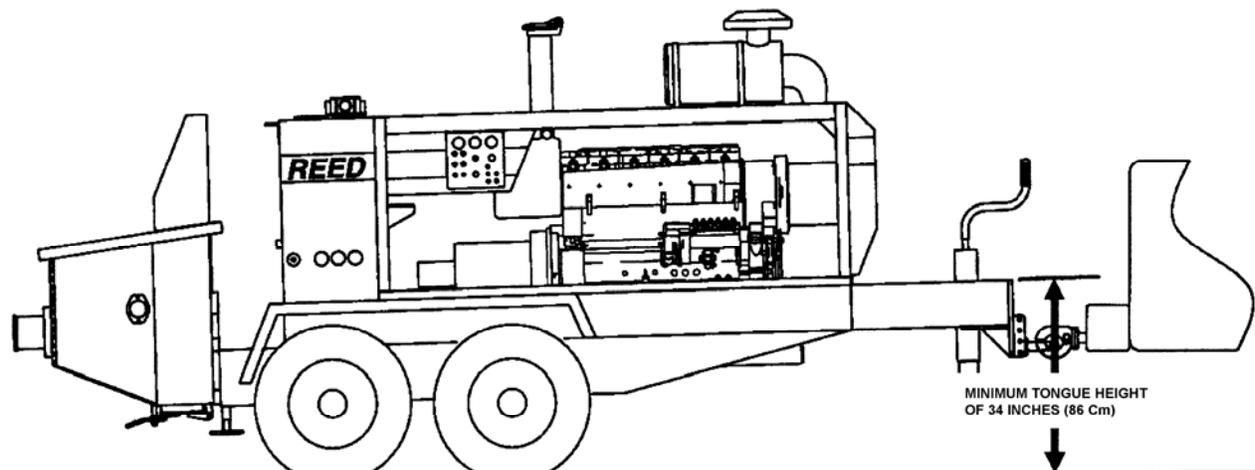
The **REED 01 MODEL C90S** is equipped with two (2) torsion bar type axles, electric brakes, and standard tail lights. It is capable of being towed by a truck at a highway speed up to **55 MPH (88KM/HR) MAXIMUM**, depending on road conditions. **THIS SHOULD NOT BE EXCEEDED.**

PREPARE THE UNIT FOR TOWING AS FOLLOWS:

- For units equipped with a pintle ring, install over pintle hook and close safety clasp. Insert pin to securely lock safety clasp.
- For units equipped with a ball hitch, secure hitch on ball and lock in place. Check that ball has been completely inserted into coupler ball socket and ball clamp is closed around the underside of the tow ball and yoke and lever is in a closed position.

⚠ WARNING

It is important from a SAFETY standpoint that sufficient weight exists on the tongue to prevent instability of the trailer during towing. On tandem axle units, the lower the hitch or tongue height from ground, the less weight is applied to the hitch. The C50HPS Models require and MUST be a MINIMUM HEIGHT, ground to the top of frame of 34 inches.





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- Always attach the **SAFETY CHAINS** to towing vehicle and attach the breakaway cable.
- Connect trailer electrical cable to truck connection to establish trailer brake circuit and lighting. Check that lighting is operational.
- Raise outrigger legs and secure in place with retainer pin.
- Make sure that hopper cleanout door is securely closed.
- Fully raise front jackleg and lock handle.
- Check the tires for proper inflation pressure and inspect for any cuts and excessive wear.
- Survey underside of pump and trailer to look for other possible obstructions.

WARNING

*Towing trailers at excessive speeds is **DANGEROUS**. Some trailers may weigh as much or more than the vehicle doing the towing, and can affect the control of the towing vehicle causing an **OVERTURN** condition. This situation can arise from excessive speed or rapid braking. Therefore, always maintain a sufficient distance for safe braking.*

TOWING TIPS:

- **Never travel with concrete in hopper.** The trailer pump is not designed to be towed with this extra weight.
- Remove all delivery lines from hopper outlet.
- Travel only as fast as conditions allow. **DO NOT EXCEED 55 MPH (88KM/HR).**
- Always leave sufficient distance between you and the vehicle ahead to allow **SAFE BRAKING**.
- Reduce speed at dips, bumps and rough road areas.

If trailer begins to sway or swerve side to side, ease off of accelerator to slow down. **DO NOT JAM ON BRAKES.** Gently touch brake pedal intermittently to come to a stop. Check to determine cause of sway. Check hitch.



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OPERATION INSTRUCTIONS

Having **READ** and **UNDERSTOOD** the previous pages on **SAFETY** and **CONTROL FAMILIARIZATION** you are now in a position to learn how to operate the unit. If you have not **READ** the previous pages we suggest you do so before **PROCEEDING**.

⚠ CAUTION

*For your own **SAFETY** and others around you it is your **RESPONSIBILITY** to insure the unit is in proper working condition. Check out the unit by using the **PRE-OPERATION INSPECTION** notes previously identified.*

⚠ WARNING

OBSERVE ALL SAFETY PRECAUTIONS WHILE OPERATING THIS MACHINE.

SELECTION AND SET-UP AT JOB SITE

Your first and primary concern when arriving at the job site is to insure the machine can be safely operated and it will afford the maximum production efficiency without jeopardizing safety.

- The machine should be located on as level ground as is possible.
- Lower the front leg jack to ground and if necessary place wooden blocking under the jack pad.
- Lower rear outriggers and pin in place. If necessary, place additional blocking under the pads.
- Lower and apply pressure to the front jack on the ground and if necessary place wooden blocking under the jack pad. This will transfer weight to the outrigger legs.

NOTE

DAMGE WILL OCCUR IF OUTRIGGERS ARE NOT USED. WARRANTY WILL NOT BE HONORED IN THIS SITUATION!



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- Keep a sufficient distance away from slopes, pits, trenches and excavations that could breakaway.
- Make every attempt to set up as near as possible to placement site. The shorter the pumping distance the greater the material delivery.

When the site for the operation has been selected proceed to set up unit for pumping.

- Disconnect safety chain, electrical cable and hitch from towing vehicle.

DELIVERY SYSTEM SUGGESTIONS

The delivery system is an arrangement of those components used from the pump discharge to the placement site. This could consist of rubberized material hose, steel piping, clamps, couplers and reducers. How this delivery system is set up, what components are used will greatly affect the end result of efficient and productive concrete pumping. The following suggestions are offered to assist in achieving your objective and for your consideration in laying out the delivery line.

- Use the most direct line as is feasible from the concrete pump to the placement area.
- Set up the delivery line using a minimum of rubber hose. Rubber hose offers three (3) times the resistance to the flow of concrete as compared to steel pipe.
- Concrete will also flow with less back-pressure through pipe than through hose.
- Minimize the use of bends in the hose. This requires more pumping pressure.
- Place the hoses or pipe to the farthest placement point from the hopper discharge outlet **FIRST**. It is easier to remove lines than it is to add as the pumping operation takes place.
- The steel pipe, elbows, and reducers and hoses should be equipped with heavy-duty ends. These ends have a higher-pressure capability than the standard ends.
- Only connect together couplings or clamps that are clean and seals that will retain the slurry in the delivery line. Dirty couplings **LEAK** and when pressurized the leaking of water will inevitably cause blockage.
- **DO NOT USE** any worn or damaged hoses, pipes or couplings.



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- If the delivery line will cross rebars, support must be considered for the pipe so that it does not contact the rebar mat.
- For best pumping results it is important to size the inside diameter of the pipe or hose to that of the size of the aggregate in the concrete to be pumped. The general rule is the inside diameter of the pump or hose shall be 3 to 4 times the size of the largest aggregate in the mix. As an example:
 1. Aggregate classified as 1 ½ inch (38mm) rock, 8 to 10% maximum content by weight requires a 5 inch (127mm) diameter concrete delivery system.
 2. Aggregate classified a 1 inch (25mm) rock, 10 to 15% maximum content by weight, requires a 4 inch (100mm) diameter concrete delivery system.
 3. Aggregate classified as ¾ inch (19mm) or smaller rock, 10 to 15% maximum content by weight, requires a 3 inch (76mm) diameter concrete delivery system.
- For vertical concrete delivery system, the vertical pipe line should be anchored to the building or other supporting structures every 10 ft (3m) of height.

PRE-PUMPING PREPARATIONS

Again we **REMAND** you to make sure the machine is in **PROPER WORKING CONDITION**. One of the worst, and possibly the most expensive, situation to encounter is to begin pumping and have a failure occur due to **NEGLIGENCE** of a thorough pre-operation inspection.

STARTING THE PUMP

Before starting diesel engine, check the position of the following controls and functions:

- That the **PUMP CYCLE** switch is **OFF**
- That the **VOLUME CONTROL** is **CLOSED**, screwed in.
- That the **AGITATOR** control lever is in **OFF** position.
- Check flush box is filled that sufficient lubrication oil or water exists. Replace cover.



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When you have completed the above checks, the unit is ready for start up.

- At the main control panel, turn key switch and start engine. When engine starts, release key.
- Check the engine indicator lights of alternator, oil temperature, low coolant and low oil.
- Check that **CONTROL LOCATION** switch is in **LOCAL** position.
- Allow a few minutes for engine to warm up.
- Increase engine RPM by adjusting **THROTTLE** control to desired engine speed as indicated on tachometer.
- Check the swing tube pressure gauge (3000 PSI/210 BAR gauge) that it is operational. Gauge should read approximately 2000 PSI (140 BAR).
- Pressure gauge (6000 PSI/420 BAR) will only indicate pressure when pump switch is **ON**.
- **DO NOT CYCLE PUMP** unless water or material has been placed in the hopper.
- To cycle pump adjust **THROTTLE** and **VOLUME** control to desired setting.
- Place pump switch to **ON** position. The hydraulic drive and material cylinders will now cycle.
- Turn pump switch **OFF** to stop cycling.

▲ CAUTION

*At **START-UP**, ALWAYS OPERATE AT LOW SPEED AND LOW VOLUME until proper operation has been assured.*



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PRIMING THE PUMP SYSTEM

Before proceeding to cycle and pump concrete material it will be necessary to prime the pump system and delivery lines. This operation consists of pumping a coating of lubrication grout through the S-tube and delivery lines to enable the regular concrete mix to flow smoothly.

The grout used for priming and lubrication should consist of two (2) parts sand and one (1) part cement and mixed to a consistency of thick soup. This will coat the delivery line ahead of the actual material mix and will assist in preventing the possibility of packing when the line is filled with regular mix.

How much grout will be needed depends on the length of the delivery line as well as the material being pumped. Experience will eventually indicate the amount to be required.

- Using a water hose wet down the inside of the hopper with about one (1) gallon of water.
- When the concrete from the ready-mix truck is ready to be placed in the hopper, pour the grout into hopper.
- Adjust **THROTTLE** to **FULL RPM**
- At pump panel adjust **VOLUME** control to about ½ open and turn **PUMP ON**.
- As the slurry is being pumped out begin charging, pouring concrete from the truck into the hopper.
- Engage the **AGITATOR** using appropriate control.
- Continue to pump until a steady flow is discharged from end of delivery line.
- Once this point has been reached, the **VOLUME** control can be adjusted to the desired concrete output.
- During the pumping operation observe the 6000 PSI hydraulic gauge. Be alert to unactuated sudden changes in pressure, high or low.
- The **S-TUBE** gauge should read approximately 2000 PSI just prior to the shifting of the S-tube. As shift is made gauge will quickly lose pressure then bounce back.
- To check pumping pressure, actuate **TEST** switch to either **CYL "A"** or **CYL "B"** position. Hold toggle until piston bottoms out. Read pressure on 6000 PSI gauge.

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NOTE

The pressure by which the concrete is being pumped is based on the ratio between the hydraulic cylinder and the material cylinders and that is divided into the hydraulic pressure being applied to the drive cylinders.

In this instance the ratio is 2.25 (piston side) and the concrete pressure is calculated as follows:

SYSTEM GAUGE-PSI	CONCRETE PRESSURE PSI
1000	440
2000	889
3000	1333
3500	1556
4000	1778
4200	1867

On the other hand the hydraulic pressure being applied to the drive cylinders is controlled by the amount the **VOLUME** control is opened. When turned to the **FULL OPEN** position this will produce approximately 4200 PSI on gauge.

PUMPING TIPS AND PRECAUTIONS

Your **SAFETY** is our utmost **CONCERN** and it is your **RESPONSIBILITY** to operate the equipment in a **SAFE** manner. The following **TIPS** and **PRECAUTIONS** are offered as **AWARENESS** facts and should be **OBSERVED** for proper safe operation.

- Always maintain the material level in the hopper to no less than the height of the remixer shaft height or 1/2 full. This is **IMPORTANT** otherwise air will be sucked into the material cylinders and the continuous smooth flow may be interrupted.
- The concrete output is influenced and related to the quality and consistency of the concrete mix. Mix consistency is a decisive factor when it comes to the filling rate of the material cylinders.

With stiffer consistency and unfavorable grading curve of the aggregate, (smaller portion of sand, crushed materials) the rate of filling the material cylinders becomes less efficient resulting in a lesser concrete output. When you encounter this condition it is suggested that pumping at a slower speed can positively increase the output by allowing more time to fill the material cylinders.



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- When it is necessary to pump unfavorable mixes such as extremely stiff, under sanded, lightweight concrete, the best procedure is to keep the remixer/agitator shaft visible all the time. In so doing, the hopper will only be filled to the lower edge of the remixer shaft making the concrete easier to pump.
- This method is called the **AIR-PLUG** method which allows air to be sucked into the material cylinders along with the unfavorable concrete mix.
- When it is necessary to pump concrete that is very liquid and has a high percentage of rough aggregate that tends to separate, keep the concrete level in the hopper as low as possible in case you encounter a work stoppage.
- Concrete that has separated or has begun to set and become lumpy should never be pumped.
- It is common that at sometime during the concrete placement you will be required to stop pumping for a period of time. This could be due to job site problems or possibly lack of concrete. Regardless of the reason, it is **IMPORTANT** to **MOVE** the concrete in the line during these periods. This can be accomplished by operating the pump in **REVERSE** for 2-3 strokes and then after another 10-15 minutes operate the pump **FORWARD** for 2-3 strokes.
- Downtime between forward and reverse movements will depend on the consistency and type of mix. Also if shutdown is for too long a period it may be necessary to clean out the delivery system and pump. Determine this from your experience in the material being pumped.
- Avoid having the material in the hopper separate during shut down.
- Air pockets in the delivery line can be dangerous as the air compresses within the delivery line and when it is released abruptly at the end of the line, the material being pumped is discharged in an explosive manner. Avoid air pockets. Keep sufficient material in hopper to prevent the induction of air into the material cylinders.
- Never bend or kink the flexible hose during the pumping operation. A kink is an obstruction that can stop the material flow, allowing pressure to build up in the system creating a dangerous condition.

When this occurs, the pumping direction must be **REVERSED** for 3-4 strokes to relieve the pressure in the line. Stop the pump and straighten out the kink, then resume pumping.



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TROUBLESHOOTING TIPS - PUMPING & BLOCKAGE

- A drop in volume can occur when pumping long distances or with stiff mixes as compared with shorter lines and wetter mixes.
- Water leaking from a connection can cause separation of the mix in the delivery line and will eventually develop into a blockage at that point.
- Avoid using damaged hoses with internal restrictions. They can cause blockage.
- When using snap joint couplings with gaskets to join the hoses, be sure they are washed and cleaned after completion of the job. We also suggest the couplings and gaskets be dipped in water prior to use for easier installation.
- Don't be alarmed by a slight pulsation of the delivery hose near the outlet. This is a normal condition. However, excessive pulsation near the pump is normally due to higher than average line pressure that may be caused by pumping stiff harsh mixes or pumping extremely long distances. Using hose with a larger internal diameter will help in reducing the line pressure.
- Be alert to the fact that if the delivery system is blocked or the hose is kinked, the pump could suddenly force out the blockage or straighten out the kink. This rapid surge could cause the line to whip or move in such a manner that it may cause **INJURY**.
- When a blockage in the hose occurs, walk along the hose until you find the point of trouble. The hose will be soft immediately past the blockage point. Elevate the hose at that point with the blockage hanging down toward the free end. Shake the hose or pound with a hammer until the blockage loosens and the material flows freely again.
- **DOWNHILL** pumping involves some extra attention and can be difficult on some jobs. The reason for this is that when the pumping operation is stopped the material can flow slowly down the incline causing the hose to collapse. This can only result in a blockage when pumping is resumed. Kinking off the hose at the discharge while the pump is stopped can prevent this. Also the use of stiffer mixes when pumping downhill will lessen the gravity flow.
- When pumping over 40 feet vertically up the side of a structure, steel pipe should be used and should be securely fastened as necessary to support the pipe column. Install long radius 90° pipe sweeps at the top and bottom of the steel pipe delivery line. Also use a short section 20 - 25 feet of hose off the pump discharge to take up the pulsation. Use steel pipe for the balance.

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CLEARING A PACK OR BLOCKAGE

Blockage in the delivery line during pumping operation will no doubt happen at one time or another. An observant alert operator, who can recognize the symptoms is of great value. A blockage can create excessive pressure in the system which is a dangerous condition. When this occurs **IMMEDIATELY STOP** the pump.

- Place the pump direction switch to **REVERSE**. Then turn the pump switch to **ON** allowing the pump to stroke 2-3 times in reverse to assist in relieving the pressure from the delivery line blockage back to the pump outlet
- Switch the pump **OFF**

WARNING

NEVER ATTEMPT TO CLEAR A PACK OR BLOCKAGE IN THE DELIVERY SYSTEM USING THE PUMP PRESSURE.

- Warn all personnel in the immediate area of the imminent **DANGER** and to stay clear of the area.
- Make sure those assigned to clear the blockage are fitted with **EYE PROTECTION** before they open the clamping device.

WARNING

Extreme caution must be exercised when opening the clamping devices on any part of the delivery system. The possibility may still exist that there is still some pressure trapped in the line.

- Open the clamp in the area of the blockage and clear the pack.
- When blockage has been cleared **START** pump, placing **DIRECTION** switch to **FORWARD**. Pump the material at a **LOW VOLUME** until material flows steadily out the end hose.



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CLEAN UP OF THE PUMP

This sometimes may seem tedious, tiresome and a distasteful task, however, the clean up is a **VERY IMPORTANT** operation. We pointed out previously the importance of the pre-operation inspection. The clean up is no different because it sets the stage as to how well the pump will perform the next time it is used. The clean up involves the removal of unpumped material remaining in the hopper, swing tube, material cylinders and delivery system piping.

NOTE

*The flushing and cleaning operation should only be done at **LOW VOLUME**.*

- At pump panel set **VOLUME** control to approximately 1/3 volume.
- With everything still in tact, pump as much material out of the system as possible, making sure there is still sufficient material in the hopper for lubrication of the piston cups. Then turn **PUMP** switch to **OFF** position.
- Open the hopper clean out door and dispose of the remaining concrete.
- Uncouple the delivery line at the pump outlet. If a reducer is used, disconnect the line right after the reducer.
- Using a water hose with spray nozzle attached to create some pressure, flush out the inside of the hopper, the inside of the S-tube and reducer if used.
- Place **DIRECTION** switch in **REVERSE**. Place the water hose through the pump discharge outlet. **START** the **PUMP**. Water will drain into the material cylinders and as pump cycles, any sand and rocks will be forced out through the open clean out door. This will take approximately 10-12 strokes.
- Remove the hose and continue to stroke the pump to make sure all the sand has been cleaned out. Turn the pump **OFF**.
- Close the hopper clean out door. Place the clean out sponge into the disconnected delivery line. Reconnect the line to the hopper outlet or reducer with the sponge inserted.

- Fill the hopper with water. Place the **DIRECTION** switch to the **FORWARD** position and check that **VOLUME** control is set at low speed. Turn **PUMP ON** and cycle the pump until the sponge passes through the entire delivery system.

⚠ CAUTION

*It is suggested that a **SPONGE CATCHER** be installed at the end of the delivery line to catch the sponge as it is discharged from the line.*

- Turn **OFF** pump and allow the water to drain from the system.
- Clean up the remaining areas of the machine hosing them down as appropriate.
PREPARE UNIT FOR TRAVEL

After the **01 MODEL C90S** has been thoroughly cleaned it can now be readied for travel.

- Return **THROTTLE** control to **IDLE** position, and shut-off engine.
- If remote control was used disconnect from control box and store in secure place.
- Pick-up and store any wheel blocks, cones, delivery line and other equipment.
- Clean up area around pump.
- Connect unit to towing vehicle, raise outrigger legs and front jack.





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DISPLACEMENT SHIFT VALVE-OPERATION

The controls for operation of the **Displacement Shift Valve** can be found and are located on the right (curb) side of the machine. A control box is provided and contains a toggle switch, and indicators. To operate the **Displacement Shift Valve**, position the toggle switch to either the **“HEAD”** or the **“ROD”** positions.

HEAD POSITION

With the toggle switch in the **“HEAD”** position, you will get a low output/high pressure operation from the drive cylinders. A green indicator light will go on, during operation.

ROD POSITION

With the toggle switch in the **“ROD”** position, you will get a high output/low pressure operation from the drive cylinders. A yellow indicator light will go on, during operation.





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PREVENTATIVE MAINTENANCE

How good is any of the equipment you own? It is only as good as it is **MAINTAINED**. Even the finest equipment manufactured requires attention and care. The **01 MODEL C90S** is no different. A good well planned and carried out preventative maintenance program will enhance a properly operating unit as well as the safety of those operating and using the equipment.

It is very important to establish a good maintenance program. Costly repairs and loss of revenue can often be avoided by planning ahead, setting a regular schedule and exercising good preventative maintenance techniques.

The following section is offered as a guide and depicts a start for developing your own preventative maintenance program for the **01 MODEL C90S** concrete pump. The program is depicted and broken into sections of **INSPECTION** and **LUBRICATION**.

NOTE

All points noted herein regarding the maintenance and checks are not intended to replace any local or regional regulations which may pertain to this type of equipment. It should also be noted that the list and schedule is not considered to be inclusive. Interval times may vary due to the climate and/or conditions associated with the location area in which the equipment will be used.

▲ CAUTION

It is your responsibility to always insure that the applicable safety precautions are strictly observed when performing the inspections and maintenance checks. Make certain any components that are found to be defective are replaced or those in need of adjustments or repair are corrected before operating the machine.



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SCHEDULED INSPECTION

The main purpose of accomplishing scheduled inspections is to identify and detect any potential malfunction before it can expand into a major problem. The list presented herein should be inspected and checked on a regular basis. In so doing, it will help ensure a good, safe unit performance.

1. TRAILER

- Frame integrity, visually check welds, cracks
- Torsion axles secure
- Wheels and tires, lug nuts tight, tire inflation
- Electric brakes, breakaway switch connected
- Front jack stand handle turns easily, smoothly
- Outriggers operate properly
- Lighting good condition operational

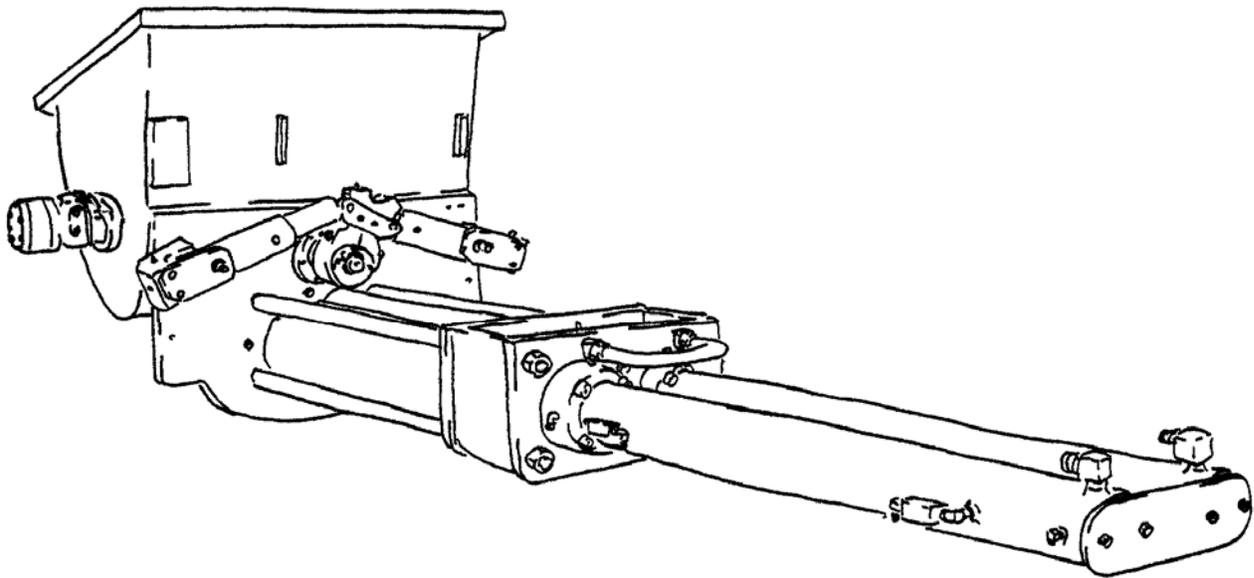
2. ENGINE

- Inspect mountings, bolts, brackets
- Oil level proper, any leaks
- Fuel system, tank mounting, filter condition, leaks, damaged lines
- Battery hold down, condition, tightness of cables
- Key switch, indicator lights operable
- Throttle control functional
- Air cleaner and muffler securely mounted

REVISION:

3. PUMP CELL

- Visually check for structural damage, cracked welds
- Hydraulic drive cylinders in good condition, secure, no leakage
- Material cylinders secure, tie rods tight
- Water box structurally sound, clean, cover in place
- S-tube shift mechanism structurally sound, all pins and retainers in place
- Hydraulic shift cylinders in good condition
- Bearing housing, seals etc. in good condition
- Hydraulic hoses secure no leaks



**SHOWN MODEL: HARSH MIX HOPPER
WITH DUAL SHIFT PUMPING TRAIN**

4. HOPPER ASSEMBLY

- Visually check for structural damage, cracked welds
- S-tube secure, in good condition
- Check condition of wear plate, wear ring, seals



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- Check connection of S-tube to outlet, seals, bearing
- Hopper drain is functional
- Remixer / Agitator in good condition, motor secure

5. MAIN CONTROL

- Control box in good condition, not damaged
- All toggles in good condition, stay in position or momentarily return to center
- Control identification in good condition, legible
- Gauges in good condition

6. REMOTE CONTROL

- Control console in good condition, not damaged
- Switch in good condition
- Umbilical cord in good condition, no cuts, securely mounted to box

7. HYDRAULIC SYSTEM

- Hydraulic tank securely mounted, covers tight
- Filler cap and strainer in place, level sight gauge in proper condition
- Check filter condition indicators
- Hydraulic oil cooler securely mounted, fan motor secure, connections tight
- Check accumulator condition, mounting brackets & clamps
- Hydraulic fluid to proper level and clean
- All hoses and tubing secure, no leaks

REVISION:



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LUBRICATION

The **01 MODEL C90S** concrete pump is equipped with several components that because of the application require frequent lubrication. These areas involve the S-tube shifting mechanism, swing components, the shift and outlet bearings and agitator. To insure the economical service and the long life of these components, grease fittings are installed at each point.

⚠ WARNING

Rapid wear and probable component breakdown will result if the unit is operated with inadequate lubrication. Follow the recommended interval and if need be increase the interval when above normal usage takes place.

LUBE POINT LOCATIONS

- **Swing Tube Shift**
 - Quantity 1 at cylinder barrel pivot
 - Quantity 2 at bell crank
 - Quantity 2 at swing tube shaft bearing housing
- **Swing Tube Outlet**
 - Quantity 2 on outlet bearing housing
- **Agitator/Remixer**
 - Quantity 2 – On non motor end
 - Quantity 1 – One on motor end

Recommended Lubricant: **GENERAL PURPOSE GREASE, SHELL ALVANIA EPLFH2 or EQUAL**

Recommended Interval: **DAILY, BEFORE START-UP AND AS REQUIRED DURING OPERATION**

REVISION:

LUBRICANT AND INTERVAL

The lubricant that is recommended is generally the best choice, however, should this lubricant be unavailable in your area, consult your local supplier for an equivalent.

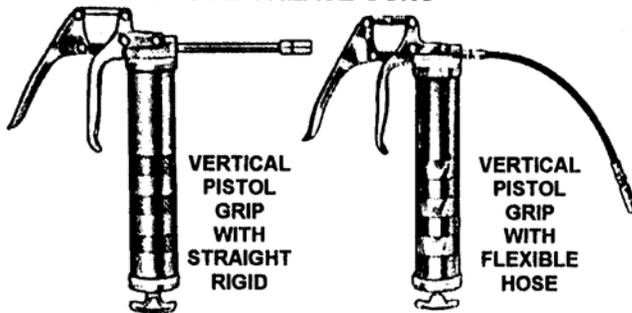
On the same basis, recommended lubrication intervals are based on normal use, in normal environmental conditions. User is **CAUTIONED** to adjust the lubrication interval accordingly to meet each individual condition and usage. If the swing tube bearing housings become extremely hot or lubricant becomes a liquid and oozes out around the bearing or seal, the area should be relubricated.

If the **01 MODEL C90S** has been stored or exposed to environmental conditions of extreme low humidity, high dust level, elevated temperatures or heavy rainfall, lubrication of components may be required more frequently than under normal conditions.

NOTE

External non-bearing surfaces should be wiped clean of extruded or spilled surplus grease and oil with a clean, but lint free cloth to prevent damaging dust and abrasive accumulation on lubricant wet surfaces.

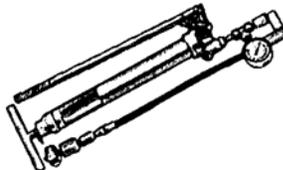
GENERAL PURPOSE GREASE GUNS



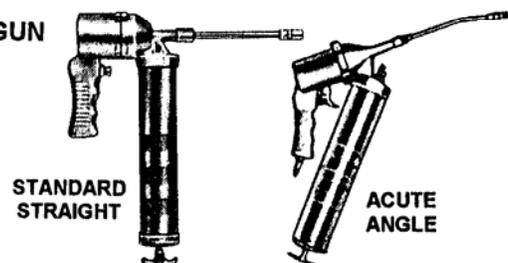
HAND HELD ELECTRIC GREASE GUN



EXTREME PRESSURE GREASE GUN

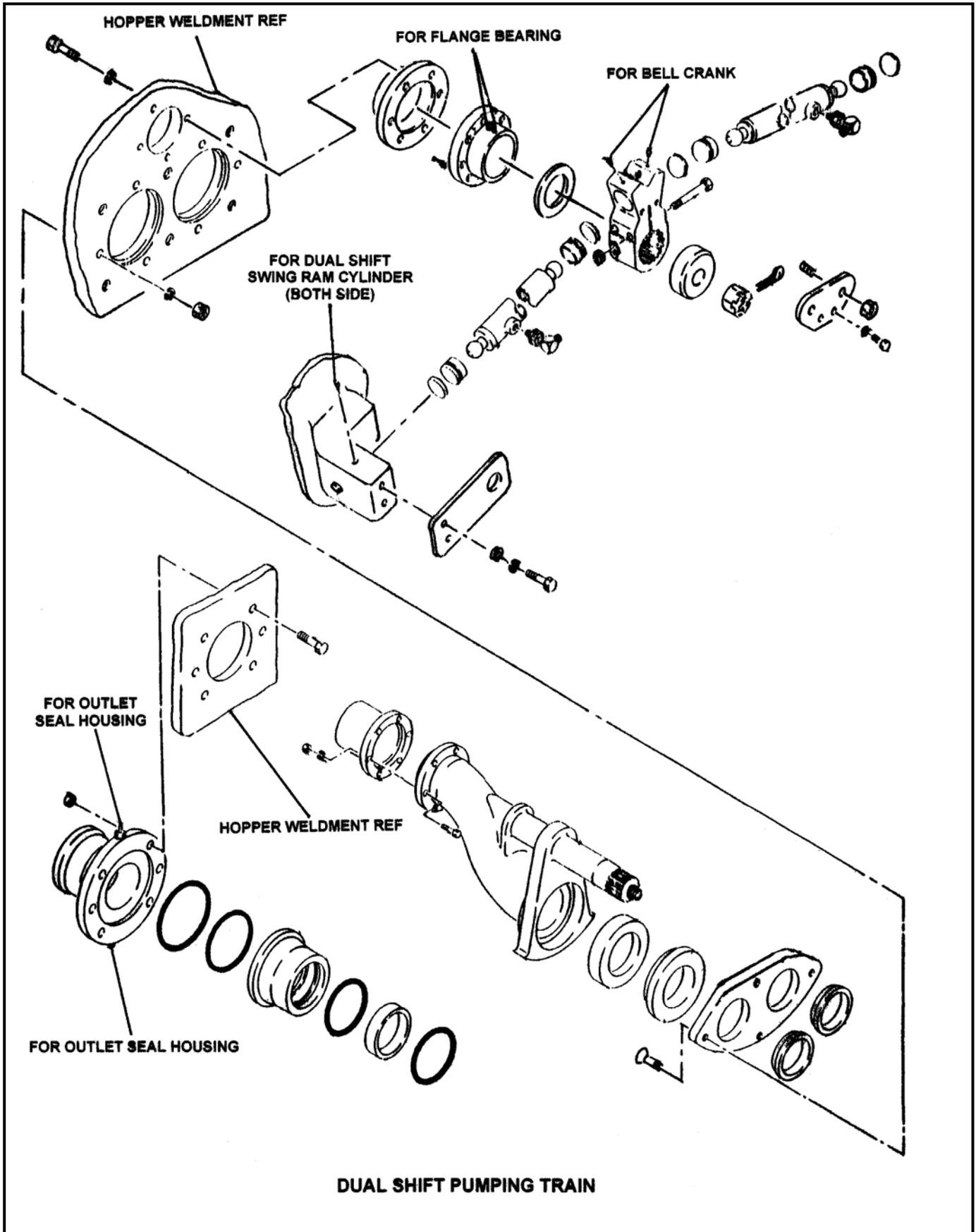


AIR POWERED GREASE GUN





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REVISION:



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LUBE POINT LOCATIONS



A



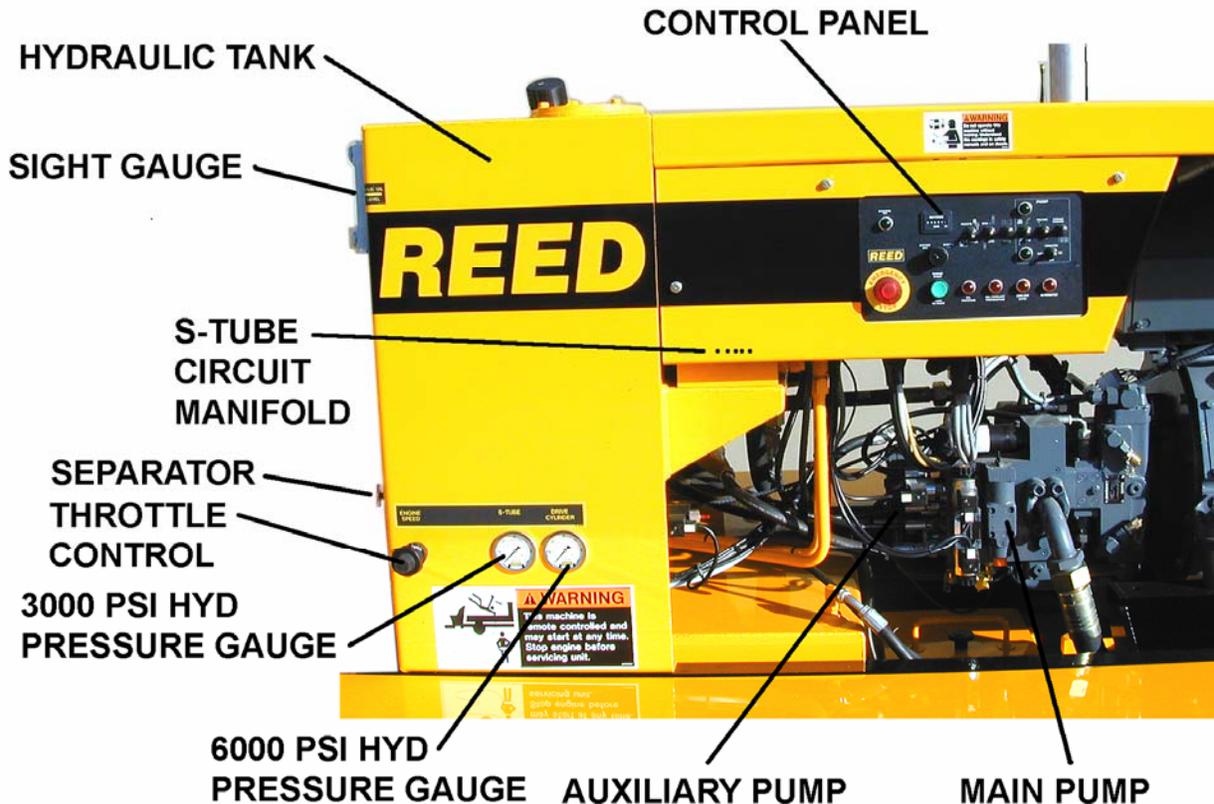
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HYDRAULIC SYSTEM MAINTENANCE

The **REED 01 MODEL C90S** utilizes a diesel engine as the main source of power, which drives the main hydraulic pump. The hydraulic pump is used to supply the flow and develop the necessary pressure to operate the concrete pump. As with any operational system, it is only as good as it is maintained. The hydraulic system is a critical system and it is for this reason that it is **IMPORTANT** that it receive extra care and good maintenance. This section is offered to alert you and guide you in maintaining the hydraulic system.

⚠ CAUTION

CONTAMINATION is the downfall of most hydraulic systems and a major contributor leading to system malfunctions. Extreme care must be exercised to prevent dirt from entering the system. Make it a habit to ALWAYS cap or plug open ports and hydraulic lines.



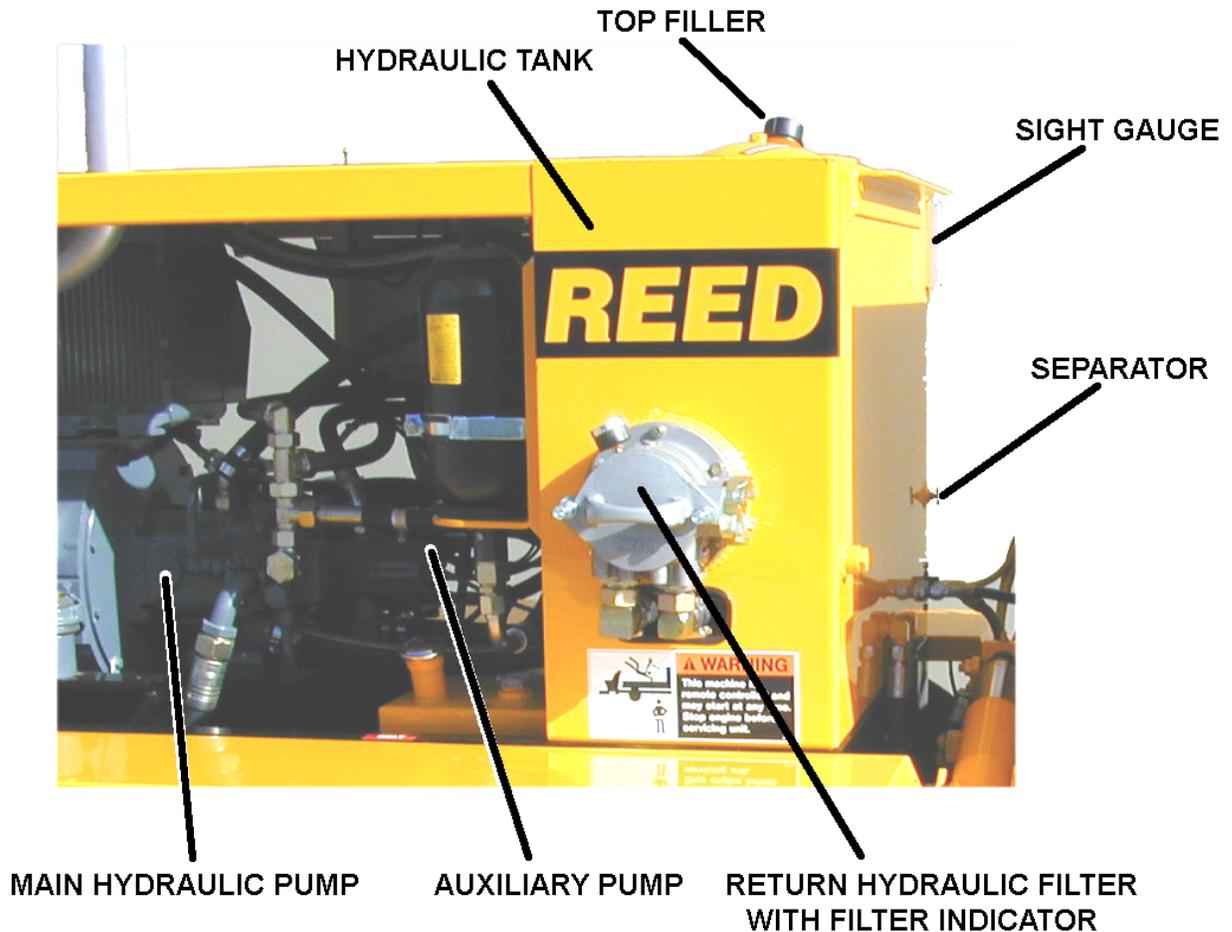


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HYDRAULIC TANK

The hydraulic tank has a capacity of 60 GALS (227L) and is located just forward of the hopper. It is equipped with a filler breather unit, access cover and two (2) magnetic suction strainers inside the tank. A sight gauge is installed on the left side of the tank and is used to determine the fluid level inside the tank. The tank is also equipped with drain valve.

Filtration is by a return line filter located on top of the tank and a hi-pressure filter on main hydraulic pump. An oil cooler is adjacent to the engine cooling unit. This cooler is used to cool the oil prior to entering the tank.





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SYSTEM MAINTENANCE ITEMS

The following are specific items for care and maintenance of the hydraulic system.

- **FLUID LEVEL** Check level daily with sight gauge provided. Maintain level at full mark. Add through filter.
- **TANK BREATHER** Clean every 50 hours of operation. Remove from tank, clean with solvent and air blow dry.
- **RETURN LINE FILTER** One (1) 10-micron filter; change after first 50 Hours of operation. Thereafter change every 150 hours of operation or when condition gauge indicates to do so.
- **HYDRAULIC TANK** Change oil in tank every 1000 hours of operation of yearly whichever comes first.

NOTE

After fluid loss for any reason, filter replacement, component removal etc., sufficient fluid must be added to properly maintain required level in tank.

HYDRAULIC FLUID

The **01 MODEL C90S** utilizes in its hydraulic system a fluid manufactured by the SHELL OIL CO. and is designated as TELLUS #46. It is to be used in ambient temperatures of 39-90° F (4-32° C). The normal fluid temperature will range from 100-167° F (38-75° C).

For ambient temperatures of 90° F (32° C) and above use fluid designated as a ISO rating of 68. Use ISO 32 for ambient temperatures of 32° F (4° C) and below.

⚠ WARNING

USE ONLY SHELL TELLUS 46 or equal hydraulic fluid and NEVER MIX with other type fluids. Always use a CLEAN fluid. Using impure or other type of fluids not specified will contaminate the hydraulic system and can lead to eventual system malfunction or damage and possibly deteriorate the hydraulic seals.

ADDING HYDRAULIC FLUID

As previously indicated, a hydraulic systems worst enemy is **CONTAMINATION**. Exercise extreme care when adding fluid to the hydraulic tank.

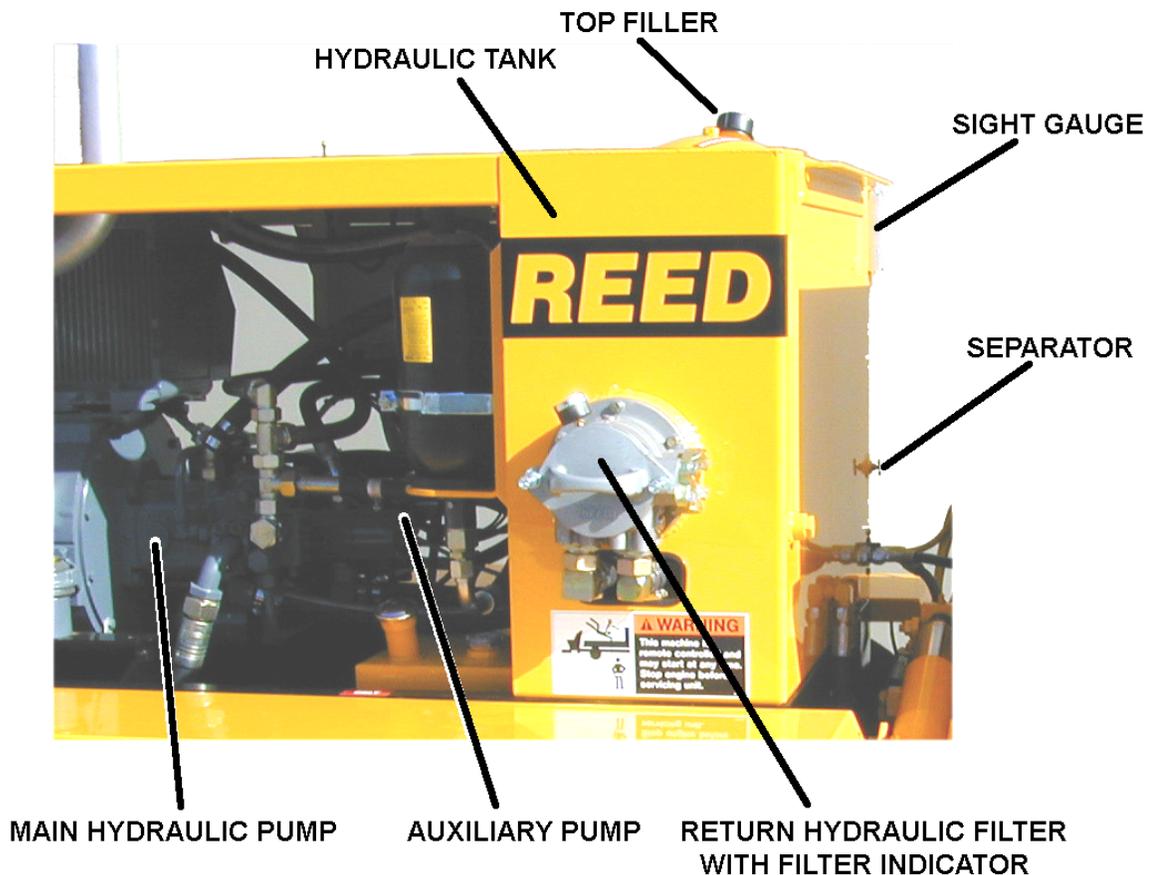
- To prevent any dirt or water from entering the hydraulic tank, thoroughly clean area around top of filter. Remove plug on top of filter.
- Use fresh clean hydraulic fluid. If a hand pump is used to transfer the fluid, check that pump filter is clean. If pouring of fluid from a container, pour it through a fine wire mesh screen, 200 mesh or finer.
- Replace plug immediately after filling tank to proper level.

⚠ WARNING

Do not use a cloth for straining fluid as lint is harmful to the hydraulic system.

FILTER SERVICING





The purpose of installing hydraulic filters in the system is to provide a means of continuous hydraulic fluid filtration in an effort to prevent recirculation of abrasive solids which will cause rapid wear of component breakdown.

The **C90S** filter system consist of a return filter located on top of the tank. The filter is equipped with a condition indicator gauge which should be checked periodically and the element changed when gauge reads 25PSI or higher..

To service/change the filter elements, the following is offered:

- Shut off machine. On pump circuit allow accumulator system to depressurize
- Wipe clean any dirt and grime from around filter housing on top of tank.
- Remove the six (6) bolts holding on top plate of filter.
- Carefully remove cover so as not to damage the gasket.
- Remove element and discard.
- Replace with new element and replace cover.



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- Start up machine and observe for leakage.

⚠ CAUTION

DO NOT ATTEMPT TO WASH OUT FILTER ELEMENT.
These are disposable types and more harm can be done than it is worth.

CLEANING THE HYDRAULIC TANK

The hydraulic tank should be drained and cleaned after 1000 hours of operation or yearly whichever comes first. This will assist in keeping the systems clean and in proper condition. To accomplish this the following is offered.

- Shut off machine. On pump circuit allow accumulator system to depressurize

Place a suitable size container under the hydraulic tank drain fitting located at back of tank facing the hopper. **NOTE:** The tank has a capacity of 60gals (227 L). Make sure your drain container is large enough. Remove drain plug.

- Remove the access cover on the hydraulic tank being careful not to damage the gasket
- Remove the two (2) suction strainers
- After tank has drained, flush the inside of the hydraulic tank with clean solvent and wipe clean with lint free cloths. **DO NOT USE PAPER TOWELS.** Remove any particles from tank bottom and sump
- Clean the suction strainers by soaking them in fresh solvent and then air blow dry
- Install the tank drain plug. Reinstall the suction strainers and access cover with gasket
- Clean the filler breather with solvent and air blow dry
- Change the hydraulic system filter element
- Refill the hydraulic tank with new **CLEAN** hydraulic fluid, **SHELL TELLUS 46**
- Start machine and check for leaks



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DESCRIPTION OF HYDRAULIC SYSTEM

The hydraulic system of the **01 MODEL C90S** consists of three separate circuits and although integrated, each is designed to perform a particular function within the operation of the concrete pump. The three circuits utilized are:

- **Main Pump Circuit** - It controls the function for operation of the hydraulic drive cylinder and material cylinders.
- **S-tube Shift Circuit** - It controls the function for operation of shifting the S-tube from one material cylinder to the other during concrete pumping.
- **Auxiliary Circuit** - This controls the operational function for the agitator/remixer.

For the purpose of making the operation of each circuit easier to understand, they are being described separately.

SPECIFICS – PRESSURES

- Main System Max. Pressure = 4700 PSI (327 Bar)
- Main System Relief Pressure = 4200 PSI (294 Bar)
- S-tube Shift System Relief Pressure = 2500 PSI (174 Bar)
- Accumulator Pre-Charge Pressure = 1200 PSI (83 Bar)
- Auxiliary System Relief Pressure = 1800 PSI (125 Bar)

SYSTEM FILTRATION

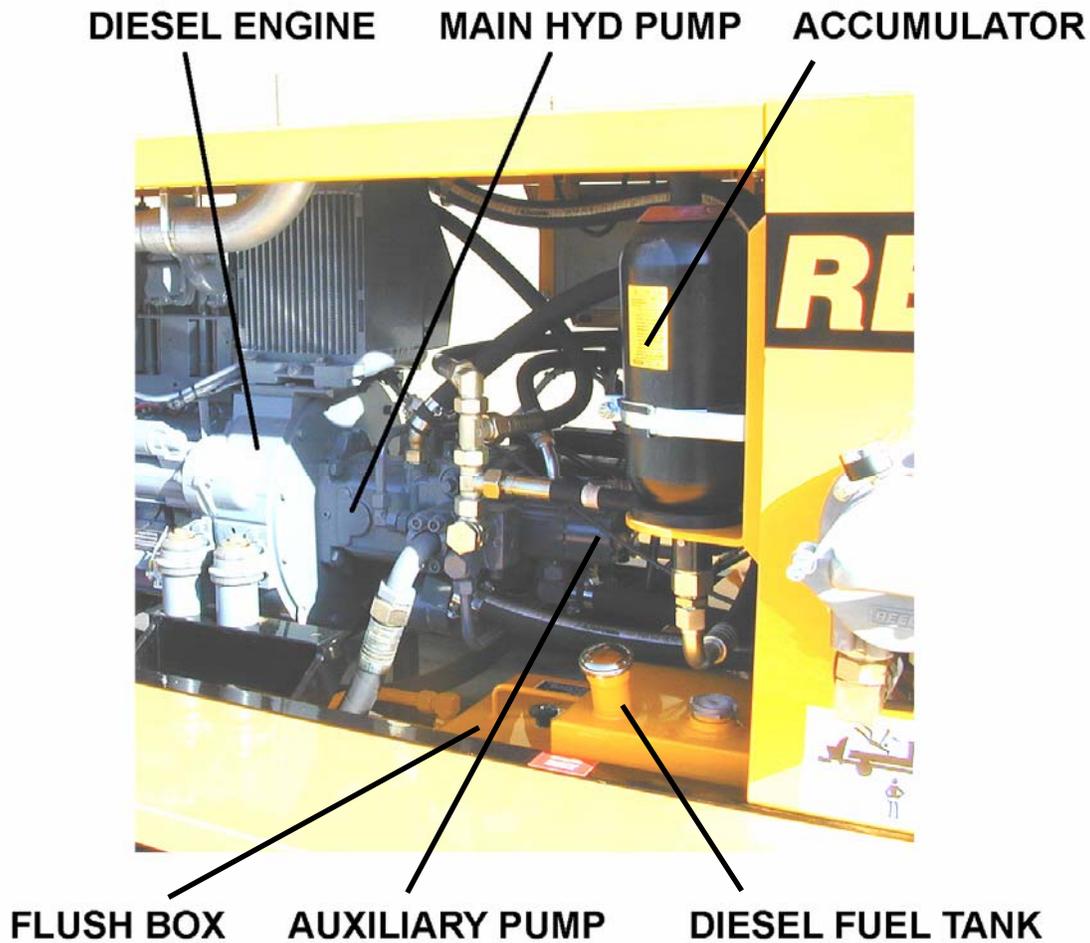
The hydraulic tank has a capacity of 60 gals (227L) of **SHELL TELLUS #46** hydraulic fluid. The start of system filtration begins inside the tank where two (2) magnetic type suction strainers are installed. The system return fluid must pass through a 10-micron filter element before returning to the tank and after passing through the oil cooler.

REVISION:

MAIN PUMP CIRCUIT (Refer To Hydraulic Schematic)

The **01 MODEL C90S** is designed to pump concrete material from the hopper to the placement site. To accomplish this requires the use of two (2) material cylinders that are driven by two (2) hydraulic cylinders and the material pumping action is the result of the two cylinders operating or stroking on an alternate basis. In other words, when one cylinder is retracting, it is drawing into the material cylinder tube, the material from the hopper. The other cylinder, which has its material cylinder already full, is extending. This causes the material to be pushed through the swing tube and out into the delivery line. This action continually takes place. This is the purpose of the **MAIN PUMP** circuit, to provide the hydraulic power for this operation.

The **MAIN PUMP CIRCUIT** is of the **CLOSED LOOP** type. In this closed loop circuit, the main ports of the hydraulic pump are connected by a hydraulic line to each of the hydraulic drive cylinders.





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By making an internal change within the pump an external control, the flow output of the fluid can be directed to either “**A**” Port or “**B**” Port. As an example, from one side of the pump to one drive cylinder with return fluid from the other cylinder going back to the pump, then changing directions to pressure the other cylinder.

To meet the volume and pressure requirements of the main pump circuit, a Sundstrand hydraulic pump is used. This pump is a variable displacement axial piston pump of a swashplate design. The pistons run against the swashplate, which is capable of being tilted. This tilting or angle varies the stroke length of the pistons which in turn varies the displacement of the fluid. The larger the angle, the greater the flow. In the case of the Model **01 C90S**, the angle of the swashplate is varied by the use of the **VOLUME** control.

The main hydraulic pump is driven through a gear box by the diesel engine. Placing the toggle switch to **ON** will place the pump in operation. However, at this point since **PUMP** switch is **OFF**, there is no volume demand, thus the charge pump within the main pump is basically circulating the oil and lubricating the inside of the pump.

To energize the cycling circuit, the **PUMP** switch must be **ON**. When this is done, an electrical signal is generated which engages the hydraulic pump to start and direct the flow to the appropriate drive cylinder.

Where, how, and why is this electrical signal generated?

It was previously noted that the material pumping action is the result of the two material cylinders cycling on an alternate basis. This alternating cycling is controlled by an electrical signal that is generated at the end of each material cylinder’s suction, retraction stroke.

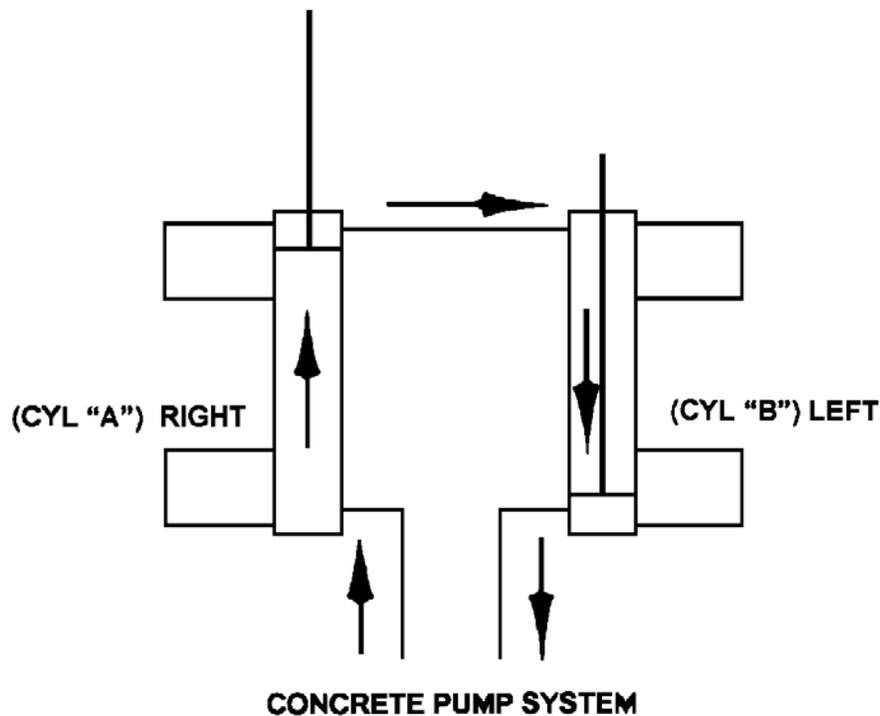
A proximity sensor, one for each material cylinder, is installed in the flush box. As the piston coupler passes under the proximity sensor, it generates an electrical signal that is sent to the logic controller or which is better known as the black box. The black box is a **REED** proprietary solid state device, designed to control the alternating action of the material cylinders and to synchronize the movement of the swing tube. The signal from the black box is then sent to the **PCP** valve.

The **PCP** valve (pressure control pilot) is a component of the Sundstrand pump. When energized it is used to convert the electrical signal to a hydraulic signal, which in turn, shifts the hydraulic pumps servo piston. The servo piston is used to change the position of the swashplate which is used to direct the flow of fluid to either **CYL “A”** or “**B**”, based on the signal received and which sensor was activated. The **PCP** valve is also used to vary the angle of the swashplate which changes the displacement of fluid to either a higher or lower output in proportion to the amount of volume demand placed on it by the potentiometers electrical signal.

CIRCUIT OPERATIONAL SEQUENCE

In the operational sequence of the **MAIN PUMP CIRCUIT** and with the engine running and throttle adjusted to maximum, the main pump is idling. When the **PUMP** switch is placed **ON** and volume control open, the hydraulic drive cylinders begin to cycle.

The cylinder to receive the flow from the hydraulic pump, the one being pressurized, is the one moving forward or the one with the rod fully retracted and ready to extend. In this example, **CYL "A"**. Cylinder **"A"** extends and at full extension, the sensor of **CYL "B"** is activated, sending a signal to the black box, which then sends a signal to the **PCP** valve. This valve causes the position of the swashplate to be changed and **CYL "B"** is being pressurized and extends. The signal from the sensor, is also used to shift the **S-TUBE** to **CYL "B"**. (This is explained in the Shift Circuit Description). This alternating cycling takes place continuously until the **PUMP** switch is turned **OFF**.



It can be noted in the schematic and diagram above, that the main pressure and flow is only directed to one side of the hydraulic drive cylinder. In this instance, it is directed to the barrel end of the cylinder. To establish the closed loop, the rod side of the cylinders are connected together. The purpose of this arrangement, is to transfer the hydraulic oil from one to the other, during the extension/retraction stroke. In example: As **CYL "A"** is being extended, the oil on the rod side of the cylinder is forced out and is directed to the rod side of **CYL "B"**, causing the rod to retract. The fluid that is in the barrel end of **CYL "B"** is forced back to the pump.



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With this arrangement of connecting the two cylinders together, it is possible for various reasons, such as leakage around the piston seals that more oil exists on the rod side of the cylinder than is required. When this condition exists, some hydraulic oil remains at the rod end of the cylinder being extended while the other cylinder is fully retracted. As a result the cylinder cannot be totally extended and thus it **SHORT STROKES** which will also happen eventually to the other cylinder.

This condition can be corrected by actuating the switch on the electrical control box to position "A" or "B" whichever cylinder is extending, and to **HOLD** switch until extended cylinder is fully bottomed out. Hydraulically, this is accomplished by use of the check valves installed on both cylinders. By holding the **CYL A-B** switch, you have interrupted the cycle and are forcing more oil into the barrel of the extending cylinder. This oil is then directed and unseats the check valve at the rod end of the extending cylinder "A", putting more oil on the rod side which is then transferred to the rod side of **CYL "B"**. Since that cavity is full, pressure is built up in the rod side of **CYL "B"**, which unseats the barrel side check valve forcing the excess oil back to the tank. Once the extending cylinder is at full stroke, regular operation can continue.

NOTE

*In addition to piston leakage, a **SHORT STROKE** condition may result from incorrect proximity sensor location or leaking check valves.*

As protection to the **MAIN PUMP CIRCUIT** against excessive pressure, a relief valve has been installed and is set to open at 4200 PSI which is 200 PSI over the main system pressure. Thus when the system pressure reaches 4200 PSI, the relief valve opens directing the oil back to the tank.

S-TUBE SHIFT CIRCUIT (Refer to Hydraulic Schematic)

In the foregoing description of the Main Pump Circuit, we learned that the hydraulic drive cylinders operate on an alternating basis causing the material cylinders to do the same. Since there is only one outlet for the pumping material, a means is required to transfer the material from the material cylinder to the outlet and into the delivery line. To accomplish this a component referred to as the swing tube or S-tube is installed in the hopper. Since there are two material cylinders and one S-tube, the S-tube must be shifted from one material cylinder to the other, whichever one is loaded with the pumping material. Thus the incorporation of a **S-TUBE SHIFT CIRCUIT**.

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The S-tube shift hydraulic circuit is of the open center type, meaning that when the control valves are in the **NEUTRAL** position hydraulic non operational (unactuated), the internal passages of the valves are open, free flow, allowing the hydraulic fluid to return to the tank. With the engine running the hydraulic pump is operating, producing a flow of oil which, with no control energized, will pass through the shift circuit on its way back to tank.

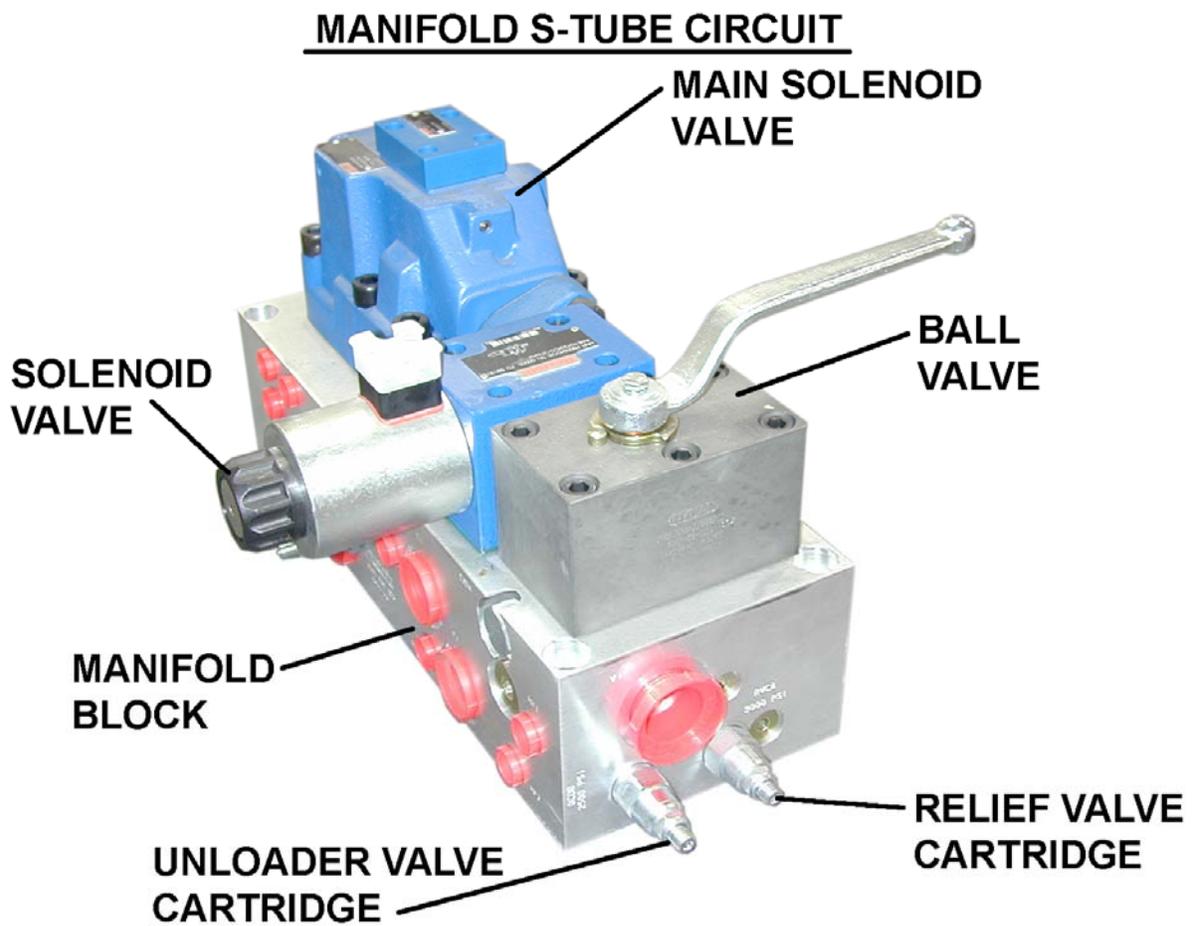
To meet the flow and pressure requirements of the shift circuit, one section of a tandem pump is used. Note: a single pump is used if unit is not equipped with an agitator. The **TANDEM HYDRAULIC PUMP** is of the gear pump design, having a fixed displacement meaning it is designed to constantly produce the same displacement at pre-set maximum engine RPM. The tandem gear pump is direct connected and driven through the gear box. In addition to the hydraulic pump, the swing tube shift circuit consists of an unloader manifold, an accumulator, a solenoid directional valve and two (2) hydraulic cylinders. The following is offered to describe the function of each in the system.

SHIFT CIRCUIT MANIFOLD

The shift circuit is also equipped with a manifold block, which is located at the rear of the hydraulic tank. It contains a relief cartridge, solenoid valve cartridge, check valve and a differential pressure sensor. A solenoid operated directional valve is mounted on top of the block and a S-tube selector control valve is located on front of the block. Each of these components is designed to perform a particular function in the swing circuit as explained in the following descriptions:

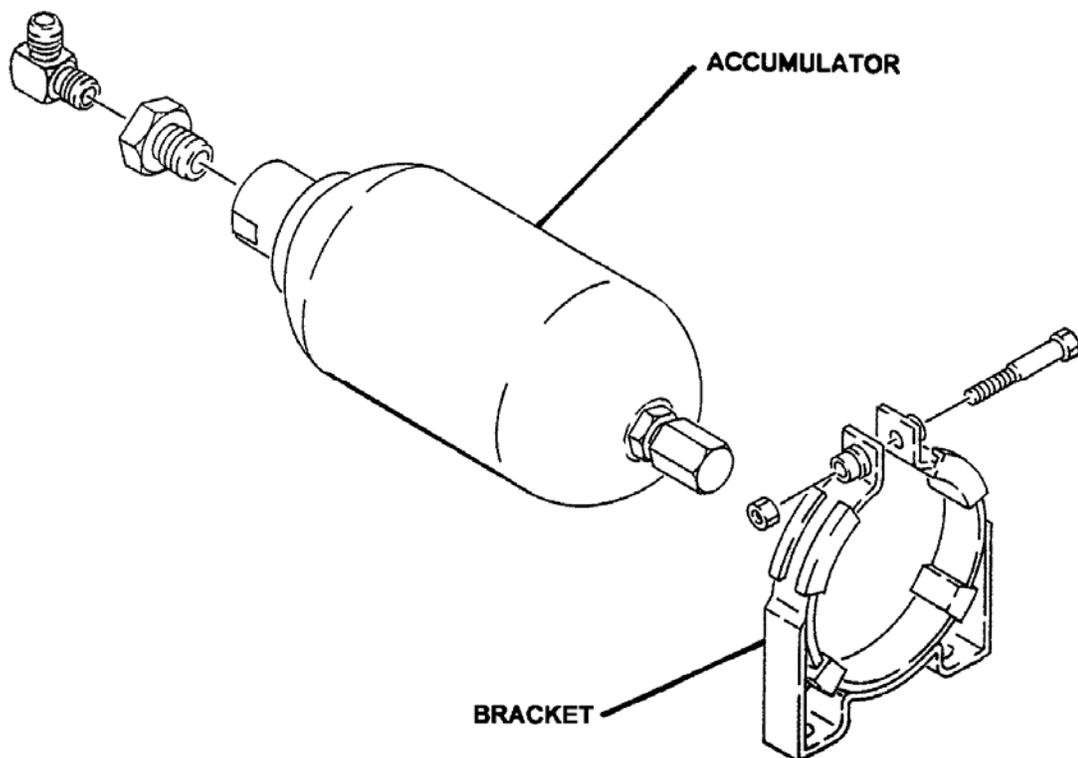
- **RELIEF CARTRIDGE** - This cartridge is located on the top side of the manifold block and is used to protect the system from excessive pressure and to limit the amount of pressure being applied to the accumulator and is set at 2300 PSI (160 Bar)
- **UNLOADER VALVE** - This cartridge is used to divert the pump flow from going to the accumulator once its capacity has been reached, directing it back to tank. It becomes operational when the relief cartridge setting has been reached.
- **SOLENOID VALVE CARTRIDGE** – There are two (2) of these cartridges used in the circuit. One, which may be referred to as a dump valve, is designed into the shift circuit as a **SAFETY VALVE**. Its purpose is to automatically relieve the pressure in the accumulator through an orifice. The valve is controlled by the **PUMP CYCLE** switch and the valve **OPENS** when the pump switch is OFF. This prevents the unintentional shifting of the S-tube when the pump is not operating.

REVISION:



- **SELECTOR CONTROL VALVE** – This is a manual valve which enables the flow to be adjusted for high or low volume depending on concrete mix design. The valve, when completely open, allows full flow for a harsh mix S-Tube movement. As the valve is closed fully, the flow is directed through an orifice for a soft type mix.
- **SOLENOID DIRECTIONAL VALVE** – This valve is a directional control valve that is shifted electrically via a 12 volt solenoid. Its purpose is to direct the flow of oil from the accumulator to one or the other end of the shift cylinder based on the signal received from the black box that was generated by the proximity sensor.
- **SHIFT BALL VALVE** – This is a manual ball valve and is used to control the S-tube shift. With valve fully opened, the flow is unrestricted, causing a fast hard shift of the S-tube. When the valve is closed, the shift is slower as it must now pass through an orifice.

ACCUMULATOR





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ACCUMULATOR

The accumulator is incorporated into the shift circuit to provide instant pressure and volume for the shifting of the swing tube, which cannot be obtained under normal circumstances. An accumulator is a hydraulic reservoir that retains the hydraulic fluid under high pressure.

To accomplish this, the accumulator contains a rubber bladder on the inside of the reservoir. This bladder prior to the installation of the accumulator on the machine must be pre-charged to a certain pressure using a dry nitrogen gas. In this pre-charge operation, the bladder is expanded much like a balloon and is retained in that state. In the application of the shift circuit, the hydraulic fluid is pumped into the accumulator at a higher pressure than that inside the bladder. This compresses the bladder building up high pressure within the accumulator that is retained until released.

CIRCUIT OPERATIONAL SEQUENCE

In the operational sequence of the shift circuit with the engine at full **RPM**, the tandem pump is operating, producing its rated displacement. The flow is going through the system and is being dumped or directed back to the tank by the solenoid cartridge of the unloader manifold.

When the “**E-STOP**” switch is placed to **ON** and the horn sounds, an electrical signal, closes the solenoid cartridge. When this occurs the hydraulic fluid is now directed to the accumulator where it starts compressing the bladder building up pressure. When the pressure in the shift circuit reaches the setting of the relief cartridge, which in this application is 2300 PSI (160 Bar), the relief opens and activates the unloader valve. The valve then shifts and directs the flow from the pump back to the tank through the relief in lieu of continuing to pressurize the accumulator. The check valve then prevents the fluid in the accumulator from going back to the pump line.

In the Main Pump Circuit description it was described how an electrical signal was generated by the proximity sensor which was sent to the black box and used to control the alternating action of the hydraulic drive cylinders. This same signal is also used to shift the swing tube so that its movement is synchronized with that of the hydraulic drive cylinder, shifting the swing tube to the material cylinder, which is ready to extend (normal forward operation).

The electrical signal activates the solenoid coil of the directional valve, shifting the spool to the appropriate side. The accumulator then releases, exhausting the fluid which is then directed to the appropriate side of the shift cylinder. As soon as the shift is made the accumulator is refilled immediately and the sequence starts all over again.

REVISION:

AUXILIARY CIRCUIT

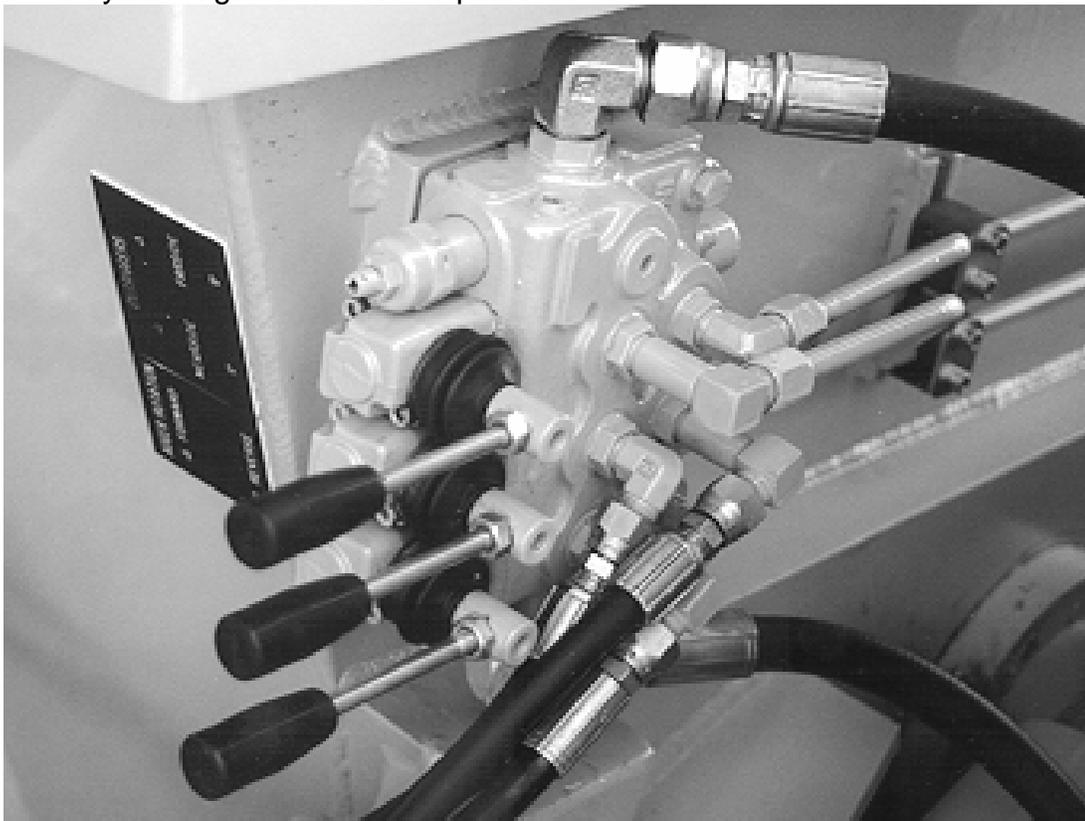
The **AUXILIARY CIRCUIT** used on the **01 MODEL C90S** has been designed and installed for the purpose of operating the hydraulic function of the agitator and outriggers. This function is that of the agitator rotation for mixing the material in the hopper and operation of the outriggers.

The flow and pressure requirements for the auxiliary circuit is met by employing the second stage or section of the same tandem pump used on the swing tube shift circuit. With the engine running and throttle set to maximum **RPM**, the flow from the tandem pump is directed to a three (3) spool directional control valve.

When the valve lever is moved away from hopper the agitator will rotate in a forward direction as hydraulic fluid is directed to that side of the motor. The rotation can be reversed by moving lever in other direction. For the outriggers, one lever controls the leg on the right side, while the other lever controls the left side leg.

A flow control valve is installed in the hydraulic line for forward rotation. The purpose of this valve is adjust the flow to that particular side of the motor which in turn regulates the rotation speed. Turn flow control knob clockwise to decrease speed.

A relief valve is installed in the directional control valve and is set at 1500 PSI. This is used to protect the system against excessive pressure.





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ADJUSTMENT PROCEDURES

It is not unusual that over a period of time due to usage, troubleshooting, making repairs or replacement of parts that certain components may require periodic adjustments to maintain the factory type performance. This section of the manual is offered to assist you in making the necessary adjustments.

ADJUSTMENTS TO HYDRAULIC SYSTEM (TEST GAUGES)

The **01 MODEL C90S** concrete pump has undergone an extensive quality control inspection and testing phase during the manufacturing process prior to being shipped. All the required settings and adjustments to provide an efficient and safe operating machine have been made. The various pressure settings and adjustments should **NOT BE ALTERED**. However, it may be necessary through the course of using the machine or replacement of parts to check and reset the pressure settings to the factory established guidelines. This should only be done by **QUALIFIED MAINTENANCE PERSONNEL** who understand the systems. The following is offered to assist in accomplishing the task.

NOTE

The unit is equipped with a test port which is used to install a test gauge. To perform the following checks and adjustments, the following test gauges may be required.

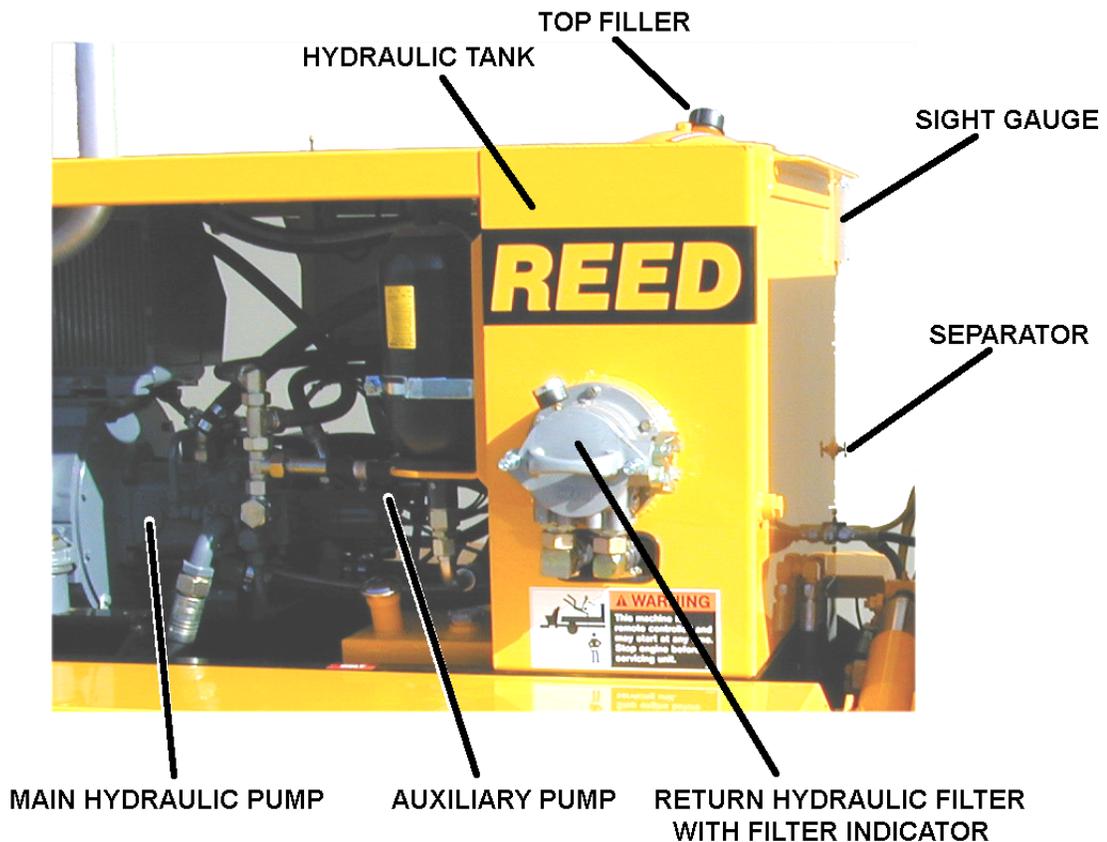
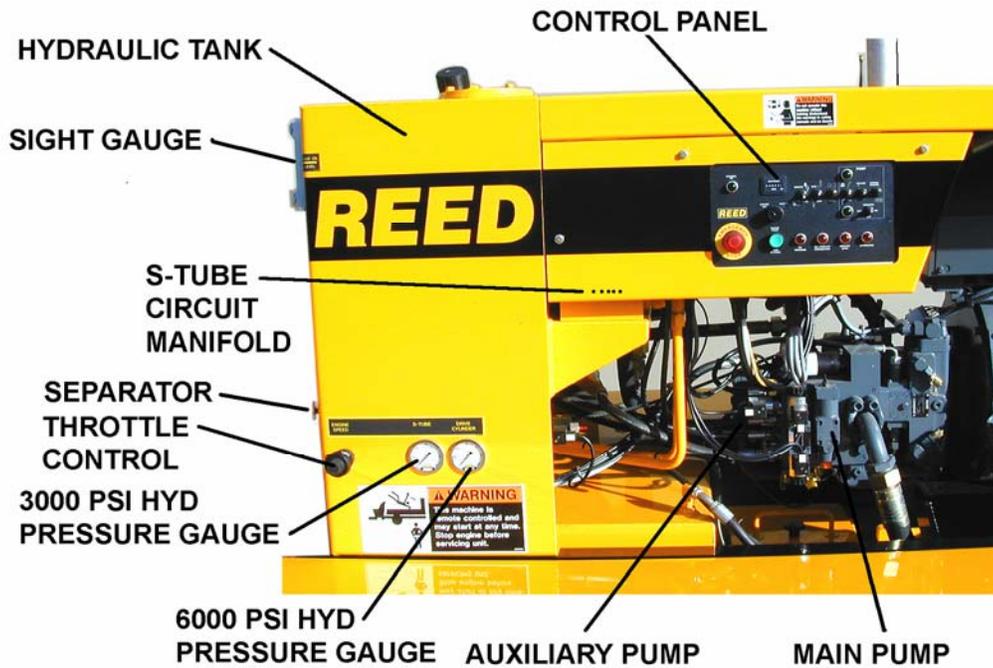
TEST GAUGE #1 – This test gauge consists of a small diameter hose having one end connected to a 0-1000 PSI (0-70 Bar) hydraulic pressure gauge and the other end containing a female adapter.

TEST GAUGE #2 – This test gauge consists of same set up as **GAUGE 1** except the gauge is a 0-6000 PSI (0-420 Bar) hydraulic pressure gauge is used.

The **TEST GAUGE KITS** are available from the **REED** Parts Department.



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ADJUSTMENTS TO HYDRAULIC SYSTEM

1. MAIN HYDRAULIC PUMP

The main hydraulic pump is manufactured by Sundstrand and all internal adjustments and settings have been made by Sundstrand to **REED** specifications. No further adjustments are required. Should it become, at some point, necessary to make adjustments, refer to the Sundstrand pump data located in the **VENDOR SECTION** of this manual.

⚠ WARNING

**DO NOT OPERATE CONCRETE PUMP WITHOUT OIL
OR WATER IN THE FLUSH/WATERBOX.**

2. PRESSURE LIMITER RELIEF VALVE-SET @ 4200 PSI/294 BAR

Two (2) relief valves have been installed in the system to limit and protect the main system from excessive pressure. The valves, one for each of the hydraulic drive cylinders, are located on the right side, just behind the engine and adjacent to the main hydraulic pump. To check or adjust the valves to the proper setting, proceed as follows:

A. CHECKING THE PRESSURE

- Start engine and adjust **THROTTLE** to maximum **RPM**.
- Place **CONTROL LOCATION** switch to **LOCAL**.
- Rotate **VOLUME** control to full **ON** position.
- Actuate **PUMP** switch to **ON**.
- On the control box actuate the switch to the **CYL "A"** position and **HOLD**.
- While doing this, observe the **CYL "A"** pressure gauge located at the bottom of the hydraulic tank. Gauge should register 4200 PSI.
- Actuate **CYL "B"** switch and observe the pressure gauge. It too should register 4200 PSI.
- Turn **PUMP** switch to **OFF** position.
- If pressure on either gauge does not read 4200 PSI, then an adjustment is necessary.



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B. ADJUSTING THE PRESSURE

- To make the pressure adjustment, loosen the locknut on the relief valve and adjust.
- Turn **PUMP** switch **ON** and again actuate and hold **TEST CYL** switch "A" or "B".
- Using a #3 Metric Allen Wrench, turn the adjustment screw **IN** to **INCREASE** pressure and turn **OUT** to **DECREASE**. Observe the pressure gauge while making the adjustment.
- Retighten locknut after adjustment has been made.
- Repeat procedure if other cylinder relief valve needs adjustment.

3. SHIFT CIRCUIT SYSTEM PRESSURE-SET @ 2000 PSI/140 Bar SHIFT RELIEF PRESSURE- 2300 PSI/160 BAR

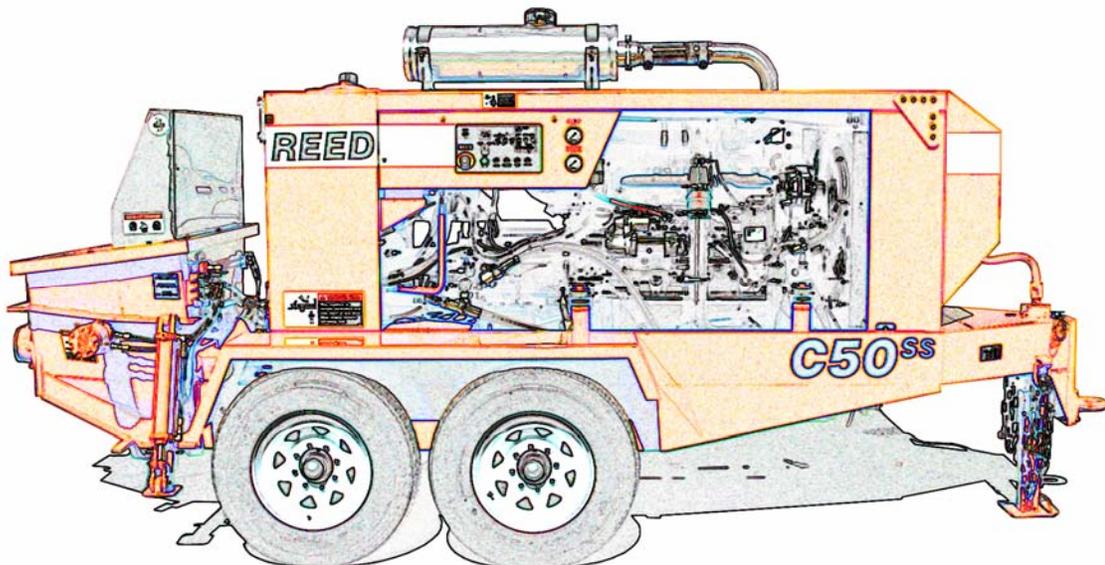
The S-Tube Shift Circuit manifold is located on the backside of the tank. It contains the relief and unloader valve. These cartridge valves are used to protect and limit the pressure being applied to the accumulator and are used to adjust and set the **SHIFT** system pressure. To check and adjust the pressure the following is offered:

A. CHECKING THE PRESSURE

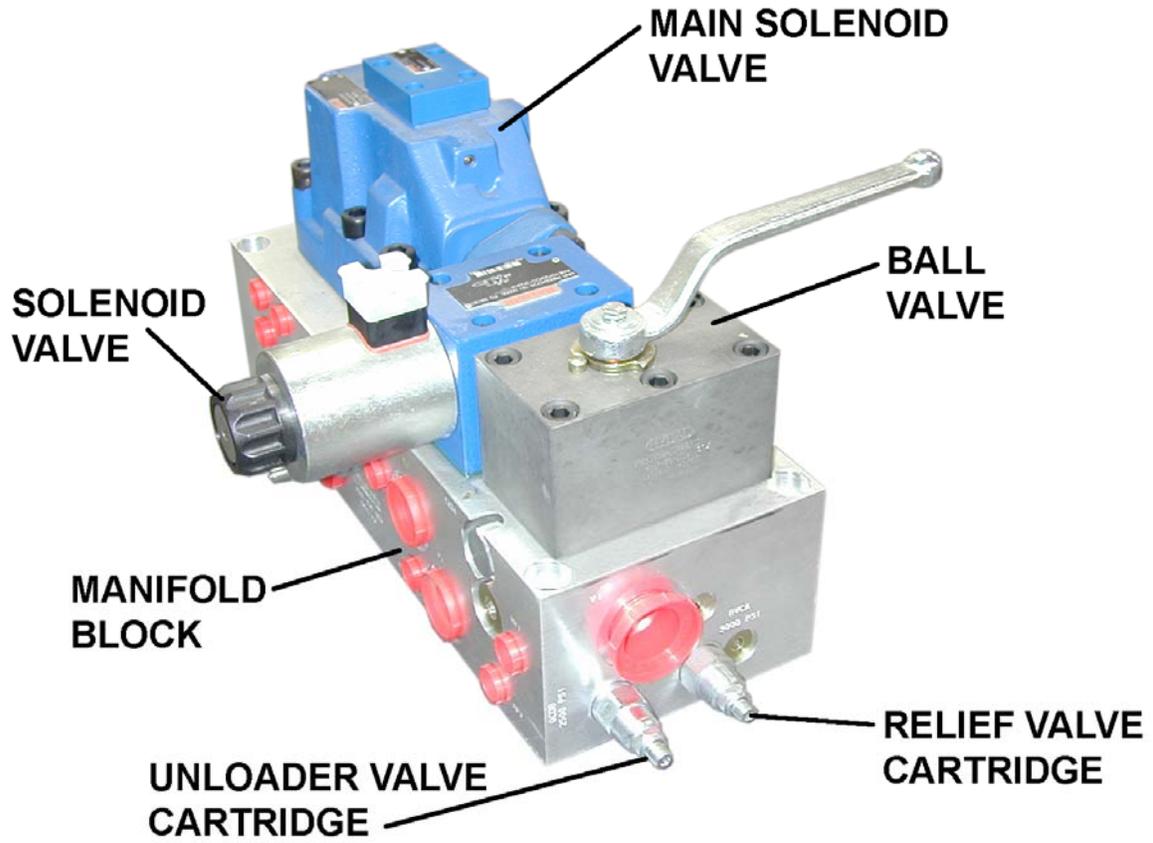
- Start engine and adjust **THROTTLE** to maximum RPM.
- Turn **VOLUME** control so that it is partially open, #3 position.
- Loosen locknut on the unload cartridge valve.
- Using an allen wrench, turn set screw all the way **IN**.
- Monitor the accumulator pressure gauge. Gauge should read 2400 PSI. This indicates the **RELIEF VALVE** setting. If gauge reads otherwise, then an adjustment is necessary.

B. SETTING SHIFT CIRCUIT PRESSURE

- Loosen the locknut on the **RELIEF VALVE**.
- Actuate **PUMP** switch to **ON** position.
- Turn **PUMP** switch **ON** and actuate **CYL** switch to either "**A**" OR "**B**" and hold.
- Monitor accumulator gauge while adjusting relief set screw **IN** to increase pressure or **OUT** to decrease pressure so that gauge reads 2400PSI .
- Shift **UNLOADER** valve will also need to be reset. With allen wrench, adjust set screw **OUT** until pressure on gauge reads 2000PSI. The **S-TUBE** will need to shift, see the new value after turning this screw each time.
- With adjustment made, tighten locknut on **UNLOADER** valve.

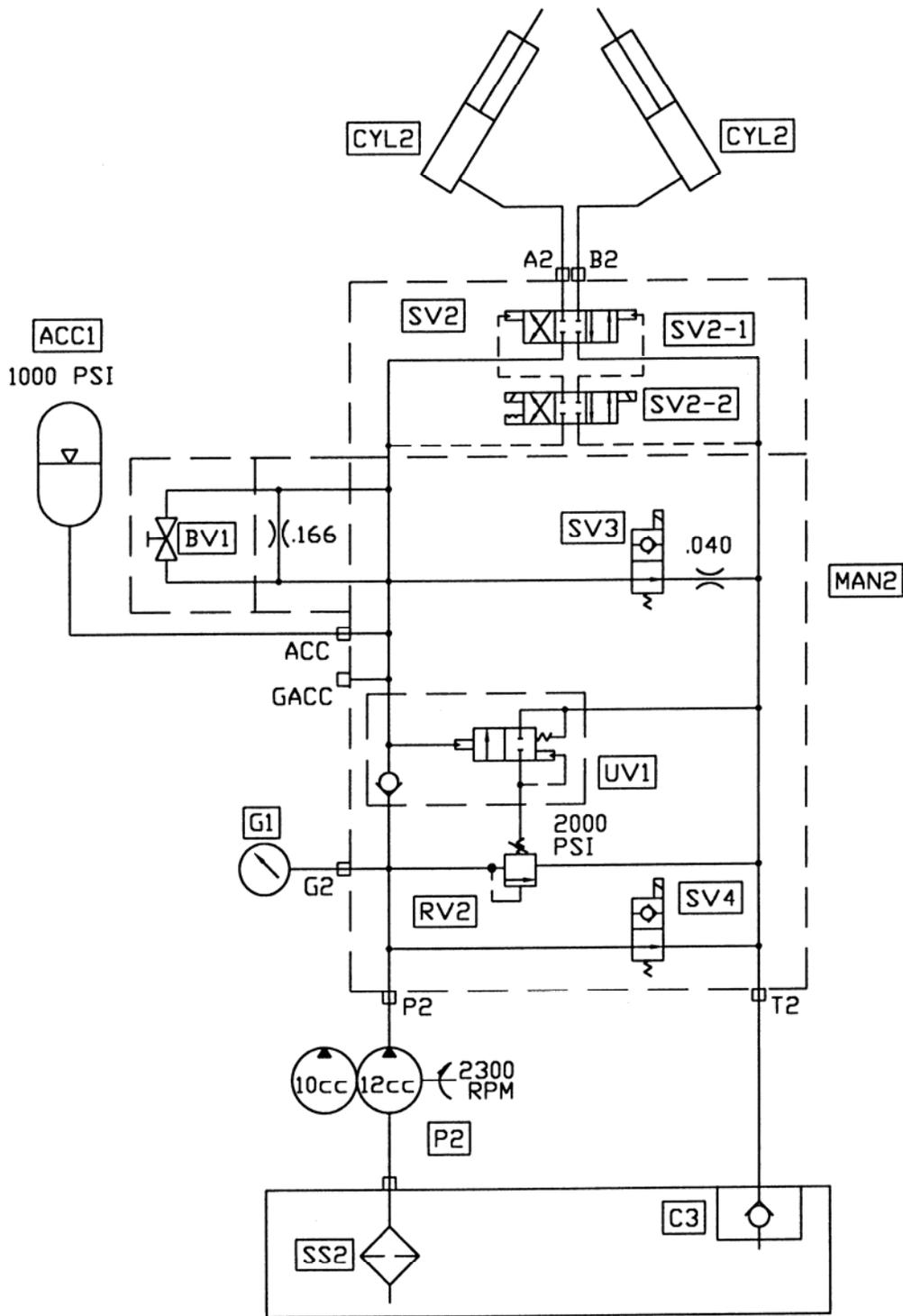


MANIFOLD S-TUBE CIRCUIT





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S-TUBE CIRCUIT HYD DIAGRAM



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4. AUXILIARY CIRCUIT RELIEF

The auxiliary circuit for the **01 MODEL C90S** is used to operate the agitator function. In this circuit, the relief valve set pressure and the system operating pressure is the same. To check and make an adjustment the following is offered:

Agitator Pressure – Set @ 1500 PSI (105 Bar)

To check or set this pressure, it will be necessary to install a test pressure gauge in the system.

- Turn off pump and engine.
- Slowly loosen hose fitting at hydraulic motor and then disconnect hose. Plug or cap end of hose securely against pressure.
- Install in the motor a 3000-PSI pressure gauge directly or attach the gauge to a test hose and install other end in motor.
- Start engine and adjust **THROTTLE** to maximum **RPM**.
- Put a 2 x 4 wood piece to lock-up remixer auger.
- At control, actuate the directional control valve lever to either **FWD** or **REV** which would be the direction that still has pressure hose connected. (Not gauge side)
- Monitor pressure gauge. Gauge should read 1500 PSI.
- If gauge reads higher or lower, then re-adjust relief valve as follows:
 - The relief valve is located in the directional control valve.
 - Loosen locknut on valve cartridge. Turn set screw **IN** to increase pressure and **OUT** to decrease pressure.
 - When correct pressure is reached, tighten locknut.
 - Shutdown engine.
 - Disconnect pressure gauge and reinstall hose onto motor.

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ADJUSTMENT TO SWING TUBE

It is important from an operational standpoint that the swing tube shift properly from side to side and that it is properly adjusted to prevent leakage particularly at high pressure and high volume pumping. On a properly adjusted swing tube, the shifting motion from one material cylinder to the other shall be smooth providing a very light scraping noise. The gap between the swing tube and the wear plate installed on the hopper shall be almost non-existent, but not so tight that it impedes a smooth movement.

Located inside the swing tube is a wear ring and it is designed to stay continually in contact with the wear plate providing the necessary sealing action for efficient operation. This is the scraping noise that should be heard. If there is a lack of the scraping noise or the swing tube shifts too freely this is usually the first indication that an adjustment is required,

To adjust the swing tube clearance:

- Shut off engine. If unit was being run, allow a few minutes for the accumulator pressure to subside.
- Remove cotter pin from large castle nut on swing tube shaft.
- Tighten the castle nut with a 24" adjustable wrench, until no more turning is possible.
- Start engine and adjust **THROTTLE** to a low **RPM**.
- Actuate the **PUMP** switch to **ON** position and see if the swing tube shifts from side to side, if it does, the wear parts are very worn and should be replaced.
- If the scraping noise of the swing tube is slight and the tube shifts briskly from side to side, the adjustment is correct.
- If further adjustment is necessary, again tighten hex nut a little at a time. **DO NOT OVER TIGHTEN** or swing tube may bind while pumping material at high pressure.
- If the swing tube hesitates or stutters during the change over, the adjustment is too tight. Loosen lock nut a little at a time
- Once adjustment is finalized, replace cotter pin and cover.

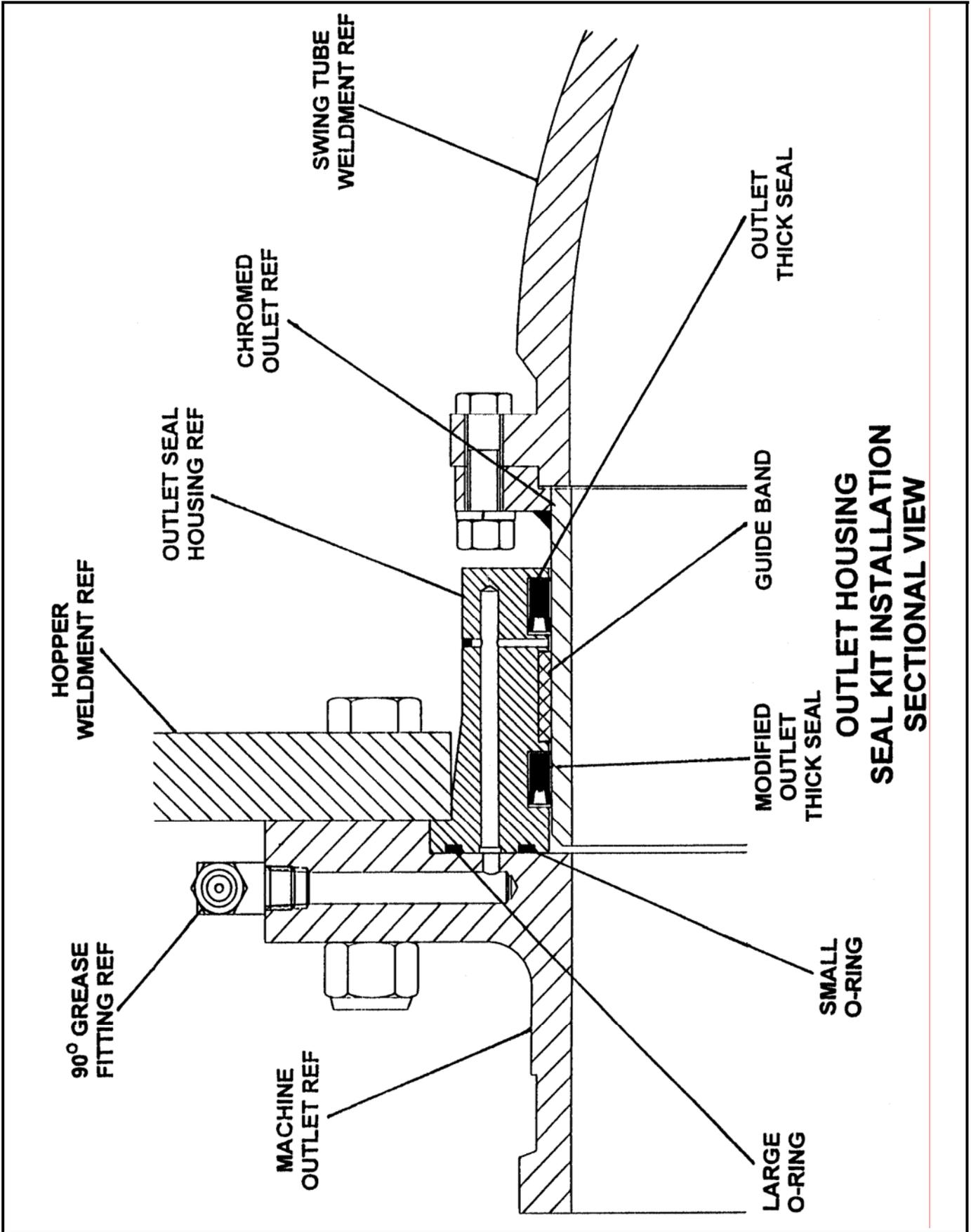
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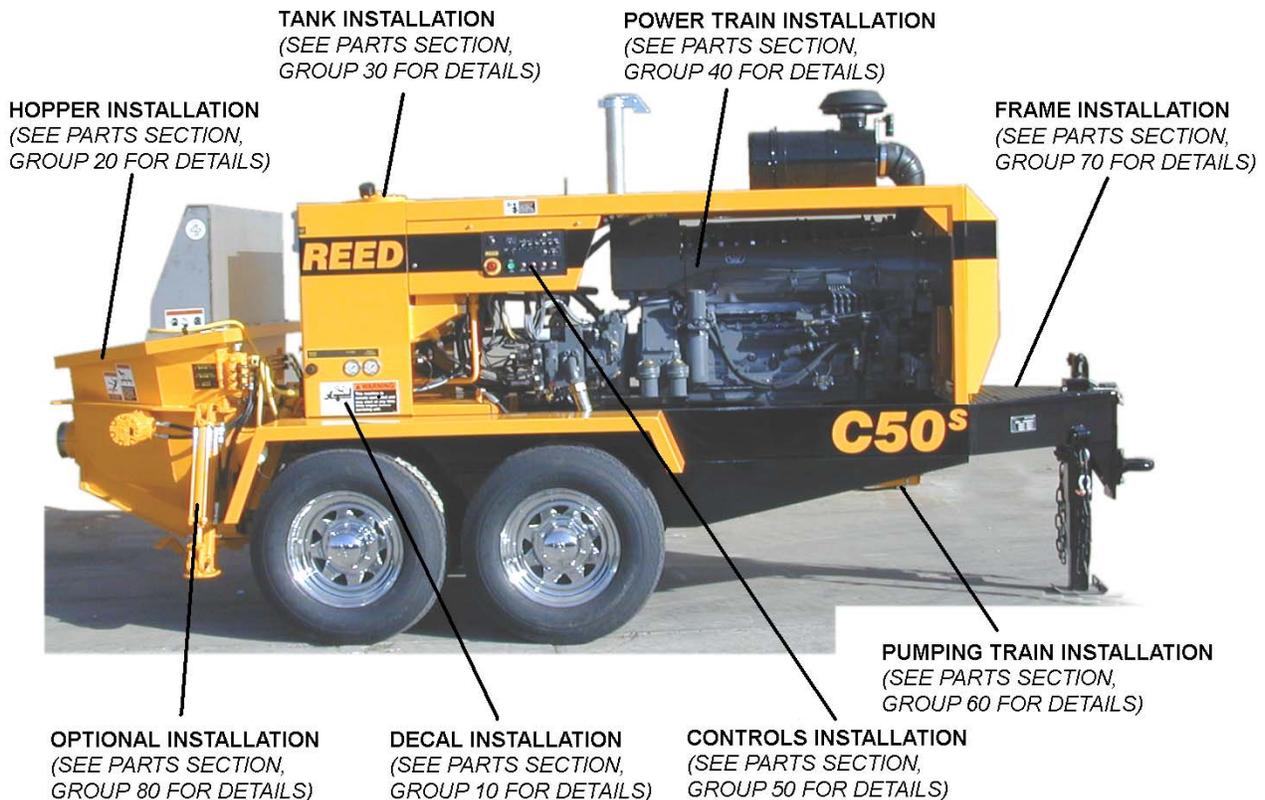


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MAJOR COMPONENT REPLACEMENT

It is a given fact that due to usage, improper maintenance and environmental conditions that certain parts will wear out over a period of time and will need to be replaced to continue efficient operation. When telling signs indicate that a part is worn, do not delay in the replacement. Continued usage with worn parts may lead to the damaging of other parts.

This section of the manual is provided to assist you in replacing some of the major components that may be worn. A step by step procedure is offered. Please be aware that the possibility exists your machine may be slightly different. If you find this to be the case, contact the **REED** Service Department. They will be pleased to assist you.





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SWING TUBE & COMPONENTS

The sealing characteristics of the swing tube depends on metal to metal friction of the wear ring, located inside the swing tube, to the wear plate installed on the inside of the hopper at the material cylinders. This friction and the abrasiveness of the pumping material mixes will cause wear and a breakdown of the sealing action. As this breakdown occurs, periodic adjustments to the swing tube can be made as described in the **ADJUSTMENT SECTION**. This will help to improve the sealing quality, however, eventually the components will need to be replaced.

Some telling signs or identifying symptoms, that adjustment is needed or parts are worn might be as follows:

- When deep grooves have developed on the face of the wear plate and/or on the wear ring.
- When the output volume at the end of the delivery line noticeably begins to decrease or eventually stops for no apparent reason.
- When the material being pumped is being forced back into the hopper under pressure.

WARNING

Be sure pressure in accumulator shift circuit has been released before doing any work inside the hopper or flush box.

WARNING

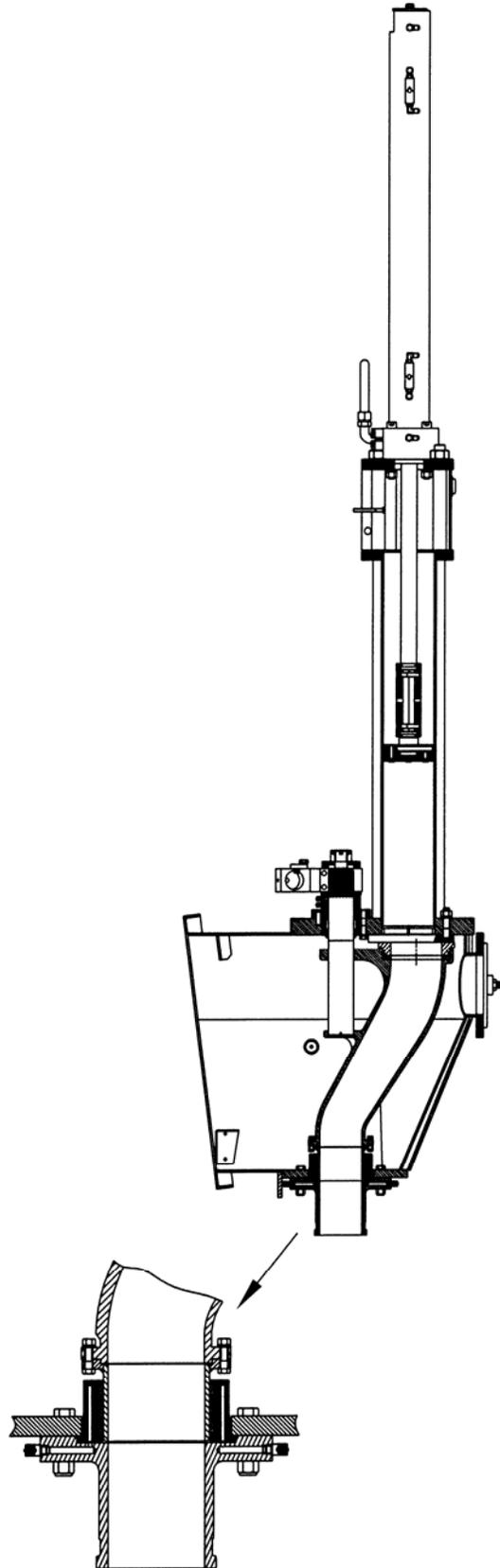
Do not place hands in the water box or adjacent area while motor is running. Always check that the pressure in the accumulator has been released before performing any work.



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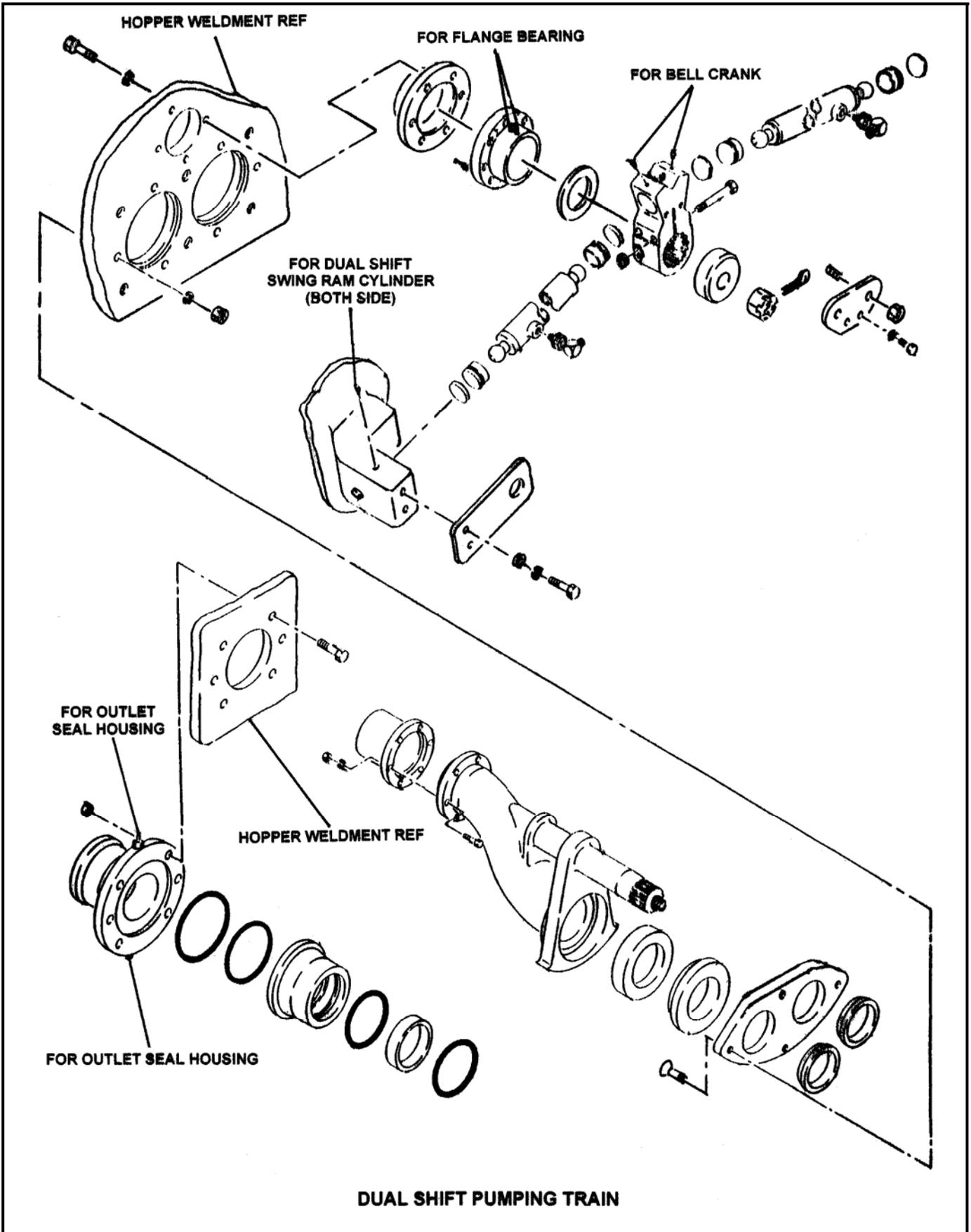


C-SERIES PUMPCELL CROSSSECTION

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WEAR RING AND WEAR PLATE REMOVAL/REPLACEMENT

- Turn off engine to shut down the system. **BE SURE ACCUMULATOR PRESSURE IS RELEASED.**
- At the bell crank, remove retainer, swing tube bolt, bell crank and shift cylinders.
- Place a sling from an overhead hoist around the discharge end of swing tube to help support the tube.
- Unbolt outlet flange from hopper and remove, being careful not to damage any of the seals and o-rings.
- Work swing tube back toward the outlet. It may be necessary to nudge it with a pry bar. **EXERCISE CARE.** The swing tube only needs to be moved toward the outlet a sufficient distance to enable the wear ring to be replaced.
- Remove wear ring and thrust ring from inside of swing tube.
- If it is necessary to replace the wear plate, this can be accomplished by backing out the mounting bolts located on the outside back the hopper. The bolts only have to be backed out a sufficient distance to enable wear plate to be removed. Maneuver the wear plate up through the gap between swing tube and hopper.
- Clean out the end of the swing tube where the wear ring will sit. Also clean the surface of the hopper where new wear plate will be installed. Make sure that all concrete material is fully removed, failure of the new parts will occur if this step is ignored.

RE-ASSEMBLY

- Apply a small amount of general-purpose grease on the outside area of the wear ring and thrust ring. Install both pieces into swing tube.
- Slide the new wear plate down between the swing tube and hopper. Reinstall and tighten the bolts.
- Slide swing tube forward until wear ring is set against wear plate.
- Install outlet flange assembly being careful not to damage any of the seals. Tighten bolts.
- Reinstall bellcrank parts, shift cylinder, and castle nut. Remove sling.
- Adjust the swing tube. Refer to procedure outlined in **ADJUSTMENT SECTION.**

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SWING TUBE REPLACEMENT

The swing tube, like the wear plate and wear ring, is considered a wear item, meaning that it will eventually need to be replaced. When this situation is encountered, the following is offered to assist you in accomplishing the replacement.

NOTE

The removal of the swing tube involves the disassembly of several other wear components. It is suggested that these be replaced as well.

REMOVAL

- Turn off engine to shut down the system. **BE SURE ACCUMULATOR PRESSURE IS RELEASED.**
- Remove the cover over the shift cylinder and bell crank.
- At the bell crank, remove the cotter pin, castle nut, bell crank, and shift cylinder.
- Place a sling from an overhead hoist around the discharge end of the swing tube to help support the tube.
- Unbolt both the outlet from swing tube and outlet housing from hopper. Remove both parts.
- Maneuver and work the swing tube toward the hopper outlet as far as it will go or until end of shaft is inside hopper. Sometimes the S-Tube shaft must be placed in the concrete cylinder, (protect the chrome surface) and then the S-Tube will come out back end first.
- Using the hoist and sling, lift swing tube out of hopper.

RE-ASSEMBLY

Before reassembly of the swing tube this is a good opportunity to clean out hopper of cured material, replace wear plate or do any maintenance on the material cylinders.

It is recommended that when the swing tube is replaced that all seals on the outlet and bearing housing be replaced as well as any other wear items. This is good preventative maintenance.

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- Reassemble the swing tube and components in basically the reverse order used in disassembly. Some important items to be noted are:
 - Make sure all components that are to be reused are cleaned from any residual material or grease.
 - Inspect all parts for damage such as nicks, scratches etc.
 - Smear a small amount of clean grease on all seals, polypacks and O-rings before installing.
 - Pay particular attention to the position and direction of seals when installing.
 - Make sure all bolts and nuts are tight.
 - Lubricate as required.
- Test movement of swing tube and make necessary adjustments following the procedure noted in the **ADJUSTMENT SECTION**.

MATERIAL CYLINDER COMPONENTS

Two (2) material cylinders powered by two (2) hydraulic drive cylinders are arranged in the system to operate alternately. While one cylinder is drawing material into the cylinder tube from the hopper on the retraction stroke, the other cylinder is pushing the material out the swing tube and discharge on the forward stroke. Because of the abrasiveness of the material being pumped, it will be necessary to periodically replace the piston cups.

Some telling signs and identifying systems of worn parts might be:

- A slurry of the material being pumped starts to appear in the flush box.
- The water or lubricating oil, if used, begins to rapidly lower the level without any sign of leakage from the box.
- Operation of the cylinder is rough and erratic.

WARNING

Be sure pressure in accumulator shift circuit has been released before doing any work inside the hopper or inside the flush box.



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WARNING

Do not place hands in the water box or in adjacent area while motor is running. Always check that the pressure in the accumulator has been released before performing any work.

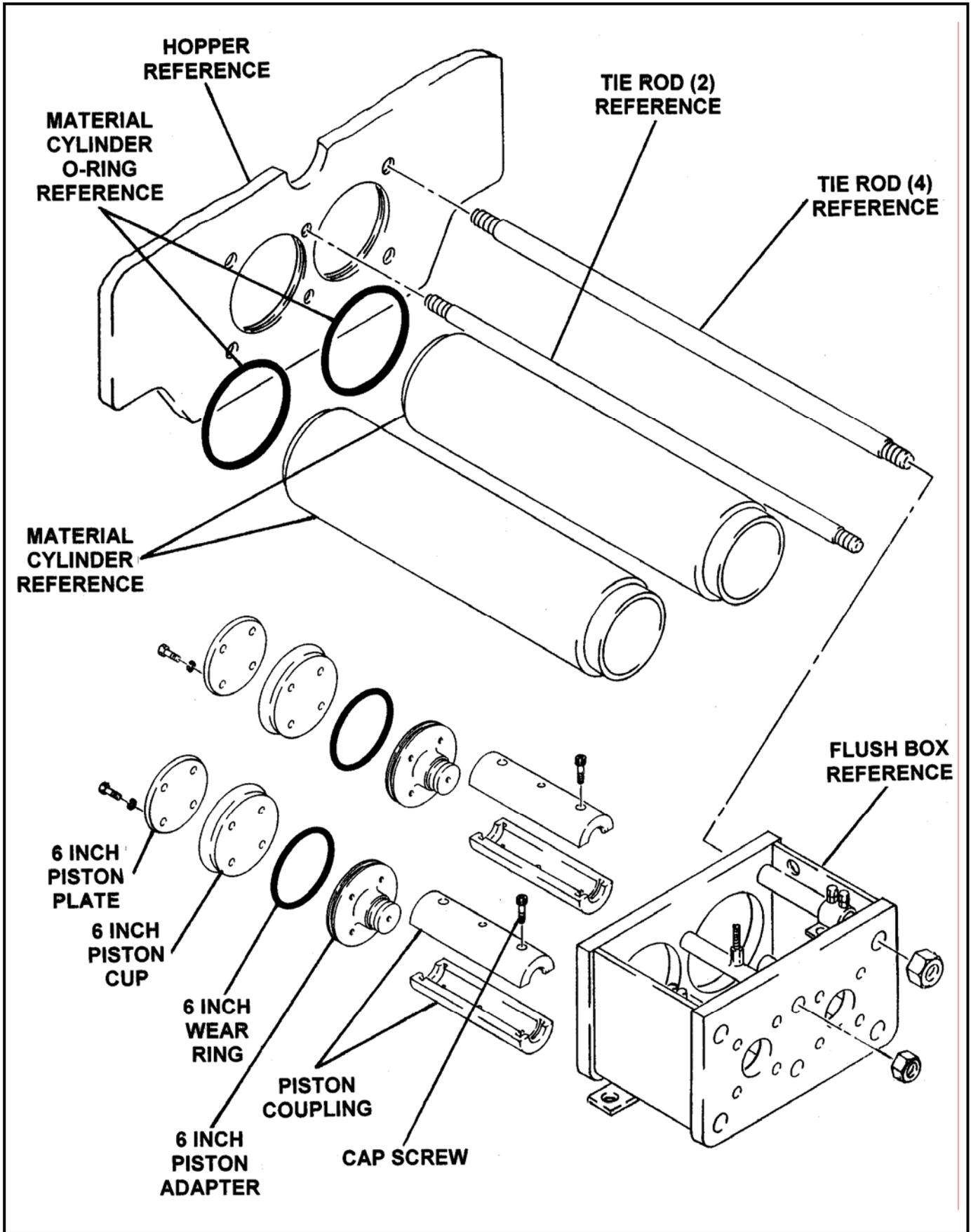
PISTON CUP REMOVAL/REPLACEMENT

- Cycle machine using appropriate controls until one of the cylinders is at full extension. Jog swing tube so that it is shifted over to other cylinder. This will expose fully extended piston.
- Turn off engine and allow pressure to subside.
- Remove the four (4) 3/8 – 20 x 1½” long bolts and lockwashers securing the piston plate, and piston cup to the piston adapter.
- Pry out the old piston cup and plate. Clean piston plate and inspect piston adapter, and clean if needed.
- Apply a good amount of grease on lip of piston cup. Tip should be facing hopper. Insert two (2) 3/8 – 20 x 4 long bolts through piston plate and cup in opposite holes. This will allow you to locate the cup in a correct position for lining up the holes.
- Screw the bolts by hand into the piston adapter. Start the piston cup into the cylinder and using a wooden dowel, tap the piston plate which will force the piston cup into the material cylinder.
- With the cup against the adapter, insert two (2) of the original 3/8 – 20 x 1½” long bolts and tighten. Remove the two (2) long bolts and replace with the originals

Replace piston cup in other cylinder in the same manner.



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PISTON ADAPTER O-RING REMOVAL/REPLACEMENT

Installed on the piston adapter, is an o-ring that is used as a second seal for the material cylinders. This o-ring will need replacing and a tell-tell sign is if the material cylinders only partially fill with material. This o-ring cannot be replaced from the hopper end, but must be done at the flush box end. To change the piston adapter o-ring, the following is offered:

- Cycle machine until one of the cylinders is completely retracted. Turn off engine and allow the pressure to subside.
- Drain all oil or water from the flush box.
- As a precaution, mark location of proximity sensor adjusting bracket. Remove proximity sensor cross bracket.
- Mark the end of the piston coupler so that on reassembly, it can be placed in the same relation.
- Unbolt and remove top half of coupler. Pull the piston assembly toward you.
- Inspect piston cup, clean up or if necessary replace.
- Remove old o-ring from adapter and smear some clean grease on the new o-ring. Install on adapter.
- Place piston cup assembly into material cylinder at an angle so that center of adapter is angling toward bottom of flush box.
- Pull up on adapter to square up piston assembly.
- Install coupler halves and bolt together.

Follow same procedure to remove and replace the o-ring on the other cylinder. After this installation proceed to:

- Replace proximity sensor cross bar and check position of adjustment bracket to previous mark.
- Refill flush box with water or oil.

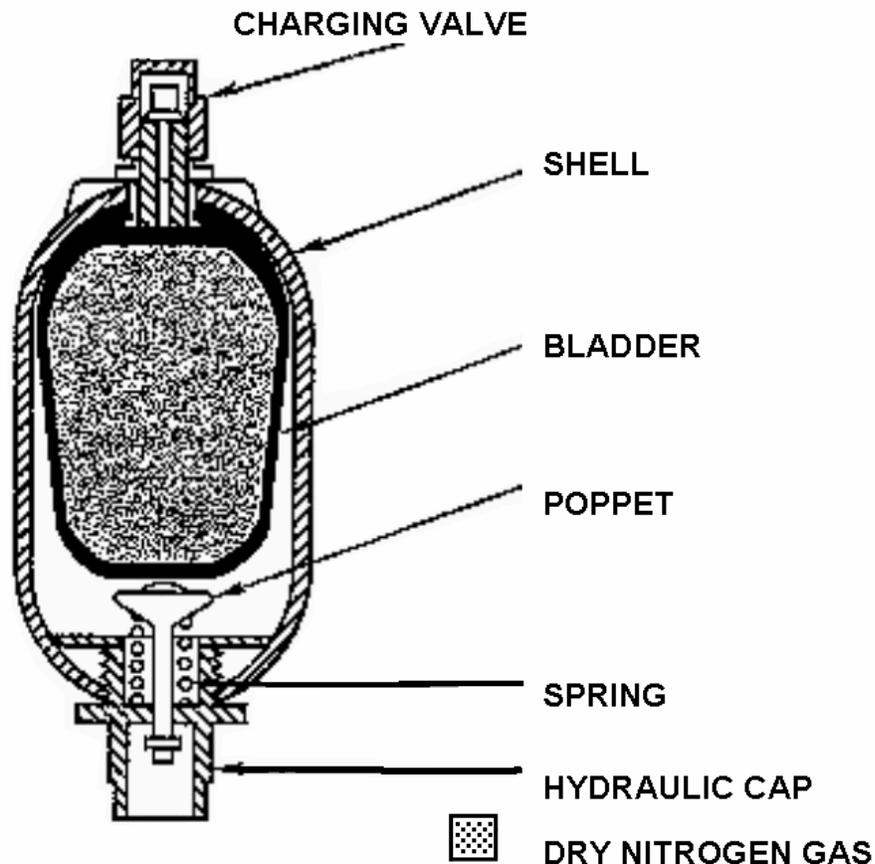
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ACCUMULATOR

It was noted in the **S-TUBE SHIFT CIRCUIT** description that the S-tube must shift alternately from one cylinder to the other in a synchronized operation. In addition this shift must be almost simultaneously. This instant pressure and volume cannot be provided by the system itself. To compensate for this an accumulator is used.

This is made up with an outer shell or tank, a rubber bladder installed inside the shell, a gas valve with port on top of the shell and a fluid port at the bottom of the shell complete with the necessary valves and seals.

To successfully work in the system and do the job intended the accumulator must first be pre-charged. This operation involved the induction of **DRY NITROGEN GAS** into the bladder to a pressure of 1250 PSI (87.5 BAR). This pressure will vary with each **REED** pump. Check the specifications noted in **MAINTENANCE SECTION, HYDRAULIC DESCRIPTION CHAPTER** of the appropriate manual. This dry nitrogen gas is inserted prior to installation of the accumulator and is used to inflate the bladder much like a balloon.



In operation of the accumulator in the hydraulic system, hydraulic fluid enters the accumulator through the fluid port and fills the area at the bottom between the inner wall of the shell and bladder. The hydraulic fluid enters at a higher pressure, 2500 PSI (175 BAR) than the gas pressure inside the bladder. At the appropriate time in the pump cycle, the unloading valve of the shift circuit opens, allowing the fluid in the accumulator to be discharged and is directed to the shift cylinder. As soon as the fluid is dispersed the accumulator is refilled. This cycle is repeated time after time.

The accumulator is a critical component in the pump operation and at some point in time it will be necessary to service the accumulator which might involve recharging with nitrogen, maintenance or bladder replacement. The following is offered to assist you in accomplishing this repair.

⚠ WARNING

The hydraulic accumulator is PRESSURIZED VESSEL and only QUALIFIED TECHNICIANS should perform the necessary repairs. Always drain the fluid COMPLETELY from the accumulator before performing any work on the component.

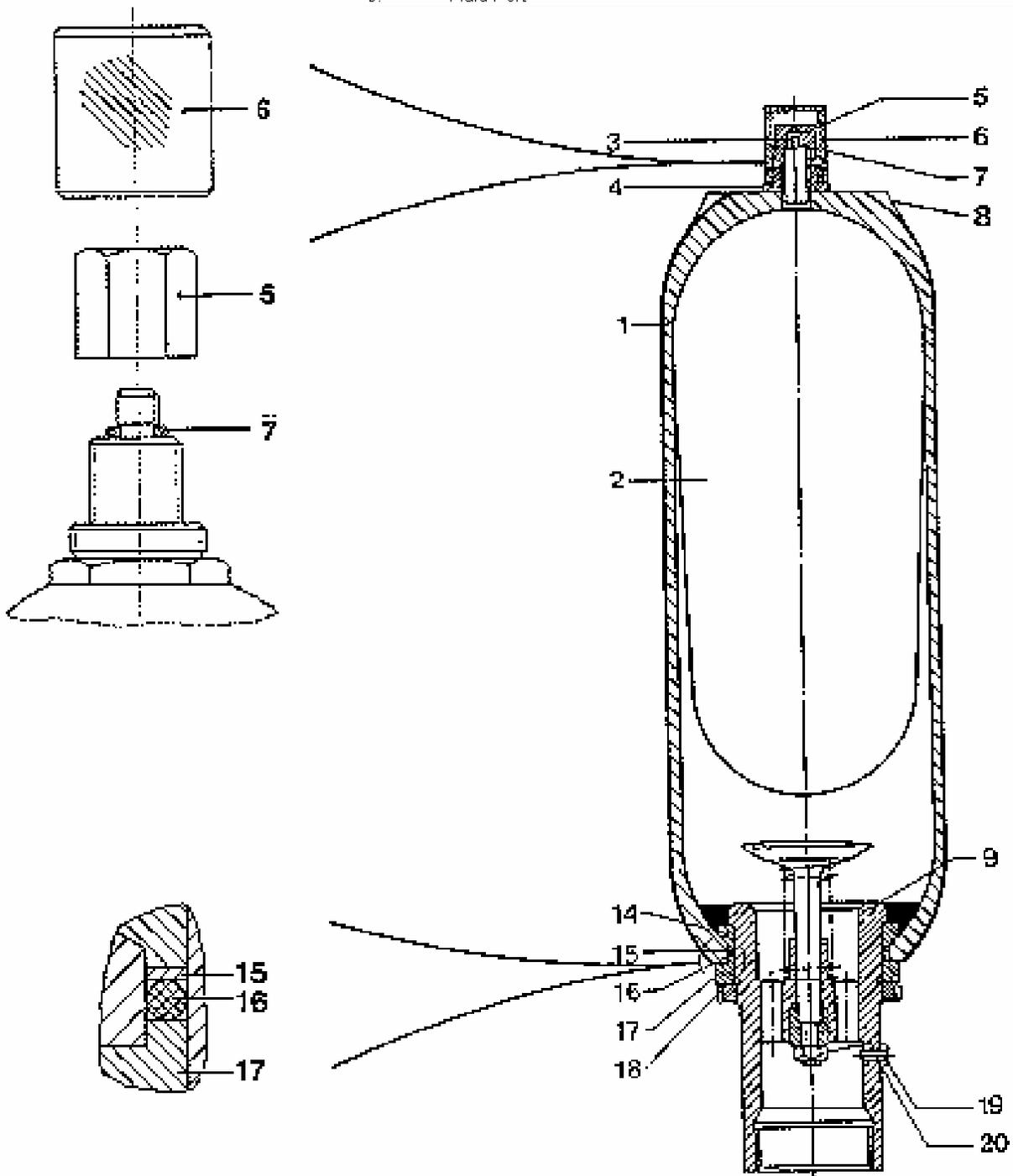
We recommend the following special tools to be on hand to facilitate any work being done on the accumulator:

- Charging & Gauge Unit
- Gas Valve Core Tool
- Spanner Wrenches
- Bladder Pull Rod
- Sockets 27mm & 36mm
- Blunt Flathead Screwdriver
- Soft Faced Hammer
- Torque Wrenches



ACCUMULATOR PART FAMILIARIZATION

- | | | | |
|----|----------------------|-----|---------------|
| 1. | Shell | 14. | Anti Ext Ring |
| 2. | Bladder | 15. | Flat Ring |
| 3. | Gas Valve Core | 16. | O-Ring |
| 4. | Lock Nut | 17. | Spacer Ring |
| 5. | Valve Seal Cap | 18. | Locknut |
| 6. | Valve Protection Cap | 19. | Vent Screw |
| 7. | O-Ring | 20. | Seal Ring |
| 8. | Nameplate | 21. | Back Up Ring |
| 9. | Fluid Port | | |



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PRE-CHARGE PRESSURE

Pre-charge pressure as it relates to the accumulator is the insertion of dry nitrogen gas into the bladder, prior to installation or use. On a new machine the accumulator is pre-charged at the factory. When a replacement is shipped from the factory it is **NOT PRE-CHARGED** unless shipped by over land or ground. A charged accumulator is a pressurized vessel thus it is against the law to ship by **AIR FREIGHT**.

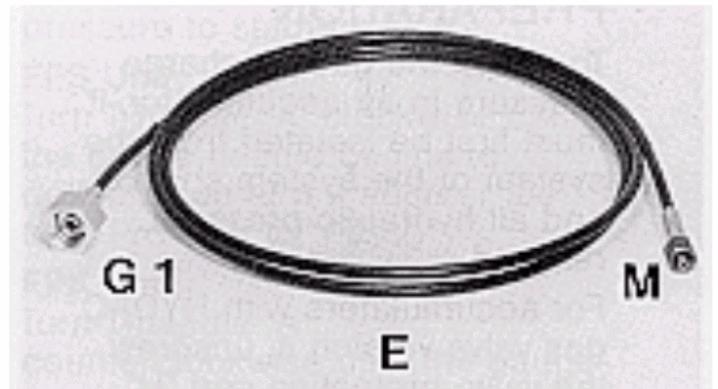
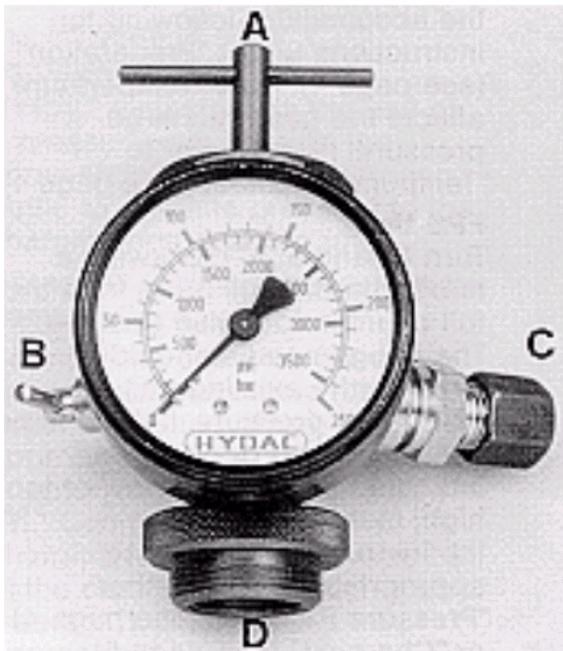
Periodically due to usage or leakage the bladder may loose some of the pre-charge which does affect the operation of the accumulator. As a result it is important that the pressure be checked at least once a year or when there is a noticeable change in the operation. The following is offered to assist you in servicing the accumulator.

NOTE

A Charging and Gauge Kit is required to perform maintenance on the accumulator. It is available from the REED Parts Department and you will find that it to be a good investment for your workshop.

CHECKING PRESSURE

Prior to checking of the accumulator pre-charge pressure the machine must be shut-down and all hydraulic pressure and fluid in the accumulator has been relieved.



- A) "T" handle
- B) Manual bleed valve
- C) Check valve
- D) Cap nut
- E) Charging hose, including cap screw connection G1 and M



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- Unscrew the valve protection cap #6 and valve seal hex cap #5. Exercise extreme care not to damage the O-ring #7 when removing the cap.
- Before making the installation of the gauge unit to the accumulator, turn the “T” handle counterclockwise until some resistance is felt. Check that the manual bleed valve is closed. It not close hand tight.
- Install gauge unit on the accumulator by screwing the cap nut onto the gas valve. Hand tighten.
- Proceed to turn T-handle clockwise a maximum of 3 full turns from the full counterclockwise position.
- The gauge should then indicate the pre-charge pressure. Refer to specifications for correct pressure:
 - If pressure reading is **TOO LOW** then accumulator will need **RECHARGED**.
 - If pressure is **TOO HIGH** then it will be necessary to **RELEASE** pressure.

RELEASE OF PRESSURE

When gauge indicates that the pre-charge pressure is too high proceed as follows to release some of the pressure within bladder.

- With gauging valve installed, carefully open the **MANUAL BLEED** valve, releasing some of the nitrogen gas.
- While doing this observe gauge until sufficient gas has been released and desired pressure has been reached.
- Close the manual bleed valve. Wait approximately 10 minutes for the pressure to stabilize, then recheck and if necessary adjust accordingly.
- To remove the gauging unit, turn “T” handle until resistance is felt to close the gas valve. Open manual bleed valve.
- Disconnect the gauging unit by unscrewing the cap from the gas valve. Replace valve seal hex cap and tighten to 18 lb. ft. Screw on valve protection cap, hand tight.

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INCREASE PRE-CHARGE PRESSURE

In checking the pre-charge pressure if it is found to be too low then add nitrogen gas as follows:

- Install gauging unit as previously described. Turn “T” handle clockwise until needle on gauge begins to move then from this point turn it another full turn.

WARNING

USE DRY NITROGEN GAS ONLY - NEVER USE OXYGEN OR AIR. THIS COULD CAUSE AN EXPLOSION.

- Connect the charging hose to the cap screw adapter and to the nitrogen bottle discharge. It is recommended that the commercial nitrogen bottle be equipped with a regulator to adjust pressure. Full pressure may damage gauge.
- Open the shut-off on the nitrogen bottle and slowly fill the accumulator. Charging too quickly may damage the accumulator.

NOTE

The gauge on the gauging unit during pre-charge registers the incoming line pressure and not necessarily the accumulator pressure while charging.

- The accumulator pressure can be checked by first closing the shut-off valve on nitrogen bottle.
- Allow a few minutes for the temperature and pressure in the accumulator to stabilize.
- Check the accumulator pressure as previously described, then fill or release pressure as required.
- Close shut-off valve on the nitrogen bottle. Turn “T” handle counterclockwise to close gas valve.
- Open bleed valve, disconnect charging hose and remove gauging unit from accumulator. Reinstall hex cap and protective cap.

REPLACING THE ACCUMULATOR BLADDER

Because of the continuous inflation-deflation of the bladder, it is not uncommon that replacement of the bladder will be required. It is not difficult but time consuming as extra care must be exercised in disassembly-reassembly so as not to damage good reusable parts. The following is offered as suggested means of accomplishing bladder replacement.

DISASSEMBLY - Refer to Parts Identification page

- Remove the hydraulic connection at the base of the accumulator or at the fluid port. Then remove the mounting brackets.

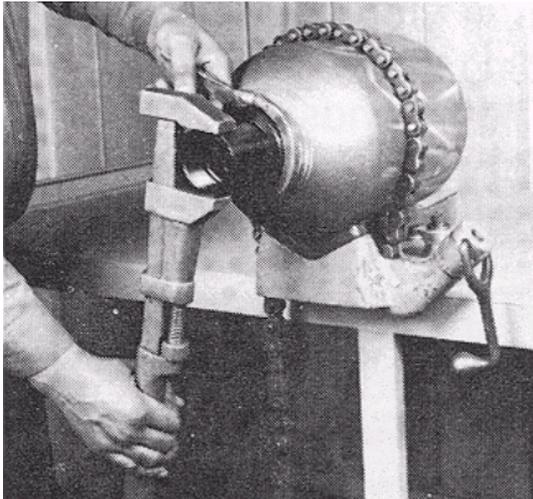


Photo A

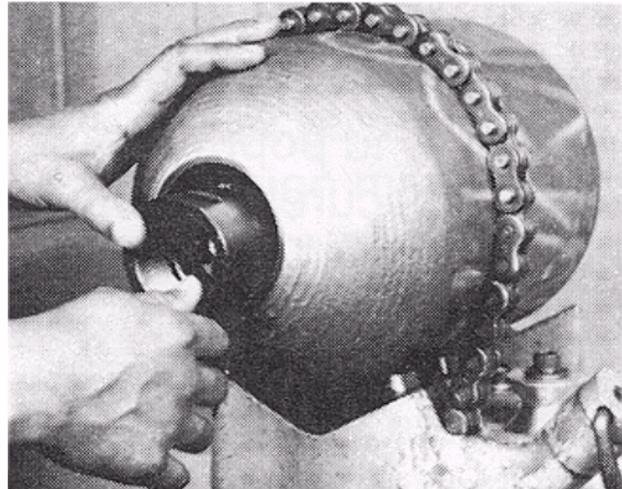


Photo B

- Place the accumulator in a vice or secure it to your work bench.

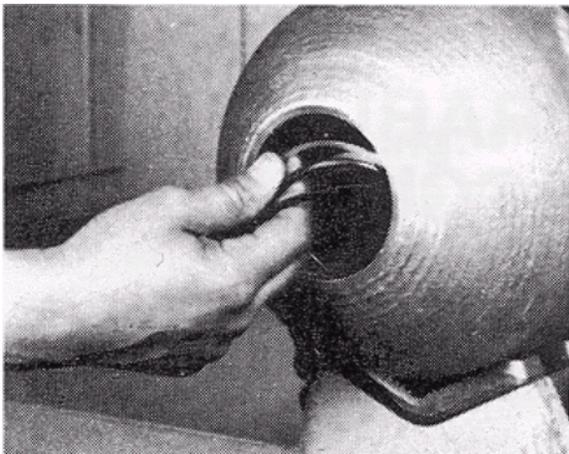


Photo C

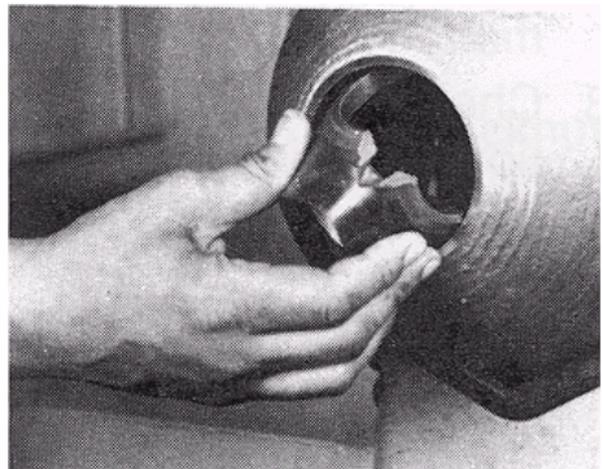
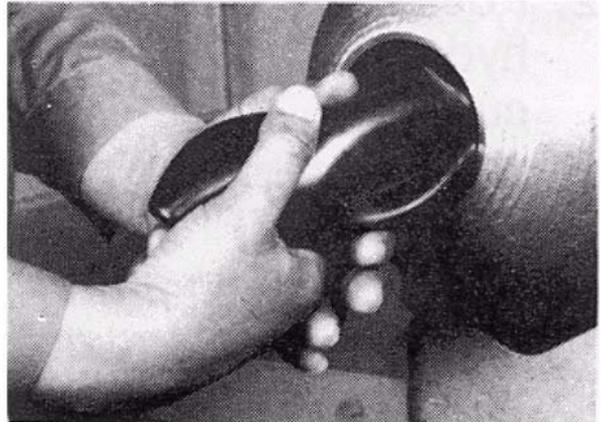


Photo D

- Install the gauging unit to the accumulator after turning the “T” handle counterclockwise until a resistance is felt. Also close manual bleed valve, hand tight.

**Photo E****Photo F**

- After gauging unit has been installed, turn “T” handle clockwise a maximum of 3 full turns from the full closed position. The gauge will indicate the existing precharge pressure.
- Release the pressure by carefully opening the manual bleed valve. Remove gauging unit from accumulator.
- Using the core tool contained in the accumulator repair kit, remove the valve core #3 of the bladder.
- At the bottom of the accumulator, remove vent screw #19 and seal ring #20.
- Use a spanner wrench to remove lock nut #18 then remove the spacer ring #17.
- Loosen the fluid port #9 and push it into the shell. Remove the back-up ring #21, O-ring #16 and flat ring #15 from the fluid port.
- Pull anti-extrusion ring #14 off the fluid port and by folding the ring in half remove it through the fluid side opening.
- Remove the fluid port #9.
- At the top of the accumulator remove locknut #4.
- From the fluid side remove the bladder #2. It may be necessary to fold the bladder lengthwise to remove it.

REASSEMBLY

Before proceeding to reassemble the accumulator it is recommended that the various parts be inspected for wear and damage. Replace as required. Also make sure that all parts are clean in particular the interior of the accumulator shell. To reassemble:

- Prepare replacement bladder for installation by removing the valve seal cap #5 and gas valve core #3. Press all residual air from bladder.
- Lubricate interior of shell and exterior of bladder with clean hydraulic fluid, Shell Tellus #46.
- Take the bladder pull rod from the kit. Put locknut #4 over the pull rod. Be sure male threads on locknut face the full rod handle.
- Insert the pull rod from top of accumulator through the shell with threaded connection toward fluid side.

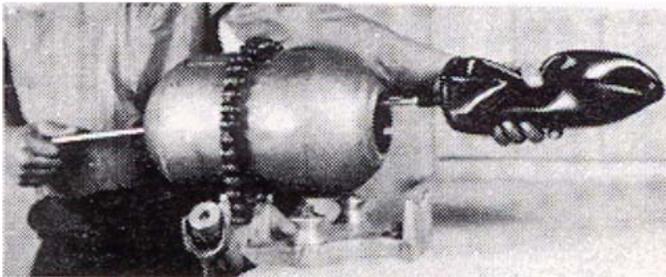


Photo G

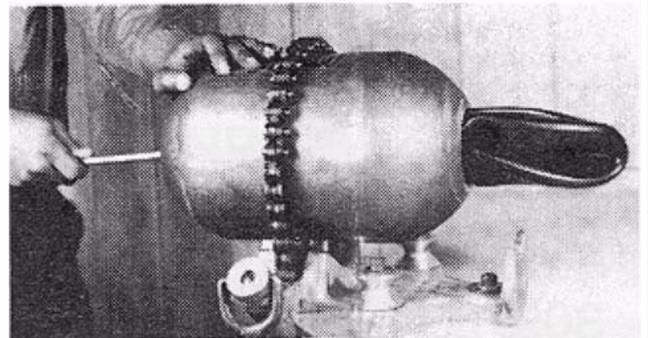
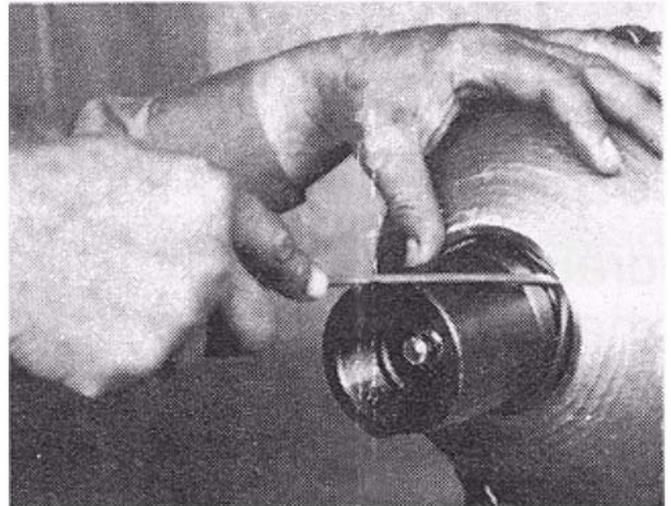


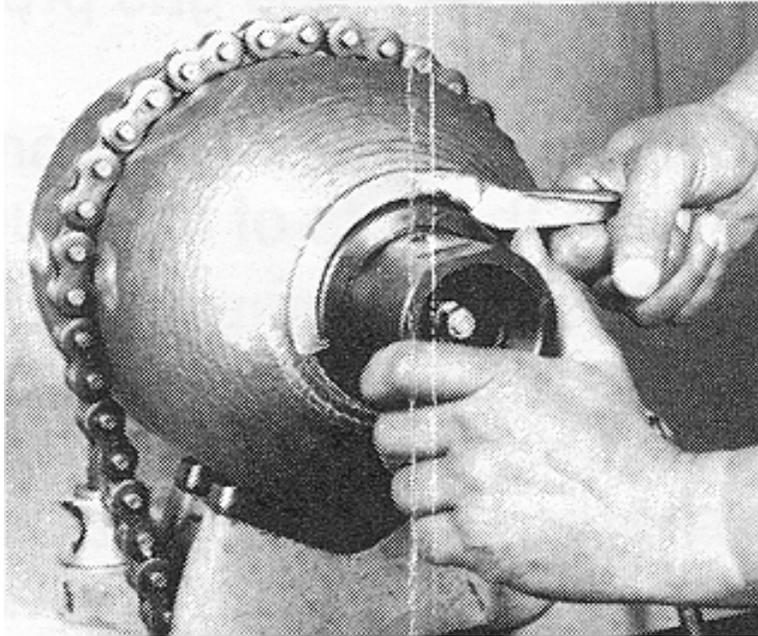
Photo H

- Thread pull rod onto bladder gas valve. Fold bladder in half lengthwise and again if necessary so that it can be easily inserted.
- Pull the rod through the top until gas valve emerges. Loosely attach locknut #4 to gas valve to prevent bladder from slipping back into shell. Remove rod from gas valve.
- Install gas valve core #3 and torque to 0.4 lb ft (0.5Nm).
- Insert fluid port #9 into shell. Exercise extreme care not to damage threads and O-ring. Make sure bladder is fully extended within shell.

- Fold anti-extrusion ring #14 in half and insert into shell with steel seat facing the fluid side opening. To do this push fluid port further into shell and then pull it back through the middle of the extension ring.
- Slightly pull on the fluid port to prevent it from falling back into the shell while inserting the seals.
- Assemble items #15 flat ring, #16 O-ring, #21 back-up ring, #17 spacer ring, #18 locknut in that order.
- Insert flat ring #15 into space between fluid port and shell. If it does not slide on properly recenter fluid port in the opening.
- Next insert O-ring #16, by pressing gently with a blunt flathead screwdriver (with rounded edges) at 90° intervals. Carefully level O-ring onto seat.
- Where applicable insert back-up ring #21 over O-ring with grooved surface towards O-ring.
- Insert spacer ring #17 with "lip" placed in the shell. Thread on locknut #18 and torque using spanner wrench. Place seal ring #20 on vent screw #19 and install in fluid port.

*Photo I**Photo J*

- On topside of accumulator, remove loosely attached locknut #4 and install nameplate. Install locknut and tighten.

**Photo K**

Install charging and gauging kit and pre-charge with **DRY NITROGEN GAS** as previously described.





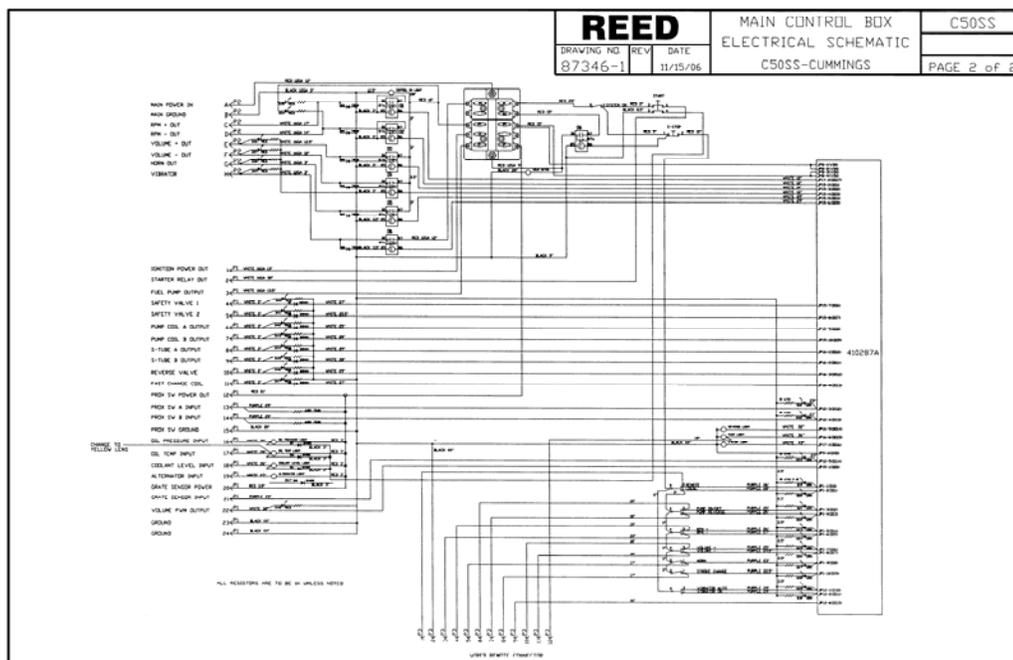
TRAILER MOUNTED PUMP 01 MODEL C90S SCHEMATICS SECTION

C90S
SCMTC

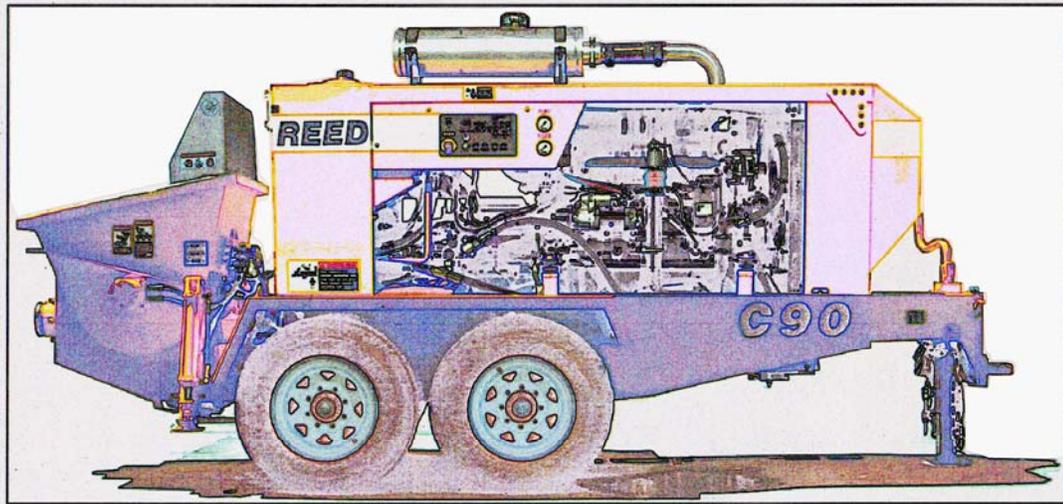
FIGURE 00
PAGE 00

REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S SCHEMATICS SECTION CONTAINS THE FOLLOWING FIGURES:

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** PN 86532 TRAILER ELECTRICAL HARNESS
- FIGURE 02** PN 87341 WIRING SCHEMATIC FOR 87452 HARNESS
- FIGURE 03** PN 87346-1 MAIN CONTROL DATA & SCHEMATIC
- FIGURE 04** PN 87347 PENDANT CONTROL BOX DATA
- FIGURE 05** PN 87425 MAIN CONTROL BOX SCHEMATIC
- FIGURE 06** PN 87426-1 HYDRAULIC SCHEMATIC
- FIGURE 07** PN 87452-1 WIRING HARNESS HYDRAULIC CYCLING
- FIGURE 08** DOCUMENT-TRANSMITTER RF I.D. TEACH PROCEDURE
- FIGURE 09** PN 86898 2-SPEED CONTROL ELECTRICAL SCHEMATIC



REVISION:



REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL CONTAINS THE FOLLOWING GROUPS AND FIGURES:

GROUP 00 HOW TO USE PARTS MANUAL

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** HOW TO USE PARTS MANUAL
- FIGURE 02** HOW TO ORDER PARTS

GROUP 10 FINAL INSTALLATION

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** FINAL INSTALLATION
- FIGURE 02** DECAL ASSEMBLY

GROUP 20 HOPPER INSTALLATION

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** HOPPER INSTALLATION
- FIGURE 02** HOPPER CLEAN OUT DOOR ASSEMBLY
- FIGURE 03** AGITATOR ASSEMBLY
- FIGURE 04** AGITATOR MOTOR ASSEMBLY
- FIGURE 05** AGITATOR/OUTRIGGERS CONTROL VALVE ASSEMBLY
- FIGURE 06** AGITATOR/OUTRIGGER CONTROL VALVE SUB-ASSEMBLY

GROUP 30 TANK INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	TANK INSTALLATION
FIGURE 02	HYDRAULIC TANK ASSEMBLY
FIGURE 03	ACCUMULATOR ASSEMBLY
FIGURE 04	ACCUMULATOR BLADDER REPAIR KIT
FIGURE 05	SWING TUBE CIRCUIT MANIFOLD ASSEMBLY
FIGURE 06	SWING TUBE CIRCUIT MAIN SOLENOID VALVE ASSEMBLY
FIGURE 07	BALL VALVE ASSEMBLY

GROUP 40 POWER TRAIN INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	POWER TRAIN INSTALLATION
FIGURE 02	POWER TRAIN ASSEMBLY
FIGURE 03	DOUBLE AUXILIARY PUMP ASSEMBLY
FIGURE 04	SINGLE AUXILIARY PUMP ASSEMBLY (OPTIONAL)
FIGURE 05	MAIN HYDRAULIC PUMP ASSEMBLY
FIGURE 06	BATTERY MOUNTING ASSEMBLY

GROUP 50 CONTROLS INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	CONTROLS INSTALLATION
FIGURE 02	CONTROL BOX ASSEMBLY
FIGURE 03	50 FEET CABLE REMOTE CONTROL ASSEMBLY
FIGURE 04	100 FEET CABLE REMOTE CONTROL ASSEMBLY
FIGURE 05	RADIO REMOTE CONTROL ASSEMBLY

GROUP 60 PUMPING TRAIN INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	PUMPING TRAIN INSTALLATION
FIGURE 02	SWING VALVE ASSEMBLY
FIGURE 03	SWING RAM CYLINDER SUB-ASSEMBLY
FIGURE 04	CONCRETE CYLINDER ASSEMBLY
FIGURE 05	FLUSHBOX ASSEMBLY
FIGURE 06	HYDRAULIC DRIVE CYLINDER ASSEMBLY
FIGURE 07	HYDRAULIC DRIVE CYLINDER SUB-ASSEMBLY

GROUP 70 FRAME INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	FRAME INSTALLATION
FIGURE 02	HYDRAULIC OUTRIGGER CYLINDER ASSEMBLY
FIGURE 03	HUB AND BRAKE ASSEMBLY
FIGURE 04	NON-OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY
FIGURE 05	OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY

GROUP 80 OPTIONAL INSTALLATION

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	OPTIONAL INSTALLATION
FIGURE 02	LUBE SYSTEM ASSEMBLY
FIGURE 03	12 VOLT LUBE PUMP ASSEMBLY
FIGURE 04	HOPPER VIBRATOR ASSEMBLY
FIGURE 05	CHROME WHEEL ASSEMBLY
FIGURE 06	OPTIONAL TOOL KIT ASSEMBLY
FIGURE 07	ACTUATOR BRAKES ASSEMBLY
FIGURE 08	WASH PUMP ASSEMBLY
FIGURE 09	WASH PUMP CONTROL VALVE ASSEMBLY
FIGURE 10	WASH PUMP MOTOR ASSEMBLY
FIGURE 11	ACCUMULATOR CHARGE KIT
FIGURE 12	NON-OPERATOR SIDE HYDRAULIC BRAKE ASSEMBLY
FIGURE 13	OPERATOR SIDE HYDRAULIC BRAKE ASSEMBLY
FIGURE 14	1 SPOOL CONTROL VALVE ASSEMBLY
FIGURE 15	1 SPOOL CONTROL VALVE SUB-ASSEMBLY
FIGURE 16	2 SPOOL CONTROL VALVE ASSEMBLY
FIGURE 17	2 SPOOL CONTROL VALVE SUB-ASSEMBLY





**TRAILER MOUNTED PUMP 01 MODEL C90S
HOW TO USE PART MANUAL**

**C90S
PARTS
GROUP 00
FIGURE 01
PAGE 01**

I. PURPOSE

This parts manual is prepared, issued and/or revised by **REED** Manufacturing, for the exclusive use of its customers and is intended for use in provisioning, requisitioning, storing and issuing replaceable **REED** trailer mounted pump **01** model **C90S**. The contents are proprietary to **REED** and are subject to change without notice. The use of any part of this document by any other person or persons or for any other purpose without the written consent of **REED** is expressly prohibited. In addition, **REED** expressly disclaims any and all responsibility arising in or any way related to such **REED**'s prior written consent thereto.

The parts number content of this document, arrangement and breakdown sequence of items is compatible with Military Standard (**MS**) and Air Transport Association Specification (**ATA**).

II. GENERAL SYSTEM OF ASSEMBLY ORDER – Detailed Parts List (Refer to Next Page)

1. This area refers to the corresponding illustration

MODEL – GROUP – FIGURE – PAGE

A. MODEL shows which is **REED**'s model number.

B. GROUP should be divided with:

- 00** **01** MODEL **C90S** PARTS MANUAL
- 10** FINAL INSTALLATION
- 20** HOPPER INSTALLATION
- 30** TANK INSTALLATION
- 40** POWER TRAIN INSTALLATION
- 50** CONTROL INSTALLATION
- 60** PUMPING TRAIN INSTALLATION
- 70** FRAME INSTALLATION
- 80** OPTIONAL INSTALLATION

C. FIGURE belong to the group. Please see page of contents and each group.

D. PAGE numbers follow to the right of each figure number.

2. The **ITEM NUMBER** corresponds to the item number shown for the part in illustration. Parts with item number preceded by a dash (such as: -1, -5, -12 etc.) are not illustrated.

3. **PARTS NUMBERS** that carry a **REED** part number.



TRAILER MOUNTED PUMP 01 MODEL C90S HOW TO USE PART MANUAL

C90S
PARTS
GROUP 00
FIGURE 01
PAGE 02

DUAL SHIFT SWING VALVE ASSEMBLY

01 B40
PARTS
GROUP 60
FIGURE 04
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	60-04	Assembly, Dual Shift Swing Valve (See Group 60, Figure 02 for NHA)					Ref
-2	86321	• Assembly, Outlet Group					1
3		•• Nut					6
4	72482	•• Outlet, Machine 5"					1
5		•• Fitting, Grease					2
6	79895	•• Kit, Outlet Seal					1
7	77761	••• O-Ring, Large					1
8	77762	••• O-Ring, Small					1
9	86504	••• Seal, Modified Outlet Thick					1
10	77763	••• Band, Guide					1
11	77765	••• Seal, Outlet Thick					1
12	72309	•• Housing, Outlet Seal					1
13		•• Bolt, Hex					6
14		•• Nut, Nylock (attaching parts)					6
15		•• Washer, Lock (attaching parts)					6
16	70042	•• Outlet, Chromed					1
17		•• Bolt, Hex (attaching parts)					6
-18	86317	• Assembly, Swing Tube Group					1
19	85965	•• Weldment, Harsh Swing Tube					1
20	86065	•• Seal, 6 Inch Single Lip					1
21	72310	•• Ring, 6 Inch Single Lip Wear					1
22	86031	•• Plate, Wear					1
23	86086	•• Ring, Anti Chip					2
24		•• Bolt, Flat Head					4
25		•• Washer, Lock					4
26		•• Nut, Hex					4
27		•• Bolt, Hex					6
28		•• Washer, Lock					6
29	85962	•• Seal, Flange Bearing					1
30		•• Pin, Dowel					1
31		•• Fitting, Grease 90					2
32	85133	•• Bearing, 3 Inch Spline Flange					1
33	85294	•• Washer, Thrust					1
34	85134	•• Spacer, Swing Tube Nut					1
35	70825	•• Nut, Swing Tube					1
36		•• Pin Cotter					1
-37	86320	• Assembly, Swing Tube Dual Shift Group					1
38		•• Plug, Pipe					4
39	86052	•• Pin, Spring					4
40		•• Fitting, Grease 90					2
41	86441	•• Retainer, Swing Ram					2

DASH (-) ITEM NOT ILLUSTRATED

REVISION:

REVISION:



DUAL SHIFT SWING VALVE ASSEMBLY

01 B40
PARTS
GROUP 60
FIGURE 04
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	60-04	Assembly, Dual Shift Swing Valve (See Group 60, Figure 02 for NHA)					Ref
-2	86321	• Assembly, Outlet Group					1
3		• • Nut					6
4	72482	• • Outlet, Machine 5"					1
5		• • Fitting, Grease					2
6	79895	• • Kit, Outlet Seal					1
7	77761	• • • O-Ring, Large					1
8	77762	• • • O-Ring, Small					1
9	86504	• • • Seal, Modified Outlet Thick					1
10	77763	• • • Band, Guide					1
11	77765	• • • Seal, Outlet Thick					1
12	72309	• • Housing, Outlet Seal					1
13		• • Bolt, Hex					6
14		• • Nut, Nylock (attaching parts)					6
15		• • Washer, Lock (attaching parts)					6
16	70042	• • Outlet, Chromed					1
17		• • Bolt, Hex (attaching parts)					6
-18	86317	• Assembly, Swing Tube Group					1
19	85965	• • Weldment, Harsh Swing Tube					1
20	86065	• • Seal, 6 Inch Single Lip					1
21	72310	• • Ring, 6 Inch Single Lip Wear					1
22	86031	• • Plate, Wear					1
23	86086	• • Ring, Anti Chip					2
24		• • Bolt, Flat Head					4
25		• • Washer, Lock					4
26		• • Nut, Hex					4
27		• • Bolt, Hex					6
28		• • Washer, Lock					6
29	85962	• • Seal, Flange Bearing					1
30		• • Pin, Dowel					1
31		• • Fitting, Grease 90					2
32	85133	• • Bearing, 3 Inch Spline Flange					1
33	85294	• • Washer, Thrust					1
34	85134	• • Spacer, Swing Tube Nut					1
35	70825	• • Nut, Swing Tube					1
36		• • Pin Cotter					1
-37	86320	• Assembly, Swing Tube Dual Shift Group					1
38		• • Plug, Pipe					4
39	86052	• • Pin, Spring					4
40		• • Fitting, Grease 90					2
41	86441	• • Retainer, Swing Ram					2

DASH (-) ITEM NOT ILLUSTRATED

REVISION:



REVISION:



TRAILER MOUNTED PUMP 01 MODEL C90S
HOW TO USE PART MANUAL

C90S
PARTS
GROUP 00
FIGURE 01
PAGE 04

4. DESCRIPTION

A. The **INDENTURE SYSTEM** used in the parts list shows the relationship of one part to another. For a given item, the number of indentures depicts the relationship of the item to the components of the item as follows:

1 2 3 4 5

Assembly (or Installation)

- **Detail part of assembly**
- **Sub-assembly**
- **Attaching parts for sub-assembly**
 - • **Detail part of sub-assembly**
 - • **Sub-sub-assembly**
 - • **Attaching parts for sub-sub-assembly**
 - • • **Detail part of sub-sub-assembly**
 - • • **Sub-sub-sub-assembly**
 - • • **Attaching parts of sub-sub-sub-assembly**
 - • • • **Detail part of sub-sub-sub-assembly**

B. "See Group 60, Figure 02 For **NHA**"

Identifies the illustrated parts chapter location; indicates where the Next Higher Assembly (**NHA**) of the item shown.

C. "See Group 60, Figure 07 For **DET**"

Identifies the illustrated parts chapter location; indicates where the item and its Detailed Breakdown (**DET**) is shown.

D. "See Group 30, Figure 05 for **REF**" or "See Vendor Chapter For **REF**"

Identifies the illustrated parts chapter where the part is, and if listed and illustrated in Vendor Chapter. It is used as a cross-reference (**REF**).

5. QUANTITY

A. Reference (**REF**) indicates the items that is listed previously in the Next Higher Assembly (**NHA**) and then again in this figure.

B. As Required (**A/R**) indicates the parts that is used in a quantity as required.

C. A number entry indicates the quantity of the part used in its next higher application.

6. Functionally related assemblies are illustrated in phantom (— — —) but not listed on the detail parts list page.

REVISION:



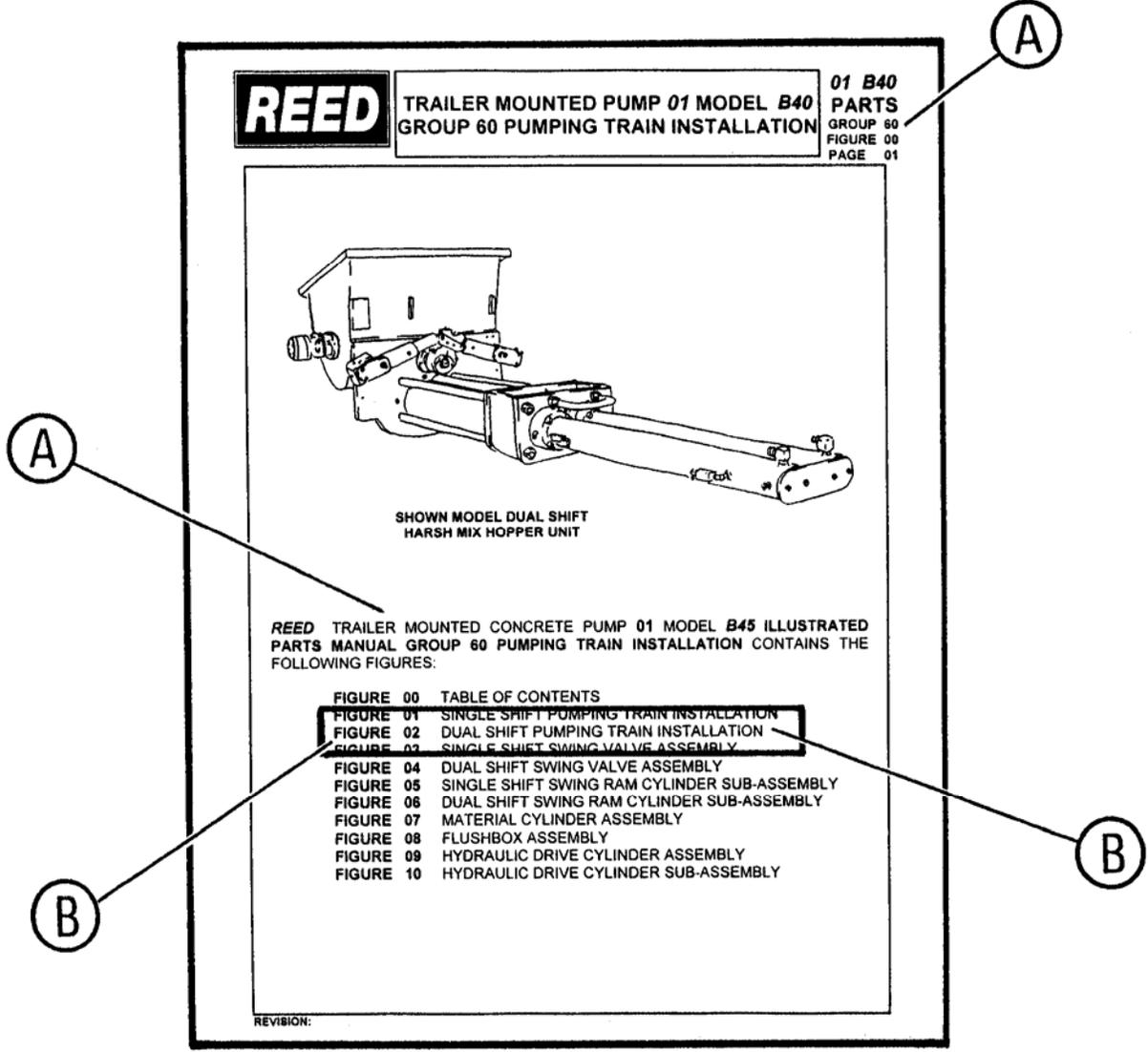
**TRAILER MOUNTED PUMP 01 MODEL C90S
HOW TO ORDER PARTS**

**C90S
PARTS
GROUP 00
FIGURE 02
PAGE 01**

1. Always give serial number and model of **REED** trailer mounted concrete pump **01** model **C90S**. (Refer to each unit name plate shown below). NOTE: This manual is being released to cover unit starting with serial number **3-07-1-2699** to current production. Some components used on earlier units differ from current productions. Where this occurs, the part is identified by a serial number.

REED		PHONE (909) 287-2100	
13822 OAKS AVENUE		FAX (909) 287-2140	
CHINO, CA 91710 USA			
MODEL	_____	SERIAL NO	_____
MATERIAL PRESSURE	_____	PSI	_____ 3AR
HYDRAULIC PRESSURE	_____	PSI	_____ 3AR
ENGINE / PTO ELECTRIC MOTOR	_____	RPM	_____ /DLTS
PN 96636			

2. Always specify part number and complete name of parts ordered.
- A. Turn to table of content in the desired Installation. Refer to main group in which part should be listed.
 - B. Find title of figure in which the part should be shown. Note figure number.



REVISION:



TRAILER MOUNTED PUMP 01 MODEL C90S HOW TO ORDER PARTS

C90S
PARTS
GROUP 00
FIGURE 02
PAGE 02

REED DUAL SHIFT SWING VALVE ASSEMBLY 01 B40 PARTS GROUP 00 FIGURE 04 PAGE 01

HOPPER REF (STANDARD P/N: 88107) (HARSH MIX P/N: 88032)

SWING RAM HOUSE REF (RH P/N: 85941) (LH P/N: 85942)

HOPPER REF (STANDARD P/N: 88107) (HARSH MIX P/N: 88032)

REVISION:

REED DUAL SHIFT SWING VALVE ASSEMBLY 01 B40 PARTS GROUP 00 FIGURE 04 PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
-1	60-04	Assembly, Dual Shift Swing Valve (See Group 60, Figure 02 for NHA)	Ref
-2	86321	Assembly, Outlet Group	1
3		** Nut	6
4	72482	** Outlet, Machine 5"	1
5		** Fitting, Grease	2
6	79895	** Kit, Outlet Seal	1
7	77781	*** O-Ring, Large	1
8	77782	*** O-Ring, Small	1
9	86504	*** Seal, Modified Outlet Thick	1
10	77783	*** Band, Guide	1
11	77785	*** Seal, Outlet Thick	1
12	72309	** Housing, Outlet Seal	1
13		** Bolt, Hex	6
14		** Nut, Nylock (attaching parts)	6
15		** Washer, Lock (attaching parts)	6
16	70042	** Outlet, Chromed	1
17		** Bolt, Hex (attaching parts)	6
-18	86317	Assembly, Swing Tube Group	1
19	85965	** Weldment, Harsh Swing Tube	1
20	86085	** Seal, 6 Inch Single Lip	1
21	72310	** Ring, 6 Inch Single Lip Wear	1
22	86031	** Plate, Wear	1
23	86086	** Ring, Anti Chip	2
24		** Bolt, Flat Head	4
25		** Washer, Lock	4
26		** Nut, Hex	4
27		** Bolt, Hex	6
28		** Washer, Lock	6
29	85962	** Seal, Flange Bearing	1
30		** Pin, Dowel	1
31		** Fitting, Grease 90	2
32	80723	** Bearing, 3 Inch Spring Flange	1
33	85294	** Washer, Thrust	1
34	86184	** Spacer, Swing Tube Nut	1
35	70825	** Nut, Swing Tube	1
36		** Pin Cotter	1
-37	86320	Assembly, Swing Tube Dual Shift Group	1
38		** Plug, Pipe	4
39	86082	** Pin, Spring	4
40		** Fitting, Grease 90	2
41	86441	** Retainer, Swing Ram	2

DASH (-) ITEM NOT ILLUSTRATED

REVISION:

C. Turn to corresponding page, find the group and figure.

D. Check your required part and its attaching parts and match with illustration page.

E. Refer to corresponding item number in the part list page.
Part numbers are located in the part number column.

F. When ordering variable or optional miscellaneous parts which are not found this in parts chapter, follow the above outlined procedure of how to order parts.

1). When applicable, give model and serial number of the component for which parts are desired.

2). In a specific, difficult to describe situation, a marked-up photograph or detailed sketch would be helpful.

REVISION:



**TRAILER MOUNTED PUMP 01 MODEL C90S
HOW TO ORDER PARTS**

**C90S
PARTS
GROUP 00
FIGURE 02
PAGE 03**

3. Do not designate quantity by "set". State specifically how many parts are wanted.
4. Always give complete address and full shipping instructions. Specify shipping instructions, truck freight, air freight. United Parcel Service (UPS), or FedEx and DHL are available in designated areas.

5. TO ORDER

A. BY MAIL

Attention: Parts Department
REED
13822 Oaks Avenue
Chino, CA. 91710

B. BY FAX

(909) 287 - 2141

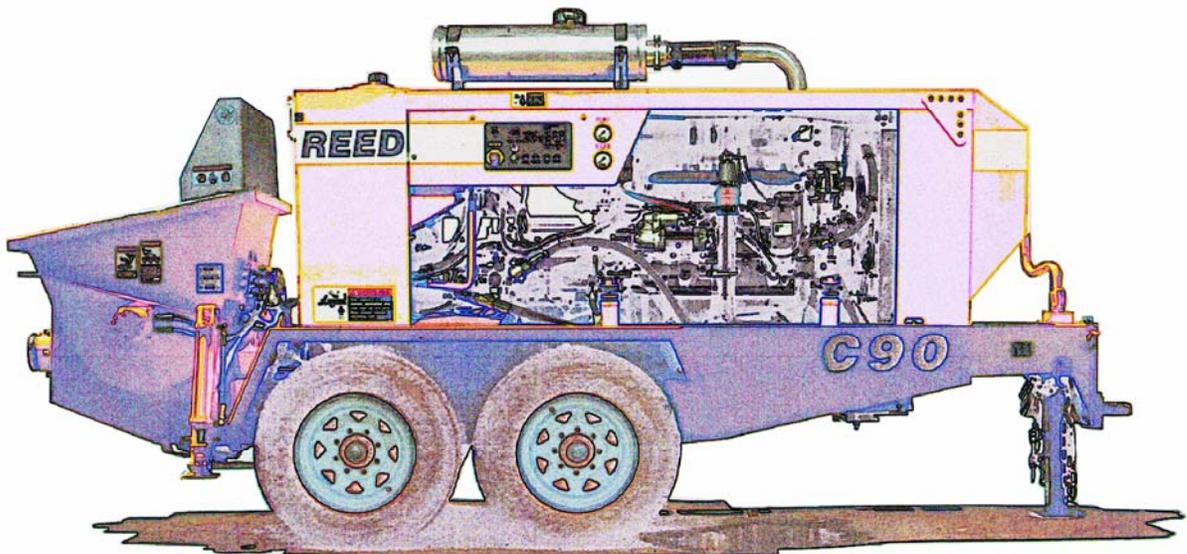
C. BY PHONE

(909) 287 - 2100

6. Parts return without authorization will not be accepted. If it is necessary to return parts for any reason, written authorization may be obtained from **REED** Parts Department, Chino, CA. 91710. A Parts Return Authorization form is provided when **REED** deems its necessary to have the part returned for evaluation. The form is issued by the Warranty of Parts Department of **REED**.
 - A. The form will be filled by **REED** unless requesting necessary information and you will receive a copy as well as shipping tag.
 - B. Attach shipping tag to part insert return original invoice.
 - C. Ship part to **REED PREPAID**.
 - D. Part must be returned to **REED** within 30 days from date of authorization.

REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 10 FINAL INSTALLATION CONTAINS THE FOLLOWING FIGURES:

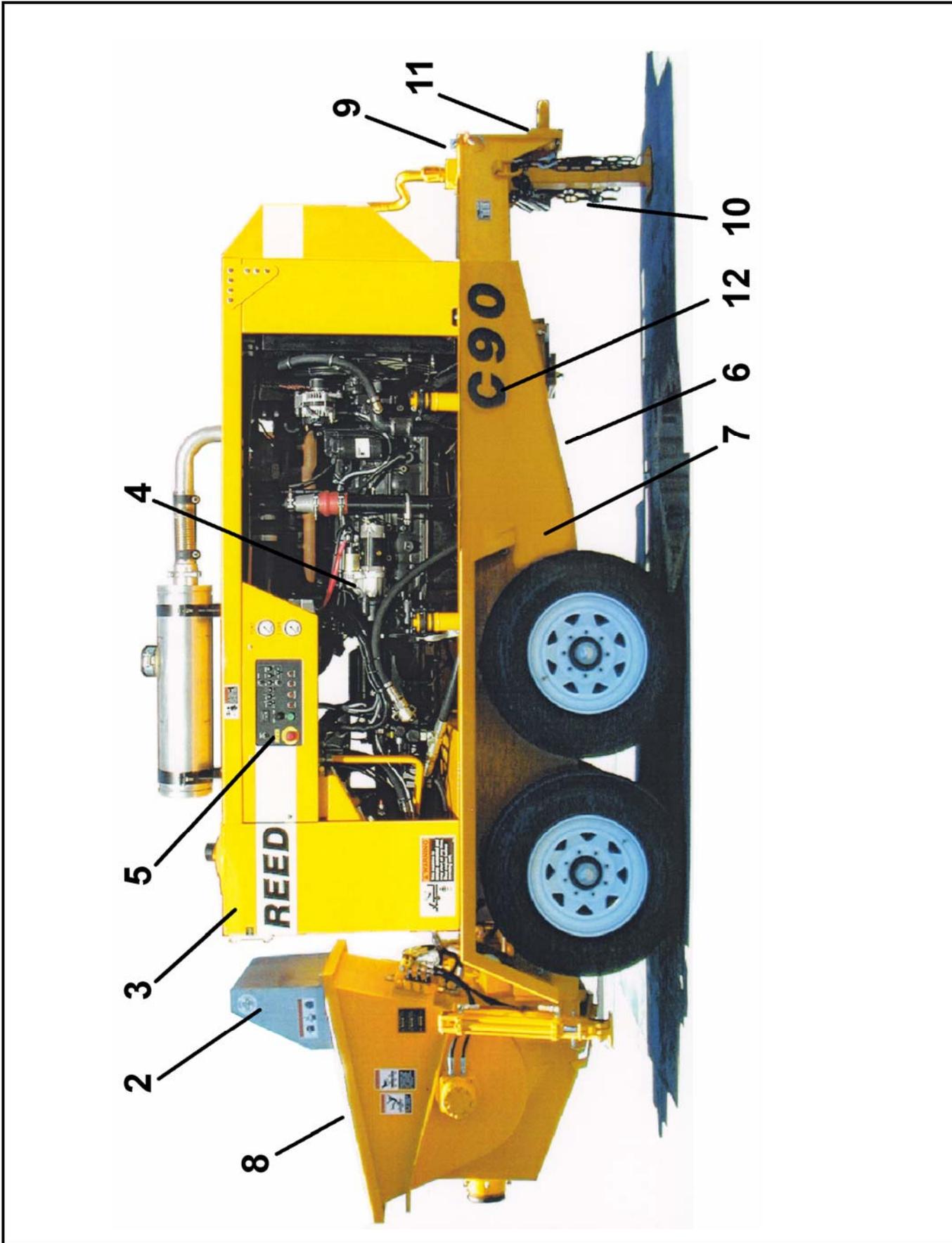
- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** FINAL INSTALLATION
- FIGURE 02** DECAL ASSEMBLY





HARSH MIX HOPPER WITH DUAL SHIFT FINAL INSTALLATION

C90S
PARTS
GROUP 10
FIGURE 01
PAGE 01



REVISION:



STANDARD HOPPER WITH DUAL SHIFT FINAL INSTALLATION

C90S
PARTS
GROUP 10
FIGURE 01
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	C90RC-V01	Installation, C90S HM Hopper with Dual Shift Final					Ref
2	20-02	• Installation, Hopper (See Group 20, Figure 01 for DET)					1
3	30-01	• Installation, Tank (See Group 30, Figure 01 for DET)					1
4	40-01	• Installation, Power Train (See Group 40, Figure 01 for DET)					1
5	50-01	• Installation, Control (See Group 50, Figure 01 for DET)					1
6	60-01	• Installation, Dual Shift Pumping Train (See Group 60, Figure 01 for DET)					1
7	70-01	• Installation, Frame (See Group 70, Figure 01 for DET)					1
8	80-01	• Installation, Optional (See Group 80, Figure 01 for DET)					1
9	77705	• Kit, Break Away					1
10	86730	• Chain 5.5FT					2
11	87085	• Shackle Anchor-Screw Pin 1/2"					4
12	10-03	• Kit, C90S Decal (See Group 10, Figure 02 for DET)					1

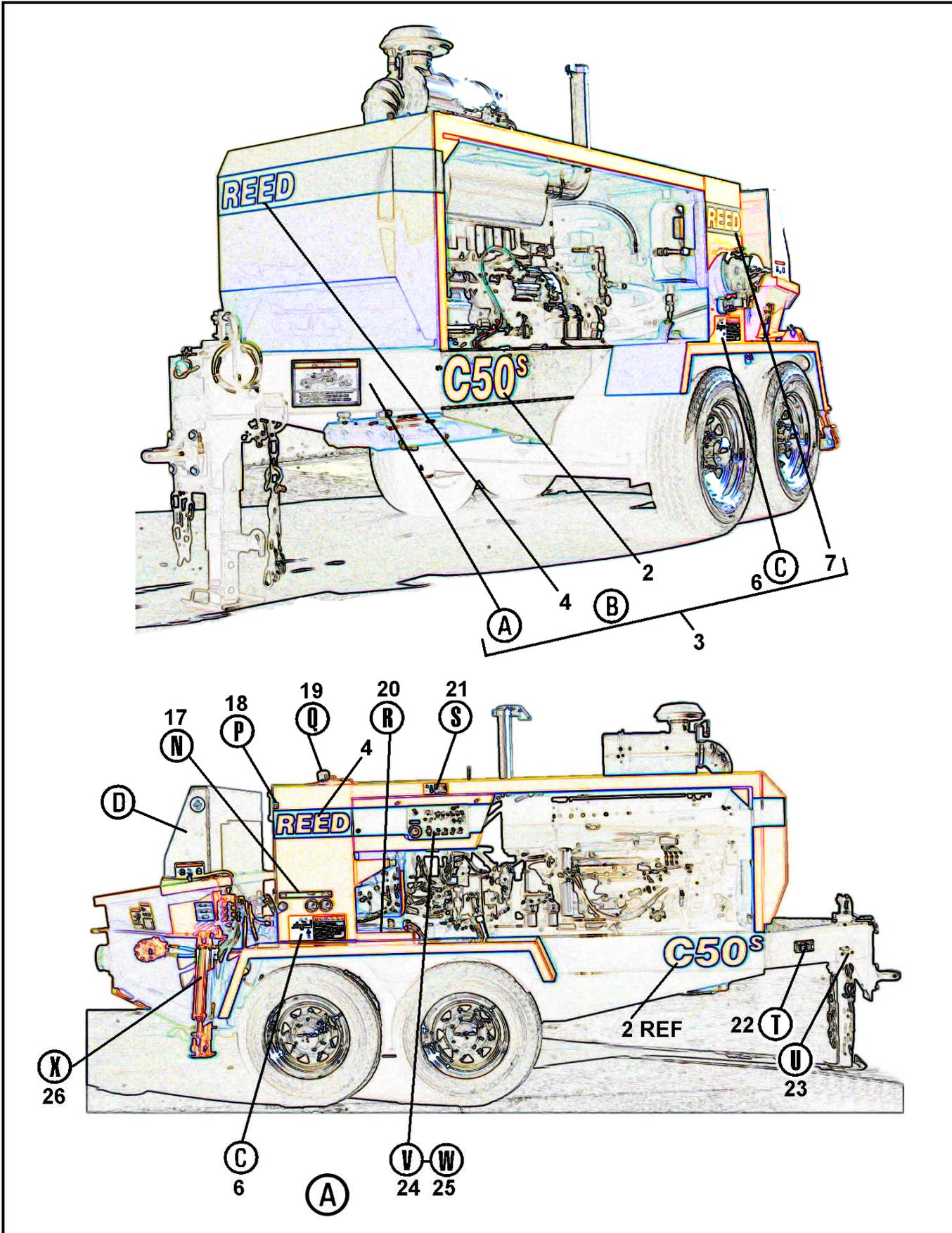
DASH (-) ITEM NOT ILLUSTRATED

REVISION:



DECAL ASSEMBLY

C90S
PARTS
GROUP 10
FIGURE 02
PAGE 01



REVISION:



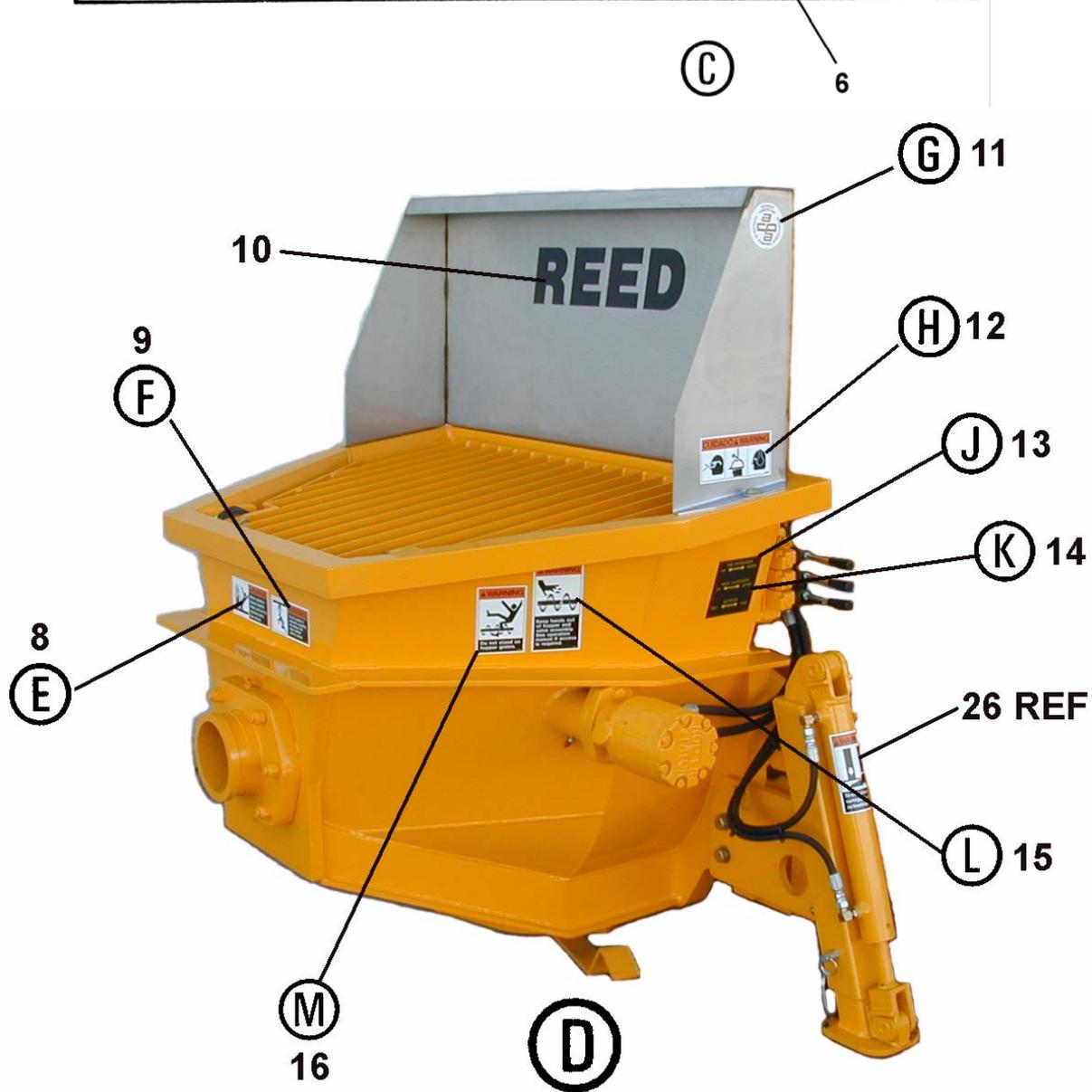
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	10-02	Kit, C90S Decal (See Group 10, Figure 01 for NHA)					Ref
2	86849-Y	• Decal, C90S 6 Inch Black					2
3	85430-Y	• Kit, C-Series Decal					1
4	85418	•• Decal, REED 4 1/2 Inch Black and White 48 Inch					2
5	800916	•• Decal, Warning, Keep Hand Out of Water Box					1
6	800924	•• Decal, Warning, This Machine is Remote Controlled and					2
7	85416	•• Decal, REED 4 1/2 Inch Black and White 20 Inch					1
8	800922	•• Decal, Warning, Before Opening a Blocked Pipeline,					1
9	800921	•• Decal, Warning, Do Not Operate at Pressures Exceeding					1
10	73132	•• Decal, REED 4 1/2 Inch					1
11	800929A	•• Decal, Warning					2
12	800917	•• Decal, Warning, Keep Hand Out of Hopper and Valve					2
13	800918	•• Decal, Warning, Do Not Stand on Hopper Grate					2
14	85684	•• Decal, C-Series Gauge					1
15	75020	•• Decal, Hydraulic Oil					1
16	800931	•• Decal, ACPA Member					1
17	85844	•• Decal, Oil Level					1
18	800926	•• Decal, Warning, Do Not Operate This Machine without					1
19	75017	•• Decal, Diesel Fuel Only					1
20	75009	•• Nameplate, REED , Serial No.					1
21	-	• Decal, C90S Control Box Panel					1
22	-	• Decal, C90S Remote Control					1
23	800919	• Decal, Optional, Warning, Stand Clear Outriggers When					2
24	83845	• Decal, Outriggers					1
25	83846	• Decal, Agitator					1

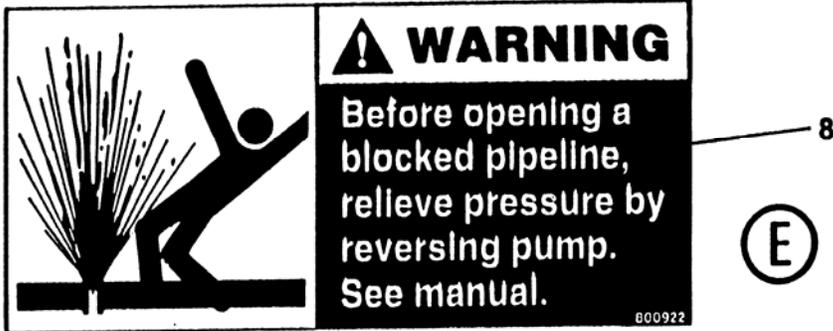
DASH (-) ITEM NOT ILLUSTRATED

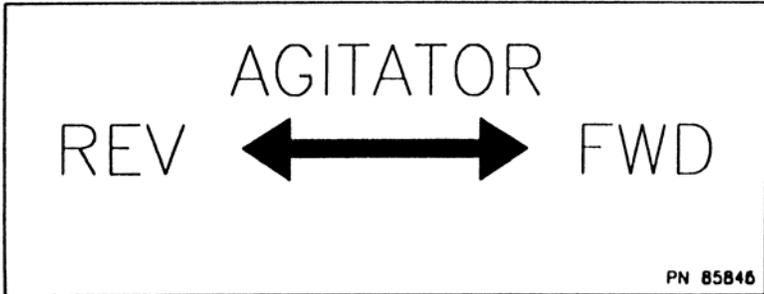


! WARNING

This machine is remote controlled and may start at any time. Stop engine before servicing unit.







(J)



(K)



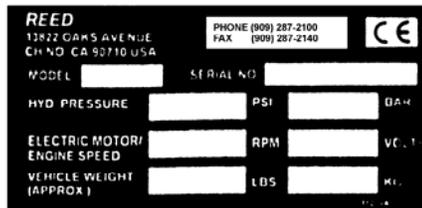
DECAL ASSEMBLY

C90S
PARTS
GROUP 10
FIGURE 02
PAGE 07



(S)

21



22

(T)

! WARNING

34" MINIMUM

- THE TONGUE WEIGHT ON TANDEM AXLE TRAILERS DECREASES AS THE TONGUE IS LOWERED.
- TOWING WITH INSUFFICIENT TONGUE WEIGHT MAY CAUSE INSTABILITY OF THE TRAILER.
- REED C-SERIES MODELS MUST BE TOWED WITH A MINIMUM TONGUE HEIGHT OF 34 INCHES.

PN 86245

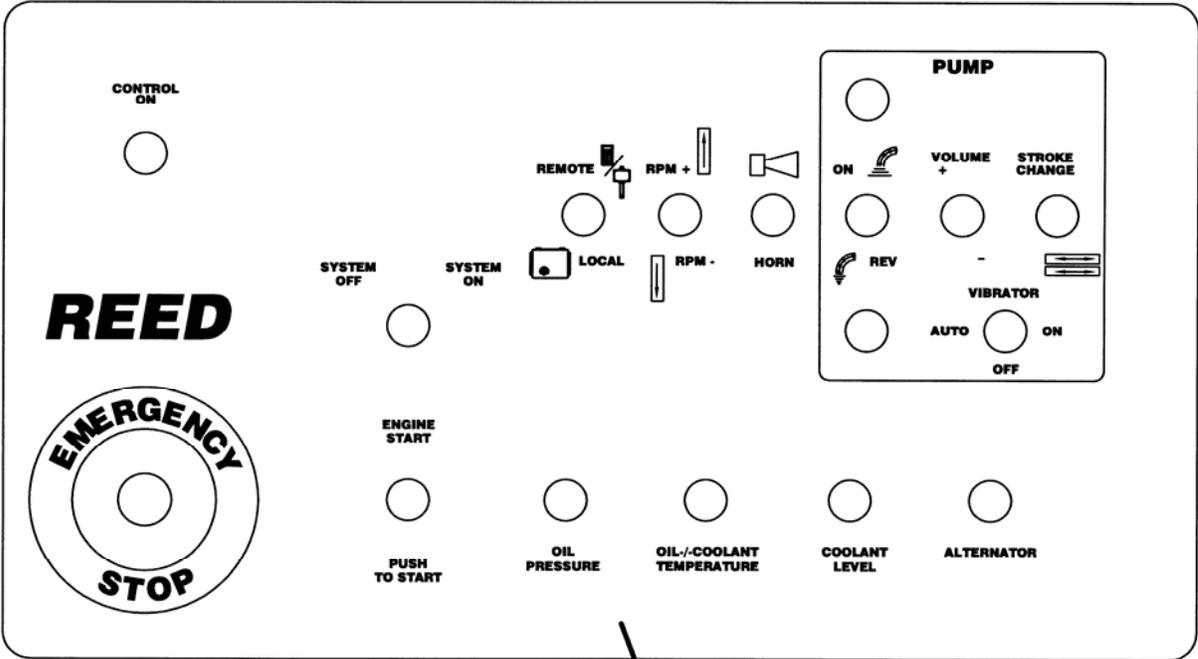
(U)

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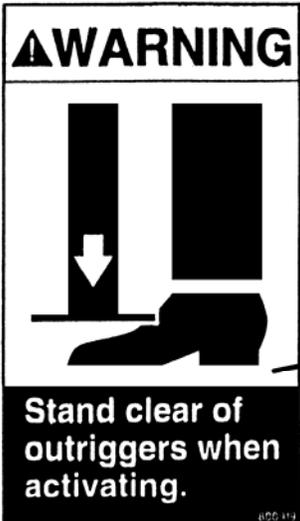


DECAL ASSEMBLY

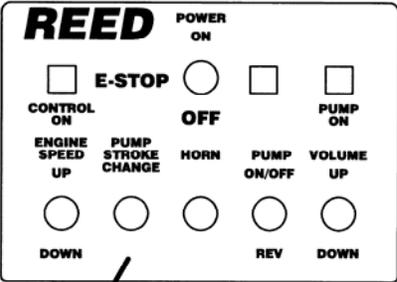
C90S
PARTS
GROUP 10
FIGURE 02
PAGE 08



Ⓥ 24



ⓧ 26



25 Ⓦ



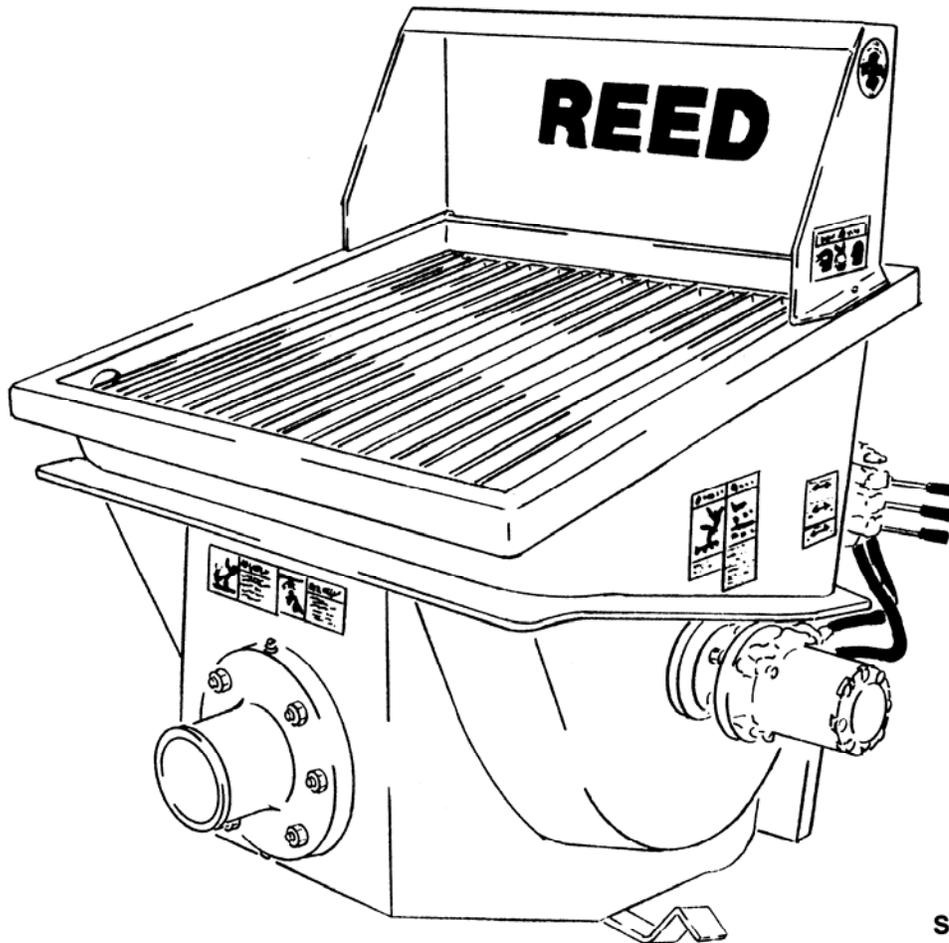
**TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 10 FINAL INSTALLATION**

C90S
PARTS
GROUP 10
FIGURE 03
PAGE 01

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REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 20 HOPPER INSTALLATION CONTAINS THE FOLLOWING FIGURES:

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** HARSH MIX HOPPER INSTALLATION
- FIGURE 02** HOPPER CLEAN OUT DOOR ASSEMBLY
- FIGURE 03** HARSH MIX HOPPER AGITATOR ASSEMBLY
- FIGURE 04** HARSH MIX HOPPER AGITATOR MOTOR ASSEMBLY
- FIGURE 05** AGITATOR/OUTRIGGERS CONTROL VALVE ASSEMBLY
- FIGURE 06** AGITATOR/OUTRIGGERS CONTROL VALVE SUB-ASSEMBLY

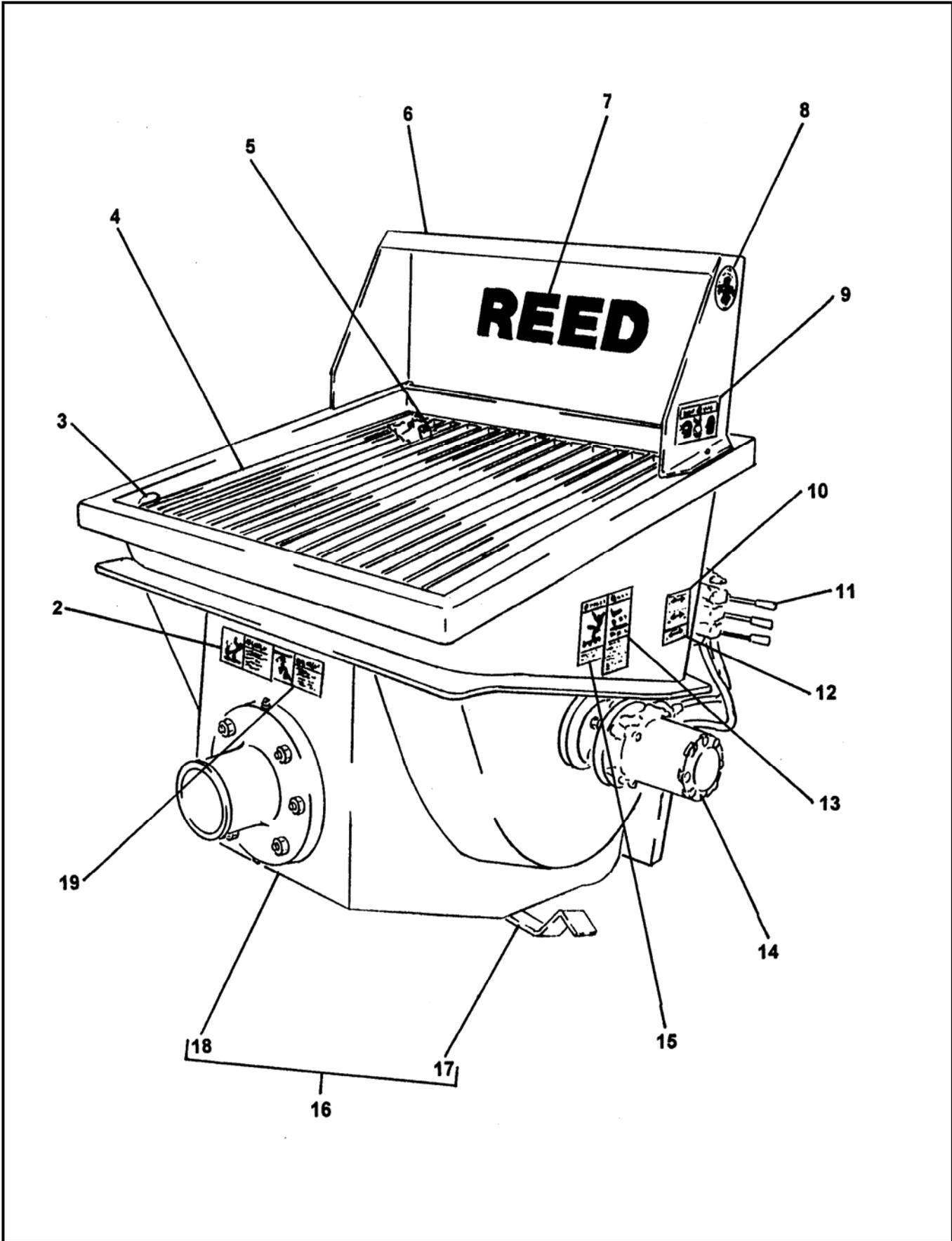


**SHOWN MODEL
HARSH MIX HOPPER**



HARSH MIX HOPPER INSTALLATION

C90S
PARTS
GROUP 20
FIGURE 01
PAGE 01



REVISION:



HARSH MIX HOPPER INSTALLATION

C90S
PARTS
GROUP 20
FIGURE 01
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	20-01	Installation, Harsh Mix Hopper (See Group 10, Figure 01 for NHA)	Ref
2	800922	• Decal, Warning, Before Opening a Blocked Pipeline,	1
3	86118	• Mount, Hopper Grate	2
4	85982	• Grate, Harsh Mix Hopper	1
5	86083	• Bumper, Hopper Grate	2
6	86084	• Weldment, Splash Guard	1
7	73132	• Decal, REED 4 1/2 Inch	1
8	800931	• Decal, ACPA Member	1
9	800929A	• Decal, Warning	2
10	85845	• Decal, Outriggers (Optional Items)	1
11	20-05	• Assembly, 3 Spool Control Valve (See Group 20, Figure 05 for DET)	1
12	85846	• Decal, Agitator	1
13	800917	• Decal, Warning, Keep Hand Out of Hopper and Valve	2
14	86323	• Assembly, Harsh Mix Hopper Agitator (See Group 20, Figure 03 for DET)	1
15	800918	• Decal, Warning, Do Not Stand on Hopper Grate	2
16	85840	• Weldment, Harsh Mix Hopper	1
17	86542	• • Assembly, Clean Out Door (See Group 20, Figure 02 for DET)	1
18	86316	• • Weldment, Harsh Mix Hopper	1
19	800921	• Decal, Warning, Do Not Operate at Pressures Exceeding	1

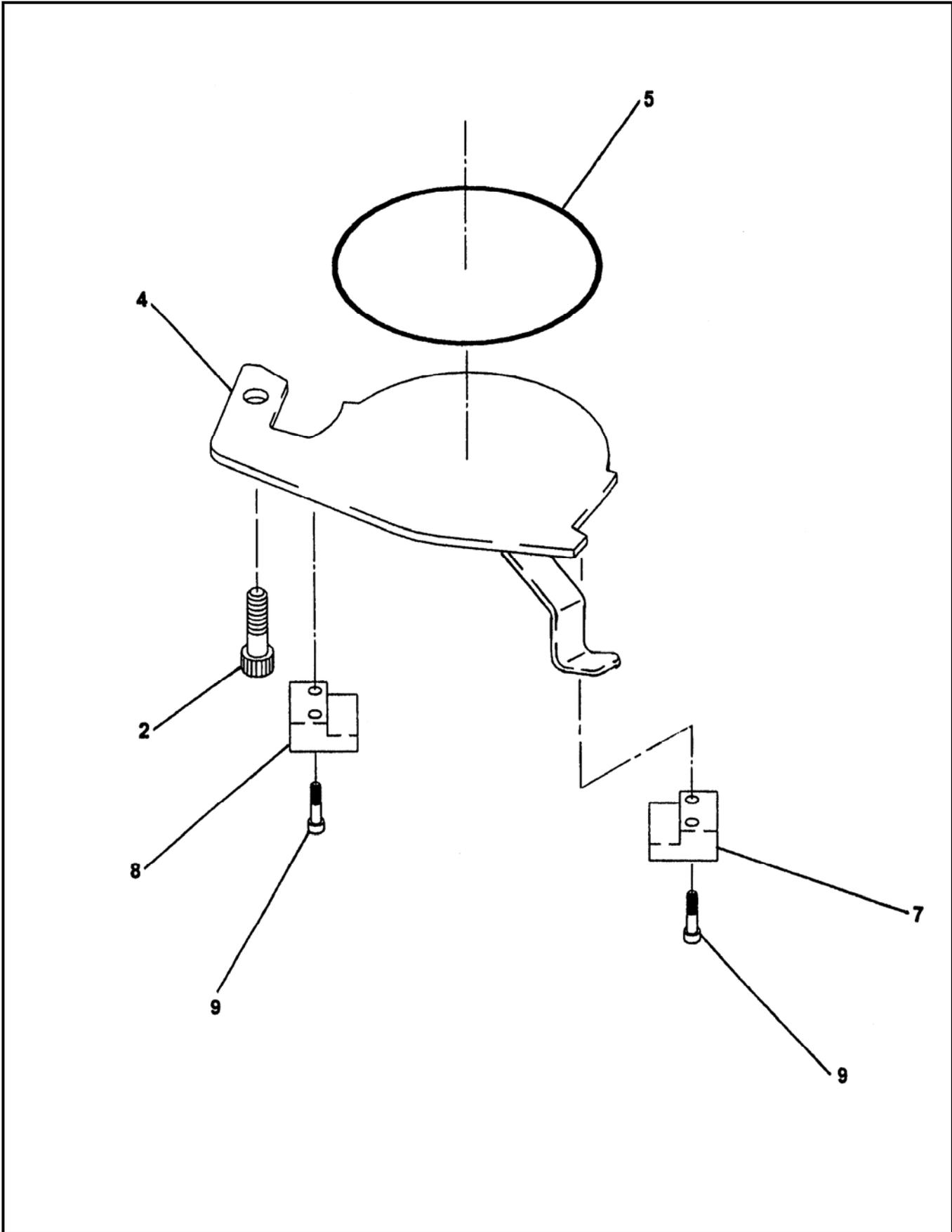
DASH (-) ITEM NOT ILLUSTRATED

REVISION:



HOPPER CLEAN OUT DOOR ASSEMBLY (ROUNDED)

C90S
PARTS
GROUP 20
FIGURE 02
PAGE 01



REVISION:



HOPPER CLEAN OUT DOOR ASSEMBLY (ROUNDED)

C90S
PARTS
GROUP 20
FIGURE 02
PAGE 02

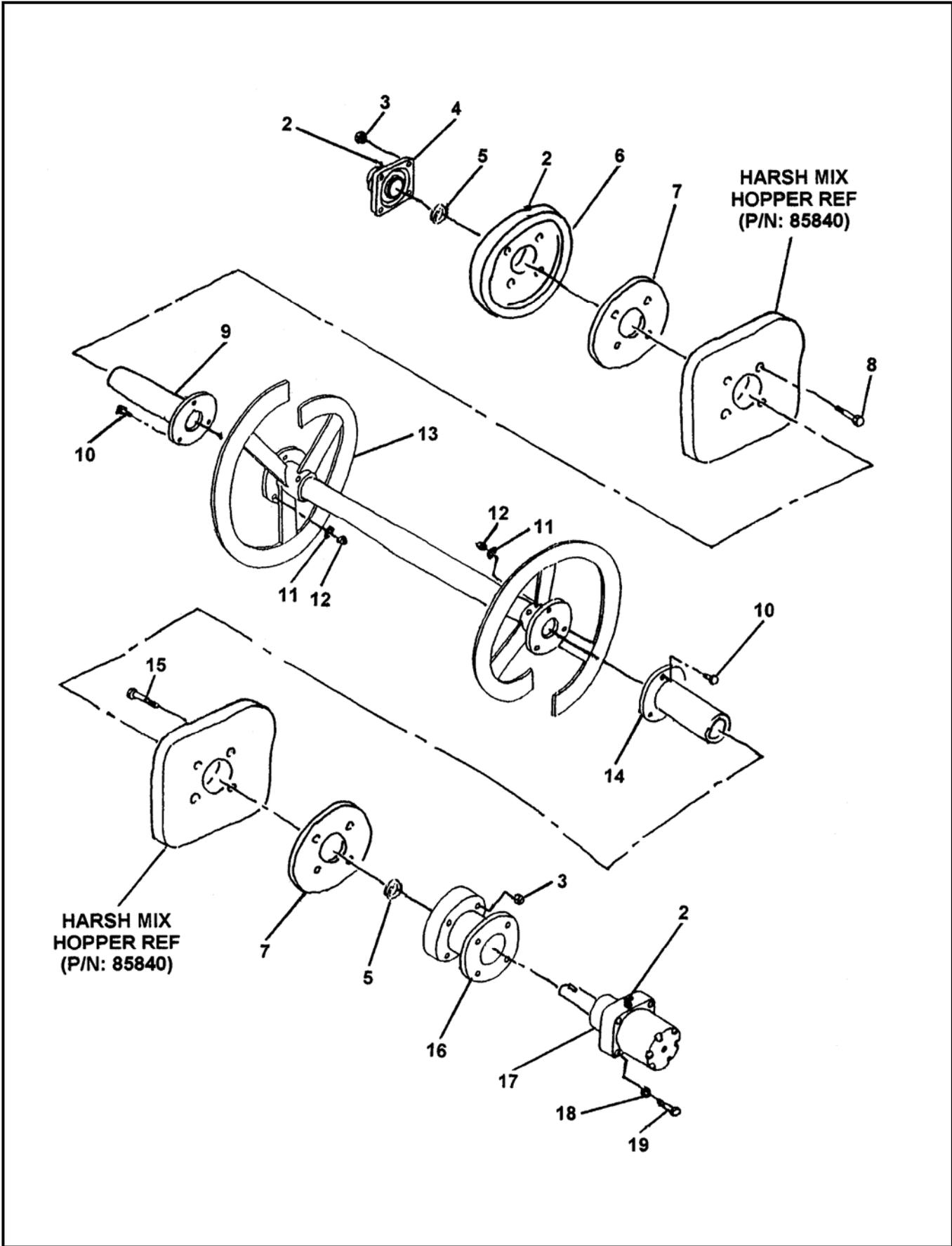
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86542	Assembly, Rounded Clean Out Door (See Group 20, Figure 01 and Figure 02 for NHA)	Ref
2	86922	• Bolt, Shoulder	1
3	-	• OPEN	-
4	86988	• Door, Weldment Clean-Out	1
5	W-102908A	• Cord, Hopper Door O-Ring 2.21 FT	1
6	-	• OPEN	-
7	86560	• Block, RH Clean Out Door	1
8	86559	• Block, LH Clean Out Door	1
9		• Capscrew, Socket Head	4
-10	85312	• Plate, Seal	1
-11	85371	• Neck, Clean Out Door	1

REVISION:



HARSH MIX HOPPER AGITATOR ASSEMBLY

C90S
PARTS
GROUP 20
FIGURE 03
PAGE 01



REVISION:

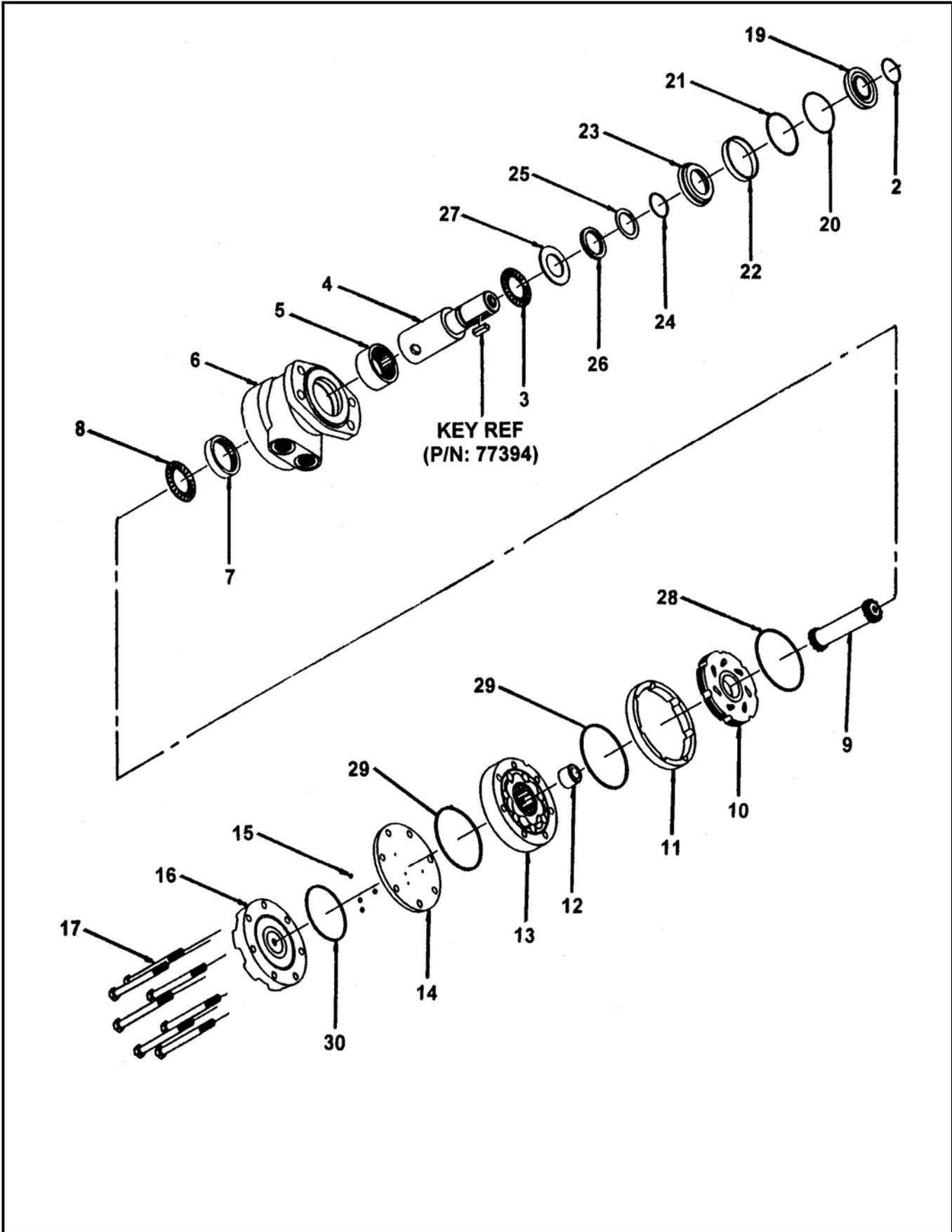
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86323	Assembly, Harsh Mix Hopper Agitator (See Group 20, Figure 01 for NHA)	Ref
2		• Fitting, Grease 90	3
3		• Nut, Nylock	8
4	86067	• Bearing, Flange	1
5	86074	• Seal, Poly	2
6	86069	• Flange, Agitator Bearing	2
7	77512	• Seal, Auger (Bearing Side)	2
8		• Bolt, Hex	4
9	86066	• Shaft, Agitator Idler	1
10		• Bolt, Hex	6
11		• Washer, Lock	6
12		• Nut, Hex	6
13	86087	• Weldment, Agitator Shaft	1
14	86062	• Shaft, Agitator Drive	1
15		• Bolt, Hex	4
16	86070	• Flange, Motor	1
17	85809	• Assembly, Harsh Mix Hopper Agitator Motor (See Group 20, Figure 04 for DET)	1
18		• Washer, Lock (attaching Parts)	4
19		• Bolt, Coarse (attaching Parts)	4

DASH (-) ITEM NOT ILLUSTRATED



HARSH MIX HOPPER AGITATOR MOTOR ASSEMBLY

C90S
PARTS
GROUP 20
FIGURE 04
PAGE 01



REVISION:

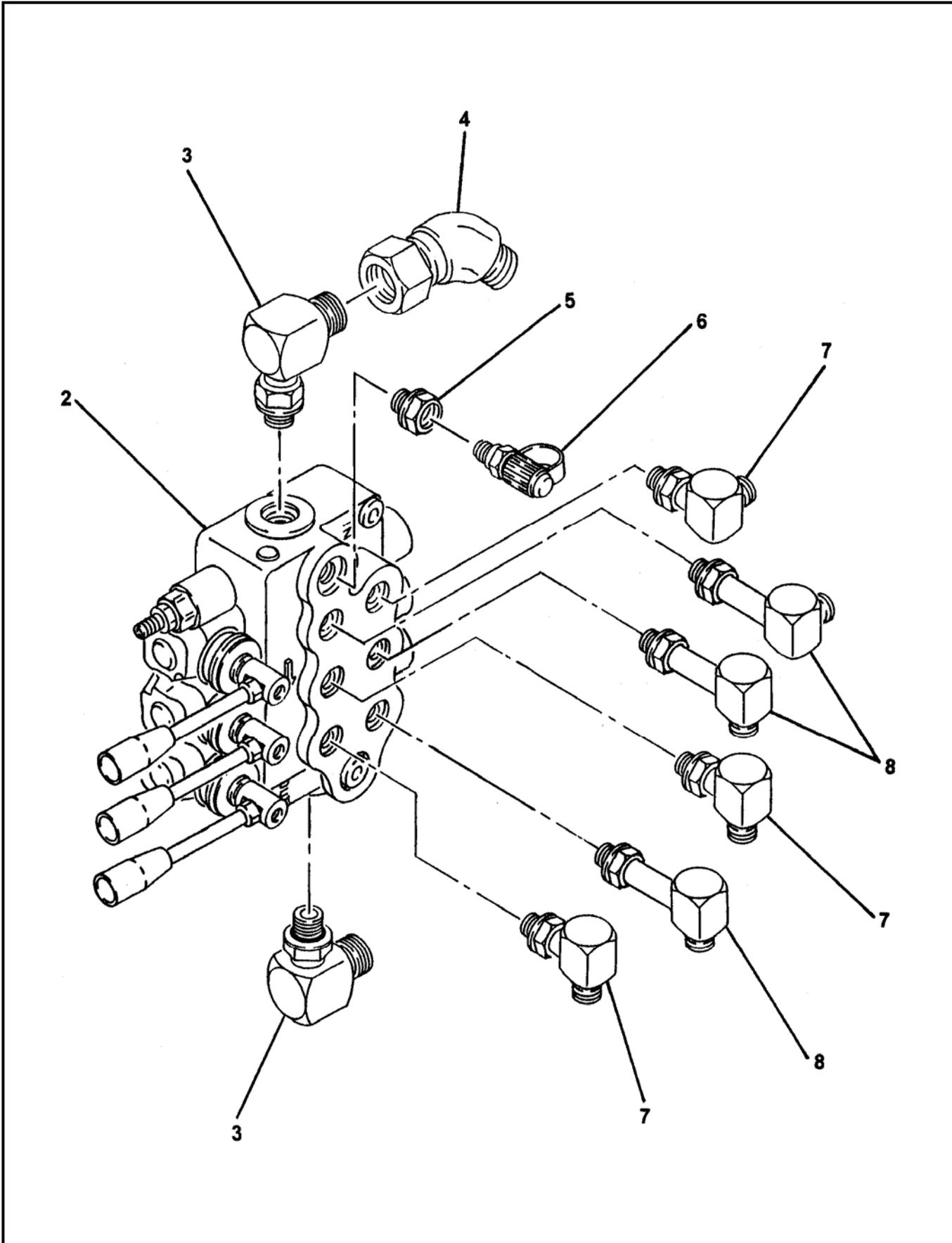
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	85809	Assembly, Harsh Mix Hopper Agitator Motor (See Group 20, Figure 03 for NHA)					Ref
2					• Ring, Wire	1	
3					• Bearing, Front Thrust	1	
4					• Kit, Shaft	1	
5					• Bearing, Front Housing	1	
6					• Kit, Housing	1	
7					• Bearing, Rear Housing	1	
8					• Bearing, Rear Thrust	1	
9					• Kit, Drive Link	1	
10					• Bearing, Front Thrust	1	
11					• Manifold	1	
12					• Boot, Manifold	1	
13					• Kit, Free Turn Rotor	1	
14					• Plate, Balance	1	
15					• Ball, Steel	4	
16					• Cover, Motor End	1	
17					• Bolt, Hex (attaching parts)	7	
-18	85809SK				• Kit, Seal	1	
19					• • Seal, Dust	1	
20					• • Ring, Split Wire	1	
21					• • Shim, Metal Back Up	1	
22					• • Seal, High Pressure	1	
23					• • Carrier, Seal	1	
24					• • Shim, Metal Back Up	1	
25					• • Seal, Polyamid	1	
26					• • Seal, Shaft	1	
27					• • Washer, Thrust	1	
28					• • Seal, Rear Housing	1	
29					• • Seal, Body	2	
30					• • Seal, End Cover	1	

DASH (-) ITEM NOT ILLUSTRATED



AGITATOR / OUTRIGGERS CONTROL VALVE ASSEMBLY

C90S
PARTS
GROUP 20
FIGURE 05
PAGE 01



REVISION:



**AGITATOR / OUTRIGGERS
CONTROL VALVE ASSEMBLY**

**C90S
PARTS
GROUP 20
FIGURE 05
PAGE 02**

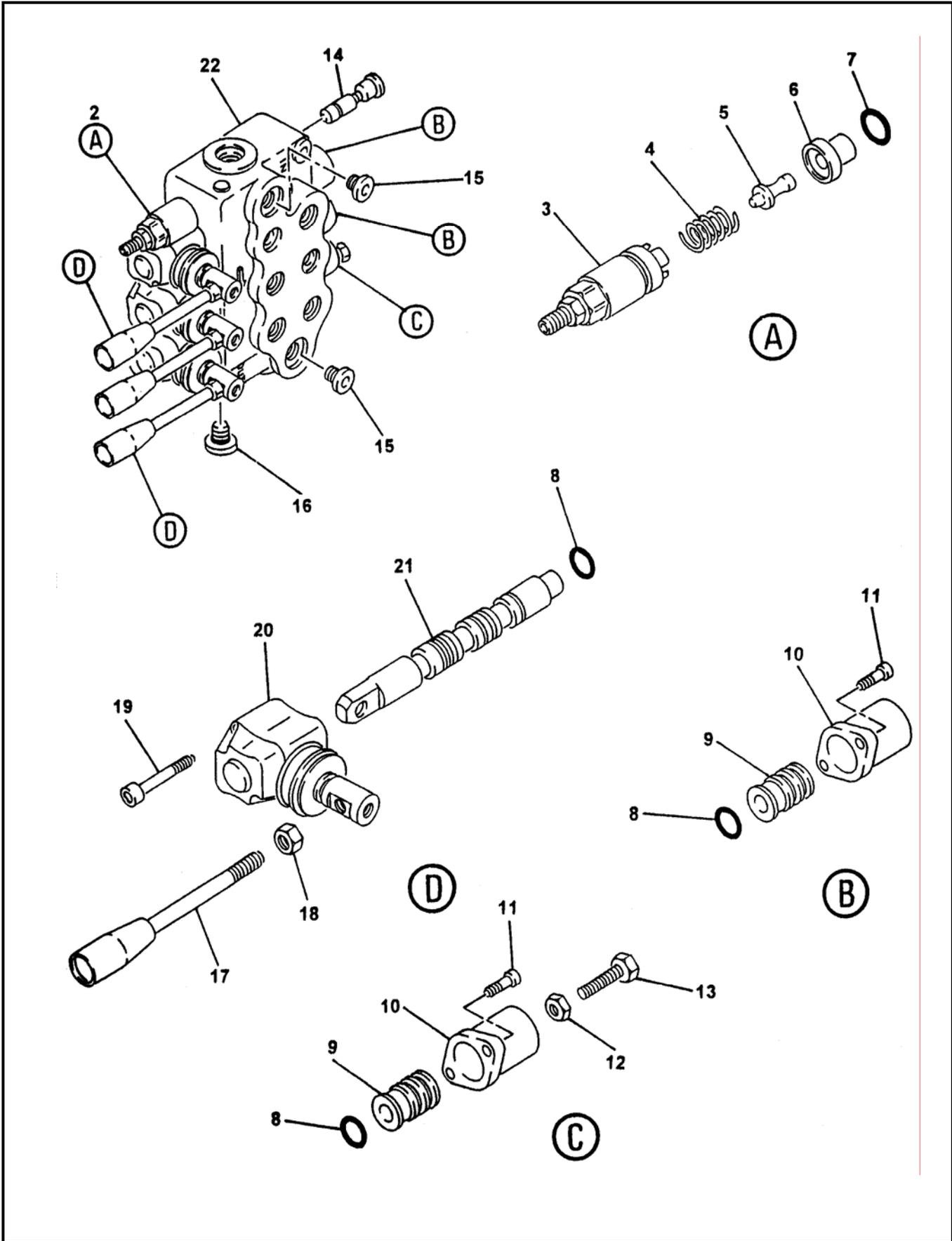
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	20-05	Assembly, 3 Spool Control Valve (See Group 20, Figure 01 for NHA)	Ref
2	74471	• Sub-Assembly, Agitator Control Valve (See Group 20, Figure 06 for DET)	1
3		• Fitting, 90	2
4		• Swivel, 45	1
5		• Reducer, 8-6	1
6	800083	• Fitting, Mini Check (Port)	1
7		• Fitting, 90	3
8		• Fitting, 90	3
-9		• Bolt, Hex	2
-10		• Washer, SPL Lock	2

DASH (-) ITEM NOT ILLUSTRATED



AGITATOR / OUTRIGGERS CONTROL VALVE SUB-ASSEMBLY

C90S
PARTS
GROUP 20
FIGURE 06
PAGE 01



REVISION:

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	74471	Sub-Assembly, 3 Spool Control Valve (See Group 20, Figure 08 for NHA)					Ref
2	85706	• Cartridge, Relief					1
3		• • Kit, Screw					1
4		• • Spring					1
5		• • Pin, Screw Kit					1
6		• • Ring					1
7		• • O-Ring					1
8		• O-Ring					4
9		• Kit, Spool Control					3
10		• Cap, Spool					3
11		• Screw, SOC (attaching Parts)					6
12		• Nut					1
13		• Bolt, Hex					1
14		• Kit, VRS					1
15		• Plug					2
16		• Plug					1
17		• Handle, Remixer Valve					3
18		• Nut (attaching parts)					3
19		• Screw, SOC					6
20		• Lever, L					3
21		• Spool					3
22		• Body, Valve					1

DASH (-) ITEM NOT ILLUSTRATED



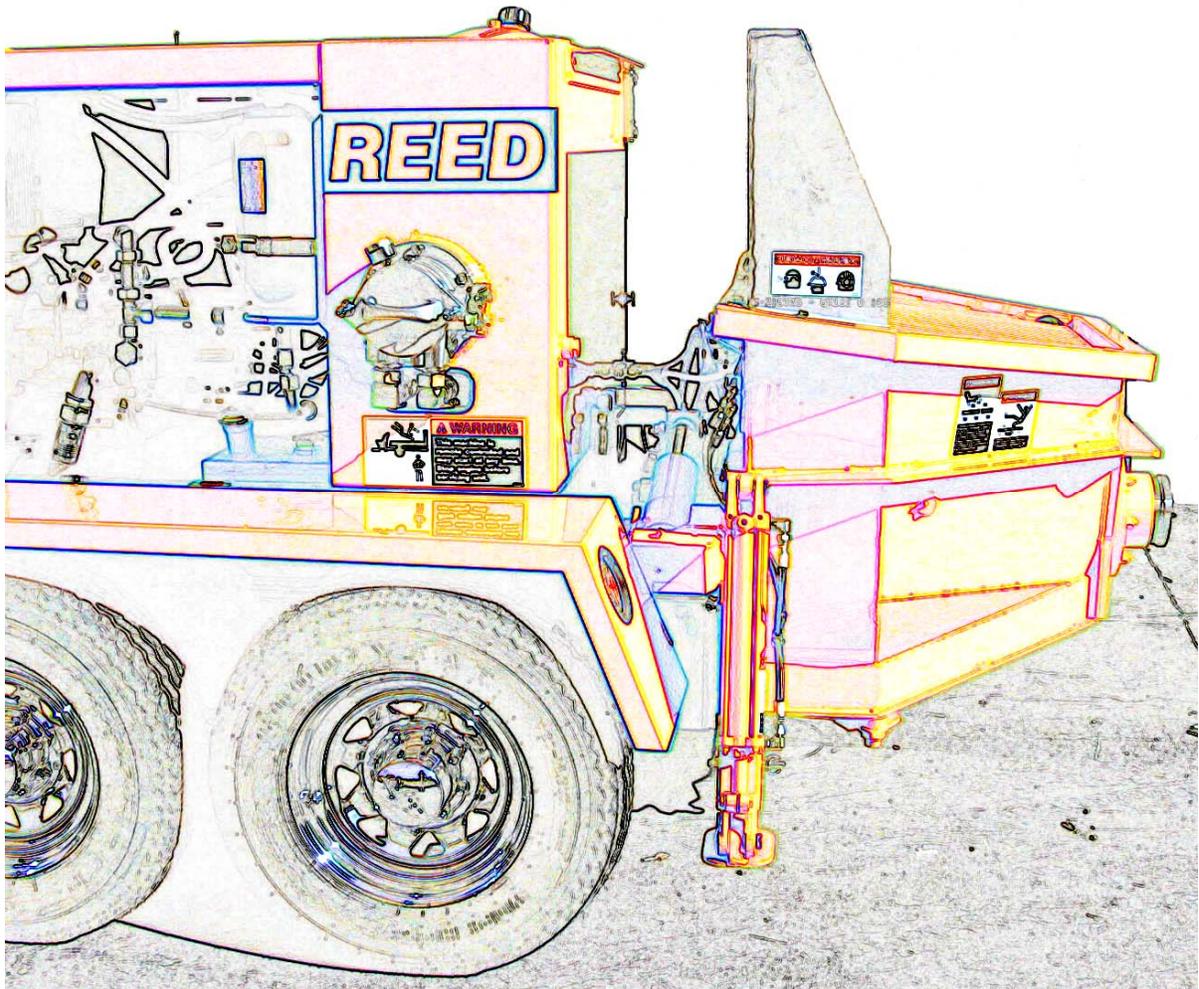
TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 20 HOPPER INSTALLATION

C90S
PARTS
GROUP 20
FIGURE 07
PAGE 01

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REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 30 HYDRAULIC TANK INSTALLATION CONTAINS THE FOLLOWING FIGURES:

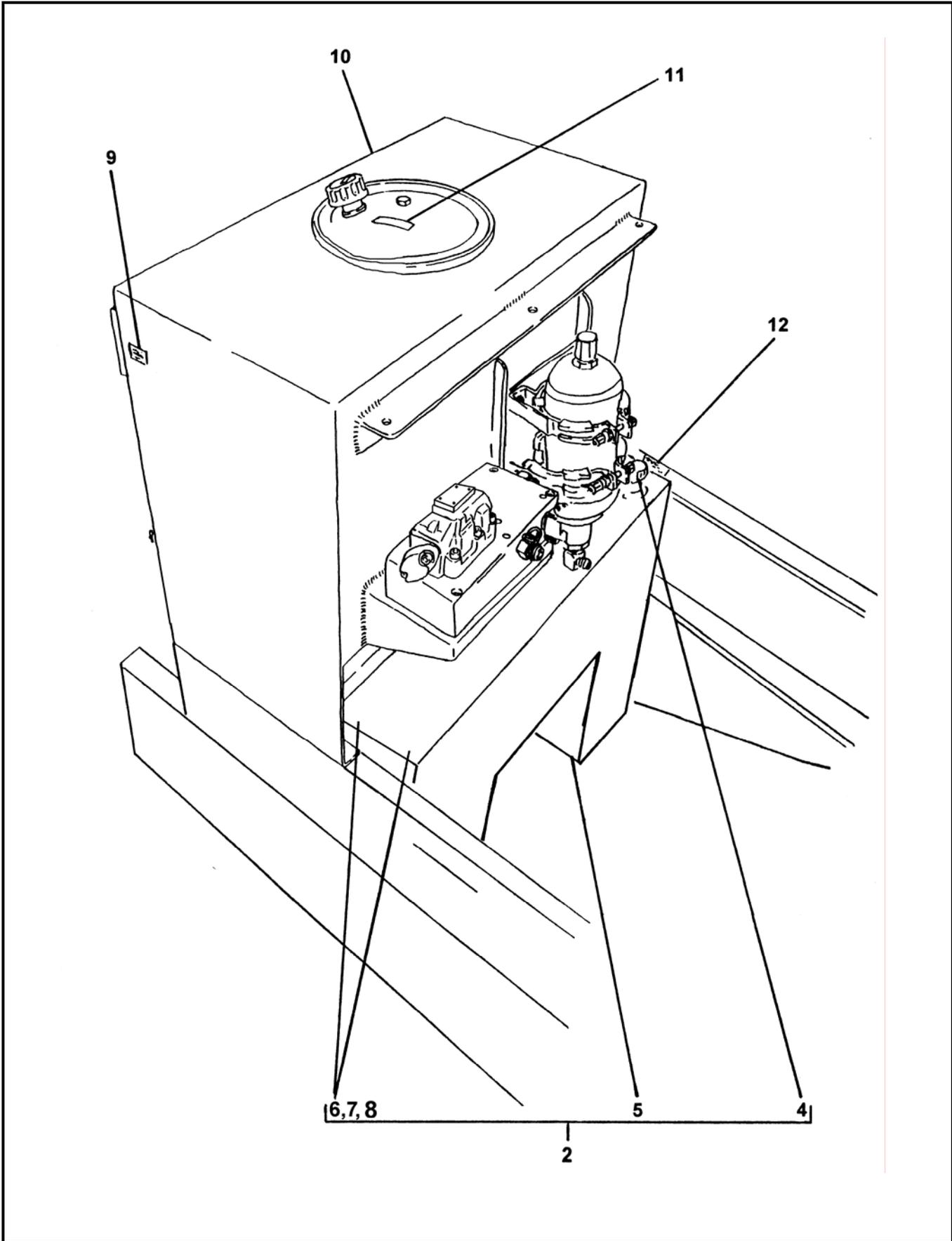
- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** TANK INSTALLATION
- FIGURE 02** HYDRAULIC TANK ASSEMBLY
- FIGURE 03** ACCUMULATOR ASSEMBLY
- FIGURE 04** ACCUMULATOR BLADDER REPAIR KIT
- FIGURE 05** SWING TUBE CIRCUIT MANIFOLD ASSEMBLY
- FIGURE 06** SWING TUBE CIRCUIT MAIN SOLENOID VALVE ASSEMBLY
- FIGURE 07** BALL VALVE ASSEMBLY





TANK INSTALLATION

C90S
PARTS
GROUP 30
FIGURE 01
PAGE 01



REVISION:



TANK INSTALLATION

C90S
PARTS
GROUP 30
FIGURE 01
PAGE 02

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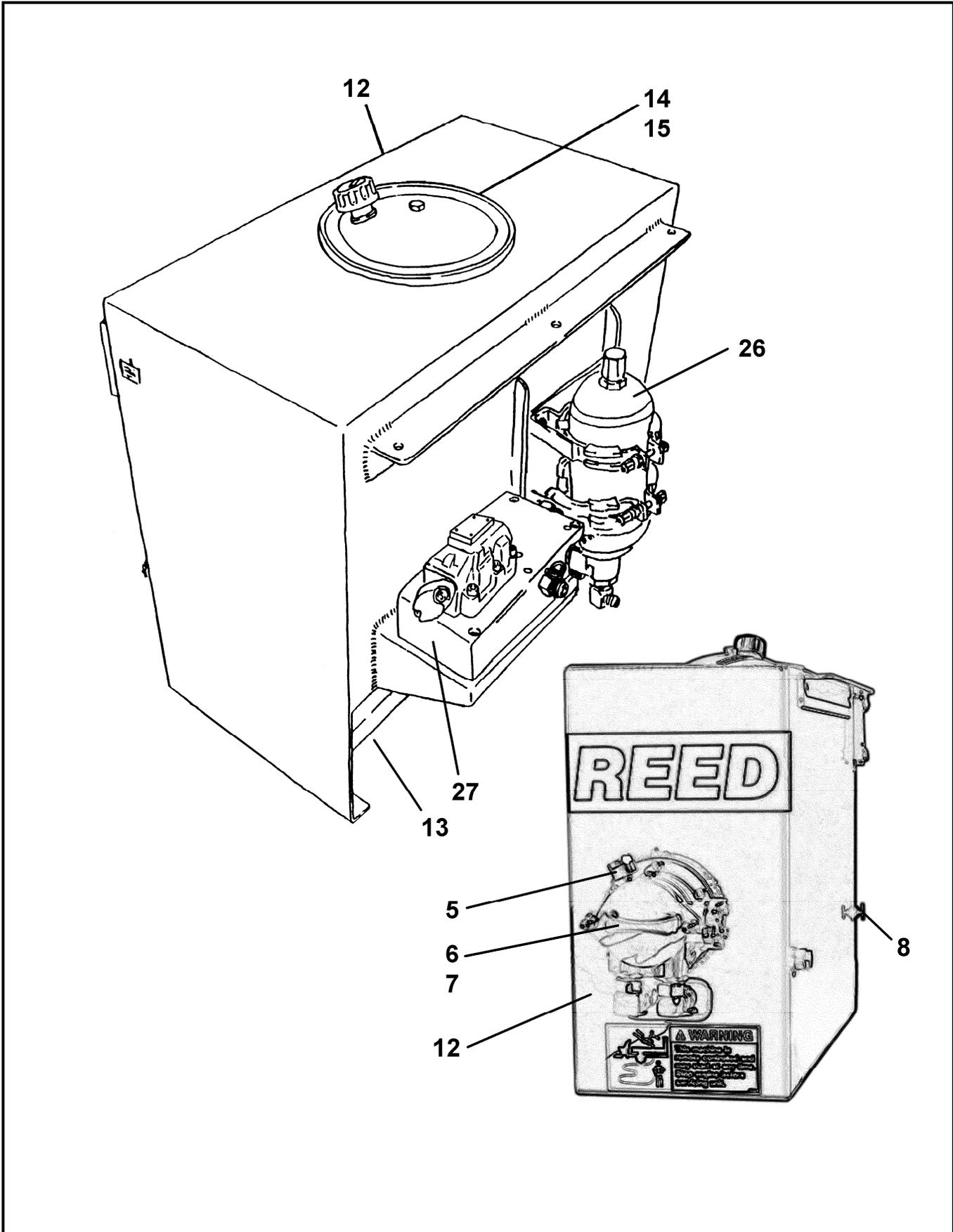
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	30-01	Installation, Tank (See Group 10, Figure 01 for NHA)	Ref
2	87536	• Assembly, Fuel Tank	1
-3	77191	• • Gauge, Fuel	1
4	85570	• • Cap, Fuel	1
5	87535	• • Weldment, Fuel Tank	1
6	10297	• Plug-1/2"	4
7	87454	• Fitting Barbed 3/8-1/2MPT	1
8	87770	• Fitting Barbed 3/8 TUBE-1/2MPT	1
8A	74716	• Hose-3/8 SAE	10ft
8B	10577	• Clamp-Hose	4
8C	87566	• Fitting Barbed JIC-Stem	4
8D	87567	• Fitting-90 Degree Metric to JIC	4
9	85844	• Decal, Oil Level	1
10	87570	• Assembly, Hydraulic Tank (See Group 30, Figure 02 for DET)	1
11	75020	• Decal, Hydraulic Oil	2
-12	87750	• Kit, C90S Hose (See SCHEMATIC Section for DET)	1
DASH ITEM (-) NOT ILLUSTRATED			

REVISION:



HYDRAULIC TANK ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 02
PAGE 01



REVISION:



HYDRAULIC TANK ASSEMBLY

C90S
PARTS
 GROUP 30
 FIGURE 02
 PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	87570	Assembly, Hydraulic Group (See Group 30, Figure 01 for NHA)					Ref
-2	70366	• Gauge, 3,000 PSI Hydraulic					1
-3	74562	• Gauge, 6,000 PSI Hydraulic					1
4	74509	• Gauge, Sight					1
5	W-106872	• Gauge, Suction Filter					1
6	801496	• Filter, Suction					1
7	802585	• • Element, Suction Filter					1
8	801025	• Cock, Drain					1
9	801937	• Flange Plug, 2" Code 61					1
10	86264-006	• Flange, Split Code 61-32 SAE					1
11	85537	• Filler, Breather					1
12	87700	• Weldment, Hydraulic Tank					1
13	87154	• Valve, Solenoid					1
14	85529	• • End Cover, Hydraulic Tank					1
15	85867	• • Gasket, End Cover					1
-16	78608	• Hose, Minicheck-48"					1
-17	77282	• Valve, Check					1
-18	75456	• Clamp, 1 1/2" Tube, Single					2
-19	86900-027	• Adaptor, MB-MJ-16-12					2
-20	78593	• Adaptor, Minicheck-SAE 4					2
-21	78594	• Adaptor, Minicheck Gauge 1/4					2
-22	86900-023	• Adaptor, MB-MJ-12-12					1
-23	87468	• Adaptor, Stl 10L(M) x SAE 4					2
-24	801876-008	• Adaptor, 25S x SAE 16					1
-25	86751	• Plug-Boss O-Ring #8 SAE					1
26	30-03	• Assembly, Accumulator (See Group 30, Figure 03 for DET)					1
27	87334	• Assembly, Swing Tube Circuit Manifold (See Group 30, Figure 05 for DET)					1
-28	87472	• Bracket, Vibrator Plug					1
-29	802287	• Clamp, Worm 1.25-2.13 Diameter					4
-30	802288	• Clamp, Worm 1.75-2.63 Diameter					12
DASH (-) ITEM NOT ILLUSTRATED							

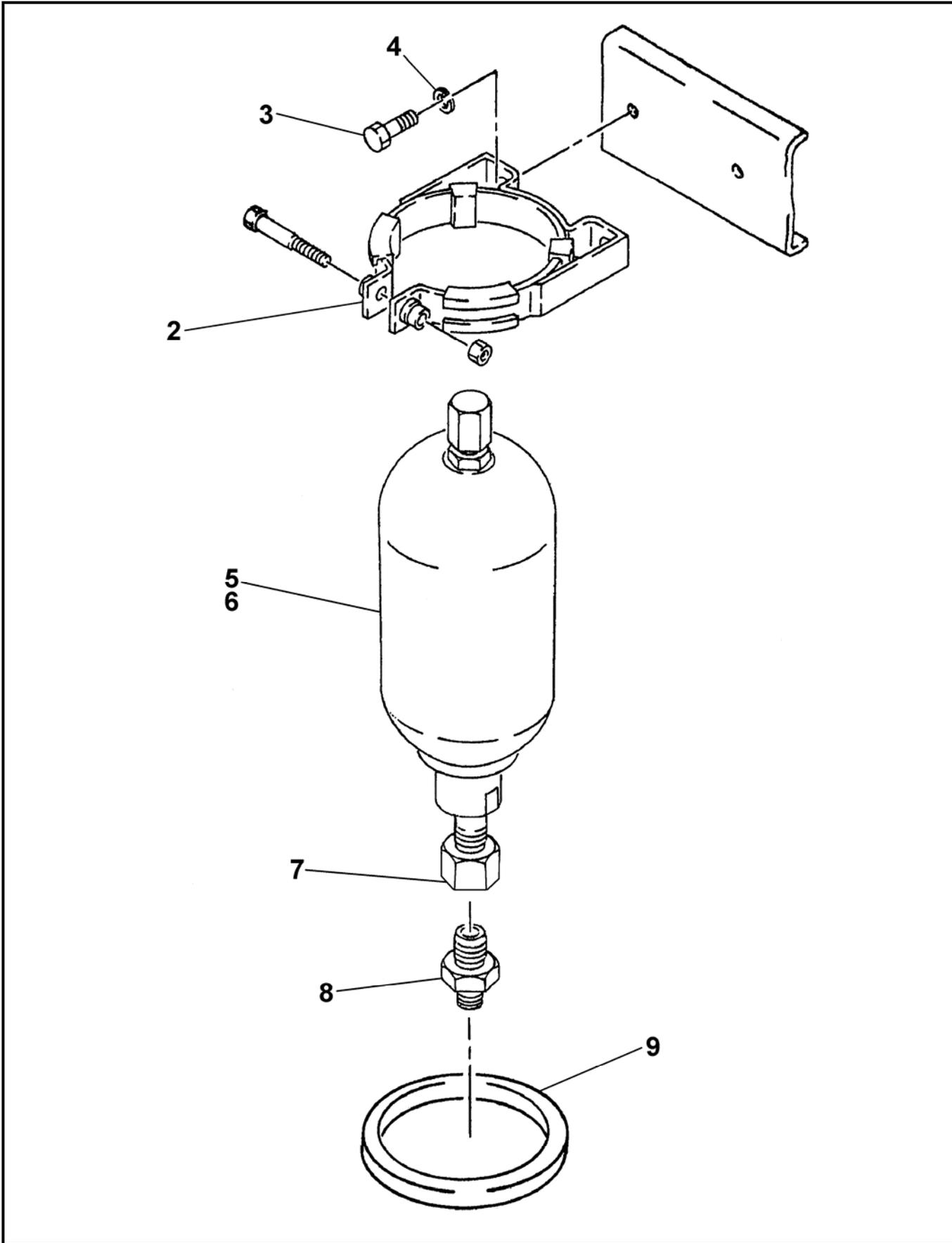
*Pressure filter for
 main pump is
 W-109849. O-ring is
 801499-ORING

REVISION:



ACCUMULATOR ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 03
PAGE 01



REVISION:



ACCUMULATOR ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 03
PAGE 02

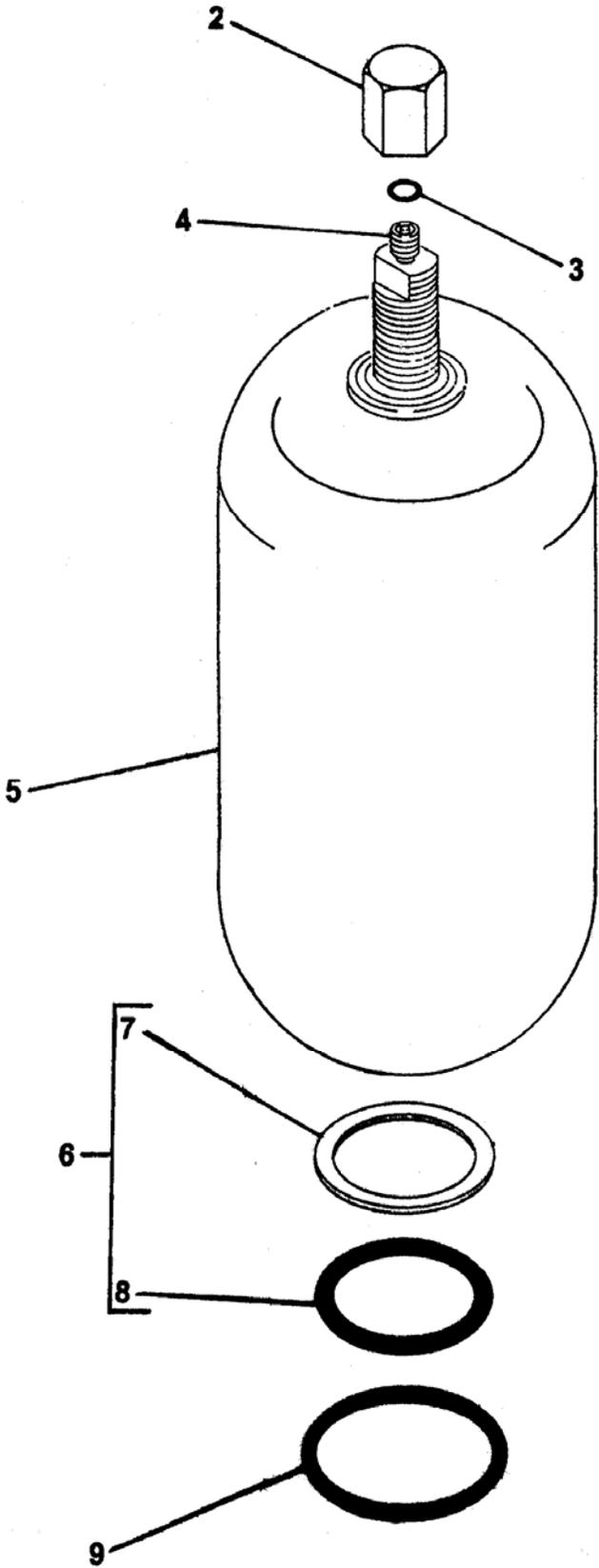
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	30-03	Assembly, Accumulator (See Group 30, Figure 01 for NHA)	Ref
2	73171	• Bracket, Accumulator	1
3		• Bolt, Hex (attaching parts)	2
4		• Washer, Lock (attaching parts)	2
5	W-103616	• Accumulator, 6 Liter	1
6	30-04	• Kit, Bladder Repair (See Group 30, Figure 04 for DET)	1
7	87471	• Adaptor-Str 1 1/4" BSPP x JIC16	1
8		• Adaptor	1
9	801028	• Grommet, Accumulator	1
-10	71460	• Kit, Accumulator Charge (See Group 80, Figure 07 for REF)	Ref

DASH (-) ITEM NOT ILLUSTRATED



ACCUMULATOR BLADDER REPAIR KIT

C90S
PARTS
GROUP 30
FIGURE 04
PAGE 01



REVISION:



ACCUMULATOR BLADDER REPAIR KIT

C90S
PARTS
GROUP 30
FIGURE 04
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	W-105630	Kit, Bladder Repair (Also See Group 30, Figure 03 for NHA)					Ref
2			•	Cap, Valve Seal		1	
3			•	O-Ring		1	
4			•	Core, Gas Valve		1	
5	W-105555		•	Bladder, 6 Liter		1	
6	85812		•	Kit, Bladder Seal		1	
7			• •	Ring, Flat		1	
8			• •	O-Ring		1	
9			•	Ring, Back Up		1	

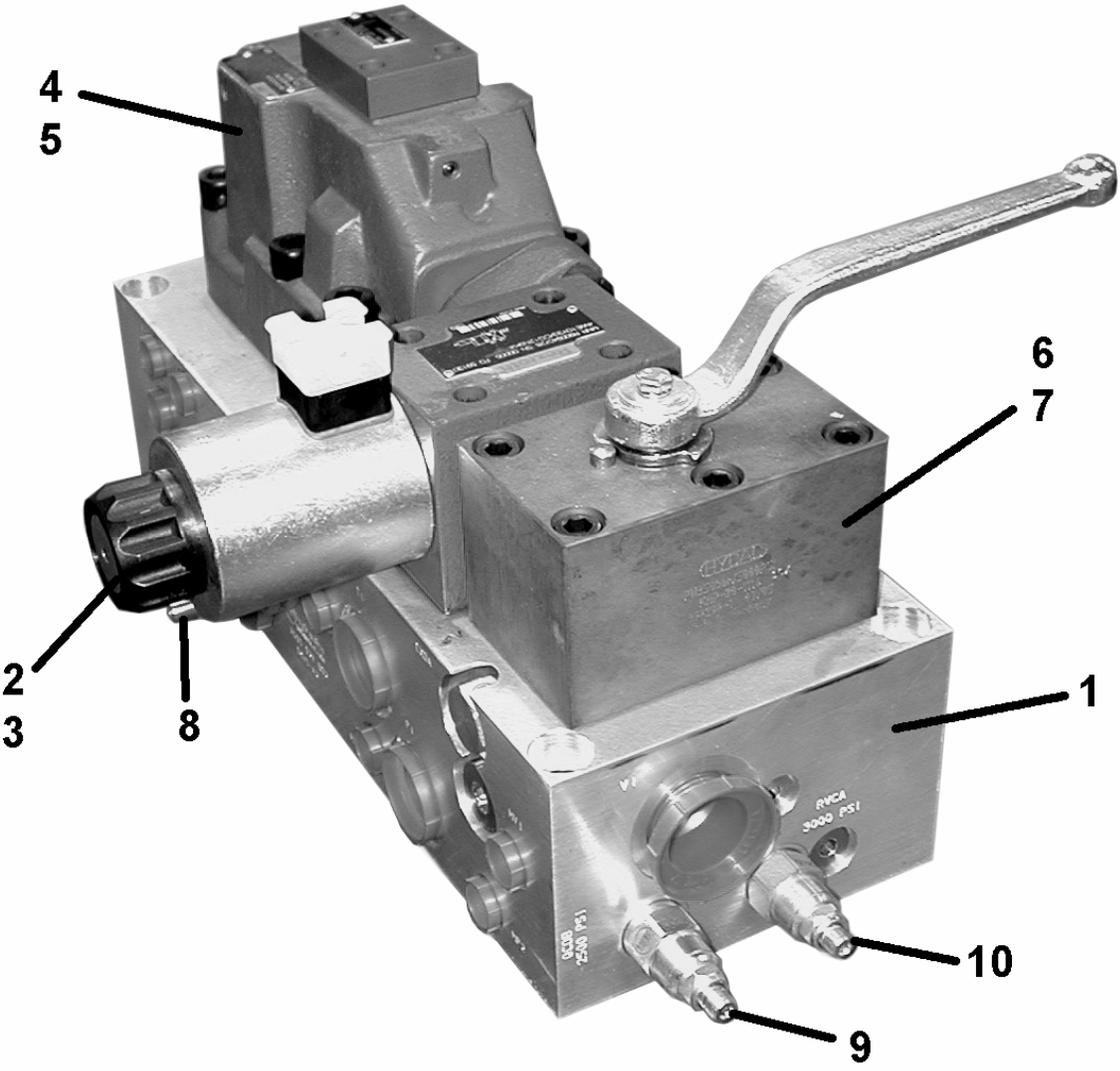
DASH (-) ITEM NOT ILLUSTRATED

REVISION:



SWING TUBE CIRCUIT MANIFOLD ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 05
PAGE 01



REVISION:



SWING TUBE CIRCUIT MANIFOLD ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 05
PAGE 02

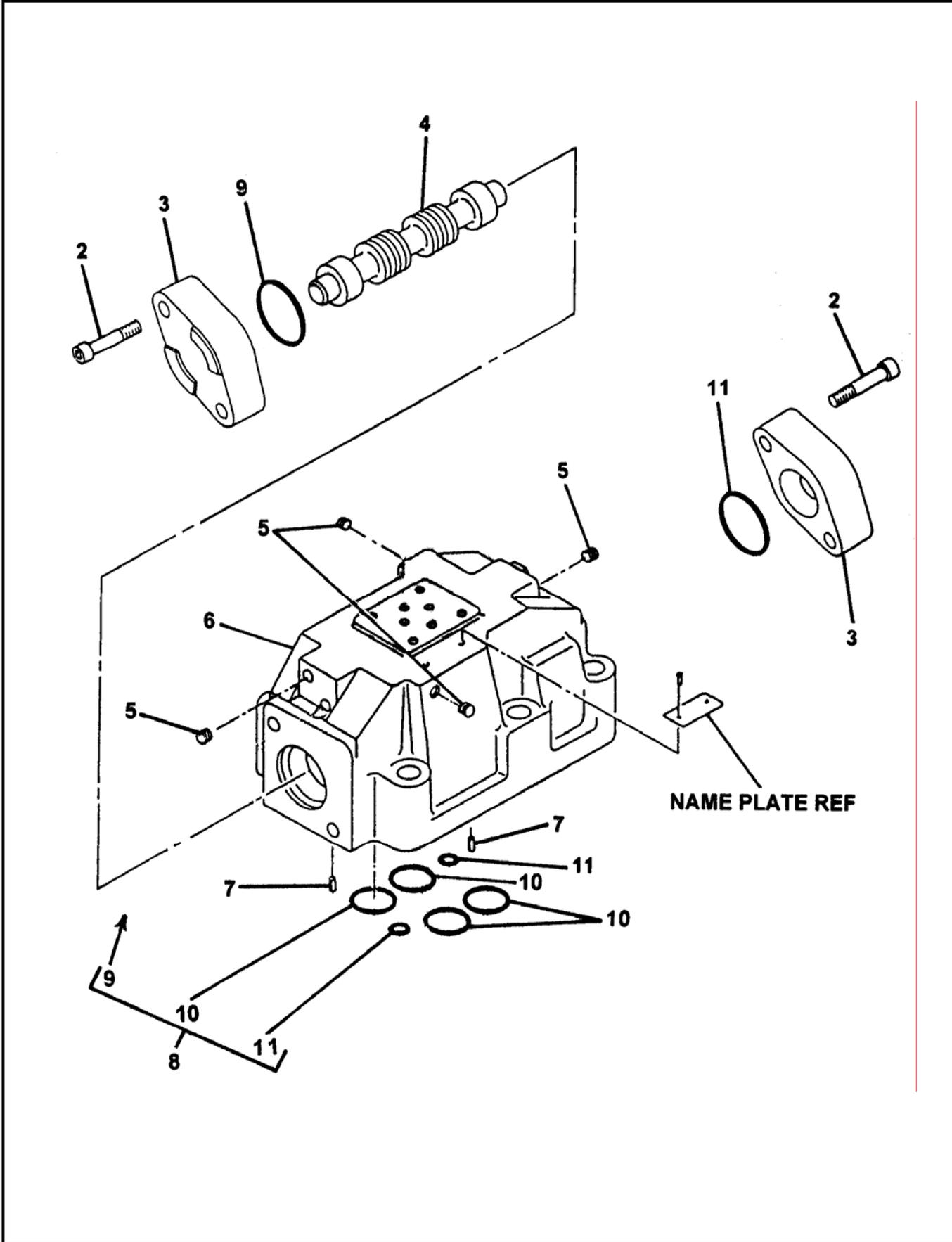
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
1A	87334	Assembly, Swing Tube Circuit Pilot Solenoid Valve (See Group 30, Figure 05 for NHA)	Ref
1	-001	• Assembly, Valvepack	1
2	-002	• Valve, 4-Way 87922 is valve w/ coil (coil only is 86674)	
3	-003	• Kit, Bolt 4-Way Valve 87922-BK	1
4	-004	• Valve, 4-Way	1
5	-005	• Kit, Bolt 4-Way Valve	1
6	-006	• Valve, Ball	1
7	-007	• Kit, Bolt	1
8	-008	• Cartridge, Valve 87919	1
9	-009	• Cartridge, Valve 87921	1
10	-010	• Cartridge, Valve 85704	1
DASH (-) ITEM NOT ILLUSTRATED			

REVISION:



SWING TUBE CIRCUIT MAIN SOLENOID VALVE ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 06
PAGE 01



REVISION:



**SWING TUBE CIRCUIT
MAIN SOLENOID VALVE ASSEMBLY**

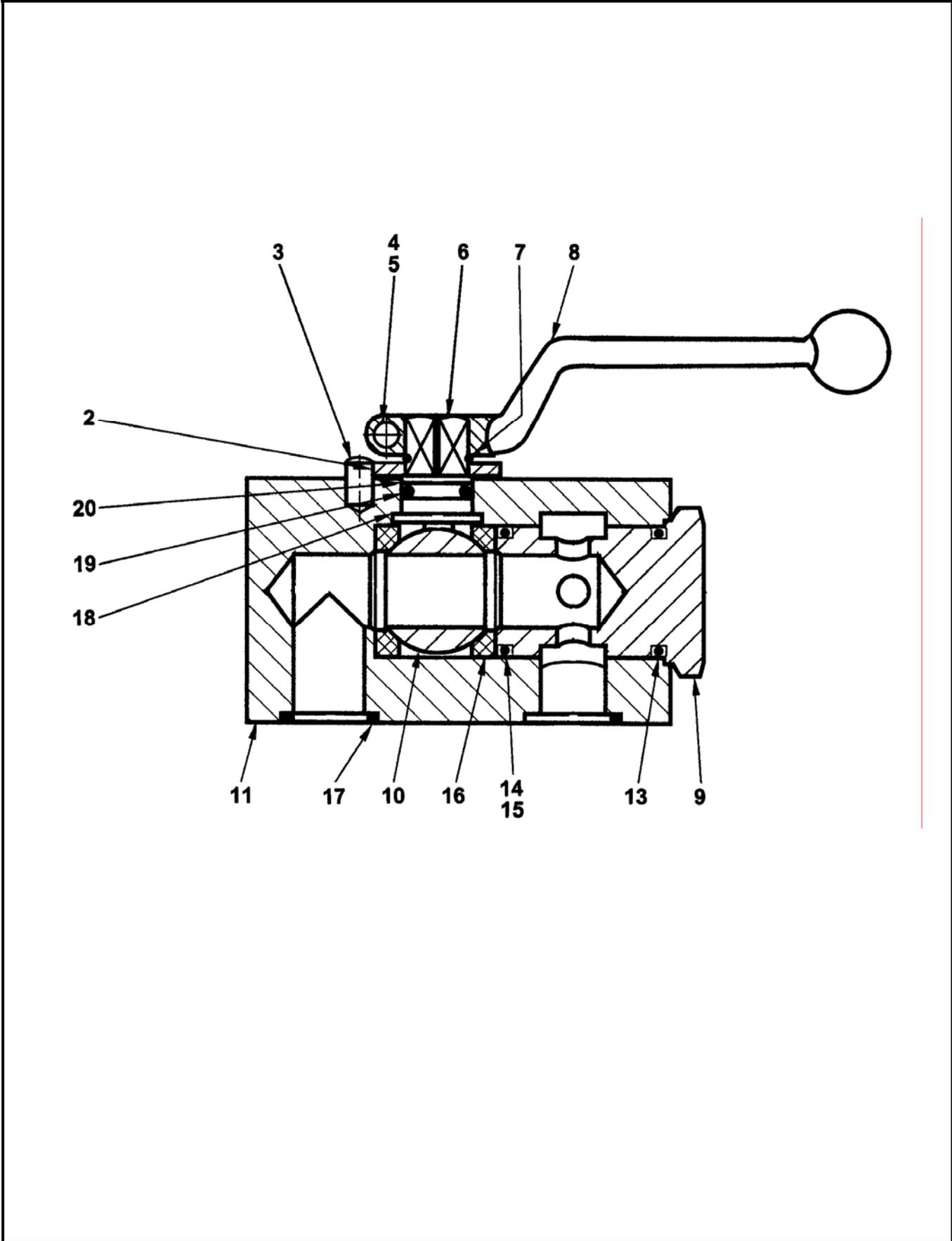
C90S
PARTS
GROUP 30
FIGURE 06
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	85694	Assembly, Swing Tube Circuit Main Solenoid Valve (See Group 30, Figure 05 for NHA)	Ref
2		• Screw, SOC	4
3		• Cover	2
4		• Spool	1
5		• Plug	4
6		• Housing, Cartridge	1
7		• Pin, Grooved	2
8	74994	• Kit, Seal	1
9		•• O-Ring	2
10		•• O-Ring	4
11		•• O-Ring	2

DASH (-) ITEM NOT ILLUSTRATED

REVISION:

BALL VALVE ASSEMBLY



REVISION:



BALL VALVE ASSEMBLY

C90S
PARTS
GROUP 30
FIGURE 07
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	85705	Assembly, Ball Valve (See Group 30, Figure 05 for NHA)	Ref
2		• Washer, Limit	1
3		• Pin, Stop	1
4		• Bolt, Hex	1
5		• Nut, Hex	1
6		• Handle, Control	1
7		• Spindle, Control	1
8		• Retainer, Spring	1
9		• Plug	1
10		• Ball	1
11		• Housing	1
-12		• Kit, Seal	1
13		•• O-Ring	1
14		•• O-Ring	1
15		•• Ring, Back Up	1
16		•• Seal, Bowl	2
17		•• O-Ring	1
18		•• Washer, Thrust	1
19		•• O-Ring	1
20		•• Ring, Back Up	1

DASH (-) ITEM NOT ILLUSTRATED

REVISION:



TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 30 TANK INSTALLATION

C90S
PARTS
GROUP 30
FIGURE 08
PAGE 01

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REVISION:



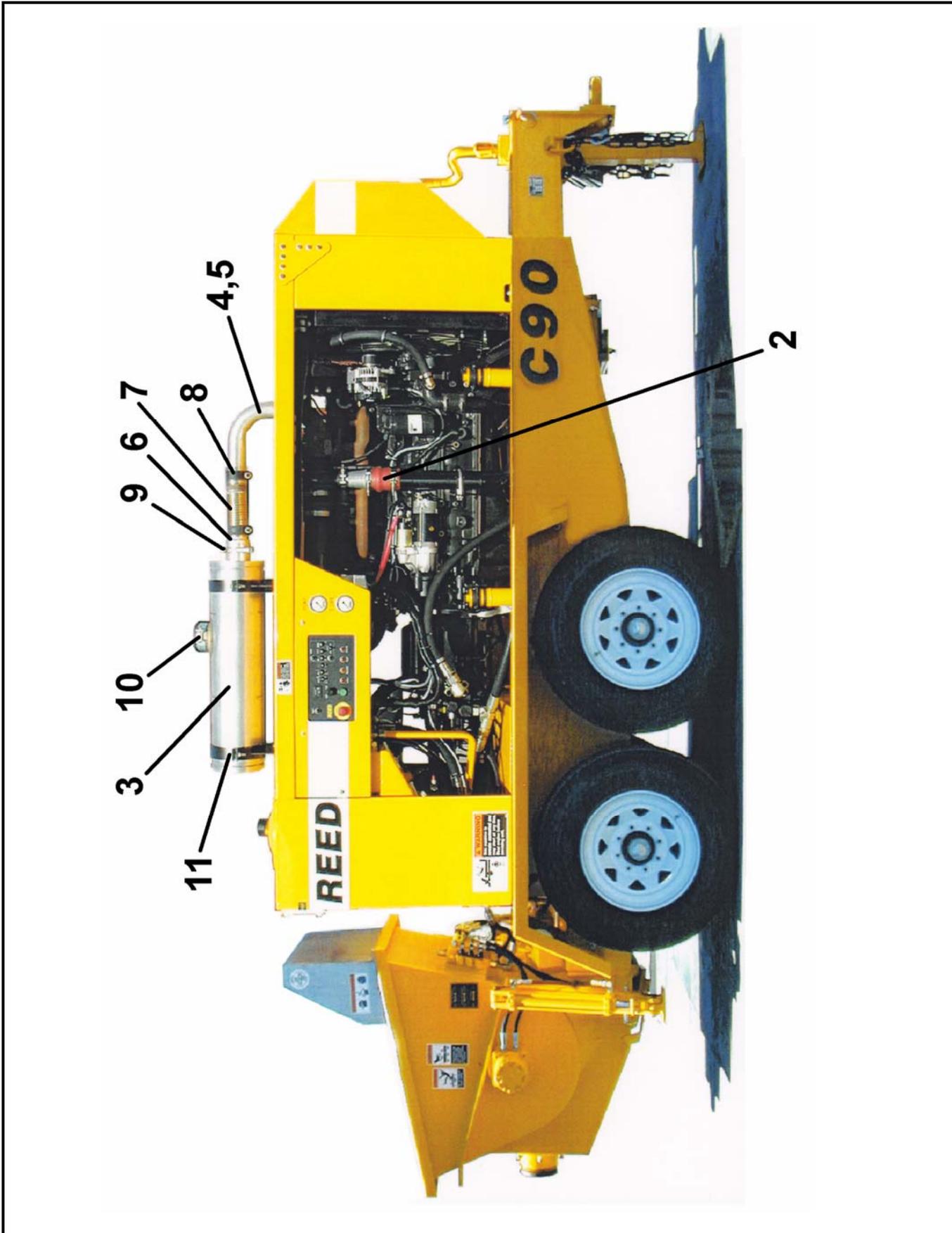
REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 40 POWER TRAIN INSTALLATION CONTAINS THE FOLLOWING FIGURES:

FIGURE 00	TABLE OF CONTENTS
FIGURE 01	POWER TRAIN INSTALLATION
FIGURE 02	POWER TRAIN ASSEMBLY
FIGURE 02	HYDRAULIC PUMPS ASSEMBLY
FIGURE 03	DOUBLE AUXILIARY PUMP ASSEMBLY
FIGURE 04	SINGLE AUXILIARY PUMP ASSEMBLY
FIGURE 05	MAIN HYDRAULIC PUMP ASSEMBLY
FIGURE 06	BATTERY MOUNTING ASSEMBLY



POWER TRAIN INSTALLATION

C90S
PARTS
GROUP 40
FIGURE 01
PAGE 01



REVISION:



POWER TRAIN INSTALLATION

C90S
PARTS
 GROUP 40
 FIGURE 01
 PAGE 02

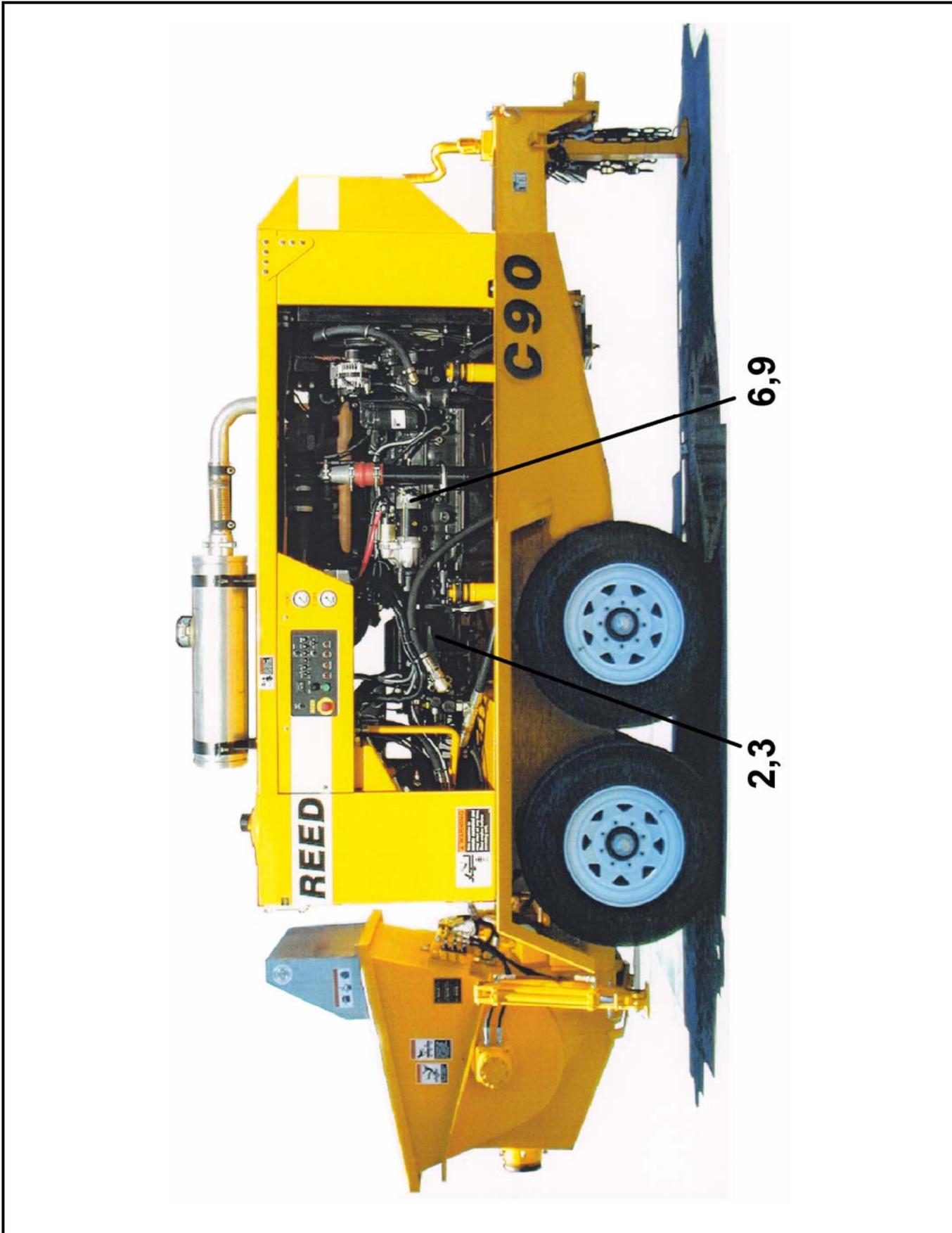
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	40-01	Installation, Power Train (See Group 10, Figure 01 and Figure 02 for NHA)	Ref
2	87574	• Assembly, Power Train (Engine-PN 87573) (See Group 40, Figure 02 for DET)	1
3	87583	• Muffler	1
4	87582	• Elbow, Exhaust	1
5	87581	• Clamp, Exhaust	1
6	87580	• Reducer, Exhaust	1
7	87579	• Flex Tube, Exhaust	1
8	87578	• Clamp, Exhaust	2
9	87577	• Clamp, Exhaust	1
10	77597	• Cap, Rain	1
11	87585	• Mount, Muffler Bracket	2
12	-	•	
13	-	•	
14	-	•	
15	-	•	
16	-	•	
17	-	•	
18	-	•	
19	-	•	
20	-	•	
21	-	•	
22	-	•	
23	-	•	
24	87562	• Assembly, Engine Wiring Harness (See Schematic Section for REF)	1
25	40-07	• Assembly, Battery Mounting (See Group 40, Figure 07 for DET)	1
26	-	•	
27	-	•	
28	-	•	
29	-	•	
30	-	•	
31	-	•	
32	-	•	
33	-	•	
34	-	•	
35	-	•	
DASH (-) ITEM NOT ILLUSTRATED			

REVISION:



POWER TRAIN ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 02
PAGE 01



REVISION:



POWER TRAIN ASSEMBLY

C90S
PARTS
 GROUP 40
 FIGURE 02
 PAGE 02

0

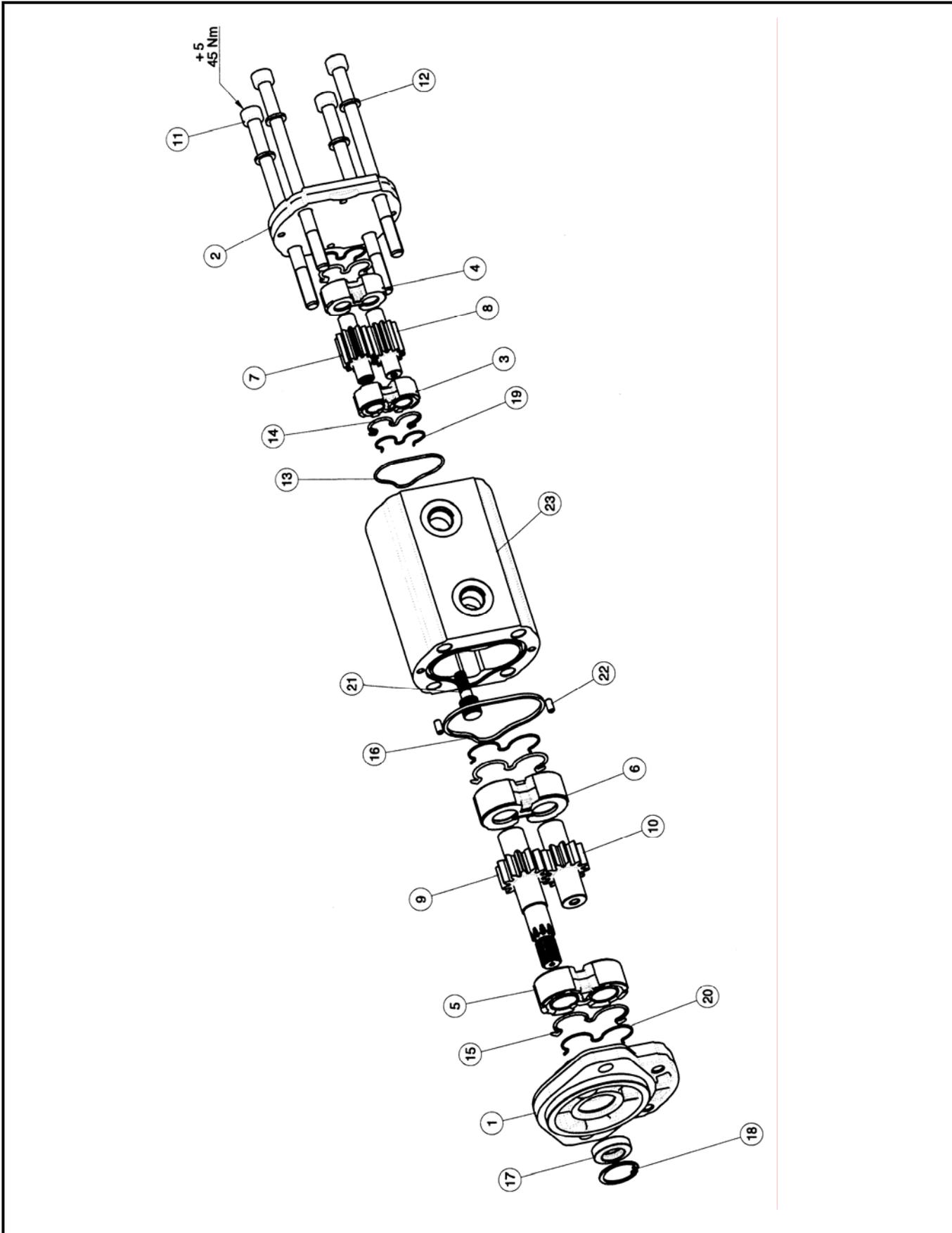
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	87574	Assembly, Power Train (See Group 40, Figure 01 for NHA)	Ref
2	87571	• Assembly, Double Auxiliary Pump (See Group 40, Figure 03 for DET)	1
3	87013	• Assembly, Single Auxiliary Pump (Optional Item) (See Group 40, Figure 04 for NHA)	1
4	86952	• Manifold, Close Loop Master Control	1
5	801778	• Manifold-A4VG125	1
6	87573	• Assembly, C90S Cummins Engine (See Vendor Section, Figure 01 for REF)	1
7	-	• • Element, Fuel Filter	1
8	-	• • Element, Engine Oil Filter	1
9	86951	• Assembly, Flywheel Coupling	1
10	-	•	
11	-	•	1
12	801901-004	• Valve, Check	2
13	W-108121	• Assembly, C90S Main Pump-180cc (See Group 40, Figure 05 for DET) (Also See Vendor Section, Figure 02 for REF)	1
14	-	•	
15	-	•	
16	-	•	
17	-	•	
18	-	•	
19	-	•	
20	-	•	
DASH (-) ITEM NOT ILLUSTRATED			

REVISION:



DOUBLE AUXILIARY PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 03
PAGE 01



REVISION:



DOUBLE AUXILIARY PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 03
PAGE 02

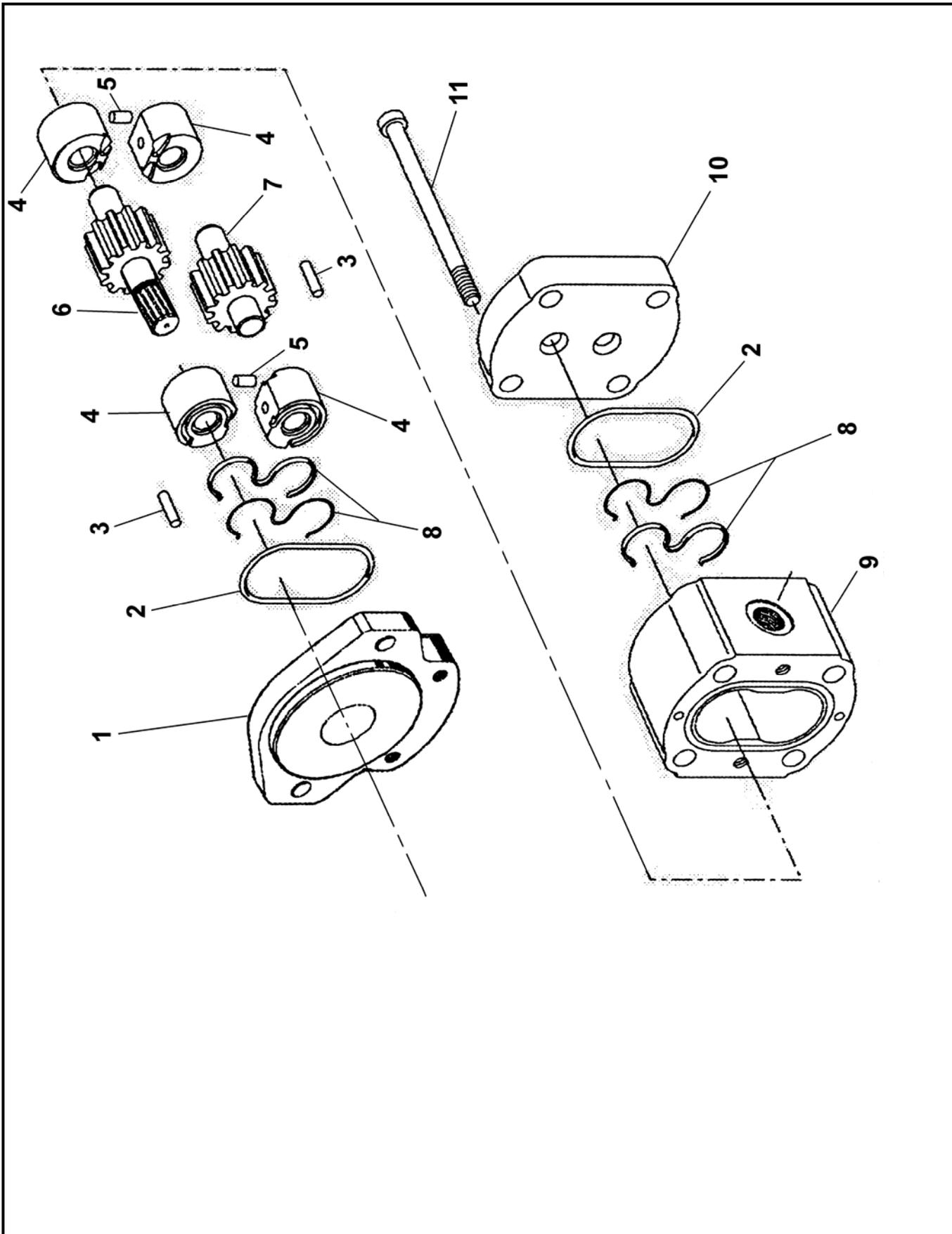
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
	87445	Assembly Double Auxiliary Pump (See Group 40, Figure 02 for NHA)	Ref
1		• Cover, Front	1
2		• Cover, Twin Rear	1
3		• Plate, Thrust	1
4		• Plate, Thrust	1
5		• Plate, Thrust	1
6		• Plate, Thrust	1
7		• Gear, Drive	1
8		• Gear, Driven	1
9		• Shaft, Drive	1
10		• Gear, Driven	1
11		• Screw	4
12		• Washer	4
13		• O-Ring	1
14		• Plate, Seal	2
15		• Plate, Seal	2
16		• Plate, Seal	1
17		• Seal, Shaft	1
18		• Ring	1
19		• Plate, Anti-Intrusion	2
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



SINGLE AUXILIARY PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 04
PAGE 01



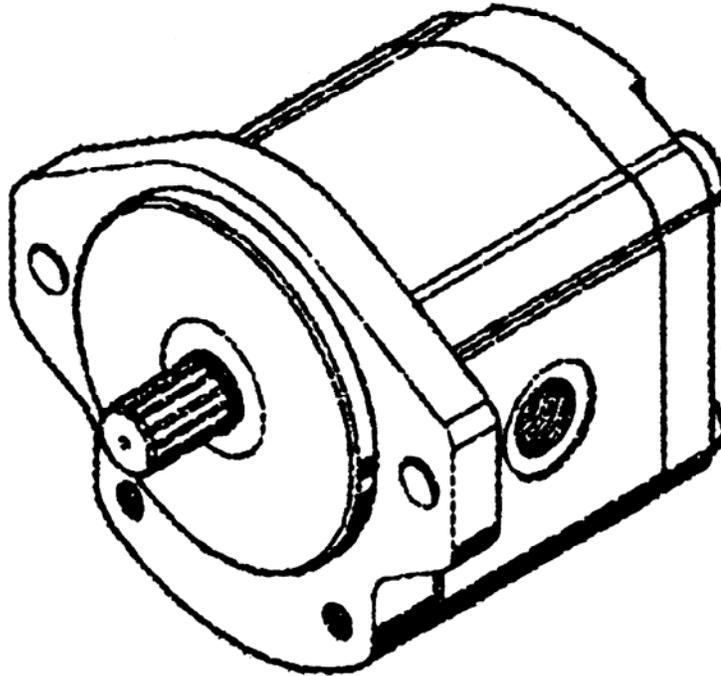
REVISION:



SINGLE AUXILIARY PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 04
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
	87013	Assembly, Single Auxiliary Pump (See Group 40, Figure 02 for NHA)					Ref
1		• Cover, Front					1
2		• Seal					2
3		• Pin, Dowel					2
4		• Bearing					4
5		• Pin, Dowel					2
6		• Gear, Driven					1
7		• Gear, Drive					1
8		• Seal					2
9		• Housing, Pump					1
10		• Cover, End					1
11		• Bolt, Hex (attaching parts)					4
-12	87013SK	• Kit, Seal					1
DASH (-) ITEM NOT ILLUSTRATED							



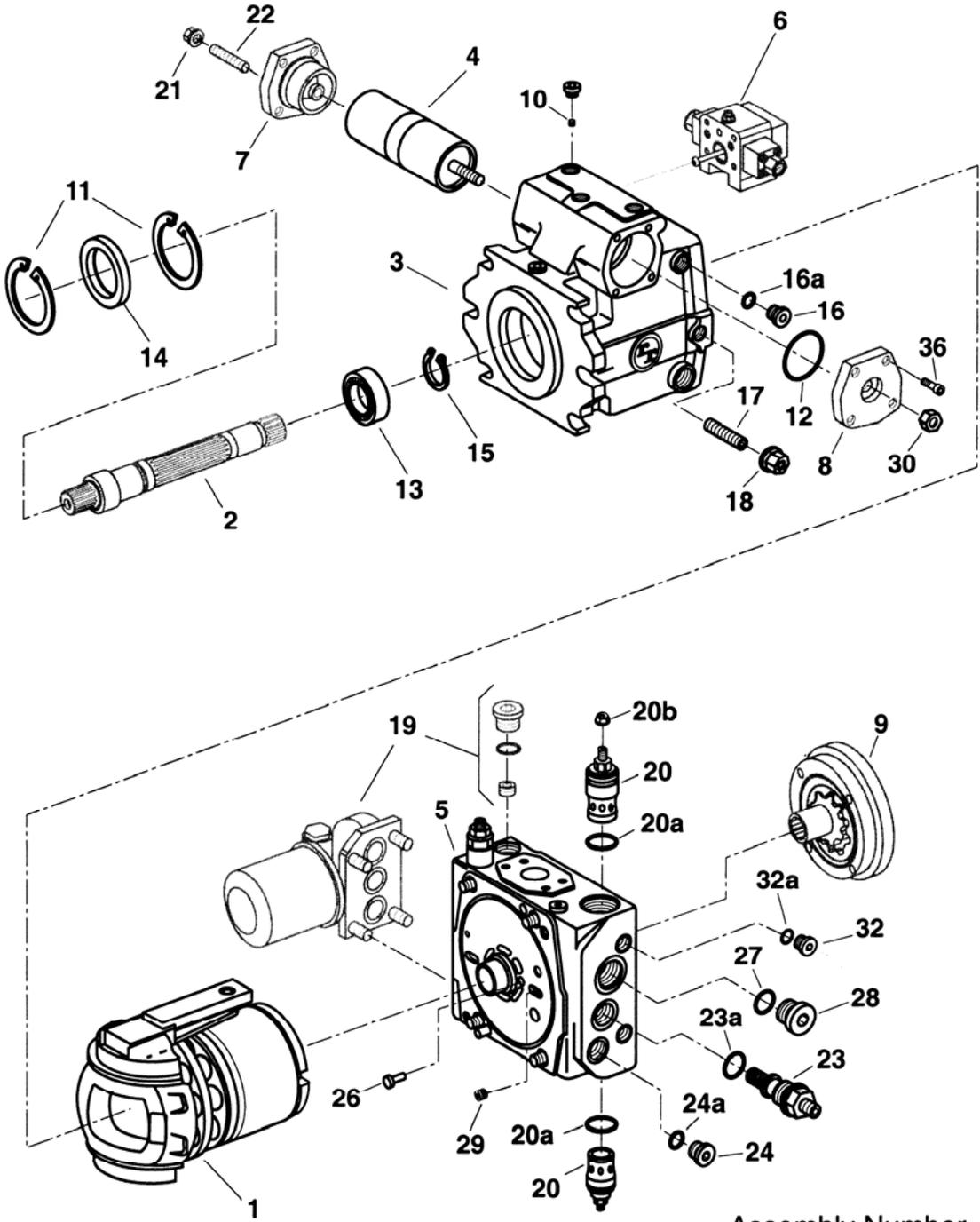
REVISION:



MAIN HYDRAULIC PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 05
PAGE 01

REED PN W-109842 MAIN HYDRAULIC PUMP



Assembly Number
AA4VG125/32

REVISION:

Assembly Number
AA4VG125/32

Item	Description	Qty	Part Number
1	Rotary Group Ass'y AA4VG125.../32L		5450-570-008
1	Rotary Group Ass'y AA4VG125.../32R		5450-570-009
2	Drive Shaft AA4VG125.../32...S		HU00921707
2	Drive Shaft AA4VG125.../32...T		HU00921708
3	Housing Ass'y	1	<i>Pages 12 & 13</i>
4	Stroking Piston Ass'y	1	<i>Pages 14 & 15</i>
5	Port Block Ass'y	1	<i>Pages 16 & 17</i>
6	Control AA4VG125HW.../32		HU00608522
6	Control AA4VG125HW...L/32		HU00608525
6	Control AA4VG125HD.../32		HU00602238
6	Control AA4VG125EP1.../32		HU00602236
6	Control AA4VG125EP2.../32		HU00602237
6	Control AA4VG125EZ1.../32		HU00437191
6	Control AA4VG125EZ2.../32		HU00437190
7	Stroking Piston Cover AA4VG125...		HU00922049
7	Stroking Piston Cover AA4VG125...M		HU00449493
7	Stroking Piston Cover AA4VG125...T		HU00651546
7	Stroking Piston Cover AA4VG125...M...T		HU00651554
8	Stroking Piston Cover AA4VG125...		HU00922048
8	Stroking Piston Cover AA4VG125...M		HU00449492
8	Stroking Piston Cover AA4VG125...T		HU00651545
8	Stroking Piston Cover AA4VG125...M...T		HU00651553
9	Charge Pump ...F00		HU00606320
9	Thru Dr. Chg. Pump ...F01 (SAE-A)		HU00606309
9	Thru Dr. Chg. Pump ...F02 (SAE-B)		HU00606312
9	Thru Dr. Chg. Pump ...F04 (SAE-BB)		HU00606314
9	Thru Dr. Chg. Pump ...F07 (SAE-C)		HU00606317
9	Thru Dr. Chg. Pump ...F69 (SAE-D)		HU00606330

Assembly Number
AA4VG125/32

Item	Description	Qty	Part Number	
10	Stroking Time Orifice (1.0 mm)	2	HU00426700	
10	Stroking Time Orifice (0.8 mm)		HU00426701	
10	Stroking Time Orifice (0.9 mm)		HU00426702	
10	Stroking Time Orifice (1.2 mm)		HU00426703	
10	Stroking Time Orifice (1.4 mm)		HU00426704	
10	Stroking Time Orifice (1.6 mm)		HU00426705	
10	Stroking Time Orifice (1.8 mm)		HU00426706	
10	Stroking Time Orifice (2.0 mm)		HU00426707	
10	Stroking Time Orifice (2.2 mm)		HU00426708	
10	Stroking Time Orifice (2.4 mm)		HU00439372	
10	Stroking Time Orifice (2.5 mm)		HU00426709	
11	Snap Ring (90 x 3 DIN 984)	2	HU002600002	
12	O-Ring (90 Duro Buna PRP-152)	2	68104-152	*▲
13	Front Bearing	1	HU00156269	
14	Shaft Seal (Buna)		HU00830974	*
14	Shaft Seal (FPM)		HU00830980	▲
15	Snap Ring (50 x 2.0 DIN 471)	1	71119-010	
16	Plug (9/16-18)	1	76107-006	
16a	O-Ring (90 Duro Buna Tube PRP-906)	1	68105-906	*▲
17	Threaded Pin	1	HU00154982	
18	Seal Nut (M12 x 1.5)	1	65110-008	*▲
19	Filtration Options	1	<i>Pages 44 & 45</i>	

* Contained in Seal Kit (P) 5450-635-031

▲ Contained in Seal Kit (N) 5450-635-032



MAIN HYDRAULIC PUMP ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 05
PAGE 04

Assembly Number
AA4VG125/32

Item	Description	Qty	Part Number	
20	H.P.R.V. w/ Tow Option (1450-6100 psi)		HU00832121	
20a	O-Ring (90 Duro Buna PRP-121)	2	68104-221	*▲□
20b	Seal Nut (M10 x 1)	2	65110-007	*▲□
21	Seal Nut (M12 x 1.75)		65110-002	*▲
22	Adjusting Screw		HU00432790	
23	Charge Relief Valve		HU00434856	
23a	O-Ring (90 Duro Buna PRP-119)	1	68104-119	*▲★
24	Plug (7/8-14)	1	76107-010	
24a	O-Ring (90 Duro Buna Tube PRP-910)	1	68105-910	*▲○
26	Lens Pin	1	HU00405732	
27	O-Ring (90 Duro Buna PRP-129)	1	68104-129	*▲
28	Plug (M42 x 2 DIN 906-5.8)	1	76118-002	
29	Plug (M8 x 1 DIN 906-5.8)	1	76117-003	
30	Jam Nut (M16 x 1.5 DIN 439-04AU)	1	HU00157477	
32	Plug (7/16-20)	2	76107-004	
32a	O-Ring (90 Duro Buna Tube PRP-904)	2	68105-904	*▲■
36	Cap Screw (M8 x 25 DIN 912-8.8)	8	60118-083	

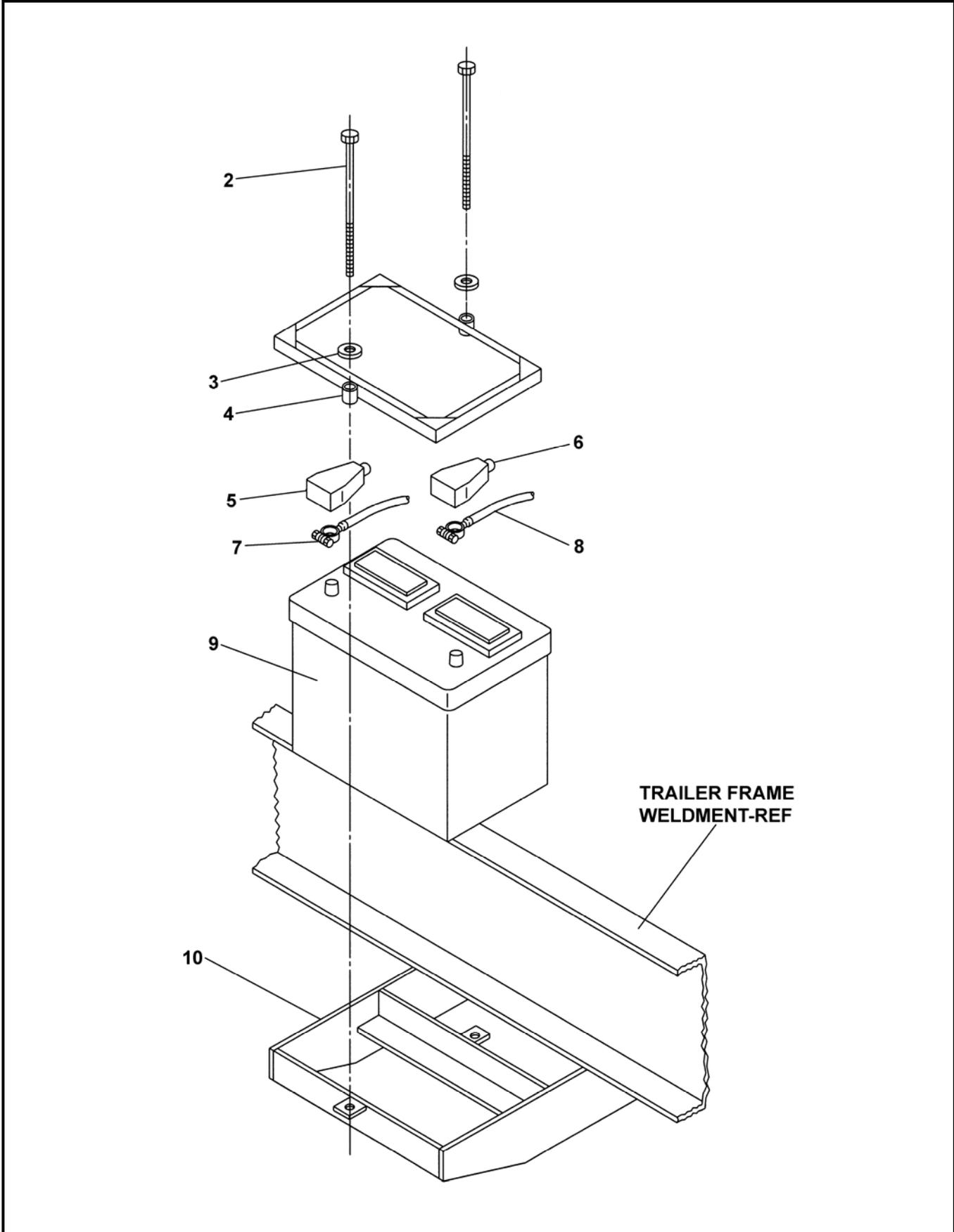
- * Contained in Seal Kit (P) 5450-635-031
- ▲ Contained in Seal Kit (N) 5450-635-032
- ★ Included with HU00434856
- Included with HU00832121
- Included with 76107-004
- Included with 76107-010

REVISION:



BATTERY MOUNTING ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 06
PAGE 01



REVISION:



BATTERY MOUNTING ASSEMBLY

C90S
PARTS
GROUP 40
FIGURE 06
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	40-07	Assembly, Battery Mounting (See Group 40, Figure 01 for NHA)	Ref
2		• Bolt, Hex	2
3		• Washer Flat	2
4	72945	• Holder, Battery Down	1
5	77720	• Insulator, Negative Battery (Black)	1
6	77719	• Insulator, Positive Battery (Red)	1
7	72116	• Cable, 26 Inch Negative Battery (Black)	1
8	72014	• Cable, 38 Inch Long Positive Battery (Red)	1
9	77075	• Battery, 12 VDC	1
10	86240	• Weldment, Battery Box	1
-11	85348	• Connector, SPNO 12VDC	1
-12	73269	• Strap, Ground	1
-13	87221	• Insulator, Right Elbow-Red	1
-14	87222	• Insulator, Left Elbow-Black	1
-15	87223	• Extender, Top Tderminal Bolt	2
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



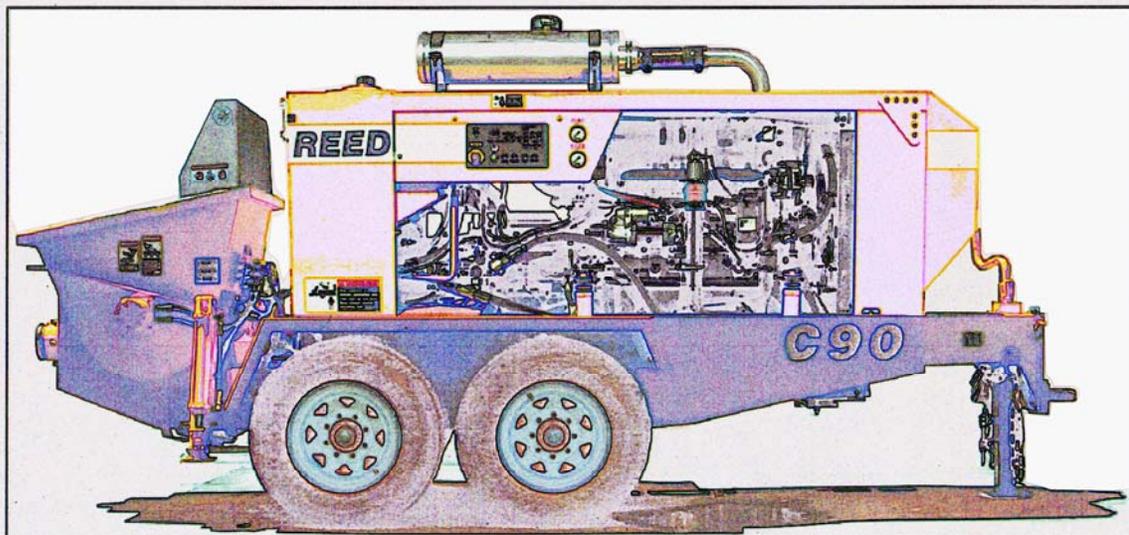
**TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 40 POWER TRAIN INSTALLATION**

C90S
PARTS
GROUP 40
FIGURE 07
PAGE 01

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REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL **C90S** ILLUSTRATED PARTS MANUAL GROUP 50 CONTROLS INSTALLATION CONTAINS THE FOLLOWING FIGURES:

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** CONTROLS INSTALLATION
- FIGURE 02** CONTROL BOX INSTALLATION
- FIGURE 03** 50 FEET CABLE REMOTE CONTROL ASSEMBLY
- FIGURE 04** RADIO REMOTE CONTROL ASSEMBLY

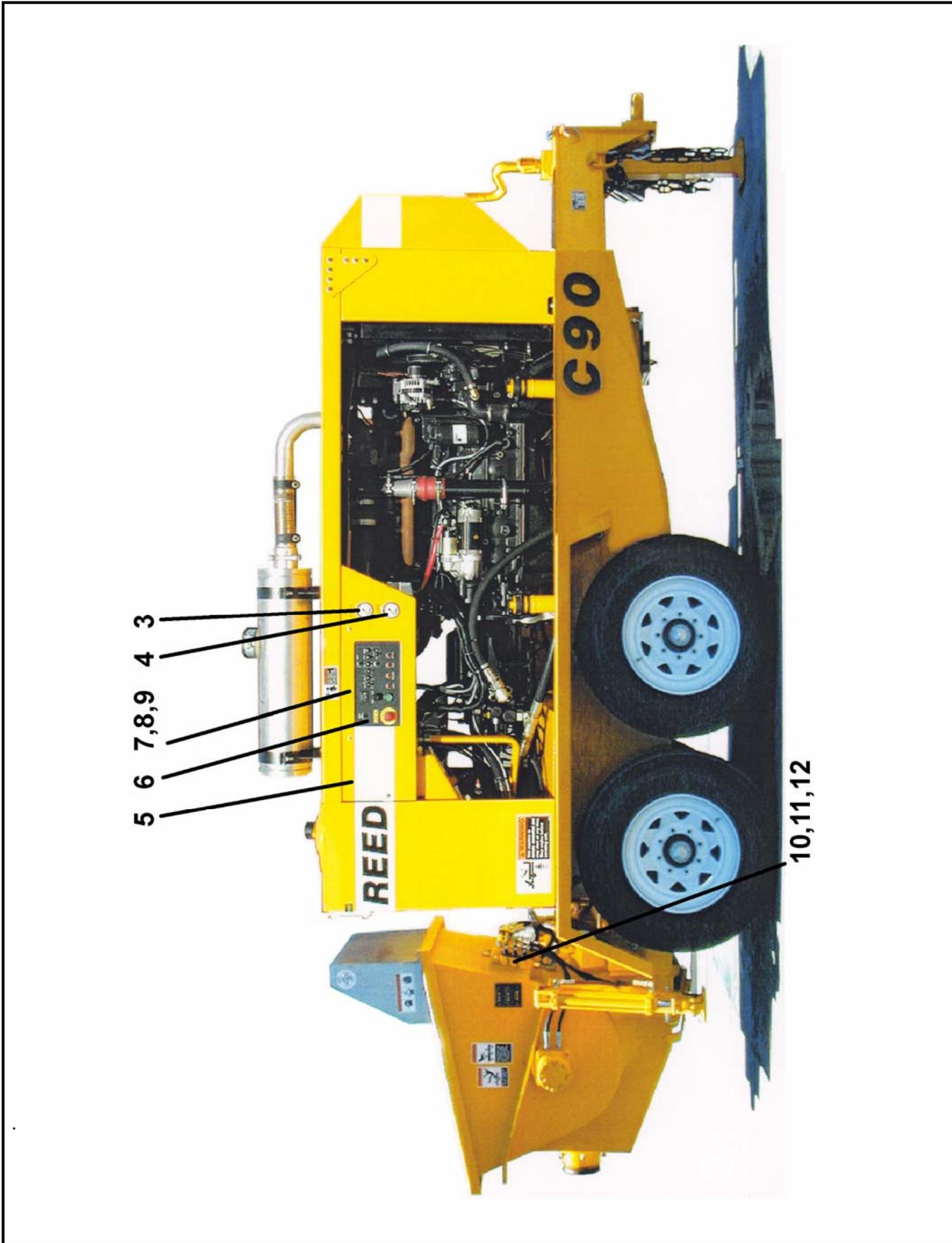


REVISION:



CONTROL INSTALLATION

C90S
PARTS
GROUP 50
FIGURE 01
PAGE 01



REVISION:



CONTROL INSTALLATION

C90S
PARTS
GROUP 50
FIGURE 01
PAGE 02

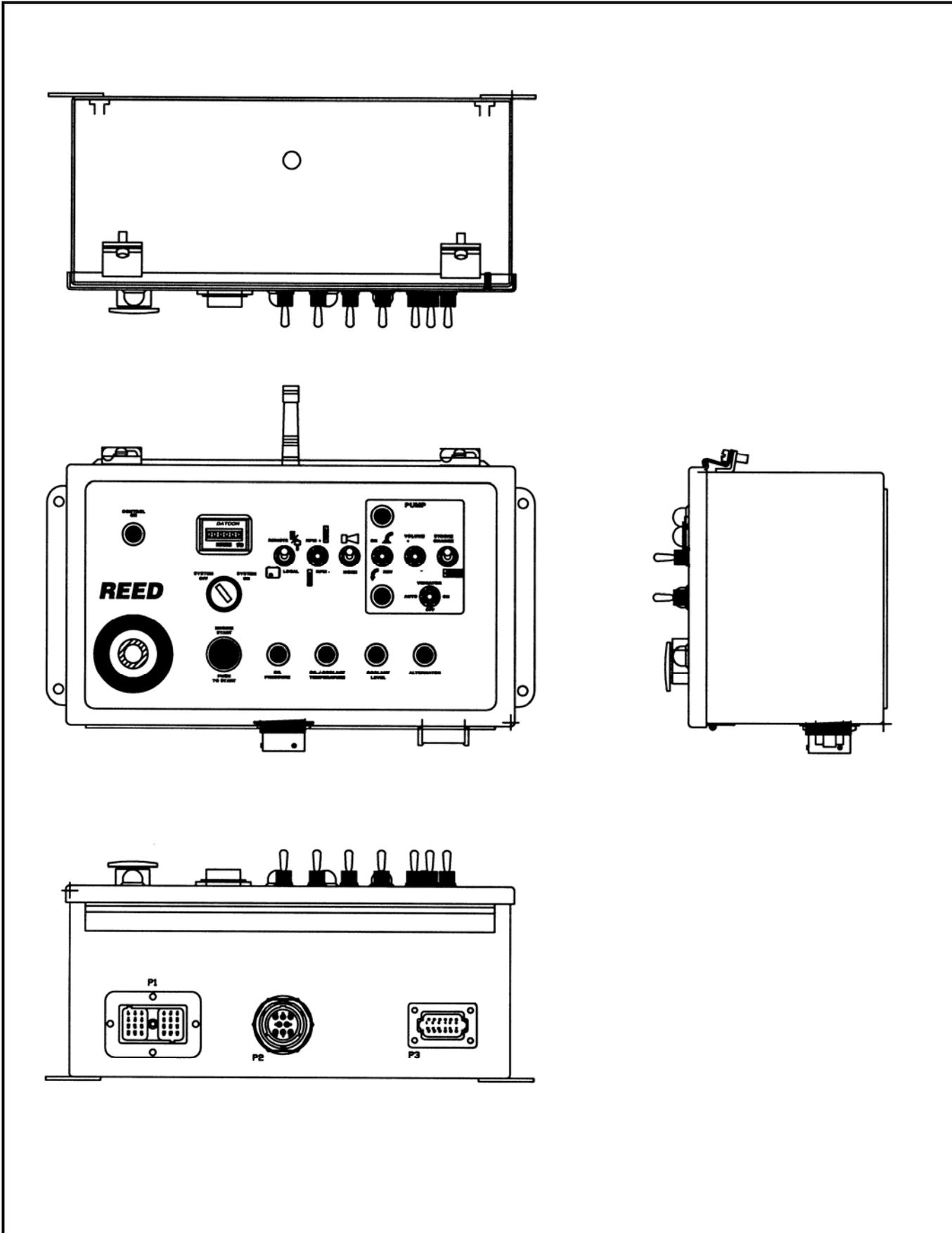
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	50-01	Installation, Control (See Group 10, Figure 01 for NHA)	Ref
-2	86897	• Group, Electrical	1
3	70366	• Gauge, 3,000 PSI Hydraulic (See Group 30, Figure 02 for REF)	1
4	74562	• Gauge, 6,000 PSI Hydraulic (See Group 30, Figure 02 for REF)	1
5	800347	• Horn, 12 V	1
6	87346	• Assembly, Control Box (See Group 50, Figure 02 for DET)	1
7	87347	• Assembly, 50 Feet Cable Remote Control (See Group 50, Figure 03 for DET)	1
8	-	• Assembly, 100 Feet Cable Remote Control See Group 50, Figure 04 for DET)	-
9	87348	• Transmitter, Radio Remote Control (Optional Item) (See Group 50, Figure 05 for DET)	1
10	20-07	• Assembly, Agitator/Outriggers Control Valve (Optional Item) (See Group 20, Figure 07 for REF)	1
11	80-15	• Assembly, 1 Spool Valve (Optional Item) (See Group 80, Figure 15 for REF)	1
12	80-17	• Assembly, 2 Spool Valve (Optional Item) (See Group 80, Figure 17 for REF)	1
-13	86532	• Assembly, Trailer Wiring Harness (See Schematic Section for REF)	1
-14	87452	• Assembly, Engine Wiring Harness (See Schematic Section for REF)	1
DASH (-) ITEM NOT ILLUSTRATED			

REVISION:



CONTROL BOX ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 02
PAGE 01



REVISION:



CONTROL BOX ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 02
PAGE 02

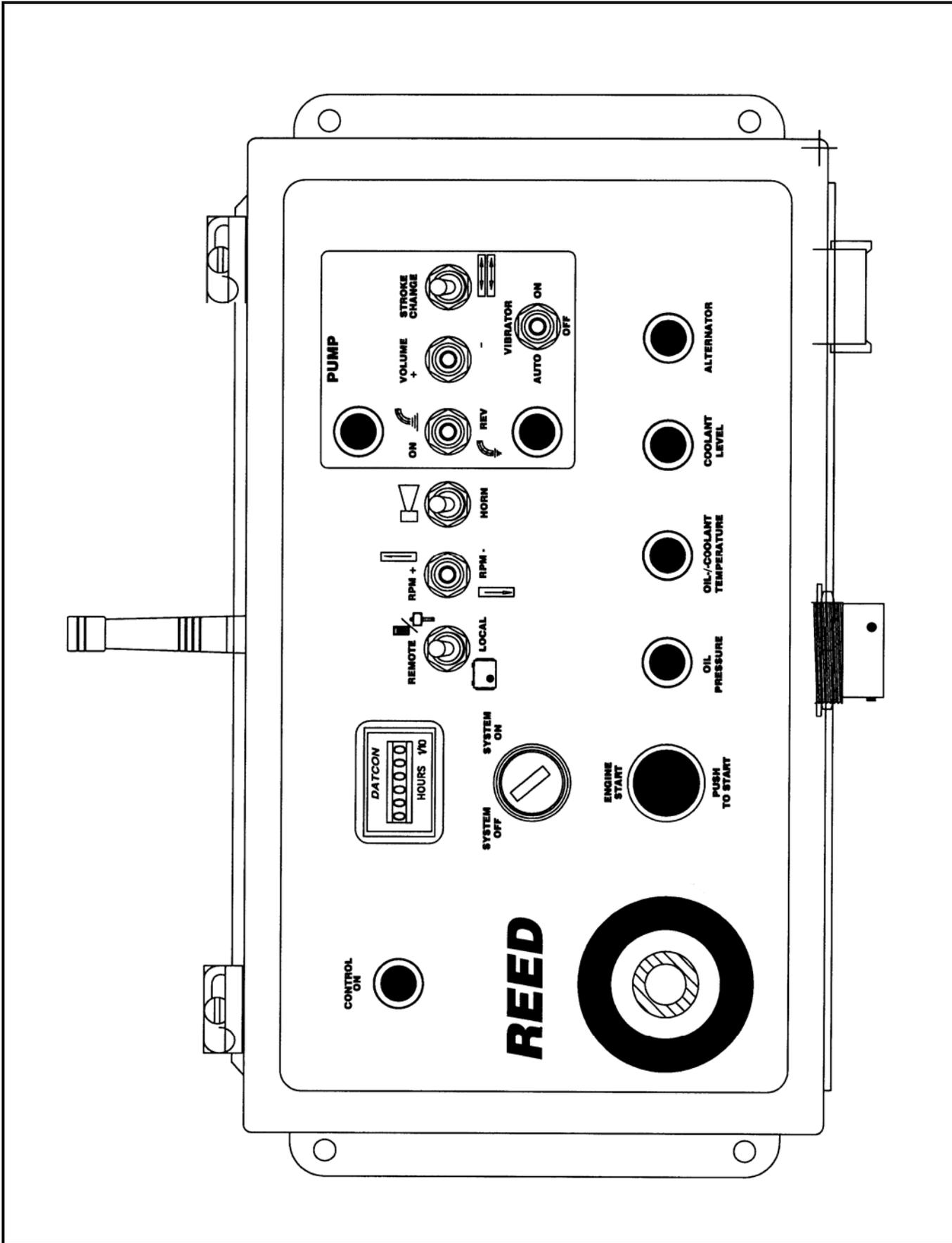
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
1	87346	Assembly, Control Box (See Group 50, Figure 01 for NHA)					Ref
2		•					
3		•					
4		•					
5		•					
6		•					
7		•					
8		•					
9		•					
10		•					
11		•					
12		•					
13		•					
14		•					
15		•					
16		•					
17		•					
18		•					
19		•					
20		•					
DASH (-) ITEM NOT ILLUSTRATED							

REVISION:



CONTROL BOX ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 02
PAGE 03



REVISION:



CONTROL BOX ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 02
PAGE 04

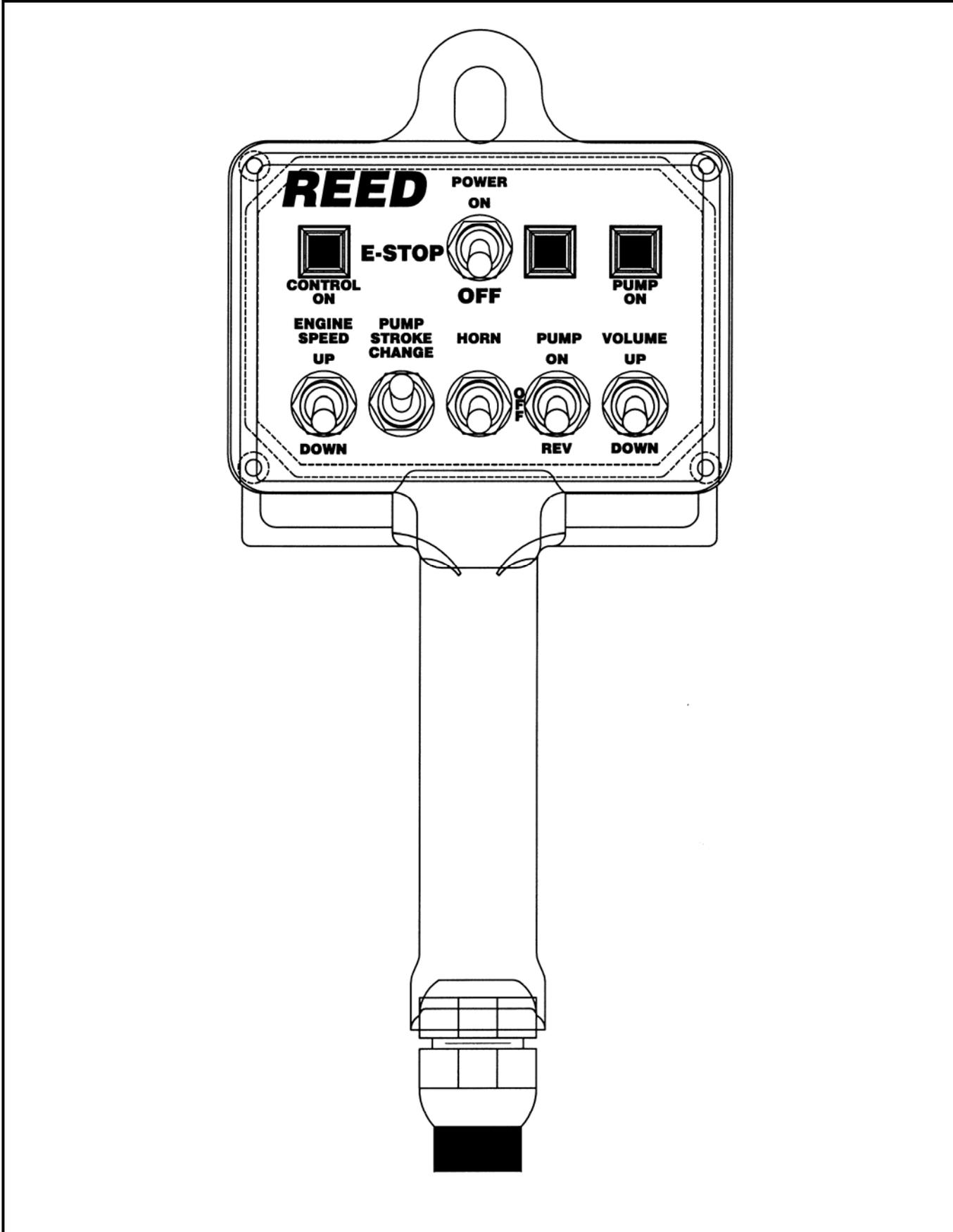
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
1	87346	Assembly, Control Box (See Group 50, Figure 01 for NHA)					Ref
2			•				
3			•				
4			•				
5			•				
6			•				
7			•				
8			•				
9			•				
10			•				
11			•				
12			•				
13			•				
14			•				
15			•				
16			•				
17			•				
18			•				
19			•				
20			•				
					DASH (-) ITEM NOT ILLUSTRATED		

REVISION:



**50 FEET CABLE
REMOTE CONTROL ASSEMBLY**

**C90S
PARTS
GROUP 50
FIGURE 03
PAGE 01**



REVISION:



**50 FEET CABLE
REMOTE CONTROL ASSEMBLY**

**C90S
PARTS
GROUP 50
FIGURE 03
PAGE 02**

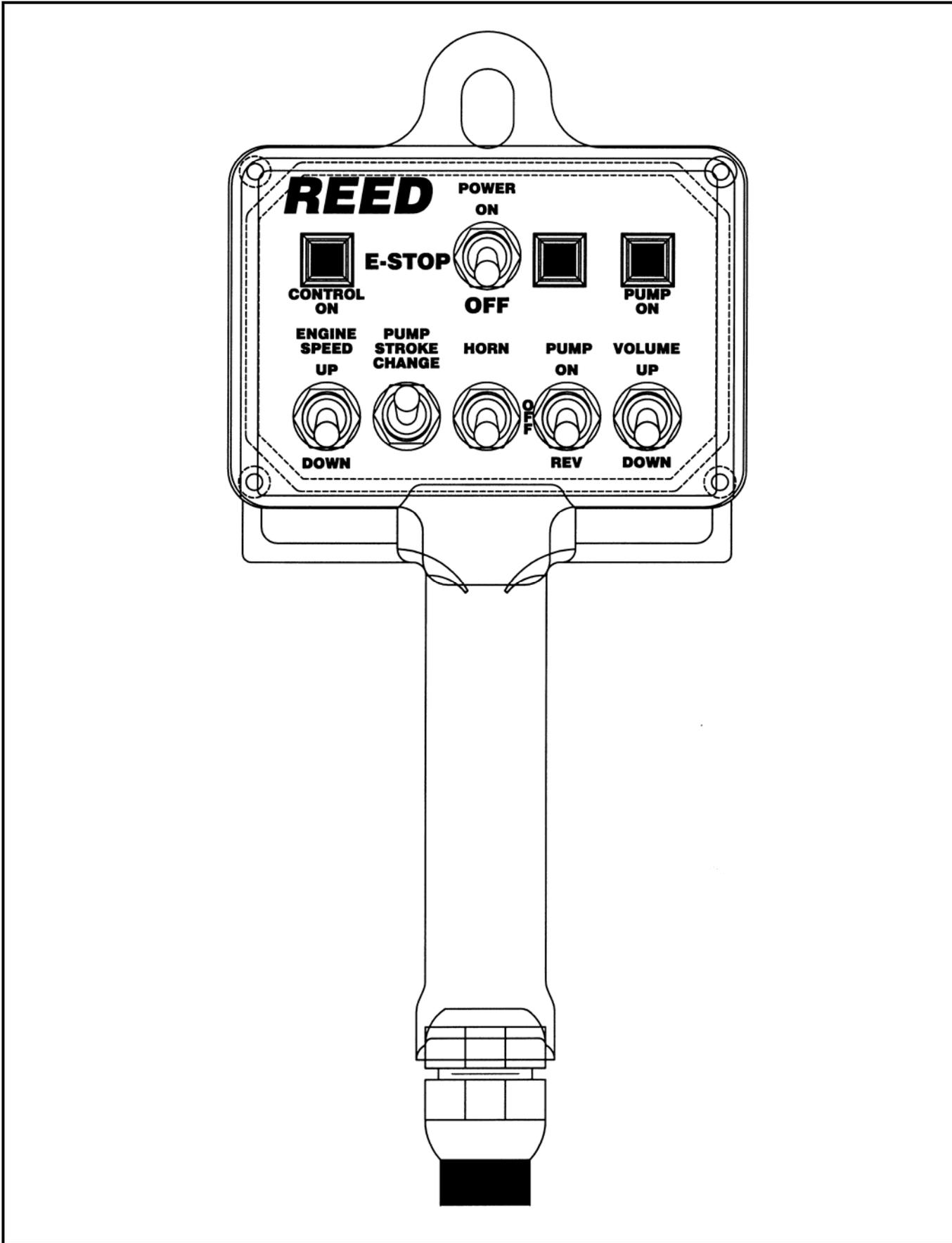
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	87347	Assembly, 50 Feet Cable Remote Control (See Group 50, Figure 01 for NHA)					Ref
2		•					
3		•					
4		•					
5		•					
6		•					
7		•					
8		•					
9		•					
10		•					
11		•					
12		•					
13		•					
14		•					
15		•					
DASH (-) ITEM NOT ILLUSTRATED							

REVISION:



100 FEET CABLE
REMOTE CONTROL ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 04
PAGE 01



REVISION:



**100 FEET CABLE
REMOTE CONTROL ASSEMBLY**

**C50SS
PARTS
GROUP 50
FIGURE 04
PAGE 02**

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
1	-	Assembly, 100 Feet Cable Remote Control (See Group 50, Figure 01 for NHA)					Ref
2			•				
3			•				
4			•				
5			•				
6			•				
7			•				
8			•				
9			•				
10			•				
11			•				
12			•				
13			•				
14			•				
15			•				
		DASH (-) ITEM NOT ILLUSTRATED					

REVISION:



**OPTIONAL RADIO REMOTE
CONTROL ASSEMBLY**

C90S
PARTS
GROUP 50
FIGURE 05
PAGE 01



**NOTE: PN 87346 CONTROL BOX HAS BUILT-IN
RADIO REMOTE CONTROL RECEIVER**

REVISION:



OPTIONAL RADIO REMOTE CONTROL ASSEMBLY

C90S
PARTS
GROUP 50
FIGURE 05
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
1	87348	Assembly, Radio Remote (See Group 50, Figure 01 for NHA)					Ref
2		• Transmitter, Radio Remote (Part of 87348 Kit)					1
3		• Cable, Coaxial (Part of 87348 Kit)					1
-4		• Antenna, Remote Control (Part of 87348 Kit)					1
		Refer to SCHEMATICS SECTION FOR WIRING DIAGRAMS					



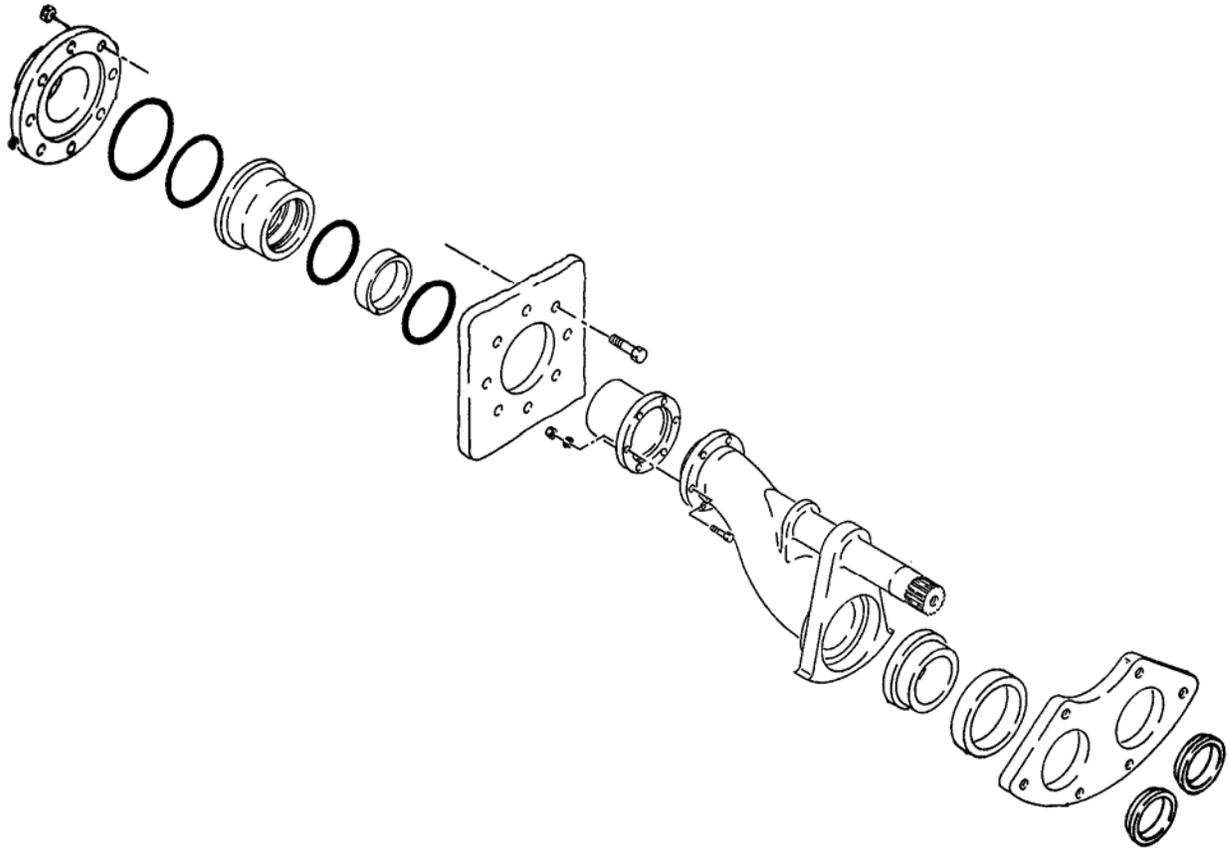
PN 87348 REMOTE KIT



**TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 50 CONTROLS INSTALLATION**

**C90S
PARTS
GROUP 50
FIGURE 06
PAGE 01**

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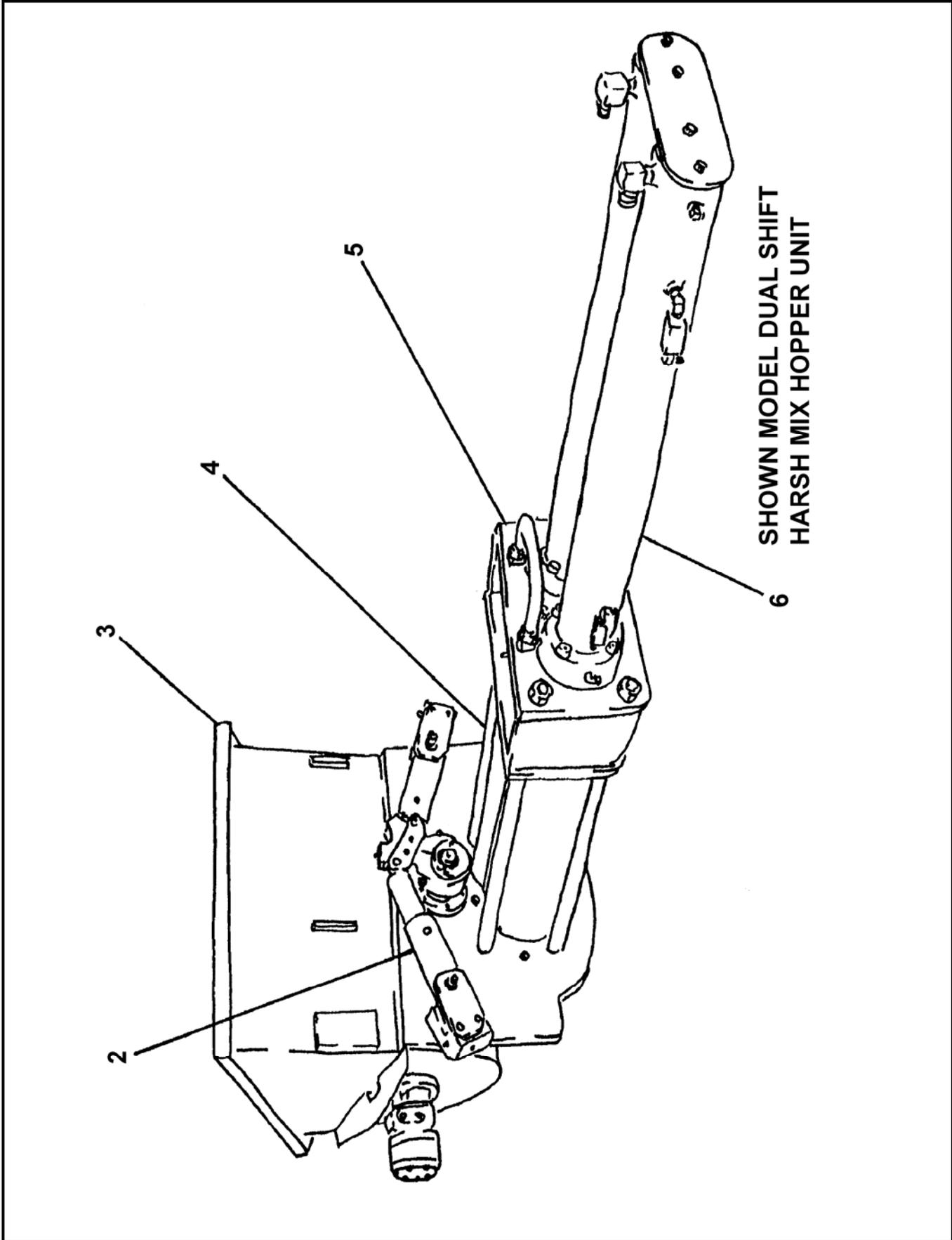
**REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S
ILLUSTRATED PARTS MANUAL GROUP 60 PUMPING TRAIN INSTALLATION
CONTAINS THE FOLLOWING FIGURES:**

- | | |
|------------------|---------------------------------------|
| FIGURE 00 | TABLE OF CONTENTS |
| FIGURE 01 | PUMPING TRAIN INSTALLATION |
| FIGURE 02 | SWING VALVE ASSEMBLY |
| FIGURE 03 | SWING RAM CYLINDER SUB-ASSEMBLY |
| FIGURE 04 | MATERIAL CYLINDER ASSEMBLY |
| FIGURE 05 | FLUSHBOX ASSEMBLY |
| FIGURE 06 | HYDRAULIC DRIVE CYLINDER ASSEMBLY |
| FIGURE 07 | HYDRAULIC DRIVE CYLINDER SUB-ASSEMBLY |



DUAL SHIFT PUMPING TRAIN INSTALLATION

C90S
PARTS
GROUP 60
FIGURE 01
PAGE 01



SHOWN MODEL DUAL SHIFT
HARSH MIX HOPPER UNIT

REVISION:



DUAL SHIFT PUMPING TRAIN INSTALLATION

C90S
PARTS
GROUP 60
FIGURE 01
PAGE 02

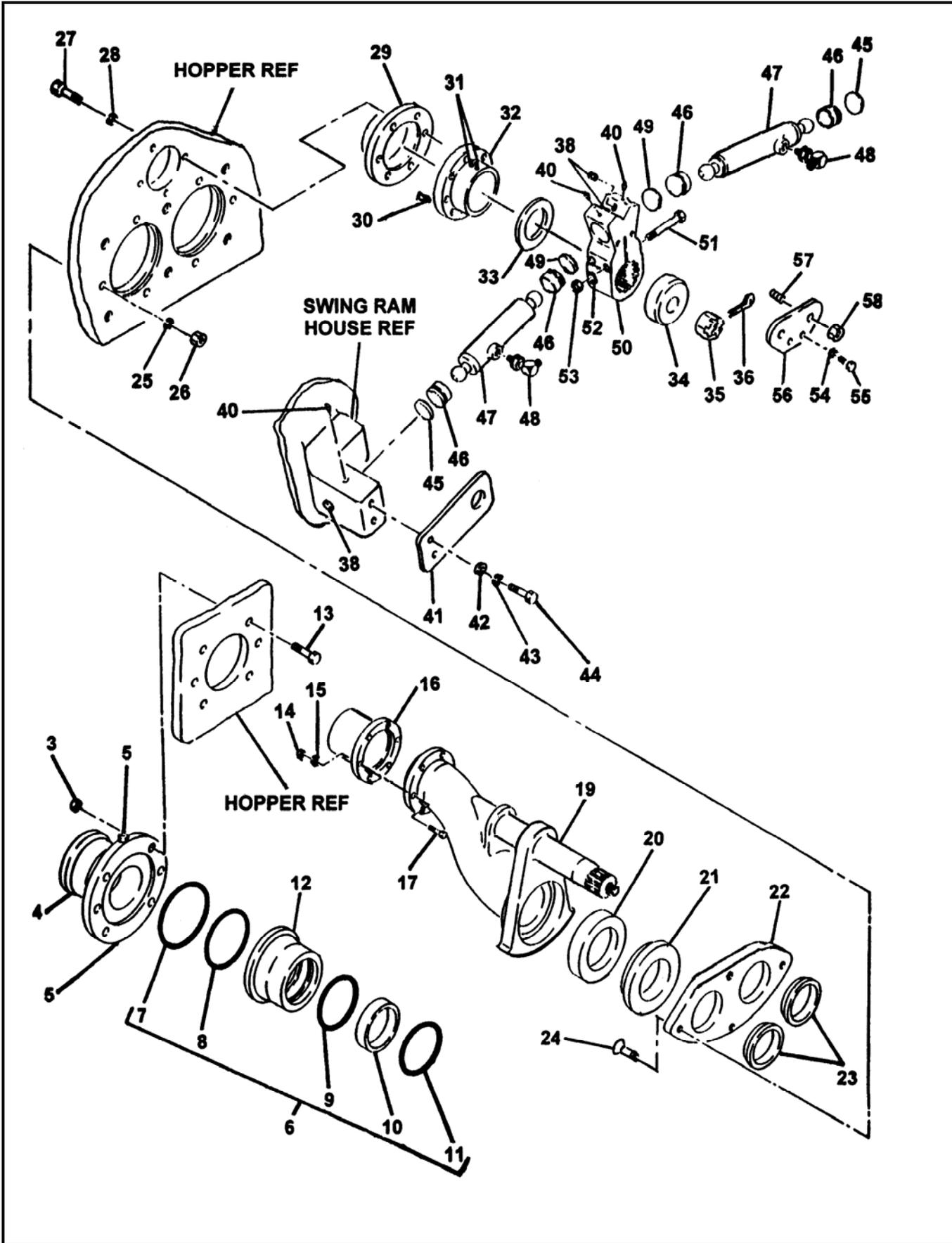
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	60-01	Installation, Dual Shift Pumping Train (See Group 10, Figure 01 and Figure 04 for NHA)	Ref
2	60-03	• Assembly, Dual Shift Swing Valve (See Group 60, Figure 03 for DET)	1
3	20-02	• Installation, Harsh Mix Hopper (See Group 20, Figure 02 for REF)	Ref
4	86312	• Assembly, Material Cylinder (See Group 60, Figure 07 for DET)	1
5	86492	• gROUP, Flushbox (See Group 60, Figure 08 for DET)	1
6	87546	• Group, Hydraulic Drive Cylinder (See Group 60, Figure 09 for DET)	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



SWING VALVE ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 02
PAGE 01



REVISION:



SWING VALVE ASSEMBLY

C90S
PARTS
 GROUP 60
 FIGURE 02
 PAGE 02

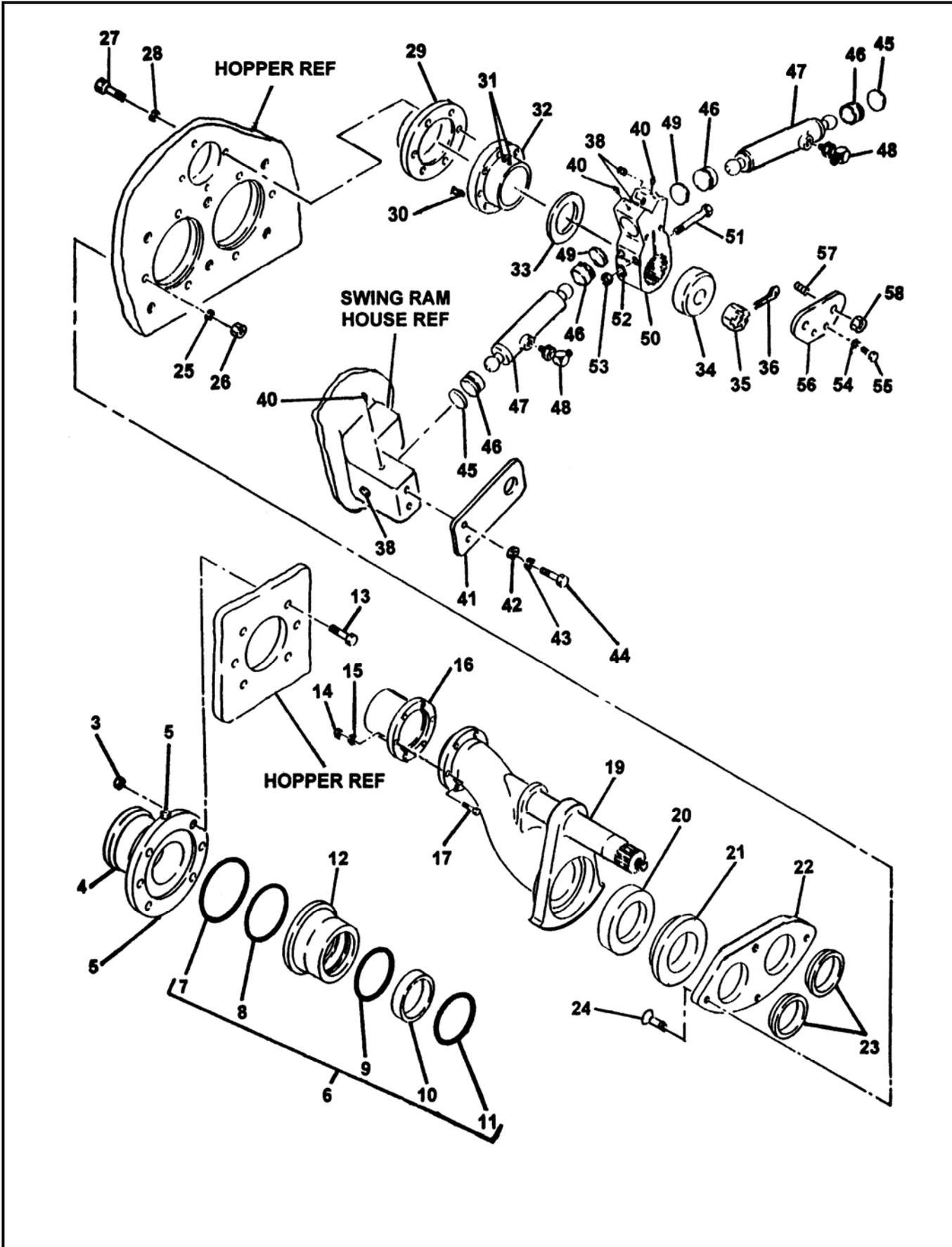
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	60-02	Assembly, Dual Shift Swing Valve (See Group 60, Figure 01 for NHA)					Ref
-2	86321	• Assembly, Outlet Group					1
3		•• Nut					6
4	72482	•• Outlet, Machine 5"					1
5		•• Fitting, Grease					2
6	79895	•• Kit, Outlet Seal					1
7	77761	••• O-Ring, Large					1
8	77762	••• O-Ring, Small					1
9	86504	••• Seal, Modified Outlet Thick					1
10	77763	••• Band, Guide					1
11	77765	••• Seal, Outlet Thick					1
12	72309	•• Housing, Outlet Seal					1
13		•• Bolt, Hex					6
14		•• Nut, Nylock (attaching parts)					6
15		•• Washer, Lock (attaching parts)					6
16	70042	•• Outlet, Chromed					1
17		•• Bolt, Hex (attaching parts)					6
-18	86318	• Assembly, Swing Tube Group (7x5)					1
19	85973	•• Weldment, Swing Tube (7x5)					1
20	85974	•• Seal, 7 Inch Single Lip					1
21	85975	•• Ring, 7 Inch Single Lip Wear					1
22	85970	•• Plate, Wear-7 Inch					1
23	85977	•• Ring, Anti Chip-7 Inch					2
24	74988	•• Bolt, Universal Kit					1
25		•• Washer, Lock					4
26		•• Nut, Hex					4
27		•• Bolt, Hex					4
28		•• Washer, Lock					4
29	85962	•• Seal, Flange Bearing					1
30		•• Pin, Dowel					1
31		•• Fitting, Grease 90					2
32	85133	•• Bearing, 3 Inch Spline Flange					1
33	85294	•• Washer, Thrust					1
34	85134	•• Spacer, Swing Tube Nut					1
35	70825	•• Nut, Swing Tube					1
36		•• Pin, Cotter					1
-37	87339	• Assembly, Swing Tube Dual Shift Group					1
38		•• Plug, Pipe					4
39	86052	•• Pin, Spring					4
40		•• Fitting, Grease 90					2
41	86441	•• Retainer, Swing Ram					2
DASH (-) ITEM NOT ILLUSTRATED							

REVISION:



SWING VALVE ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 02
PAGE 03

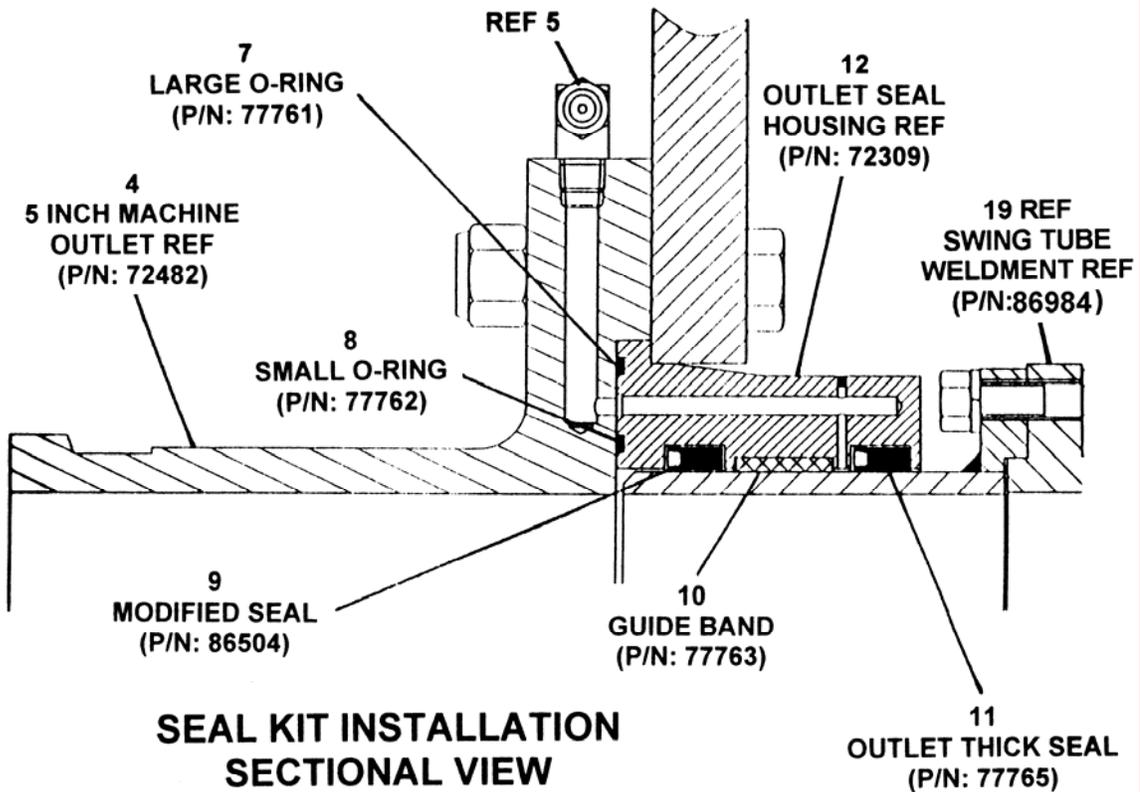


REVISION:

SWING VALVE ASSEMBLY

ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
42		••	••	Washer, Flat (attaching parts)			4
43		••	••	Washer, Lock (attaching parts)			4
44		••	••	Bolt, Hex (attaching parts)			4
45	75501	••	••	Spacer			2
46	76798	••	••	Socket, Ball			4
47	87333a	••	••	Assembly, Dual Shift Swing Ram Cylinder (See Group 60, Figure 03 for DET)			1
48		••	••	Fitting, 90			2
49	75502	••	••	Spacer			2
50	85956	••	••	Crank, 3 Inch Dual Shift Splined Bell			1
51		••	••	Bolt, Hex (attaching parts)			2
52		••	••	Washer, SPL Lock (attaching parts)			2
53		••	••	Nut, Hex (attaching parts)			2
54		••	••	Washer, Lock			2
55	86283	••	••	Screw, Set			2
56	86282	••	••	Retainer, Dual Shift Cylinder			1
57		••	••	Stud			2
58		••	••	Nut, Hex			2

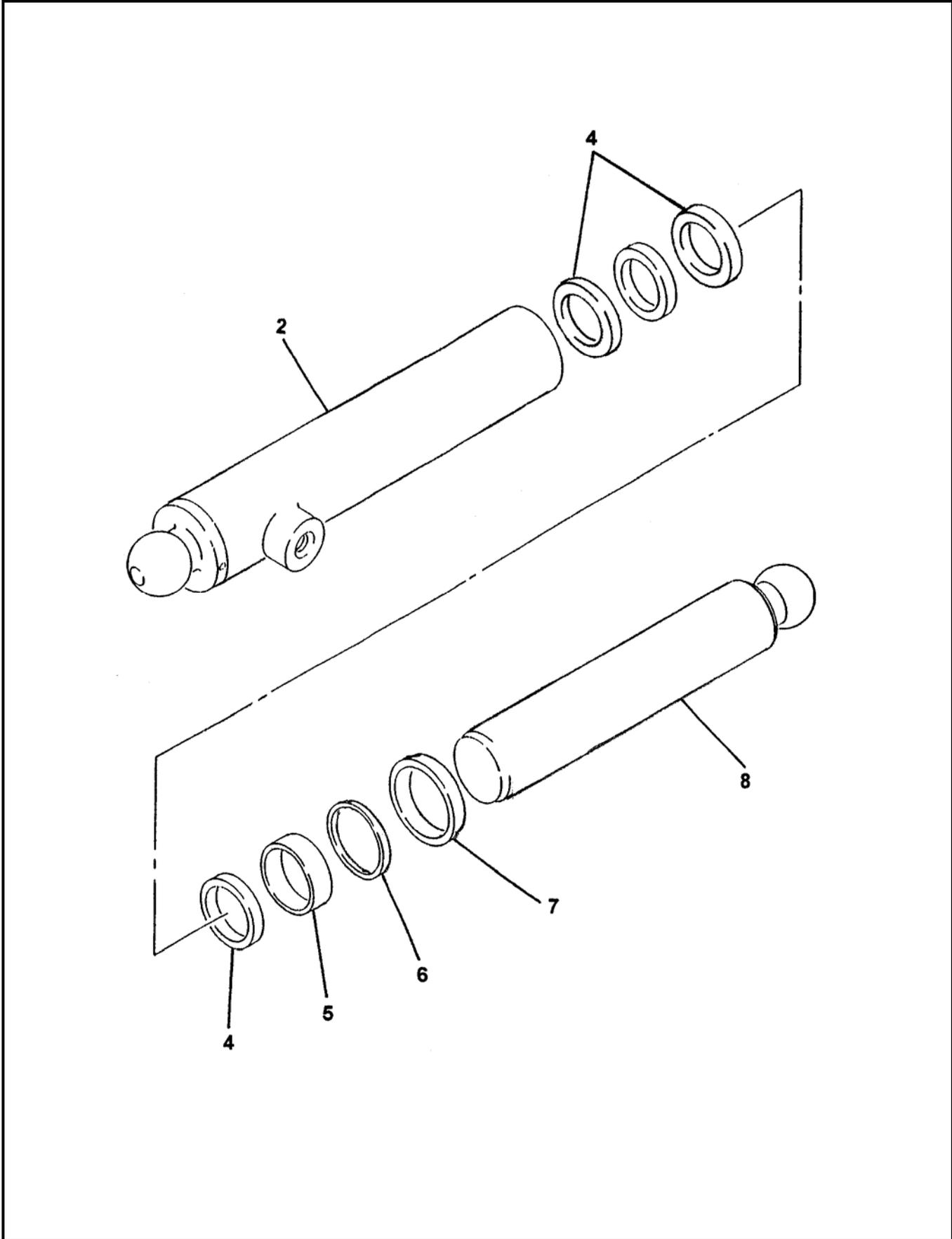
DASH (-) ITEM NOT ILLUSTRATED





DUAL SHIFT SWING RAM CYLINDER ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 03
PAGE 01



REVISION:



**DUAL SHIFT
SWING RAM CYLINDER ASSEMBLY**

**C90S
PARTS
GROUP 60
FIGURE 03
PAGE 02**

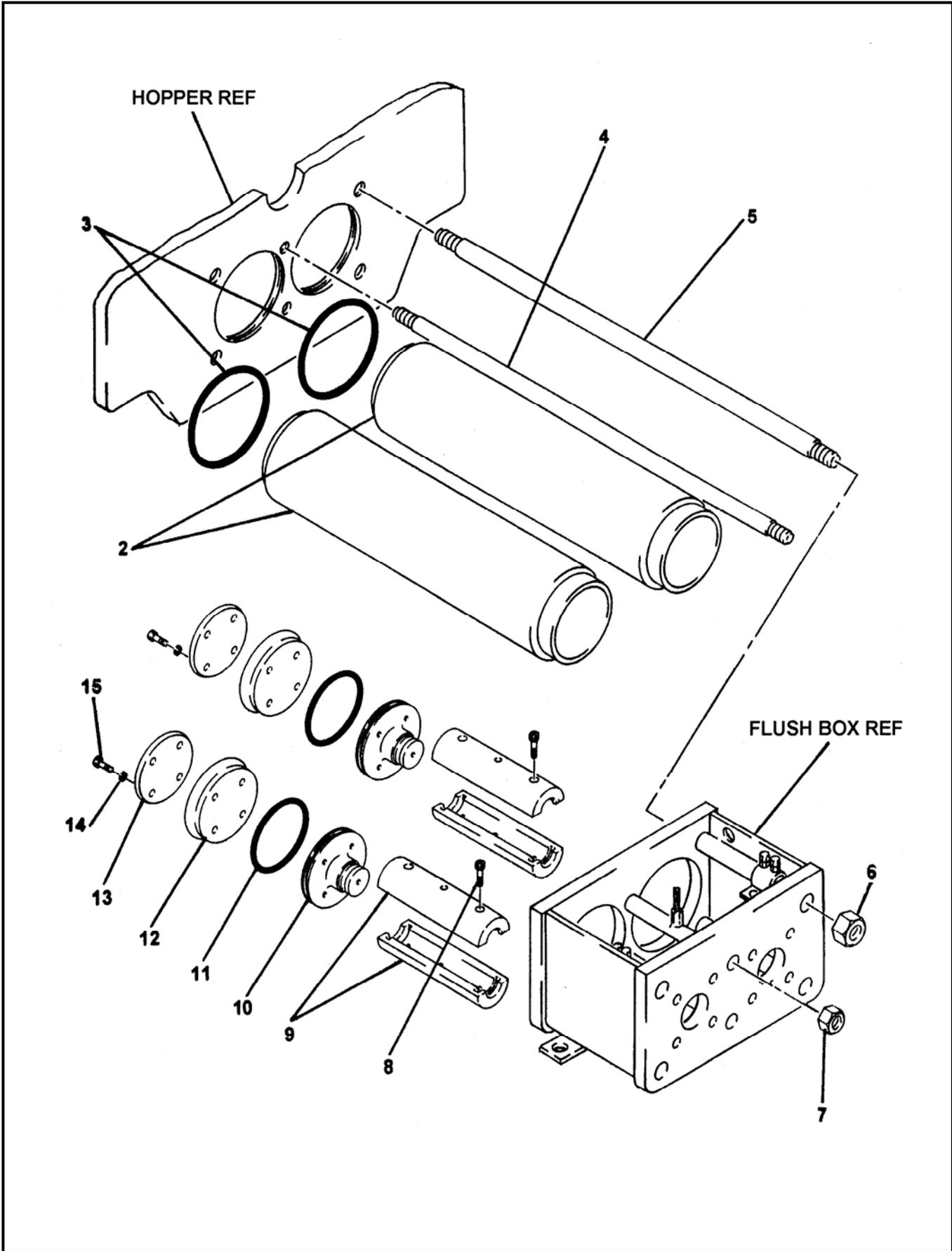
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	87333	Assembly, Swing Ram Cylinder (See Group 60, Figure 02 for NHA)	Ref
2		• Weldment, Cylinder Case	1
-3	87333-SK	• Kit, Seal	1
4		•• Ring, Wear	1
5		•• U-Cup	1
6		•• Ring, Back-Up	4
7		•• Wiper, Rod	1
8		•• Weldment, Cylinder Rod	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



MATERIAL CYLINDER ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 04
PAGE 01



REVISION:



MATERIAL CYLINDER ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 04
PAGE 02

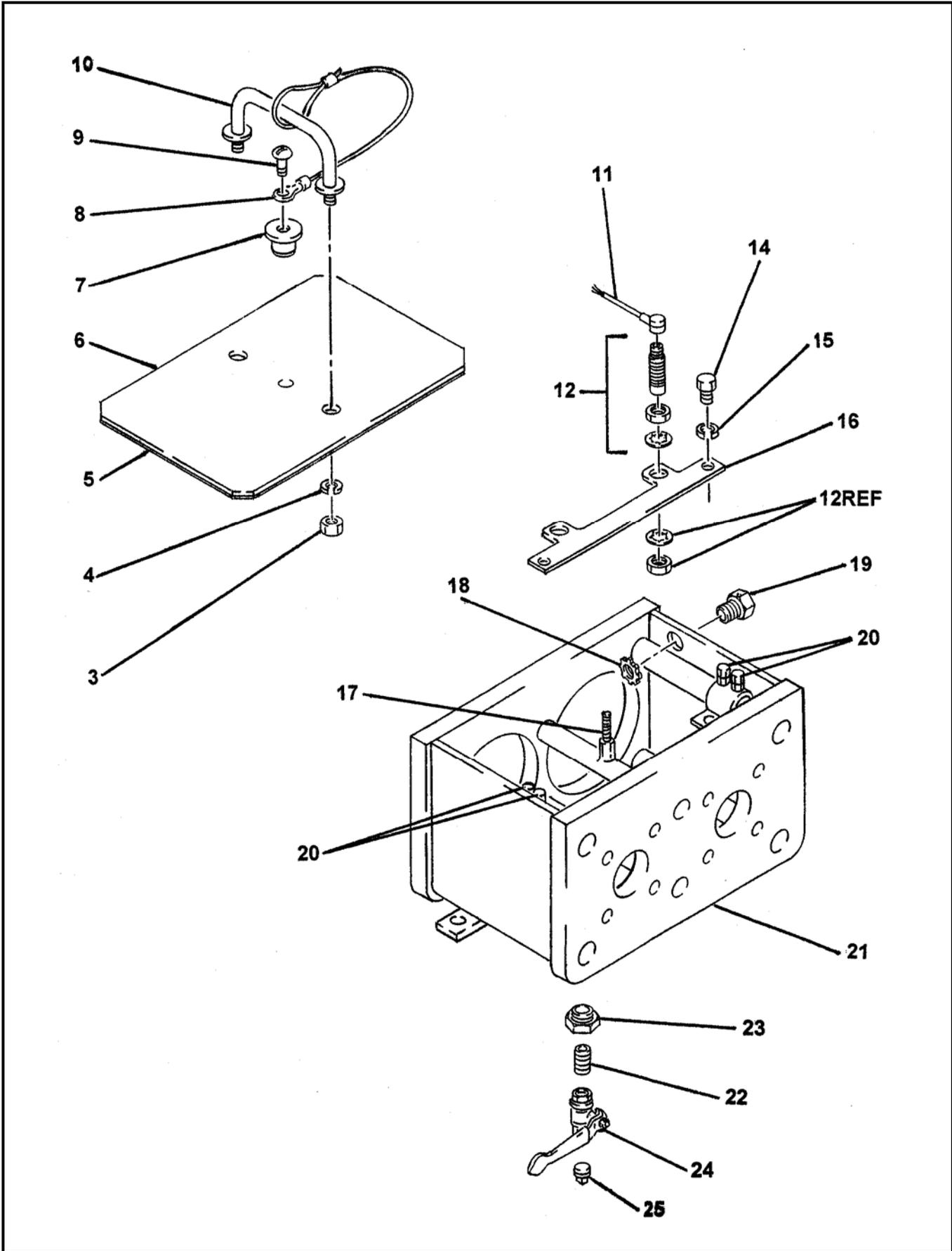
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	86312	Assembly, Material Cylinder (7x42) (See Group 60, Figure 01 for DET)					Ref
2	86146	• Cylinder, Material (7x42)					2
3	86037	• O-Ring, Material Cylinder					2
4	86023	• Rod, Tie					2
5	86022	• Rod, Tie					4
6		• Nut, Hex (attaching parts)					4
7		• Nut, Hex (attaching parts)					2
8		• Screw, Cap					4
9	86024	• Coupling, Piston					2
10	77055	• Adapter, 7 Inch Piston					2
11	77056	• Band, Guide 7 Inch					2
12	70504	• Cup, 7 Inch Piston					2
13	70505	• Plate, 7 Inch Piston					2
14		• Washer, (attaching parts)					8
15		• Bolt, Hex (attaching parts)					8

DASH(-) ITEM NOT ILLUSTRATED



FLUSH BOX ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 05
PAGE 01



REVISION:



FLUSH BOX ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 05
PAGE 02

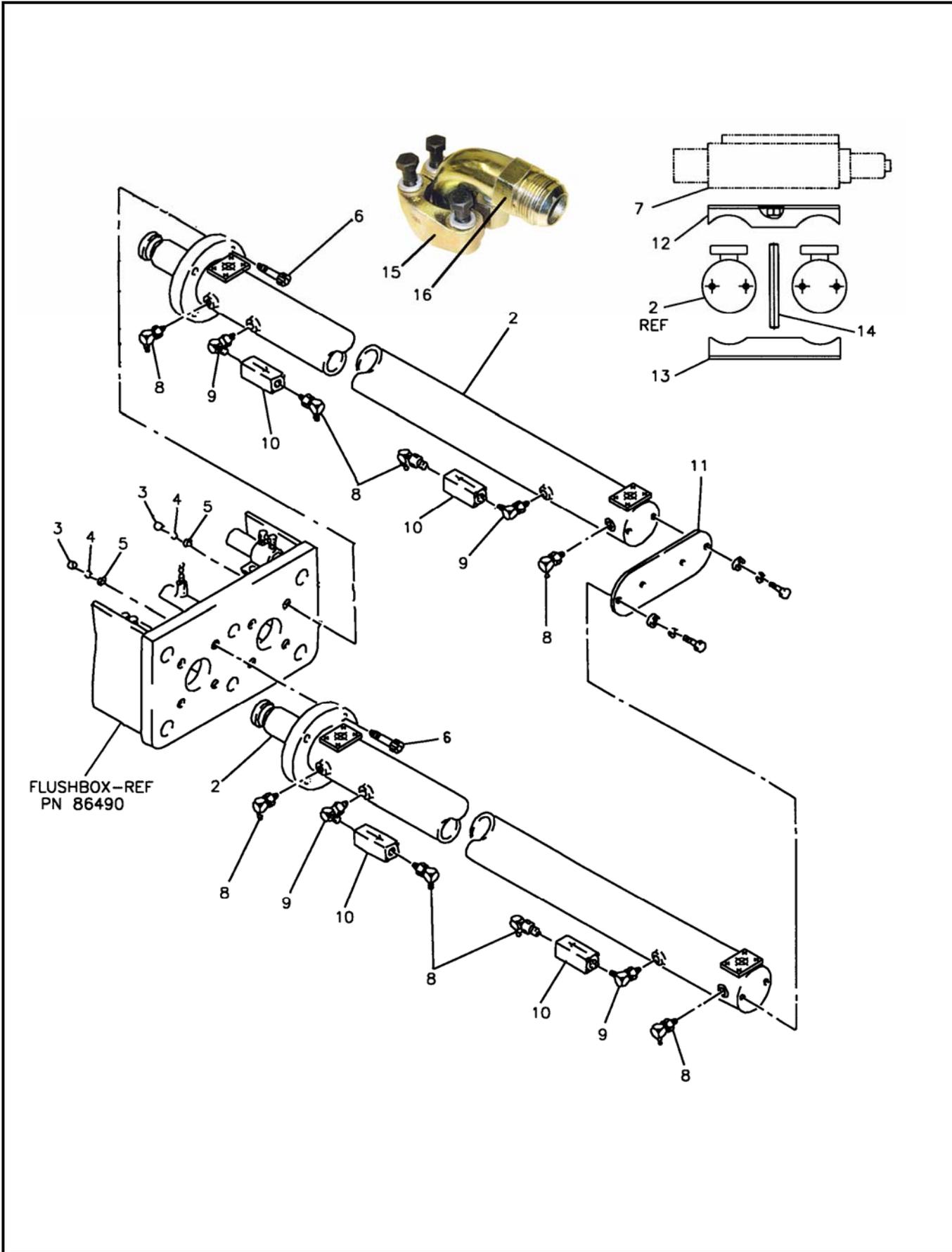
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	60-05	Assembly, Flushbox (See Group 60, Figure 01 for NHA)	Ref
2	86106	• Assembly, Flush Box Cover	1
3		• • Nut, Hex	2
4		• • Washer, Lock	2
5	13257	• • Weatherstrip, Rubber	A/R
6	86010	• • Weldment, Flush Box Cover	1
7	86105	• • Knob	1
8	800418	• • Lanyard	1
9		• • Screw, Rd Hd	1
10	79056	• • Handle, Splash Guard	1
11	77990	• Cable, Proximity Switch	2
12	77998	• Sensor, Proximity Switch	2
-13	86492	• Assembly, 7 Inch Flush Box Group	1
14		• • Bolt, Hex	2
15		• • Washer, Lock	2
16	86006	• • Bracket, Proximity Switch	1
17	86665	• • Stud	1
18	10528	• • Nut	1
19	10522	• • Conduit, Fitting (Proximity wires must be removed to replace fitting)	1
20		• • Bolt, Hex	4
21	86490	• • Weldment, 7 Inch Flush Box	1
22	10224	• Bushing, Hex	1
23	10355	• Nipple	1
24	56413	• Valve, Ball	1
25	74944	• Plug	1

DASH (-) ITEM NOT ILLUSTRATED



HYDRAULIC DRIVE CYLINDER ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 06
PAGE 01



REVISION:



HYDRAULIC DRIVE CYLINDER ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 06
PAGE 02

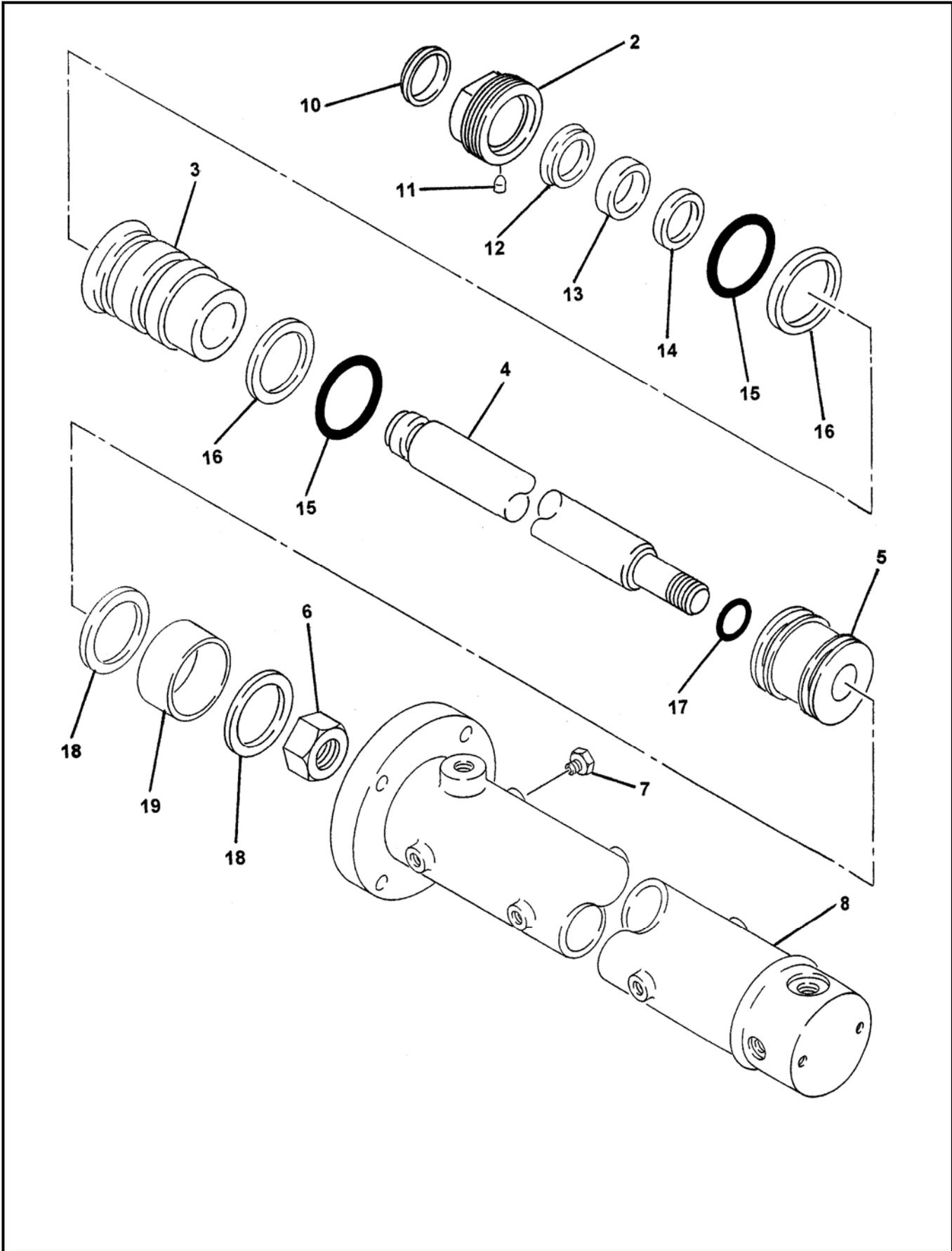
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	87546	Group, Hydraulic Drive Cylinder (See Group 60, Figure 01 for NHA)	Ref
2	86225	• Sub-Assembly, Hydraulic Drive Cylinder (See Group 60, Figure 07 for DET)	1
3		• Nut, Hex (attaching parts)	8
4		• Washer, Lock (attaching parts)	8
5		• Washer (attaching parts)	8
6		• Bolt (attaching parts)	8
7	86883	• Manifold	1
8		• Fitting, 90°	8
9		• Fitting, 90°	4
10	78961	• Valve, Check	4
11	86544	• Plate, End	1
12	86881	• Bracket, Mounting-Top	1
13	86882	• Bracket, Mounting-Lower	1
14	86889	• Washer, Lock (attaching parts)	1
15	86265-002	• Split Flange-Code 62-16 SAE	4
16	86912-004	• Flange – 16 SAE	4
-17	86883-CAR	• Cartridge, Manifold-86883	1
-18	86883-COIL	• Coil, Manifold-86883	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



HYDRAULIC DRIVE CYLINDER SUB-ASSEMBLY

C90S
PARTS
GROUP 60
FIGURE 07
PAGE 01



REVISION:



**HYDRAULIC DRIVE
CYLINDER SUB-ASSEMBLY**

C90S
PARTS
GROUP 60
FIGURE 07
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86225	Sub-Assembly, Hydraulic Drive Cylinder (See Group 60, Figure 06 for NHA)	Ref
2		• Nut, Retaining	1
3		• Rod, Cylinder	1
4		• Retainer	1
5		• Piston	1
6		• Weldment, Cylinder Barrel	1
-7	86225-SKTX	• Kit, Seal	1
8		•• Wiper, Rod	1
9		•• Bearing, Rod Bronze	1
10		•• Seal, Rod	1
11		•• Seal, Static	1
12		•• Seal, Static	1
13		•• Seal, Piston	2
14		•• Ring, Wear	2
15		•• Nut, Piston	1
16		• Plug	4

DASH (-) ITEM NOT ILLUSTRATED



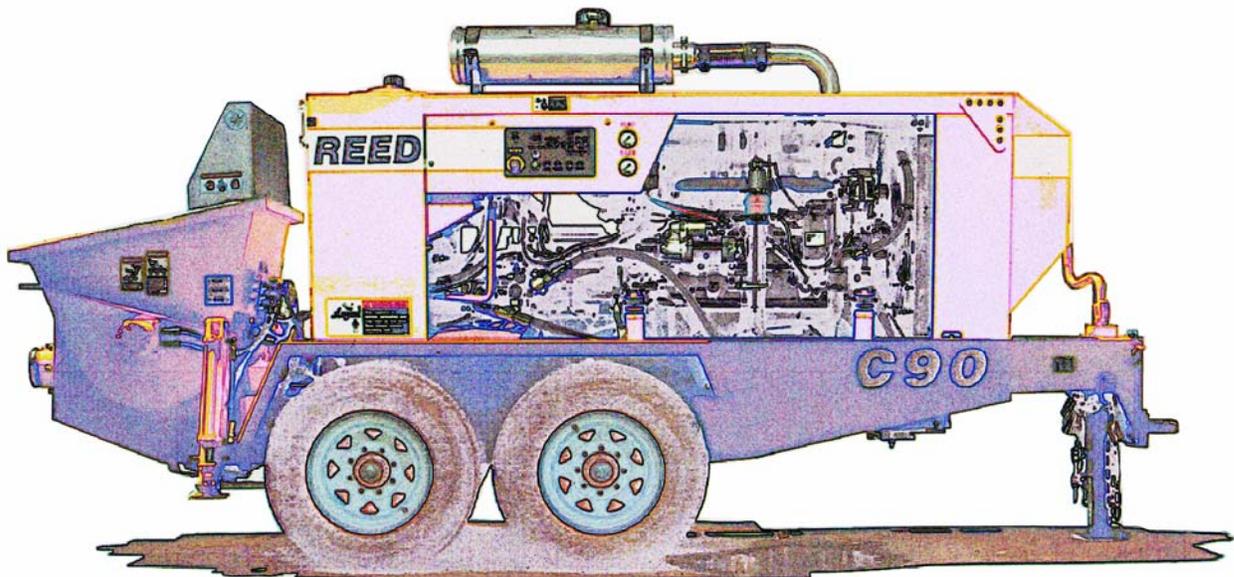
**TRAILER MOUNTED PUMP 01 MODEL C90S
ILLUSTRATED PARTS MANUAL**

C90S
PARTS
GROUP 60
FIGURE 08
PAGE 01

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REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 70 FRAME INSTALLATION CONTAINS THE FOLLOWING FIGURES:

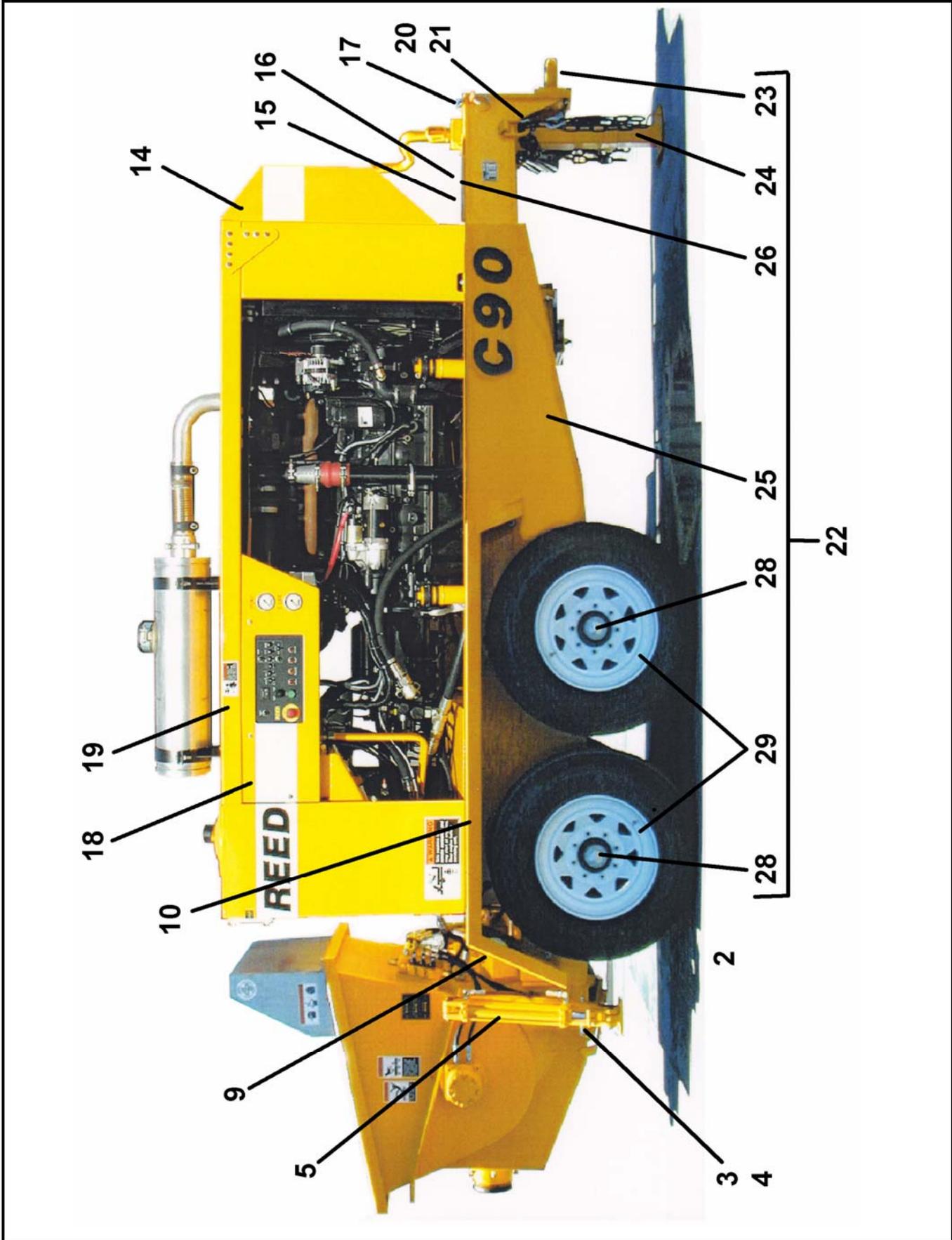
- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** FRAME INSTALLATION
- FIGURE 02** HYDRAULIC OUTRIGGER CYLINDER ASSEMBLY
- FIGURE 03** HUB AND BRAKE ASSEMBLY
- FIGURE 04** NON-OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY
- FIGURE 05** OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY





FRAME INSTALLATION

C90S
PARTS
GROUP 70
FIGURE 01
PAGE 01



REVISION:



FRAME INSTALLATION

C90S
PARTS
 GROUP 70
 FIGURE 01
 PAGE 02

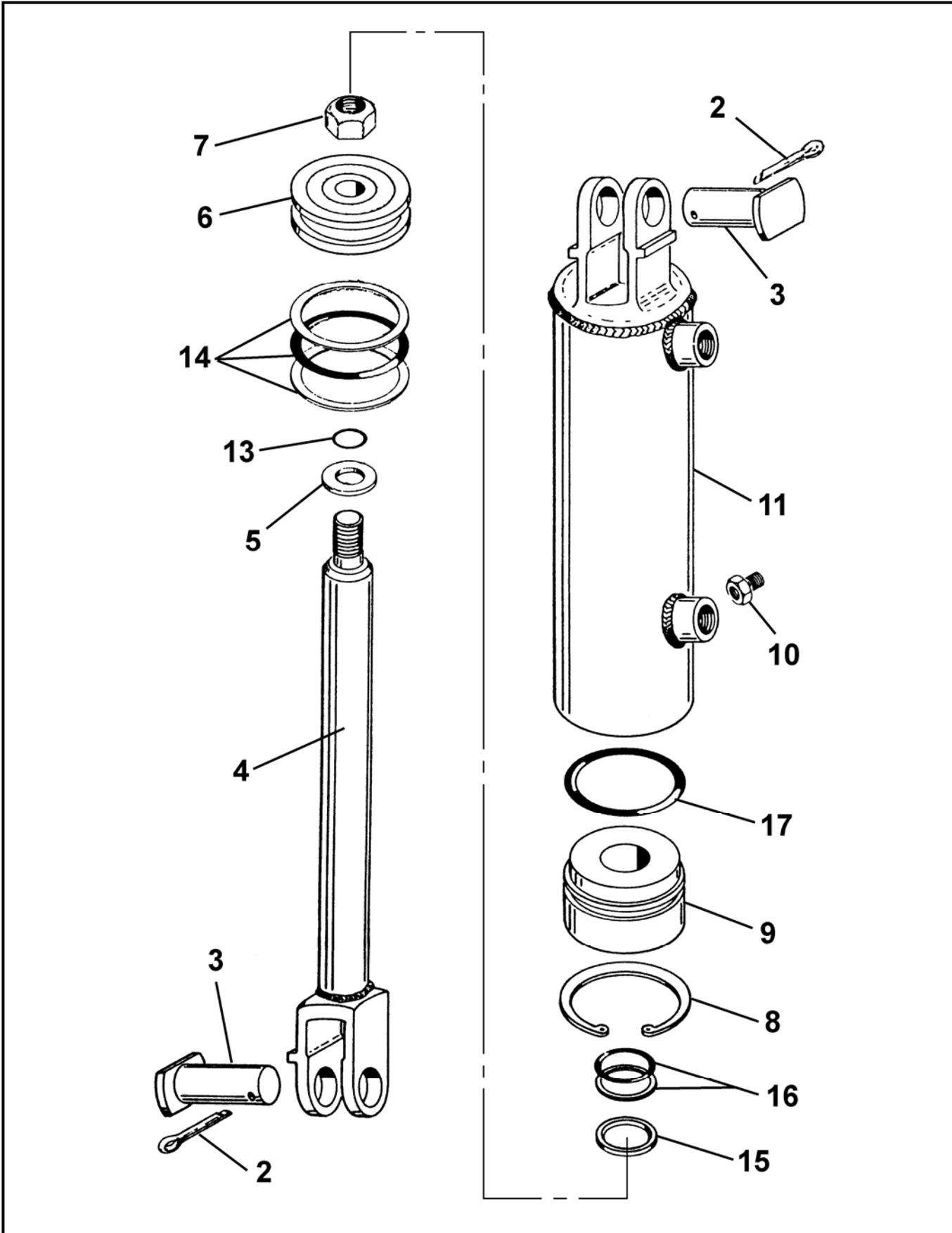
ITEM NO.	REED'S PARTS NO.	DESCRIPTION					QTY
		1	2	3	4	5	
-1	70-01	Installation, Frame (See Group 10, Figure 01 for NHA)					Ref
2A	86553	• Weldment, Outrigger Inner					2
2B	86557	• Outertube, Outrigger					2
3	85595	• Pin					2
4	800418	• Lanyard, Pin					2
5	86574	• Assembly, Hydraulic Outrigger Cylinder (See Group 70, Figure 02 for REF)					2
-6	85685	• Tube, Hydraulic Outrigger					1
-7	88686	• Tube, Hydraulic Outrigger					1
-8	801902-020	• Clamp, Tube					4
9	72948	• Light, Tail					2
10	85394	• Weldment, Right Fender					1
-11	85395	• Weldment, Left Fender					1
-12	85438	• Tube, Hydraulic Shift Cylinder					1
-13	85439	• Tube, Hydraulic Shift Cylinder					1
14A	87592	• Cover, Front Air Intake					1
14B	87593	• Cover, Front Engine					1
14C	87647	• Gusset, Engine Cover					2
15	86532	• Assembly, Trailer Wiring Harness (See Schematic Section for REF)					1
16	72813	• Grommet, Tool Box					1
17	72949	• Grommet, Trailer					5
18	87449	• Cover, Control Box					1
-18A	87397	• Mount, Control Box Angle-RH					1
-18B	87398	• Mount, Control Box Angle-LH					1
19	87591	• Cover, Top Engine					1
20	87086	• Chain Assembly					2
20A	86730	•• Chain-5FT					2
21	87085	•• Shackle-Connector, Chain					4
22	87587	• Assembly, Frame					1
23	87037	•• Drawbar					1
24	85123	•• Weldment, Jack					1
25	87648	•• Weldment, Frame					1
26	85636	••• Cover, Tool Box					1
27	85383	•• Axle					2
28	70-03	•• Assembly, Hub and Brake (See Group 70, Figure 03 for DET)					4
29	85423	•• Assembly, Wheel and Tire					4
-30	10196	• Lok, Trim 1.5 FT					1
-31	73613	• Seal, Trim 6 FT					1
DASH (-) ITEM NOT ILLUSTRATED							

REVISION:



HYDRAULIC OUTRIGGER CYLINDER ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 02
PAGE 01



REVISION:



HYDRAULIC OUTRIGGER CYLINDER ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 02
PAGE 02

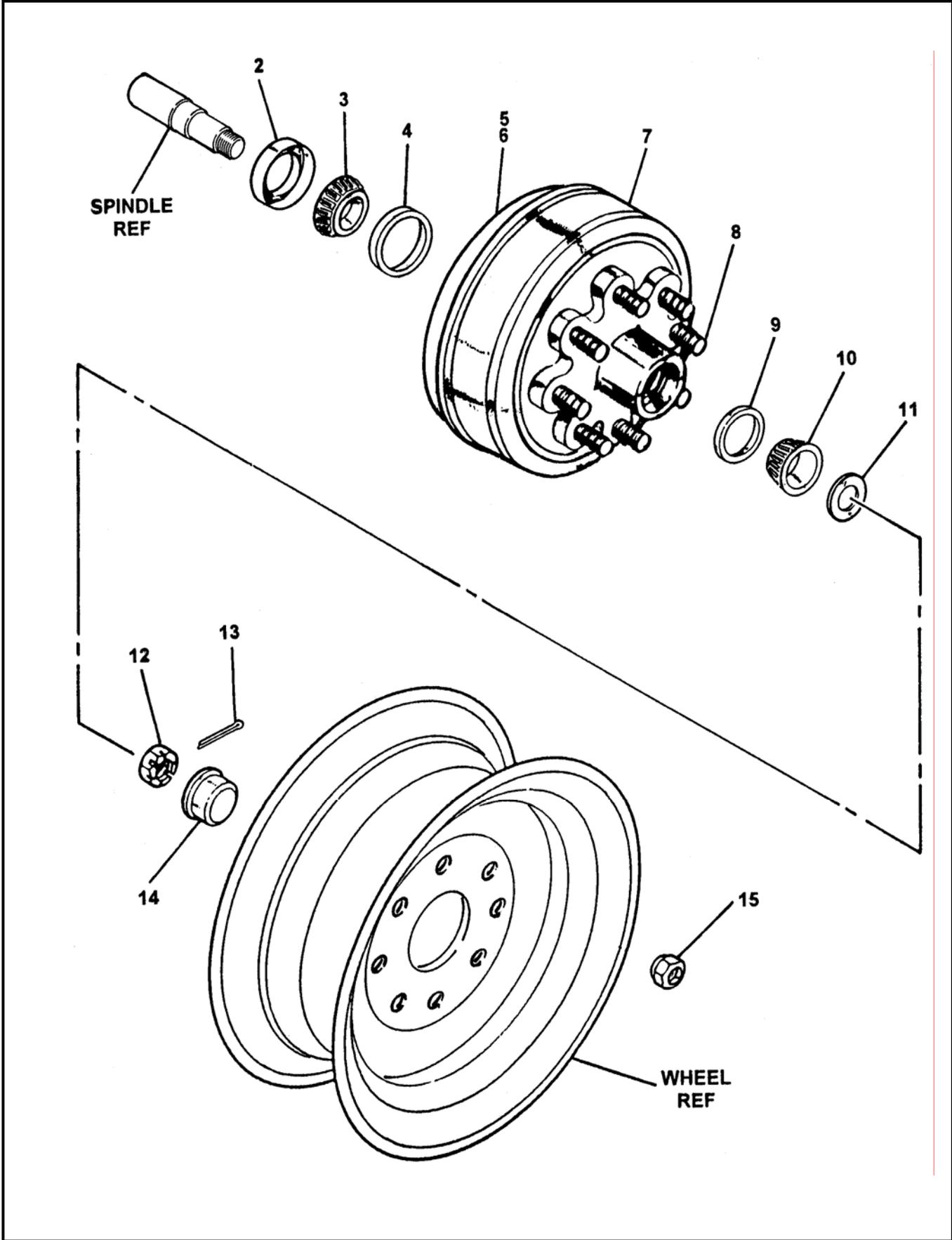
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86574	Assembly, Hydraulic Outrigger Cylinder (See Group 70, Figure 01 for NHA)	Ref
2		• Pin, Safety	2
3		• Pin, Clevis	2
4		• Assembly, Shaft	1
5		• Washer, Steel	1
6		• Piston	1
7		• Nut, Piston Lock	1
8		• Ring, Head Lock	1
9		• Head	1
10		• Screw, Head Set	1
11		• Assembly, Tube	1
-12	86574-SK	• Kit, Seal	1
13		•• O-Ring, Small	1
14		•• Sub-Assembly, Piston O-Ring	1
15		•• Wiper, Rod	1
16		•• Packing, Shaft (Pair)	1
17		•• O-Ring, Head	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



HUB AND BRAKE ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 03
PAGE 01



REVISION:



HUB AND BRAKE ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 03
PAGE 02

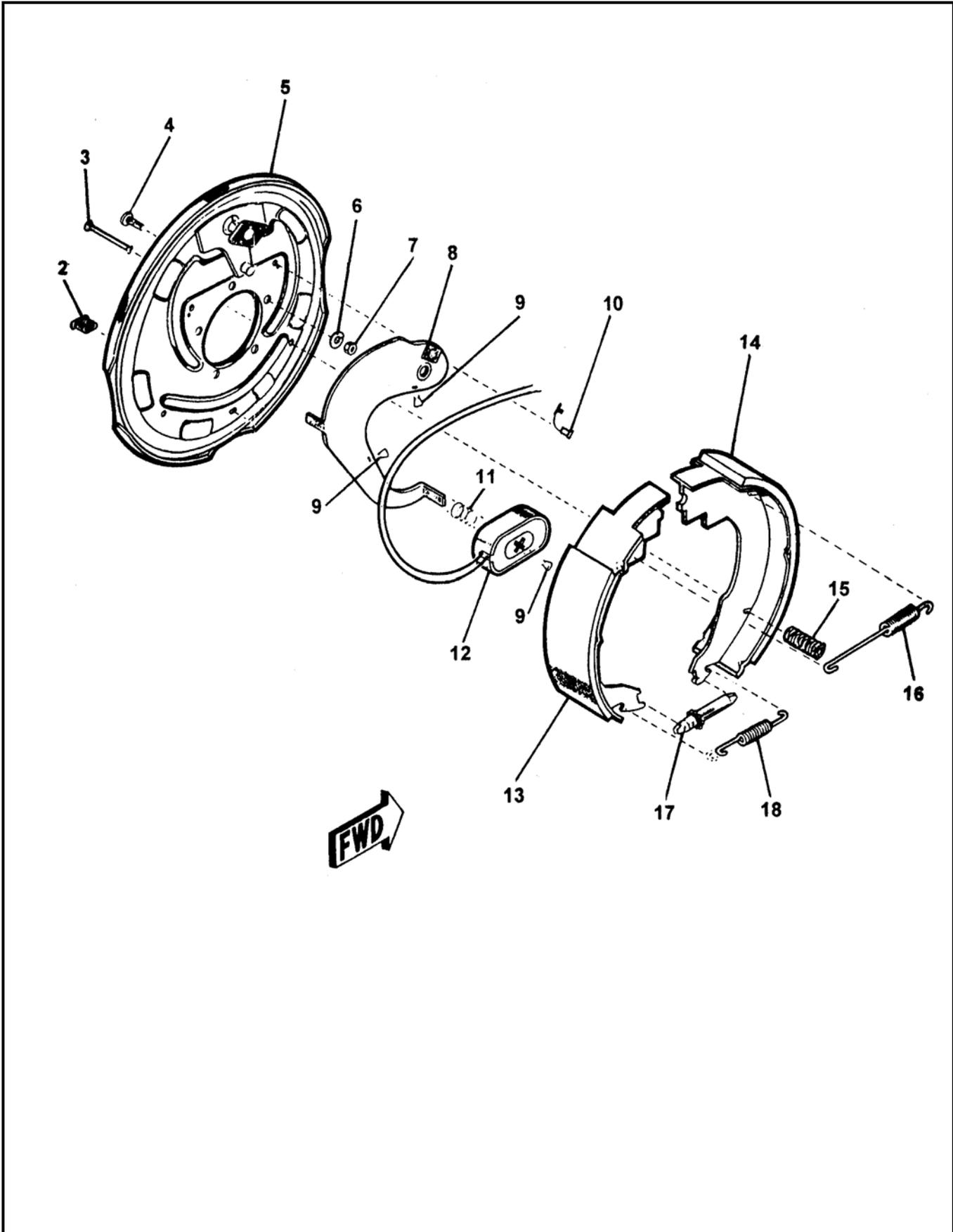
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	70-03	Assembly, Hub and Brake (See Group 70, Figure 01 for NHA)	Ref
2	86709	• Seal, Double Lip Grease	2
3	71094	• Bearing, Inner	2
4	71092	• Race, Inner Bearing	2
5	71056-L	• Assembly, Non-Operator Electric Brake (See Group 70, Figure 04 for DET)	1
6	71056-R	• Assembly, Operator Electric Brake (See Group 70, Figure 05 for DET)	1
7	86717	• Assembly, Drum & Hub	2
8	86716	• Stud, Wheel	16
9	86710	• Race, Outer Bearing	2
10	71098	• Bearing, Outer	2
11	86711	• Washer, Spindle	2
12	86712	• Nut, Spindle	2
13	86713	• Pin, Cotter	2
14	86714	• Cap, Dust	2
15	86715	• Nut, Wheel	16
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



NON OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 04
PAGE 01



REVISION:



NON OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 04
PAGE 02

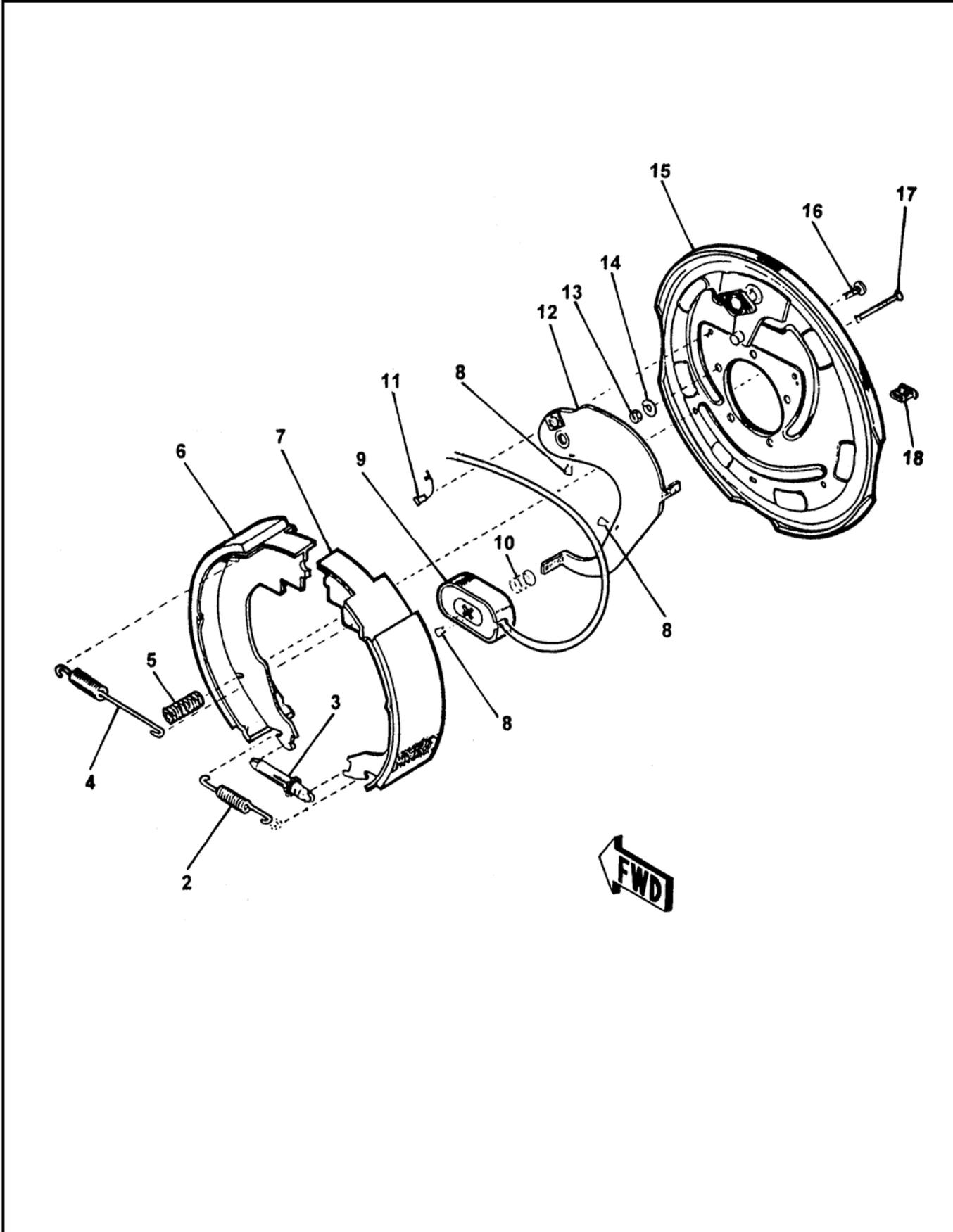
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	71056-L	Assembly, Non-Operator Side Electric Brake (See Group 70, Figure 03 for NHA)	Ref
2		• Slot, Plug Adjust	1
3		• Pin, Shoe Hold down	1
4		• Stud, Brake Mounting	5
5		• Assembly, Baking Plate	1
6		• Washer, Brake Lock	5
7		• Nut, Brake Mounting	5
8		• Lever, Non-Operator Side	1
9		• Clip, Wire and Magnet	3
10		• Relief, Strain	2
11		• Spring, Magnet	1
12		• Sub-Assembly, Magnet	1
13		• Shoe and Lining, Primary	1
14		• Shoe and Lining, Secondary	1
15		• Spring, Shoe Hold down	1
16		• Spring, Shoe Retractor	1
17		• Sub-Assembly, Adjuster Screw	1
18		• Spring, Adjuster Screw	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



OPERATOR SIDE ELECTRIC BRAKE ASSEMBLY

C90S
PARTS
GROUP 70
FIGURE 05
PAGE 01



REVISION:



**OPERATOR SIDE
ELECTRIC BRAKE ASSEMBLY**

**C90S
PARTS
GROUP 70
FIGURE 05
PAGE 02**

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	71056-R	Assembly, Operator Side Electric Brake (See Group 70, Figure 03 for NHA)	Ref
2		• Spring, Adjuster Screw	1
3		• Sub-Assembly, Adjuster Screw	1
4		• Spring, Shoe Retractor	1
5		• Spring, Shoe Hold down	1
6		• Shoe and Lining, Secondary	1
7		• Shoe and Lining, Primary	1
8		• Clip, Wire and Magnet	3
9		• Sub-Assembly, Magnet	1
10		• Spring, Magnet	1
11		• Relief, Strain	2
12		• Lever, Operator Side	1
13		• Nut, Brake Mounting	5
14		• Washer, Brake Lock	5
15		• Assembly, Baking Plate	1
16		• Stud, Brake Mounting	5
17		• Pin, Shoe Hold down	1
18		• Slot, Plug Adjust	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



**TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 70 FRAME INSTALLATION**

**C90S
PARTS
GROUP 70
FIGURE 06
PAGE 01**

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REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S ILLUSTRATED PARTS MANUAL GROUP 80 OPTIONAL INSTALLATION CONTAINS THE FOLLOWING FIGURES:

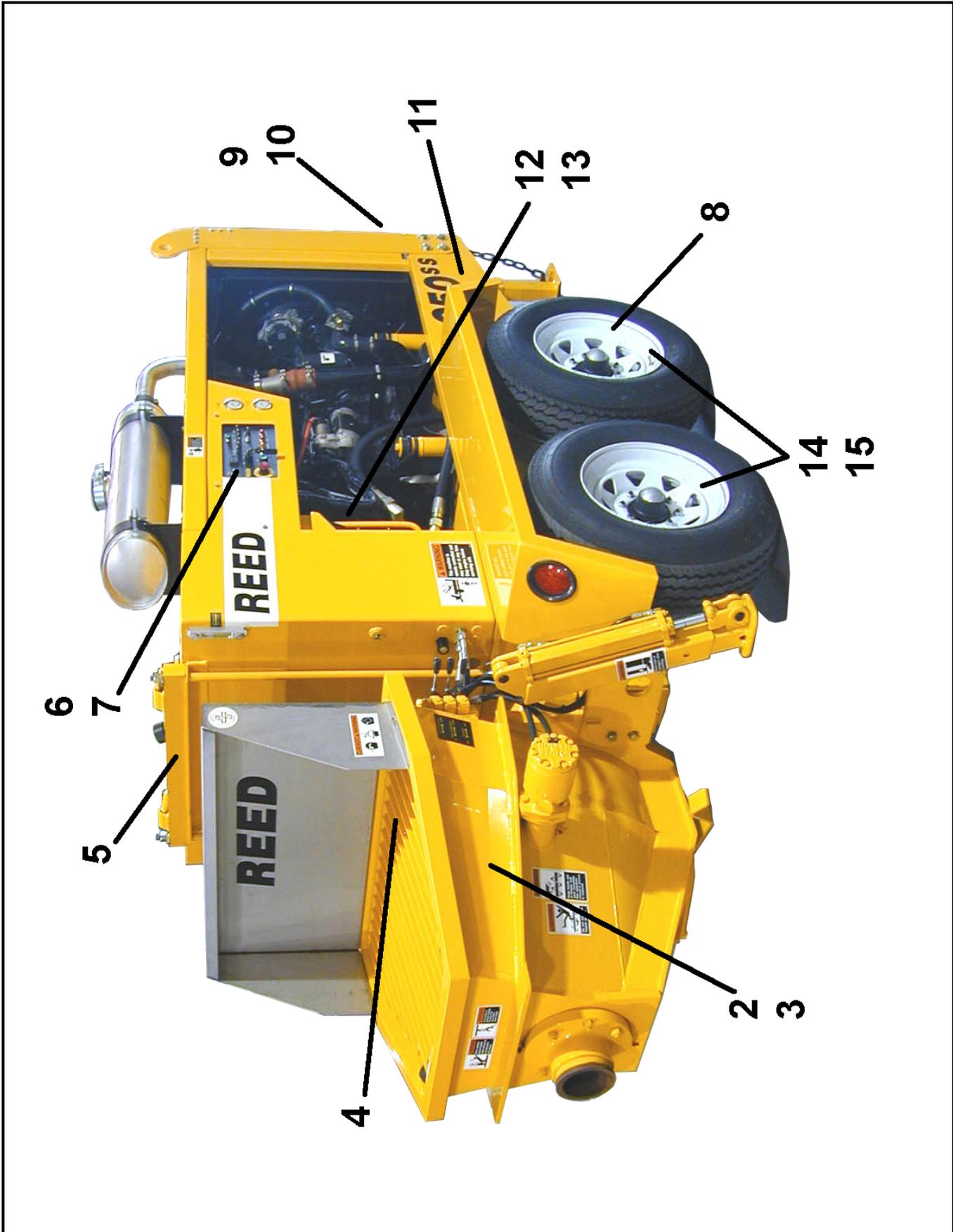
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FIGURE 03	12 VOLT LUBE PUMP ASSEMBLY
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FIGURE 10	WASH PUMP MOTOR ASSEMBLY
FIGURE 11	ACCUMULATOR CHARGE KIT
FIGURE 12	NON-OPERATOR SIDE HYDRAULIC BRAKE ASSEMBLY
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FIGURE 14	1 SPOOL VALVE ASSEMBLY
FIGURE 15	1 SPOOL VALVE SUB-ASSEMBLY
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OPTIONAL INSTALLATION

C90S
PARTS
GROUP 80
FIGURE 01
PAGE 01



REVISION:



OPTIONAL INSTALLATION

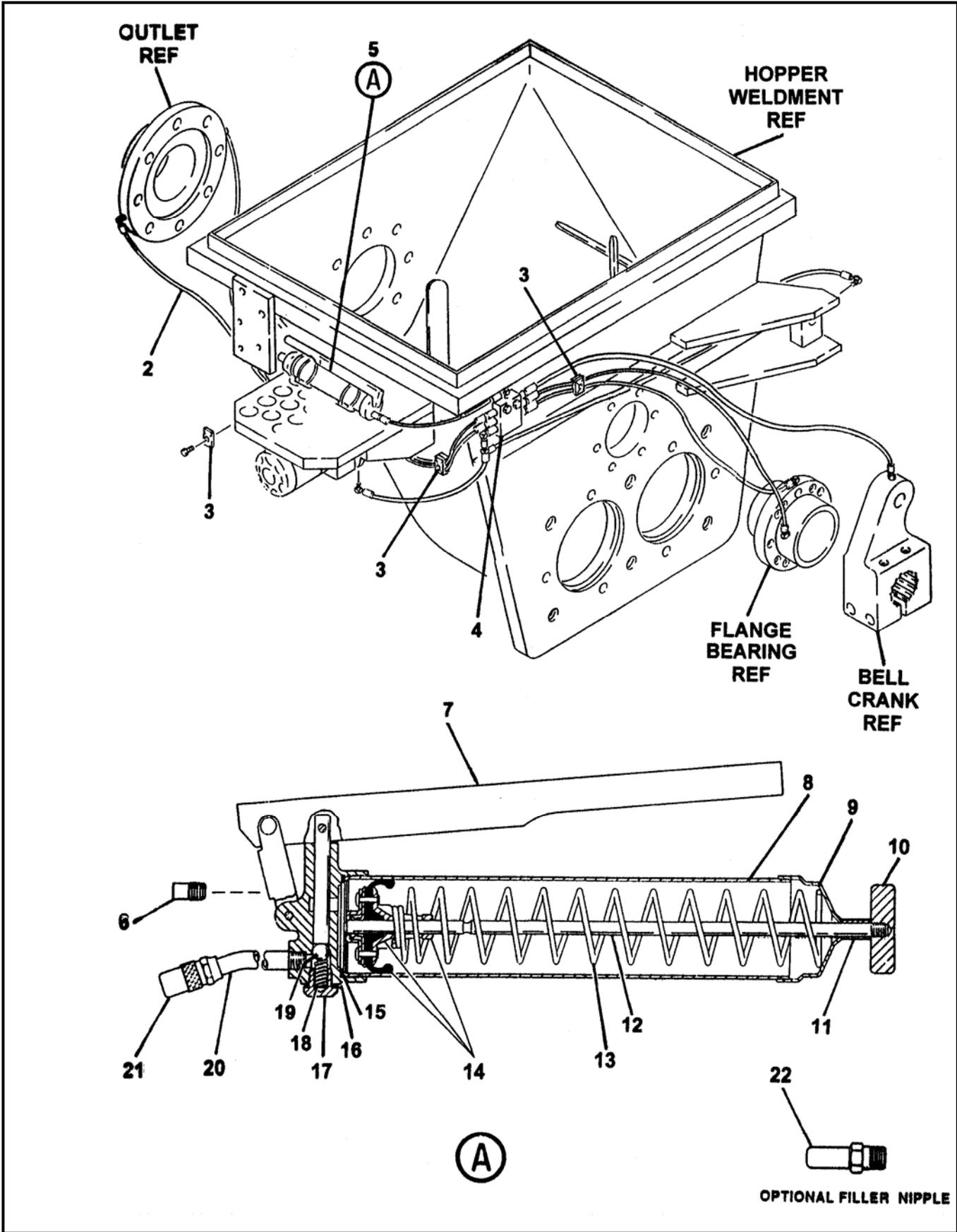
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-01	Installation, Optional (See Group 10, Figure 01 and Figure 02 for NHA)	Ref
2	80-02	• Assembly, Lube System (See Group 80, Figure 02 for DET)	1
3	78736	• Assembly, Lube Pump (See Group 80, Figure 03 for DET)	1
4	86926	• Assembly, Hopper Vibration (See Group 80, Figure 04 for DET)	1
5	86863	• Assembly, Optional Lifting	1
6	85818	• Assembly, Radio Remote Control (See Group 50, Figure 04 for REF)	1
7	85774	• Assembly, Stroke Counter	1
8	80-05	• Assembly, Chrome Wheel (See Group 80, Figure 05 for DET)	1
9	79020	• Assembly, Optional Tool Kit (See Group 80, Figure 07 for DET)	1
10	87191	• Assembly, Actuator Brake (See Group 80, Figure 08 for DET)	1
11	86399	• Assembly, Wash Pump (See Group 80, Figure 09 for DET)	1
12	71460	• Kit, Accumulator Charge (See Group 80, Figure 12 for DET)	1
13	30-11	• Kit, Bladder Repair (See Group 30, Figure 11 for REF)	1
14	80-13	• Assembly, Non-Operator Side Hydraulic Brake (See Group 80, Figure 13 for DET)	2
15	80-14	• Assembly, Operator Side Hydraulic Brake (See Group 80, Figure 14 for DET)	2
16	80-15	• Assembly, 1 Spool Valve (See Group 80, Figure 15 for DET)	1
17	80-17	• Assembly, 2 Spool Valve (See Group 80, Figure 17 for DET)	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



LUBE SYSTEM ASSEMBLY(OPTIONAL)

C90S
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GROUP 80
FIGURE 02
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LUBE SYSTEM ASSEMBLY(OPTIONAL)

C90S
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GROUP 80
FIGURE 02
PAGE 02

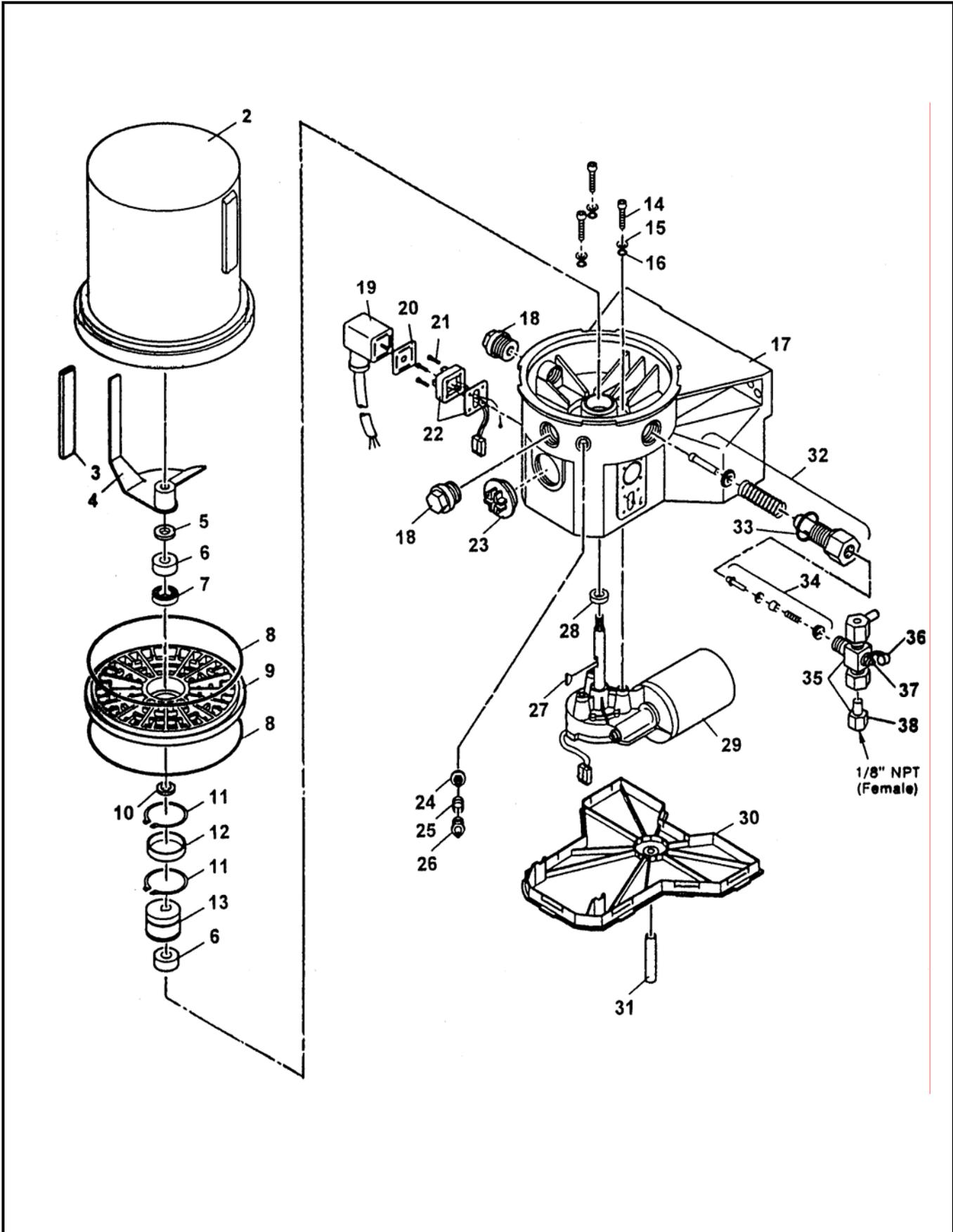
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-02	Assembly, Lube System (See Group 80, Figure 01 for NHA)	Ref
2		• Assembly, Lube Hose	A/R
3	75436	• Clamp, Pipe	3
4	72355	• Block, 6 Station Lube System	1
5	78532	• Gun, Grease	1
6		•• Plug	1
7		•• Handle, Pumping	1
8		•• Tube, Container	1
9		•• Cap, Tube	1
10		•• Handle, Follower	1
11		•• Spacer	1
12		•• Rod, Follower	1
13		•• Spring	1
14		•• Sub-Assembly, Follower	1
15		•• Packing, Container	1
16		•• Gasket	1
17		•• Housing, Spring	1
18		•• Spring	1
19		•• Ball, Check	1
20		•• Extension, Nozzle	1
21		•• Coupler, Hydraulic	1
22		•• Nipple, Filler (Optional Item)	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



LUBE PUMP ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 03
PAGE 01



REVISION:



LUBE PUMP ASSEMBLY

C90S
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GROUP 80
FIGURE 03
PAGE 02

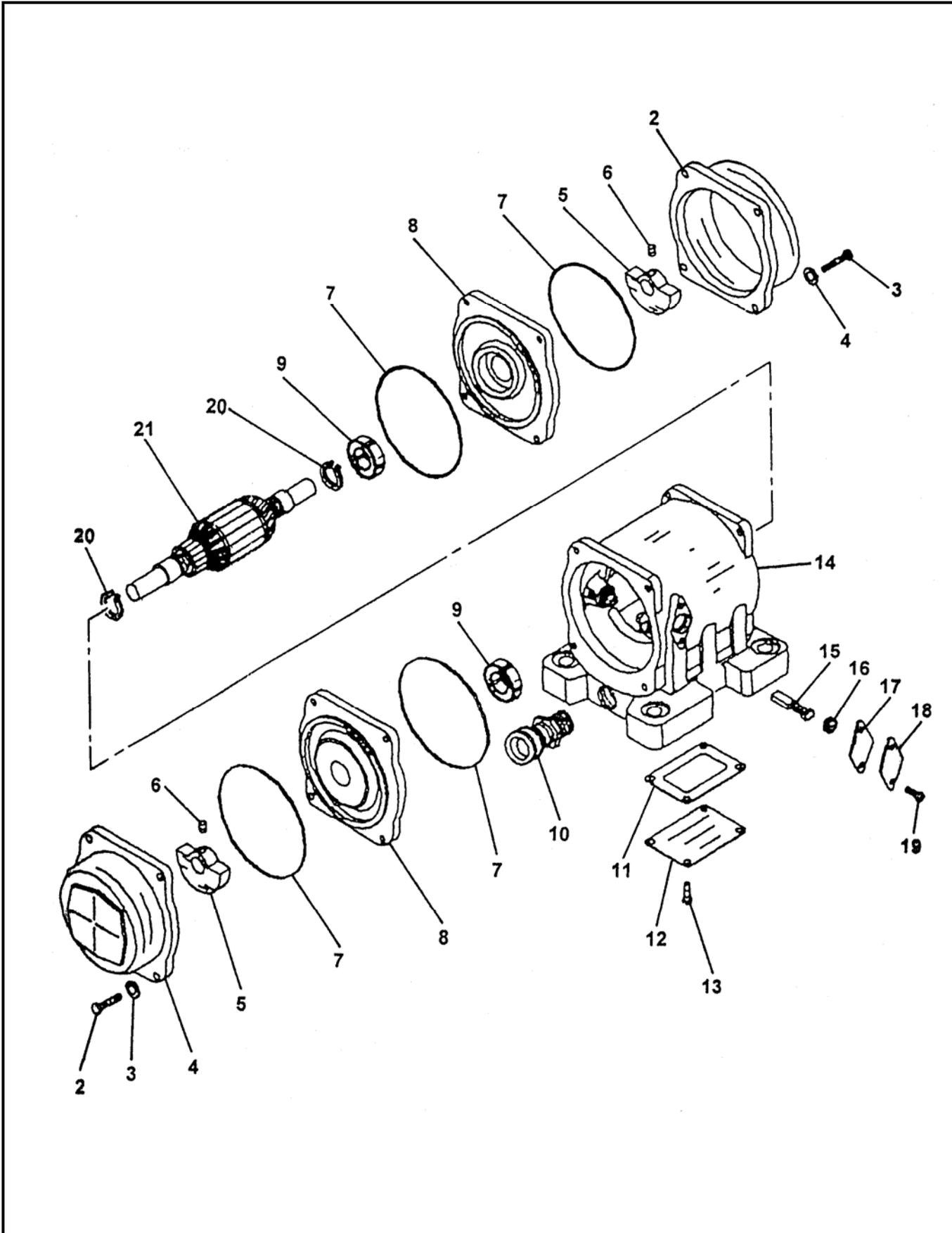
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	78736	Assembly, Lube Pump (See Group 80, Figure 01 for NHA)	Ref
2		• Reservoir	1
3		• House	1
4		• Paddle, Stirring	1
5		• Washer	1
6		• Ring, Bearing	2
7		• Bearing	1
8		• O-Ring	2
9		• Plate, Intermediate	1
10		• Shim	1
11		• Ring, Snap	2
12		• Ring, Inner	1
13		• Cam, Eccentric	1
14		• Screw	3
15		• Washer	3
16		• O-Ring	3
17		• Housing, Pump	1
18		• Plug, Closure	2
19		• Socket with Cord	1
20		• Packing, Flat	1
21		• Screw	4
22		• Plug	1
23		• Plug, Sealing	1
24		• Insert, Filter	1
25		• Spring	1
26		• Fitting, Grease	1
27		• Key, Woodruff	1
28		• Seal, Radial	1
29		• Motor, 12 VDC	1
30		• Cover, Housing	1
31		• Hose	1
32		• Element, Pump	1
33		• Gasket	1
34		• Valve, Check	1
35		• Assembly, Pressure Reliefs	1
36		• Cap, Grease	1
37		• Fitting, Grease	1
38		• Assembly, Adapter for Relief	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



HOPPER VIBRATOR ASSEMBLY

C90S
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FIGURE 04
PAGE 01



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HOPPER VIBRATOR ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 04
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86926	Assembly, Hopper Vibrator (See Group 80, Figure 01 for NHA)	Ref
2		• Cap, End	2
3		• Bolt (attaching parts)	8
4		• Washer, Lock (attaching parts)	8
5		• Weight	2
6		• Screw, Set (attaching parts)	2
7		• O-Ring	4
8		• Bell, End	2
9		• Bearing	2
10		• Holder, Cord	1
11		• Gasket	1
12		• Cover, Box	1
13		• Screw (attaching parts)	4
14		• Sub-Assembly, Housing	1
15		• Brush	1
16		• Cap, Brush	2
17		• Gasket	2
18		• Cover, Brush	2
19		• Screw (attaching parts)	4
20		• Ring, Snap	2
21		• Assembly, Armature	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



CHROME WHEEL ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 05
PAGE 01



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REVISION:

CHROME WHEEL ASSEMBLY

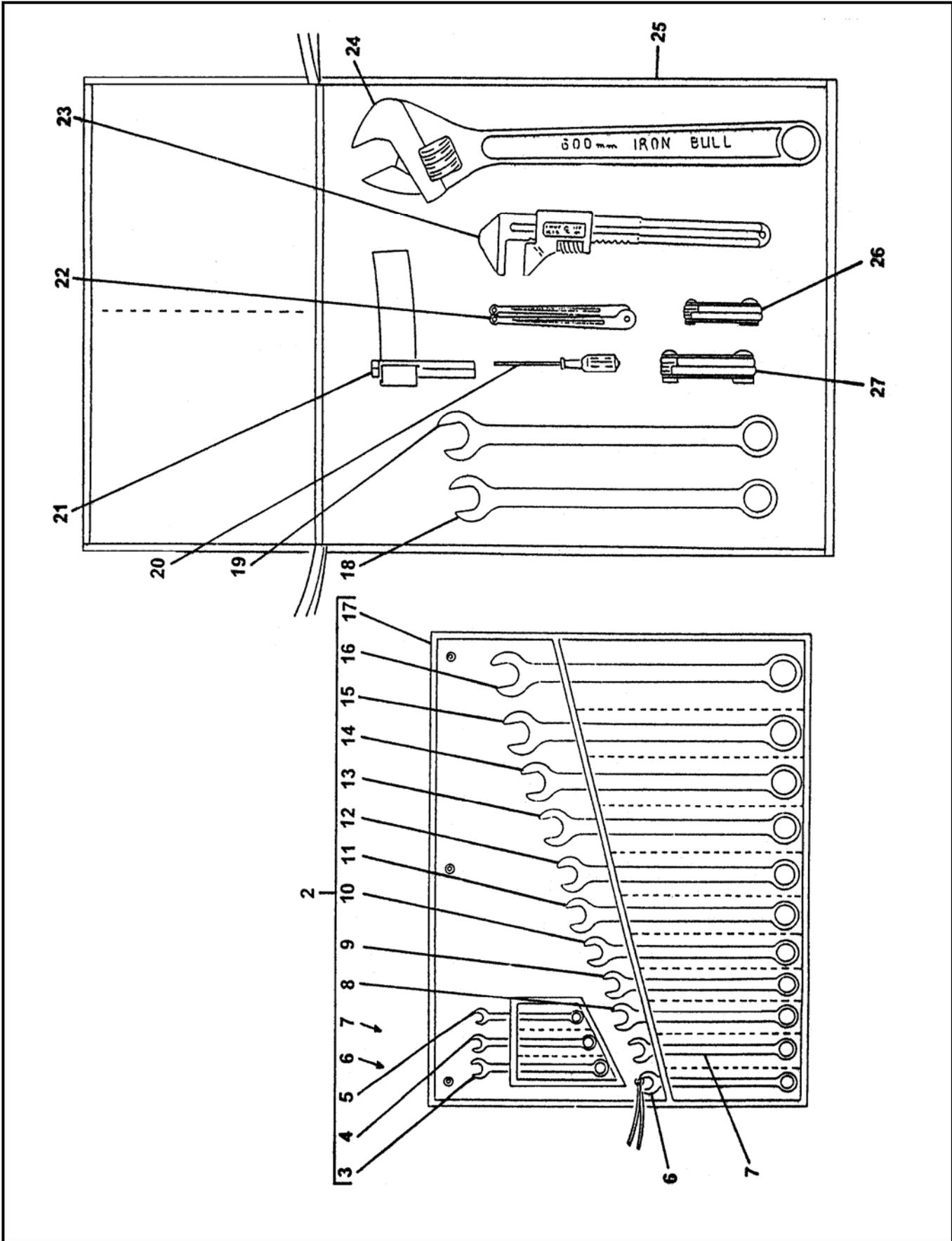


ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-05	Assembly, Chrome Wheel (See Group 80, Figure 01 for NHA)	Ref
2	86059	• Assembly, Chrome Wheel and Tire	4
3	-	•• Tire	1
4	-	•• Wheel	1
5	85383	• Axle	2



OPTIONAL TOOL KIT

C90S
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GROUP 80
FIGURE 06
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OPTIONAL TOOL KIT

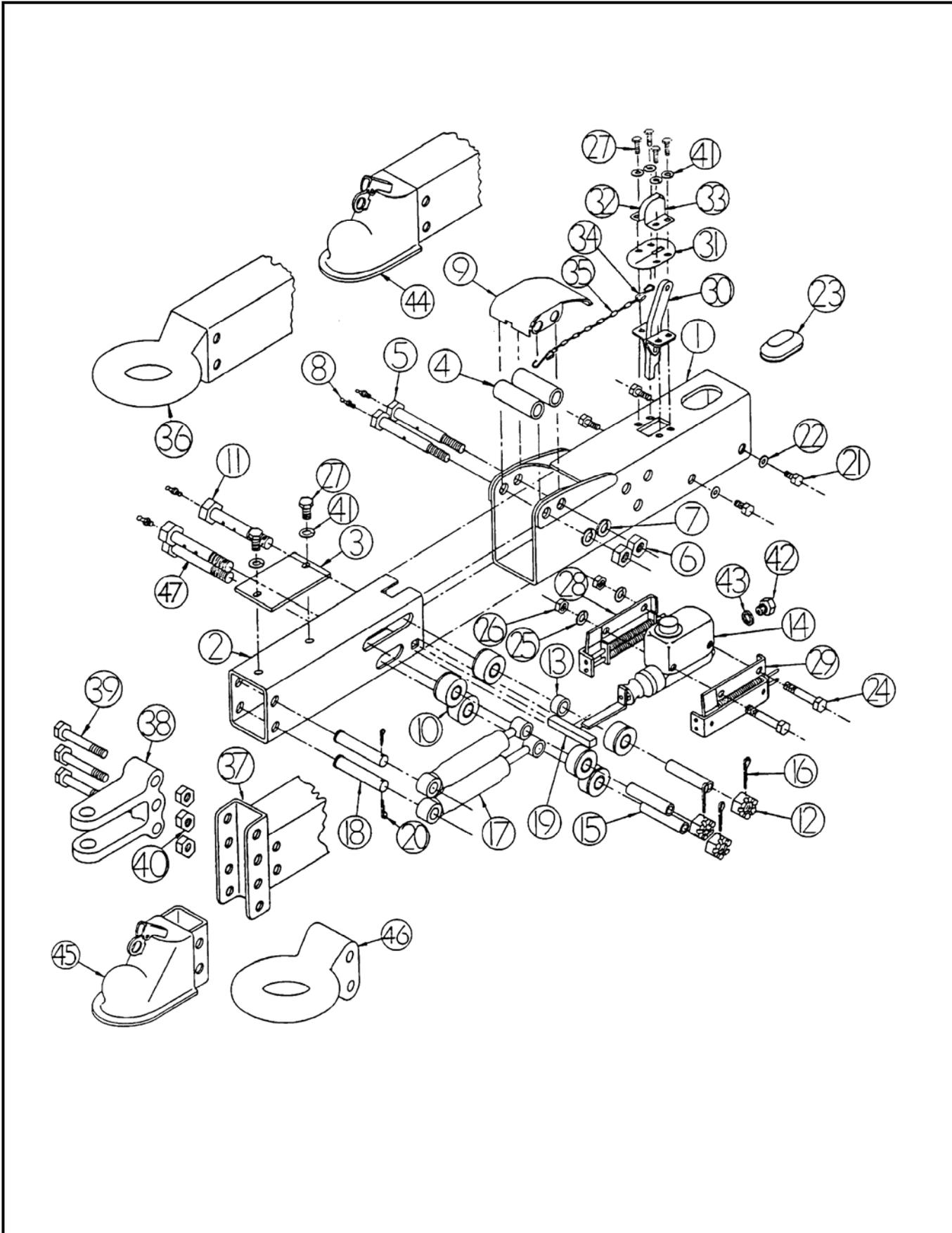
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	79020	Assembly, Optional Tool Kit (See Group 80, Figure 01 for NHA)	Ref
2	79037	• Kit, Wrench	1
3		•• Wrench, 1/2 Inch	1
4		•• Wrench, 7/16 Inch	1
5		•• Wrench, 3/8 Inch	1
6		•• Wrench, 9/16 Inch	1
7		•• Wrench, 5/8 Inch	1
8		•• Wrench, 11/16 Inch	1
9		•• Wrench, 3/4 Inch	1
10		•• Wrench, 13/16 Inch	1
11		•• Wrench, 7/8 Inch	1
12		•• Wrench, 15/16 Inch	1
13		•• Wrench, 1 Inch	1
14		•• Wrench, 1-1/16 Inch	1
15		•• Wrench, 1-1/8 Inch	1
16		•• Wrench, 1-1/4 Inch	1
17		•• Wrap, Plastic	1
18	79036	• Wrench, 1-3/8 Inch	1
19	79028	• Wrench, 1-1/2 Inch	1
20	79038	• Screwdriver	1
21	79814	• Wrench, Strap (for Filter)	1
22	79325	• Wrench, Spanner	1
23	79031	• Wrench, Monkey	1
24	79032	• Wrench, Adjustable 24 Inch	1
25	77502	• Bag, Tool	1
26	79030	• Set, Metric Allen Key (2-8 mm)	1
27	79029	• Set, Standard Allen Key (3/16-3/8 Inch)	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



ACTUATOR BRAKES ASSEMBLY

C90S
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FIGURE 07
PAGE 01



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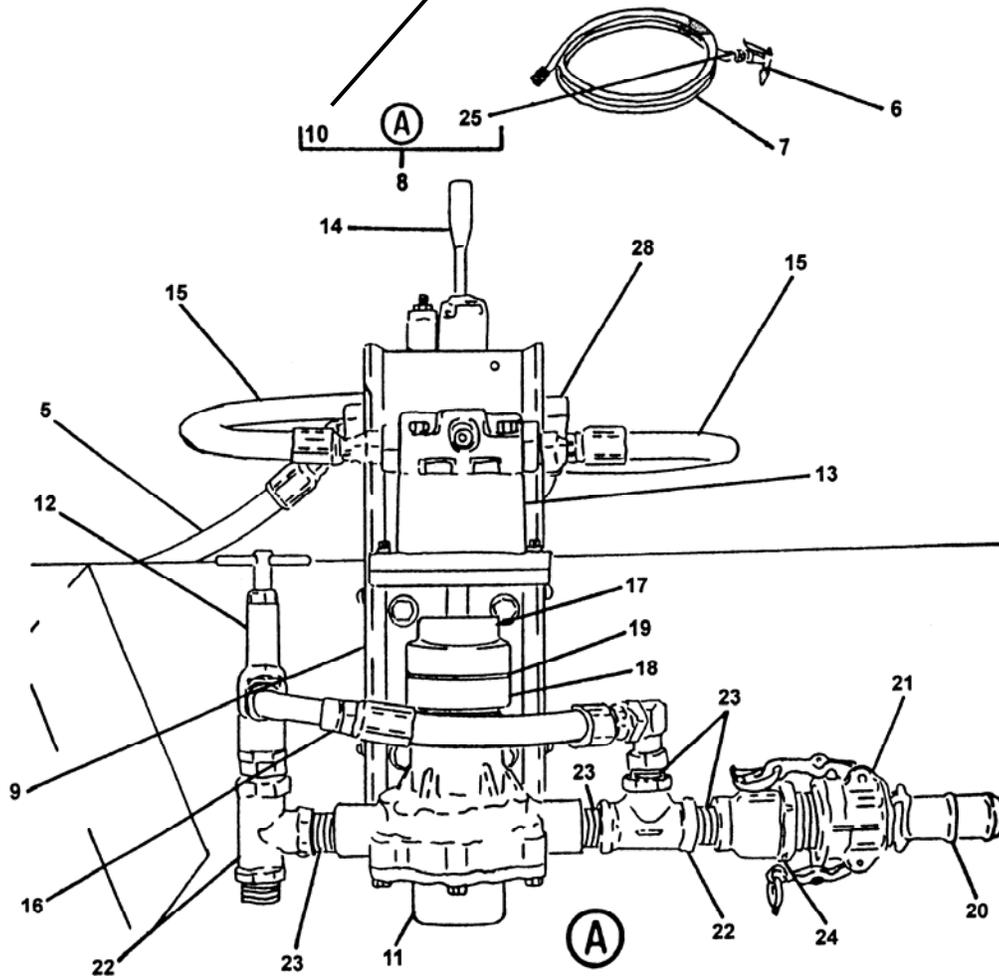
ACTUATOR BRAKES ASSEMBLY

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY																																																																																																																																																																																																																								
A	87191	1 2 3 4 5 Assembly, Actuator Brakes (See Group 80, Figure 01 for NHA)	Ref																																																																																																																																																																																																																								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">KEY NO.</th> <th style="width: 10%;">PART NO.</th> <th style="width: 45%;">DESCRIPTION</th> <th style="width: 5%;">KEY NO.</th> <th style="width: 10%;">PART NO.</th> <th style="width: 25%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1055300</td> <td>Outer Case Assembly - Primer</td> <td>25</td> <td>1255200</td> <td>GR 5, Zinc STAR Lockwasher 3/8"</td> </tr> <tr> <td>1</td> <td>1734900</td> <td>Outer Case Assembly w/Mounting Channel - Primer</td> <td>26</td> <td>0797600</td> <td>Hex Nut 3/8 NC</td> </tr> <tr> <td></td> <td></td> <td></td> <td>27</td> <td>0794900</td> <td>HX HD Capscrew 5/16x5/8 NC, GR 5, Zinc</td> </tr> <tr> <td>1</td> <td>4488300</td> <td>Outer Case Assembly w/Mounting Channel - Plated</td> <td>28</td> <td>0838800</td> <td>RH Cylinder Bracket Assembly</td> </tr> <tr> <td>2</td> <td>1556300</td> <td>Inner Slide Assembly - No Coupler</td> <td>29</td> <td>0838900</td> <td>LH Cylinder Bracket Assembly</td> </tr> <tr> <td>2</td> <td>1735000</td> <td>Inner Slide Assembly w/2-5/16" Drop Coupler</td> <td>30</td> <td>1054100</td> <td>Breakaway Lever Assembly</td> </tr> <tr> <td></td> <td></td> <td></td> <td>31</td> <td>1055200</td> <td>Weather Seal</td> </tr> <tr> <td>2</td> <td>4490400</td> <td>Inner Slide Assembly w/2-5/16" Drop Coupler - Plated</td> <td>32</td> <td>1052700</td> <td>RH Breakaway Lock - Plated</td> </tr> <tr> <td></td> <td></td> <td></td> <td>33</td> <td>1052600</td> <td>LH Breakaway Lock - Plated</td> </tr> <tr> <td>3</td> <td>0828400</td> <td>Centering Rail</td> <td>34</td> <td>1055500</td> <td>S-Hook</td> </tr> <tr> <td>4</td> <td>1601900</td> <td>Front Roller - Plated</td> <td>35</td> <td>0776800</td> <td>Safety Chain</td> </tr> <tr> <td>5</td> <td>0828800</td> <td>Front Roller Bolt 5/8x5.25-1/2 NC</td> <td>36</td> <td>1297600</td> <td>Inner Slide Assembly w/ 3" Lunette Eye</td> </tr> <tr> <td>6</td> <td>0798500</td> <td>Hex Nut 1/2 NC</td> <td>37</td> <td>1058200</td> <td>Inner Slide Assembly w/Leveler Channel</td> </tr> <tr> <td>7</td> <td>0793700</td> <td>Lockwasher 1/2" STD</td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>0144901</td> <td>Zerk 35/64</td> <td>38</td> <td>1807800</td> <td>Clevis Hitch, For 1" Pin</td> </tr> <tr> <td>9</td> <td>0828900</td> <td>Front Roller Cover</td> <td>39</td> <td>0909300</td> <td>HHCS 5/8x4.5 NC, GR 5, Zinc</td> </tr> <tr> <td>9</td> <td>0828925</td> <td>Front Roller Cover - Plated</td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td>0829100</td> <td>Rear Roller</td> <td>40</td> <td>1040500</td> <td>Locknut 5/8 NC</td> </tr> <tr> <td>11</td> <td>0829400</td> <td>Roller Bolt 5/8x5 NF, GR 5</td> <td>41</td> <td>0793800</td> <td>Lockwasher 5/16" STD</td> </tr> <tr> <td>12</td> <td>0797100</td> <td>Slotted Hex Nut 5/8 NC</td> <td>42</td> <td>1209900</td> <td>Connector Drum Brake</td> </tr> <tr> <td>13</td> <td>0332800</td> <td>Spacer</td> <td>42</td> <td>4750200, 4750300</td> <td>Connector Disc Brake</td> </tr> <tr> <td>14</td> <td>1250300</td> <td>Filler Cap (Included in 23744)</td> <td>43</td> <td>0774500</td> <td>Gasket</td> </tr> <tr> <td>14</td> <td>2374400</td> <td>Master Cylinder Assembly, 1-1/4" Bore (drum)</td> <td>44</td> <td>1278800</td> <td>Inner Slide Assembly w/2-5/16" Coupler - Primer</td> </tr> <tr> <td>14</td> <td>4747100</td> <td>Master Cylinder Assy. (disc)</td> <td>44</td> <td>4488400</td> <td>Inner Slide Assembly w/2-5/16" Coupler - Plated</td> </tr> <tr> <td>14</td> <td></td> <td>Push Rod Bracket Assembly (Included in 23744)</td> <td>45</td> <td>1882000</td> <td>Adjustable Ball Coupler - 2-5/16"</td> </tr> <tr> <td>15</td> <td>0829700</td> <td>Spacer</td> <td>46</td> <td>1613700</td> <td>Lunette Eye - 3" Adjustable</td> </tr> <tr> <td>16</td> <td>0799700</td> <td>Cotter Pin-1/8x1.00</td> <td>47</td> <td>0829500</td> <td>HX HD Screw 5/8x5 NF, GR 5</td> </tr> <tr> <td>17</td> <td>0778400</td> <td>Damper</td> <td></td> <td></td> <td></td> </tr> <tr> <td>18</td> <td>0829800</td> <td>Damper Bar</td> <td></td> <td>1018700</td> <td>1-1/4" Master Cylinder Repair Kit Drum Brake</td> </tr> <tr> <td>19</td> <td>0830100</td> <td>Pushrod Block</td> <td></td> <td>1848700</td> <td>2-5/16" Ball Coupler Repair Kit</td> </tr> <tr> <td>20</td> <td>0799700</td> <td>Cotter Pin-1/8x3/4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>21</td> <td>0794800</td> <td>HX HD Capscrew 5/16x1/2 NC, GR 5, Zinc</td> <td></td> <td>2402900</td> <td>Model 20 I&I Manual</td> </tr> <tr> <td>22</td> <td>1248900</td> <td>Star Lockwasher 5/16"</td> <td></td> <td>4823800</td> <td>Master Cylinder Repair Kit Disc Brake</td> </tr> <tr> <td>23</td> <td>1507000</td> <td>Cylinder Cover</td> <td></td> <td></td> <td></td> </tr> <tr> <td>24</td> <td>0827100</td> <td>HX HD Capscrew 3/8x3 NC,</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	KEY NO.	PART NO.	DESCRIPTION	KEY NO.	PART NO.	DESCRIPTION	1	1055300	Outer Case Assembly - Primer	25	1255200	GR 5, Zinc STAR Lockwasher 3/8"	1	1734900	Outer Case Assembly w/Mounting Channel - Primer	26	0797600	Hex Nut 3/8 NC				27	0794900	HX HD Capscrew 5/16x5/8 NC, GR 5, Zinc	1	4488300	Outer Case Assembly w/Mounting Channel - Plated	28	0838800	RH Cylinder Bracket Assembly	2	1556300	Inner Slide Assembly - No Coupler	29	0838900	LH Cylinder Bracket Assembly	2	1735000	Inner Slide Assembly w/2-5/16" Drop Coupler	30	1054100	Breakaway Lever Assembly				31	1055200	Weather Seal	2	4490400	Inner Slide Assembly w/2-5/16" Drop Coupler - Plated	32	1052700	RH Breakaway Lock - Plated				33	1052600	LH Breakaway Lock - Plated	3	0828400	Centering Rail	34	1055500	S-Hook	4	1601900	Front Roller - Plated	35	0776800	Safety Chain	5	0828800	Front Roller Bolt 5/8x5.25-1/2 NC	36	1297600	Inner Slide Assembly w/ 3" Lunette Eye	6	0798500	Hex Nut 1/2 NC	37	1058200	Inner Slide Assembly w/Leveler Channel	7	0793700	Lockwasher 1/2" STD				8	0144901	Zerk 35/64	38	1807800	Clevis Hitch, For 1" Pin	9	0828900	Front Roller Cover	39	0909300	HHCS 5/8x4.5 NC, GR 5, Zinc	9	0828925	Front Roller Cover - Plated				10	0829100	Rear Roller	40	1040500	Locknut 5/8 NC	11	0829400	Roller Bolt 5/8x5 NF, GR 5	41	0793800	Lockwasher 5/16" STD	12	0797100	Slotted Hex Nut 5/8 NC	42	1209900	Connector Drum Brake	13	0332800	Spacer	42	4750200, 4750300	Connector Disc Brake	14	1250300	Filler Cap (Included in 23744)	43	0774500	Gasket	14	2374400	Master Cylinder Assembly, 1-1/4" Bore (drum)	44	1278800	Inner Slide Assembly w/2-5/16" Coupler - Primer	14	4747100	Master Cylinder Assy. 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9	0828925	Front Roller Cover - Plated																																																																																																																																																																																																																									
10	0829100	Rear Roller	40	1040500	Locknut 5/8 NC																																																																																																																																																																																																																						
11	0829400	Roller Bolt 5/8x5 NF, GR 5	41	0793800	Lockwasher 5/16" STD																																																																																																																																																																																																																						
12	0797100	Slotted Hex Nut 5/8 NC	42	1209900	Connector Drum Brake																																																																																																																																																																																																																						
13	0332800	Spacer	42	4750200, 4750300	Connector Disc Brake																																																																																																																																																																																																																						
14	1250300	Filler Cap (Included in 23744)	43	0774500	Gasket																																																																																																																																																																																																																						
14	2374400	Master Cylinder Assembly, 1-1/4" Bore (drum)	44	1278800	Inner Slide Assembly w/2-5/16" Coupler - Primer																																																																																																																																																																																																																						
14	4747100	Master Cylinder Assy. (disc)	44	4488400	Inner Slide Assembly w/2-5/16" Coupler - Plated																																																																																																																																																																																																																						
14		Push Rod Bracket Assembly (Included in 23744)	45	1882000	Adjustable Ball Coupler - 2-5/16"																																																																																																																																																																																																																						
15	0829700	Spacer	46	1613700	Lunette Eye - 3" Adjustable																																																																																																																																																																																																																						
16	0799700	Cotter Pin-1/8x1.00	47	0829500	HX HD Screw 5/8x5 NF, GR 5																																																																																																																																																																																																																						
17	0778400	Damper																																																																																																																																																																																																																									
18	0829800	Damper Bar		1018700	1-1/4" Master Cylinder Repair Kit Drum Brake																																																																																																																																																																																																																						
19	0830100	Pushrod Block		1848700	2-5/16" Ball Coupler Repair Kit																																																																																																																																																																																																																						
20	0799700	Cotter Pin-1/8x3/4																																																																																																																																																																																																																									
21	0794800	HX HD Capscrew 5/16x1/2 NC, GR 5, Zinc		2402900	Model 20 I&I Manual																																																																																																																																																																																																																						
22	1248900	Star Lockwasher 5/16"		4823800	Master Cylinder Repair Kit Disc Brake																																																																																																																																																																																																																						
23	1507000	Cylinder Cover																																																																																																																																																																																																																									
24	0827100	HX HD Capscrew 3/8x3 NC,																																																																																																																																																																																																																									



WASH PUMP ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 08
PAGE 01



REVISION:



WASH PUMP ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 08
PAGE 02

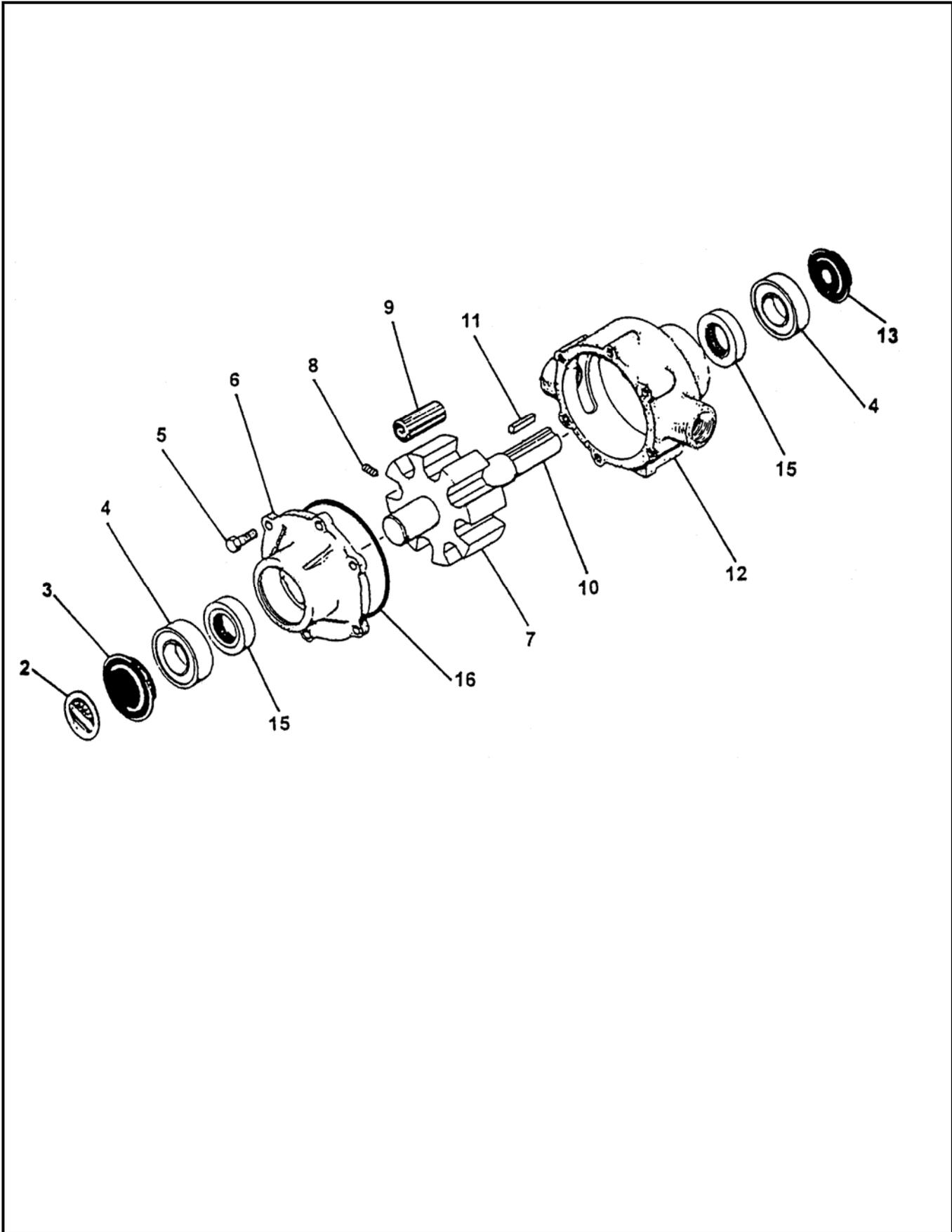
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	86399	Wash Pump Kit, C-Series (PN 86200 Wash Pump Assy-Only)	Ref
2	86384	• Sleeve, Power Beyond	1
3	86692	• Spacer, Agitator Valve	1
4	85657-021	• Hose-8M2T-10FJX-10FJX45-12.25	1
5	85657-020	• Hose-8M2T-10FJX-10FJX45-64.00	1
6	800098	• Nozzle, Garden Hose	1
7	86267	• Hose, Garden 20 FT	1
8	86200	• Wash Pump Assy-Only	1
9	86196	• Wash Pump Base Weldment	1
10	86199	• Cover, Wash Pump	1
11	78157	• Washpump-Hydro	1
12	78128	• Valve, Relief	1
13	78152	• Motor-Hyd Wash Pump	1
14	86397	• Valve-Manual-1 Spool-3 Way	1
15	85658-002	• Hose-6M2T-6FJX-6FJX-17.00	2
16	85657-022	• Hose-8M2T-10FJX-10FJX90S-11.25	1
17	78153	• Coupling, Wash Motor	1
18	78154	• Coupling, Wash Pump	1
19	78155	• Spider	1
20	10948	• Coupling-Cam/Groove 1.25" Female x MPT	1
21	10947	• Coupling-Cam/Groove 1.25" Male x MPT	1
22	10228	• Tee-3/4"	2
23	40047	• Nipple-Close Pipe-3/4"	4
24	86398	• Bell Reducer-3/4" x 1 1/4"	1
25	800371	• Fitting-Garden Hose	1
26	801902-020	• Tube Clamp-3/8" - Single	1
27	86721	• Wash Pump Installation C-Series (Drawing)	REF
28	85657-012	• Hose-8M2T-10FJX-10FJX-64.00	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



WASH WATER PUMP ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 09
PAGE 01



REVISION:



WASH WATER PUMP ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 09
PAGE 02

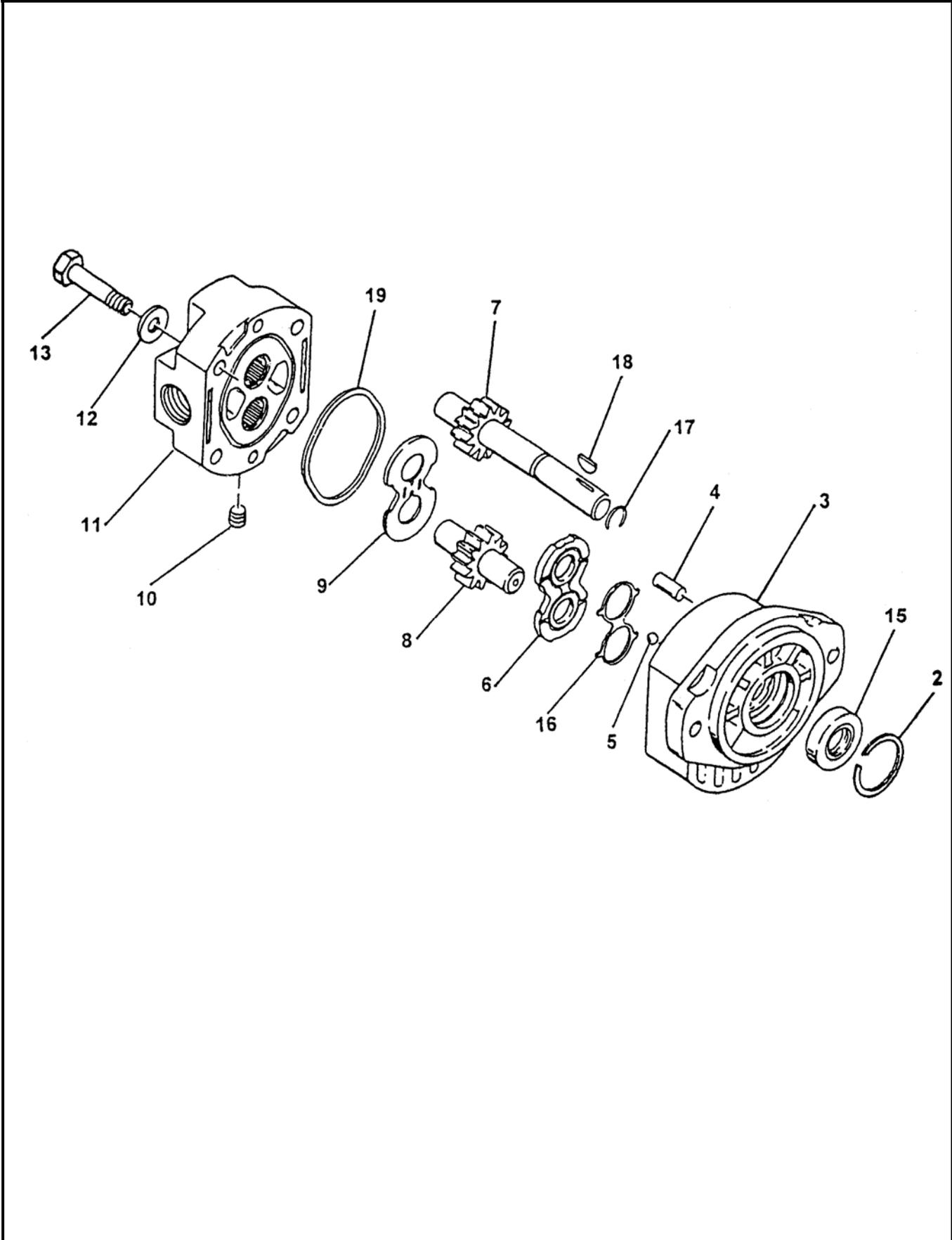
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	78157	Assembly, Wash Water Pump (See Group 80, Figure 08 for NHA)	Ref
2		• Plate, Name	1
3		• Cover, Bearing Rear	1
4		• Bearing, Sealed Bowl	2
5		• Endplate, (Ni-Resist) with Seal	1
6		• Bolt, Hex (attaching parts)	6
7		• Rotor, (Ni-Resist) with Shaft	1
8		• Screw, Set (attaching parts)	1
9		• Roller, Teflon	1
10		• Shaft	1
11		• Key	1
12		• Body, (Ni-Resist) with Seal	1
13		• Cover, Bearing Shaft	1
-14	72329	• Kit, Seal	1
15		•• Seal, Buna	2
16		•• Gasket, End Plate O-Ring	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



WASH PUMP MOTOR ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 10
PAGE 01



REVISION:



WASH PUMP MOTOR ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 10
PAGE 02

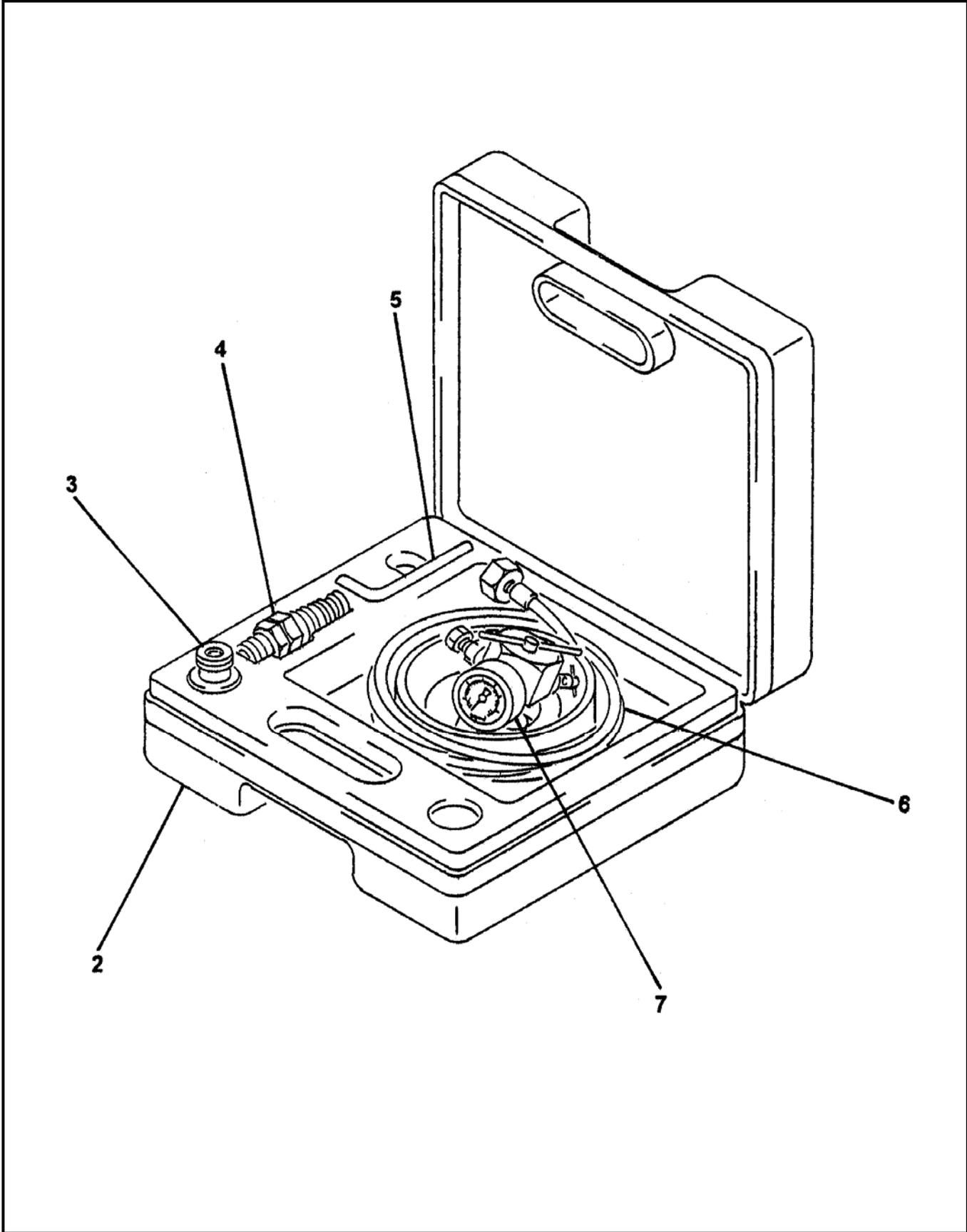
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	78152	Assembly, Wash Pump Motor (See Group 80, Figure 09 for NHA)	Ref
2		• Retainer	1
3		• Assembly, Body	1
4		• Pin, Dowel	2
5		• Bearing, Ball	2
6		• Plate, Wear	1
7		• Gear, Driven Wear	1
8		• Gear, Driven	1
9		• Plate, Thrust	1
10		• Plug, Pipe	4
11		• Assembly, Cover	1
12		• Washer (attaching parts)	4
13		• Screw, Hex (attaching parts)	4
14		• Kit, Seal	1
15		• • Brush	1
16		• • Cap, Brush	1
17		• • Gasket	1
18		• • Cover, Brush	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



ACCUMULATOR CHARGE KIT

C90S
PARTS
GROUP 80
FIGURE 11
PAGE 01



REVISION:



ACCUMULATOR CHARGE KIT

C90S
PARTS
GROUP 80
FIGURE 11
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
-1	71460	Kit, Accumulator Charge (See Group 80, Figure 01 for NHA)	Ref
2		• Case, Charge Kit	1
3		• Adapter, FPK / SB	1
4		• Adapter, G4	1
5		• Wrench, Allen	1
6		• Hose, Charging	1
7		• Unit, FPK Charging and Gagging	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



NON-OPERATOR SIDE HYDRAULIC BRAKE ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 12
PAGE 02

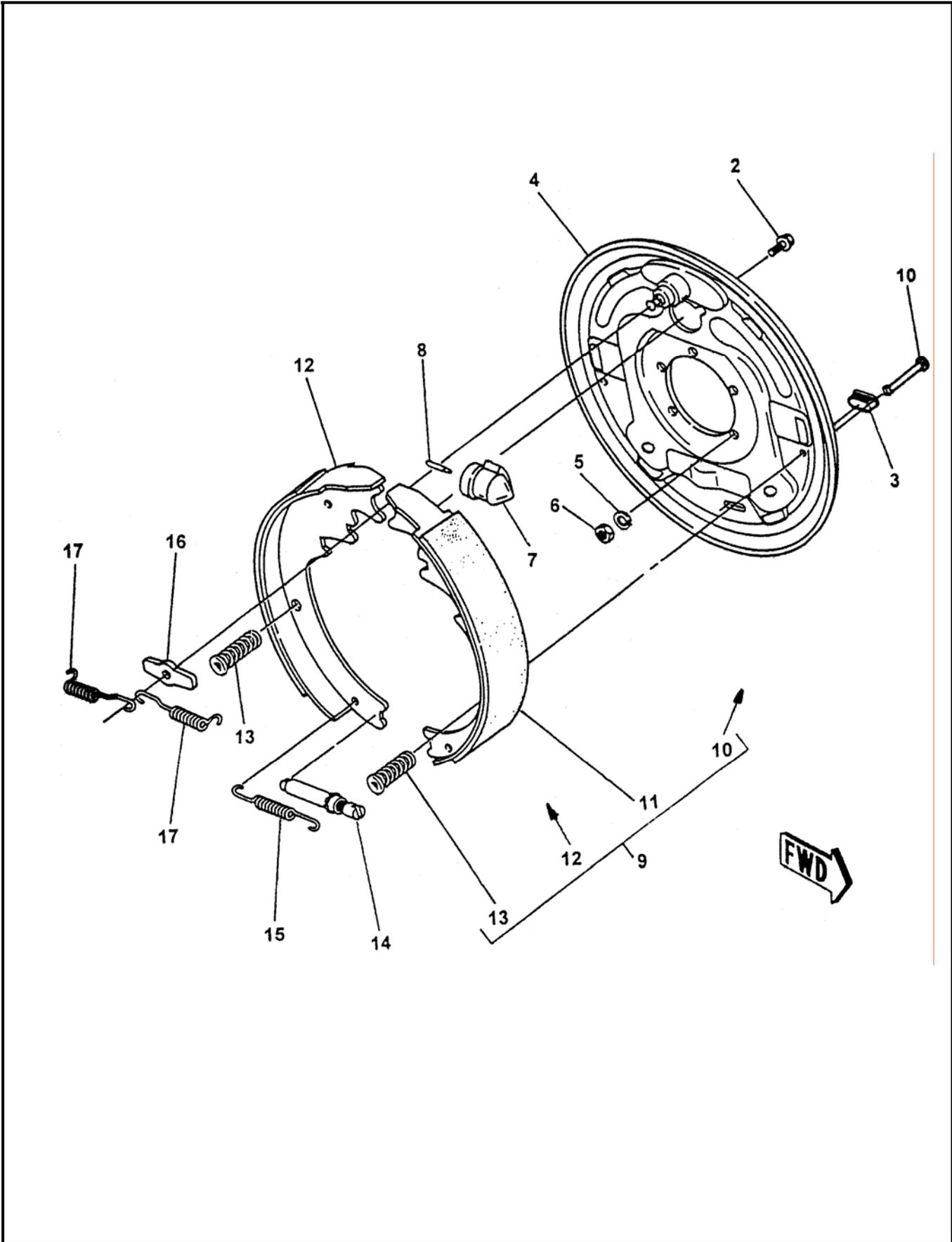
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-12	Assembly, Non-Operator Side Hydraulic Brake (See Group 80, Figure 01 for NHA)	Ref
2		• Screw, with Washer	1
3		• Plug	2
4		• Plate, Backing	1
5		• Washer, Lock (attaching parts)	5
6		• Nut, Brake Mounting (attaching parts)	5
7		• Cylinder, Non-Operator Side Brake	1
8		• Rod, Push	1
9		• Kit, Non-Operator Side Shoe and Lining	1
10		• • Pin, Shoe Hold Down	2
11		• • Primary, Non-Operator Side	1
12		• • Secondary, Non-Operator Side	1
13		• • Pin, Shoe Hold Down	2
14		• Assembly, Adjuster	1
15		• Spring, Adjusting Screw	1
16		• Washer, Anchor Post	1
17		• Spring, Retractor	2
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



OPERATOR SIDE HYDRAULIC BRAKE ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 13
PAGE 01



REVISION:



**OPERATOR SIDE
HYDRAULIC BRAKE ASSEMBLY**

**C90S
PARTS
GROUP 80
FIGURE 13
PAGE 02**

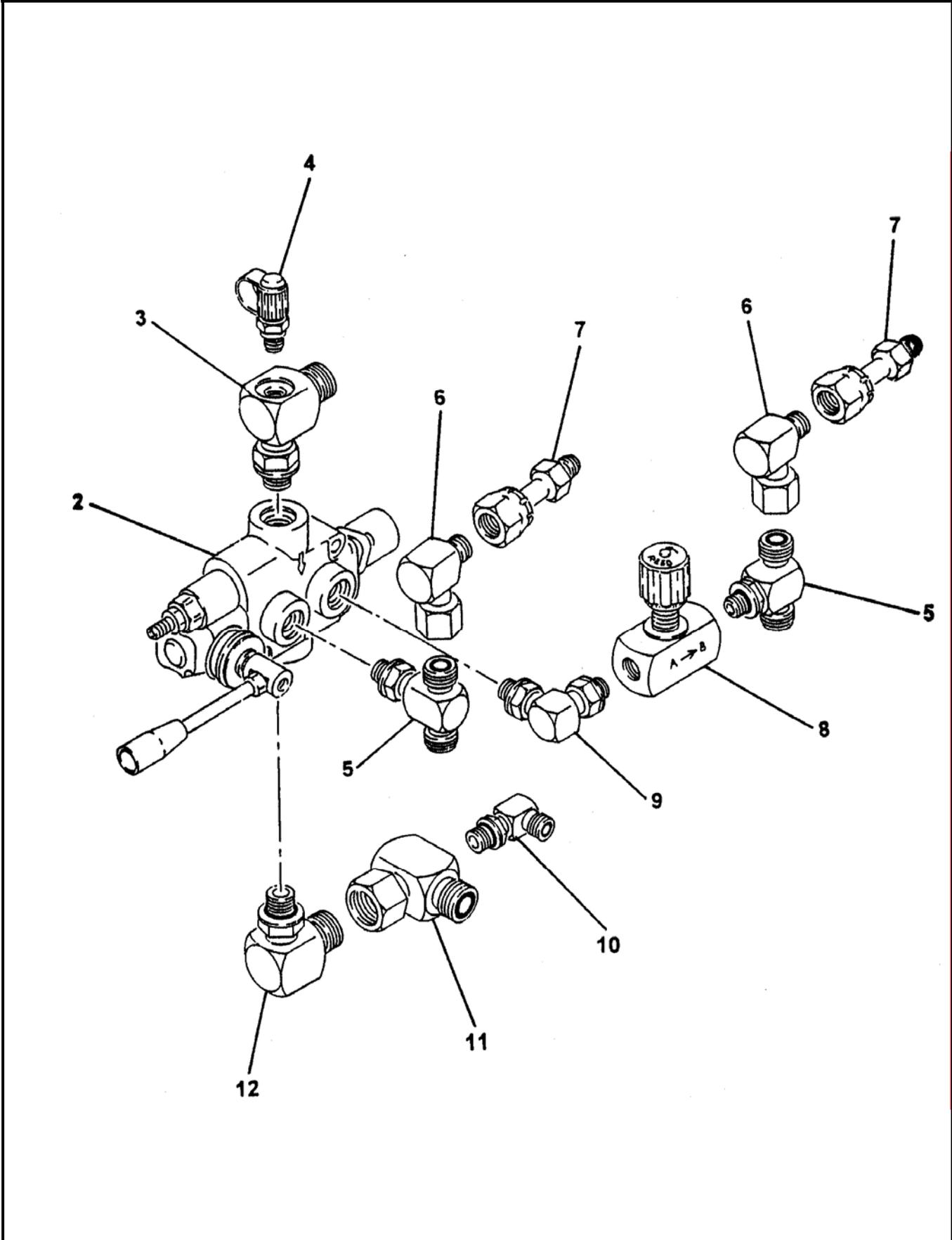
ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-13	Assembly, Operator Side Hydraulic Brake (See Group 80, Figure 01 for NHA)	Ref
2		• Screw, with Washer	1
3		• Plug	2
4		• Plate, Backing	1
5		• Washer, Lock (attaching parts)	5
6		• Nut, Brake Mounting (attaching parts)	5
7		• Cylinder, Operator Side Brake	1
8		• Rod, Push	1
9		• Kit, Operator Side Shoe and Lining	1
10		•• Pin, Shoe Hold Down	2
11		•• Primary, Operator Side	1
12		•• Secondary, Operator Side	1
13		•• Pin, Shoe Hold Down	2
14		• Assembly, Adjuster	1
15		• Spring, Adjusting Screw	1
16		• Washer, Anchor Post	1
17		• Spring, Retractor	2
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:



1 SPOOL VALVE ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 14
PAGE 01



REVISION:



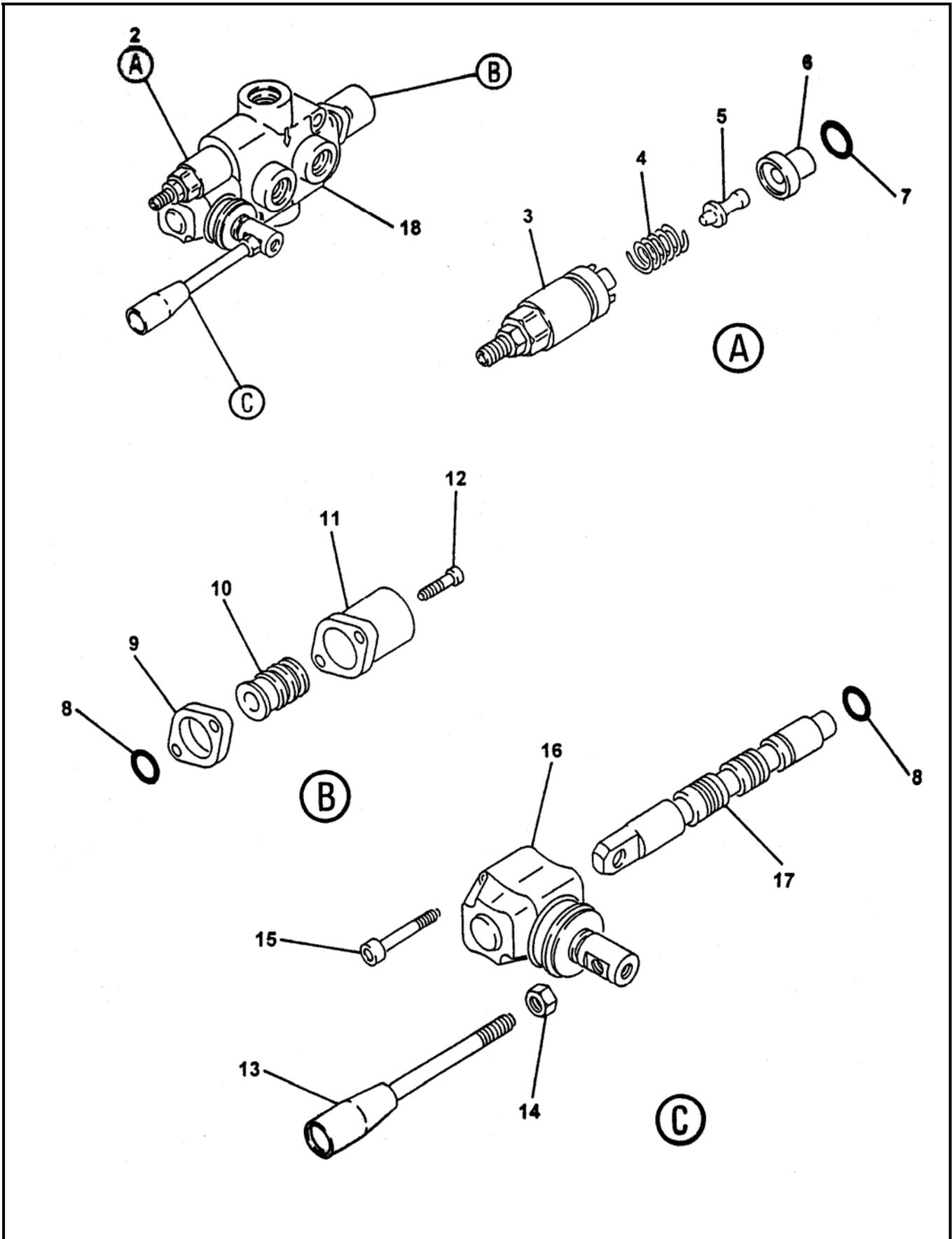
1 SPOOL VALVE ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 14
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
-1	80-15	1 2 3 4 5 Assembly, 1 Spool Valve (See Group 80, Figure 01 for NHA)	Ref
2	74584	• Sub-Assembly, 1 Spool Valve (See Group 80, Figure 15 for DET)	1
3		• Tee, Special Drill	1
4	78593	• Fitting, Mini Check (Port)	1
5		• Tee	2
6		• Fitting, 90	2
7		• Fitting, Connector	2
8		• Controller, Check	1
9		• Fitting, 90	1
10		• Fitting, 90	1
11		• Tee, Special Drill	1
12		• Fitting, 90	1
		DASH (-) ITEM NOT ILLUSTRATED	

REVISION:

1 SPOOL VALVE SUB-ASSEMBLY



REVISION:



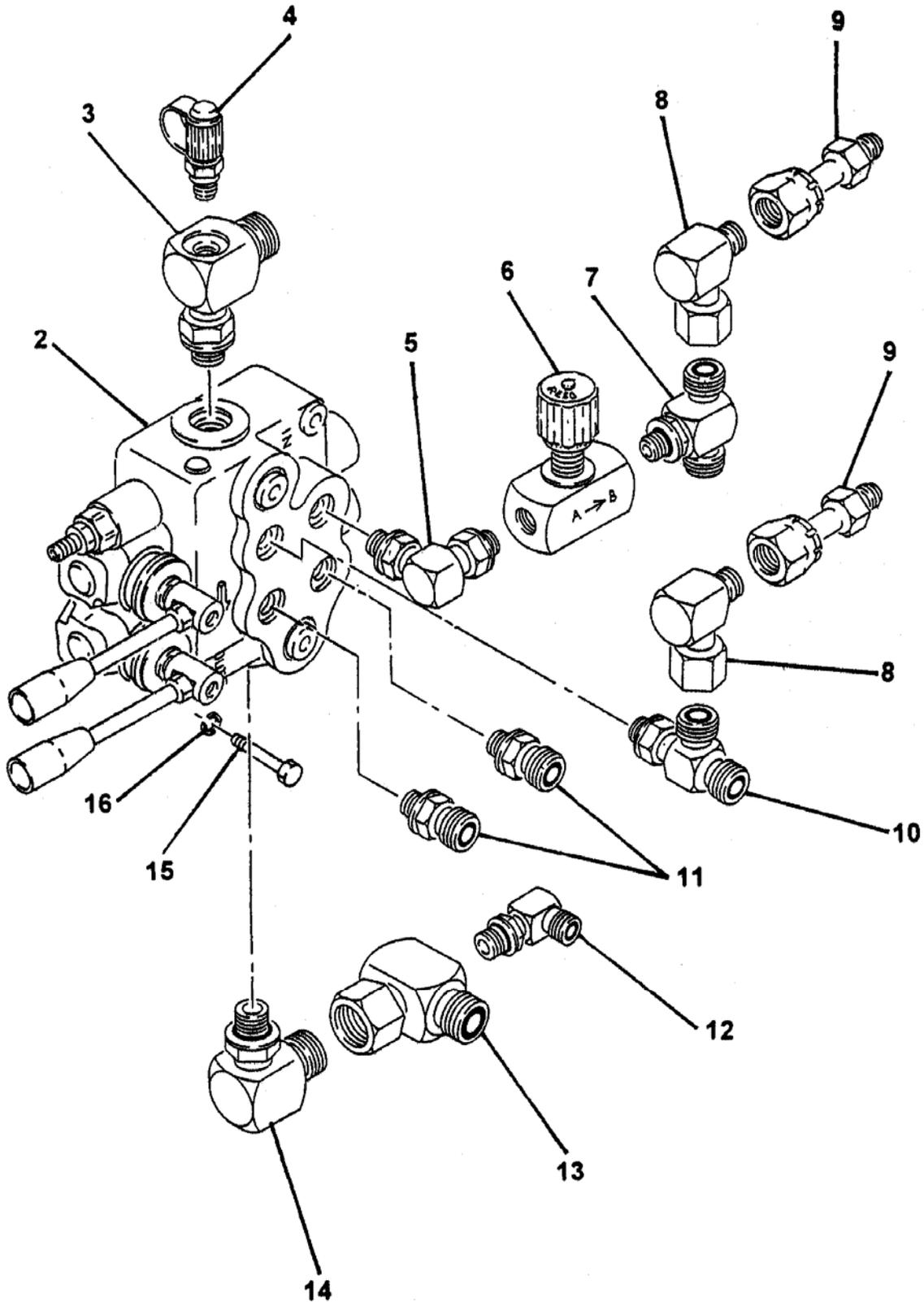
1 SPOOL VALVE SUB-ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 15
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	74584	Sub-Assembly, 1 Spool Valve (See Group 80, Figure 14 for NHA)	Ref
2		• Body, Valve	1
3		• Kit, Screw	1
4		• Spring	1
5		• Pin, Screw Kit	1
6		• Ring	1
7		• O-Ring	1
8		• O-Ring	2
9		• Spacer	1
10		• Kit, Spool Control	1
11		• Cap, Spool	1
12		• Screw, SOC (attaching Parts)	2
13		• Handle, Remixer Valve	1
14		• Nut (attaching parts)	1
15		• Screw, SOC	2
16		• Lever, L	1
17		• Spool	1
		DASH (-) ITEM NOT ILLUSTRATED	

2 SPOOL VALVE ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 16
PAGE 01





2 SPOOL VALVE ASSEMBLY

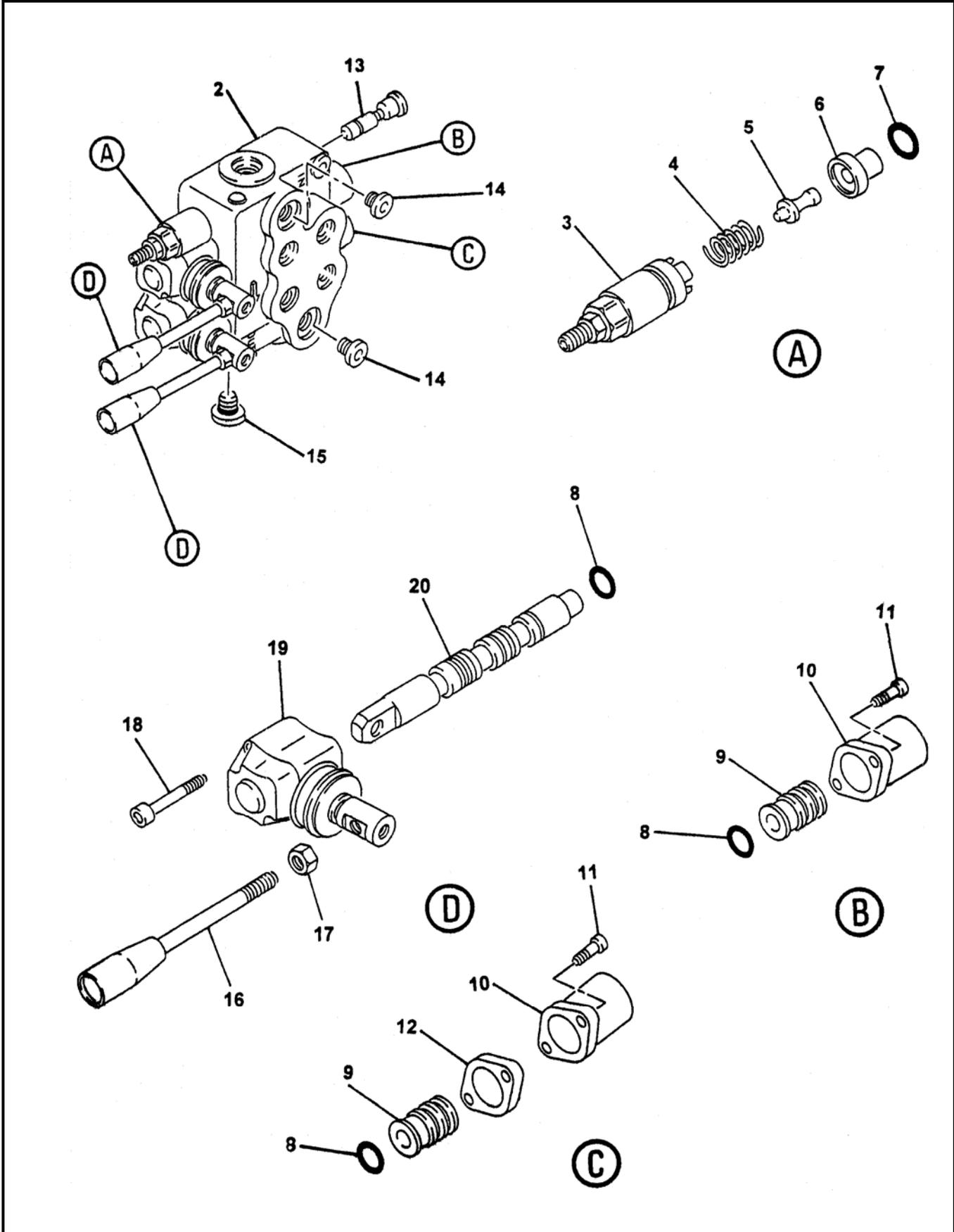
C90S
PARTS
GROUP 80
FIGURE 16
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	80-17	Assembly, 2 Spool Valve (See Group 80, Figure 01 for NHA)	Ref
2	74585	• Sub-Assembly, 2 Spool Valve (See Group 80, Figure 17 for DET)	1
3		• Tee, Special Drill	1
4	78593	• Fitting, Mini Check (Port)	1
5		• Fitting, 90	1
6		• Controller, Check	1
7		• Tee	1
8		• Fitting	2
9		• Fitting, Connector	2
10		• Tee	1
11		• Fitting, 90	2
12		• Fitting, 90	1
13		• Tee, Special Drill	1
14		• Fitting, 90	1
15		• Bolt, Hex	2
16		• Washer, SPL Lock	2
		DASH(-) ITEM NOT ILLUSTRATED	



2 SPOOL VALVE SUB-ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 17
PAGE 01



REVISION:



2 SPOOL VALVE SUB-ASSEMBLY

C90S
PARTS
GROUP 80
FIGURE 17
PAGE 02

ITEM NO.	REED'S PARTS NO.	DESCRIPTION	QTY
		1 2 3 4 5	
-1	74585	Sub-Assembly, 2 Spool Valve (See Group 80, Figure 17 for NHA)	Ref
2		• Body, Valve	1
3		• Kit, Screw	1
4		• Spring	1
5		• Pin, Screw Kit	1
6		• Ring	1
7		• O-Ring	1
8		• O-Ring	4
9		• Kit, Spool Control	2
10		• Cap, Spool	2
11		• Screw, SOC (attaching Parts)	4
12		• Spacer	1
13		• Kit, VRS	1
14		• Plug	2
15		• Plug	1
16		• Handle, Remixer Valve	2
17		• Nut (attaching parts)	2
18		• Screw, SOC	4
19		• Lever, L	2
20		• Spool	2
		DASH (-) ITEM NOT ILLUSTRATED	



**TRAILER MOUNTED PUMP 01 MODEL C90S
GROUP 80 OPTIONAL INSTALLATION**

C90S
PARTS
GROUP 80
FIGURE 18
PAGE 01

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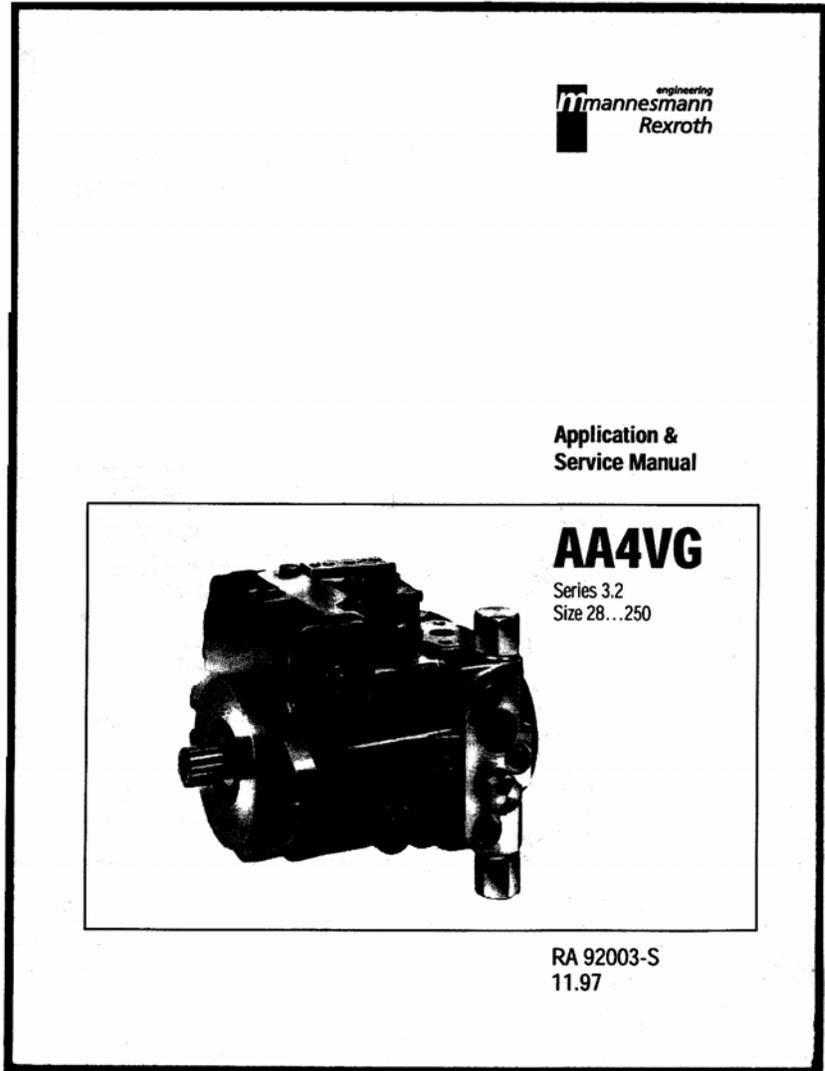
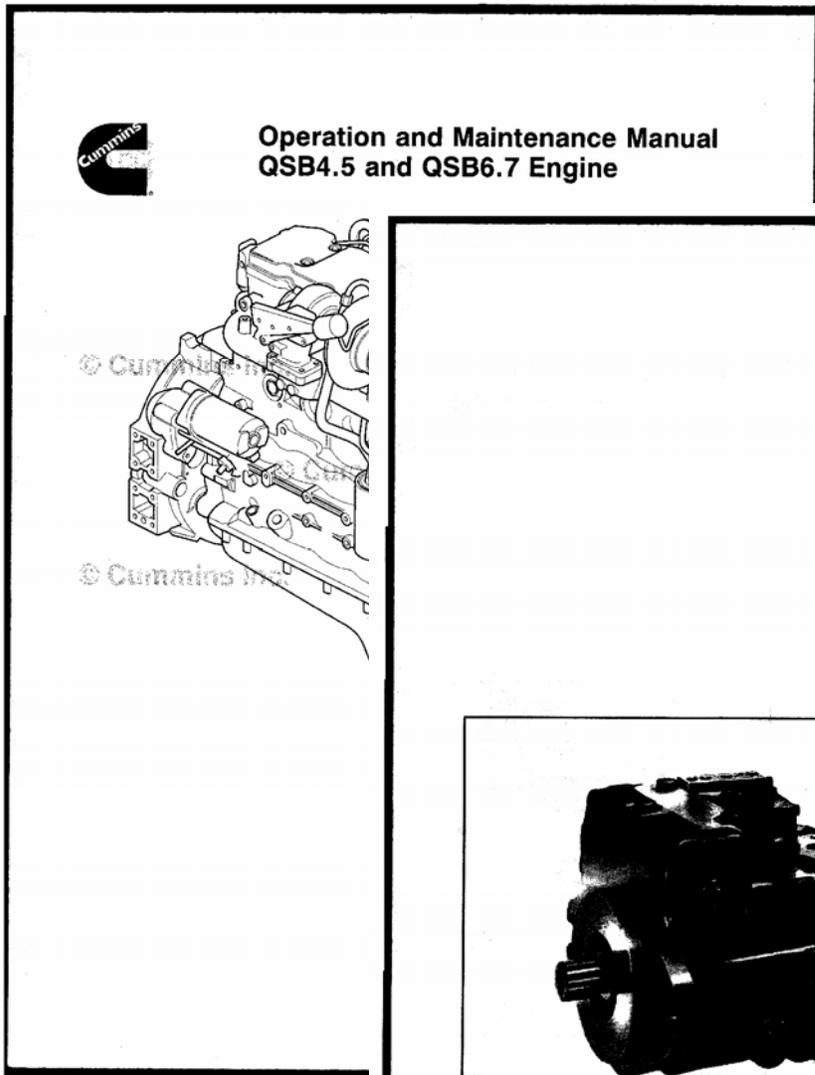
**TRAILER MOUNTED PUMP 01 MODEL C90S
VENDOR SECTION**

**C90S
VENDOR**

FIGURE 00
PAGE 00

REED TRAILER MOUNTED CONCRETE PUMP 01 MODEL C90S VENDOR SECTION CONTAINS THE FOLLOWING FIGURES:

- FIGURE 00** TABLE OF CONTENTS
- FIGURE 01** CUMMINS DIESEL ENGINE MODEL QSB6.7 2200RPU
- FIGURE 02** REXROTH MAIN HYDRAULIC PUMP-A4VG180





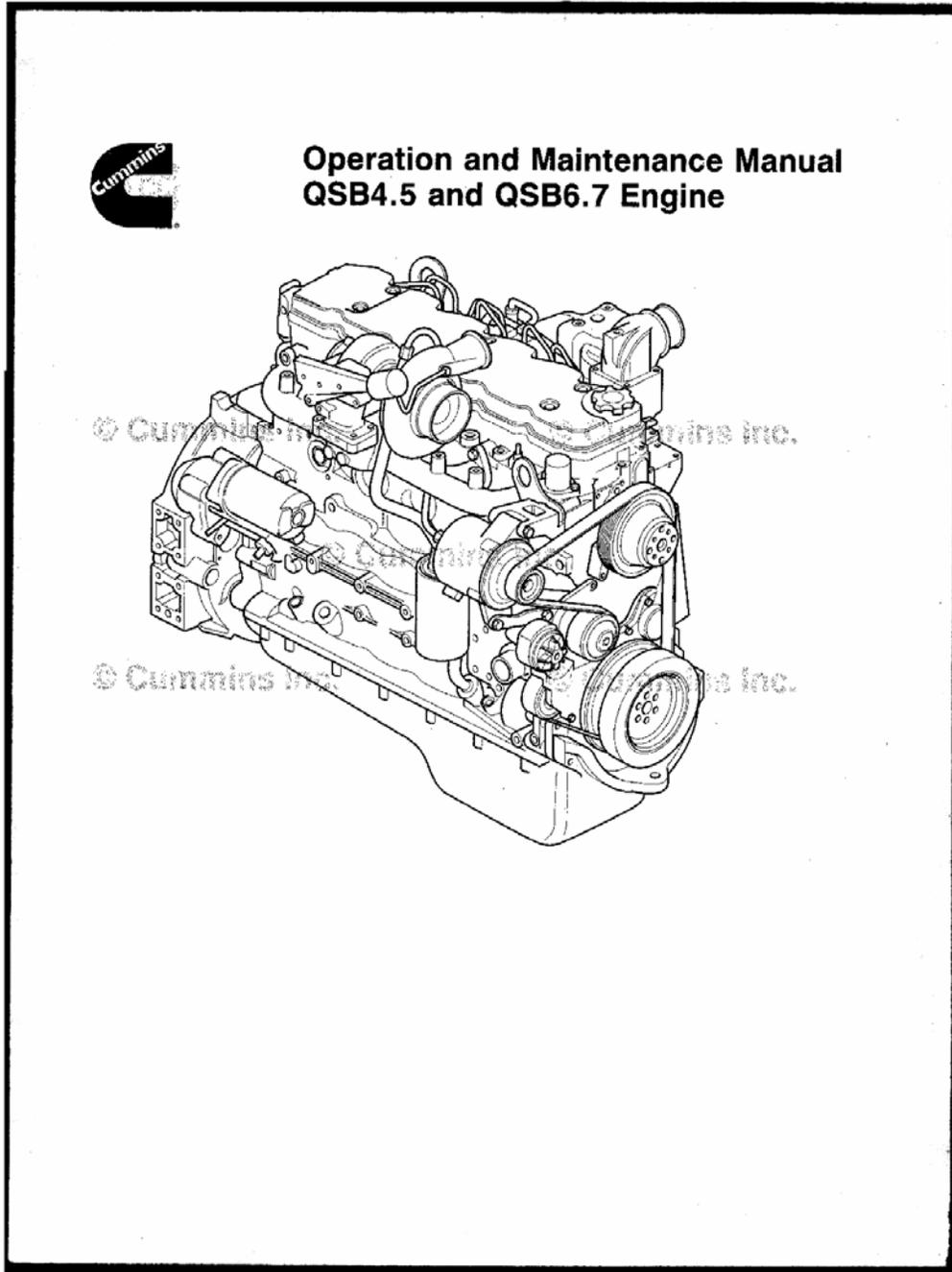
TRAILER MOUNTED PUMP 01 MODEL C90S
VENDOR SECTION

C90S
VENDOR

FIGURE 00
PAGE 01

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REVISION:





**CUMMINS 220HP DIESEL ENGINE C90S
VENDOR SECTION**

**C90S
VENDOR**

**FIGURE 01
PAGE 02**

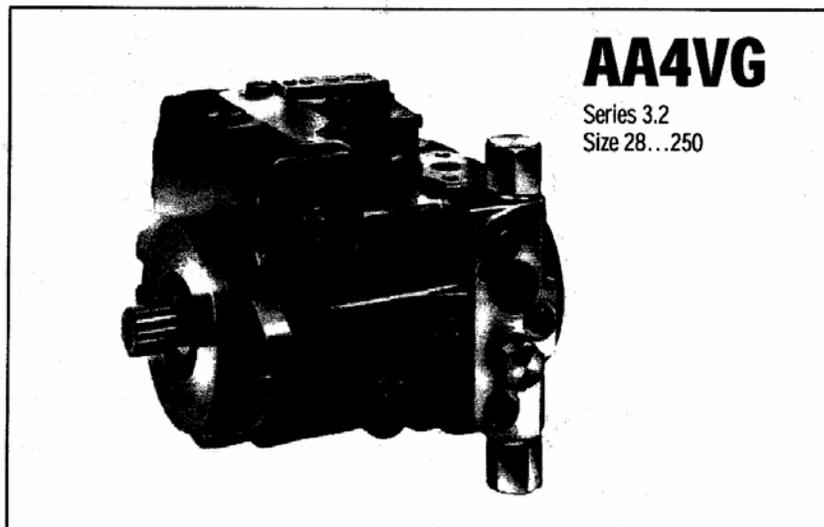
NOTICE

**THIS MANUAL IS SUPPLIED BY CUMMINS
PER EACH ENGINE THAT IS SUPPLIED TO REED.**

REVISION:



Application & Service Manual



AA4VG

Series 3.2
Size 28...250

RA 92003-S
11.97



**REXROTH MAIN HYD PUMP – A4VG180
VENDOR SECTION**

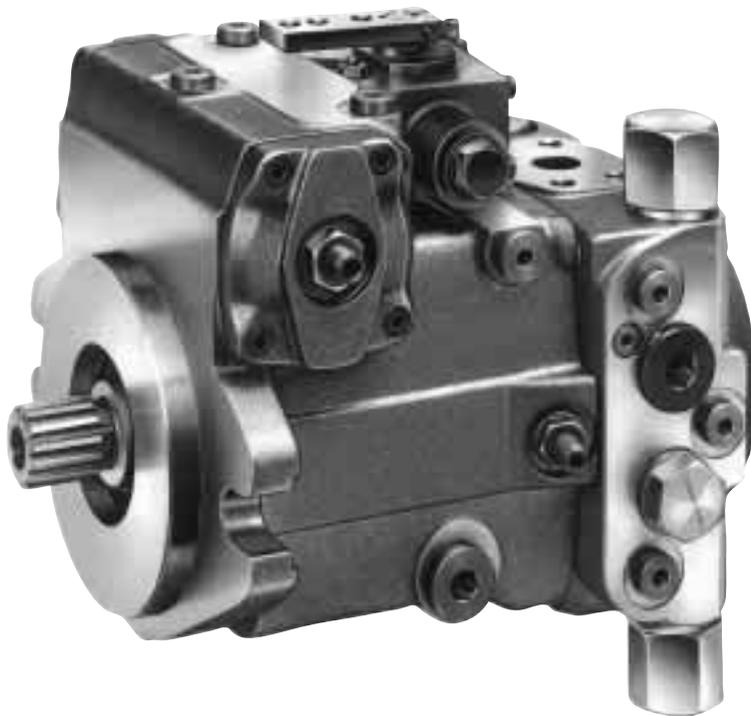
**C90S
VENDOR**

**FIGURE 02
PAGE 02**

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REVISION:

Application & Service Manual



AA4VG

Series 3.2
Size 28...250

RA 92003-S
11.97

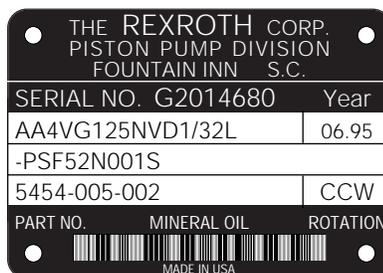


Ordering of Parts

For Rexroth to supply the correct parts for your unit, please include all of the following information along with your parts order.

Model Code
Serial Number
Unit Number
Part Name
Part Number

Due to modifications and improvements to our products, minor changes can occur to the parts, even though the type code may not necessarily reflect these changes. The type number and serial number will guarantee that the correct parts for your unit are supplied.



Ordering Example

To order a replacement rotary group for an AA4VG variable displacement pump having the above nameplate, the following information would be required.

+ Model Code	AA4VG125NVD1/32LPSFN001S
+ Serial Number	G2014680
+ Unit Number	5454-005-002
* Part Name	Charge Pressure Relief Valve
* Part Number	HU00434856

+ This information is taken from the nameplate on the pump.

* This information is taken from the Application and Service Manual.

Index

Name Tag Information	Page 2
Type Code	4–5
Technical Data	6–7
Filtration Options	7–9
High Pressure Relief Valve	10
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Pump Installation	17–18
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Trouble Shooting Procedure	20–23
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Adjustment of High Pressure Relief Valves	27
Tow Option Engagement	28
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Removal and Installation of Shaft Seal	30
Filter Replacement	31
Routine Maintenance	32
Replacement Subassemblies and Parts	33–36
Filtration Configuration	37

Variable Displacement Pump AA4VG, Series 3

Ordering Code

Hydraulic Fluid

Petroleum Oil (For operation with other fluids, consult a Rexroth Application Engineer)

Axial Piston Unit

Variable swashplate design. Nominal pressure 5800 psi; peak pressure 6500 psi

AA4V

Mode of Operation

Pump in closed circuit

G

Size

≈ Displacement $V_{g,max}$ (cm³)

28 40 56 71 90 125 180 250

Size 28, see RA 92002

Size 250, see RA 92000

Control Options

		40	56	71	90	125	180	
None	NV	●	●	●	●	●	●	NV
Hydraulic Control–Direct Operated	DG	●	●	●	●	●	●	DG
Electrical Control–Proportional	EP	●	●	●	●	●	●	EP
Electrical Control–Non Proportional	EZ	●	●	●	●	●	●	EZ
Rotary Manual Servo Control	HW	●	●	●	●	●	●	HW
Hydraulic Control–Pilot Operated	HD	●	●	●	●	●	●	HD
Hydraulic Control–Speed Dependent	DA	●	●	●	●	●	●	DA

Solenoid Voltage (EP, EZ, or DA only)

	40	56	71	90	125	180	
12 Volt DC	●	●	●	●	●	●	1
24 Volt DC	●	●	●	●	●	●	2

Pressure Cut-Off

	40	56	71	90	125	180	
With Pressure Cut-Off	●	●	●	●	●	●	D

Neutral Position Switch (HW control only)

	40	56	71	90	125	180	
Without Neutral Position Switch (no code)	●	●	●	●	●	●	Omit
With Neutral Position Switch	●	●	●	●	●	●	L

Mechanical Stroke Limiter

	40	56	71	90	125	180	
Without Stroke Limiter	●	●	●	●	●	●	Omit
With Stroke Limiter	●	●	●	●	●	●	M

Ports X₃, X₄ for Stroking Pressure

	40	56	71	90	125	180	
Without Ports X ₃ , X ₄ (no code)	●	●	●	●	●	●	Omit
With Ports X ₃ , X ₄	●	●	●	●	●	●	T

Regulating (DA) Cartridge

	NV	EZ	DG	EP	HW	HD	DA	40	56	71	90	125	180	
Without DA Cartridge	●	●	●	●	●	●	–	●	●	●	●	●	●	1
With DA Cartridge, fixed adjustment	–	●	●	●	●	●	●	●	●	●	●	●	●	2
With DA Cartridge, mech. adjustable w/lever	–	●	●	●	●	●	●	●	●	●	●	●	●	3
With DA Cartridge, fixed adjustment and Hydraulic Inching Valve built on	–	–	–	–	–	●	●	●	●	●	●	●	●	4
With DA Cartridge, mech. adjust. w/lever and Hydraulic Inching Valve built on	–	–	–	–	–	●	●	●	●	●	●	●	●	5
With DA Cartridge, fixed adjustment and connection for TH7 master controller	–	●	●	●	●	●	●	●	●	●	●	●	●	7

Series

3

Index

2

Direction of Rotation

(As viewed from drive shaft)

clockwise

R

counter-clockwise

L

- ① Shaft Option "S" is standard for the front pump of tandem units.
- ② See Page 6.
- ③ With "Cold Start" bypass valve. See page 7.

- Available
- On Request; Consult Factory
- Not Available

Variable Displacement Pump AA4VG, Series 3

AA4V G / 3 2 - 52

- ▶ Axial Piston Unit
- ▶ Operation
- ▶ Displacement
- ▶ Control & Options
- ▶ Regulating Cartridge
- ▶ Design Series
- ▶ Index
- ▶ Direction of Rotation

Seals

NBR	P
NBR, FPM shaft seal	N

Shaft Type (For maximum permissible shaft torque refer to page 33)

	40	56	71	90	125	180	
Spline–SAE (Standard for single pump)	●	●	●	●	●	●	S
Spline–SAE (Standard for tandem pump, 1 st pump)	①	●	●	①	●	●	T
Spline–SAE (Only for tandem pump, 2 nd pump)	●	–	–	–	–	–	U
Spline–DIN 5480 (For tandem pump, 2nd pump)	–	–	–	●	–	–	Z

Mounting Flange

	40	56	71	90	125	180	
SAE 2-bolt	●	●	–	–	–	–	C
SAE 4-bolt	–	–	–	–	–	●	D
SAE 2 + 4 bolt	–	–	●	●	●	–	F

Port Connections

	40	56	71	90	125	180	
Ports A & B (SAE 4-bolt flange), on top and bottom	●	●	●	●	●	●	52

Charge Pump

	40	56	71	90	125	180	
With Charge Pump & without Through-Drive	●	●	●	●	●	●	F00
Without Charge Pump & without Through-Drive	●	●	●	●	●	●	N00
With Charge Pump & with Through-Drive	●	●	●	●	●	●	F...
Without Charge Pump & with Through-Drive	○	○	○	○	○	○	K...

Through-Drive

		40	56	71	90	125	180	
Shaft	Flange							
SAE A (3/8" 9T 16/32P)	SAE A, 2-bolt	●	●	●	●	●	●	...01
SAE B (3/8" 13T-16/32P)	SAE B, 2-bolt	●	●	●	●	●	●	...02
SAE B–B (1" 15T-16/32P)	SAE B, 2-bolt	●	●	●	●	●	●	...04
SAE B–B (1" 15T-16/32P)	SAE C, 2-bolt	●	–	–	–	–	–	...09
SAE C (1 1/4" 14T-12/24P)	SAE C, 2-bolt	–	●	●	●	●	●	...07
DIN (N35x2x30x16x9H DIN 5480)	SAE D, 2+4-bolt	–	–	–	●	–	–	...73
SAE D (1 3/4" 13T-8/16P)	SAE D, 2+4-bolt	–	–	–	–	●	●	...69
SAE D (1 3/4" 13T-8/16P)	SAE E, 4-bolt	–	–	–	–	–	○	...72

Relief Valves ②

		Adjustment Range	40	56	71	90	125	180	
W/high press. relief valves, pilot oper.	1450...6100 psi	with bypass	–	–	●	●	●	●	1
With high pressure relief valves	4000...6100 psi	without bypass	●	●	–	–	–	–	3
Direct operated, fixed setting	1450...3600 psi	with bypass	●	●	–	–	–	–	5
		without bypass	●	●	–	–	–	–	4
		with bypass	●	●	–	–	–	–	6

Filtration

	40	56	71	90	125	180	
Filtration in Charge Pump suction line	●	●	●	●	●	●	S
Charge Pressure Filtration (Ports Fe and Fa)	●	●	●	●	●	●	D
Cold start valve and ports for external charge circuit filter (Ports Fe and Fa)	○	○	○	○	○	○	K
Mounted Filter (Without contamination indicator) ③	●	●	●	●	●	●	F
Filter with visual contamination indicator ③	●	●	●	●	●	●	P
Filter with electrical contamination indicator ③	●	●	●	●	●	●	L
Filter with visual and electrical contamination indicator ③	●	●	●	●	●	●	M
External Charge Supply (Units without charge pump–N00 or K..)	●	●	●	●	●	●	E

Variable Displacement Pump AA4VG, Series 3

Technical Data

Description

The AA4VG is a swashplate design, variable displacement, over center, axial piston pump. It has been designed exclusively for closed circuit hydrostatic transmissions where a self-contained pump package is required. The pump design incorporates a charge pump, a charge pressure relief valve, two combination high pressure relief and make-up check valves, and an integrated pressure cut-off valve.

Installation

The AA4VG pump may be mounted in any position around the horizontal (drive shaft) axis. Other mounting orientations (e.g. drive shaft vertical) are possible, but should be reviewed with a Rexroth Application Engineer prior to finalizing the design. The case drain line should be connected to the highest case drain port (T₁ or T₂) so that the pump case always remains full of oil. The case drain piping, or hose, should be sized to accept the full flow of the charge pump at the maximum anticipated drive speed, with minimal pressure drop.

Fluid Recommendations

The AA4VG pumps are supplied as standard for use with good quality, petroleum oil based, anti-wear hydraulic fluids. More detailed information regarding the selection of hydraulic fluids and their application limits can be found in our Data Sheets RA 90220 (Petroleum Oil), RE 90221 (Biodegradable Fluids) and RA 90223 (Type HF–Fire Resistant/Synthetic Fluids).

For applications with biodegradable or Type HF fluids, possible reduction of the operating specifications may be required. Please consult Rexroth and your oil supplier.

Operating Viscosity Range

In order to obtain optimum efficiency and service life, we recommend that the operating viscosity (at normal loop operating temperature) be selected from within the range:

Optimum Viscosity (V_{opt}) 80...170 SUS (16...36 mm²/S)

Viscosity Limits

Max. Viscosity at startup (V_{max}) 7273 SUS (1600 mm²/S)

Min. Viscosity for short duration (V_{min}) 42 SUS (5 mm²/S)

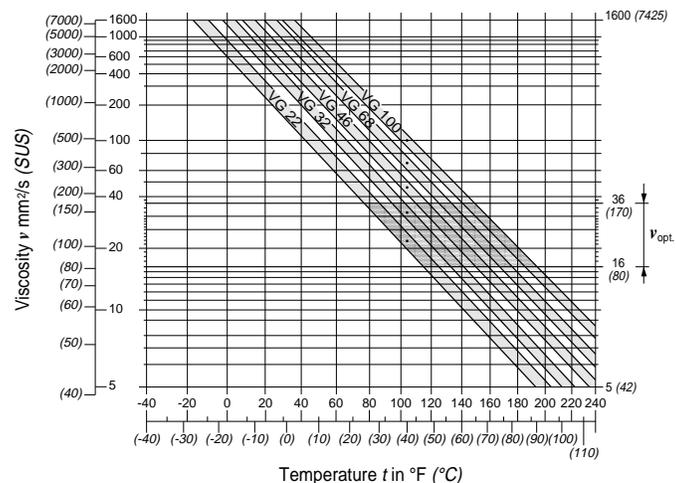
Operating Temperature Limits

Min. operating temperature -13°F (-25°C)

Absolute min. temperature -40°F (-40°C)

Max. operating temperature for short duration 239°F (115°C)

Selection Diagram



Notes on hydraulic fluid selection

In order to select the correct fluid, it is necessary to know the normal operating temperature in the circuit (closed loop), when the system is operated at the design ambient temperature.

The hydraulic fluid should be selected so that, within the operating temperature range, the fluid viscosity is within the optimum range V_{opt} (see shaded area of the selection diagram). We recommend that the higher viscosity grade is selected in each case.

Example: At an ambient temperature of X°F the closed circuit fluid temperature is 140°F (60°C). Within the optimum operating viscosity range V_{opt} (shaded area), this corresponds to ISO viscosity grades VG 46 or VG 68. VG 68 should be selected.

Important: The leakage oil (case drain oil) temperature is influenced by pressure and pump speed and is typically higher than the circuit temperature. However, maximum temperature at any point in the system must be limited to 239°F (115°C).

If it is not possible to comply with the above conditions because of extreme operating parameters or high ambient temperatures please consult Rexroth.

Fluid Cleanliness Levels

In order to ensure proper and reliable operation, the hydraulic fluid must be maintained at a minimum cleanliness level of 18/15 (ISO/DIS 4406; SAE J1165). Axial piston pump component life is directly affected by the cleanliness of the fluid in the system.

Temperature Range	-40...195°F (-40...90°C)	195...240°F (90...115°C)
Cleanliness Recommendations:	Class	Class
ISO/DIS 4406 (SAE J1165)	18/15	17/14
NAS 1638	9	8
SAE, ASTM, AIA	6	5

Operating Pressures Ranges

Main pump:

Nominal charge pressure; p_{sp} 20 bar (290 psi)

Nominal pressure (port A or B); p_N 400 bar (5800 psi)

Peak pressure (port A or B); p_{max} 450 bar (6525 psi)

Maximum case drain pressure (T₁, T₂, T₃, and T₄)

p_L 2 bar abs. (30 psia)

short term (cold start) 3 bar abs. (43.5 psia)

Charge pump:

Nominal pressure p_{sp} 20 bar (290 psi)

Peak pressure p_{H max} 40 bar (580 psi)

Min. pressure at charge pump inlet port (S):

at V= 141 SUS (30 cSt) p ≥ 0.8 bar abs. (6.3 in-Hg.)

at cold start p ≥ 0.5 bar abs. (15.2 in-Hg.)

Variable Displacement Pump AA4VG, Series 3

Technical Data

AA4VG Specifications (Theoretical values; rounded)

Size				40	56	71	90	125	180	
Displacement	Variable pump	$V_{g \max}$	cm ³ /rev	40	56	71	90	125	180	
			in ³ /rev	2.44	3.42	4.33	5.49	7.63	10.98	
	Charge pump	V_{gH}	cm ³ /rev	8.4	11.1	18.7	18.7	25.7	36.9	
			in ³ /rev	0.51	0.68	1.14	1.14	1.56	2.25	
Speed	max. rpm at $V_{g \max}$	$n_{\max \text{ cont}}$	rpm	4000	3600	3300	3050	2750	2400	
	limited max. rpm ①	$n_{\max \text{ limit}}$	rpm	4200	3900	3600	3300	3100	2900	
	intermittent max. rpm ②	$n_{\max \text{ Interm}}$	rpm	5000	4500	4100	3800	3450	3000	
	minimum rpm	n_{\min}	rpm	500	500	500	500	500	500	
Flow	at $n_{\max \text{ cont}}$ and $V_{g \max}$	Q_{\max}	L/min	160	202	234	275	344	432	
			gpm	42.3	53.4	61.8	72.7	90.9	114.1	
Power	at $n_{\max \text{ cont}}$	$\Delta p = 400 \text{ bar}$ $\Delta p = 5800 \text{ psi}$	P_{\max}	kW	107	134	156	183	229	288
				hp	144	180	209	245	307	386
Torque (without charge pump)	at $V_{g \max}$	$\Delta p = 400 \text{ bar}$ $\Delta p = 5800 \text{ psi}$	M_{\max}	Nm	254	356	451	572	795	1144
				lb-ft	187	263	333	423	586	844
		$\Delta p = 100 \text{ bar}$ $\Delta p = 1450 \text{ psi}$	M	Nm	63.5	89	112.8	143	198.8	286
				lb-ft	46.8	65.6	83.2	105.5	146.6	210.9
Moment of inertia (about drive axis)		J	kgm ²	0.003	0.0051	0.0072	0.0106	0.0164	0.0323	
			lb-ft ²	0.0712	0.1210	0.1709	0.2515	0.3892	0.7665	
Weight (standard model without through drive)		m	kg	31	38	50	66	80	104	
			lbs.	68	84	110	145	176	229	

- ① Limited maximum rpm: – at half corner power (e.g. at $V_{g \max}$ and $p_N/2$)
- ② Intermittent maximum rpm: – at high idle speed
- during engine overspeed: $\Delta p = 70\text{--}150 \text{ bar}$ (1015–2176 psi) and $V_{g \max}$
- with reversing loads: $\Delta p < 300 \text{ bar}$ (4350 psi) and $t < 5 \text{ seconds}$

V_g = Displacement (cm³ or in³) per revolution

Δp = Differential pressure

n = Speed (rpm)

Input Drive (Permissible axial and radial loading on drive shaft)

Size				40	56	71	90	125	180	
Distance of F_q (from shaft shoulder)		a	mm	17.5	17.5	20.0	20.0	22.5	25.0	
			in	0.69	0.69	0.79	0.79	0.89	0.98	
		b	mm	30	30	35	35	40	45	
			in	1.18	1.18	1.38	1.38	1.57	1.77	
		c	mm	42.5	42.5	50	50	57.5	60	
			in	1.67	1.67	1.97	1.97	2.26	2.36	
Max. permissible radial load at distance		a	$F_{q \max}$	N	3600	5000	6300	8000	11000	16000
			lbs.	809	1124	1416	1798	2473	3597	
		b	$F_{q \max}$	N	2891	4046	4950	6334	8594	12375
			lbs.	650	910	1113	1424	1932	2782	
		c	$F_{q \max}$	N	2416	3398	4077	5242	7051	10150
			lbs.	543	764	917	1178	1585	2282	
Max. permissible axial load			$\pm F_{q \max}$	N	1500	2200	3500	3500	4800	6000
				lbs.	337	495	787	787	1079	1349

Filtration Options

Many factors influence the selection of a filter to achieve the desired cleanliness level, including: dirt ingestion rate, required cleanliness level, and system complexity. We have found the following filter Beta (β) ratios (ISO 4572) to be satisfactory:

- Suction Filtration..... $\beta_{10} \geq 2.0$ & $\beta_{30} \geq 100$
- Charge Pressure Filtration..... $\beta_{10} \geq 10.0$ & $\beta_{20} \geq 100$

Machine testing is necessary to confirm the ability of the selected filter to maintain the desired fluid cleanliness levels.

Charge Flow Suction Filtration (standard model)...S

Filter type: Filter **without** bypass

Filter element pressure drop:
 at $V = 141 \text{ SUS}$ (30 cSt); $n = n_{\max}$ $\Delta p \leq 0.1 \text{ bar}$ (1.5 psi)
 at $V = 4635 \text{ SUS}$ (1000 cSt); $n = 1000 \text{ rpm}$.. $\Delta p \leq 0.3 \text{ bar}$ (4.5 psi)

Min. pressure at charge pump inlet port (S):
 at $V = 141 \text{ SUS}$ (30 cSt)..... $p \geq 0.8 \text{ bar abs.}$ (6.3 in-Hg.)
 at cold start $p \geq 0.5 \text{ bar abs.}$ (15.2 in-Hg.)
 The filter should be fitted with a ΔP indicator and/or switch.

Variable Displacement Pump AA4VG, Series 3

Filtration Options

Charge Pressure Filtration...D (Ports Fe & Fa)

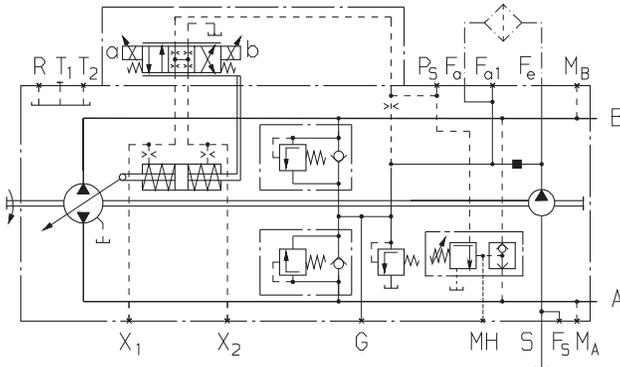
Filter type: Filter **without** bypass

Filter element pressure drop (line mounted filter):
 at $V=141 \text{ SUS (30 cSt)}$; $n=n_{\text{max}}$ $\Delta p \leq 1 \text{ bar (14.5 psi)}$
 at cold start $\Delta p_{\text{max}} = 3 \text{ bar (43.5 psi)}$
 (valid for entire speed range $n_{\text{min}}-n_{\text{max}}$)

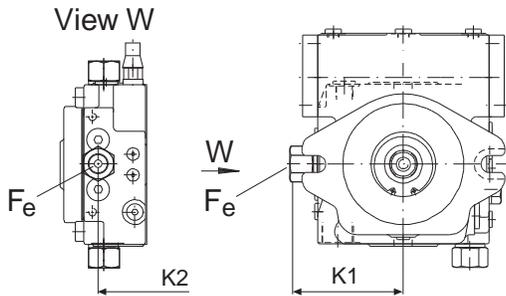
Please note:

- With Direct Operated Hydraulic Control–Type DG, control pressure should be supplied from the P_S port.
- The filter should be fitted with a ΔP indicator and/or switch set at $\leq 3 \text{ bar (43.5 psid)}$.

Circuit Diagram...D (Ports Fe & Fa)



Dimensions...D (Ports Fe & Fa)



Size	K1	K2	Fe
40	112	198.7	3/4"-16 UNF-2B; 15 deep
56	115	215.4	3/4"-16 UNF-2B; 15 deep
71	134	239.0	1 1/16"-12 UN; 20 deep
90	128	248.5	1 1/16"-12 UN; 20 deep
125	147	267.9	1 5/16"-12 UN-2B; 20 deep
180	148	311.9	1 5/16"-12 UN-2B; 20 deep

Charge Pressure Filtration...K (with cold start valve)

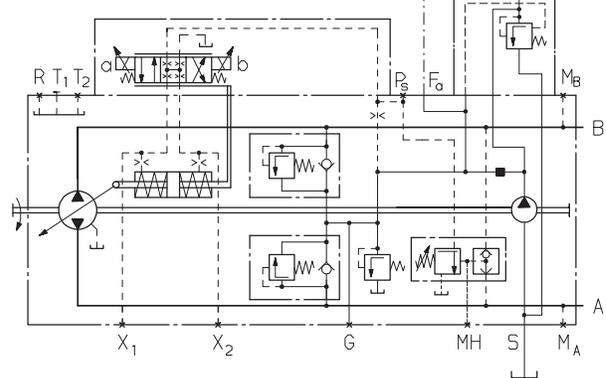
Similar to option D, except with cold start valve, providing filter bypass function and charge pump protection.

Bypass valve:
 Bypass setting $\Delta p \geq 3.5 \text{ bar (50 psi)}$
 Bypass flow To charge pump inlet

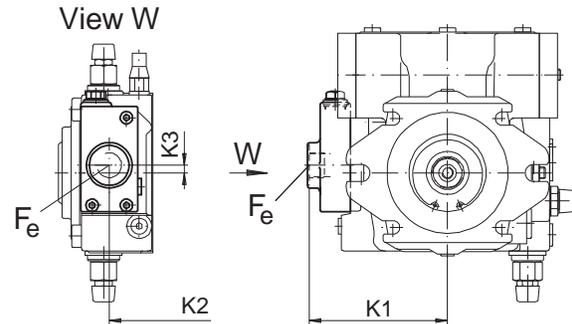
Port F_e To line mounted filter
 Port F_a From line mounted filter

The filter should be fitted with a ΔP indicator and/or switch set at $\leq 3 \text{ bar (43.5 psid)}$.

Circuit Diagram...K (with cold start valve)



Dimensions...K (with cold start valve)

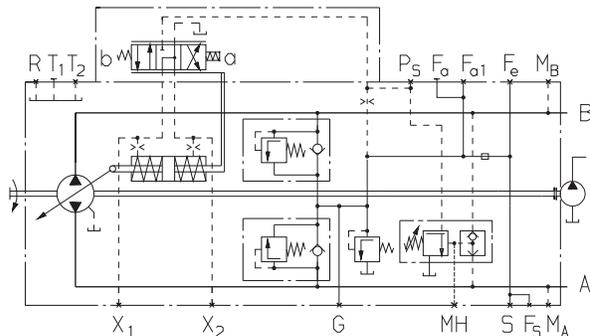


Size	K1	K2	K3	Fe
40	122.5	198.7	0	3/4"-16 UNF-2B; 15 deep
56	125.5	215.4	0	3/4"-16 UNF-2B; 15 deep
71	145.5	239.0	8	1 1/16"-12 UN; 20 deep
90	139.5	248.5	24	1 1/16"-12 UN; 20 deep
125	172.0	267.9	20	1 5/16"-12 UN-2B; 20 deep
180	173.0	311.9	3	1 5/16"-12 UN-2B; 20 deep

External Charge Supply...E (without charge pump)

On units supplied without an integrated charge pump (N00 or K...) the suction port (S) is plugged, and the external charge supply is connected at port F_a . Please note that the externally supplied charge flow must be maintained at the cleanliness levels indicated on page 4.

Circuit Diagram...E (without charge pump)



Variable Displacement Pump AA4VG, Series 3

Filtration Options

Charge Pressure Filtration...F (mounted filter)
(Without contamination indicator)

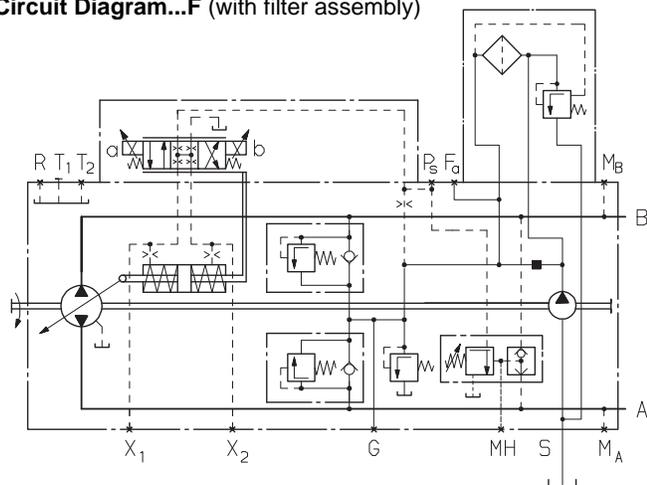
Filter type: Filter **without** bypass
Integral bypass valve:
Bypass setting $\Delta P \geq 3.5$ bar (50 psi)
Bypass flow To charge pump inlet

Filter element pressure drop (mounted filter):
at $V = 141$ SUS (30 cSt); $n = n_{max}$ $\Delta p \leq 1$ bar (14.5 psi)
at cold start $\Delta p_{max} = 3$ bar (43.5 psi)
(valid for entire speed range $n_{min} - n_{max}$)

Please note:

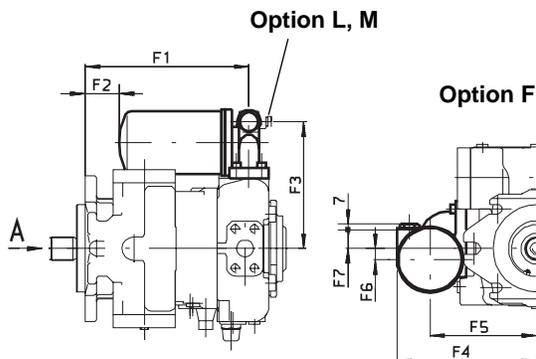
- Max. perm. charge pressure for sizes 40 and 56:
 $p_{Sp\ max} = 510$ psi (35 bar)
- With Direct Operated Hydraulic Control–Type DG, control pressure should be supplied from the P_s port.
- The filter should be fitted with a ΔP indicator and/or switch set at ≤ 3 bar (43.5 psid).

Circuit Diagram...F (with filter assembly)



Dimensions...F, P, L, M (with filter assembly)

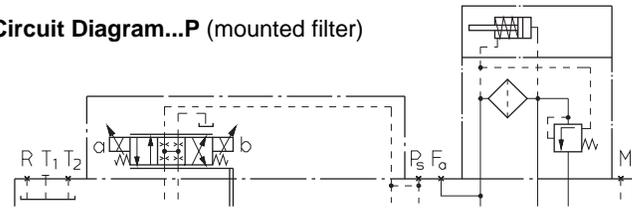
Size	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
40	198.7	46.7	160	175	135	0	42	78.5	122	125
56	215.4	63.4	163	178	138	0	42	78.5	122	125
71	239	50	185	203.5	155	16	29	65.5	109	112
90	248.5	59.4	179	197.5	149	0	53	89.5	133	136
125	267.9	62.8	201	219.5	171	0	53	89.5	133	136
180	311.9	37.9	202	220.4	171.9	17	36	72.5	116	119



Charge Pressure Filtration...P (mounted filter)
(With visual contamination indicator)

Similar to option F, except model P includes visual contamination indicator. Indication: Green/Red window.
Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)

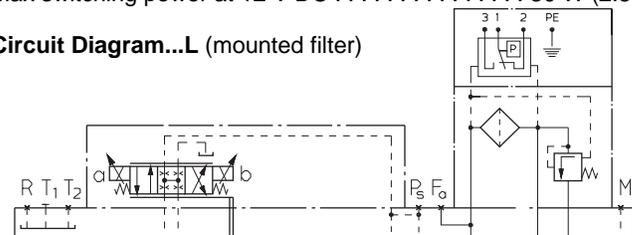
Circuit Diagram...P (mounted filter)



Charge Pressure Filtration...L (mounted filter)
(With electrical contamination indicator)

Similar to option F, except model L includes electrical contamination indicator. Indication: Electrical.
Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)
Max switching power at 24 V DC 60 W (2.5 A)
Max switching power at 12 V DC 30 W (2.5 A)

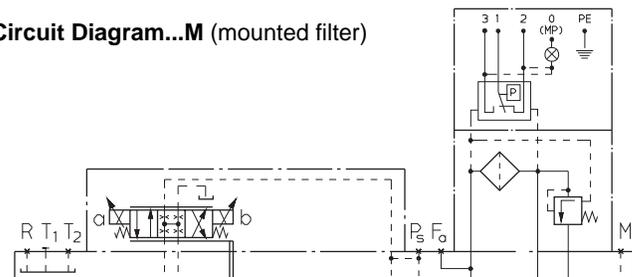
Circuit Diagram...L (mounted filter)



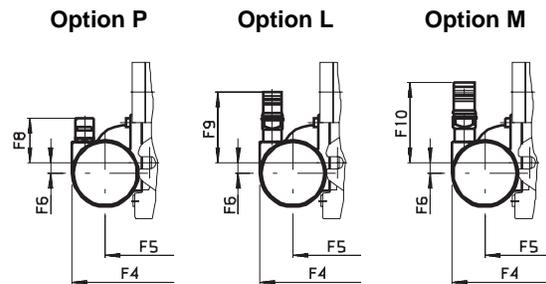
Charge Pressure Filtration...M (mounted filter)
(With visual and electrical contamination indicator)

Similar to option F, except model M includes visual and electrical contamination indicator. Indication: ep. and visual by lamp.
Indicator switching pressure. $\Delta p = 3$ bar (43.5 psi)
Max switching power at 24 V DC 60 W (2.5 A)
Max switching power at 12 V DC 30 W (2.5 A)

Circuit Diagram...M (mounted filter)



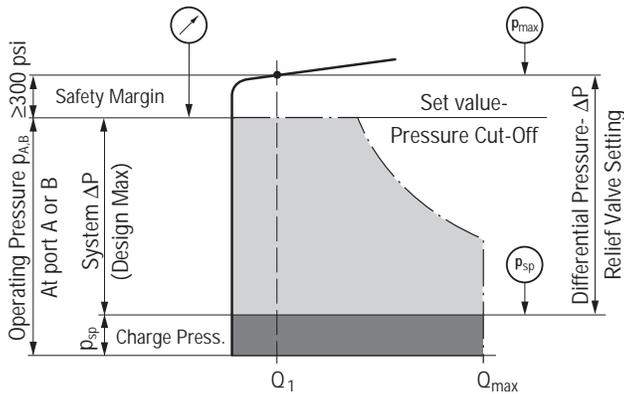
View A, rotated 90°



Variable Displacement Pump AA4VG, Series 3

High Pressure Relief Valve

Adjustment diagram with Pressure Cut-Off



Note: Relief valves are adjusted at a flow rate of:
Q₁ = 6–10 l/min (1.6–2.6 gpm), depending on size

Example: Charge pressure 30 bar (435 psi)

Operating pressure 410 bar (5945 psi)
(Pressure cut-off setting)

Safety margin 20 bar (290 psi)

$$\begin{aligned} \text{Operating press. } p_{A,B} - \text{Charge press. } p_{sp} + \text{Safety Margin} &= \text{Differential press. } \Delta p \\ 410 \text{ bar} - 30 \text{ bar} + 20 \text{ bar} &= 400 \text{ bar} \\ (5945 \text{ psi}) - (435 \text{ psi}) + (290 \text{ psi}) &= (5800 \text{ psi}) \end{aligned}$$

High pressure relief valve Pilot Operated (size 71...180)	Differential pressure settings (Δp_{HD})
Setting range valve 1	420 bar (6090 psi)
Δp 100–420 bar	400 bar (5800 psi) *
Δp 1450–6090 psi (see model code)	350 bar (5075 psi)
	320 bar (4640 psi)
	300 bar (4350 psi)
	270 bar (3915 psi)
	250 bar (3625 psi)
	230 bar (3335 psi)
	200 bar (2900 psi)
	150 bar (2175 psi)
	100 bar (1450 psi)

High pressure relief valve Direct Operated (size 40, 56)	Differential pressure settings (Δp_{HD})
Setting range valve 3, 5	420 bar (6090 psi)
Δp 270–420 bar	400 bar (5800 psi) *
Δp 3915–6090 psi (see model code)	350 bar (5075 psi)
	320 bar (4640 psi)
	300 bar (4350 psi)
	270 bar (3915 psi)
Setting range valve 4, 6	250 bar (3625 psi)
Δp 60–250 bar	230 bar (3335 psi) *
Δp 870–3625 psi (see model code)	200 bar (2900 psi)
	150 bar (2175 psi)
	100 bar (1450 psi)

* Standard setting if not specified otherwise

Bypass Function

Size 40, 56: HD-valves direct operated (3), (4): without bypass
 Size 40, 56: HD-valves direct operated (5), (6): with bypass
 Size 71...180: HD-valves pilot operated (1): with bypass

Simplification: The bypass function is not shown in the circuit diagrams.
 The pilot operated HD-valves (sizes 71...180) are not shown in the circuit diagrams.

Please state in clear text when ordering:

High pressure relief valve A
 Differential pressure setting: $\Delta p_{HD} = \dots \text{psi}$
 Pressure value of the HD-valve (at Q_1) $p_{max} = \dots \text{psi}$
 ($p_{max} = \Delta p_{HD} + p_{Sp}$)

High pressure relief valve B
 Differential pressure setting: $\Delta p_{HD} = \dots \text{psi}$
 Pressure value of the HD-valve (at Q_1) $p_{max} = \dots \text{psi}$

Pressure Cut-Off

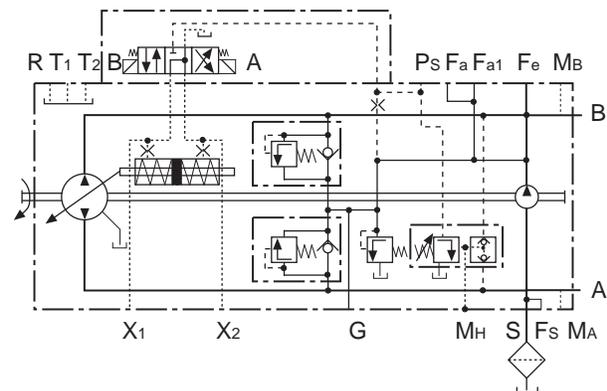
The pressure cut-off valve varies the swashplate angle, as required, to limit the maximum pressure at port A or B.

The pressure cut-off valve prevents continuous dumping of excessive flow, at load pressure, through the cross port relief valves in the pump. This eliminates unnecessary heating of the oil and protects the pump and motor during rapid acceleration or deceleration, or when the drive stalls, causing the pump to dead-head.

The pressure peaks that occur with rapid swivel angle changes, and also the maximum system pressure, are further protected by the high pressure relief valves.

The pressure cut-off valve should be set 20–30 bar (290–435 psi) less than the high pressure relief valve settings.

Standard Adjustment Range: 2175–6500 psi (150–450 bar)



Electrical Control–Non Proportional, EZ1D/EZ2D with Pressure Cut-Off

Variable Displacement Pump AA4VG, Series 3

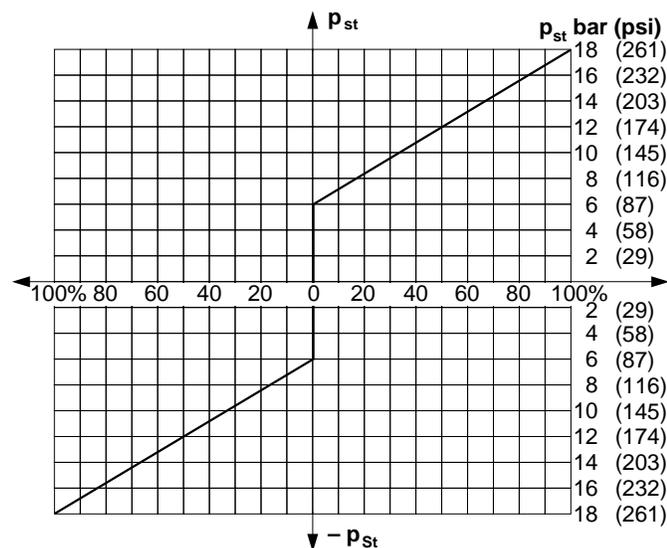
HD Hydraulic Pilot Control

The flow output of the pump is infinitely varied between 0 and 100%, proportional to the difference in pilot pressure applied to the two control ports (Y₁ and Y₂), in the range of 6 to 18 bar (87 to 261 psi).

The pilot signal, which originates from an external, remote source, is pressure only. Flow is negligible as the pilot signal is only acting on the spool of the control valve.

This spool then directs control oil into and out of the stroking cylinder to adjust pump displacement as required.

A feedback lever, connected to the stroking piston, maintains the pump flow for any given pilot signal.

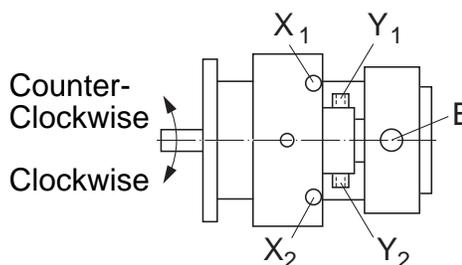
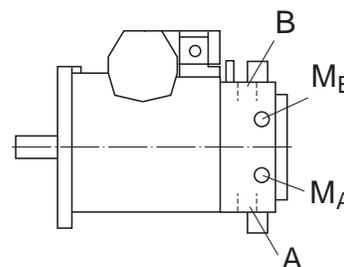


Pilot pressure p_{st} : 6–18 bar (87–261 psi) at ports Y₁, Y₂
 Begin of regulation: 6 bar (87 psi)
 End of regulation: 18 bar (261 psi)

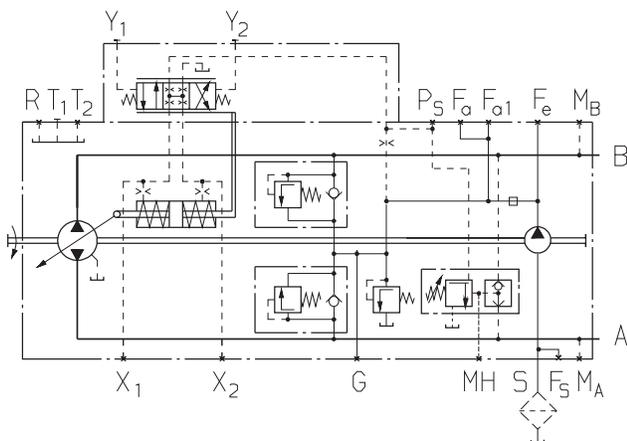
If the pump is also fitted with a DA control valve, automotive control of the vehicle transmission is possible.
 For DA control valve see page 12, 13, 28, & 29.

Data Table – AA4VG...HD
 Direction of rotation – Control – Output flow direction

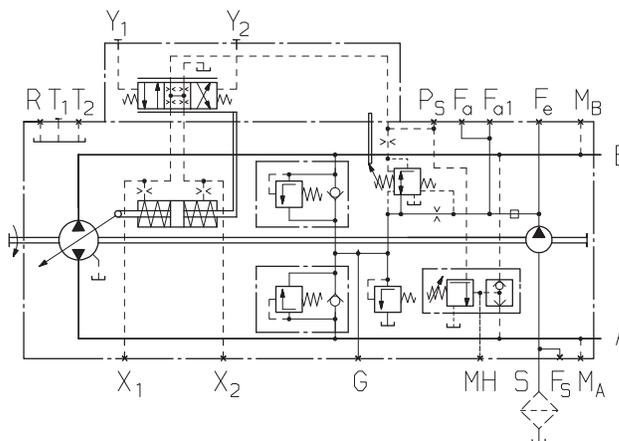
	Size	Pilot Pressure	Control Pressure	Direction of Flow	Operating Pressure
Direction of Rotation Clockwise	40, 56	Y ₁	X ₁	A to B	M _B
		Y ₂	X ₂	B to A	M _A
Direction of Rotation Counter-Clockwise	71, 90, 125, 180	Y ₁	X ₁	B to A	M _A
		Y ₂	X ₂	A to B	M _B
Direction of Rotation Counter-Clockwise	40, 56	Y ₁	X ₁	B to A	M _A
		Y ₂	X ₂	A to B	M _B
Direction of Rotation Counter-Clockwise	71, 90, 125, 180	Y ₁	X ₁	A to B	M _B
		Y ₂	X ₂	B to A	M _A



Standard model



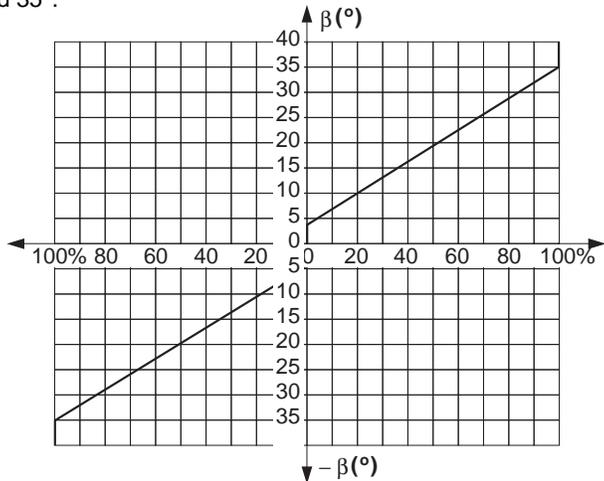
Model with DA control valve



HW Rotary Manual Servo Control

The flow output of the pump is infinitely varied in the range of 0 to 100%, proportional to the rotation of the control lever between 0° and ±35° from the spring centered zero flow position.

A feedback lever, connected to the stroking piston, maintains the pump flow for any given position of the control lever between 0° and 35°.



Swivel angle of the control lever:

from 0 to $\pm V_{g,max}$ or $\beta = 0^{\circ}$ to $\pm 35^{\circ}$

mechanical stop: size 40-71 $\pm 40^{\circ}$
 size 90-180 $\pm 35^{\circ}$

Required lever torque: 85-210 Ncm (7.5-19 lb-in)

Maximum lever torque: 250 Ncm (22 lb-in)

If the pump is also fitted with a DA valve, automotive control of the vehicle transmission is also possible.

For DA control valve see page 12, 13, 28, & 29.

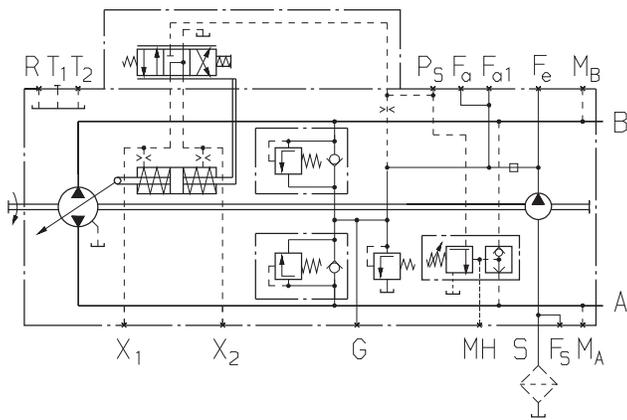
For pressure cut-off see page 8.

Option: Neutral position switch...HWDL

When the HW control lever is in the neutral position, the neutral position switch is closed. The switch opens if the control lever is moved out of neutral in either direction.

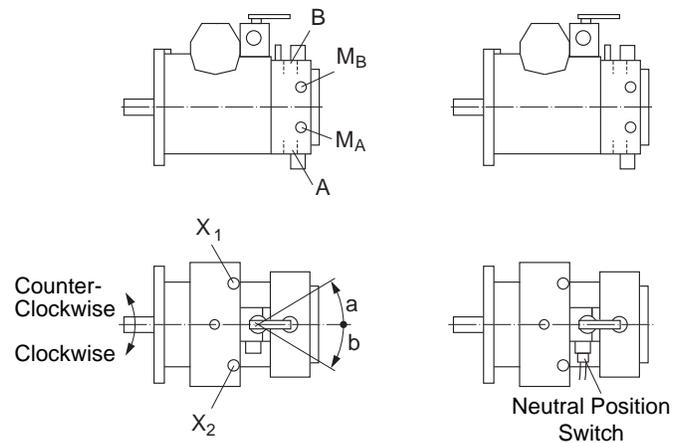
The neutral position switch provides a safety function for systems that require zero flow under certain operating conditions. (e.g.-engine start).

Standard model



Data Table – AA4VG...HW
Direction of rotation – Control – Output flow direction

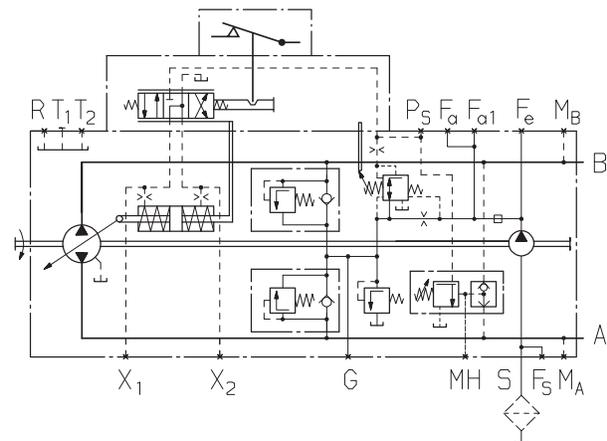
Direction of Rotation	Size	Lever Direction	Control Pressure	Direction of Flow	Operating Pressure
Clockwise	40, 56	a	X ₂	B to A	M _A
		b	X ₁	A to B	M _B
Counter-Clockwise	71, 90, 125, 180	a	X ₂	A to B	M _B
		b	X ₁	B to A	M _A
Counter-Clockwise	40, 56	a	X ₂	A to B	M _B
		b	X ₁	B to A	M _A
Counter-Clockwise	71, 90, 125, 180	a	X ₂	B to A	M _A
		b	X ₁	A to B	M _B



Technical data for neutral position switch

Load performance	20A (continuous)
Switch performance	15A / 32V (DC)
	4A / 32V (AC - inductive)

Model with DA control valve and neutral position switch



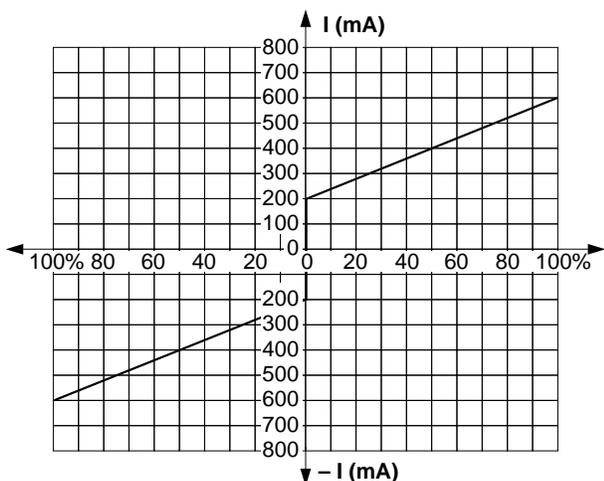
Variable Displacement Pump AA4VG, Series 3

EP Proportional Electrical Control

The flow output of the pump is infinitely varied in the range of 0 to 100%, proportional to an electrical current, in the range of 200–600 mA at 24 volts DC, supplied to solenoid a or b. (A current of 400 to 1200 mA is required for the 12 volt solenoids.)

The electrical energy is converted to a force acting on the control spool. The spool then directs control oil in and out of the stroking piston to stroke the pump as required. A feedback lever, connected to the stroking piston, maintains the pump flow for any given current within the control range.

Proportional amplifiers MDSD, PVR-PVRS and special function amplifier EDA are available to control the proportional solenoids. As well, electronic control of the solenoids can be achieved by using a microcontroller with software that is programmed to perform special functions for custom applications.

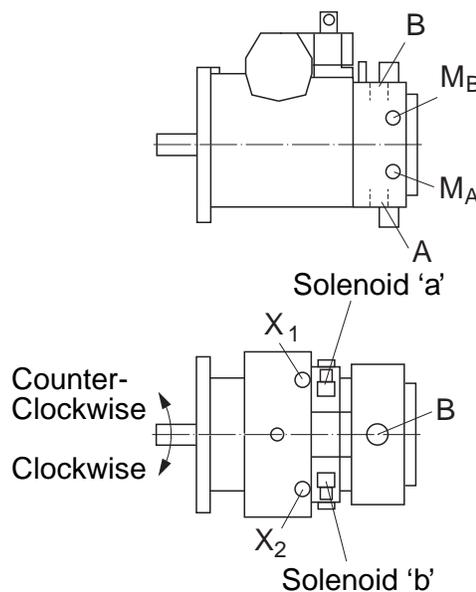


Control current (24 vdc;EP2): I=200–600 mA
 Begin of control: I=200 mA (V_{g0})
 End of control: I=600 mA (V_{gmax})
 Control current (12 vdc;EP1): I=400–1200 mA
 Begin of control: I=400 mA (V_{g0})
 End of control: I=1200 mA (V_{gmax})

If the pump is also fitted with a DA control valve, automotive control of the vehicle transmission is possible. For DA control valve see page 12,13, 28, & 29.

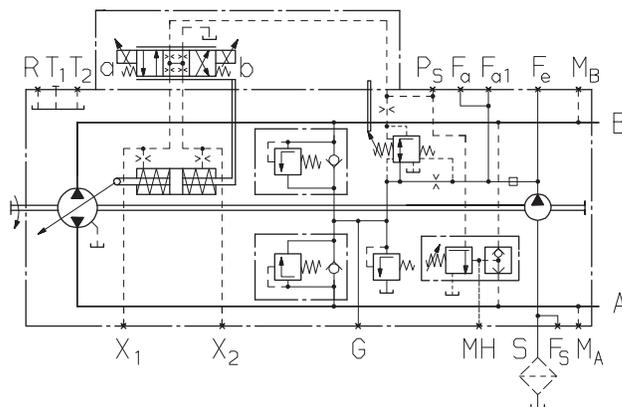
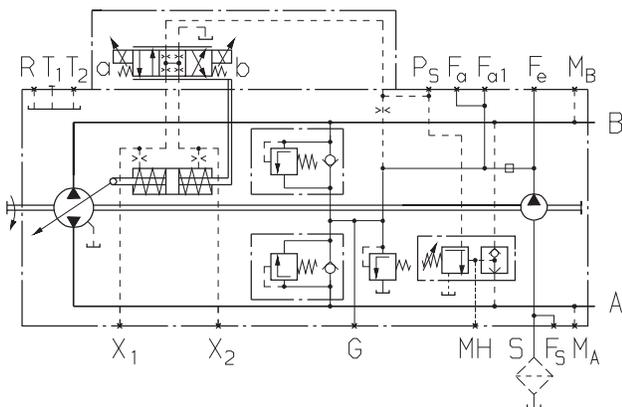
Data Table – AA4VG...EP
 Direction of rotation – Control – Output flow direction

Direction of Rotation	Size	Solenoid	Control Pressure	Direction of Flow	Operating Pressure
Clockwise	40, 56	a	X ₁	A to B	M _B
		b	X ₂	B to A	M _A
Counter-Clockwise	71, 90, 125, 180	a	X ₁	B to A	M _A
		b	X ₂	A to B	M _B
Clockwise	40, 56	a	X ₁	B to A	M _A
		b	X ₂	A to B	M _B
Counter-Clockwise	71, 90, 125, 180	a	X ₁	A to B	M _B
		b	X ₂	B to A	M _A



Standard model

Model with DA control valve



Variable Displacement Pump AA4VG, Series 3

DA Hydraulic Control Speed Dependent

Pilot pressure from the DA regulating cartridge is directed to the stroking piston of the pump by a 4/3 way directional valve. Pump displacement is infinitely variable in each direction of flow, proportional to both pump drive speed and discharge pressure. Flow direction (i.e.-Machine forward or reverse) is controlled by energizing solenoid a or b (refer to flow direction data table at right).

Increasing pump drive speed generates a higher pilot pressure from the DA cartridge, with a subsequent increase in pump flow and/or pressure.

Dependent on the pump operating curve, increasing system pressure causes the pump to swivel back towards a smaller displacement.

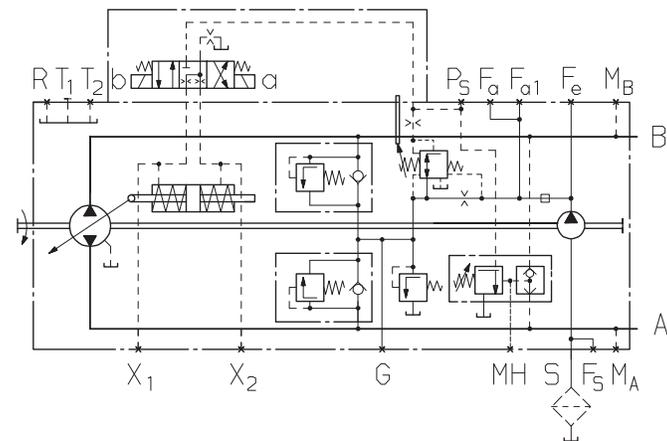
A relatively constant torque input to the pump is achieved by this combination of de-stroking the pump as the operating pressure increases and the response to the "pull-down" of the prime mover (reduced pilot pressure).

Any additional power requirements, such as implement hydraulics, may result in engine pull down. This leads to a reduction in pilot pressure and therefore pump displacement (i.e.-power). The power thus released is then available to supply that demanded by the implement hydraulics. Automatic power division and full utilization of available power is thus achieved for both the vehicle transmission and the implement hydraulics.

Minimizing the engine pull down provides optimum usage of the available drive power. This can be achieved by "partial inching", using the adjustable regulating cartridge with lever (catalog code options 3 and 5). With partial inching, the DA cartridge is mechanically coupled to the accelerator pedal. This means that when a certain engine speed is reached, (movement of the accelerator pedal), the control curve is offset parallel to the engine speed curve.

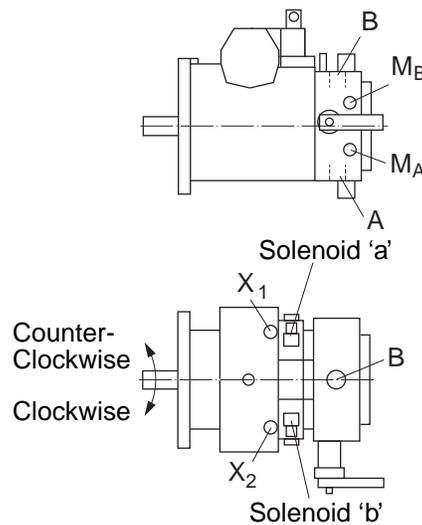
*Application of the DA Control is only appropriate on certain types of vehicle drive systems, and requires a careful review of the engine and vehicle parameters to ensure that the pump is set up correctly. All DA applications **must** therefore be reviewed by a Rexroth Application Engineer.*

Hydraulic Control, Speed Dependent (DA) control valve, mech. adjustable with control lever DA1D3/DA2D3



Data Table – AA4VG...DA
Direction of rotation – Control – Output flow direction

Direction of Rotation	Size	Solenoid	Control Pressure	Direction of Flow	Operating Pressure
					MA
Clockwise	40, 56	a	X ₂	B to A	MA
		b	X ₁	A to B	MB
Counter-Clockwise	71, 90, 125, 180	a	X ₂	A to B	MB
		b	X ₁	B to A	MA
Clockwise	40, 56	a	X ₂	A to B	MB
		b	X ₁	B to A	MA
Counter-Clockwise	71, 90, 125, 180	a	X ₂	B to A	MA
		b	X ₁	A to B	MB



Rotary Inching Valve

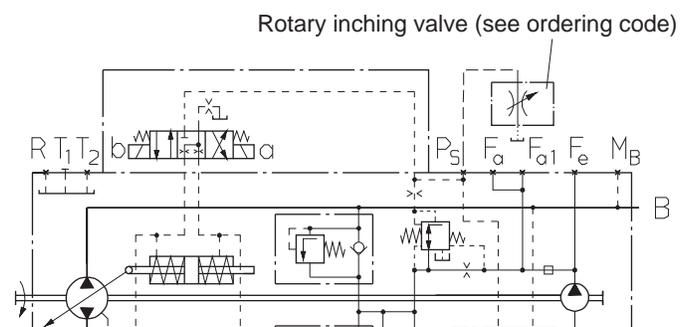
This valve is used to provide vehicle inching function, and is used in conjunction with the DA Regulating Cartridge with fixed adjustment.

It permits the pilot pressure (speed dependent) to be reduced as necessary, independently of the pump drive speed, controlled by rotation of the inching lever.

Maximum angle of lever operation is 90°. The position of the lever is optional (inching operation clockwise or counter-clockwise).

The valve is mounted separately from the pump and connected to the P_S port. Maximum line length should be limited to approximately 2 meters (79").

Hydraulic Control, Speed Dependent (DA) with separate rotary inching valve



Variable Displacement Pump AA4VG, Series 3

DA Hydraulic Control Speed Dependent

Function and control of DA valves.

Rotary Inching Valve

The rotary inch valve is to be ordered separately.

Size	Ordering Code
40, 56, 71, 90	438 553/470.05.31.01
125	438 554/470.05.31.02
180	438 555/470.05.31.03

Please state your requirements in clear text: Inching, clockwise or counter-clockwise operation of the lever (this is determined on assembly).

Attention: The rotary inch valve can be used independently from the control device.

DA regulating cartridge, fixed adjustment (2)

Pilot pressure is generated in relation to drive speed. There are no provisions for inching with this cartridge. The pump is factory preset as determined by engine/vehicle requirements.

DA regulating cartridge, mechanically adjustable w/lever (3)

Pilot pressure is generated in relation to drive speed. The pump is factory preset as determined by engine/vehicle requirements. Pilot pressure may be reduced (independently of drive speed) as required, by operation of the control lever (inching function).

Maximum angle of lever operation is 70°. The position of the lever is optional (inching operation clockwise or counter-clockwise).

Hydraulic inching valve (4, 5)

This valve is used to provide vehicle inching function, and is used in conjunction with the DA Regulating Cartridge, either with fixed adjustment or mechanically adjustable with lever.

Model with throttle valve used on Size 40, 56, & 71.

Model with pressure reducing valve used on size 90, 125, & 180.

It permits the pilot pressure (speed dependent) to be reduced as necessary, independently of the pump drive speed, by applying a hydraulic pressure at Port Z. This is normally supplied from the vehicle braking system using the brake fluid of the power brakes.

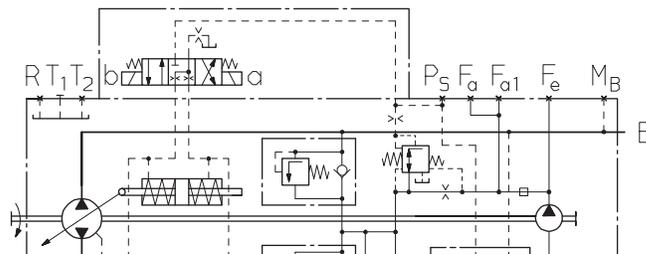
Master controller TH7 as inching valve (7)

This valve is used to provide vehicle inching function, and is used in conjunction with the DA control valve, fixed setting.

Any reduction of control pressure, independent from the input speed through the mechanical operation of the master controller TH7.

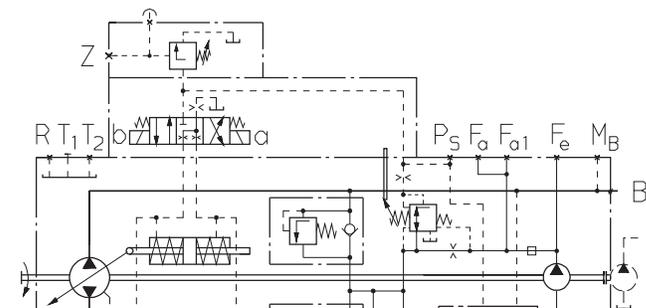
The master controller is installed separately from the pump connected with the pump by 2 hydraulic control lines at ports P_s and Y. The master controller is to be ordered separately (see data sheet RE 64558)

Hydraulic Control, Speed Dependent (DA) fixed setting, DA1D2/DA2D2

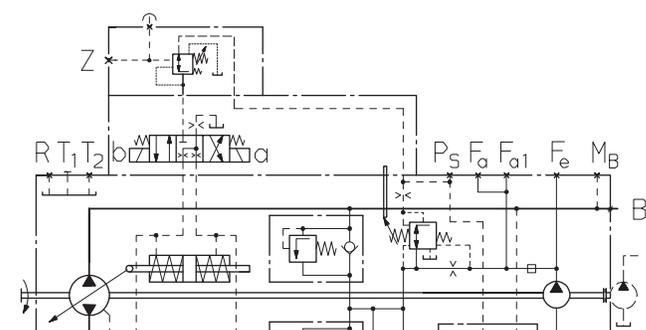


Hydraulic Control, Speed Dependent (DA) mechanically adjustable with control lever, with hydraulic inching valve, DA1D5/DA2D5

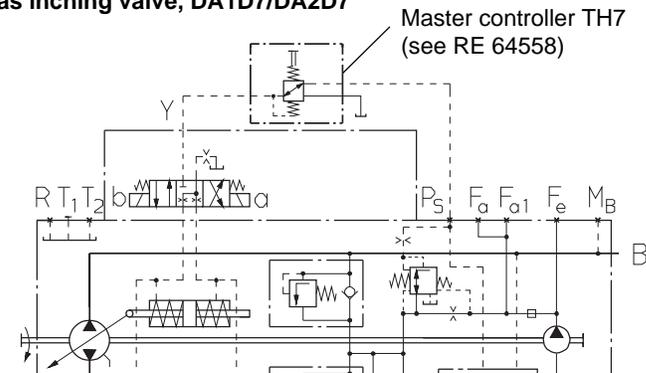
with throttle valve
Sizes 40...71



with pressure reducing valve
Sizes 90...180



Hydraulic Control, Speed Dependent (DA) fixed setting, with separately installed master controller TH7 as inching valve, DA1D7/DA2D7



Variable Displacement Pump AA4VG, Series 3

EZ Electrical Control Non-Proportional

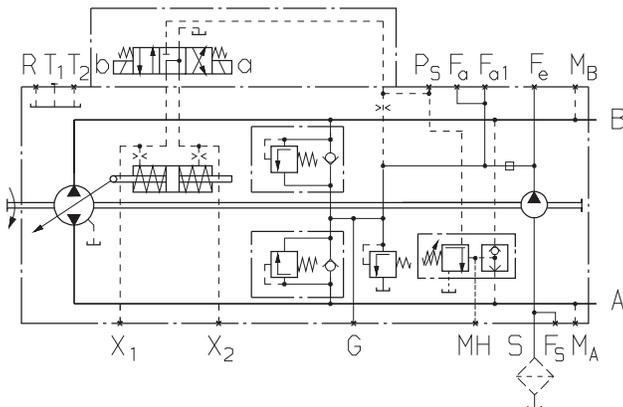
By energizing either solenoid a or b, internal control pressure is connected directly to the stroking piston, and the pump swivels to maximum displacement.

With the EZ control pump flow is switchable from zero flow (neither solenoid energized) to maximum flow. Flow direction is determined by which solenoid is energized (please refer to the data table at the top of page 12).

- EZ1 12 vdc solenoids
- EZ2 24 vdc solenoids

Pressure Cut-Off: Refer to page 8.

Standard model



DG Hydraulic Control Direct Operated

Pumps supplied with the DG control have no control module. The module is replaced by a cover plate.

Pump output is controlled by hydraulic control pressure (P_{st}), typically supplied by a remote pilot controller, applied directly to the stroking piston through either the X_1 or X_2 port. The DG control is not a positive displacement control, as there is no control feedback device.

While pump displacement is infinitely variable between 0 and 100%, a given swashplate position can be affected by system pressure and/or pump drive speed, as well as the stroking piston centering springs.

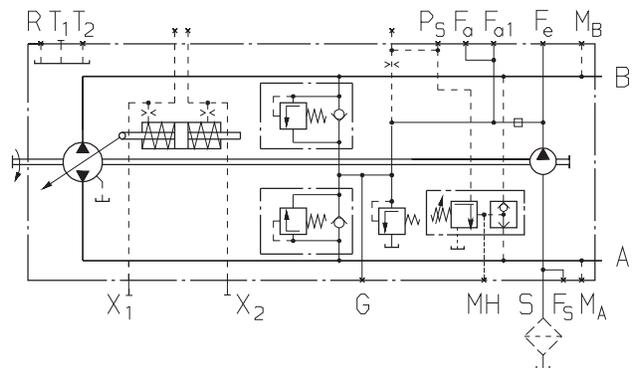
Flow direction is determined by which pilot port is pressurized (please refer to the data table at the top of page 9; Control Pressure column- X_1 ; X_2).

Nominal characteristics:

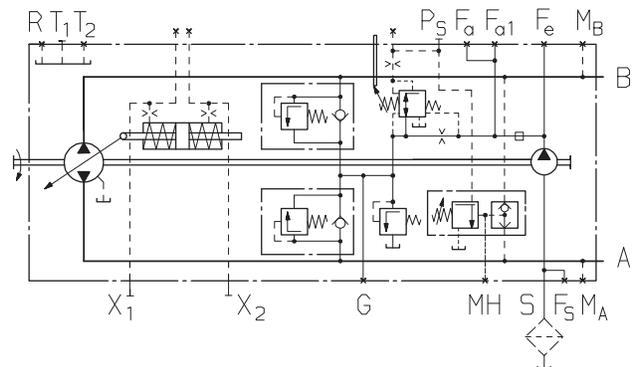
- Begin of regulation- $P_{st \min}$ 5–8 bar (73–116 psi)
- End of regulation (full stroke)- $P_{st \max}$. . . 22–25 bar (320–363 psi)

Application of the DG Control is only appropriate on certain types of vehicle drive systems, and requires a careful review of the engine and vehicle parameters to ensure that the pump is set up correctly. All DG applications should be reviewed by a Rexroth Application Engineer.

Standard model



Standard model with DA control valve

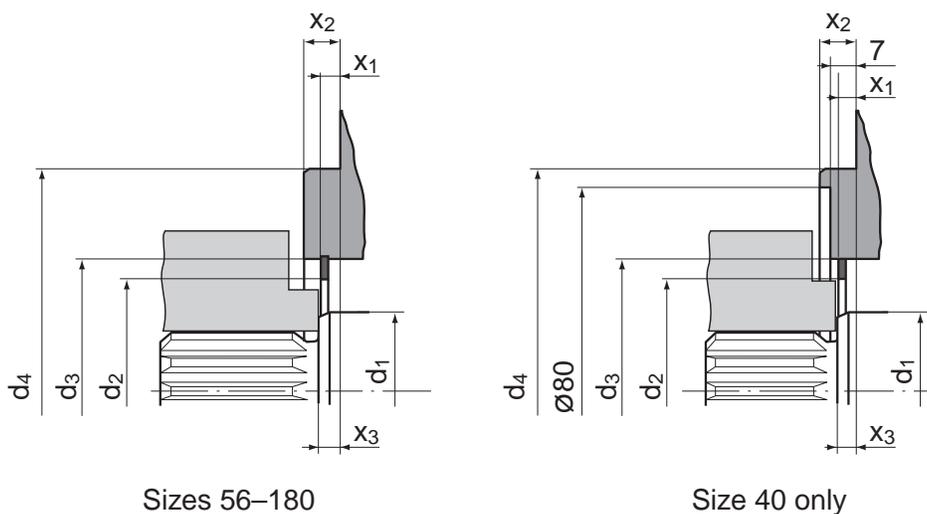


Variable Displacement Pump AA4VG, Series 3

Installation Situation for Coupling Assembly

In order to assure that rotating parts (coupling hub) and fixed parts (housing circlip) do not contact each other the installation situations are described in this data sheet have to be observed. The installation situation depend upon the sizes and the spline.

For SAE spline shaft (shaft S or T) the outer diameter of the coupling hub must be smaller than the inner diameter of the circlip d_3 at the zone of the drive shaft shoulder (measure $X_2 - X_3$).

SAE Spline

Size	$\varnothing d_1$	$\varnothing d_2$ min	$\varnothing d_3$	$\varnothing d_4$	X_1	X_2	X_3
40	40	51.4	63 ± 0.1	127	$4.3^{+0.2}$	$12.7_{-0.5}$	$8^{+0.9}_{-0.6}$
56	40	54.4	68 ± 0.1	127	$7.0^{+0.2}$	$12.7_{-0.5}$	
71	45	66.5	81 ± 0.1	127	$7.0^{+0.2}$	$12.7_{-0.5}$	
90	50	66.5	81 ± 0.1	152.4	$6.8^{+0.2}$	$12.7_{-0.5}$	
125	55	76.3	91 ± 0.1	152.4	$7.0^{+0.2}$	$12.7_{-0.5}$	
180	60	88	107 ± 0.1	165.1	$7.4^{+0.2}$	$15.9_{-0.5}$	

Variable Displacement Pump AA4VG, Series 3

Combination Pump

Combination pumps provide two independent closed circuits without the need for splitter gear boxes. When ordering combination pumps the individual model codes should be connected by a '+' sign:

Code: Pump #1 (front pump) + Code: Pump #2 (rear pump)

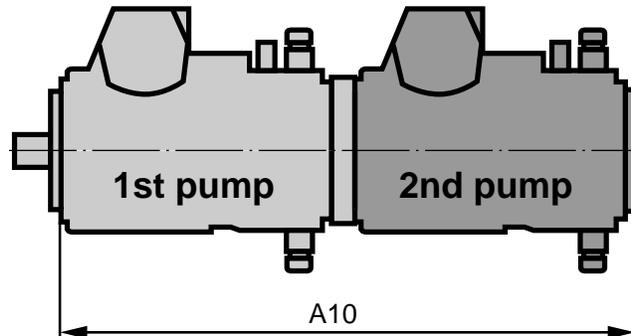
Code example: AA4VG 56 EP1D1/32 R – PTC 52 **F073S** + AA4VG 56 EP1D1/32 R – PSC 52 F003S

External support for combination pumps of the same frame size is not required, if the dynamic acceleration does not exceed 10g (=98.1 m/s²).

The 4-bolt mounting flange is recommended for size 71 and larger pumps.

Combination pump of the same size
(2nd pump without through drive and with auxiliary pump, F00)

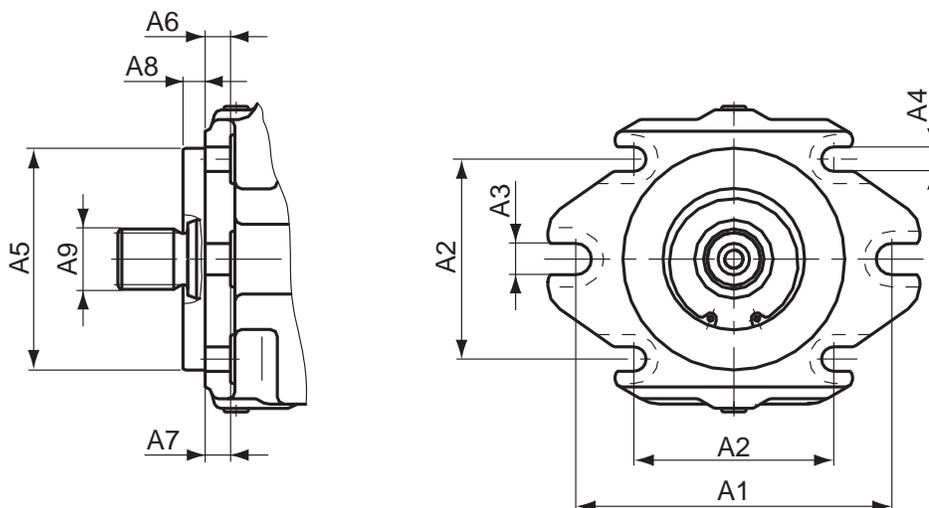
Size	40	56	71	90	125	180
A10	475.5	521.2	596.4	608.8	669.1	764



Mounting flanges & shaft options (of single and combination pumps)

Size	Mtg. flange	A1	A2	A3	A4	A5	A6	A7	A8	Single pump	Combination pump of same size		
										A9	1st Pump	Through drive	2nd Pump
40	SAE C (2-Bolt)	181	-	18	-	ø127	-	15	12.7	S (SAE 1 1/4")	S (SAE 1 1/4")	F09/K09	U (SAE 1")
56	SAE C (2-Bolt)	181	-	18	-	ø127	-	18	12.7	S (SAE 1 1/4")	T (SAE 1 3/8")	F07/K07	S (SAE 1 1/4")
71	SAE C (2+4-Bolt)	181	114.6	18	14	ø127	15	15	12.7	S (SAE 1 1/4")	T (SAE 1 3/8")	F07/K07	S (SAE 1 1/4")
90	SAE D (2+4-Bolt)	228.6	161.4	22	21	ø152.4	17	20	12.7	S (SAE 1 3/4")	S (SAE 1 3/4")	F73/K73	Z (W35)
125	SAE D (2+4-Bolt)	228.6	161.4	22	21	ø152.4	20	20	12.7	S (SAE 1 3/4")	T (SAE 2")	F69/K69	S (SAE 1 3/4")
180	SAE E (4-Bolt)	-	224.5	-	21	ø165.1	22	-	15.9	S (SAE 1 3/4")	T (SAE 2 1/4")	F72/K72	S (SAE 1 3/4")

Mounting Flange



Variable Displacement Pump AA4VG, Series 3

Start-Up Procedure

The following procedure has been developed based on experience with most types of applications, however certain applications may require a departure from or variation to this procedure.

For the start-up of new or overhauled installations.

1. If the prime mover is:

Internal combustion engine: (Diesel, gasoline or LP)- Remove the coil wire, close the injector rack or leave the gas turned off and turn the engine over until the charge pressure reaches 50 psi or more.

Electric Motor: Jog the starting circuit until the charge pressure reaches 50 psi or more.
2. Start the prime mover, and if possible, maintain a pump speed of approximately 750 rpm for 5 minutes. This will allow the system to be filled.
3. Listen for any abnormal noises.
4. Check for oil leaks.
5. Run prime mover to 1800 rpm. (Adjust to the design speed if less than 1800 rpm.)
6. Set charge and pilot pressure as required for the application. (Refer to circuit schematic)
7. For the HD control, bleed the pilot lines by loosening the connections at Y1 and Y2 and then actuate the remote control unit in both directions until oil seeps from the connections.
8. Retighten all connections.
9. Operate the control to work the hydrostatic transmission at approximately 20% of maximum speed.
10. Deaerate system by venting a bleed valve or by cracking the highest connection until fluid seeps out without bubbles.
11. Check fluid level and add fluid if necessary.
12. Continue operating transmission and gradually increase to full speed, still with no load.
13. With controls neutralized, check for creep in neutral. If evident, center the control in accordance with the instructions in the pump service manual.
14. Check that the controls are connected so that the transmission operates in the correct direction related to the control input.
15. Continue to monitor all pressure gauges and correct any irregularities.
16. Apply brakes and set high pressure relief valves (and pressure override if installed) to levels required for the application by stroking the pump to approximately 20% of maximum displacement.
17. Check security of high pressure connections.
18. Check oil level and temperature.
19. Remove and inspect high pressure filter elements, if so equipped. Replace with new elements.
20. Operate transmission under no load conditions for about 15 minutes to stabilize the temperature and remove any residual air from the fluid.
21. Again remove and inspect high pressure filter elements, if so equipped. If clean, the high pressure, bi-direction filters may be removed from the circuit. If contamination is still evident, fit new elements and continue flushing until the system is clean.
22. Replace the elements in the charge pump suction or pressure filter, whichever is installed.
23. Operate the transmission under full and normal load conditions.
24. Erratic operation may indicate there is still air trapped in the system. By working the pump control to one or both sides the remaining air can be eliminated. The system is free of air when all functions can be operated smoothly and when the oil in the reservoir is no longer aerated. (Usually less than 1 hour of operation).

Note:

If, after following the Pre-Start and Start-up procedures, the transmission does not perform correctly, refer to the relevant sections of the trouble-shooting procedures on pages 20–23.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure

To aid in troubleshooting, refer also to the diagnostic port connections for test gauge installation information. Procedure assumes gauges are installed.

This procedure was written to aid the troubleshooter in following a logical approach to a system fault.

1...Transmission does not Drive with the Prime Mover Running

- | | | | |
|-----|---|-----|--|
| 1.1 | Is there oil in the reservoir? | No | Fill reservoir. |
| | | Yes | Proceed to step 1.2. |
| 1.2 | Is engine clutch engaged? | No | Engage clutch. |
| | | Yes | Proceed to step 1.3. |
| 1.3 | Is the hydraulic piping in accordance with the hydraulic circuit? | No | Correct the piping. |
| | | Yes | Proceed to step 1.4. |
| 1.4 | Is the pump direction of rotation correct? | No | Fit pump having the correct direction of rotation. |
| | | Yes | Proceed to step 1.5. |
| 1.5 | Is there a broken pipe, loose fitting or burst hose? | No | Proceed to step 1.6. |
| | | Yes | Repair the fault. |
| 1.6 | Are the brakes released? | No | Check brake release circuit or mechanism. |
| | | Yes | Proceed to step 1.7. |

Charge Pump & Relief Valve

- | | | | |
|-----|--|-----|---|
| 1.7 | Is there any charge pressure at port G? | No | Proceed to step 1.10. |
| | | Yes | Proceed to step 1.8. |
| 1.8 | Is the charge pressure at least 300 psi while the pump is running at normal operating speed? | No | Proceed to step 1.9. |
| | | Yes | Proceed to step 1.19. |
| 1.9 | Can charge pressure be adjusted by adding or removing relief valve spring shims or by adjusting charge pressure relief valve setting screw if so equipped. | No | Proceed to step 1.10. |
| | | Yes | Adjust charge pressure to 300 psi and proceed to step 1.19. |

Note: If flushing valve is used in circuit, it should set at 25 psi less than charge pump relief. Refer to data sheet on flushing valve for information and setting procedure.

- | | | | |
|------|--|-----|-------------------------------|
| 1.10 | Is the suction line shut-off? | No | Open valve |
| | | Yes | Proceed to step 1.11. |
| 1.11 | Is the charge pump suction pressure within the recommended limits? (0.8 bar abs or 6.3 in-Hg.) | No | Proceed to step 1.12. |
| | | Yes | Proceed to step 1.16. |
| 1.12 | Is the suction filter element plugged. | No | Proceed to step 1.13. |
| | | Yes | Replace filter element |
| 1.13 | Does the reservoir design ensure that suction pipe is always covered with oil. | No | Correct the reservoir design. |
| | | Yes | Proceed to step 1.14. |

- | | | | |
|------|---|-----|---|
| 1.14 | Is the suction pipe size adequate for the flow? | No | Run at lower speed and return to point 1.7, or rework suction piping. |
| | | Yes | Proceed to step 1.15. |
| 1.15 | Is the reservoir air breather blocked or undersized? | No | Proceed to step 1.16. |
| | | Yes | Clean or Replace air breather. |
| 1.16 | Remove charge pressure relief valve cartridge and inspect. Is it damaged? | No | Refit cartridge and proceed to step 1.17. |
| | | Yes | Fit a new cartridge and return to step 1.7. |
| 1.17 | Remove and inspect charge pump assembly. Is it damaged? | No | Proceed to step 1.18. |
| | | Yes | Repair or replace damaged components and return to step 1.7. |
| 1.18 | Is the charge pump installed for correct direction of rotation? | No | Refit charge pump. Return to step 1.7. |
| | | Yes | With proper charge pressure, and transmission still does not operate, proceed to step 1.19. |

Pump Control

- | | | | |
|------|---|-----|---|
| 1.19 | Is control medium connected to pump control? HD...pilot pressure HW...mechanical cable or linkage. EP...12 or 24 volts dc, electrical current. | No | Connect appropriate medium and check that control signal is actually being applied to the pump control valve. |
| | | Yes | Proceed to step 1.20. |
| 1.20 | If variable displacement motors are installed, is maximum displacement selected? (If not done automatically). | No | Select maximum displacement. |
| | | Yes | Proceed to step 1.21. |
| 1.21 | Actuate the control in both directions. Does pump stroke? Does it go to full stroke? | No | Refer to the pump service manual and then proceed to step 1.22. |
| | | Yes | Operate the transmission. |
| 1.22 | Remove stroking orifices in X1 and X2. Stroke the pump in both directions. Do the pressures at X1 and X2 Alternate between 30 and 250 psi during cycle? | No | Remove control module and replace it with a new unit. Repeat step 1.21. |
| | | Yes | Proceed to step 1.23 |

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**1...Transmission does not Drive with the Prime Mover Running** (Continued from page 20)

1.23	Is the pressure at port R less than 2 bar abs. or 30 psia?	No	Repipe pump case drain line so that case pressure at port R is less than 8 bar abs. or 30 psia. Return to step 1.21.	1.25	Is it possible to adjust high pressure relief valves using the 0...10,000 psi gages at MA and MB to monitor pressure? (Refer to relief valve adjustment).	No	Replace high pressure relief valve cartridges and return to step 1.21.
		Yes	Proceed to step 1.24.			Yes	Adjust high pressure relief valves to required or design pressure. Proceed to step 1.26.
1.24	Stroke pump in both directions. Does any pressure greater than 350 psi alternate between parts M _A and M _B ?	No	Verify that loading of the pump will cause system pressure to increase above charge pressure. Proceed to step 1.19.	1.26	Actuate Control in both directions. Does transmission run?	No	Check if motor sizing is adequate for application. Check for mechanical faults in the drive beyond the motor shaft.
		Yes	Proceed to step 1.25.			Yes	operate the transmission.

2...Transmission Drive is Sluggish or Erratic

2.1	Is the control medium in good condition? For example: control medium is not in good condition if: HD...control-air in pilot lines. HW...Control-sticking cable or linkage. EP...Control-fluctuating control current.	No	Rectify the control fault. HD...Bleed pilot lines. HW...Lubricate or free the cable or linkage. EP...Check control current.	2.5	Does the charge pressure fluctuate more than 30 psi when stroking the pump?	No	Proceed to step 2.9.
		Yes	Proceed to step 2.2.			Yes	Proceed to step 2.6.
2.2	Are the brakes fully released?	No	Check brake release circuit or mechanism.	2.6	If the charge pump output is used to operate auxiliary functions, do these other functions cause fluctuations in charge pressure?	No	Proceed to step 2.8.
		Yes	Proceed to step 2.3.			Yes	Proceed to step 2.7.
2.3	Are the stroking time orifices correctly sized for the application?	No	Remove the plugs in ports X ₁ and X ₂ and remove control orifices with 3mm allen wrench, for size 71 and a 5mm allen wrench for size 250. Try various sizes until desired pump stroking rate is attained.	2.7	Isolate the auxiliary function and run the transmission. Are the charge pressure fluctuations reduced or eliminated?	No	Proceed to step 2.8
		Yes	Proceed to step 2.4.			Yes	Operate transmission and return to step 2.1.
2.4	With HD control, is the control curve of the remote pilot valve correctly matched to the pump?	No	Change spring to suit.	2.8	Are there system pressure fluctuations which are synchronous with the charge pressure fluctuations?	No	Proceed to step 2.9.
		Yes	Proceed to step 2.5.			Yes	Determine the cause of system pressure fluctuations.
				2.9	If variable displacement motor is used, is the motor stroking time correct for the application?	No	Add motor stroking time adjustment valve or orifice to the variable motor, or modify the control circuit to provide desired stroking time.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**3...Transmission Drives in One Direction Only**

3.1	With control lines lines switched does pump drive in opposite direction only?	No Yes	Proceed to step 3.2. Control signal from one side does not work properly. Repair as necessary.	3.4	Check flushing valve (If Installed). Is shuttle spool stuck in one position?	No Yes	(Not installed) Proceed to step 3.5. Remove flushing valve and clean or replace.
3.2	With control lines still switched does pump drive in initial direction only?	No Yes	proceed to step 3.3. Problem is one side of control module or the pump. Proceed to step 3.3.	3.5	Switch relief valves. does transmission drive in other direction only?	No Yes	Proceed to step 3.6. Repair or replace relief valve on nondriving side.
3.3	Is there control pressure or current from both control lines?	No Yes	Correct control signal problem. Proceed to step 3.4.	3.6	Replace control module and reconnect control lines. Does pump operate properly?	No Yes	Replace or repair pump. Operate transmission.

4...Transmission Drives in the Wrong Direction

4.1	Pump with HD control.		Switch control lines on ports Y ₁ and Y ₂ .	4.3	Pump with HW Control.		Rework linkage or cable to give correct drive direction.
4.2	Pump with EP Control.		Switch electrical connectors on solenoids A & B.				

5...Pump Does Not Find or Hold Neutral (Also refer to pages 24 & 25)

5.1	Does pump return to neutral with control lines removed?	No Yes	Proceed to step 5.2. Check control for electrical signal problem (EP control) or back pressure in the pilot lines (HD Control).	5.2	Check mechanical centering of pump and control per pages 24 & 25. Does pump return to neutral with control lines removed?	No Yes	Repair or replace pump. Replace control module if needed. Operate transmission.
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6...Transmission Drives at a High Noise Level

6.1	Are the drive gearboxes filled with correct grade of oil?	No Yes	Fill gearbox with correct grade of oil to the prescribed level. Proceed to step 6.2.	6.4	Is the suction pressure at the charge pump inlet within recommended limits?	No Yes	Return to step 1.7. Proceed to step. 6.5.
6.2	Is the drive coupling correctly installed and aligned?	No Yes	Install coupling per manufacturer's instructions and tolerances. Proceed to step 6.3.	6.5	Is there air in the hydraulic oil? This may be indicated by foaming or milky colored oil.	No Yes	Proceed to step 6.6. Deaerate the oil and inspect system for cause of air induction.
6.3	Is rigid piping connected to the pump and motor?	No Yes	Proceed to step 6.4 Install short length of hose between pressure ports and the system piping.	6.6	Is the hydraulic motor operating at excessive speed?	Yes	Check motor sizing in relation to available oil flow from the pump. Check motor minimum displacement. See page 20.

Variable Displacement Pump AA4VG, Series 3

Troubleshooting Procedure**7...Transmission Operates at a Higher Than Normal Temperature**

7.1	Is the operating temperature above 195°F?	No	195°F is the upper limit. If temperature is close to 195°F, the oil cooler may need to be cleaned.	7.4	Check differential pressure across oil cooler as compared to the manufacturer's specs at charge pump flow. Is ΔP higher than it should be?	No	Proceed to step 7.5
		Yes	Proceed to step 7.3.			Yes	Check piping from oil cooler to reservoir. Check for plugged or damaged oil cooler.
7.2	Is the hydraulic motor stalling intermittently?	No	Proceed to 7.3.				
		Yes	Hydraulic oil is being heated through system relief valves. Shut down system and rectify cause of the motor stall.	Note:	See page 7 for case pressure rating.		
7.3	Does temperature remain above 195°F after cleaning oil cooler?	No	Operate transmission. Check oil cooler more often.	7.5	Disconnect pump case drain from oil cooler and check flow from charge pump. Is flow normal?	No	Refer to charge pump removed and inspection procedure.
		Yes	Proceed to step 7.4.			Yes	Check oil cooler location.

8...Pump Does Not Develop Maximum Horsepower (Flow & Pressure)

8.1	Does charge pressure meet specification	No	Return to step 1.9.	8.3	Are high pressure relief valves adjusted to the required pressure so that they do not bypass?	No	Adjust or replace relief valve cartridge.
		Yes	Proceed to 8.2.			Yes	Replace the pump.
8.2	Is the case pressure less than 2 bar abs or 30 psia?	No	Check sizing of return line from T port of pump and cooler sizing related to flow.	Note:	If pressure override valve is fitted to pump, check that pressure setting is sufficient for the application.		
		Yes	Proceed to 8.3.				

Variable Displacement Pump AA4VG, Series 3

Charge Pressure Relief Valve Adjustment

For AA4VG28...AA4VG56

With pressure gauge installed at G port run pump at normal operating speed and temperature. If pressure is low, remove relief valve and add shim(s). If pressure is high, remove relief valve and take shim(s) out.

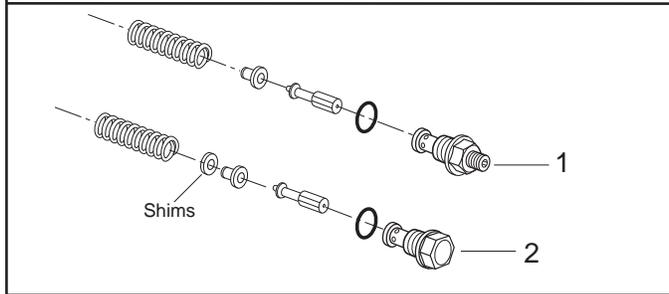
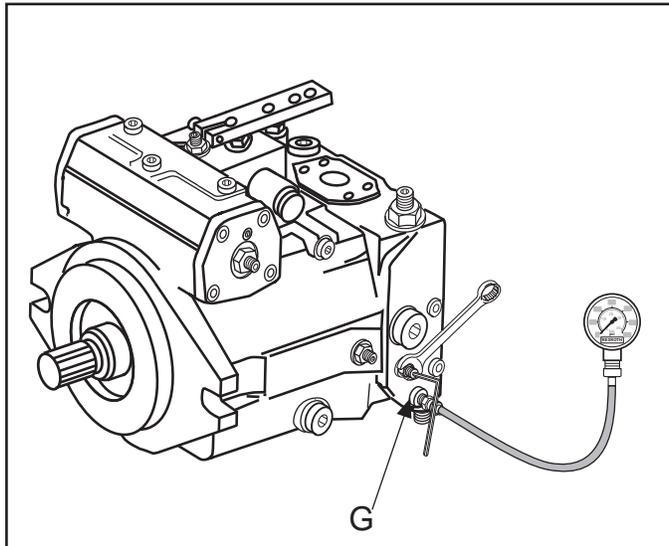
Note: 1mm = 56.5 psi (3.9 bar)

For AA4VG71...AA4VG250

With pressure gage installed at G port run pump at normal operating speed and temperature. If pressure is low loosen jam nut and turn set screw clockwise. If pressure is high loosen jam nut and turn set screw counterclockwise.

Note: 1 turn = 55 psi (3.8 bar) for sizes 71 thru 125.

Note: 1 turn = 43.5 psi (3.0 bar) for sizes 180 thru 250.



1. Adjustable charge pressure relief valve for sizes 71...180.
2. Shim charge relief for sizes 28 and 56.

Pump Size	Allen Wrench	Box Wrench	Wrench To Remove
28 - 56	N/A	N/A	27 mm
71 - 125	5 mm	17 mm	27 mm
180 - 250	5 mm	17 mm	32 mm

Mechanical Centering of Pump

Preparation for Adjustment

The control piston has strong centering springs to ensure that once the pump is adjusted for the neutral position it will always return to neutral. If an adjustment is necessary follow the steps listed below.

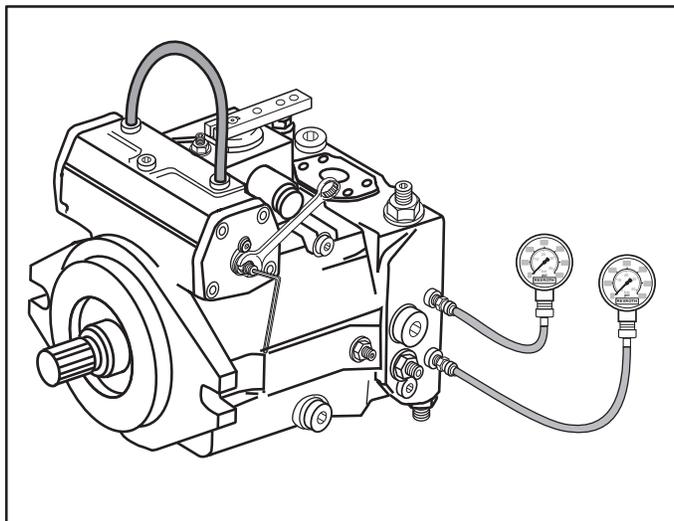
To ensure there is equal pressure on both sides of the control module during the centering operation, it is necessary to connect the X₁ and X₂ ports together by means of hose or tubing (No less than a 1/4 inch ID). The port sizes are as follows:

Size 28...90 7/16"-20 UNF
Size 125 & 250 9/16"-18 UNF

Pump Size	Allen Wrench	Wrench
28...56	6 mm	19 mm
71...90	6 mm	24 mm
125...250	8 mm	24 mm

With pressure gages installed at M_A and M_B, and with A and B ports blocked (or motor stalled), and with the pump running, loosen the jam nut. Turn the mechanical centering adjusting screw until 1000 psi is read on M_A or M_B then turn screw opposite direction until 1000 psi is read on other pressure port. Turn the screw back, splitting the distance between the previous two positions. This should be the neutral position. Pressure on M_A and M_B should be equal.

Tighten jam nut, stop the pump drive, remove the hose connecting ports X₁ and X₂.



Variable Displacement Pump AA4VG, Series 3

Hydraulic Centering of Control Modules**Preparation for Adjustment**

When control modules are exchanged or replaced, it is generally necessary to center the new module. This is done by running the pump with gauges installed at ports X_1 , X_2 , M_A and M_B . Release the jam nut and turn the adjustment screw on top of the control module valve body.

The adjustment screw is an eccentric, therefore, turning more than 90° in either direction will have no further centering effect, and could cause damage to the eccentric pin.

Pump Size	Allen Wrench	Wrench
28...71	Screw Driver	10 mm
90...250	4mm	13 mm

Centering the HD Control Module

With Y_1 and Y_2 ports vented to atmosphere, neutral position of the HD control is correctly adjusted when any or all of the following conditions exist:

1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registered equally at ports M_A and M_B , when flow output of the pump is deadheaded against a locked motor, or a valve.

Centering the HW Control Module

With the control lever allowed to freely spring to its center position, the HW control module is correctly adjusted when any or all of the following conditions exist:

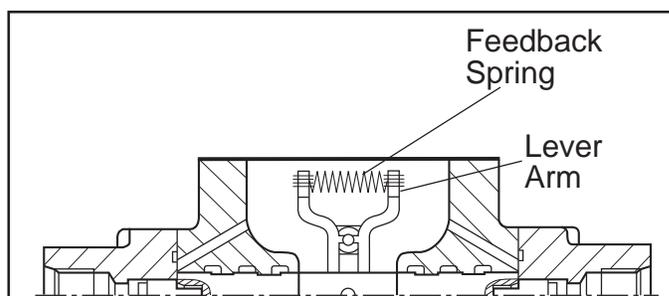
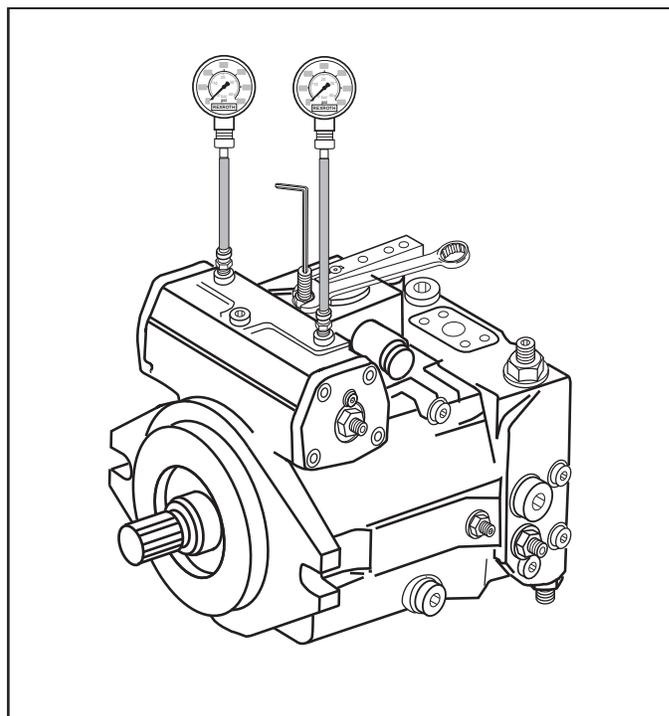
1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registers equally at ports M_A and M_B , when the flow output of the pump is deadheaded against a locked motor, or a valve.

Centering the EP Control Module

With no electrical signal to solenoids A and B, (remove both plug-in connectors), the EP control module is correctly adjusted when any or all of the following conditions exist:

1. Approximately, when equal control pressures are obtained at control pressure ports X_1 and X_2 .
2. The hydraulic motor does not turn when the brake is released.
3. Charge pressure is registered equally at ports M_A and M_B , when the flow output of the pump is deadheaded against a locked motor or a valve.

If difficulties are encountered in obtaining neutral position of the HD or EP control modules, check that the ends of the control spring are correctly located in the grooves near the end of the feedback lever arms.



Variable Displacement Pump AA4VG, Series 3

Pressure Override Valve Adjustment**Function of Pressure Override**

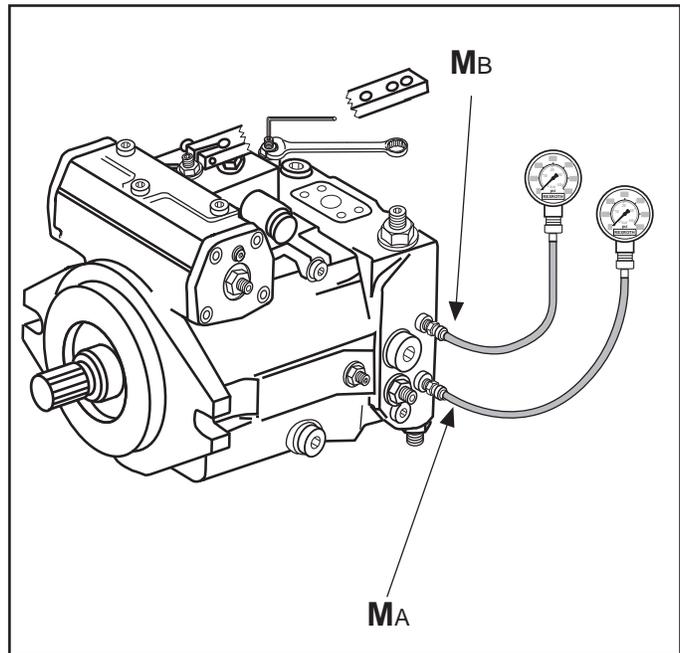
The pressure override valve varies the swashplate angle, as required, to limit the maximum pressure at port A or B. The override valve prevents continuous dumping of excessive flow, at load pressure, through the cross port relief valves contained in the pump. This eliminates unnecessary heating of the oil and protects the pump and motor from heavy-handed operators, or, if the drive stalls causing the pump to deadhead. The pressure override valve should be adjusted to a pressure at least 500 psi less than the setting of the main relief valves.

Adjustment Procedure

1. Neutralize the pump control and turn P.O.R. adjusting screw counterclockwise, all the way out.
2. Stroke the pump fully in either direction, then turn the P.O.R. adjusting screw in (clockwise) until the desired pressure setting is achieved.
3. Stroke the pump for opposite flow direction to that used in step 2 and check the operation of the P.O.R. Equal maximum pressures should be seen both sides of center.

Note: One turn of screw equals 1200 psi.

Note: All adjustments require a 4 mm allen wrench and a 13 mm box wrench.



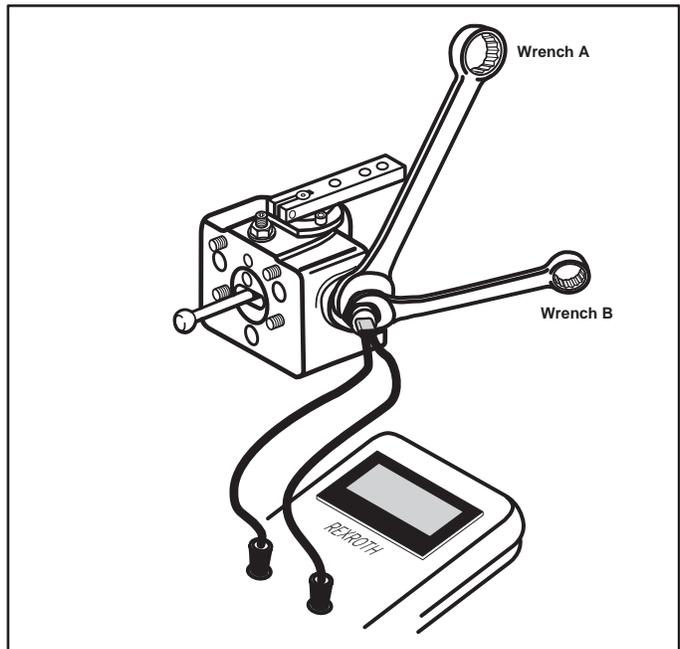
Adjustment of P.O.R. valve on pumps with remote hydraulic pilot control (type HD), manual rotary servo (type HW), and proportional electric control (type EP).

Neutral Start Switch Adjustment Procedure

Note: Before adjusting neutral start switch pump should be centered.

1. To adjust neutral safety switch, disconnect linkage from control handle and connect an ohm meter across the leads from the neutral safety switch adjust the ohm meter to read continuity.
2. Then loosen the jam nut with wrench A and turn the switch (wrench B) in until you lose Continuity.
3. Then back the switch out until you complete the circuit and tighten jam nut.
4. Block vehicle to prevent movement. Return HW control to neutral. Install gages in M_A and M_B and start engine. Slowly bring pump on stroke, switch must open before pressure is developed in M_A or M_B port.

Note: All adjustments require a 23 mm box wrench and a 30 mm box wrench.



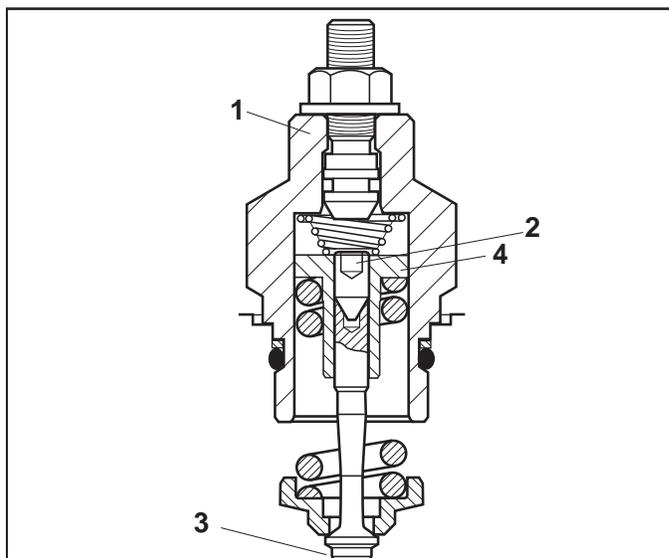
Variable Displacement Pump AA4VG, Series 3

High Pressure Relief Valve Adjustments

High Pressure Relief Valve Adjustment Procedure
AA4VG40 & AA4VG56

1. Remove relief valve cover from pump (ref. item 1).
2. Loosen jam screw (ref. item 2).
3. Holding spring loading nut (ref. item 4) adjust valve spindle (ref. item 3). One turn equals approx. 630 psi (44 bar).
4. After adjustment is completed tighten jam screw (ref. item 2) to 5 ft-lbs. (7 Nm).
5. Install relief valve assembly into pump, tighten cover (ref. item 1) to 66 ft-lbs. (90 Nm).

Note: All high pressure relief valve adjustments on size 40 and 56 to be done with a 3 mm allen wrench and a 5 mm box wrench.



High pressure relief valve with tow option used in AA4VG40 and AA4VG56

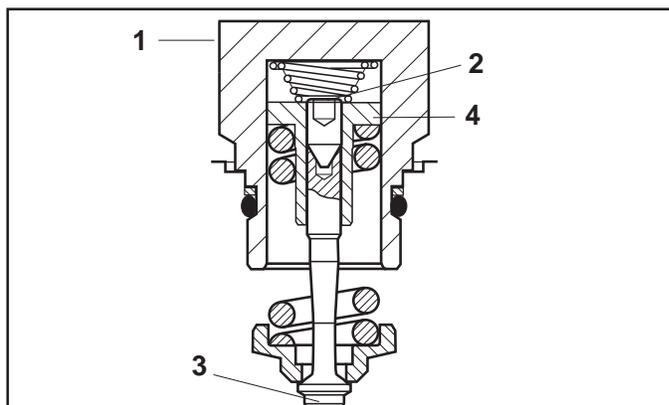
High Pressure Relief Valve Adjustment Procedure
AA4VG71...AA4VG250

Following is a suggested procedure for adjusting the relief valves. It is assumed that high pressure gauges are connected to ports M_A and M_B . Some applications may require a slight departure from the procedure.

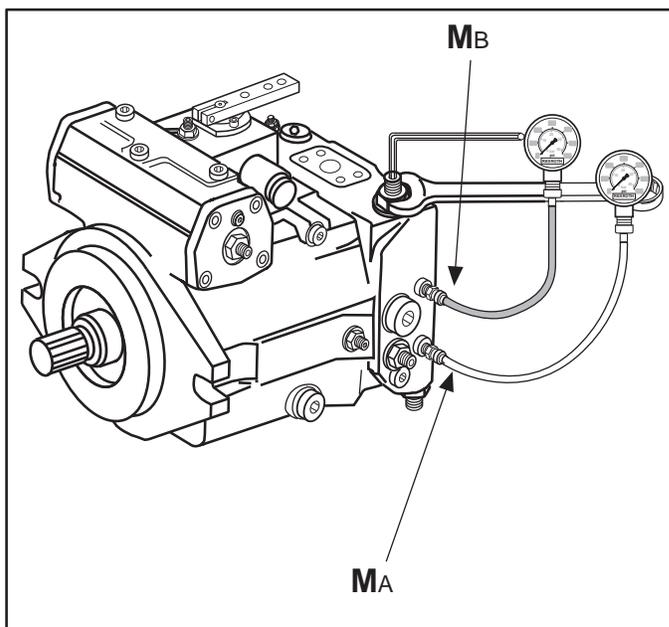
1. Block the output flow from the high pressure ports A & B, or lock the hydraulic motor by applying the brake.
2. Turn both high pressure relief valve adjusting screws counterclockwise until the spring tension is completely relieved, then turn both adjusting screws one full turn clockwise.
3. Turn the P.O.R. adjusting screw in (clockwise) until firm resistance is encountered. Do not force the adjustment beyond this point.
4. Stroke the pump to approximately 20 percent of full flow in one direction and adjust the high pressure relief for that flow direction to a pressure which is 500 psi higher than the required P.O.R. pressure setting. For the AA4VG71 and AA4VG90 one turn equals 2200 psi (150 bar).
5. Repeat step 4 for the opposite direction of flow.

Note: Perform steps 4 & 5 as quickly as possible to prevent overheating of the pump. Flow should not be permitted to spill over the high pressure relief valves for longer than 10 seconds, especially at higher pressures.

Note: High pressure relief valve adjustments on size 71 and 90 to be done with a 11 mm box wrench and a 19 mm box wrench, 125 and 180 to be done with a 5 mm allen wrench and a 17 mm box wrench.



High pressure relief valve with out tow option used in AA4VG40 and AA4VG56



Variable Displacement Pump AA4VG, Series 3

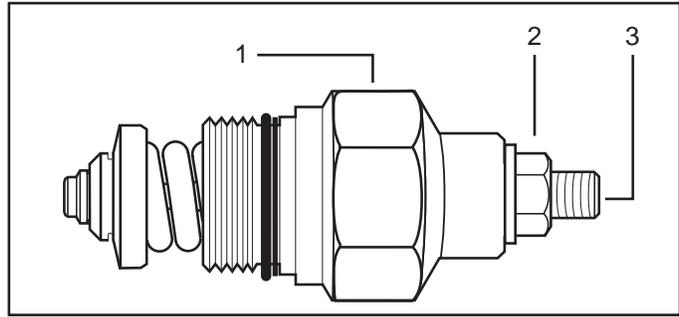
Engagement of Relief Valve Tow Option

Tow Option Engagement for AA4VG40 and AA4VG56

To actuate tow option loosen lock nut (ref. item 2). Turn tow option engagement screw (ref item 3) in six turns and tighten lock nut.

To disengage tow option loosen lock nut and turn tow option screw all the way out until it stops.

Note: Use a 4 mm allen wrench and a 13 mm box wrench to adjust.



Relief valve for AA4VG40 and AA4VG56.

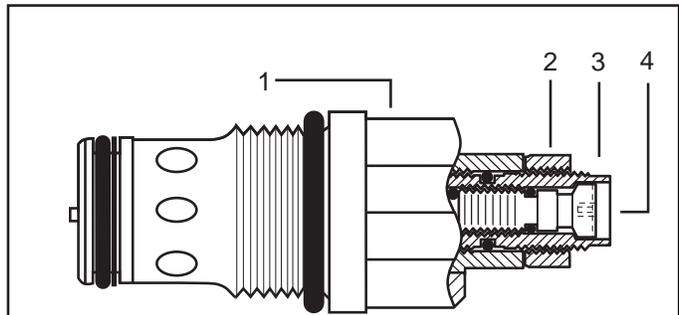
- 1...Nut used to torque relief valve into port block.
- 2...Lock nut for tow option engagement.
- 3...Tow option engagement screw.

Tow Option Engagement for AA4VG71 and AA4VG90

To actuate tow option turn tow option engagement screw (ref. item 4) out three turns.

To disengage tow option turn tow option engagement screw in until it stops.

Note: Use a 4 mm allen wrench to adjust.



Relief valve for AA4VG71 and AA4VG90.

- 1...Nut used to torque relief valve into port block.
- 2...Lock nut for high pressure relief adjustment.
- 3...Adjustment screw for high pressure adjustment.
- 4...Tow option engagement screw.

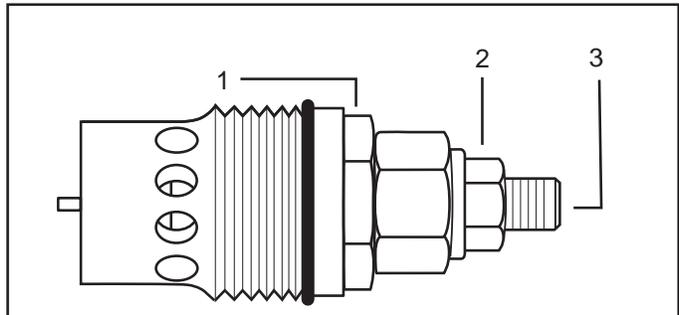
Tow option Engagement for AA4VG125 and AA4VG180

To actuate tow option turn relief valve (ref. item 1) out two turns.

To disengage tow option tighten relief valve.

Note: Use a 36 mm box wrench to adjust.

Note: Tow options are meant to be used for a short time period only. Tow options are not to be used for extended tows.



Relief valve for AA4VG125 and AA4VG180.

- 1...Nut used to torque relief valve into port block and engage tow option.
- 2...Lock nut for high pressure relief adjustment.
- 3...Adjustment Screw for high pressure relief adjustment.

Torque Specs for Relief Valves into Port Block

Pump Size	Wrench Size	Torque
28...56	32 mm	66 ft.lb. (90 Nm)
71...90	32 mm	110 ft.lb. (150 Nm)
125...180	36 mm	147 ft.lb. (200 Nm)

Warning: Tow option bypasses high pressure relief valves. Catastrophic motor damage can occur if hydraulic circuit empties or overheats.

Variable Displacement Pump AA4VG, Series 3

Removal and Inspection of Charge Pump

Before removing cap screws, mark the position of the charge pump housing and separator plate in relation to the port block.

Loosen screws with metric allen wrench.

Pump Size	Allen Wrench
28...125	6 mm
180...250	10 mm

Remove charge pump housing and inspect for wear or damage to gear set and O-ring seals. Grease O-rings prior to reassembly. Make sure O-rings are completely seated in their grooves.

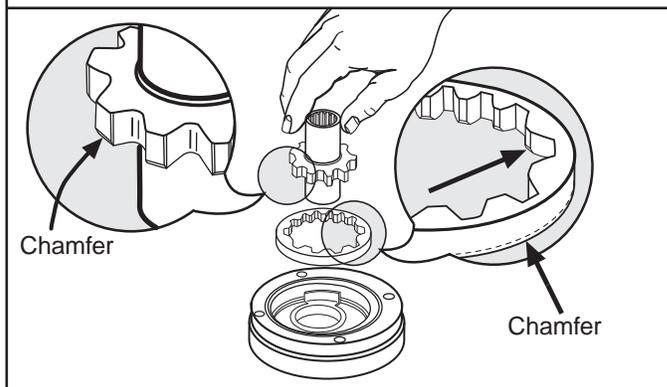
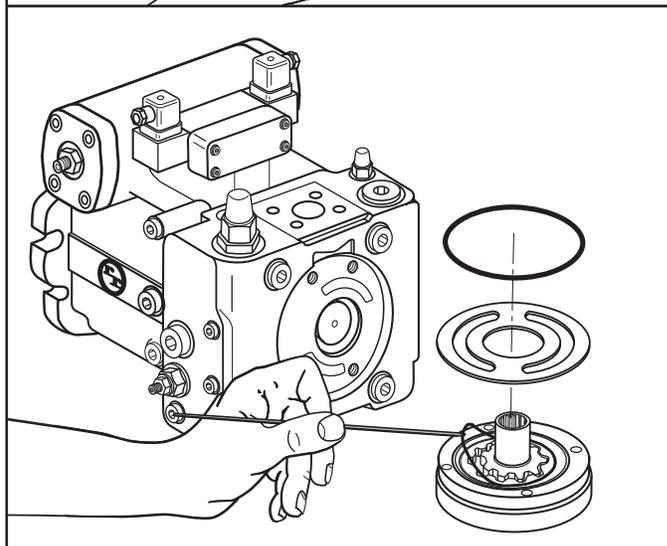
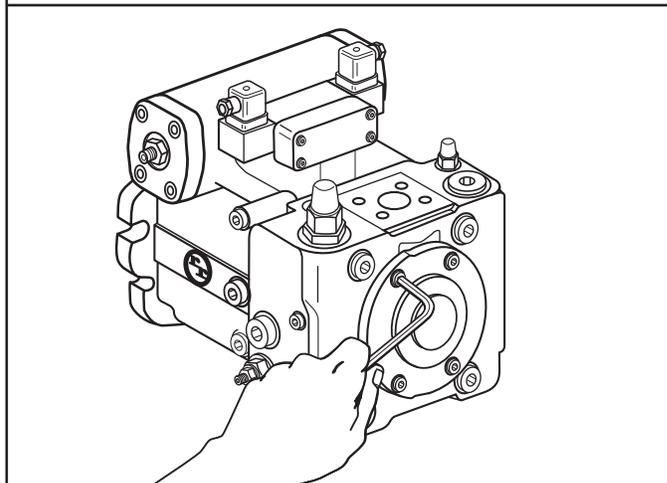
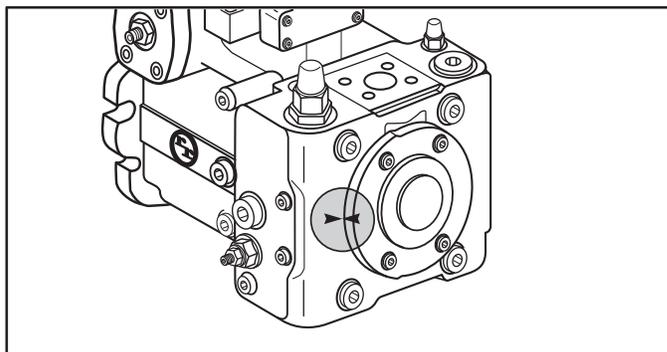
Withdraw pinion shaft and inspect gear teeth and bearing surfaces for abnormal wear.

When reassembling, make sure chamfer (on outer edge of driven gear and drive gear) is installed into housing per illustration.

Torque value for bolts when replacing charge pump.

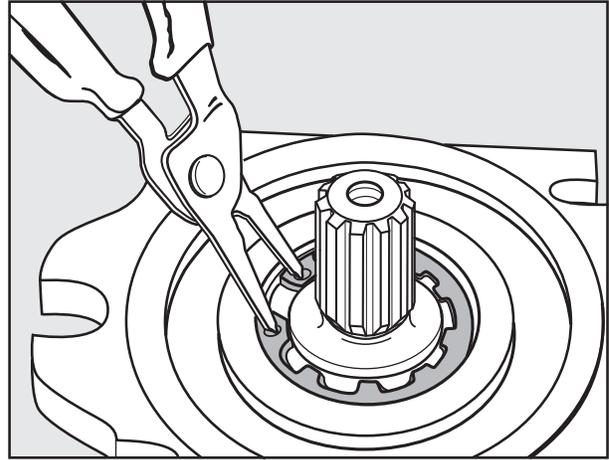
Pump Size	Torque
28...125	18 ft-lbs (24 Nm)
180...250	62 ft-lbs (24 Nm)

Note: If serious wear or damage has occurred to one component, the complete charge pump assembly must be replaced because they are matched components.



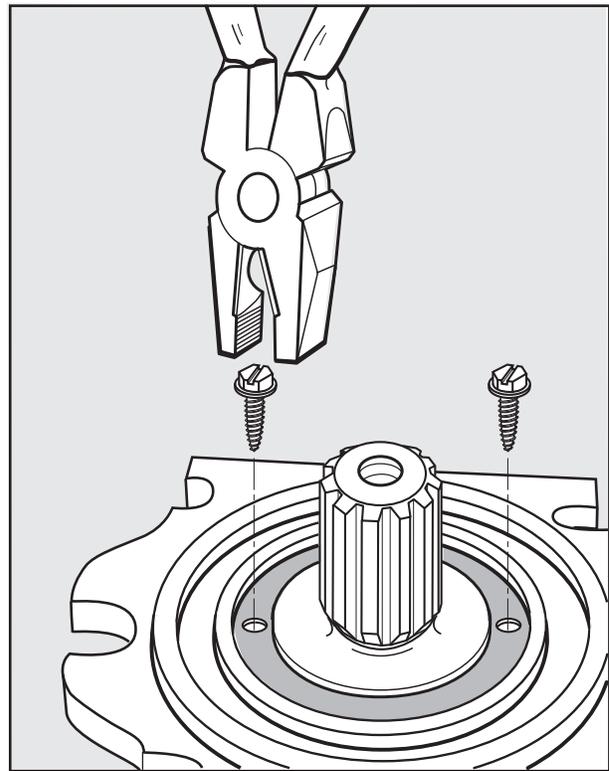
Removal and Installation of Shaft Seal

Remove the retaining ring with snap ring pliers.

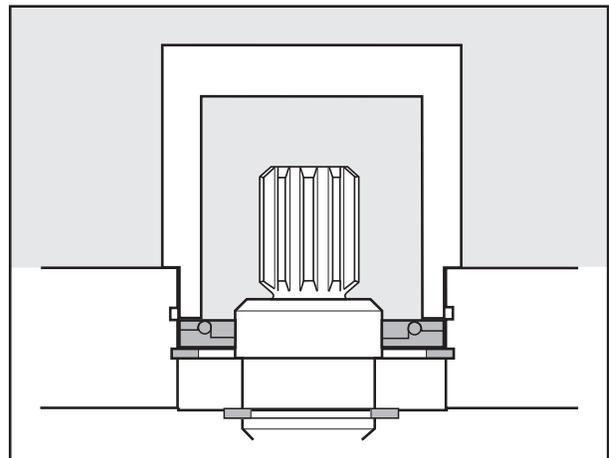


Screw in sheet metal screw into the holes fitted with rubber.

Pull out shaft seal with pliers.



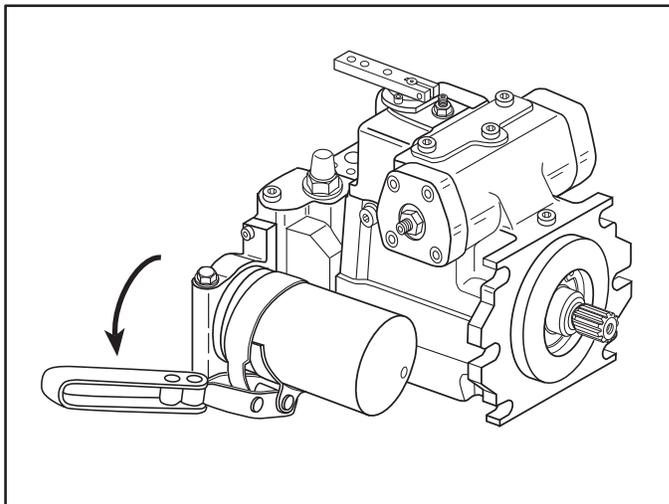
Press-in shaft seal with bushing to the stop.
Then replace snap ring.



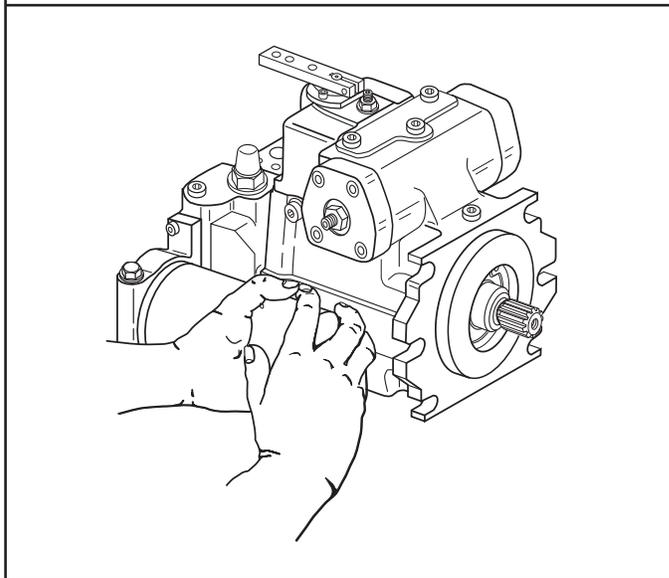
Variable Displacement Pump AA4VG, Series 3

Changing Charge Filter

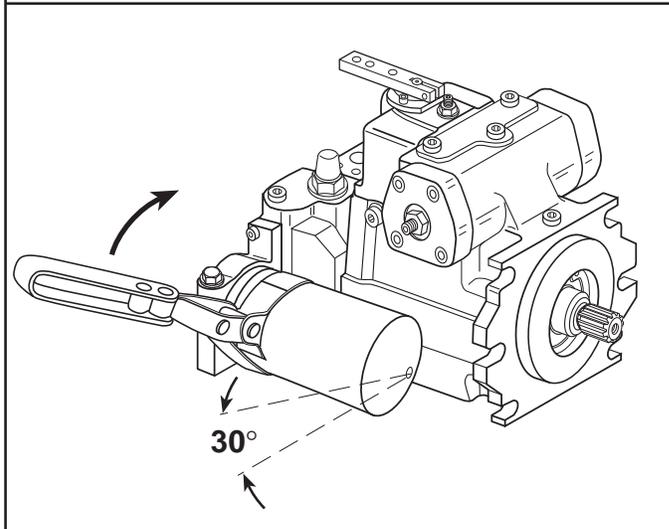
Remove charge filter (turn counter clockwise) with filter wrench.



Apply a small amount of oil to seal.
Screw on new filter (Clockwise) until seal touches housing.



Turn charge filter 30 degrees (clockwise) to tighten.



Variable Displacement Pump AA4VG, Series 3

Routine Maintenance

The AA4VG variable pumps are relatively maintenance free. Maintenance work is confined to the system, by way of oil changes and renewal of filter elements. Both of these measures promote system cleanliness. Monitoring and periodic maintenance of the system can prevent premature breakdowns and repairs. Under normal application conditions, the following maintenance intervals are suggested:

1. Renewal of Filter Elements

- After commissioning.
- At every 500 operating hours, or when filter indicator shows a dirty element.
- With suction filtration, the filter element should be renewed as soon as a charge pump inlet pressure of less than -3.2 psi (0.8 bar absolute) becomes evident with the transmission in warm running condition (indicates contamination).
- With charge flow filtration, watch for high pressure differential across the filter element (Refer to filter manufacturer's specifications).

Caution: Only filter elements capable of meeting or exceeding the fluid cleanliness level requirements (reference page 9) should be used.

Note: Paper inserts cannot be cleaned; use throwaway cartridges (maintain a stock).

2. Hydraulic Oil Change

- After 2000 operating hours (1st oil change).
- Thereafter every 2000 operating hours or annually irrespective of operating hours achieved.

The oil change should be carried out with the system in warm running condition. Before re-filling, the reservoir should be cleaned to remove any sludge.

Caution: Rags or other threading material must not be used.

Note: The recommended interval between oil changes is based on various factors and should be carried out according to the type of fluid, the degree of aging and contamination of the fluid. The water content is also a contributory factor.

Under application conditions with a heavy occurrence of dust or severe temperature fluctuations the intervals between oil changes should be shortened accordingly.

Caution: Practical experience shows that most maintenance errors occur during an oil change due to:

- Use of an unsuitable hydraulic oil.
- Use of oil contaminated due to faulty storage.
- Failure to clean reservoir.
- Inadequate cleanliness when filling (dirty drums or containers).

3. Leakage Inspection

- After commissioning.
- The complete transmission (pump, motor and all pipelines, filters, valves, etc.) should be checked for leakage at regular intervals.

Caution: Leaking joints and connections must only be tightened in pressure less conditions

4. Cleanliness Inspection

The oil tank breather should be regularly cleaned of dirt and dust to prevent clogging. The cooling surfaces should be cleaned at the same time.

Caution: If hose couplings are used in the high pressure lines, it is imperative that the utmost care be taken that no foreign bodies infiltrate the oil circuit when coupling and uncoupling (danger of damage to rotary group, and even possibility of total breakdown).

5. Oil level Inspection

Inspect oil level in reservoir after commissioning, thereafter daily.

Caution: Top up only with specified oil type. Do not mix fluids.

Hydraulic Fluid

Most good quality, mineral oil based, hydraulic fluids exhibiting the following characteristics are suitable for use in a Rexroth hydrostatic transmission.

Good antiwear performance
Resistant to oxidation deprecation
Protection against rust and corrosion
Resistance to foaming
Ability to separate water rapidly
Suitable for widely varying temperature conditions
good low temperature flow properties
Retains viscosity-temperature characteristics in service
Universally available

The prime consideration in the selection of hydraulic fluid is the expected oil temperature extremes that will be experienced in service. The extremes should be considered when selecting a fluid, so that the most suitable temperature-viscosity characteristics are obtained.

The fluid chosen should permit the system to operate within the following viscosity ranges.

Maximum viscosity at start-up 4600 SUS (1000 cSt)
Normal operating viscosity range 66–464 SUS (12–100 cSt)
Optimum viscosity range 81–141 SUS (16–30 cSt)
Absolute minimum viscosity 60 SUS (10 c St)

When the fluid viscosity is greater than 1000 SUS (216 c St) the transmission should be operated at reduced speed until the oil has been warmed to a temperature of 40°F (4.5°C).

For applications that will operate near the extremes of viscosity and/or temperature, the fluid manufacturer should be consulted for assistance in selection of the most suitable type and grade of fluid for your application.

Rexroth strongly recommends the selection and use of fluids from reputable and established suppliers.

Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

Control Modules

Control Module	Size		
	28	40	56
HW	HU00606886	HU00606886	HU00606888
HWD	HU00607224	HU00607224	HU00607226
HD	HU00601717	HU00601717	HU00433487
EP1	HU00601622	HU00601622	HU00429169
EP2	HU00601621	HU00601621	HU00429168
EZ1	HU00600074	HU00600074	HU00600074
EZ2	HU00600076	HU00600076	HU00600076

Control Module	Size		
	71	90	125
HW	HU00606891	HU00608523	HU00608522
HWD	HU00607228	HU00608526	HU00608525
HD	HU00429114	HU00602225	HU00602238
EP1	HU00428139	HU00602227	HU00602236
EP2	HU00428138	HU00602226	HU00602237
EZ1	HU00600074	HU00437191	HU00437191
EZ2	HU00600076	HU00437190	HU00437190

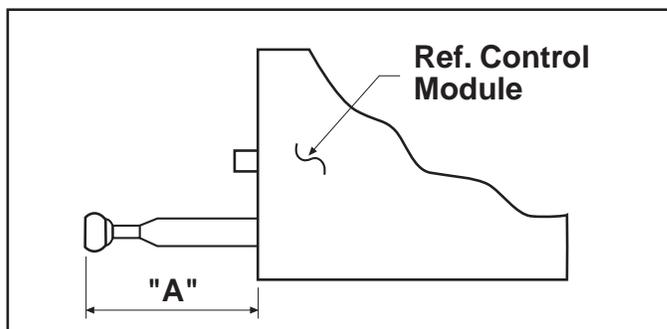
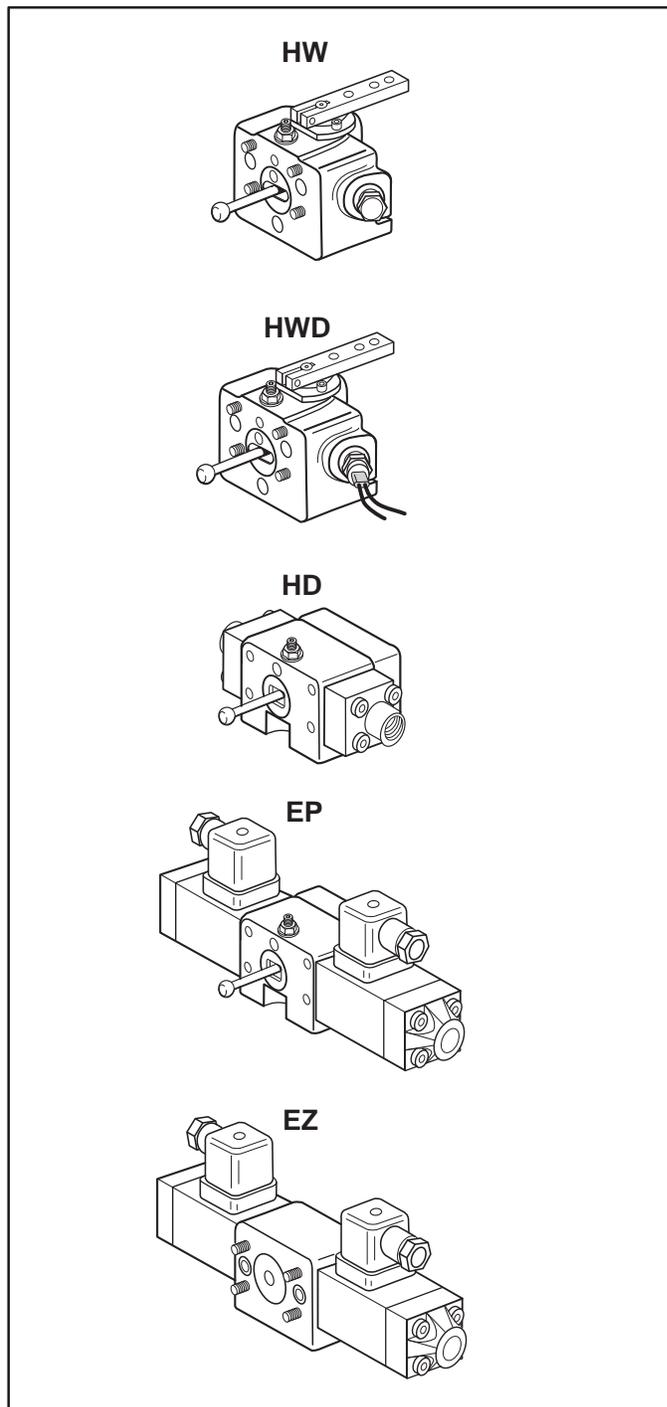
Control Module	Size	
	180	250
HW	HU00608521	HU02008008
HWD	HU00608524	▲
HD	HU00602245	▲
EP1	HU00602248	HU02007246
EP2	HU00602247	HU02007245
EZ1	HU00437191	HU00437191
EZ2	HU00437190	HU00437190

Note: To add neutral start switch to an existing HW control add kit 5400-635-009
 ▲ Part numbers not released at time of printing

Control Module Size

Control module housing for sizes AA4VG28...AA4VG71 and AA4VG90...AA4VG250 are the same. To determine size of control module feedback lever length (dimension "A") can be measured. To convert control modules within a housing size feed back levers can be changed (Reference page 33).

Pump Size	"A" Dimension
28...40	See page 33
56	1.45 in. (36.8 mm)
71	See page 33
90	1.36 in. (34.5 mm)
125	1.55 in. (39.4 mm)
180	2.15 in. (54.6 mm)
250	2.88 in. (73.2 mm)



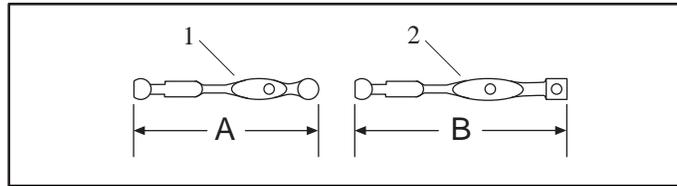
Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

Control Module Size

Control module housing for sizes AA4VG28, AA4VG40, AA4VG56 and AA4VG71 are the same. To determine size of control module feedback lever length (dimension "A" or "B") can be measured. To convert control modules within a housing size feedback levers can be changed (Reference page 33).

Pump Size	"A" Dimension	"B" Dimension
28...40	2.27 in. (57.7 mm)	2.62 in. (66.5 mm)
71	2.31 in. (58.7 mm)	2.66 in. (67.5 mm)

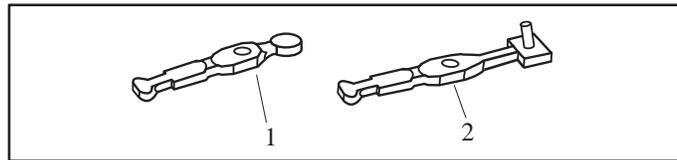


Feedback Control Levers.

- 1...Feedback lever for HW control.
- 2...Feedback lever for HD and EP controls.

Feedback Levers

Pump Size	Feedback lever HW Control	Feedback lever HD & EP Control
28...40	HU00432448	HU00432509
56	HU00432489	HU00430310
71	HU00432256	HU00430319
90	HU02008032	HU00436442
125	HU02008033	HU00445730
180	HU02008034	HU02008036
250	HU02008006	HU02006296



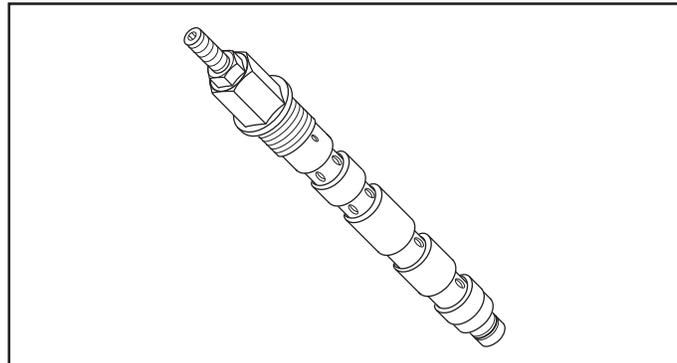
Feedback Control Levers.

- 1...Feedback lever for HW control.
- 2...Feedback lever for HD and EP controls.

Pressure Override Valve Part Numbers

Pump Size	Pressure Override Valve
28	HU00447281
40	HU00447281
56	HU00446763
71	HU00437084
90	HU00437363
125	HU00433834
180	HU00433834
250	▲

▲ Part numbers not released at time of printing

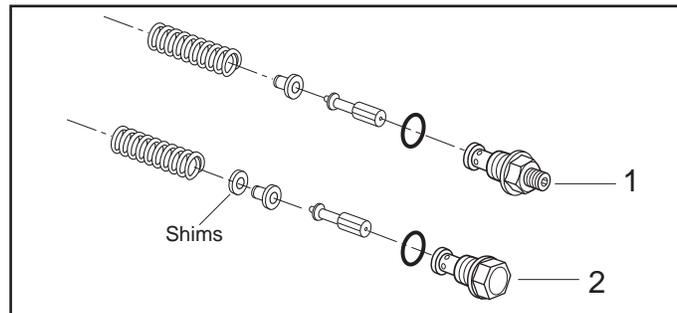


Pressure Override Valve

Charge Pressure Relief Valves

Pump Size	Pressure Range	Part Number
28	215...435 psi (15...30 bar)	5400-635-007 ^①
40	215...435 psi (15...30 bar)	5400-635-007 ^①
56	215...435 psi (15...30 bar)	5400-635-007 ^①
71	215...435 psi (15...30 bar)	HU00434856
90	215...435 psi (15...30 bar)	HU00434856
125	215...435 psi (15...30 bar)	HU00434856
180	215...435 psi (15...30 bar)	HU00437151
250	215...435 psi (15...30 bar)	HU00437151

^① Adjustment kit 5400-635-007 consists of charge pressure relief valve HU00434636 and shims.



Charge Pressure Relief Valves

- 1...Adjustable Charge relief for sizes 71 thru 180.
- 2...Shim charge relief for sizes 40 and 56 only, 1 mm equals 56 psi (3.9 bar).

Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

High Pressure Relief Valve Part Numbers

Pump Size	Part Number	Pressure Range	Type of Relief Valve
40	HU00447133	3600-6000 psi	Direct acting without tow option
	HU00447134	3600-6000 psi	Direct acting with tow option
56	HU00429458	3600-6000 psi	Direct acting without tow option
	HU00434301	3600-6000 psi	Direct acting with tow option
71...90	HU02600466	1450-6000 psi	Pilot operated with tow option
125...180	HU00832121	1450-6000 psi	Pilot operated with tow option
250	▲	▲	▲

▲ Part number not released at time of printing

EP Solenoids (Proportional)

Pump Size	24 Volts DC	12 Volts DC
All	HU00441692	HU00441691

EZ Solenoids (Non-Proportional)

Pump Size	24 Volts DC	12 Volts DC
All	HU00428266	HU00428265

Plug-in Connectors

Pump Size	Gray	Black
All	HU00152503	HU0085290

Ammeter with Sandwich Plug

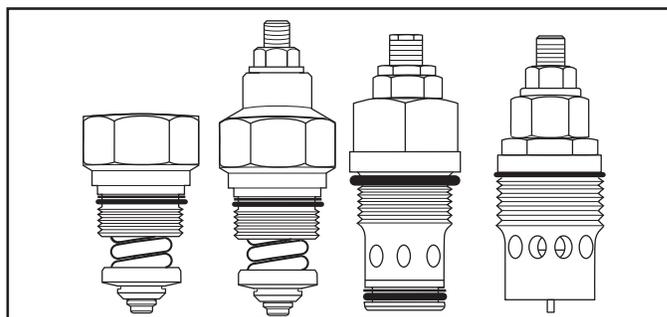
Pump Size	Part Number
All EP Controls	5956-001-018

Stroking Time Orifices for Sizes 28...71

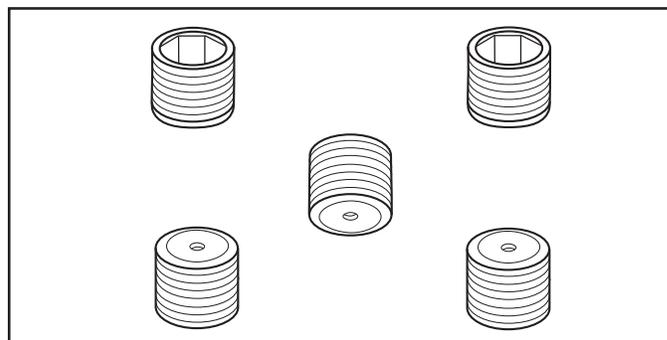
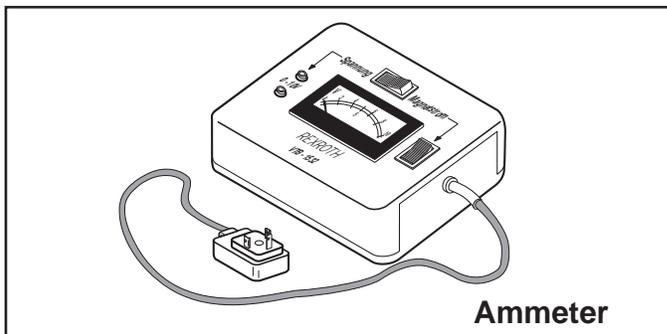
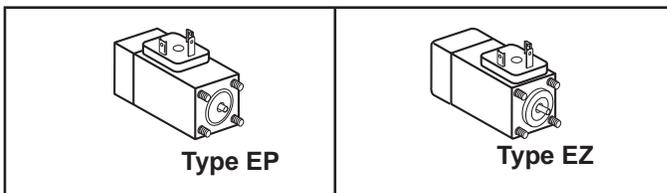
Part Number	Orifice Size	Thread Size
HU00156492	0.8 mm DIA.	M 6
HU00156493	1.0 mm DIA.	M 6
HU00156494	1.2 mm DIA.	M 6
HU00156495	1.4 mm DIA.	M 6
HU00156496	1.6 mm DIA.	M 6
HU00156497	1.8 mm DIA.	M 6

Stroking Time Orifices for Sizes 90...250

Part Number	Orifice Size	Thread Size
HU00426701	0.8 mm DIA.	M 10
HU00426702	0.9 mm DIA.	M 10
HU00426700	1.0 mm DIA.	M 10
HU00426703	1.2 mm DIA.	M 10
HU00426704	1.4 mm DIA.	M 10
HU00426705	1.6 mm DIA.	M 10
HU00426706	1.8 mm DIA.	M 10
HU00426707	2.0 mm DIA.	M 10
HU00426708	2.2 mm DIA.	M 10
HU00439372	2.4 mm DIA.	M 10
HU00426709	2.5 mm DIA.	M 10



High Pressure relief valves for AA4VG28...AA4VG180



Stroking Time Orifices

Variable Displacement Pump AA4VG, Series 3

Replacement Subassemblies and Parts

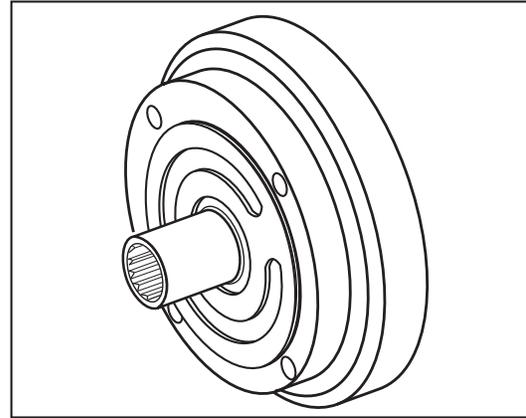
Charge Pumps and Through Drives

Type Code	AA4VG28	AA4VG40	AA4VG56	AA4VG71
F00	▲	HU00606688	HU00606382	HU00606657
F01	▲	HU00606691	HU00606386	HU00606655
F02	▲	HU00606694	HU00606390	HU00606661
F04	▲	HU00606700	HU00606393	HU00606658
F09	▲	HU00606687	○	○
F07	▲	○	HU00606379	HU00606660
F69	▲	○	○	○
F73	▲	○	○	○

Type Code	AA4VG90	AA4VG125	AA4VG180	AA4VG250
F00	HU00606811	HU00606320	HU00606233	▲
F01	HU00606803	HU00606309	HU00606225	▲
F02	HU00606809	HU00606312	HU00606228	▲
F04	HU00606807	HU00606314	HU00606226	▲
F09	○	○	○	▲
F07	HU00606801	HU00606317	HU00606214	▲
F69	○	HU00606330	HU00606245	▲
F73	HU00606805	○	○	▲

○ Not Available

▲ Part numbers not released at time of printing.



Charge Pump

Seal Kits and Shaft Seals for AA4VG/32 – Size 28...250

Pump Size	Seal Kits			Shaft Seal	
	AA4VG/32...P Buna	AA4VG/32...V FPM	AA4VG/32...N FPM Shaft Seal with Buna Seals	Buna	FPM
28	5470-635-023	5470-635-024	5470-635-025	HU00830425	HU00830742
40	5410-635-033	5410-635-035	5410-635-034	HU00831285	HU00831284
56	5420-635-028	5420-635-031	5420-635-029	HU00830970	HU00830976
71	5430-635-025	5430-635-027	5430-635-026	HU00830971	HU00830977
90	5440-635-033	5440-635-040	5440-635-038	HU00830972	HU00830978
125	5450-635-031	5450-635-033	5450-635-032	HU00830974	HU00830980
180	5480-635-007	5480-635-009	5480-635-008	HU00830973	HU00830979
250	○	5460-635-022	5460-635-023	○	HU02600118

○ Not Available

Charge Pressure Filtration Kits and Filter Elements

Pump Size	"F" Standard	"P" Visual Indicator	"L" Electrical Indicator	"M" Visual & Electrical Indicator	Filter Element Only	Cold Starting Valve
28	▲	▲	▲	▲	▲	▲
40...56	HU00434508	HU00441717	HU00606914	HU00606305	HU00830024	HU02007002
71...90	HU00434509	HU00446438	HU00434984	N/A	HU00157926	HU02006412
125	HU00434510	HU00447605	HU00601330	HU00602557	HU00157926	HU02006413
180	HU00434511	HU00600111	HU00447472	HU00606008	HU00157956	HU02006413
250	▲	▲	▲	▲	▲	▲

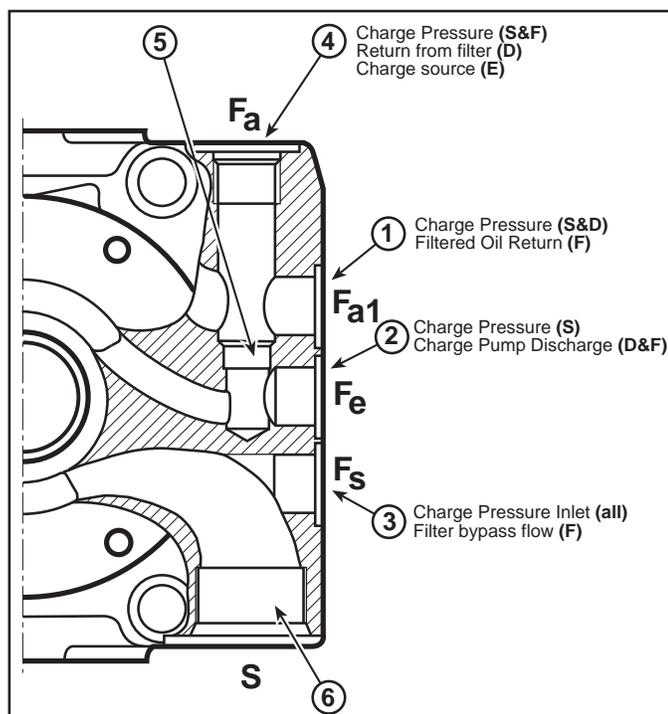
▲ Part numbers not released at time of printing

Variable Displacement Pump AA4VG, Series 3

Filtration Configurations for AA4VG, Series 32

Filtration Configuration	Port Configuration	AA4VG40 AA4VG56		AA4VG71 AA4VG90		AA4VG125 AA4VG180	
		Port Size	Part Number	Port Size	Part Number	Port Size	Part Number
Suction Filtration "S"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Plugged	3/4" - 16 UN	76107-008	1 1/16" - 12 UN	76107-012	1 5/16" - 12 UN	76107-016
	5 Open	M14 x 1.5		M18 x 1.5		M20 x 1.5	
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
Charge Pressure Filtration "D"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Open	3/4" - 16 UN	HU00607033 ^①	1 1/16" - 12 UN	HU00448824 ^①	1 5/16" - 12 UN	HU00442847 ^①
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Open	3/4" - 16 UN		1 1/16" - 12 UN		1 5/16" - 12 UN	
	5 Plugged	M14 x 1.5	76117-001	M18 x 1.5	76117-007	M20 x 1.5	76117-008
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
Mounted Filter "F" or Cold Start Valve "K"	1 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	2 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	3 Open	M18 x 1.5	Filter Port	M22 x 1.5	Filter Port	M33 x 2	Filter Port
	4 Plugged	3/4" - 16 UN	76107-008	1 1/16" - 12 UN	76107-012	1 5/16" - 12 UN	76107-016
	5 Plugged	M14 x 1.5	76117-001	M18 x 1.5	76117-007	M20 x 1.5	76117-008
	6 Open	1 5/16" - 12 UN		1 5/8" - 12 UN		1 7/8" - 12 UN	
External Charge Supply "E"	1 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	2 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	3 Plugged	M18 x 1.5	76116-010	M22 x 1.5	76116-009	M33 x 2	76116-008
	4 Open	3/4" - 16 UN		1 1/16" - 12 UN		1 5/16" - 12 UN	
	5 Open	M14 x 1.5		M18 x 1.5		M20 x 1.5	
	6 Plugged	1 5/16" - 12 UN	76107-016	1 5/8" - 12 UN	76107-020	1 7/8" - 12 UN	76107-024

① Adapts metric "Fe" port to SAE size indicated.



Variable Displacement Pump AA4VG, Series 3

Note Page:

Variable Displacement Pump AA4VG, Series 3

Note Page:

Variable Displacement Pump AA4VG, Series 3

Specifications, descriptions, and illustrative material shown herein were as accurate as known at the time this publication was printed. Rexroth reserves the right to discontinue models or options at any time or to change specifications, materials, or designs without notice and without incurring obligation.

Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

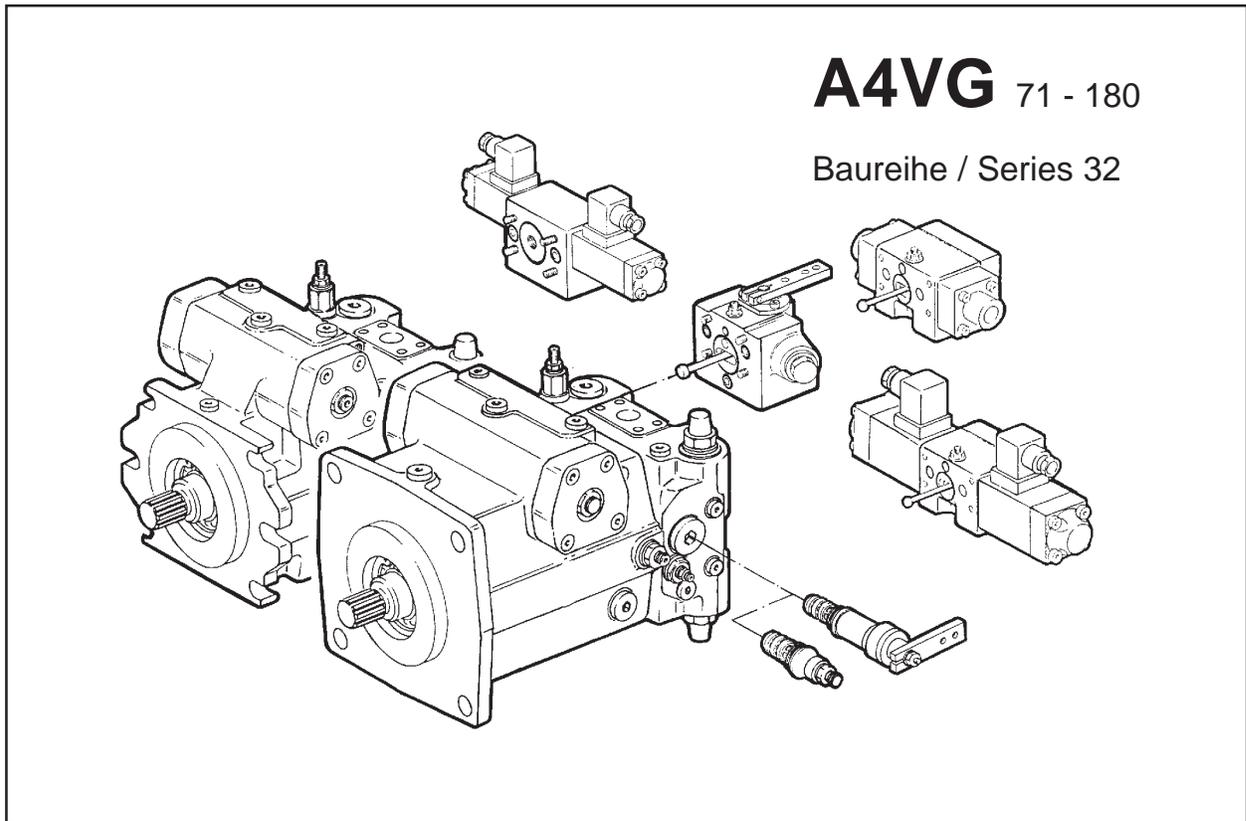
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R

**Reparaturanleitung
Repair Instructions**



A4VG 71 - 180

Baureihe / Series 32

HINWEIS

Bezeichnungen, Beschreibungen und Darstellungen entsprechen dem Informationsstand zum Zeitpunkt der Drucklegung dieser Unterlage.

Änderungen können den Service am Produkt beeinflussen, Verpflichtungen entstehen uns daraus nicht. Methoden und Vorrichtungen sind Empfehlungen, für deren Resultat wir keine Haftung übernehmen können.

BRUENINGHAUS HYDROMATIK- Baugruppen, mit Angabe der Fabrik-Nr. bestellt, sind die Basis guter Reparaturen.

Einstell- und Prüfarbeiten sind bei Betriebstemperatur auf dem Teststand vorzunehmen.

Schutz von Personen und Eigentum ist durch Vorkehrungen sicherzustellen.

Sachkenntnis, die Voraussetzung für jede Servicearbeit, vermitteln wir in unseren Schulungskursen.

NOTICE

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Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

For the available combinations refer to the relevant data sheet for the basic unit and the desired option.

Adjustment and tests have to be carried out on the test bench under operating temperatures.

Protection of personnel and property has to be guaranteed by appropriate measures.

Expert knowledge, the precondition of any service work, can be obtained in our training courses.

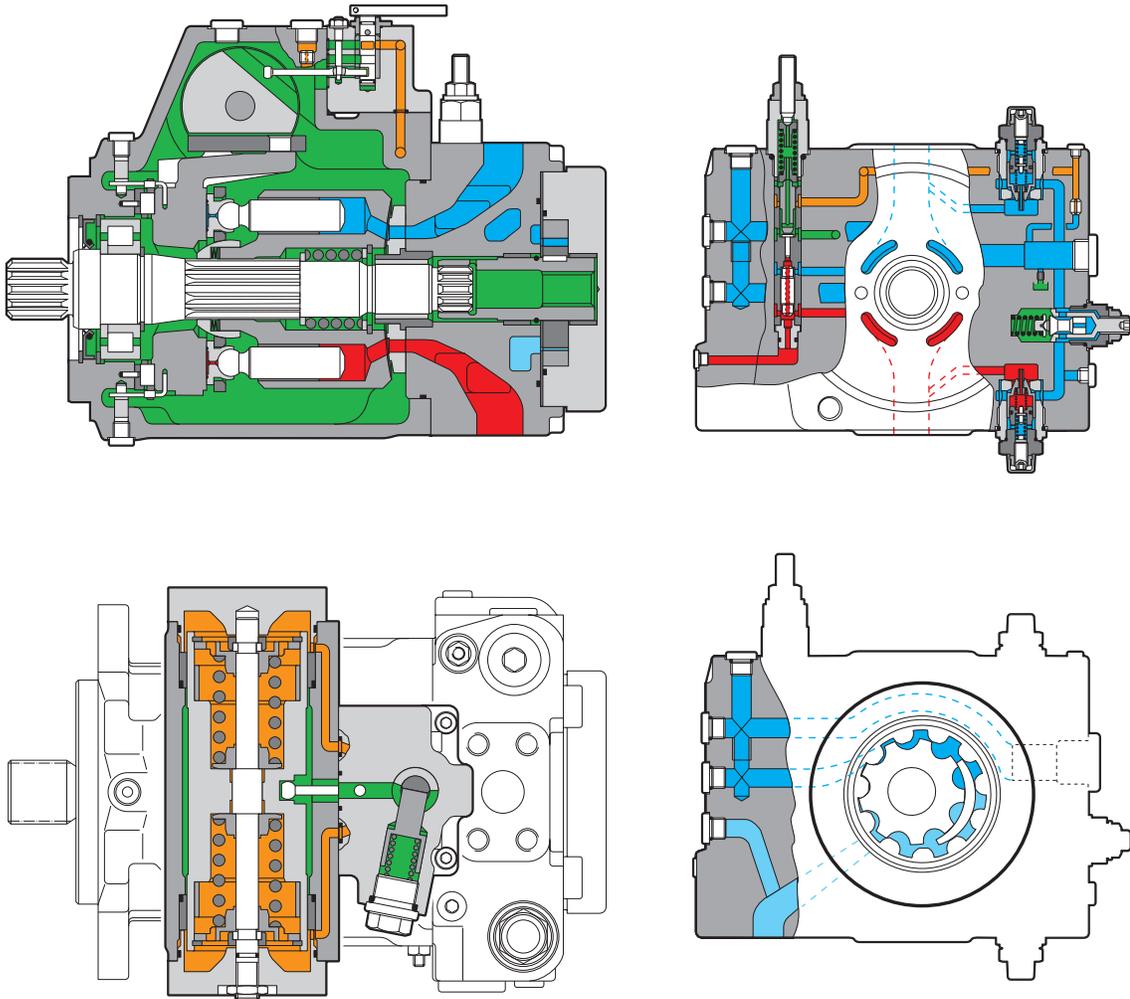
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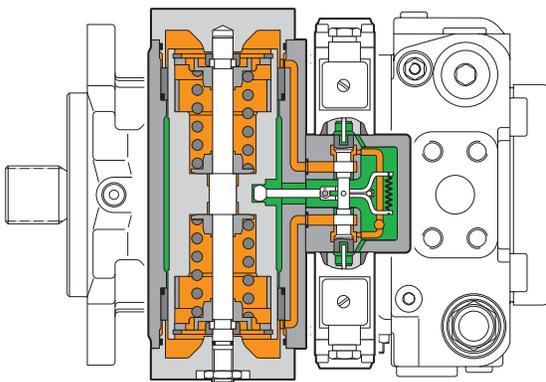
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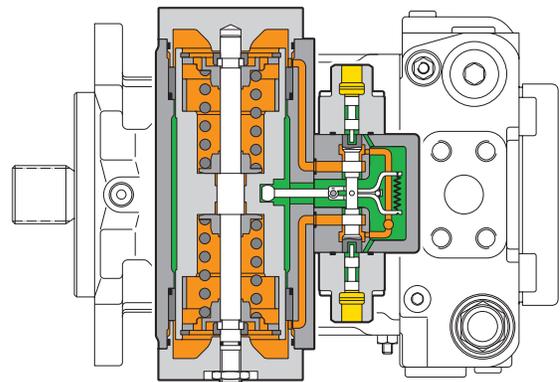
HW/D



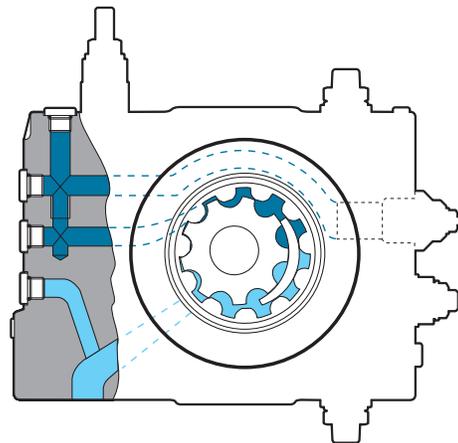
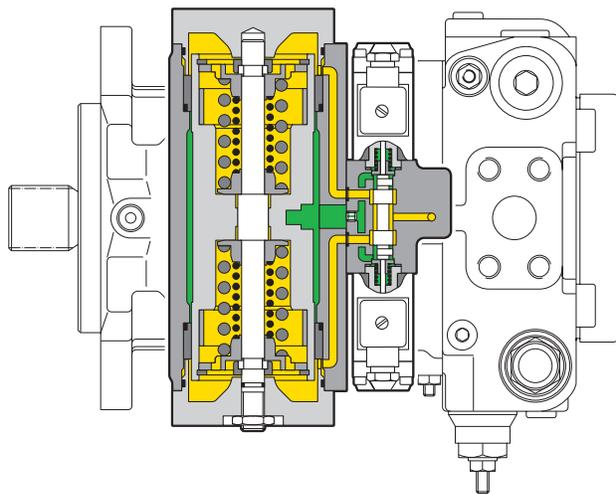
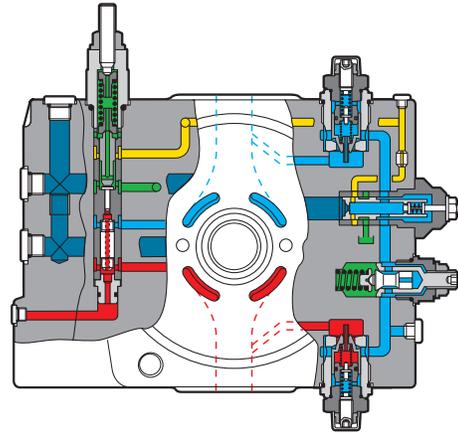
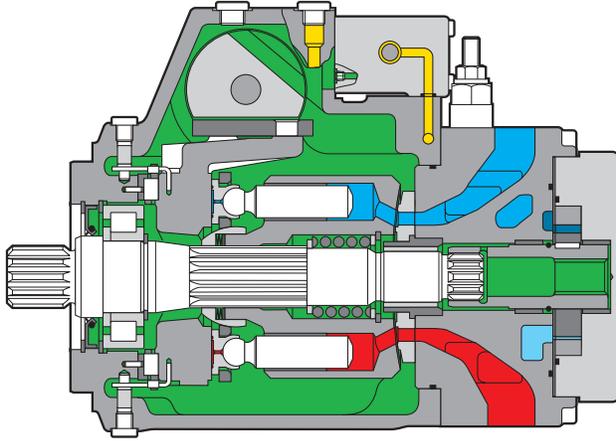
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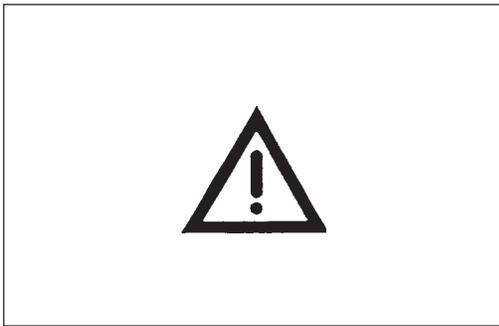


HD/D



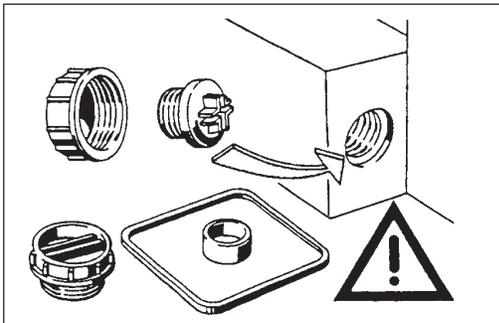
DA/D





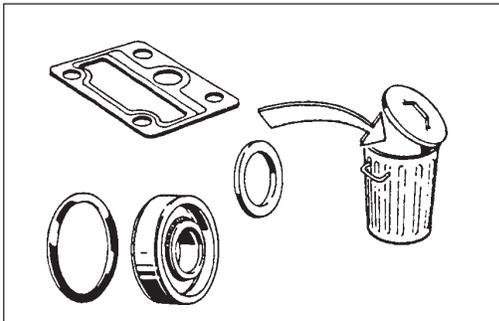
Achtung!
Nachfolgend Hinweise bei allen Reparaturarbeiten an Hydraulikaggregaten beachten!

Attention!
Observe the following notices when carrying out repair work at hydraulic aggregates!



Alle Öffnungen der Hydraulikaggregate verschließen.

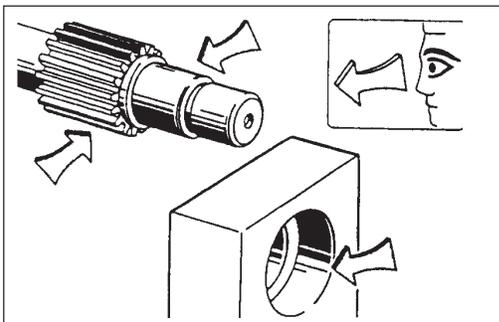
Close all ports of the hydraulic aggregates.



Alle Dichtungen erneuern.

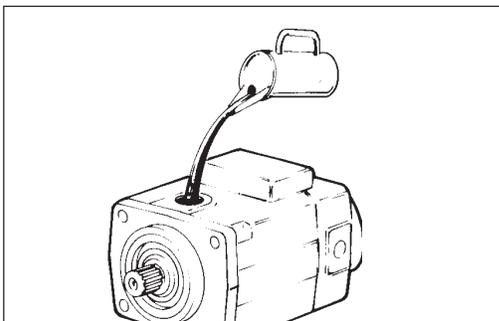
Nur original HYDROMATIK-Ersatzteile verwenden.

Replace all seals.
Use only original HYDROMATIK spare parts.



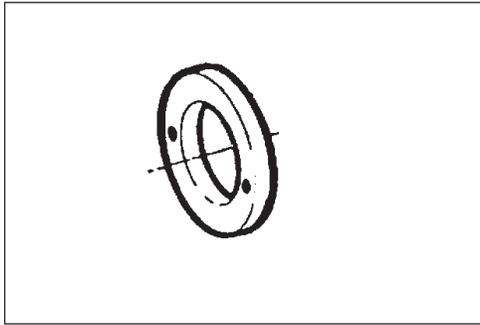
Alle Dicht- und Gleitflächen auf Verschleiß prüfen.
Achtung: Nacharbeiten an Dichtflächen z.B. durch Schleifpapier kann die Oberfläche beschädigen.

Check all seal and sliding surfaces for wear.
Attention: Rework of sealing area f. ex. with abrasive paper can damage surface.



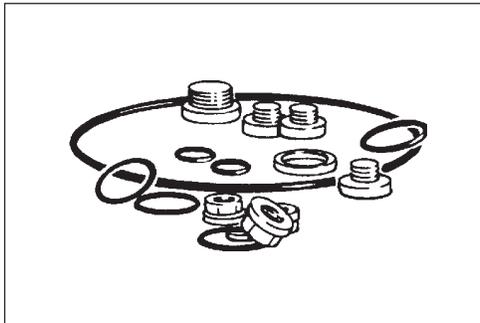
Hydraulikaggregate vor Inbetriebnahme mit Betriebsmedium befüllen.

Fill up hydraulic aggregates with medium before start-up.



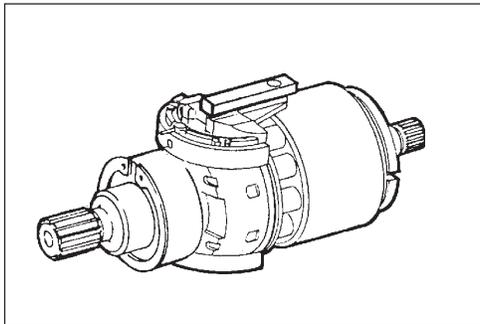
1 Dichtsatz für Triebwelle.

Seal kit for drive shaft.



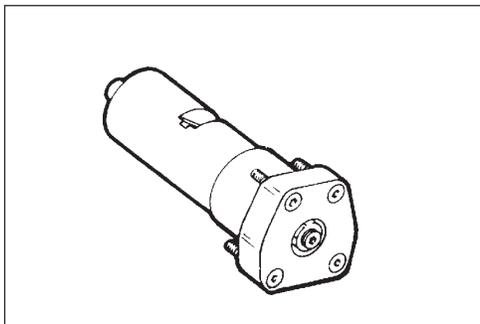
2 Äußerer Dichtsatz.

External seal kit.



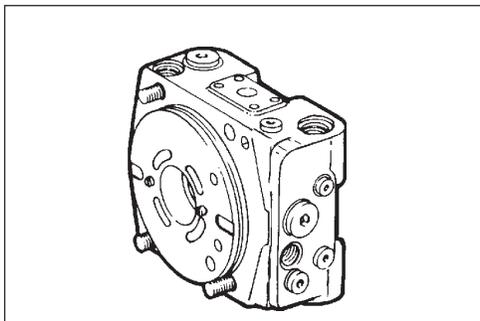
3 Triebwerk komplett.

Complete rotary group.



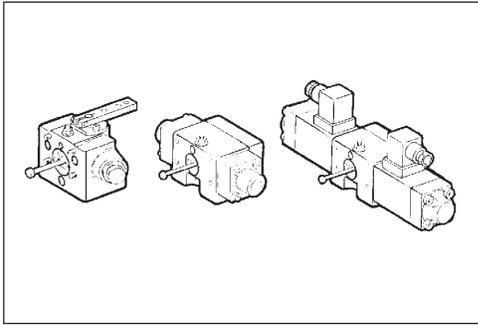
4 Stellkolben

Positioning piston



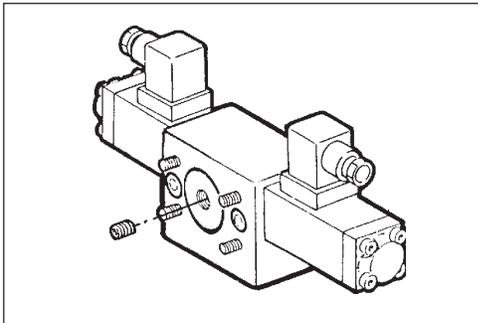
5 Anschlußplatte

Valve plate



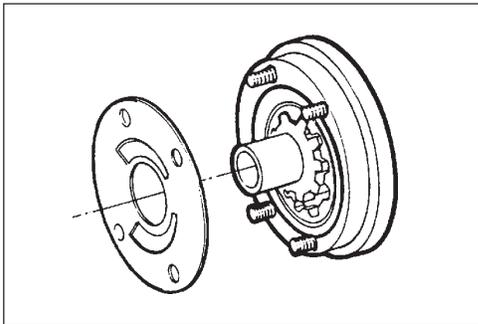
- 6 Ansteuergeräte **HW, HD, EP**
Hinweis:
NG 71 wie NG 40 - 56 mit Flachdichtung.

Control device **HW, HD, EP**
Note:
Size 71 control device as size 40 - 56 with flat seal.

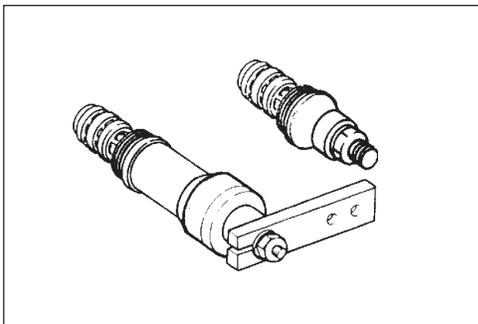


- 7 Ansteuergerät **DA**
Hinweis:
NG 71 wie NG 40 - 56 mit Flachdichtung.

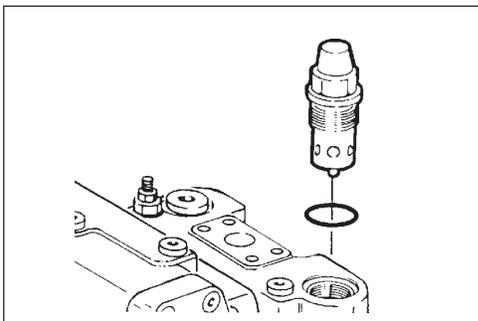
Control device **DA**
Note:
Size 71 control device as size 40 - 56 with flat seal.



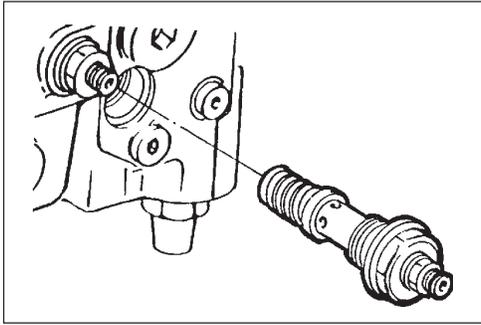
- 8 Hilfspumpe
Boost pump



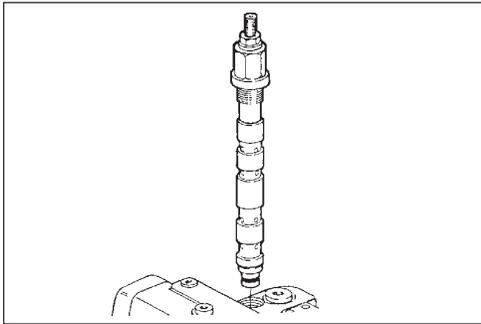
- 9 Regelventil
Control valve



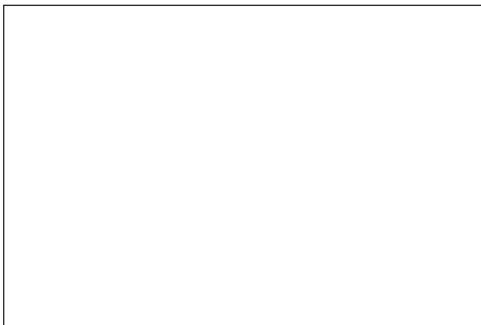
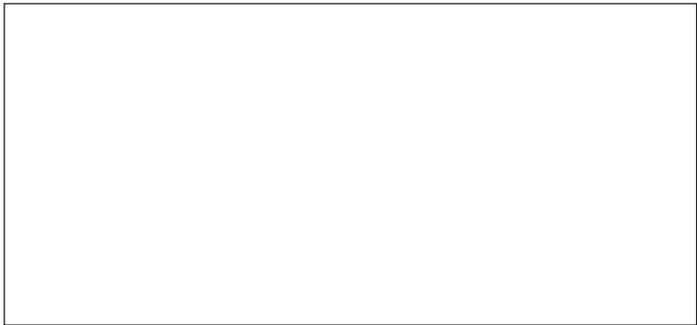
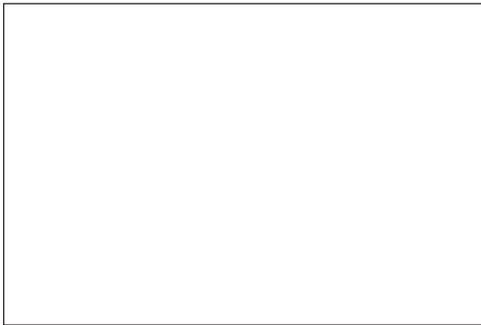
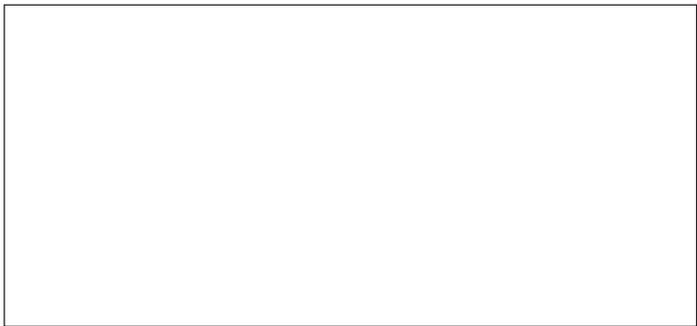
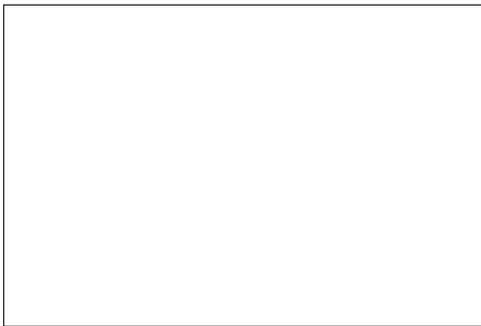
- 10 HD - Ventil
High pressure valve

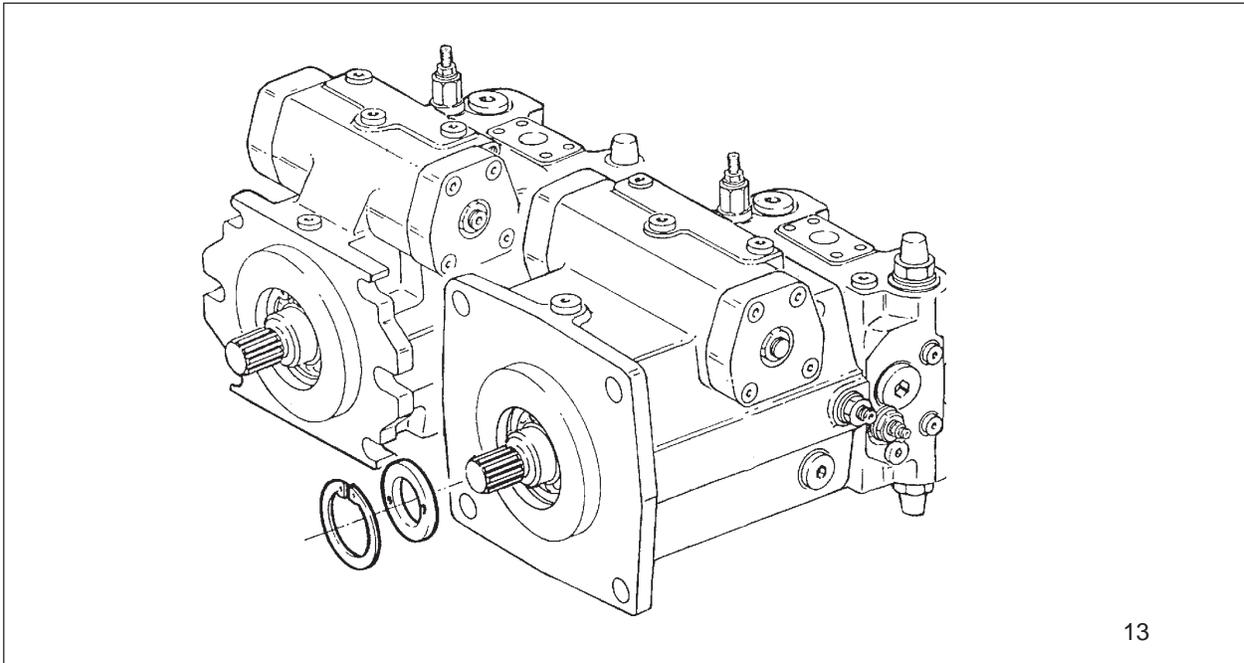


11 ND - Ventil
Low pressure valve

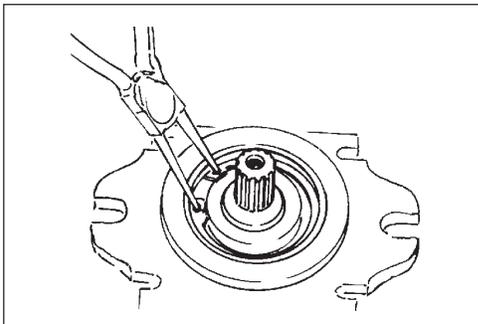


12 Druckabschneidung
Pressure cut-off



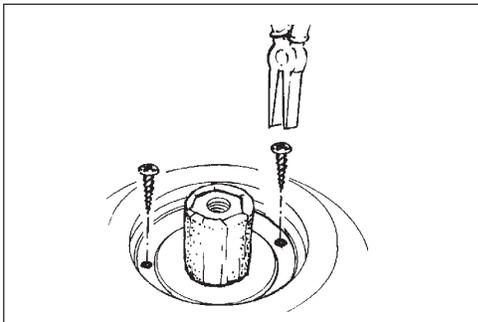


13



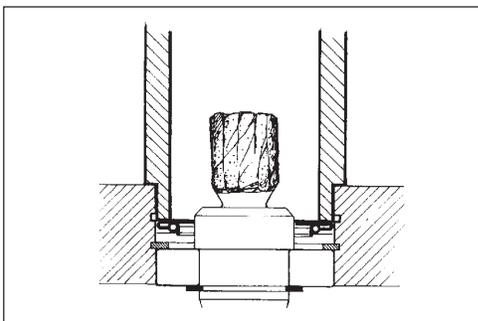
- 14 Triebwelle abkleben.
Sicherungsring ausbauen.

Protecting the drive shaft.
Remove retaining ring.



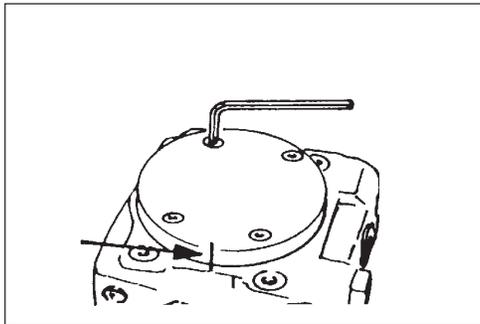
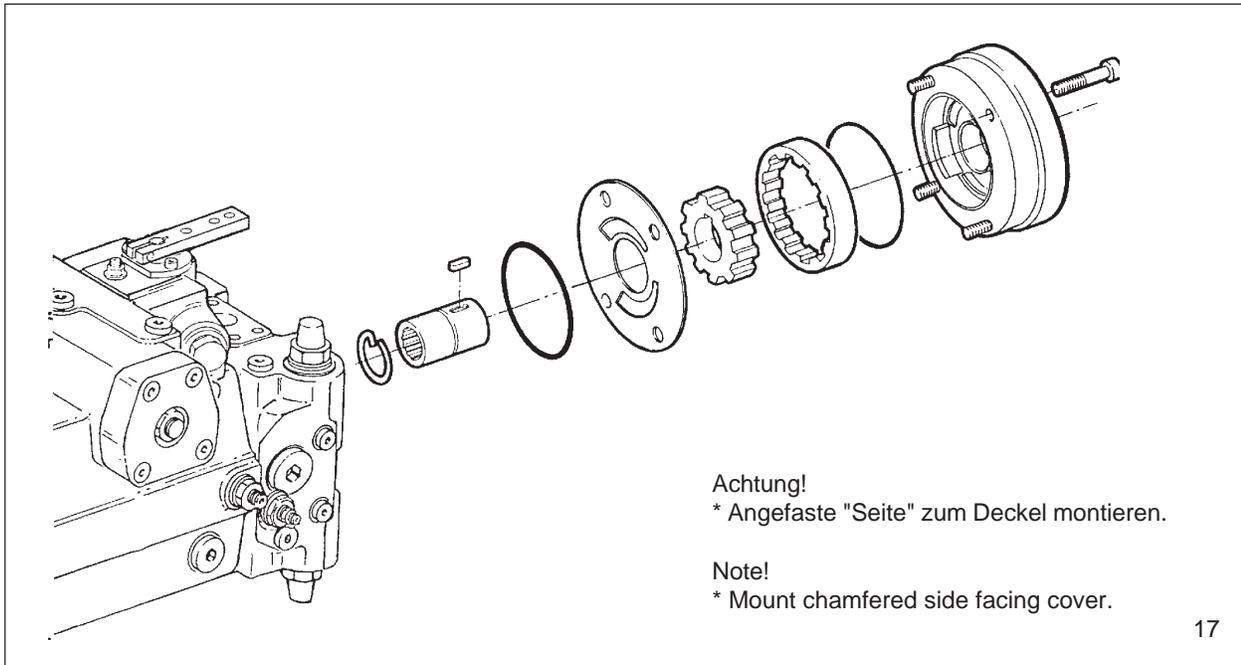
- 15 Blechschaube in die mit Gummi gefüllten
Löcher eindrehen.
Mit Zange WDR herausziehen.

Screw in sheet metal screw into the holes
fitted with rubber.
Pull out shaft seal with pliers.



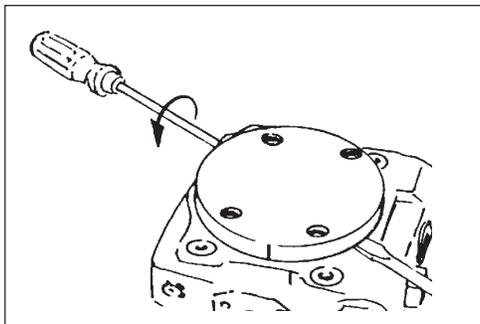
- 16 Wellendichtring mit Buchse auf
Anschlag einpressen.
Sicherungsring einbauen.

Press-in shaft seal with bush to stop.
Assemble retaining ring.



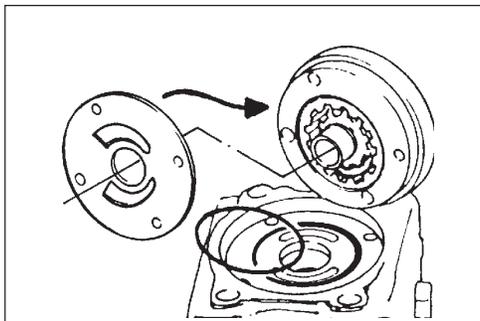
- 18 Lage kennzeichnen,
Befestigungsschrauben ausbauen.

Mark position,
remove fixing screws.



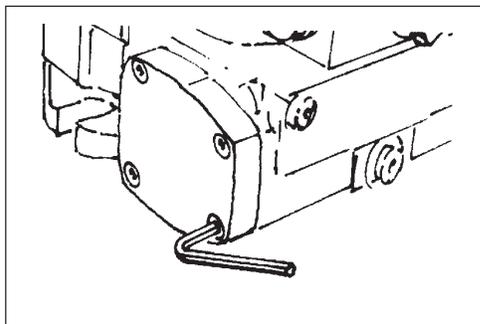
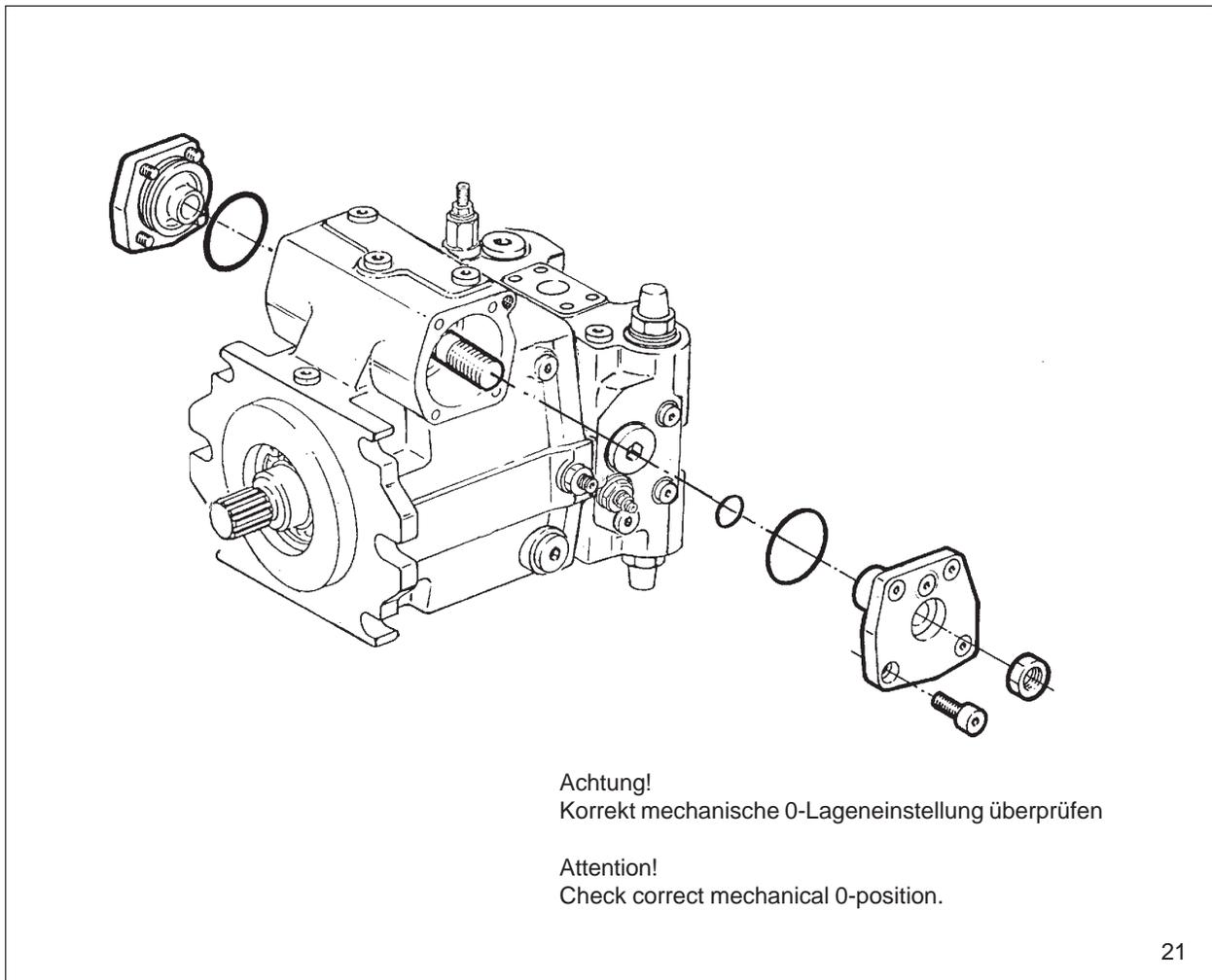
- 19 Deckel abdrücken.

Pry-off cover.

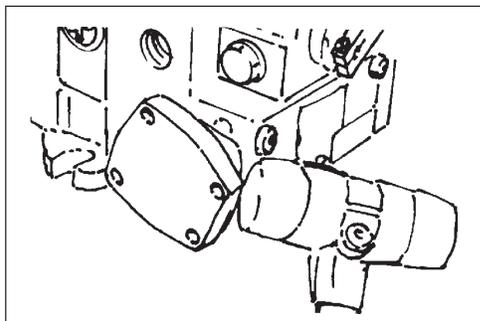


- 20 Kontrolle:
O-Ring, Nut,
Lauffläche, Anschlußplatte.

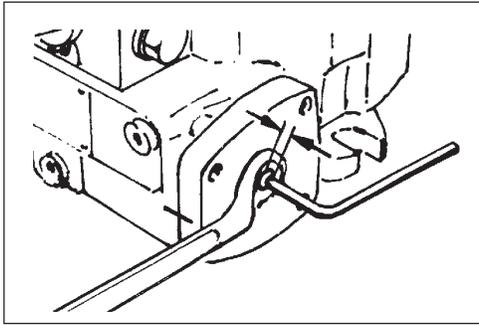
Check:
O-ring, groove,
gliding surface, connection plate.



- 22 Lage kennzeichnen.
Mark position.

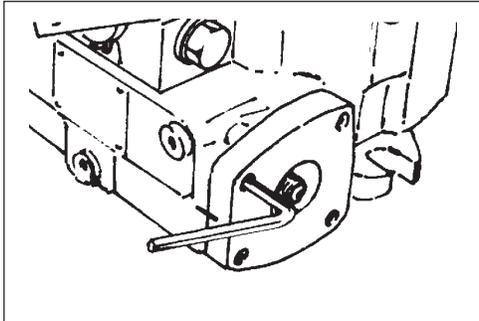


- 23 Deckel verdrehen und mit leichten Hammerschlägen lösen.
Rotate cover and release by tapping gently with hammer.



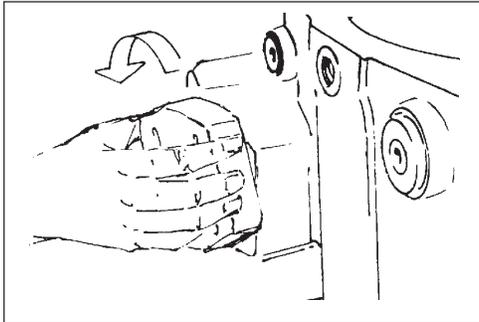
- 24 Deckel kennzeichnen. Maß festhalten, Kontermutter lösen, Stellschraube gegenhalten.

Mark cover. Must be fixed, loosen counter nut, hold adjustment screw.



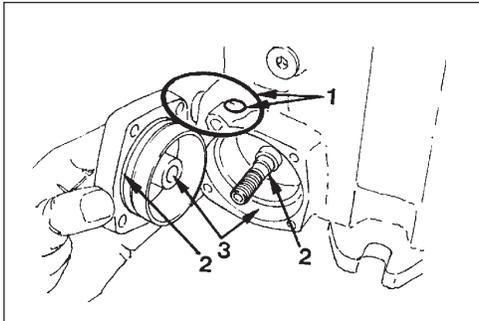
- 25 Deckel demontieren.

Remove cover.



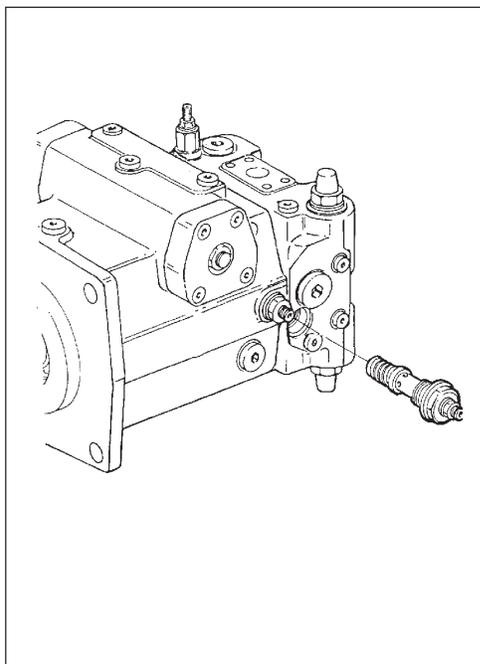
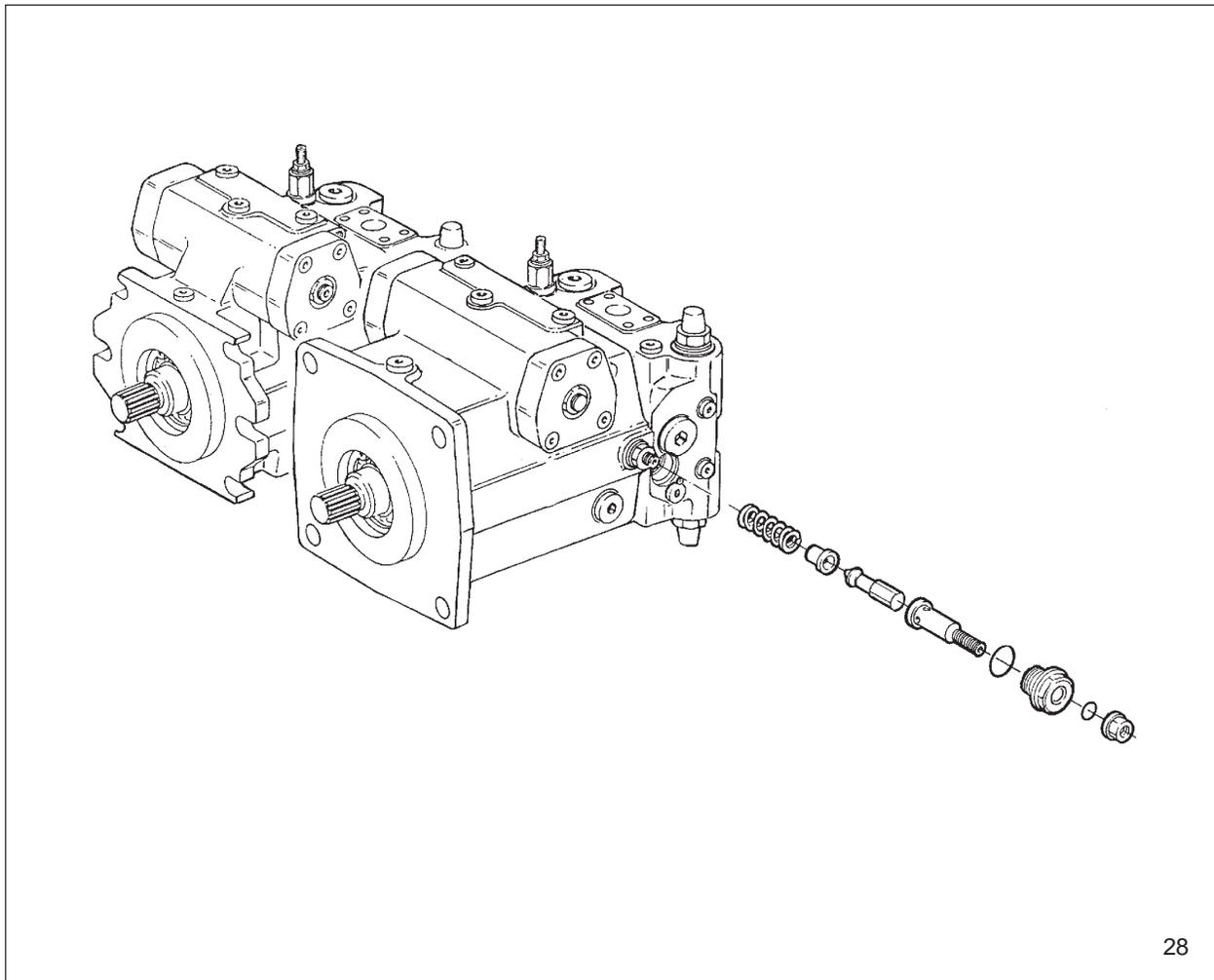
- 26 Deckel von Stellschraube "abschrauben".

Lift off by turning the setting screw.



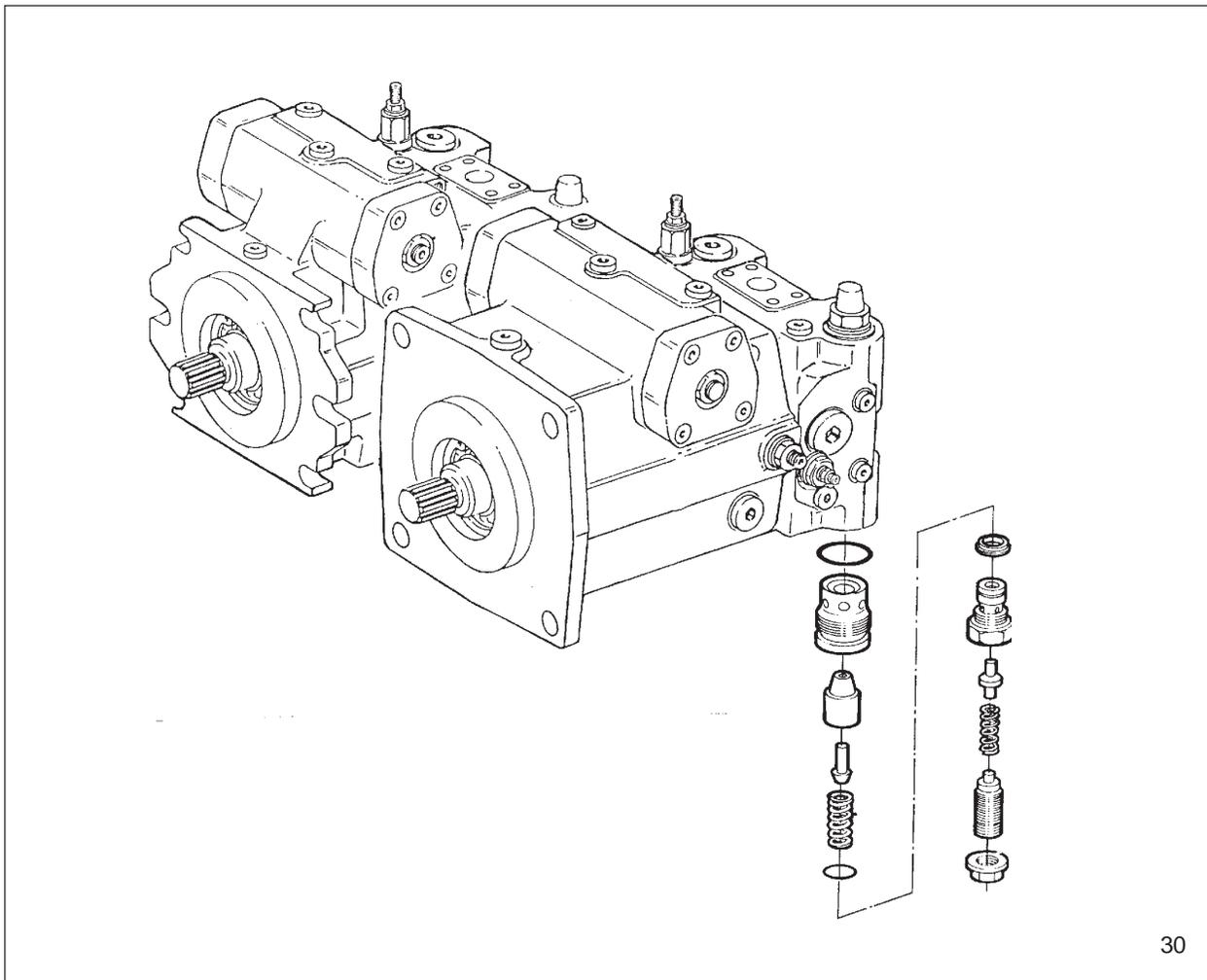
- 27 Kontrolle!
O-Ring (1), Nut (2), Gehäuse (3).

Check!
O-ring (1), groove (2), housing (3).

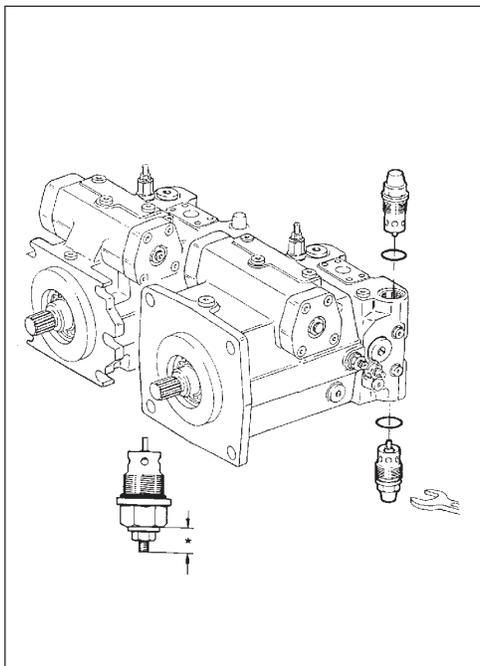


- 29 Ventil komplett ausbauen.
Hinweis:
Einstellschraube nicht verändern.
Achtung!
Nach Einbau Ventileinstellung überprüfen!

Remove valve completely:
Note:
Do not change adjustment screw.
Attention!
Check valve setting after installation.



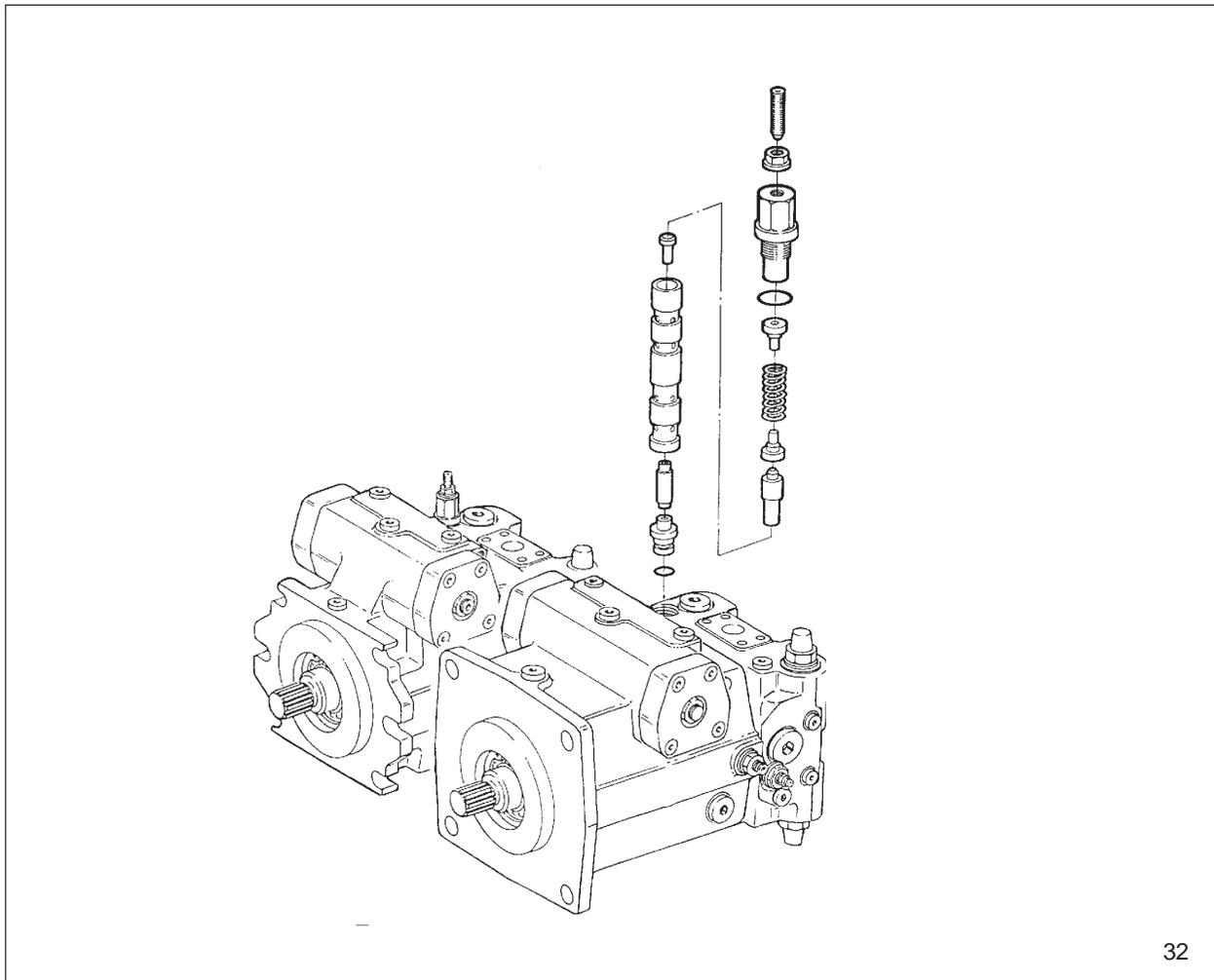
30



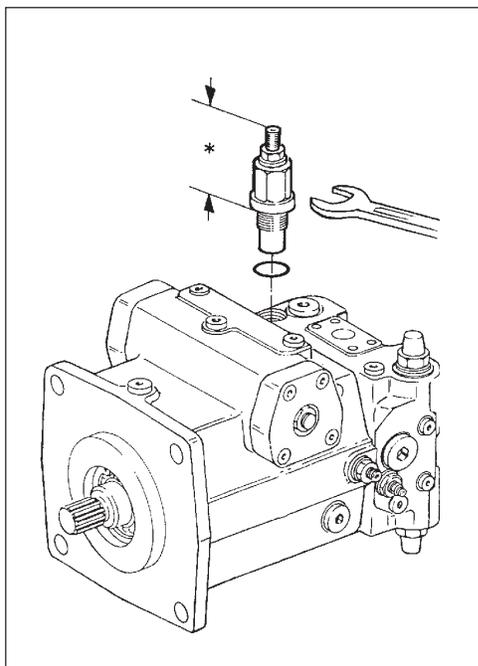
31

Ventil komplett ausbauen.
Kontrolle: O-Ring, Gehäuse.
Wechsel der Dichtmutter - Einstellmaß (*) festhalten.
Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Remove valve completely.
Control: O-ring, housing.
Replacement of the tightening nut, record measure (*).
Attention!
After assembly check "valve setting".



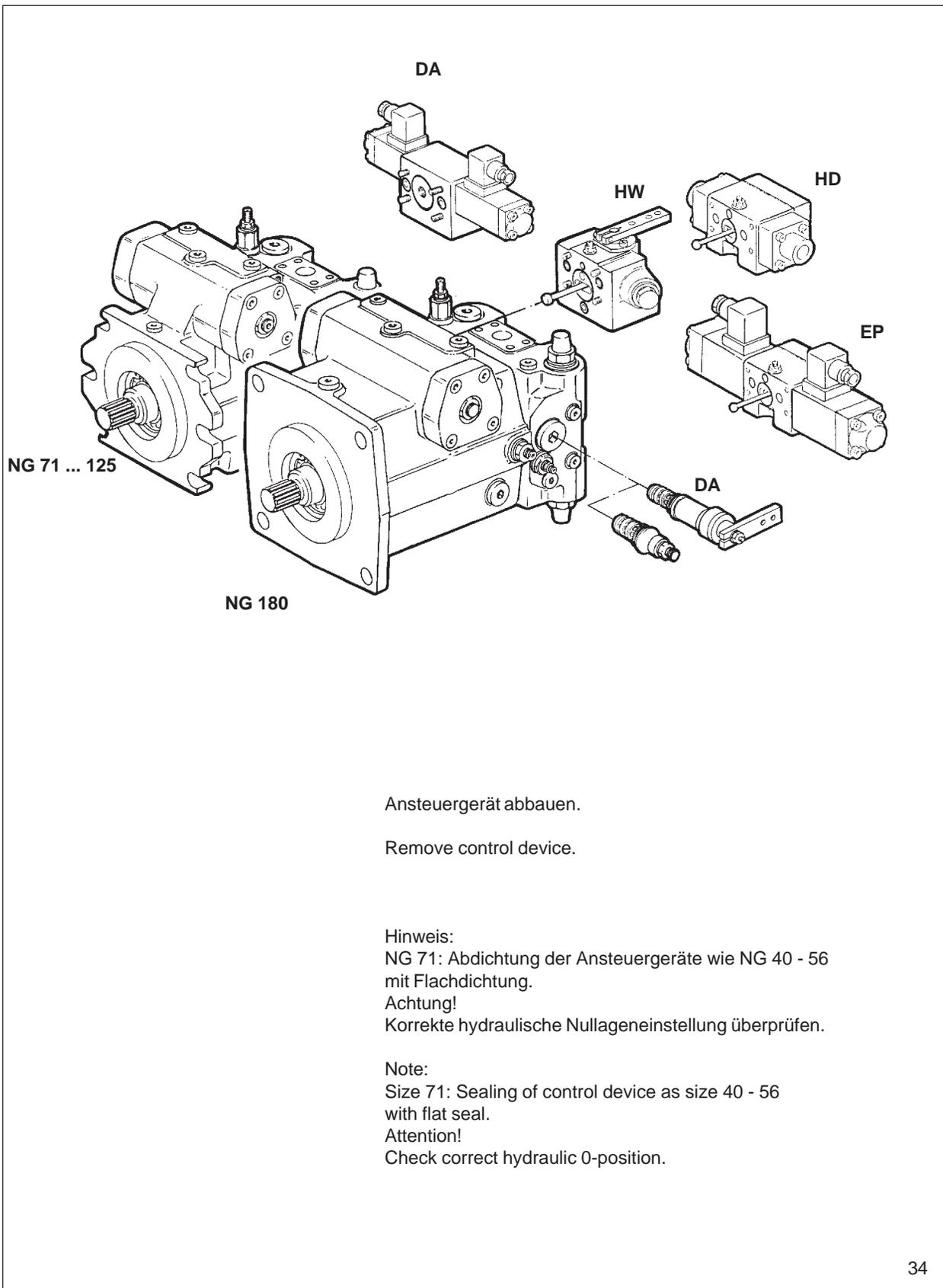
32



33

Einstellteil komplett ausschrauben.
Kontrolle: O-Ring, Gehäuse.
Wechsel der Dichtmutter - Einstellmaß (*) festhalten.
Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Unscrew setting cartridge completely.
Control: O-ring, housing.
Replacement of the tightening nut, record measure (*).
Attention!
After assembly check "valve setting".



Ansteuergerät abbauen.

Remove control device.

Hinweis:

NG 71: Abdichtung der Ansteuergeräte wie NG 40 - 56
mit Flachdichtung.

Achtung!

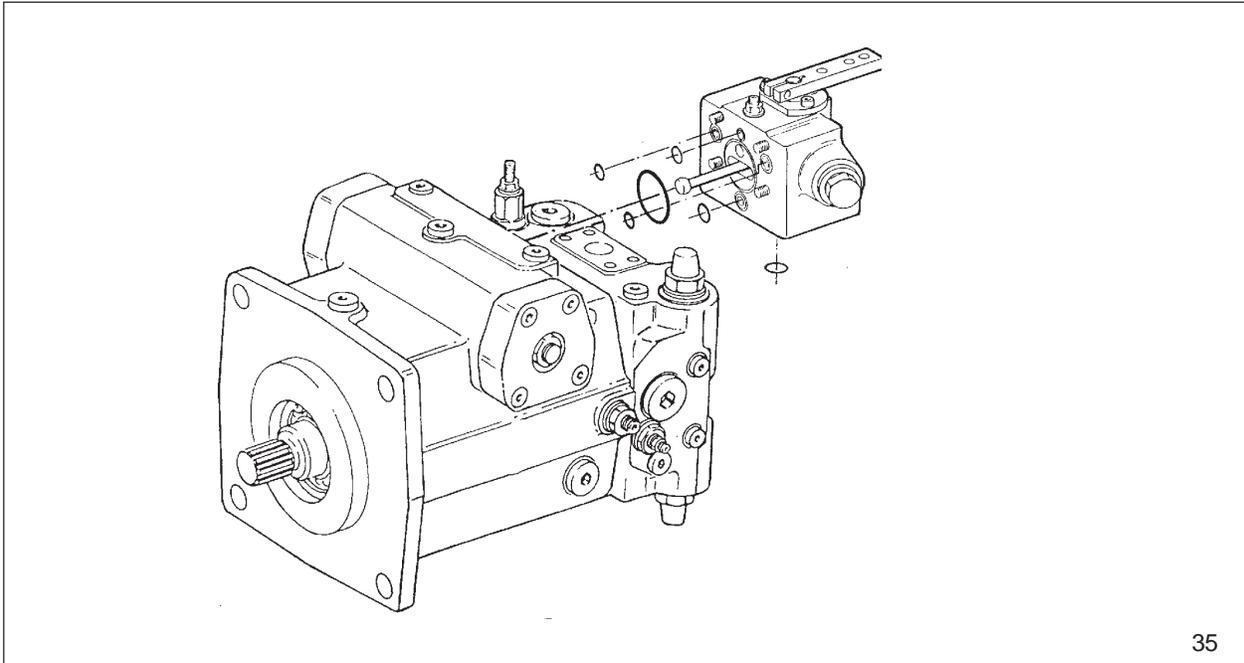
Korrekte hydraulische Nullageneinstellung überprüfen.

Note:

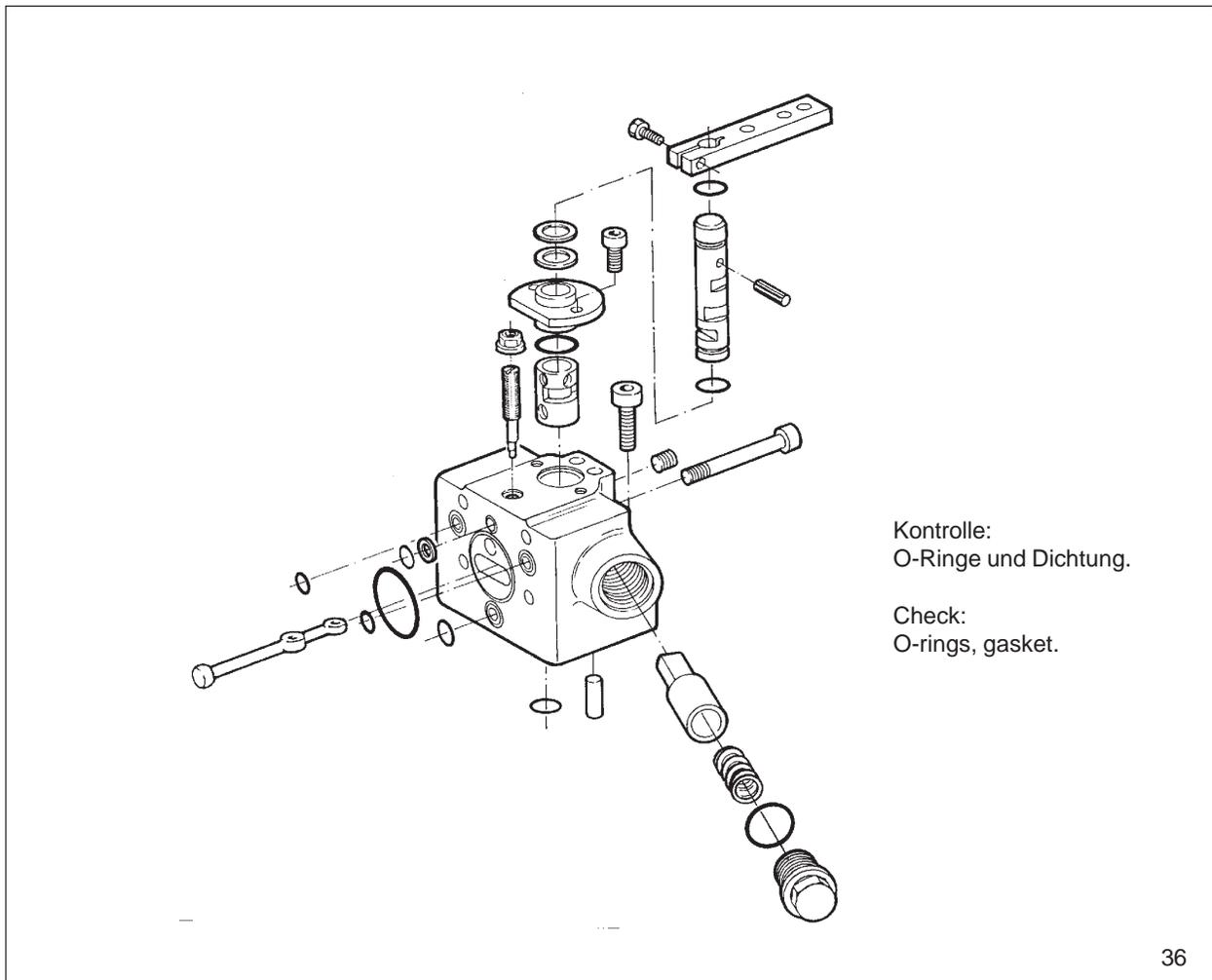
Size 71: Sealing of control device as size 40 - 56
with flat seal.

Attention!

Check correct hydraulic 0-position.



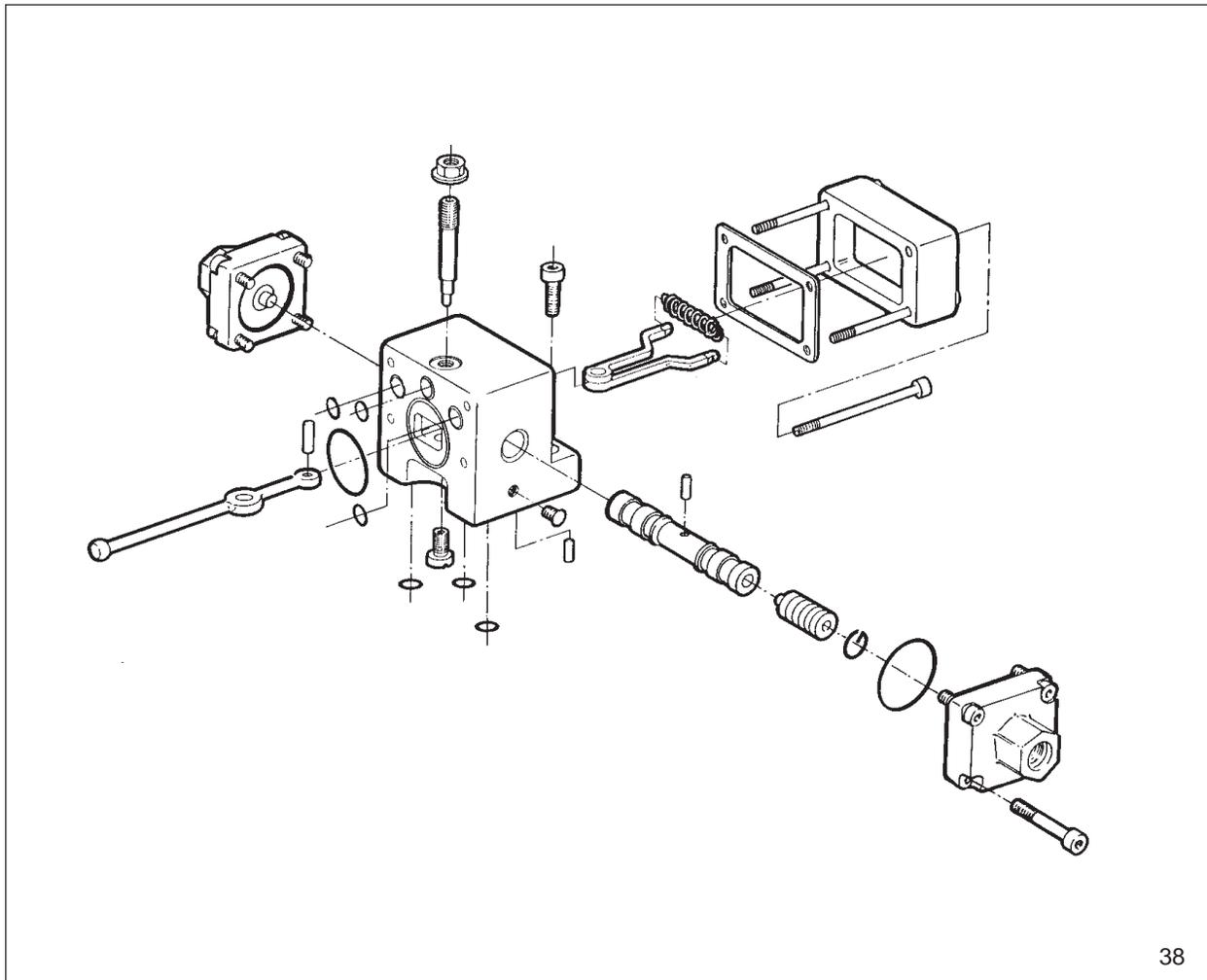
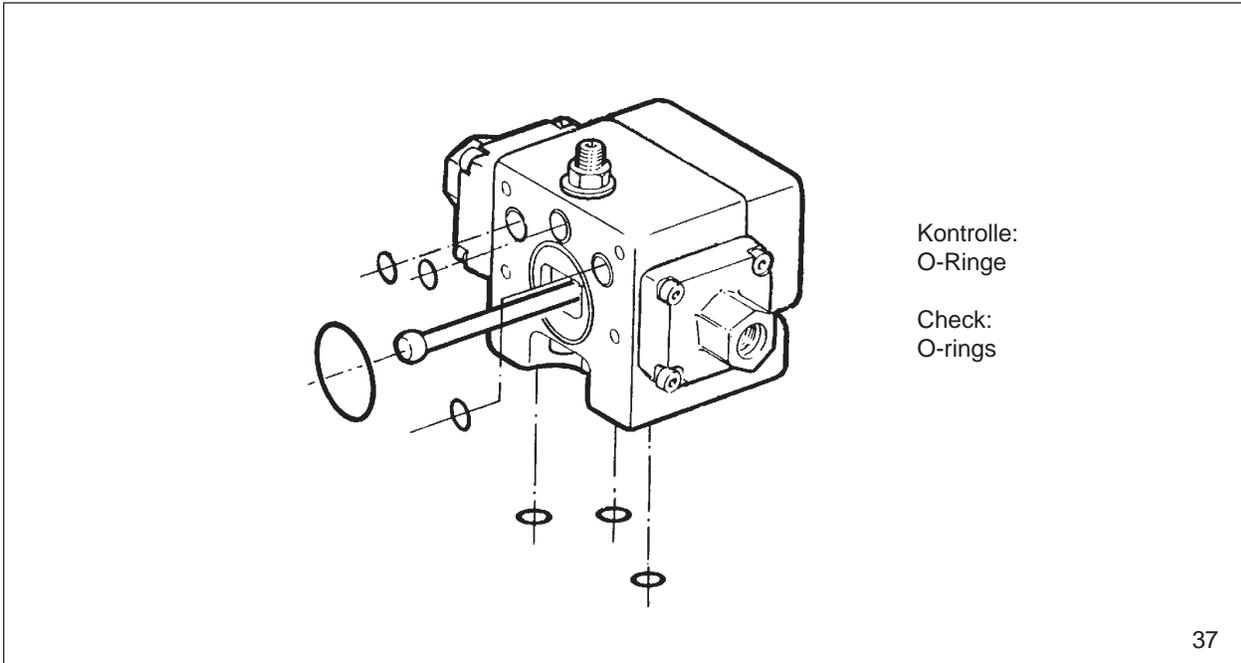
35

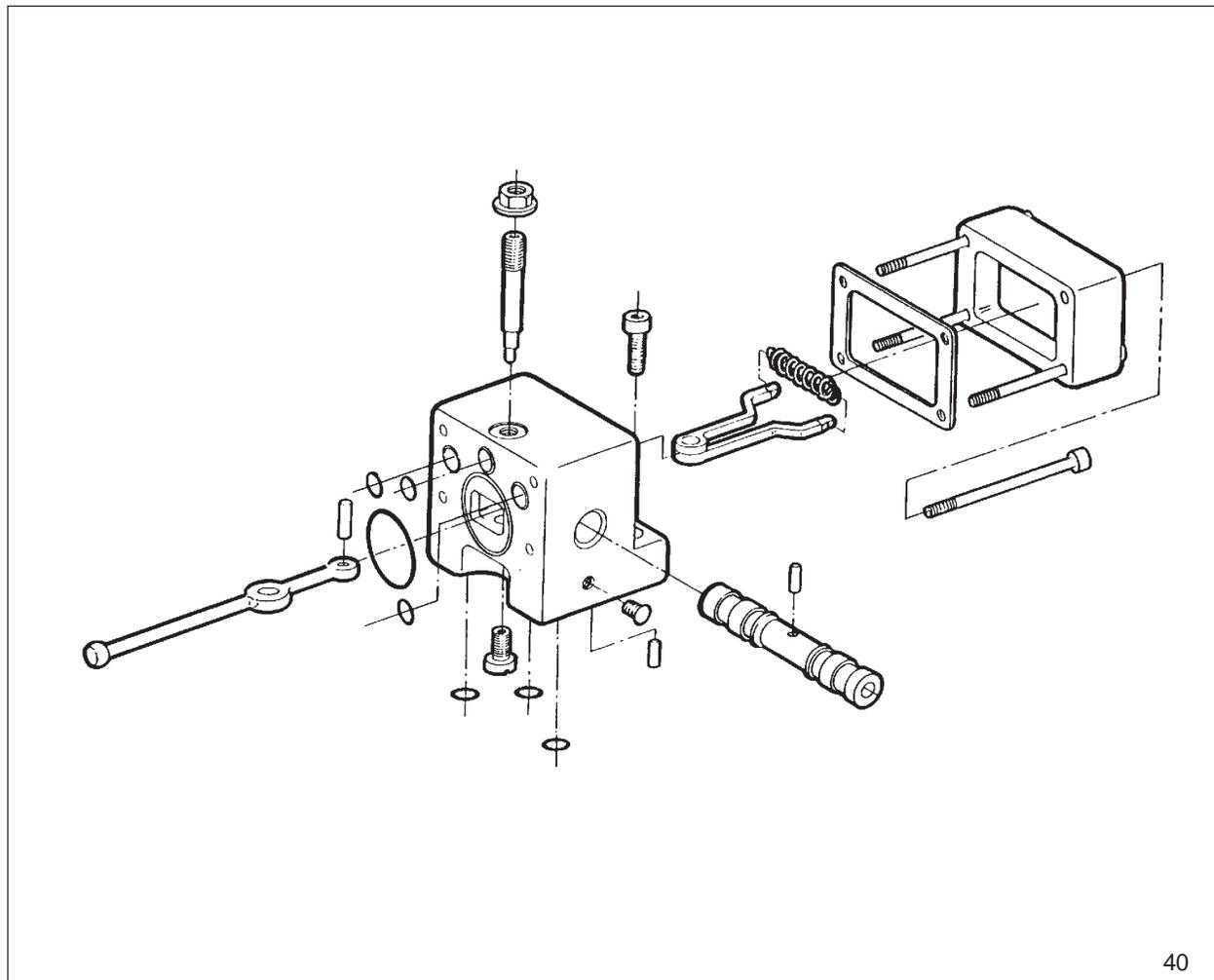
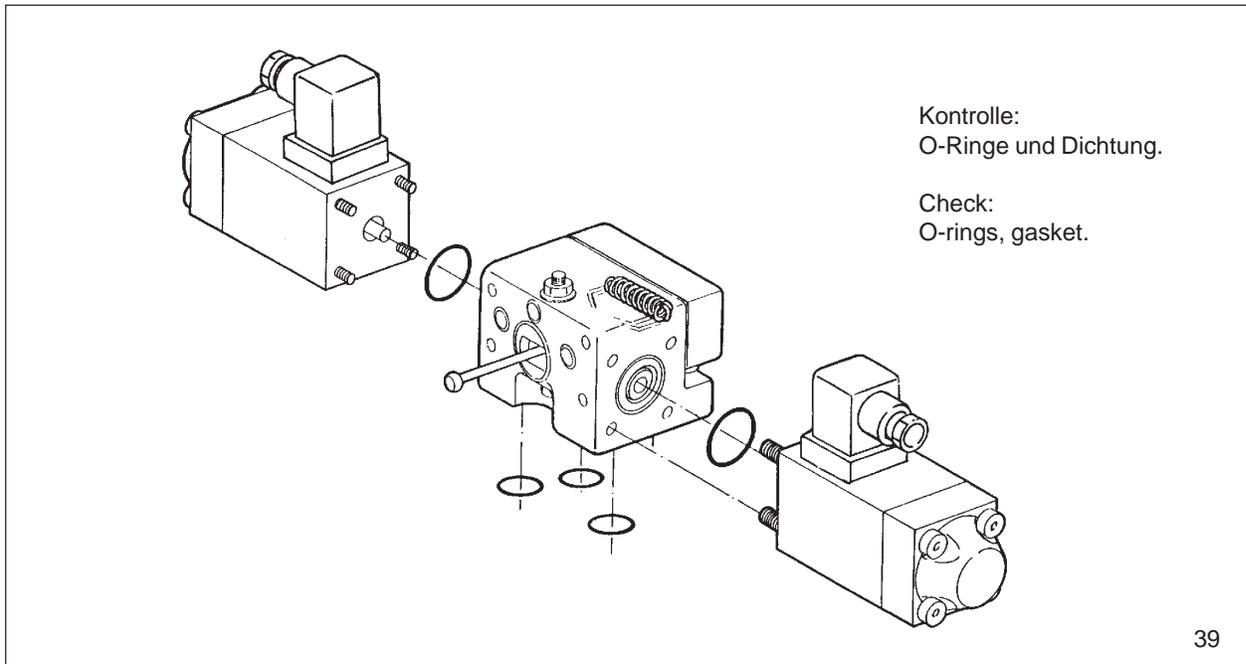


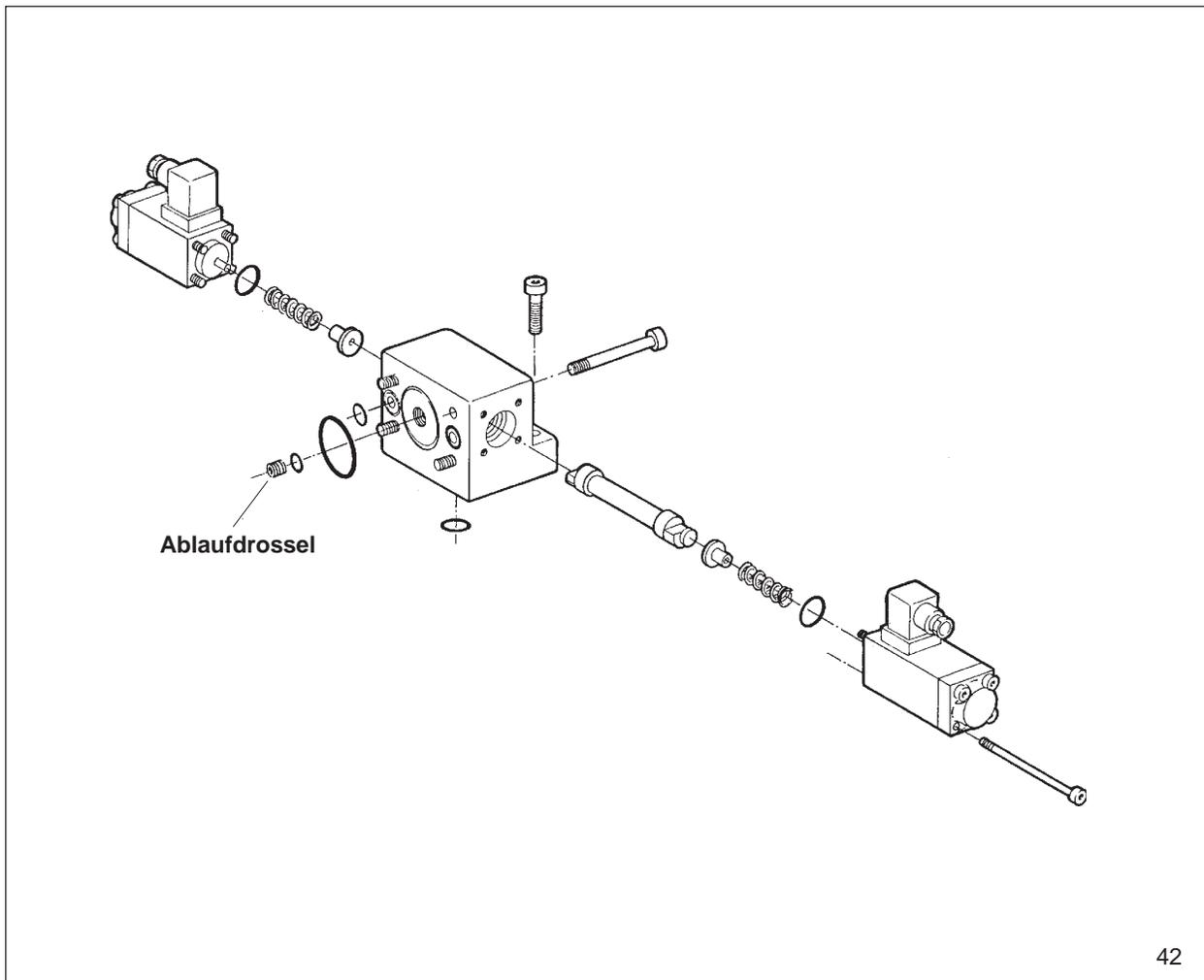
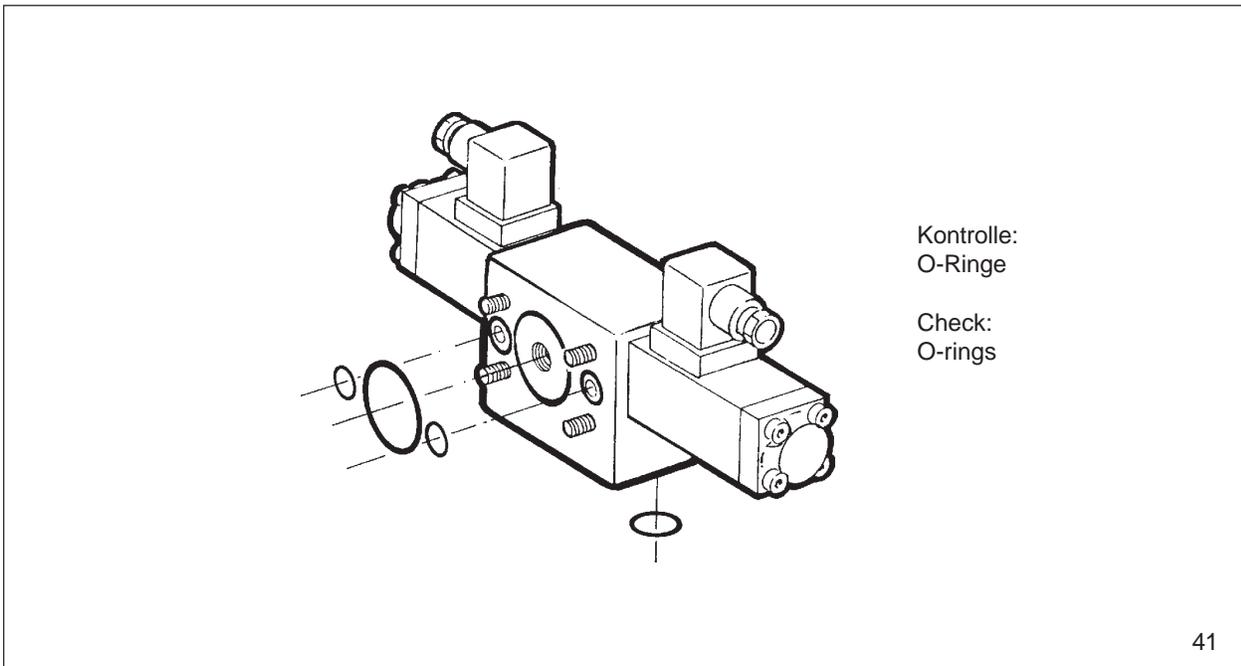
Kontrolle:
O-Ringe und Dichtung.

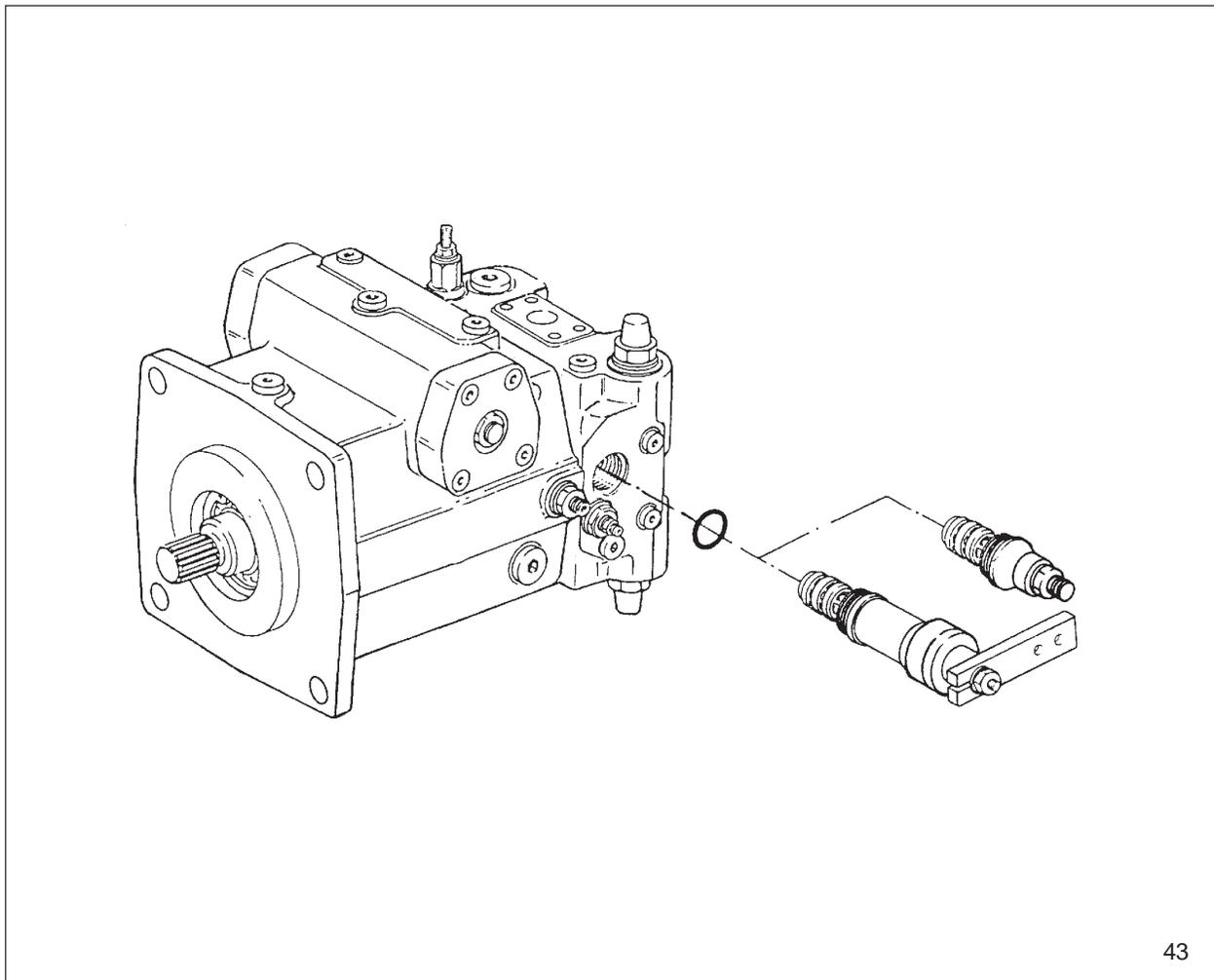
Check:
O-rings, gasket.

36

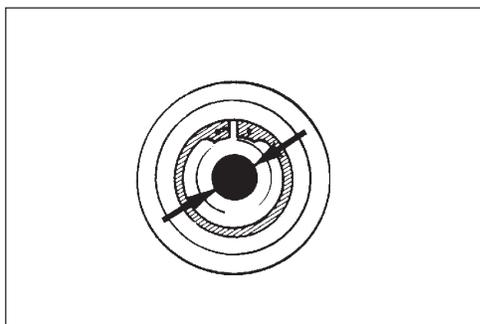






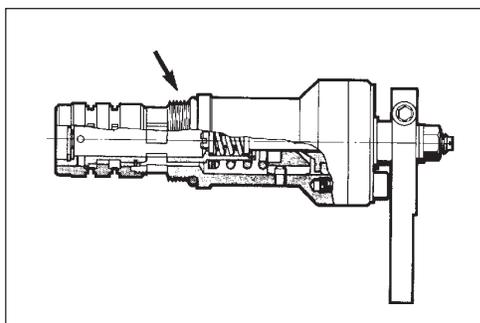


43



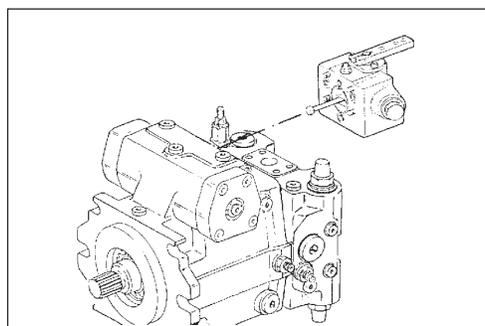
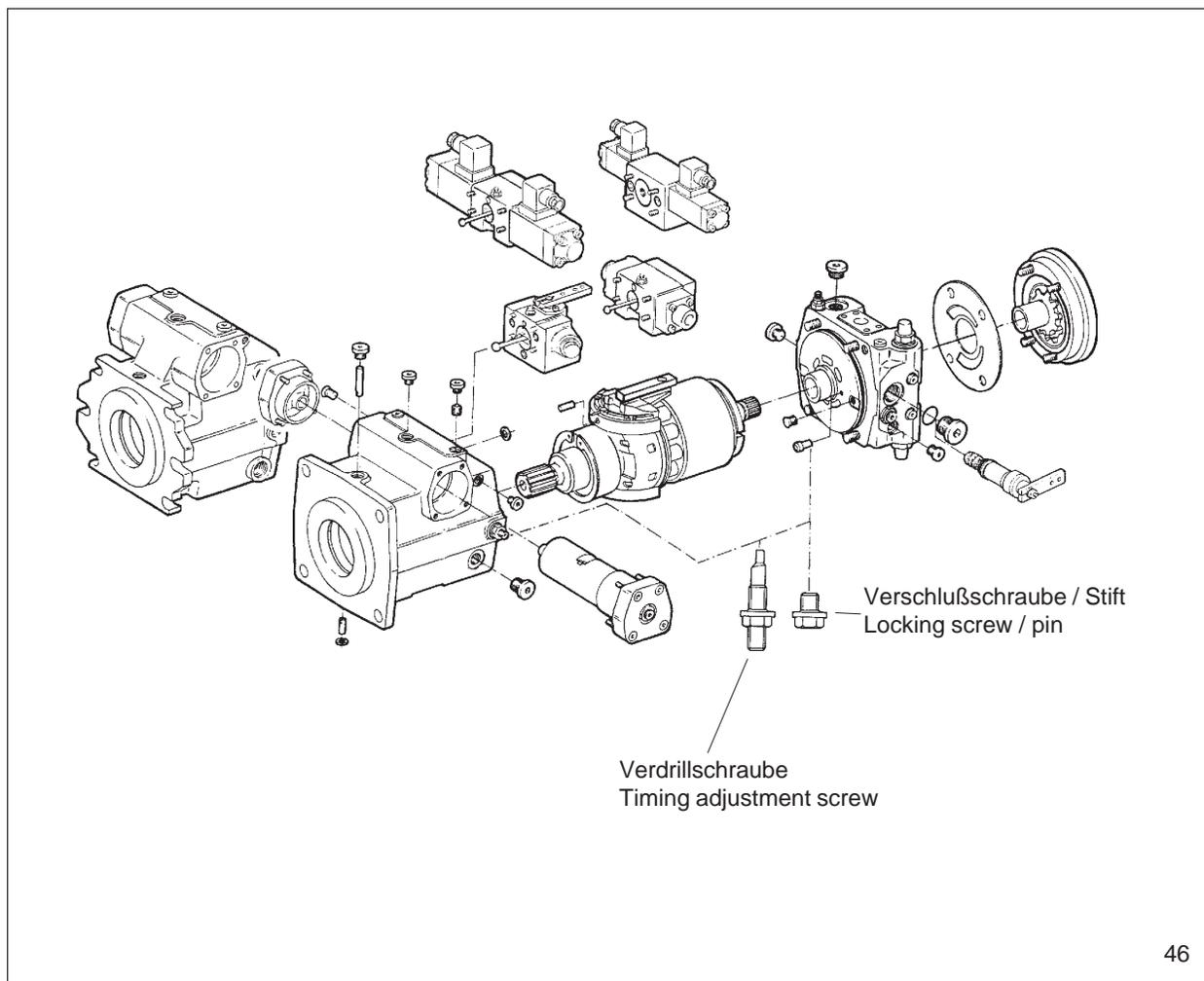
44 Blende überprüfen.
Keine Beschädigung.

Inspect orifice.
No damage.

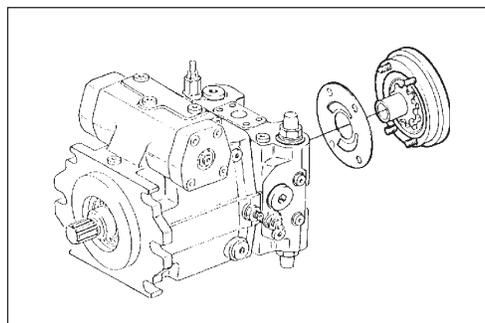


45 Gewinde abkleben.
O-Ring einsetzen.

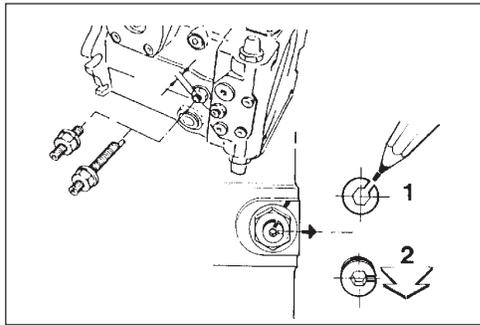
Cover threads.
Insert O-ring.



- 47 Ansteuergerät abbauen.
Remove control device.

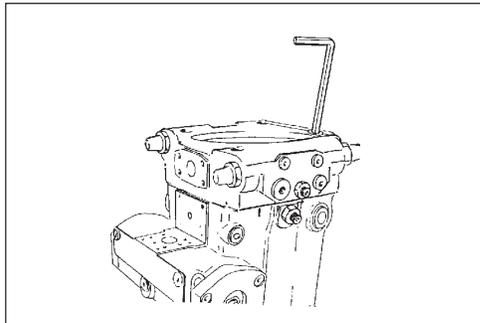


- 48 Hilfspumpe ausbauen.
Hinweis:
Einbaulage kennzeichnen.
Remove auxiliary pump.
Note:
Mark assembly position previously.



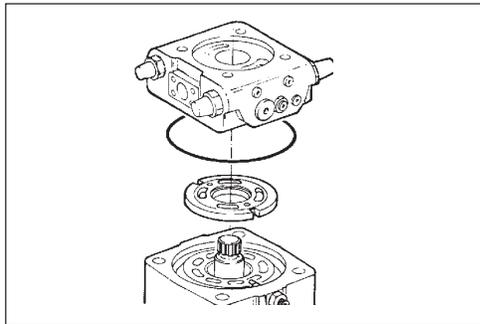
- 49 Lage der Verdrillschraube markieren (1).
Einstellmaß festhalten.
Verdrillschraube auf Demontageposition stellen (2).

Mark the position of the indexing screw (1).
Record setting measure.
Set the indexing screw to disassembly position (2).



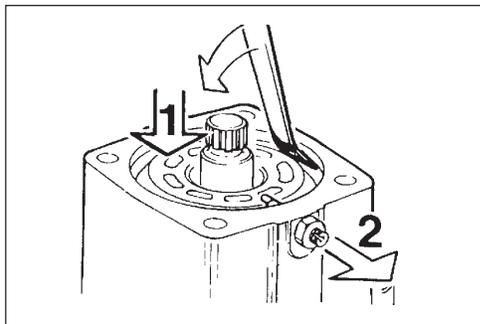
- 50 Lage der Hilfspumpe und Anschlußplatte markieren.
Anschlußplattenbefestigung lösen.

Mark position of the connection plate.
Loosen connection plate fixation.

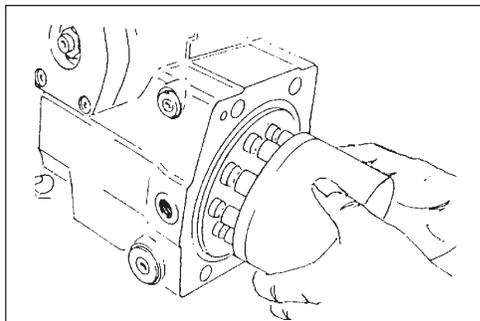


- 51 Anschlußplatte und Steuerplatte abheben.

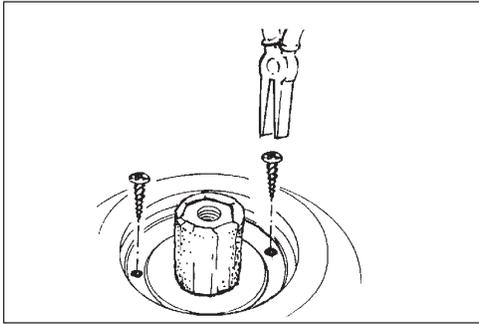
Lift off port plate and control plate.



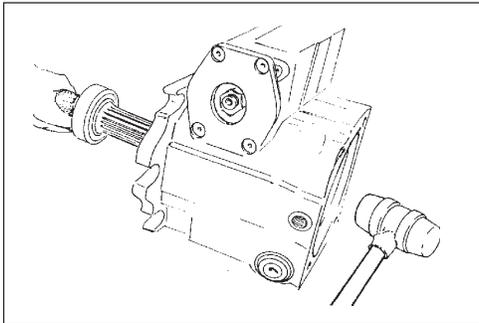
- 52 1. Zylinder nach unten drücken.
2. Verdrillschraube herausdrehen.
1. Press the cylinder to the bottom.
2. Remove fixing indexing screw.



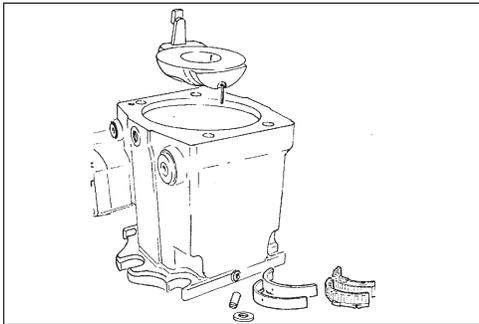
- 53 Zylinder komplett mit Kolben und
Rückzugeinrichtung ausbauen.
- Push off hydraulic section of rotary group.



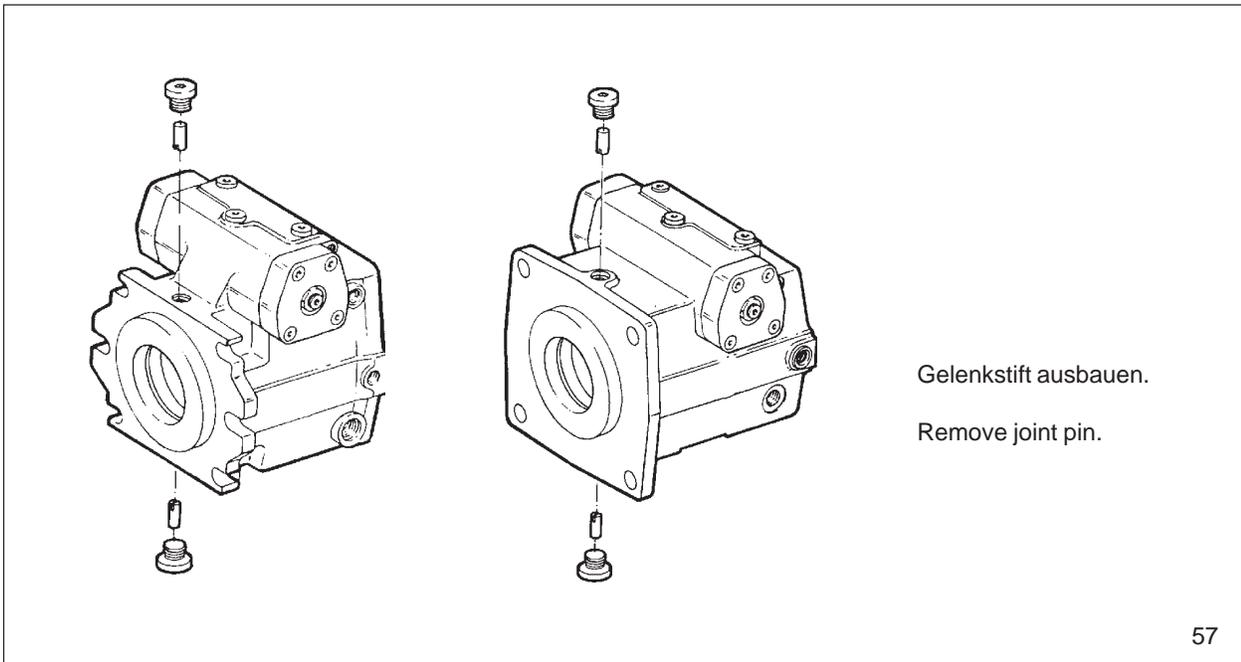
- 54 Seegerring / WDR ausbauen.
Remove retaining ring and radial seal ring.



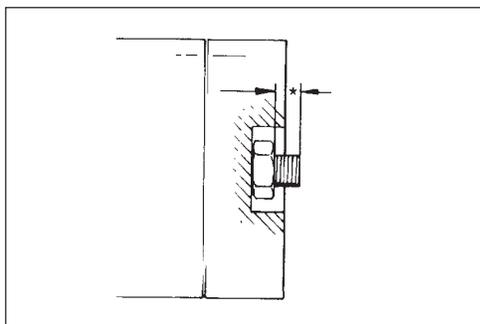
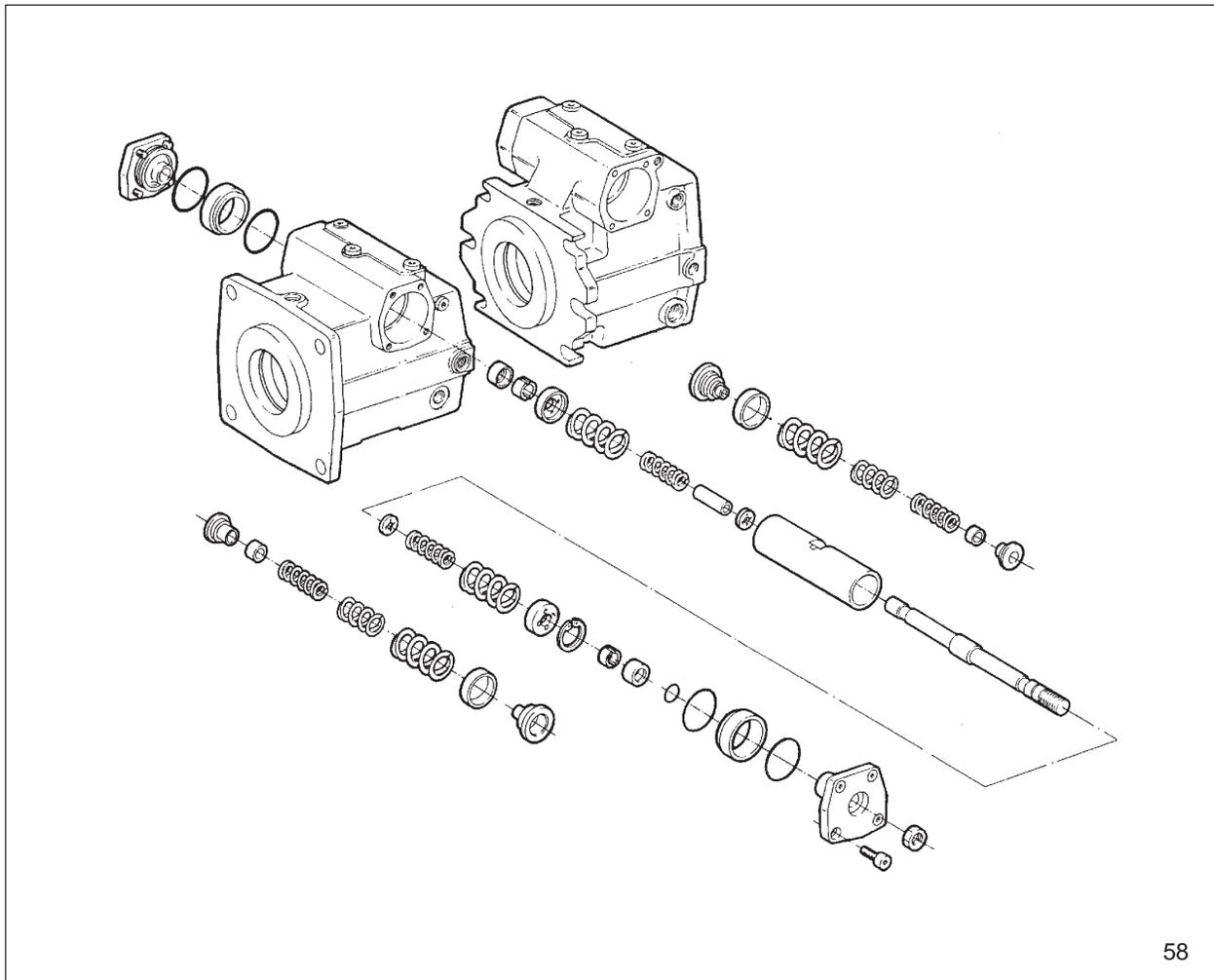
- 55 Triebwelle mit leichten Hammerschlägen austreiben.
Remove drive shaft with slide hammer strokes.



- 56 Schwenkwiege / Lager komplett ausbauen.
Remove swash plate / bearing cups.

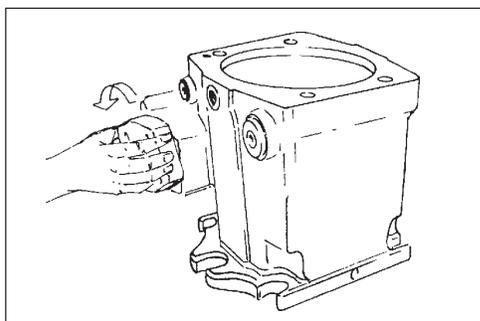


- Gelenkstift ausbauen.
Remove joint pin.



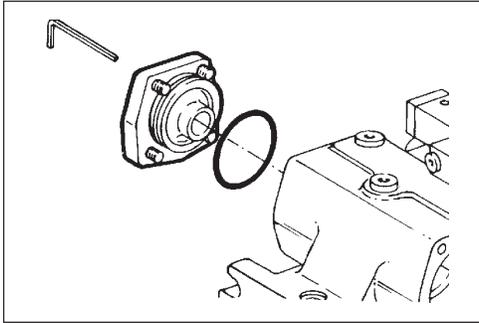
59 Lage vom Deckel markieren, Maß "Nullage" festhalten, Mutter lösen.

Mark position of the cover, note measure of "zero position".
Loosen nut.

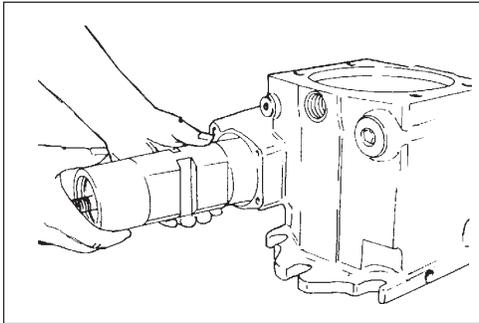


60 Deckel abdrehen.

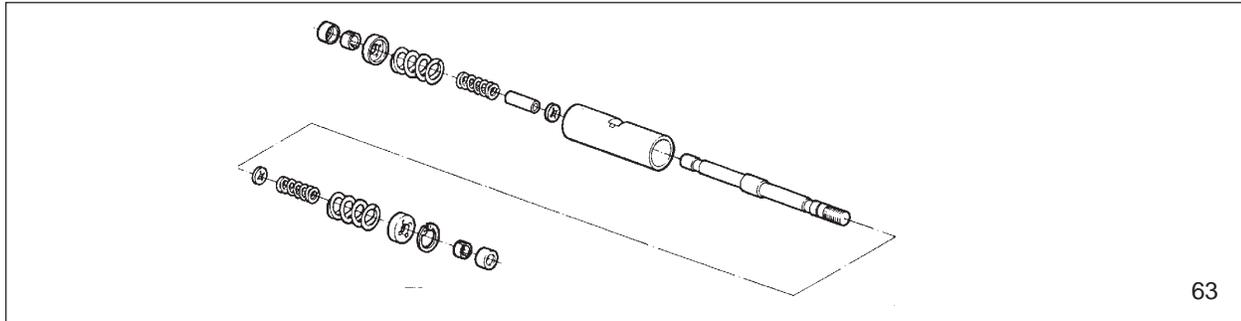
Remove cover.



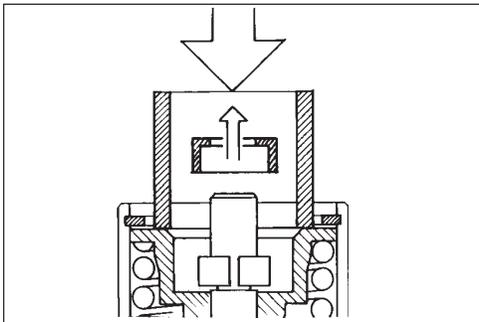
- 61 Lage des Deckels markieren.
Befestigungsschrauben lösen, abbauen.
- Mark position of the cover.
Loosen locking screw, remove cover.



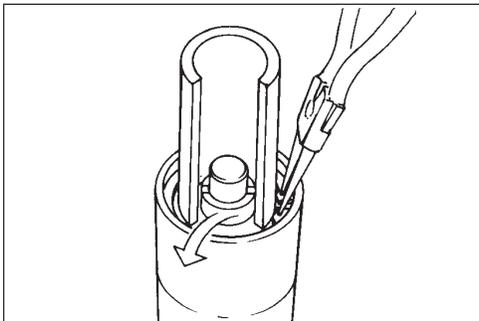
- 62 Stellzylinder ausbauen.
- Remove positioning ring.



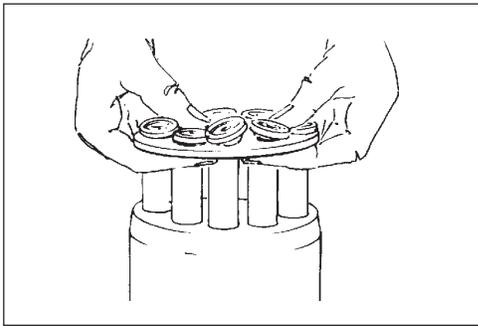
63



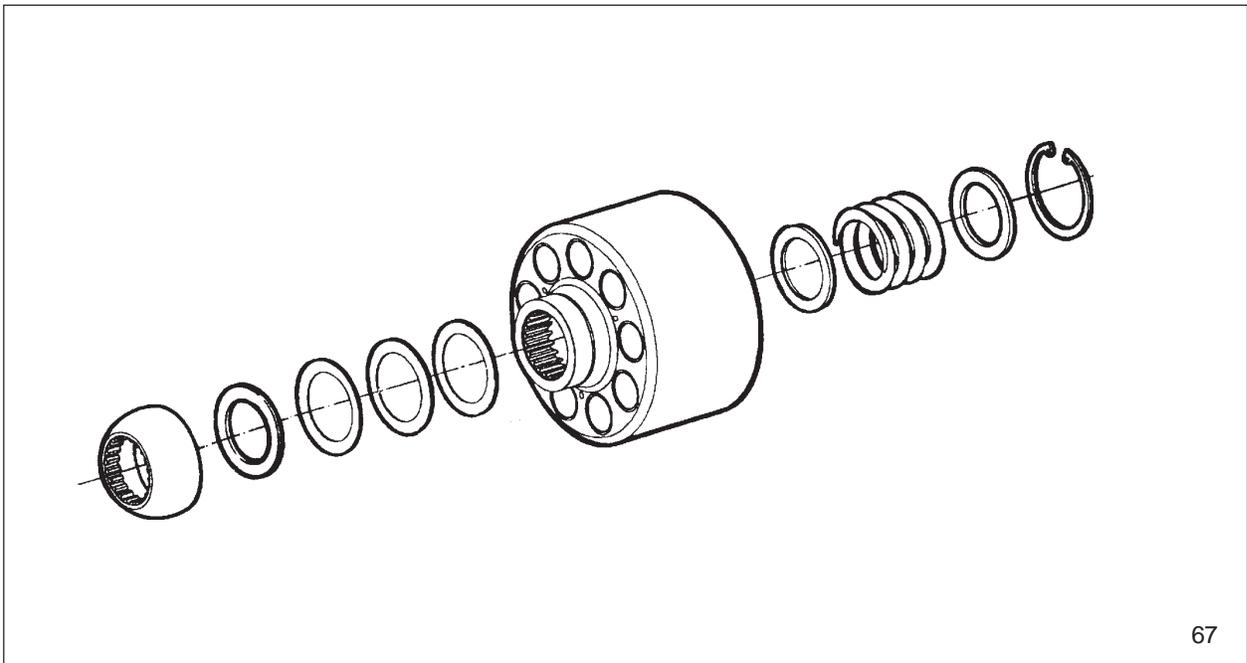
- 64 Vorrichtung aufsetzen und Feder vorspannen.
Aufnahmering ausbauen.
- Fit tool device and preload spring.
Remove take-off ring.



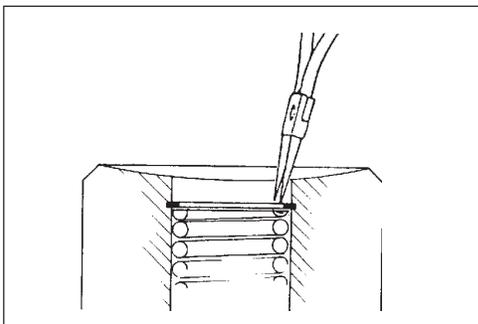
- 65 Ringe ausbauen.
Sicherungsring ausbauen.
Achtung: Teile stehen unter Federvorspannung.
- Remove rings.
Remove safety ring.
Attention: Parts are under spring load.



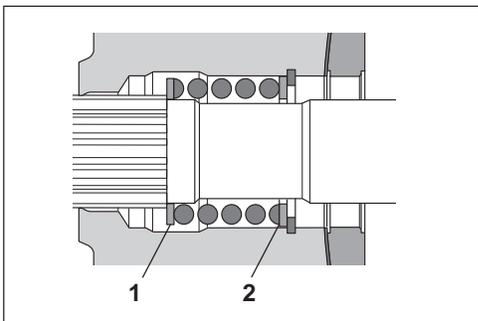
- 66 Kolben mit Rückzugeinrichtung ausbauen.
Tragkugel mit Tellerfedersäule abheben.
- Remove piston with retaining plate.
Remove retaining ball with spring cup assembly.



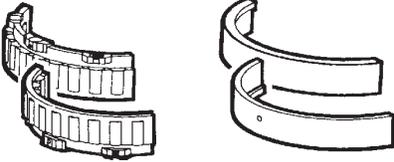
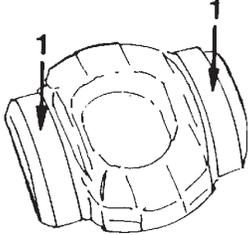
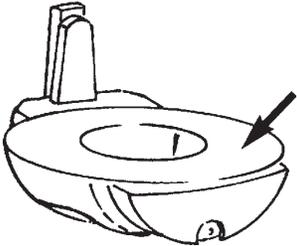
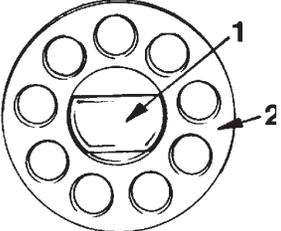
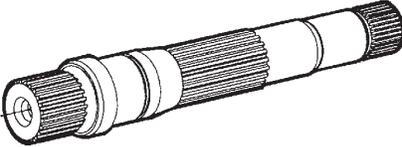
67

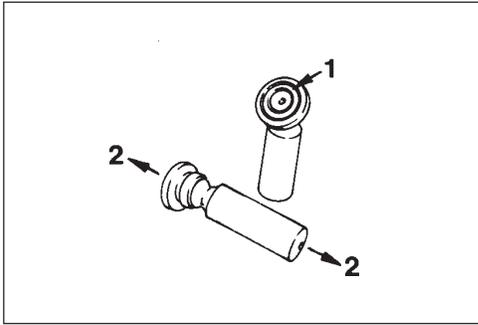


- 68 Sicherungsring ausbauen.
- Remove safety ring.



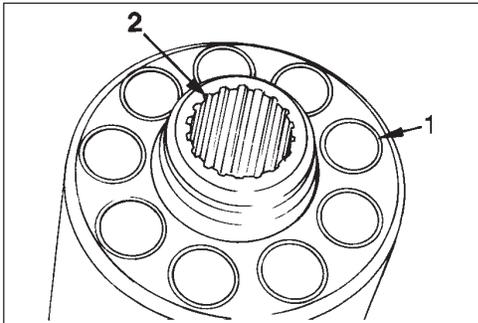
- 69 Scheibe 1, 2
- Disc 1, 2

<p>Lager Bearing</p>  <p>Lagerschalen Bearing cup</p>	<p>70 Kontrolle! Käfig-Paar (1), Lagerschalenpaar (2).</p> <p>Check! Cage set (1), Bearing cup set (2).</p>
	<p>71 Kontrolle! Lagerbahnen (1)</p> <p>Check! Bearing surfaces (1)</p>
	<p>72 Kontrolle! Gleitfläche riefenfrei.</p> <p>Check! Sliding surface free from scoring.</p>
	<p>73 Kontrolle! Rückzugeinrichtung riefenfrei.</p> <p>Check! Check that return device is free of scoring.</p>
	<p>74 Kontrolle! 1. Verzahnung "ausgeschlagen", Passungsrost. 2. Laufflächen. 3. Lauffläche - Wellendichtring.</p> <p>Check! 1. Splines for damage or fretting. 2. Running surfaces. 3. Groove cut by shaft seal.</p>



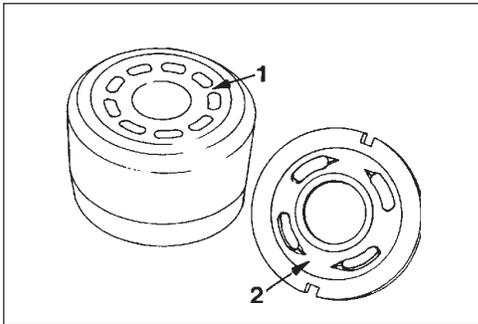
- 75 Kontrolle!
Lauffläche (1) keine Kratzer, keine Metalleinlagerungen,
kein Axialspiel (2), (Kolben nur satzweise tauschen).

Check!
Check that there are no scratches or metal deposits on
sliding surface (1), and there is no axial play (2),
(otherwise: pistons must be replaced in sets).



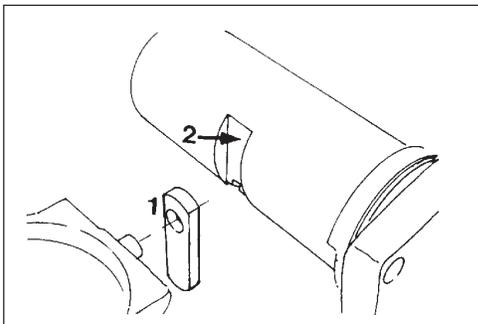
- 76 Kontrolle!
Zylinderbohrungen (1), Verzahnungen (2).

Check!
Cylinder bores (1), splines (2).



- 77 Kontrolle!
Zylindergleitfläche (1) riefenfrei.
Steuerplatte (2) nicht riefig.

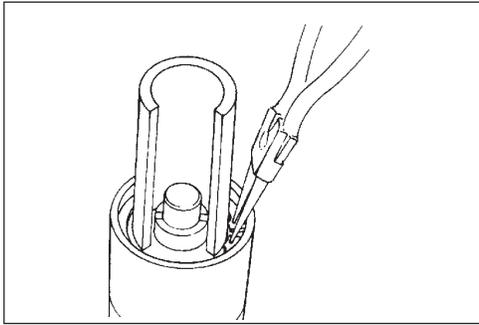
Check!
Cylinder surface (1) free of scoring.
Control plate (2) without scoring.



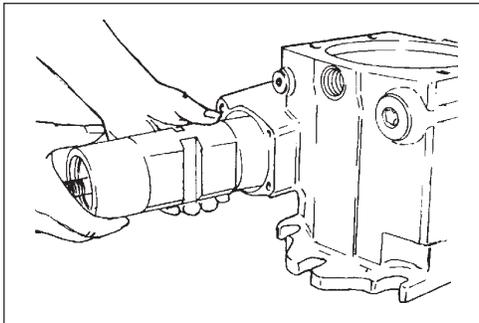
- 78 Kontrolle!
Stellkolben - Schwenkwiegenverbindung
Gleitstein (1), Nut im Stellkolben (2), Stellkolben.

Check!
Positioning piston - cradle linkage
Gliding stone (1), groove at the positioning piston (2).
Positioning piston.

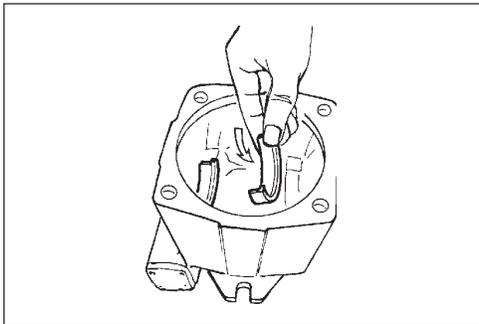




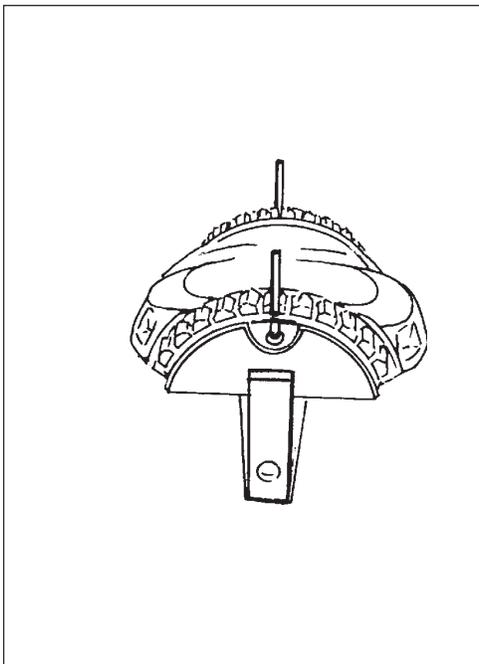
- 79 Stellkolben montieren.
Hinweis:
Auf korrekten Sitz der geteilten Ringe "achten".
- Assemble positioning piston.
Instruction:
Observe correct fit of the divided rings.



- 80 Stellkolben ins Gehäuse einsetzen.
Hinweis:
Stellkolben vor Einbau einölen.
- Insert positioning piston into the housing.
Instruction:
Oil positioning piston before assembly.

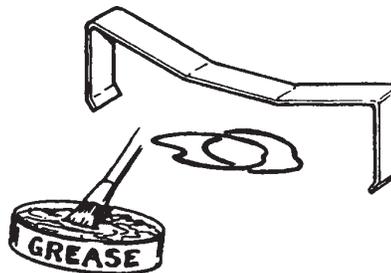


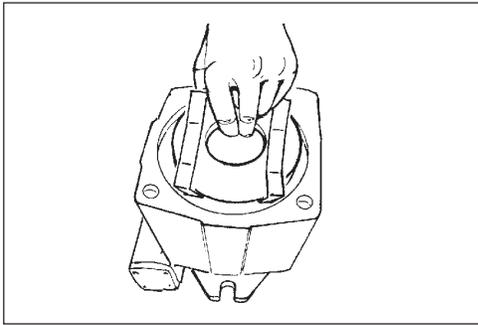
- 81 Lagerschalenpaar einsetzen.
- Insert bearing cup set.



Lager, Draht, Gleitstein und Gelenkstift
montieren.
Montagehilfe: z.B. - Klammer / Gummiringe / Fett

Assemble bearing, wire, gliding stone
and articulating pin.
Assistance: Devices e.g. - Clamp / rubber rings / grease



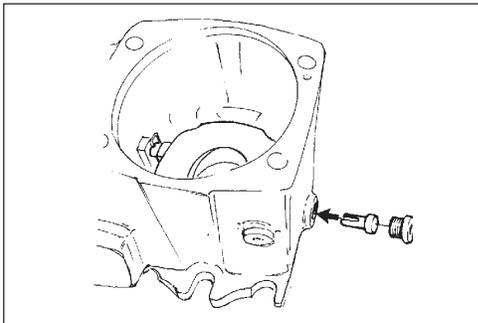


- 83 Schwenkwanne komplett ins Gehäuse einsetzen.
Auf korrekten Sitz der Schwenklager im Gehäuse "achten".

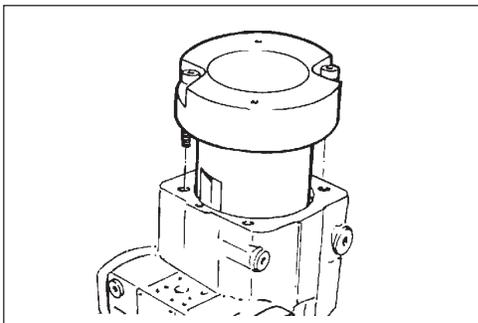
⚠ Montagehilfe ausbauen.

Insert completely swivel cradle into the housing.
Pay attention for correct seat of the swivel cradle in the housing.

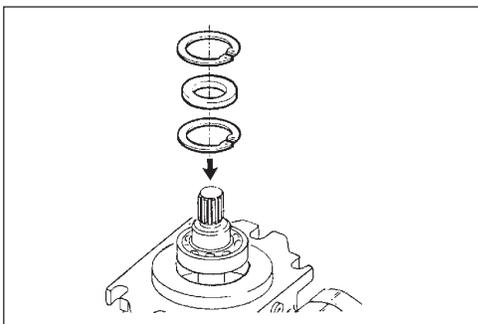
⚠ Remove auxiliary device.



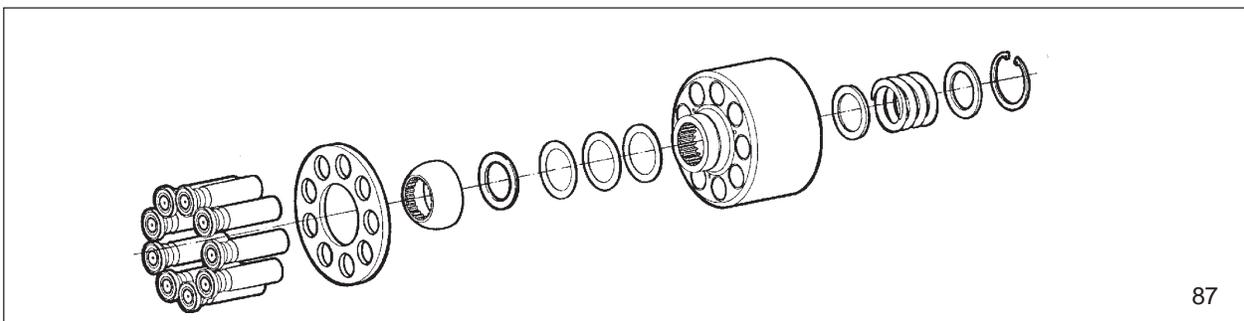
- 84 Gelenkstifte montieren.
Assemble articulating pins.

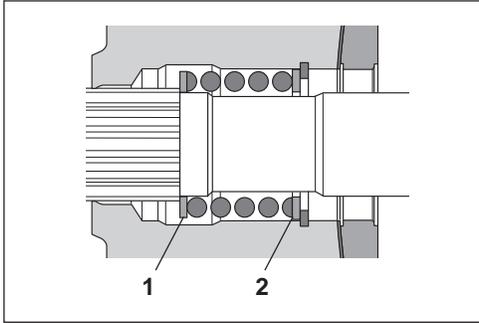


- 85 Vorrichtung zum Fixieren der Schwenkwanne montieren.
Assemble device for fixation of the swivel cradle.

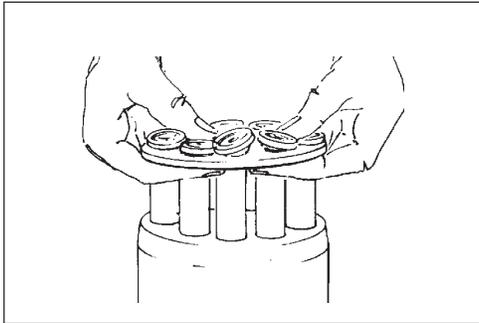


- 86 Neue Montageposition!
Triebwelle mit Lager und Wellendichtring einbauen.
Assemble drive shaft with bearings and radial seal rings.



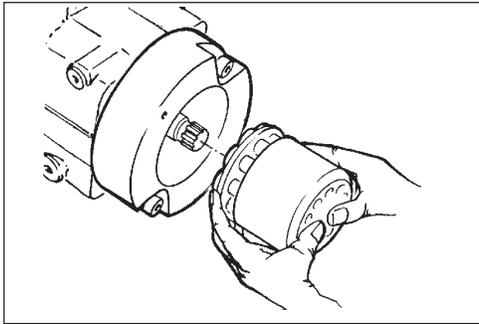


- 88 Scheibe 1, 2
Disc 1, 2



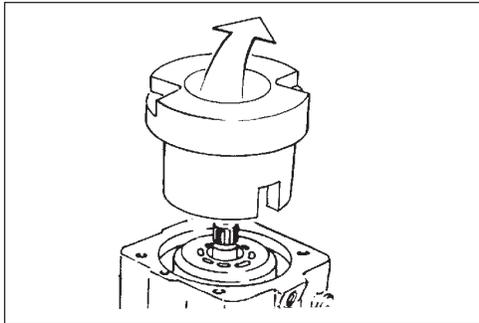
- 89 Kolben mit Rückzugeinrichtung montieren.
Hinweis:
Kolben, Gleitschuhe einölen.

Assemble piston with retaining plate.
Note:
Oil piston and piston pad.



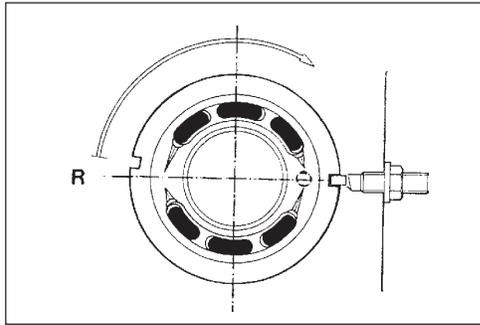
- 90 Zylinder komplett einbauen.

Assemble cylinder completely.



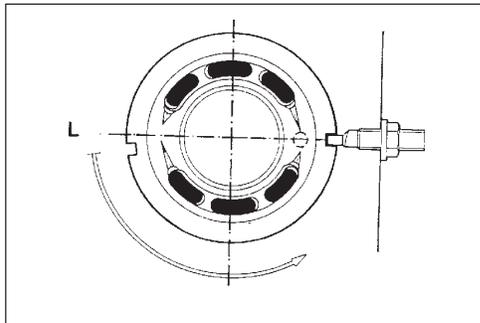
- 91 Vorrichtung ausbauen.

Remove assembly device.



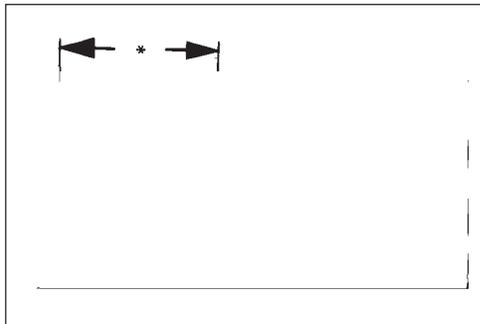
- 92 Steuerplatte Rechtslauf - in Drehrichtung verdreht.
Achtung!
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate clockwise rotation - indexed in the direction of rotation.
Note!
Noise grooves are machined - in based on direction of rotation.



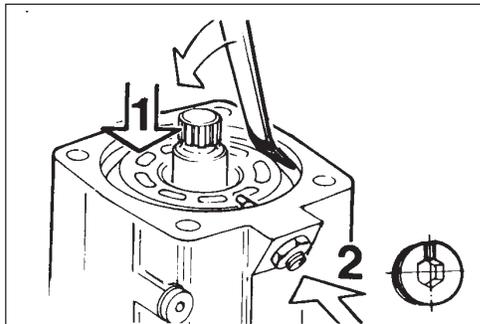
- 93 Steuerplatte Linkslauf - in Drehrichtung verdreht.
Achtung!
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate counter clockwise rotation - indexed in the direction of rotation.
Note!
Noise grooves are machined - in based on direction of rotation.

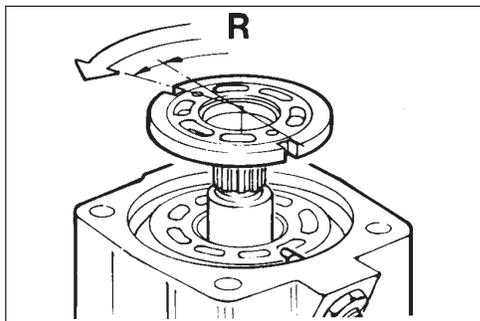


- 94 Grundeinstellung - Verdrillschraube
A4VG...71 * = $28 \pm 0,75$ mm A4VG...90 * = $29 \pm 0,75$ mm
A4VG...125 * = $20 \pm 0,75$ mm A4VG...180 * = $22 \pm 0,75$ mm.

Basic setting - indexing screw
A4VG...71 * = $28 \pm 0,75$ mm A4VG...90 * = $29 \pm 0,75$ mm
A4VG...125 * = $20 \pm 0,75$ mm A4VG...180 * = $22 \pm 0,75$ mm.

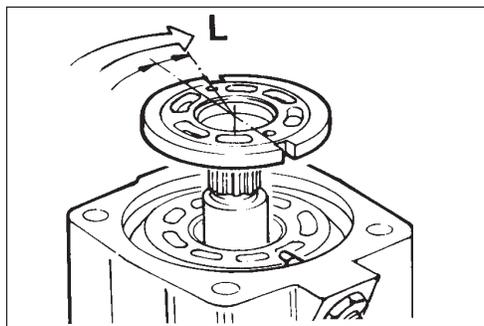


- 95 Steuerplatte einsetzen - Rechtslauf.
Insert the control plate - clockwise rotation.

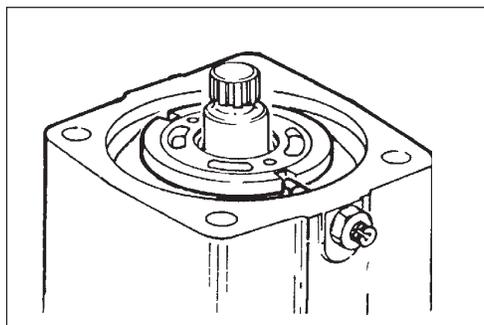


- 96 Zylinder nach unten drücken (1).
Verdrillschraube einbauen (2).
Kerbe in Montageposition.

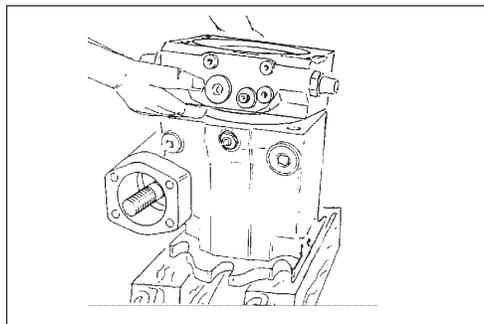
Press the cylinder to the bottom (1).
Screw in the indexing screw (2).
Groove in mounting position.



- 97 Steuerplatte einsetzen - Linkslauf.
Insert the control plate - Counter- clockwise rotation.

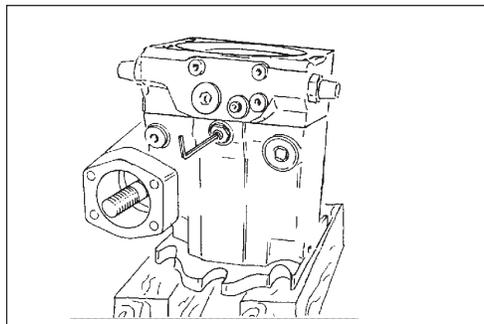


98

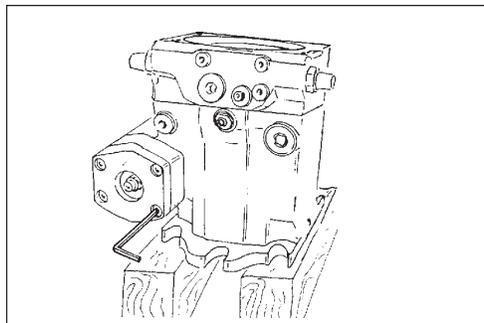


- 99 Anschlußplatte aufbauen.
Achtung! Federvorspannung!
Mit zwei Befestigungsschrauben überkreuz Anschlußplatte
in Gehäuseführung einsetzen - Fertigmontage!

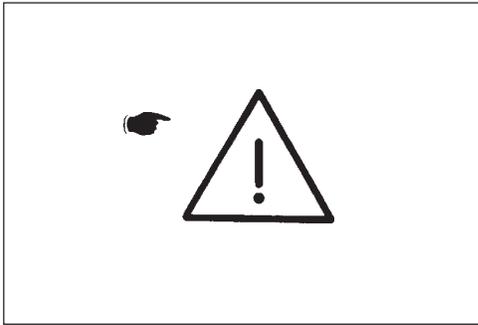
Assemble connection plate.
Attention! Spring preloaded!
Insert control plate into housing, guidance with two locking
screws crossing over -Finish assembly!



- 100 Verdrillschraube - Nach Markierung ausrichten.
Locking screw - Observe adjusting measure.

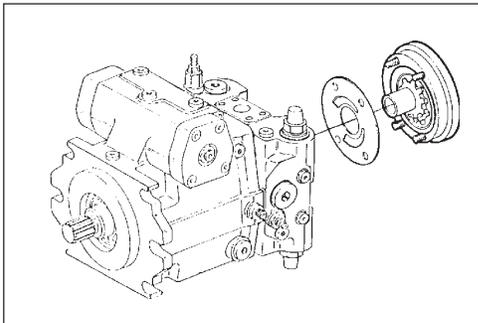


- 101
1. Deckel montieren.
 2. Nulllage nach Maß einstellen.
1. Assemble cover
2. Adjust zero position according to measure.



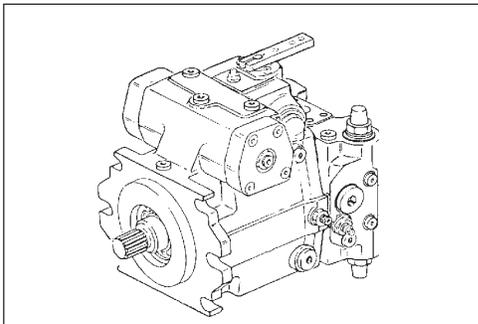
- 102 Achtung!
 Korrekte mechanische Nullageneinstellung muß nach Einbau im Gerät bzw. Prüfstand erfolgen.

Attention!
 Adjustments of the correct zero position to be carried out after installation into the machine or on the bench test.



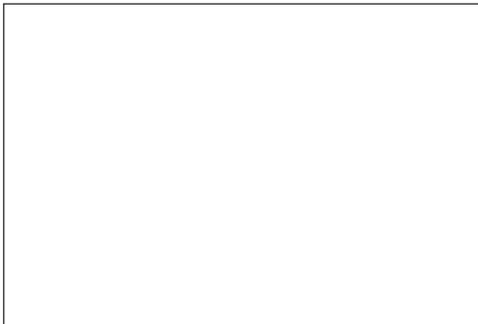
- 103 Hilfspumpe montieren.
 Hinweis: Drehrichtung beachten.

Assemble auxiliary pump.
 Note: Take care of direction of rotation.



- 104 Ansteuergerät montieren.

Assemble control device.



Anziehdrehmomente Tightening torques

Reparaturanleitung A4VG Repair Instructions A4VG

Anziehdrehmomente für Schaftschrauben (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Schaftschrauben mit metrischem ISO-Regelgewinde und Kopfaulagemaßen nach DIN 912, DIN 931 und DIN 933. Außerdem gelten diese Werte nur für leicht oder nicht geölte, unbehandelte Oberflächen, sowie nur bei Verwendung von Drehmoment- und Kraftbegrenzungsschlüsseln.	Gewindegröße	Festigkeitsklassen		
		8.8	10.9	12.9
		Anziehdrehmoment(Nm)		
M 3	1,1	1,6	1,9	
M 4	2,9	4,1	4,9	
M 5	6	8,5	10	
M 6	10	14	17	
M 8	25	96	41	
M10	49	69	83	
M12	86	120	145	
M14	135	190	230	
M16	210	295	355	
M18	290	405	485	
M 20	410	580	690	
M 22	550	780	930	
M 24	710	1000	1200	
M 27	1050	1500	1800	
M 30	1450	2000	2400	

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.	Thread size	Strength Classes		
		8.8	10.9	12.9
		Tightening Torque (lb.ft)		
M 3	0,8	1,2	1,4	
M 4	2,1	3,0	3,6	
M 5	4,4	6,3	7,4	
M 6	7,4	10,3	12,5	
M 8	18,4	25,8	30,2	
M10	36,1	50,9	61,2	
M12	63,4	88,4	106,9	
M14	99,5	140,0	169,5	
M16	154,8	217,4	261,6	
M18	213,7	298,5	357,4	
M 20	302,2	427,5	508,5	
M 22	405,4	574,9	685,4	
M 24	523,5	737,0	884,4	
M 27	773,9	1105,5	1326,6	
M 30	1068,7	1474,0	1768,8	

Anziehdrehmomente für Verschlusschrauben VSTI (Metrisches Feingewinde)

Gewindegröße	Bezeichnung	Anziehdrehmoment(Nm)
M 8 x 1	VSTI 8 x 1 -ED/SA	= 5
M 10 x 1	VSTI 10 x1 -ED	= 10
M 12 x 1,5	VSTI 12 x 1,5 -ED	= 20
M 14 x 1,5	VSTI 14 x 1,5 -ED	= 30
M 16 x 1,5	VSTI 16 x 1,5 -ED/SA	= 30
M 18 x 1,5	VSTI 18 x 1,5 -ED/SA	= 40
M 20 x 1,5	VSTI 20 x 1,5 -ED/SA	= 50
M 22 x 1,5	VSTI 22 x 1,5 -ED	= 60
M 26 x 1,5	VSTI 16 x 1,5 -ED/SA	= 70
M 27 x 2	VSTI 27 x 2 -ED	= 90
M 30 x 1,5	VSTI 30 x 1,5 -ED/SA	= 100
M 33 x 2	VSTI 33 x 2 -ED/SA	= 120
M 42 x 2	VSTI 42 x 2 -ED/SA	= 200
M 48 x 2	VSTI 48 x 2 -ED	= 300

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation	Tightening torques (lb.ft)
M 8 x 1	VSTI 8 x 1 -ED/SA	= 4
M 10 x 1	VSTI 10 x1 -ED	= 7
M 12 x 1,5	VSTI 12 x 1,5 -ED	= 15
M 14 x 1,5	VSTI 14 x 1,5 -ED	= 22
M 16 x 1,5	VSTI 16 x 1,5 -ED/SA	= 22
M 18 x 1,5	VSTI 18 x 1,5 -ED/SA	= 29
M 20 x 1,5	VSTI 20 x 1,5 -ED/SA	= 37
M 22 x 1,5	VSTI 22 x 1,5 -ED	= 44
M 26 x 1,5	VSTI 16 x 1,5 -ED/SA	= 51
M 27 x 2	VSTI 27 x 2 -ED	= 66
M 30 x 1,5	VSTI 30 x 1,5 -ED/SA	= 74
M 33 x 2	VSTI 33 x 2 -ED/SA	= 88
M 42 x 2	VSTI 42 x 2 -ED/SA	= 147
M 48 x 2	VSTI 48 x 2 -ED	= 220

Anziehdrehmomente für Seal-Lock Bundmuttern (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Seal-Lock Bundmuttern der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde.	Gewindegröße	Festigkeitsklassen		
		8.8	10.9	12.9
		Anziehdrehmoment (Nm)		
M 6	10			
M 8	22			
M 10	40			
M 12	69			
M 14	110			
M 16	170			

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.	Thread size	Strength classes		
		8.8	10.9	12.9
		Tightening torque (lb.ft)		
M 6	7,4			
M 8	16,2			
M 10	29,5			
M 12	50,9			
M 14	81,1			
M 16	125,3			

Anziehdrehmomente für Linsenschrauben mit Kreuzschlitz DIN 7985 (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Linsenschrauben mit Kreuzschlitz DIN 7985 der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde	Gewindegröße	Festigkeitsklassen		
		8.8	10.9	12.9
		Anziehdrehmoment(Nm)		
M 3	1,1			
M 4	2,9			
M 5	6			
M 6	10			
M 8	25			
M10	49			

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO- Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.	Thread size	Strength classes		
		8.8	10.9	12.9
		Tightening torques (lb.ft)		
M 3	0,8			
M 4	2,1			
M 5	4,4			
M 6	7,4			
M 8	18,4			
M10	36,1			

Allgemein

- Machen Sie sich mit der Ausstattung der Maschine vertraut.
- Fahren Sie die Maschine nur, wenn Sie sich völlig mit den Bedien- und Steuerelementen sowie der Arbeitsweise der Maschine vertraut gemacht haben.
- Benutzen Sie Ihre Schutzausrüstung wie Schutzhelm, Sicherheitsschuhe und Gehörschutz.
- Machen Sie sich mit Ihrem Arbeitsgebiet vertraut.
- Benutzen Sie die Maschine nur für den ihr zuge-dachten Zweck.

Beachten Sie bitte die Richtlinien der Berufsge-nossenschaft und des Maschinenherstellers

**General advice**

- Make yourself familiar with the equipment of the machine.
- Only operate the machine if you are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Please observe the guidelines of the Professional Association and the machine manufacturer.

**Vor dem Start**

- Beachten Sie die Bedienungshinweise vor dem Starten.
- Prüfen Sie die Maschine auf auffällige Fehler.
- Fahren Sie die Maschine nicht mit defekten Instrumenten, Kontrolleuchten oder Steuerorganen.
- Alle Schutzvorrichtungen müssen fest auf ihrem Platz sein.
- Nehmen Sie keine losen Gegenstände mit bzw. befestigen Sie diese an der Maschine.
- Halten Sie die Maschine von öligem und zünd-fähigem Material frei.
- Prüfen Sie vor dem Besteigen der Maschine, ob sich Personen oder Hindernisse neben oder unter der Maschine befinden.
- Vorsicht beim Besteigen der Maschine, benutzen Sie Treppen und Griffe.
- Stellen Sie vor dem Start Ihren Sitz ein.

Before starting

- Observe the operating instructions before starting.
- Check the machine for obvious faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.
- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering the driver's cabin, check if persons or obstacles are beside or beneath the machine.
- Be careful when entering the driver's cabin, use stairs and handles.
- Adjust your seat before starting.

Starten

- Beim Starten müssen alle Bedienhebel in "Neutralstellung" stehen.
- Die Maschine nur vom Fahrersitz aus Starten.
- Prüfen Sie die Anzeigeeinstrumente nach dem Start, um sicher zu gehen, daß alles ordnungsgemäß funktioniert.
- Lassen Sie die Maschine nicht unbewacht, während der Motor läuft.
- Beim Start mit Batterieverbindingskabeln verbinden Sie Plus mit Plus und Minus mit Minus. Massekabel (Minus) immer zuletzt anschliessen und zuerst abtrennen.

Vorsicht

- Auspuffgase sind lebensgefährlich. Bei Start in geschlossenen Räumen für ausreichende Luftzufuhr sorgen!

Hydraulikanlage

1. Hydraulikanlage steht unter hohem Druck!



Unter hohem Druck austretende Hochdruck-Flüssigkeiten (Kraftstoff, Hydrauliköl) können die Haut durchdringen und schwere Verletzungen verursachen. Daher sofort einen Arzt aufsuchen, da anderenfalls schwere Infektionen entstehen können!

2. Bei der Suche nach Leckstellen wegen Verletzungsgefahr geeignete Hilfsmittel verwenden!
3. Vor Arbeiten an der Hydraulikanlage diese unbedingt drucklos machen und angebaute Geräte absenken!
4. Bei Arbeiten an der Hydraulikanlage unbedingt Motor abstellen und Maschine gegen Wegrollen sichern (Feststellbremse, Unterlegkeil)!
5. Beim Anschließen von Hydraulikzylindern und -motoren ist auf vorgeschriebenen Anschluß der Hydraulikschläuche zu achten!
6. Bei Vertauschen der Anschlüsse umgekehrte Funktionen (z.B. Heben/Senken) - Unfallgefahr!
7. Hydraulikschlauchleitungen regelmäßig kontrollieren und bei Beschädigung und Alterung austauschen! Die Austauschschlauchleitungen müssen den technischen Anforderungen des Geräteherstellers entsprechen!



Öle, Kraftstoffe und Filter ordnungsgemäß entsorgen!

Start

- When starting all operating levers must be in "neutral position".
- Only start the machine from the driver's seat
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus. Always connect negative (-) cable last and disconnect negative cable first.

Attention

- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment

1. Hydraulic equipment is standing under high pressure.

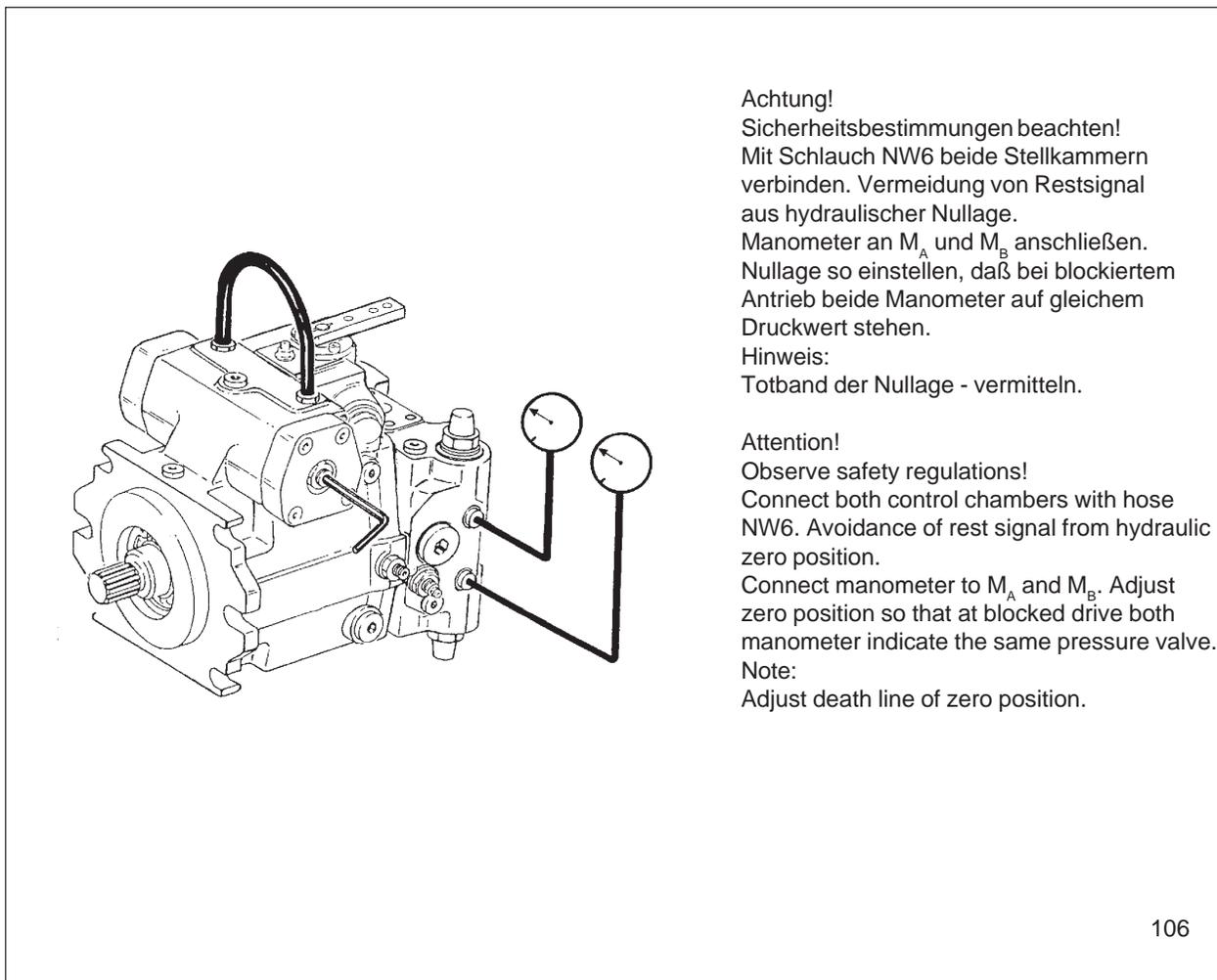
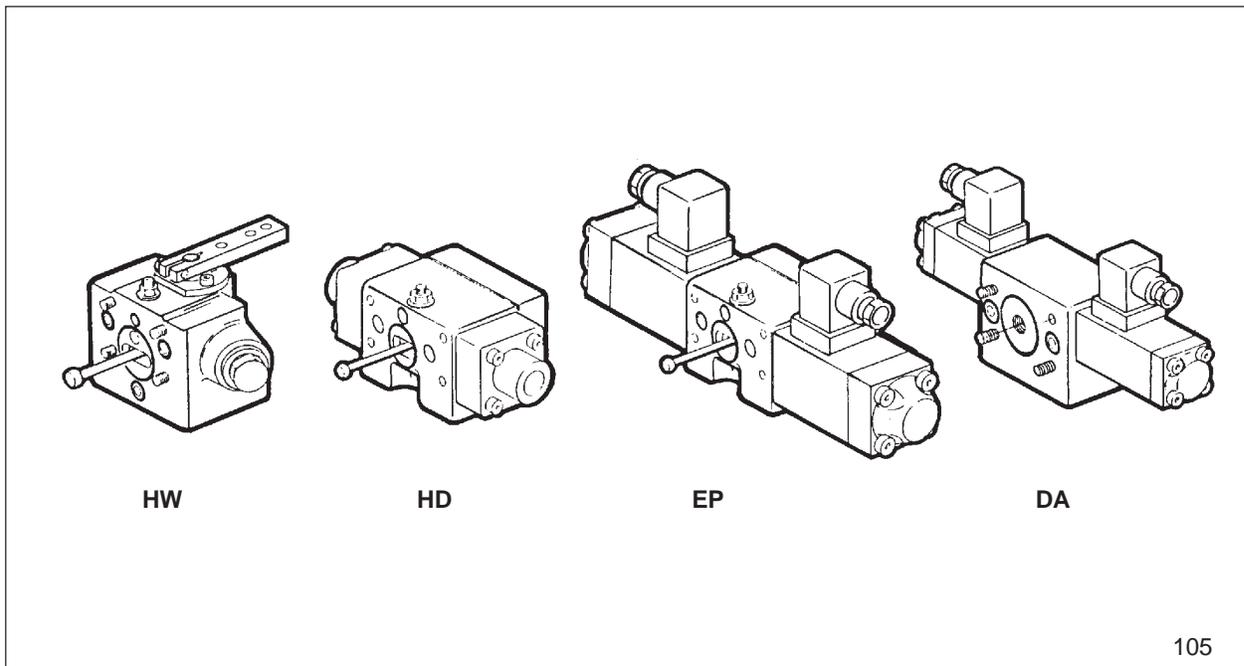


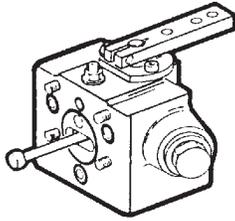
High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries. Therefore immediately consult a doctor as otherwise heavy infections can be caused.

2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the machine.
4. When working at the hydraulic equipment, absolutely stop motor and secure machine against rolling away (parking brake, shim)!
5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the functions are vice versa (f. ex. lift-up/lower) - danger of accidents!
7. Check hydraulic flexible hoses regularly and replace them in case of damage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

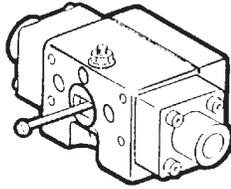


Orderly disposal or recycling of oil, fuel and filters!

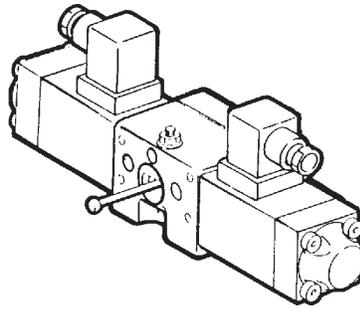




HW



HD

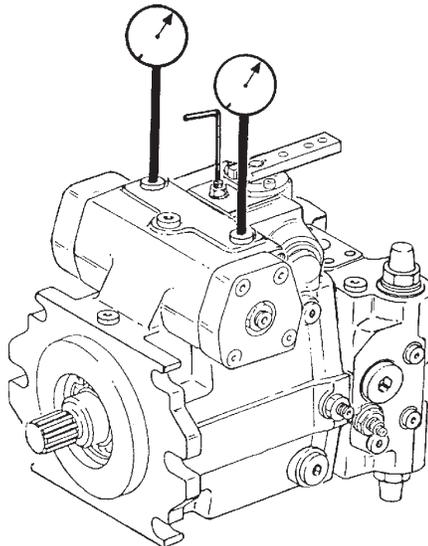


EP

Achtung!
Sicherheitsbestimmungen beachten!

Attention!
Observe safety regulations!

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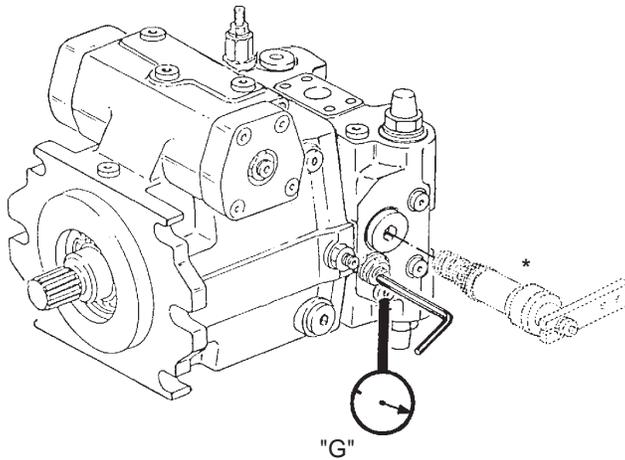
Manometer an X₁ und X₂ anschließen.
Nullage so einstellen, daß bei blockiertem
Antrieb beide Manometer auf gleichem
Druckwert stehen.

Hinweis:
Excenterjustierung
- nicht über $\pm 90^\circ$ verdrehen.

Connect manometer to X₁ and X₂.
Adjust zero position so that at blocked drive
both manometer indicate the same pressure
value.

Note:
Eccentric adjusting
- Do not turn over $\pm 90^\circ$.

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Achtung!
 Sicherheitsbestimmungen beachten!

Hinweis:
 Nachjustierung nur bei Betriebstemperatur.

Manometer an "G" anschließen.

Achtung!
 * Speisedruckeinstellung!
 Nenndruck p_H - 18 bar
 Höchstdruck p_H - 40 bar
 Bei Max.-Drehzahl.

Hinweis:
 Einstelldaten nach Werksauftrag.

* bei DA-Ausführung

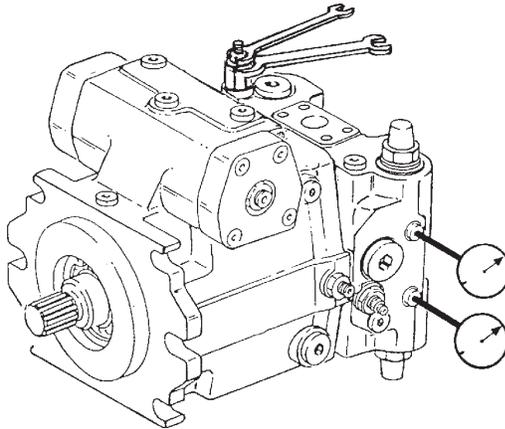
Attention!
 Observe safety regulations!

Note:
 Readjusting only at operating temperature.

Connect manometer to "G".

Attention!
 * Boost pressure setting!
 Nominal pressure p_H - 18 bar
 Peak pressure p_H - 40 bar
 at max. speed.

Note:
 Adjusting data according to order.

Druckabschneidung
Pressure cut-off

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Achtung!
Sicherheitsbestimmungen beachten!

HD-Ventil ohne Bypass

1. HD- Ventile sind immer 10% höher eingestellt als die Druckabschneidung.
Bei Veränderung eines Einstellwertes immer beide kontrollieren.
2. Nachjustierung nur bei Betriebstemperatur

Manometer an M_A und M_B anschließen.
Druckabschneidung: Maß X Einstellschrauben notieren!
Einstellschraube auf Block drehen.

HD- Ventile: Mit geringer Pumpenmenge über Ventile fahren. Einstellwert kontrollieren.
(Nur kurzzeitig "Temperatur".)

Drucklos "Einstellwert" verändern - Kontrolle

Druckabschneidung:
Einstellschraube auf Maß (*) zurückdrehen.
Druckwert kontrollieren bzw. nachjustieren.
Achtung! Differenz von 10% HD- Ventile und Druckabschneidung beachten!
Hinweis: Einstelldaten nach Werksauftrag.

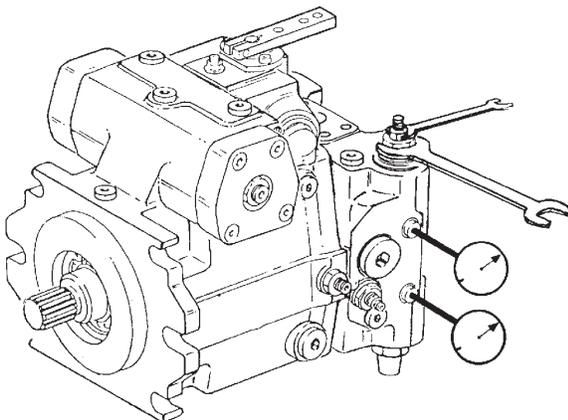
Attention!
Observe safety regulations.

HP valve without bypass-function

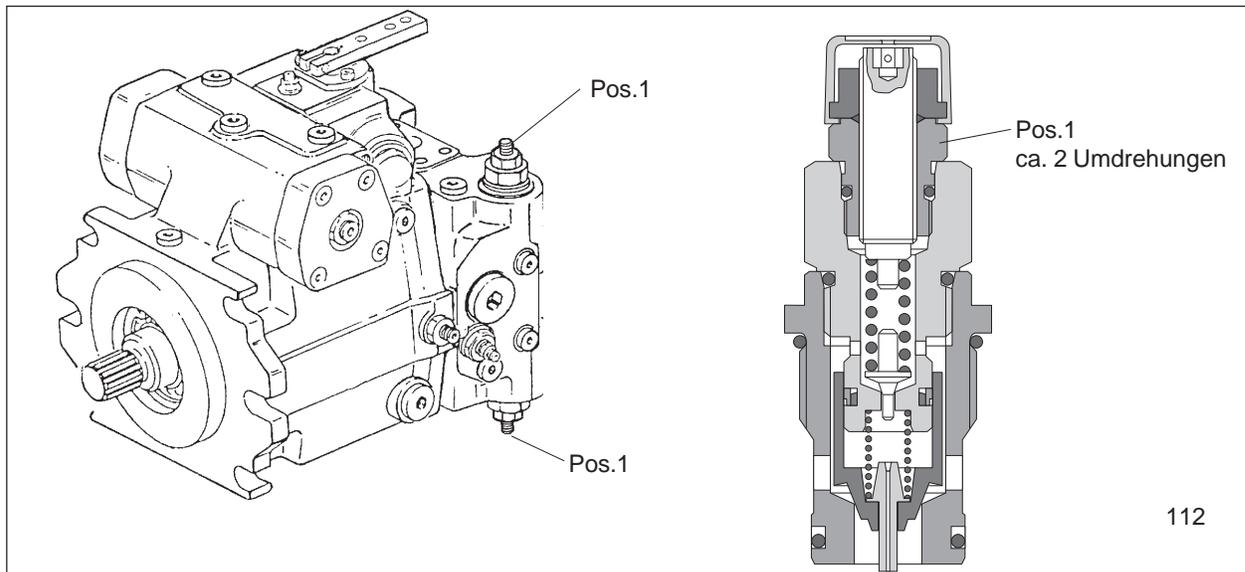
1. HP valves are always adjusted 10% higher than the pressure cut-off.
If one setting value is changed, always check both values.
2. Readjusting only at operating temperature.

Connect manometer M_A and M_B .
Pressure cut-off: Note measure X setting screw! Turn setting screw on block.
HP valves: Operate valves with small pump flow volume.
Check setting value. ("temperature" only for a short time).
Change "setting value" - check.

Pressure cut-off:
Turn back setting screw to measure (*).
Check pressure value and readjust.
Attention! Observe 10% pressure difference HP valves and pressure cut-off!

HD- Ventile
HP- valves

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Fahrzeuge mit rein-hydrostatischem Fahrtrieb bzw. mit hydrostatischem Fahrtrieb und Schaltgetriebe ohne Leerlaufstellung (Freilauf).

Hydrostatischer Antrieb / Bypass-Schaltung

In diesem Fall wird der Fahrtrieb auf freien Umlauf geschaltet. Zu diesem Zweck haben die in der Verstellpumpe integrierten Hochdruckbegrenzungsventile eine sogenannte Bypass-Funktion. D.h. durch Drehen der entsprechenden Schraube (Pos.1) wird der Ventil-Einsatz so entspannt, daß ein freier Öl-Umlauf möglich ist.

Schleppgeschwindigkeit

Die maximale Schleppgeschwindigkeit sollte 2 km/h nicht überschreiten.

- Höhere zulässige Schleppgeschwindigkeiten sind abhängig von der Hydromotordrehzahl bzw. dem eingelegten Gang.

Abschleppdistanz

Die Schleppentfernung sollte 1 km nicht überschreiten.

- Bei fehlender Einspeisung entleert sich der Hydraulik-Kreislauf. Zu beachten ist die Wärmeentwicklung im Hydromotor-Triebwerk.

Abschleppvorgang beendet

Nach beendetem Abschleppvorgang Pos.1 zurückdrehen. Der ursprüngliche Einstellwert der Hochdruckventile liegt somit wieder vor.

Vehicle with hydrostatic transmission and gear shift without idling setting position (free wheeling).

Hydrostatic transmission / Bypass-switching

In this case the travel transmission is switched on to free wheeling. For this purpose the variable displacement pump has incorporated high pressure relief valves with bypass function.

The screw (item 1) is unscrewed to such an extent, that the valve cartridge is released and free oil circulation is possible.

Towing speed

The max. towing speed of 2 km/h should not be exceeded.

- Higher admissible towing speeds depend on the available hydr. motor speed and engaged gear shift.

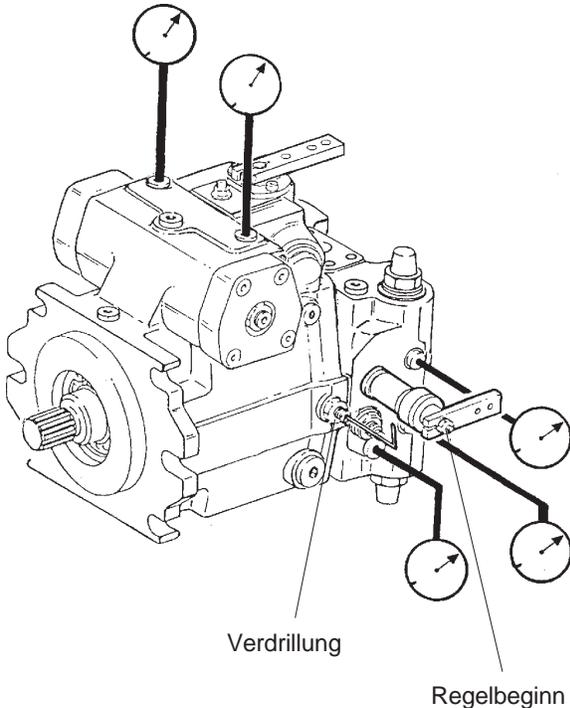
Towing distance

The towing distance should not exceed 1 km.

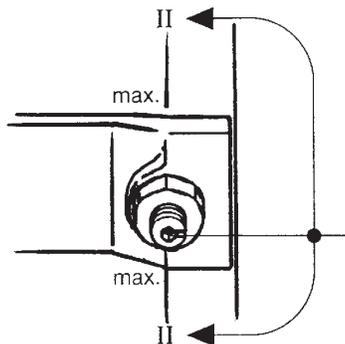
- If there is a lack of oil boosting, the hydraulic circuit will get empty. Take care of the heat development in the hydr. motor-rotary group.

Towing operation terminated

After termination of the towing operation turn item 1 back. The original pressure value setting of the high pressure relief valves will be available again.



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Achtung!
Sicherheitsbestimmungen beachten!

Überprüfung der Einstelldaten
Betriebstemperatur soll während des Überprüfungs Vorgangs weitgehend konstant gehalten werden.
Antriebsmotor starten, Leerlaufdrehzahl

Blockzustand

Fahrtrichtungsschalter "0"
Motordrehzahl langsam steigern bis zur max. Motordrehzahl, dabei Meßgeräte beobachten.
Speisedruck:
Leerlaufdrehzahl
Psp = ca. 15-20 bar
max. Motordrehzahl
Psp = bar*

Blockzustand

Fahrtrichtungsschalter - vorwärts
(Straßengang und Festgebremst)

Einstelldaten Pumpe A4V/DA überprüfen

Regelbeginn

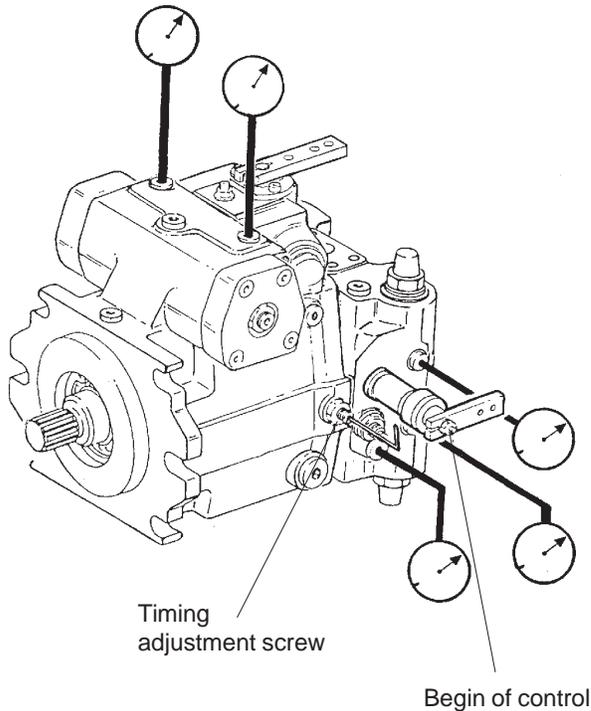
HD 40 - 50 bar
Motordrehzahl . min.¹ * Psp bar*
HD bar
Nachjustierung - Regelbeginnschraube

Regelende

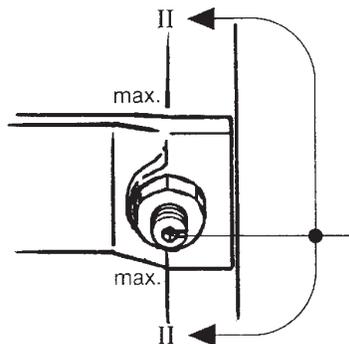
HD bar*
Motordrehzahl min.¹ * Psp bar*
Nachjustierung - Verdrillschraube

Hinweis:
Excenterjustierung - Drehrichtung beachten

Hinweis: * Einstelldaten nach Werksauftrag!



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Attention!
Observe safety regulations!

Check setting data.
Operating temperature should be kept largely constant during the check procedure.
Start prime mover, idle speed.

Block position

Drive direction switch - "0".
Slowly increase motor speed up to the max. motor speed and thereby observe measuring instruments.

Boost pressure:

Idle speed of prime mover
Psp = approx. 15 - 20 bar
max. motor speed
Psp = bar*

Block position

Drive direction switch - **forward**
(Road gear and fully applied brake)

Check setting data pump A4VIDA

Begin of control:

HD 40 - 50 bar
Motor speed rpm* Psp bar*
HD bar*
Readjusting - control start screw

End of control

HD bar
Motor speed rpm* Psp bar*
Readjusting timing adjustment screw

Note:

Eccentric adjusting - observe direction of rotation

* Setting data according to order!

Hinweis!

Um eine ordnungsgemäße Abwicklung von Ersatzteil-Aufträgen sicherzustellen, muß die Bestellung folgende Angaben enthalten:

Typenschlüssel
Typ-Nr.
Fabrikations-Nr.
Baugruppe
Position
Benennung

Zur Reparatur des Gerätes empfehlen wir die Verwendung von vormontierten und teilgeprüften Baugruppen.

Note!

In order to supply proper spare parts, please provide following specifications when ordering spares:

Type Code
Type Number
Serial Number
Assembly Group
Item
Designation

In repairing the unit, we recommend the use of pre-assembled partially tested assembly groups.



TRAILER MOUNTED PUMP 01 MODEL C90S
SERVICE BULLETIN

C90S
SRVBT

PAGE 01

AS WE MAKE IMPROVEMENTS TO THE **REED**
TRAILER MOUNTED CONCRETE PUMP **01** MODEL **C90S**,
WE LIKE TO SUPPLY YOU, THE CUSTOMER, WITH
UPDATED INFORMATION WHICH APPLIES TO YOUR PUMP.

THIS SECTION IS PROVIDED AS A PLACE TO STORE
SERVICE BULLETINS AS YOU RECEIVE THEM FROM
REED LLC.

REVISION:



**TRAILER MOUNTED PUMP 01 MODEL C90S
SERVICE BULLETIN**

**C90S
SRVBT**

PAGE 02

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**SERVICE BULLETIN 001
WARRANTY PROGRAM**

**C90S
SRVBT**

**SB 001
PAGE 01**

BULLETIN NO: SB 001
DATE: FEBRUARY 5, 1998
TO: ALL **REED** DEALERS
SUBJECT: **REED WARRANTY PROGRAM**

Each **REED** Concrete Placing Trailer Pump, Truck Mounted Boom Pump and Dry-mix Spraying Gun, undergoes before delivery a thorough Quality Assurance inspection, a performance check and final testing. However, even with these precautions the possibility exists that after delivery, for some reason, a component may fail.

This is the reason for warranty. If this should happen to one of your machines during the first 12 months or 1000 pumping hours after delivery, there is a good chance the failed component could be replaced under warranty.

REED has updated and formalized its **WARRANTY PROGRAM** and this bulletin is issued to make all dealers aware of the program.

Enclosed is a supply of our new **WARRANTY CLAIM** forms. From this point on, all warranty claims must be submitted on these forms. Also, please find a description of the program, coverage and how to make a claim and its submission. We suggest you give this some careful attention. Briefly some noteworthy items are:

- Do not return any failed part unless requested by **REED**.
- Purchase the replacement part through normal channels from **REED**. Submit your claim noting the invoice number of the replacement part. Upon approval of the claim, a credit will be issued.
- Every effort will be made to process claim within 2 weeks from receipt except for those occasions where the part is to be returned.

Should questions arise during your review, please do not hesitate to contact us.

We appreciate the opportunity to be of service.

Sincerely,

Mike Wickstrom
Service Manage

WARRANTY PROGRAM POLICY

REED Concrete Placing Equipment **01** MODEL **C90S** is designed and engineered to perform as stated on published specifications. Only quality materials and workmanship are used in the manufacture of these products. As a back up for the product manufactured by **REED**, a guarantee against defects in design and workmanship of components is provided for each machine.

The **REED** guarantee/warranty states, in general, that **REED** will replace free of charge any components found to be defective within the time frame of the warranty period. There are exceptions to some components which are not the responsibility of **REED**. These are noted elsewhere.

A formal printed policy is available and depicts in more detail the warranty and description. However, for your ready reference the following is offered:

A. WARRANTY PERIOD

- ALL CONCRETE PLACING MACHINES

The warranty period is for twelve (12) months from date of delivery to initial user or 1000 pumping hours whichever comes first.

- NEW PARTS WARRANTY

For parts sold through the **REED** Parts Department the warranty is ninety (90) days from invoice ship date.

- REPLACEMENT WARRANTY PARTS

Replacement parts provided under the terms of the machine warranty are for the warranty period applicable to the unit in which they were installed as if such parts were original components of the machine.

B. WARRANTY COVERAGE

- DEFECTIVE PARTS

Unless otherwise authorized the replacement part **MUST** be **PURCHASED** from **REED**. Once warranty claim is received and approved, **REED** will provide credit to the dealer/user for their cost of the replacement part as invoiced by **REED**.



SERVICE BULLETIN 001 WARRANTY PROGRAM

C90S
SRVBT

SB 001
PAGE 03

- LABOR

No labor time and related compensation will be provided by **REED** to dealers/users or others to perform work under this warranty policy.

- TRAVEL TIME

No travel time, mileage or other expenses will be compensated by **REED** to dealers/users or others to perform work under this warranty policy.

- FREIGHT, IMPORT DOCUMENTATION, CUSTOM DUTY

Any expense incurred for freight, import duty and documentation will not be reimbursed by **REED** in association with this warranty policy.

C. EXCLUSIONS

- CHASSIS AND RELATED COMPONENTS (TRUCK MOUNTED UNITS)

The warranty for the chassis is handled by the chassis manufacturer and their dealer network. Prior to putting the truck in service it is suggested you contact the nearest manufacturer dealership.

- ENGINE - TRAILER UNITS

The engine warranty is handled by the engine manufacturer and their dealer network. The terms and conditions of their warranty will apply. Contact the local engine dealer for specifics on warranty of the engine.

- NORMAL WEAR

This pertains to items that have failed as a result of normal wear and tear to the product including but not limited to material cylinder and hydraulic cylinder piston components, delivery systems, pins, chains, bushings, seals, concrete pump wear parts, brakes, filter elements, fluids and tires.

- DAMAGES

Caused by transport of equipment or parts, improper set-up or installation, operator error, improper operation or storage, environmental conditions, accidents, improper mechanical techniques employed by anyone or any other cause other than a structural defect in materials or workmanship.

- MAINTENANCE

Caused by failure to perform any scheduled maintenance or routine maintenance as specified in technical manual on any structural or mechanical component.

- MODIFICATIONS

Any non-authorized changes or modifications of any kind to the product. Any modification must be authorized and approved in writing by **REED** Engineering Department.

- ABUSE

Any accidental or intentional abuse of product including but not limited to neglect, loading beyond capacity or any operation of the equipment beyond the limits set forth by **REED** documentation and as depicted in the appropriate technical manual.

D. SUBMISSION OF CLAIM BY DEALER/USER

Should a component failure be encountered during the warranty period and should it fall within the guidelines of the **REED WARRANTY POLICY** the following procedure is to be followed to claim warranty:

1. REPLACEMENT PART

- Obtain the replacement part by ordering it from the **REED PARTS DEPARTMENT**. through normal channels. You will be **INVOICED** for the part.
- If the part has been previously ordered from **REED** and is in your replacement stock inventory you may choose to use that part.

2. COMPLETE THE CLAIM FORM

REED has supplied you with a pre-numbered Warranty Claim Form which consists of four (4) parts. This and only this form is **ACCEPTABLE**. **DUPLICATE** copies of the form are **NOT ACCEPTABLE**. If you do not have the proper form, contact the **REED** Service Department. They will send you a supply.

The following instructions are offered for completing the **WARRANTY CLAIM FORM**. Refer to sample of form. Circled numbers on form correspond to items below. **FILL IN:**

1. Date your claim is written
2. Distributor name and address
3. End user name and address
4. Model number of unit affected
5. Serial number of unit affected
6. Date unit was first placed in service
7. Hours (from hour-meter) of operation at time of failure
8. Date when failure occurred
9. Date when unit was repaired
10. Return Authorization number as received from **REED** Service Department. This will only apply when failed component is requested to be returned by **REED**.
11. Date when failed part is shipped back to **REED**
12. List **REED** part number, description of part, quantity and price of part.
13. List **REED** invoice number sent you when replacement part was purchased
14. Briefly describe failure and how it occurred
15. Dealers signature and date

The claim form **MUST BE COMPLETELY FILLED OUT**. Claims lacking specific, accurate information will be returned **UNPROCESSED**. If additional room is needed to describe the failure or to list the parts used, attach a separate sheet and identify those sheets with the **SAME WARRANTY CLAIM NUMBER**.

3. SUBMITTING TO REED

When all appropriate data has been entered on the claim and signed, proceed as follows:

- Remove copies of form marked “**DEALER**” (yellow) and “**RETURN AUTHORIZATION**” (green). The Dealer copy is for your records and the Return Authorization copy is to be retained in the event **REED** requests the return of the part.
- Mail the “**REED**” copy (white) and “**ACCOUNTING**” copy (pink) along with any back-up data such as a copy of the replacement part **INVOICE** to **REED**. **DO NOT FAX COMPLETED FORM** and send only **FORM ORIGINALS**.

E. RETURN OF FAILED COMPONENT

Depending on the type of part and circumstance surrounding the component failure, the possibility exists that **REED** may request that the failed part be returned to them for investigation and evaluation purposes or to apply for warranty from the manufacturer of the part.

- Upon receipt of your warranty claim and before claim is approved, **REED** will inform you in writing if the part is to be returned. On this correspondence a **RETURN AUTHORIZATION** number will be given to you.
- This number is to be written in the appropriate area on the **RETURN AUTHORIZATION** copy (green) of the warranty form. Include this copy as part of your packing slip. Also write the number on a tag and attach to the part.
- Parts requested to be returned must be shipped back to **REED** within 30 days from issuing of the **RA** number. Failure to do so will cause warranty claim to be **DENIED**.
- Returned parts are to be properly packaged and shipped freight **PREPAID**.
- Any parts received by **REED** without the **PROPER RA** number will be shipped back at **DEALER/USER EXPENSE**.
- If claim is approved and no request to return parts from **REED** has been made, then parts can be discarded.

