OPERATION, MAINTENANCE AND PARTS MANUAL TRAILER CONCRETE PUMP 01 MODEL *B70*

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: 86691) maybe obtained through the ***REED*** Parts Department.

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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 B70*** **TRAILER MOUNTED CONCRETE PUMP**.

This manual (Part Number: 86691) 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.**

N O T E

If you have not yet done so, please record the SERIAL NUMBER of your 01 MODEL B70 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.

PRODUCT DESCRIPTION

The ***REED 01 MODEL B70*** 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 Deutz liquid-cooled diesel engine model BF4M1012 having a horsepower rating of 84HP at 2300 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.

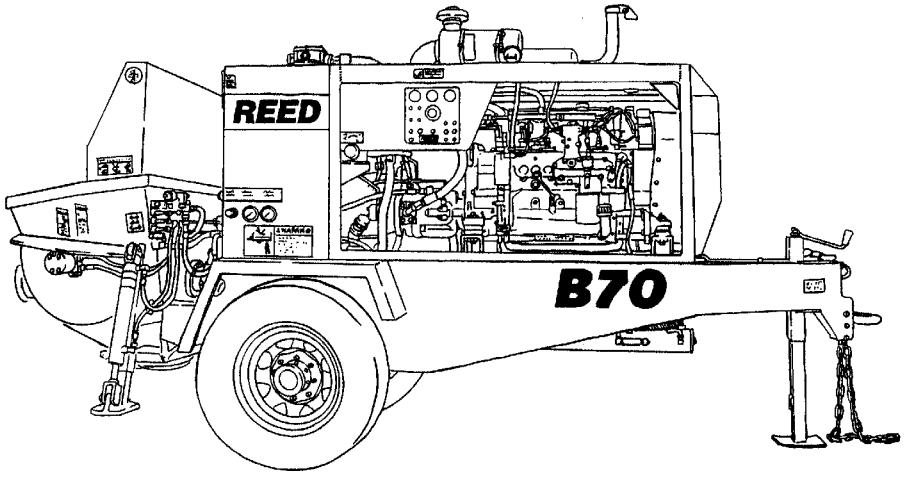
The ***01 MODEL B70*** utilizes a swing tube design delivery system. This system incorporates two (2) material cylinders, powered by two (2) hydraulic cylinders that operate alternately. With concrete material in the hopper and the pump operating, one material cylinder retracts which causes the concrete 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 cu ft. (396L) and the material cylinders are 7" inches (178mm) 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).

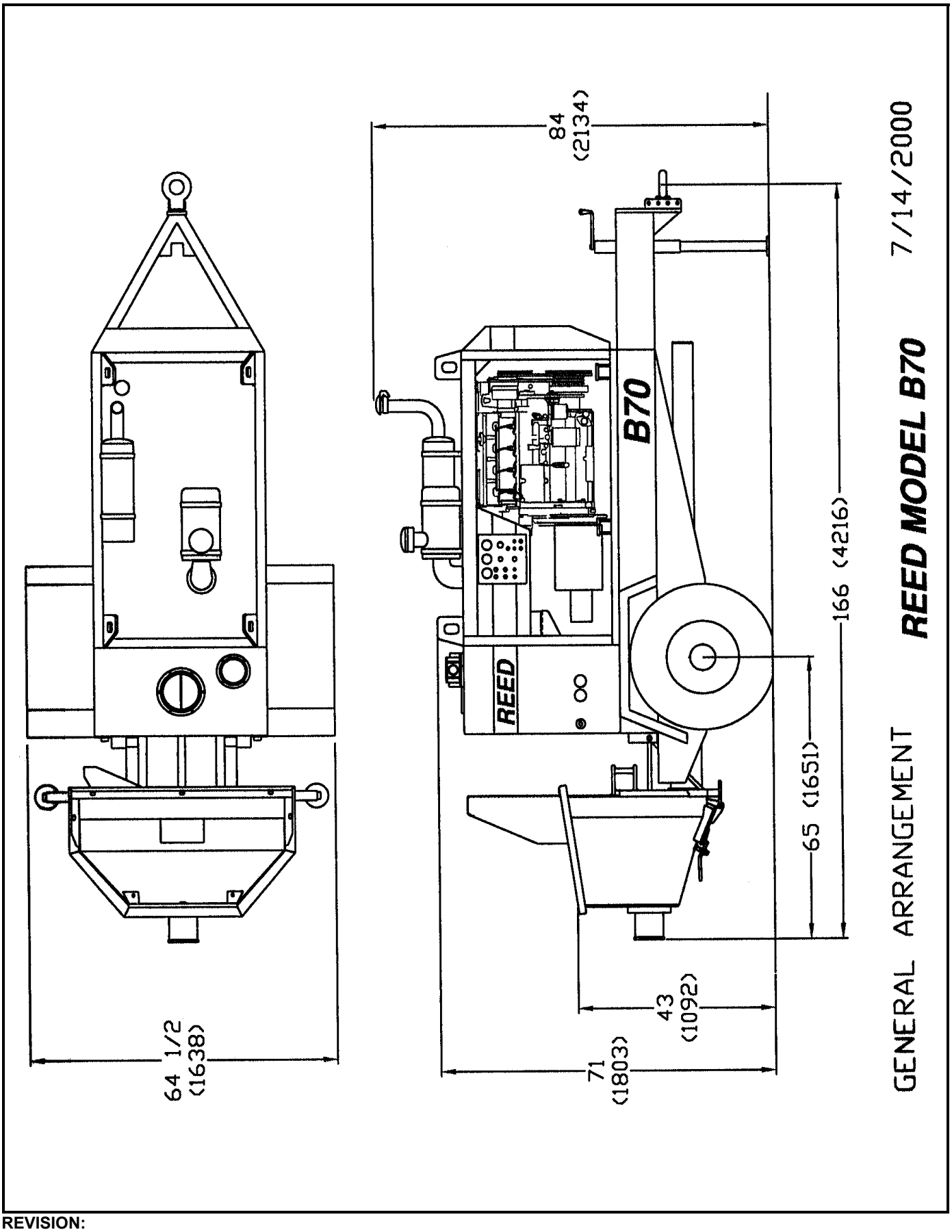
SPECIFICATIONS

PERFORMANCE	U.S.	METRIC
• Maximum Theoretical Output	70yd^3/hr	54m^3/hr
• Maximum Pressure	1000 PSI	69 Bar
• Maximum Rated Strokes/Min.	38/Min.	38/Min.

TECHNICAL DATA	U.S.	METRIC
• Material Cylinders (Dia x Lgth)	7" x 36"	178 x 914mm
• Hydraulic Cylinders (Dia x Lgth)	3.50" x 36"	89 x 914mm
• Variable Volume Control	0-Full	0-Full
• Swing Tube	7" x 5"	178 x 127mm
• Harsh Mix Hopper Capacity	14.44 ft^3	409L
• Outlet Diameter	5"	127mm
• Main Hydraulic System Type	Open Loop	Open Loop
• Main Hydraulic System Pressure	4000 PSI	245 Bar
• Hydraulic Tank Capacity	52 gal	197L
• Engine Horsepower	84	63kw
• Fuel Tank Capacity	24 gal	91L
• Overall Length	168"	4267mm
• Overall Width	64.5"	1638mm
• Overall Height	84"	2134mm
• Weight(approx.)	6400lbs	2905Kgs



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.


84
(2134)
B70
REED
166 (4216)
65 (1651)
43
(1092)
71
(1803)
64 1/2
(1638)
7/14/2000
REED MODEL B70
GENERAL ARRANGEMENT

REVISION:

SAFETY AWARENESS AND PRECAUTIONS

The ***REED 01 MODEL B70*** 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 B70*** must be thoroughly familiar with this Technical Manual (P/N: 86688). 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 B70***. 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.

⚠ *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

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

⚠ *WARNING*

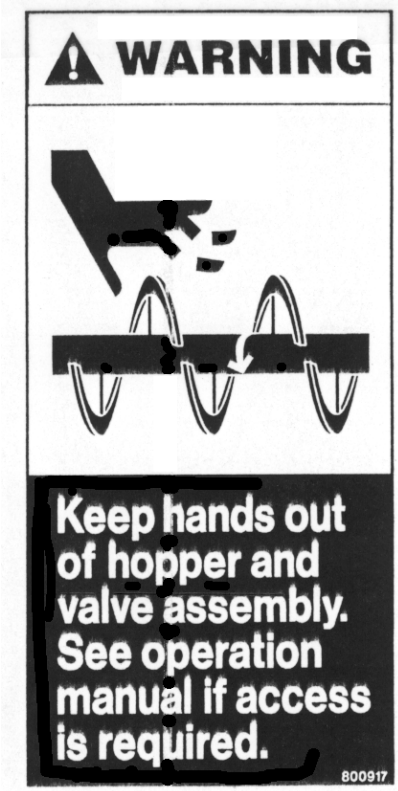
BETTER SAFE THAN SORRY - DON'T TAKE CHANCES THAT COULD CAUSE INJURY TO YOU AND/OR OTHERS

- 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

SAFETY ALERT DECALS

D A N G E R ------ C A U T I O N ------ W A R N I N G 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.

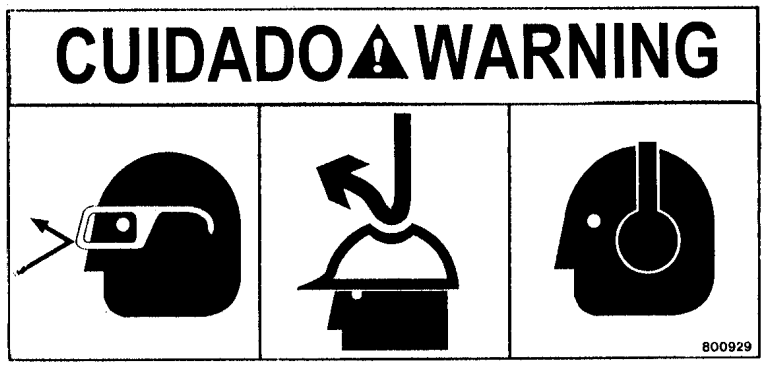

WARNING
Keep hands out of hopper and valve assembly. See operation manual if access is required.
800917

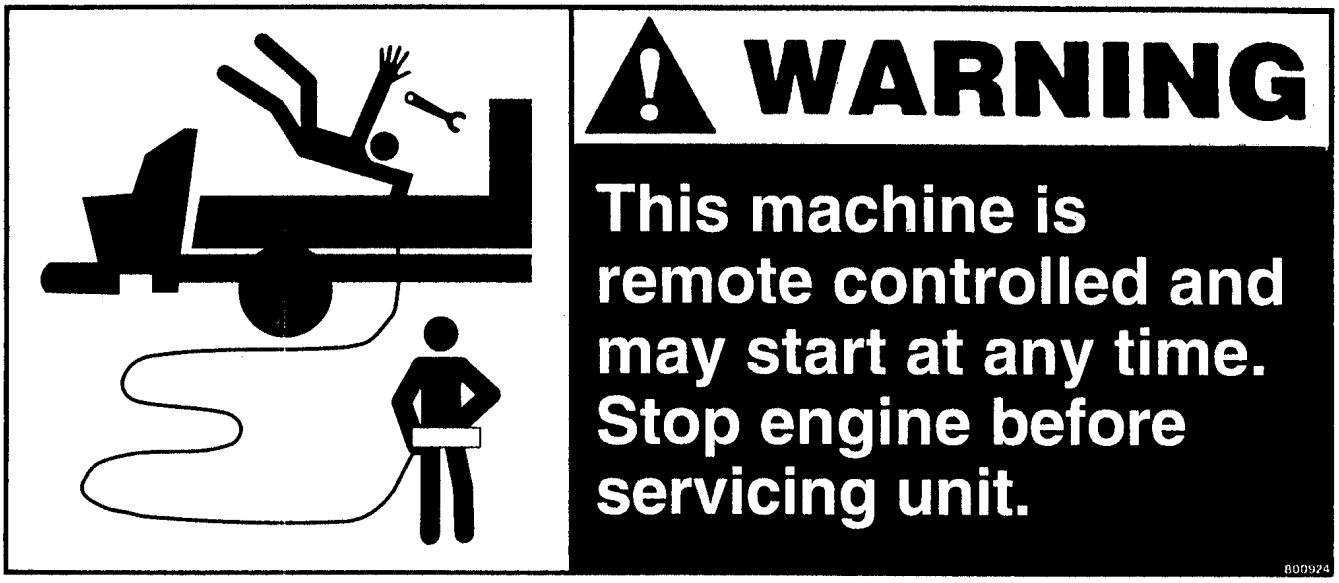

WARNING
Do not stand on hopper grates.
800918


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.
SAFETY
MANUAL
800926


CUIDADO WARNING
800929


WARNING
This machine is remote controlled and may start at any time. Stop engine before servicing unit.
800924

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.

MEMBER AMERICAN CONCRETE PUMPING ASSOCIATION

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
13822 OAKS AVENUE
CHINO, CA 91710 USA

PHONE (909) 287 - 2100
FAX (909) 287 - 2140

MODEL _____ SERIAL NO. _____

MATERIAL PRESSURE		PSI		BAR
HYDRAULIC PRESSURE		PSI		BAR
ENGINE / PTO ELECTRIC MOTOR		RPM		VOLTS

PN 86636

OPERATOR QUALIFICATIONS

Making the choice for an operator is a vital decision as it affects safety and productivity. The ***01 MODEL B70*** 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 B70***. 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 B70*** 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 B70***. 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 B70***.
- 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

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 B70*** 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

- 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

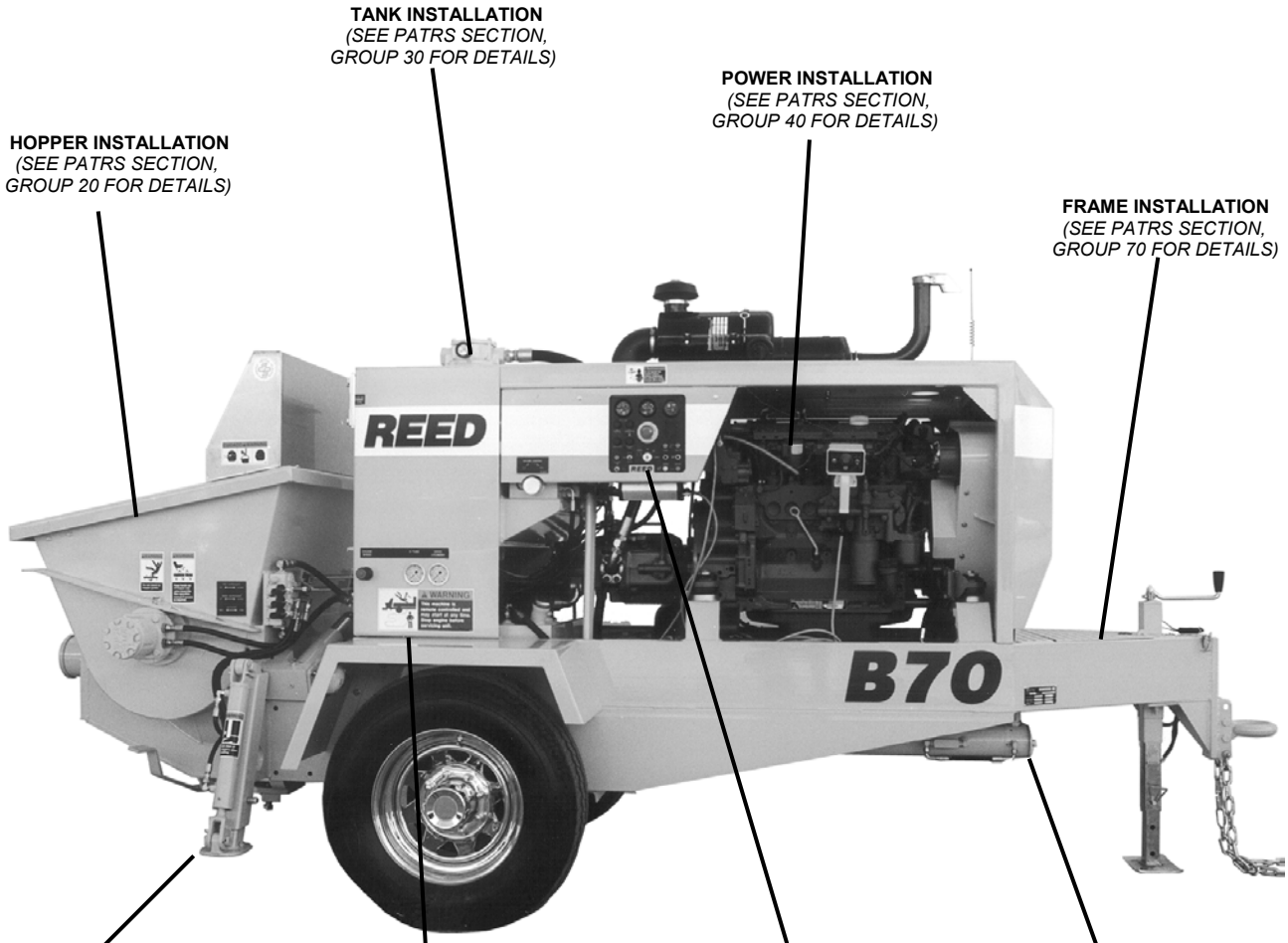
⚠ CAUTION

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.

GETTING ACQUAINTED
(UNIT FAMILIARIZATION)

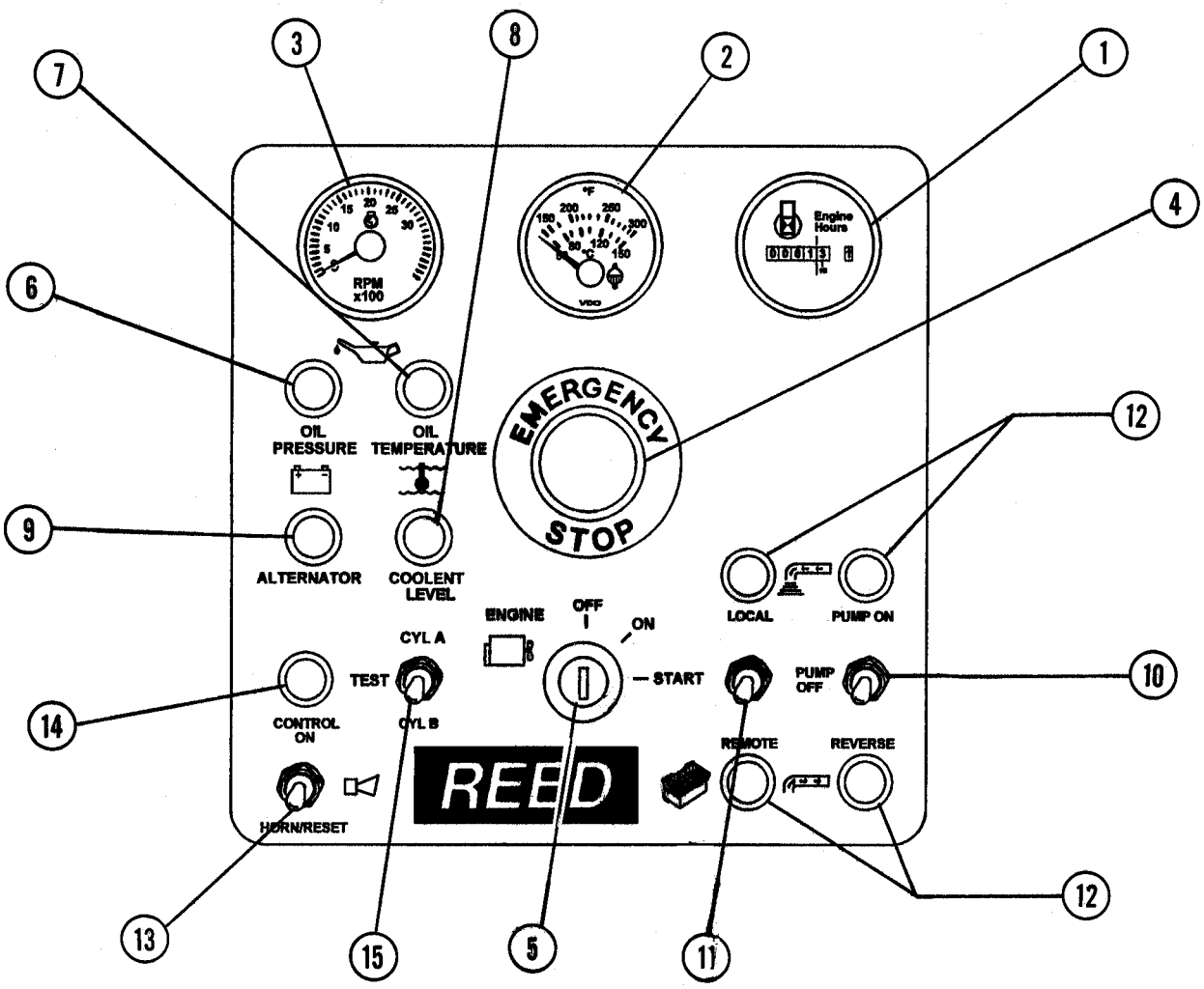
As previously indicated, it is important from a **SAFE** operational standpoint that you, the **OPERATOR**, know your machine. This means the function of each control as to what happens when it is activated, how it might interact with other functions and any limitations, which might exist. A **GOOD UNDERSTANDING** 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 B70*** concrete pump. Carefully study these.



CONTROL FAMILIARIZATION

The controls for operation of the ***01 MODEL B70*** 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. HOURMETER

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**.

2. TEMPERATURE GAUGE

This gauge is used to depict the temperature of the engine coolant.

3. TACHOMETER

This is used to monitor the engine RPM. The read out is in RPM's thus when gauge indicates, for example20, multiply by 100 = 2000 RPM. Adjustment of the RPM is done by the throttle cable.

4. 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.**

5. ENGINE START SWITCH

This is a three (3) position key switch with one position momentary and is used to control the engine. Turn key to **FAR RIGHT** position to engage starter; releasing key will put switch in **ON** position. Shut down engine turning key to **OFF** position.

6. LOW OIL INDICATOR

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

7. OIL TEMPERATURE INDICATOR

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

8. COOLANT LEVEL INDICATOR

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

9. ALTERNATOR INDICATOR

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

10. 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.

11. 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.

12. INDICATOR LIGHTS

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

13. HORN/RESET

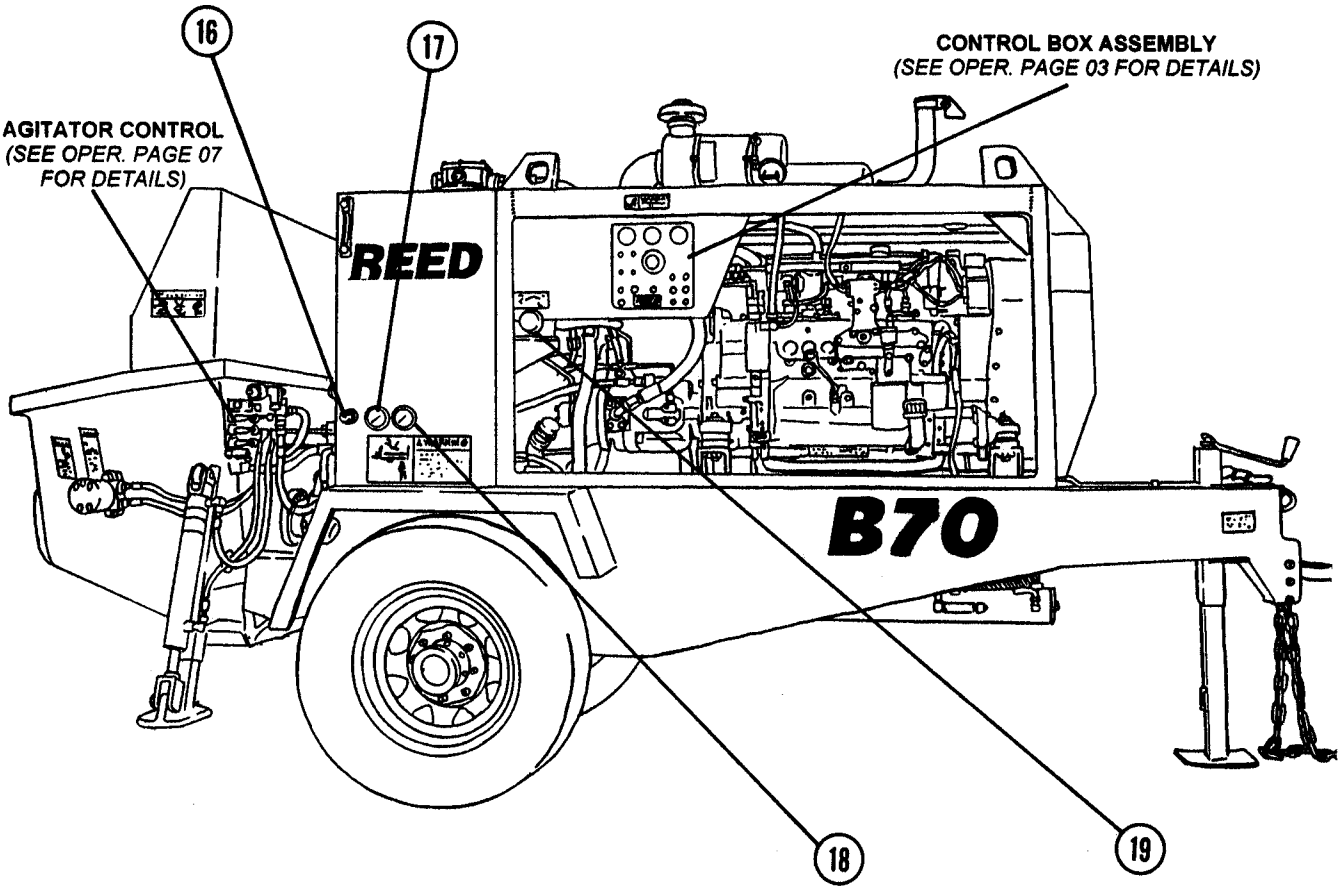
This is a momentary toggle switch and is used to reactivate the control and pump circuit after machine has been shut down using the **EMERGENCY STOP** switch. Once the emergency stop has been depressed it will be necessary to pull out switch and move toggle of **HORN** switch momentary to **RESET** position.

14. CONTROL ON INDICATOR

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

15. TEST – CYL "A", CYL "B" SWITCH

This switch is a three (3) position momentary toggle switch. It is used for the purpose of pressure test or jogging of pistons in cylinder "A" or "B". Move toggle to desired position. Toggle will return to center when released.



16. THROTTLE CONTROL

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.

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.

18. VOLUME CONTROL

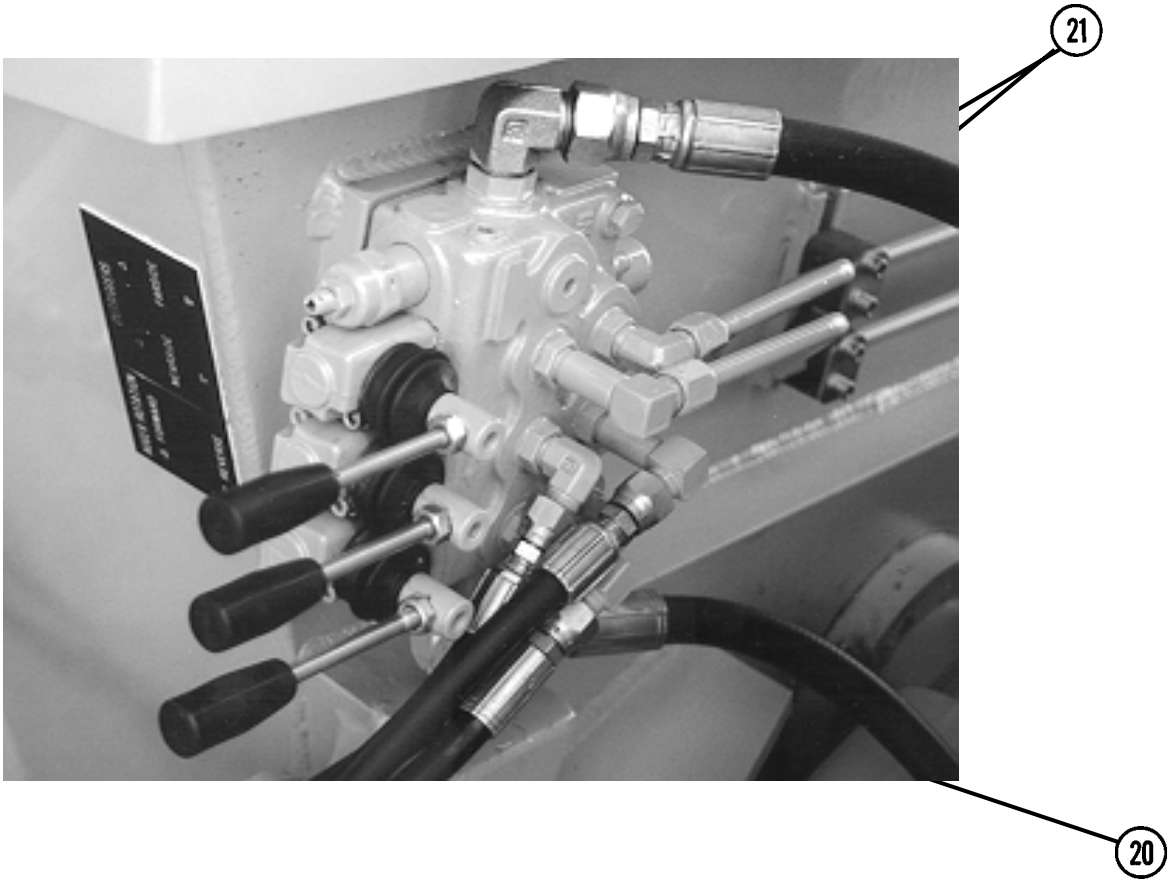
This control is installed adjacent to the main panel, just forward of the hydraulic tank. It is used to adjust volume output of the material cylinders which in turn is controlled by the output of the hydraulic pump. Turning knob **COUNTERCLOCKWISE** will **INCREASE** volume, turning knob **CLOCKWISE** will **DECREASE** volume.

⚠ *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**.



21. OUTRIGGER CONTROL

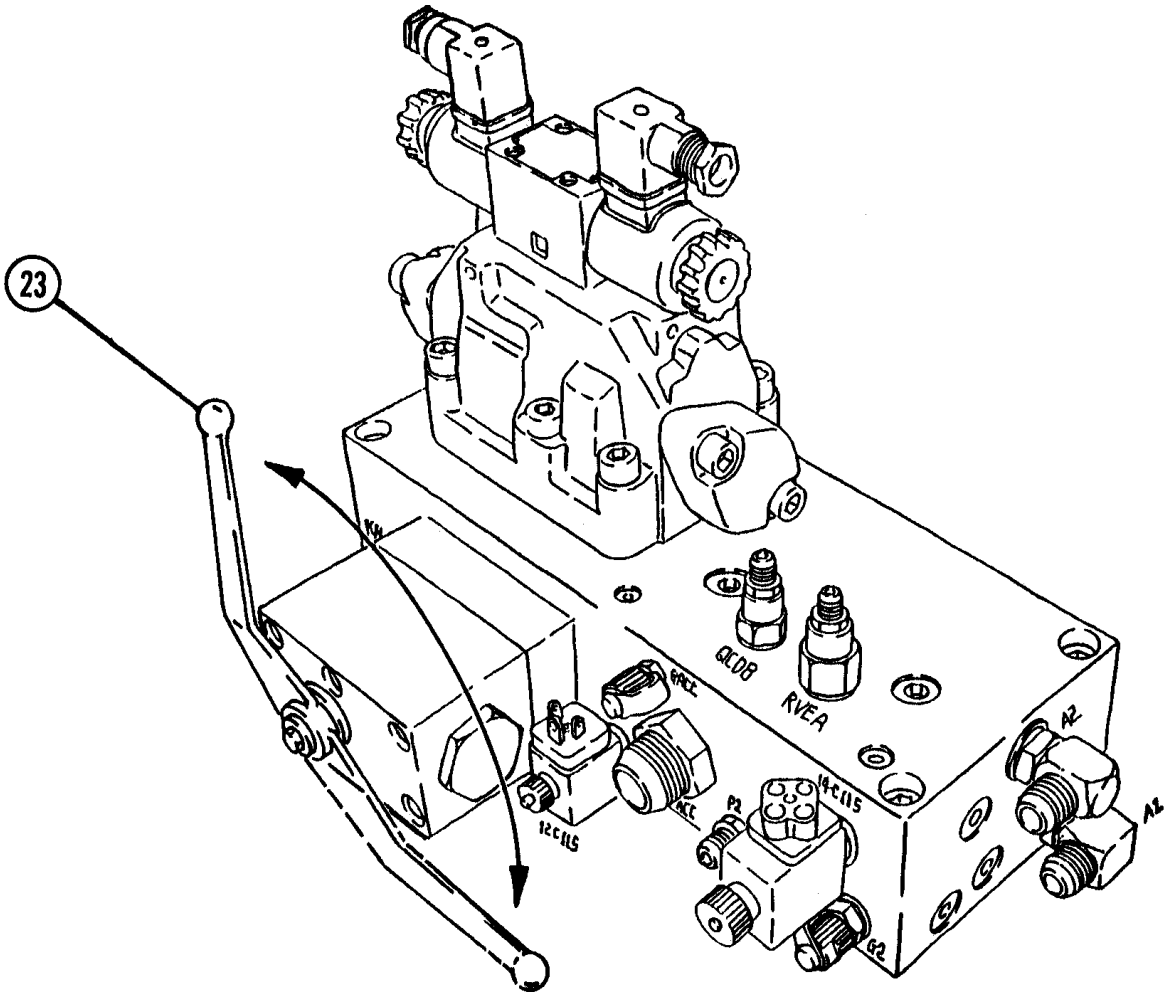
As part of the same valve bank as the agitator, the two (2) additional valve sections are used to control the outriggers. One lever controls the right outrigger; the other controls the left outrigger. Lever in **CENTER** position, the flow is **OFF**.

22. 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.

23. 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 many be used when a harsh material mix is being pumped requiring more power in shifting the S-tube.

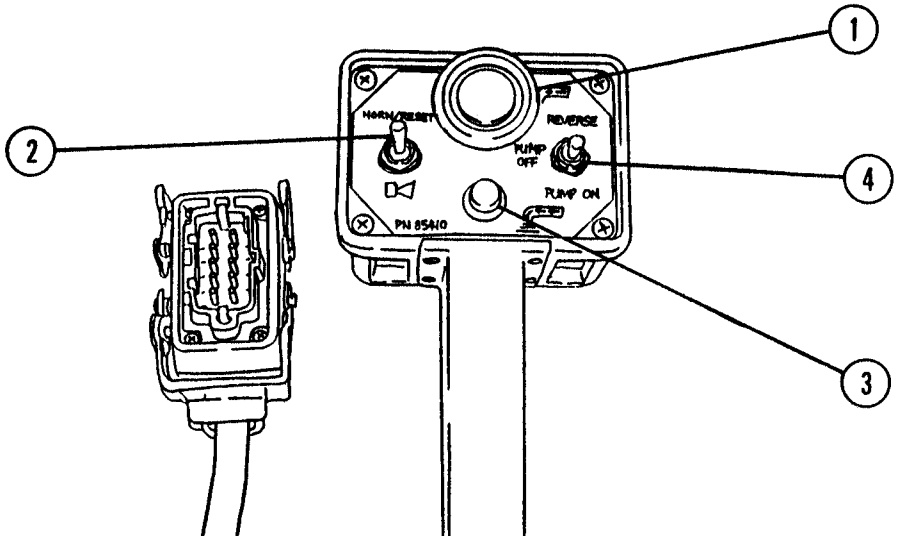


For an easier, slower shift, move the ball valve lever to the 3 o'clock position. This closes the ball valve and directs the fluid through the orifice. This position may be used when a slurry is being pumped or when the machine is being cleaned out.

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.

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. EMERGENCY STOP SWITCH

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. In this position, knob will light. **PULL** knob **OUT** 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.

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 **REVERSE** cycling.

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 on the trailer near the control panel.

The console contains the following functions:

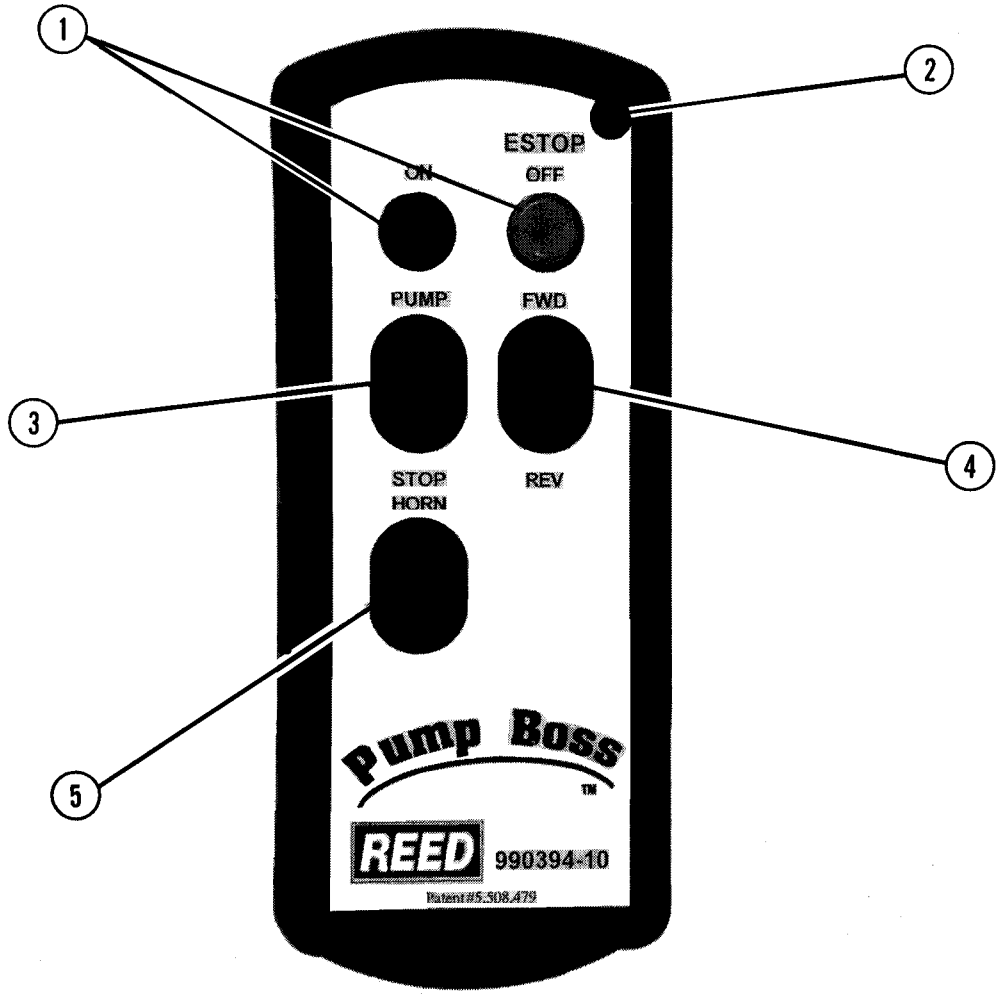
INDICATOR LEDS **RECEIVER** **TRANSMITTER**
(SEE NEXT PAGE FOR DETAILS)

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

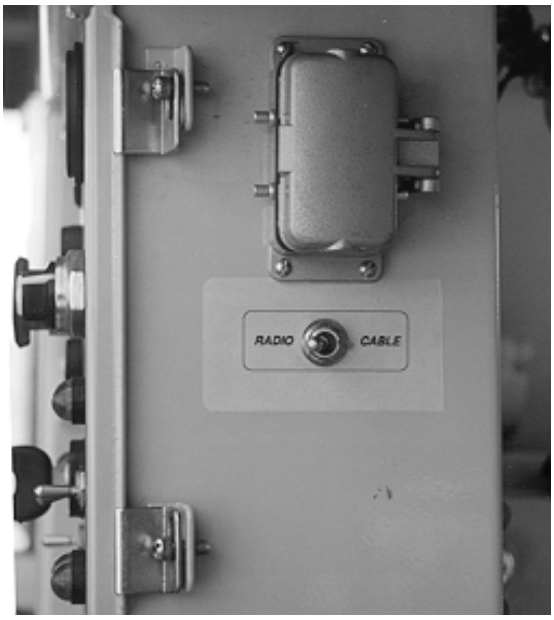
This switch is used to control the operation of the concrete pump. **PUSH** top part of switch to turn pump **ON**, start cycling. **PUSH** bottom of switch to turn pump **OFF**.

4. PUMP DIRECTION SWITCH

This switch is used to select the pump direction of the unit. Momentarily press switch to **FORWARD**, pump will cycle normally pumping material out discharge. 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.



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 B70*** 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 B70*** is equipped with a torsion bar single type axle, 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.
- 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.

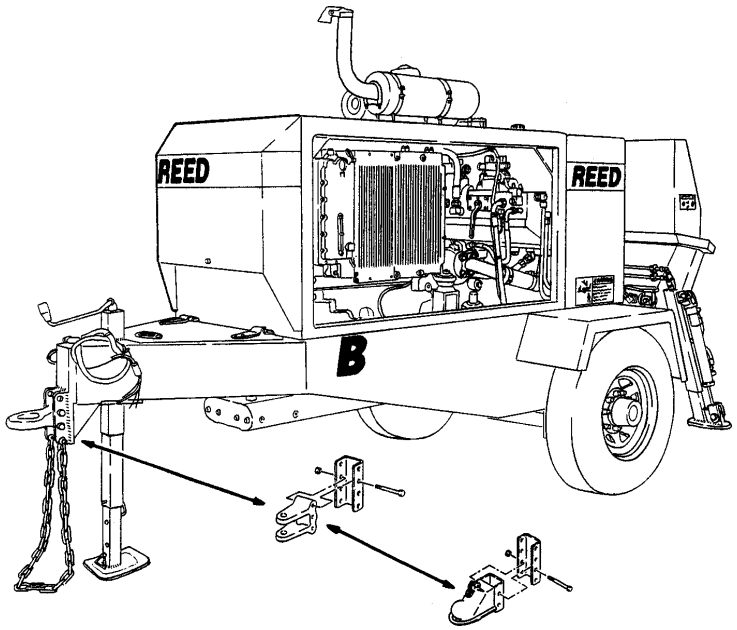
⚠ *WARNING*

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.



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. WARRENTY WILL NOT BE HONERED IN THIS SITUATION!

- 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.

- 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 **REMIND** 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.

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.*

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.

N O T E

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 4.00 (piston side) and the concrete pressure is calculated as follows:

SYSTEM GAUGE-PSI	CONCRETE PRESSURE PSI
1000	250
2000	500
3000	750
3500	875
4000	1000

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 4000 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.

- 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.

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 90º 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.

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 devise.

⚠ *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.

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.

N O T E

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.

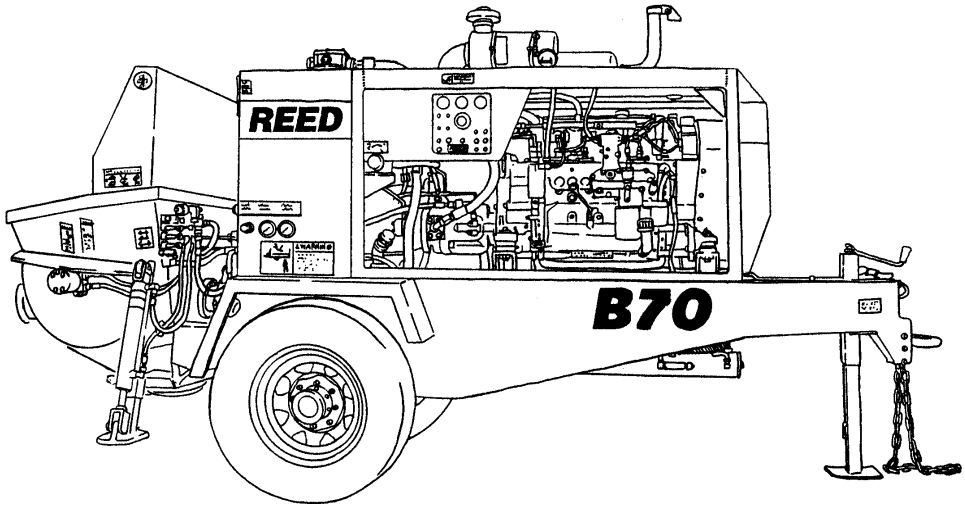
⚠ CAUTION

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 B70*** 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.



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 B70*** 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 B70*** 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.

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

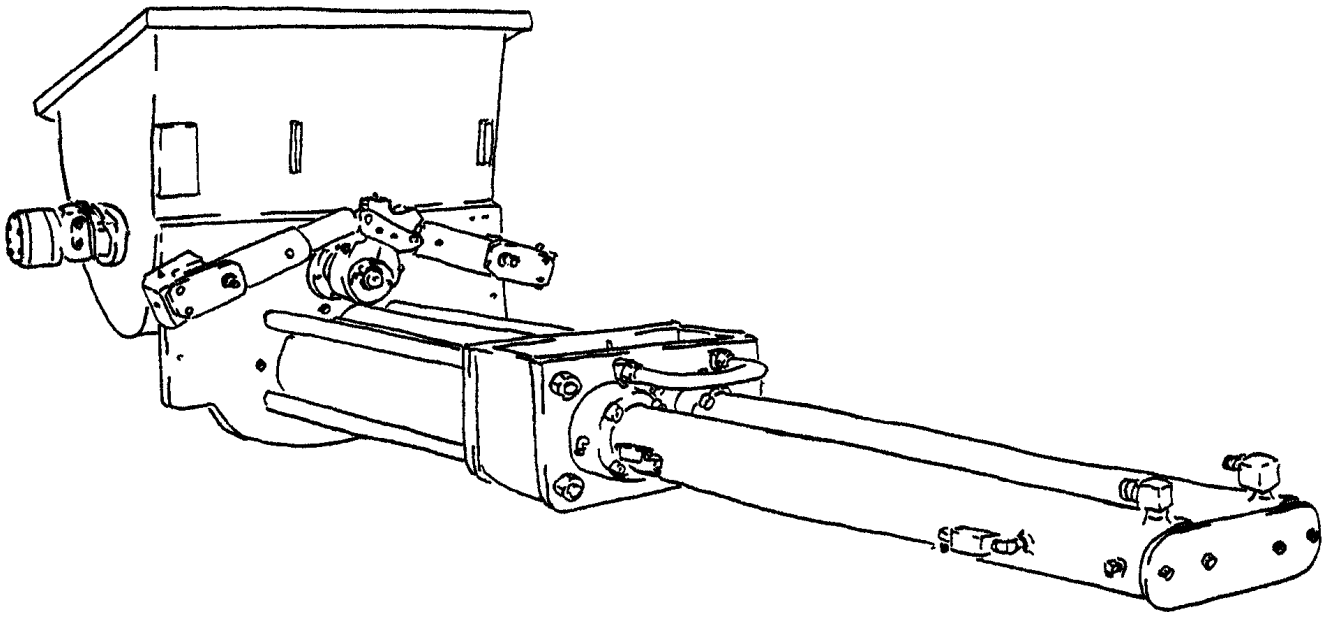
- Frame integrity, visually check welds, cracks
- Torsion axle secure
- Wheels and tires, lug nuts tight, tire inflation
- Electric brakes, breakaway switch connected
- Front jack stand handle turns easily, smoothly
- Manual jacks slide freely, lock pins in place
- Lighting good condition operational

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

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



4. HOPPER ASSEMBLY

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

- 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

LUBRICATION

The ***01 MODEL B70*** 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 LOCATION

- **Swing Tube Shift**
  - Quantity 1 at cylinder barrel pivot
  - Quantity 1 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**

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.

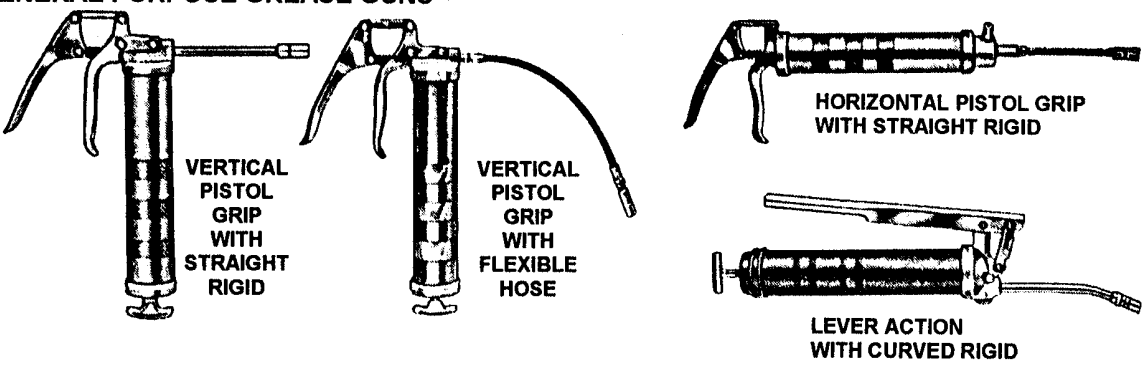
On the same basis, recommended lubrication intervals are based on normal use, in normal environmental conditions. User is **CAUTIONED** to adjust the lubrication interval accordingly to meet each individual condition and usage If the swing tube bearing housings become extremely hot or lubricant becomes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

If the ***01 MODEL B70*** 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.

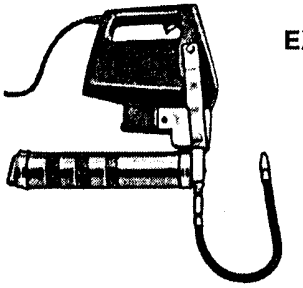
N O T E

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.

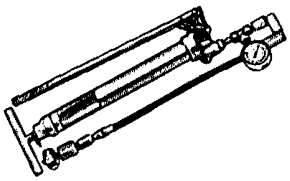
GENERAL PURPOSE GREASE GUNS



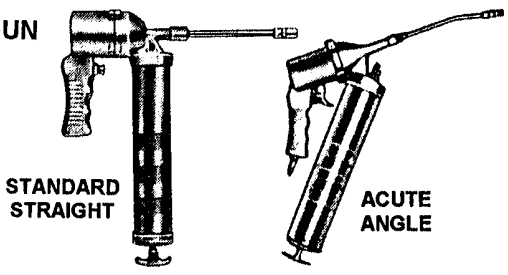
HAND HELD ELECTRIC GREASE GUN

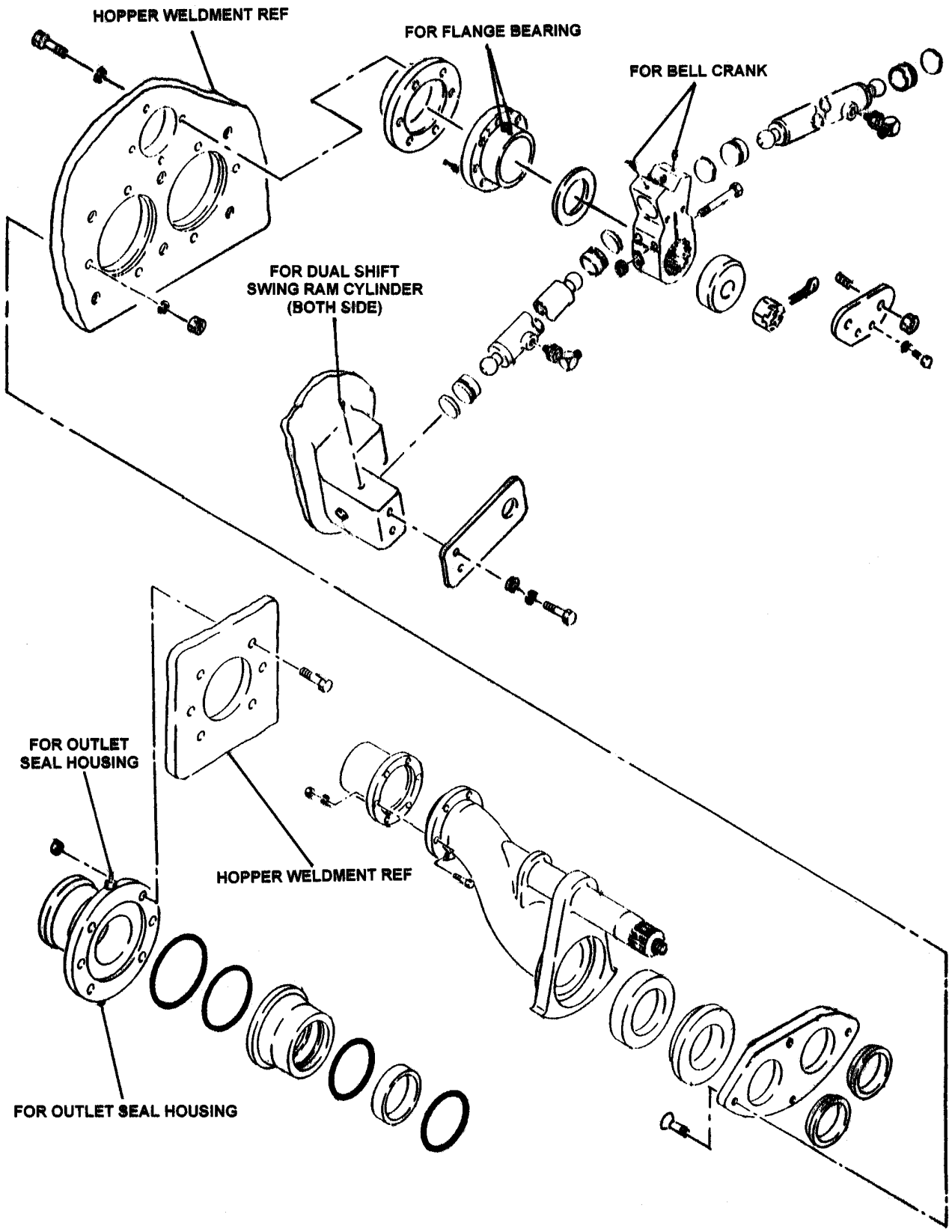


EXTREME PRESSURE GREASE GUN



AIR POWERED GREASE GUN





DUAL SHIFT PUMPING TRAIN

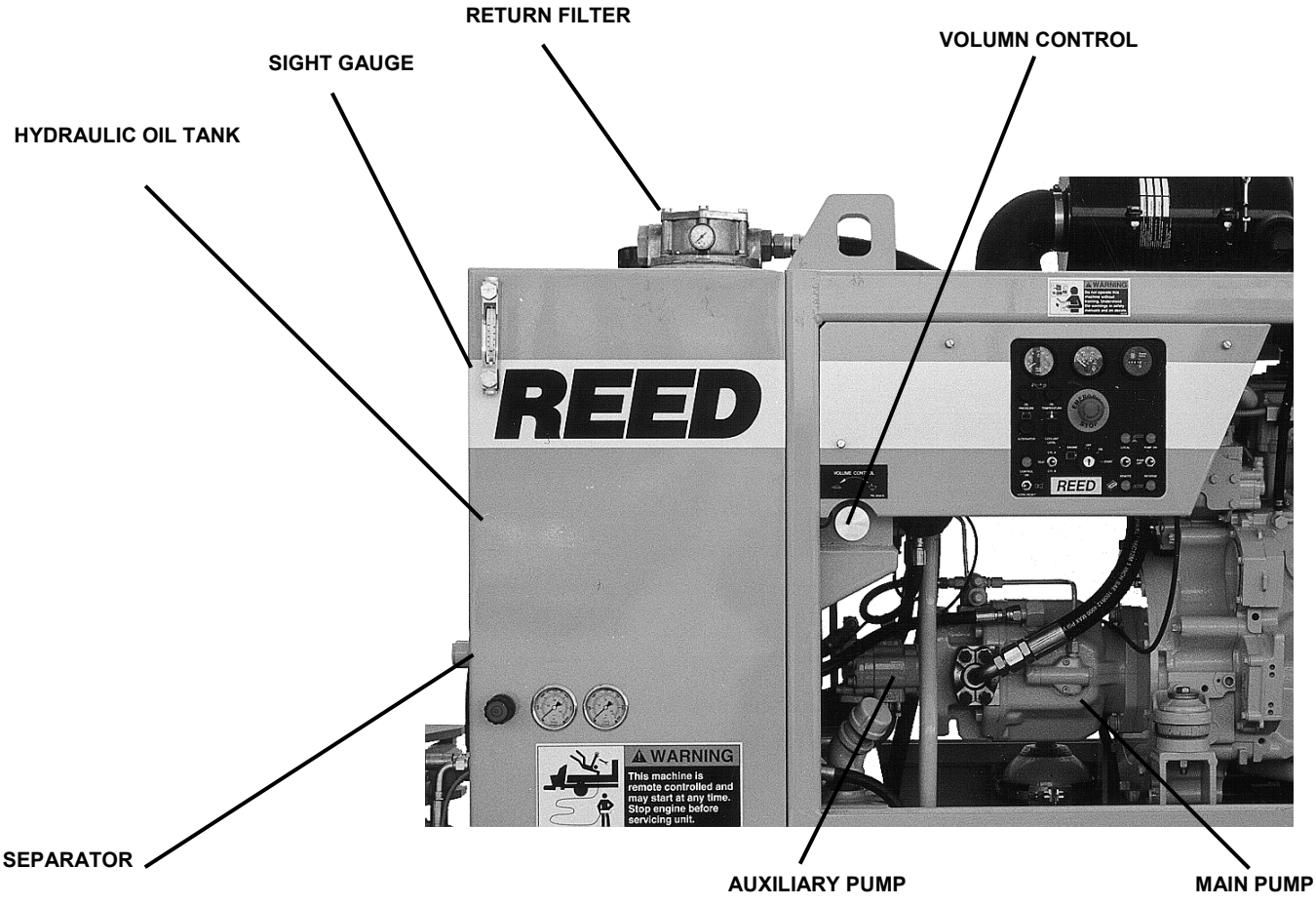
REVISION:

HYDRAULIC SYSTEM MAINTENANCE

The ***REED 01 MODEL B70*** 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

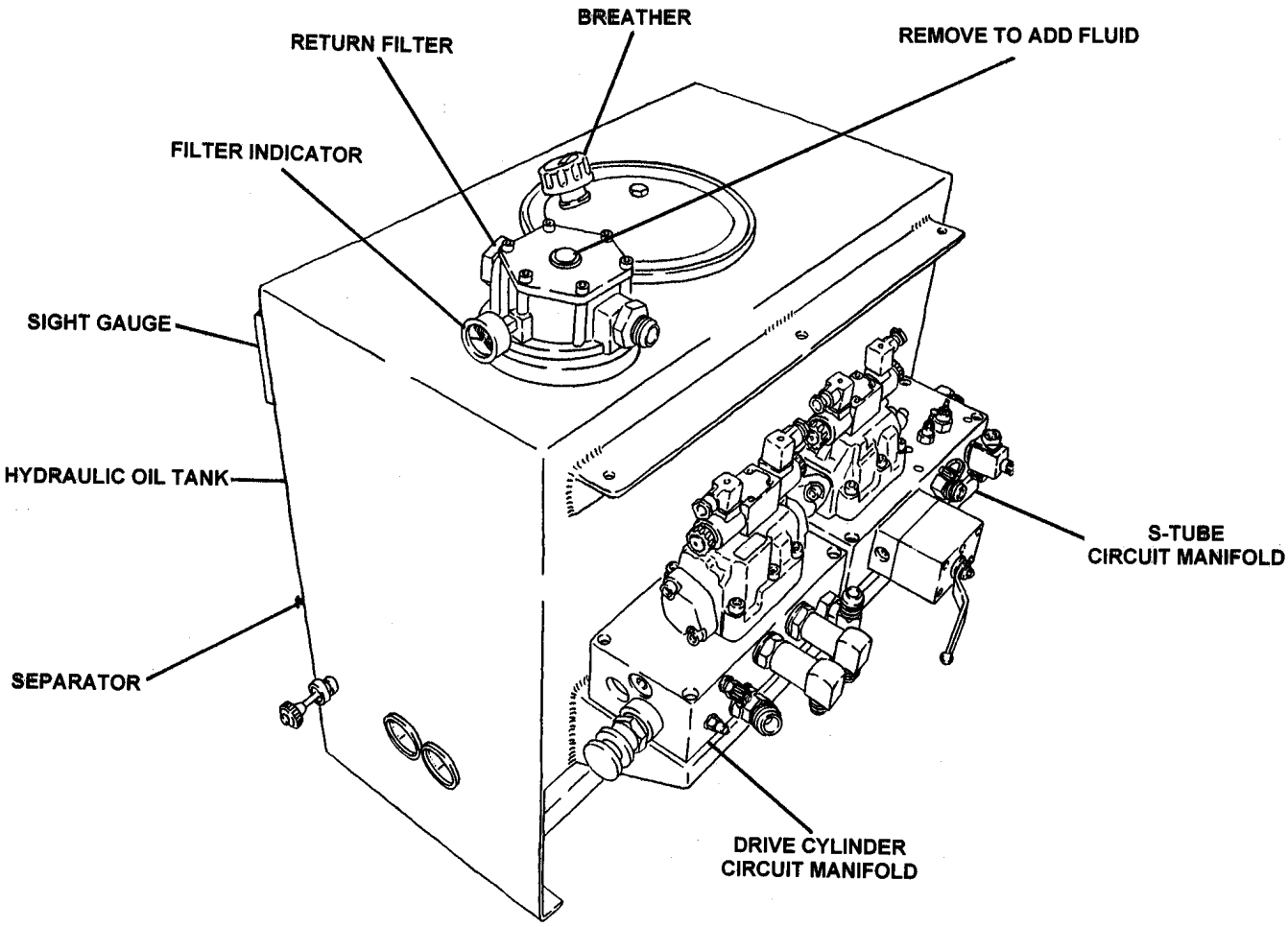
CONTAMINATION is the downfall of most hydraulic systems and a major contributor leading to system malfunctions. Extreme care must be exercised to prevent dirt from entering the system. Make it a habit to ALWAYS cap or plug open ports and hydraulic lines.



HYDRAULIC TANK

The hydraulic tank has a capacity of 55 GALS (208L) 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. An oil cooler is adjacent to the engine cooling unit. This cooler is used to cool the oil prior to entering the tank.



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 B70*** 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

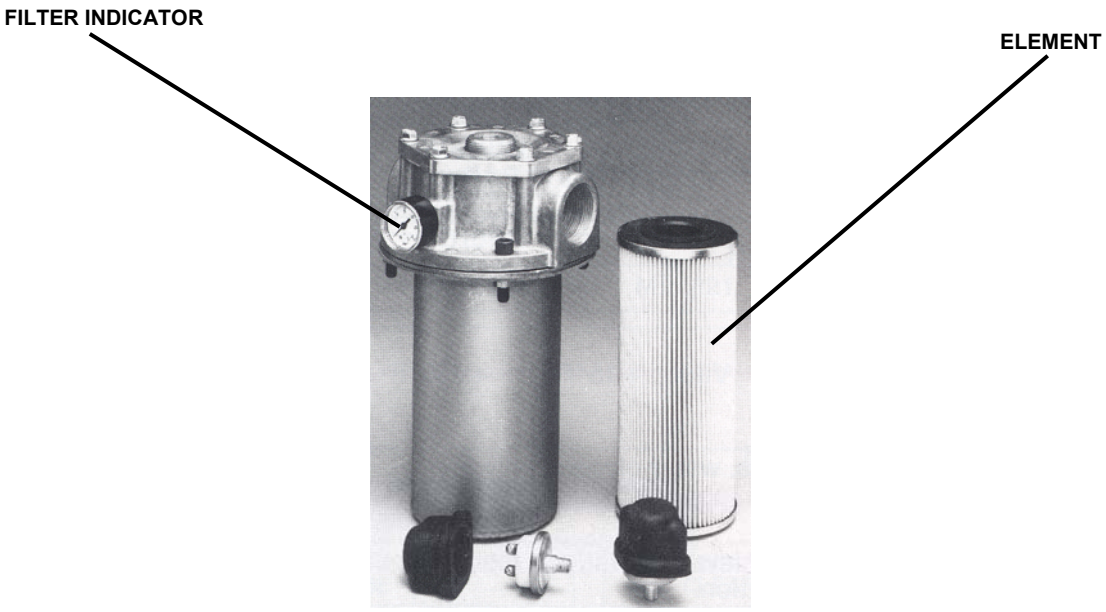
As previously indicated, a hydraulic systems worst enemy is **CONTAMINATION**. Exercise extreme care when adding fluid to the hydraulic tank.

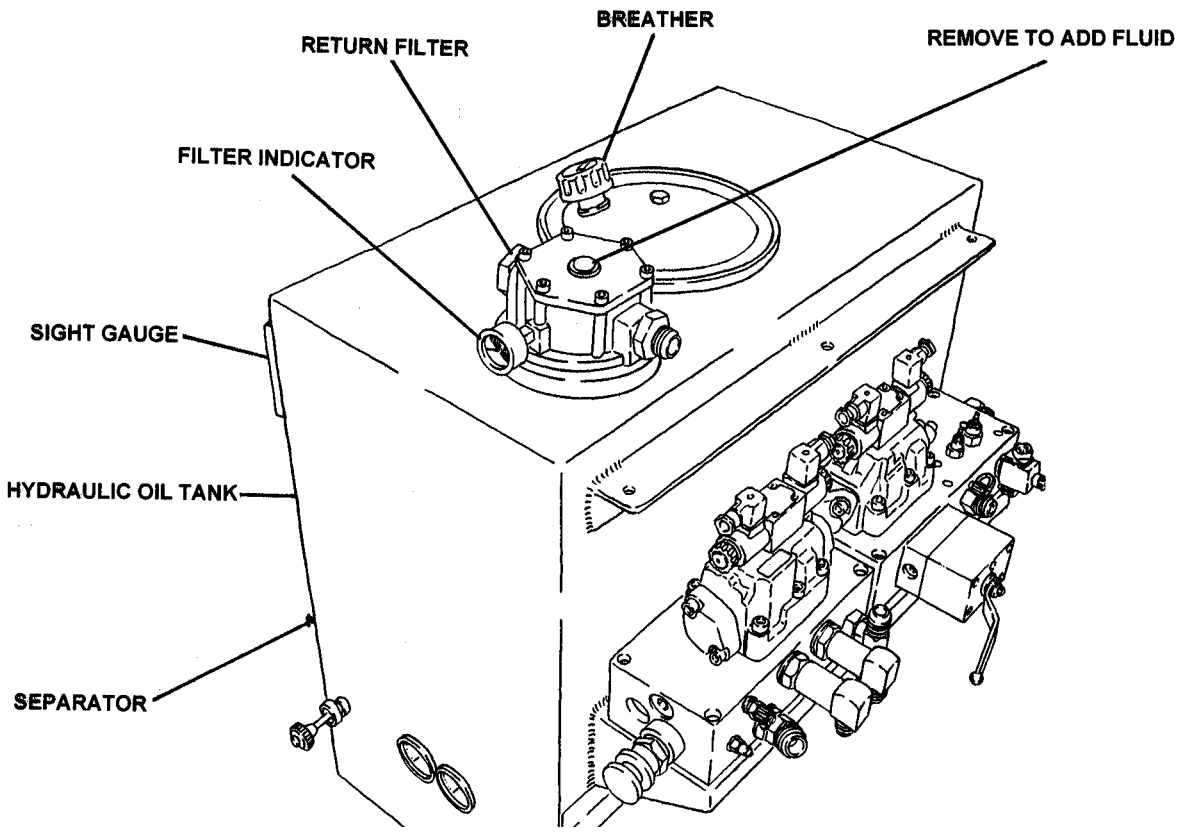
- To prevent any dirt or water from entering the hydraulic tank, thoroughly clean area around top of filter. Remove plug on top of filter.
- Use fresh clean hydraulic fluid. If a hand pump is used to transfer the fluid, check that pump filter is clean. If pouring of fluid from a container, pour it through 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 ***B70*** 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.

- 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 55gals (208 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

DESCRIPTION OF HYDRAULIC SYSTEM

The hydraulic system of the ***01 MODEL B70*** 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.

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

SPECIFICS – PRESSURES

- Main Pump Standby Pressure = 230 PSI (16 Bar)
- Main System Max. Pressure = 4000 PSI (250 Bar)
- Main System Relief Pressure = 4250 PSI (297 Bar)
- S-tube Shift System Relief Pressure = 1800 PSI (126 Bar)
- Accumulator Pre-Charge Pressure = 900 PSI (63 Bar)
- Auxiliary System Relief Pressure = 1500 PSI (105 Bar)

SYSTEM FILTRATION

The hydraulic tank has a capacity of 55 gals (208L) 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.

MAIN PUMP CIRCUIT (Refer To Hydraulic Schematic)

The ***01 MODEL B70*** is designed to pump concrete like 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 **OPEN LOOP** type. Meaning, that the hydraulic pump directs the fluid to one hydraulic cylinder to extend and the oil from the retracting cylinder is directed back to the tank.

To meet the volume and pressure requirements of the main pump circuit a Rexroth 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 ***01 MODEL B70***, the angle of the swashplate is varied by use of the **VOLUME** control that works in conjunction with the load sense feature of the pump.

The main hydraulic pump is driven directly by the Deutz diesel engine. When the engine is started and running and the **PUMP** switch is in the **OFF** position, and the **VOLUME** control turned **IN** there is no demand placed on the pump. This is referred to as the pump being de-stroked, meaning, it is only producing a minimal amount of flow to enable the lubrication of the pump. This condition exists regardless of whether the engine is at idle or maximum **RPM**.

The main pump circuit is equipped with a manifold block installed at the rear of the hydraulic tank. This manifold is drilled and ported to accommodate the relief valve, check valve, flow control and the pilot operated cycle valve. The cycle valve is a directional spool valve with electro hydraulic solenoid operation. Its purpose is to direct the flow of oil to one or the other hydraulic drive cylinders.

To energize the pump circuit, set the engine speed at maximum **RPM**, adjusted by use of the throttle control. Open the **VOLUME** control to any range from 0 to full. In so doing, the load sense is alerted to the demand and places the pump on stroke. The pump will now produce the flow in proportion to the amount by which the volume control has been opened. Since the **PUMP** switch is **OFF**, the flow from the hydraulic pump is directed to the cycling valve, however, it is blocked and thus returns to the hydraulic tank.

To energize the cycling circuit, the **PUMP** switch must be **ON**. When this is done, an electrical signal is generated which in turn energizes the coils of the main cycling pilot valve and also activates the swing tube shift circuit. (Described later)

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

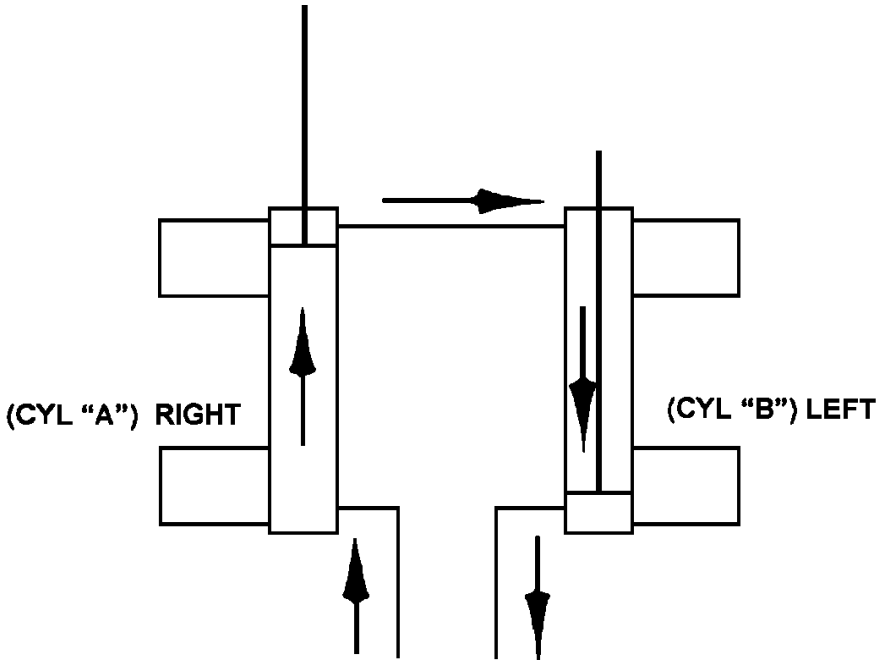
It was previously noted that the material pumping action is the result of the two material cylinders cycling on an alternate basis. This alternating cycling is controlled by an electrical signal that is generated at the end of each material cylinder's suction, retraction stroke.

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 used to energize the coils of the main cycling pilot valve as well as that of the swing tube shift valve.

CIRCUIT OPERATIONAL SEQUENCE

In the operational sequence of the **MAIN PUMP CIRCUIT** and with the engine started 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 via the cycling valve, is the cylinder whose coupler has triggered the proximity sensor while in the retracted position and is ready to extend. At full extension the other cylinder is totally retracted and the coupler activates the proximity sensor which via the black box, shifts the main cycling valve spool, allowing the oil to flow to the now retracted cylinder. This alternating cycling takes place continuously until the **PUMP** switch is turned **OFF**.

It can be noted in the schematic and the diagram below 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 or piston side of the cylinder.



CONCRETE PUMP SYSTEM

The hydraulic drive cylinders are identical and because only one cylinder is pressurized at a time, a means is required to assist in the retraction of the opposite cylinder. This is accomplished by connecting the rod sides of the cylinders together. In so doing, the hydraulic fluid that exists in the rod side of the extending cylinder (**CYL A**) is transferred and directed to the rod side of the other cylinder (**CYL B**) causing it to retract. The oil in the barrel of **CYL B** is then forced out and has a free flow through the cycling valve back to the hydraulic tank or return system.

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.

N O T E

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 4250 PSI which is 250 PSI over the main system pressure. Thus when the system pressure reaches 4250 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**.

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 Rexroth pump. 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

Like the main hydraulic circuit, the shift circuit is also equipped with a manifold block. This block is located adjacent to the main circuit block. 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.

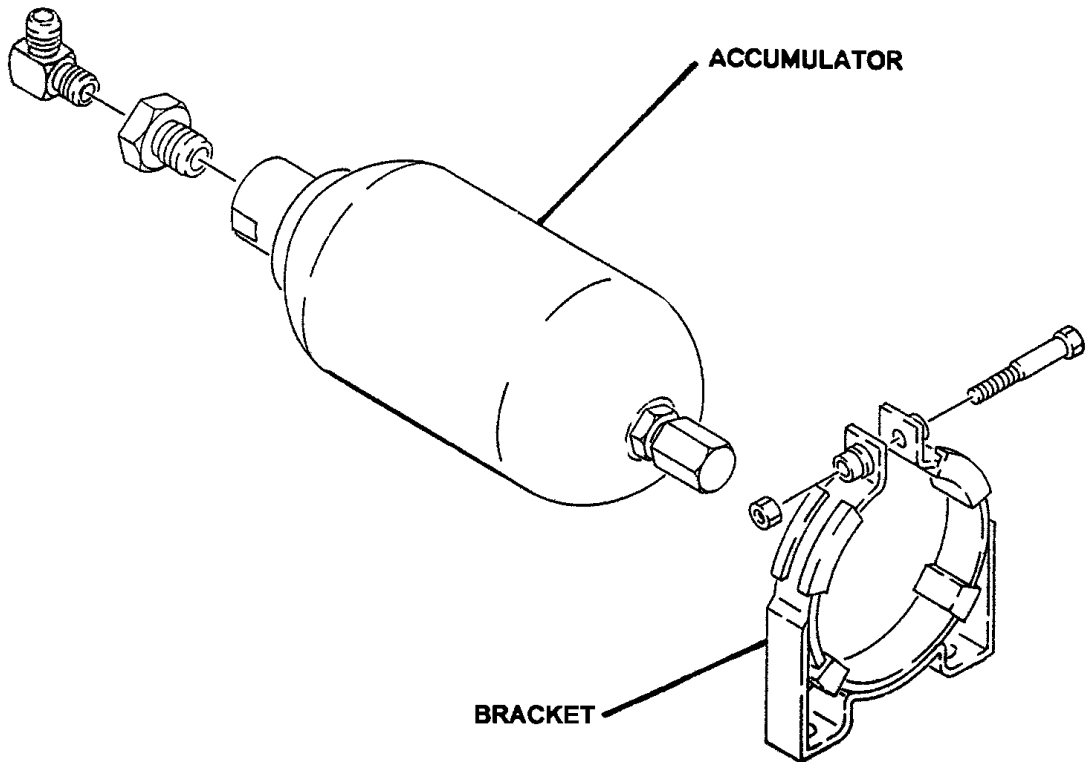
The second valve is also used as a dump valve and is used to direct the flow of oil back to the tank when the accumulator pressure has been reached, thereby, eliminating the surging of the relief valve.

- **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



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 **PUMP CYCLE** switch is placed to **ON**, 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.

AUXILIARY CIRCUIT

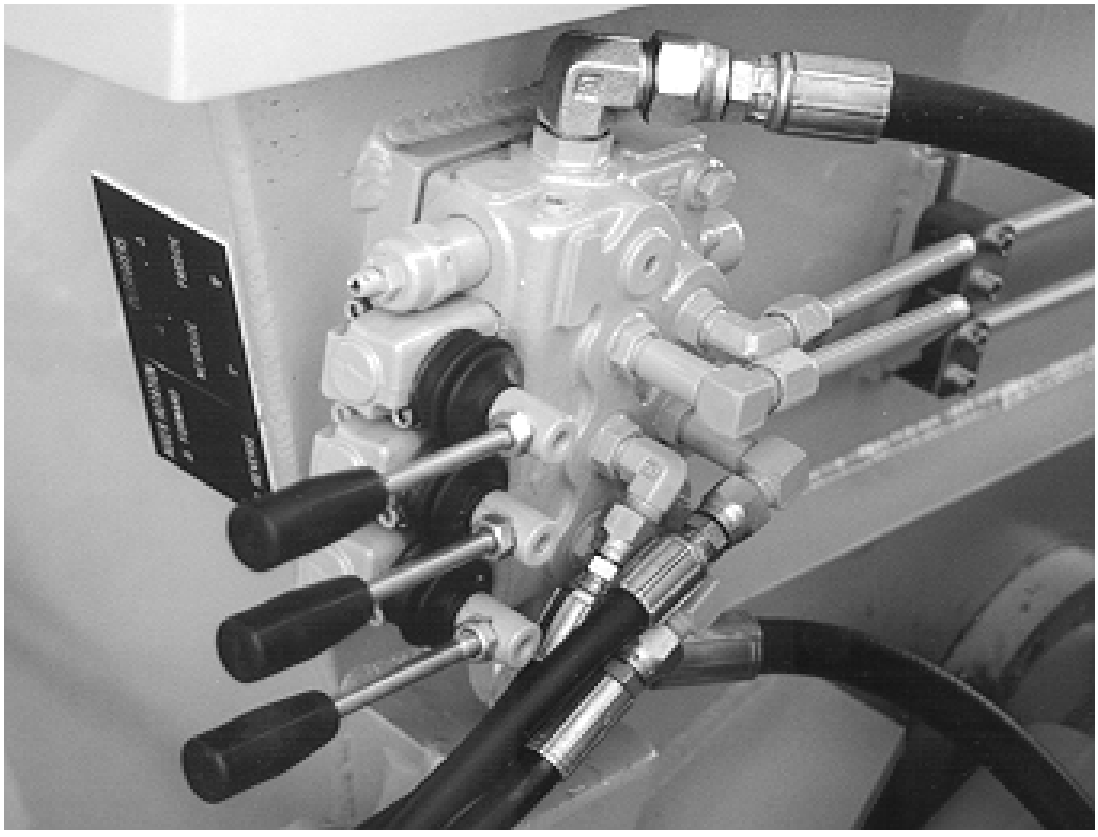
The **AUXILIARY CIRCUIT** used on the ***01 MODEL B70*** has been designed and installed for the purpose of operating the hydraulic function of the agitator. This function is that of the agitator rotation for mixing the material in the hopper.

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 single 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.

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.



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

The ***01 MODEL B70*** 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.

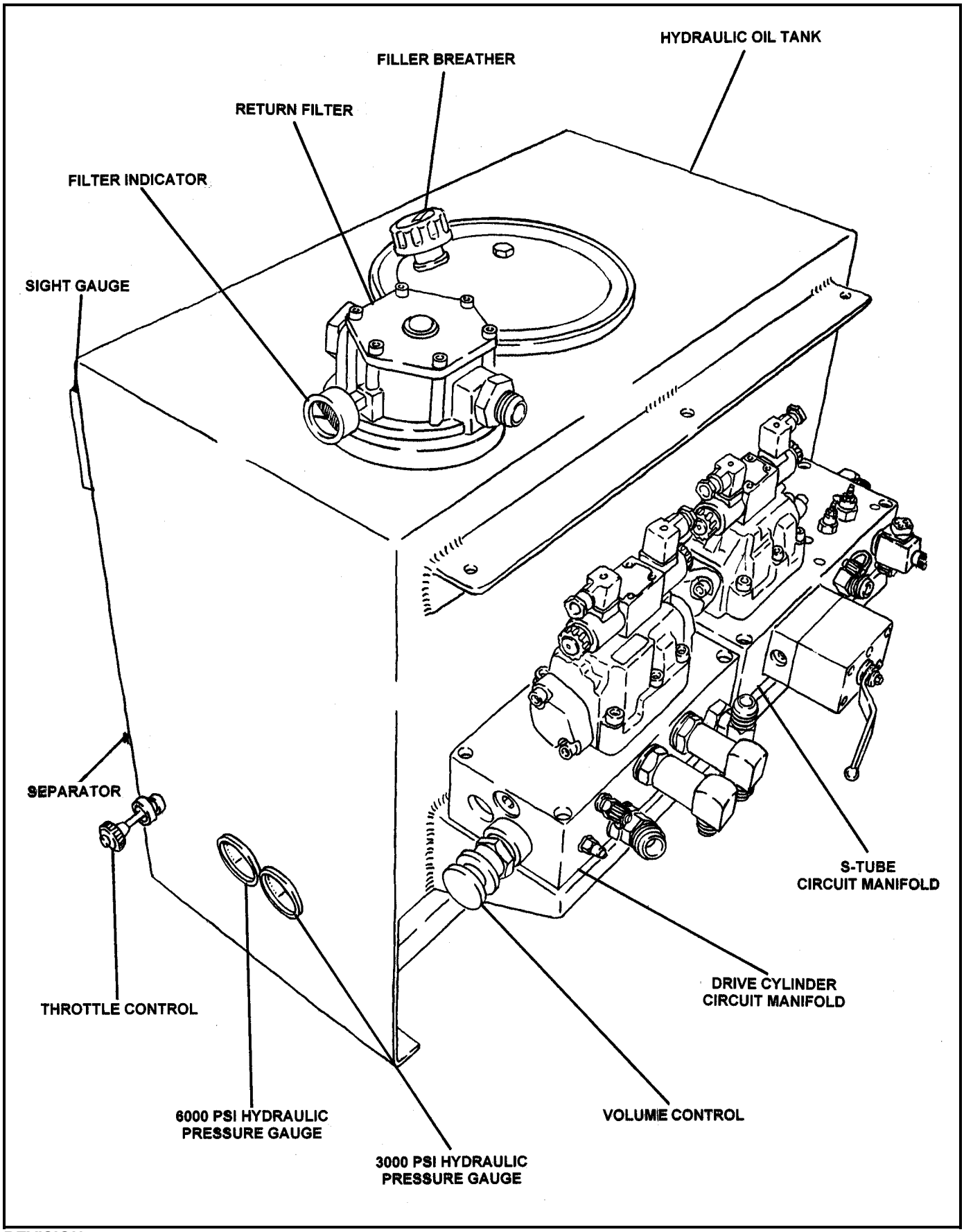
N O T E

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.


HYDRAULIC OIL TANK
FILLER BREATHER
RETURN FILTER
FILTER INDICATOR
SIGHT GAUGE
SEPARATOR
S-TUBE
CIRCUIT MANIFOLD
DRIVE CYLINDER
CIRCUIT MANIFOLD
THROTTLE CONTROL
6000 PSI HYDRAULIC
PRESSURE GAUGE
VOLUME CONTROL
3000 PSI HYDRAULIC
PRESSURE GAUGE

1. STAND BY PUMP PRESSURE (230-290 PSI/16-20 Bar)

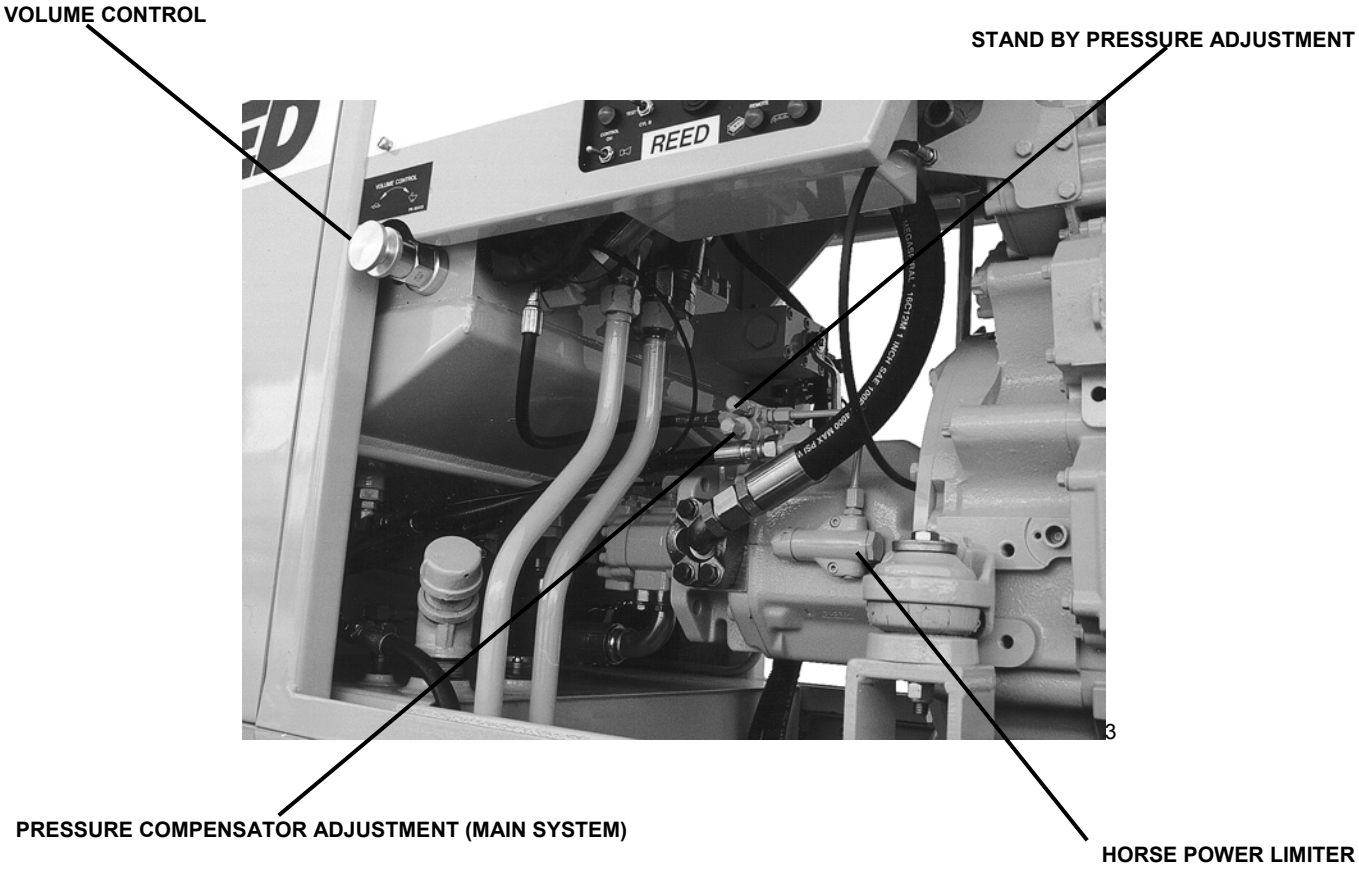
Located on the manifold block near the volume control is a test port. Shut off engine. Remove cap from the test port and install **TEST GAUGE #1**. (IF REQUIRED)

A. CHECKING THE PRESSURE

- Start engine and adjust **THROTTLE** to maximum RPM.
- Adjust **VOLUME CONTROL**, so that it is completely closed, turn **CLOCKWISE**.
- Pressure gauge should read 230-290 PSI.
- If pressure indicated does not fall within specified range then an adjustment is necessary.

⚠ *WARNING*

DO NOT ACTUATE PUMP SWITCH. To do so will damage test gauge.



B. SETTING RELIEF PRESSURE

- **TEST GAUGE #1** can remain installed and engine can remain running.
- Remove cap from Standby Pressure adjustment screw on main hydraulic pump. This will expose the adjustment screw. Loosen locknut.
- Using a #3 Metric Allen Wrench, turn screw **IN** to **INCREASE** pressure and turn **OUT** to **DECREASE**.
- Make adjustment in small increments and monitor gauge.
- After pressure has been adjusted to proper setting, tighten locknut and replace cap.
- Turn engine **OFF**. Remove **TEST GAUGE #1** and cap test port.

2. MAIN SYSTEM (4000 PSI/280 Bar) RELIEF PRESSURE (4250 PSI/298 BAR)

The adjustment of the main system pressure is done at the pump and the relief is located at the front side of the manifold block.

A. CHECKING THE PRESSURE

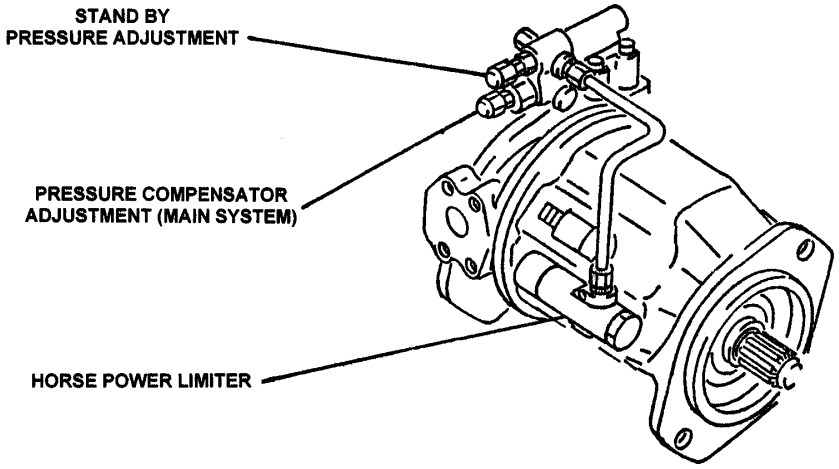
- Shut off engine. Remove cap from the test port located on manifold block near the volume control.
- Remove the cap from the pressure compensator adjustment screw on the hydraulic pump. This will expose the adjustment screw. Loosen locknut.
- Start engine and adjust **THROTTLE** to maximum RPM. Turn **VOLUME CONTROL** full **ON**.
- Using a #3 Metric Allen Wrench, turn compensator adjusting screw **IN** about one and half turns. This will increase pressure to greater than relief valve setting.
- Turn **PUMP** switch **ON**, allowing pump to cycle. Actuate **CYL** switch to either **"A" OR "B"** and hold.

- Monitor **TEST GAUGE** or gauge on side of tank. They both should read 4250 PSI/298 Bar. Release switch and turn **PUMP** switch **OFF**.

- If pressure on gauge does not read 4250 PSI then an adjustment is necessary.

⚠ *WARNING*

DO NOT ACTUATE PUMP SWITCH. To do so will damage test gauge.



B. SETTING RELIEF PRESSURE

- The relief valve is located on the forward side of the manifold block. Loosen the locknut on the relief.

- Start engine, adjust **THROTTLE** to maximum RPM and set **VOLUME** control full **ON**.

- Turn **PUMP** switch **ON** and actuate **CYL** switch to either **"A" OR "B"** and hold.

- Using an allen wrench, adjust set screw until gauge reads 4250 PSI.

- Release switch and turn **PUMP** switch to **OFF** position.

- Tighten lock nut at relief valve.

C. SETTING MAIN SYSTEM PRESSURE (4000 PSI/280 BAR)

After setting the relief pressure, it will be necessary to reset the main system pressure so that it is lower than that of the relief pressure.

- With engine running at maximum RPM and **VOLUME** control full **ON**, turn **PUMP** switch **ON**.
- Actuate **CYL** switch to either **"A" OR "B"** and hold.
- Using an allen wrench, adjust compensator adjusting set screw **OUT** to decrease pressure until gauge reads 4000 PSI.
- Release switch, turn **PUMP** switch **OFF** and shut down engine.
- Tighten locknut on adjustment screw and replace cap.
- Remove **TEST GAUGE #2** and cap test port.

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 back side 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:

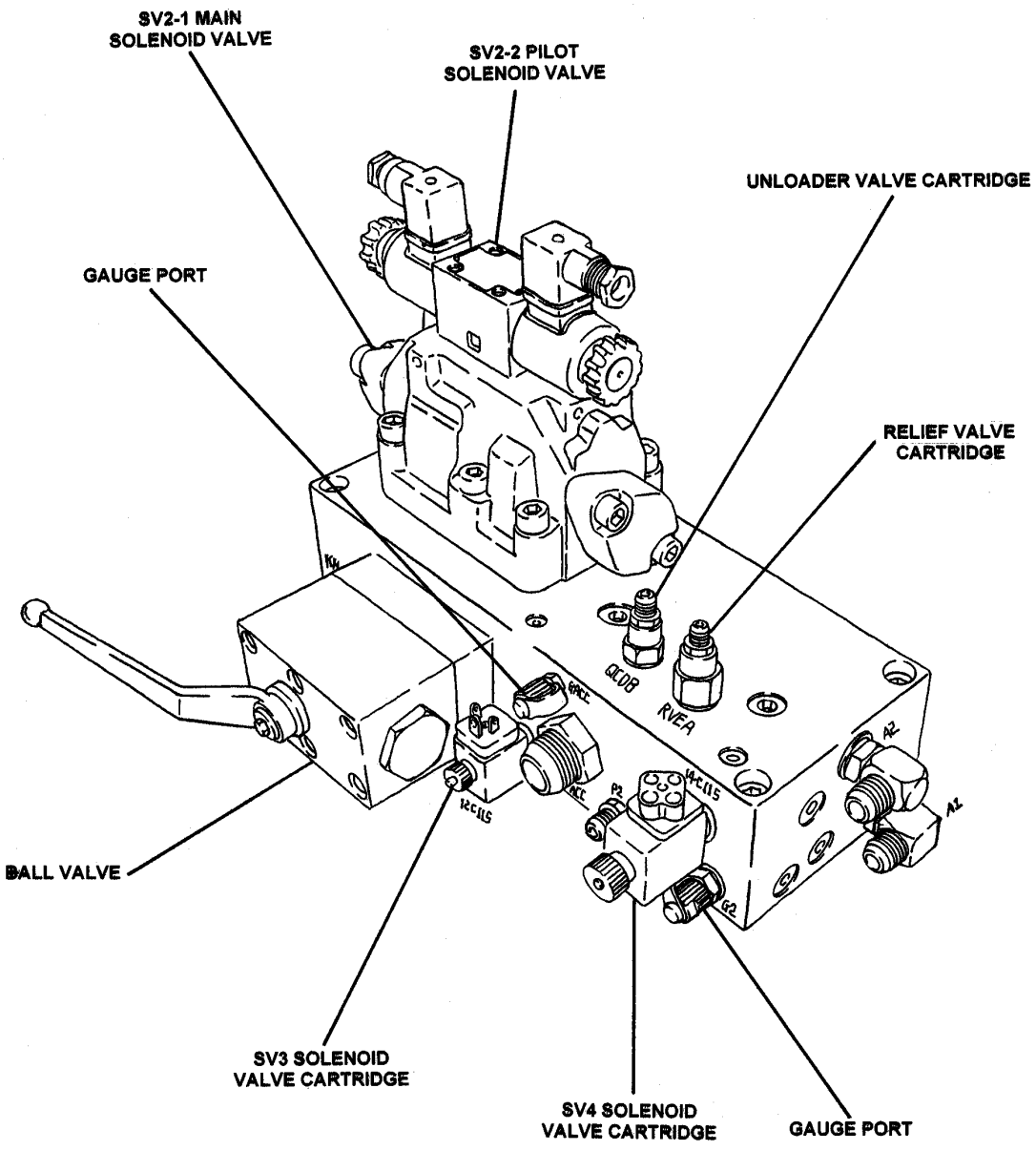
A. CHECKING THE RELIEF PRESSURE

- Start engine and adjust **THROTTLE** to maximum RPM.
- Turn **VOLUME** control so that it is partially open.
- 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 2300 PSI. This indicates the **RELIEF VALVE** setting. If gauge reads otherwise, then an adjustment is necessary.

B. SETTING SHIFT CIRCUIT PRESSURE

- Loosen locknut on **RELIEF VALVE**.

- Actuate **PUMP** switch to **ON** position.
- Monitor accumulator gauge while adjusting relief set screw **IN** to increase pressure or **OUT** to decrease pressure so that gauge reads 2300 PSI.
- Shift **UNLOADER** valve will also need to be reset. With allen wrench, adjust set screw **OUT** until pressure on gauge reads 2000 PSI.
- With adjustment made, tighten lock nut on **UNLOADER**.



S-TUBE CIRCUIT MANIFOLD

4. AUXILIARY CIRCUIT RELIEF

The auxiliary circuit for the ***01 MODEL B70*** 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**.
- 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.

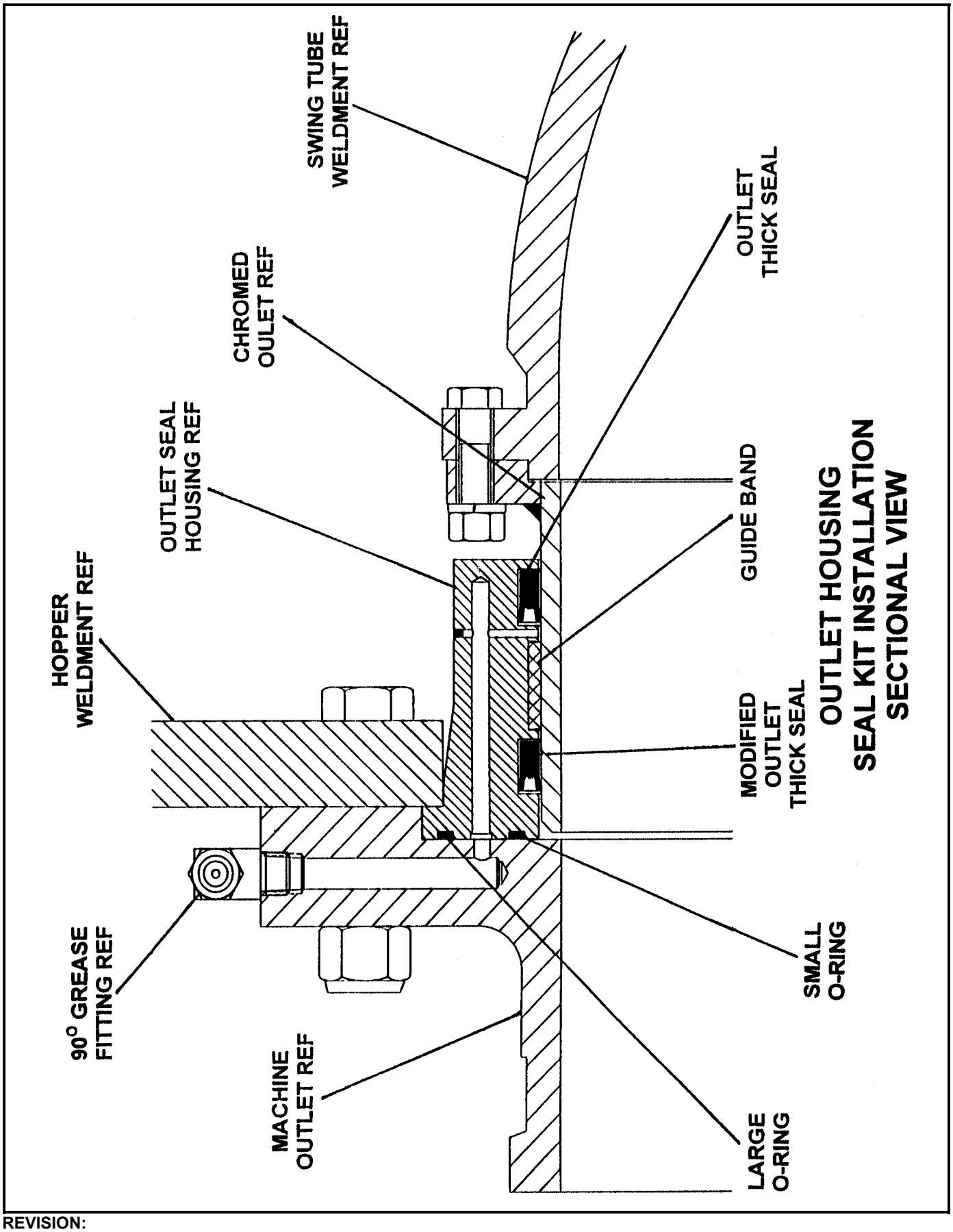
ADJUSTMENT TO SWING TUBE

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:

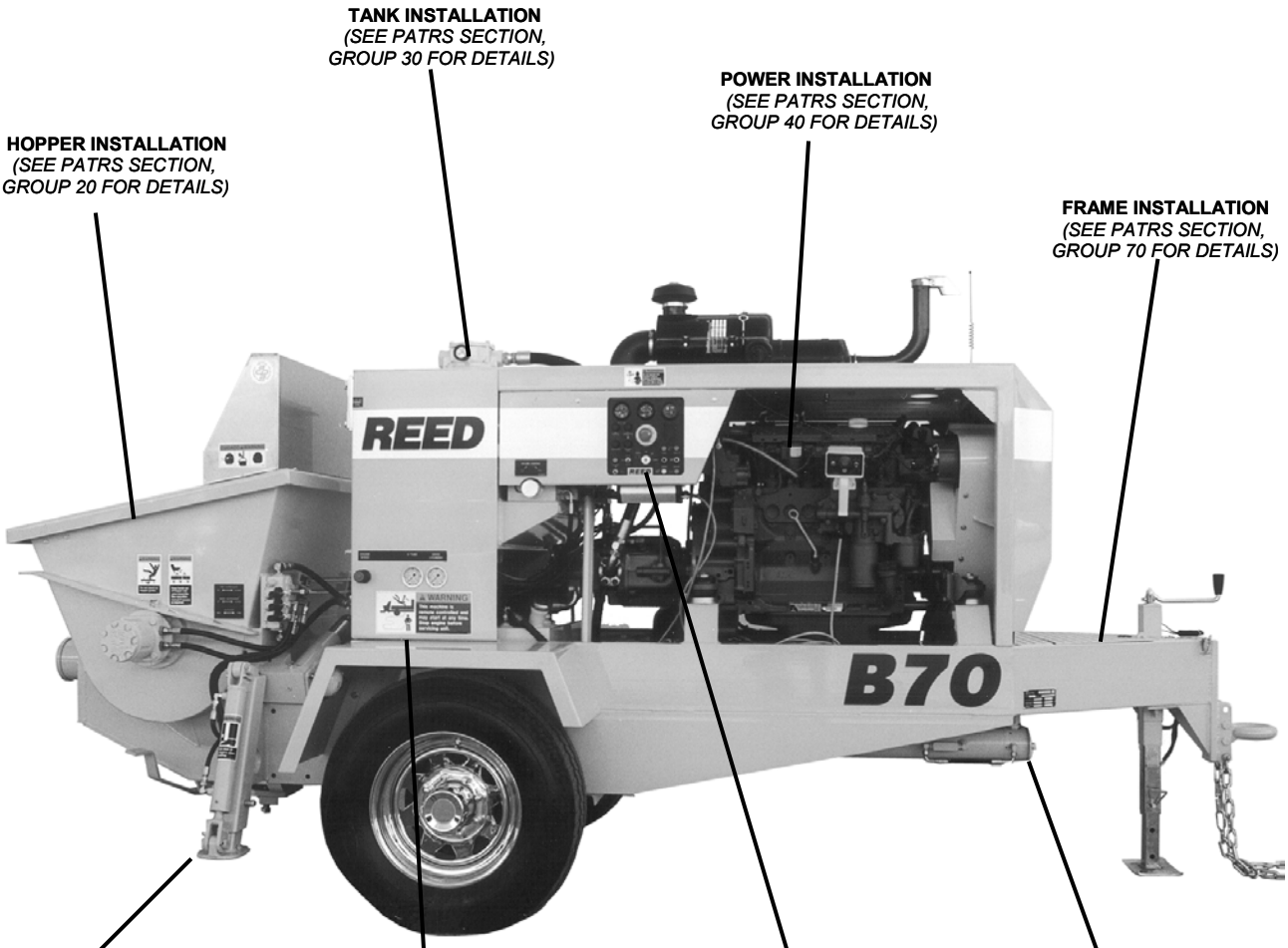
- Shut off engine. If unit was being run, allow a few minutes for the accumulator pressure to subside.
- Remove cotter pin from large castle nut on swing tube shaft.
- Tighten the castle nut approximately one-half turn.
- Start engine and adjust **THROTTLE** to a low **RPM.**
- Actuate the **SWING** switch to **JOG** position and allow swing tube to shift from side to side a few times.
- 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.


SWING TUBE WELDMENT REF
CHROMED OULET REF
OUTLET SEAL HOUSING REF
HOPPER WELDMENT REF
90° GREASE FITTING REF
MACHINE OUTLET REF
LARGE O-RING
SMALL O-RING
MODIFIED OUTLET THICK SEAL
GUIDE BAND
OUTLET THICK SEAL
OUTLET HOUSING
SEAL KIT INSTALLATION
SECTIONAL VIEW

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 tell-tell 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.

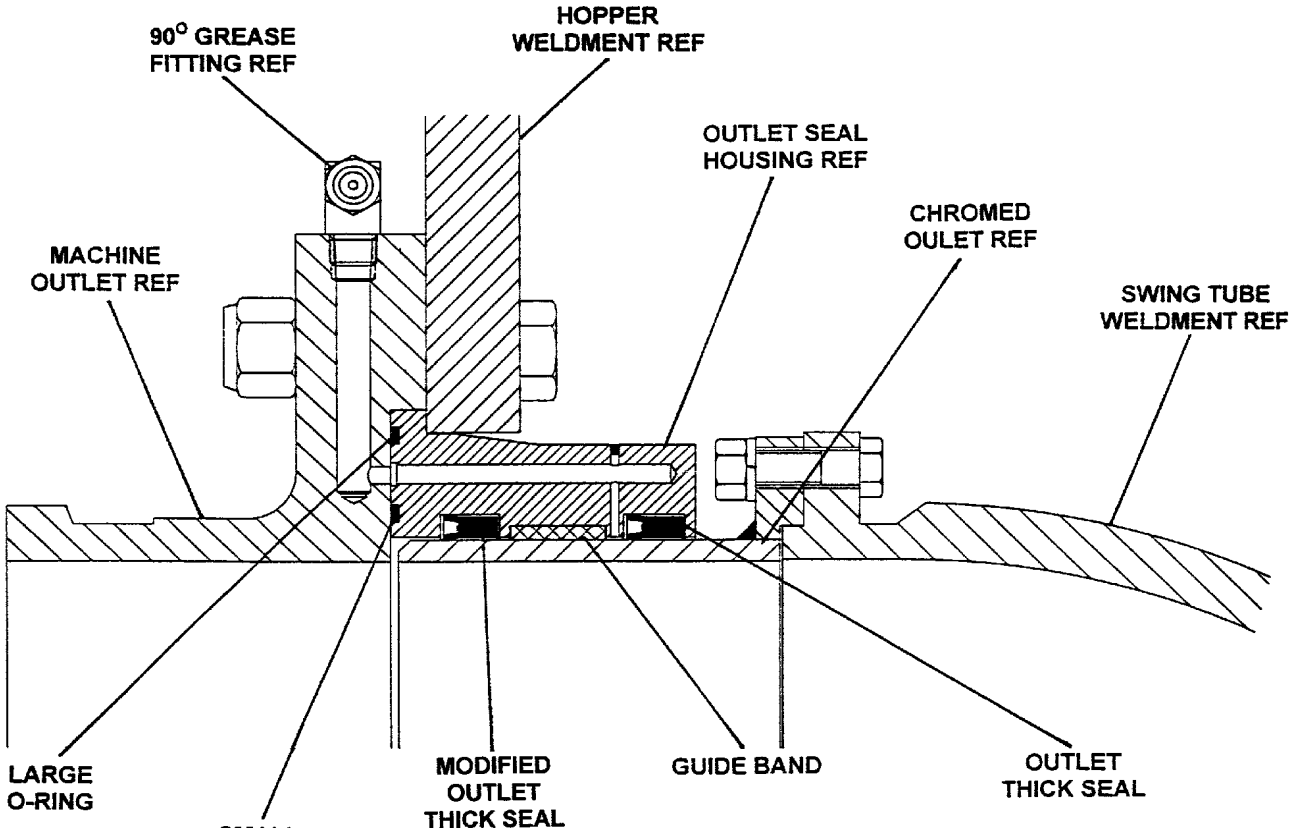


SWING TUBE & COMPONENTS

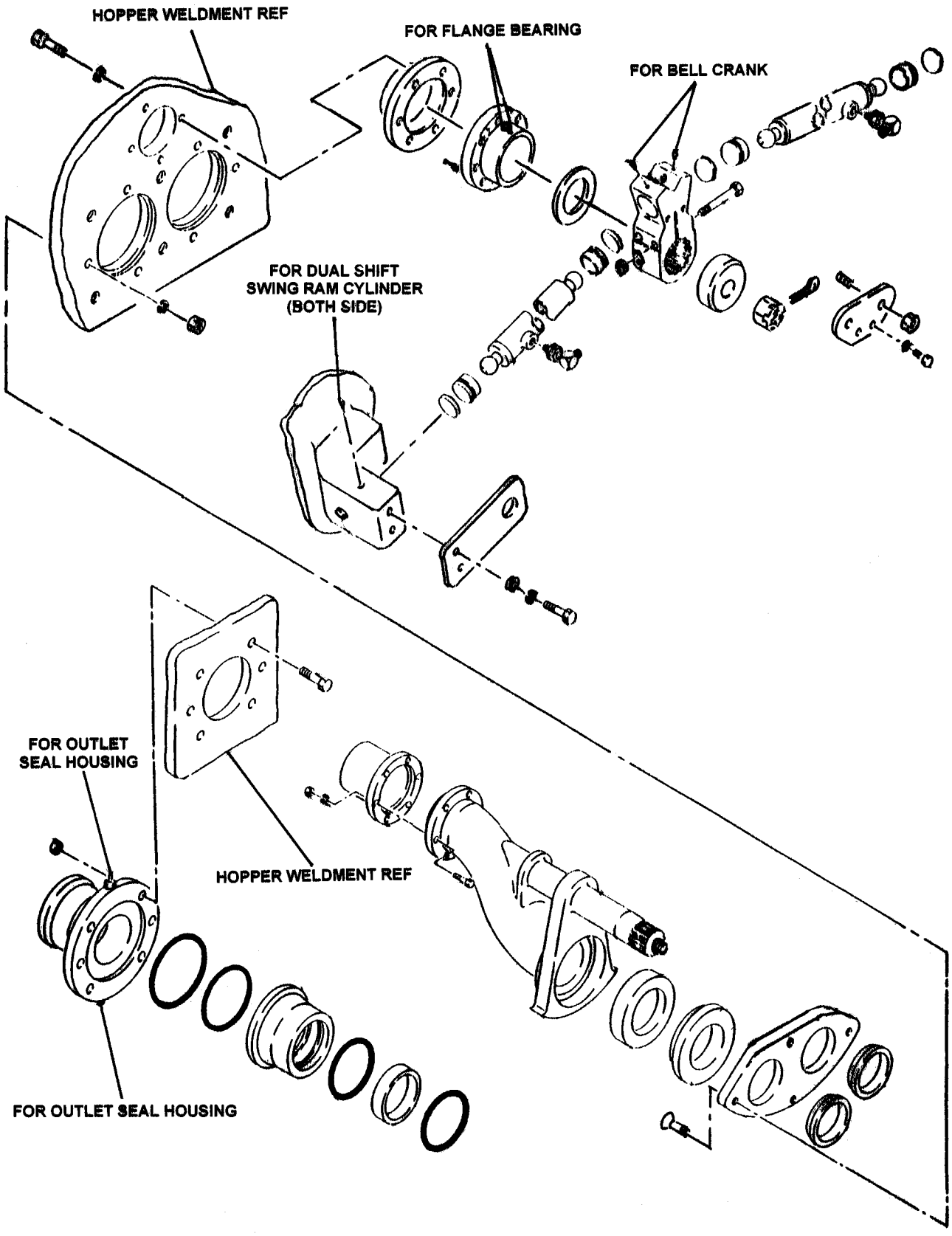
The sealing characteristics of the swing tube depends on metal to metal friction of the wear ring, located inside the swing tube, to the wear plate installed on the inside of the hopper at the material cylinders. This friction and the abrasiveness of the pumping material mixes will cause wear and a breakdown 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 tell-tell signs or identifying symptoms that adjustment is needed or parts are worn might be:

- 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.



OUTLET HOUSING SEAL KIT INSTALLATION SECTIONAL VIEW



DUAL SHIFT PUMPING TRAIN

WEAR RING AND WEAR PLATE REMOVAL/REPLACEMENT

- 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 cotter pin, castle nut, bell crank, and shift cylinder.
- 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 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.

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**.

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 outlet from swing tube and push outlet as far as possible toward hopper.
- Maneuver and work the swing tube toward the hopper outlet as far as it will go or until end of shaft is inside hopper.
- 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.

- 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 tell-tell 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.

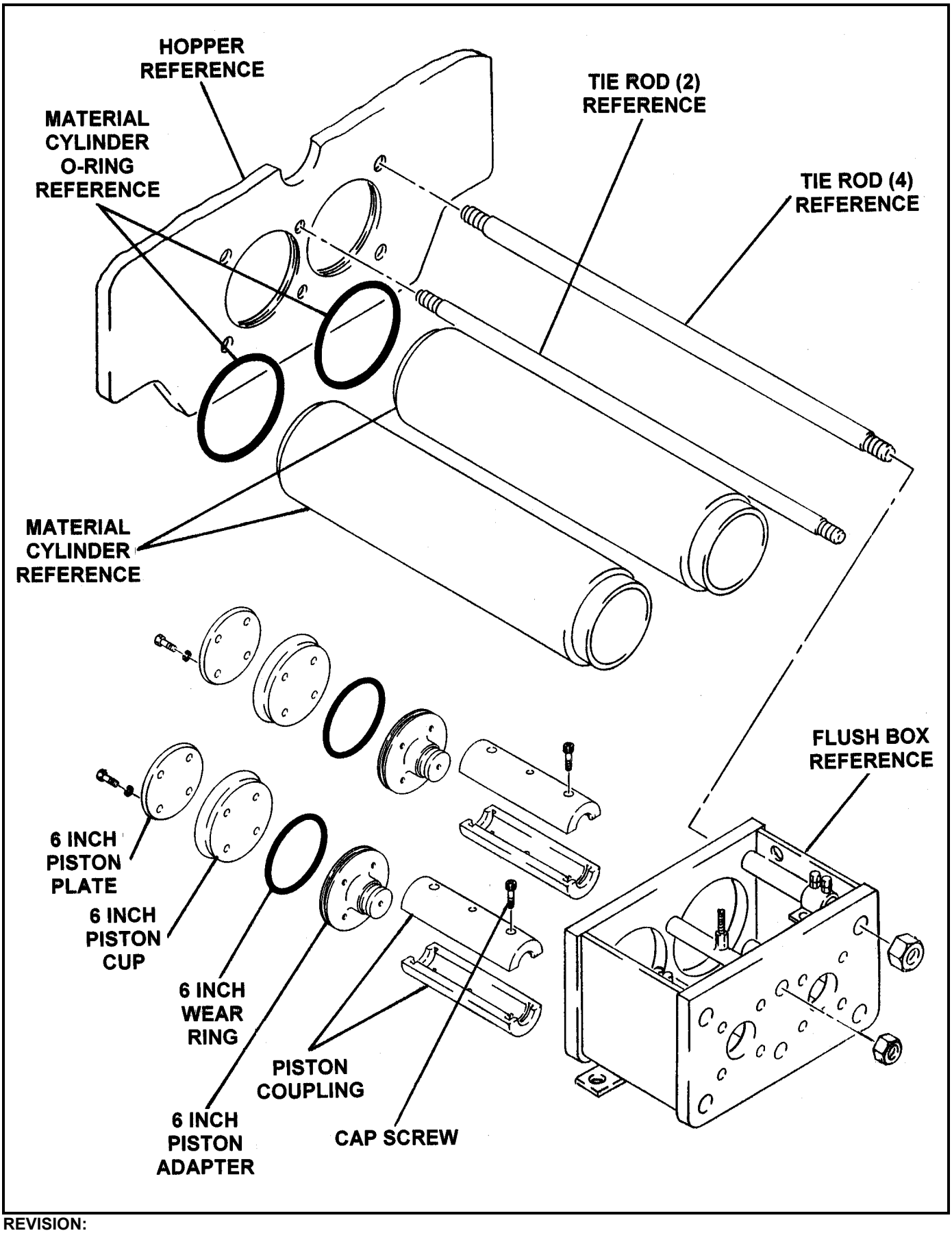
⚠ WARNING

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.


HOPPER REFERENCE
MATERIAL CYLINDER O-RING REFERENCE
TIE ROD (2) REFERENCE
TIE ROD (4) REFERENCE
MATERIAL CYLINDER REFERENCE
FLUSH BOX REFERENCE
6 INCH PISTON PLATE
6 INCH PISTON CUP
6 INCH WEAR RING
PISTON COUPLING
6 INCH PISTON ADAPTER
CAP SCREW

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:

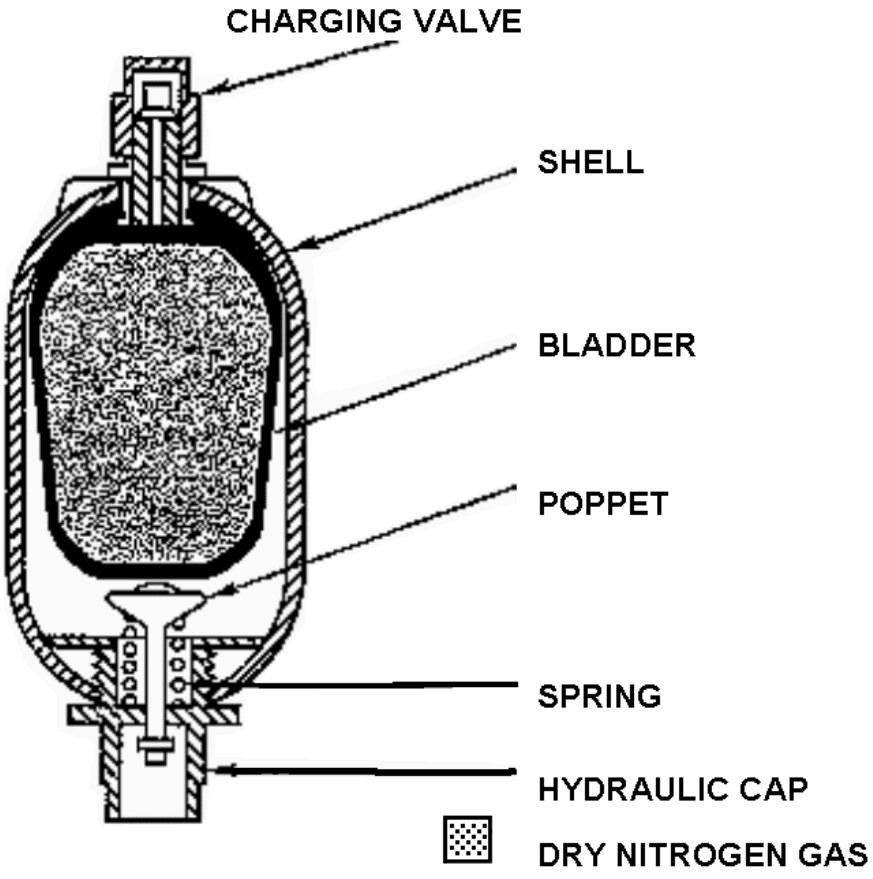
- Replace proximity sensor cross bar and check position of adjustment bracket to previous mark.
- Refill flush box with water or oil.

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*

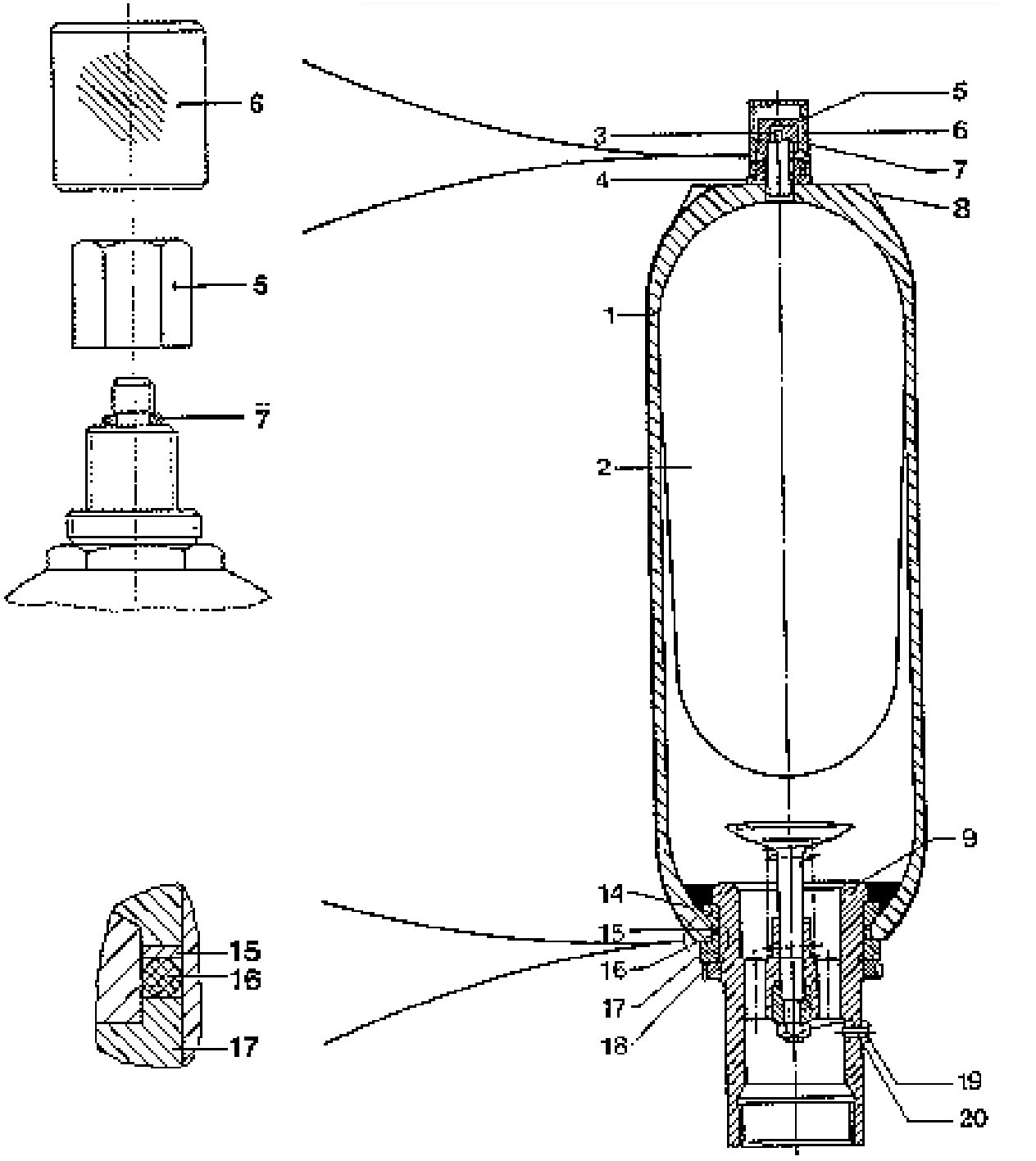
The hydraulic accumulator is PRESSURIZED VESSEL and only QUALIFIED TECHNICIANS should perform the necessary repairs. Always drain the fluid COMPLETELY from the accumulator before performing any work on the component.

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		



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**.

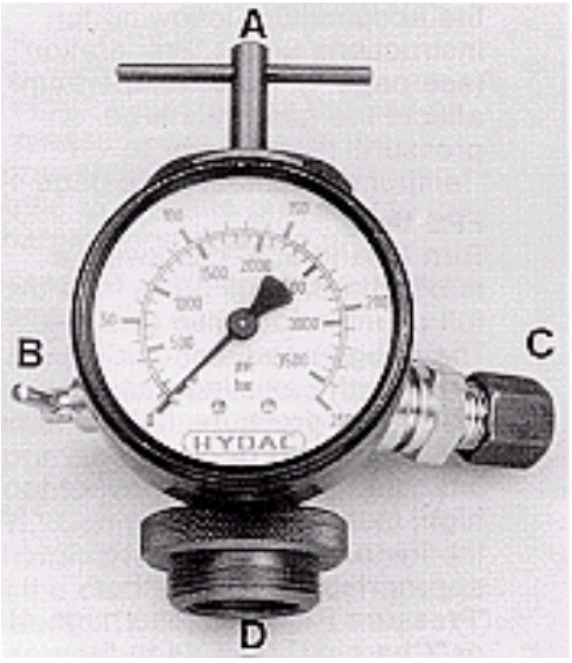
Periodically due to usage or leakage the bladder may loose some of the pre-charge which does affect the operation of the accumulator. As a result it is important that the pressure be checked at least once a year or when there is a noticeable change in the operation. The following is offered to assist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

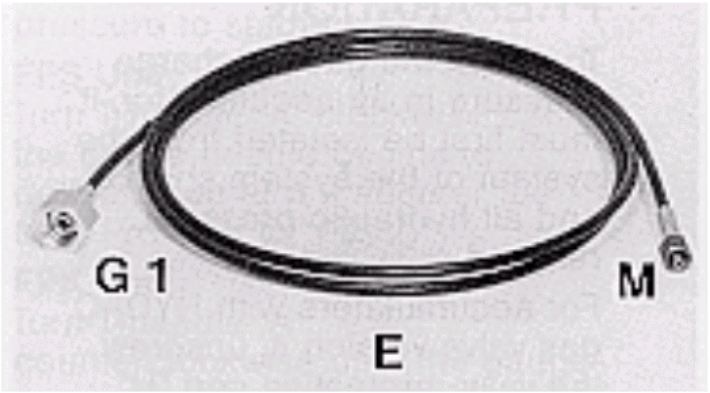
N O T E

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

- 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.

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.

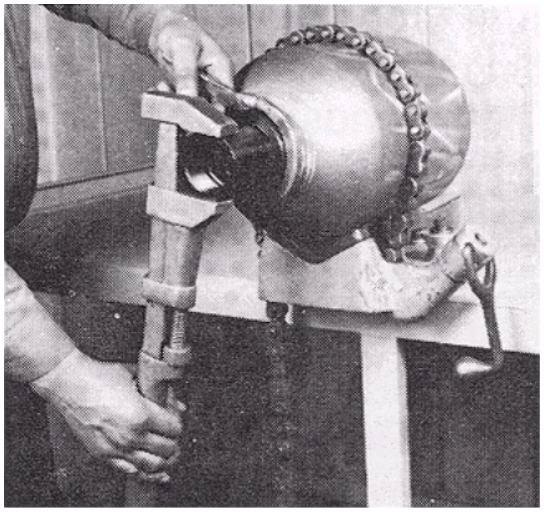


Photo A

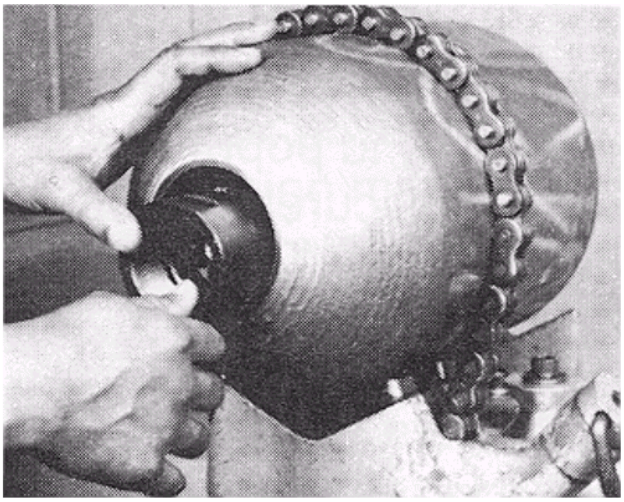


Photo B

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

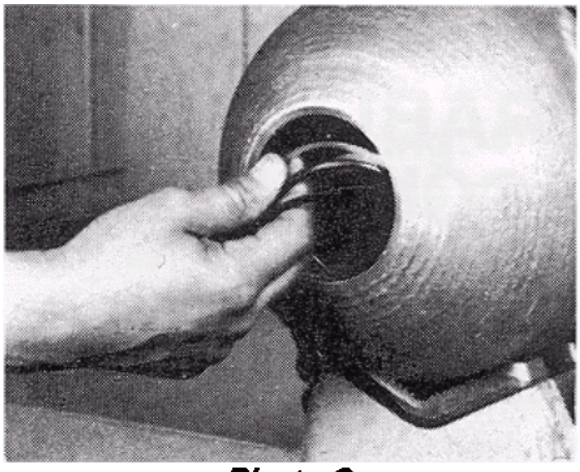


Photo C

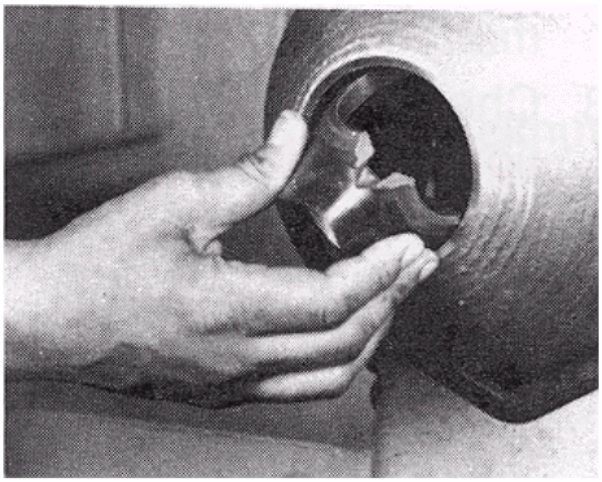


Photo D

- 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

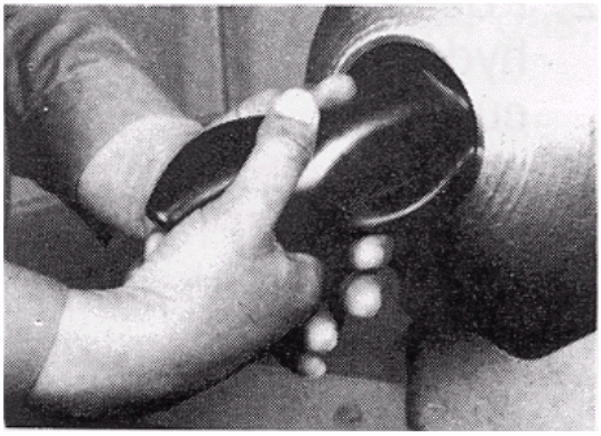


Photo F

- 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.

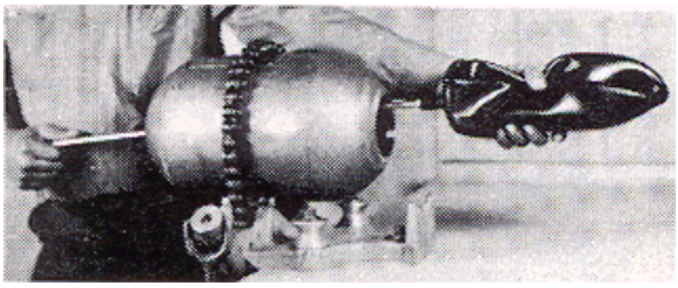


Photo G

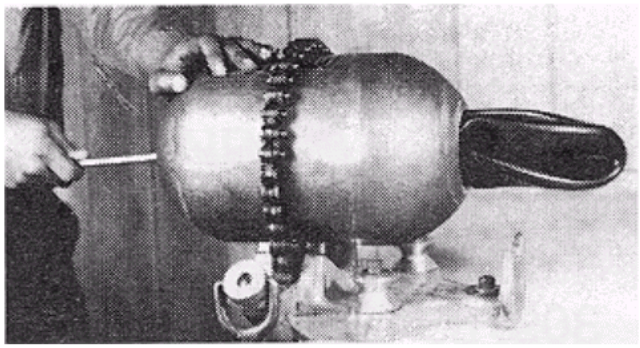


Photo H

- 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.

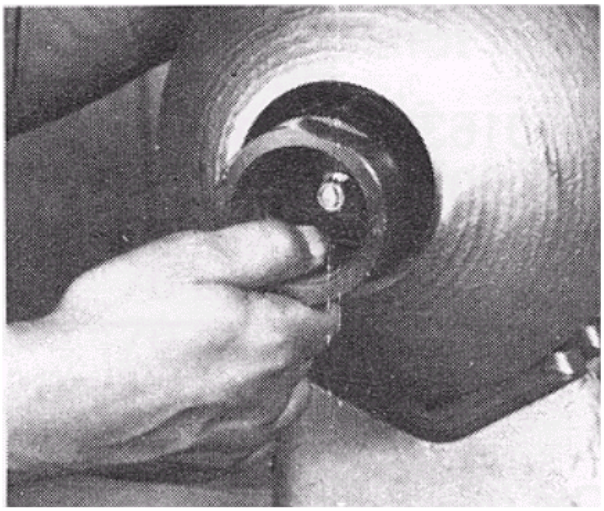


Photo I

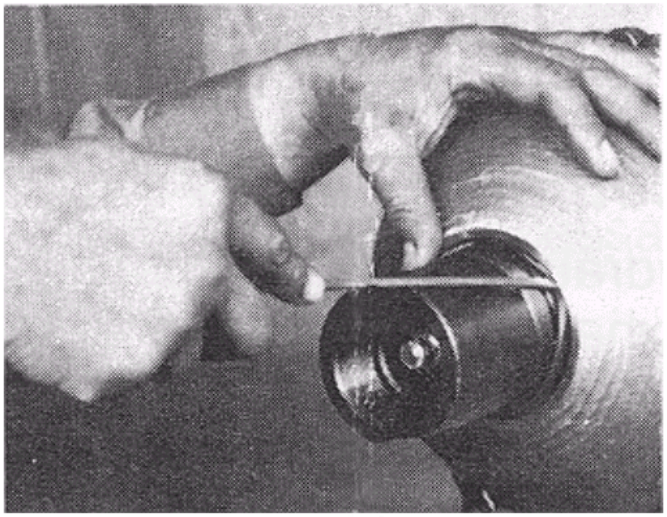


Photo J

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

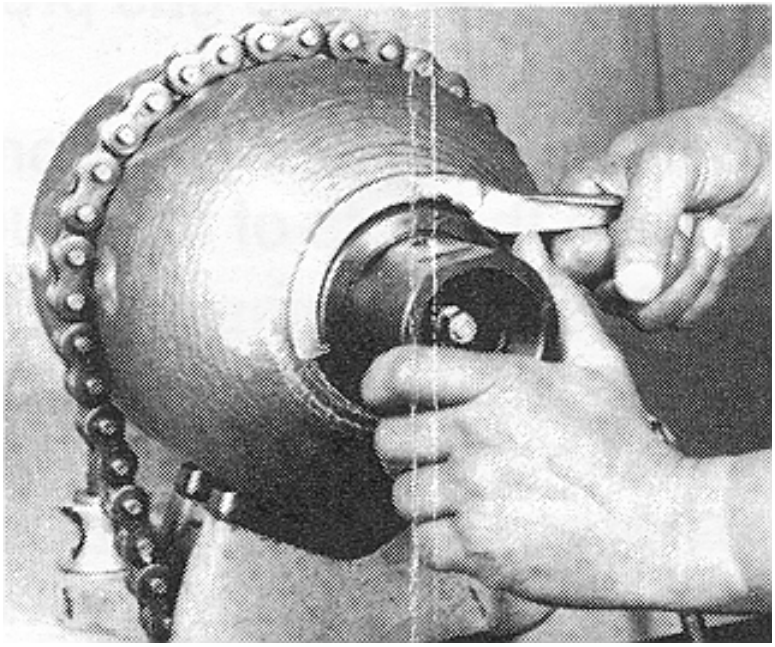
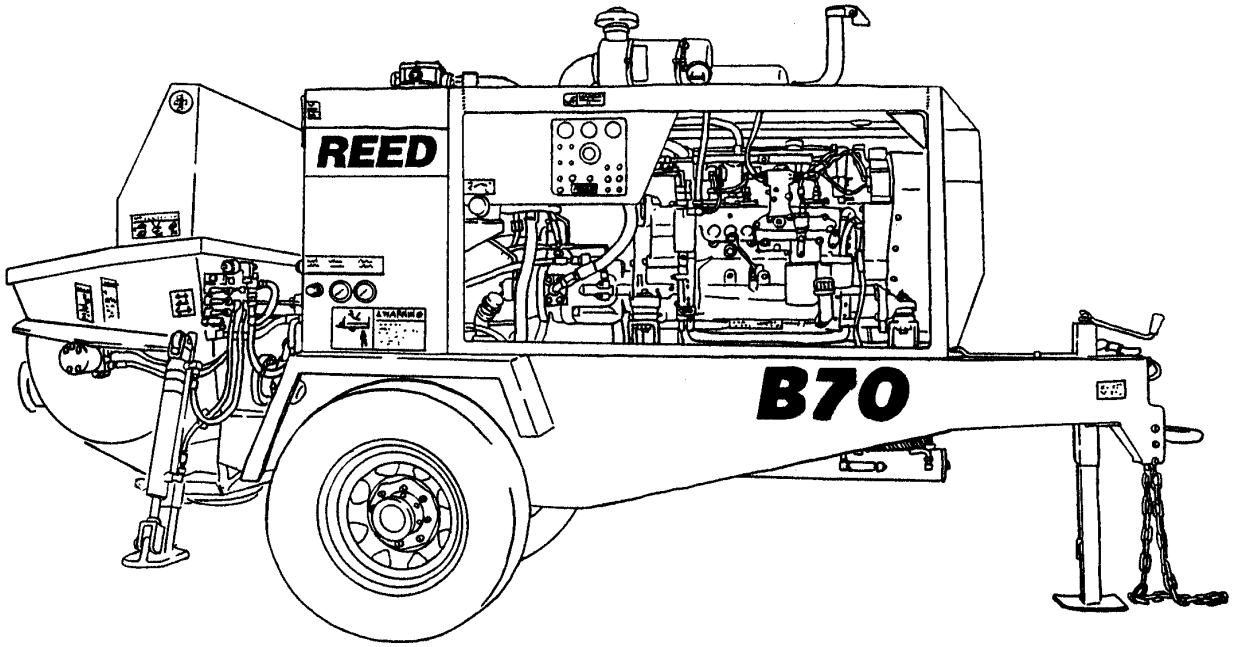


Photo K

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



TRAILER MOUNTED PUMP *01* MODEL *B70*
DRIVE CYLINDER CIRCUIT
HYDRAULIC COMPONENTS & SCHEMATIC

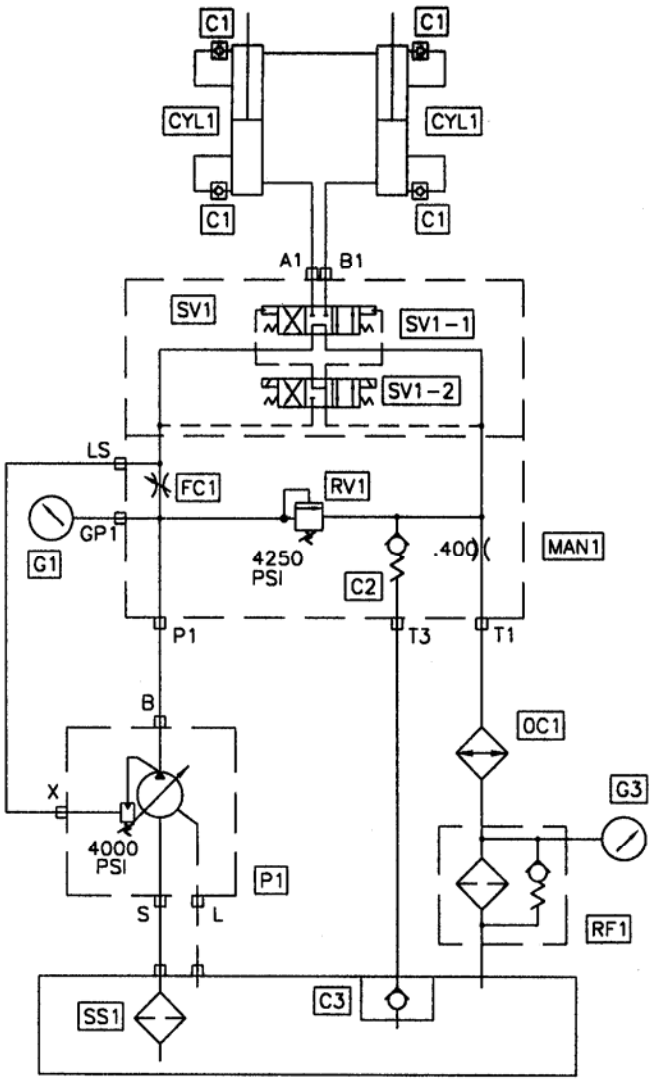
B SERIES DRIVE CYLINDER CIRCUIT
HYDRAULIC SCHEMATIC

DATE 12/3/01

REV.

PART NO. 86708

REED



CODE	DESCRIPTION	PART NO.	QTY.
P1	Main Pump, Parts, Group 40		
CYL1	Hydraulic Drive Cylinder, Parts Group 60		
MAN1	Manifold Drive Cylinder Circuit	85248	1
SV1	Solenoid Valve, Drive Cylinder Circuit	85689	1
SV1-1	Solenoid Valve Main	85690	1
SV2-2	Solenoid Valve Pilot	85691	1
	Coil For SV2-2	85692	2
RV1	Relief Valve Cartrige	85696	1
FC1	Flow Control Valve Cartrige	85697	1
C1	Check Valve	78961	4
C2	Check Valve Cartrige	85698	1
C3	Check Valve	85574	1
G1	Pressure Gauge 6000 psi	74562	1
G3	Pressure Gauge Return	85575	1
OC1	Oil Cooler	85713	1
RF1	Return Filter	85282	1
	Return Filter Element	85283	1
SS1	Magnetic Suction Strainer 2"	801024	1

REVISION:

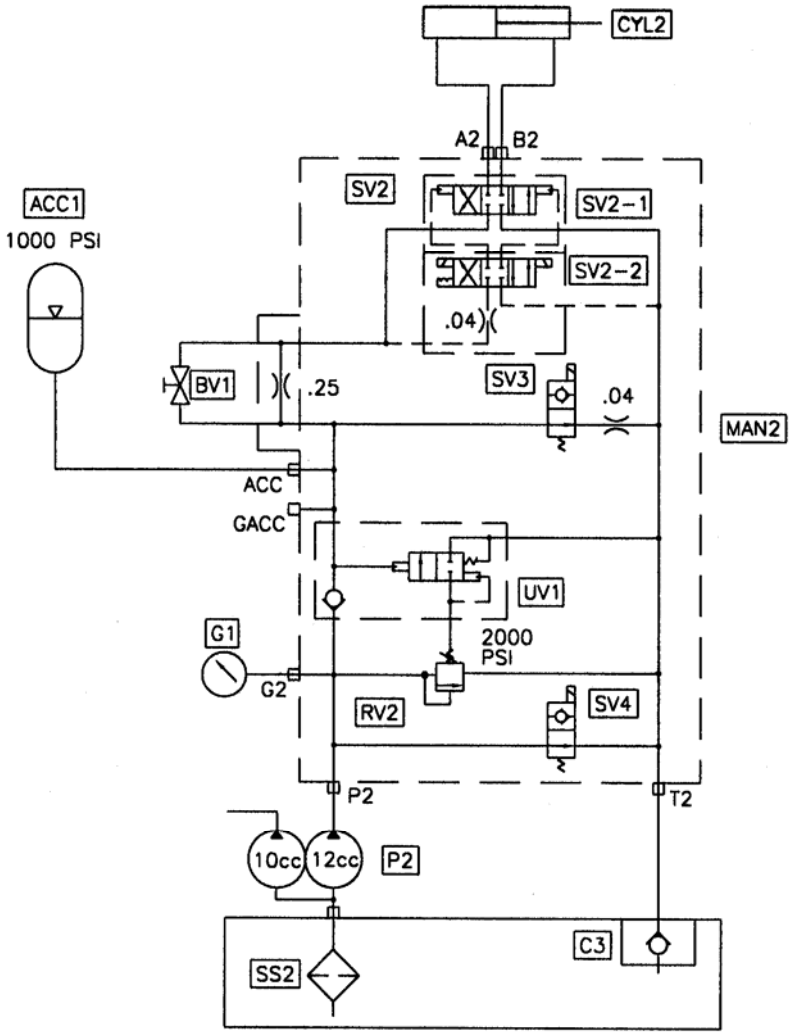
B & C SERIES SWING TUBE HYDRAULIC
SCHEMATIC, SINGLE SHIFT CYLINDER

DATE 11/7/01

REV.

PART NO. 86705

REED



CODE	DESCRIPTION	PART NO.	QTY.
P2	Gear Pump, Parts, Group 40	73156	1
CYL2	S Tube Single Shift Cylinder	86221	1
MAN2	Manifold S Tube Circuit	85249	1
SV2	Solenoid Valve S Tube Circuit	85693	1
SV2-1	Solenoid Valve Main	85694	1
SV2-2	Solenoid Valve Pilot	85695	1
	Coil For SV2-2	85692	2
SV3	Solenoid Valve Cartridge	85699	1
	Coil For SV3	85700	1
SV4	Solenoid Valve Cartridge	85701	1
	Coil For SV4	85702	1
RV2	Relife Valve Cartrige	85703	1
UN1	Unloding Valve Cartrige	85704	1
BV1	Ball Valve	85705	1
AAC1	Accumulator	74515	1
	Accumulator, Bladder	74516	1
G2	Pressure Gauge 3000 PSI	70366	1
SS2	Magnetic Suction Strainer 1 1/4"	79247	1
C3	Check Valve	85574	1

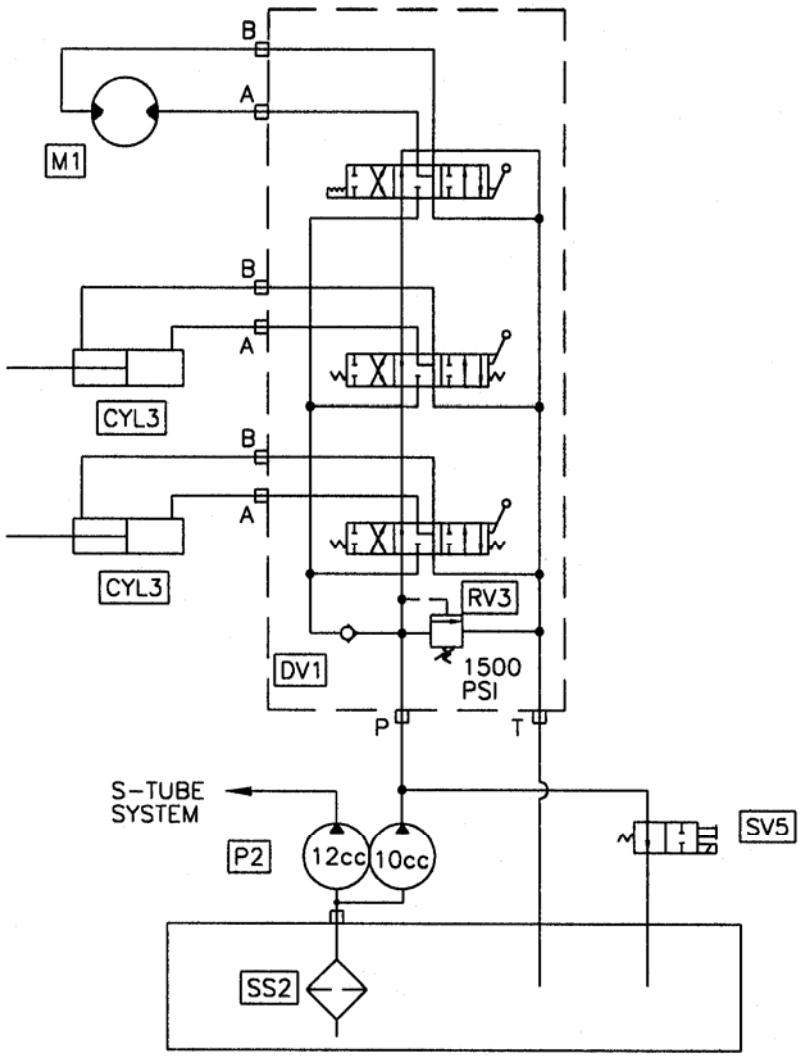
REVISION:

B & C SERIES AGITATOR/OUTRIGGER
OPTION SCHEMATIC

DATE 11/7/01

REV.

PART NO. 86707



CODE	DESCRIPTION	PART NO.	QTY.
P2	Gear Pump, Parts, Group 40		
CYL3	Hydraulic Outrigger Cylinder	86220	2
DV1	Directional Valve Agitator/Outrigger	86329	1
RV3	Relife Valve Cartrige	85706	1
M1	Agitator Motor, Parts, Group 20		
SV5	Solenoid Valve	85815	1
	Coil For SV5	85702	1
SS2	Magnetic Suction Strainer 1 1/4"	79247	1

REED

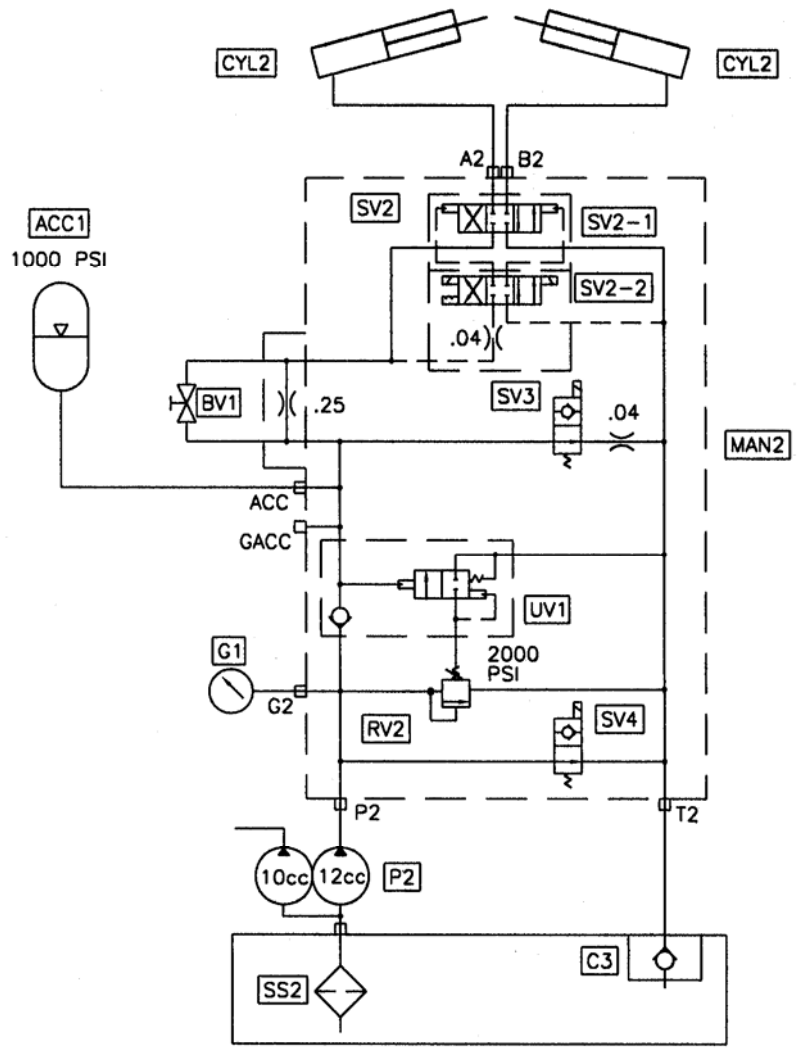
REVISION:

B & C SERIES SWING TUBE HYDRAULIC
SCHEMATIC, DUAL SHIFT CYLINDER

DATE 11/7/01

REV.

PART NO. 86706



CODE	DESCRIPTION	PART NO.	QTY.
P2	Gear Pump, Parts, Group 40		
CYL2	S Tube Single Shift Cylinder	86220	2
MAN2	Manifold S Tube Circuit	85249	1
SV2	Solenoid Valve S Tube Circuit	85693	1
SV2-1	Solenoid Valve Main	85694	1
SV2-2	Solenoid Valve Pilot	85695	1
	Coil For SV2-2	85692	2
SV3	Solenoid Valve Cartridge	85699	1
	Coil For SV3	85700	1
SV4	Solenoid Valve Cartridge	85701	1
	Coil For SV4	85702	1
RV2	Relife Valve Cartrige	85703	1
UN1	Unloding Valve Cartrige	85704	1
BV1	Ball Valve	85705	1
AAC1	Accumulator	74515	1
	Accumulator, Bladder	74516	1
G2	Pressure Gauge 3000 PSI	70366	1
SS2	Magnetic Suction Strainer 1 1/4"	79247	1
C3	Check Valve	85574	1

REED

REVISION:

HOSE KIT 86365

Part No.	End #1	End #2
85666-001	Main Pump "P"	Cylinder Manifold "P1"
85666-001	Cylinder Bulkhead "A"	Cylinder "A"
85666-006	Cylinder Bulkhead "B"	Cylinder "B"
85659-001	Main pump load sense	Cylinder Manifold "LS"
85657-005	Main pump case drain	Tank return
85654-001	Cylinder Maniflod "T1"	Oil Cooler "IN"
85654-001	Oil Cooler "OUT"	Return Filter Bulkhead
85659-002	Check Loop	
85659-002	Check Loop	
85659-002	Check Loop	
85659-002	Check Loop	
85659-002	Check Loop	
85663-002	Tank Suction	Tandem Pump "S"
85657-002	Tandem Pump 12cc"P"	S-Tube Manifold "P2"
85667-001	S-Tube Manifold "ACC"	Acumulator
85657-002	Bulkhead "A"	Left shift cylinder bore side
85657-002	Bulkhead "B"	Right shift cylinder bore side
85657-003	Tandem Pump 10cc"P"	Bulkhead Tee "P"
85657-002	Bulkhead Tee "P"	Bypass Valve "1"
85657-016	Bulkhead "T"	Bulkhead "P"
85657-004	Bulkhead "T"	Cylinder Manifold "T1"

SUCTION HOSES - POWER TRAIN

Part No.	End #1	End #2
85660-001	Tank Suction	Main Pump "S"
85661-001	Tank Suction	Main Pump "S"
85662-001	Tank Suction	Main Pump "S"

FUEL HOSES - 86344 FUEL GROUP

Part No.	End #1	End #2
85669-001	Fuel Tank Suction	Fuel Filter "IN"
85669-005	Fuel Filter "OUT"	Engine
74716	Engine	Fuel Tank Return

CONTROL VALVE GROUP - 86329

Part No.	End #1	End #2
85657-016	Bulkhead "P"	Agitator Valve "P"
85658-011	Agitator Valve "A"	Agitator Motor "A"
85658-010	Agitator Valve "B"	Agitator Motor "B"

HYD OUTRIGGER GROUP - 86334

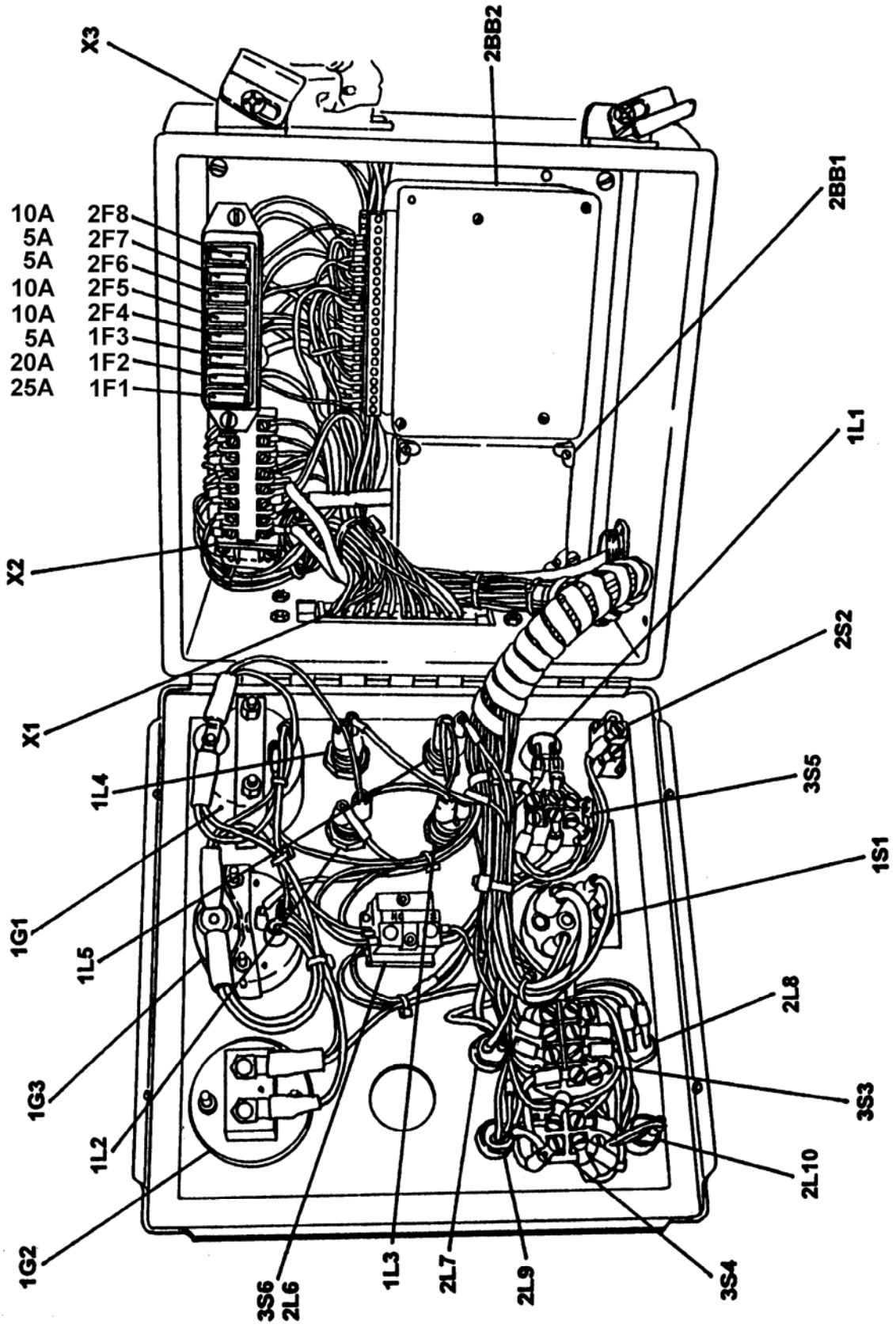
Part No.	End #1	End #2
85659-010	O/R Valve "A"	RH Outrigger Bore
85659-010	O/R Valve "B"	RH Outrigger Rod
85659-010	O/R Valve Tube "A"	LH Outrigger Bore
85659-010	O/R Valve Tube "B"	LH Outrigger Rod

WATER PUMP - 86400

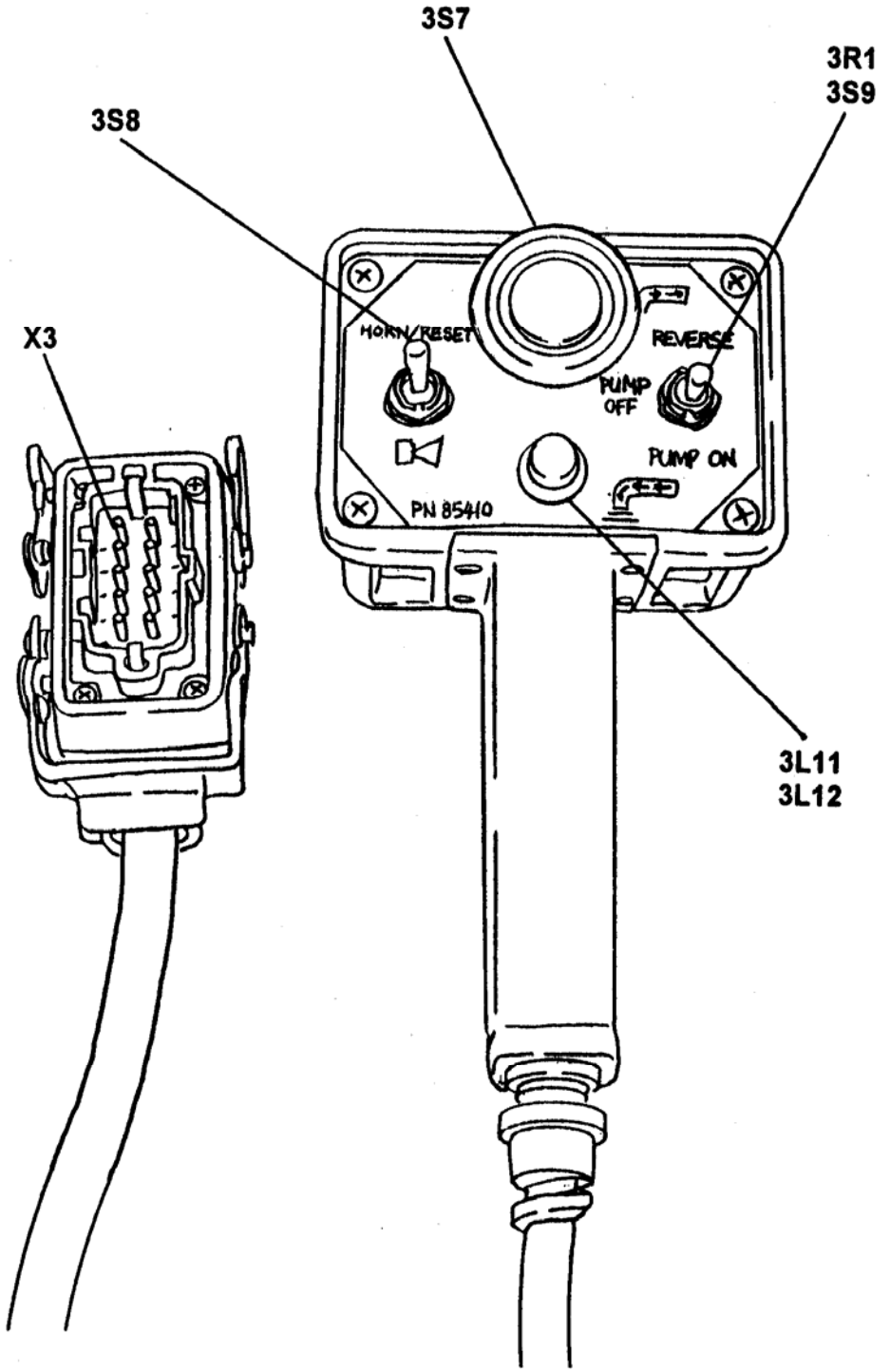
Part No.	End #1	End #2
85657-021	Agitator Valve "PB"	Bulkhead "P"
85657-023	Bulkhead "P"	Water Valve "P
85657-023	Water Valve "T"	Tank
85658-002	Water Valve "B"	Motor "A"
85658-002	Water Valve "A"	Motor "B"
85657-022	Water Relief	Water Suction

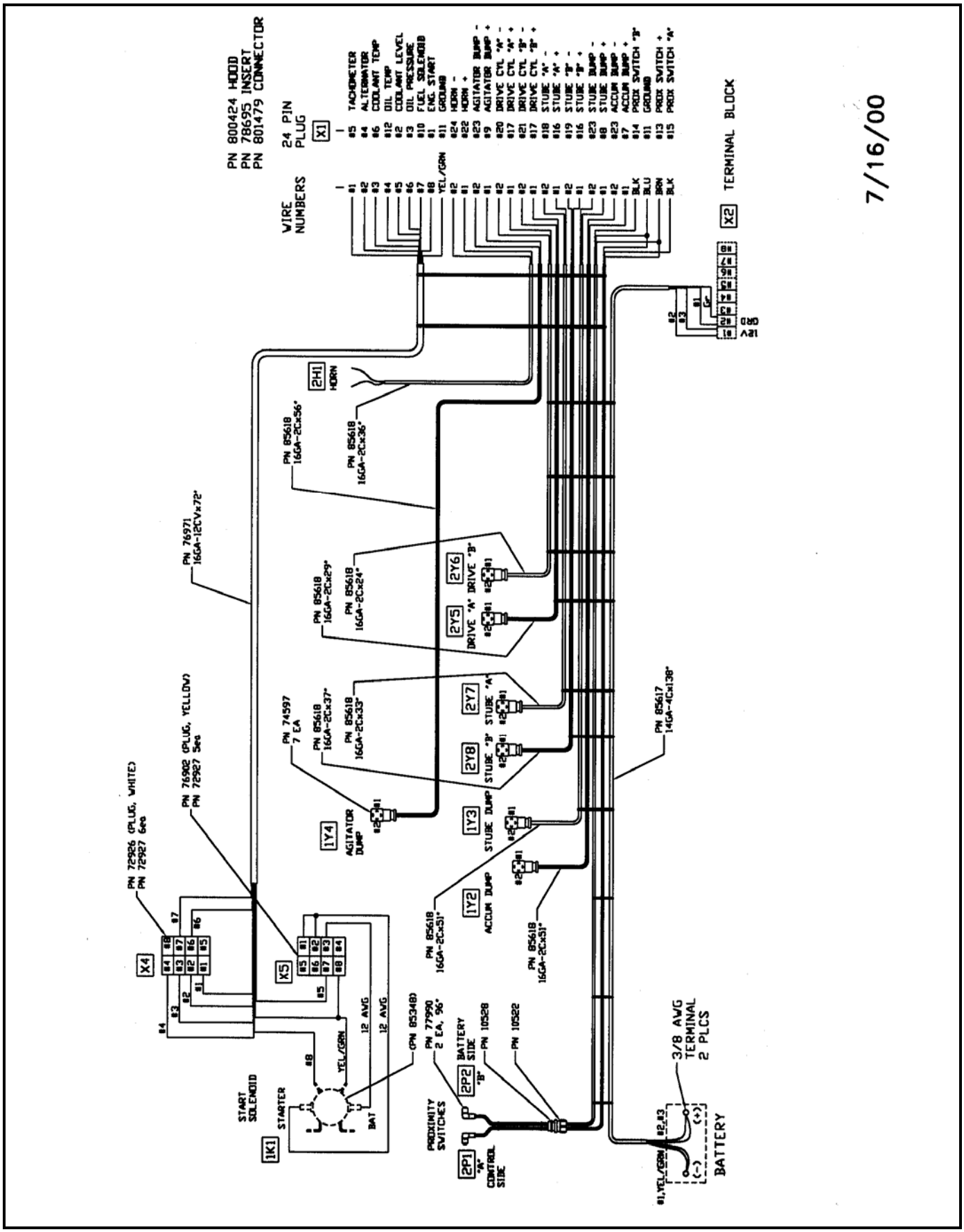
Code	Description	Part No.	Qty	Location	
	SWITCHES				
1S1	Key Switch	71154	1	Control Panel	
2S2	Toggle Switch, Horn	85347	1	Control Panel	
3S3	Toggle Switch, Local/Remote	78563	1	Control Panel	
3S4	Toggle Switch, Pump On/Reverse	72003	1	Control Panel	
3S5	Toggle Switch, Test A/B	85346	1	Control Panel	
3S6	E-Stop Switch	85342	1	Control Panel	
	Contact Block, 1NC for 3S6	85343	1	Control Panel	
3S7	E-Stop Switch	85342	1	Remote Control	
	Contact Block, 1NC for 3S7	85343	1	Remote Control	
3S8	Toggle Switch, Horn	85347	1	Remote Control	
3S9	Toggle Switch, Pump On/Reverse	72003	1	Remote Control	
	RELAYS				
1K1	Relay, Engine Start	85348	1	Engine	
	LIGHTS				
1L1	Light, Green, Control On	85355	1	Control Panel	
1L2	Light, Red, Oil Temperature	73775	1	Control Panel	
1L3	Light, Red, Coolant Level	73775	1	Control Panel	
1L4	Light, Red, Oil Pressure	73775	1	Control Panel	
1L5	Light, Red, Alternator	73775	1	Control Panel	
	Bulb for IL2, 1L3, 1L4, 1L5	72022	4	Control Panel	
2L6	Bulb, E-Stop	85344	1	Control Panel	
2L7	Light, Green, Local	85355	1	Control Panel	
3L8	Light, Yellow, Remote	85356	1	Control Panel	
3L9	Light, Green, Pump On	85355	1	Control Panel	
3L10	Light, Green, Reverse	85355	1	Control Panel	
3L11	Bulb, E-Stop	85344	1	Remote Control	
3L12	Light, Green, Pump On	85355	1	Remote Control	
	GAUGES				
1G1	Hour Meter	74240	1	Control Panel	
1G2	Tachometer	78687	1	Control Panel	
1G3	Coolant Temperature Gauge	78203	1	Control Panel	

Code	Description	Part No.	Qty	Location	
	FUSES				
1F1	Fuse, 25A	800447	1	Control Panel	
1F2	Fuse, 20A	800448	1	Control Panel	
1F3	Fuse, 5A	90392	1	Control Panel	
2F4	Fuse, 10A	800449	1	Control Panel	
2F5	Fuse, 10A	800449	1	Control Panel	
2F6	Fuse, 5A	90392	1	Control Panel	
2F7	Fuse, 5A	90392	1	Control Panel	
2F8	Fuse, 10A	800449	1	Control Panel	
	Fuse Block, 8 Way	85354	1	Control Panel	
	SOLENOID VALVE COILS				
1Y1	Coil, Fuel Solenoid	Deutz	1	Engine	
1Y2	Coil, Accumulator Bypass	85700	1	S-Tube Manifold	
1Y3	Coil, S-Tube Bypass	85702	1	S-Tube Manifold	
1Y4	Coil, Agitator Bypass	73184	1	Hyd. Tank	
2Y5	Coil, Cylinder "B"	85692	1	S-Tube Manifold	
2Y6	Coil, Cylinder "A"	85692	1	S-Tube Manifold	
2Y7	Coil, S-Tube Shift "A"	85692	1	Pump Manifold	
2Y8	Coil, S-Tube Shift "B"	85692	1	Pump Manifold	
	Plugs for 1Y2 thru 2Y8	74597	7	Manifolds	
	MISCELLANEOUS				
2BB1	Black Box, Pump Control	85334	1	Control Box	
2BB2	Black Box, E-Stop Logic	85596	1	Control Box	
2P1	Proximity Switch, Cyl "B"	77998	1	Water Box	
2P2	Proximity Switch, Cyl "A"	77998	1	Water Box	
2H1	Horn	800347	1	Control Box	
3R1	Resistor, 100 Ohm	72777	1	Remote Control	
	CONNECTORS				
X1	Connector Insert, 24 Pin, Female	78696	1	Control Box	
X1	Connector Base	78697	1	Control Box	
X1	Connector Insert, 24 Pin, Male	78695	1	Harness	
X1	Connector Hood	800424	1	Harness	
X2	Terminal Block	72820	8	Control Box	
X3	Connector Insert, 10 Pin, Female	79963	1	Control Box	
X3	Connector Base	79965	1	Control Box	
X3	Connector Insert, 10 Pin, Male	79964	1	Remote Control	
X3	Connector Hood	79966	1	Remote Control	
X4	Connector, Engine, White	72926	1	Harness	
X5	Connector, Engine, Yellow	76902	1	Harness	

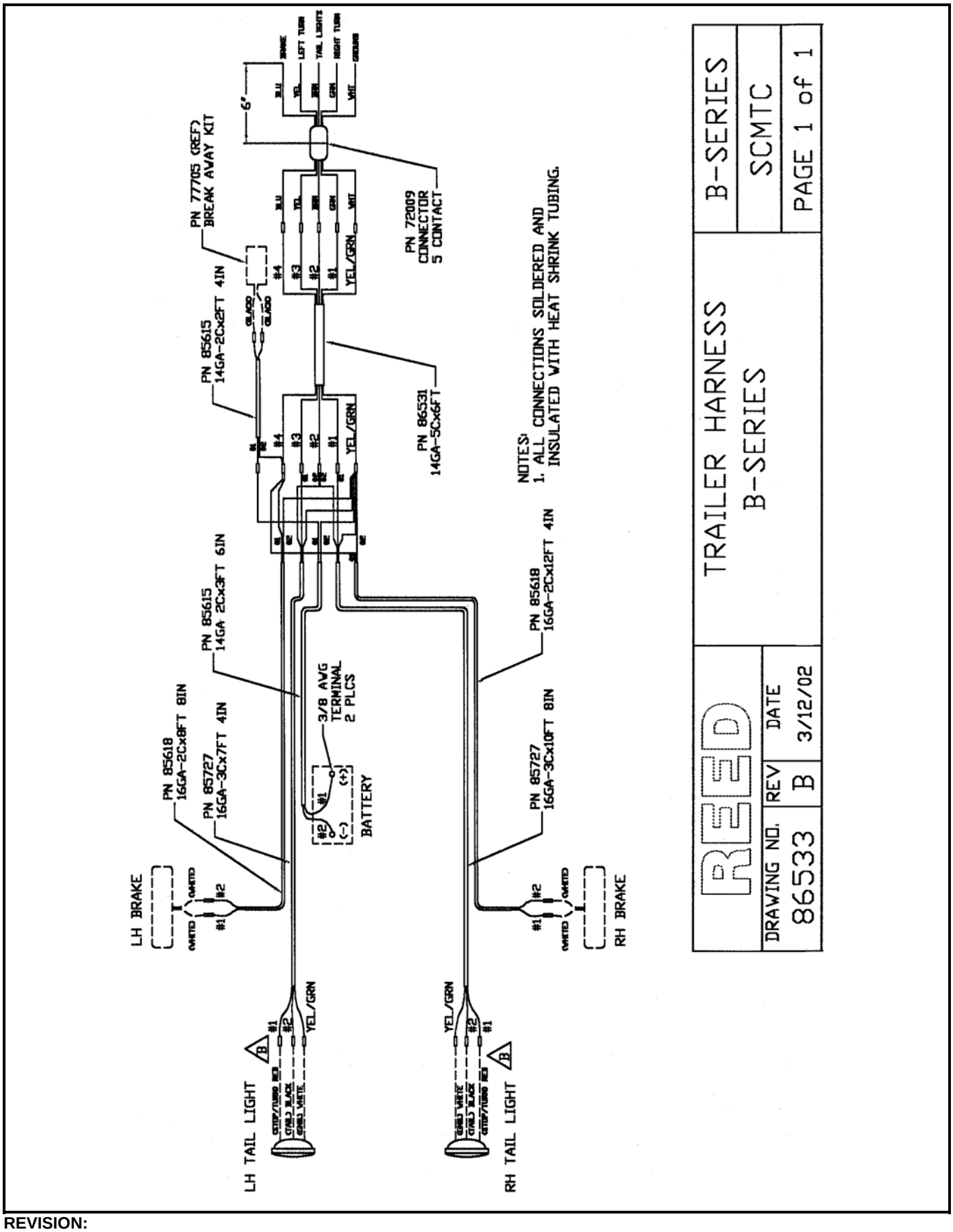

X3
2BB2
2BB1
10A 2F8
5A 2F7
5A 2F6
10A 2F5
10A 2F4
5A 1F3
20A 1F2
25A 1F1
1L1
X2
X1
2S2
1L4
3S5
1S1
1G1
1L5
2L8
1G3
3S3
1L2
2L10
1G2
3S6
2L6
1L3
2L7
2L9
3S4

REVISION:

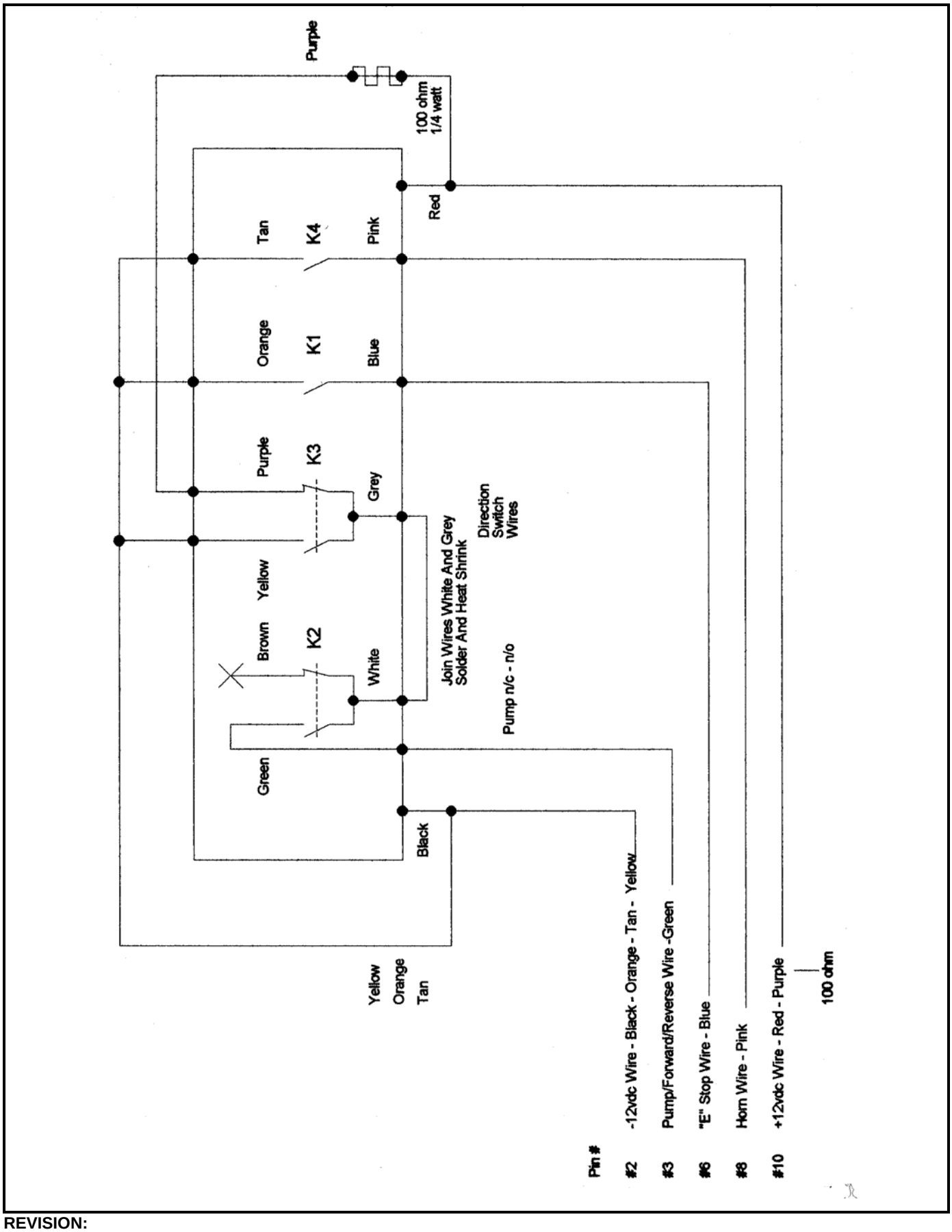

3S7
3R1
3S9
3S8
X3
HORN/RESET
REVERSE
PUMP
OFF
PUMP ON
PN 85410
3L11
3L12


PN 800424 HOOD
PN 78695 INSERT
PN 801479 CONNECTOR
24 PIN PLUG
X1
WIRE NUMBERS
#5 TACHOMETER
#4 ALTERNATOR
#6 COOLANT TEMP
#12 OIL TEMP
#2 COOLANT LEVEL
#3 OIL PRESSURE
#10 FUEL SOLENOID
#1 ENG. START
#11 GROUND
#24 HORN -
#22 HORN +
#23 AGITATOR BUMP -
#9 AGITATOR BUMP +
#20 DRIVE CYL "A" -
#17 DRIVE CYL "A" +
#21 DRIVE CYL "B" -
#17 DRIVE CYL "B" +
#18 STUBE "A" -
#16 STUBE "A" +
#19 STUBE "B" -
#16 STUBE "B" +
#23 STUBE BUMP -
#8 STUBE BUMP +
#23 ACCUM BUMP -
#7 ACCUM BUMP +
#14 PROX SWITCH "B"
#11 GROUND
#13 PROX SWITCH +
#15 PROX SWITCH "A"
YEL/GRN
BLK
BLU
BRN
BLK
X2 TERMINAL BLOCK
7/16/00
2H1 HORN
PN 85618 16GA-2Cx56"
PN 85618 16GA-2Cx36"
PN 76971 16GA-12CVx72"
2Y6 DRIVE "B"
2Y5 DRIVE "A"
PN 85618 16GA-2Cx29"
PN 85618 16GA-2Cx24"
2Y7 STUBE "A"
2Y8 STUBE "B"
PN 74597 7 EA
PN 85618 16GA-2Cx37"
PN 85618 16GA-2Cx33"
PN 85617 14GA-4Cx138"
1Y4 AGITATOR DUMP
1Y3 STUBE DUMP
1Y2 ACCUM DUMP
PN 85618 16GA-2Cx51"
PN 85618 16GA-2Cx51"
PN 72926 (PLUG, WHITE)
PN 72927 6ea
PN 76902 (PLUG, YELLOW)
PN 72927 5ea
X4
X5
12 AWG
12 AWG
CPN 85348
PN 77990 2 EA, 96"
BATTERY SIDE
2P2 "B"
PN 10528
PN 10522
3/8 AWG TERMINAL 2 PLCS
START SOLENOID
STARTER
1K1
PROXIMITY SWITCHES
2P1 "A" CONTROL SIDE
#1,YEL/GRN
#2,#3
(-)
(+)
BATTERY

REVISION:


PN 77705 (REF)
BREAK AWAY KIT
PN 85615
14GA-2Cx2FT 4IN
PN 72009
CONNECTOR
5 CONTACT
PN 86531
14GA-5Cx6FT
PN 85615
14GA 2Cx3FT 6IN
PN 85618
16GA-2Cx8FT 8IN
PN 85727
16GA-3Cx7FT 4IN
3/8 AWG
TERMINAL
2 PLCS
BATTERY
PN 85618
16GA-2Cx12FT 4IN
PN 85727
16GA-3Cx10FT 8IN
LH BRAKE
RH BRAKE
LH TAIL LIGHT
RH TAIL LIGHT
YEL/GRN
NOTES:
1. ALL CONNECTIONS SOLDERED AND
INSULATED WITH HEAT SHRINK TUBING.
TRAILER HARNESS
B-SERIES
B-SERIES
SCMTC
PAGE 1 of 1
REED
DRAWING NO.
86533
REV
B
DATE
3/12/02

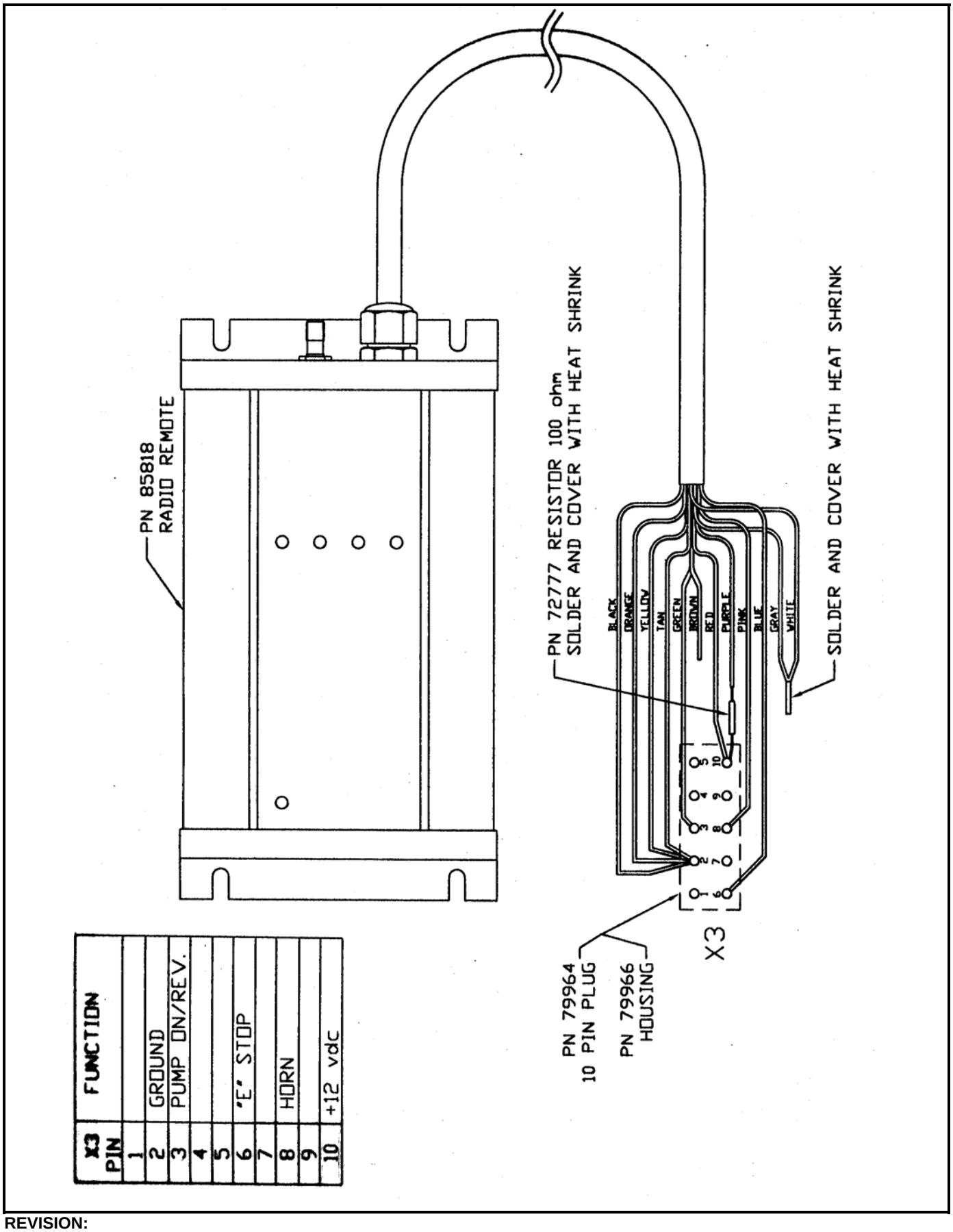
REVISION:


Purple
100 ohm
1/4 watt
Red
Tan
K4
Pink
Orange
K1
Blue
Purple
K3
Grey
Direction
Switch
Wires
Yellow
Brown
K2
White
Join Wires White And Grey
Solder And Heat Shrink
Pump n/c - n/o
Green
Black
Yellow
Orange
Tan
Pin #
#2 -12vdc Wire - Black - Orange - Tan - Yellow
#3 Pump/Forward/Reverse Wire -Green
#6 "E" Stop Wire - Blue
#8 Horn Wire - Pink
#10 +12vdc Wire - Red - Purple
100 ohm

REVISION:

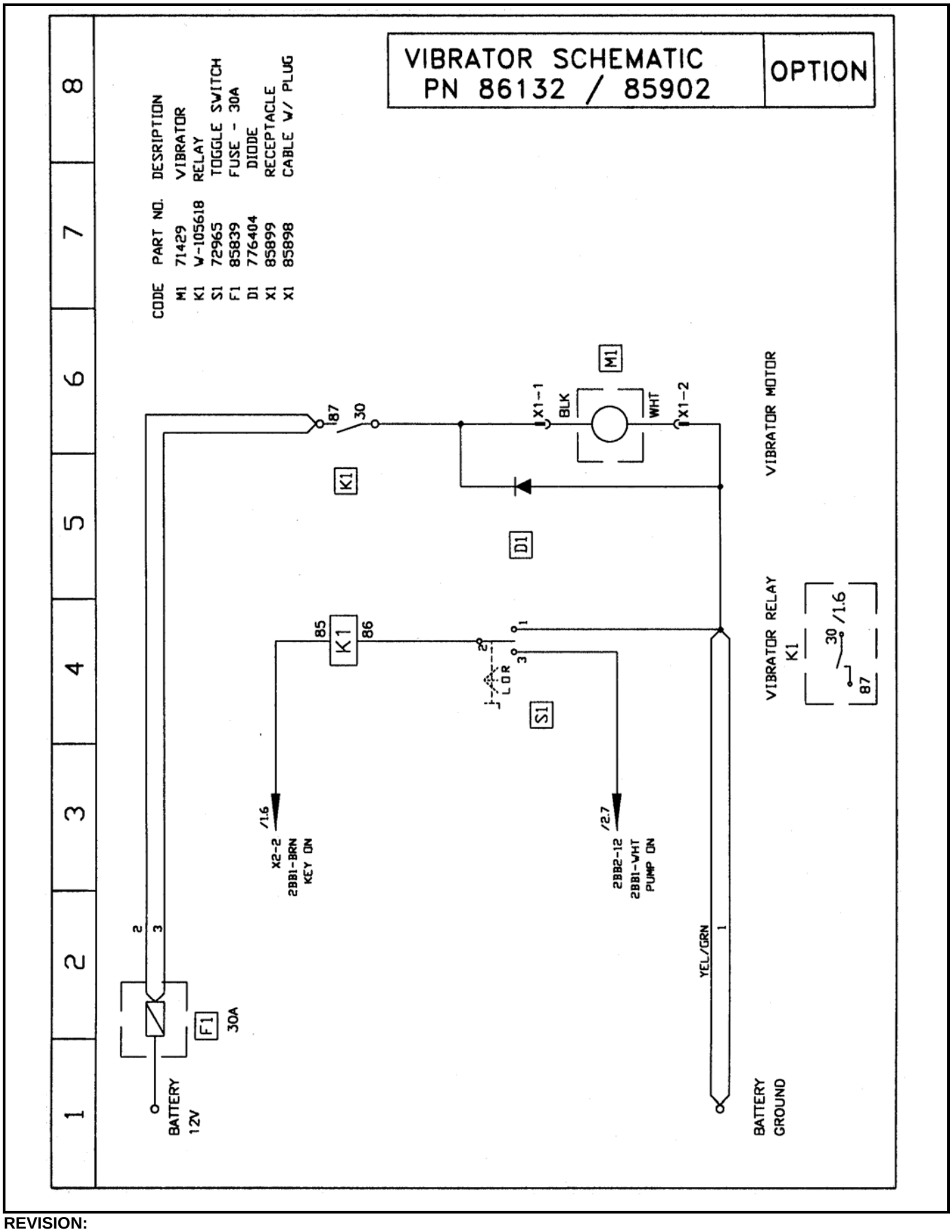
TRAILER MOUNTED PUMP *01* MODEL *B70*
RADIO REMOTE CONTROL OPTION
WIRING DIAGRAM

SCMTC

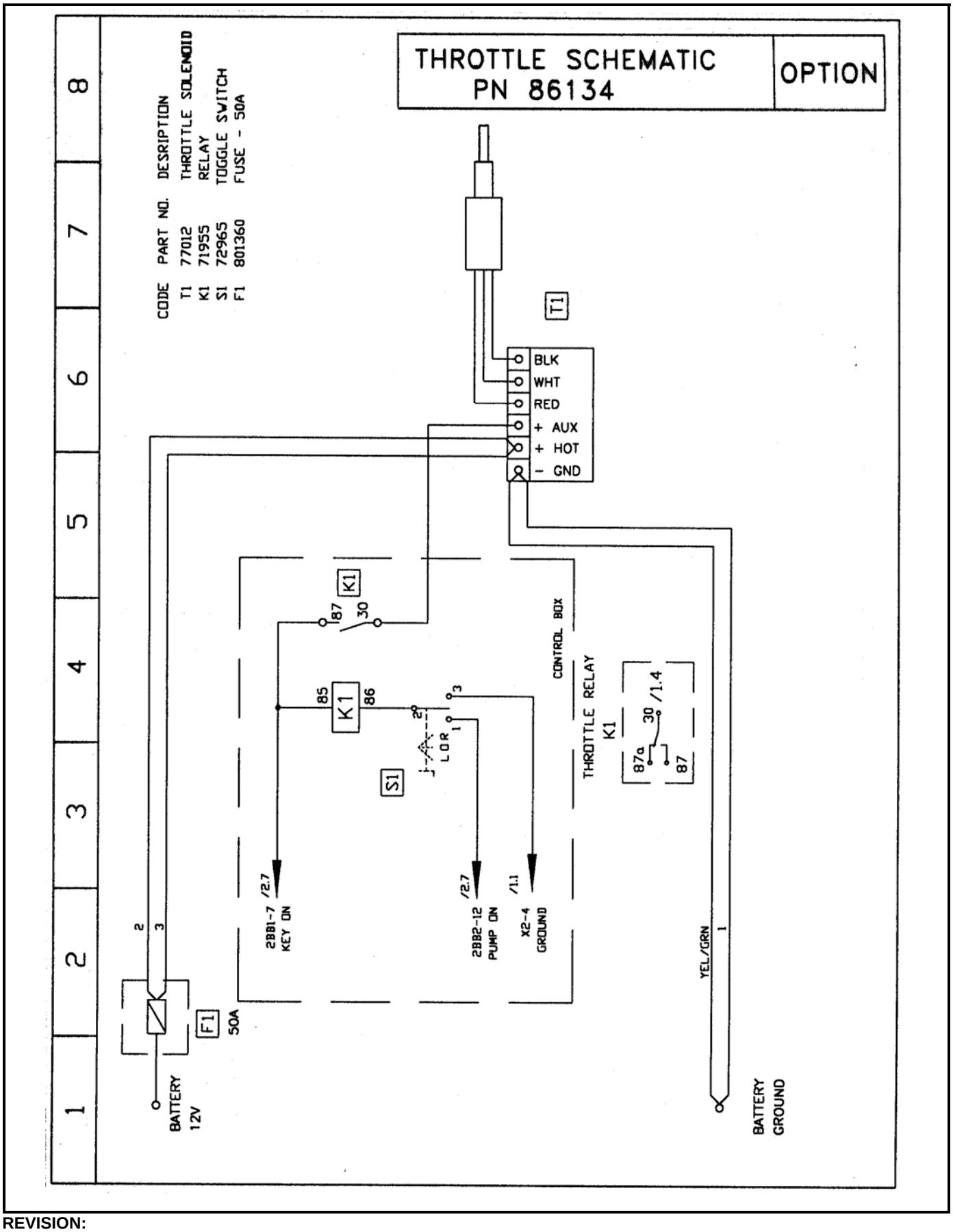


X3 PIN	FUNCTION
1	
2	GROUND
3	PUMP ON/REV.
4	
5	
6	"E" STOP
7	
8	HORN
9	
10	+12 vdc

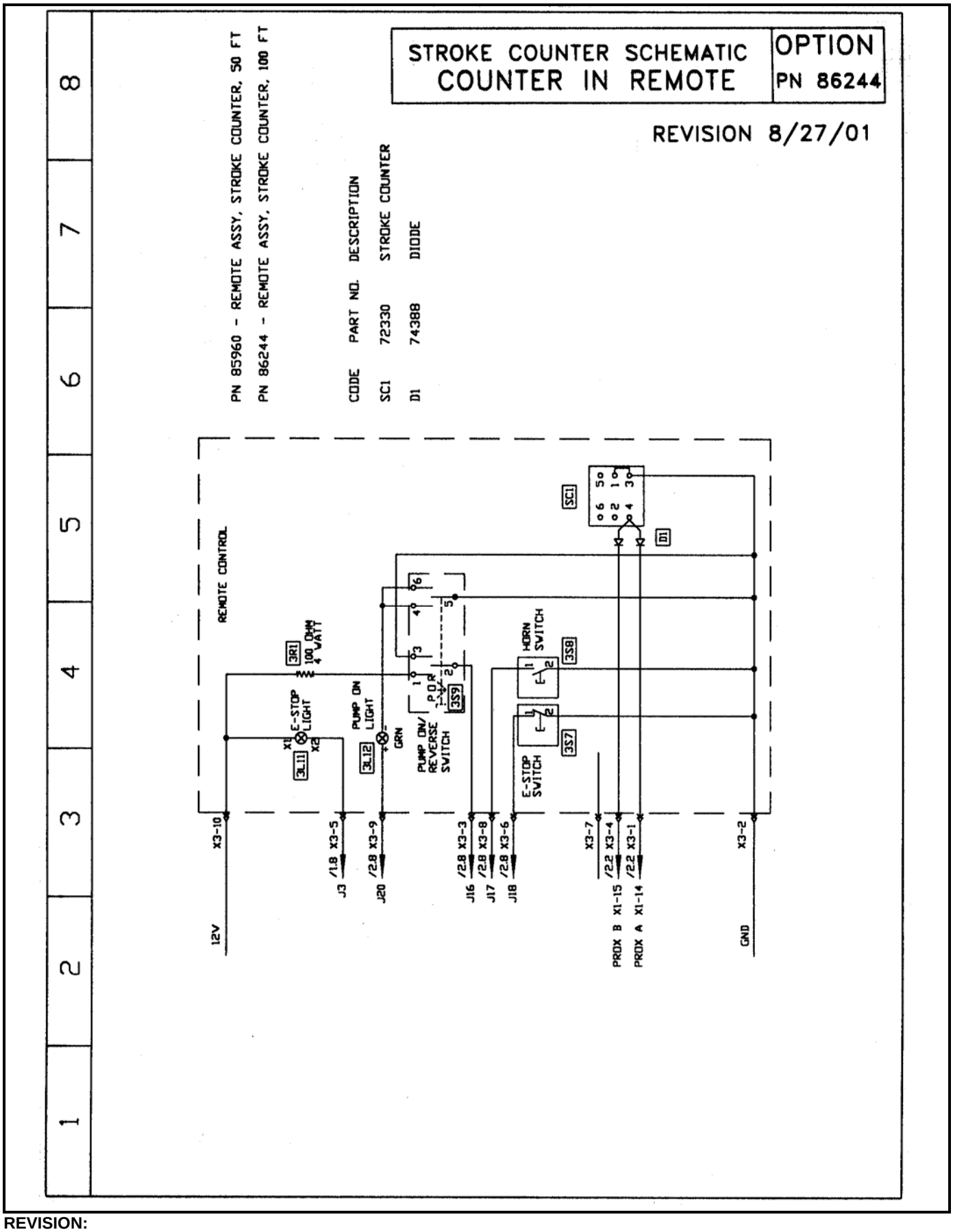
REVISION:


VIBRATOR SCHEMATIC
PN 86132 / 85902
OPTION
CODE PART NO. DESRIPTION
M1 71429 VIBRATOR
K1 W-105618 RELAY
S1 72965 TOGGLE SWITCH
F1 85839 FUSE - 30A
D1 776404 DIODE
X1 85899 RECEPTACLE
X1 85898 CABLE W/ PLUG
M1
X1-1
BLK
WHT
X1-2
VIBRATOR MOTOR
87
30
K1
D1
85
K1
86
2
1
3
LOR
S1
VIBRATOR RELAY
K1
30
/1.6
87
/1.6
X2-2
2BB1-BRN
KEY ON
/2.7
2BB2-12
2BB1-WHT
PUMP ON
YEL/GRN
1
2
3
F1
30A
BATTERY
12V
BATTERY
GROUND
1
2
3
4
5
6
7
8

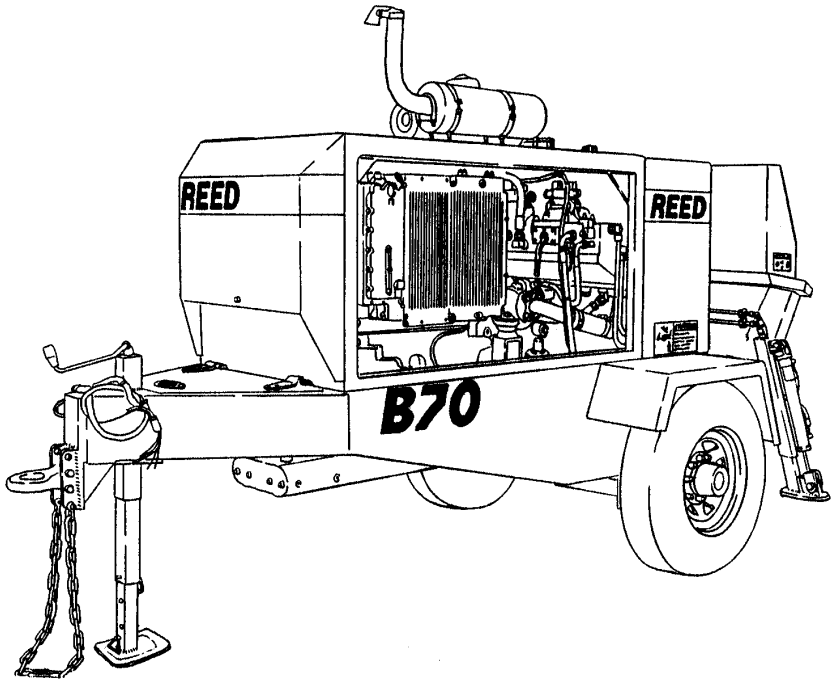
REVISION:


THROTTLE SCHEMATIC
PN 86134
OPTION
CODE PART NO. DESRIPTION
T1 77012 THROTTLE SOLENOID
K1 71955 RELAY
S1 72965 TOGGLE SWITCH
F1 801360 FUSE - 50A
T1
BLK
WHT
RED
+ AUX
+ HOT
- GND
K1
87
30
85
86
S1
LOR
CONTROL BOX
THROTTLE RELAY
K1
87a
87
/1.4
F1
50A
BATTERY
12V
2B81-7 /2.7
KEY ON
2B82-12 /2.7
PUMP ON
X2-4 /1.1
GROUND
YEL/GRN
BATTERY
GROUND

REVISION:


STROKE COUNTER SCHEMATIC
COUNTER IN REMOTE
OPTION
PN 86244
REVISION 8/27/01
PN 85960 - REMOTE ASSY, STROKE COUNTER, 50 FT
PN 86244 - REMOTE ASSY, STROKE COUNTER, 100 FT
CODE PART NO. DESCRIPTION
SC1 72330 STROKE COUNTER
D1 74388 DIODE
REMOTE CONTROL
3R1 100 OHM 4 WATT
E-STOP LIGHT
PUMP ON LIGHT
GRN
PUMP ON/ REVERSE SWITCH
3S9
HORN SWITCH
3S8
E-STOP SWITCH
3S7
SC1
D1
X3-10
/1.8 X3-5
/2.8 X3-9
/2.8 X3-3
/2.8 X3-8
/2.8 X3-6
X3-7
/2.2 X3-4
/2.2 X3-1
X3-2
12V
J3
J20
J16
J17
J18
PROX B X1-15
PROX A X1-14
GND

REVISION:



REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL** CONTAINS THE FOLLOWING GROUPS AND FIGURES:

GROUP 30 TANK INSTALLATION

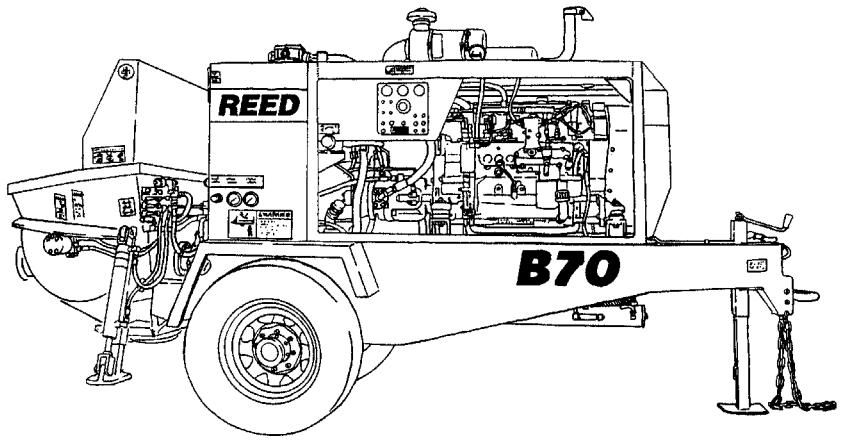
GROUP 40 POWER TRAIN INSTALLATION

GROUP 50 CONTROLS INSTALLATION

GROUP 60 PUMPING TRAIN INSTALLATION

GROUP 70 FRAME INSTALLATION

GROUP 80 OPTIONAL INSTALLATION



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 ***B70.*** 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:

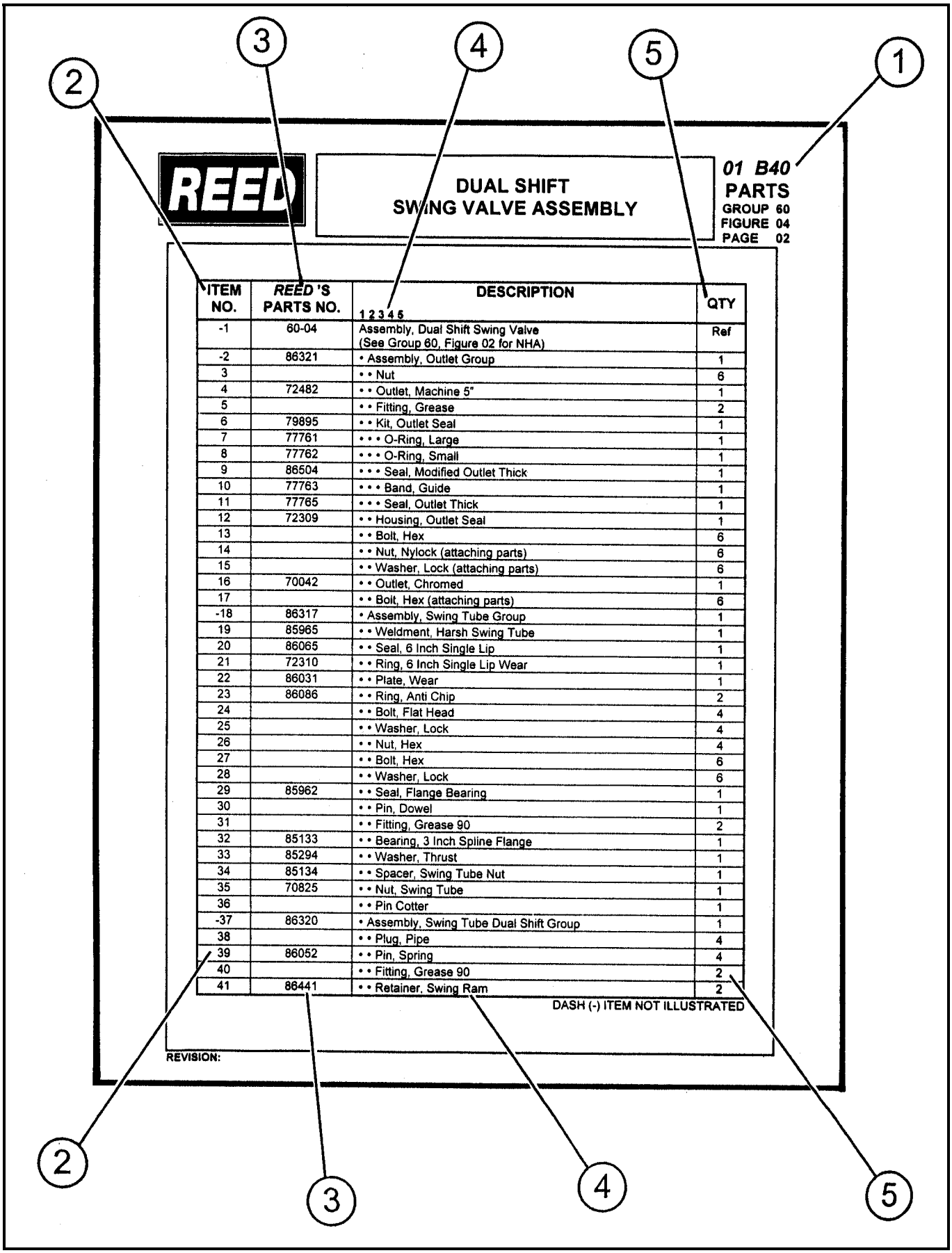
00	***01*** MODEL ***B70*** PARTS MANUAL
10	FINAL INSTALLATION
20	HOPPER INSTALLATION
30	TANK INSTALLATION
40	POWER TRAIN INSTALLATION
50	CONTROL INSTALLATION
60	PUMPING TRAIN INSTALLATION
70	FRAME INSTALLATION
80	OPTIONAL INSTALLATION

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.



REED

DUAL SHIFT SWING VALVE ASSEMBLY

01 B40
PARTS
GROUP 60
FIGURE 04
PAGE 02

ITEM NO.	*REED* 'S PARTS NO.	DESCRIPTION 1 2 3 4 5	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	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:

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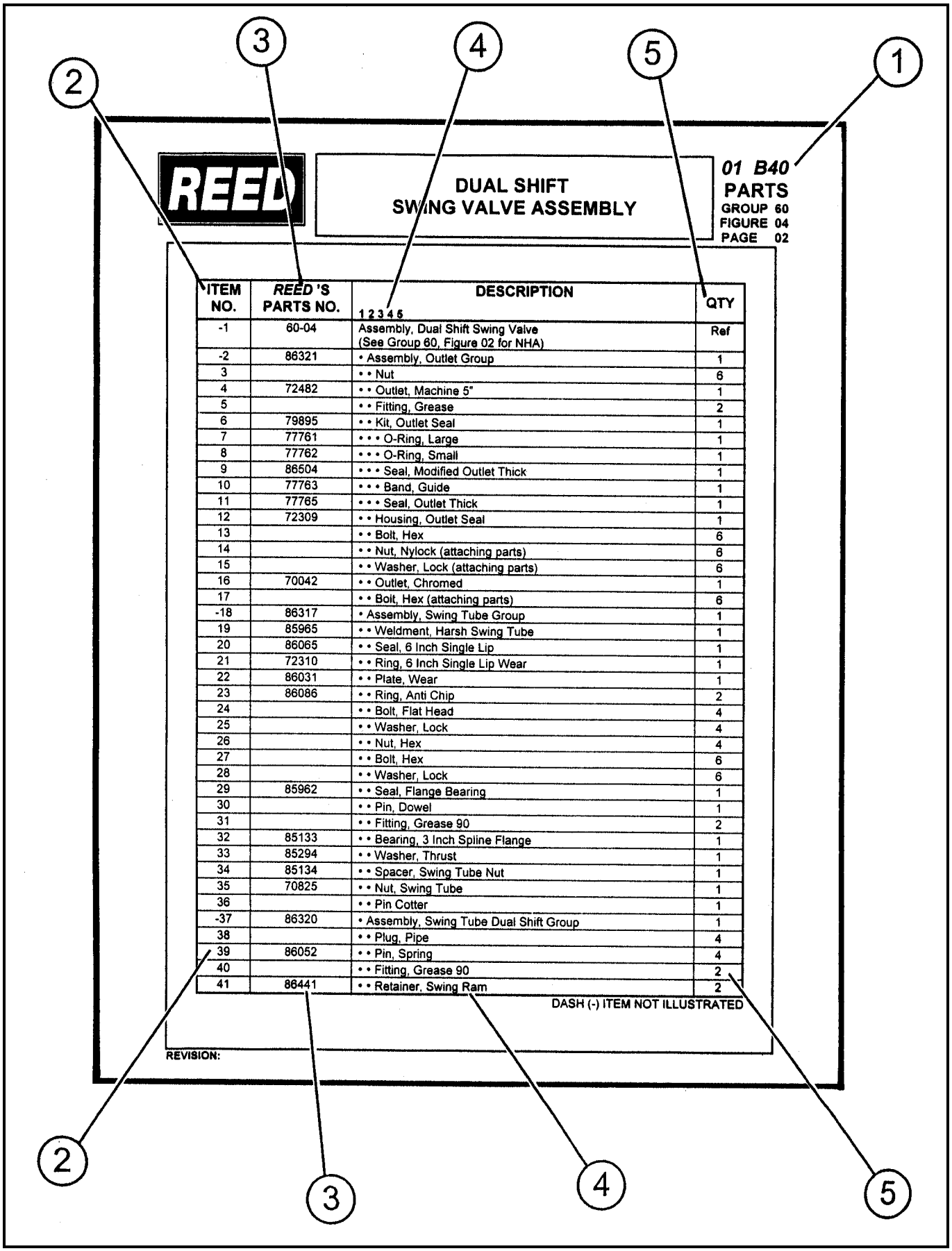


REED

DUAL SHIFT SWING VALVE ASSEMBLY

01 B40
PARTS
GROUP 60
FIGURE 04
PAGE 02

ITEM NO.	*REED* 'S PARTS NO.	DESCRIPTION 1 2 3 4 5	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	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:

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 **I**nstallation)

- **D**etail part of assembly
- **S**ub-assembly
- **A**ttaching parts for sub-assembly
- • **D**etail part of sub-assembly
- • **S**ub-sub-assembly
- • **A**ttaching parts for sub-sub-assembly
- • • **D**etail part of sub-sub-assembly
- • • **S**ub-sub-sub-assembly
- • • **A**ttaching parts of sub-sub-sub-assembly
- • • • **D**etail 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

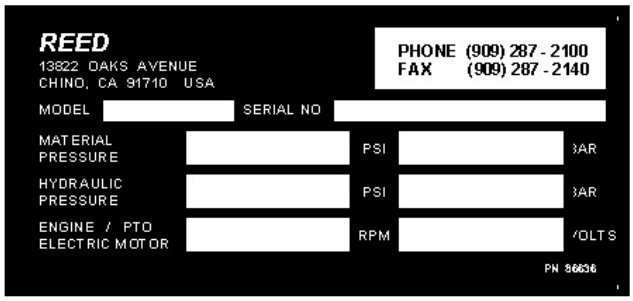
A. Reference (**REF**) indicates the items that is listed previously in the Next Higher Assembly (**NHA**) and then again in this figure.

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.

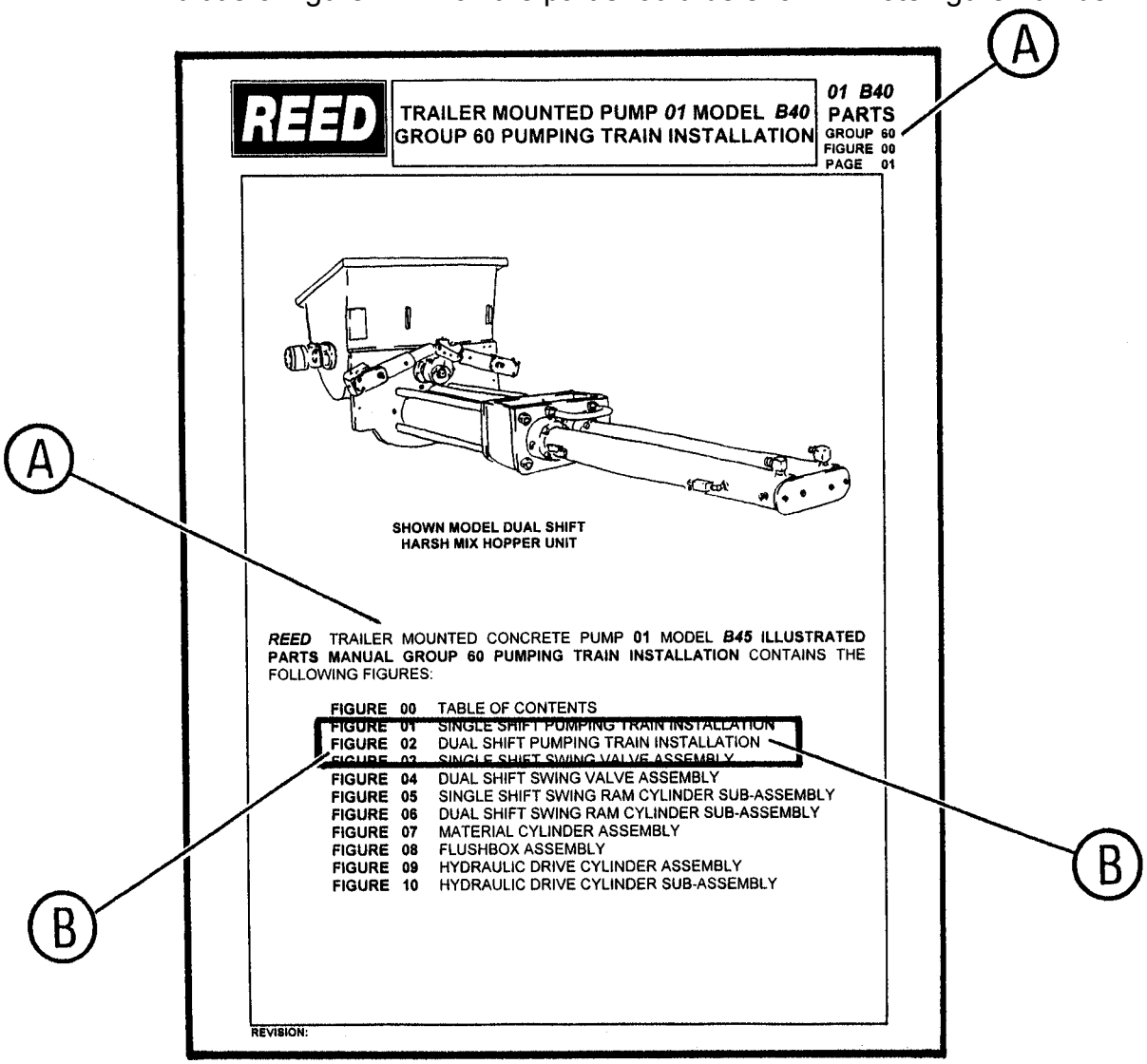
1. Always give serial number and model of ***REED*** trailer mounted concrete pump ***01*** model ***B70.*** (Refer to each unit name plate shown below). NOTE: This manual is being released to cover unit starting with serial number **3-01-1-1843** to current production. Some components used on earlier units differ from current productions. Where this occurs, the part is identified by a serial number.

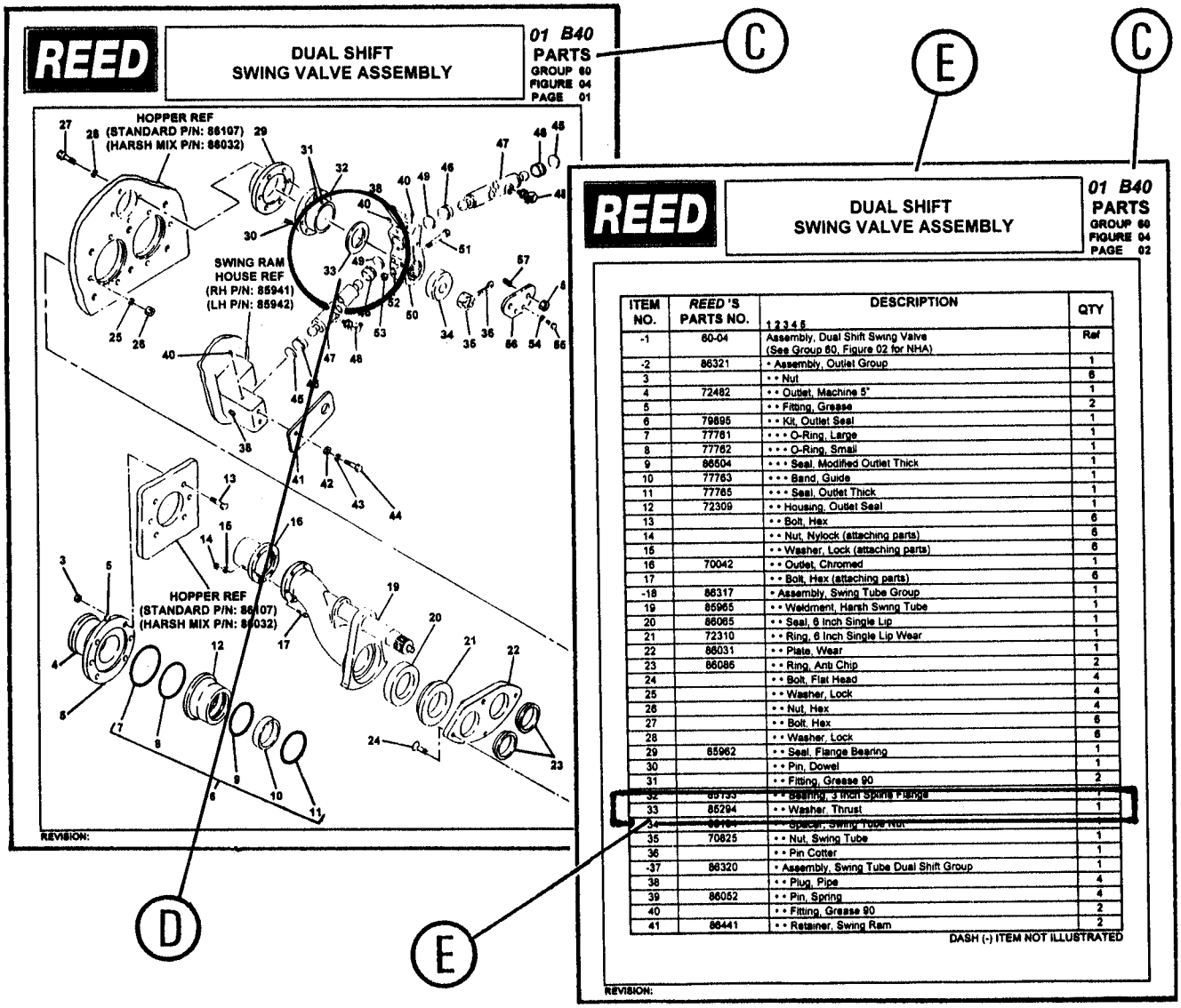


2. Always specify part number and complete name of parts ordered.

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.





ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	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	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 Spirit Flange	1
33	85294	• • Washer, Thrust	1
34	86106	• • Spacer, Swing Tube Nut	1
35	70625	• • 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

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.

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 Air Borne Express and DHL are available in designated areas.

5. TO ORDER

A. BY MAIL

Attention: Parts Department
REED
13822 Oaks Avenue
Chino, CA. 91710 - 7008

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. 91710-7008. 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*****.**

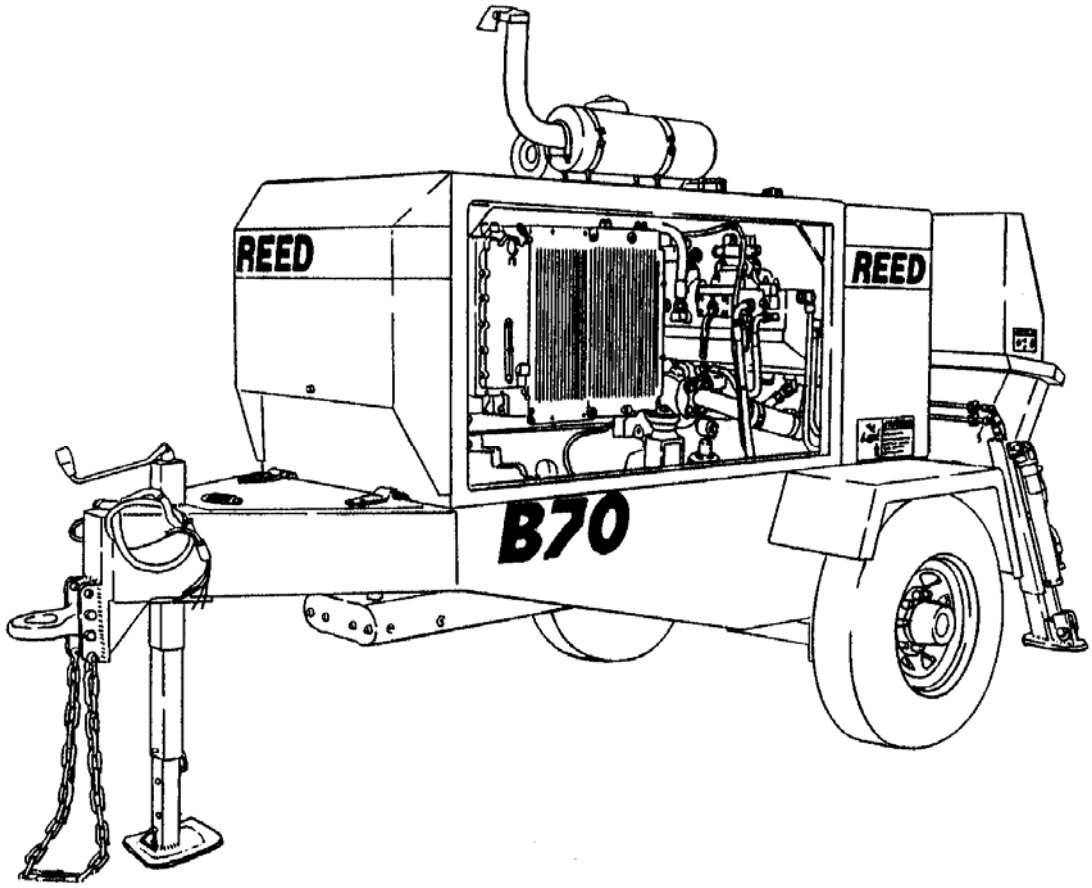
A. The form will be filled by ***REED*** unless requesting necessary information and you will receive a copy as well as shipping tag.

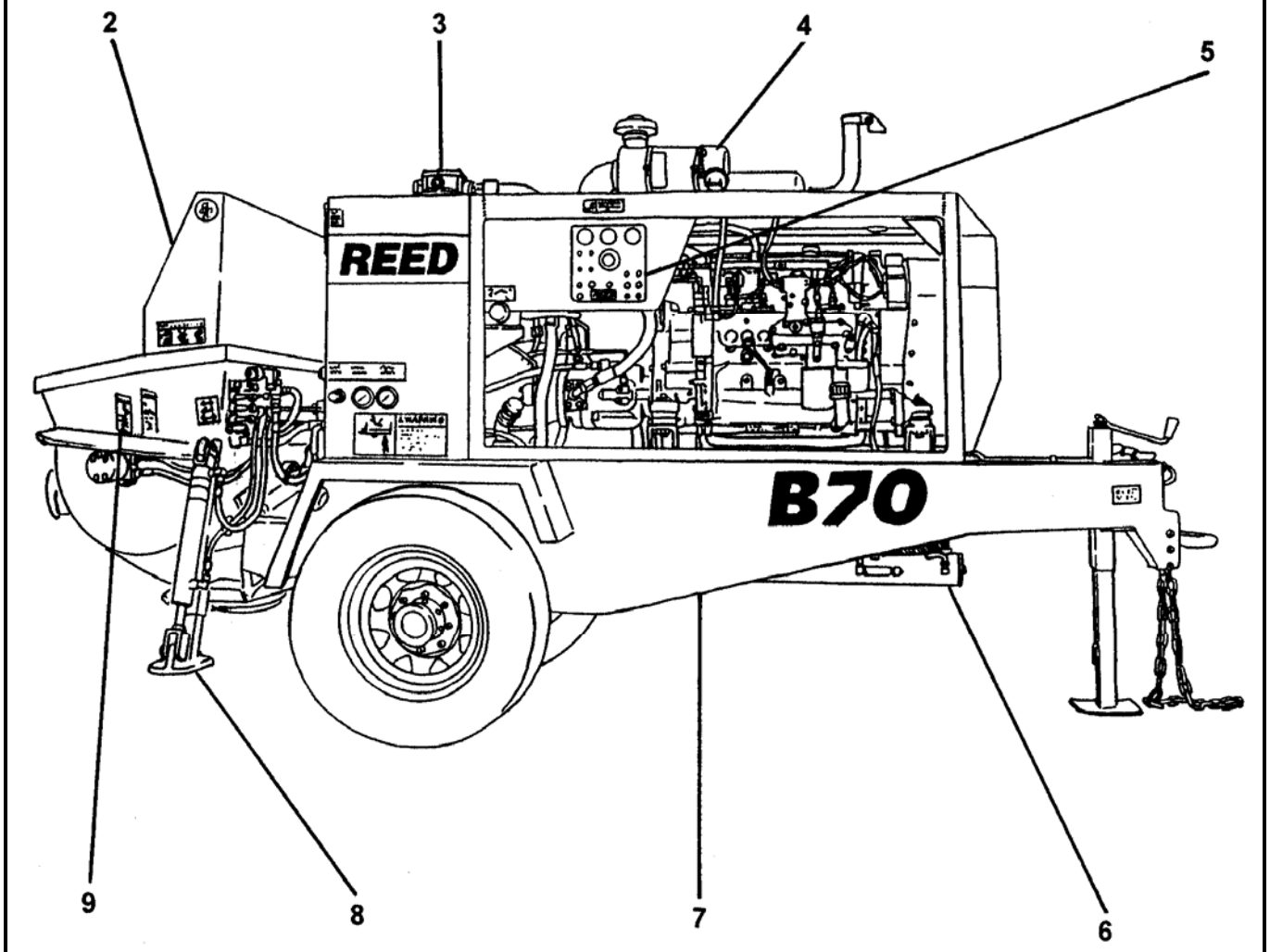
B. Attach shipping tag to part insert return original invoice.

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 ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 10 FINAL INSTALLATION** CONTAINS THE FOLLOWING FIGURES:

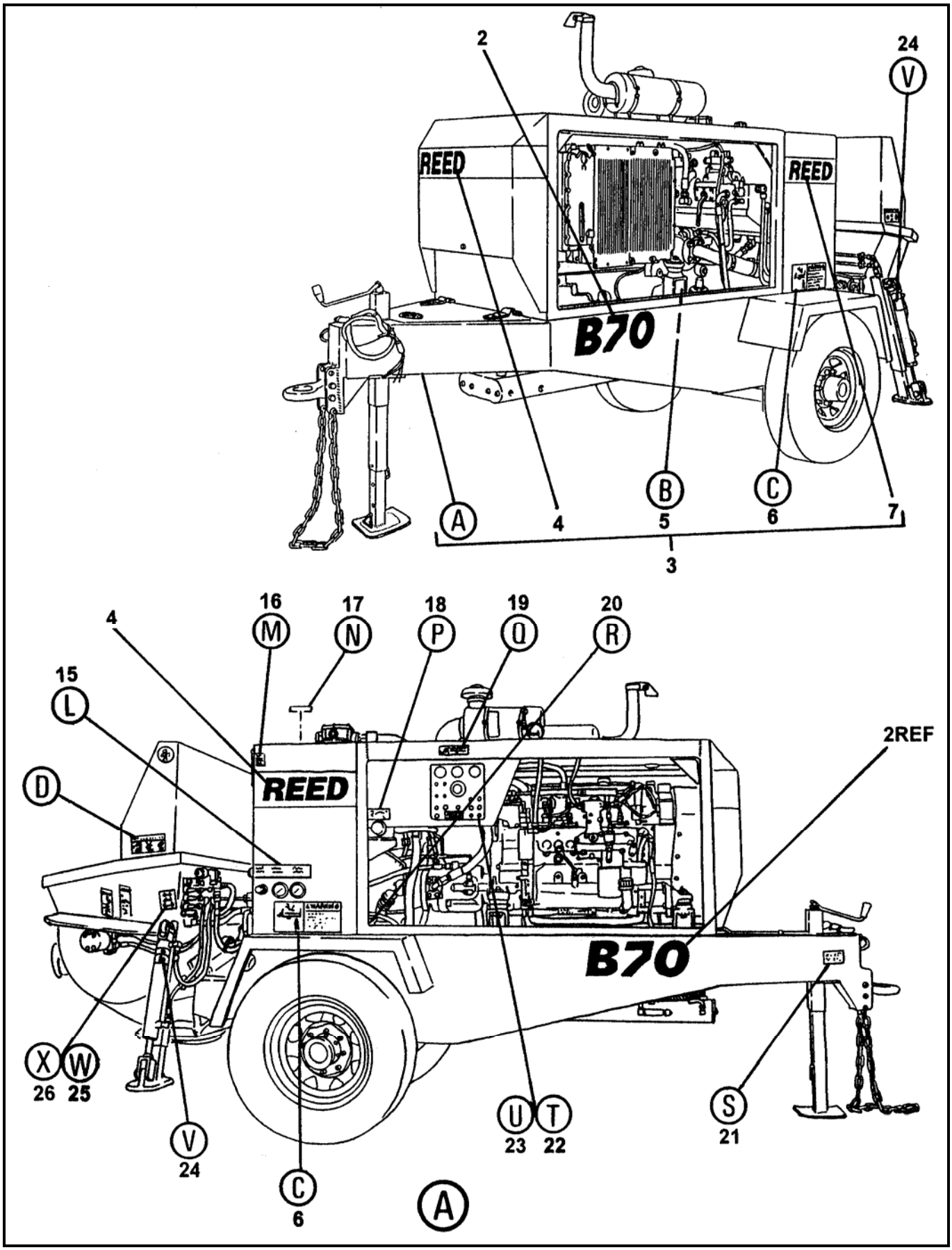




REVISION:

ITEM NO.	*REED* 'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	***B70***D-V01	Installation, ***B70*** Harsh Mix Hopper with Dual Shift Final	Ref
2	20-01	• Installation, Harsh Mix Hopper (See Group 20, Figure 02 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	60-02	• Installation, Dual Shift Pumping Train (See Group 60, Figure 02 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	10-02	• Kit, ***B70*** Decal (See Group 10, Figure 05 for DET)	1

DASH (-) ITEM NOT ILLUSTRATED


2
24
V
REED
REED
B70
A
4
B
5
C
6
7
3
16
M
17
N
18
P
19
Q
20
R
4
15
L
D
REED
2REF
B70
X
W
26
25
V
24
C
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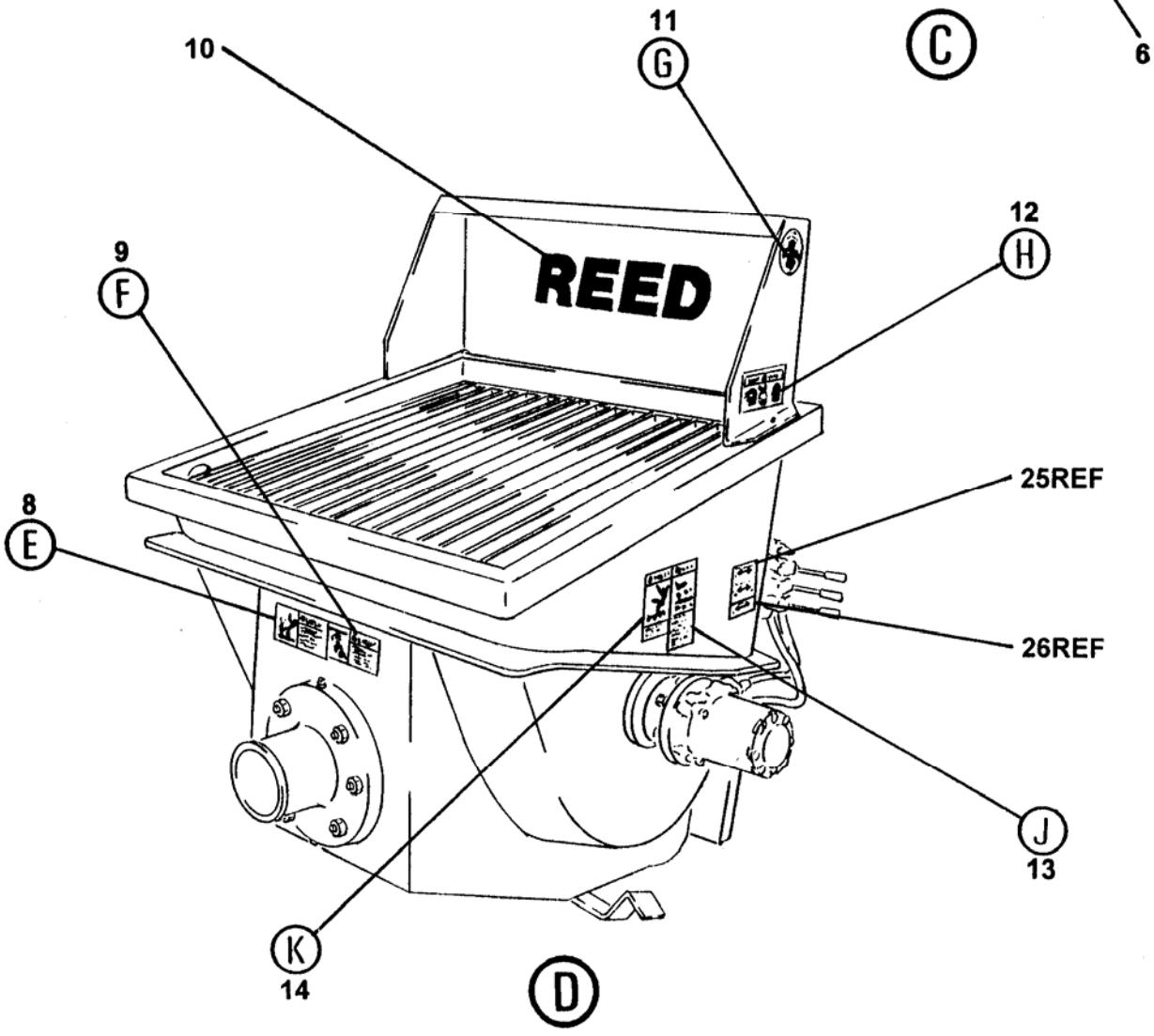
21

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	10-02	Kit, ***B70*** Decal (See Group 10, Figure 01 for NHA)	Ref
2	86049	• Decal, ***B70*** 6 Inch Black	2
3	85425	• Kit, B-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	800931	• • Decal, **ACPA** Member	1
12	800929A	• • Decal, Warning	2
13	800917	• • Decal, Warning, Keep Hand Out of Hopper and Valve	2
14	800918	• • Decal, Warning, Do Not Stand on Hopper Grate	2
15	85684	• • Decal, B-Series Gauge	1
16	85844	• • Decal, Oil	1
17	75020	• • Decal, Hydraulic Oil	1
18	85413	• • Decal, Volume Control	1
19	800926	• • Decal, Warning, Do Not Operate This Machine without	1
20	75017	• • Decal, Diesel Fuel Only	1
21	86636	• • Nameplate, ***REED***, Serial No.	1
22	85332	• Decal, ***B70*** Control Box Panel	1
23	85410	• Decal, ***B70*** Remote Control	1
24	800919	• Decal, Optional, Warning, Stand Clear Outriggers When	2
25	85845	• Decal, Outriggers (Optional Items)	1
26	85846	• Decal, Agitator (Optional Items)	1

DASH (-) ITEM NOT ILLUSTRATED


WARNING
This machine is remote controlled and may start at any time. Stop engine before servicing unit.
800924


6
10
11
G
C
12
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REED
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E
25REF
26REF
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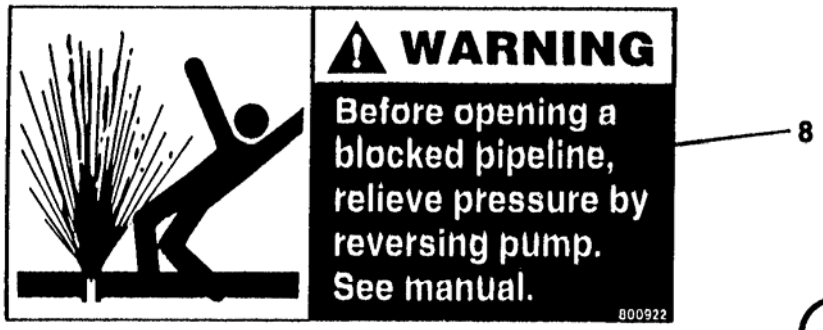
REVISION:



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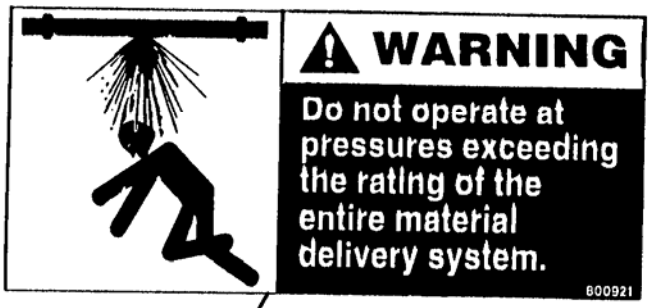
(E)



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(F)

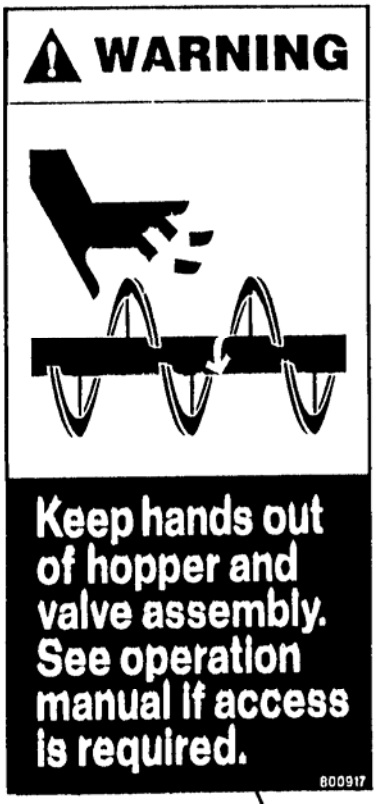
12

(H)

11

(G)

REVISION:



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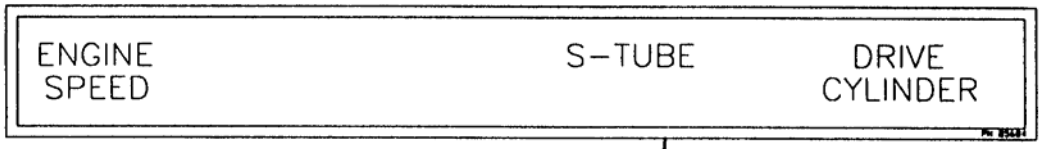

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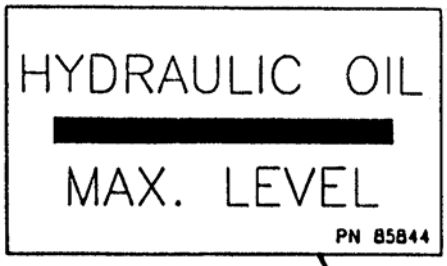

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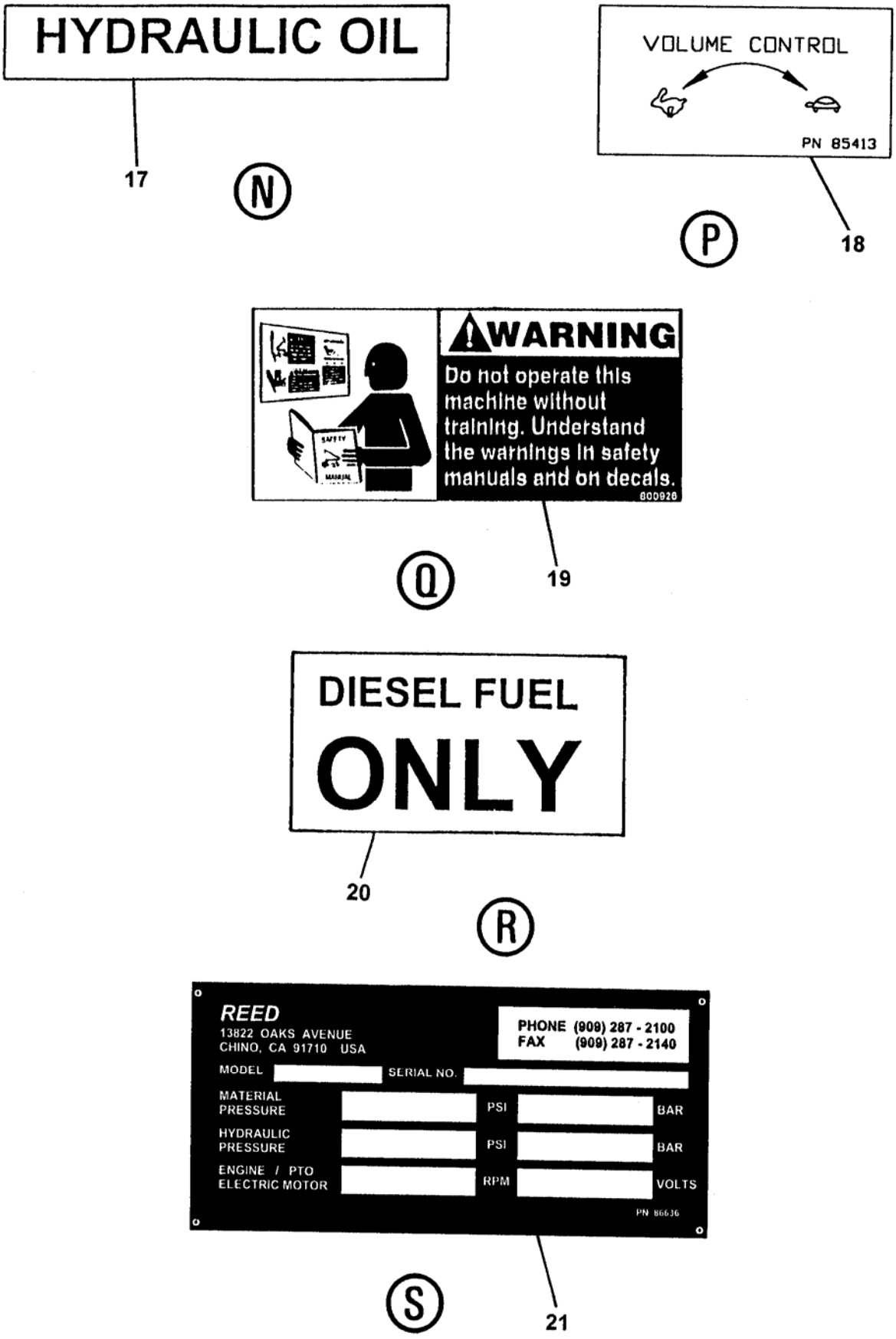
HYDRAULIC OIL
17
N
VOLUME CONTROL
PN 85413
P
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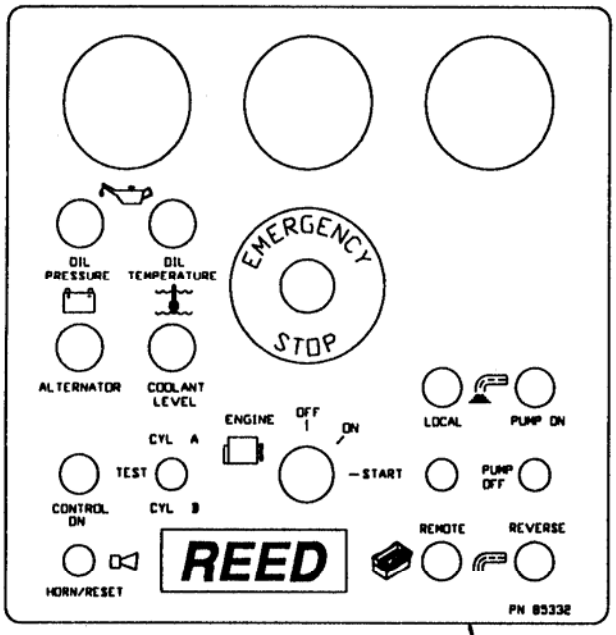
WARNING
Do not operate this machine without training. Understand the warnings in safety manuals and on decals.
800926
Q
19
DIESEL FUEL
ONLY
20
R
REED
13822 OAKS AVENUE
CHINO, CA 91710 USA
PHONE (909) 287 - 2100
FAX (909) 287 - 2140
MODEL
SERIAL NO.
MATERIAL PRESSURE
PSI
BAR
HYDRAULIC PRESSURE
PSI
BAR
ENGINE / PTO ELECTRIC MOTOR
RPM
VOLTS
PN 86636
S
21

REVISION:



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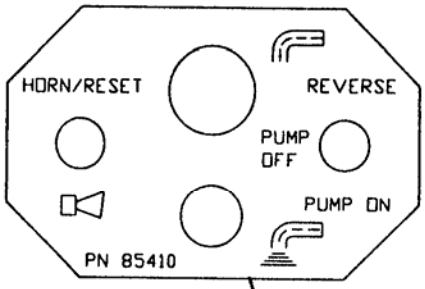

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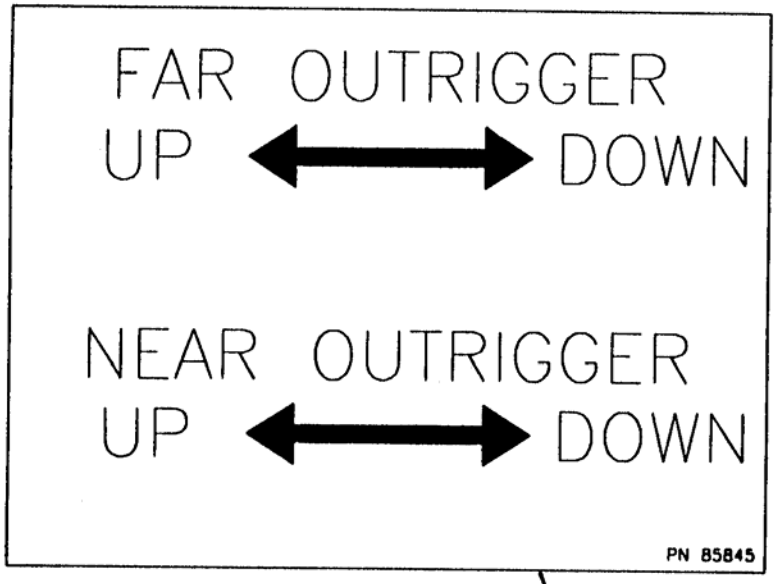

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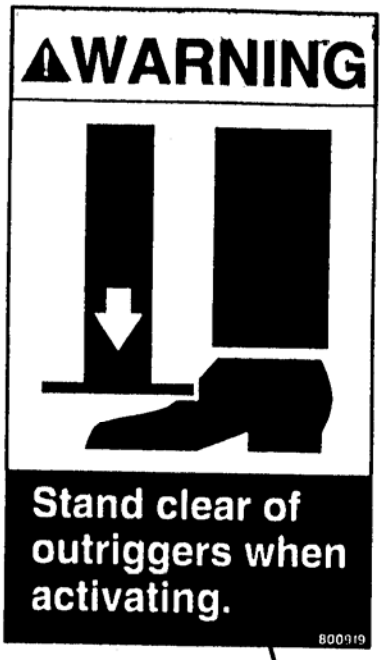

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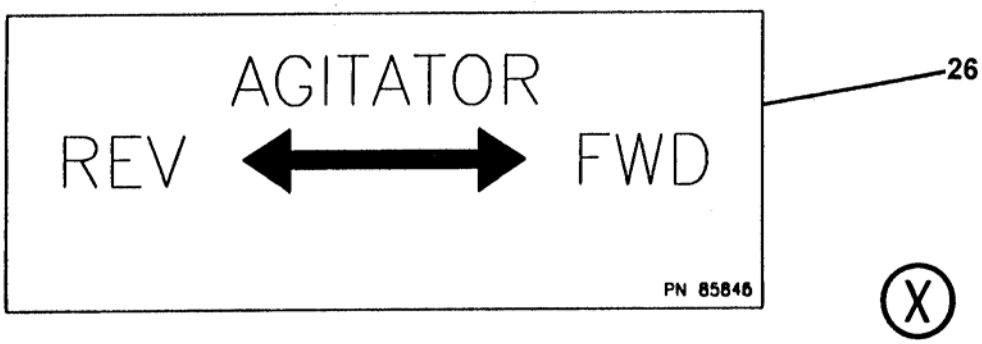
REVISION:



ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	10-02	Kit, ***B70*** Decal (See Group 10, Figure 01 for NHA)	Ref
2	86049	• Decal, ***B70*** 6 Inch Black	2
3	85425	• Kit, B-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	800931	• • Decal, **ACPA** Member	1
12	800929A	• • Decal, Warning	2
13	800917	• • Decal, Warning, Keep Hand Out of Hopper and Valve	2
14	800918	• • Decal, Warning, Do Not Stand on Hopper Grate	2
15	85684	• • Decal, B-Series Gauge	1
16	85844	• • Decal, Oil	1
17	75020	• • Decal, Hydraulic Oil	1
18	85413	• • Decal, Volume Control	1
19	800926	• • Decal, Warning, Do Not Operate This Machine without	1
20	75017	• • Decal, Diesel Fuel Only	1
21	86636	• • Nameplate, ***REED***, Serial No.	1
22	85332	• Decal, ***B70*** Control Box Panel	1
23	85410	• Decal, ***B70*** Remote Control	1
24	800919	• Decal, Optional, Warning, Stand Clear Outriggers When	2
25	85845	• Decal, Outriggers (Optional Items)	1
26	85846	• Decal, Agitator (Optional Items)	1

DASH (-) ITEM NOT ILLUSTRATED

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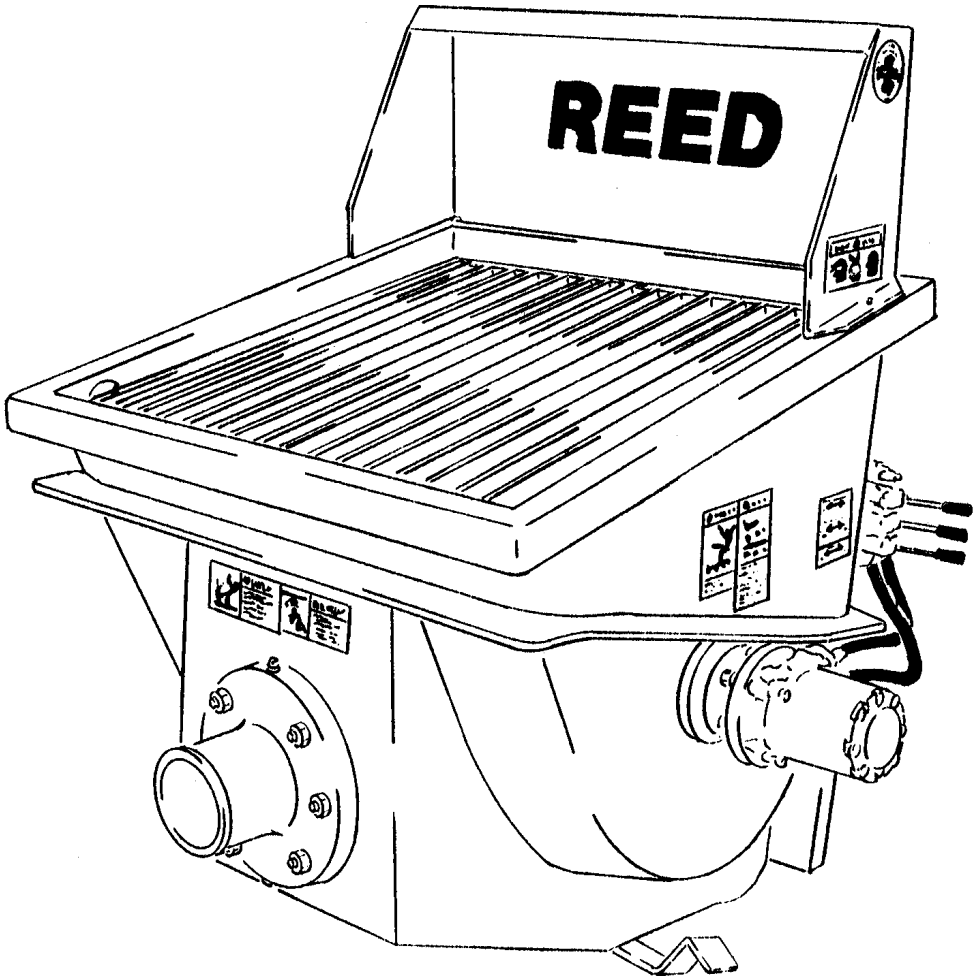
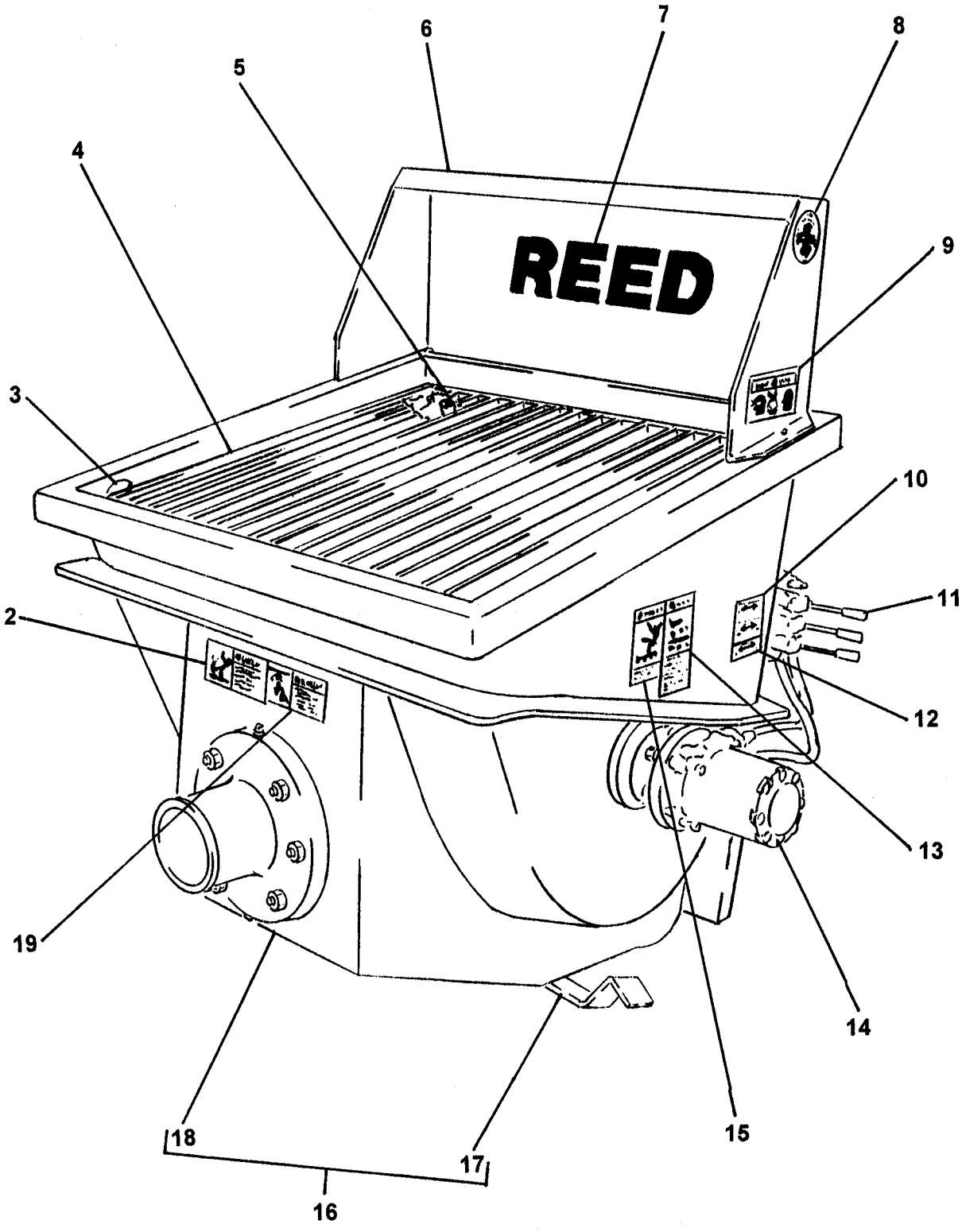
REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 20 HOPPER INSTALLATION** CONTAINS THE FOLLOWING FIGURES:



HARSH MIX
HOPPER INSTALLATION



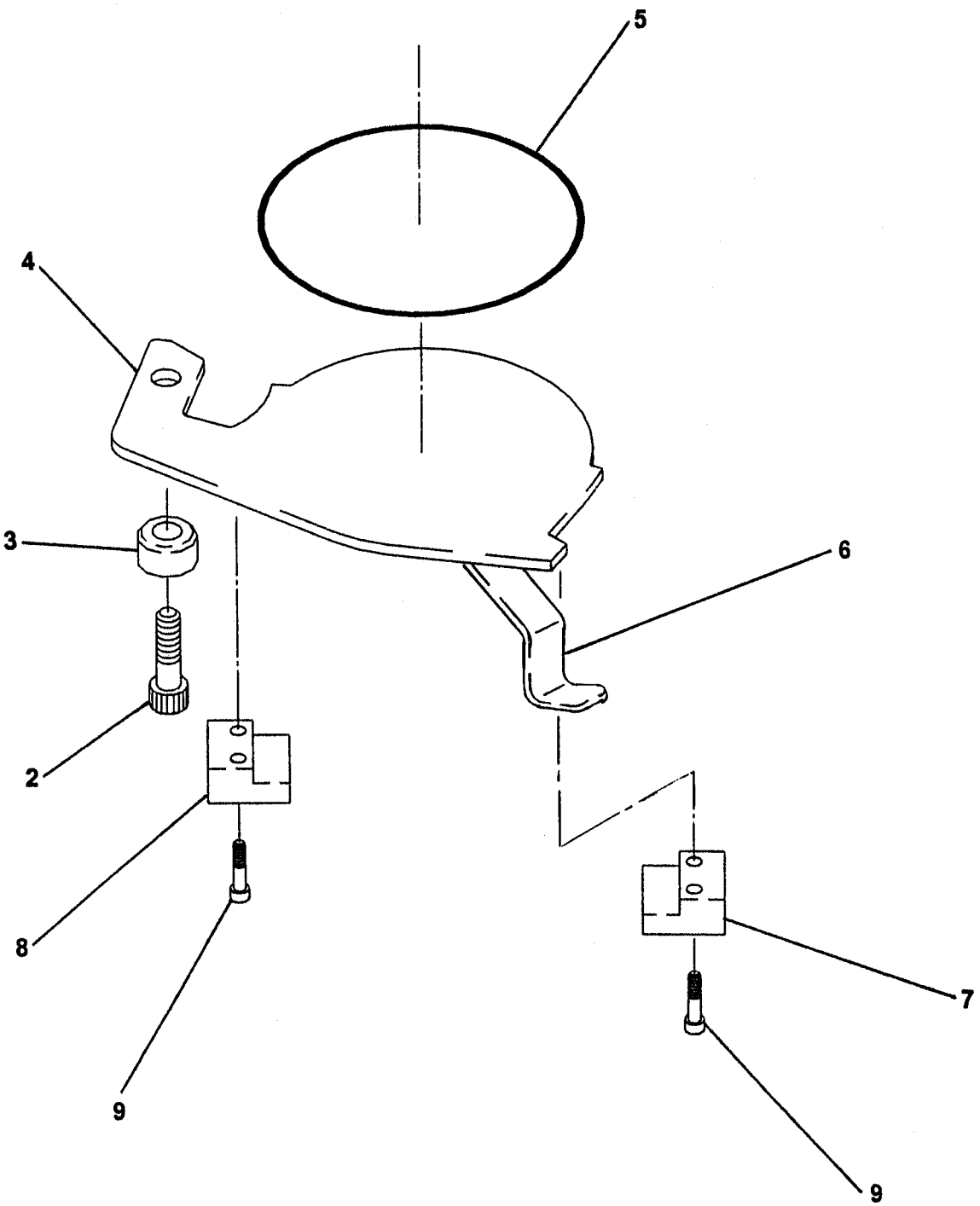
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

REED

HOPPER CLEAN OUT DOOR ASSEMBLY (ROUNDED)

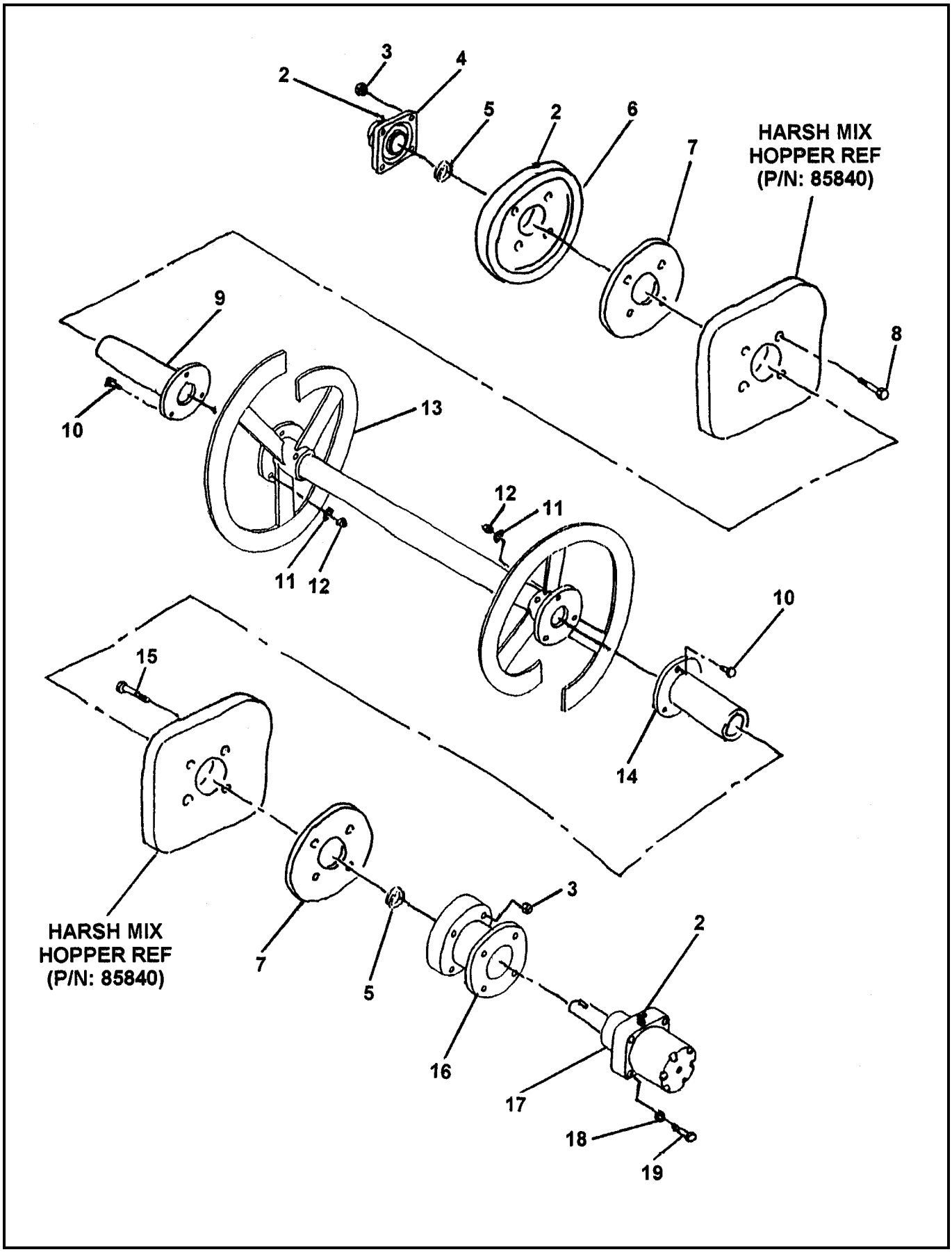


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86542	Assembly, Rounded Clean Out Door (See Group 20, Figure 01 for NHA)	Ref
2		• Bolt, Shoulder	1
3	85367	• Boss, Clean Out Door	1
4	85370	• Door, Clean Out	1
5	W-102908A	• Cord, Hopper Door O-Ring 2.21 FT	1
6	86541	• Handle, Clean Out Door	1
7	86560	• Block, RH Clean Out Door	1
8	86599	• Block, LH Clean Out Door	1
9		• Capscrew, Socket Head	4
-10	85312	• Plate, Seal	1
-11	85371	• Neck, Clean Out Door	1

DASH (-) ITEM NOT ILLUSTRATED

HARSH MIX HOPPER AGITATOR ASSEMBLY

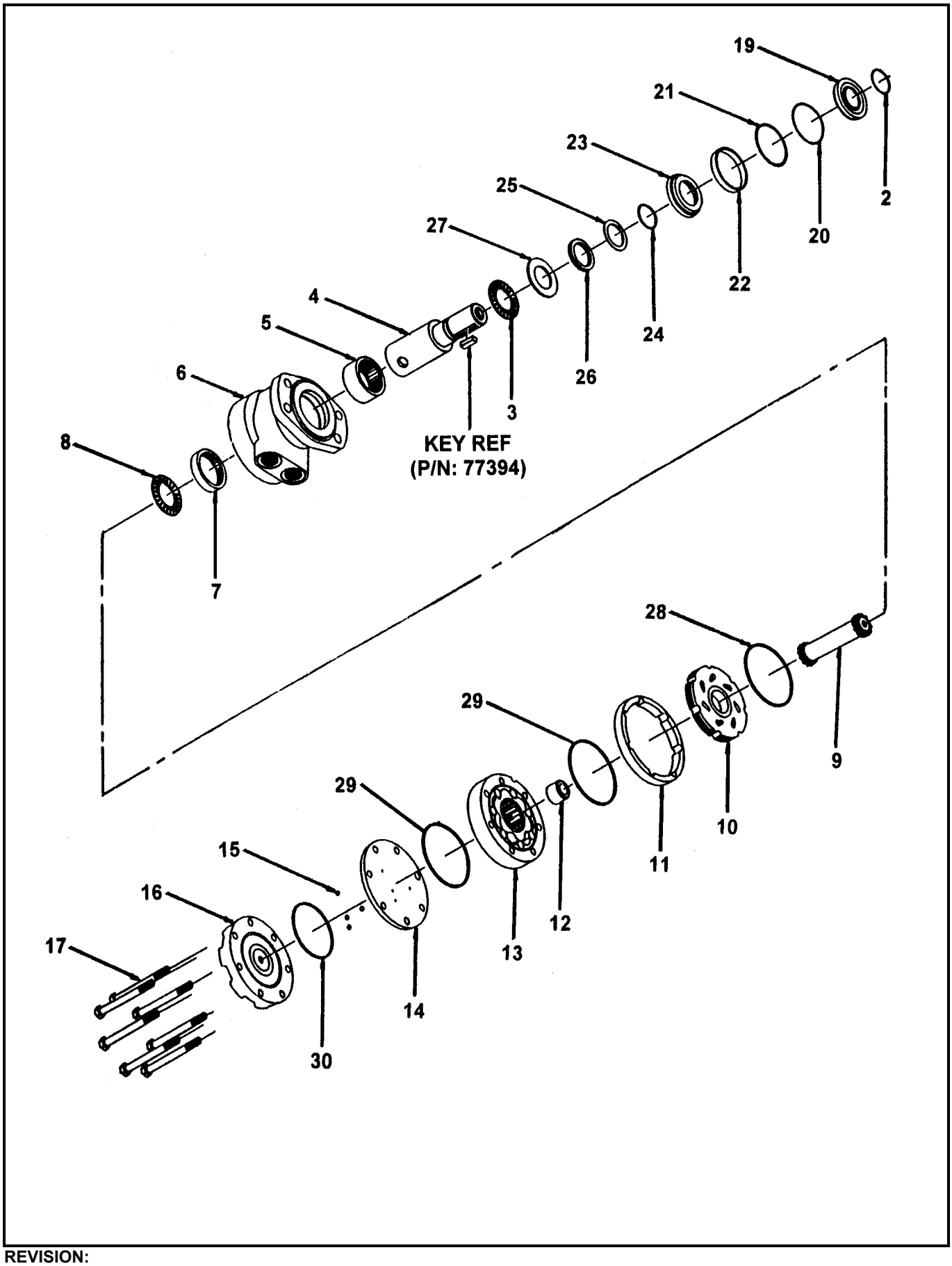


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

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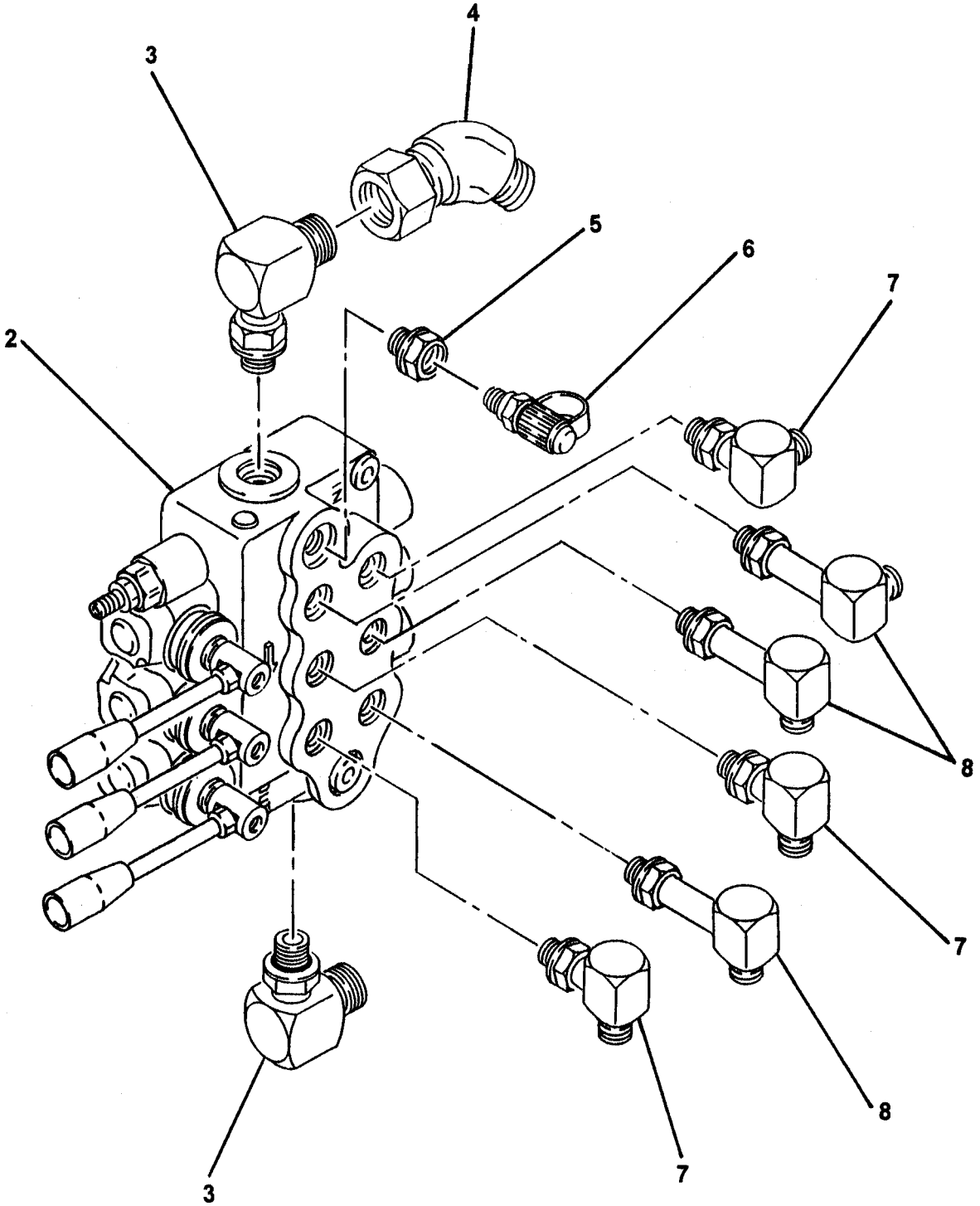
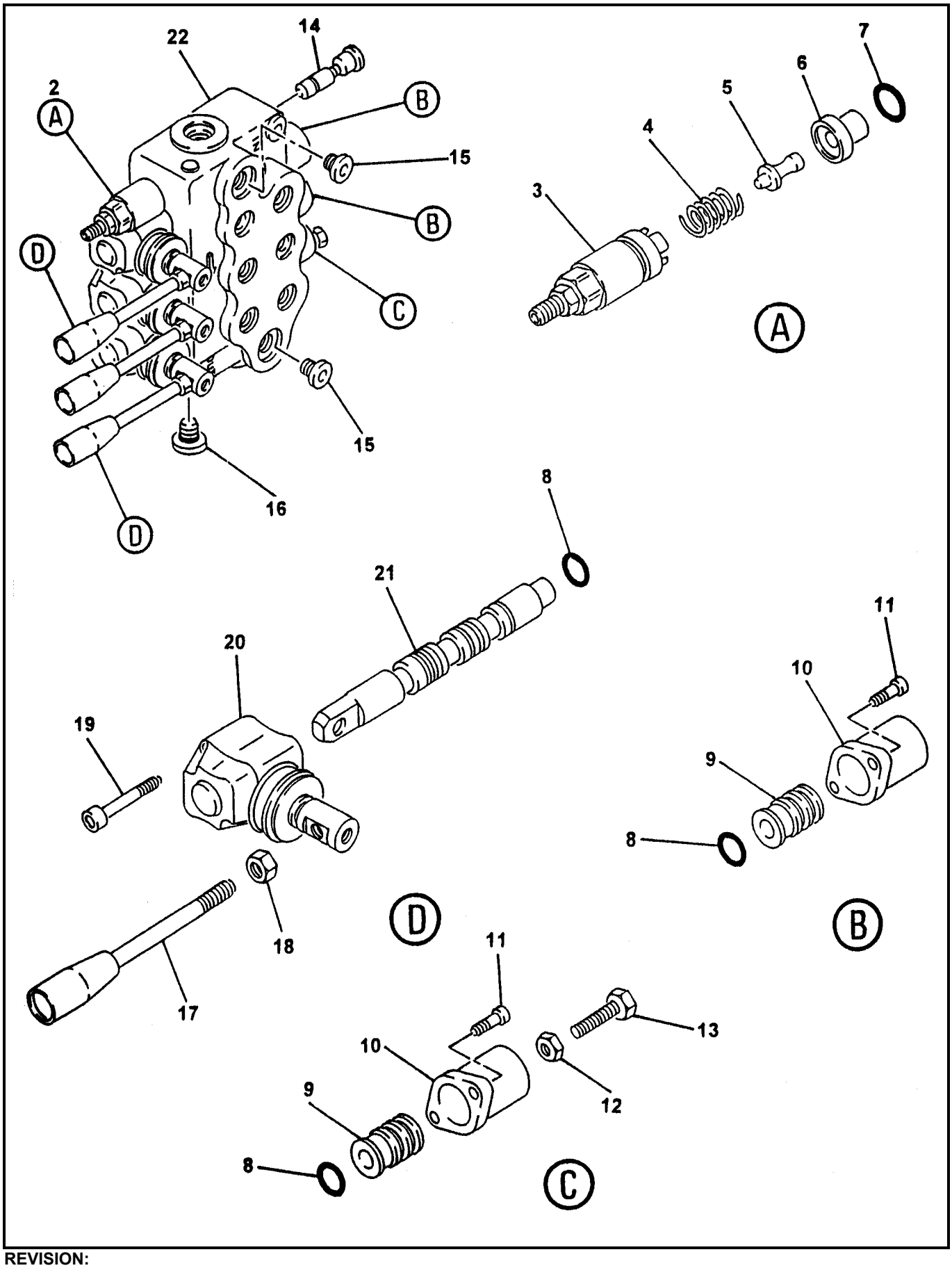


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

3 SPOOL CONTROL VALVE SUB-ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	74471	Sub-Assembly, 3 Spool Control Valve (See Group 20, Figure 05for 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

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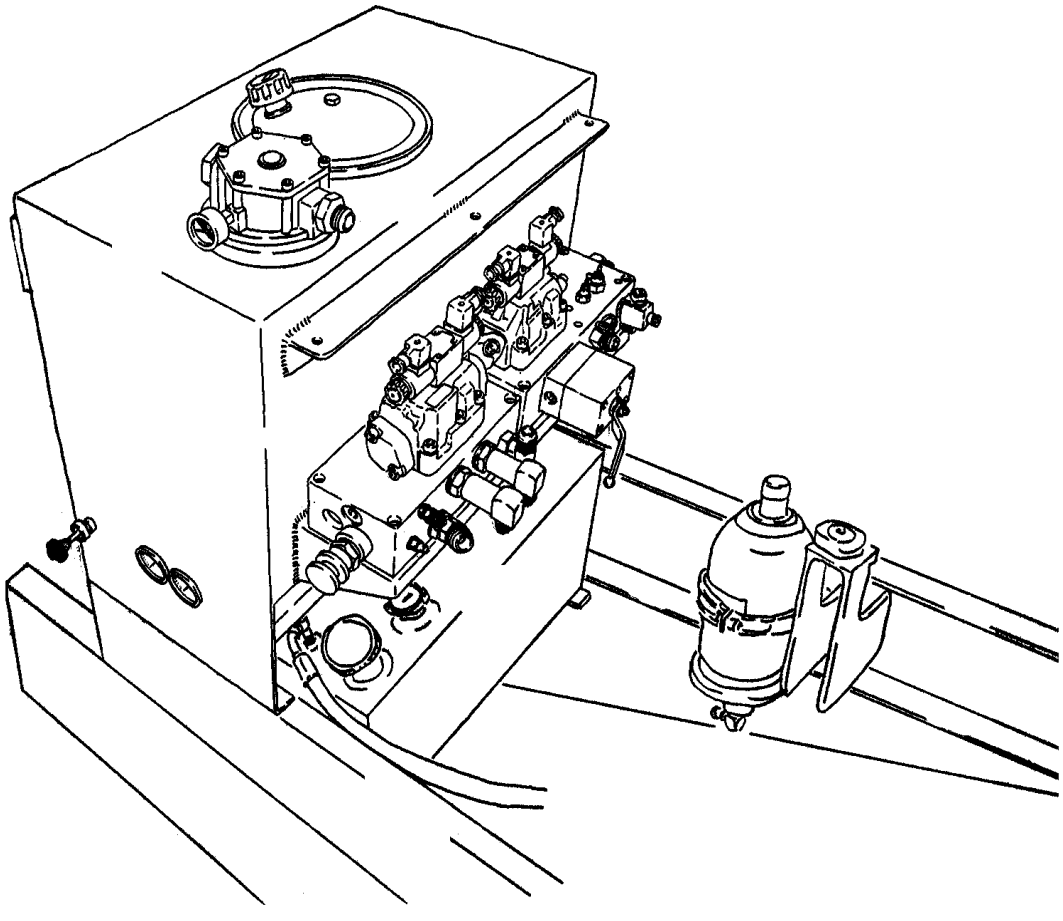
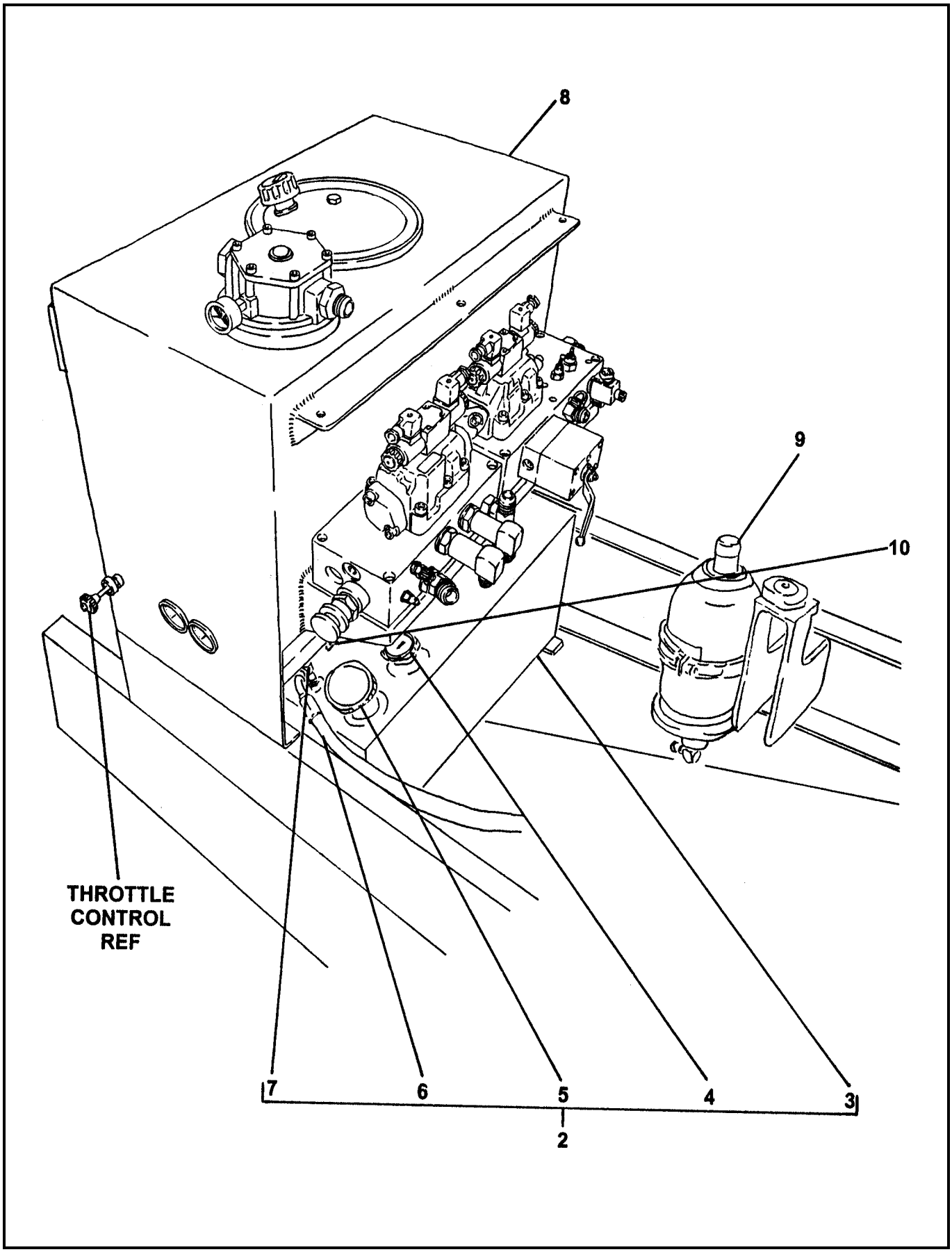
REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 30 HYDRAULIC TANK INSTALLATION** CONTAINS THE FOLLOWING FIGURES:

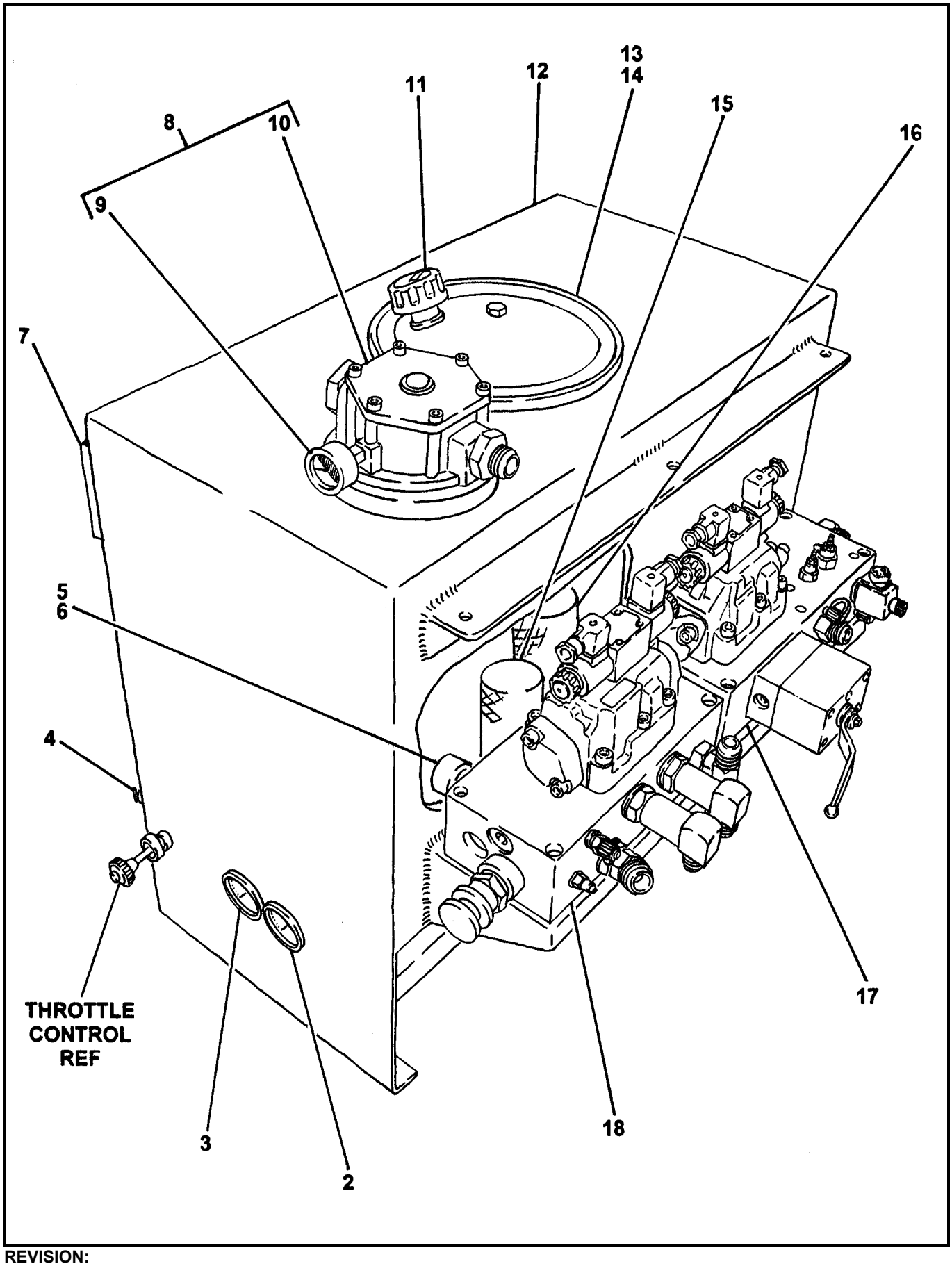




REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	30-01	Installation, Tank (See Group 10, Figure 01 for NHA)	Ref
2	85363	• Assembly, Fuel Tank	1
3	85111	• • Weldment, Fuel Tank	1
4	85569	• • Gauge, Fuel	1
5	85570	• • Cap, Fuel	1
6	85362	• • Assembly, Fuel Pick Up Tube	2
7		• • Elbow, 90	2
8	85361	• Assembly, Hydraulic Tank (See Group 30, Figure 02 for DET)	1
9	30-10	• Assembly, Accumulator (See Group 30, Figure 10 for DET)	1
10	85815	• Valve, Solenoid	1
-11	85701	• • Cartridge, Solenoid Valve	1
-12	85702	• • Coil, 12 VDC	1
-13	74716	• Hose, 6 Feet Fuel	1
-14	10577	• Clamp, Fuel Hose	2
-15	86365	• Kit, Hose (See SCHEMATIC Section, Page 05 for DET)	1

DASH (-) ITEM NOT ILLUSTRATED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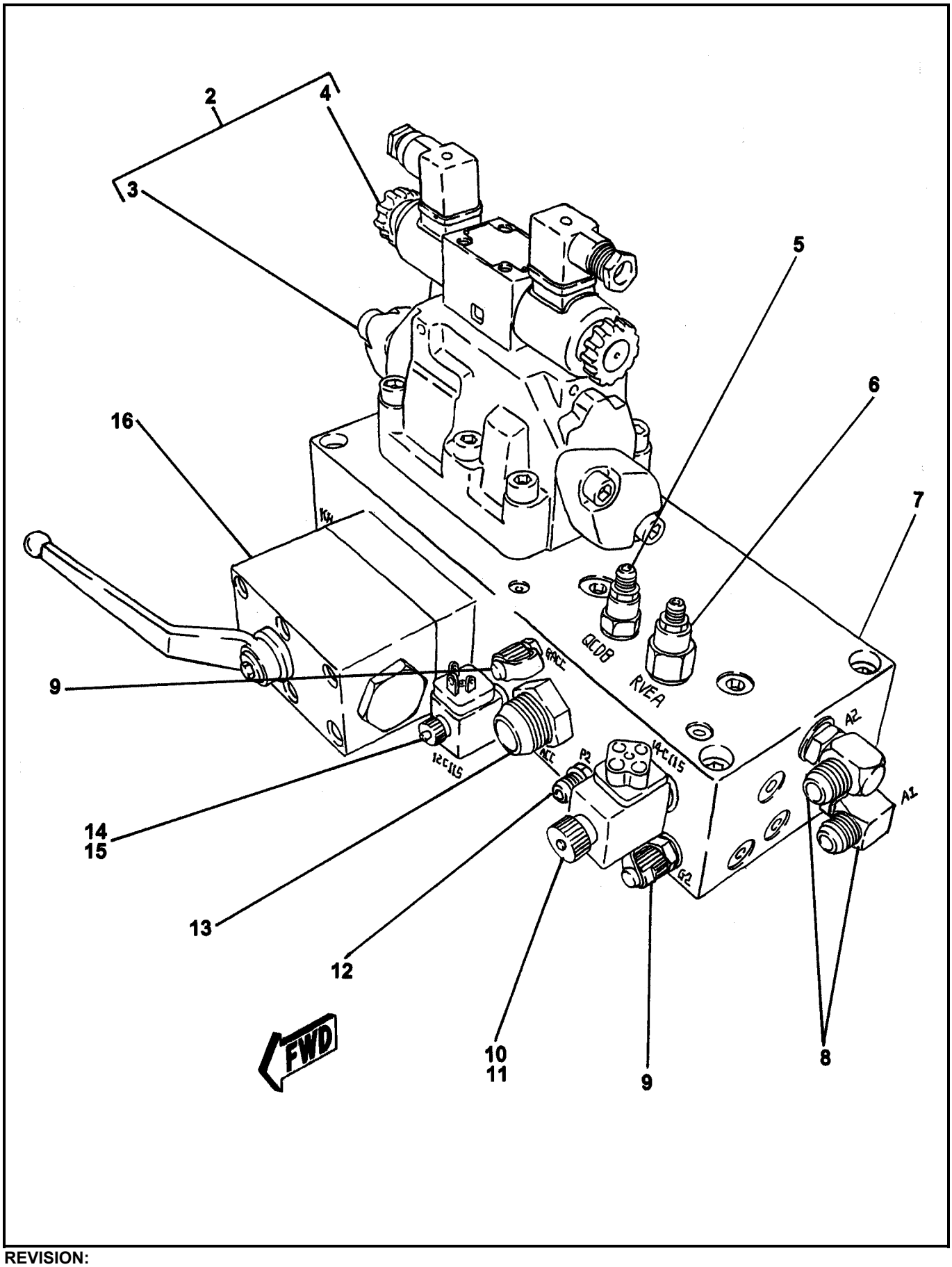
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85361	Assembly, Hydraulic Tank (See Group 30, Figure 01 for NHA)	Ref
2	70366	• Gauge, 3,000 PSI Hydraulic	1
3	74562	• Gauge, 6,000 PSI Hydraulic	1
4	801025	• Cock, Drain	1
5	85574	• Valve, 2 Inch Check	1
6	10981	• Nipple, 2 Inch	1
7	74509	• Gauge, Sight	1
8	85282	• Filter, Return	1
9	85575	• • Gauge, Return Filter	1
10	85283	• • Element, Return Filter	1
11	85537	• Filler, Breather	1
12	85102	• Weldment, Hydraulic Tank	1
13	85824	• • End Cover, Hydraulic Tank	1
14	85867	• • Gasket, End Cover	1
15	79247	• Separator, Magnetic	1
16	800230	• Separator, Magnetic	1
17	85249	• Assembly, Swing Tube Circuit Manifold (See Group 30, Figure 03 for DET)	1
18	85248	• Assembly, Drive Cylinder Circuit Manifold (See Group 30, Figure 07 for DET)	1
-19	78598	• Plug, Hoffman	A/R

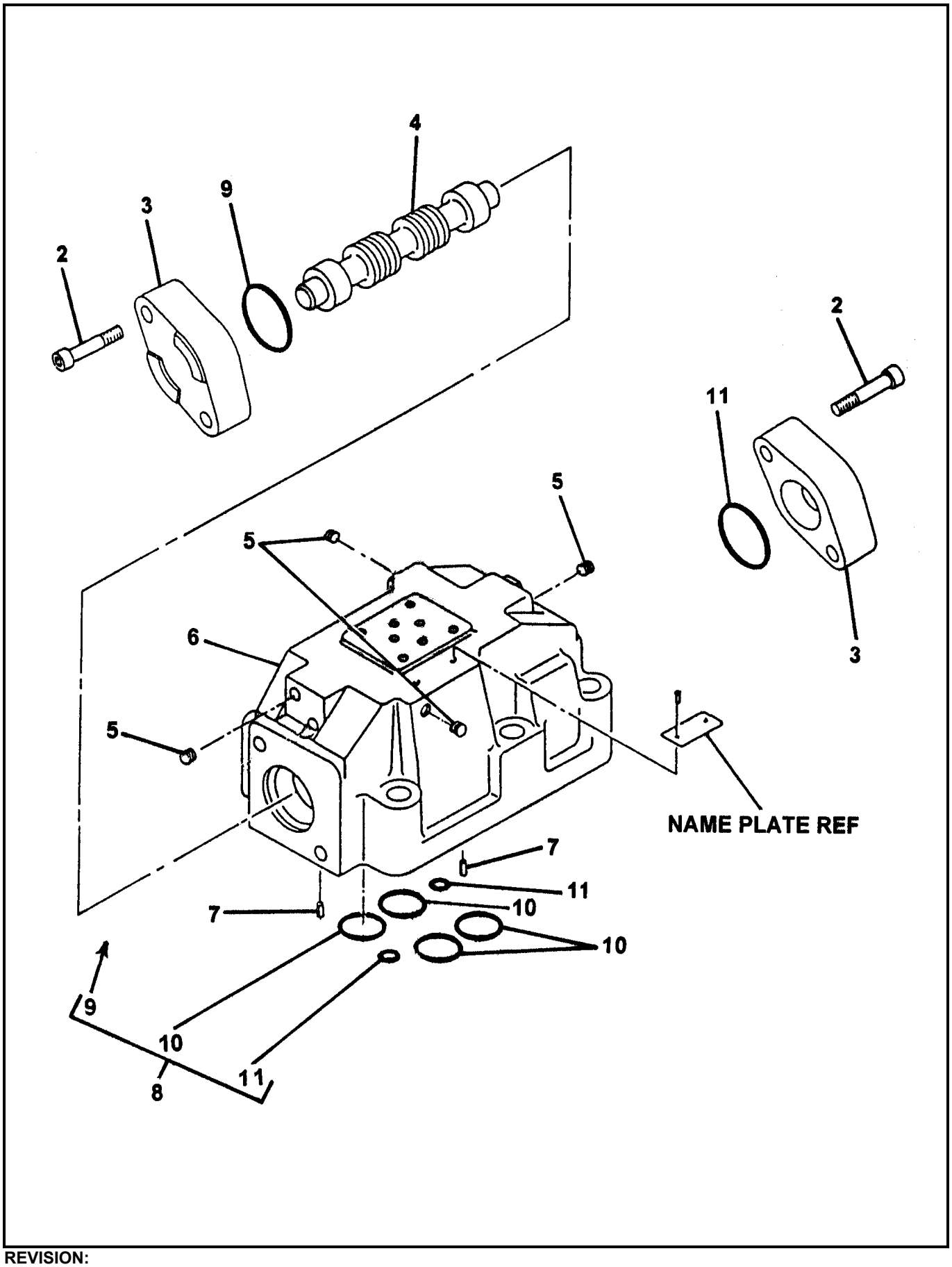
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85249	Assembly, Swing Tube Circuit Manifold (See Group 30, Figure 02 for NHA)	Ref
2	85693	• Assembly, Swing Tube Circuit Solenoid Valve	1
3	85694	• • Assembly, Swing Tube Circuit Main Solenoid Valve (See Group 30, Figure 04 for DET)	1
4	85695	• • Assembly, Swing Tube Circuit Pilot Solenoid Valve (See Group 30, Figure 05 for DET)	1
5	85704	• Cartridge, Unloader Valve	1
-5A	85704SK	• • Kit, Unloader Valve Cartridge Seal	1
6	85703	• Cartridge, Relief Valve	1
-6A	85703SK	• • Kit, Relief Valve Cartridge Seal	1
7		• Body, Swing Tube Circuit Manifold	1
8		• Elbow, 90	2
9	78593	• Port, Mini Check	2
10	85701	• Cartridge, SV4 Solenoid Valve	1
11	85702	• • Coil, SV4 Solenoid Valve Cartridge	1
12		• Fitting, STR	1
13		• Fitting, STR	1
14	85699	• Cartridge, SV3 Solenoid Valve	1
15	85700	• • Coil, SV3 Solenoid Valve Cartridge	1
16	85705	• Assembly, Ball Valve (See Group 30, Figure 06 for DET)	1

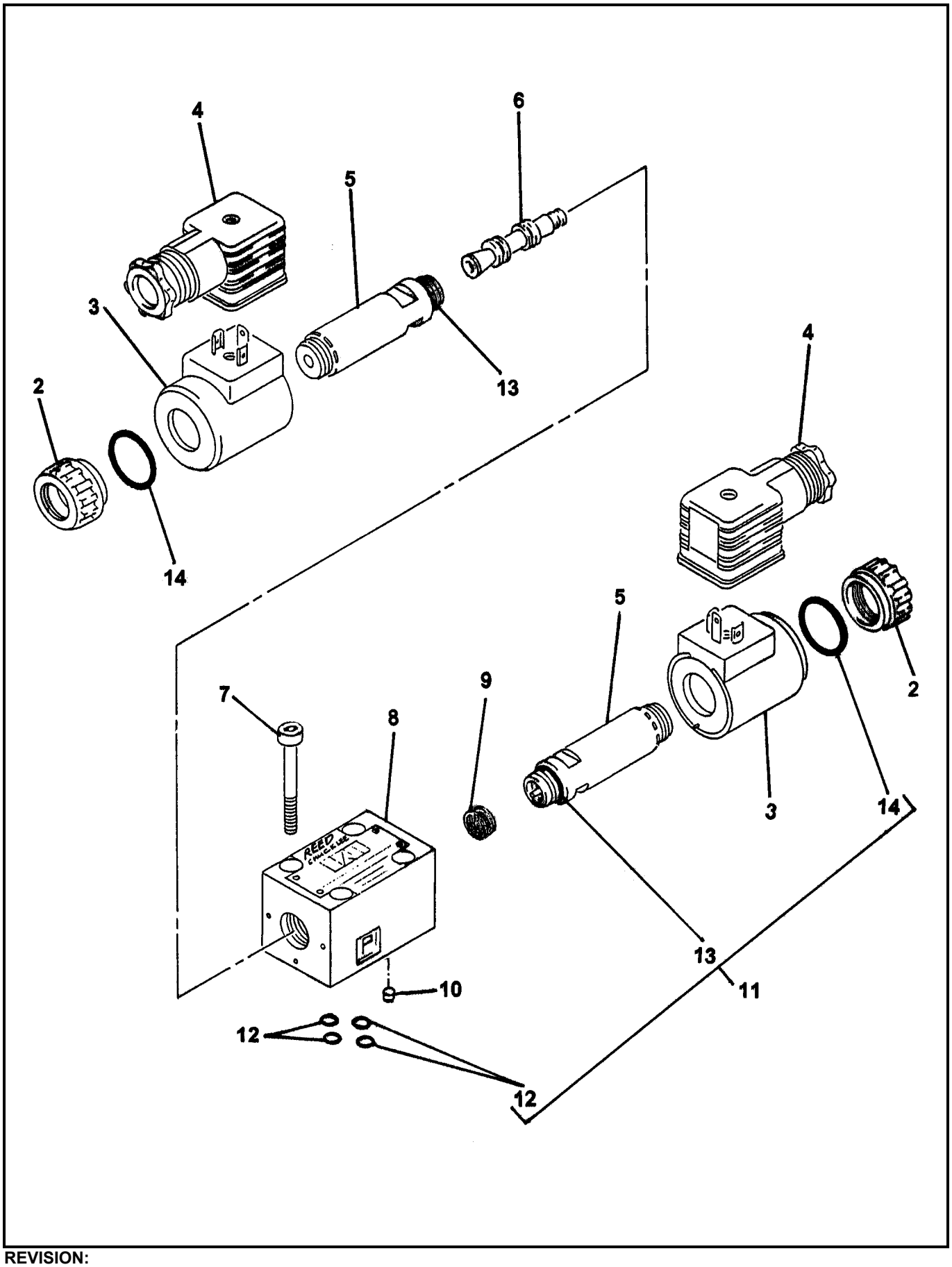
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85694	Assembly, Swing Tube Circuit Main Solenoid Valve (See Group 30, Figure 03 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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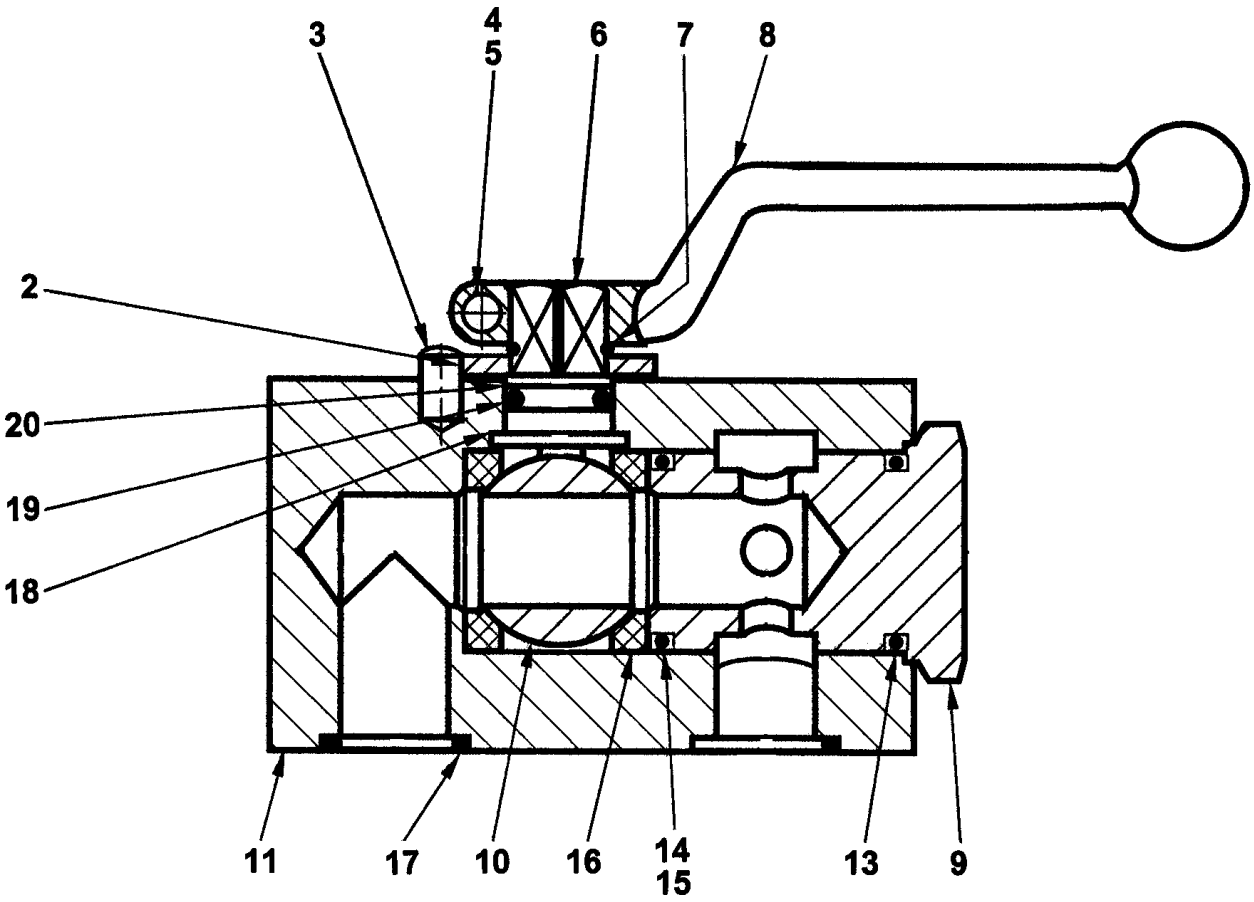
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85695	Assembly, Swing Tube Circuit Pilot Solenoid Valve (See Group 30, Figure 03 for NHA)	Ref
2		• Cap, Coil	2
3	85692	• Coil, Solenoid	2
4	74597	• Connector, Plug	2
5		• Amature	2
6		• Spool	1
7		• Screw, SOC	4
8		• Housing, Solenoid Valve	1
9		• Detent	1
10		• Orifice	1
11	72313	• Kit, O-Ring	1
12		• • O-Ring	4
13		• • O-Ring	2
14		• • O-Ring	2

DASH (-) ITEM NOT ILLUSTRATED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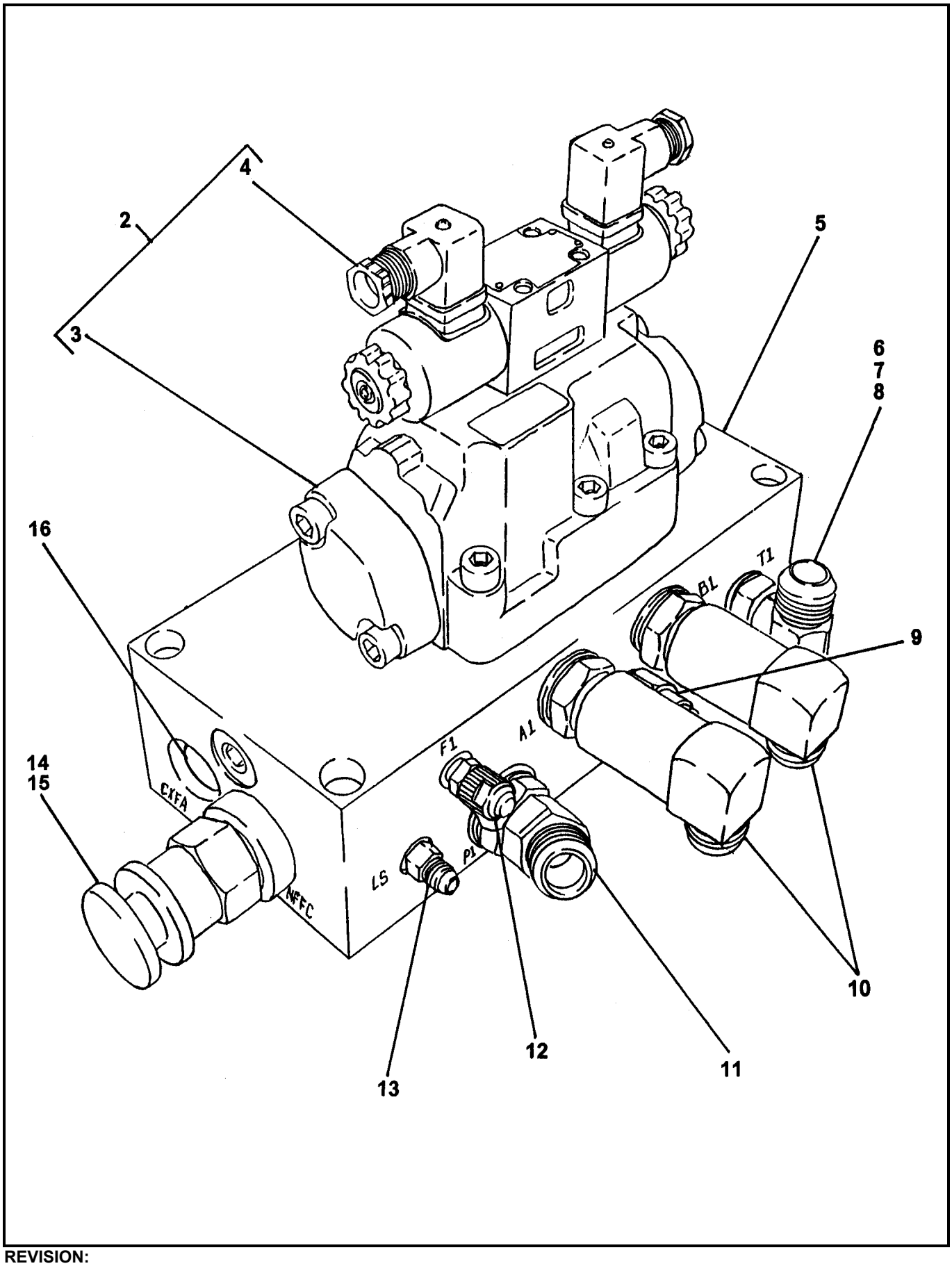
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85705	Assembly, Ball Valve (See Group 30, Figure 03 for NHA)	Ref
2		• Washer, Limit	1
3		• Pin, Stop	1
4		• Bolt, Hex	1
5		• Nut, Hex	1
6		• Handle, Control	1
7		• Spindle, Control	1
8		• Retainer, Spring	1
9		• Plug	1
10		• Ball	1
11		• Housing	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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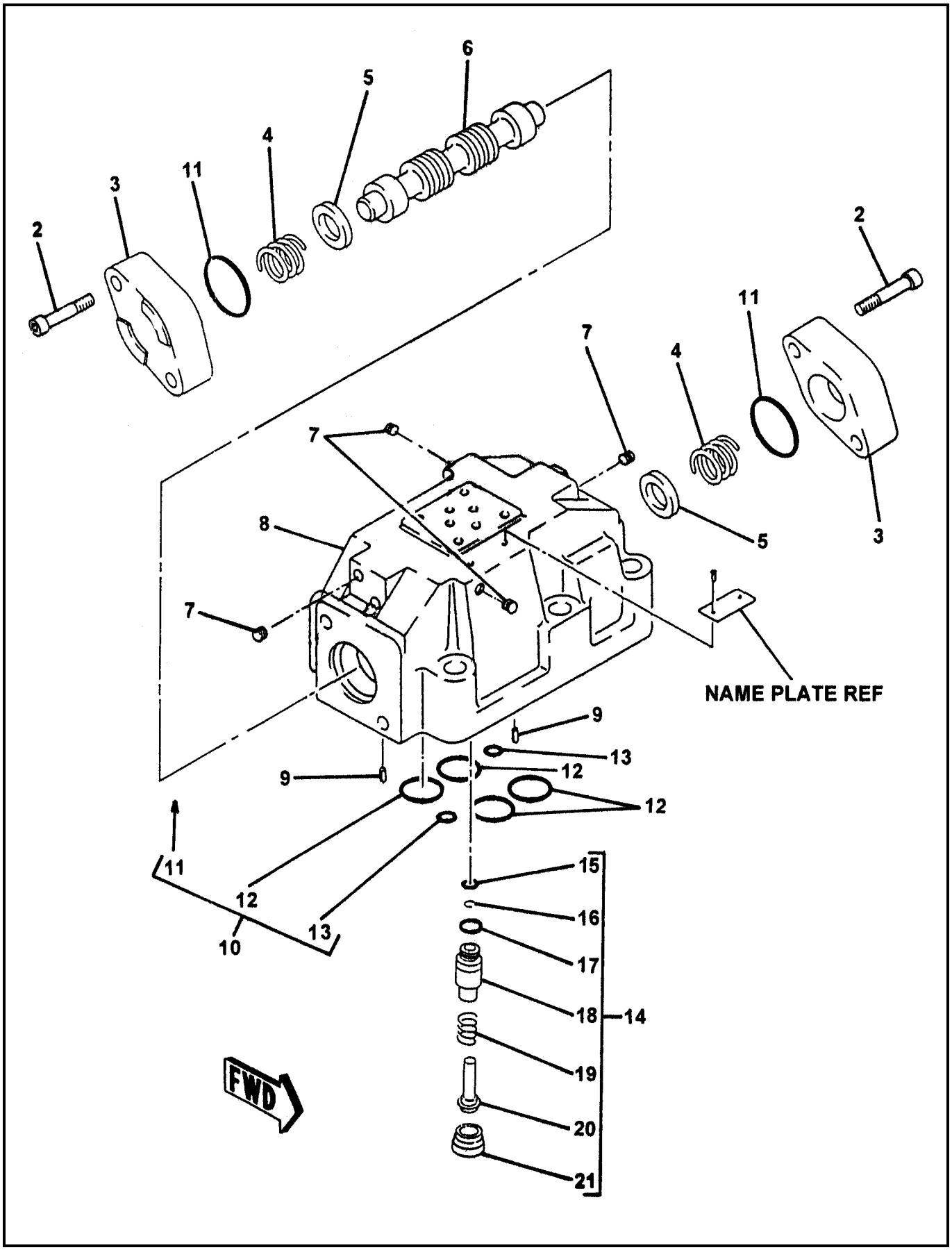
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85248	Assembly, Drive Cylinder Circuit Manifold (See Group 30, Figure 02 for NHA)	Ref
2	85689	• Assembly, Drive Cylinder Circuit Solenoid Valve	1
3	85690	• • Assembly, Drive Cylinder Circuit Main Solenoid Valve (See Group 30, Figure 08 for DET)	1
4	85691	• • Assembly, Drive Cylinder Circuit Pilot Solenoid Valve (See Group 30, Figure 09 for DET)	1
5		• Body, Drive Cylinder Circuit Manifold	1
6		• Tee	1
7		• Reducer	1
8		• Plug	1
9	85696	• Cartridge, Relief Valve	1
10		• Elbow, 90	2
11		• Elbow, 45	1
12	78593	• Port, Mini Check	1
13		• Fitting, STR	1
14	85697	• Cartridge, Flow Control Valve	1
15	85697SK	• • Kit, Flow Control Valve Cartridge Seal	1
16	85698	• Cartridge, Check Valve	1

DASH (-) ITEM NOT ILLUSTRATED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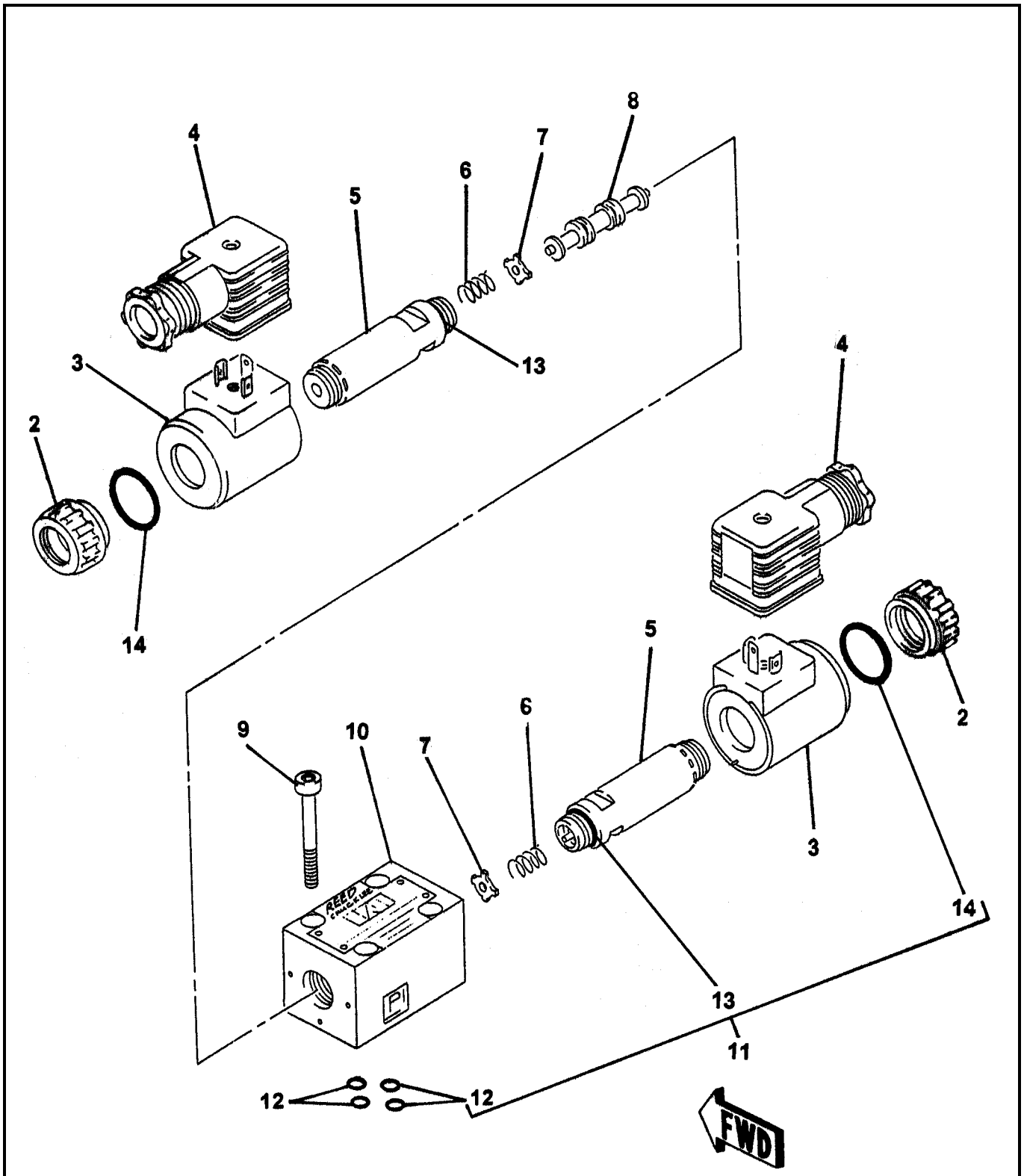
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85690	Assembly, Drive Cylinder Circuit Main Solenoid Valve (See Group 30, Figure 07 for NHA)	Ref
2		• Screw, SOC	4
3		• Cover	2
4		• Spring, Compression	2
5		• Plate, Spring	2
6		• Spool	1
7		• Plug	4
8		• Housing, Cartridge	1
9		• Pin, Grooved	2
10	74994	• Kit, Seal	1
11		• • O-Ring	2
12		• • O-Ring	4
13		• • O-Ring	2
14	73147	• Sub-Assembly, Pilot Pressure Valve	1
15		• • O-Ring	1
16		• • Circlip	1
17		• • O-Ring	1
18		• • Sleeve	1
19		• • Spring, Compression	1
20		• • Cone	1
21		• • Valve, Seat	1

DASH (-) ITEM NOT ILLUSTRATED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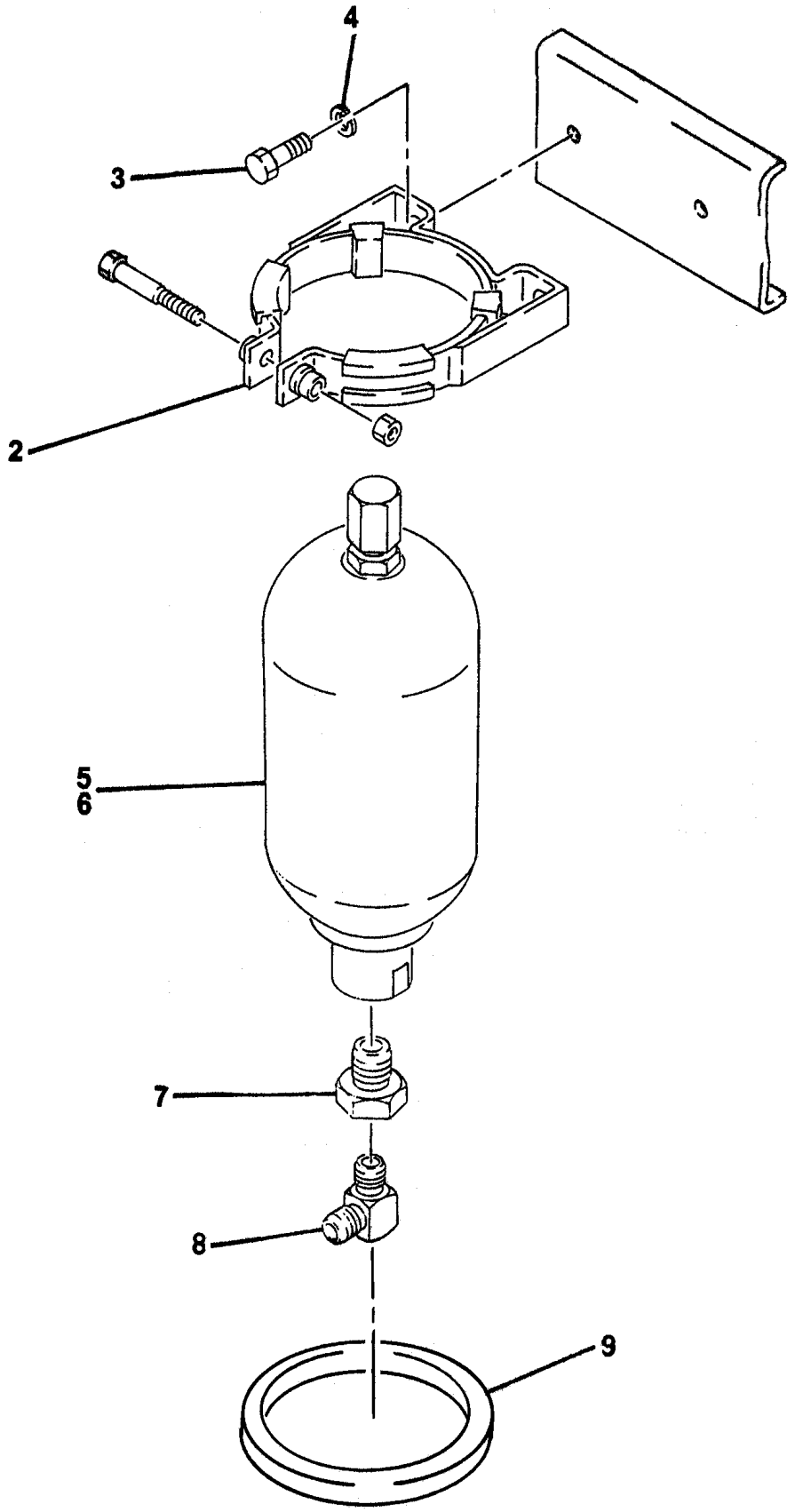
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85691	Assembly, Drive Cylinder Circuit Pilot Solenoid Valve (See Group 30, Figure 07 for NHA)	Ref
2		• Cap, Coil	2
3	85692	• Coil, Drive Cylinder Circuit Main Solenoid	2
4	74597	• Connector, Plug	2
5		• Amature	2
6		• Spring	2
7		• Plate, Spring	2
8		• Spool	1
9		• Screw, SOC	4
10		• Housing, Solenoid Valve	1
11	72313	• Kit, O-Ring	1
12		• • O-Ring	4
13		• • O-Ring	2
14		• • O-Ring	2

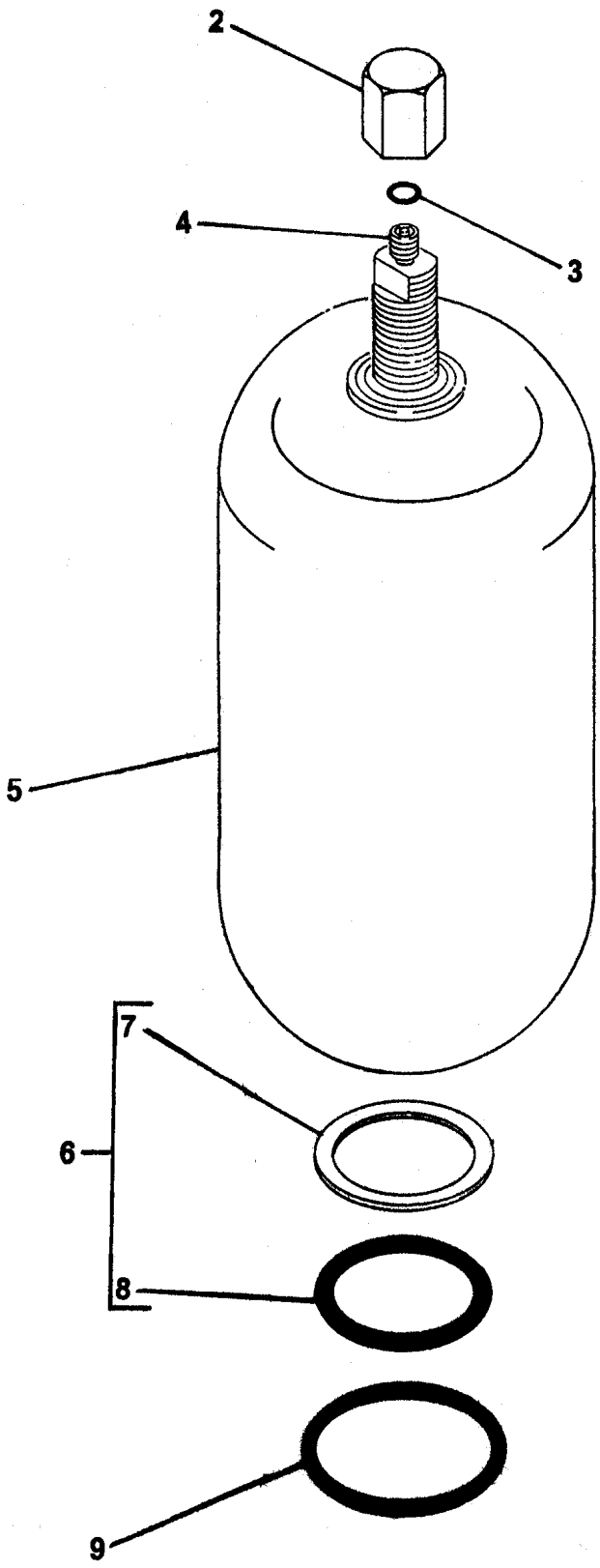
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	30-10	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	74515	• Accumulator, 1 Gal	1
6	30-11	• Kit, Bladder Repair (See Group 30, Figure 11 for REF)	1
7		• Reducer	1
8		• Elbow, 90	1
9	801028	• Grommet, Accumulator	1
-10	71460	• Kit, Accumulator Charge (See Group 80, Figure 07 for REF)	Ref

DASH (-) ITEM NOT ILLUSTRATED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ITEM NO.	*REED* 'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	30-11	Kit, Bladder Repair (Also See Group 30, Figure 10 for NHA)	Ref
2		• Cap, Valve Seal	1
3		• O-Ring	1
4		• Core, Gas Valve	1
5	74516	• Bladder, 1 Gal	1
6	85812	• Kit, Bladder Seal	1
7		• • Ring, Flat	1
8		• • O-Ring	1
9		• Ring, Back Up	1

DASH (-) ITEM NOT ILLUSTRATED

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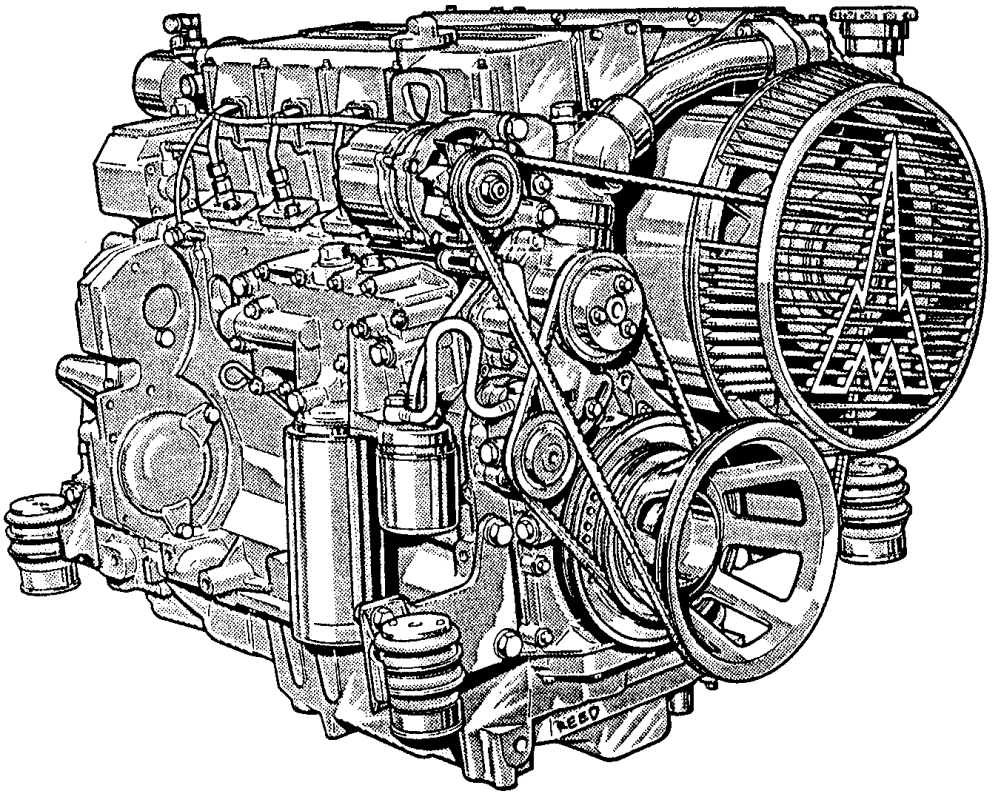
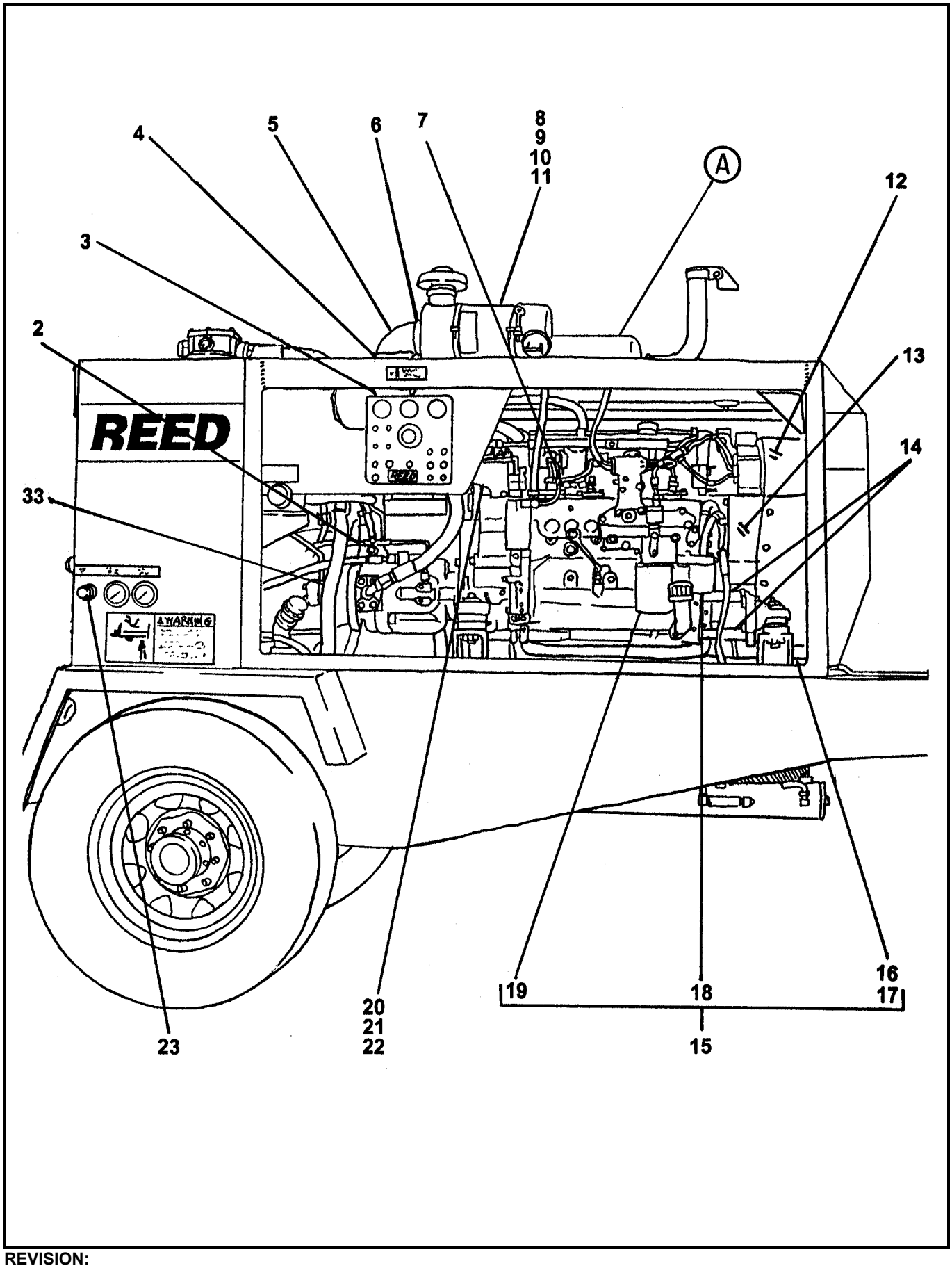


REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 40 POWER TRAIN INSTALLATION** CONTAINS THE FOLLOWING FIGURES: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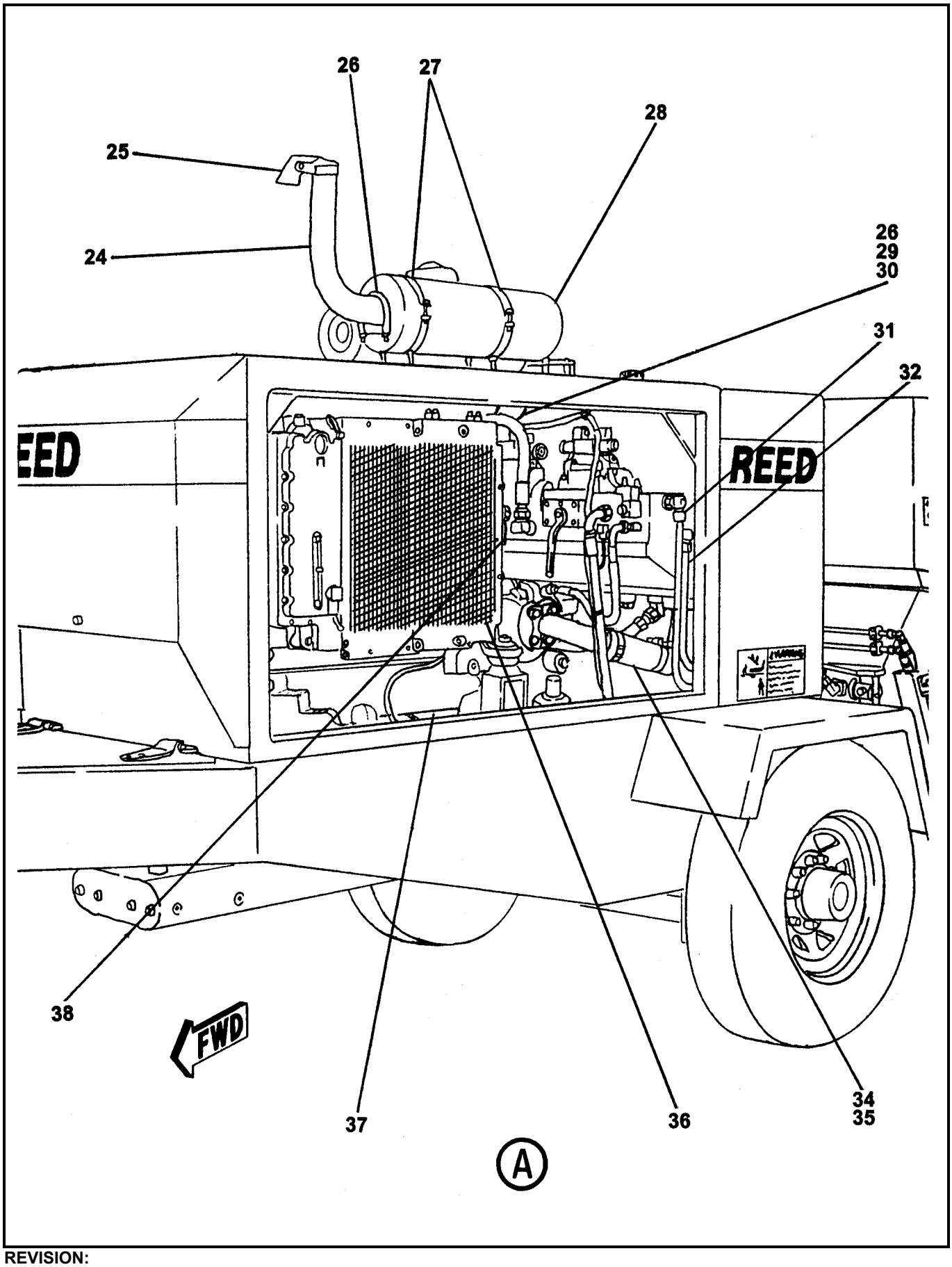
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	40-01	Installation, Power Train (See Group 10, Figure 01 for NHA)	Ref
2	40-02	• Assembly, Main and Auxiliary Pumps (See Group 40, Figure 02 for DET)	1
3	78195	• Elbow, 4 Inch Rubber	1
4	77477	• Clamp	4
5	74256	• Elbow, 3 to 4 Inch	1
6	74461	• Clamp	1
7	10577	• Clamp, Hose	2
8	74273	• Cleaner, Air	1
-8A	78243	• • Element, Air Cleaner	1
9	78192	• Hood, Inlet	1
10	78193	• Band, Mounting	2
11	85728	• Tube, Air Cleaner	2
11A	85348	• Switch, 12 VDC Solenoid	1
12	72226	• Ring, Air Guide	1
13	85345	• Guard, Small Engine Belt	1
14	72493	• Spacer	2
15	78190	• Assembly, Engine (See Vendor Section, Figure 01 for REF)	1
16	76951	• • Filter, Water Separator	1
-16A	79794	• • • Element, Water Separator Filter	1
17	74716	• • Hose, 6 Feet Fuel	1
18	74500	• • Element, Oil Filter	1
19	72960	• • Element, Fuel Filter	1
20	85779	• Bracket, Start Solenoid	1
21	78202	• Coupler, Throttle Cable	1
22	72294	• Bolt, Throttle Control	1
23	78201	• Cable, Throttle Control	1
33	85426	• Tube, Hydraulic Cylinders	2

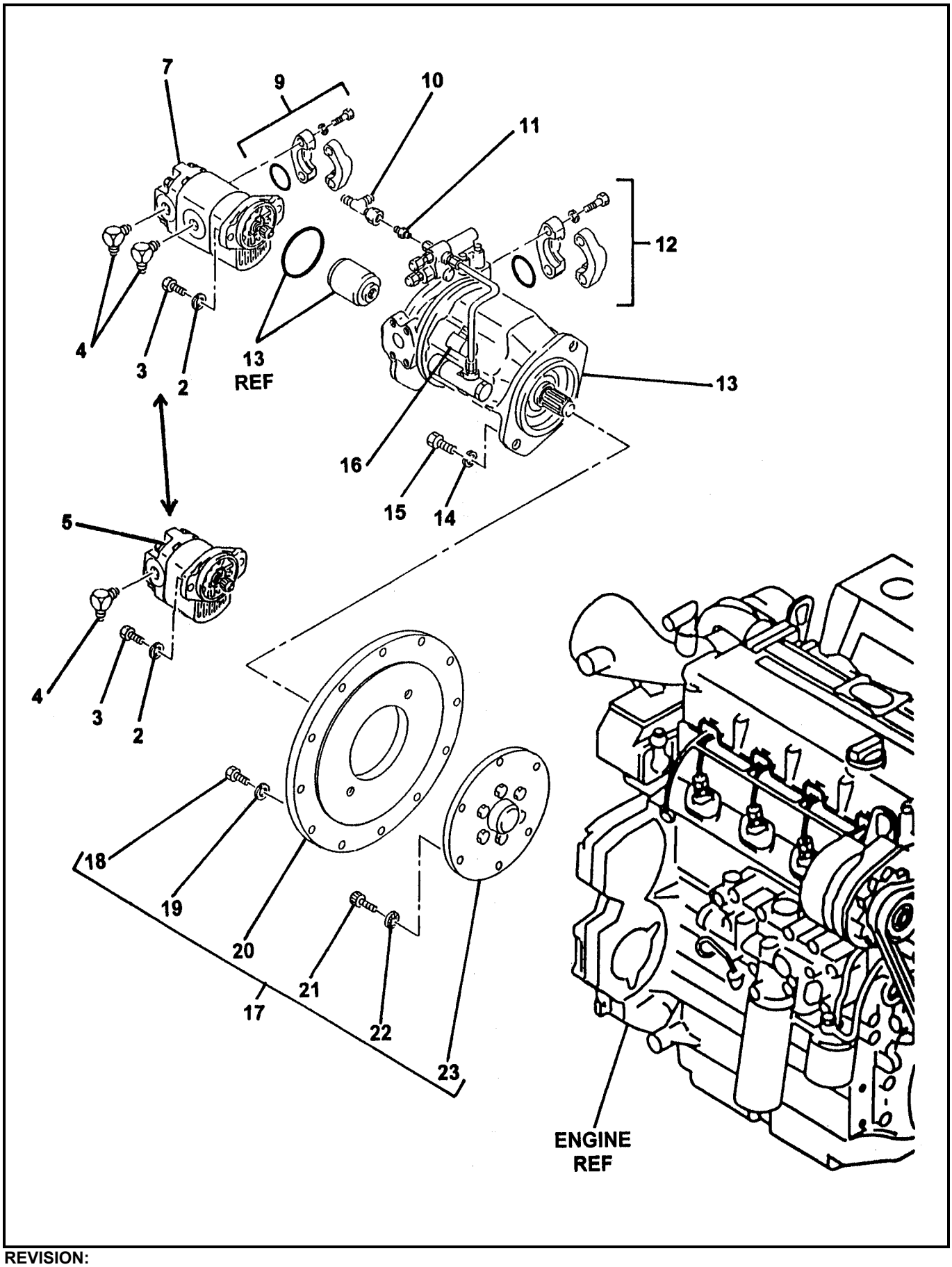
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
24	78212	• Elbow, Exhaust	1
25	70849	• Cap, Rain	1
26	78213	• Clamp	2
27	78211	• Band, Air Cleaner Mounting	2
28	78199	• Muffler, Oval	1
29	85741	• Elbow, Exhaust	1
30	76524	• Spacer, Exhaust	4
31	85429	• Tube, Hydraulic Shift Cylinder	1
32	85428	• Tube, Hydraulic Shift Cylinder	1
33	85426	• Tube, Hydraulic Cylinders	2
34	85661-001	• Hose, Main Pump Suction	1
35	74310	• Clamp, Severe Service	1
36	85732	• Adapter, Suction	1
37	85670	• Guard, Cooler	1
38	40-06	• Assembly, Battery Mounting (See Group 40, Figure 06 for DET)	1
39	78256	• Bracket, Intake	1
-40	73269	• Strap, Ground	1
-41	85396	• Assembly, Engine Wiring Harness (See Schematic Section, Page 11 for REF)	1

DASH (-) ITEM NOT ILLUSTRATED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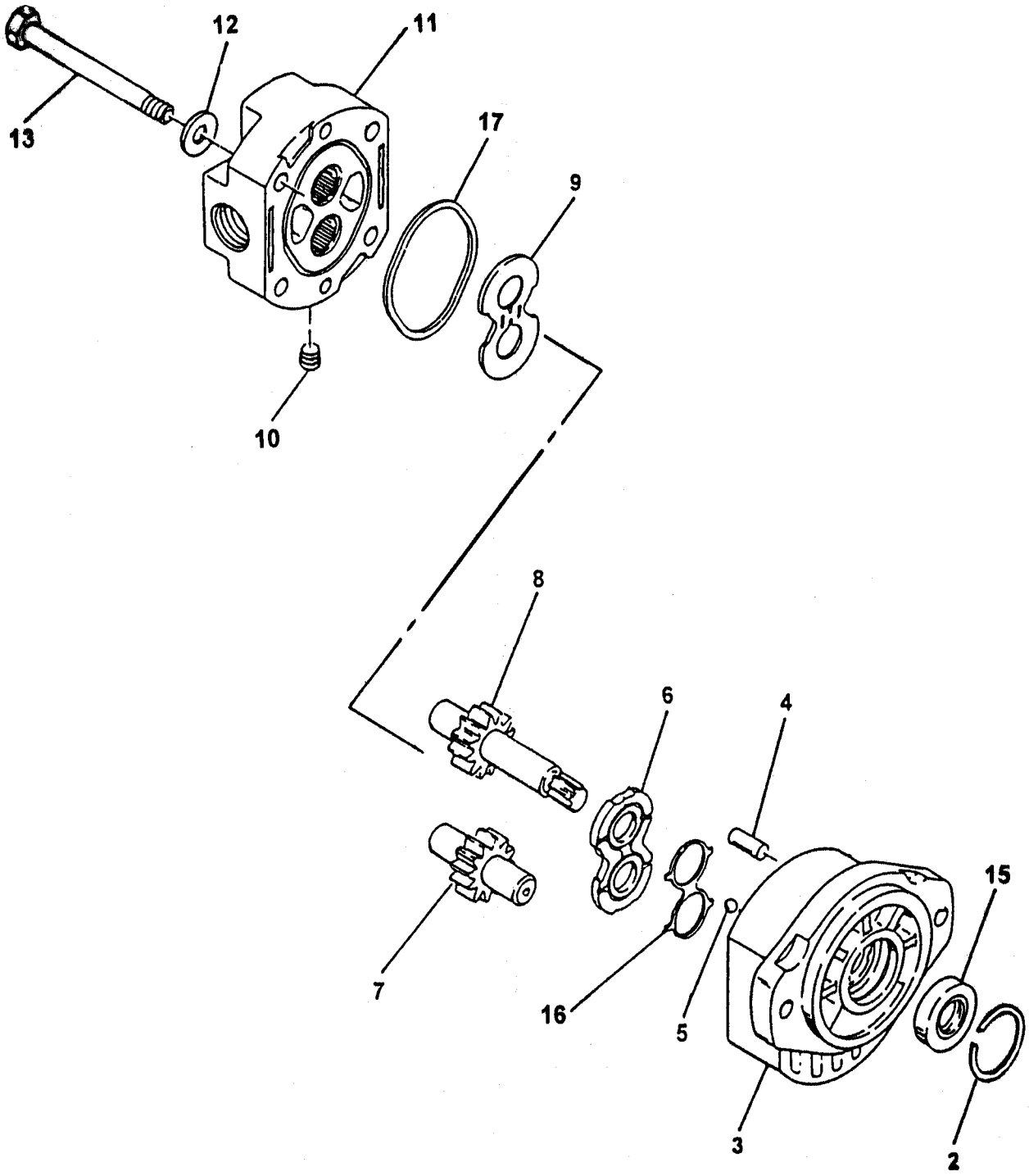
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	40-02	Assembly, Hydraulic Pump (See Group 40, Figure 01 for NHA)	Ref
2		• Washer, Lock	2
3		• Bolt, Hex	2
4		• Fitting, 90	A/R
5	72978	• Assembly, Single Auxiliary Pump (See Group 40, Figure 04 for DET)	1
-6	85675	• Assembly, Optional Pump	1
7	73156	• • Assembly, Double Auxiliary Pump (See Group 40, Figure 03 for DET)	1
-8	85652	• • Valve, Solenoid	1
9		• Kit, Flange	1
10		• Fitting, Tee	1
11		• Fitting STR	1
12		• Kit, Flange	1
13	85124	• Assembly, Main Pump (See Group 40, Figure 05 for DET) (Also See Vendor Section, Figure 02 for REF)	1
14		• Washer, Lock (attaching parts)	2
15		• Bolt, Hex (attaching parts)	2
16		• Fitting, 90	1
17	85126	• Assembly, Flywheel Coupling	1
18		• • Bolt, Hex	12
19		• • Washer, SPL	12
20		• • Plate, Flywheel	1
21		• • Screw	6
22		• • Washer	6
23		• • Drive, Flywheel	1
-24	78256	• Bracket, Air Intake	1

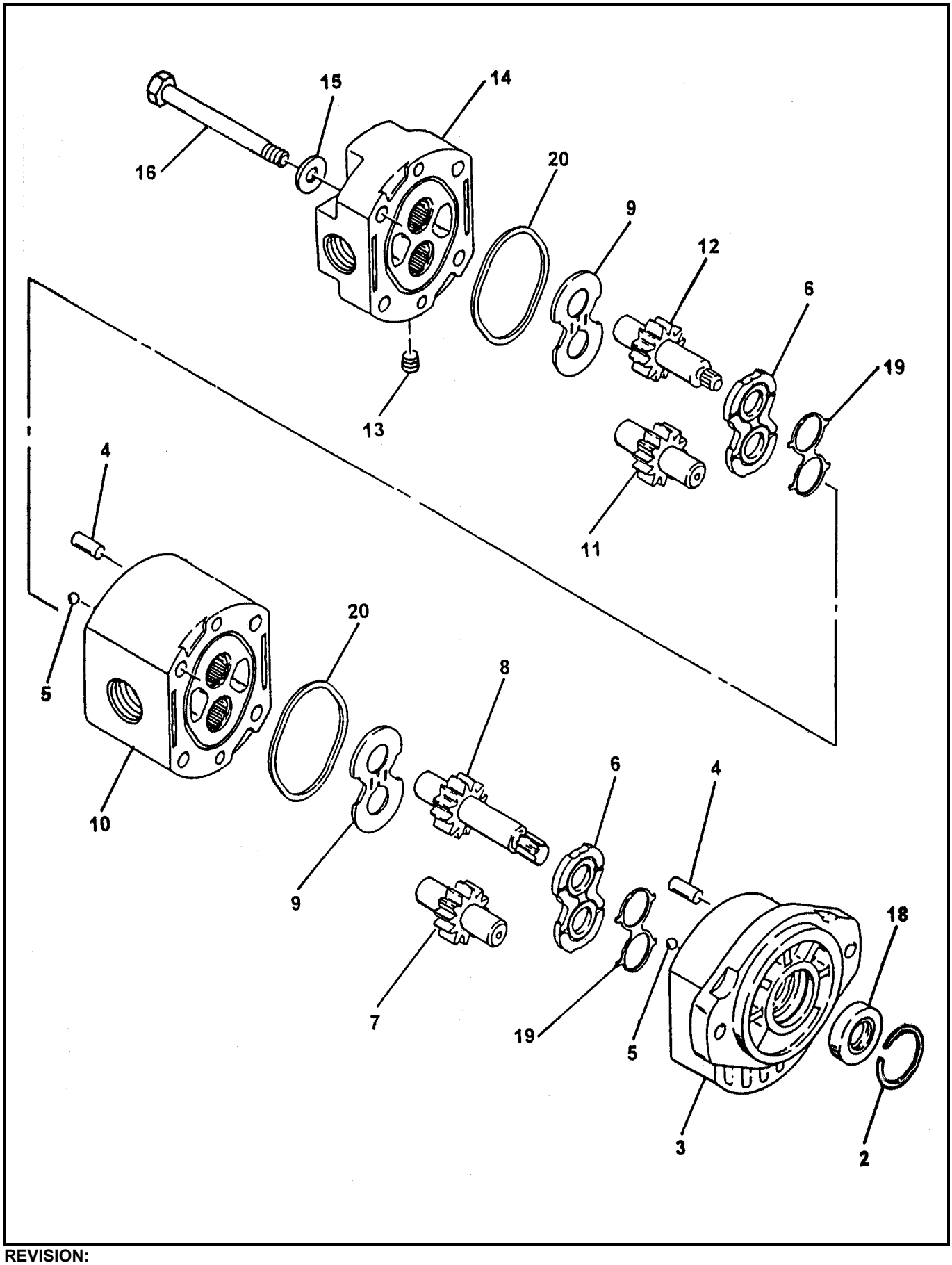
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	72978	Assembly, Single Auxiliary Pump (See Group 40, Figure 02 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	1
8		• Gear, Drive	1
9		• Plate, Thrust	2
10		• Plug, Pipe	1
11		• Assembly, Cover	1
12		• Washer, Flat (attaching parts)	4
13		• Screw, Hex (attaching parts)	4
-14	72978SK	• Kit, Seal	1
15		• • Seal, Shaft	1
16		• • Rubber, Space	1
17		• • Ring, Square Cut	1

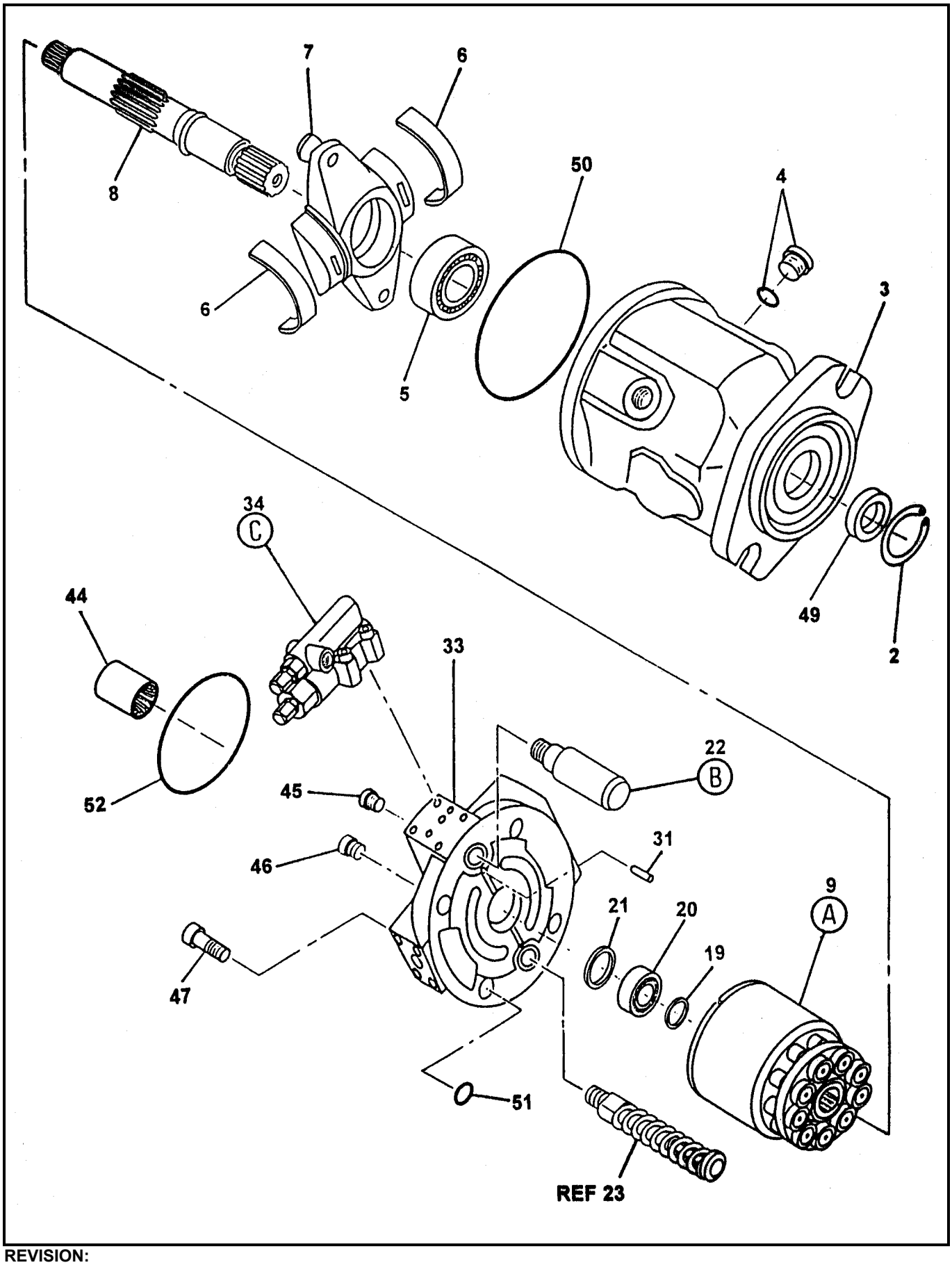
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	73156	Assembly Double Auxiliary Pump (See Group 40, Figure 02 for NHA)	Ref
2		• Retainer	1
3		• Assembly, Body	1
4		• Pin, Dowel	4
5		• Bearing, Ball	4
6		• Plate, Wear	2
7		• Gear, Driven	1
8		• Gear, Drive	1
9		• Plate, Thrust	2
10		• Assembly, Middle Body	1
11		• Gear, Rear Driven	1
12		• Cover, Rear Drive	1
13		• Plug, Pipe	1
14		• Assembly, Cover	1
15		• Washer, Flat (attaching parts)	4
16		• Screw, Hex (attaching parts)	4
-17	79598	• Kit, Seal	1
18		• • Seal, Shaft	1
19		• • Rubber, Space	2
20		• • Ring, Square Cut	2

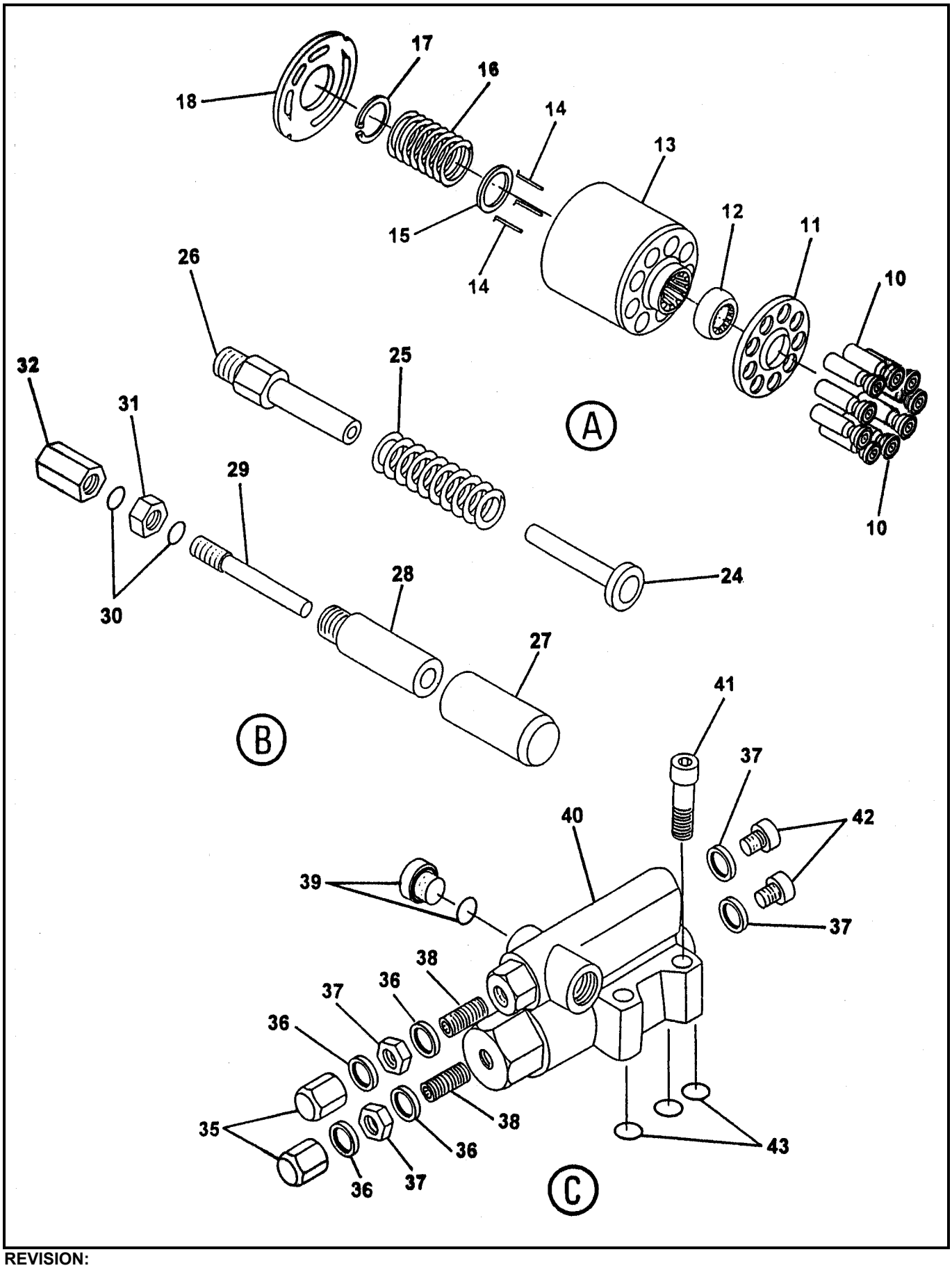
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85124	Assembly, Main Pump (See Group 40, Figure 02 for NHA) (Also See Vendor Section, Figure 02 for REF)	Ref
2		• V-Ring, Seeger	1
3		• Housing, Pump	1
4		• Plug, O-Ring	1
5		• Bearing, Tapered Roller	1
6		• Bearing, Cradle	2
7		• Assembly, Cradle	1
8		• Shaft, Drive	1
9		• Assembly, Rotary	1
23		• Assembly, Piston Control	1
33		• Block	1
34		• Assembly, Control Valve	1
44		• Coupling	1
45		• Plug	1
46		• Plug	1
47		• Screw, Cap	2
-48		• Kit, Seal	1
49		• • Seal, Shaft	1
50		• • O-Ring	1
51		• • O-Ring	1
52		• • O-Ring	1

DASH (-) ITEM NOT ILLUSTRATED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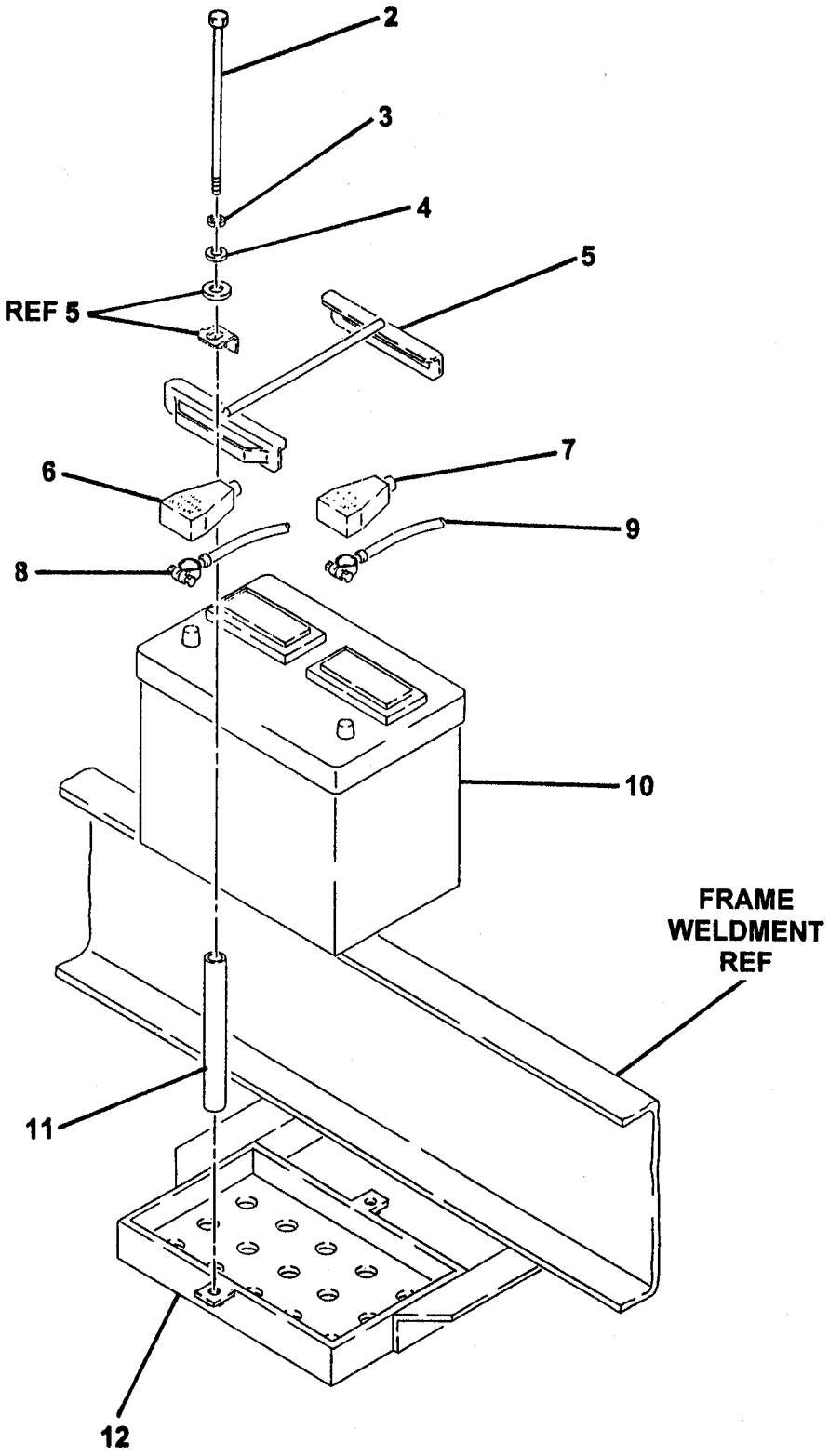
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-9		• Assembly, Rotary	1
10		• • Piston	9
11		• • Plate, Retaining	1
12		• • Ball, Retaining	1
13		• • Barrel	1
14		• • Pin, Pressure	3
15		• • Disc, Retaining Clip	1
16		• • Spring	1
17		• • Ring, Retaining	1
18		• • Plate, Lens	1
-23		• Assembly, Piston Control	1
24		• • Piston, Counter	1
25		• • Spring	1
26		• • Guide, Counter Piston	1
27		• • Piston, Counter	1
28		• • Guide, Counter Piston	1
29		• • Screw, Max Volume Adjustment	1
30		• • O-Ring	2
31		• • Nut, Lock	1
32		• • Nut, Acorn	1
-34		• Assembly, Control Valve	1
35		• • Nut, Acorn	2
36		• • O-Ring	3
37		• • Nut, Jam	2
38		• • Screw, Adjusting	2
39		• • Plug, O-Ring	1
40		• • Body, Control Valve	1
41		• • Screw, Cap (attaching parts)	4
42		• • Plug	2
43		• • O-Ring	3

DASH (-) ITEM NOT ILLUSTRATED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ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	40-06	Assembly, Battery Mounting (See Group 40, Figure 01 for NHA)	Ref
2		• Bolt, Hex	2
3		• Washer, Lock	2
4		• Washer Flat	2
5	72945	• Holder, Battery Down	1
6	77720	• Insulator, Negative Battery (Black)	1
7	77719	• Insulator, Positive Battery (Red)	1
8	75116	• Cable, Negative Battery (Black)	1
9	72016	• Cable, 24 Inch Long Positive Battery (Red)	1
10	77075	• Battery, 12 VDC	1
11	73753	• Spacer, Battery Mounting	2
12	72954	• Weldment, Battery Box	1
-13	72014	• Cable, 36 Inch Long Battery Top	1
-14	85348	• Connector, SPNO 12 VDC	1

DASH (-) ITEM NOT ILLUSTRATED

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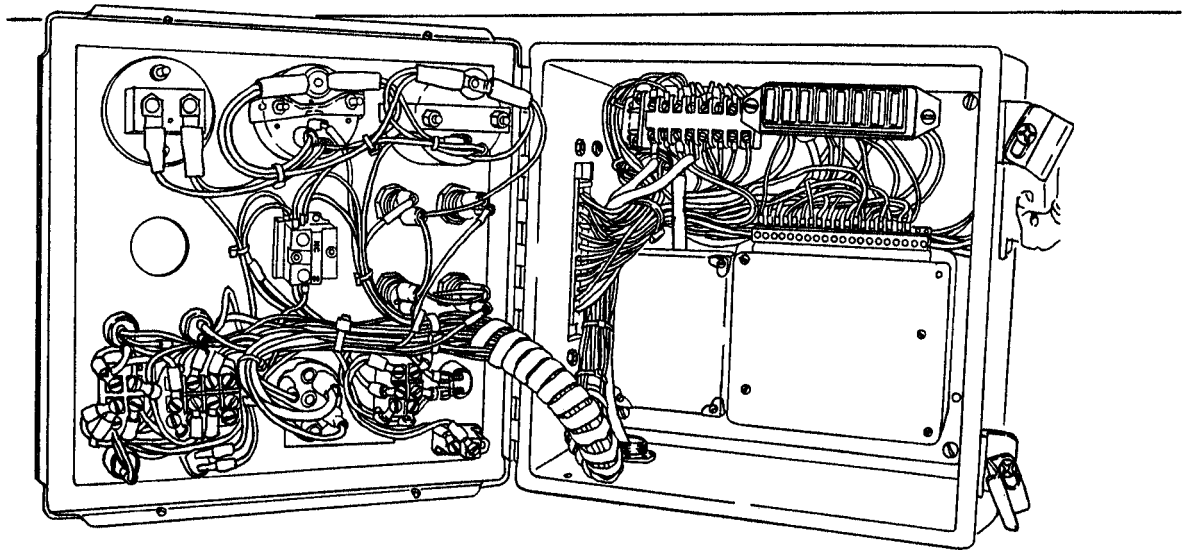
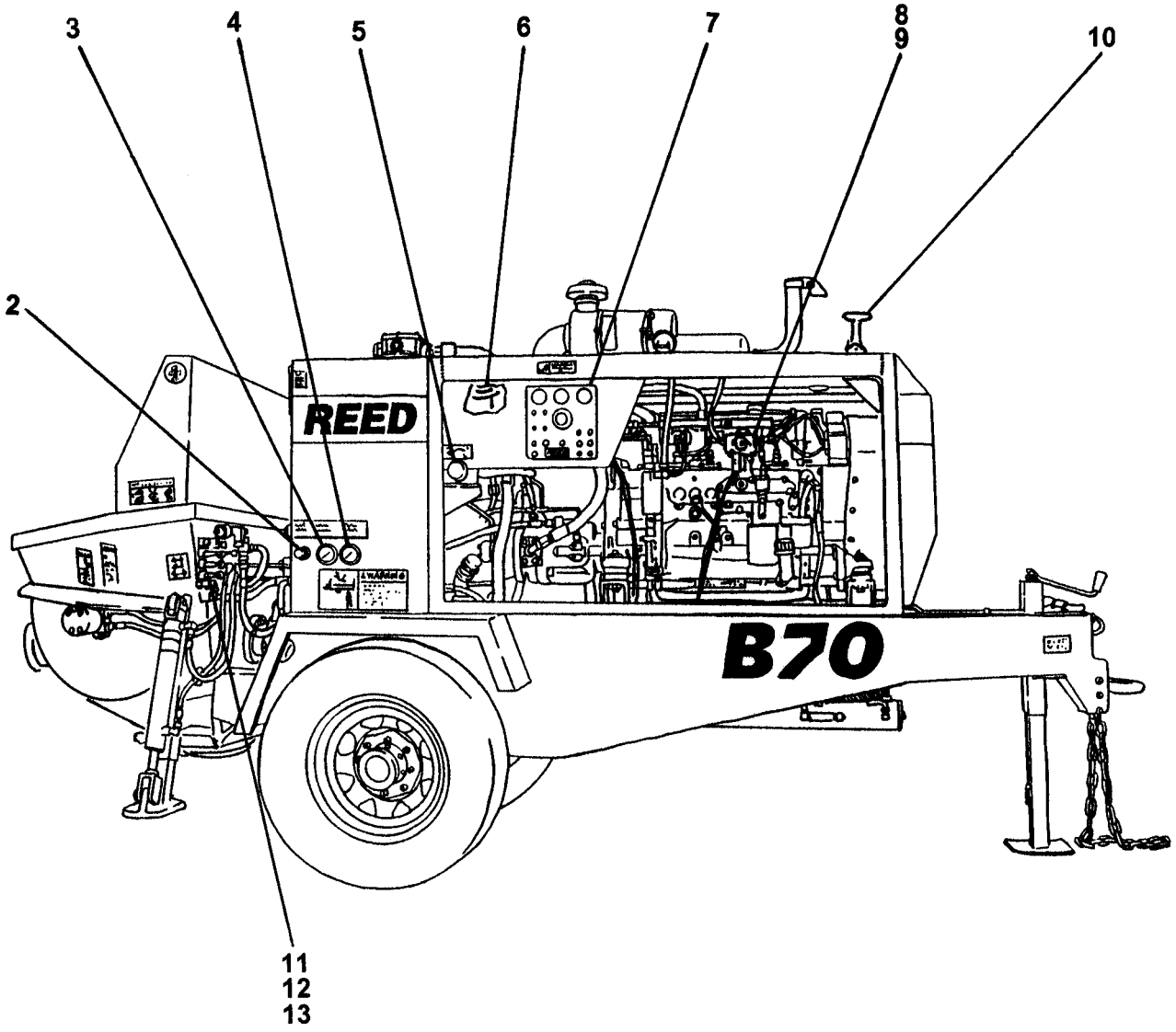
REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 50 CONTROLS INSTALLATION** CONTAINS THE FOLLOWING FIGURES:

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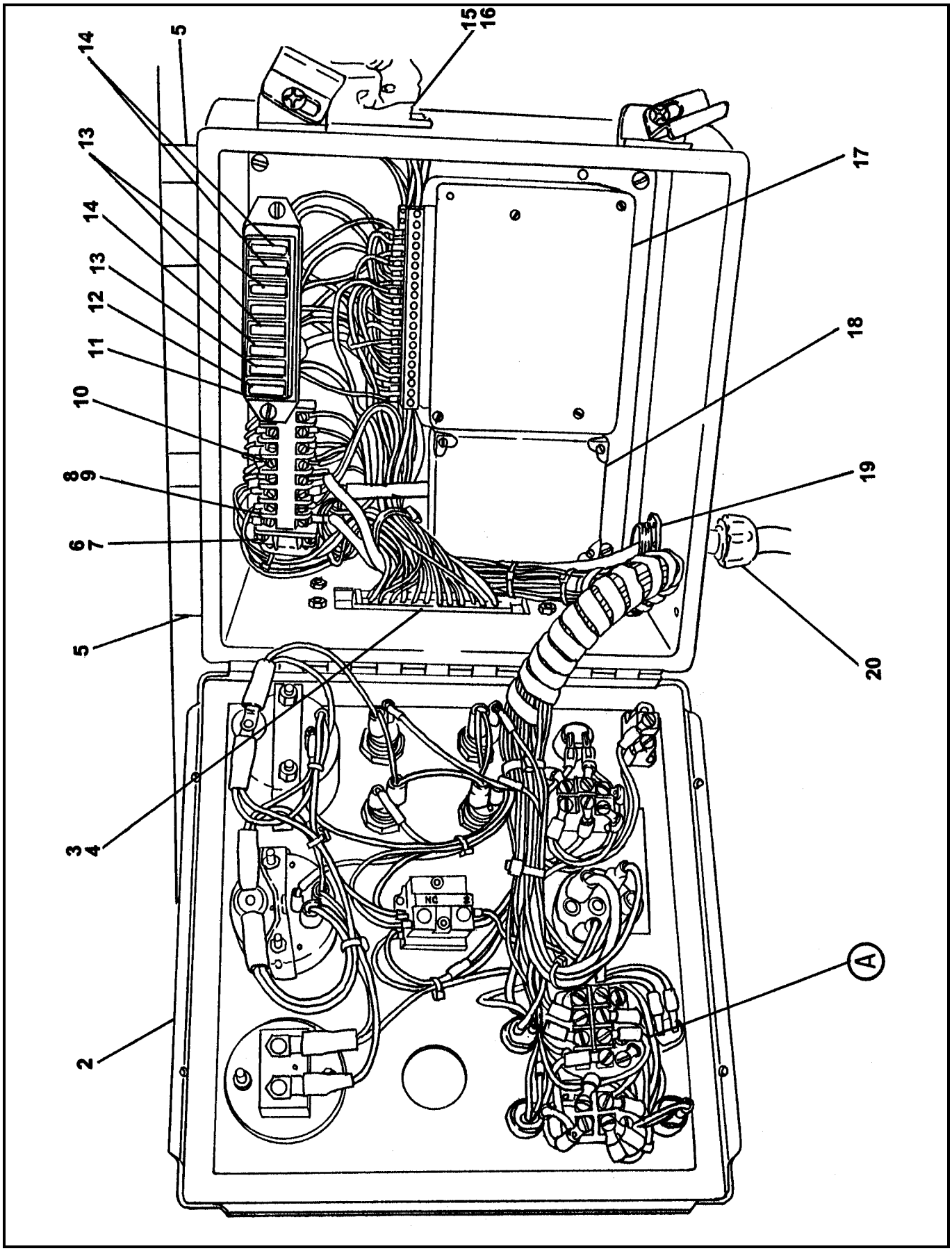
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	50-01	Installation, Control (See Group 10, Figure 01 for NHA)	Ref
2	78201	• Cable, Throttle Control (See Group 40, Figure 01 for REF)	1
3	70366	• Gauge, 3,000 PSI Hydraulic (See Group 30, Figure 02 for REF)	1
4	74562	• Gauge, 6,000 PSI Hydraulic (See Group 30, Figure 02 for REF)	1
5	85697	• Cartridge, Flow Control Valve (See Group 30, Figure 07 for REF)	1
6	800347	• Horn, 12 V	1
7	85358	• Assembly, Control Box (See Group 50, Figure 02 for DET)	1
8	85359	• Assembly, 50 Feet Cable Remote Control (See Group 50, Figure 03 for DET)	1
9	85359A	• Assembly, 100 Feet Cable Remote Control (See Group 50, Figure 04 for DET)	1
10	85818	• Assembly, Radio Remote Control (Optional Item) (See Group 50, Figure 05 for DET)	1
11	20-05	• Assembly, 3 Spool Control Valve (Optional Item) (See Group 20, Figure 05 for REF)	1
12	80-16	• Assembly, 1 Spool Control Valve (Optional Item) (See Group 80, Figure 16 for REF)	1
13	80-18	• Assembly, 2 Spool Control Valve (Optional Item) (See Group 80, Figure 18 for REF)	1

DASH (-) ITEM NOT ILLUSTRATED

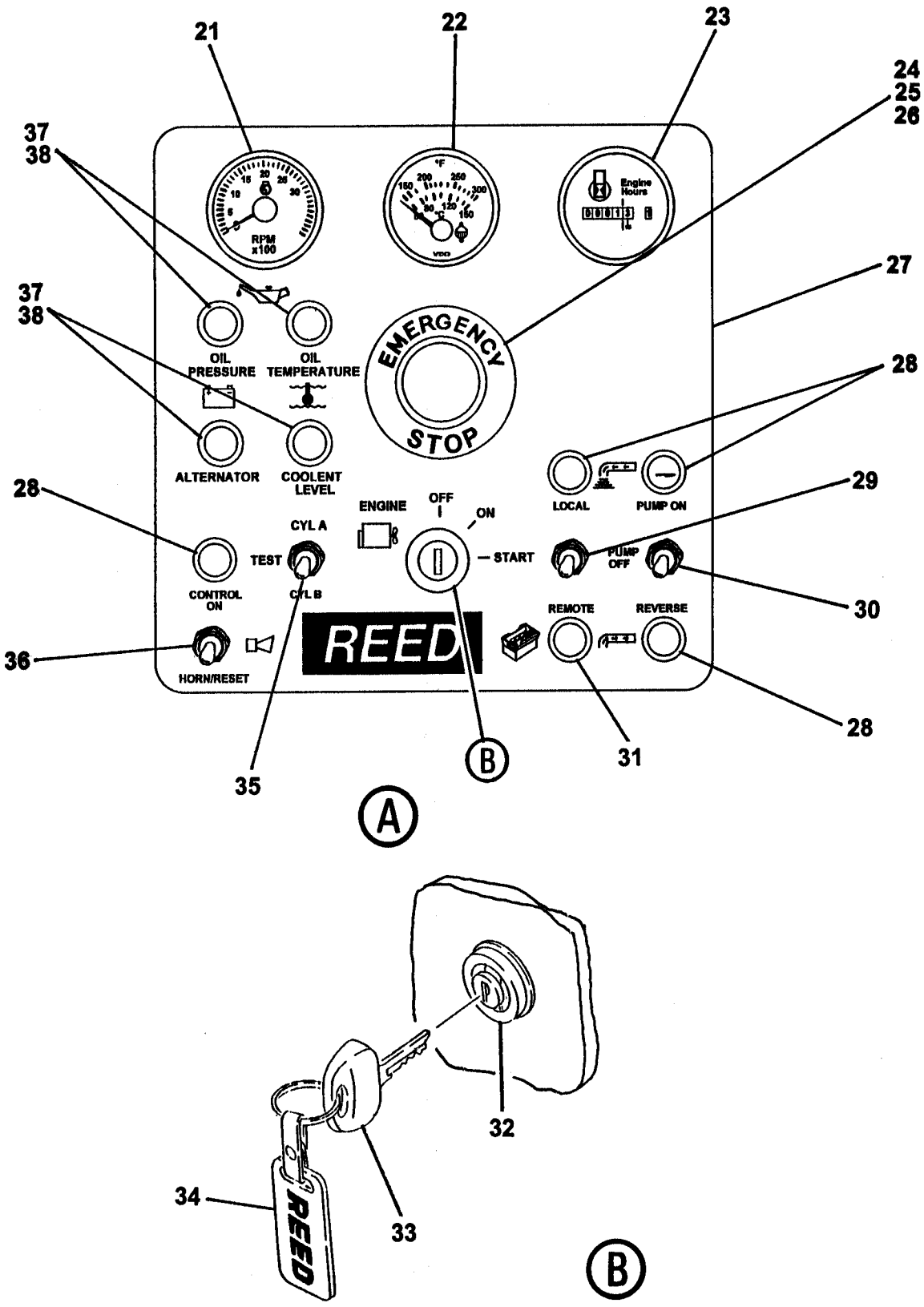
CONTROL BOX ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85358	Assembly, Control Box (See Group 50, Figure 01 for NHA)	Ref
2	85400	• Box, Control	1
3	78696	• Insert, Connector	1
4	78697	• Base, Connector	1
5	73748	• Bumper	4
6	75654	• End, Barrier	1
7	72821	• Rail, 0.333 Feet Barrier	1
8	72820	• Terminal	8
9	72824	• Jumper	2
10	85354	• Block, Fuse	1
11	85419	• Stand Off	1
12	800447	• Fuse, 25	1
13	800449	• Fuse, 10	4
14	90392	• Fuse, 5	3
15	79963	• Insert, Connector	1
16	79965	• Base, Connector	1
17	85596	• Box, Black	1
18	85334	• Box, Pump Black	1
19	10528	• Nut	1
20	10523	• Relief, Strain	1

DASH (-) ITEM NOT ILLUSTRATED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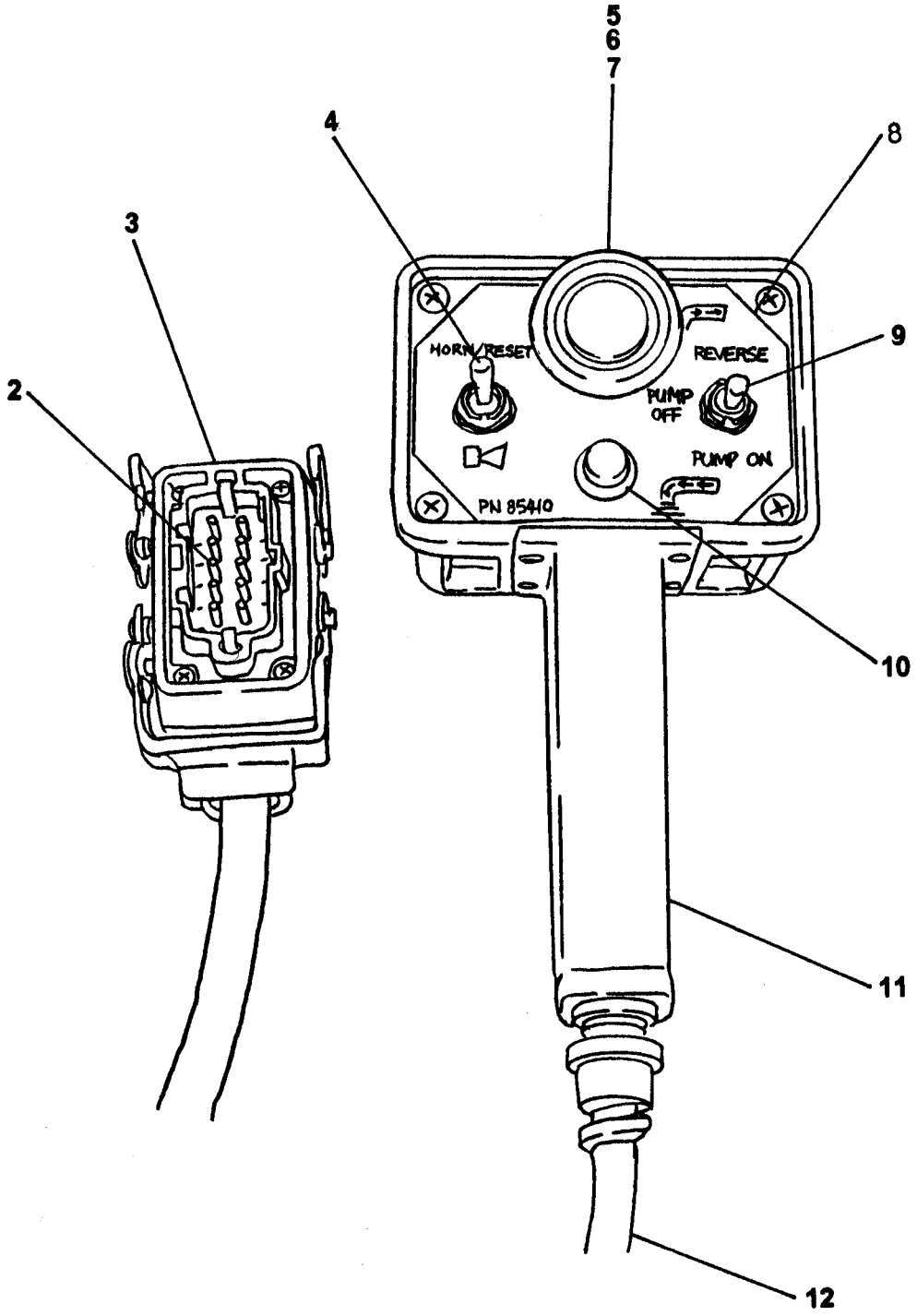
RPM x100
°F
Engine Hours
OIL PRESSURE
OIL TEMPERATURE
ALTERNATOR
COOLENT LEVEL
EMERGENCY STOP
LOCAL
PUMP ON
ENGINE
OFF
ON
START
CYL A
TEST
CYL B
CONTROL ON
PUMP OFF
REMOTE
REVERSE
HORN/RESET
REED
A
B
B
REED

REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
21	78687	• Tachometer	1
22	78203	• Gauge, Water Temperature	1
23	74240	• Meter, Engine Hour	1
24	85342	• Operator, Emergency Stop	1
25	85343	• Block, Contact	1
26	85344	• Bulb, Emergency Stop	1
27	85332	• Decal, Control Box	1
28	85355	• Pilot, Light	4
29	78563	• Switch, Local / Remote	1
30	72003	• Switch, Pump On / Reverse	1
31	85356	• Pilot, Light	1
32	71154	• Switch, Ignition	1
33	71155	• • Key (Pair)	1
34	72862	• Gauge, Proximity Switch	1
35	85346	• Switch, CYL A / CYL B	1
36	85347	• Switch, Horn / Reset	1
37	73775	• Indicator, Red Light 14 VDC	4
38	72022	• Bulb, Indicator	4
-39	85396	• Assembly, Engine Wiring Harness (See Schematic Section, Page 11 for REF)	1
-40	86533	• Assembly, Trailer Wiring Harness (See Schematic Section, Page 12 for REF)	1

DASH (-) ITEM NOT ILLUSTRATED

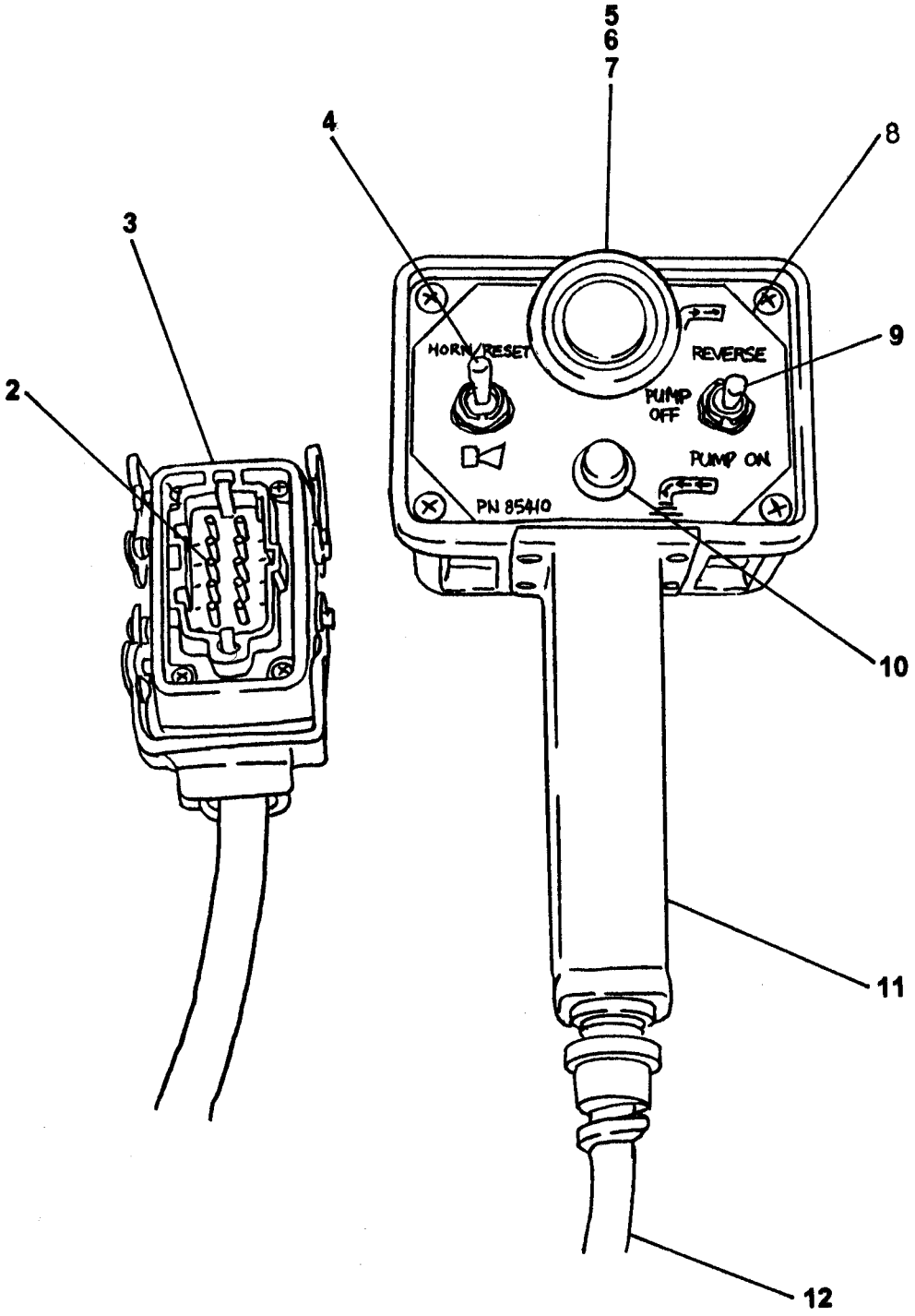
50 FEET CABLE
REMOTE CONTROL ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85359	Assembly, 50 Feet Cable Remote Control (See Group 50, Figure 01 for NHA)	Ref
2	79964	• Connector, Insert	1
3	79966	• Connector, Hood	1
4	85347	• Switch, Horn / Reset	1
5	85342	• Operator, Emergency Stop	1
6	85343	• Block, Contact	1
7	85344	• Bulb, Emergency Stop	1
8	85410	• Decal, Remote Control Box	1
9	72003	• Switch, Pump On / Reverse	1
10	85355	• Pilot, Light	1
11	71999	• Pistol, Grip	1
12	85620	• Cable, 50 Feet Remote Control	1

DASH (-) ITEM NOT ILLUSTRATED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2
HORN/RESET
REVERSE
PUMP OFF
PUMP ON
PN 85410
10
11
12

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85359A	Assembly, 100 Feet Cable Remote Control (See Group 50, Figure 01 for NHA)	Ref
2	79964	• Connector, Insert	1
3	79966	• Connector, Hood	1
4	85347	• Switch, Horn / Reset	1
5	85342	• Operator, Emergency Stop	1
6	85343	• Block, Contact	1
7	85344	• Bulb, Emergency Stop	1
8	85410	• Decal, Remote Control Box	1
9	72003	• Switch, Pump On / Reverse	1
10	85355	• Pilot, Light	1
11	71999	• Pistol, Grip	1
12	85816	• Cable, 100 Feet Remote Control	1

DASH (-) ITEM NOT ILLUSTRATED


ESTOP
OFF
FWD
REV
ON
PUMP
STOP
HORN
Pump Boss
REED
990394-10


POWER
Pump Boss
Quality and Durability
from the Industry Leader!
COMMAND PRO
REMTRON
GORILLA TOUGH
HORN K4
REVERSE K3
PUMP K2
ACTIVE K1
REMTRON
1916 W. Mission Rd.
Escondido, CA 92029
(760) 737-7800
REED
Model
990394-20

THIS GROUP 50, FIGURE 05, PARTS NUMBER 85818,
OPTIONAL RADIO REMOTE CONTROL ASSEMBLY,
DETAIL PARTS LIST IS NOT AVAILABLE THIS REVISION.

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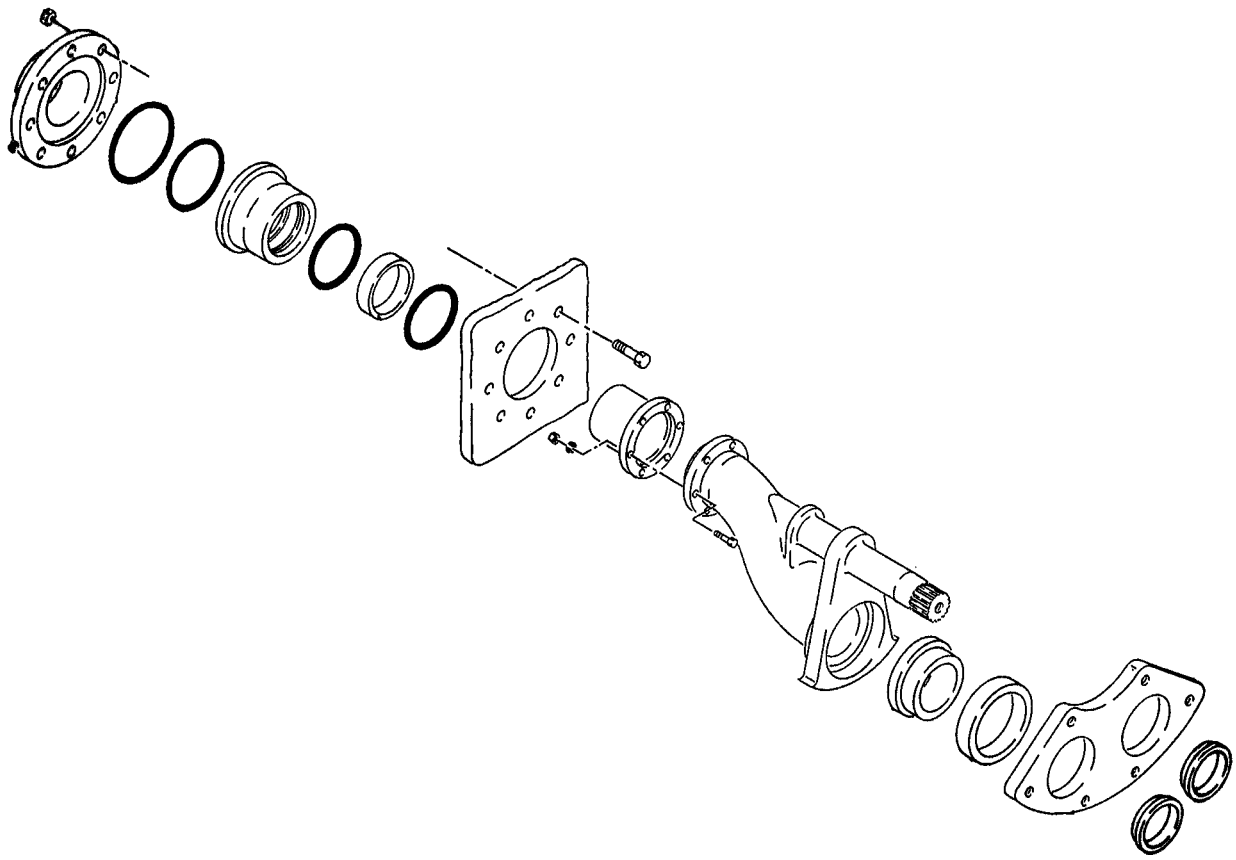
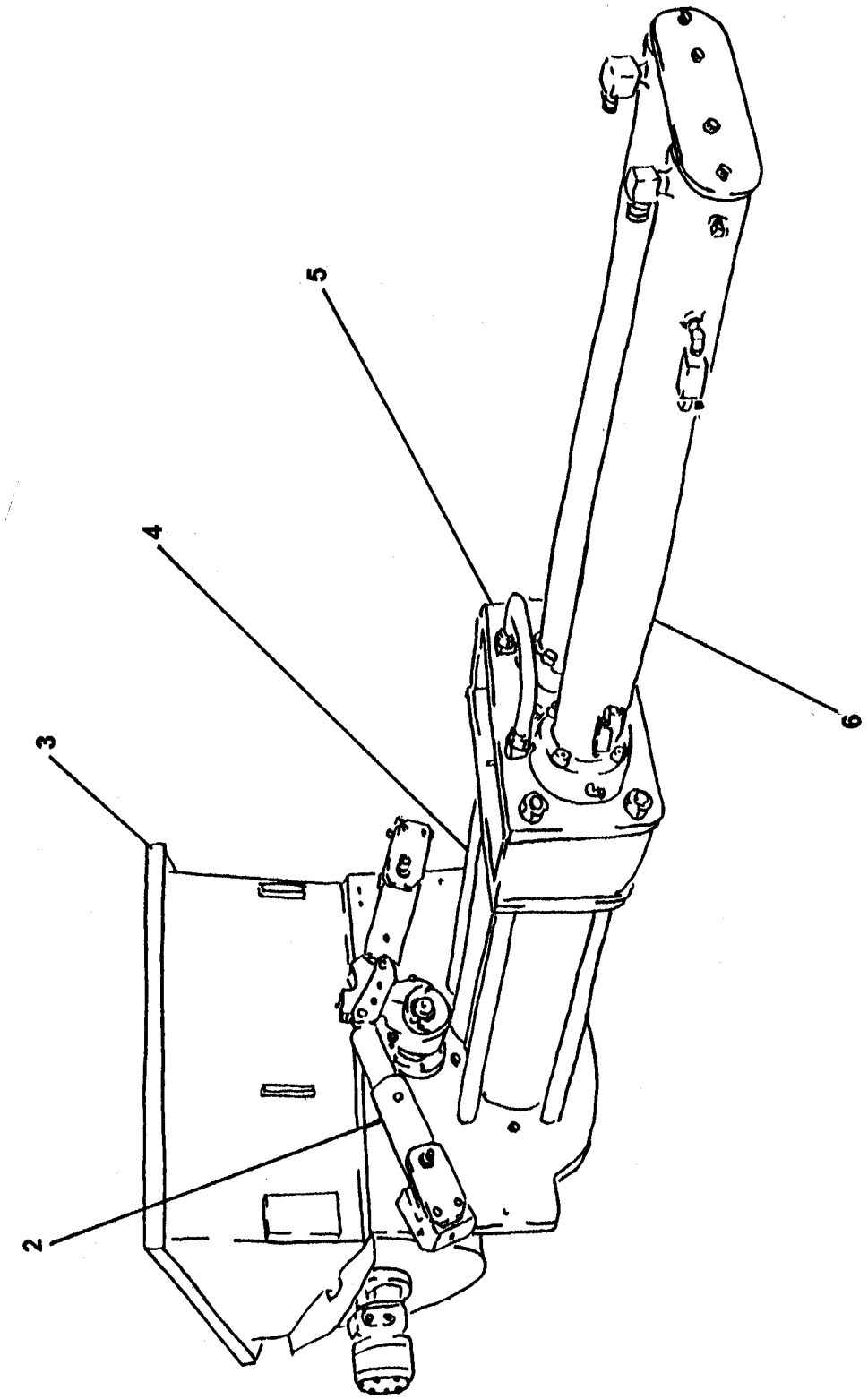


REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 60 PUMPING TRAIN INSTALLATION** CONTAINS THE FOLLOWING FIGURES:

DUAL SHIFT
PUMPING TRAIN INSTALLATION



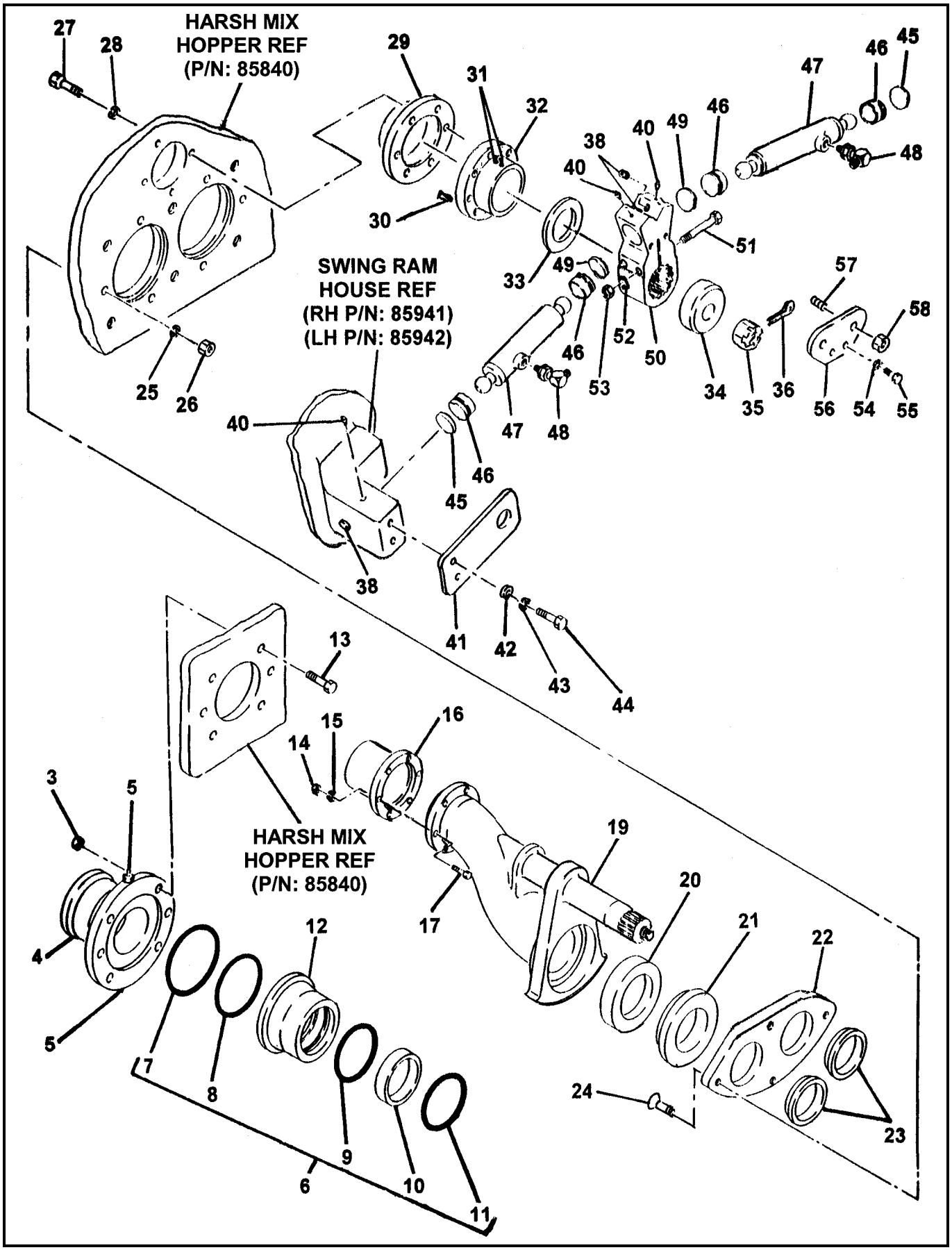
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	60-01	Installation, Dual Shift Pumping Train (See Group 10, Figure 01 for NHA)	Ref
2	60-02	• Assembly, Dual Shift Swing Valve (See Group 60, Figure 02 for DET)	1
3	20-01	• Installation, Harsh Mix Hopper (See Group 20, Figure 01 for REF)	Ref
4	86310	• Assembly, Material Cylinder (See Group 60, Figure 04 for DET)	1
5	60-05	• Assembly, Flushbox (See Group 60, Figure 05 for DET)	1
6	86304	• Assembly, Hydraulic Drive Cylinder (See Group 60, Figure 06 for DET)	1

DASH (-) ITEM NOT ILLUSTRATED

REED

DUAL SHIFT
SWING VALVE ASSEMBLY

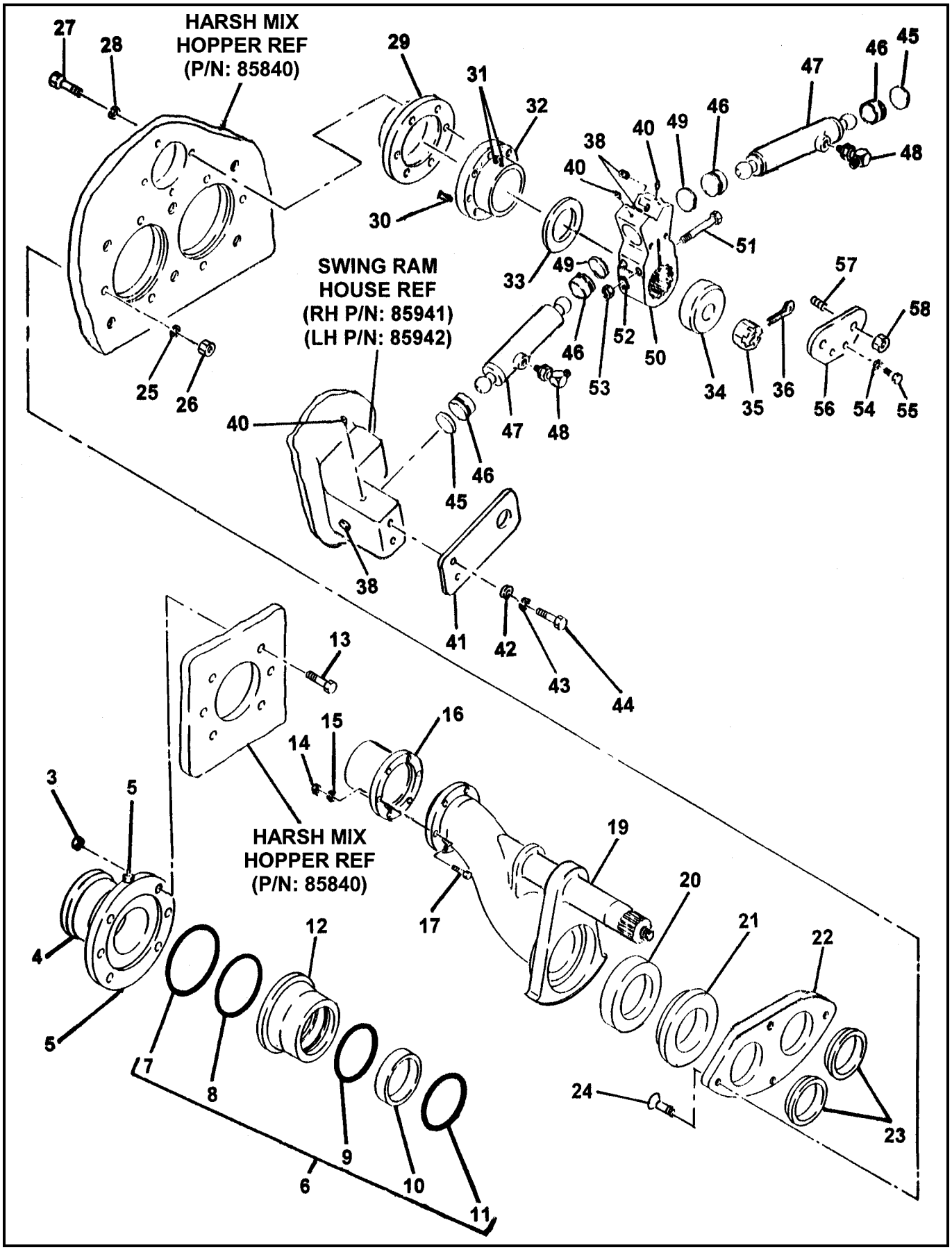


REVISION:

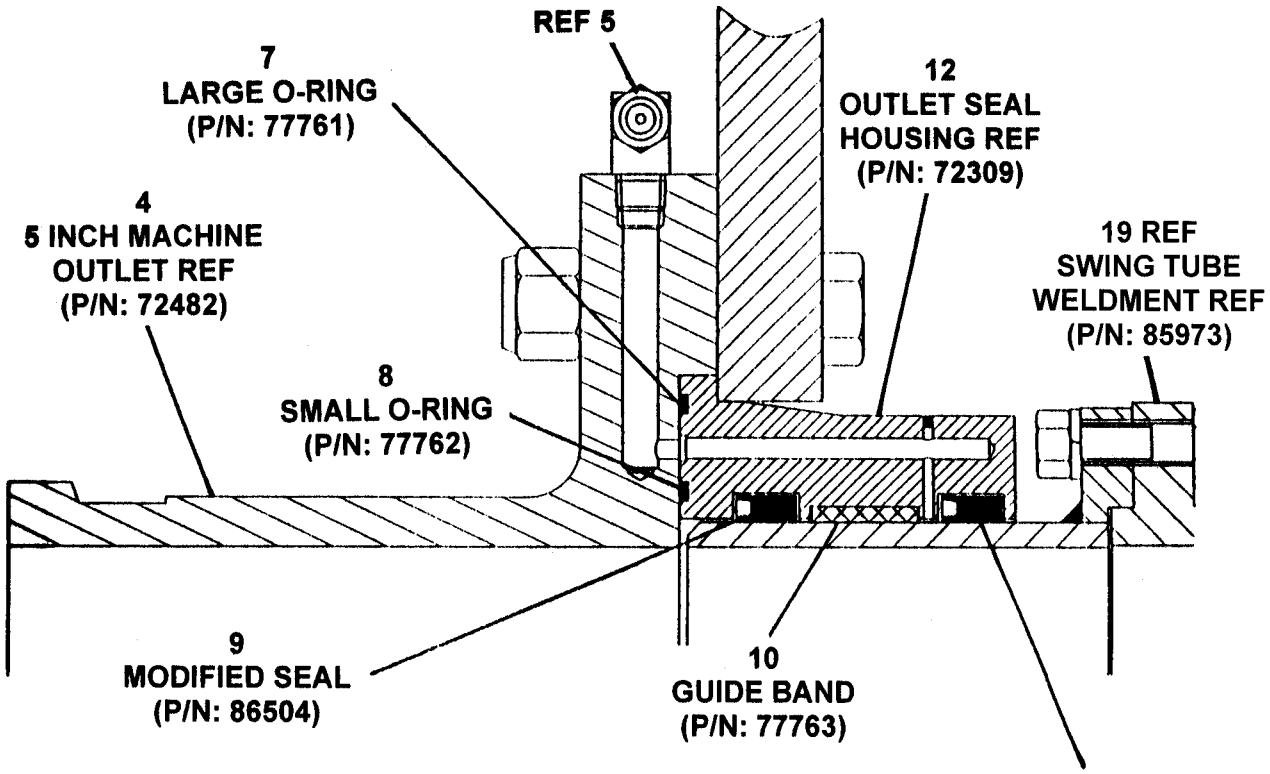
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	60-02	Assembly, Dual Shift Swing Valve (See Group 60, Figure 01 for NHA)	Ref
-2	86321	• Assembly, Outlet Group	1
3		• • Nut	6
4	72482	• • Outlet, Machine 5"	1
5		• • Fitting, Grease	2
6	79895	• • Kit, Outlet Seal	1
7	77761	• • • O-Ring, Large	1
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, 7 Inch Swing Tube Group	1
19	85973	• • Weldment, 7 Inch Harsh Swing Tube	1
20	85974	• • Seal, 7 Inch Single Lip	1
21	85975	• • Ring, 7 Inch Single Lip Wear	1
22	85970	• • Plate, 7 Inch Wear	1
23	85977	• • Ring, 7 Inch 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

DUAL SHIFT
SWING VALVE ASSEMBLY



REVISION:



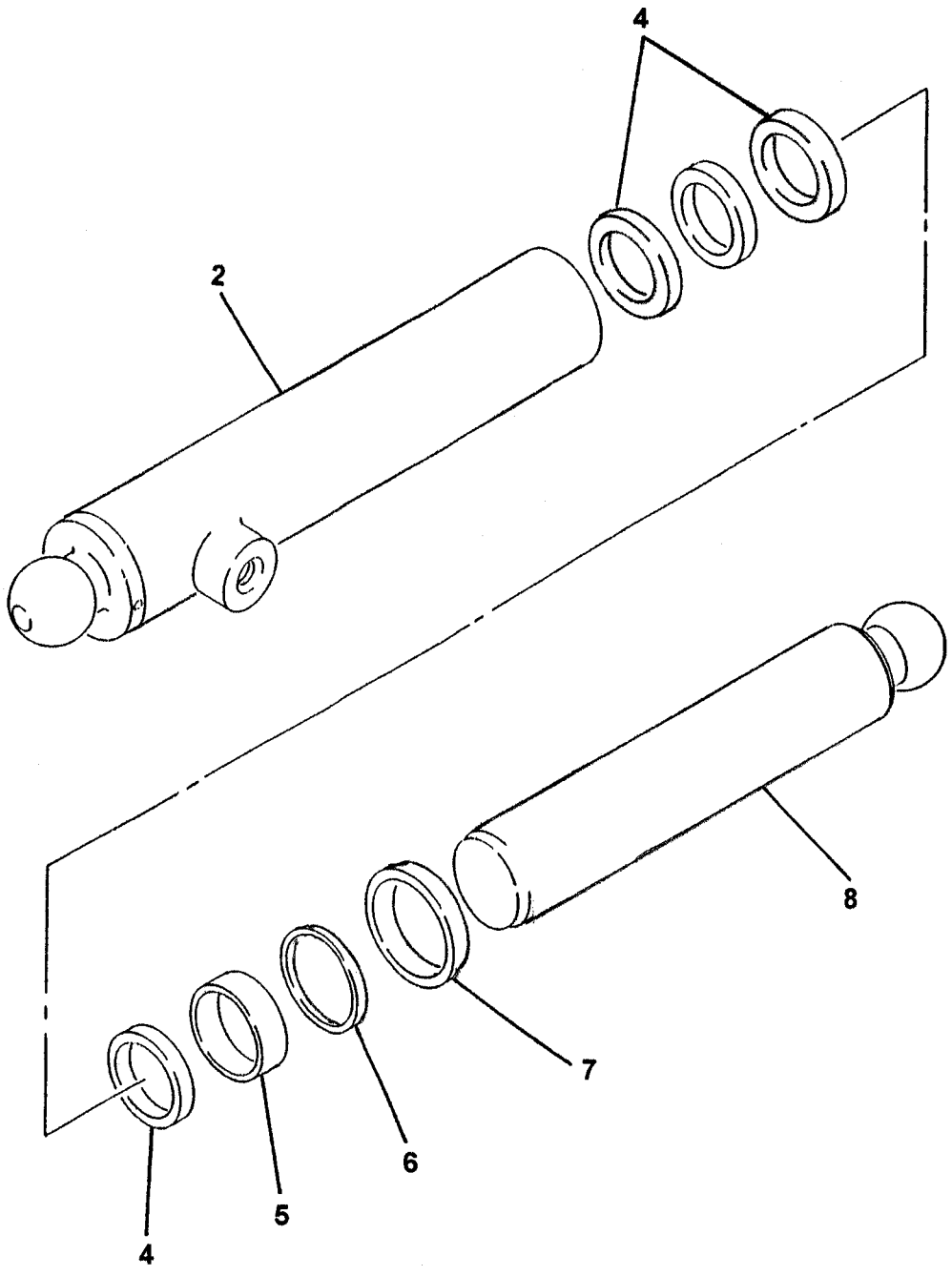
SEAL KIT INSTALLATION
SECTIONAL VIEW
(P/N: 79885)

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
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	86220	• • Assembly, Dual Shift Swing Ram Cylinder (See Group 60, Figure 03 for DET)	1
48	75502	• • Fitting, 90	2
49	75501	• • 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	• • Bolt, Hex	2
56	86282	• • Retainer, Dual Shift Cylinder	1
57		• • Stud	2
58		• • Nut, Hex	2

DASH (-) ITEM NOT ILLUSTRATED

REVISION:

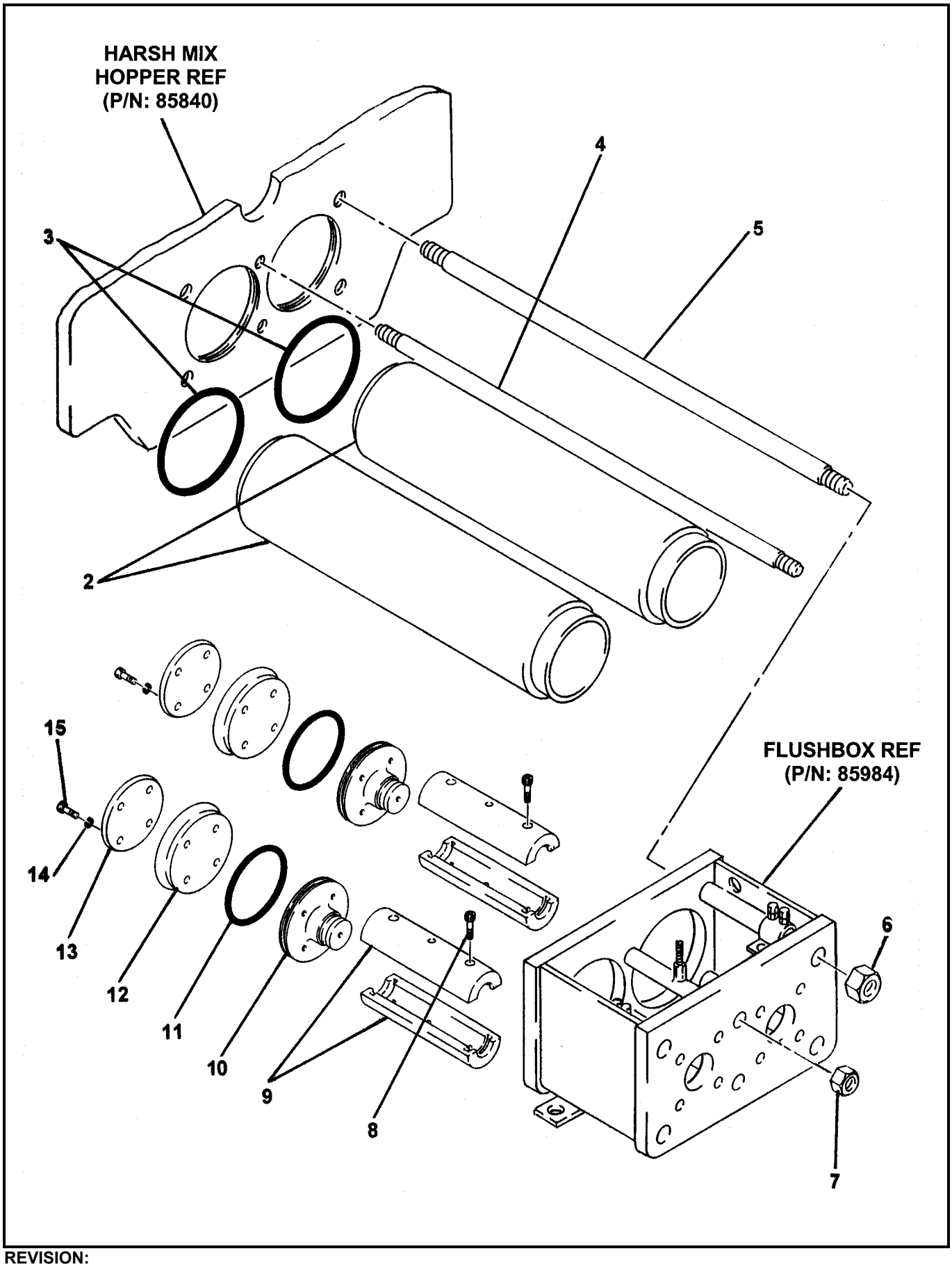
DUAL SHIFT
SWING RAM CYLINDER ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86220	Assembly, Swing Ram Cylinder (See Group 60, Figure 02 for NHA)	Ref
2		• Weldment, Cylinder Case	1
-3	86220-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


HARSH MIX
HOPPER REF
(P/N: 85840)
FLUSHBOX REF
(P/N: 85984)
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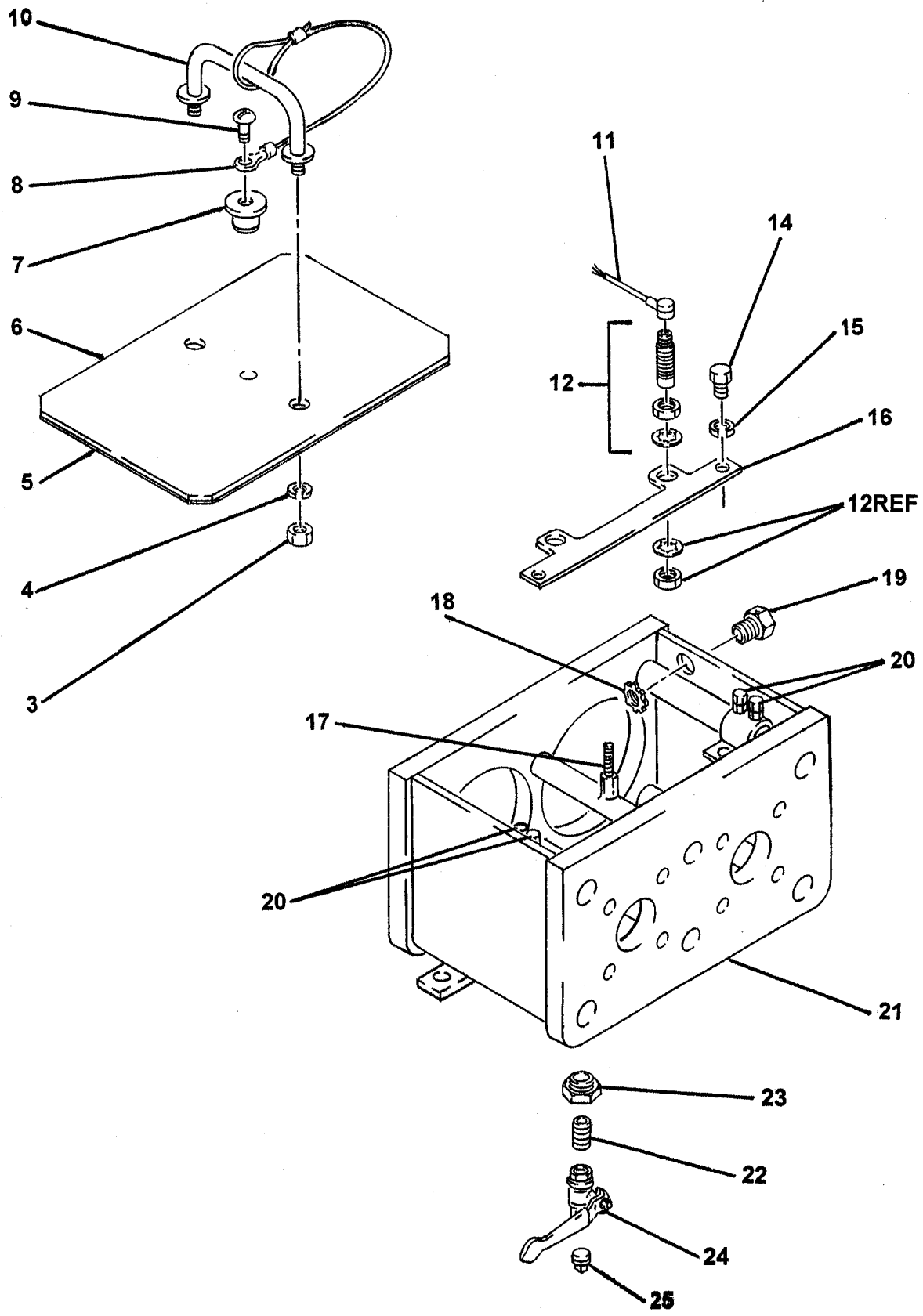
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86310	Assembly, Material Cylinder (See Group 60, Figure 01 for NHA)	Ref
2	86045	• Cylinder, Material	2
3	86037	• O-Ring, Material Cylinder	2
4	86047	• Rod, Tie	2
5	86046	• Rod, Tie	4
6		• Nut, Hex (attaching Parts)	4
7		• Nut, Hex (attaching Parts)	2
8		• Screw, Cap	4
9	86101	• Coupling, Piston	2
10	77055	• Adapter, 7 Inch Piston	2
11	77056	• Ring, 7 Inch Wear	2
12	70504	• Cup, 7 Inch Piston	2
13	70505	• Plate, 7 Inch Piston	2
14		• Washer, Star (attaching Parts)	8
15		• Bolt, Hex (attaching Parts)	8

DASH (-) ITEM NOT ILLUSTRATED



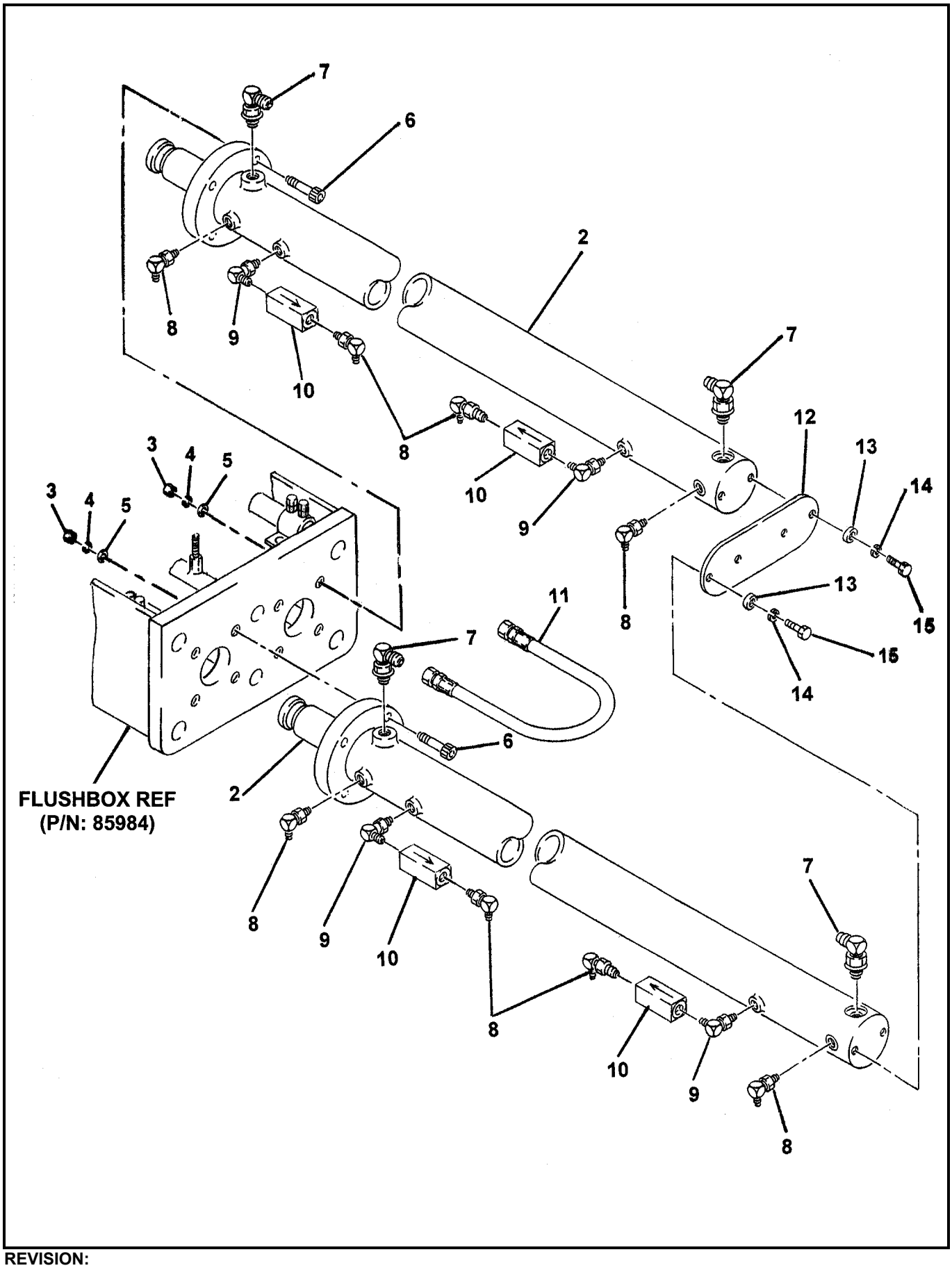
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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, Round Head	1
10	79056	• • Handle, Splash Guard	1
11	77998	• Sensor, Proximity Switch	2
12	77990	• Cable, Proximity Switch	2
-13	86308	• 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	73783	• • Conduit, Fitting	1
20		• • Bolt, Hex	4
21	85984	• • 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

REED

HYDRAULIC DRIVE CYLINDER ASSEMBLY

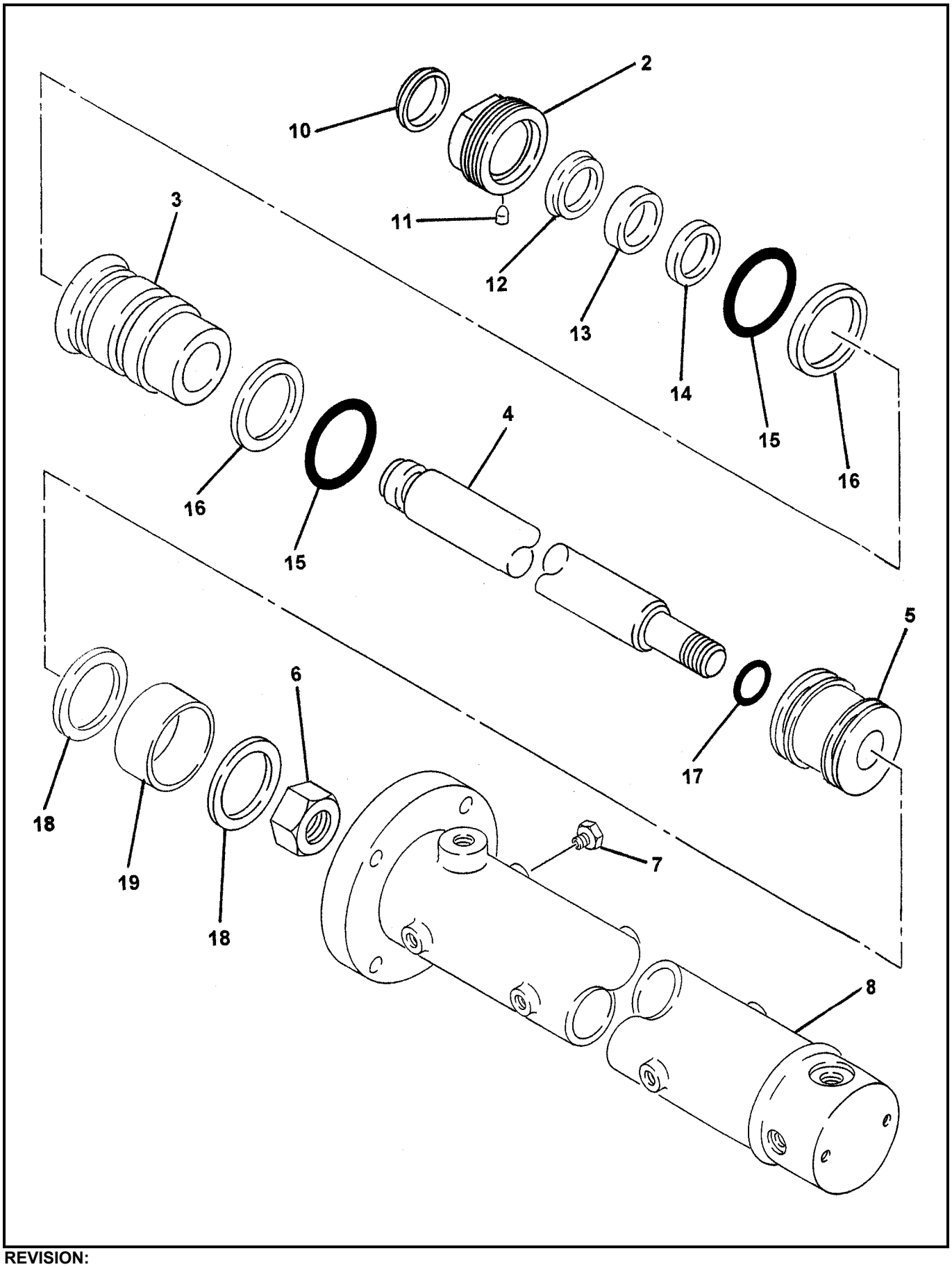


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86304	Assembly, Hydraulic Drive Cylinder (See Group 60, Figure 01 for NHA)	Ref
2	86223	• Assembly, Drive Cylinder (See Group 60, Figure 07 for DET)	1
3		• Nut, Hex (attaching parts)	8
4		• Washer, Lock (attaching parts)	8
5	77396	• Washer, Thread (attaching parts)	8
6		• Bolt (attaching parts)	8
7		• Fitting, 90	4
8		• Fitting, 90	8
9		• Fitting, 90	4
10	78961	• Valve, Check	4
11	85427	• Assembly, Tube	1
12	86544	• Plate, End	1
13		• Washer, Flat (attaching parts)	4
14		• Washer, Lock (attaching parts)	4
15		• Bolt, Hex (attaching parts)	4

DASH (-) ITEM NOT ILLUSTRATED

DRIVE CYLINDER ASSEMBLY



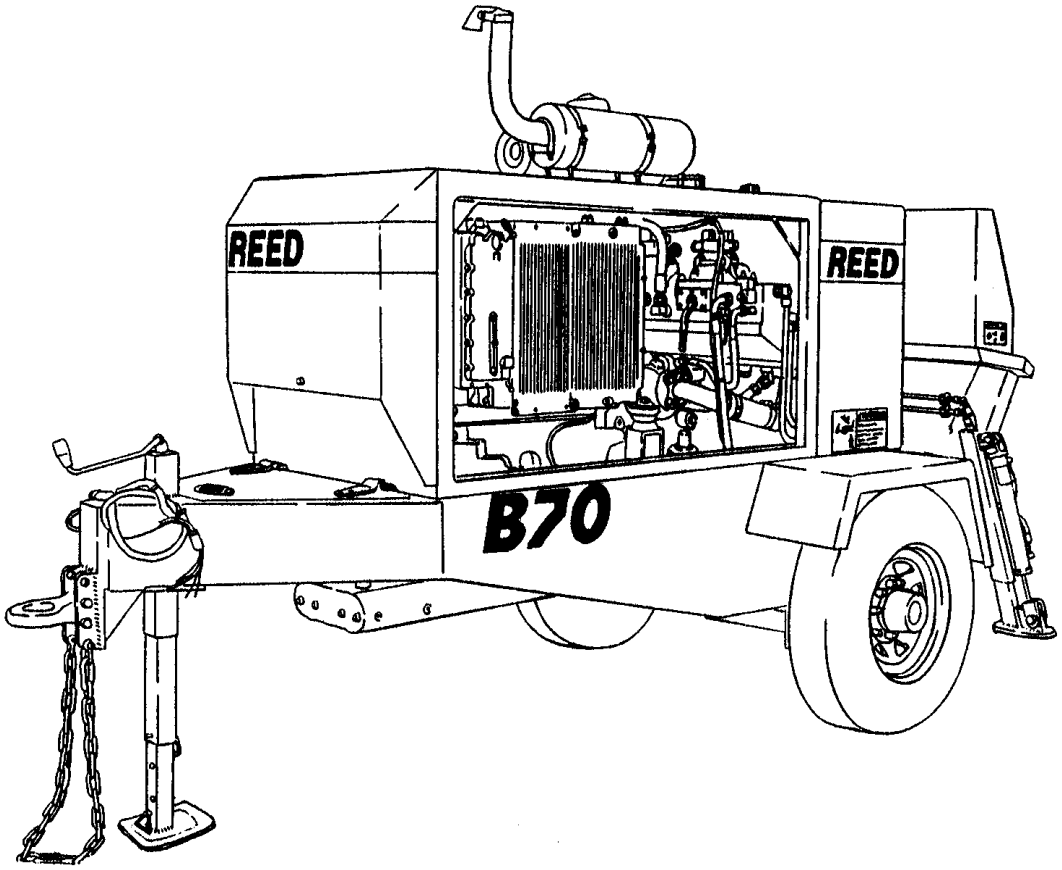
REVISION:

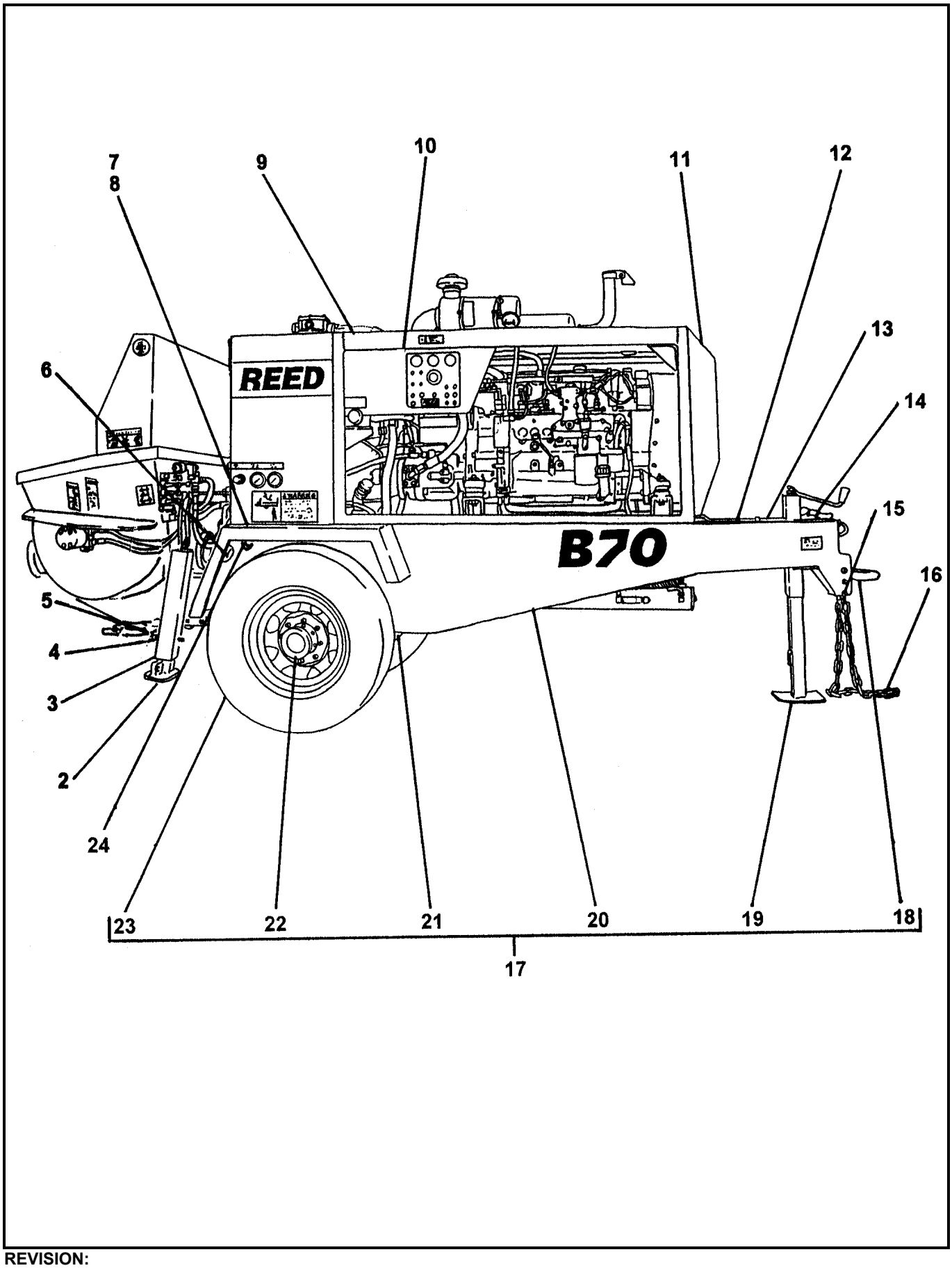
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86223	Assembly, Drive Cylinder (See Group 60, Figure 06 for NHA)	Ref
2		• Ring, Threaded	1
3		• Gland, Head	1
4		• Rod, Cylinder	1
5		• Piston	1
6		• Nut, Piston	1
7		• Plug	4
8		• Weldment, Cylinder Case	1
-9	86223-SK	• Kit, Seal	1
10		• • Wiper, Rod	1
11		• • Plug, Nylon	1
12		• • Ring, Back Up	1
13		• • U-Cup	1
14		• • Seal, Buffer	1
15		• • O-Ring	2
16		• • Ring, Back Up	2
17		• • O-Ring	1
18		• • Seal, Piston	2
19		• • Ring, Wear	1

DASH (-) ITEM NOT ILLUSTRATED

REVISION:

REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 70 FRAME INSTALLATION** CONTAINS THE FOLLOWING FIGURES:

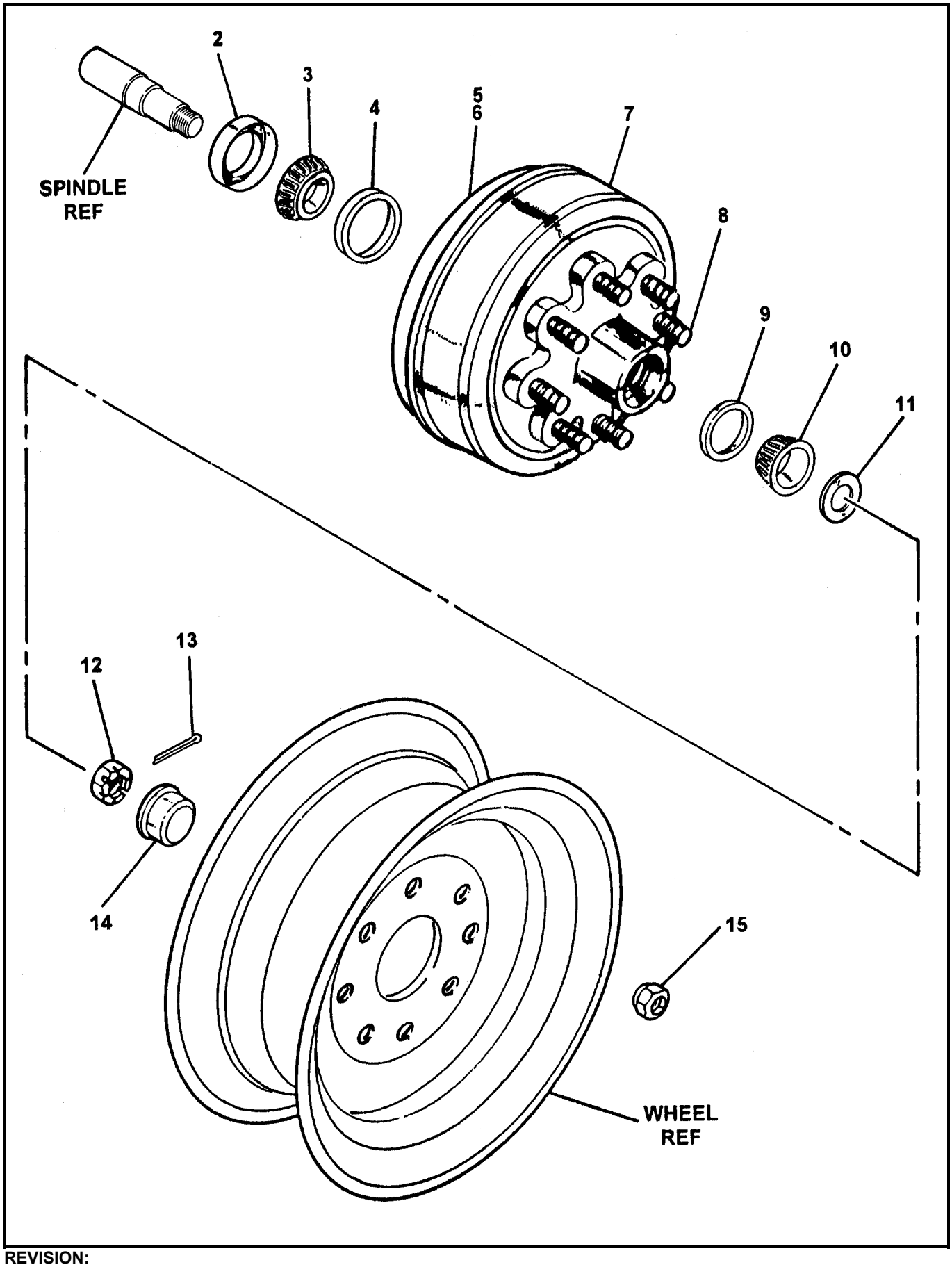




REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	70-01	Installation, Frame (See Group 10, Figure 01 for NHA)	Ref
2	86553	• Weldment, Outrigger Inner	2
3	86550	• Weldment, Outrigger Outer Tube	2
4	85595	• Pin, Outrigger Safety	2
5	800418	• Lanyard, Q/R Pin	2
6	72948	• Light, Tail	2
7	85392	• Weldment, Right Fender	1
8	85393	• Weldment, Left Fender	1
9	85115	• Weldment, Lifting Structure	1
10	85391	• Cover, Control Box	1
11	85401	• Cover, Front	1
12	85338	• Cover, Tool Box	1
13	86533	• Assembly, Trailer Wiring Harness (See Schematic Section, Page 12 for REF)	1
14	77705	• Kit, Break Away	1
15	86243	• Connector, Chain	2
16	86242	• Chain, 3/8 Proof Coil GR 30 Zinc 6 FT	1
17	86187	• Assembly, Frame	1
18	71051	• • Lunette, 3 Inch Eye	1
19	85527	• • Weldment, Jack	1
20	86214	• • Weldment, Frame	1
21	85424	• • Axle	1
22	70-02	• • Assembly, Hub and Brake (See Group 70, Figure 02 for DET)	1
23	85423	• • Assembly, Wheel and Tire	2
24	72949	• Grommet, Trailer	3

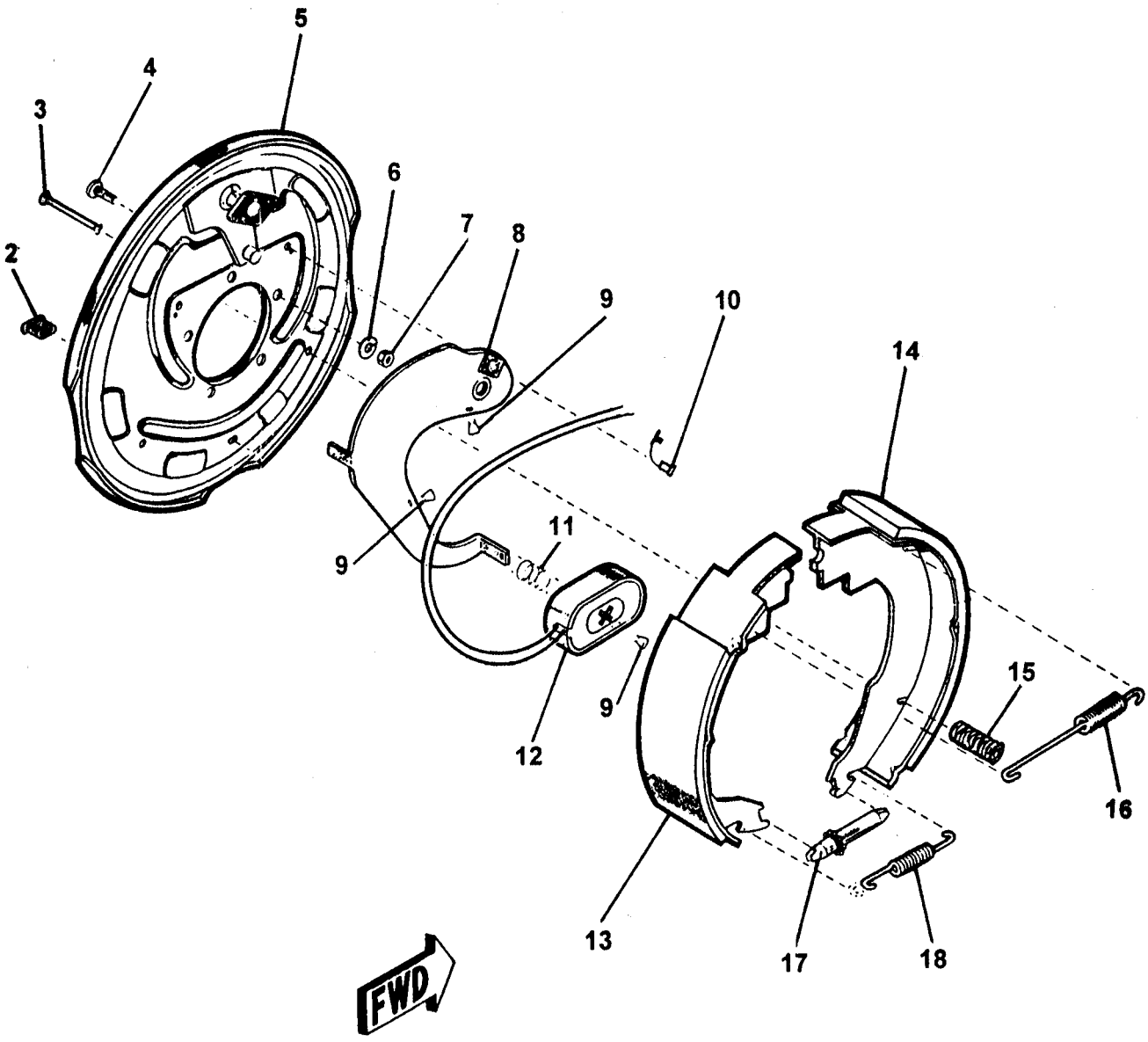
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	70-02	Assembly, Hub and Brake (Left And Right Side) (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 Side Electric Brake (Set) (See Group 70, Figure 03 for DET)	1
6	71056-R	• Assembly, Operator Side Electric Brake (Set) (See Group 70, Figure 04 for DET)	1
7	86717	• Assembly, Drum And 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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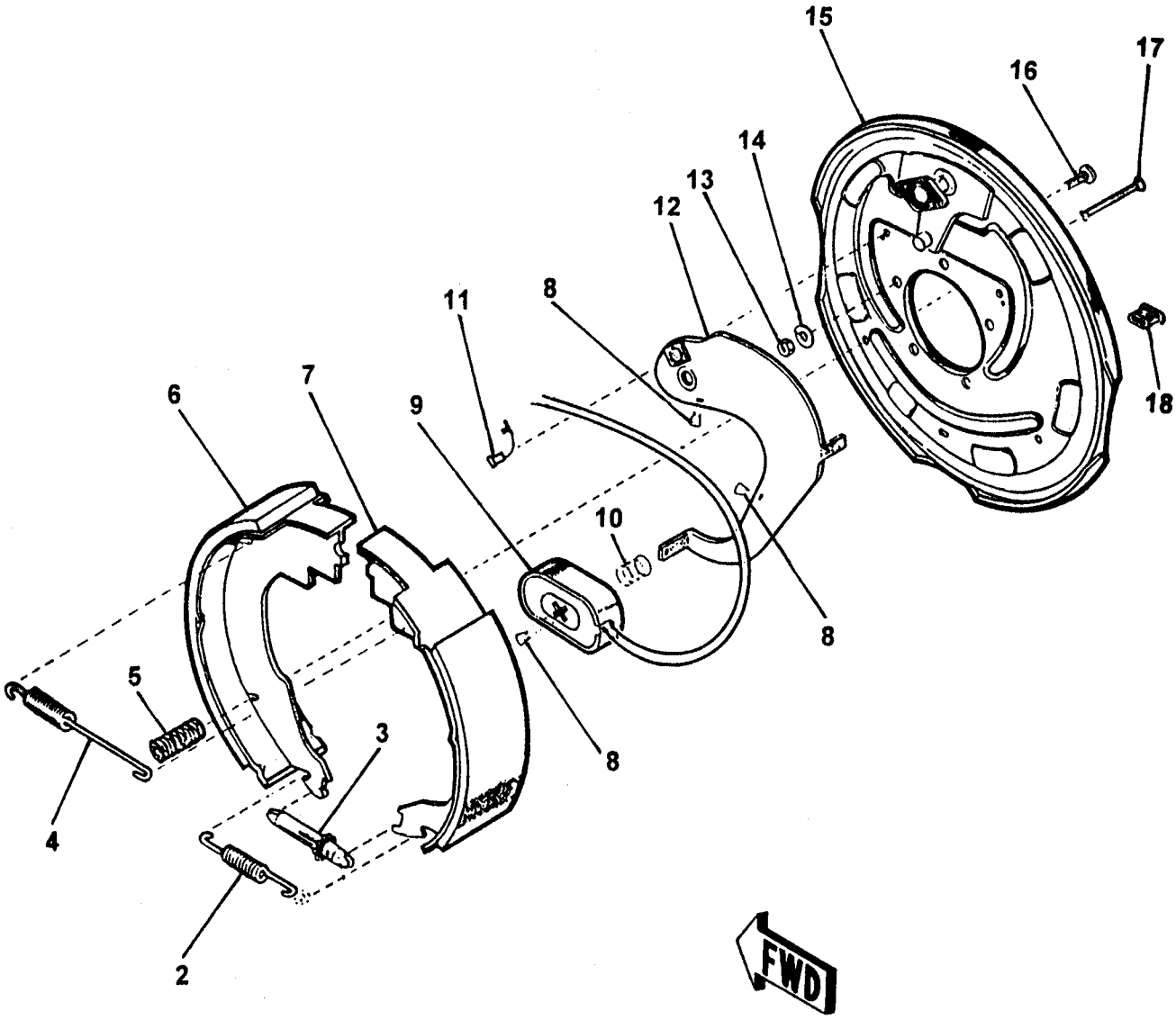
FWD

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	71056-L	Assembly, Non-Operator Side Electric Brake (See Group 70, Figure 02 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

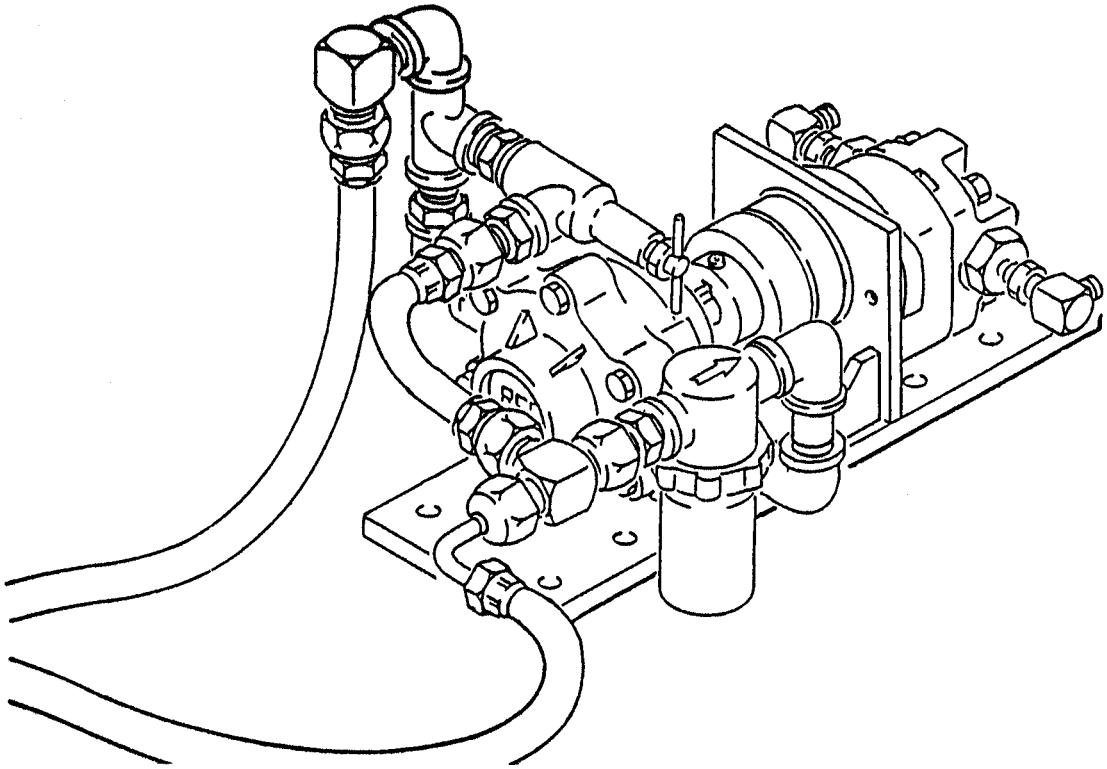


REVISION:

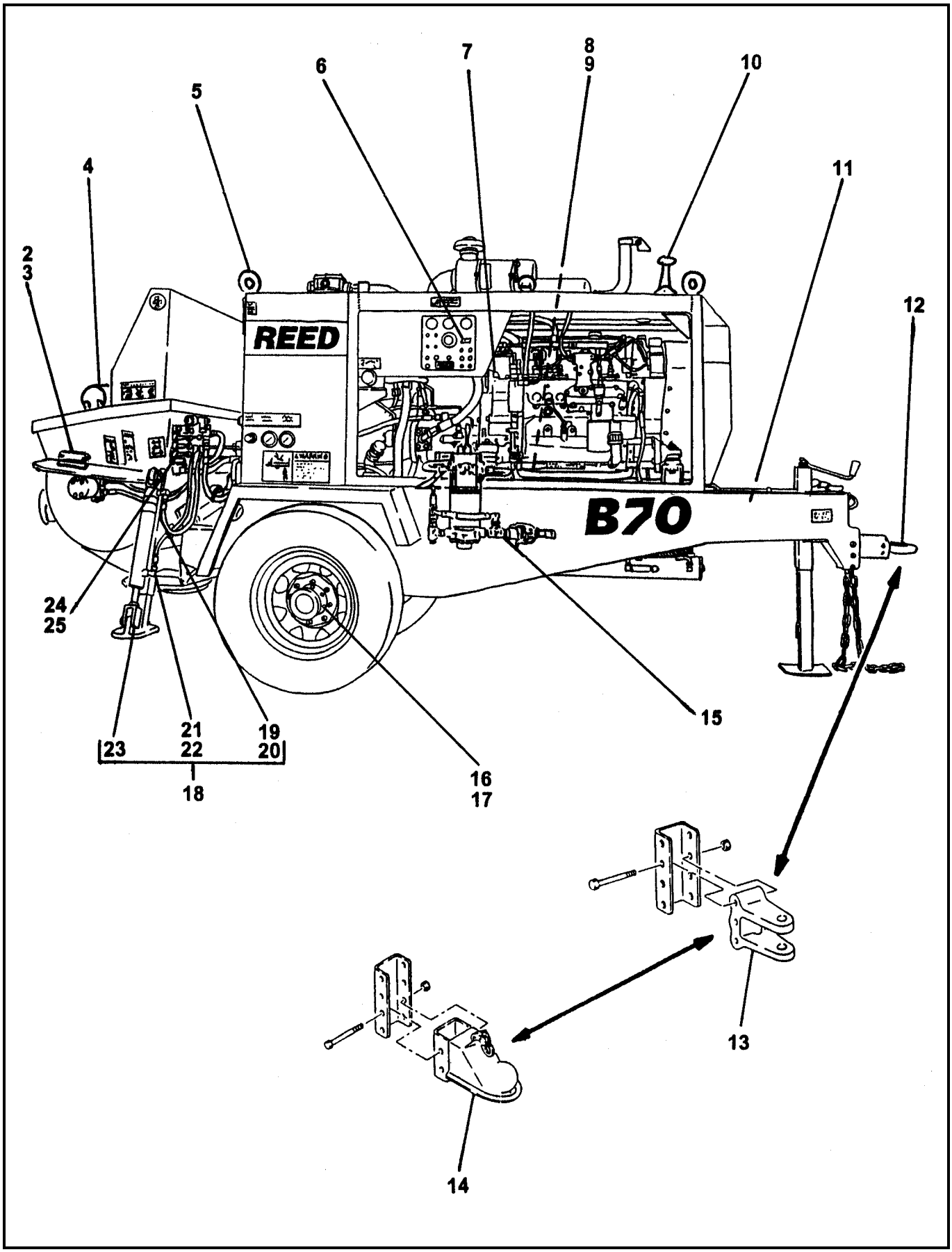
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	71056-R	Assembly, Operator Side Electric Brake (See Group 70, Figure 02 for NHA)	Ref
2		• Spring, Adjuster Screw	1
3		• Sub-Assembly, Adjuster Screw	1
4		• Spring, Shoe Retractor	1
5		• Spring, Shoe Hold down	1
6		• Shoe and Lining, Secondary	1
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:



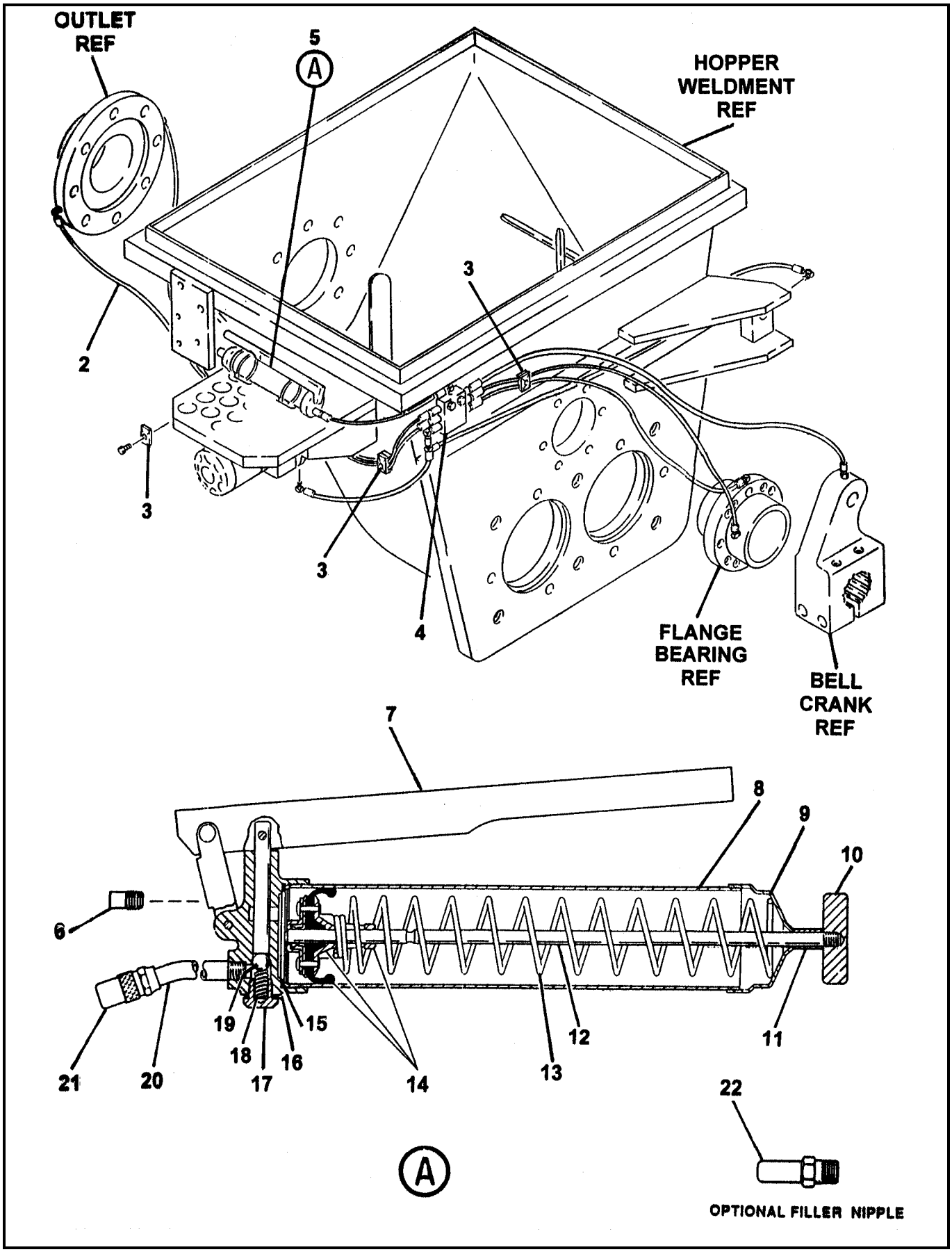
REED TRAILER MOUNTED CONCRETE PUMP **01** MODEL ***B70*** **ILLUSTRATED PARTS MANUAL GROUP 80 OPTIONAL INSTALLATION** CONTAINS THE FOLLOWING FIGURES:



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	80-01	Installation, Optional (See Group 10, Figure 01 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	71429	• Assembly, Hopper Vibration (See Group 80, Figure 04 for DET)	1
5	85810	• Assembly, Optional Lifting	1
6	85774	• Assembly, Stroke Counter	1
7	77012	• Assembly, Throttle Solenoid (See Group 80, Figure 05 for DET)	1
8	71460	• Kit, Accumulator Charge (See Group 80, Figure 06 for DET)	1
9	30-11	• Kit, Bladder Repair (See Group 30, Figure 11 for REF)	1
10	85818	• Assembly, Radio Remote Control (See Group 50, Figure 05 for REF)	1
11	79020	• Assembly, Optional Tool Kit (See Group 80, Figure 07 for DET)	1
12	75413	• Assembly, Actuator Brake (See Group 80, Figure 08 for DET)	1
13	71050	• Assembly, Adjustable 1 Inch Clevis	1
14	71099	• Assembly, Adjustable Ball Coupler 2 – 5/16"	1
15	86400	• Installation, Water Pump (See Group 80, Figure 09 for DET)	1
16	80-13	• Assembly, Non-Operator Side Hydraulic Brake (See Group 80, Figure 13 for DET)	1
17	80-14	• Assembly, Operator Side Hydraulic Brake (See Group 80, Figure 14 for DET)	1
18	85677	• Assembly, Hydraulic Outrigger	1
19	85685	• • Assembly, Tube	2
20	85686	• • Assembly, Tube	2
21	85659-010	• • Assembly, Hose (See Schematic Section, Figure 05 for REF)	4
22		• • Elbow, 90	4
23	85640	• • Assembly, Hydraulic Outrigger Cylinder (See Group 80, Figure 15 for DET)	2
24	80-16	• Assembly, 1 Spool Valve (See Group 80, Figure 16 for DET)	1
25	80-18	• Assembly, 2 Spool Valve (See Group 80, Figure 18 for DET)	1
-26	85943	• Assembly, Side Door (See Group 80, Figure 20 for DET)	1
-27	85960	• Assembly, 50 Feet Remote Control Stroke Counter (See Group 80, Figure 21 for DET)	1
-28	85960A	• Assembly, 100 Feet Remote Control Stroke Counter (See Group 80, Figure 22 for DET)	1

DASH (-) ITEM NOT ILLUSTRATED


OUTLET REF
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HOPPER WELDMENT REF
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FLANGE BEARING REF
BELL CRANK REF
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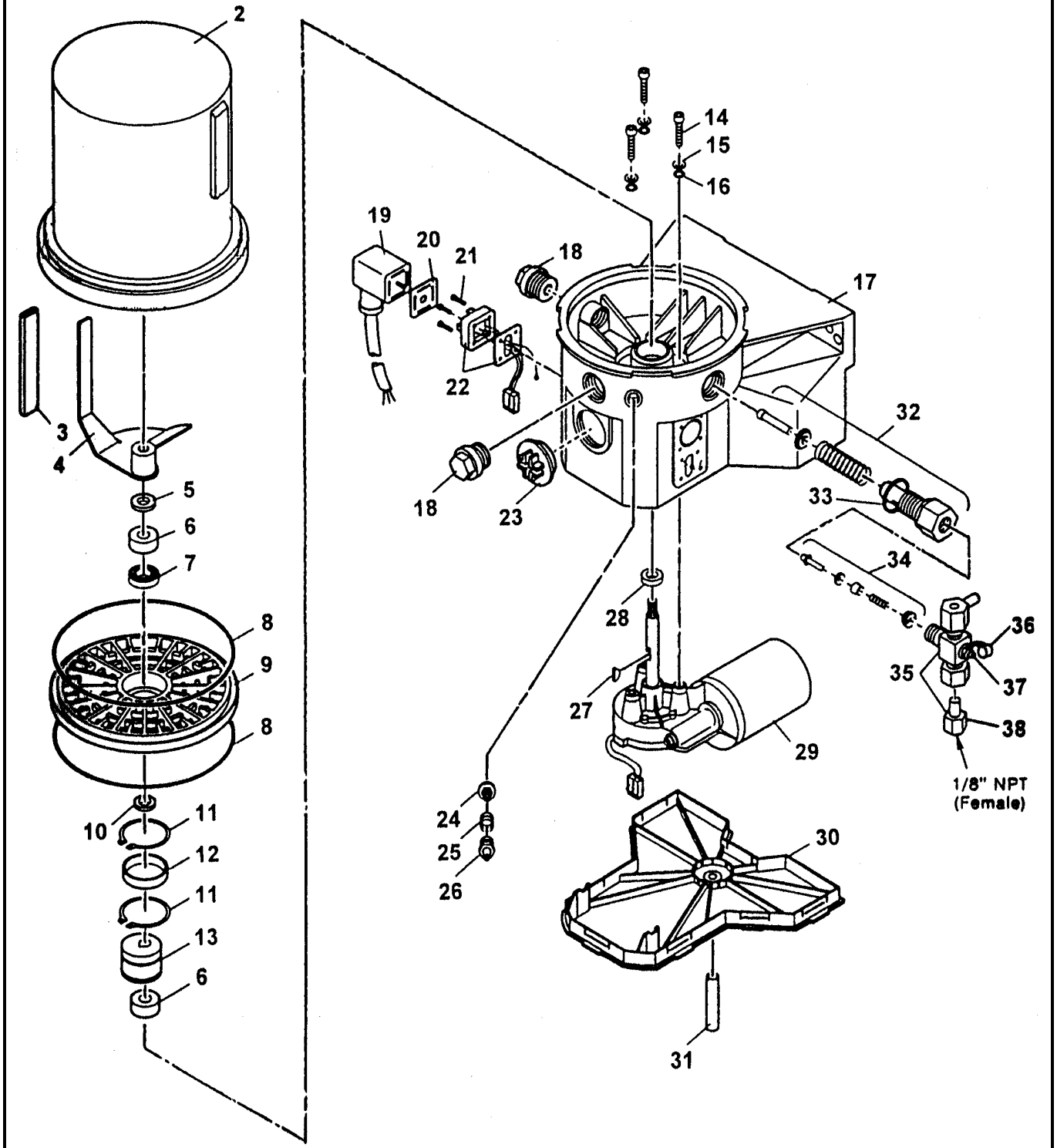
OPTIONAL FILLER NIPPLE

REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

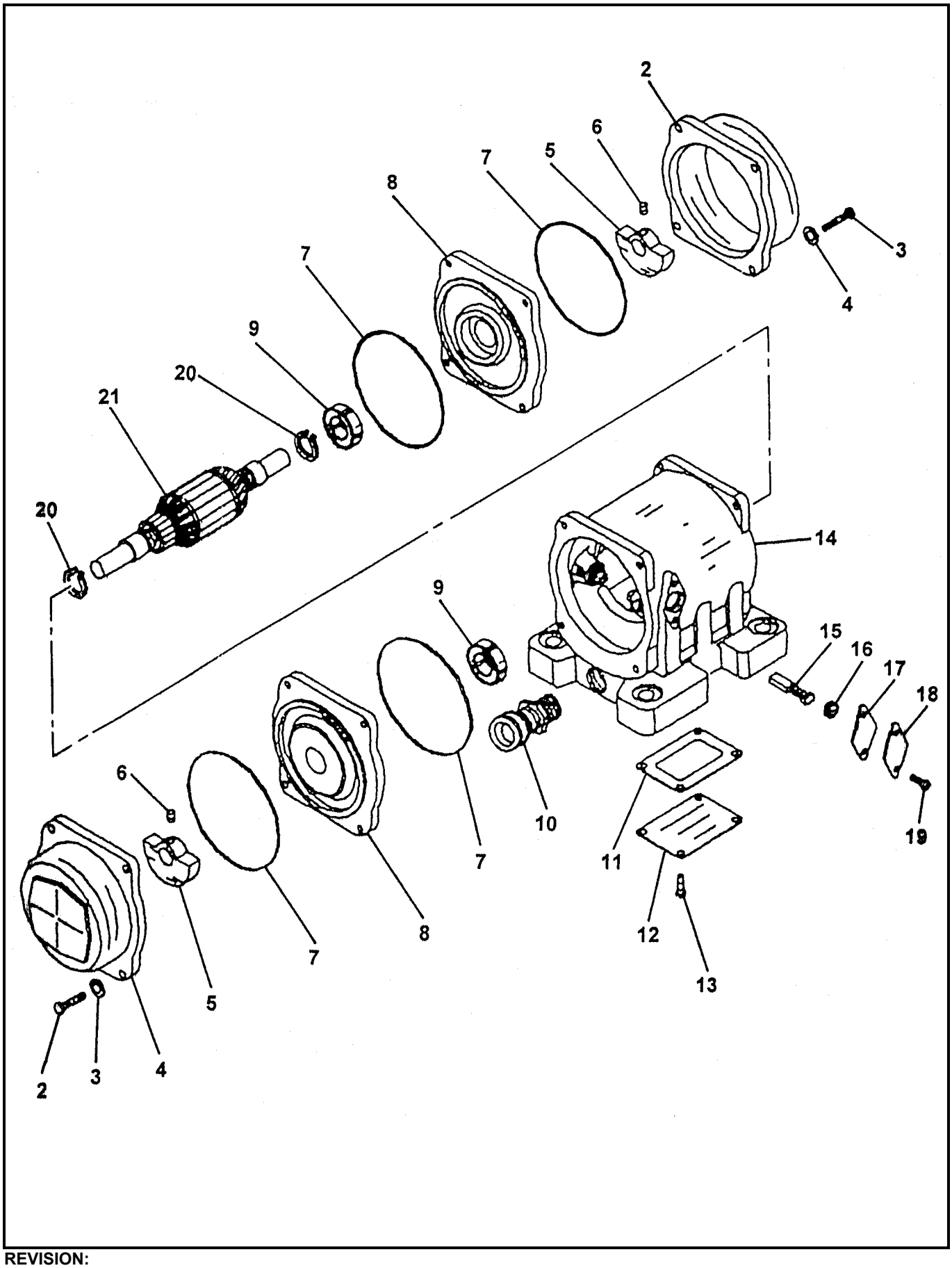
LUBE PUMP ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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 Relies	1
36		• Cap, Grease	1
37		• Fitting, Grease	1
38		• Assembly, Adapter for Relief	1

DASH (-) ITEM NOT ILLUSTRATED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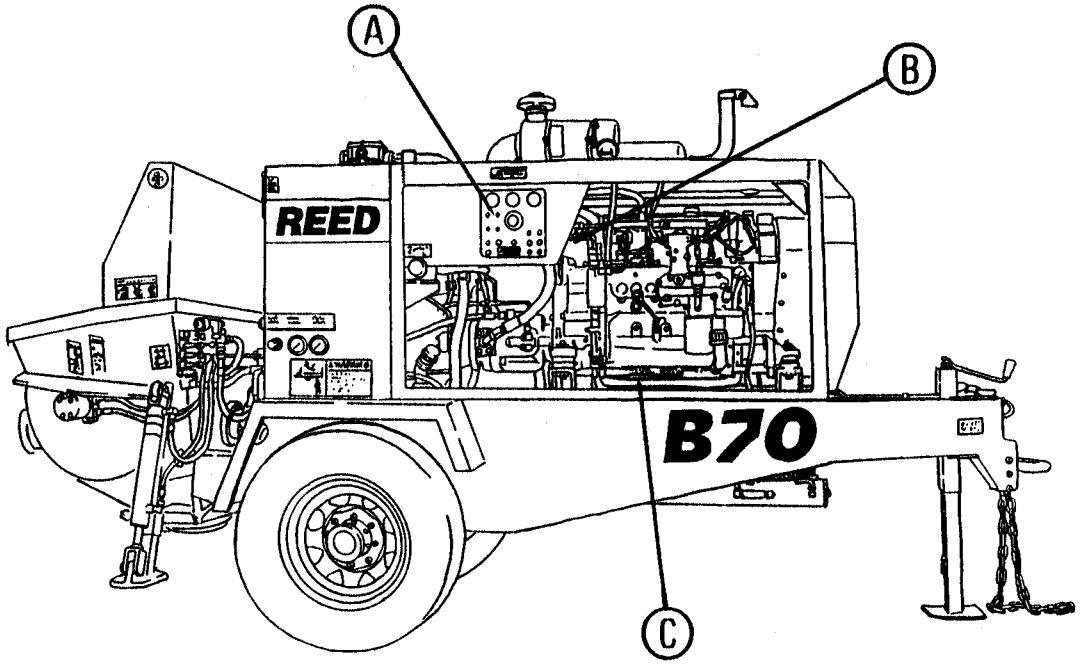
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	71429	Assembly, Hopper Vibrator (See Group 80, Figure 01 for NHA)	Ref
2		• Cap, End	2
3		• Bolt (attaching parts)	8
4		• Washer, Lock (attaching parts)	8
5		• Weight	2
6		• Screw, Set (attaching parts)	2
7		• O-Ring	4
8		• Bell, End	2
9		• Bearing	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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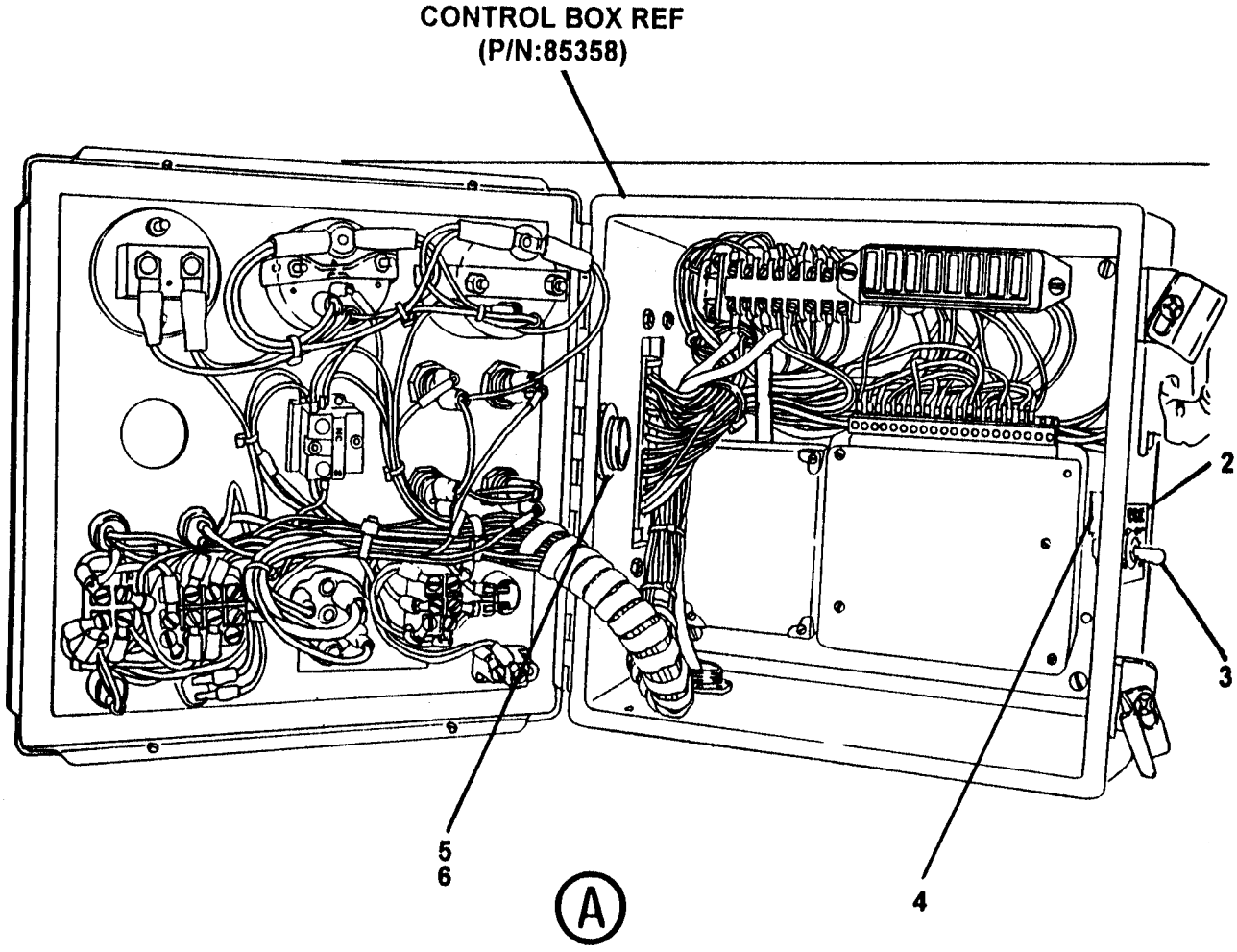
CONTROL BOX REF
(P/N:85358)
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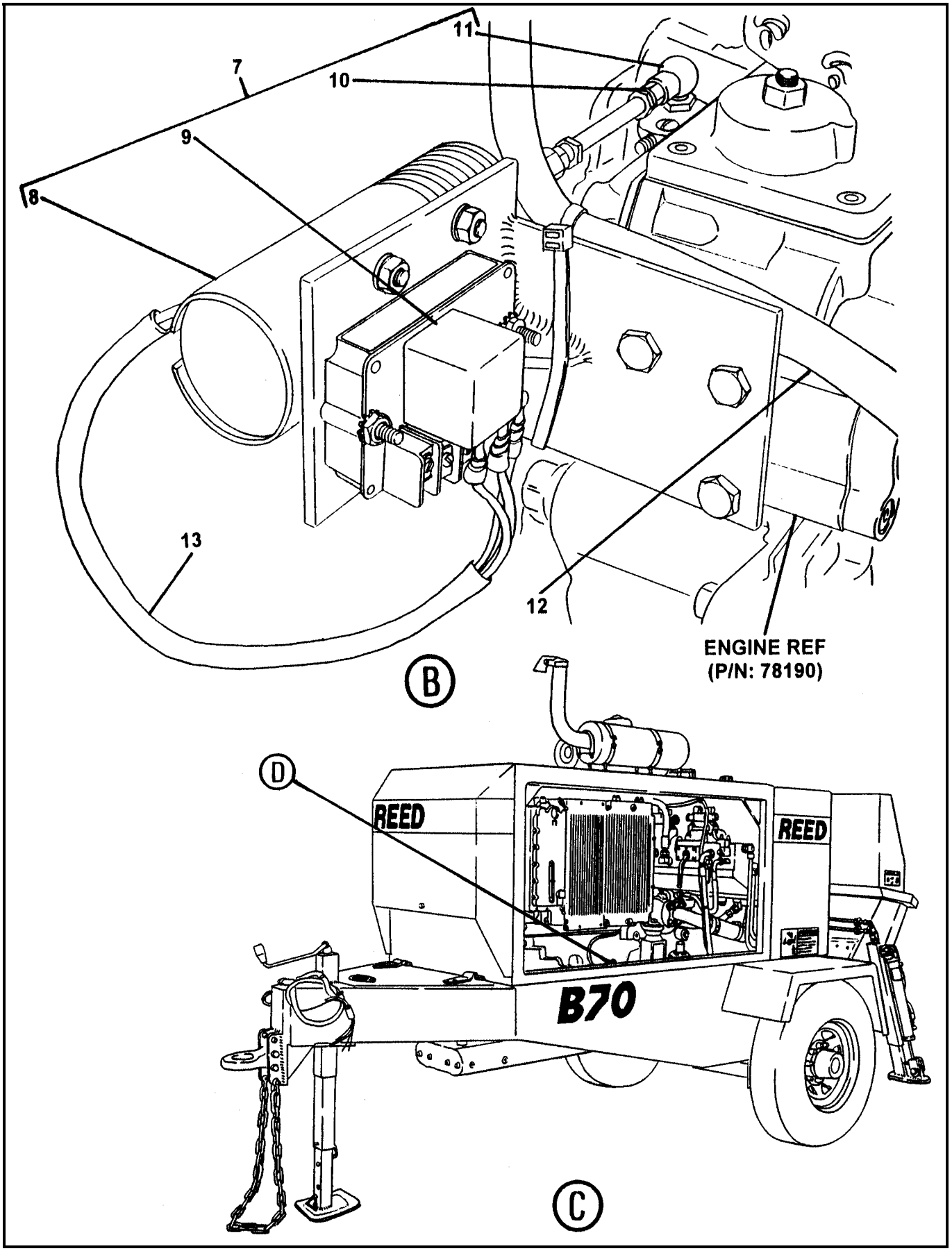
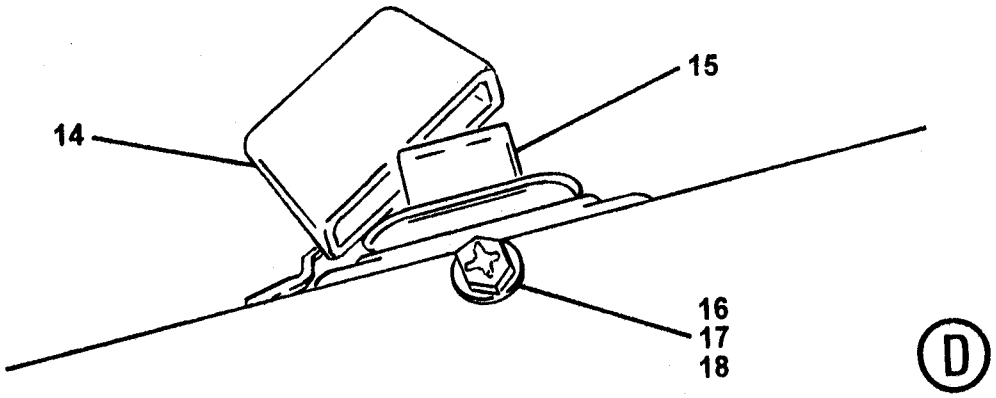
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86134	Assembly, Throttle Solenoid (See Group 80, Figure 01 for NHA)	Ref
2	86131	• Case, Charge Kit	1
3	72965	• Switch, ON/OFF/ON Toggle	1
4	71955	• Relay, 12V	1
5	10523	• Relief, Strain	1
6	10528	• Nut, Bonding Type Lock	1
7	77012	• Solenoid, Throttle	1
8		• • Solenoid	1
9	71955	• • Relay, 12V	1
10	72294	• • Bolt, Throttle Control	1
11	78202	• • Coupler	1
12	85615	• Cable, 7 Feet 14AWG-2C	A/R
13	85617	• Cable, 6 Feet 14AWG-4C	A/R
14	801359	• Holder, Fuse with Cover	1
15	801360	• Fuse, 50AMP	1
16		• Bolt, Hex	1
17		• Washer, flat	2
18		• Nut, Lock	1

DASH (-) ITEM NOT ILLUSTRATED

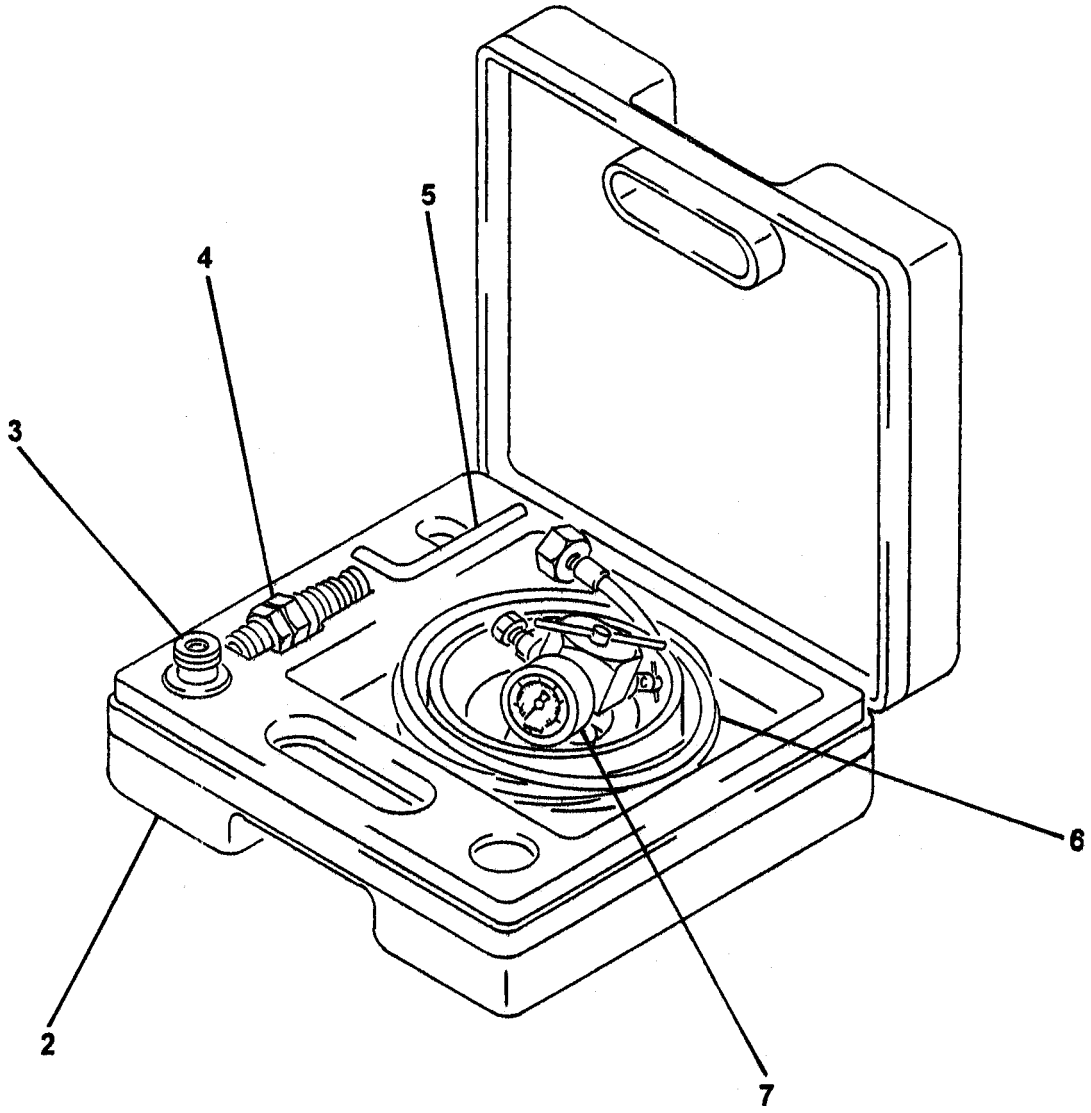


REVISION:



ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86134	Assembly, Throttle Solenoid (See Group 80, Figure 01 for NHA)	Ref
2	86131	• Case, Charge Kit	1
3	72965	• Switch, ON/OFF/ON Toggle	1
4	71955	• Relay, 12V	1
5	10523	• Relief, Strain	1
6	10528	• Nut, Bonding Type Lock	1
7	77012	• Solenoid, Throttle	1
8		• • Solenoid	1
9	71955	• • Relay, 12V	1
10	72294	• • Bolt, Throttle Control	1
11	78202	• • Coupler	1
12	85615	• Cable, 7 Feet 14AWG-2C	A/R
13	85617	• Cable, 6 Feet 14AWG-4C	A/R
14	801359	• Holder, Fuse with Cover	1
15	801360	• Fuse, 50AMP	1
16		• Bolt, Hex	1
17		• Washer, flat	2
18		• Nut, Lock	1

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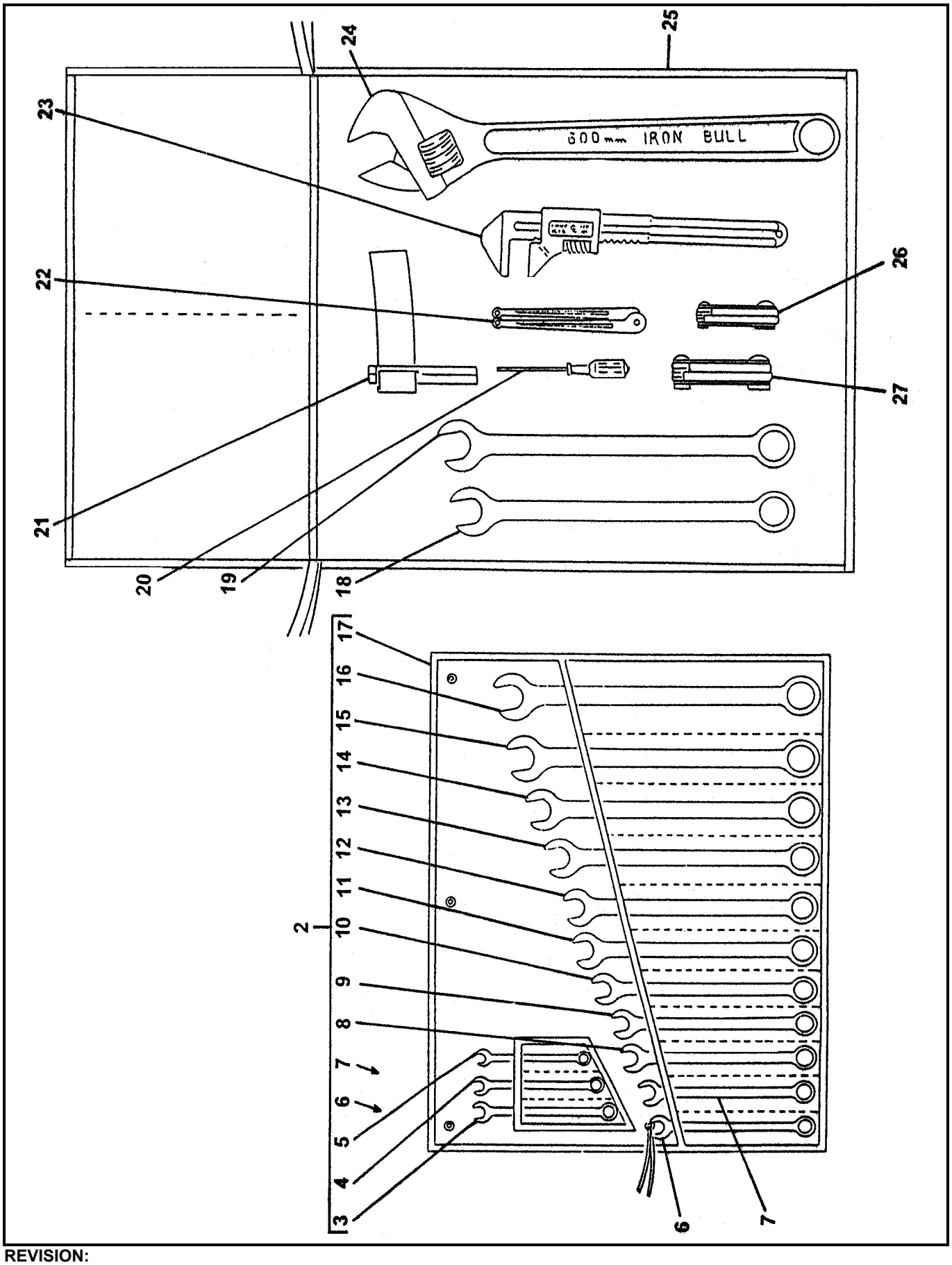
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	71460	Kit, Accumulator Charge (See Group 80, Figure 01 for NHA)	Ref
2		• Case, Charge Kit	1
3		• Adapter, FPK / SB	1
4		• Adapter, G4	1
5		• Wrench, Allen	1
6		• Hose, Charging	1
7		• Unit, FPK Charging and Gagging	1

DASH (-) ITEM NOT ILLUSTRATED


600mm IRON BULL
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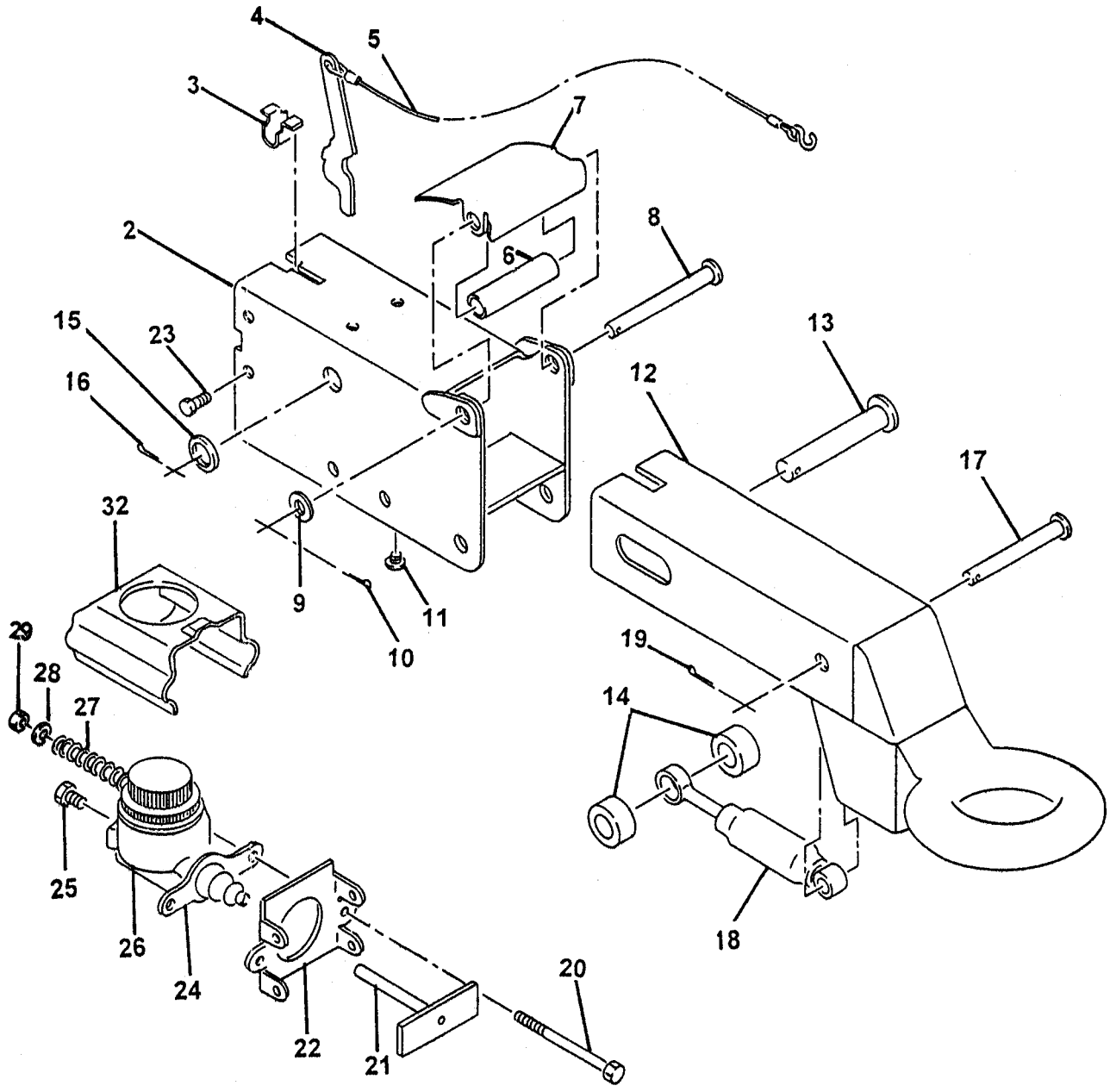
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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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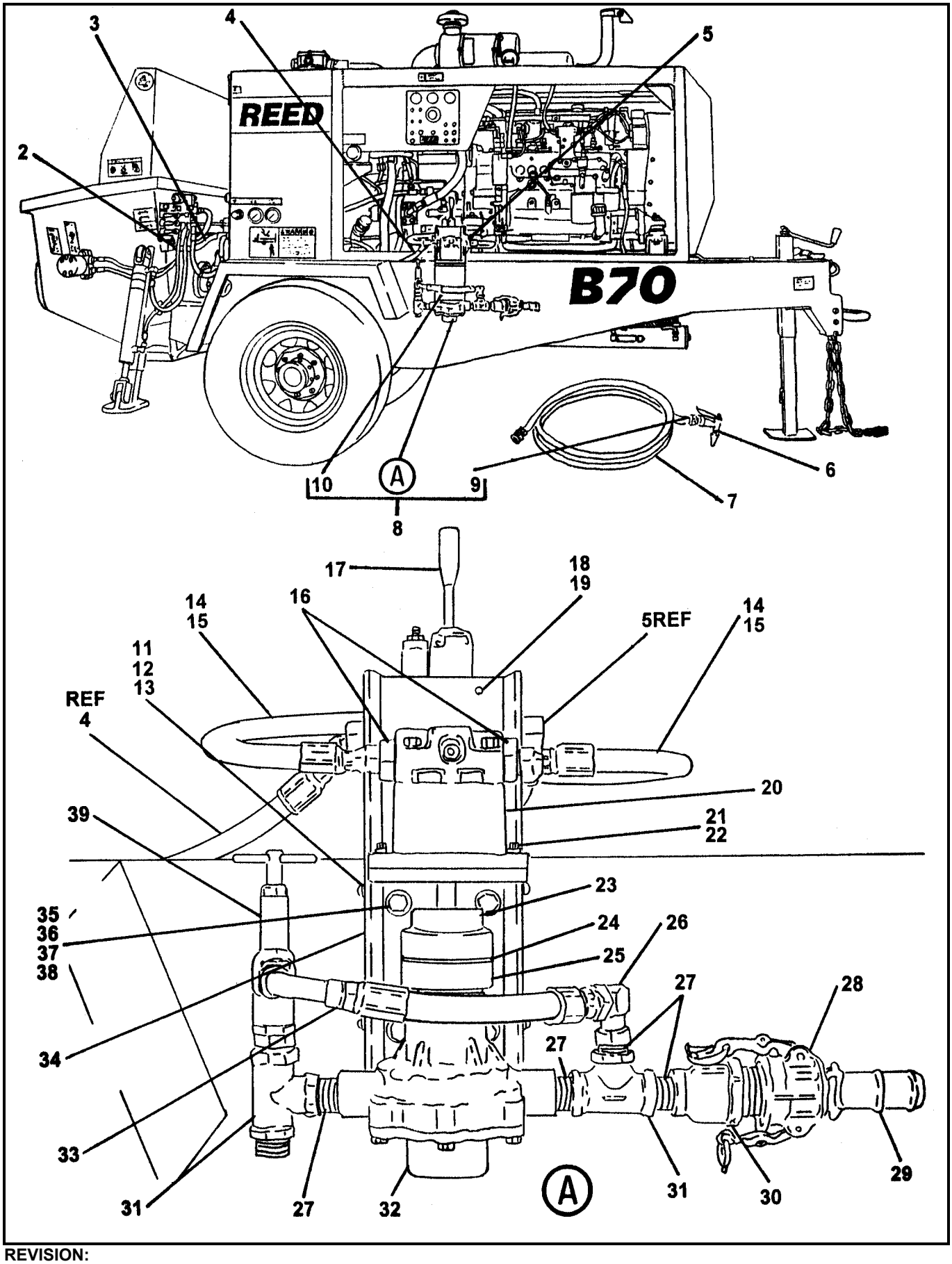
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	75413	Assembly, Actuator Brakes (See Group 80, Figure 01 for NHA)	Ref
2		• Case, Outer	1
3		• Spring, Breakaway	1
4		• Lever, Breakaway Pin	1
5		• • S-Hook	1
6		• Roller, Front	1
7		• Cover, Front Roller	1
8		• Pin, Front Roller	1
9		• Washer, Front Roller Pin	1
10		• Pin, Cotter	1
11		• Bearing	2
12		• Lunette Eye, Inner Side	1
13		• Pin, Master	1
14		• Roller, Rear	2
15		• Washer, Master Pin	1
16		• Pin, Cotter	1
17		• Pin, Damper	1
18		• Damper	1
19		• Pin, Cotter	1
20		• Bolt, Hex	2
21		• Rod, Push	1
22		• Plate, Cylinder Mounting	1
23		• Bolt, Self Topping	4
24		• Cylinder, Master	1
25		• Connector, Orifice	1
26		• Cap, Master Cylinder with Gasket	1
27		• Spring	2
28		• Washer	2
29		• Nut, hex	2

DASH (-) ITEM NOT ILLUSTRATED

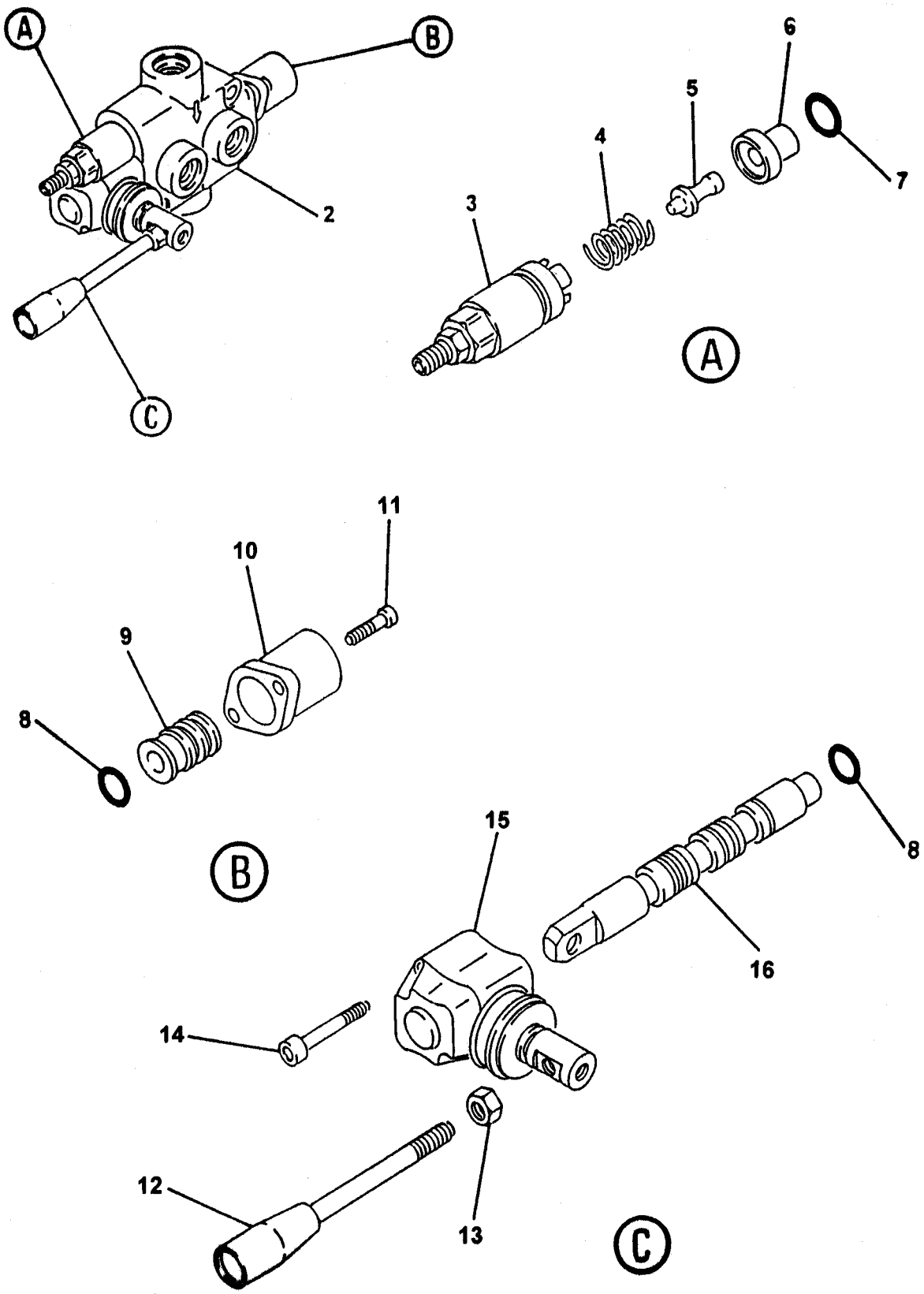


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86400	Installation, Water Pump (See Group 80, Figure 01 for NHA)	Ref
2	86384	• Sleeve, Power Beyond	1
3		• Assembly, Hose	1
4		• Assembly, Hose	1
5		• Assembly, Hose	1
6	800098	• Nozzle, Garden Hose	1
7	86267	• Hose, Garden 20 FT	1
8	86200	• Kit, Wash Pump	1
9	800371	• • Fitting, Garden Hose	1
10	86199	• • Cover, Wash Pump	1
11		• • Screw (attaching parts)	4
12		• • Washer, SPL Lock (attaching parts)	4
13		• • Washer, Flat (attaching parts)	4
14		• • Fitting, 90	2
15	85658-002	• • Assembly, Hose	2
16		• • Fitting, STR	2
17	86397	• • Assembly, Water Pump Control Valve (See Group 80, Figure 10 for DET)	1
18		• • Bolt (attaching parts)	2
19		• • Washer, SPL Lock (attaching parts)	2
20	78152	• • Assembly, Water Pump Motor (See Group 80, Figure 11 for DET)	1
21		• • Bolt, Hex (attaching parts)	2
22		• • Washer, SPL Lock (attaching parts)	2
23	78153	• • Coupling, Wash Motor	1
24	78155	• • Spider	1
25	78154	• • Coupling, Wash Pump	1
26		• • Fitting, 90	1
27	40047	• • Nipple, Close, Pipe	5
28	10947	• • Coupling, Female Cam / Groove	1
29	10948	• • Coupling, Male Cam / Groove	1
30	86398	• • Reducer, Bell	1
31	10228	• • Tee	2
32	78157	• • Assembly, Water Pump (See Group 80, Figure 12 for DET)	1
33	85657-022	• • Assembly, Hose	1
34	86196	• • Weldment, Wash Pump Base	1
35		• • Bolt, Hex (attaching parts)	4
36		• • Washer, Flat (attaching parts)	8
37		• • Washer, SPL Lock (attaching parts)	4
38		• • Nut, Lock (attaching parts)	4
39	78128	• • Valve, Relief	1

DASH (-) ITEM NOT ILLUSTRATED

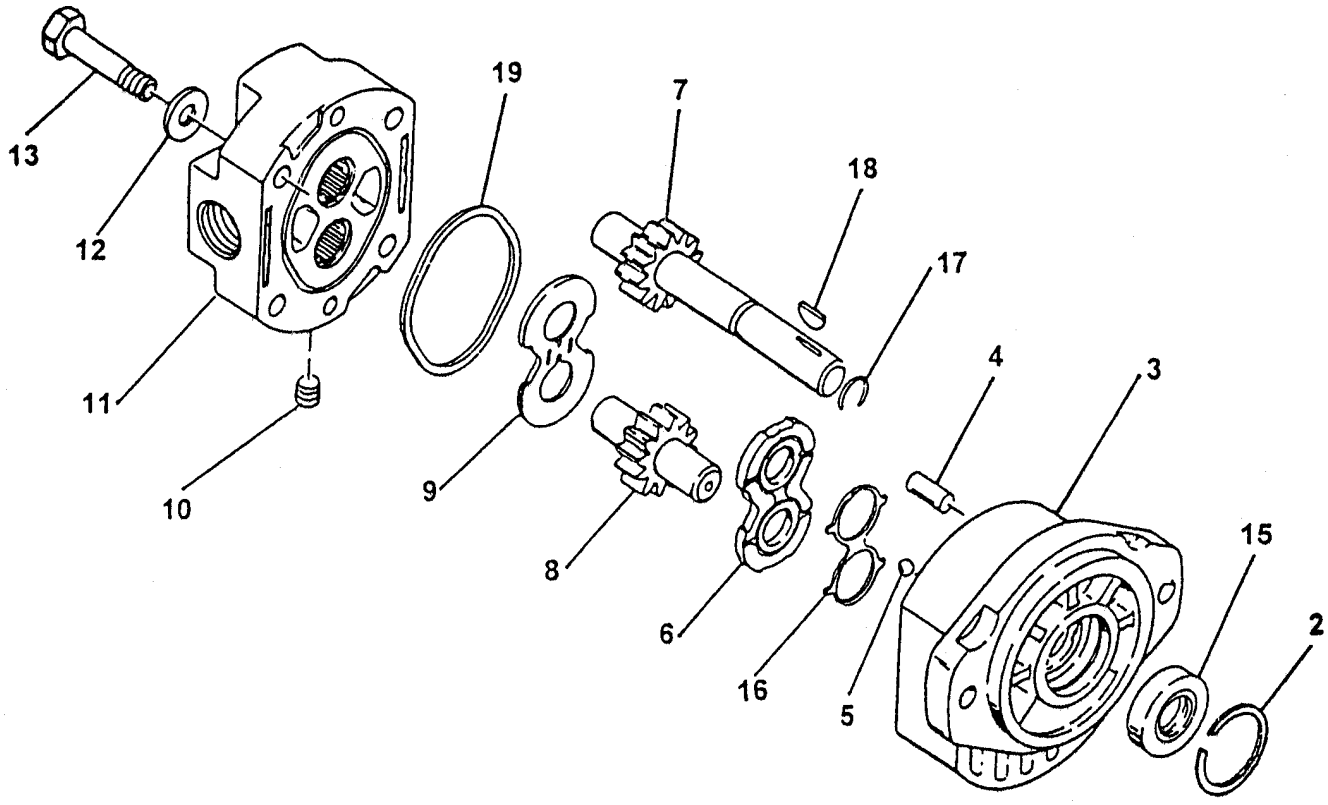
WATER PUMP CONTROL VALVE ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	86397	Assembly, Water Pump Control Valve (See Group 80, Figure 09 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		• Kit, Spool Control	1
10		• Cap, Spool	1
11		• Screw, SOC (attaching Parts)	2
12		• Handle, Remixer Valve	1
13		• Nut (attaching parts)	1
14		• Screw, SOC	2
15		• Lever, L	1
16		• Spool	1

DASH (-) ITEM NOT ILLUSTRATED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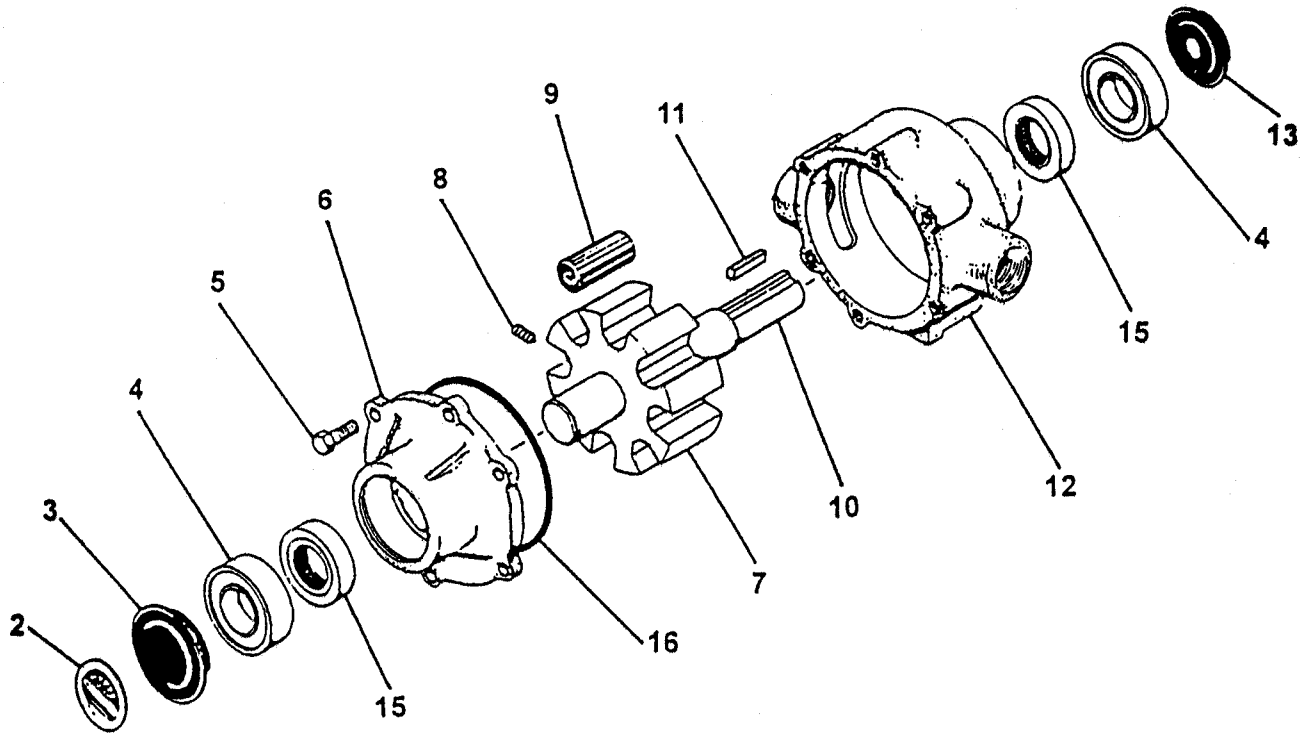
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	78152	Assembly, Wash Pump Motor (See Group 80, Figure 09 for NHA)	Ref
2		• Retainer	1
3		• Assembly, Body	1
4		• Pin, Dowel	2
5		• Bearing, Ball	2
6		• Plate, Wear	1
7		• Gear, Driven Wear	1
8		• Gear, Driven	1
9		• Plate, Thrust	1
10		• Plug, 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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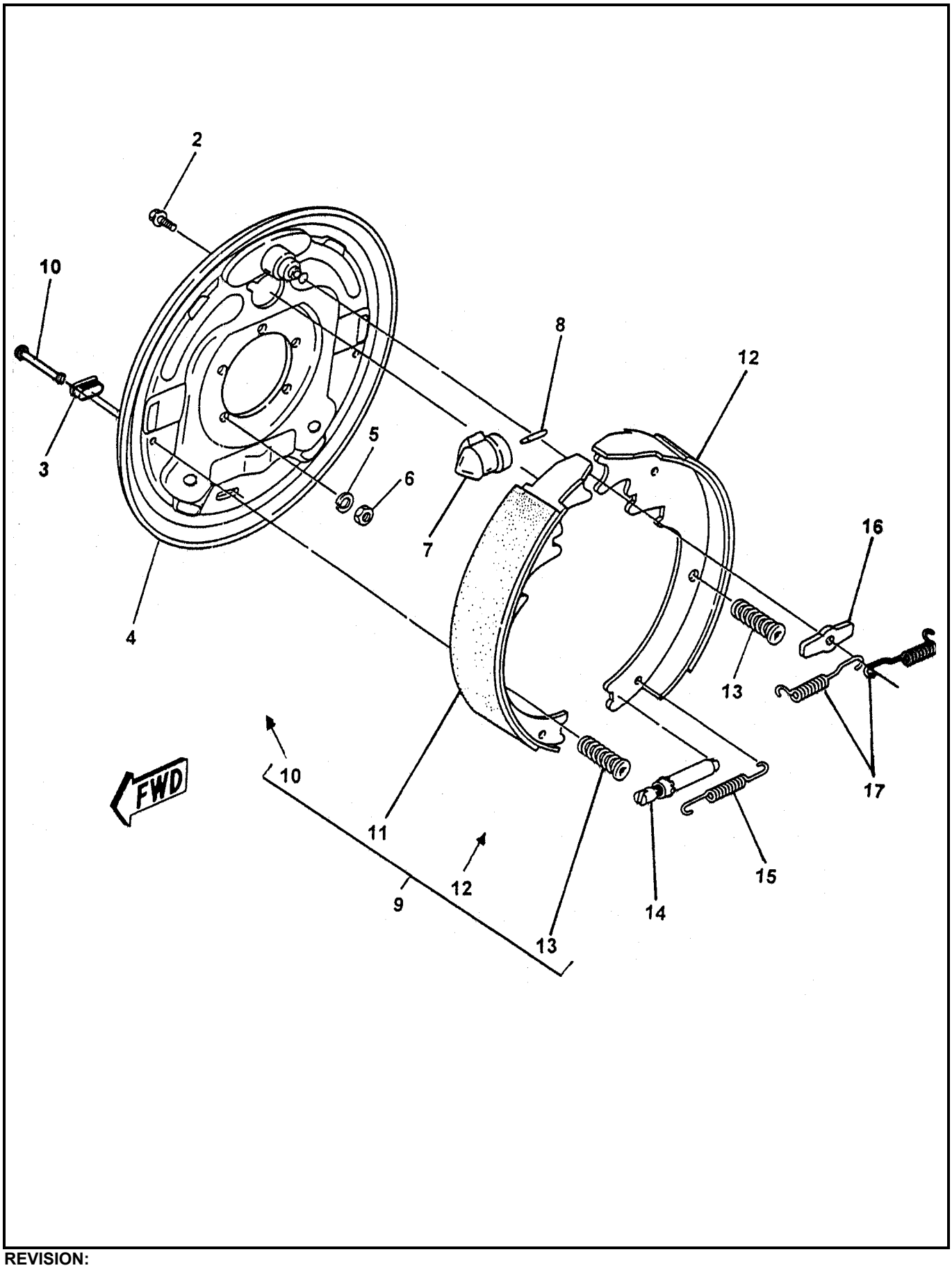
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	78157	Assembly, Wash Water Pump (See Group 80, Figure 09 for NHA)	Ref
2		• Plate, Name	1
3		• Cover, Bearing Rear	1
4		• Bearing, Sealed Bowl	2
5		• Endplate, (Ni-Resist) with Seal	1
6		• Bolt, Hex (attaching parts)	6
7		• Rotor, (Ni-Resist) with 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

NON-OPERATOR SIDE
HYDRAULIC BRAKE ASSEMBLY

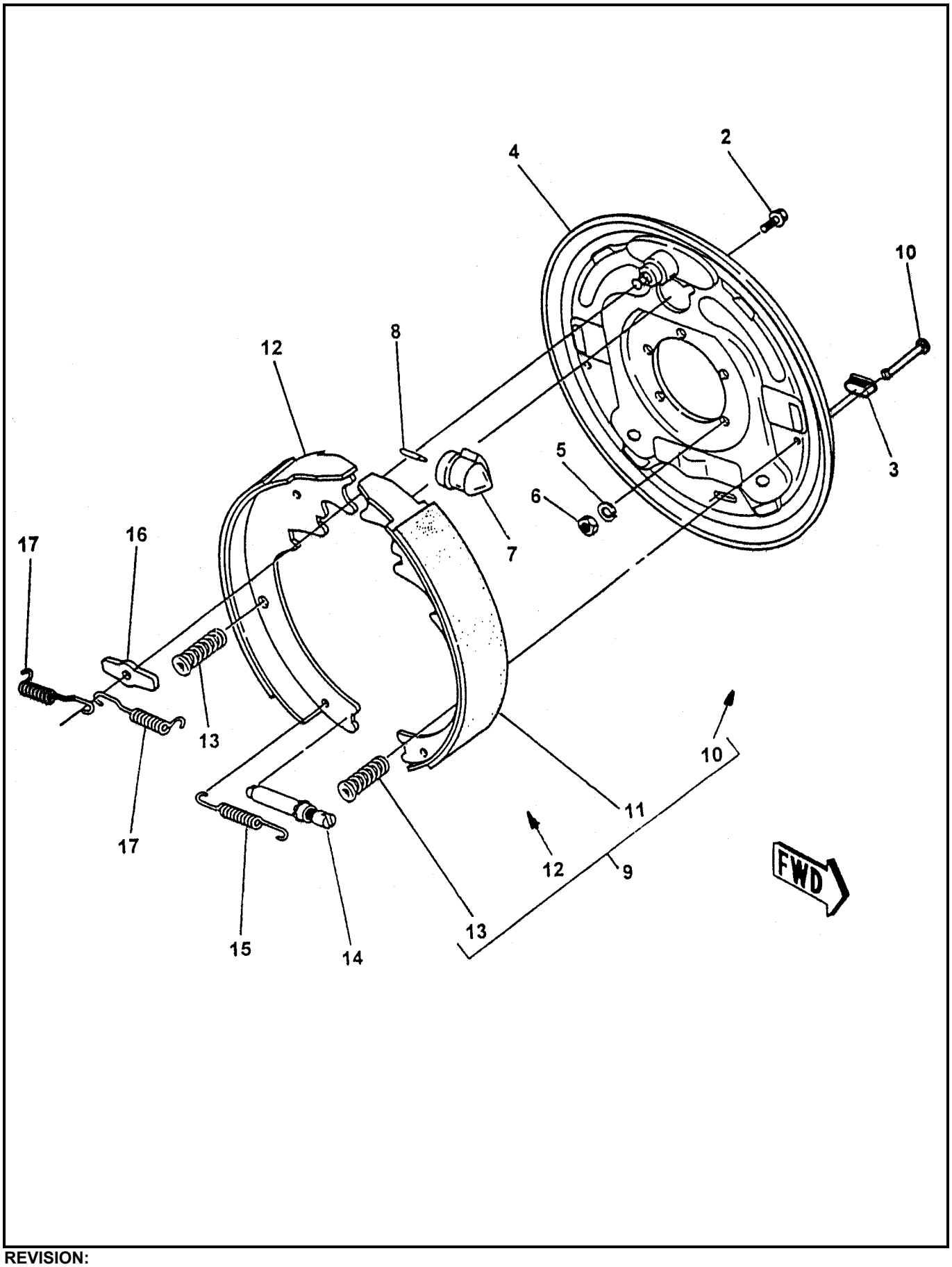


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

OPERATOR SIDE
HYDRAULIC BRAKE ASSEMBLY



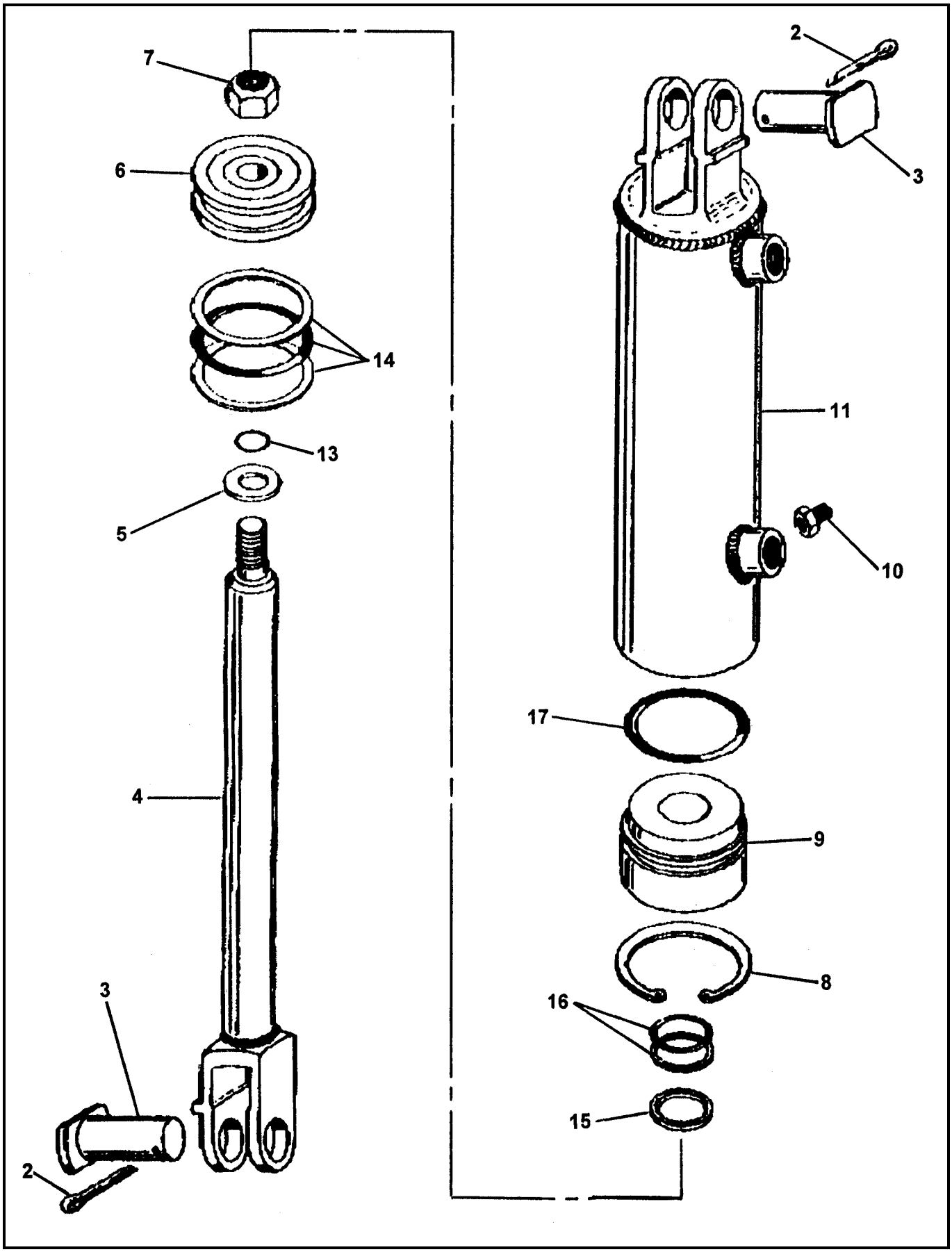
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-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

REED

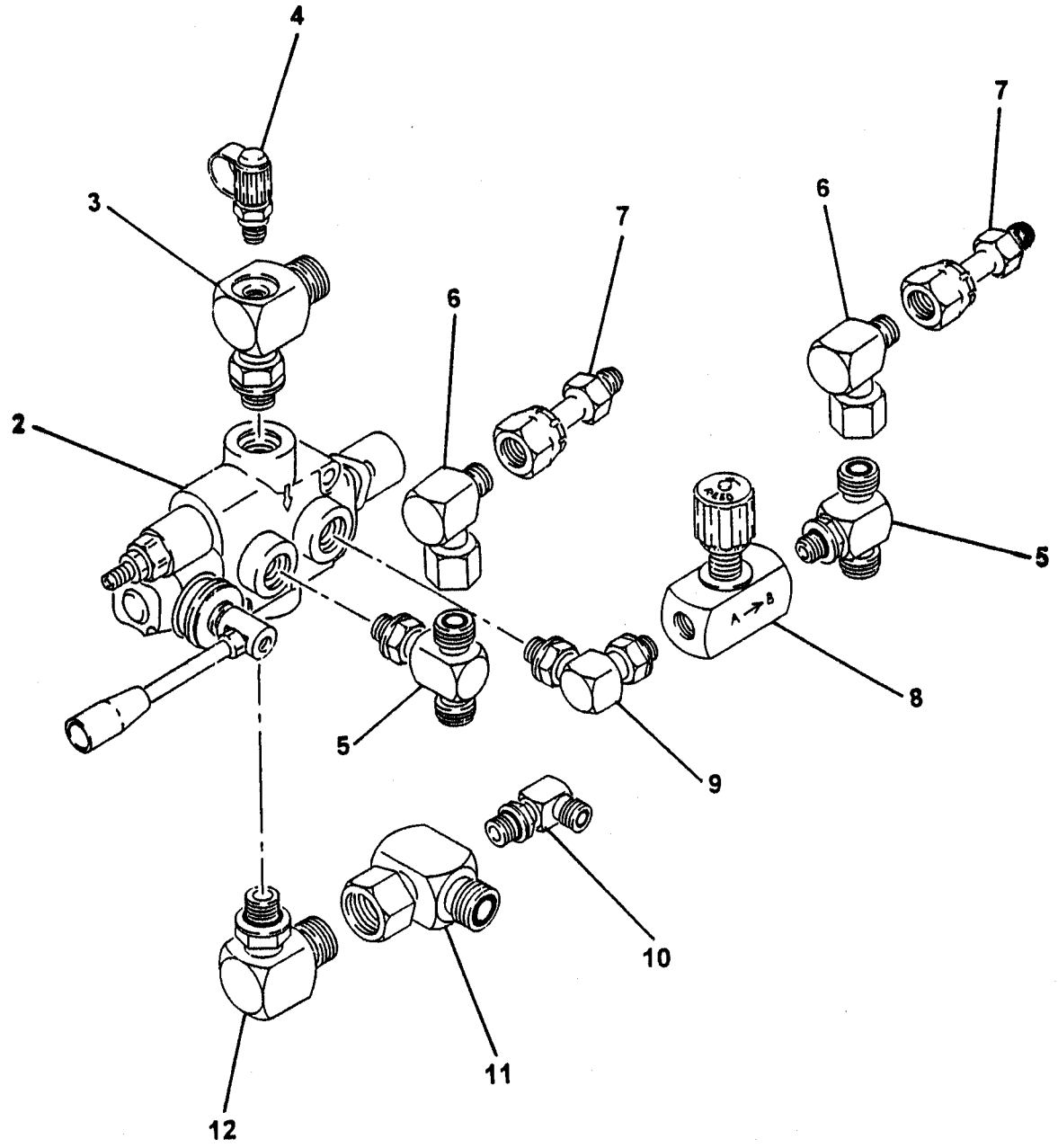
HYDRAULIC OUTRIGGER CYLINDER ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85640	Assembly, Hydraulic Outrigger Cylinder (See Group 80, 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	74497	• 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

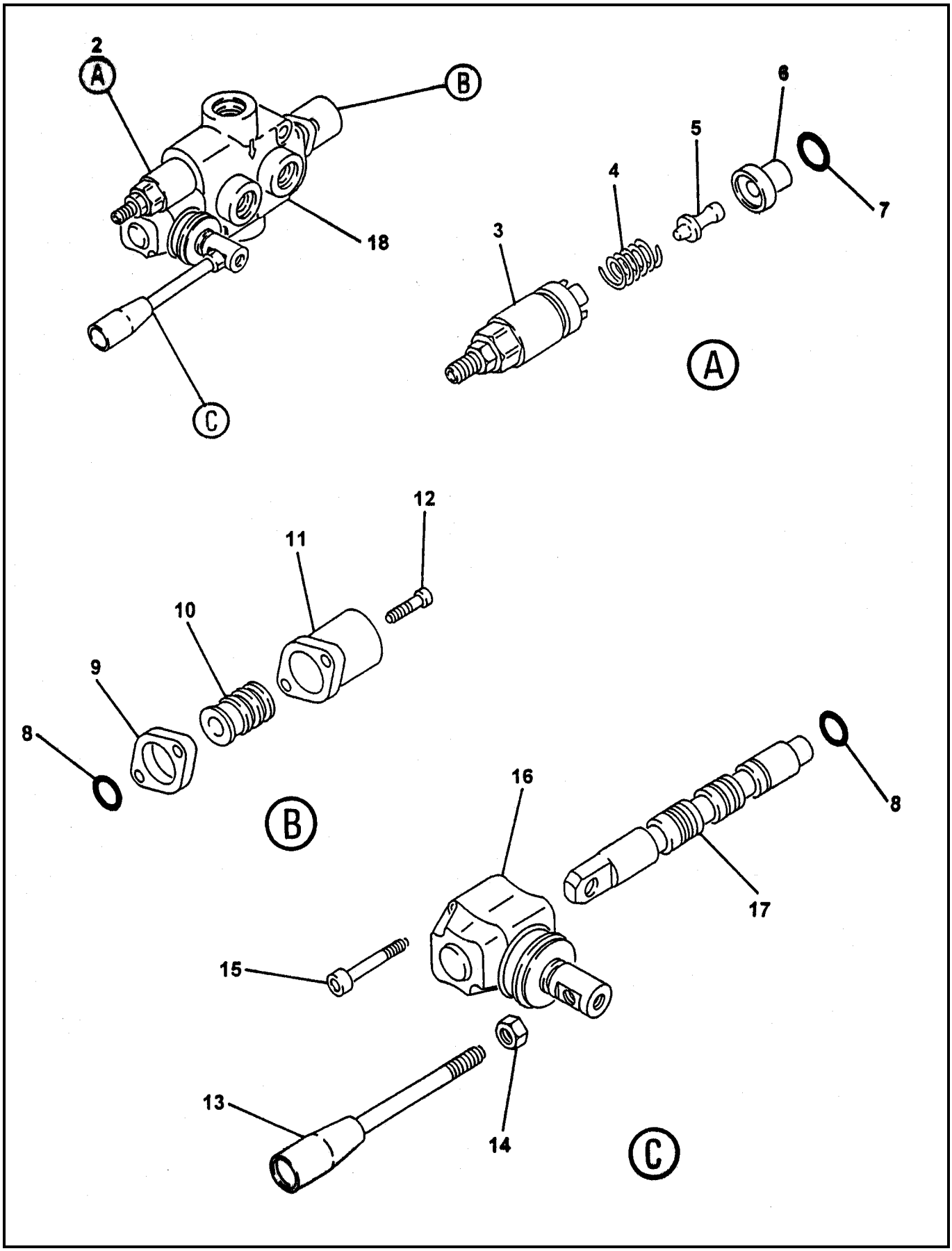
DASH (-) ITEM NOT ILLUSTRATED



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	80-16	Assembly, 1 Spool Control Valve (See Group 80, Figure 01 for NHA)	Ref
2	74584	• Sub-Assembly, 1 Spool Control Valve (See Group 80, Figure 17 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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A
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C
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B
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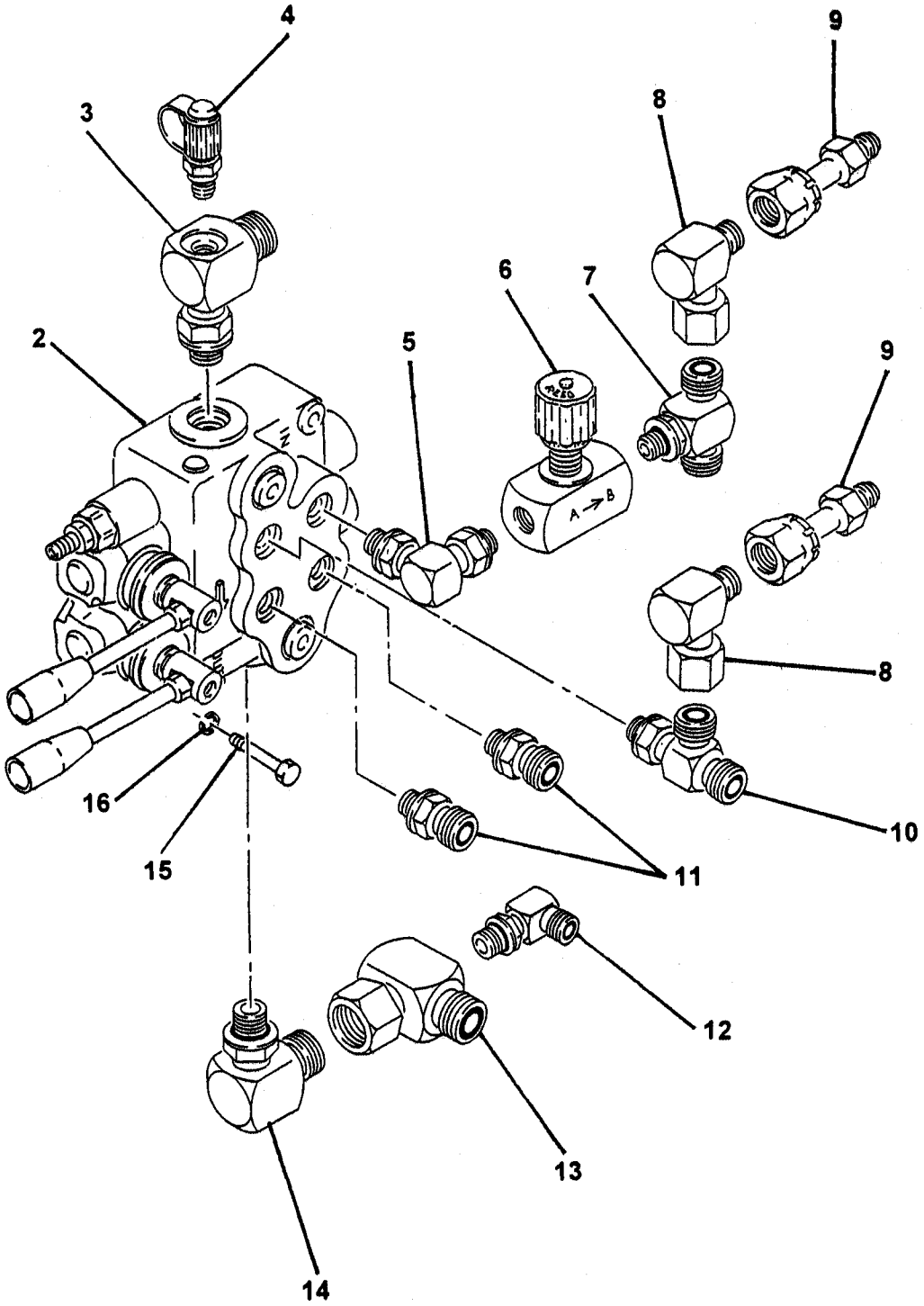
C

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	74584	Sub-Assembly, 1 Spool Control Valve (See Group 80, Figure 16 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	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
18		• Body, Valve	1

DASH (-) ITEM NOT ILLUSTRATED

2 SPOOL CONTROL VALVE ASSEMBLY

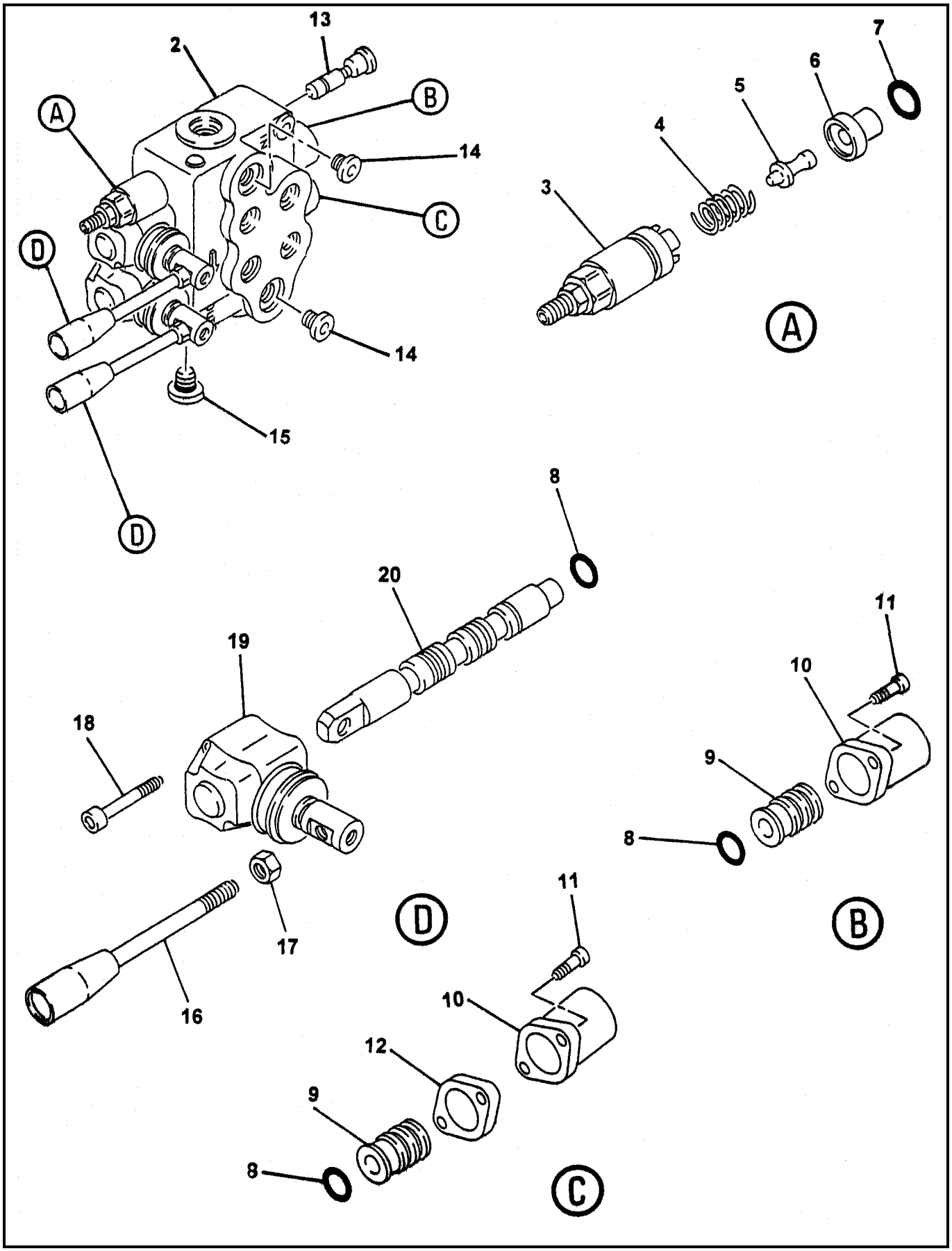


REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	80-18	Assembly, 2 Spool Control Valve (See Group 80, Figure 01 for NHA)	Ref
2	74585	• Sub-Assembly, 2 Spool Control Valve (See Group 80, Figure 20 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

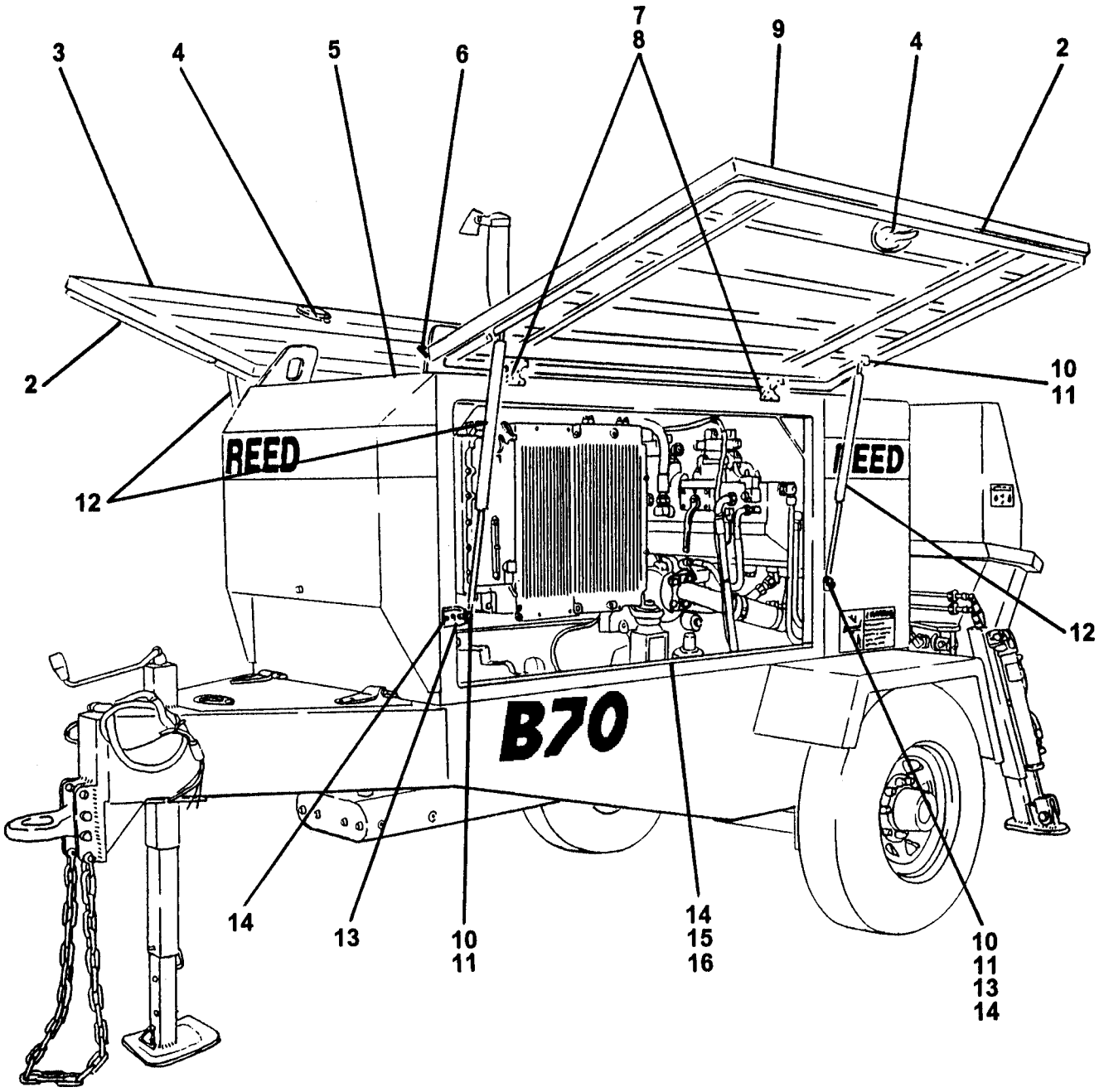
2 SPOOL CONTROL VALVE SUB-ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	74585	Sub-Assembly, 2 Spool Control Valve (See Group 80, Figure 18 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	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
21		• Body, Valve	1

DASH (-) ITEM NOT ILLUSTRATED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REED
REED
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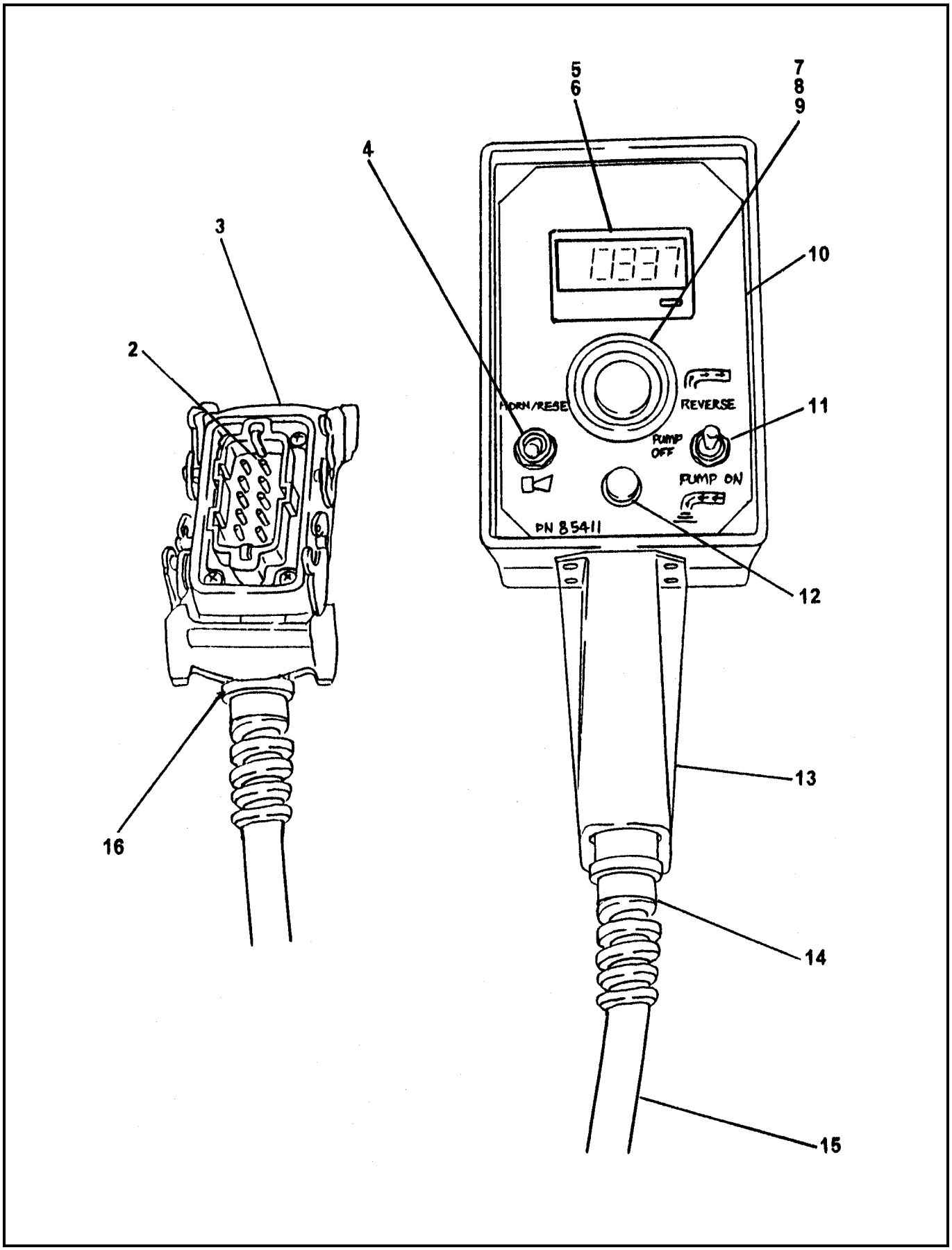
REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85943	Assembly, B-Series Side Door (See Group 80, Figure 01 for NHA)	Ref
2	73163	• Seal, 3/8 Bulb 15.75 FT Trim	A/R
3	85968	• Weldment, B-Series Right Hand Side Door	1
4	73767	• Latch, D Ring with Key	2
5	86144	• Structure, Lifting	1
6	71364	• Seal, 3/8 Bulb 3.5 FT Trim	A/R
7	85928	• Hinge, Machining	4
8	85945	• Screw, Button Head Cap	12
9	85967	• Weldment, B-Series Left Hand Side Door	1
10	75215	• Stud, Ball	8
11		• Washer, Flat	A/R
12	75214	• Spring, 130 LBS Gas	4
13	85931	• Tab, Frame Gas Spring	2
14	85944	• Screw, Button Head Cap	16
15	85939	• Angle, Left Hand Side Door	1
16	85940	• Angle, Right Hand Side Door	1

DASH (-) ITEM NOT ILLUSTRATED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2
HORN/RESET
REVERSE
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PUMP OFF
PUMP ON
PN 85411
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14
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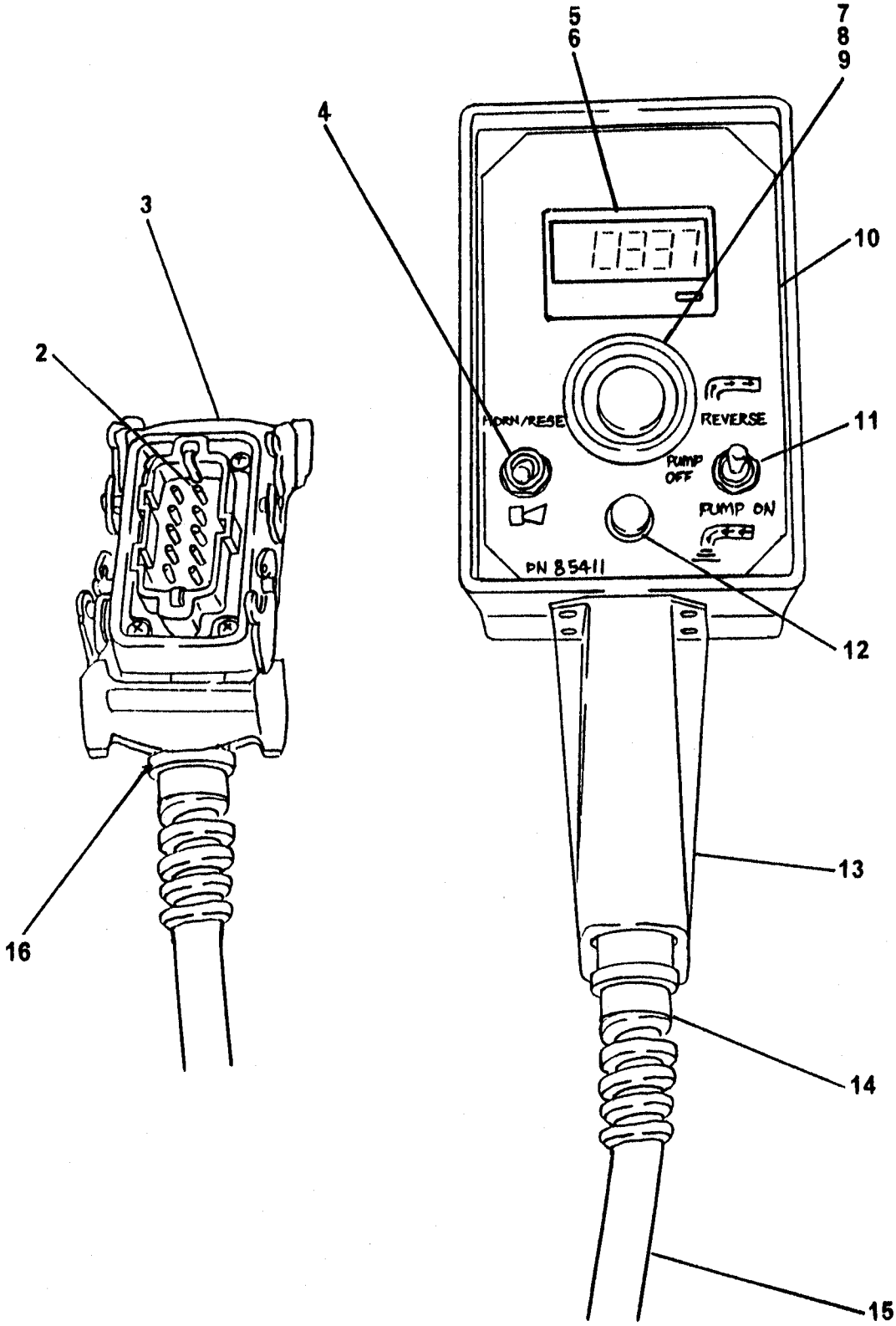
ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85960	Assembly, 50 Feet Cable Remote Control with Stroke Counter (See Group 80, Figure 01 for NHA)	Ref
2	79964	• Connector, Insert	1
3	79966	• Connector, Hood	1
4	85347	• Switch, Horn / Reset	1
5	72330	• Counter, Stroke	1
6	74388	• Diode, Stroke Counter	1
7	85342	• Operator, Emergency Stop	1
8	85343	• Block, 1 NC Lighted Contact	1
9	85344	• Bulb, Emergency Stop	1
10	85411	• Decal, C-Series Remote Control Box	1
11	72003	• Switch, Pump On / Reverse	1
12	85355	• Pilot, Light	1
13	85961	• Enclosure, Remote Control	1
14	86133	• Relief, PG-11 Spiral Strain	1
15	85620	• Cable, 50 Feet Remote Control	1
16	86145	• Reducer, PG-16 to PG-11	1
-17	72777	• Resister, Green 100 OHM	1

DASH (-) ITEM NOT ILLUSTRATED

100 FEET STROKE COUNTER
CABLE REMOTE CONTROL ASSEMBLY



REVISION:

ITEM NO.	*REED*'S PARTS NO.	DESCRIPTION 1 2 3 4 5	QTY
-1	85960A	Assembly, 100 Feet Cable Remote Control with Stroke Counter (See Group 80, Figure 01 for NHA)	Ref
2	79964	• Connector, Insert	1
3	79966	• Connector, Hood	1
4	85347	• Switch, Horn / Reset	1
5	72330	• Counter, Stroke	1
6	74388	• Diode, Stroke Counter	1
7	85342	• Operator, Emergency Stop	1
8	85343	• Block, 1 NC Lighted Contact	1
9	85344	• Bulb, Emergency Stop	1
10	85411	• Decal, C-Series Remote Control Box	1
11	72003	• Switch, Pump On / Reverse	1
12	85355	• Pilot, Light	1
13	85961	• Enclosure, Remote Control	1
14	86133	• Relief, PG-11 Spiral Strain	1
15	85816	• Cable, 100 Feet Remote Control	1
16	86145	• Reducer, PG-16 to PG-11	1
-17	72777	• Resister, Green 100 OHM	1

DASH (-) ITEM NOT ILLUSTRATED

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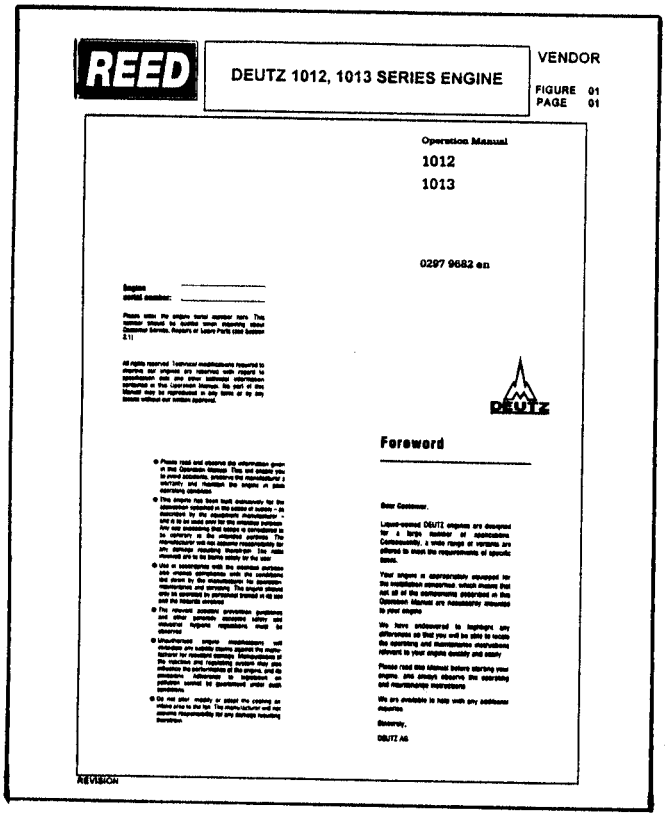
REED TRAILER MOUNTED CONCRETE PUMP ***01*** MODEL ***B70*** **VENDOR SECTION** CONTAINS THE FOLLOWING FIGURES:


REED

DEUTZ 1012, 1013 SERIES ENGINE

VENDOR

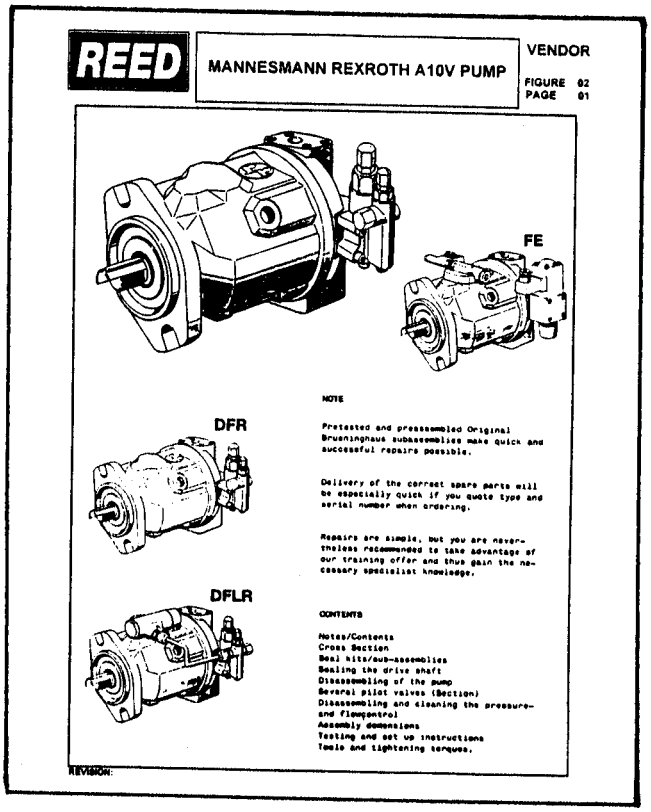
FIGURE 01
PAGE 01

Operation Manual
1012
1013

0297 9682 en

Foreword

REVISION


REED

MANNESMANN REXROTH A10V PUMP

VENDOR

FIGURE 02
PAGE 01

FE

DFR

DFLR

NOTE

Presorted and preassembled Original Brueninghaus subassemblies make quick and successful repairs possible.

Delivery of the correct spare parts will be especially quick if you quote type and serial number when ordering.

Repairs are simple, but you are nevertheless recommended to take advantage of our training offer and thus gain the necessary specialist knowledge.

CONTENTS

Notes/Contents
Cross Section
Seal kits/sub-assemblies
Sealing the drive shaft
Disassembling of the pump
Several pilot valves (Section)
Disassembling and cleaning the pressure- and flowcontrol
Assembly dimensions
Testing and set up instructions
Tools and tightening torques.

REVISION:

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Operation Manual

1012
1013

0297 9682 en

Engine serial number: | | | | | | | |

Please enter the engine serial number here. This number should be quoted when inquiring about Customer Service, Repairs or Spare Parts (see Section 2.1).

All rights reserved. Technical modifications required to improve our engines are reserved with regard to specification data and other technical information contained in this Operation Manual. No part of this Manual may be reproduced in any form or by any means without our written approval.

DEUTZ

Foreword

- Please read and observe the information given in this Operation Manual. This will enable you to avoid accidents, preserve the manufacturer's warranty and maintain the engine in peak operating condition.
- This engine has been built exclusively for the application specified in the scope of supply – as described by the equipment manufacturer – and is to be used only for the intended purpose. Any use exceeding that scope is considered to be contrary to the intended purpose. The manufacturer will not assume responsibility for any damage resulting therefrom. The risks involved are to be borne solely by the user.
- Use in accordance with the intended purpose also implies compliance with the conditions laid down by the manufacturer for operation, maintenance and servicing. The engine should only be operated by personnel trained in its use and the hazards involved.
- The relevant accident prevention guidelines and other generally accepted safety and industrial hygiene regulations must be observed.
- Unauthorized engine modifications will invalidate any liability claims against the manufacturer for resultant damage. Manipulations of the injection and regulating system may also influence the performance of the engine, and its emissions. Adherence to legislation on pollution cannot be guaranteed under such conditions.
- Do not alter, modify or adapt the cooling air intake area to the fan. The manufacturer will not assume responsibility for any damage resulting therefrom.

Dear Customer,

Liquid-cooled DEUTZ engines are designed for a large number of applications. Consequently, a wide range of variants are offered to meet the requirements of specific cases.

Your engine is appropriately equipped for the installation concerned, which means that not all of the components described in this Operation Manual are necessarily mounted to your engine.

We have endeavored to highlight any differences so that you will be able to locate the operating and maintenance instructions relevant to your engine quickly and easily.

Please read this Manual before starting your engine, and always observe the operating and maintenance instructions.

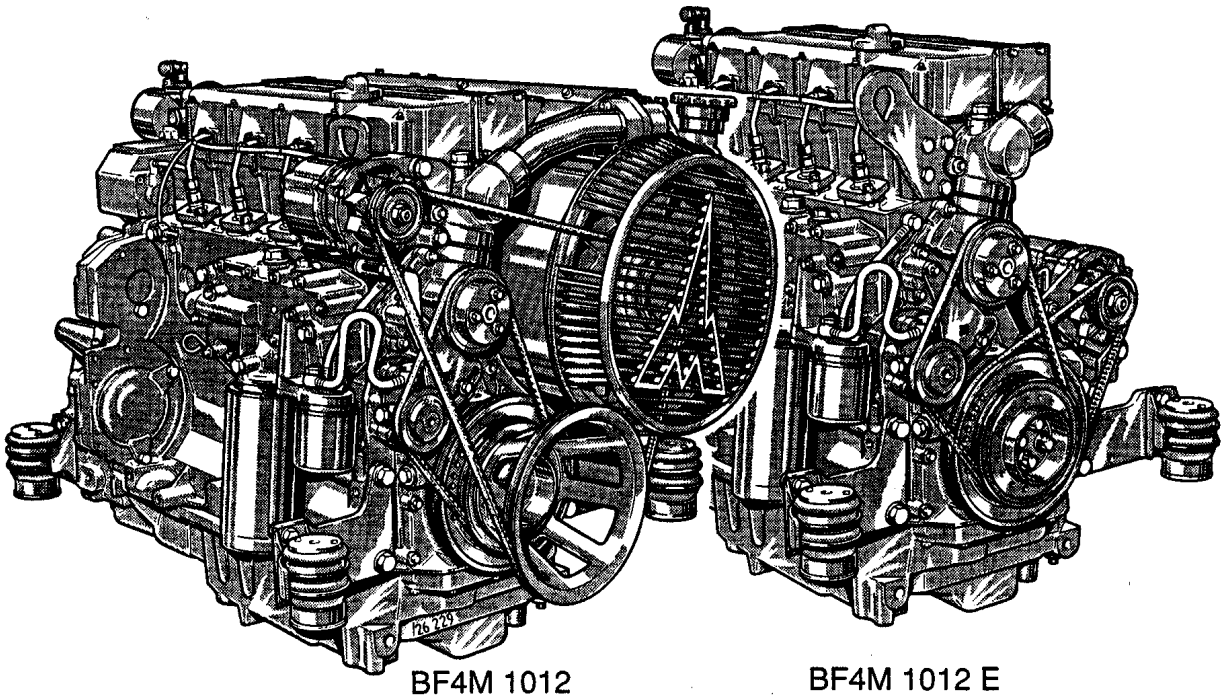
We are available to help with any additional inquiries.

Sincerely,

DEUTZ AG

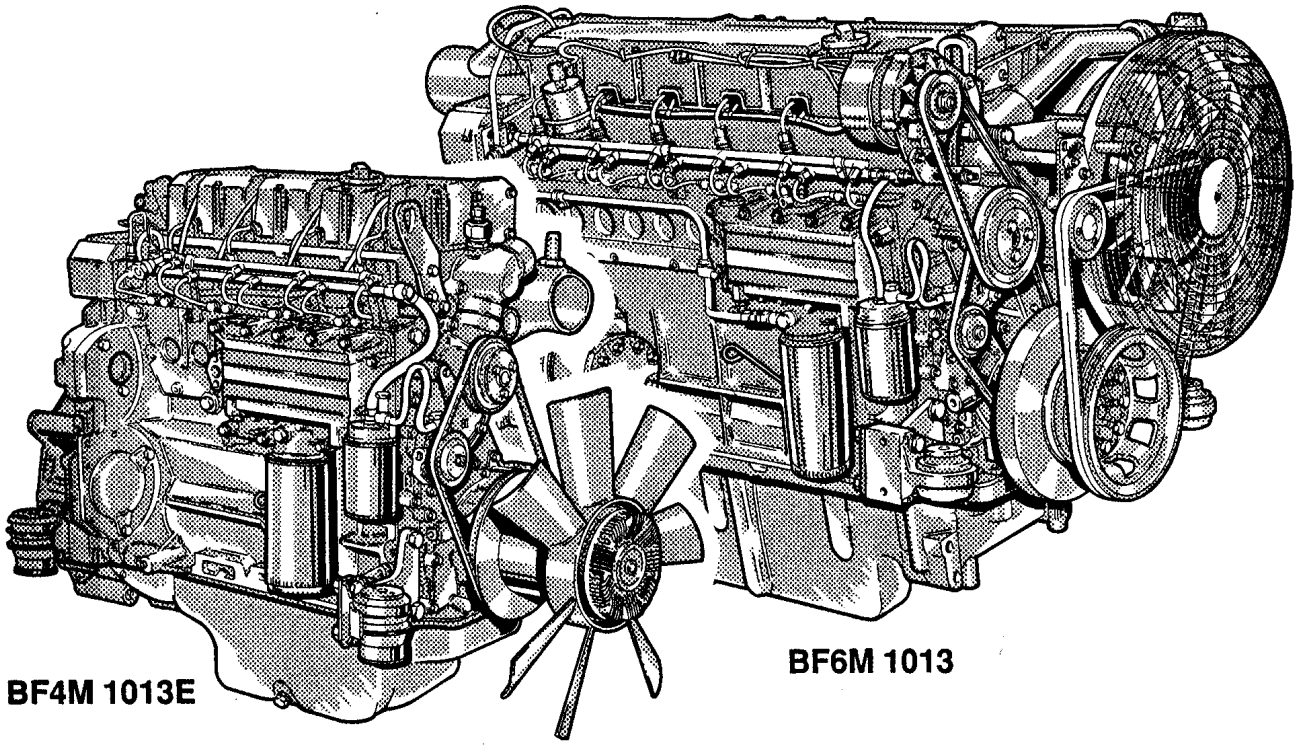
Table of contents

DEUTZ 1012, 1013 SERIES ENGINE



BF4M 1012

BF4M 1012 E



BF4M 1013E

BF6M 1013

General

1

DEUTZ Diesel Engines

are the product of many years of research and development. The resulting know-how, coupled with stringent quality standards, guarantee their long service life, high reliability and low fuel consumption.
It goes without saying that DEUTZ Diesel Engines meet the highest standards for environmental protection.

Care and Maintenance

Sound care and maintenance practices will ensure that the engine continues to meet the requirements placed on it. Recommended service intervals must be observed and service and maintenance work carried out conscientiously.
Special care should be taken under abnormally demanding operating conditions.

Service

Please contact one of our authorized service representatives in the event of breakdowns or for spare parts inquiries. Our trained specialists will carry out repairs quickly and professionally, using only genuine spare parts.
Original parts from DEUTZ AG are always produced in accordance with state-of-the-art technology.
Please turn to the end of this manual for further service information.

Beware of Running Engine

Shut the engine down before carrying out maintenance or repair work. Ensure that the engine cannot be accidentally started. Risk of accidents.
When the work is complete, be sure to refit any panels and guards that may have been removed.
Never fill the fuel tank while the engine is running.
Observe industrial safety regulations when running the engine in an enclosed space or underground.

Safety

This symbol is used for all safety warnings. Please follow them carefully. The attention of operating personnel should be drawn to these safety instructions. General safety and accident prevention regulations laid down by law must also be observed.

Asbestos

DEUTZ original parts are asbestos-free.

California
Proposition 65 Warning

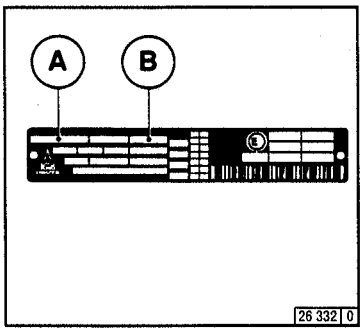
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Engine Description

2.1 Model

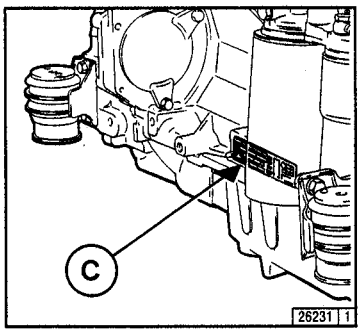
2

2.1.1 Rating Plate



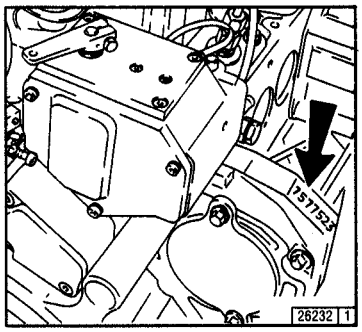
The model **A**, the engine serial number **B** and the performance data are stamped on the rating plate. The model and engine serial number must be given when ordering spare parts.

2.1.2 Rating Plate Location



The rating plate **C** is attached to the crankcase.

2.1.3 Engine Serial Number



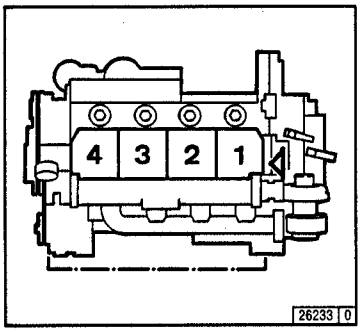
The engine serial number is also stamped on the crankcase itself **(arrow).**

2.1 Model

Engine Description

2

2.1.4 Cylinder Numbering



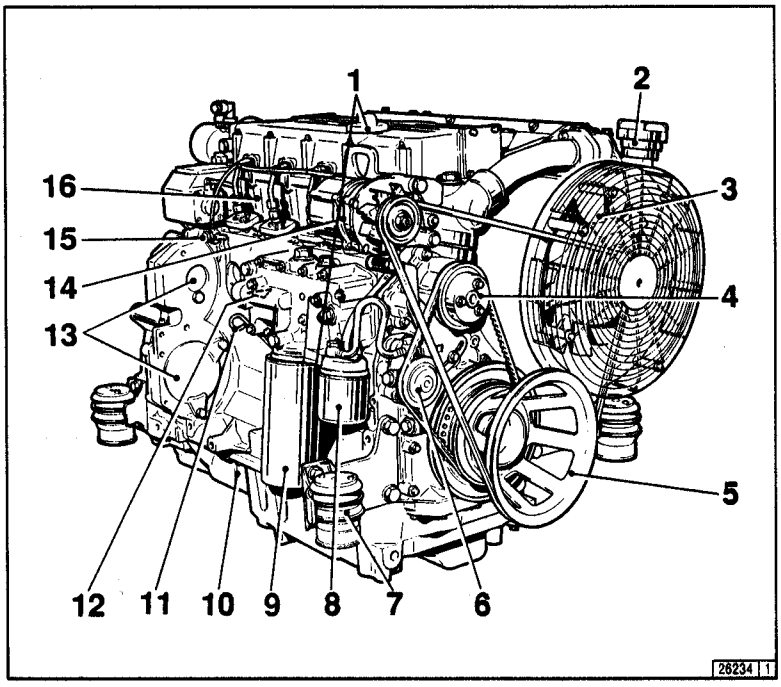
Cylinders are numbered consecutively, beginning at the flywheel end.

Engine Description

2.2 Engine Illustrations

2

2.2.1 Service Side 1012



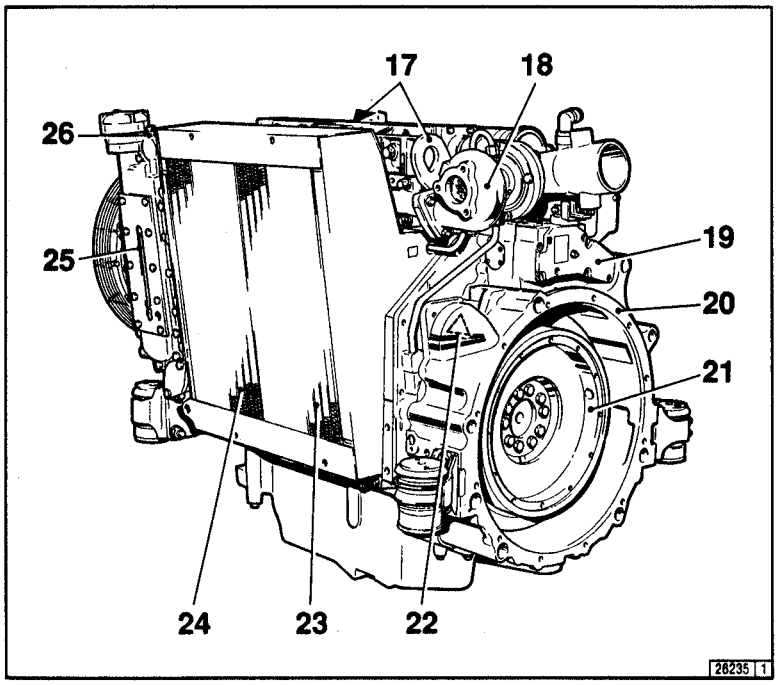
1 Oil filler (option: between filters)
2 Coolant filler
3 Cooling fan
4 Coolant pump
5 Belt pulley
6 Fuel pump
7 Engine mount
8 Fuel filter
9 Lube oil filter
10 Oil pan
11 Dipstick
12 Lube oil cooler
13 Mounting facility for hydraulic pumps
14 Alternator
15 Back leak fuel pipe with pressure-regulating valve
16 Cylinder head

2.2 Engine Illustrations

Engine Description

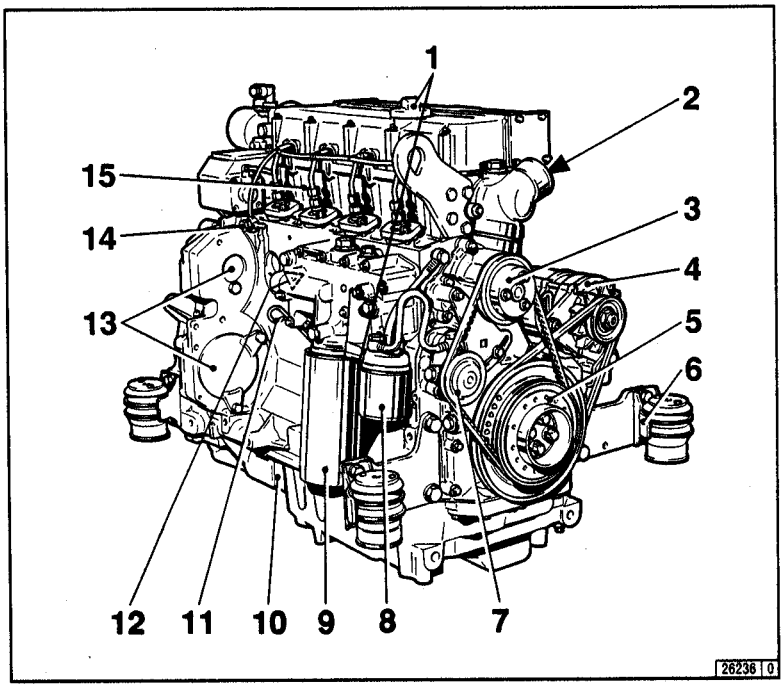
2

2.2.2 Starter Side 1012



17 Lifting points
18 Exhaust turbocharger
19 Speed governor
20 SAE housing
21 Flywheel
22 Starter motor
23 Hydraulic oil cooler
24 Coolant heat exchanger
25 Coolant level gauge
26 Bleeder valve

2.2.3 Service Side 1012 E



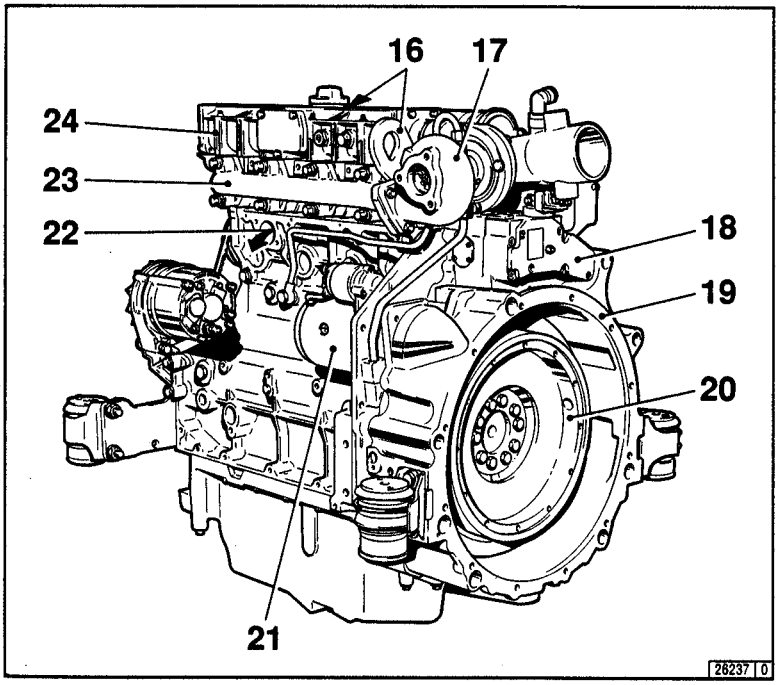
1 Oil filler (option: between filters)
2 Coolant inlet
3 Coolant pump
4 Alternator
5 Belt pulley
6 Engine mount
7 Fuel pump
8 Fuel filter
9 Lube oil filter
10 Oil pan
11 Dipstick
12 Lube oil cooler
13 Mounting facility for hydraulic pump
14 Back leak fuel pipe with pressure-regulating valve
15 Cylinder head

2.2 Engine Illustrations

Engine Description

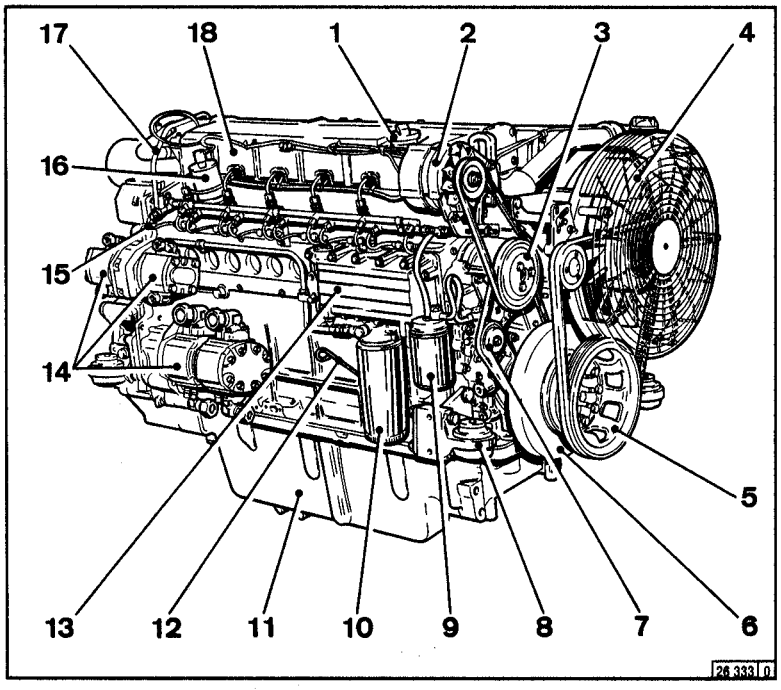
2

2.2.4 Starter Side 1012 E



16 Lifting points
17 Exhaust turbocharger
18 Speed governor
19 SAE housing
20 Flywheel
21 Starter motor
22 Coolant outlet to heat exchanger
23 Exhaust manifold
24 Air intake manifold

2.2.5 Service Side 1013



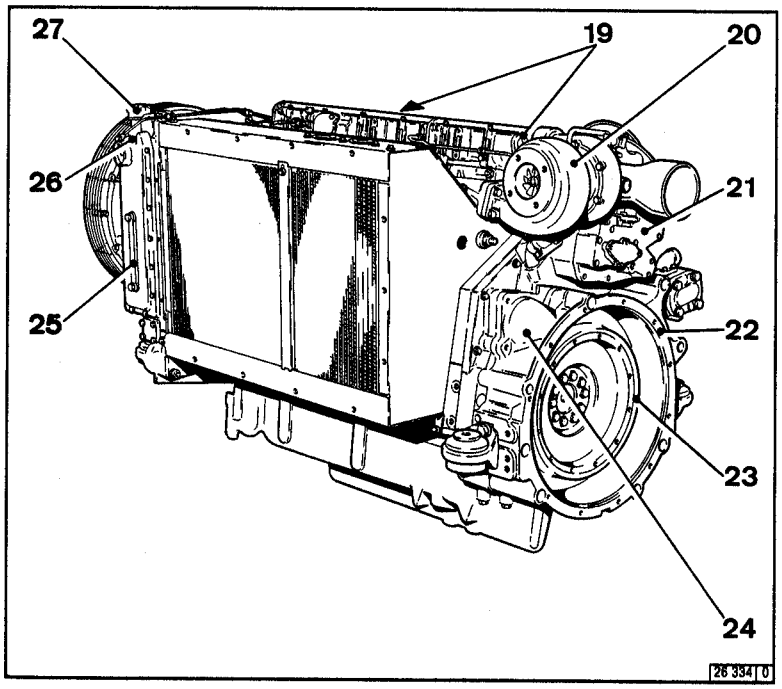
1 Oil filler (option: between filters)
2 Alternator
3 Coolant pump
4 Fan
5 Belt Pulley
6 Vibration damper
7 Fuel pump
8 Engine mount
9 Fuel filter
10 Lube oil filter
11 Oil pan
12 Dipstick
13 Lube oil cooler
14 Hydraulic pumps (or compressor)
15 Fuel pipe
16 Solenoid
17 Lube oil line to turbocharger
18 Cylinder head

2.2 Engine Illustrations

Engine Description

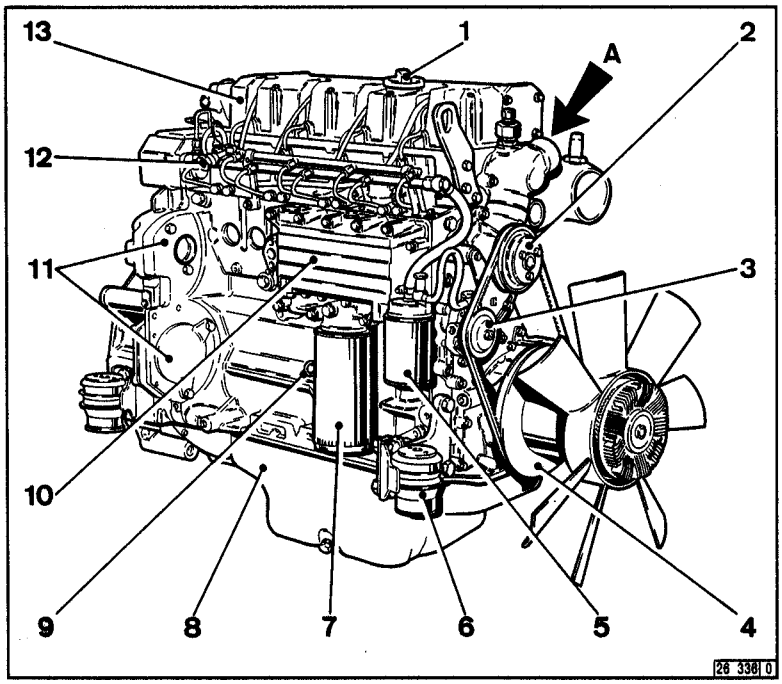
2

2.2.6 Starter Side 1013



19 Lifting points
20 Exhaust turbocharger
21 Speed governor
22 SAE housing
23 Flywheel
24 Starter motor
25 Coolant level gauge
26 Bleeder valve
27 Coolant filler cap

2.2.7 Service Side 1013 E



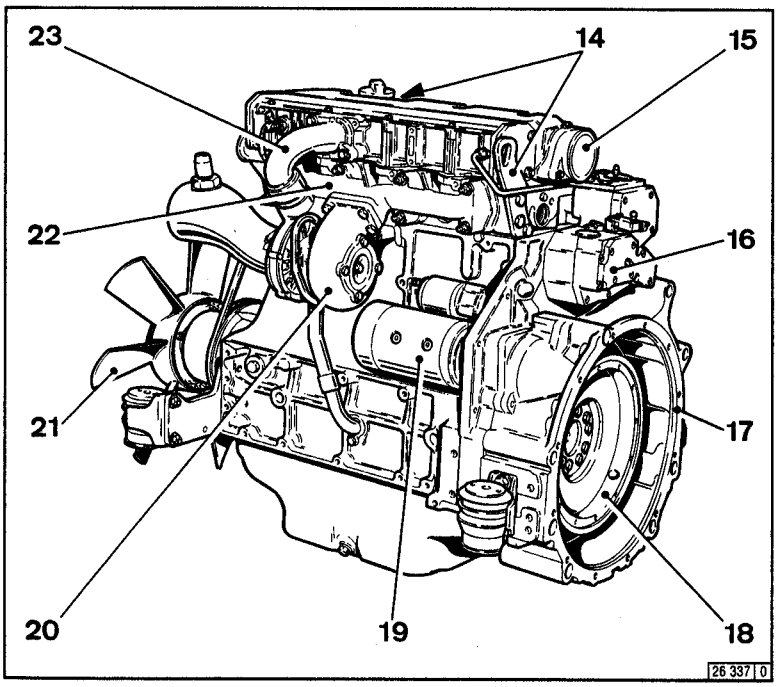
1 Oil filler
2 Coolant pump
3 Fuel pump
4 Vibration damper
5 Lube oil filter
6 Engine mount
7 Fuel filter
8 Oil pan
9 Dipstick
10 Lube oil cooler
11 Mounting facility for hydraulic pump
12 Back leak fuel pipe with pressure-regulating valve
13 Cylinder head
A Coolant inlet

2.2 Engine Illustrations

Engine Description

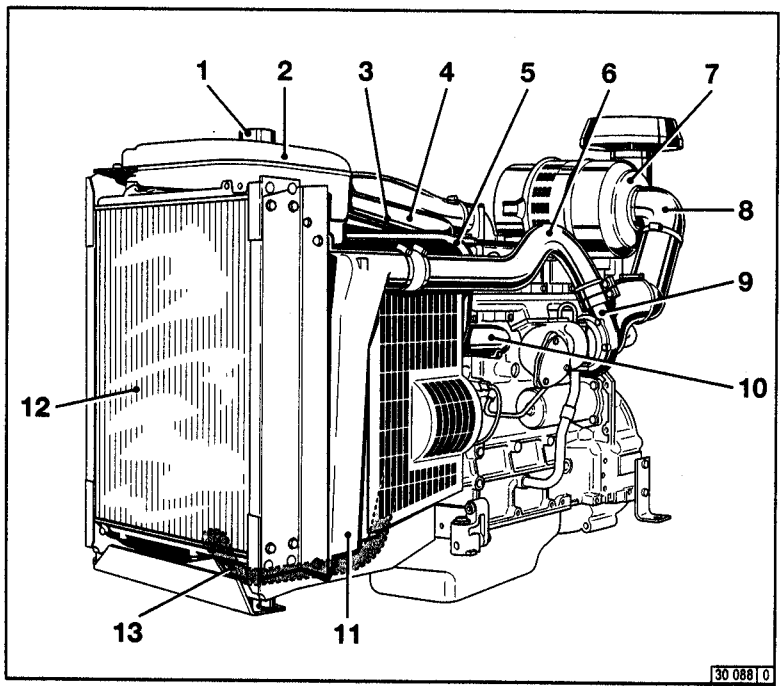
2

2.2.8 Starter Side 1013 E



14 Lifting points
15 Crankcase breather valve
16 Speed governor
17 SAE housing
18 Flywheel
19 Starter motor
20 Exhaust turbocharger
21 Fan
22 Exhaust manifold
23 Air intake manifold

2.2.9 Starter Side
Unit Engine BF4M 1013 EC



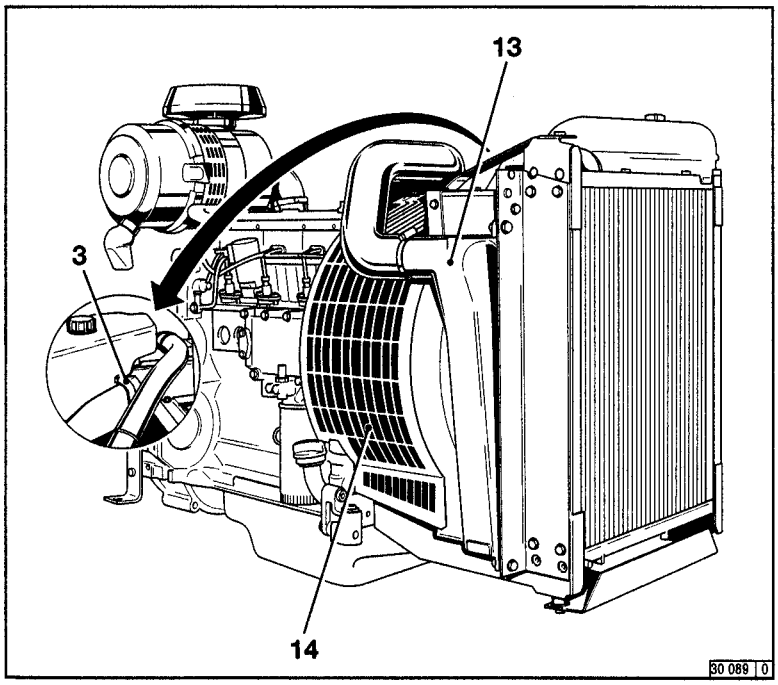
1 Coolant filler neck with cap
2 Expansion tank
3 Vent line from cylinder head to expansion tank
4 Coolant line from engine crankcase to engine fluid radiator
5 Expansion line from expansion tank to radiator
6 Charge air line from exhaust turbocharger to charge-air cooler
7 Dry air filter
8 Induction air line between dry air filter and exhaust turbocharger
9 Exhaust turbocharger
10 Coolant line from crankcase to engine fluid radiator
11 Charge-air cooler
12 Engine fluid radiator
13 Coolant line from engine fluid radiator to engine thermostat

2.2 Engine Illustrations

Engine Description

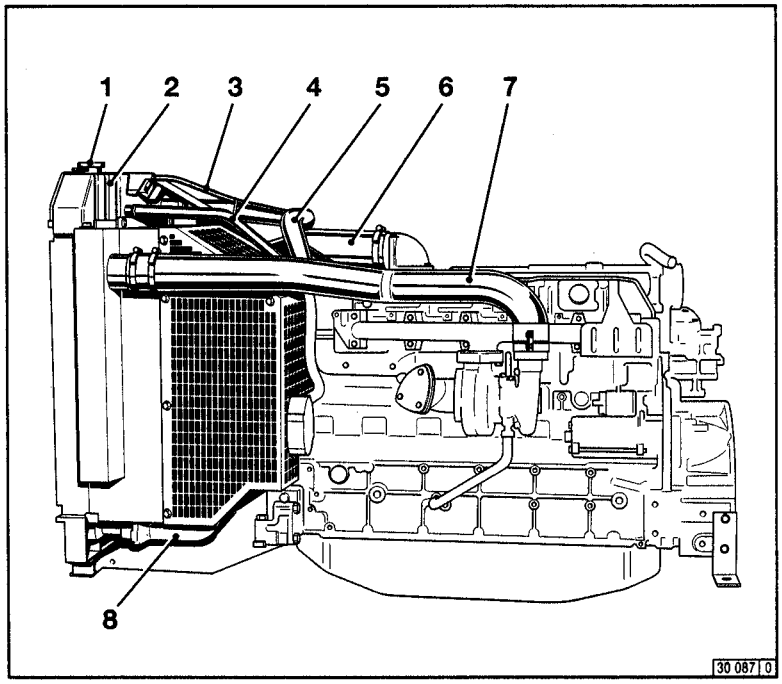
2

2.2.10 Service Side
Unit Engine BF4M 1013 EC



3 Ventilation line from cylinder head to expansion tank
13 Charge-air line from charge-air cooler to engine
14 Protective guard

2.2.11 Starter Side
Unit Engine BF6M 1013 EC



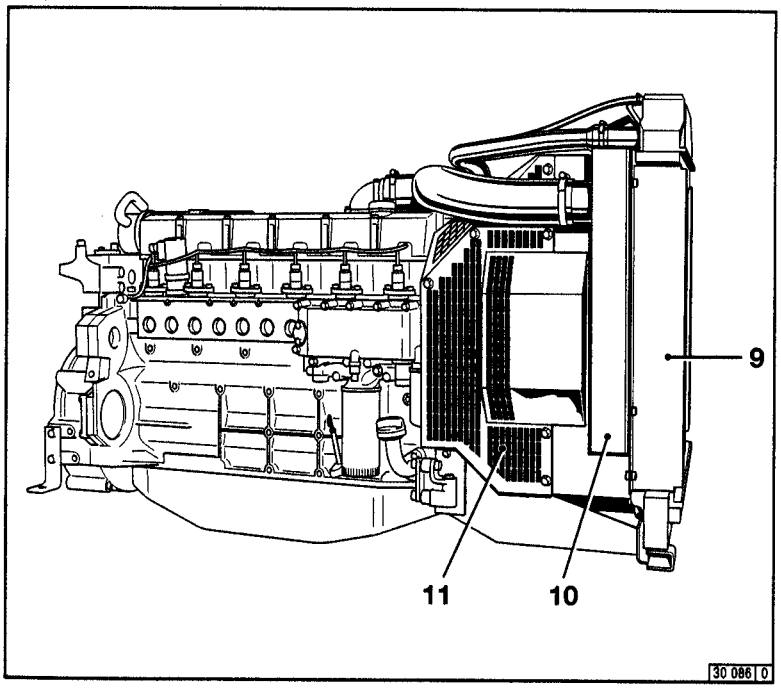
1 Filler neck with cap
2 Expansion tank
3 Vent line from cylinder head to expansion tank
4 Expansion line from expansion tank to coolant pump
5 Coolant line from crankcase to engine fluid radiator
6 Charge-air line from charge-air cooler to engine
7 Charge-air line from exhaust turbocharger to charge-air cooler
8 Coolant line from engine fluid radiator to engine thermostat

2.2 Engine Illustrations

Engine Description

2

2.2.12 Service Side
Unit Engine BF4M 1013 EC

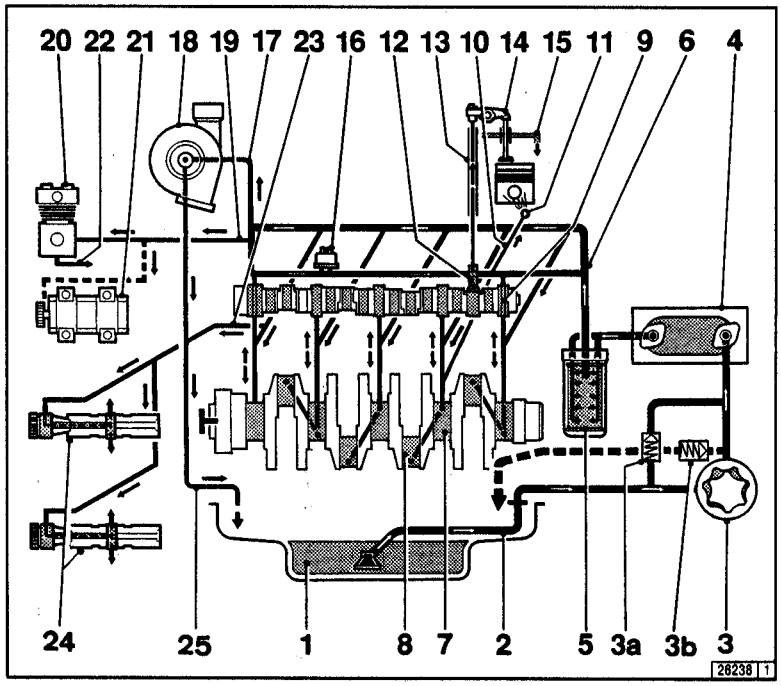


9 Engine fluid radiator
10 Charge-air cooler
11 Protective guard

Engine Description

2.3 Lube Oil Circuit

2.3.1 Lube Oil Circuit Schematic
1012 / 1012 E



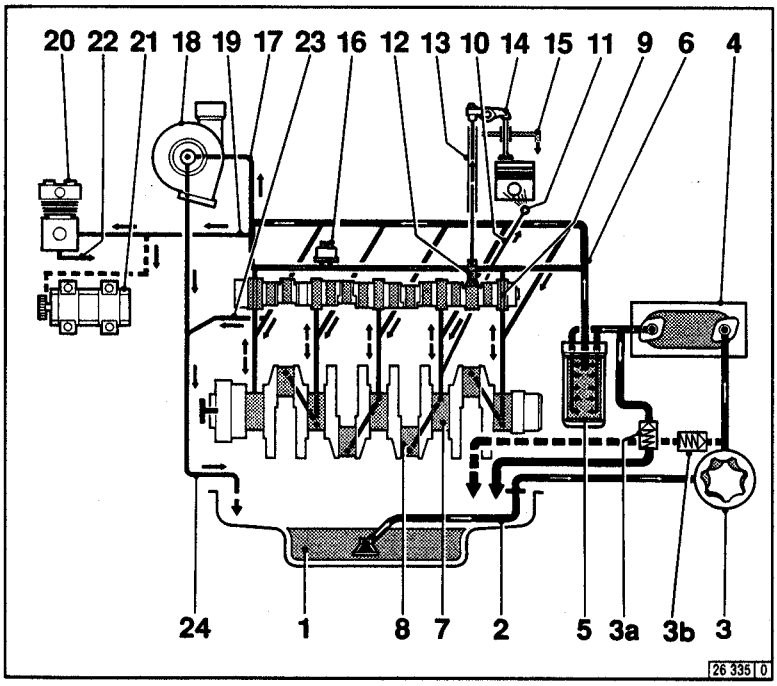
1 Oil pan
2 Air intake manifold
3 Lube oil pump
3a Back leak fuel valve
3b Pressure-relief valve
4 Lube oil cooler
5 Lube oil filter
6 Main oil gallery
7 Crankshaft bearing
8 Conrod bearing
9 Camshaft bearing
10 Line to spray nozzle
11 Spray nozzle for piston cooling
12 Tappet w/ control bore for pulse lubrication of rocker arms
13 Pushrod (designed for lube oil supply of rocker arms)
14 Rocker arm
15 Return line to oil pan
16 Oil sensor
17 Oil line to exhaust turbocharger
18 Exhaust turbocharger
19 Oil line to compressor or hydraulic pump
20 Compressor
21 Hydraulic pump
22 Return line to compressor or hydraulic pump
23 Line to mass balancing gear (2x)
24 Counterbalancing shafts
25 Exhaust turbocharger return to crankcase

2.3 Lube Oil Circuit

Engine Description

2

2.3.2 Lube Oil Circuit Schematic 1013 / 1013 E

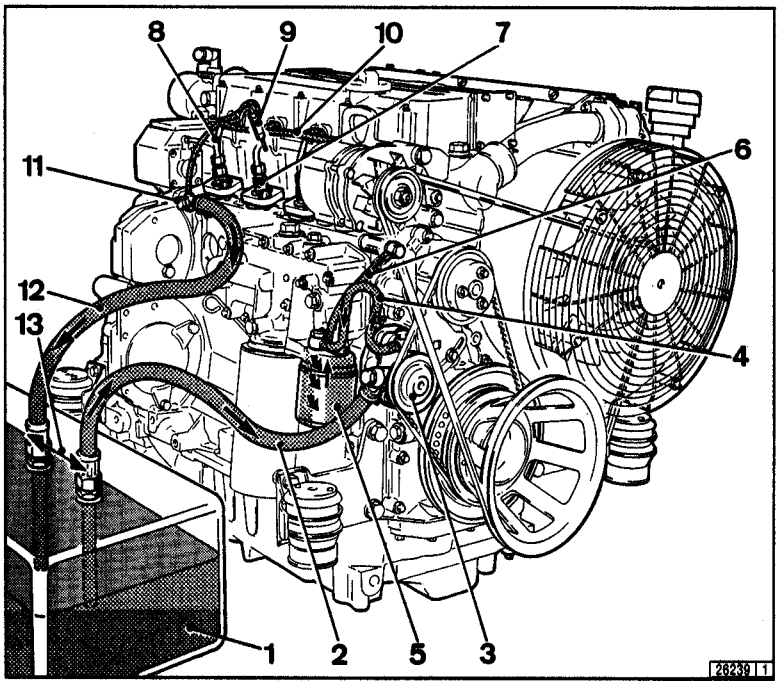


1 Oil pan
2 Air intake manifold
3 Lube oil pump
3a Back leak fuel valve
3b Pressure-relief valve
4 Lube oil cooler
5 Lube oil filter
6 Main oil gallery
7 Crankshaft bearing
8 Conrod bearing
9 Camshaft bearing
10 Spray nozzle line
11 Spray nozzle for piston cooling
12 Tappet w/ control bore for pulse lubrication of rocker arms
13 Pushrod (designed for lube oil supply of rocker arms)
14 Rocker arm
15 Return line to oil pan
16 Oil sensor
17 Oil line to exhaust turbocharger
18 Exhaust turbocharger
19 Oil line to compressor or hydraulic pump
20 Compressor
21 Hydraulic pump
22 Return line to compressor or hydraulic pump
23 Return to oil pan
24 Exhaust turbocharger return to crankcase

Engine Description

2.4 Fuel System

2.4.1 Fuel System Schematic



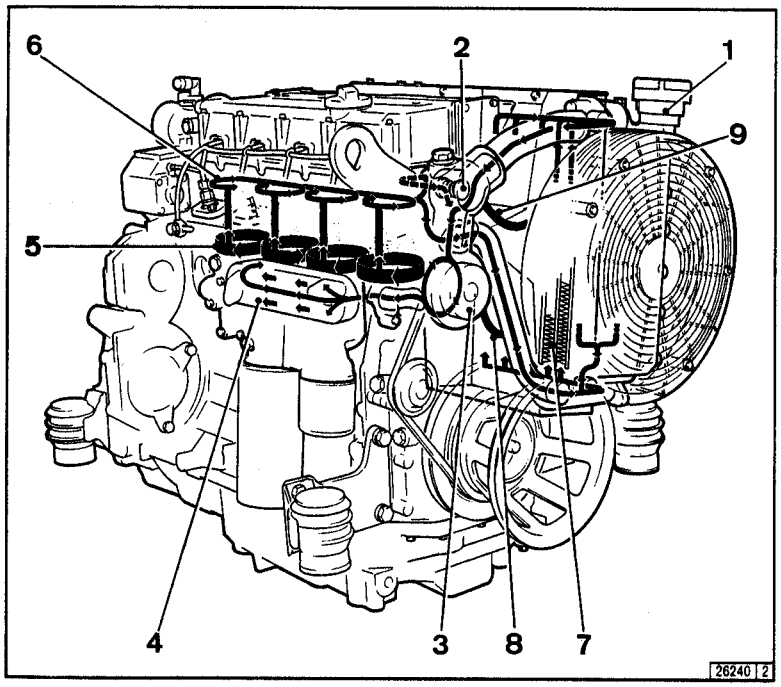
1 Fuel tank
2 Line to fuel pump
3 Fuel pump
4 Line to fuel filter
5 Fuel filter
6 Line to injection pumps
7 Injection pump
8 Line to injector
9 Injector
10 Back leak fuel pipe
11 Banjo bolt with pressure-regulating valve
12 Return line to fuel tank
13 Keep this spacing as wide as possible

2.5 Cooling System

Engine Description

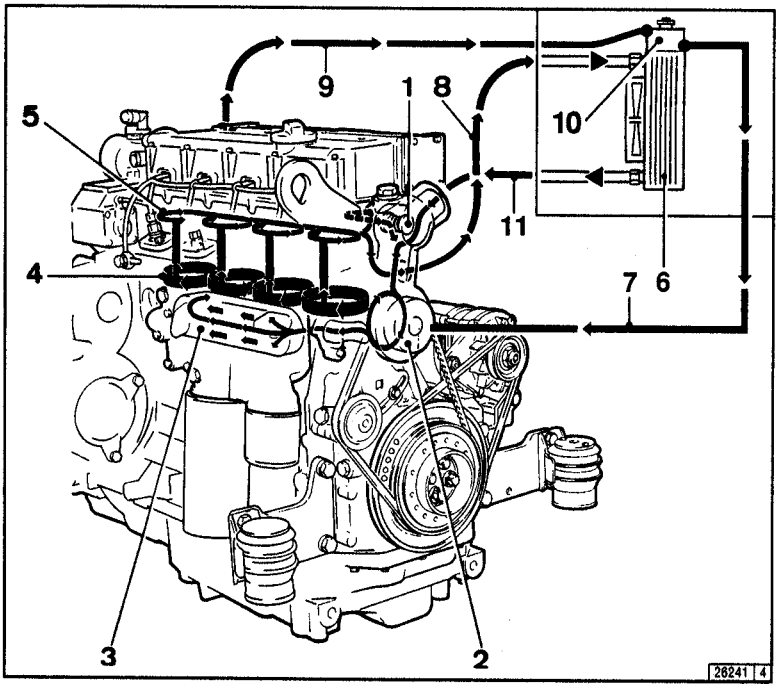
2

2.5.1 Cooling System Schematic 1012



1 Coolant filler
2 Thermostat housing
3 Coolant pump
4 Lube oil cooler
5 Cylinder cooling
6 Cylinder head cooling
7 Heat exchanger
8 Return from thermostat to coolant pump housing
9 Ventilation line from cylinder head to heat exchanger (expansion tank)

2.5.2 Cooling System Schematic 1012 E entrance regulation



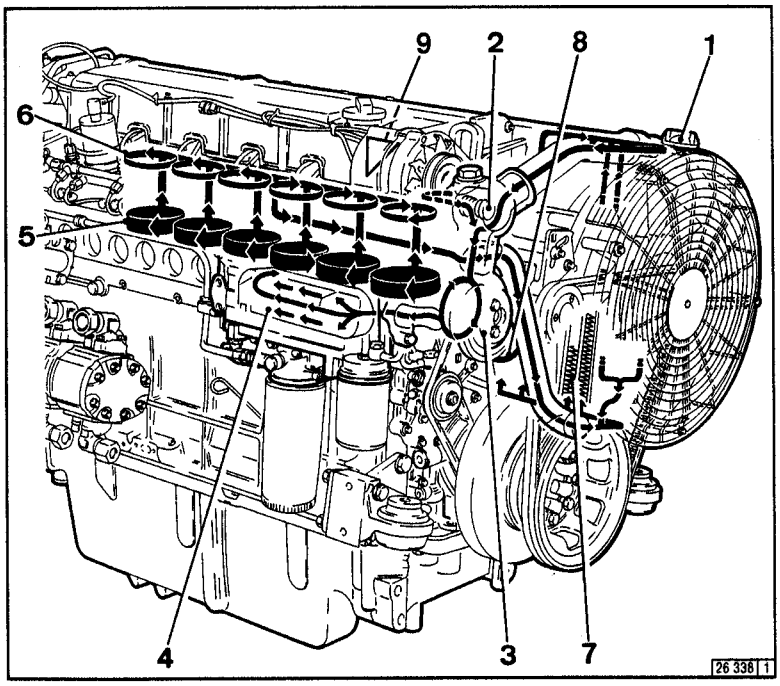
1 Thermostat housing
2 Coolant pump
3 Lube oil cooler
4 Cylinder cooling
5 Cylinder head cooling
6 Heat exchanger
7 Ventilation line expansion tank - coolant pump
8 Line from engine to heat exchanger
9 Ventilation line from cylinder head to expansion tank
10 Expansion tank
11 Line from heat exchanger to thermostat

2.5 Cooling System

Engine Description

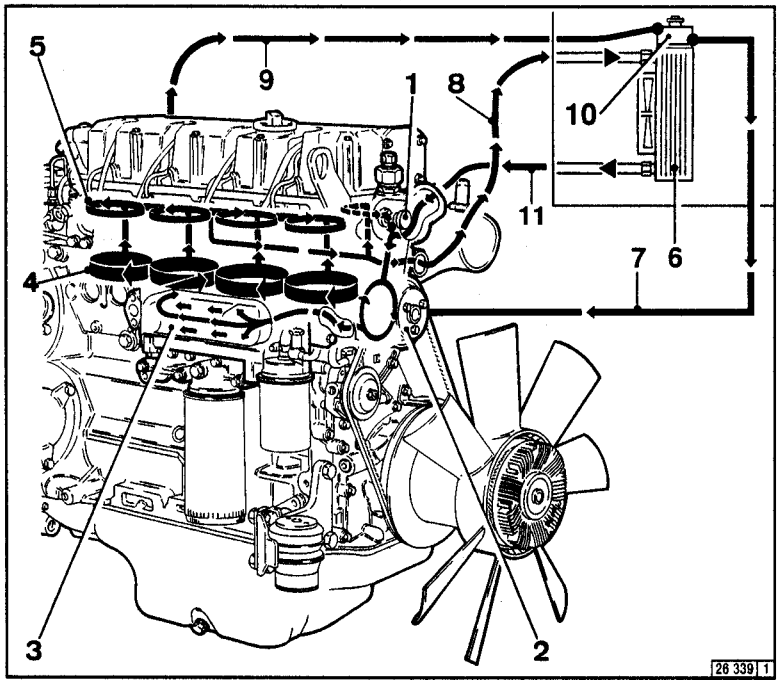
2

2.5.3 Cooling System Schematic 1013



1 Coolant filler
2 Thermostat housing
3 Coolant pump
4 Lube oil cooler
5 Cylinder cooling
6 Cylinder head cooling
7 Heat exchanger
8 Expansion line coolant pump/expansion tank
9 Ventilation line from cylinder head to heat exchanger (expansion tank)

2.5.4 Cooling System Schematic 1013 E entrance regulation



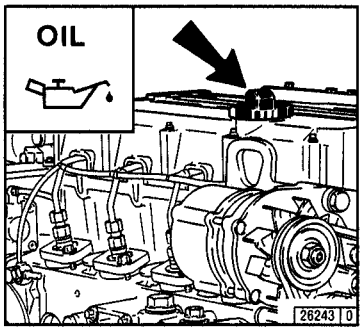
1 Thermostat housing
2 Coolant pump
3 Lube oil cooler
4 Cylinder cooling
5 Cylinder head cooling
6 Heat exchanger
7 Ventilation line expansion tank - coolant pump
8 Line from engine to heat exchanger
9 Ventilation line from cylinder head to expansion tank
10 Expansion tank
11 Line from heat exchanger to thermostat

Engine Operation

3.1 Commissioning

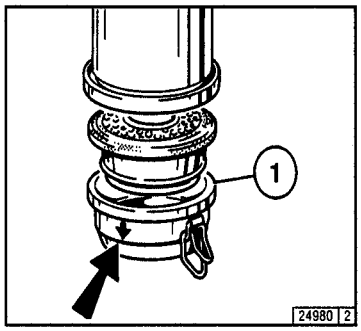
3

3.1.1 Adding Engine Oil



As a rule, engines are delivered empty of oil.
Pour lube oil into the oil filler neck (arrow).
For oil quantities, see 9.1.
For oil grade and viscosity, see 4.1.

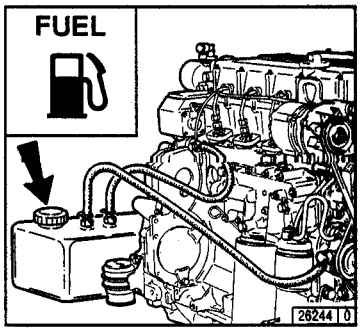
3.1.2 Filling Oil Bath Air Cleaner



Fill oil cup 1 of the oil bath air cleaner (if fitted) with oil up to the arrow.
For oil grade and viscosity, see 4.1.

Do not fill the precleaner dust collector (if fitted) with oil.

3.1.3 Adding Fuel



Use only commercial-grade diesel fuel. For fuel grade, see 4.2.
If required use a preliminary fuel filter.
If in doubt, please ask your service representative.
Use summer or winter-grade fuel, depending on the ambient temperature.

Never fill the fuel tank while the engine is running. Keep the filler cap area clean and do not spill fuel.

3.1.4 Filling/Venting the Cooling System

- 1012/1013
  See section 6.3.4
- 1012 E/1013 E
  See section 6.3.6
- Unit engine (with frontal radiator)
  See section 6.3.8.

3.1.5 Other Preparations

- Check battery and cable connections, see 6.7.1.
- **Trial run**
  - After the engine has been prepared, let it run for about 10 minutes without load.

  During and after trial run
  - Check the engine for leaks.

  After the engine has been turned off
  - Check the oil level and top up if necessary, see 6.1.2.
  - Tighten the V-belt, see 6.5.
- **Breaking-in**
  During the break-in phase - about 200 operating hours - check the oil level twice a day.
  After the engine is broken in, checking once a day will be sufficient.
- **Commissioning conserved engines**
  Remove conservation materials as outlined in section 8.1

Engine Operation

3.2 Starting

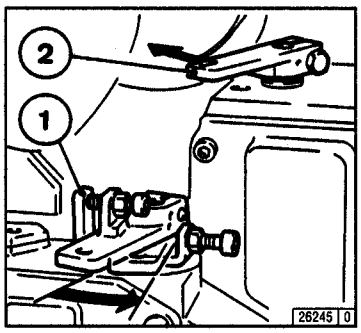
3

3.2.1 Electric Starting

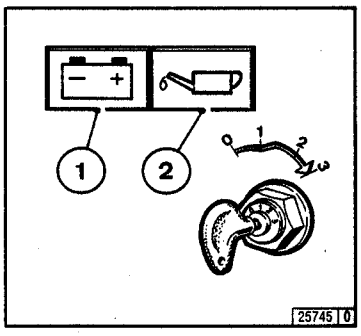
Before starting, make sure that nobody is standing in the immediate vicinity of the engine or driven machine.
After repair work:
Check that all guards have been replaced and that all tools have been removed from the engine.
When starting with glow plugs, do not use any other starter substance (e.g. injection with start pilot). Doing so could result in an accident.
Important:
Never start the engine with speed governor removed. Disconnect battery.

Do not actuate the starter for more than 20 seconds. If the engine does not catch, wait a minute then try again.
If the engine does not catch after two attempts, refer to the Diagnosis Chart (see 7.1).

Starting without Cold-Start Aid

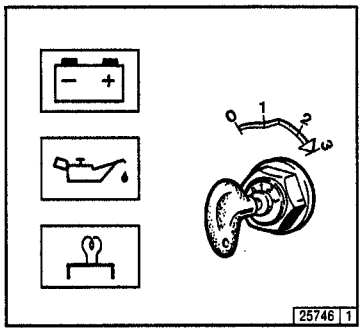


- Disengage the clutch to separate the engine from the driven equipment.
- Move speed control lever 1 in direction of arrow at least to middle speed position.
- Move shutdown lever 2 to operating position (in opposite direction of arrow).



- Insert key.
  – Position 0 = no operating voltage.
- Turn key clockwise.
  – Position 1 = operating voltage.
  – Pilot lights 1 and 2 come on.
- Push the key in and turn it further clockwise against spring pressure.
  – Position 2 = no function
  – Position 3 = start
- Release key as soon as engine fires.
  – Pilot lights go out.

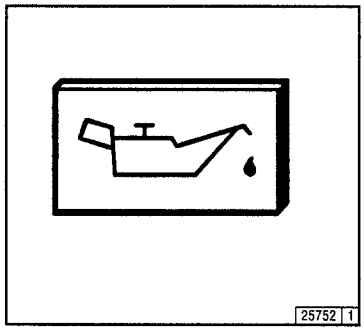
Starting with Heater Plugs



- Insert key.
  – Position 0 = no operating voltage.
- Turn key clockwise.
  – Position 1 = operating voltage.
  – Pilot lights come on. Leave to preheat until pilot lights go out.
- Push key in and turn further clockwise against spring pressure.
  – Position 2 = no function.
  – Position 3 = start.
- **Release key as soon as engine fires.**
  – **Pilot lights go out.**

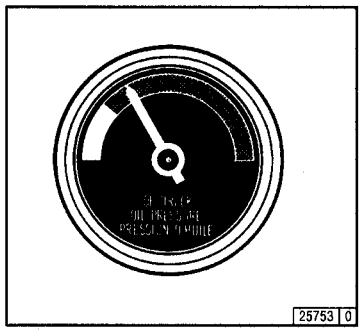
3.3.1 Engine Oil Pressure

Oil Pressure Pilot Light



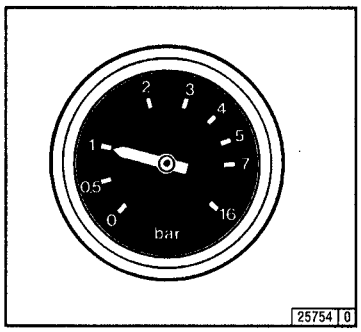
- The oil pressure pilot light comes on with operating voltage on and engine off.
- The oil pressure pilot light should go out when the engine is running.

Oil Pressure Indicator



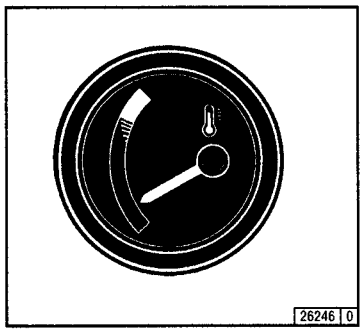
- The pointer must remain in the green sector over the entire operating range.

Oil Pressure Gauge



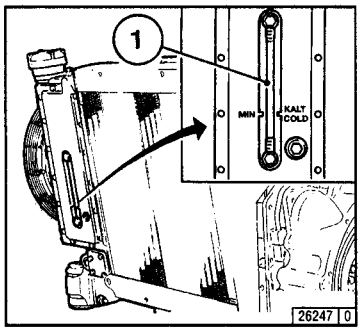
- The pointer must indicate the minimum oil pressure (see 9.1).

3.3.2 Coolant Temperature



- The coolant temperature gauge pointer should remain in the green sector most of the time. It should rarely enter the yellow-green sector. If the pointer enters the orange sector, the engine is overheating. Turn it off and establish the cause from the Diagnosis Chart (see 7.1).

3.3.3 Coolant Level / Coolant Level Gauge



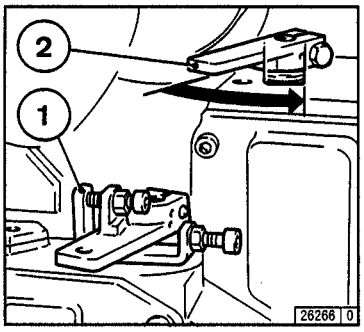
- When the engine is cold, coolant level 1 should be above the KALT-COLD mark.
- Top up with coolant if the level falls below the MIN mark on the sight glass, or if the coolant warning switch comes on.
  - Unscrew the filler cap.
  - Top up with coolant up to the upper edge of the filler neck.
  - Tighten the filler cap
- If it is not possible to carry out a check at the inspection opening, if required carry out a check at the filler neck:
  If you cannot see any fluid:
  - topping up is required.
- If a level switch is fitted, the engine is shut down automatically when the level falls below the MIN marking.

Engine Operation

3.4 Stopping

3

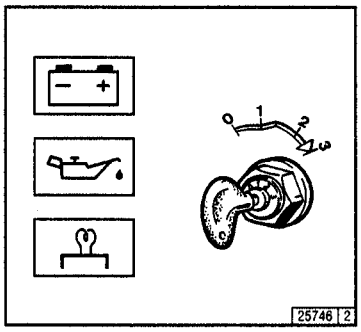
3.4.1 Engines with Mechanical Shutdown



- Move speed control lever 1 to low idle.
- Operate shutdown lever 2 until the engine comes to a stop. The charge pilot light and the oil pressure pilot light will come on when the engine stops.
- Turn key counterclockwise (to Position 0) and remove. The pilot lights will go out.

Where possible, do not switch the engine off from full load. Leave running in idle for approx. 2 minutes.

3.4.2 Engines with Electrical Shutdown



- Turn key counterclockwise (to Position 0) and remove. The pilot lights will go out.

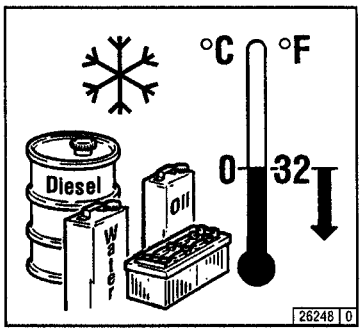
3.5 Operating Conditions

Engine Operation

3

3.5.1 Winter Operation

- **Lube Oil Viscosity**
  - Select the oil viscosity (SAE grade) according to the ambient temperature when the engine is started (see 4.1.2).
  - Increase oil change frequency when operating below –10°C, see 6.1.1.
- **Diesel Fuel**
  - Use winter-grade diesel fuel for operation below 0°C, see 4.2.2.
- **Coolant**
  - Set the water/antifreeze mix to suit the lowest likely temperature (max. –35°C), see 4.3.1.
- **Additional Maintenance Work**
  - Drain the sludge from the fuel tank once a week by undoing the drain plug.
  - Adjust the oil level in the oil bath air cleaner (if fitted) to suit the ambient temperature.
  - At temperatures below –20°C, lubricate the flywheel ring gear from time to time with low-temperature grease, such as Bosch FT 1 V 31. To do so, remove the starter and introduce the grease through the pinion hole.
- **Cold-Start Aids**
  - At temperatures near or below freezing point, use glow plugs if necessary (see 3.2.1). This not only lowers the starting limit temperature, but provides easier starting at temperatures normally not requiring a starting aid.
- **Battery**
  - Efficient cold starting requires a healthy battery (see 6.7.1).
  - The starting limit temperature can be lowered by 4-5°C by heating the battery up to about +20°C. To do so, remove the battery and store in a warm place.



Engine Operation

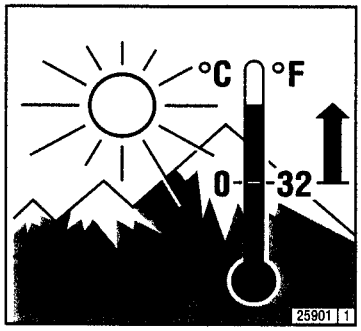
3.5 Operating Conditions

3

3.5.2 High Ambient Temperature, High Altitude

- As the altitude and ambient temperature rise, the density of the air tends to decrease, which affects the maximum power output of the engine, the exhaust gas quality and, in extreme cases, the starting behavior. Under transient conditions, the engine can be used at altitudes up to 1000 meters / 3400 feet and temperatures up to 30°C.
  If the engine is to operate under more severe conditions (at higher altitudes or temperatures), it will be necessary to reduce the injected fuel quantity and, thus, engine power.

- If you have any doubts about engine operation under these or similar conditions, ask your engine or equipment supplier whether the engine has been derated in the interests of reliabiiity, service life and exhaust gas quality (smoke). Otherwise, contact the nearest service representative.



Operating Media

4.1 Lube Oil

4

4.1.1 Quality Grade

Lube oils are differentiated according to their performance and quality class. In common use are specifications named after the **API** (American Petroleum Institute) and **ACEA** (European Oil Sequences).

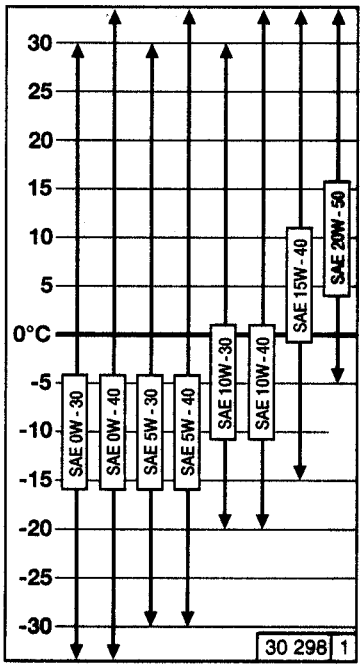
Approved API Oils:
Turbocharged engines: CF-4 CG-4 CH-4

Approved ACEA Oils:
Turbocharged engines: E1-E3/96 + E4-98

If in doubt, contact your service representative

4.1.2 Viscosity

As the viscosity of lube oil is dependent on temperature, the choice of SAE grade should be governed by the ambient temperature prevailing at the engine operating site.
Optimum operating behaviour will be attained if you take the accompanying oil viscosity diagram as a guide.
Should the temperature fall temporarily below the limits of the SAE grade selected, cold starting may be affected but the engine will not be damaged.
In order to keep wear to a minimum, do not exceed application limits for extended periods of time.
Oil changes dictated by the seasons can be avoided by using multi-grade lube oils. Multigrade oils - particularly low-friction oils - also reduce fuel consumption.



4.2 Fuel

Operating Media

4

4.2.1 Quality Grade

Use commercially available diesel fuel with less than 0.5% sulphur content. If the sulfur content is higher than 0.5%, oil change intervals should be reduced (see 6.1.1).

The following fuel specifications/standards are approved:

- EN 590
- BS 2869: A1 and A2
- ASTM D975-96: 1-D and 2-D
- NATO Code F-34/F-35, F44, F-54 and F-63

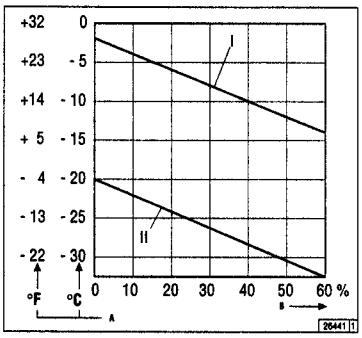
4.2.2 Winter-Grade Fuel

Waxing may occur at low temperatures, clogging the fuel system and reducing engine efficiency. If the ambient temperature is less than 0 °C, winter-grade fuel (suitable down to -20 °C) should be used. This fuel is usually available from filling stations well in advance of the cold months.

- At temperatures below -20°C/, kerosene should be added to the diesel fuel. The relevant percentages are given in the diagram at the right
- Special diesel fuels can be used for climatic zones down to - 44 °C.

If summer-grade diesel fuel must be used at temperatures below 0°C, up to 60% kerosene can be added (see diagram).

In most cases, adequate resistance to cold can be obtained by adding a flow improver (additive). Please contact your DEUTZ partner.



Legend:	
I	Summer diesel fuel
II	Winter diesel fuel
A	Outside temperature
B	Percentage of kerosene to be added

Mix in tank only. Fill with the appropriate amount of kerosene **first, then add the diesel fuel.**

Operating Media

4.3 Coolant

4

4.3.1 Water Quality for Coolant Preparation

The values given below must not be exceeded.
A test kit (order number 1213 0382) can be obtained from DEUTZ Service to check the quality of the water available.

Water quality		min.	max.
pH-value at 20°C /68° F		6.5	8.5
Chloride ion content	[mg/dm3]	–	100
Sulfate ion content	[mg/dm3]	–	100
Total hardness	[°dGH]	3	20

4.3.2 Coolant Preparation

The preparation and monitoring of coolant in liquid-cooled engines is especially important because corrosion, cavitation and freezing can lead to engine damage.
The coolant is prepared by admixing a cooling system protective liquid with the cooling water.
The cooling system must be monitored regularly (see 5.1). The water level and the cooling system protective liquid concentration should both be checked.
The cooling system protective liquid concentration can be checked with a commercially available tester (e.g. gefo glycomat®).

When nitrite-based cooling system protective liquids are mixed with amine-based liquids, harmful nitrosamines are formed.

4.3.3 Cooling System Protective Liquid

DEUTZ cooling system protective agents can be obtained under order number 01011490 (5 litres) or 1221 1500 (210 litres). These are nitrite-, amine- and phosphate-free and provide effective protection against corrosion, cavitation and freezing.
If the above-mentioned cooling system agents are not available, the following products can be used in exceptional cases.

Manufacturer	Product description
AVIA	AVIA Antifreeze Extra
BASF	Glysantin G 48
DEA	DEA radiator antifreeze
SHELL	SHELL GlycoShell

The concentration of the cooling system protective liquid in the coolant may not fall below/exceed the following limits:

Cooling system protective liquid	Water
max. 45 Vol.%	55%
min. 35 Vol.%	65%

For the quantity, see table overpage and information in section 9.1.
Other cooling system protective liquids, e.g. chemical corrosion inhibitors, can, in exceptional circumstances, be used in the coolant, in consultation with DEUTZ Service. Order the cooling system protective liquid from: **DEUTZ Service**

Cooling system protective liquids must be disposed of in accordance with environmental regulations.

4.3 Coolant

Operating Media

4

Cooling System Protection

Cooling system protective agent [Vol %]	Cooling protection [°C]	Cooling system capacity *) [Liters]							
		18	20	22	25	27	30	32	35
		Cooling system protective liquid [Liters]							
35	–22	2.8	7.0	7.7	8.75	9.5	10.5	11.2	12.3
40	–28	7.2	8.0	8.8	10.0	10.8	12.0	12.8	14.0
45	–35	8.1	9.0	9.9	11.3	12.2	13.5	14.4	15.8
50	–45	9.0	10.0	11.0	12.5	13.5	15.0	16.0	17.5

*) For quantity of coolant in your engine, see Section 9.1.
Note: For figures in gray field, refer back to head-office.

Routine Maintenance

5.1 Maintenance Schedule

5

In running hours (h)[1] every: once after 2) 50-150	Every 10 h or daily	125	250	500	1000	1500	2000	3000	check	clean	renew	Job	Section
	●								●			Oil level [2] [9]	6.1.2/ 3.1.6
●									●			Engine for leakages	
	●								●			Oil bath- and dry type air cleaners [3] [4]	6.4
		●							●			Battery and lead connections	6.7.1
		●	●	●	●		●		●			Cooling system (dep. on engine use) [3] [8]	6.3.1/ 6.3.2
●				●							●	Engine oil (dep. on engine use) [5]	6.1.1/ 6.1.2
●				●							●	Oil filter cartridge	6.1.3
●					●						●	Fuel filter cartridge	6.2.1
●					●				●			Fuel prefilter	6.2 / 6.3
●					● 7)				●		●	Fuel leakage lines	6.2.5
●						●			●			Valve clearance (readjust if nec.)	6.6.1
●				●					●			Engine mounts (retighten if necessary)	9.2
●				●					●			V-belts (retension if nec.)	6.5
●									●			Alarm system, engine mounts	3.3/ 9.3
●				●					●			Radiator bearing rubber/locking elements	
					●				●			Glow plugs	
							● 7)				●	Coolant [6]	6.3.3/ 6.3.4
				●					●			Coolant , additive-concentration	4.3.2/ 4.3.3
	●								●			Coolant level	3.3.3
					●				●			Hose connections / clamps on air intake side, CAC [10]	6.3.3/9-6.2.5

The specified engine maintenance times are maximum values. Depending on the operating environment, shorter maintenance intervals may be required. Please observe the operating instructions of the equipment manufacturer.

1) recommended maximum
2) commissioning new and reconditioned engines
3) clean if needed
4) change if required. If fitted, service according to maintenance indicator
5) oil grade API-CF4 or ACEA E1-E3-96+E4-98 for turbocharged engines, for oil change intervals, see 6.1.1
6) check antifreeze or if necessary chemical concentration every 500 OH
7) or change at least every 2 years
8) system cleaning
9) check twice a day during the run-in phase
10) drain off any tube oil/condensation water that has collected in the charge-air cooler, see section 6 .3.9

5.2 Maintenance Chart

Routine Maintenance

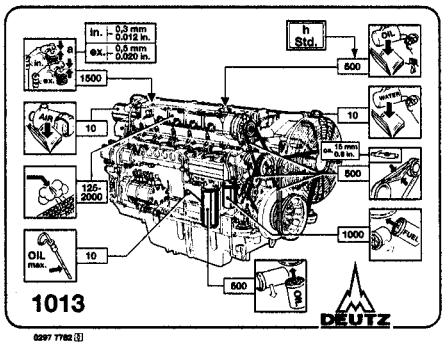
5

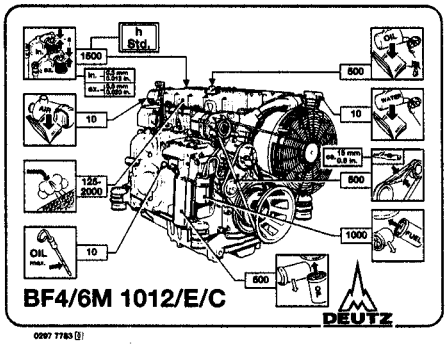
The maintenance chart shown here is supplied as self-adhesive label with each engine. It should be affixed where it can be seen clearly on the engine or driven equipment.

Check that this is the case.

If necessary, ask your engine or equipment supplier for a fresh supply of labels.

Routine work should be carried out according to the schedule in 5.1.





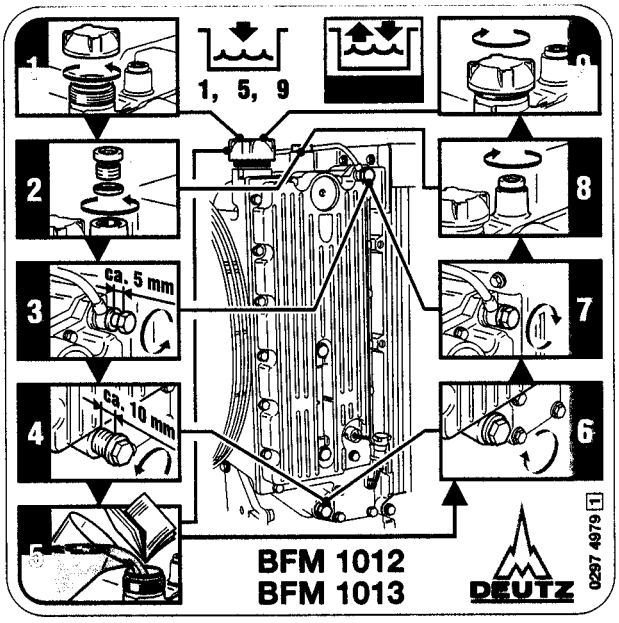
Stop the engine before carrying out any maintenance work.

The service diagram for series 1012/1013 (filling the cooling system, venting, bleeding) featured on this page is stuck on the engine as a servicing aid.

Check that this is the case!

If the sticker is not on the engine, ask for a replacement from your engine or vehicle supplier.

For a full description regarding servicing, see Sections 3.1.4, 6.3.3 and 6.3.4.



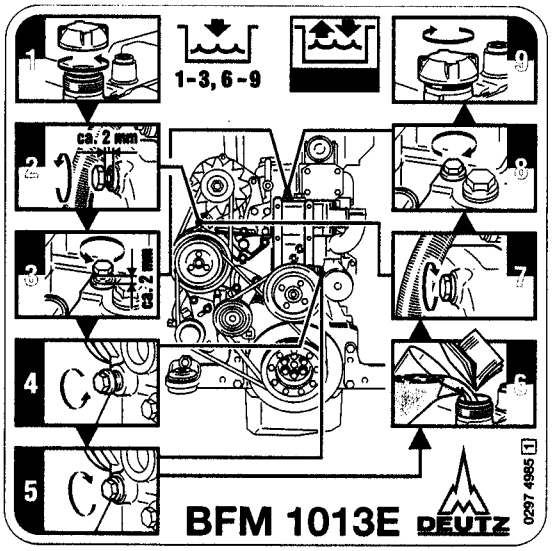
5.2 Maintenance Chart

Routine Maintenance

5

The service diagram for series 1012/1013 (filling the cooling system, venting, bleeding) featured on this page is stuck on the engine as a servicing aid.
Check that this is the case!

If the sticker is not on the engine, ask for a replacement from your engine or vehicle supplier.
For a full description regarding servicing, see Sections 3.1.4, 6.3.3 and 6.3.4.



Routine Maintenance

5.3 Completed Maintenance Jobs

5

Hours.	Date	Signaure / Stamp	Hours	Date	Signaure / Stamp
50-150*			-		
125			250		
375			500		
625			750		
875			1000		
1125			1250		
1375			1500		
1625			1750		
1875			2000		
2115			2250		
2375			2500		
2625			2750		

* Commissioning new and overhauled engines
The maintenance jobs duly completed can be recorded in the above table.

5.3 Completed Maintenance Jobs

Routine Maintenance

5

Hours	Date	Signaure / Stamp	Hours	Date	Signaure / Stamp
2875			3000		
3125			3250		
3375			3500		
3625			3750		
3875			4000		
4125			4250		
4375			4500		
4625			4750		
4875			5000		
5125			5250		
5375			5500		
5625			5750		

The maintenance jobs duly completed can be recorded in the above table.

Hours.	Date	Signaure / Stamp	Hours	Date	Signaure / Stamp
5875			6000		
6125			6250		
6375			6500		
6625			6750		
6875			7000		
7125			7250		
7375			7500		
7625			7750		
7825			8000		
8125			8250		
8375			8500		
8625			8750		

The maintenance jobs duly completed can be recorded in the above table.

Service and Maintenance

6.1 Lubrication System

6

6.1.1 Oil Change Intervals

- The oil change intervals are dependent on the engine application and the quality of the lube oil.
- If the engine runs fewer hours during the year than stated in the table, the oil should be changed at least **once a year.**
- The table refers to the following conditions:
  - For diesel fuel: sulfur content max. 0.5 % by weight.
  - Continuous ambient temperatures down to -10 °C / +14°F
- For fuels
  - with sulfur content is > 0.5 to 1 %
  or
  - continuous ambient temperature below -10 °C/+14°F
  - with bio-diesel fuels in accordance with DIN 51606-FAME the intervals between oil changes should be halved.
- In the case of fuels containing more than 1 % sulfur, contact your **service representative.**

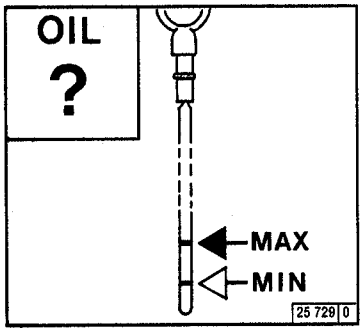
Oil Grade	Turbocharged engine
API Classification	CF-4 CG-4 CH-4
ACEA Classification	E1– E3/96 + E4-98

Oil Change Intervals	Service Group	Average Speed [km]	[OH]	[km]
Equipment Engines	–	–	500	–
Automotive Engines	I II III	25 40 60	– – –	10 000 20 000 30 000

Change the oil with the engine off but still warm (lube oil temperature approx. 80 °C).

6.1.2 Checking Oil Level / Changing Engine Oil

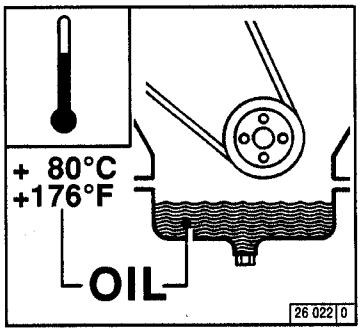
6.1.2.1 Checking Oil Level



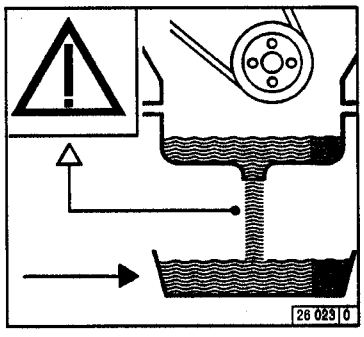
- Ensure that the engine or vehicle is on a level surface.
- **– Warm engine**
- Switch off engine, wait 5 minutes and check the oil level
- **– Cold engine**
  Check the oil level
- Remove the dipstick
- Wipe off with a non-fibrous, clean cloth.
- Insert up to the stop and pull out again.
- Check oil level, if required top up to the "**MAX**" level
  – If the oil level is just above the "**MIN**" mark, it should be topped up.

The oil level must not drop below the "**MIN**" mark.

6.1.2.2 Changing Engine Oil



- Run the engine warm
- Ensure that the engine or vehicle is on a level surface
  – Lube oil temperature approx. 80°C.
- Switch off the engine.



- Place an oil tray beneath the engine
- Unscrew drain plug.
- Drain oil.
- Fit oil drain plug with new gasket and tighten firmly (for torque, see 9.2).
- Fill with lube oil
  – For grade/viscosity, see 4.1.
  – For quantity, see 9.1.
- Check oil level, see 6.1.2.1

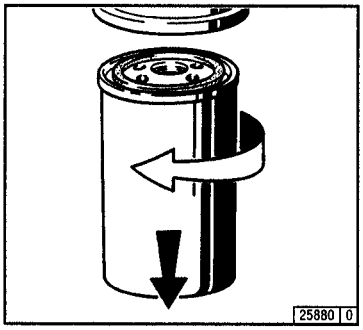
Be careful when draining hot oil - danger of scalds! Do not let used oil run into the soil but catch it in a container ready for proper disposal.

Service and Maintenance

6.1 Lubrication System

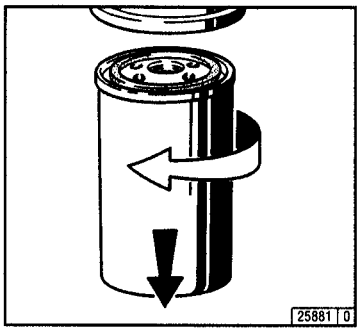
6

6.1.3 Changing Oil Filter

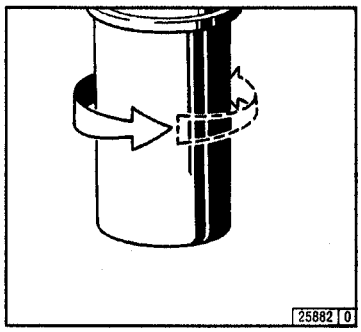


- With fitted torsion lock:
  Loosen screws and slide clamps downwards.
- Undo the filter cartridge with commercial tool and spin off.
- Catch any dripping oil.

Beware of burns from hot oil.

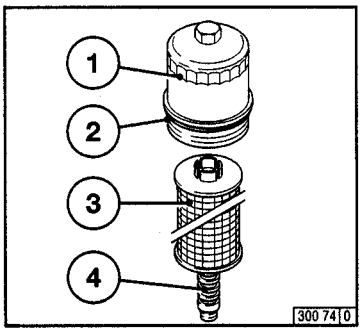


- Clean any dirt from the filter carrier rim.
- Lightly oil the rubber gasket of the new oil filter cartridge.
- Screw in the new cartridge finger tight against the gasket.



- Check that the cartridge is correctly seated against the gasket and tighten with a final half-turn.
- If a torsion lock is fitted:
  Slide clamps up into position and tighten screws.
- Check oil level (see 6.1.2).
- Check oil pressure (see 3.3.1).
- Check cartridge seal.

6.1.4 Cleaning/Changing Oil filter (Cup)



- Switch off the engine.
- Loosen the lube oil filter cap 1 and unscrew in an anticlockwise direction.
- Carefully lift the paper filter cartridge 3 out of guide 4.
- Catch any dripping oil.
- Change the paper filter cartridge 3.
- Clean any dirt from the filter carrier rim and the lube oil filter cover 1 and guide 4.
- Replace rubber seal 2 and apply a small amount of grease

Caution: hot oil!
Risk of scalding!

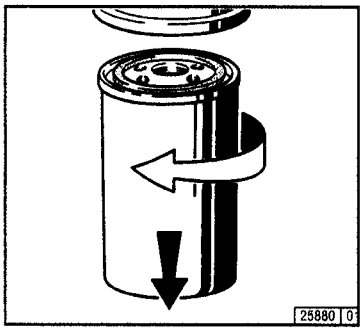
- Carefully insert the new paper filter cartridge 3 in guide 4.
- Tighten lube oil filter cover 1 in the clockwise direction (25 Nm).
- Start the engine.
- Check the oil level, see 6.1.2.
- Check the oil pressure, see 3.3.1.
- Check lube oil filter fitting for leaks.

Service and Maintenance

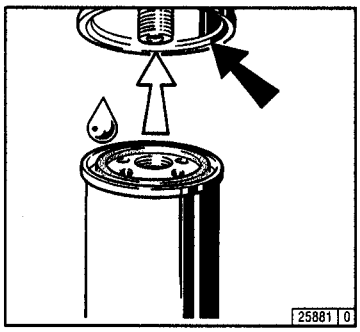
6.2 Fuel System

6

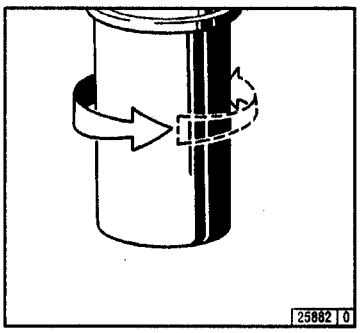
6.2.1 Changing Fuel Filter



- Close fuel stopcock.
- Undo fuel filter cartridge with commercial tool and spin off.
- Catch any fuel.



- Clean any dirt from the filter carrier rim.
- Apply light film of oil or diesel fuel to the rubber gasket of the new fuel filter cartridge.
- Screw in the new cartridge finger tight against the gasket.

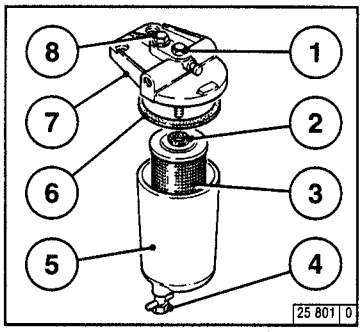


- Check that the cartridge is seated correctly against the gasket and tighten with a final half-turn.
- Open fuel stopcock.
- Check for leaks.

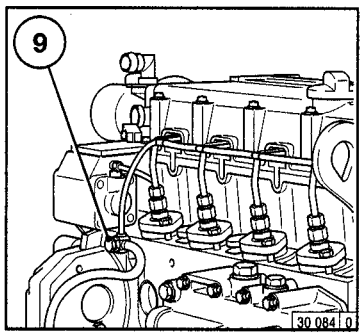
Keep naked flames away when working on the fuel system. Do not smoke!

The fuel system does not need to be bled.

6.2.2 Cleaning/Changing Fuel Pre-Filter Element



Cleaning:
- Close fuel stopcock.
- Place the fuel pan beneath the preliminary fuel filter.
- Remove drain plug 4 and drain off fuel.
- Unscrew clamping screw 1, remove filter housing 5 with filter insert 3.
- Clean sealing surface of the filter bracket 7 and filter insert housing 5 of any dirt.
- Insert new sealing ring 6 and filter insert 3 (change as necessary).
  – Push the filter insert up to approx. 3 cm over the edge of the housing onto the guide in the filter housing 5.



- Press filter housing 5 with filter insert 3 and sealing ring 6 against the filter console 7 and screw into place with clamping screw 1 (tightening torque 25 Nm).
  Note: it must be possible to push the upper seal 2 on filter insert 3 over the guide bracket on filter console 7.
- Tighten drain plug 4.
- Open fuel stopcock.
- Check for leaks after the engine has been started.

Changing:
- Replace defective filter insert 3.

6.2.3 Venting the Fuel System with Preliminary Fuel Filter

Bleeding:
- Place the fuel pan beneath the preliminary fuel filter.
- Loosen drain plug 4 and observe the draining fluid. When fuel instead of water starts to flow, retighten drain plug 4.
- Check for leaks after the engine has been started.

Venting:
- During initial commissioning, after maintenance work or if the tank is run empty it is essential to vent the fuel system.
- Set engine controller to stop position
- Place fuel collecting trough under the filter housing (5) / pressure control valve (9).
- Open fuel stopcock, pressure control valve (9), vent screw (8)
- Turn engine with starter (max. 20 sec.) until fuel with no air bubbles escapes from vent screw (8) and pressure holding valve (9).
- **Tighten** vent screw 8 (tightening torque 15 Nm) and pressure control valve 9.
- Set engine controller to start position and start
- When the engine has started check for leaks

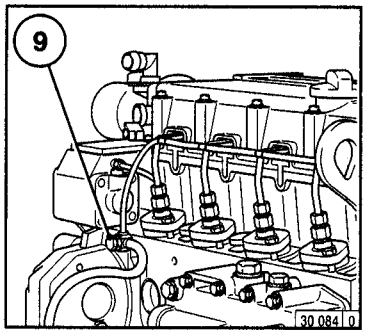
Avoid naked flames when working on the fuel system. Do not smoke. Dispose of waste fuel in an environmentally-friendly way

Service and Maintenance

6.2 Fuel System

6

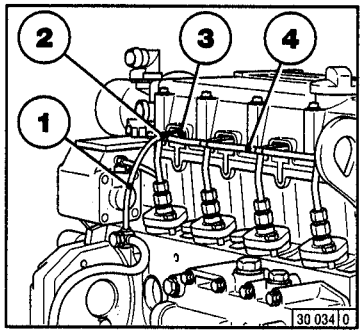
6.2.4 Changing Fuel Leakage Line



- Set engine controller to stop position
- Open fuel stopcock
- Loosen pressure holding valve (9)
  Catch any fuel which escapes and dispose of in an environmentally-friendly way
- Turn engine with starter (max. 20 sec.) until fuel with no air bubbles escapes from pressure holding valve (9).
- Tighten up pressure holding valve (9).
- Set engine controller to start position and start
- When the engine has started check for leaks

Avoid naked flames when working on the fuel system. Do not smoke. Dispose of waste fuel in an environmentally-friendly way

6.2.5 Changing Fuel Leakage Pipes



- Close fuel stopcock
- Dismantle valve cap cover
- Remove rubber hoses (3) from the injection valves
- Dismantle rubber hoses (1), (3) and (4) and connection piece (2) and dispose of in an environmentally-friendly way
- Fit new rubber hoses (1), (3) and (4) and connection piece (2)
- Connect rubber hoses (3) to injection valves
- Remount valve cap cover
- Open fuel stopcock
- When the engine has started check for leaks

6.3 Cooling System

Service and Maintenance

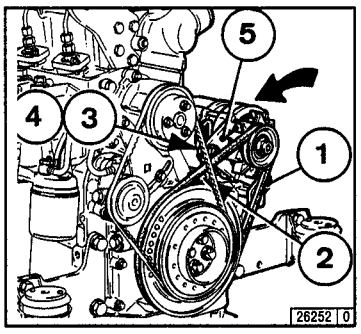
6

6.3.1 Cleaning Intervals

- The amount of contamination in the cooling system depends on the engine application.
- Spilled oil or fuel on the engine increases the risk of contamination. Be especially careful if the engine is used in dusty environments.
- Serious contamination can occur, for example:
  - on construction sites where there is a high level of air-borne dust.
  - in harvesting application where there are high concentrations of chaff and chopped straw in the vicinity of the machine.
- Because applications vary, cleaning intervals have to be determined from case to case. The cleaning intervals given in the table below can be used as a guide.

Checking / Cleaning Intervals	
Suggested OH	**Application**
2000	Ships, gensets in enclosed spaces, pumps
1000	Vehicles on paved roads
500	Tractors, forklift trucks, mobile gensets
250	Vehicles on construction sites and unpaved roads, construction equipment, compressors,underground mining equipment
125	Agricultural machinery, harvester tractors

6.3.2 Cleaning Cooling System



Series 1012/1013

- Place a cleaning bath under the heat exchanger (it. 2).
- Remove the service flap on the heat exchanger (see insert).

Compressed Air
- Blow out heat exchanger with compressed air (first from it. 3, then from it. 1).
  Be careful not to damage the cooling fins.
- Wash out loosened dirt with a hose.

Cold Cleansing Agent
- Spray the heat exchanger with a commercial cold cleansing agent and let stand for about 10 minutes.
- First spray clean with a water jet from position 3 then from position 1 (do not spray sensitive engine components directly with a water jet, eg generator, cables, electronic components, fan drive).

Cleaning with steam or with hot water
- Remove oil and grease residues with the jet set at a gentle setting.

- Refit service flap.
- Run the engine up to normal operating temperature to evaporate any remaining water.

Series 1012E/1013E

- If an external cooling system is fitted, follow the manufacturer's instructions.

Unit engine

- Clean as described under series 1012/1013. The cleaning jet must be positioned parallel to the cooling-air ducts.

Hose pressure: max. 100 bar

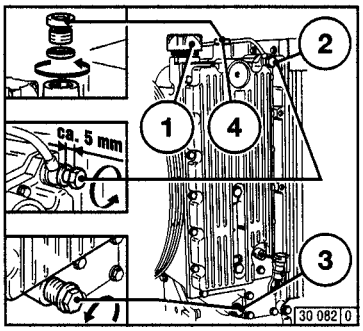
Service and Maintenance

6.3 Cooling System

6

6.3.3 Draining Cooling System

1012 / 1013



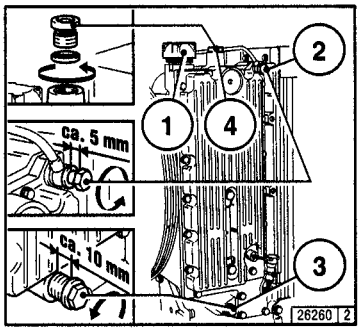
- Place container under drain plug 3.
- Unscrew cap 1.
- Unscrew drain plug 3 fully.
- Drain coolant.
- Drain the remaining fluid from the engine oil cooler (coolant duct).
- Screw in the sealing plug 3 up to the first notch and screw in the sealing plug on the oil cooler (arrow).

Fill/vent the cooling system: see section 6.3.4

Be careful when draining hot coolant – danger of scalds! Collect drained coolant and dispose of according to environmental regulations.

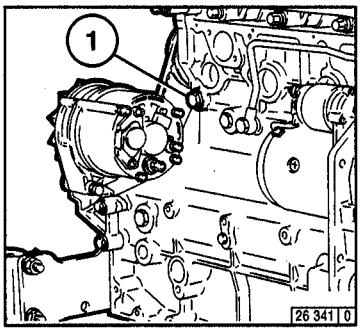
If a heater is connected to the cooling system, all heater valves must be opened during filling. Depending on the water content and the installation position of the heater, it may be required to repeat the last point several times to vent the heater system.

6.3.4 Filling / Venting Cooling System 1012 / 1013



- Unscrew cap 1
- Loosen sealing plug 2
- Unscrew vent plug 4.
- Unscrew sealing plug 3 (10 mm) up to the first notch.
- Add coolant up to the max. marking or fill-up limit (heater valve – if fitted – of the unit must be opened).
- Tighten sealing plug 2 (tightening torque 18 Nm)
- Tighten vent plug 4 (tightening torque 40 Nm)
- Tighten sealing plug 3.
- Close cap 1.
- Start engine and warm up until thermostat opens.
- Switch off engine.
- Check coolant level (see section 3.3.3) and top up as required.

6.3.5 Draining the Cooling System 1012 E / 1013 E

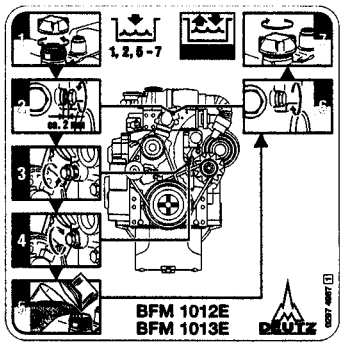


- Place a container under sealing plug 1.
- Remove sealing plug 1 from the crankcase.
- Drain off the coolant.
- Tighten sealing plug 1 again.
- If sealing plug 1 is not accessible, the system can be drained at the engine oil cooler (coolant duct).

Filling/venting the cooling system:
See section 6.3.6.

Be careful when draining hot coolant – danger of scalds! Collect drained coolant and dispose of according to environmental regulations.

6.3.6 Filling/Venting the Cooling System 1012 E/1013 E Standard engine



- Open radiator cap position 1.
- Loosen vent plug position 2.
- Add coolant up to the maximum marking or filler limit (heater valve of the system must be opened – if fitted).
- Tighten vent plug position 2 + sealing plug position 3.
- Close radiator cap position 1.
- Start engine and warm up until thermostat opens.
- Switch off engine.
- Check coolant level when the engine is cold and top up as required.
- Close the radiator sealing plug position 1.

Venting

- The cooling systems, which are built in line with our installation guidelines, are vented automatically after they have been filled.
- With external cooling systems in accordance with the specifications of the manufacturer.

Service and Maintenance

6.3 Cooling System

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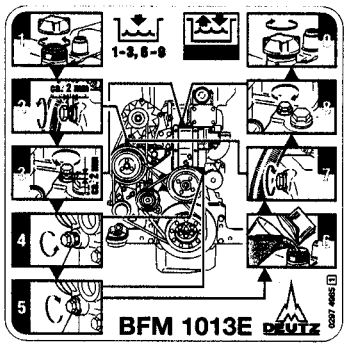
1013 E
Short engine

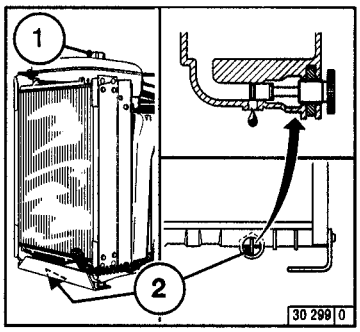


- Loosen vent plug position 2 and sealing plug position 3.
- Add coolant up to the maximum marking or filler limit (heater valve of the system must be opened – if fitted).
- Tighten vent plug position 2 + sealing plug position 3.
- Close radiator cap position 1.
- Start engine and warm up until thermostat opens.
- Switch off engine.
- Check coolant level when the engine is cold and top up as required.
- Close the radiator sealing plug position 1.

Venting

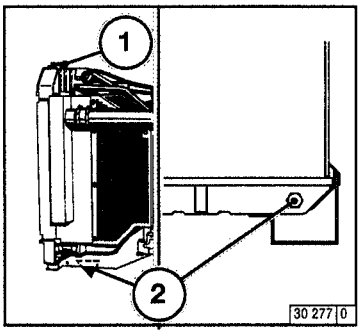
- The cooling systems, which are built in line with our installation guidelines, are vented automatically after they have been filled.
- With external cooling systems in accordance with the specifications of the manufacturer.
- Start the engine and warm up until the thermostat opens.

6.3.7 Draining the Cooling System
Unit Engine (4 Cylinders)



- Open the cap 1 of the expansion tank.
- Place a container beneath knurled screw 2.
- Unscrew the knurled screw 2 in an anti-clockwise direction until coolant is emitted.
- Drain off coolant.
- In case of clogging, rinse the radiator through with clear water.
- Tighten knurled screw 2.
  Filling/venting the cooling system:
  see section 6.3.8

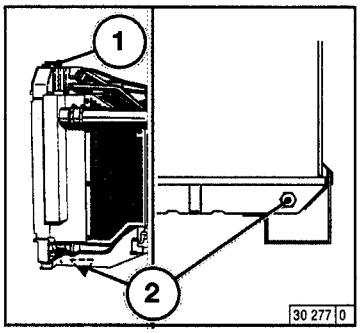
Unit engine (6 cylinders)



- Open the cap 1 of the expansion tank.
- Place a container beneath sealing plug 2.
- Unscrew the sealing plug 2.
- Drain off coolant.
- In case of clogging, rinse the radiator through with clear water.
- Tighten sealing plug 2.
  Filling/venting the cooling system:
  see section 6.3.8

Be careful when draining hot coolant - danger of scalds! Collect drained coolant and dispose of according to environmental regulations.

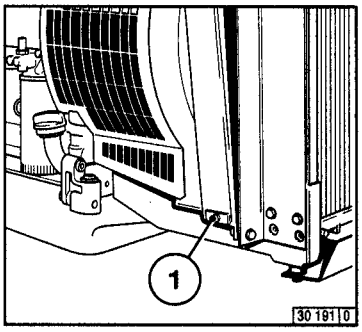
6.3.8 Filling/Venting the Cooling System
Unit Engine



- Open the cap 1 of the expansion tank.
- **Slowly** add coolant up to the max. marking or filler limit.
- Close the cap.
- Start the engine and warm up until the thermostat opens, the upper coolant line warms up tangibly.
- Briefly run the engine at nominal output (fixed setting), this rinses out any pockets.
- Switch off the engine and leave to cool down.
- Open cap 1, add coolant up to the max. marking or filler limit and close the cap 1.
- Once the engine has been run once, check the coolant level when the engine is cold.

If a heater is connected to the cooling system, the heater valves must be opened when coolant is added. Depending on the coolant contents and the installation location of the heater, it may be necessary to repeat the procedure several times.

6.3.9 Draining the Charge-Air Cooler



- Loosen the drain plug 1 on the end of the charge-air cooler.
- Drain off any oil residues that may be remaining.
- Close the drain plug 1.

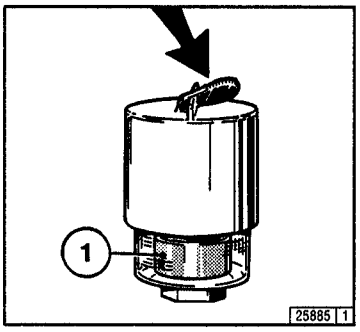
Service and Maintenance

6.4 Combustion Air Cleaner

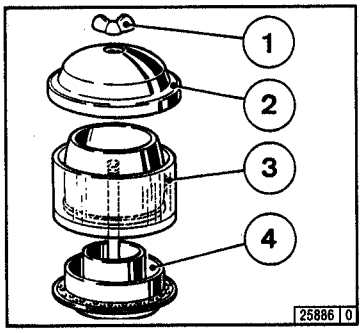
6

6.4.1 Cleaning Intervals

- The amount of dirt in the air cleaner depends on the amount of dust in the air and the size of the air cleaner used. If a high level of dust is anticipated, a cyclone-type precleaner can be fitted to the air cleaner.
- Cleaning intervals will have to be determined from case to case.
- If a dry type air cleaner is used, clean when indicated by the service indicator or switch.
- Air cleaner servicing is needed when:
  - **Service Indicator**
    the red signal 1 is fully visible when the engine is off.
  - **Service Switch**
    the yellow pilot light comes on when the engine is running.
- After carrying out service work, reset the signal by pressing the button on the service indicator.



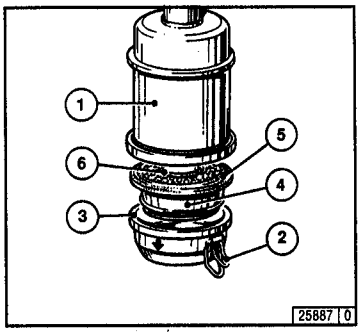
6.4.2 Emptying Cyclone Type Precleaner



- Undo wing nut 1 and remove cover 2.
- Remove collector bowl 3 from lower section 4 and empty. Clean leaves, straw and other foreign matter from lower section of precleaner.
- Reposition collector bowl 3 onto lower section 4, fasten cover 2 in place by tightening wing nut 1.

Never fill collector bowl with oil. Replace collector bowl if damaged.

6.4.3 Cleaning Oil Bath Air Cleaner



- Turn engine off and wait about 10 minutes for the oil to drain from filter housing 1.
- Release snap clips 2 and remove oil cup 3 together with filter element 4. If necessary prize element out with a screwdriver, taking care not to damage the rubber gasket 5.
- Remove dirty oil and sludge. Clean oil cup.
- Clean filter element 4 in diesel fuel and allow to drip-dry.
- Clean filter housing 1 if very dirty.
- Inspect and replace rubber gaskets 5 and 6 if necessary.
- Fill oil cup with engine oil up to the mark (arrow) (for viscosity, see 4.1.2).
- Refit oil cup and element to filter housing and secure with snap clips.

Never clean air cleaner with gasoline. Dispose of old oil in accordance with environmental regulations.

Service and Maintenance — 6.4 Combustion Air Cleaner

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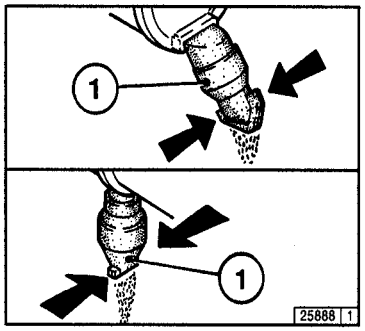
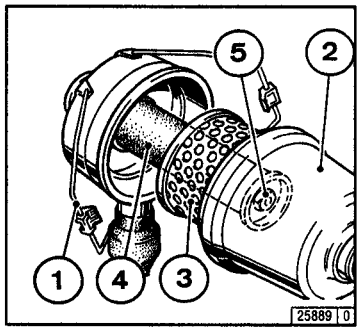
6.4.4 Dry Type Air Cleaner

Dust Discharge Valve



- Empty dust discharge valve 1 by pressing apart lips of discharge slot as indicated by arrows.
- Clean discharge slot from time to time.
- Remove any caked dirt by pressing together the upper section of the valve.

Filter Cartridge



- Undo clip fasteners 1.
- Take off hood 2 and remove cartridge 3.
- Clean cartridge (replace at least once a year).
- Clean cartridge 3:
  - Blow out from inside out with dry compressed air (max. 5 bar), or
  - in difficult cases, tap out, taking care not to damage the cartridge, or
  - wash according to manufacturer's instructions.
- Check paper filter (light showing through) and gaskets for damage. Replace if necessary.
- After five air cleaner services or after two years at the latest, replace safety cartridge 4 (never clean).
  To do so:
  - Undo hex. nut 5 and remove cartridge 4.
  - Install new cartridge, insert and tighten hex. nut.
- Install cartridge 3, replace hood 2 and do up clip fasteners.

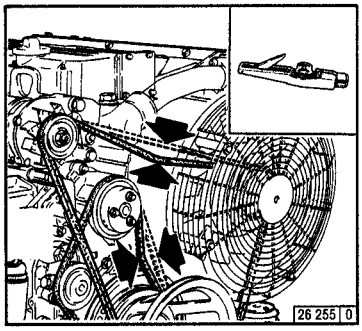
Never clean filter cartridge with gasoline or hot fluids.

6.5 Belt Drives — Service and Maintenance

6

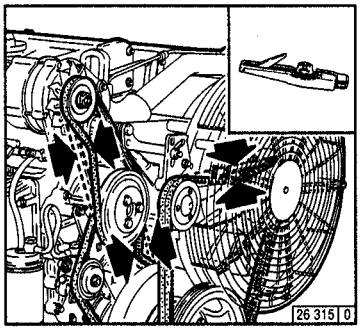
6.5.1 Checking V-Belts

1012



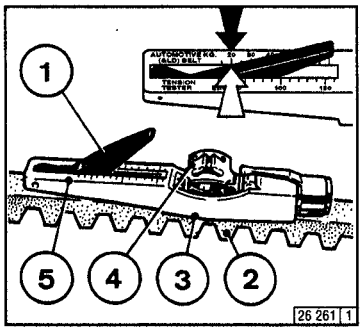
- Inspect entire V-belt for damage.
- Replace damaged V-belts.
- After installing new belts, run engine for 15 minutes, then check belt tension.
- Use a V-belt tension gauge (see 9.3) to check belt tension.
  - Place indicator arm 1 into gauge.
  - Position gauge on V-belt 2, midway between the pulleys, with flange 3 on bottom of gauge against the edge of belt.
  - Push slowly on the black pad 4 at right angles to belt 2 until the spring is heard or felt to trigger.

1013



- Carefully remove the gauge without altering the position of the indicator arm.
  - Read off the value: Turn the gauge sideways to see the exact spot where the top of the black indicator arm 1 intersects scale 5 (arrow). For settings, see 9.1.
  - If necessary, retension belt and measure again.

Check, tension and change belts only with the engine off. Refit belt guard, if provided.



Service and Maintenance

6.5 Belt Drives

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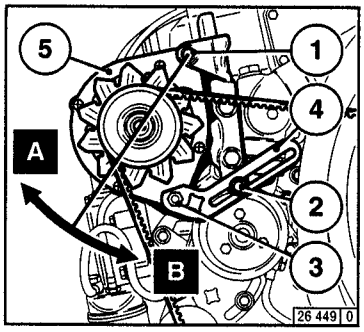
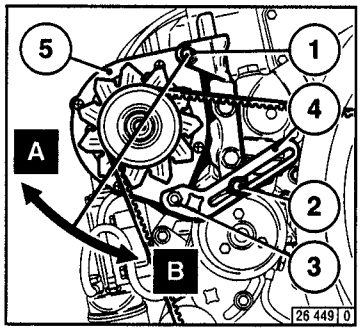
6.5.2 Tensioning Fan / Alternator Belts 1012



- Slacken off bolts 1, 2 and 3.
- Press alternator 5 in direction of arrow A until correct belt tension is achieved.
- Re-tighten bolts 1, 2 and 3.

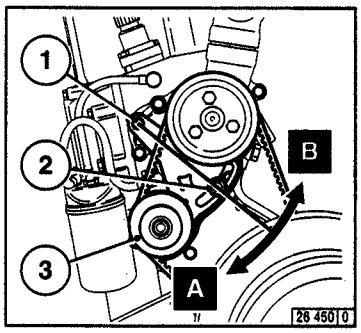
Check, tension and change belts only with the engine off. Refit belt guard, if provided.

6.5.3 Changing Fan / Alternator Belts 1012



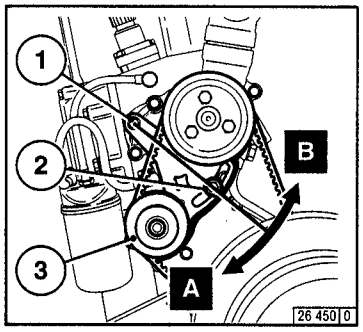
- Slacken off bolts 1, 2 and 3.
- Press alternator in direction of arrow B.
- Remove and replace belt.
- Tension belt in accordance with 6.5.3.
- Re-tighten bolts 1, 2 and 3.

6.5.4 Tensioning Coolant / Fuel Pump Belts 1012



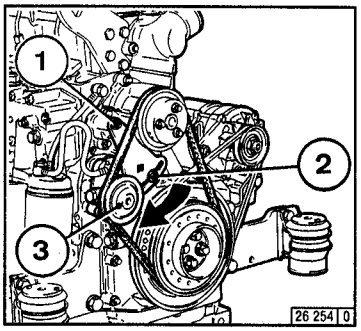
- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow (A) until correct belt tension is achieved.
- Re-tighten bolts 1 and 2.

6.5.5 Changing Coolant / Fuel Pump Belts 1012



- Remove fan belt as described in 6.5.3.
- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow (B).
- Remove and replace belt.
- Push fuel pump in direction of arrow (A) until correct belt tension is achieved.
- Tighten bolts 1 and 2.
- Reinstall fan belt and tension as described in 6.5.2.

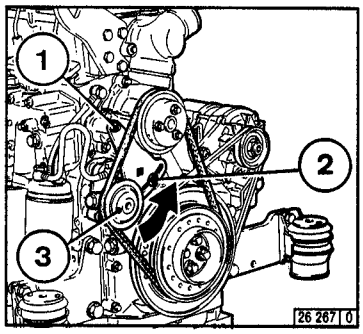
6.5.6 Tensioning Coolant / Fuel Pump Belts 1012 E



- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.

Check, tension and change belts only with the engine off. Refit belt guard, if provided.

6.5.7 Changing Coolant / Fuel Pump Belts 1012 E



- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow.
- Remove and replace belt.
- Push fuel pump in opposite direction of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.

Service and Maintenance

6.5 Belt Drives

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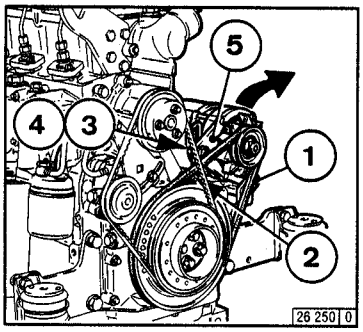
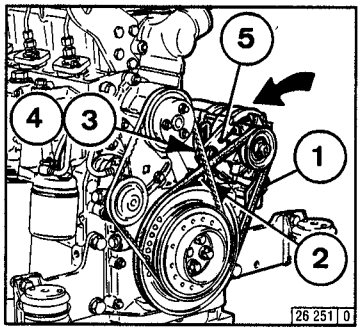
6.5.8 Tensioning Alternator Belt 1012 E



- Slacken off bolts 1, 2 and 4.
- Move alternator 5 in direction of arrow by turning bolt 3 until correct belt tension is achieved.
- Tighten bolts 1, 2 and 4.

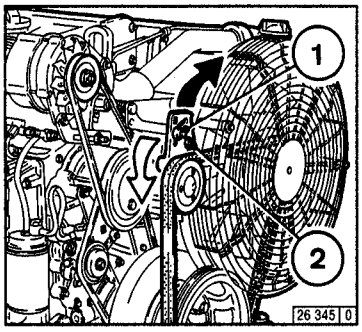
Check, tension and change belts only with the engine off. Refit belt guard, if provided.

6.5.9 Changing Alternator Belt 1012 E



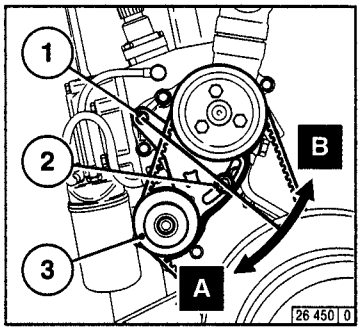
- Remove fuel pump belt as described in 6.5.7.
- Slacken off bolts 1, 2 and 4.
- Adjust bolt 3 until the V-belt can be removed.
- Fit new belt.
- Adjust bolt 3 until the correct belt tension is achieved.
- Tighten bolts 1, 2 and 4.
- Reinstall fuel pump belt and tension as described in 6.5.6.

6.5.10 Tensioning / Changing Fan Belt 1013



- Slacken off bolts 1 and 2.
  - Tensioning:
    Insert square wrench in square and pull in direction of arrow until correct belt tension is achieved.
  - Changing:
    Insert square wrench in square and loosen in opposite direction of arrow. Tension new belt as described above.
- Tighten bolts 1 and 2.

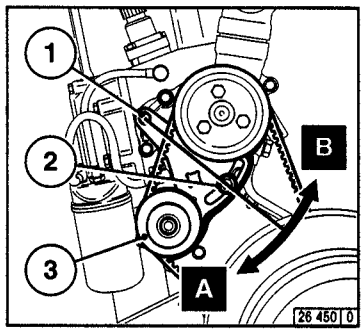
6.5.11 Tensioning Coolant / Fuel Pump belts 1013



- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction (A) of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.

Check, tension and change belts only with the engine off. Refit belt guard, if provided.

6.5.12 Changing Coolant / Fuel Pump Belts 1013



- Remove fan / alternator belt as described in 6.5.10 and 6.5.13.
- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction (B) of arrow.
- Remove and replace belt.
- Push fuel pump in direction (A) of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.
- Reinstall fan / alternator belt and retension as described in 6.5.10 and 6.5.13.

Service and Maintenance

6.5 Belt Drives

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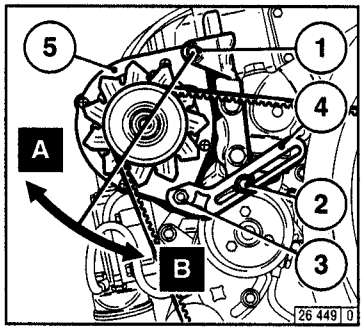
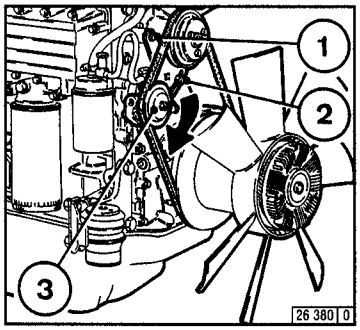
6.5.13 Tensioning /Changing Alternator Belt 1013



Tensioning:
- Slacken off bolts 1, 2 and 3.
- Move alternator 5 in direction of arrow (A) until correct belt tension is achieved.
- Re-tighten bolts 1, 2 and 3.

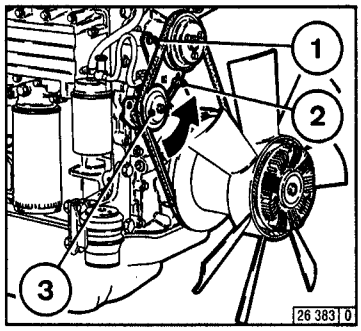
Changing:
- Slacken off bolts 1, 2 and 3.
- Move alternator 5 in direction of arrow (B) until belt is exposed.
- Remove and replace belt, tension (see above).
- Re-tighten bolts 1, 2 and 3.

6.5.14 Tensioning Coolant /Fuel Pump Belts 1013 E



- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.

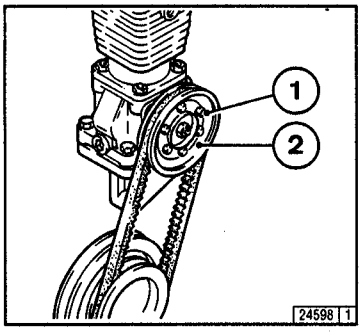
6.5.15 Changing Coolant / Fuel Pump Belts 1013 E



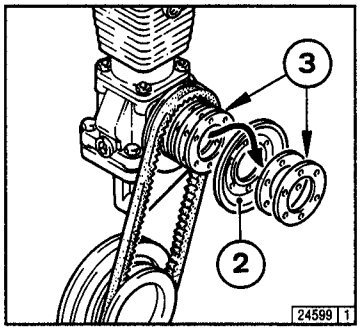
- Slacken off bolts 1 and 2.
- Push fuel pump 3 in direction of arrow.
- Remove and replace belt.
- Push fuel pump 3 in opposite direction of arrow until correct belt tension is achieved.
- Tighten bolts 1 and 2.

Check, tension and change belts only with the engine off. Refit belt guard, if provided.

6.5.16 Tensioning / Changing Compressor Belt



- Remove hex. bolts 1.
- Take off outer half-pulley 2.
- Replace belt if necessary.



- To retension belt, remove one or more shims 3 – as may be required – from inside. Place removed shim(s) outside on removed half-pulley 2.
- Turn engine over while tightening bolts 1 to prevent belt being pinched.

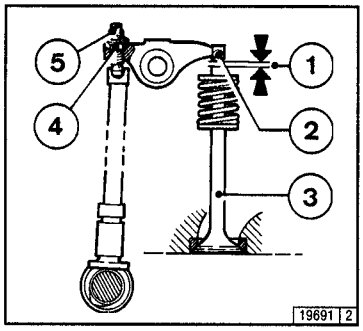
Check, tension and change belts only with the engine off. Refit guard, if provided.

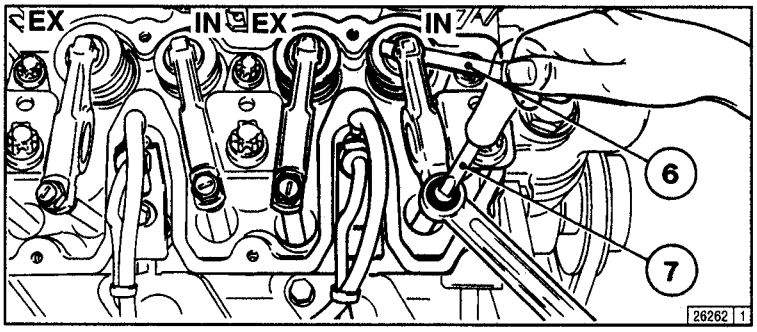
Service and Maintenance

6.6 Adjustments

6

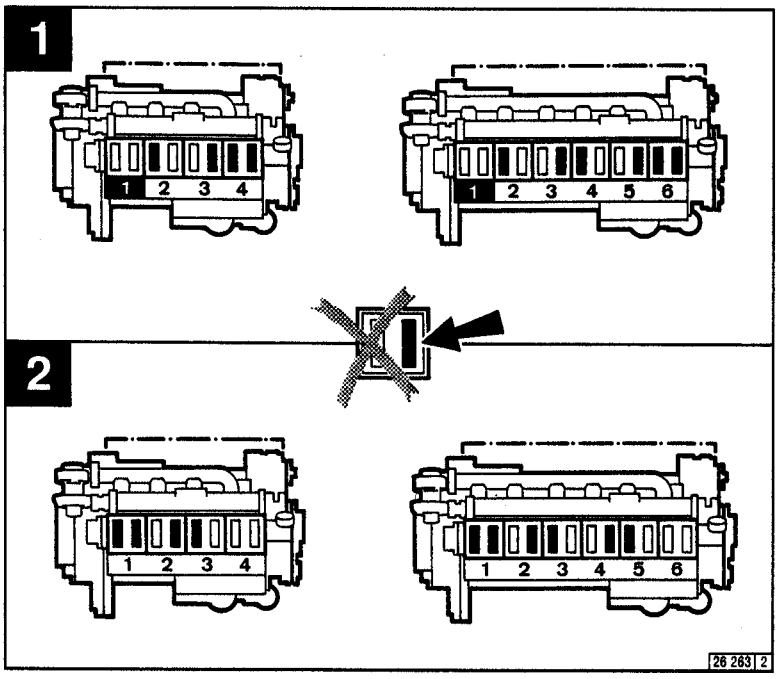
6.6.1 Checking / Adjusting Valve Clearances





- Slacken off breather valve and swing to one side.
- Remove rocker cover.
- Position crankshaft as per schematic 6.6.1.1
- Before adjusting valve clearance, allow engine to cool down for at least 30 minutes. The oil temperature should be below 80 °C / 176 °F.
- Check valve clearance between rocker arm / tappet contact face 2 and valve stem 3 with feeler gauge 6 (there should be only slight resistance when feeler blade is inserted). For permissible valve clearance, see 9.1.
- Adjust valve clearance if necessary:
  - Release locknut 4.
  - Use screwdriver 7 to turn setscrew 5 so that the correct clearance is attained after locknut 4 has been tightened.
- Check and adjust valve clearance on all remaining cylinders.
- Replace rocker cover (use new gasket if needed).
- Swing breather valve back into position and secure.

6.6.1.1 Valve Clearance Adjustment Schematic



- **Crankshaft Position 1:**
  Turn crankshaft until both valves in cylinder 1 overlap (exhaust valve about to close, **inlet** valve about to open). Adjust clearance of valves **marked in black** on schematic. Mark respective rocker arm with chalk to show that adjustment has been done.
- **Crankshaft Position 2:**
  Turn crankshaft one full revolution (360°).
  Adjust clearance of valves **marked in black** on schematic.

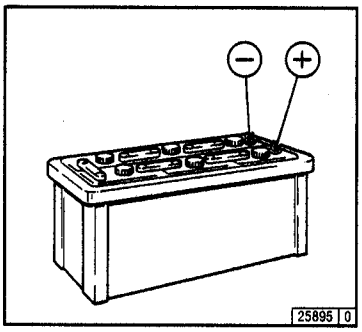
Service and Maintenance

6.7 Accessories

6

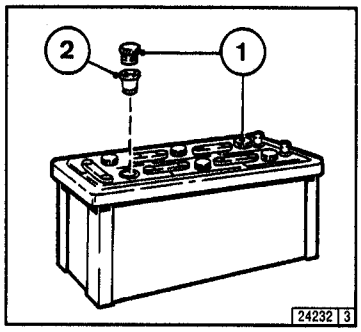
6.7.1 Battery

6.7.1.1 Checking Battery and Cable Connectors



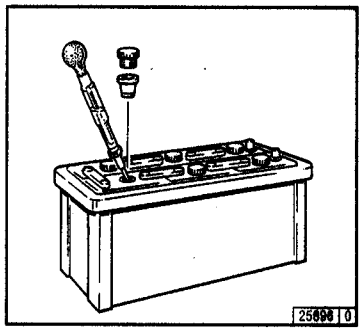
- Keep battery clean and dry.
- Undo dirty clamps.
- Clean terminal posts (+ and –) and clamps of the battery, and grease with acid-free and acid-resistant grease.
- When reassembling, ensure that clamps make good contact. Do up clamp bolts finger tight.

6.7.1.2 Checking Electrolyte Level



- Remove caps 1.
- If testers 2 are used, the electrolyte should come up to their base.
- If testers are not used, the electrolyte level should be 10-15 mm above the top of the plates.
- If necessary, top up with distilled water.
- Replace caps.

6.7.1.3 Checking Specific Gravity of Electrolyte



- Measure the specific gravity of individual cells with a commercial hydrometer.

  The hydrometer reading (see table on following page) indicates the state of charge. During measurement, the temperature of the electrolyte should preferably be 20°C / 68°F.

Specific Gravity				
in [kg/l]		in °Bé [°Baumé]*		State of Charge
Normal	Tropics	Normal	Tropics	
1.28	1.23	32	27	Fully charged
1.20	1.12	24	16	Half charged, recharge
1.12	1.08	16	11	Discharged, recharge immediately

* Measurement of specific gravity in °Bé is out of date and rarely used today.

The gases emitted by the battery are explosive. Keep sparks and naked flames away from the battery.
Do not allow battery acid to come into contact with skin or clothing.
Wear protective goggles.
Do not rest tools on the battery.

Service and Maintenance

6.7 Accessories

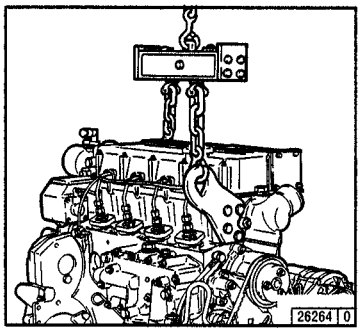
6

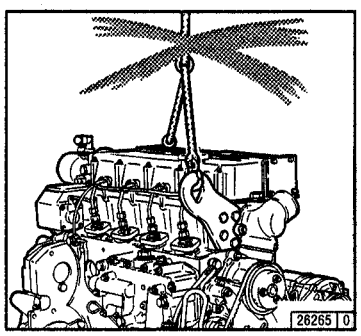
6.7.2 Three-Phase Alternator

Notes on the three-phase system:

- **Never** disconnect the cables between battery, alternator and regulator while the engine is **running.**
- If, however, it is necessary to start and operate the engine without the battery, disconnect the regulator from the alternator before starting.
- Be sure not to confuse the battery terminals.
- Replace defective bulb of the charge pilot lamp immediately.
- Cleaning the engine: Do not spray water/steam directly onto the alternator. Run the engine up to normal operating temperature to evaporate any remaining water.
- The habit of touching a lead against the frame to check whether it is live must under no circumstances be used with three-phase electrical systems.
- In the case of electric welding, connect the ground terminal on the welder directly to the piece being welded.

6.7.3 Lifting Tackle





- Always use proper lifting tackle when transporting the engine.

Use only the correct lifting tackle.

Troubleshooting

7.1 Diagnosis Chart

7

- If engine problems occur, they frequently have their cause in improper operation or engine maintenance.
- If problems do occur, always check first that the operating and maintenance instructions have been followed.
- A diagnosis chart is given on the facing page.
- If you cannot identify the cause of the problem or are unable to rectify it yourself, please contact DEUTZ Service.

Before starting, make sure that nobody is standing in the immediate vicinity of the engine or driven machine.
Important: When carrying out repair work, never start the engine with speed governor removed. Disconnect battery.

7.1 Diagnosis Chart

Troubleshooting

7

Fault	Remedy
Engine fails or is difficult to start	Check P
Engine starts but runs unevenly or stalls	Adjust E
Engine overheats. Temperature monitor gives warning	Replace W
Engine gives poor performance	Clean R
Engine not firing on all cylinders	Top up A
Engine has little or no oil pressure	Lower level S
Engine oil consumption excessive	
Engine smokes - blue	
- white	
- black	

Cause	Section	
Not declutched (where possible)	Operation	P
Below starting limit temperature		P
Engine shutdown lever in stop position (faulty solenoid)		P
Oil level too low		A
Oil level too high		S
Excessive inclination of engine		P / E
Speed control lever set to middle position		P / E
Dirty air cleaner/Faulty turbocharger	Combustion air	P / W
Air cleaner service switch/indicator defective		P
LDA* defective (leaking line)		P
Charge air line leaking		P / W
Coolant pump defective	Cooling system	P / R
Charge air cooler contaminated		P / R
Coolant heat exchanger dirty		P / R
Cooling fan defective, split or loose V-belt (belt-driven fuel pump)		P / W
Cooling air temperature rise/ hot air recirculation		P
Battery defective or discharged	Electrics	P

*LDA = Aneroid device

Table 1 of 2

Fault	Remedy
Engine fails or is difficult to start	Check P
Engine starts but runs unevenly or stalls	Adjust E
Engine overheats. Temperature monitor gives warning	Replace W
Engine gives poor performance	Clean R
Engine not firing on all cylinders	Top up A
Engine has little or no oil pressure	Lower level S
Engine oil consumption excessive	
Engine smokes - blue	
- white	
- black	

Cause	Section	
Electrics cable connections to starter, electrical system loose or oxidized	Electrics	P
Starter defective or pinion does not engage		P
Incorrect valve clearance	Engine	E
Leaking injection line		P
Vent pipe blocked (coolant heat exchanger)		P / R
Glow plugs defective		P
Injector defective		P / W
Air in fuel system		P / W
Fuel filter/prefilter dirty		P/ R /W
Oil filter defective		W
Incorrect lube oil SAE class or quality	Operating media	W
Fuel quality not as per Operation Manual		P/ W
Coolant level too low		P/ A

Table 2 of 2

Engine Preservation

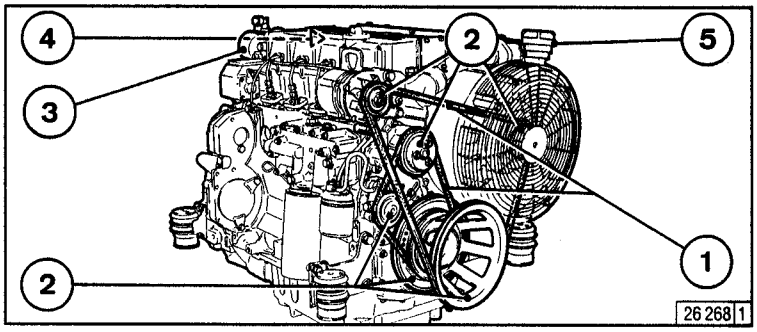
8.1 Preservation

8

8.1 Preservation

If the engine is to remain idle for an extended period of time, it is necessary to take protective measures to prevent rust formation. The preservative measures described here will protect the engine for up to 6 months. The procedure will have to be reversed before the engine is re-commissioned.

- Anti-corrosion oils to specification:
  - MIL-L-21260B
  - TL 9150-037/2
  - NATO code C 640/642
- Recommended cleansing agent to remove preservatives when recommissioning engine:
  - Petroleum benzine (hazardous materials class A3)



Preserving Engine:

- Clean engine (with cold cleansing agent if preferred). See 6.3.2.
- Run engine until warm, then turn off.
- Drain engine oil (see 6.1.2) and fill with anti-corrosion oil.
- Drain coolant (see 6.3.3/6.3.5).
- Fill with anti-corrosion agent (see 4.3.3).
- If necessary, clean oil bath air cleaner (see 6.4.3) and fill with anti-corrosion oil.
- Drain fuel tank.
- **Make up a mixture of 90% diesel fuel and 10% anti-corrosion oil, and refill fuel tank.**
- Run engine for about 10 minutes.
- Turn engine off.
- Turn engine over manually several times. If using starter, set shutdown lever to stop position.
- Remove V-belts 1 and store in wrapped condition.
- Spray grooves of V-belt pulleys 2 with anti-corrosion agent.
- Close off intake ports 3 and exhaust ports 4.
- Lightly grease and replace coolant filler 5.
- Drain anti-corrosion agent (see 6.3.3 / 6.3.5).

Removing Engine Preservatives:

- Remove anti-corrosion agent from grooves in V-belt pulleys 2.
- Install V-belts 1. Retension after brief operation is necessary (see 6.5).
- Remove covers from intake port 3 and exhaust port 4.
- Fill with coolant (see 6.3.4 / 6.3.5).
- Start engine.

Technical Specifications

9.1 Engine Specifications and Settings

9

Model		BF4M 1012 / BF4M 1012 E	BF4M 1012 C / BF4M 1012 EC	BF6M 1012 / BF6M 1012 E	BF6M 1012 C / BF6M 1012 EC
Number of cylinders		4	4	6	6
Cylinder arrangement		vertical, in line			
Bore	[mm]	94			
Stroke	[mm]	115			
Total displacement	[cm³]	3192	3192	4788	4788
Compression ratio	[ε].	17.5			
Working cycle/Combustion system		4-stroke diesel with turbocharging and direct injection			
Charge air cooler		w/o	w/	w/o	w/
Direction of rotation		counter-clockwise			
Weight 1012 / C incl. cooling system	[kg approx.]	contact company headquarters			
Weight 1012 E / EC w/o cooling system as per DIN 70020-A	[kg approx.]	330	332	435	437
Engine power	[kW]	[1].			
Speed	[rpm]	[1].			
Valve clearance with cold engine	[mm]	Inlet $0,3^{+0,1}$ / Outlet $0,5^{+0,1}$.			
Injector opening pressure	[bar]	250/275			
Start of delivery	[°crank angle bTDC]	[1].			
Firing order of engine		1-3-4-2	1-3-4-2	1-5-3-6-2-4	1-5-3-6-2-4
V-belt tension:		Pre-tension / re-tension [2].			
Generator fan	[N]	$450 / 300^{\pm 50}$.			
Fuel pump - coolant pump	[N]	$450 / 300^{\pm 50}$.			
Compressor	[N]	$550 / 450^{\pm 50}$.			

[1] Engine power, speed, start of delivery are stamped on engine rating plate, see also 2.1
[2] Retension 15 minutes after the engine has been driven under load

9.1 Engine Specifications and Settings — Technical Specifications

9

Model BFM1012 / E		BF4M 1012 — BF4M 1012 E	BF4M 1012 C — BF4M 1012 EC	BF6M 1012 — BF6M 1012 E	BF6M 1012 C — BF6M 1012 EC
Cooling system		Liquid-cooled/Cooling system protection			
Coolant quantity					
1012/C	[litres approx.]	9.3	10.0	12.2	13.6
1012 E/EC [5]	[litres approx.]	5.6	5.6	7.3	7.3
1012 unit engine (with frontal radiator)	[litres approx.]	15.9	18.1	—	—
Permissible continuous coolant temperature					
Engine outlet, with performance group I	[°C]	max.110 [6].			
Engine outlet, with performance group II-IV	[°C]	max.105 [6].			
Thermostat initial opening at	[°C]	83 [7].			
Thermostat full open temperature	[°C]	95 [8].			
Coolant prewarming		[4].			
Coolant pump					
Delivery pressure in	[bar]	[9].			
Delivery rate in	[m³/h]	[9].			
Power consumption in	[kW]	[9].			
Lubrication		forced-feed lubrication			
Oil temperature in oil pan	[°C]	125			
Min. oil pressure with engine warm (120°C and SAE oil 15 W 40) and low idle speed	[bar]	0.8			
Oil capacity (first fill-up) without filter	[litres approx.]	8.5 [3].	8.5 [3].	12.5 [3].	12.5 [3].
Oil capacity (first fill-up) with filter	[litres approx.]	10.0 [3].	10.0 [3].	14.0 [3].	14.0 [3].

[3] Approximate figures can vary depending on the design. The upper marking on the dipstick is always the maximum.
[4] Only during winter (see 3.5.1)
[5] Only engine capacity without radiator. Capacity of external cooling system dependent on cooling system design.
[6] Other performance groups have different values. Please contact company headquarters.
[7] With external cooling systems with outlet control, the temperature at which the thermostat opens is 87°C
[8] With external cooling systems with outlet control, the temperature at which the thermostat is fully opened is 102°C.
[9] Please contact company headquarters (varies depending on engine design)

Model		BF4M 1013 — BF4M 1013 E	BF4M 1013 C — BF4M 1013 EC	BF6M 1013 — BF6M 1013 E	BF6M 1013 C — BF6M 1013 EC	BF6M 1013 CP — BF6M 1013 ECP
Number of cylinders		4	4	6	6	6
Cylinder arrangement		vertical, in line				
Bore	[mm]	108				
Stroke	[mm]	130				
Total displacement	[cm³]	4764	4764	7146	7146	7146
Compression ratio	[ε].	17.5				
Working cycle/Combustion system		4-stroke diesel with turbocharging and direct injection				
Charge air cooler		w/o	w/	w/o	w/	w/
Direction of rotation		counter-clockwise				
Weight 1013 / CP incl. cooling system	[kg approx.]	contact company headquarters				
Weight 1013 E / EC / ECP w/o cooling system as per DIN 70020-A	[kg approx.]	455	455	600	600	600
Engine power	[kW]	[1].				
Speed	[rpm]	[1].				
Valve clearance with cold engine	[mm]	Inlet 0,3 +0.1 / Outlet 0,5 +0.1.				
Injector opening pressure	[bar]	250/275				
Start of delivery	[°crank angle bTDC]	[1].				
Firing order of engine		1-3-4-2	1-3-4-2	1-5-3-6-2-4	1-5-3-6-2-4	1-5-3-6-2-4
V-belt tension:		Pre-tension / re-tension [2].				
Generator fan	[N]	450 / 300 ±50.				
Fuel pump - coolant pump	[N]	450 / 300 ±50.				
Compressor	[N]	550 / 375 ±50.				

[1] Engine power, speed, start of delivery are stamped on engine rating plate, see also 2.1
[2] Retension 15 minutes after the engine has been driven under load

9.1 Engine Specifications and Settings

Technical Specifications

9

Model 1013 /E		BF4M 1013 — BF4M 1013 E	BF4M 1013 C — BF4M 1013 EC	BF6M 1013 — BF6M 1013 E	BF6M 1013 C — BF6M 1013 EC	BF6M 1013 CP — BF6M 1013 ECP
Cooling system		Liquid-cooled/Cooling system protection				
Coolant quantity						
1013 / C / CP	[litres approx.]	12.1	13.6	15	16.3	16.9
1013 E / EC / ECP [5]	[litres approx.]	7.2	7.2	9.8	9.8	9.8
1013 unit engine (with frontal radiator)	[litres approx.]	17.5	19.7	22	23.7	23.7
Permissible continuous coolant temperature						
Engine outlet, with performance group I	[°C]	max.110 [6].				
Engine outlet, with performance group II-IV	[°C]	max.105 [6].				
Thermostat initial opening at	[°C]	83 [7].				
Thermostat full open temperature	[°C]	95 [8].				
Coolant prewarming		[4].				
Coolant pump						
Delivery pressure in	[bar]	[9].				
Delivery rate in	[m³/h]	[9].				
Power consumption in	[kW]	[9].				
Lubrication		forced-feed lubrication				
Oil temperature in oil pan	[°C]	max. 125				
Min. oil pressure with engine warm (120°C and SAE oil 15 W 40) and low idle speed	[bar]	0.8				
Oil capacity (first fill-up) without filter	[litres approx.]	13 [3].	13 [3].	20 [3].	20 [3].	20 [3].
Oil capacity (first fill-up) with filter	[litres approx.]	14.0 [3].	14.0 [3].	21.0 [3].	21.0 [3].	21.0 [3].

[3] Approximate figures can vary depending on the design. The upper marking on the dipstick is always the maximum.
[4] Only during winter (see 3.5.1)
[5] Only engine capacity without radiator. Capacity of external cooling system dependent on cooling system design.
[6] Other performance groups have different values. Please contact company headquarters.
[7] With external cooling systems with outlet control, the temperature at which the thermostat opens is 87°C
[8] With external cooling systems with outlet control, the temperature at which the thermostat is fully opened is 102°C.
[9] Please contact company headquarters (varies depending on engine design)

Model		BF4M 1013 FC	BF6M 1013 FC
Number of cylinders		4	6
Cylinder arrangement		vertical, in line	
Bore	[mm]	108	
Stroke	[mm]	130	
Total displacement	[cm³]	4764	7146
Compression ratio	[ε].	17.6	
Working cycle/Combustion system		4-stroke diesel with turbocharging and direct injection	
Charge air cooler		with	
Direction of rotation		counter-clockwise	
Weight 1013 FC without cooling system as per DIN 70020-A	[kg approx.]	contact company headquarters 455	600
Engine power	[kW]	[1].	
Speed	[rpm]	[1].	
Valve clearance with cold engine	[mm]	Inlet 0,3 +0,1 / Outlet 0,5 +0,1.	
Injector opening pressure	[bar]	275	
Start of delivery	[°crank angle bTDC]	[1].	
Firing order of engine		1-3-4-2	1-3-4-2 — 1-5-3-6-2-4 — 1-5-3-6-2-4
V-belt tension:		Pre-tension / re-tension [2].	
Generator fan	[N]	550 / 300 ±50.	
Fuel pump - coolant pump	[N]	550 / 300 ±50.	
Compressor	[N]	650 / 400 ±80.	

[1] Engine power, speed, start of delivery are stamped on engine rating plate, see also 2.1
[2] Retension 15 minutes after the engine has been driven under load

9.1 Engine Specifications and Settings

Technical Specifications

9

Model 1013 FC		BF4M 1013 FC	BF6M 1013 FC
Cooling system		Liquid-cooled/Cooling system protection	
Coolant quantity			
1013 FC [5]	[litres approx.]	7.2	9.8
Permissible continuous coolant temperature			
Engine outlet, with performance group I	[°C]	with hinged-type charger (turbocharger) max.110 [6] ./ with fixed charger (turbocharger) max.105 [6] .	
Engine outlet, with performance group II-IV	[°C]	with hinged-type charger (turbocharger) + with fixed charger (turbocharger max.105 [6].	
Thermostat initial opening at	[°C]	87 .	
Thermostat full open temperature	[°C]	102 .	
Coolant prewarming		[4] .	
Coolant pump			
Delivery pressure in	[bar]	[7] .	
Delivery rate in	[m³ /h]	[7] .	
Power consumption in	[kW]	[7] .	
Lubrication		forced-feed lubrication	
Oil temperature in oil pan	[°C]	max. 125	
Min. oil pressure with engine warm (120°C and SAE oil 15 W 40) and low idle speed	[bar]	0.8	
Oil capacity (first fill-up) without filter	[litres approx.]	16 [3] .	28 [3] .
Oil capacity (first fill-up) with filter	[litres approx.]	17 [3] .	29 [3] .

[3] Approximate figures can vary depending on the design. The upper marking on the dipstick is always the maximum.
[4] Only during winter (see 3.5.1)
[5] Only engine capacity without radiator. Capacity of external cooling system dependent on cooling system design.
[6] Other performance groups have different values. Please contact company headquarters.
[7] Please contact company headquarters (varies depending on engine design)

Technical Specifications

9.2 Torque Wrench Settings

9

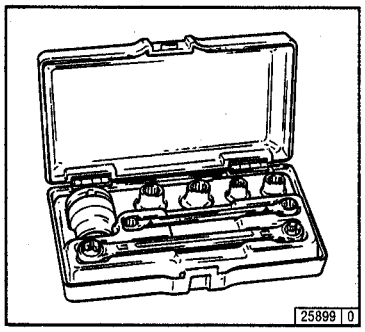
Location	Preload [Nm]			Torquing Load [Nm]				Total [Nm]	Remarks
	Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3	Stage 4		
Rocker cover								8,5	
Rocker arm setscrew								21	
Mount, flywheel side								187	M16x40 8.8 A4C
Mount, turbocharger side								187	M16x40 8.8 A4C
Air intake manifold								8,5	
Exhaust manifold								21	
Oil drain plug								50	
Injector mounting								16	Torx
Injection line mounting								30	M14x1.5
Oil pan (cast iron)								29	
Oil pan (sheet metal)								21	

9.3 Tools

Technical Specifications

9

TORX



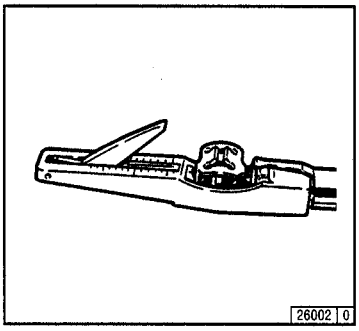
A TORX wrench set is used with engines in the 1012/1013 series. This system was chosen because of the many advantages it offers:

- Outstanding accessibility to bolts.
- High load transfer when loosening and tightening.
- Almost impossible for socket to slide off or break.

TORX tools can be ordered from:

WILBÄR
Postfach 14 05 80
D-42826 Remscheid

V-belt Tension Gauge



The V-belt tension gauge can be obtained under order number **8115 + 8120** from:

WILBÄR
Postfach 14 05 80
D-42826 Remscheid

Notes

Warnings to Place on Equipment

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Warning in the Manual

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

or

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Notes

CALIFORNIA PROPOSITION 65 INFORMATION

TO CALIFORNIA CUSTOMERS AND TO CUSTOMERS SELLING DIESEL ENGINE EQUIPMENT INTO OR FOR USE IN CALIFORNIA.

Proposition 65, a California law, requires warnings on products which expose individuals in California to chemicals listed under that law, including certain chemicals in diesel engine exhaust.

Obligations of Manufactures of Diesel-Powered Off-Road Equipment. The California Superior Court has approved either of the following two methods of compliance with Proposition 65 requirements by manufactures of off-road equipment containing diesel engines. (The court order containing these provisions is attached.)

1. **On-Equipment Warning.** Place the warning pictured in attachment 1 on all equipment shipped by you into or for sale in California after January 1, 1996. The warning must be in a location where it is easily visible to the operator of the equipment when (s)he is operating the equipment. The warning must be secured to the equipment. If warnings or operating instructions are provided through a digital display, you may usee that method of providing warning.
2. **Operator Manual Warning.** When the operator manual is next revised or by December 31, 1995 whichever is earlier, place the warning in attachment 2 in the operator manual. The warning may be either printed in the manual or on a sticker.

The warning must appear in one of the following locations:

- Inside The front cover
- Inside the back cover
- Outside the front cover
- Outside the back cover
- As the first page of text

Under either alternative, the warning must appear in the same size, print and format as the attachment selected or be of an equally conspicuous size and format. If the warning is provided in an on-screen display, the warning must contain the language in the attachment and must be provided at the time of or in connection with ignition in the same manner as other safety warnings electronically communicated on screen.

Obligation of Resellers of Diesel Engines. This letter must accompany any loose diesel engine sold in California.
Should you have any questions, please call Deutz Corporation Product Support Department.

Service

10

Knowing it's DEUTZ

DEUTZ has always stood for excellence in motor construction, pioneering many developments in the industry. As an independent motor manufacturer, we offer — worldwide — a comprehensive range of diesel and gas motors spanning from 4kW to 7,400kW. Our products are perfectly tailored to meet our customers' individual requirements.

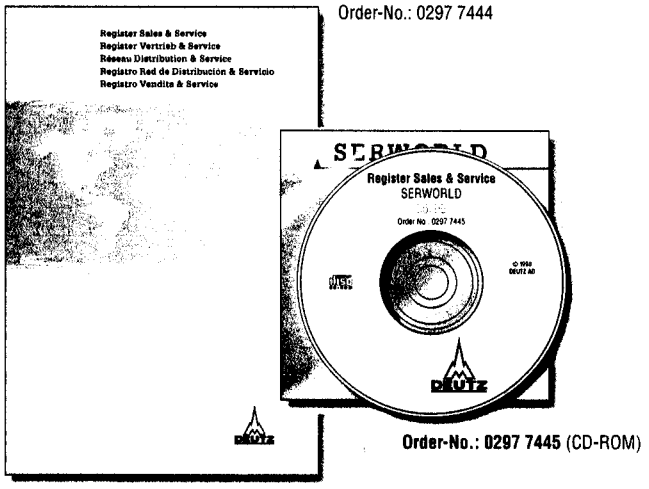
Over 1.4 million DEUTZ motors do their job reliably all over the world. We are determined to preserve the high standard of performance and dependability of our motors, thus keeping our customers satisfied at all times. Therefore we are represented worldwide through a network of highly competent service partners who will meet the needs of our customers, wherever they are.

This is why DEUTZ is not only the name for motors which pack a lot of inventive genius. DEUTZ also means reliable service and comprehensive support to enhance your motor's performance.

This index Sales & Service offers you an overview of the DEUTZ partners in your vicinity, including the products for which they are responsible and the range of services provided. But even when no direct product responsibility is mentioned, your DEUTZ partner will be happy to help you with expert advice.

The Index is constantly updated. Please ask your DEUTZ service partner for the latest edition.

DEUTZ AG — at your service.



Order-No.: 0297 7444

Order-No.: 0297 7445 (CD-ROM)

Obtainable from the local service Partner reponsible for you or from:

DEUTZ AG
Deutz-Mülheimer Str. 147-149
D-51057 Köln

Phone: 0049-221-822-0
Telefax: 0049-221-822-5304
Telex: 8812-0 khd d
http://www.deutz.de

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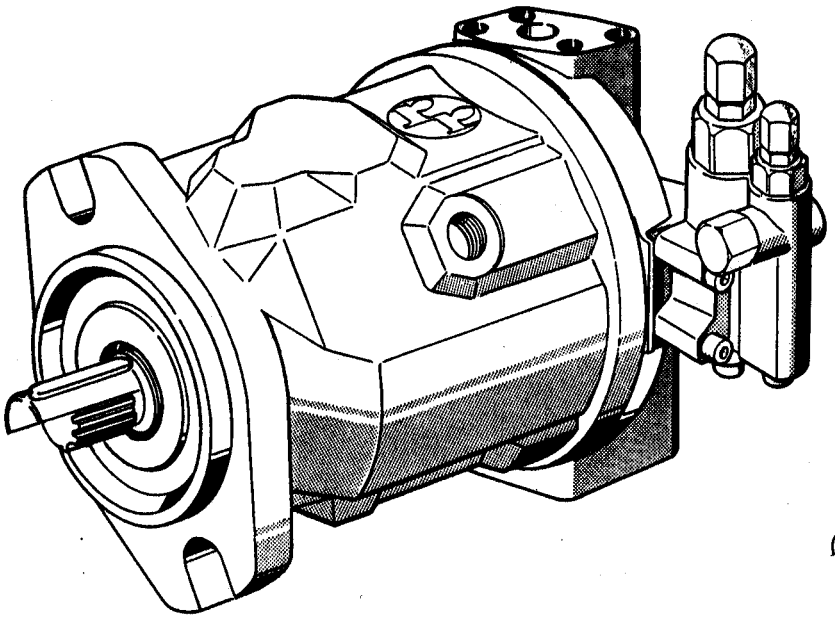
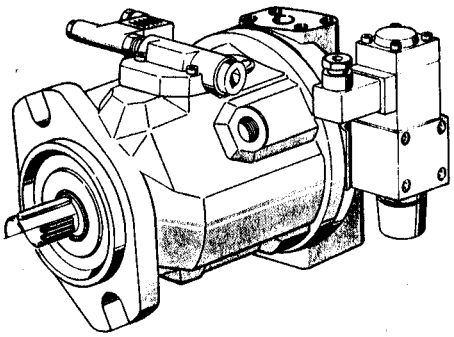
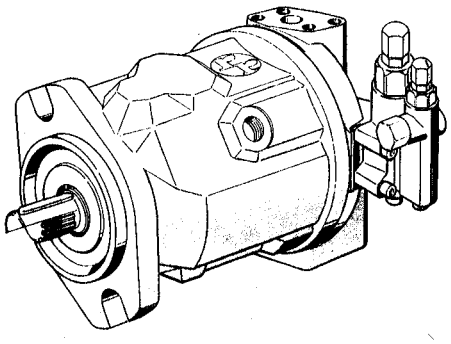


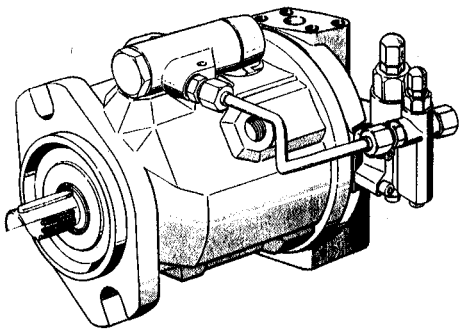
FE



DFR



DFLR



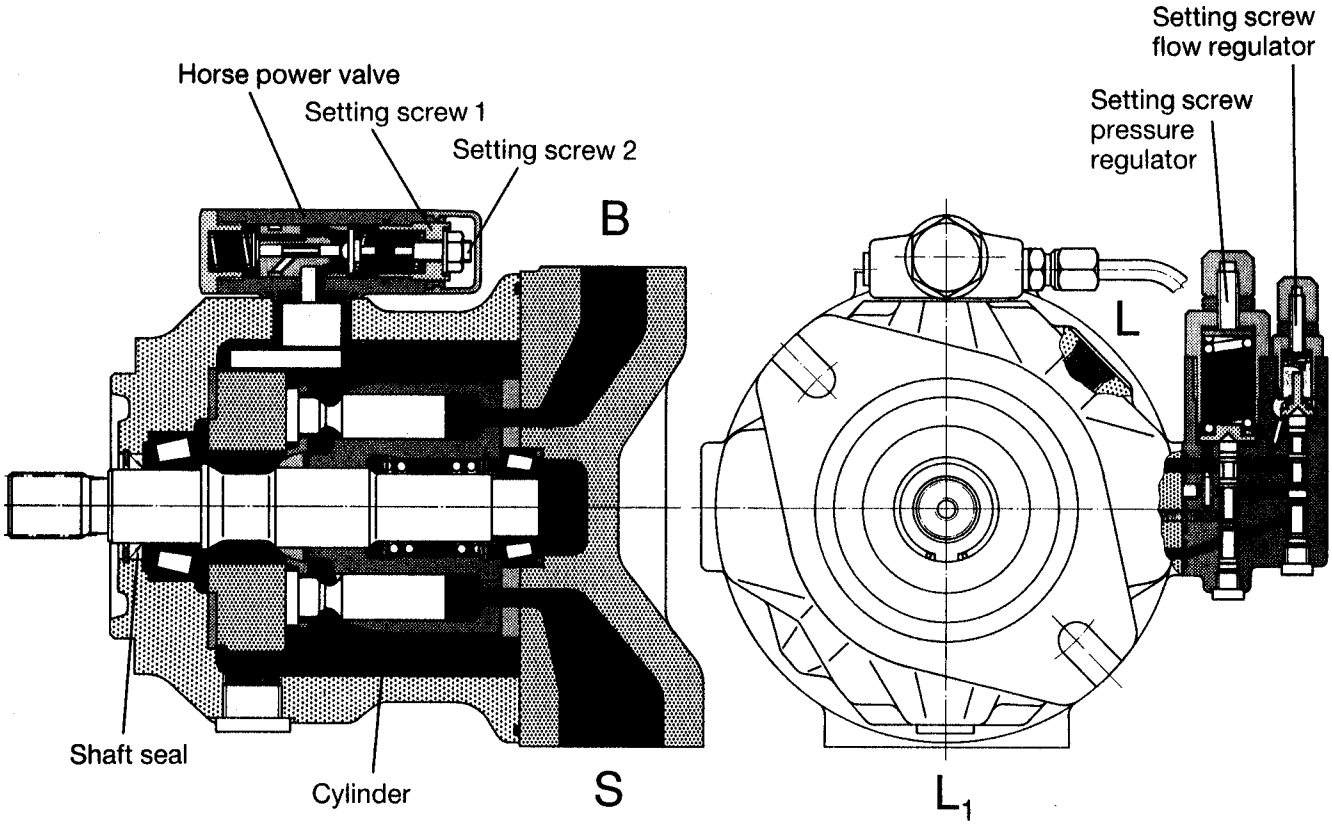
NOTE

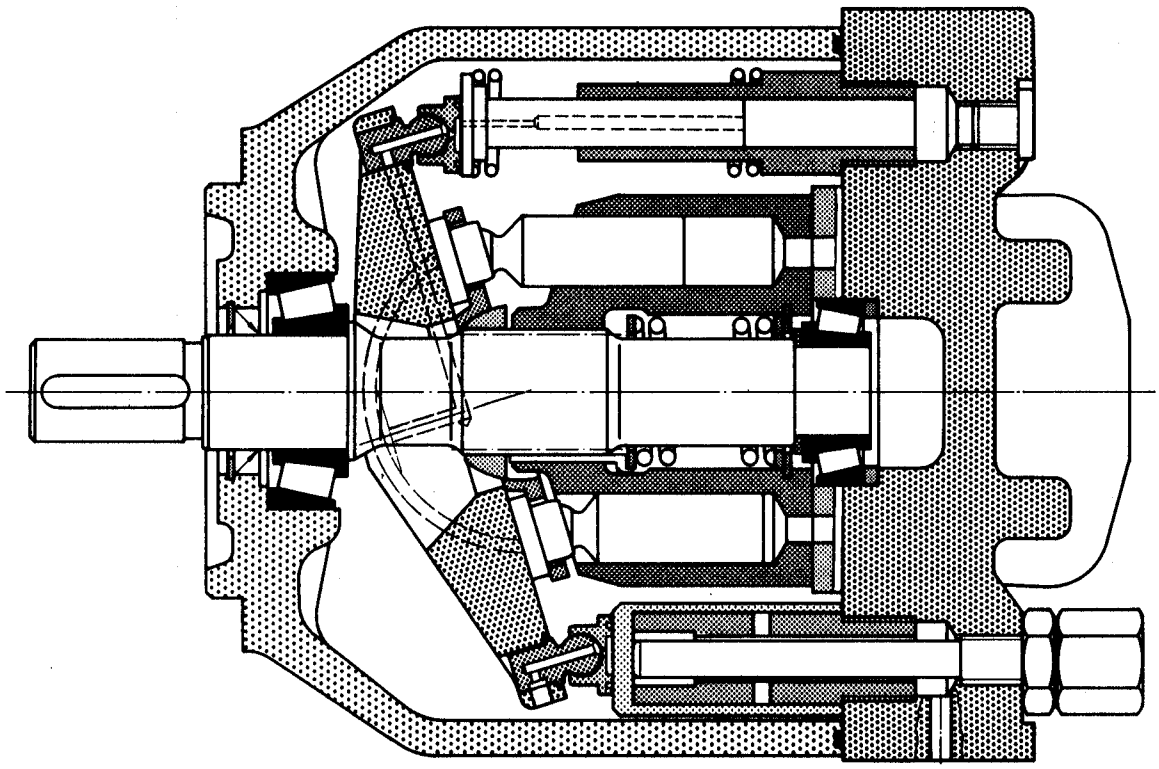
Pretested and preassembled Original Brueninghaus subassemblies make quick and successful repairs possible.

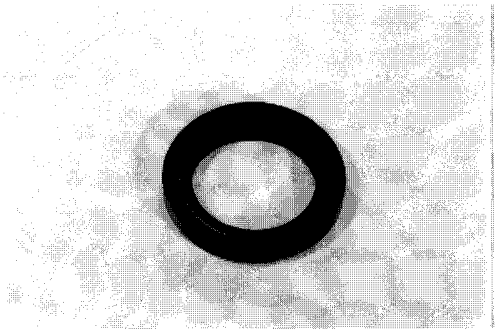
Delivery of the correct spare parts will be especially quick if you quote type and serial number when ordering.

Repairs are simple, but you are nevertheless recommended to take advantage of our training offer and thus gain the necessary specialist knowledge.

CONTENTS

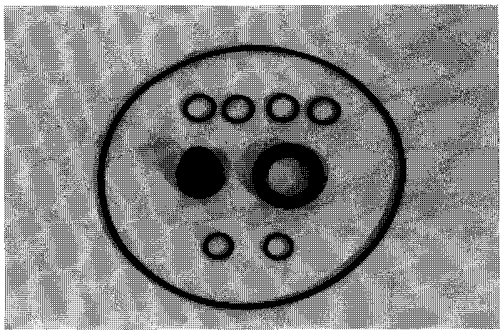

Horse power valve
Setting screw 1
Setting screw 2
B
Setting screw
flow regulator
Setting screw
pressure
regulator
L
Shaft seal
Cylinder
S
L_1





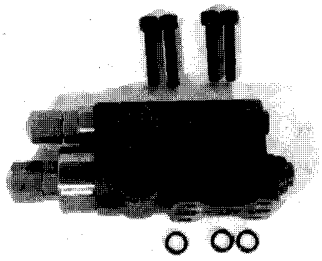
D1 Wellendichtring für Antriebswelle.

Sealing ring of drive shaft.



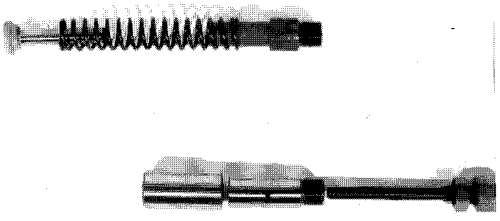
D2 Kompletter Dichtsatz (Dichtsätze sind typenbezogen festgelegt, Foto z.B. A10VSO 28 DFR, ohne Steuerventildichtungen).

Complete seal kit (Sealing kits are based on the type of the pump, picture shows for example A10VSO 28 DFR, without pilot valve seals).



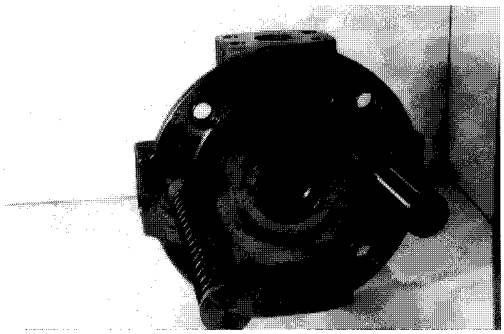
B1 Steuervetil: Druck- Förderstromregler.

Pilot valve: pressure- flow control.



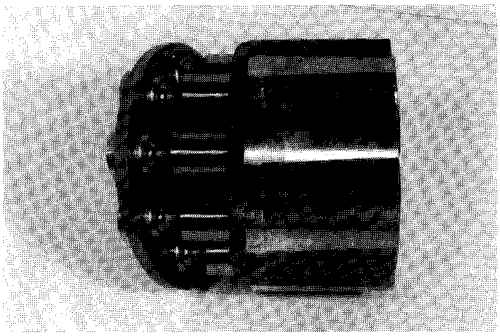
B2 Verstellteile.

Control device.



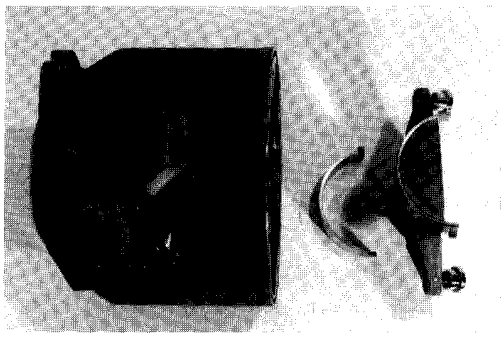
B3 Anschlußplatte mit Verstellteilen und Verteilerplatte.

Port plate and parts of control device and distributor plate.



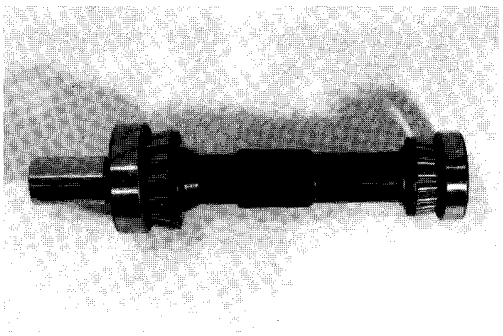
B4 Triebwerk

Rotary group



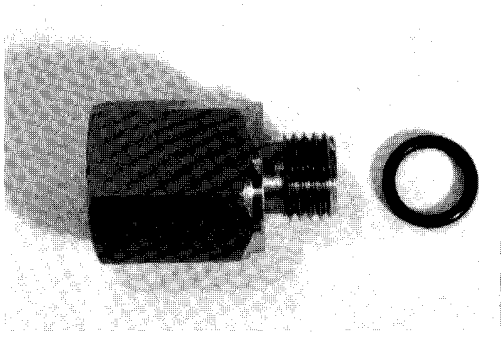
B5 Gehäuse mit Schwenkwiege und Lagerschalen.

Pump housing, cradle and bearing shells.



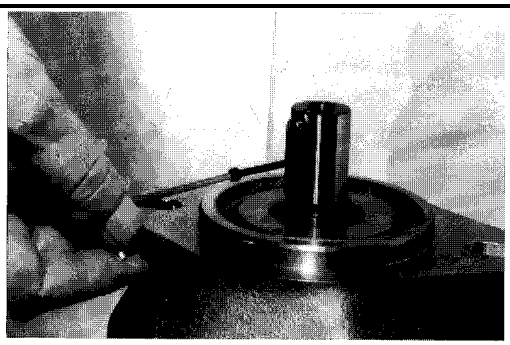
B6 Antriebswelle und Kegelrollenlager.

Driving shaft and taper roller bearings.



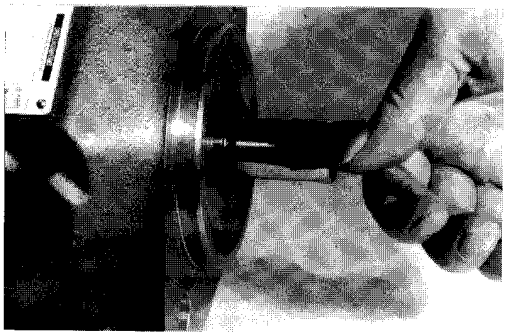
B7 Adapter am DFR-Steuerventil für metrische Verrohrung des Steueranschlußes X (ohne Blende)

Adapter without orifice of the DFR-pilot valve, if you use a metric pilot pipe connection X.



1 Entfernen der Paßfeder.

Disassemble of the key.

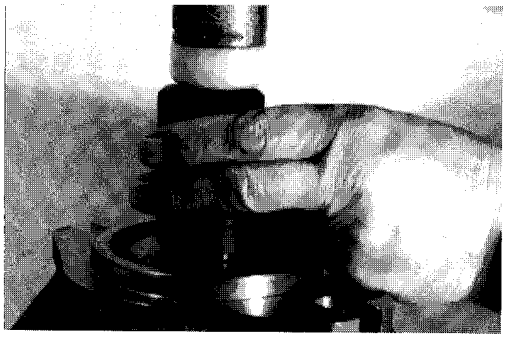


2 Sicherungsring ausbauen.

Remove the retaining ring.

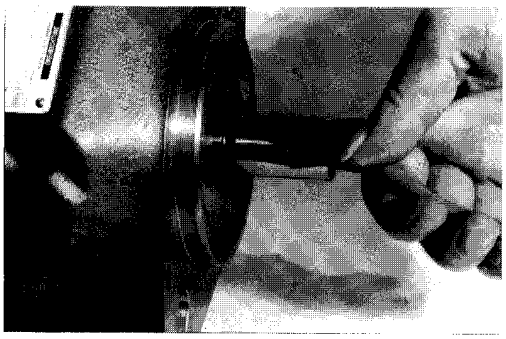
3 Nach Demontage des gelaufenen Wellendichtringes einfetten des neuen WDR. (Kontrolle der Laufflächen, Welle und Gehäuse).

Change the shaft seal and check the running area (drive shaft and housing), grease sealing ring.



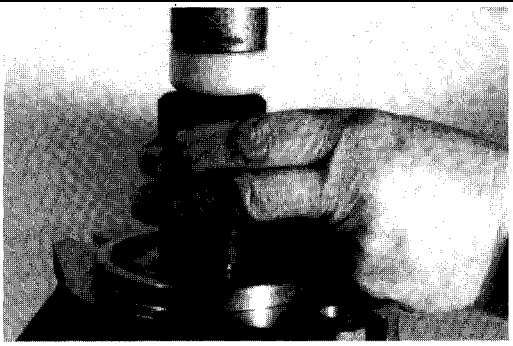
4 WDR einpressen, Anschlag des Montagewerkzeuges entspricht der Einpreßtiefe.

Assemble sealing ring, fitting tool holds the correct position of the sealing ring in the pump housing.



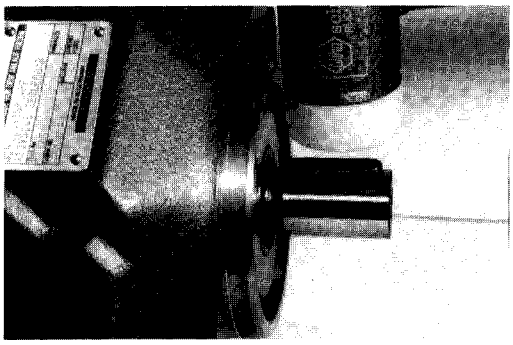
5 Sicherungsring einsetzen.

Assemble the retaining ring.



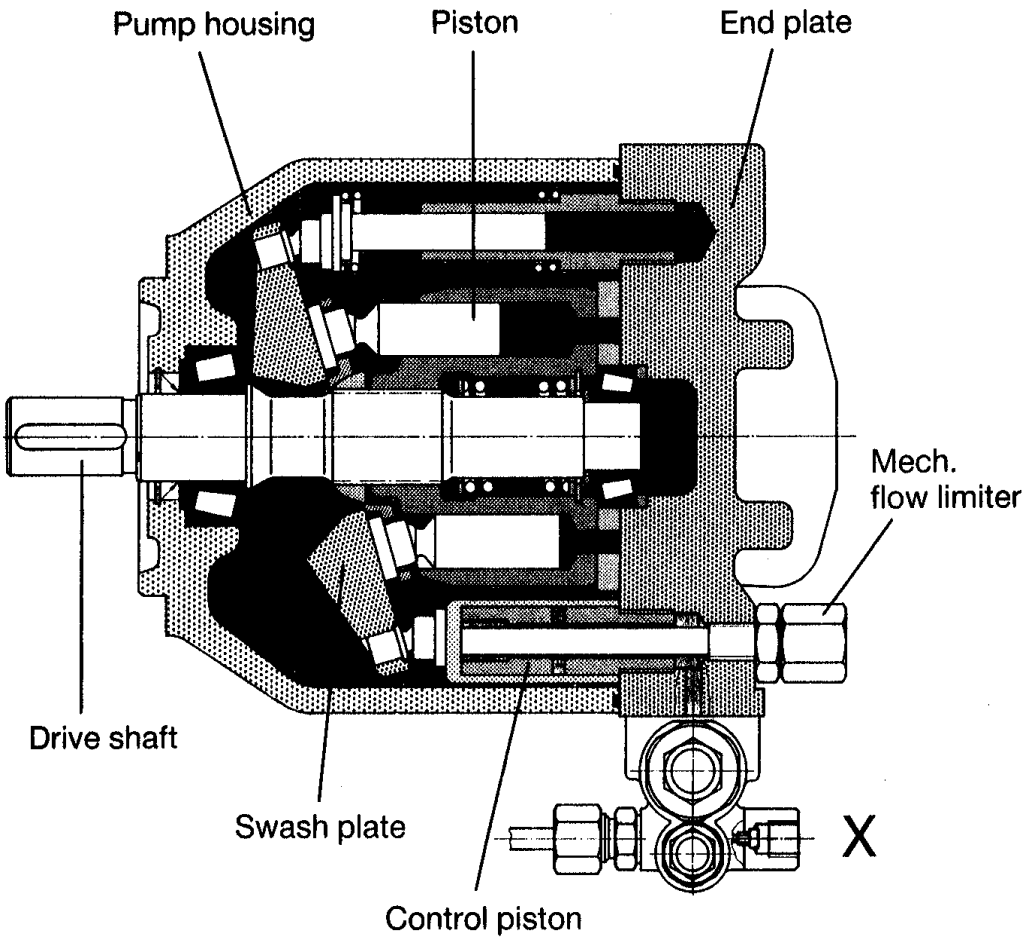
6 Sicherungsring ganz einrasten.

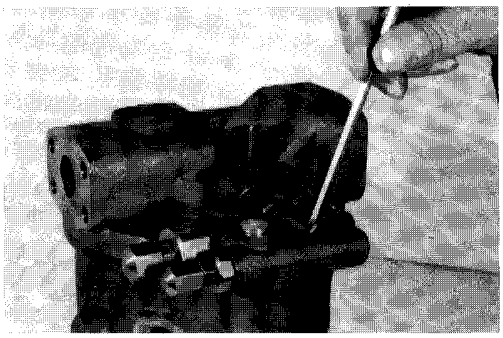
Assemble the retaining ring in the correct position.



7 Paßfeder einbauen.

Assemble the key.



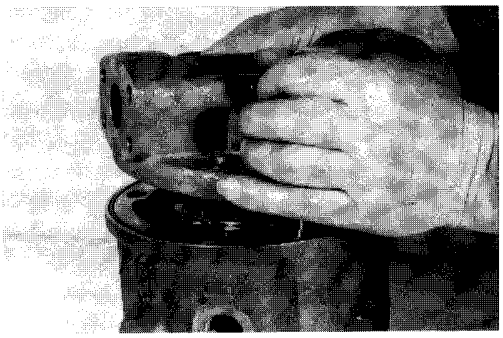


11 Abbau des Steuerventils.

Disassemble pilot valve.

12 Markieren der Anschlußplatte und Lösen der Befestigungsschrauben.

Mark position of the port plate and remove socket screws of port plate.



13 Abheben der Anschlußplatte mit allen Verstellteilen.

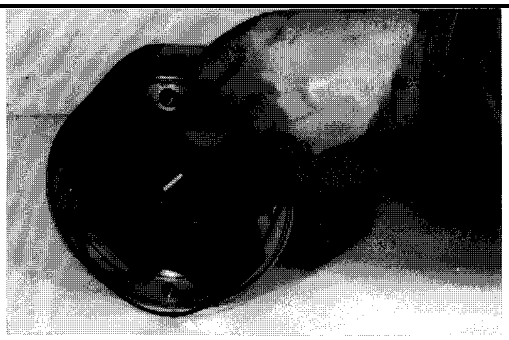
Remove port plate together with all parts of the control device.

14 Abheben des Kegelrollenlagers und Abstimmscheiben (anschlußplattenseitig).

Disassemble taper roller bearing and shims (nearby port plate).

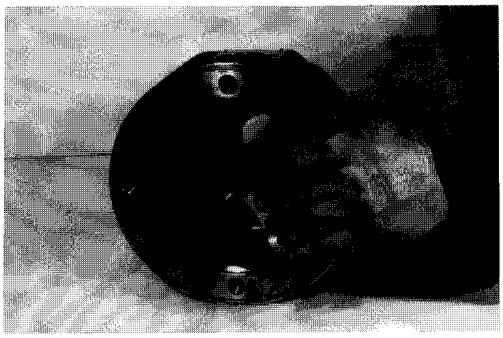
15 Triebwerk herausziehen.

Disassemble the rotary group.



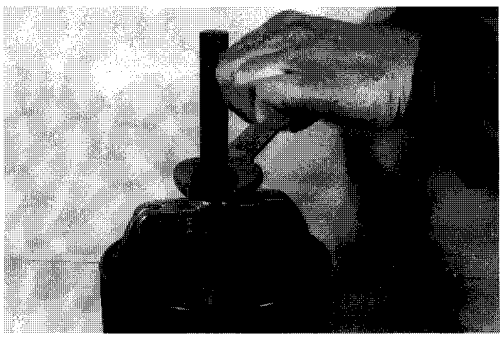
16 O-Ring entfernen.

Remove the O-ring.



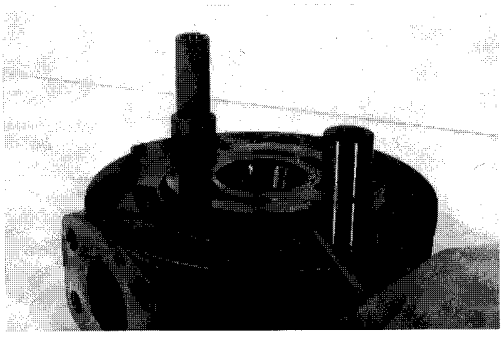
17 Lagerschalen herausheben.

Disassemble bearing shells.



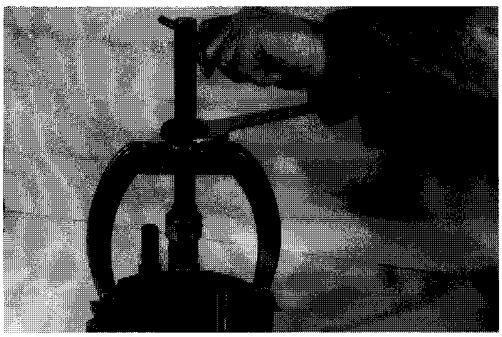
18 Kugellager Ab- und Auszieher (handelsüblich) für Kegelrollenlager-Außenring (antriebswellenseitig).

Use bearing puller to remove outer bearing race of front bearing.



19 Steuerplatte abheben.

Remove the control plate.

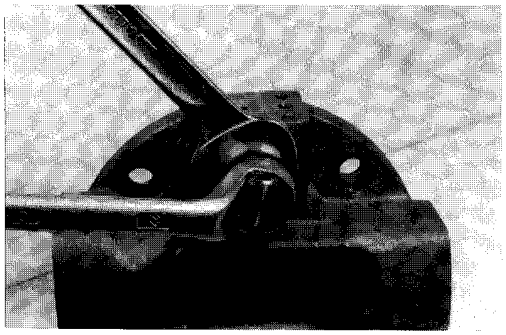


20 Kugellager Ab- und Auszieher (handelsüblich) des Kegelrollenlager-Außenringes (anschlußplattenseitig).

Use bearing puller to remove outer bearing race of rear bearing.

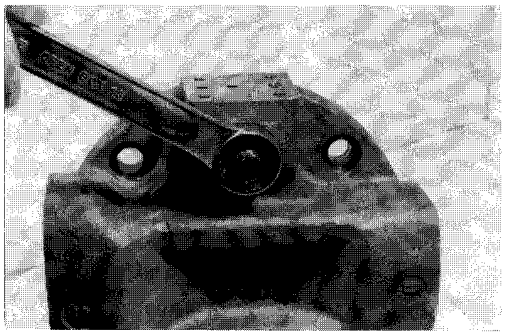
21 O-Ringe entfernen.

Remove the O-rings.



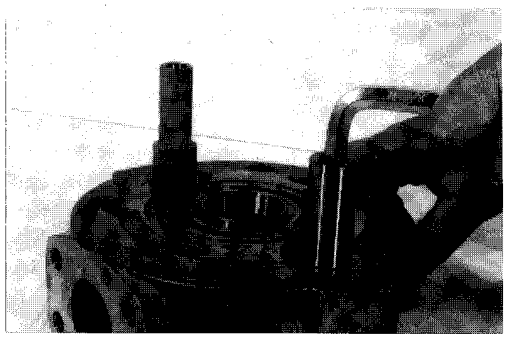
22 Demontage der Hutmutter für Gewindestift.

Disassemble the head nut of threaded pin.



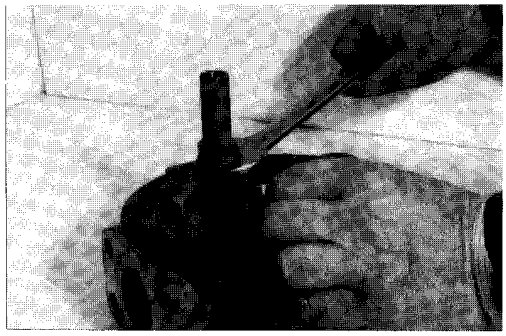
23 Demontage des Gewindestiftes.

Disassemble the threaded pin.



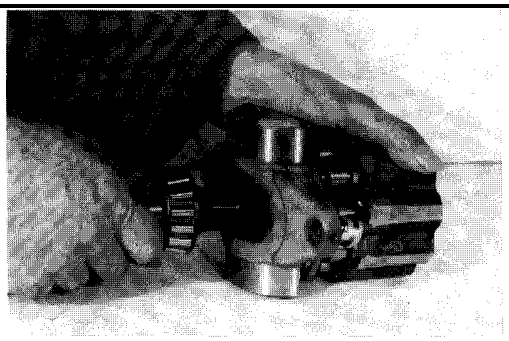
24 Kolbenführung V ausbauen.

Disassemble the guide of control piston.



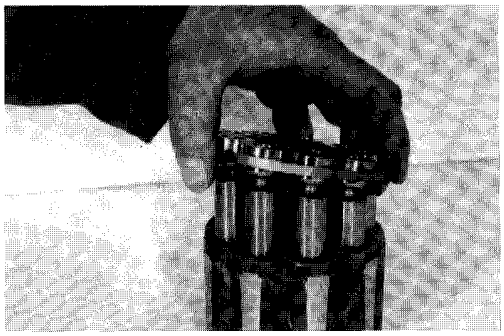
25 Kolbenführung des Gegenkolbens ausbauen.

Disassemble the guide of opposite piston.



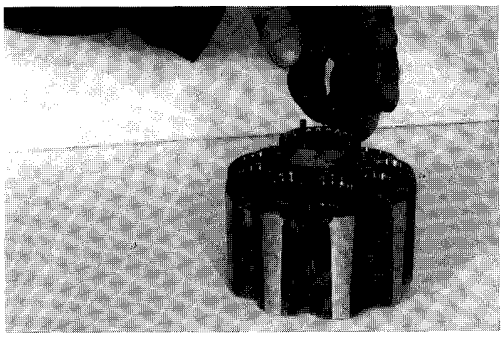
26 Antriebswelle aus der Rotationsgruppe herausziehen.

Pull out drive shaft.



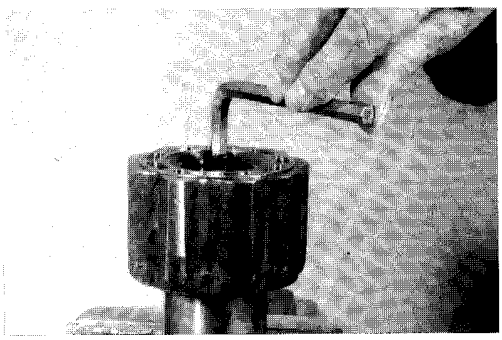
27 Kolben und Rückzugplatte entfernen.

Remove the piston and retaining plate.



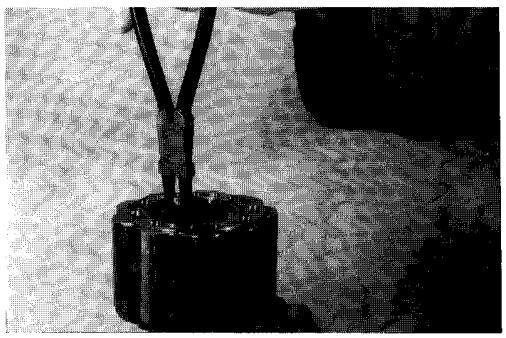
28 Rückzugkugel entfernen.

Remove the retaining ball.



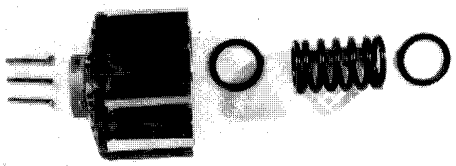
29 Vorspannung der Feder für Ausbau des Sicherungsringes erhöhen.

Compress the center spring in order to disassemble the retaining ring.



30 Sicherungsring ausbauen.

Disassemble the retaining ring.



31 Restliche Einzelteile des Zylinders: Zylinderstifte, Zylinder, Scheibe, Feder, Scheibe.

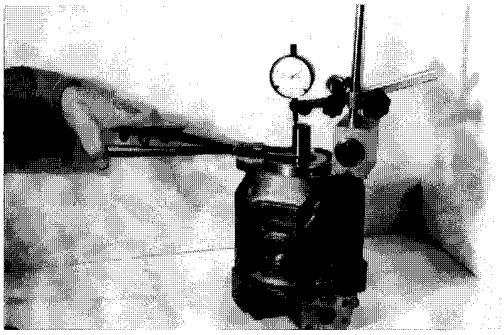
Remaining parts of cylinder: pins, cylinder, shim, spring, shim.

H I N W E I S

N O T E

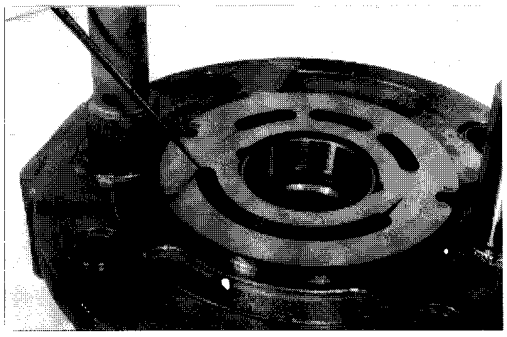
32 Beim Zusammenbau der Pumpe in umgekehrter Reihenfolge ist auf die folgenden Punkte (33-43) zu achten.

Assemble the pump in reverse order and note the following (33-43).



33 Im Graugußgehäuse werden die Kegelrollenlager mit einer Vorspannung von 0...0,05 abgestimmt.

Taper roller bearing in the cast iron pump-housing must have a initial tension with 0...0,05 mm.



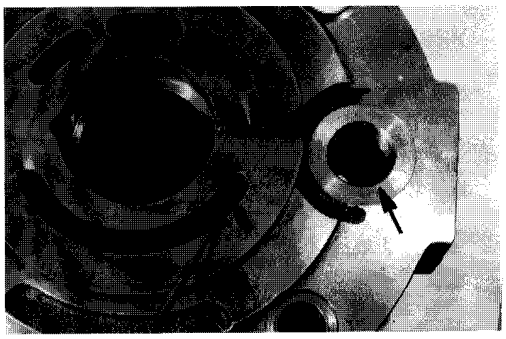
34 Vorbereiten der Anschlußplatte (Drehrichtung rechts). Führung für Verstell- und Gegenkolben mit Loctite einkleben.

- Lagerichtiges Verdrillen in Drehrichtung 4^{o} (Steuerplatte).
- Befetten der O-Ringe.

See picture 34.

Port plate (direction of rotation clockwise): Both piston guides are glued with Loctite.

- Correct position of distributor plate (clockwise 4^{o}).
- Grease O-rings prior assembly.



36 Vorbereiten der Anschlußplatte (Drehrichtung links). Führung für Verstell- und Gegenkolben mit Loctite einkleben.

- Lagerichtiges Verdrillen in Drehrichtung 4^{o} (Steuerplatte).
- Befetten der O-Ringe.

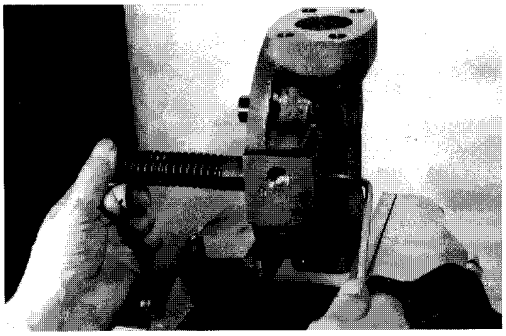
1. Lage des Gegenkolbens.

See picture 36

Port plate (direction of rotation anti-clockwise): Both piston guides are glued with Loctite.

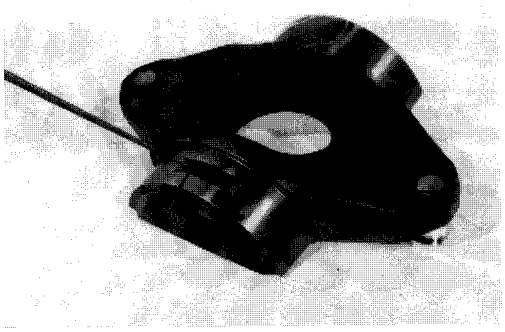
- Correct position of distributor plate (anti-clockwise 4^{o}).
- Grease O-rings prior to assembly.

1. Position of the counter piston.



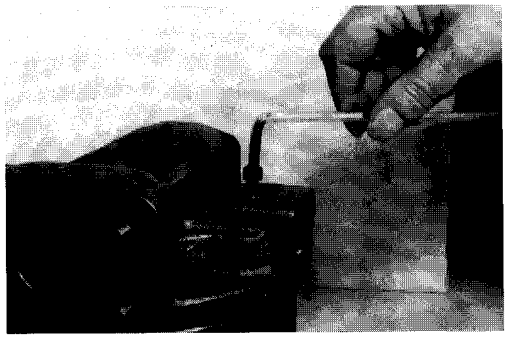
38 Vorspannen der Feder für Gegenkolben (Montagehilfe).

Retain the spring tension with a bolt (only for fitting).



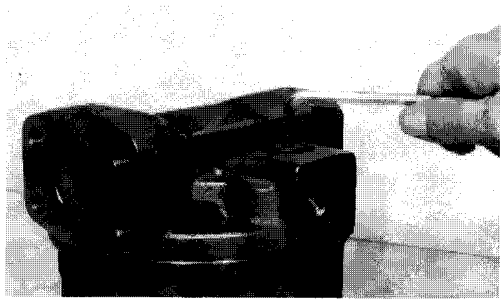
39 Lagerichtiger Einbau der Schwenkwiege mit großer Schmiertasche auf der Hochdruckseite, Schwenkwiege für Drehrichtung rechts oder Schwenkwiege für Drehrichtung links verwenden.

Correct position of cradle (lubrification bore relief on the high pressure side), use cradle for clockwise rotation, if counter clockwise use cradle for counter clockwise rotation (two different sub-assemblies).



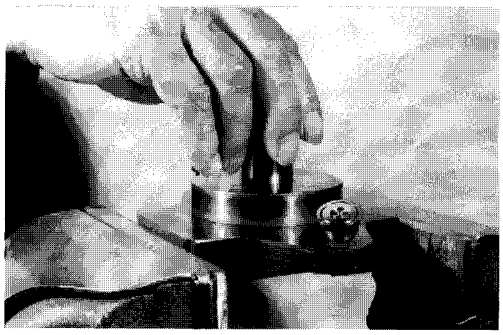
40 Nach dem Anziehen der Anschlußdeckelschrauben (lagerichtiges Anbauen der Anschlußplatte, entsprechend Markierung) entfernen der Montagehilfe.

After fitting the port plate in the correct position (see mark), remove the spring retaining bolt.



41 Montage des Verschlußstopfens.

Install the plug.

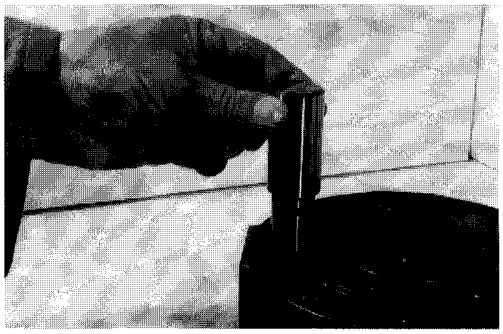


42 U.U. Nacharbeit der Schwenkwiege im Laufbereich durch Läppen möglich, jedoch Auspressen der Anschläge (Kugelzapfen und Gleitschuh) nicht zulässig. (Riefenbildung beim Wiedereinbau.)

If it is possible to lap the cradle (running area of the piston shoes) it can be possible to use the cradle again.
Notice: It is no allowed to press out the piston connection parts of the cradle (scorings while fitting!).

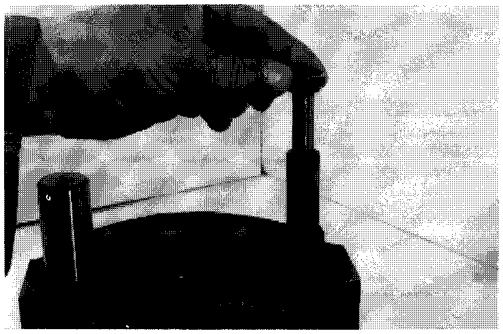
43 Kontaktstelle Steuerplatte/Zylinder durch Nachläppen ggf. wiederverwenden (Angabe gilt nicht für Guß-Zylinder).

Connection between control plate and cylinder: if lapping is possible use it again, but it is not allowed if you use cast iron cylinders.



44 Überprüfung der Laufeigenschaft des Verstellkolbens.

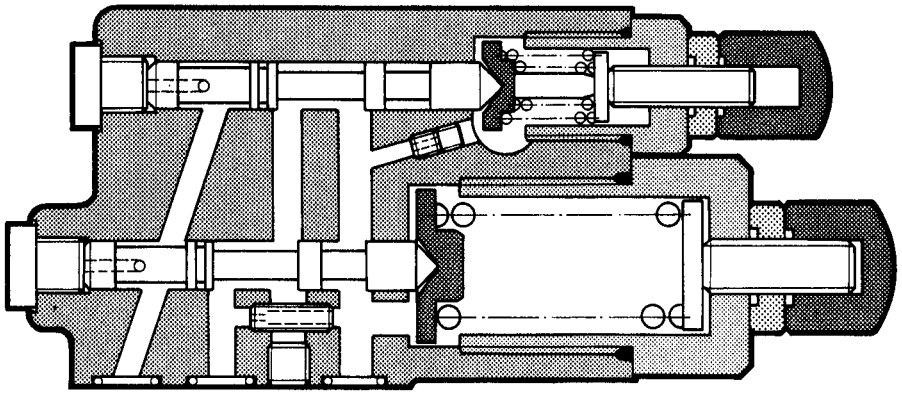
Check running condition of control piston.



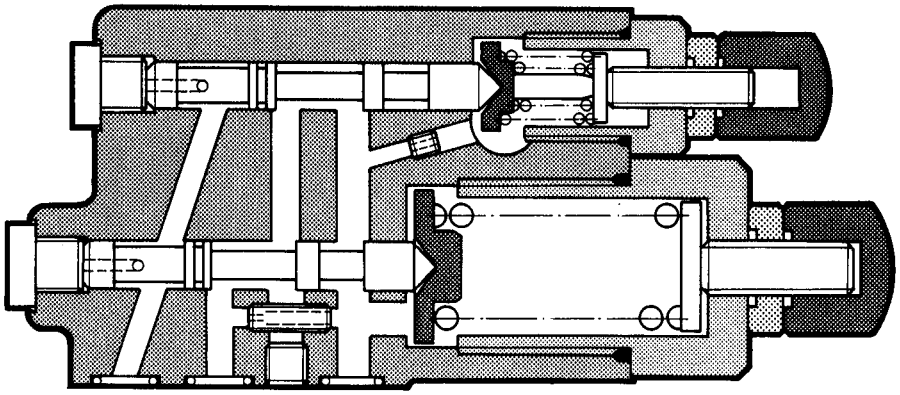
45 Überprüfung der Laufeigenschaft des Gegenkolbens.

Check running condition of opposite piston.

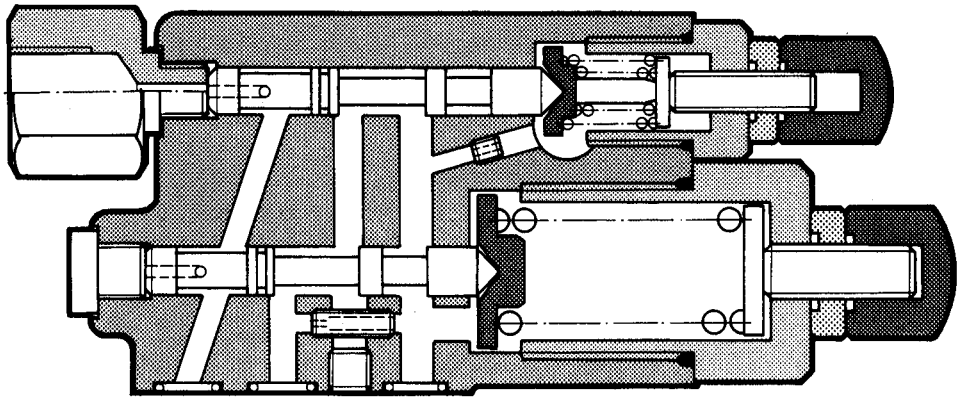
mit Stopfen
with plug

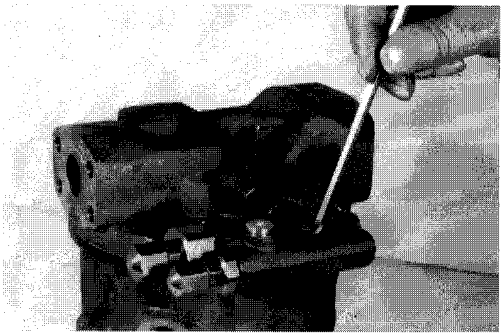


Entlastungsdüse montiert
Orifice



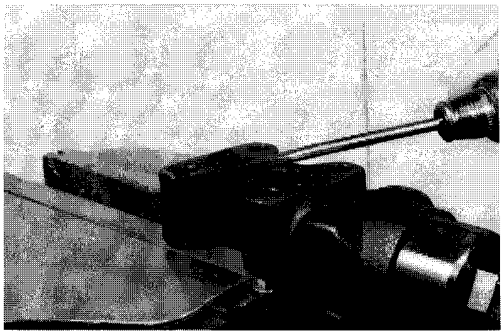
Sonderausführung
Special design





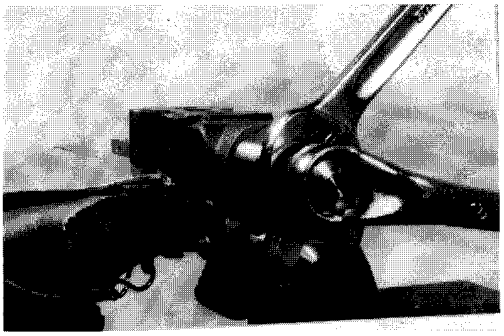
46 Lösen der Befestigungsschrauben.(siehe S. 15).

Loosen socket screws.(see page 15).



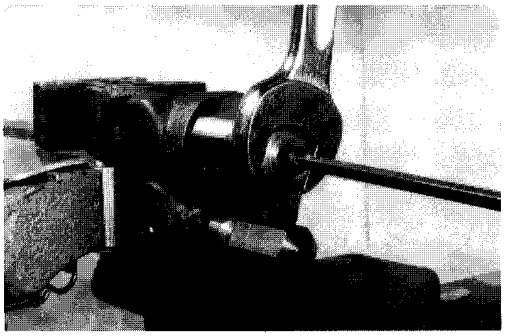
47 Entfernen der O-Ringe.

Remove the O-rings.



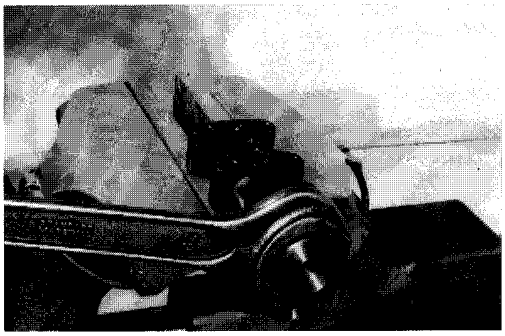
48 Entfernen der Hutmuttern. Die folgenden Arbeiten werden erst beim Druckregler, dann beim Förderstromregler durchgeführt.

Remove the hexagon nuts. First disassemble pressure control, afterwards flow control.



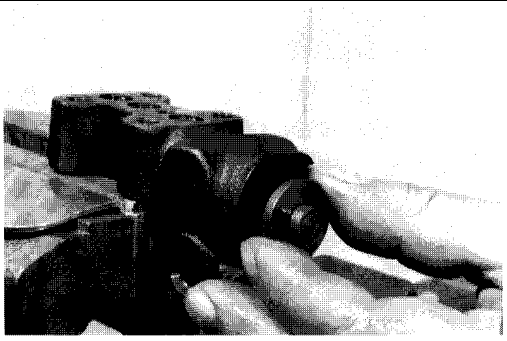
49 Kontermutter lösen und Gewindestift herausdrehen.

Loosen the lock nut and unscrew threaded pin.



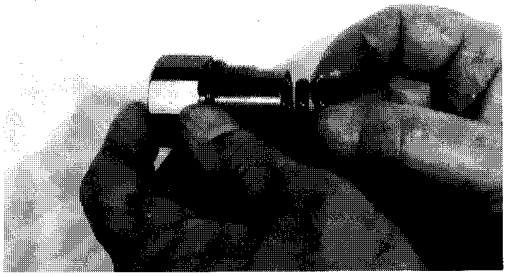
50 Verschlußschraube demontieren.

Disassemble the plug.



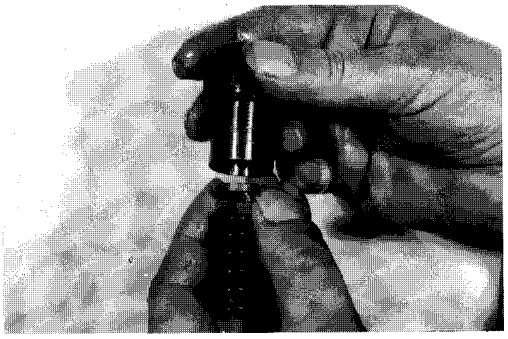
51 Herausnehmen der Scheibe.

Remove the disc.



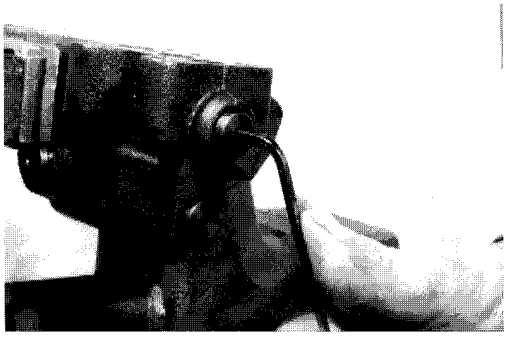
52 Herausnehmen der Feder (bei Förderstromregler 2 Stück).

Remove the spring (two of them are in the flow-control).



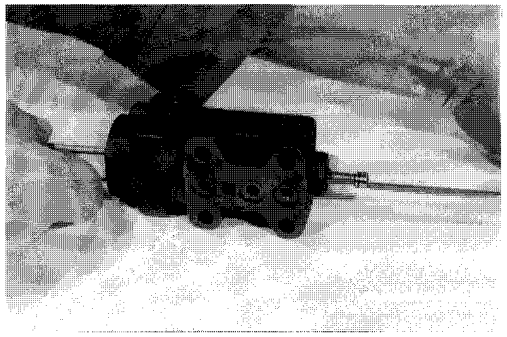
53 Herausnehmen des Federtellers.

Remove the spring cup.



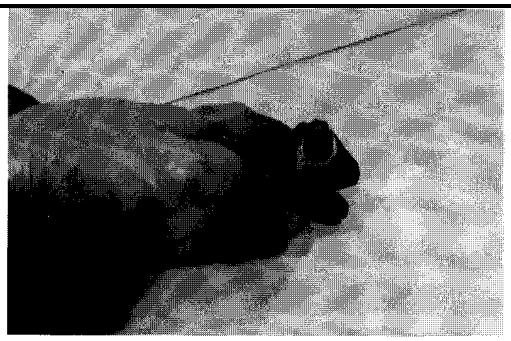
54 Verschlußschraube entfernen.

Disassemble the plug.



55 Sorgfältiger Ausbau des Kolbens.

Be careful while disassembling the piston.

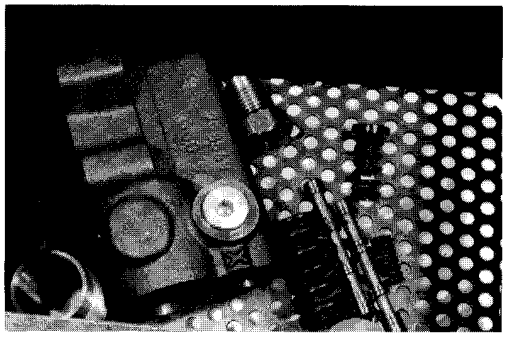


56 Demontage der Pulsationsblende (im Druckregler-Federraum).

Disassemble the orifice (spring area of pressure control).

57 Demontage des Stopfens bzw. der Entlastungsdüse (im Förderstromregler-Federraum).

Disassemble the plug or orifice (spring area of flow control).



58 Auswaschen des Steuerventilgehäuses und Einzelteile mit gründlichem Beseitigen des Waschmittels durch Ausblasen.

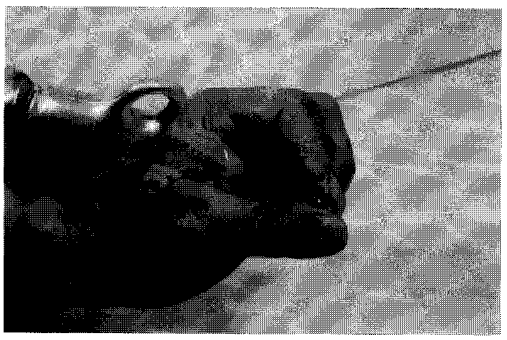
Clean housing and parts with clean fluid and dry with air carefully.

H I N W E I S

N O T E

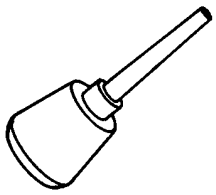
59 Zusammenbau des Steuerventils in umgekehrter Reihenfolge. Dabei ist auf folgende Punkte zu achten (60-63).

Assemble pilot valve in reverse order and note the following (60-63).



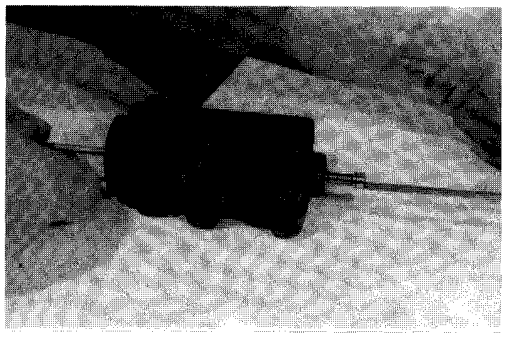
60 Kontrolle der Düsendurchlässigkeit.

Check the opening of orifice.



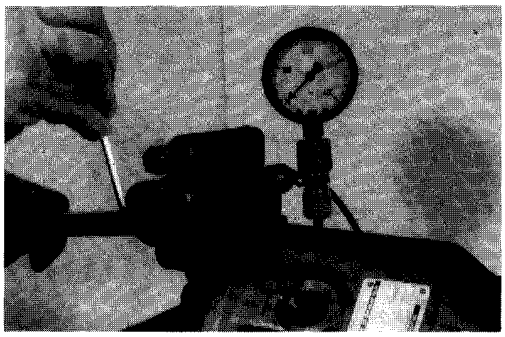
61 Einkleben der Düsen (auf verstopfte Düsen ist beim Klebevorgang zu achten).

Be careful when loctiting the orifice.



62 Laufeigenschaft der Reglerkolben prüfen, keine Beschädigungen der Kolben und der Bohrungen.

Check the movement of the pilot valve spool, and drillings should not be damaged.

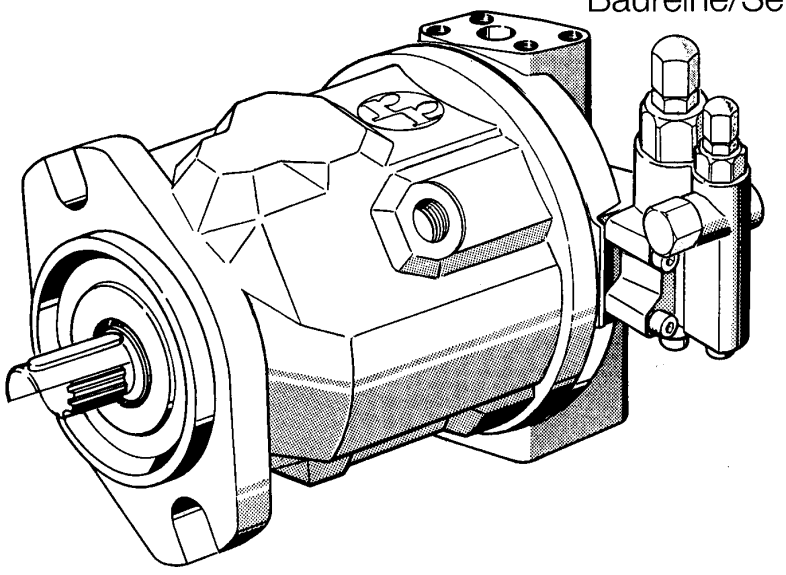


63 Einstellen des Steuerventils siehe Einstellhinweise (s.S. 21).

For adjustment of the pilot valve see set up instructions (page 21).

A10VSO

Baureihe/Series 30

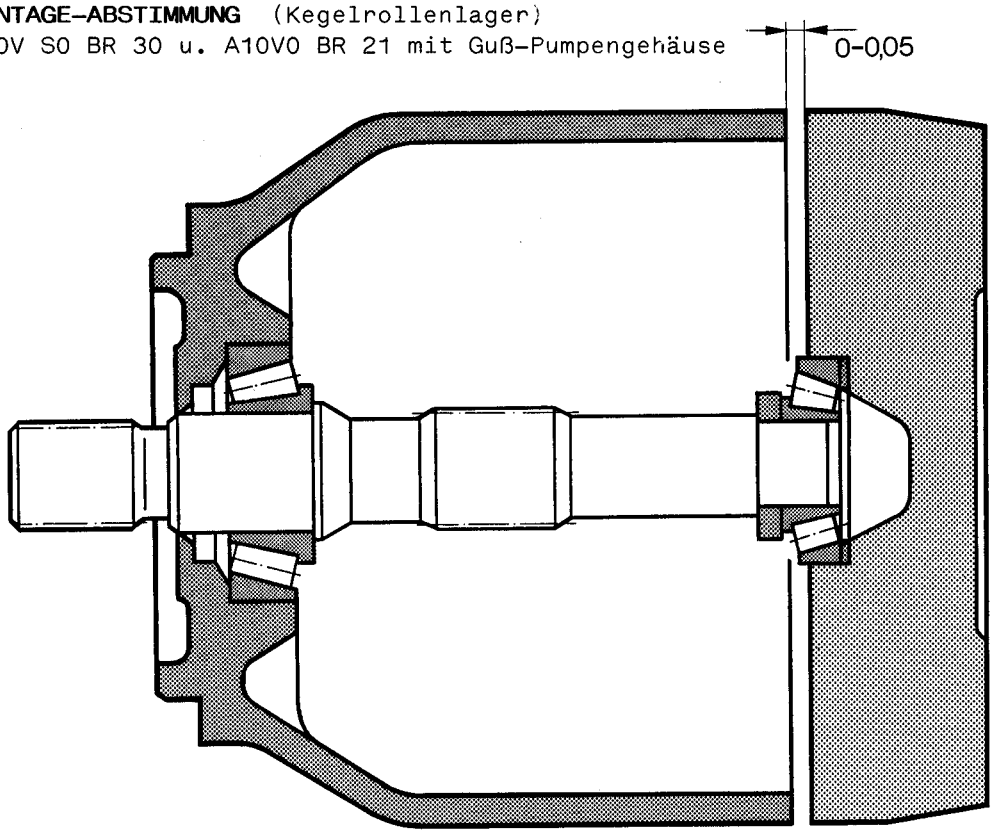


T A B E L L E "mechanische Förderstrombegrenzung"

L I S T mechanical flow limiter

NG / Size	28	45	71	100
Volumenänderung (in cm^3) pro Gewindestiftumdrehung	1,58	3,23	4,69	6,16
Differntial volume (cm^3) if you are rotating the threaded pin - each rotation.				

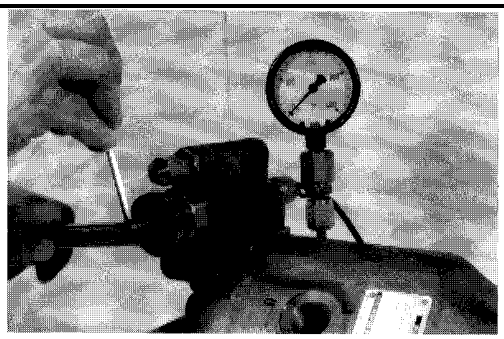
MONTAGE-ABSTIMMUNG (Kegelrollenlager)
A10V SO BR 30 u. A10VO BR 21 mit Guß-Pumpengehäuse



Abstimmung der Triebwerkslagerung (Kegelrollenlager-Pumpengehäuse GG-30).

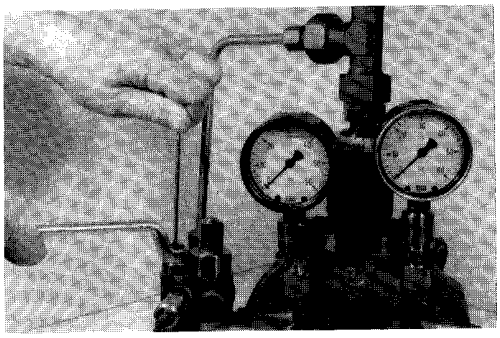
Die Vorspannung der Triebwerkslagerung von 0 bis 0,05 mm durch Abschleifen der Abstimmscheibe Pos. 12 hergestellt.

Cast iron pumphousing must have initial tension of the bearings: 0...0,05 mm.



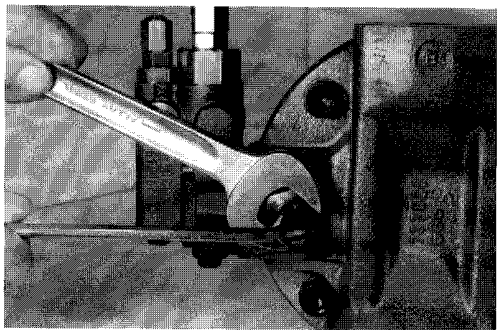
DR: bei geschlossener Verbraucherleitung wird der Regler auf Sollwert eingestellt (bei DFR einstellb. Drossel offen, FR-Feder vorgespannt)

DR: When pressure line is closed adjust the pressure of the controller (if it's DFR design then open th adjustable orifice and increase force of the spring - FR -).



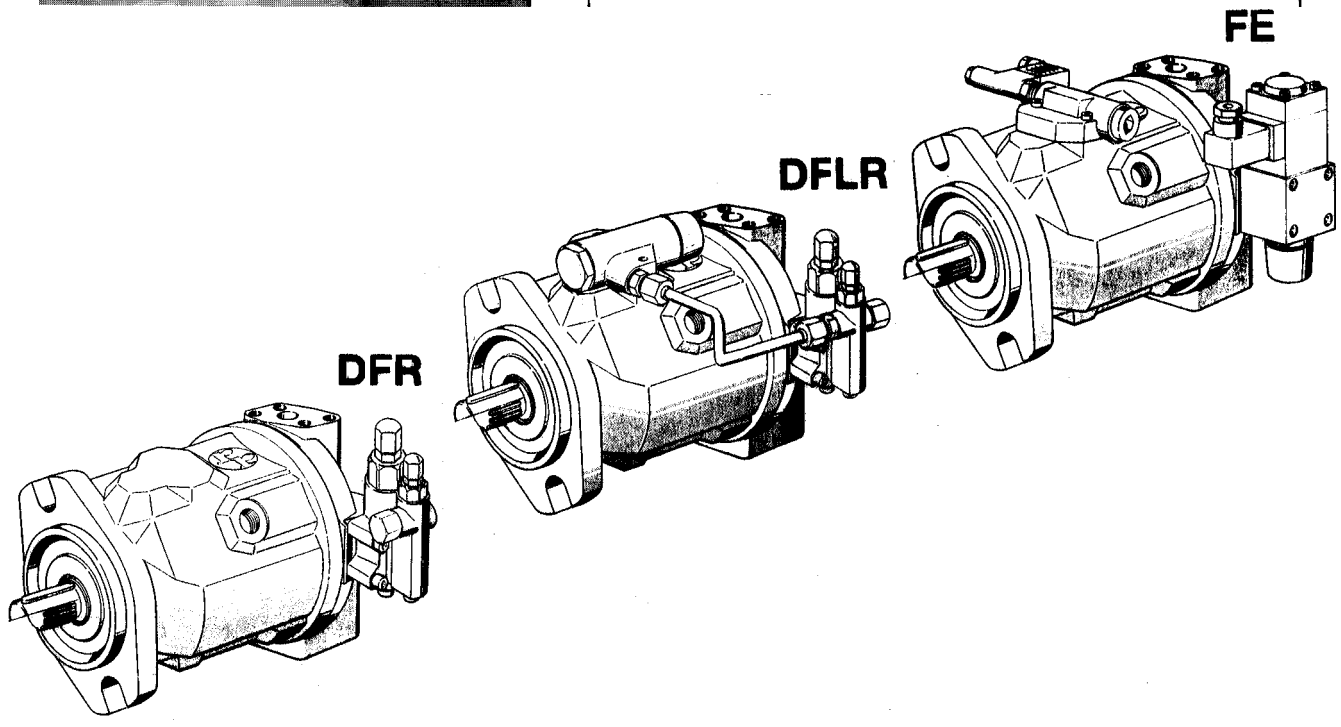
FR: Differenzdruck 14 bar wird eingestellt bei halbem Schwenkwinkel der Pumpe (einstellbare Drossel teilweise geschlossen).

FR: If swivel angle is in the mid position adjust differential pressure 14 bar (adjustable orifice is partly closed).

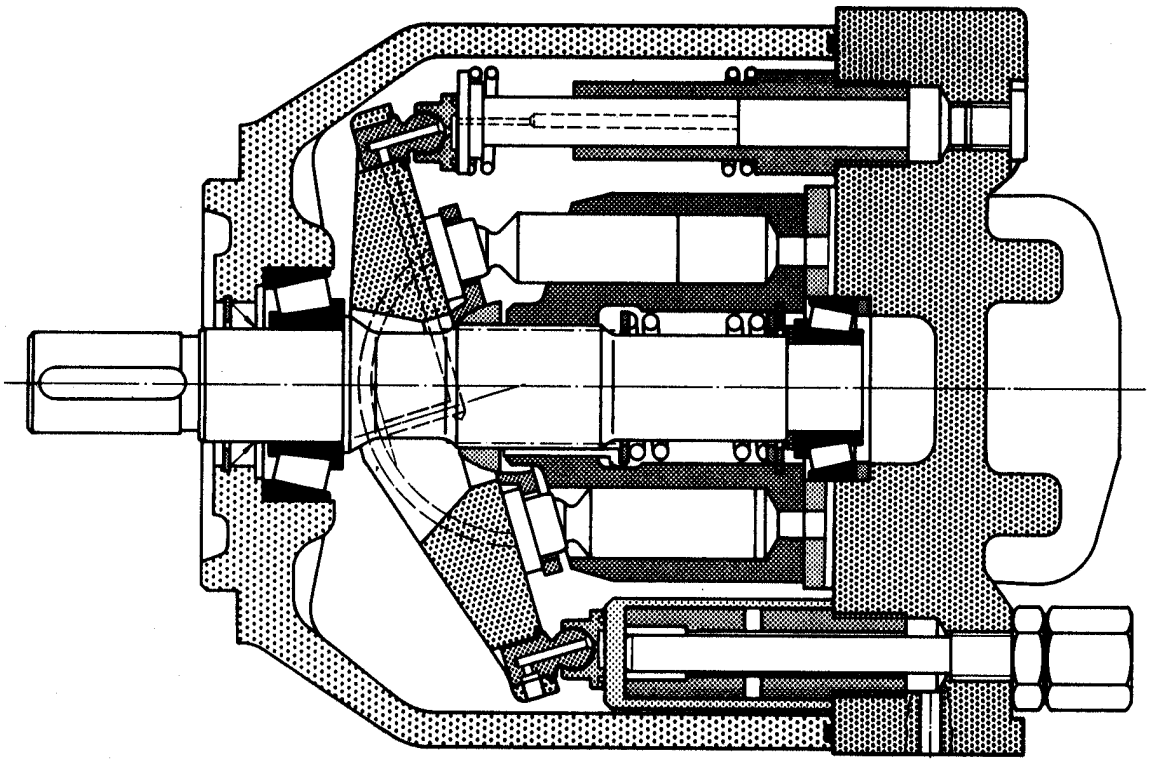


Mechanische Förderstrombegrenzung: Durch Drehen am Gewindestift kann der Förderstrom der Pumpe bis 50% von Vg max reduziert werden. Einstellwerte siehe Tabelle Seite 20.

Mechanical flow limiter: While screwing in the threaded pin you will be able to reduce the flow from Vg max to 50% of Vg max. Set up instructions see "lists" on page 20.

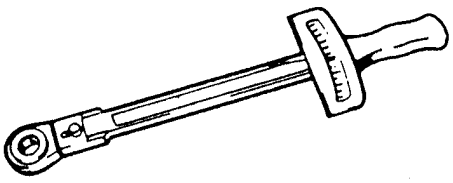


REVISION:



Verwendete Loctite-Sorten / take Loctite:

alle Abreißstopfen / pull-off plugs	Nr. 601
sonst / normaly	Nr. 242



Anziehdrehmomente
Tightening torques

Festigkeitsklassen
Stab.-classification 8.8; 10.9; 12.9

M_a	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M24	M30
8,8	2,3	5,0	8,5	21	41	72	115	176	240	350	600	1160
10,9	3,2	7,2	12	29	58	100	165	250	350	490	840	1620
12,9	4,1	8,5	14,5	35	70	121	195	300	410	590	990	2000

M_a <Nm> = max. Anziehdrehmomente (geölte Schrauben $\mu = 0{,}125$)
M_a <Nm> = max. tightening torques (screws lubricated $\mu = 0.125$)

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AS WE MAKE IMPROVEMENTS TO THE ***REED***
TRAILER MOUNTED CONCRETE PUMP ***01*** MODEL ***B70***,
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.**

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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 ***B70*** 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***.

- 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 DEPT.** 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.

REED
CONCRETE PLACING EQUIPMENT

WARRANTY CLAIM

13822 OAKS AVENUE
CHINO, CA. 91710 909-364-2100

NO.

Date: (1)

Distributor Account Number:
Distributor: (2)
Address:
City:
State: Zip Code:
Phone: ( )

End User Account Number:
End User: (3)
Address:
City:
State: Zip Code:
Phone: ( )

MACHINE PUMP DATA

Model (4) Serial No. (5) In Service Date (6)
Hours of Operation (7) Failure Date (8) Repair Date (9)

NOTE - Hold deficient part(s) until requested by **REED** or until claim is approved. All parts requested to be returned must have a return authroization number provided by **REED**, shipped freight prepaid.Parts must ship within 30 days from **REED** request.

RETURN AUTHORIZATION NO. (10) SHIP DATE (11)

PART NUMBER	DESCRIPTION (12)	QTY.	NET PRICE	TOTAL PRICE	REED REPLACEMENT PART INVOICE NO. (13)

Describe Failure and How it Occurred (14)

REED comments

Claim Approved for

$

REED Use - Claim Approved ☐ Denied ☐

Signed Date

Dealer Signature (15)

Date

REVISION:

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.

F. APPROVAL/DENIAL OF CLAIM

Every effort will be made to process the warranty claim within 2 weeks from receipt.

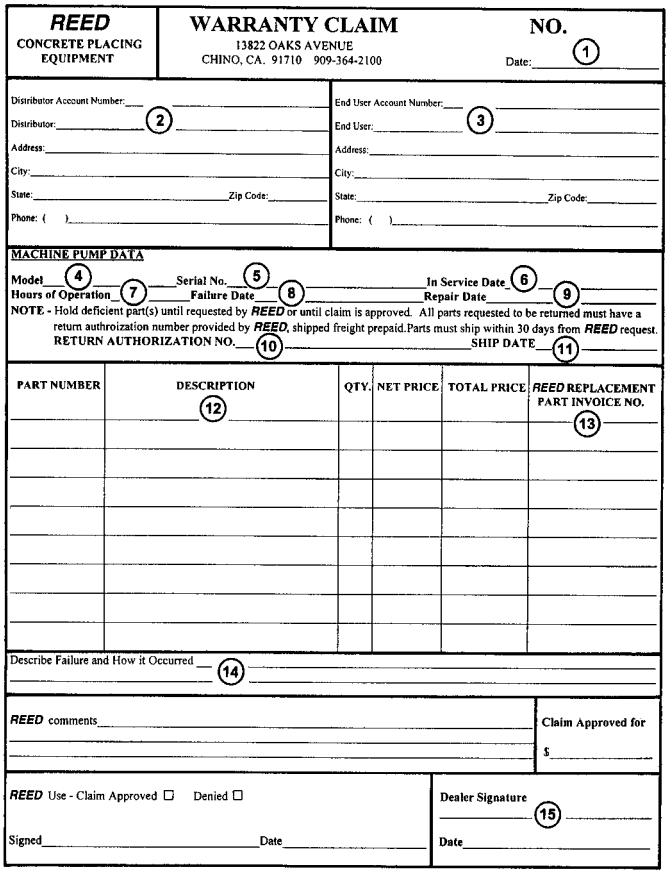
- APPROVAL

  Once your claim has been approved by ***REED***, the pink copy will be forwarded to our Accounting Dept. They in turn will issue a credit against the invoice for the replacement purchased part.

  In the meantime a fax or notification will be sent you indicating the claim and the amount approved.

- DENIAL

  If your warranty claim is denied for any reason, a fax or notification will be sent to you indicating reasons for denial. Should you have any dispute with the decision, you have the right to have the decision reconsidered. You must present your arguments in **WRITING** within 15 days of your receipt of the claim denial.



REED
CONCRETE PLACING EQUIPMENT

WARRANTY CLAIM NO. (1)
13822 OAKS AVENUE
CHINO, CA. 91710 909-364-2100
Date:

Distributor Account Number:
Distributor: (2)
Address:
City:
State: Zip Code:
Phone: ( )

End User Account Number:
End User: (3)
Address:
City:
State: Zip Code:
Phone: ( )

MACHINE PUMP DATA

Model (4) Serial No. (5) In Service Date (6)
Hours of Operation (7) Failure Date (8) Repair Date (9)
NOTE - Hold deficient part(s) until requested by REED or until claim is approved. All parts requested to be returned must have a return authroization number provided by REED, shipped freight prepaid.Parts must ship within 30 days from REED request.
RETURN AUTHORIZATION NO. (10) SHIP DATE (11)

PART NUMBER	DESCRIPTION (12)	QTY.	NET PRICE	TOTAL PRICE	REED REPLACEMENT PART INVOICE NO. (13)

Describe Failure and How it Occurred (14)

REED comments

Claim Approved for
$

REED Use - Claim Approved ☐ Denied ☐

Signed Date

Dealer Signature (15)

Date