

OPERATING AND MAINTENANCE MANUAL

ICE MODEL 416

VIBRATORY PILE DRIVER/EXTRACTOR

WITH MODEL 325 POWER PACK

Serial Numbers: 182940 & Above



INTERNATIONAL
CONSTRUCTION

SPECIALIZING IN PILE DRIVING EQUIPMENT

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OM-416/325-0796

PREFACE

This manual was prepared to acquaint the owner, operator and serviceman with the operation and maintenance of the vibratory driver/extractor. We suggest that this manual be carefully studied before operating or undertaking any maintenance work on the unit.

This manual is organized into two major categories.

The first category is for routine OPERATING INSTRUCTIONS of the unit and includes a GENERAL DESCRIPTION section, which presents a basic explanation of the driver/extractor and some of its specifications. The MAINTENANCE AND ADJUSTMENT section should be referred to periodically for normal servicing of equipment. All machines and equipment require systematic, periodic inspection and maintenance, if they are to perform satisfactorily, over a long period of time. The driver/extractor is primarily a vibrating machine and if not given the best of care, or if improperly used and maintained, it is self-destructive. Therefore, the unit should receive at least the same care and maintenance as other high quality construction equipment.

The second category is for parts reordering and it includes both a PARTS LIST and a pictorial drawing of the assembly, for easier determination of the required part. Refer to the ORDERING PARTS section of the PARTS LIST for more specific procedures regarding parts ordering. Adherence of the listed procedures will insure receipt of the required part(s) with the minimal amount of delay or error.

WARRANTY

INTERNATIONAL CONSTRUCTION EQUIPMENT STANDARD WARRANTY

International Construction Equipment (ICE) warrants new products sold by it to be free from defects in material or workmanship for a period of 90 days after date of delivery to the first user and subject to the following conditions:

ICE's obligation and liability under this WARRANTY is expressly limited to repairing or replacing, at ICE's option, any parts which appear to ICE, upon inspection, to have been defective in material or workmanship. Such parts shall be provided at no cost to the user, at the business establishment of ICE or the authorized ICE distributor of the product, during regular working hours. This WARRANTY shall not apply to component parts or accessories of products not manufactured by ICE and which may carry the warranty of the manufacturer thereof, or to normal maintenance (such as engine tune-up) or to normal maintenance parts (such as oil filters). Replacement or repair parts installed in the product covered by this WARRANTY are warranted only for the remainder of the warranty, as if such parts were original components of said product. ICE COMPANY MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS, FOR ANY PARTICULAR PURPOSE.

ICE's obligation under this WARRANTY shall not include any transportation charges, cost of installation, duty, taxes or any other charges whatsoever, or any liability for direct, indirect, incidental, or consequential damage of delay. If requested by ICE, products or parts for which a warranty claim is made are to be returned, transportation prepaid to ICE. Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution of parts not approved by ICE or any alteration or repair by others in such manner as in ICE's judgement affects the product materially and adversely, shall void this WARRANTY.

NO EMPLOYEE OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY AN OFFICER OF ICE.

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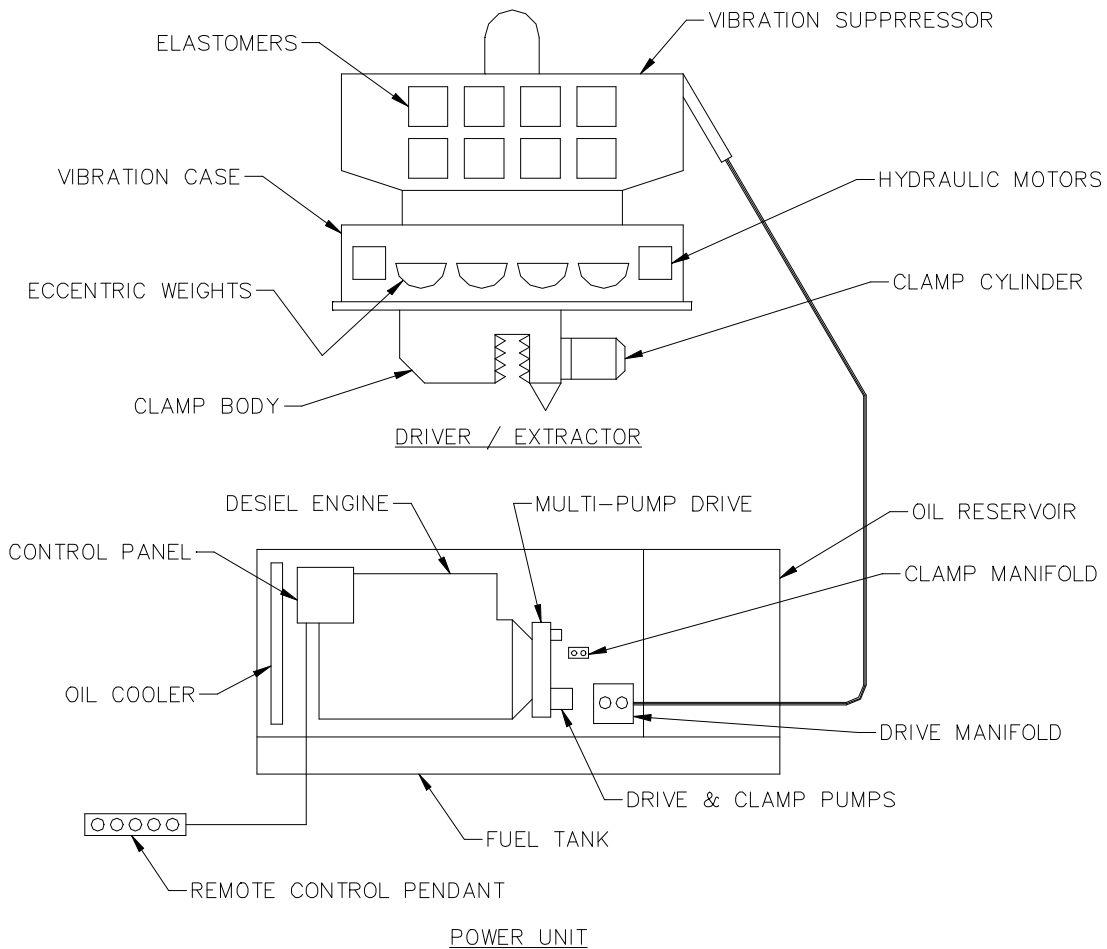
I. GENERAL DESCRIPTION

A. GENERAL

The ICE Model 416L is a low-frequency vibratory pile driver/extractor designed to drive and extract sheet, pipe, timber and concrete piles, caisson pipe and H, I and wide-flange beams.

The Model 416L operates in a frequency range of 700 to 1540 vibrations per minute to provide maximum pile penetration rates in a wide variety of soils. The unit has an eccentric moment of 2200 inch-pounds (25.3 kg-M) and produces a maximum amplitude of .1.00 inch (25.4mm).

The vibratory driver unit consists of two major components. (1) The vibrator with attached clamp and (2) the power unit with remote control pendant.



I. GENERAL DESCRIPTION

B. VIBRATOR

The vibrator consists of two major components. (1) The vibration case and (2) the vibration suppressor.

The vibration case contains four eccentric weights which rotate in a vertical plane to create vibration. The eccentric weights are driven by two hydraulic motors mounted on the vibration case. The two motors and four eccentrics are all gear connected to maintain proper synchronization. The eccentric and motor shafts are mounted in heavy-duty cylindrical roller bearings. Lubrication is provided by a splash system activated by the rotating eccentrics and gears.

A suppressor assembly is mounted to the top of the vibration case, to isolate vibration from the crane and permit pile extraction. A, heavy, outer suppressor housing is connected to the vibration case by sixteen (16) rubber elastomers. Up to forty (40) tons of crane line pull may be applied to this suppressor during extraction.

C. HYDRAULIC CLAMP

A hydraulic clamp, bolted to the bottom of the vibration case, transmits vibration to the piling. The hydraulic clamp contains two gripping jaws; one fixed and one moveable. A large hydraulic cylinder operates the moveable jaw with 125 tons of force to grip the pile. Clamping and un-clamping occurs in a few seconds.

D. POWER UNIT

The Model 325 power unit for the Model 416L vibrator is powered by a Caterpillar 3306TA diesel engine. The diesel engine develops 325 HP at 2100 RPM, which drives 3 hydraulic pumps that create the hydraulic pressures to operate the 416L vibrator motors and hydraulic clamp.

The totally enclosed power unit is mounted on a skid-type fuel tank sub-base. A Control panel at the side of the unit contain all operating gages and controls. A common reservoir supplies hydraulic fluid to three separate hydraulic pumps - two for the vibrator motors and one for the hydraulic clamp.

Three hydraulic hoses, 100 feet in length, connect the power unit to the hydraulic motors on the vibrator. Two other hydraulic hoses run from the power unit to the hydraulic clamp.

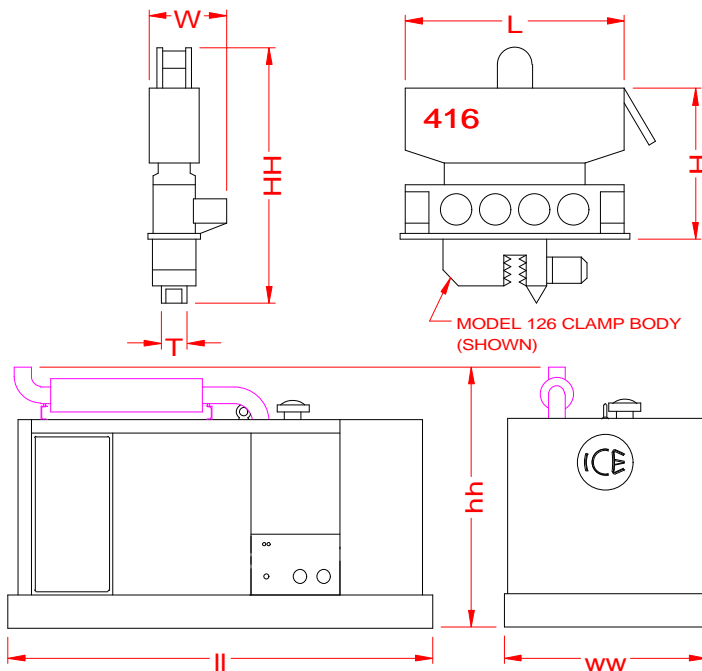
I. GENERAL DESCRIPTION

E. REMOTE-CONTROL PENDANT

The vibrator is operated by a hand-held remote control pendant. The pendant has three, two-way switches and two push buttons, (one with a light). One switch (SLOW-FAST) raises and lowers the diesel engine speed. The second switch (REVERSE-FORWARD) starts and stops the vibrator. The other switch (OPEN-CLOSE) operates the hydraulic clamp. The light indicates that adequate clamping pressure exists for vibration to begin. The (red mushroom) push button (EMERGENCY STOP) shuts down the diesel engine instantly, in the event of an emergency. Note: Controls are duplicated on the control panel in case the pendant is damaged. (See pg.III-5, Section E-e)

F. SPECIFICATIONS

1. Constant improvement and engineering progress make it necessary that we reserve the right to make specification changes without notice.



2. MODEL 416L VIBRATOR (w i t h hydraulic clamp)

Type	Hydraulic
Eccentric Moment.....	2200 In-lbs.(25.3kg-M)
Frequency	760-1600 VPM
Amplitude	1.00 in. (25.4mm)
Pile Clamping Force.....	125 Tons (1112kN)
Max. Line Pull for	
Extraction	40 Tons (356kN)
Suspended Weight with 126 Clamp and half hoses.....	9,975 lbs. (4525kg)
Length [L].....	95 in. (241cm)
Width [W]	17 in. (43cm)
Throat Width [T].....	14 in. (35.5cm)
Height with Clamp [HH].....	101 in.(256.5cm)
Height without clamp [H]	69 in. (175cm)

3. MODEL 325 POWER UNIT

Type	Diesel
Engine.....	CAT 3306TA
Horsepower (2100 RPM).....	325 (242.5kW)
Weight.....	10,485 lbs. (4756kg)
Length [II].....	126in. (320cm)
Width [ww].....	60 in. (152cm)
Height [hh].....	79 in. (201cm)

II. PREPARATION FOR OPERATION

A. GENERAL

When unloading and unpacking the vibratory driver, use extreme care. For your protection, make a thorough inspection of the unit immediately on delivery. In case of any damage or shortage, notify the transit agent at once and have the delivering carrier make a notation on the freight bill.

B. SAFETY PRECAUTIONS

Safety is basically common sense. There are standard safety rules, but each situation has its own peculiarities which can not always be covered by rules. Therefore, your experience and common sense will be your best guide to safety. Be ever watchful for safety hazards and correct deficiencies promptly.

Use the following safety precautions as a general guide to safe operations:

1. Read this manual thoroughly before operating or working on the equipment.
2. Read and follow any safety instructions in the CATERPILLAR engine operators manual.
3. Only well trained and experienced personnel should attempt to operate or maintain this equipment.
4. Never adjust, lubricate or repair the unit when it is in operation, or lifted above ground level.
5. Never remove, paint over or cover warning or safety labels. If labels become damaged or unreadable, replace immediately.
6. All personnel should wear approved safety clothing, including **HARD HATS, SAFETY SHOES, SAFETY GLASSES** and **HEARING PROTECTION** when in the vicinity of this machinery.
7. Do not stand any closer to this equipment than necessary when it is in operation. Parts may loosen and fall. Never stand under operating, or elevated, equipment.
8. When maintaining or repairing the equipment, never substitute parts not supplied, or approved in writing, by ICE.
9. Do not weld, or flame cut, on this equipment.
10. Never use or store flammable liquids on or near the engine.
11. Insure that all lifting equipment, including cranes, wire rope, slings, hooks, shackles, etc., are properly sized for the worst case loads anticipated during operations.
12. If there are any questions about the weights, specifications, or performance of the unit, contact ICE before handling or operating the equipment.
13. If the equipment is to be used for anything other than driving or extracting plumb piles, contact ICE before using the unit.
14. Check wire rope clips for tightness, and check wire ropes for wear, daily.
15. Insure that ground vibrations will not damage or collapse adjacent structures or excavations.
16. Remove all tools, parts and electrical cords before starting the unit.
17. When operating in an enclosed area, pipe exhaust fumes outside. Continued breathing of exhaust fumes may be fatal.

II. PREPARATION FOR OPERATION

B. SAFETY PRECAUTIONS (CONTINUED)

18. When servicing batteries, do not smoke or use open flames in the vicinity. Batteries generate explosive gas during charging. There must be proper ventilation when charging batteries.
19. When filling fuel tank, do not smoke or use open flame in the vicinity.
20. If abnormal equipment operation is observed, discontinue use immediately and correct the problem. Do not leave the equipment control pendant (radio control) unattended.
21. Store oily rags in approved containers, and away from engine exhaust system.
22. Make sure that the vibrator is OFF before starting the power unit engine.
23. Do not adjust, or set, hydraulic pressures higher or lower than those specified in this manual.
24. Never operate this equipment with hydraulic hoses that are damaged or "kinked". Replace damaged hoses immediately.
25. Do not lift, or support, hydraulic hoses with wire rope slings.
26. Never attempt to connect quick disconnects when the power unit is running.
27. Do not pull on, or attempt to move equipment, with hydraulic hoses.
28. Do not attempt to locate hydraulic leaks with your hands. High pressure hydraulic leaks can penetrate the skin, causing severe damage, blood poisoning and infection. Do not attempt to repair leaks while the equipment is in operation.
29. Do not attempt to tighten, or loosen, fittings or hoses when the machine is in operation.
30. Power unit must always be placed on level, stable, ground.
31. Do not remove power unit heat shields, or operate power unit without heat shields. Severe fires may result.
32. A properly maintained fire extinguisher, suitable for oil fires, must be kept in the immediate vicinity of equipment operations.
33. When moving or transporting this equipment, insure that the vehicle or vessel is of sufficient capacity to handle the load, and that the equipment is properly tied down.
34. When moving or transporting this equipment, be sure that quick disconnect dust caps are tight, and that cap safety cables are in place. Be sure that all equipment parts are tight, or properly secured, before shipment. Unsecured parts may vibrate loose and fall, during transport, causing injury or property damage.
35. Keep crane boom, piles, leads, wire rope and other equipment at least 15' (5M) from electrical power lines, transformers and other electrical equipment, or at such distance as required by applicable safety codes.
36. Rounded or damaged bolt heads or nuts should be replaced so that proper torque values may be obtained. Proper torque values are necessary to prevent parts on this equipment, leads and crane boom from loosening and falling. Refer to Torque Chart, in this manual, for proper values.
37. Do not use the vibrator clamp to move piles. Loss of hydraulic pressure could cause piles to fall.

II. PREPARATION FOR OPERATION

B. SAFETY PRECAUTIONS (CONTINUED)

38. Never clamp vibrator to pile and disconnect the crane line. Loss of hydraulic pressure could cause vibrator to fall. Lay vibrator down when not in use.
39. When extracting piles, always attach a safety line between pile and crane hook.
40. When extracting piles, check crane load/radius tables to be sure crane capacity is adequate for maximum allowable extraction pull.
41. When extracting piles, or any other driving operations, always be sure that the crane line is aligned with the centerline of the pile. Do not side load crane boom or vibrator. Dangerous crane boom, or vibrator, damage may result.
42. When extracting piles, do not exceed the capacity of the vibrator suppressor. Continued operation against the safety stops will cause damage to the crane boom and the vibrator.
43. Never induce line pull on a vibrator before starting the unit in vibration. Always start both driving and extraction of piles with a slack line.
44. Keep hands away from clamp jaws.
45. Keep hands away from vibrator suppressor during operation. Clearances may change causing pinch points.
46. Do not run vibrator unless clamp jaws are closed.
47. Use tag line to control vibrator whenever possible.
48. When driving "batter" piles, insure that the leads, and crane boom, have sufficient bending strength to handle the worst case load. Consult ICE.

REMEMBER, SAFETY IS EVERYONE'S BUSINESS.

C. RIGGING OF VIBRATOR

A steel wire rope sling must be connected to the lifting pin of the vibration suppressor. The required strength of this sling depends on the capacity of the crane and the work to be carried out. A safety factor of five is recommended. Several turns of a smaller diameter cable will usually last longer than one turn of a larger diameter cable.

D. CONNECTION OF HYDRAULIC CLAMP

The vibrator is usually shipped with the hydraulic clamp already attached.

If the clamp is not attached, it will be necessary to attach it to the bottom of the vibrator. Orient the clamp to the vibrator with the clamp cylinder end (movable jaw) at the same end of the vibrator as the hose chute is mounted. All eight (1.5-6UNC x 5.00) bolts must be in place and torqued to approximately 2800 ft-lbs.

For caisson work, the caisson beam must be attached to the bottom of the vibrator and tightened as above. Then slide the clamps into position on the caisson beam.

II. PREPARATION FOR OPERATION

E. CONNECTION OF HYDRAULIC HOSES

1. Connection of hoses at power unit.

- a. The vibrator and hydraulic clamp are connected to the power unit by five hydraulic hoses (Fig. 1) on the next page.

CAUTION: The power unit must be shut down during connection of the hydraulic hoses.

- b. The hoses connect to the power unit with quick-disconnect couplers. Hose couplers are arranged to insure correct connections at the power unit. See the diagram (Fig. 1) for correct hose connection.
- c. Clean couplers with a lint-free cloth before making connections.
- d. Make sure that the couplers are fully run up. They should be fully hand tight. Do not use wrenches to tighten.

2. Connection of hoses at vibrator.

- a. The vibrator is usually shipped with the hoses attached to the vibrator. If the hoses have been shipped separately, they must be connected in the field. Fig. 1 shows the correct arrangement of the five hoses connecting the power unit to the vibrator.

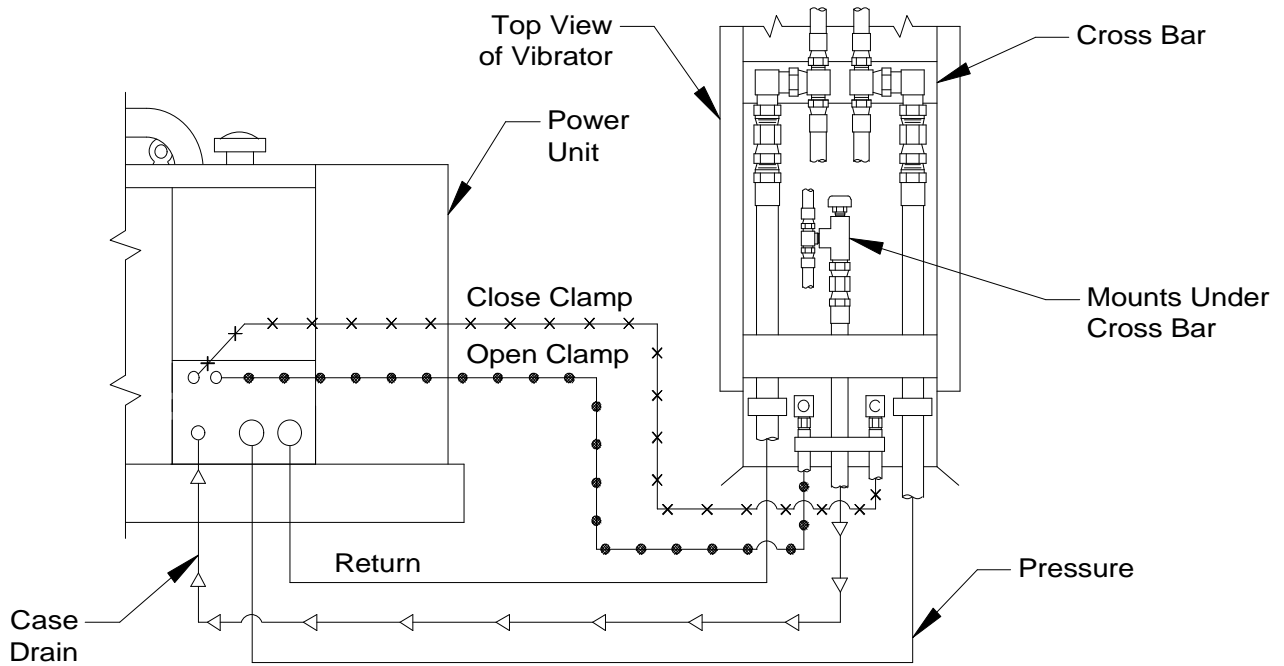
CAUTION: Starting the vibrator with the hoses reversed will result in low power or possible ruptured hoses.

- b. The vibrator is usually shipped with the hydraulic clamp and hoses attached. If the clamp has been shipped separately, the two hoses connecting the clamp to the vibrator must be connected. (Fig. 2) on the next page shows the correct arrangement of these hoses.

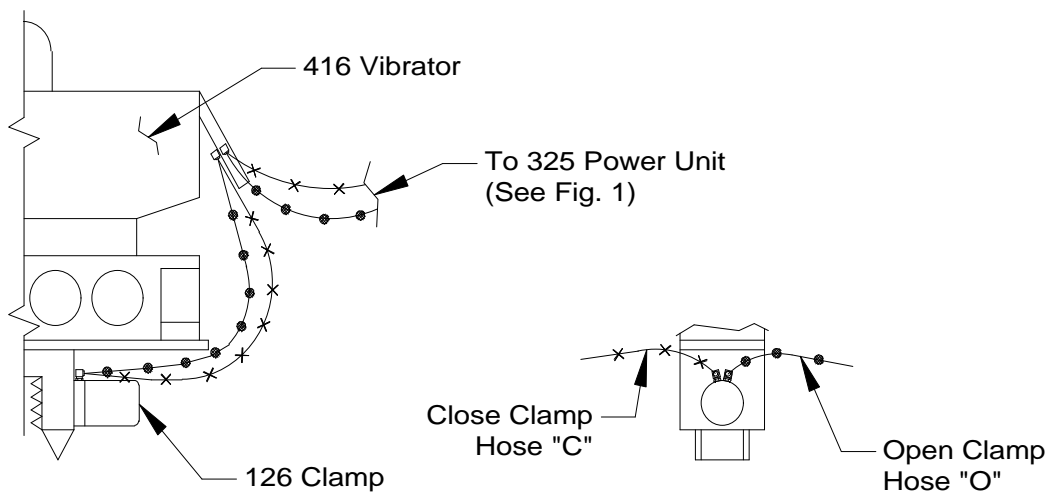
For caisson clamps, four hoses must be connected. The two 90° fittings on the underside of the hose chute must be removed and replaced by two tees. This allows the four hoses to run to both sides of the vibrator and operate the caisson clamps. The 90° fittings on the top side of the hose chute are stamped O and C (O for Open Clamp on the left side) (C for Close Clamp on the right side).

II. PREPARATION FOR OPERATION

E. CONNECTION OF HYDRAULIC HOSES (CONTINUED)



(Fig. 1)



(Fig. 2)

II. PREPARATION FOR OPERATION

F. BLEEDING HYDRAULIC CLAMP HOSES

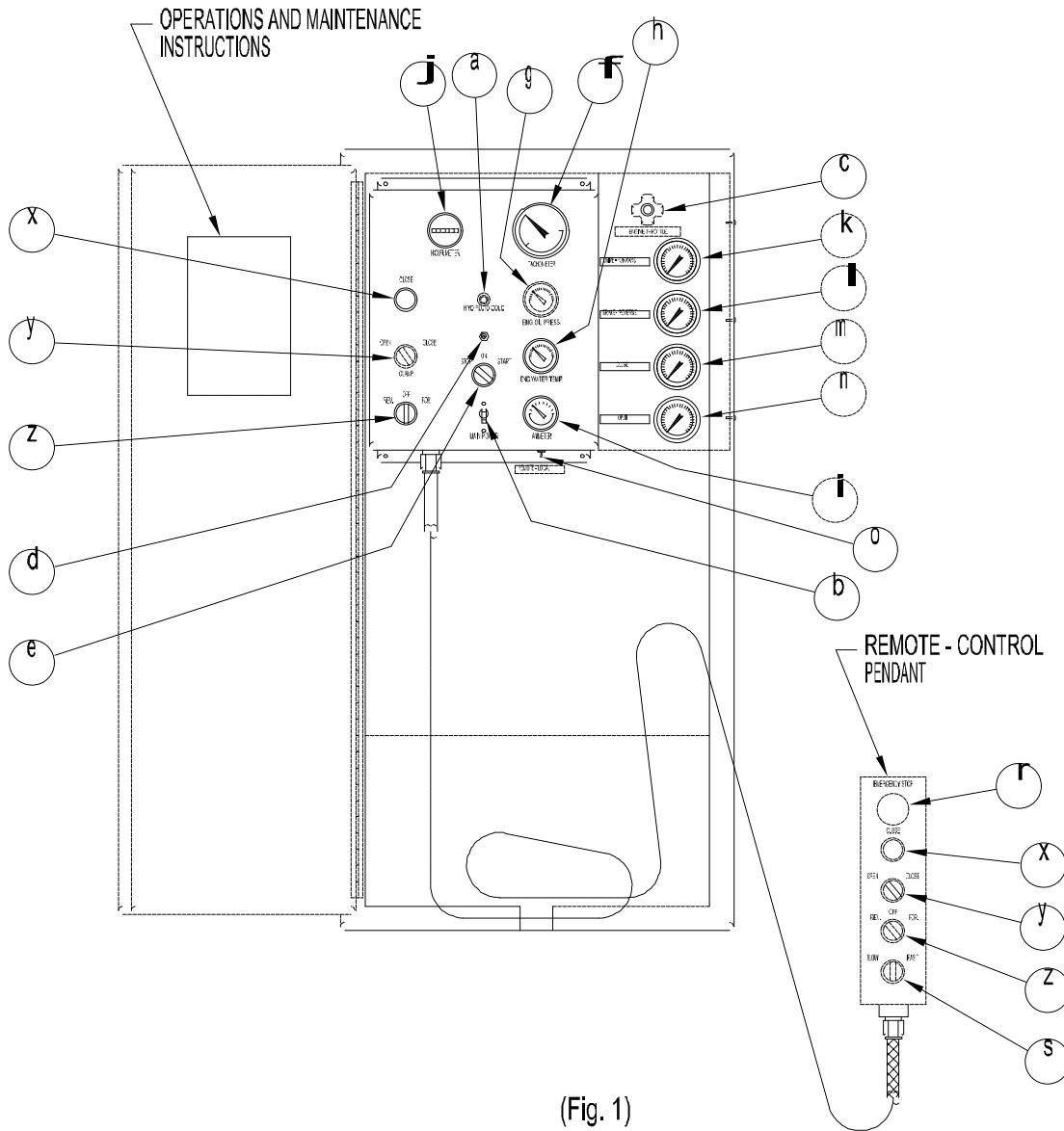
1. When the vibrator and hydraulic clamp are shipped with all hoses attached (between vibrator and clamp and five main hoses connected to the vibrator), the hoses are usually full of fluid and may be used immediately. However, if any of the clamp hoses are connected at the jobsite or if air is present in hoses, they must be bled prior to operation.
2. Read SECTION III - OPERATING INSTRUCTIONS.
3. Start and warm up the diesel engine in accordance with SECTION III-C - STARTING AND WARMING UP ENGINE.
4. With the engine warmed-up and running at 1500 RPM, loosen the close-clamp line at the hydraulic clamp. Turn the clamp switch on the remote-control pendant to CLOSE. Wait until fluid flows from the connection at the hydraulic clamp. When fluid flows without air, tighten the connection.
5. After the line has been bled, alternately turn the clamp switch to CLOSE and OPEN to insure that the clamp is working properly. It may be necessary to bleed the line more than once. The open-clamp line may also require bleeding.

G. FILLING VIBRATOR PRESSURE HOSE

1. The vibrator is usually shipped with the vibrator hydraulic hoses full of fluid and the unit may be used immediately. However, if the pressure hose has been removed from the vibrator, the hose should be allowed to fill with hydraulic fluid prior to full speed operation.
2. Read SECTION III - OPERATING INSTRUCTIONS.
3. Start and warm up the diesel engine in accordance with SECTION III-C - STARTING AND WARMING UP ENGINE. Hold the vibrator in a vertical position.
4. With the engine warmed up and running at 1000 RPM, turn and hold the vibrator switch REVERSE. The hoses will fill in approximately 5 minutes. CAUTION: If vibration begins in the vibrator, stop immediately and recheck hose connections.

III. OPERATING INSTRUCTIONS

CONTROL PANEL WITH REMOTE CONTROL-PENDANT



III. OPERATING INSTRUCTIONS

A. COMPLETION OF SET-UP AND MAINTENANCE

1. Complete all preparation as described in Section II.
2. Read Section IV - MAINTENANCE AND ADJUSTMENTS and perform any required maintenance.

B. CONTROL PANEL

1. The control box (Fig. 1, page III-1) at the side of the power pack contains the controls and gages for the diesel engine, vibrator, and the OPERATION AND MAINTENANCE INSTRUCTIONS.
2. Control panel contains the following controls and gages:
 - a. Hydraulic fluid cold light - comes on if hydraulic fluid is below 60°F (16°C).
 - b. Main power switch (Circuit Breaker) - on/off switch for 24 volt electrical power. Must be "ON" for the vibrator to run.
 - c. Engine throttle.
 - d. Engine shut-down reset button - on start must be held in until oil pressure exceeds 30 PSI.
 - e. Engine "ON/OFF/START" switch - for diesel engine.
 - f. Engine tachometer.
 - g. Engine oil pressure gage.
 - h. Engine water temperature gage.
 - i. Engine ammeter.
 - j. Engine hourmeter.
 - k. Pressure gage - (Drive - Forward).
 - l. Pressure gage - (Brake - Reverse).
 - m. Pressure gage - (Close).
 - n. Pressure gage - (Open).
 - o. Remote-Local switch.
 - r. Emergency Stop - Push to stop engine
 - s. Electric Throttle
 - x. Clamp light.
 - y. Clamp switch.
 - z. Vibrator switch.
3. The OPERATION AND MAINTENANCE INSTRUCTIONS on the control panel are there as reminders only. They are not complete and therefore not intended to substitute for a thorough understanding of this Operating Manual.

III. OPERATING INSTRUCTIONS

C. STARTING AND WARMING UP ENGINE

1. Before starting the engine, read the CATERPILLAR OPERATION GUIDE carefully. Follow the engine starting, operating and maintenance procedures in that manual.
2. The diesel engine should not be started if the temperature of the hydraulic fluid is below 0°F. The temperature may be read on the gage on the hydraulic reservoir. If ambient temperatures below 0°F are anticipated, an immersion heater for the hydraulic fluid is available. Consult ICE for details.
3. The MAIN POWER SWITCH on the control panel should be ON. The vibrator switch (FOR/REV) on the control pendant should be in the neutral position.
4. Pull out the ENGINE THROTTLE about half way. Press the button on the end of the throttle for adjustment.
5. Hold SHUTDOWN RESET button in and turn the ENGINE START switch to START position. If the engine fails to start after 30 seconds of cranking, allow the starter to cool for two minutes before repeating the starting procedure.
6. As the engine starts, release the ENGINE START switch. It will return to the RUN position.
7. Adjust the throttle until the engine is running at 1500 RPM and allow to warm-up for five minutes.
8. Allow the temperature of the hydraulic fluid to come up to at least 30°F before starting vibrator.

D. WARMING HYDRAULIC FLUID

1. The vibrator should not be operated at full speed if the temperature of the hydraulic fluid is below 60°F. The HYDRAULIC FLUID COLD light on the control panel will be on if fluid temperature is below 60°F. Also check gage on reservoir.
2. If temperature of the hydraulic fluid is below 60°F, set the diesel engine at 1500 RPM and run the vibrator at reduced speed until the temperature of the hydraulic fluid exceeds 60°F. The Hydraulic Fluid Cold light will then go off.

III. OPERATING INSTRUCTIONS

D. WARMING HYDRAULIC FLUID (CONTINUED)

3. When the engine is warmed up and hydraulic fluid temperature is at least 60° F, full speed operation may begin. Adjust the throttle so the engine is running at 2310 RPM unloaded. The engine should maintain about 2100 RPM under load.

CAUTION: Do not operate the vibrator if hydraulic fluid temperature exceeds 160°F as this may damage hydraulic components.

E. OPERATION OF REMOTE-CONTROL PENDANT

1. The operation of the vibratory driver is controlled by the remote-control pendant. The pendant is connected to the control cabinet with 50 feet of electrical cable to permit operation from any advantageous position to view the vibrator. (Consult ICE for pendant extensions)

2. The pendant has three, two-way switches, an indicator light and an Emergency Stop button.

- a. To Clamp to Pile:

Position vibratory driver on pile. Turn the clamp switch on the pendant to CLOSE. The CLAMP light on the pendant will come on when the hydraulic clamp has achieved adequate pressure to permit vibration to begin. The light should normally come on in a few seconds.

- b. To Start Vibration:

Turn the vibrator switch to FORWARD.

NOTE: The vibrator switch reads FORWARD/REVERSE instead of START/STOP because the Model 325 power unit also operates ICE earth augers.

CAUTION: Do not turn the switch to FORWARD until the CLAMP light in the pendant comes on, indicating adequate clamping pressure.

- c. To Stop Vibration:

Turn the vibrator switch to OFF.

NOTE: Accidentally turning the switch to REVERSE normally has no effect and will not cause damage.

III. OPERATING INSTRUCTIONS

E. OPERATION OF REMOTE-CONTROL PENDANT (CONTINUED)

d. To Unclamp from Pile:

Turn the CLAMP switch to OPEN to release the hydraulic clamp so that the vibrator can be moved from the pile. Hold the CLAMP switch in the open position until the jaws are fully open.

CAUTION: Do not turn the switch to OPEN until a visual check indicates that vibration has stopped.

e. To change engine speed:

Turn the Throttle switch (SLOW-FAST) to SLOW and the engine speed will decrease. Turn the switch to FAST and the engine speed will increase. Momentarily turning the throttle switch to FAST or SLOW during operations will adjust engine speed, and therefore vibrator speed, to facilitate the desired penetration rate.

f. Emergency stop button:

Push the EMERGENCY STOP button in and all operating functions will cease to operate. Diesel engine and vibrator will stop immediately.

g. If the remote control pendant is damaged or the pendant line is cut, you may still operate the vibrator by using the control switches on the control panel (See Fig. 1 on page III-1 items X, Y, Z). On the lower right bottom of the control panel there is a switch labeled "REMOTE-LOCAL". Turn the switch to LOCAL and the switches on the control panel will be functional, and the Remote Control Pendant will be disabled. Engine speed must be adjusted manually.

F. CHANGING FREQUENCY

1. In order to provide maximum flexibility in achieving optimum pile penetration and extraction rates, the frequency of the vibratory driver is adjustable.
2. The frequency can be varied from 760 to 1600 vibrations per minute by changing engine speed. Engine speed is changed with the ENGINE THROTTLE on the control panel or electric throttle switch (SLOW-FAST) on the remote control pendant. Vibrator frequency corresponds to engine speed according to the table shown on the next page:

III. OPERATING INSTRUCTIONS

F. CHANGING FREQUENCY (CONTINUED)

<u>ENGINE RPM</u>	<u>VIBRATOR VPM</u>
2100	1600
2000	1525
1800	1370
1600	1220
1400	1070
1200	910
1000	760

G. SHUT DOWN

1. Stop the vibrator.
2. Allow the diesel engine to run for five minutes at 1500 RPM.
3. Reduce speed to low idle for about thirty seconds.
4. Stop the engine by turning the ENGINE START switch to OFF. (Engine may also be stopped by pushing in the EMERGENCY STOP button on the Remote Control Pendant.)

CAUTION: If the diesel engine is shut down while the vibrator is clamped to a pile, the clamp check valve will keep the vibrator clamped to the pile. However, system leakage could result in a loss of clamp pressure over time. Therefore, it is not recommended to leave the vibrator clamped to a pile when the diesel engine is not running.

IV. MAINTENANCE AND ADJUSTMENTS

A. GENERAL

Preventive maintenance includes normal servicing that will keep the vibratory driver, clamp and power unit in peak operating condition and prevent unnecessary trouble from developing. This servicing consists of periodic lubrication and inspection of the moving parts and accessories of the unit.

Lubrication is an essential part of protective maintenance, controlling to a great extent the useful life of the unit. Different lubricants are needed and some components in the unit require more frequent lubrication than others. Therefore, it is important that the instructions regarding types of lubricants and frequency of their applications be closely followed.

To prevent minor irregularities from developing into serious conditions that might involve shut-down and major repair, several other services or inspections are recommended for the same intervals as the periodic lubrications. The purpose of these services or inspections is to assure the uninterrupted operation of the unit.

Thoroughly clean all lubrication fittings, caps, filler and level plugs and their surrounding surfaces before servicing. Prevent dirt from entering with lubricants and coolants. The intervals given in the schedule are based on normal operation. Perform these services, inspections, etc., more often as needed for operation under abnormal or severe conditions.

B. DAILY

1. Check the entire unit prior to and during set-up each day or at the beginning of each shift.
2. Prior to starting the power unit or at the beginning of each shift, check the following items:
 - a. Visibly inspect all bolts, nuts and screws, including the bolts fastening the hydraulic clamp to the vibration case, to insure they are tight. **IMPORTANT: vibration loosens bolts- check carefully.**
 - b. Tighten bolts holding gripping jaws in hydraulic clamp.
 - c. Grease plunger in hydraulic clamp with any good multi-purpose grease.
 - d. Check the oil level in the vibration case and add oil if required. The oil level should be in the middle of the sight glass. Change oil if milky or contaminated. DO NOT OVERFILL
 - e. Check the fluid level in the hydraulic reservoir and refill if necessary. Check oil level, with dipstick, in the multi-pump drive.

IV. MAINTENANCE AND ADJUSTMENTS

B. DAILY (CONTINUED)

CAUTION: It is absolutely imperative that no dirt or other impurities be permitted to contaminate the hydraulic fluid. Any contamination will drastically shorten the life of the high-pressure hydraulic system.

- f. Visually check all hoses for signs of damage or cuts that might cause hose failure during operation. Be sure all connections are tight, especially the quick-disconnect couplers.
 - g. Visually inspect all suppressor elastomers.
 - h. Electrical components need no maintenance except periodic wiping with a clean, dry, lint-free cloth to remove dust.
 - i. Perform all daily maintenance checks and lubrication indicated in the CATERPILLAR OPERATION GUIDE.
3. After engine start-up, check the following:
- a. Check all hydraulic hoses for leaks. Make sure they hang freely with no kinks.
 - b. Check pump and all hydraulic manifolds for leaks.
 - c. Check the filter indicators. 0-17psi = Filter Clean, 18-23psi = Change Filter, 24 + psi = Filter Clogged The return filter on the power pack must be checked with the diesel engine running at full speed.

C. 100 HOURS, 500 HOURS AND OTHER

1. Every 100 hours, drain and add new lubricant in the vibration case.
2. After the first 500 hours, drain and replace the lubricant in the multi-pump drive. There after change every six months or 2000 hours, which ever comes first.
3. Perform all maintenance checks and lubrication indicated in the CATERPILLAR OPERATION GUIDE.

D. ANNUALLY

Have the hydraulic fluid tested by a local hydraulic service center or oil company. Replace if required.

NOTE: The frequency with which hydraulic fluid requires changing depends both on the condition of the fluid and the operating conditions involved. The most accurate method for determining how often fluid should be changed is to have a laboratory fluid analysis done periodically.

IV. MAINTENANCE AND ADJUSTMENTS

E. SEVERE CONDITIONS

The servicing intervals specified are based on normal operating conditions. Operation under severe or unusual conditions will require some adjustments in servicing intervals.

1. When the average temperature is above 80°F or below -10°F, reduce service time intervals by one-half of those specified above.
2. When operating in the presence of dust or sand, reduce service time intervals by one-half of those specified.
3. When operating in excess of twelve hours per day, reduce service time intervals by one-half of those specified.
4. When operating in air with high salt or moisture, the servicing intervals need not usually be changed. However, the unit should be inspected weekly to determine if additional servicing be required. Also, have hydraulic fluid tested quarterly.
5. For extended inactive periods, the engine should be started at least once a week and run until thoroughly warm. Servicing time intervals may be extended from those specified, but for actual time intervals, contact you local Caterpillar dealer, especially during lengthy storage periods.

F. LUBRICATION

1. Crankcase (Diesel Engine)
 - a. Follow the engine manufacturer's maintenance schedule and the lubricating oil specifications outlined in the CATERPILLAR OPERATION GUIDE.
 - b. The lubricant shall meet the performance requirements of API Service Classifications CD or MIL-L-2104C.
 - c. New engines are shipped with ASHLAND 400M + HDT 15W-40 but the following multi-grade crankcase oils are recommended for use or replacement in normal operation (10°F to 90°F) (-12°C to 32°C).

IV. MAINTENANCE AND ADJUSTMENTS

F. LUBRICATION (CONTINUED)

AMOCO	- 15W-40	300
ARCO	- 15W-40	Fleet S3 Plus
BORON (BP)	- 15W-40	Vanellus C Extra
CHEVRON	- 15W-40	Delo 400
CITGO	- 15W-40	C500 Plus
CONOCO	- 15W-40	Fleet Supreme
EXXON	- 15W-40	XD3
GULF	- 15W-40	Super Duty Plus
MOBIL	- 15W-40	Delvac Super
PHILLIPS	- 15W-40	Super HD II
SHELL	- 15W-40	Rotella T
SUN	- 15W-40	Sunfleet Super C
TEXACO	- 15W-40	Ursa Super Plus
UNION	- 15W-40	Guardol
VALVOLINE	- 15W-40	All Fleet

- d. For operation in extreme sub-zero climate, refer to the CATERPILLAR OPERATION GUIDE Crankcase Lubricating Oils or contact the nearest Caterpillar representative.

2. Hydraulic System

To maintain the maximum operating efficiency in the precision parts of the hydraulic system, it is extremely important to eliminate factors which can cause breakdowns or unsatisfactory performance in the system. Among the most common of these factors are rust, corrosion, contamination and products of oil deterioration. Most problems can be minimized or avoided simply by maintaining a disciplined preventive maintenance program.

Some simple steps to follow as part of that program are:

- a. Keep stored oil dry and clean at all times and always store in clean containers.
- b. Always clean tools, spouts, lids, funnels, etc. when used in conjunction with the transfer of oil.
- c. Never put dirty oil into the hydraulic system. Use only clean, uncontaminated oil of the types recommended below. Never return to the system any fluid which has leaked out.
NOTE: Foreign material in the hydraulic system can drastically effect the life and operation of many hydraulic component parts.
- d. Clean or replace filter elements at the first indication that they are dirty or ineffective.

IV. MAINTENANCE AND ADJUSTMENTS

F. LUBRICATION (CONTINUED)

Mixing of different manufacturers' hydraulic fluid is not recommended. However, it can be done if the fluids are miscible (contain the same base and additive). It may be necessary to contact an oil supplier to determine this.

New power units are shipped with CHEVRON Clarity AW46 hydraulic oil. This oil exceeds the requirements of both the E.P.A. and U.S. Fish and Wildlife Service for non-toxicity and is inherently biodegradable. Adding any other oil from the list below, will contaminate the Clarity oil and the system will no longer be environmentally friendly.

Should the customer choose to use an alternate oil, the following recommendations may be used when replacing fluid in the hydraulic system.

FIRST Preference Group:

CHEVRON	Clarity AW46
MOBIL	DTE-15
SUN	2105

SECOND Preference Group:

ARCO	Duro AW46
CHEVRON	Hydraulic AW46
PHILLIPS	Magnus A46
SHELL	Tellus 46

THIRD Preference Group:

BORON	Energol HLP46
CITGO	A.W. Hydraulic 46
CONOCO	Super 46
EXXON	Nuto H46
GULF	Harmony 46AW
SUN	Sunvis 846
TEXACO	Rando HD AZ46
UNION	Unax AW46

Whenever fluids from the second preference group are used, it is necessary to test the oil more often to insure that viscosity remains within recommended limits while in service. Using fluids from the third preference group requires even a more discerning inspection than use of fluids from the second group.

The recommended fluids were chosen based on the hydraulic system operating temperature range being 5°F (-15 °C) (cold ambient start-up) to 160°F (71°C) (maximum operating).

IV. MAINTENANCE AND ADJUSTMENTS

F. LUBRICATION (CONTINUED)

When operating in arctic conditions, it is recommended to use an immersion heater to pre-heat the oil prior to starting . Contact ICE for other arctic operating procedures. It may also be necessary in extremely cold or hot climates to use a different viscosity oil which is better adapted to adverse conditions. Contact the nearest oil supply representative for suggested procedures.

CHEVRON Clarity AW46 hydraulic fluid is available from ICE in five gallon cans. See SECTION VIII - ORDERING PARTS, page VIII-40.

3. Vibration Case

The fluid level is easily read through the sight glass located at the lower center of the vibration case opposite the motor side. Lubricating oil may be added when necessary, through either of the holes in the vibration case top plate after removing the 1" pipe plugs. To drain the case, remove a 3/4" pipe plug at either end of the base plate. Tilt the case for complete drainage.

Multi-Pump Drive Adapter

The fluid level is easily checked by removing the dip stick mounted on the right side of the Multi pump Drive Adapter. Lubricating oil may be added by removing the filler-breather plug from the 90° street ell located on the top center of the Multi-pump drive Adapter. Draining the lubricant may be done by removing the magnetic drain plug on the bottom of the Multi-pump Drive Adapter.

The preferred lubricating oil for ICE vibration cases is "High Moly" oil (Schaeffer 268). Longer intervals between fluid changes and fewer maintenance hours spent on mechanical service can generally be realized with this fluid.

Therefore, whenever the "first preferred" oil is not available, or desired, and an alternate fluid is selected, it will be necessary to test and/or change the oil at shorter intervals.

Extensive tests have indicated that the use of Schaeffer 268 results in cooler operation and extended bearing and gear life.

IV. MAINTENANCE AND ADJUSTMENTS

F. LUBRICATION (CONTINUED)

- a. The vibration case and multi-pump drive adapter lubricants installed at the factory are SCHAEFFER 268 but the following gear lubes may be used when changing lubricants:

FIRST Preference Group:

SCHAEFFER 268

SECOND Preference Group:

MOBIL	SHC-634
BORON	Gearep 140
CHEVRON	Gear Comp. NL460
CITGO	Premium MP 85W-140
CITGO	Standard MP 85W-140
GULF	Lub 85W-140 Lub 85W-140
PHILLIPS	MP 85W-140
SHELL	Omala 460 Omala 460
SUN	Sunep 1110

THIRD Preference Group (Natural Petroleum Base):

AMOCO	Perma Gear EP140
ARCO	Pennant NL 460
CONOCO	EP 460
EXXON	Spartan EP 460
PHILLIPS	AP 140
TEXACO	Meropa 460
UNION	MP 85W-140
VALVOLINE	Gear Lub 85W-140

SCHAEFFER 268 Lubricant is available from ICE in five gallon cans. See SECTION VIII ORDERING PARTS, page VIII-48

G. CAPACITIES

- | | | |
|---------------------------------|------|---------|
| 1. Diesel Engine Crankcase | 29 | Quarts |
| 2. Hydraulic System (Reservoir) | 270 | Gallons |
| 3. Vibration Case | 2.5 | Gallons |
| 4. Fuel Tank Sub-Base (Diesel) | 130 | Gallons |
| 5. Engine Cooling System | 56 | Quarts |
| 6. Multi-Pump Drive Adapter | 4.25 | Quarts |

IV. MAINTENANCE AND ADJUSTMENTS

H. DRAINING AND FILLING HYDRAULIC FLUID RESERVOIR

1. The Hydraulic reservoir is drained by removing a plug on the bottom of the reservoir.
2. The hydraulic reservoir is filled by the manual pump mounted on the back (engine side) of the reservoir. All fluid is pumped to the reservoir through the returned filter (F2) to insure no dirt enters the hydraulic system.

I. CHANGING HYDRAULIC RETURN FILTER ELEMENTS

1. The return filters are located on the hydraulic reservoir above the hex key rack.
2. To remove the return filter elements, you must use a filter wrench capable of accepting a 5" diameter filter. (Available at your local auto-parts store.) Unscrew the return filter elements counterclockwise to remove. Remove both filter elements and gaskets from the filter housing.
3. Clean filter housing with a lint free rag.
4. Install the new gaskets to the new filter elements. Apply a light coating of multi-purpose grease to the top of each gasket.
5. Screw the return filter elements and gaskets clockwise onto the filter housing until the gaskets make contact to the filter housing base.
6. Using the filter wrench, tighten both return filter elements approximately 3/4 of a turn.
7. With four new return filter elements installed, start the power unit and run for approximately three minutes. CHECK FOR LEAKS.

IV. MAINTENANCE AND ADJUSTMENTS

J. BOLT TORQUE INFORMATION

Torque, in foot-pounds, is determined by the length of the wrench handle (in feet) multiplied by the weight (or force in pounds) applied at the end of the handle. For example, if the wrench is one foot long and five pounds of force is applied at the end of the handle, the total torque applied would be five foot pounds. A six inch wrench would require ten pounds of force to obtain five foot pounds of torque.

Proper use of the torque wrench is important. To obtain the listed torques, a steady pull should be exerted to the handle until the desired torque is reached.

The following torque specifications apply to the bolts from the vibrator assemblies listed. Whenever any of these bolts, are replaced, the given torque specifications should be adhered to.

<u>VIBRATION SUPPRESSOR</u>		<u>Page VIII-6</u>
Item 14, 45	1/2"-13	119 Ft-Lbs (16.4 Kg-M)
Item 16, 21	5/8"-11	233 Ft-Lbs (32.3 Kg-M)
Item 6, 17, 20	3/4"-10	417 Ft-Lbs (57.6 Kg-M)

<u>VIBRATION CASE</u>		<u>Page VIII-10</u>
Item 3, 12	1/2"-13	119 Ft-Lbs (16.4 Kg-M)
tem 16	5/8"-11	233 Ft-Lbs (32.3 Kg-M)

<u>CLAMP BODY</u>		<u>Page VIII-34</u>
Item 3	1"-8	1009 Ft-Lbs (139.4 Kg-M)
Item 18	1 -1/2"-6	2800 Ft-Lbs (387 Kg-M)

V. HYDRAULIC CIRCUITRY (REFERENCE:HYDRAULIC SCHEMATIC PG V-4)

A. HYDRAULIC CLAMP

With the diesel engine running, hydraulic fluid is taken from the reservoir by the clamp pump (P2). The clamp pump flow returns to the reservoir if the clamp switch on the pendant has not been moved. Returning oil is filtered by the return filter (F2).

Turning the clamp switch on the control pendant to CLOSE activates the CLAMP CONTROL VALVE (V1). Hydraulic fluid is directed to the CLOSE CLAMP side of the hydraulic CYLINDER (CYL) in the hydraulic clamp. The clamp closes. Clamping pressure is indicated by the clamp pressure gage (GA-3). When clamping pressure reaches approximately 4700 PSI (324 Bar), the CLAMP PRESSURE SWITCH (PS-1) deactivates the CLAMP CONTROL VALVE (V1), which directs the flow from the clamp pump to the reservoir. Pressure at the clamp is maintained by the CLAMP CHECK VALVE (CV5). If clamping pressure falls below 4400 PSI (303 Bar), the CLAMP PRESSURE SWITCH activates the CLAMP CONTROL VALVE to restore pressure. In the event of hose failure, a second CLAMP CHECK VALVE (CV7), located in the CLAMP CYLINDER, will hold the CLAMP CYLINDER closed.

Turning the clamp switch on the control pendant to OPEN activates the CLAMP CONTROL VALVE (V1). Hydraulic fluid is directed to the OPEN CLAMP side of the hydraulic cylinder. The pressure in the OPEN CLAMP line opens the CLAMP CHECK VALVE (CV5). The clamp opens. Pressure in the OPEN CLAMP line is indicated by the clamp pressure gage (GA-4).

Pressure in the clamping circuit is limited to 4800 PSI by the clamp relief valve (RV2). The quick-disconnect couplers (QD3 & QD4) permit de-coupling of the clamp hoses at the power unit.

NOTE: Clamp pump may also be used to power some auxiliary functions. Contact ICE for information on "POWER BEYOND" modifications.

B. VIBRATOR DRIVE

With the diesel engine running, hydraulic fluid is taken from the reservoir by two DRIVE PUMPS (P1) and directed to the CONTROL MANIFOLD. Fluid pressure opens the cartridges (CA1 and CB1), which vent the hydraulic fluid back to the reservoir through the RETURN FILTER (F2), if the vibrator switch on the pendant has not been moved.

V. HYDRAULIC CIRCUITRY

B. VIBRATOR DRIVE (CONTINUED)

Turning the vibrator switch, on the control pendant, to FORWARD activates the FORWARD SOLENOID on the CONTROL VALVE (V2). By blocking the pilot flow from cartridge (CB1 and CA2), the CONTROL VALVE (V2) causes these cartridges to close, thus directing pump flow to the VIBRATOR MOTORS (M).

Full motor speed is reached within a few seconds and the motor drive pressure is indicated by GAGE (GA - 1). Maximum drive pressure is limited to approximately 5000 PSI by the FORWARD RELIEF VALVE (RV1). The FORWARD RELIEF VALVE (RV1), if opened by over pressure, permits a small pilot flow from cartridges (CB1 AND CA2). This pilot flow causes cartridges (CB1 and CA2) to partially open and allows some or all of the pump flow to return to the reservoir. Case drain fluid from the motors returns to the reservoir. Case drain pressure is limited to 50 PSI by the case drain RELIEF VALVE (RV3). Oil returning from the VIBRATOR MOTORS (M) opens cartridge CB2 and returns to the reservoir through COOLER VALVE (V3) and FILTER (F2).

Returning the Vibrator Switch to the center position de-energizes control valve (V2), and again opens cartridges CA1 and CB1 which allows pump flow to return to the reservoir without driving the vibrator. In neutral, CONTROL VALVE, (V2) also blocks pilot flow from cartridges (CA2) and the oil returning from VIBRATOR MOTORS (M). To produce a momentary "Braking" Action. When return oil pressure reaches 1000 PSI, REVERSE RELIEF VALVE (RV4) permits a small pilot flow from cartridge (CB2). This pilot flow allows cartridge (CB2) to partially open and direct motor return flow to the reservoir at 1000 PSI. Cavitation of the VIBRATOR MOTORS (M) is prevented during braking, by CHECK VALVE (CV-6). The "Reverse" position of the vibrator switch is non-functional in the "Vibrator Mode."

Hydraulic fluid temperature is regulated by the COOLER VALVE (V3). When fluid temperature is below 100°F, V3 directs the flow directly to the reservoir through FILTER (F2). When fluid temperature exceeds 100°F, COOLER VALVE (V3) directs flow through the HEAT EXCHANGER (HE) before it enters the reservoir, through FILTER (F2). Excessive pressure in the HEAT EXCHANGER (HE) is prevented by CHECK VALVE (CV-2), which bypasses excess flow and limits pressure to 65 PSI.

The quick-disconnect couplers (QD1, QD2, and QD5) permit de-coupling of the drive and case drain hoses at the power unit.

V. HYDRAULIC CIRCUITRY

C. AUGER DRIVE

To convert the 325 Power Unit to operate an ICE, or similar, Bi-Directional Drill open (turn CCW) VIBRO-AUGER valve (V4) fully. Re-adjust RELIEF VALVES (RV-1 & RV4) to forward & reverse pressure specified for Auger, and re-set RELIEF VALVE (RV-2), if necessary, for two speed signal.

See ICE Auger Manuals for description of Hydraulic Control Manifold operation, in the "Auger Mode."

D. HYDRAULIC IMPACT HAMMER

To convert a 325 Power Unit to operate an ICE Hydraulic Impact Hammer, open (CCW) VIBRO-AUGER valve (V4) fully. Readjust RELIEF VALVE (RV1) to specified pressure, and reset RELIEF VALVE (RV2) for two stroke signal.

See ICE Hydraulic Impact Hammer Manual for complete Impact Hammer set up instructions.

E. OTHER

Returning fluid is filtered by the RETURN FILTER (F2). INDICATOR GAGE (GA5) shows condition of FILTER (F2).

A manual PUMP (MP) is provided to fill the hydraulic reservoir. A CHECK VALVE (CV4) prevents loss of fluid from the reservoir back through this pump.

A TEMPERATURE SWITCH (TS) located in the reservoir operates the hydraulic fluid cold light.

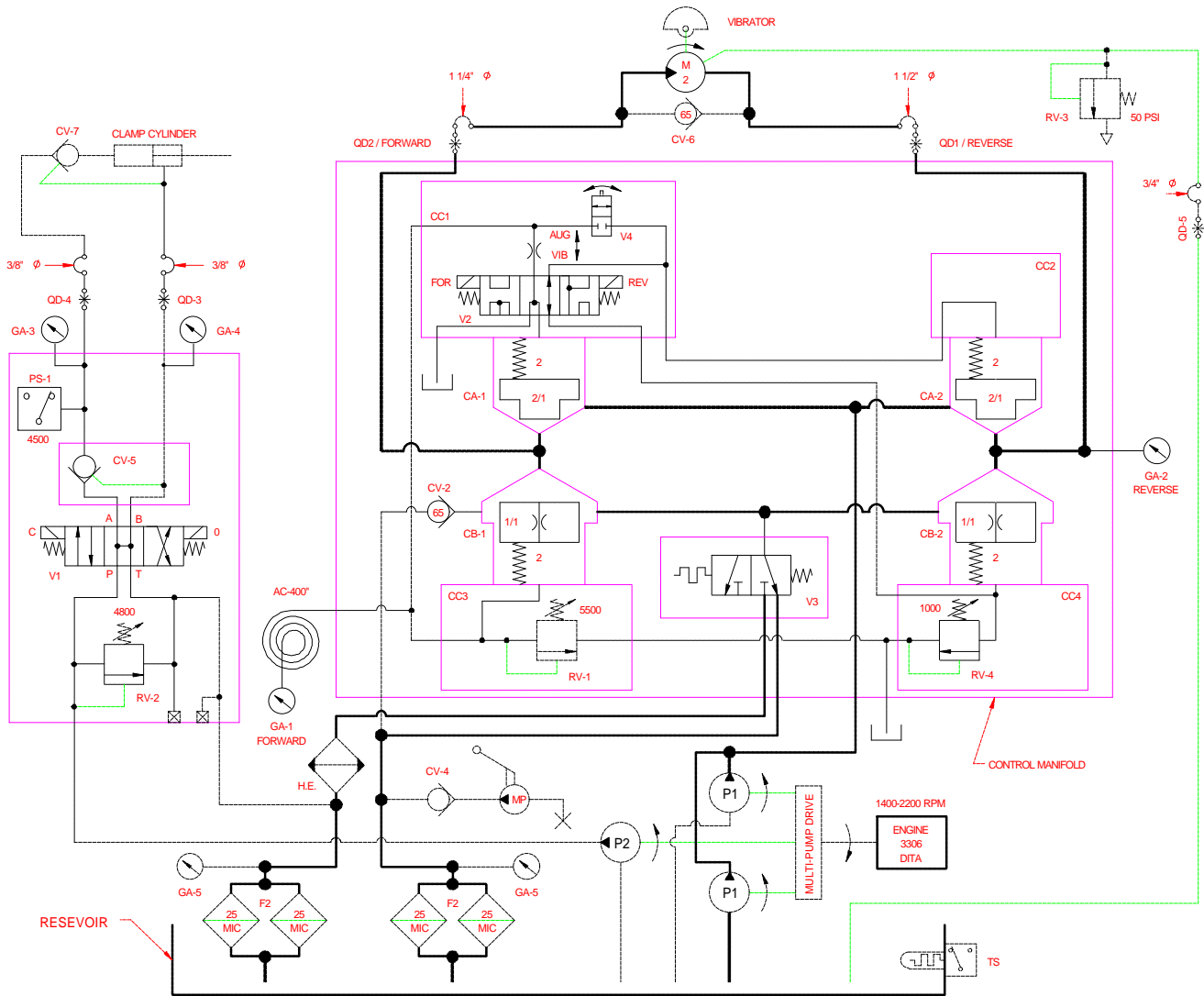
The HEAT EXCHANGER (HE) cools the hydraulic fluid returning to the reservoir.

Motor cavitation is prevented in the braking operation by the CHECK VALVE (CV6).

Extra Long ACCUMULATOR HOSE (AC) in pilot system expands as pressure increases. The additional pilot flow causes (CA2) to produce a smooth acceleration of VIBRATOR MOTOR (M).

V. HYDRAULIC CIRCUITRY

HYDRAULIC SCHEMATIC



V. HYDRAULIC CIRCUITRY

F. HYDRAULIC COMPONENTS LIST

Notation	Description	Part Number	Page Ref.
AC	Accumulator Hose	110680	VII-16
CA1 & 2	Cartridge A (2)	110624	VIII-16
CB1 & 2	Cartridge B (2)	110622	VIII-16
CC1	Cartridge Cover	110530	VIII-16
CC2	Cartridge Cover	110606	VIII-16
CC3	Cartridge Cover	110546	VIII-16
CC4	Cartridge Cover	110544	VIII-16
CV2	Check Valve	130339	VIII-16
CV4	Manual Pump Check Valve	100451	VIII-23
CV5	Clamp Check Valve	110149	VIII-32
CV6	Check Valve - Vibrator	100800	VIII-6
CV7	Check Valve - Clamp Cylinder	120629	VIII-34
E	Diesel Engine	100508	VIII-22
F2	Return Filter	100518	VIII-22
GA-1	Forward Pressure Gage	110600	VIII-16
GA-2	Reverse Pressure Gage	110600	VIII-16
GA-3	Close Clamp Pressure Gage	110600	VIII-16
GA-4	Open Clamp Pressure Gage	110600	VIII-16
GA-5	Filter Indicator Gage	100436	VIII-23
HE	Heat Exchanger	400099	VIII-22
M	Motor	100779	VIII-10
MP	Manual Pump	100447	VIII-23
P1	Drive Pumps (2)	100406	VIII-22
P2	Clamp Pump	100684	VIII-22
PS-1	Clamp Pressure Switch	810033	VIII-32
QD1	Vibrator Reverse Disconnect	110690	VIII-22
QD2	Vibrator Forward Disconnect	110692	VIII-22
QD3	Clamp Open Disconnect	100777	VIII-22
QD4	Clamp Close Disconnect	100245	VIII-22
QD5	Case Drain Disconnect	400095	VIII-22
RV1	Forward Relief Valve	100632	VIII-30
RV2	Clamp Relief Valve	100898	VIII-32
RV3	Case Drain Relief Valve	100032	VIII-6
RV4	Reverse Relief Valve	100630	VIII-30
TS	Temperature Switch	400115	VIII-23
VI	Clamp Control Valve	110147	VIII-32
V2	Control Valve	810519	VIII-30
V3	Cooler Valve	110628	VIII-30
V4	Vibro-Auger Valve	100654	VIII-30

VI. ELECTRIC CIRCUITRY (REFERENCE:ELECTRICAL SCHEMATIC PG VI-3)

A. DIESEL ENGINE

The BATTERIES provides 24-volt current to start the diesel engine. In order to start the diesel engine, the circuit breaker (MAIN POWER) switch should be ON and the vibrator switch (REV-FOR) on the remote control pendant should be in the neutral position. This insures that the vibrator will not begin vibrating when the engine starts. Turning the ENGINE START SWITCH to START energizes the START RELAY which energizes the START MOTOR and turns over the diesel engine. If fuel is available, the diesel engine will start. In order for fuel to be available to the engine, the shutdown reset must be closed (pushed in) to energize the FUEL SOLENOID. The FUEL SOLENOID opens the injector pump and allow fuel to flow to the engine. With the diesel engine running, the AMMETER indicates charging amperes. The HOUR METER indicates engine operating hours. A TACHOMETER indicates engine speed.

A system of safety controls shut off the fuel supply, which stops the diesel engine in the event that engine water temperature is too high or engine oil pressure is too low. The heart of the safety system is the shutdown reset, which is normally closed, thereby providing current to operate the HOUR METER and to energize the FUEL SOLENOID. Energizing the fuel solenoid opens the injector pump and allows fuel to flow to the diesel engine. The shutdown reset must remain closed so that fuel continues to flow to the diesel engine.

If the coil in the shutdown reset is energized, the shutdown reset will open, shutting off the fuel to the diesel engine. The engine will stop. The coil may be energized by either of the following devices:

1. ENGINE OIL PRESSURE GAGE - If oil pressure is below 15 PSI, contacts in the gage will be closed providing current to energize the shutdown reset coil. On start-up, the reset button of the shutdown reset (on the control panel) must be held in until oil pressure exceeds 30 PSI.
2. ENGINE WATER TEMPERATURE GAGE - If water temperature exceeds 210°F, the contacts of the gage will close energizing the shutdown reset coil.
3. Pushing the EMERGENCY STOP BUTTON on Remote Control Pendant energizes the shutdown reset coil.

The diesel engine is stopped by turning the ENGINE START SWITCH to OFF. This will de-energize the FUEL SOLENOID shutting off the fuel to the engine.

VI. ELECTRICAL CIRCUITRY

B. HYDRAULIC CLAMP

With the diesel engine running, turning the clamp switch (OPEN-CLOSE), on the control pendant to CLOSE energizes the close-clamp solenoid (CLOSE-SOL.). This operates the clamp control hydraulic valve and closes the clamp.

When the pressure in the close-clamp hydraulic circuit reaches 4800 PSI, the pressure switch (PS-1) opens and de-energizes the close-clamp solenoid and turns on the CLAMP LIGHTS on the control pendant and control panel. If close-clamp pressure falls below 4500 PSI, the pressure switch closes and re-energizes the close-clamp solenoid to rebuild pressure. The CLAMP LIGHTS go out. When pressure returns to 4800 PSI, The pressure switch opens de-energizing the close-clamp solenoid and turns on the CLAMP LIGHTS.

With the diesel engine running, turning the clamp switch (OPEN-CLOSE) to OPEN energizes the open-clamp solenoid (OPEN SOL.). The clamp opens.

C. VIBRATOR

With the diesel engine running, turning the vibrator switch on the control pendant to the FORWARD position energizes the forward SOLENOID on the control valve (V2). The control valve directs hydraulic fluid to the hydraulic motors and the vibrator starts.

With the diesel engine running, turning the vibrator switch on the control pendant to the center position de-energizes the forward SOLENOID. Fluid no longer is directed to the motor and they stop.

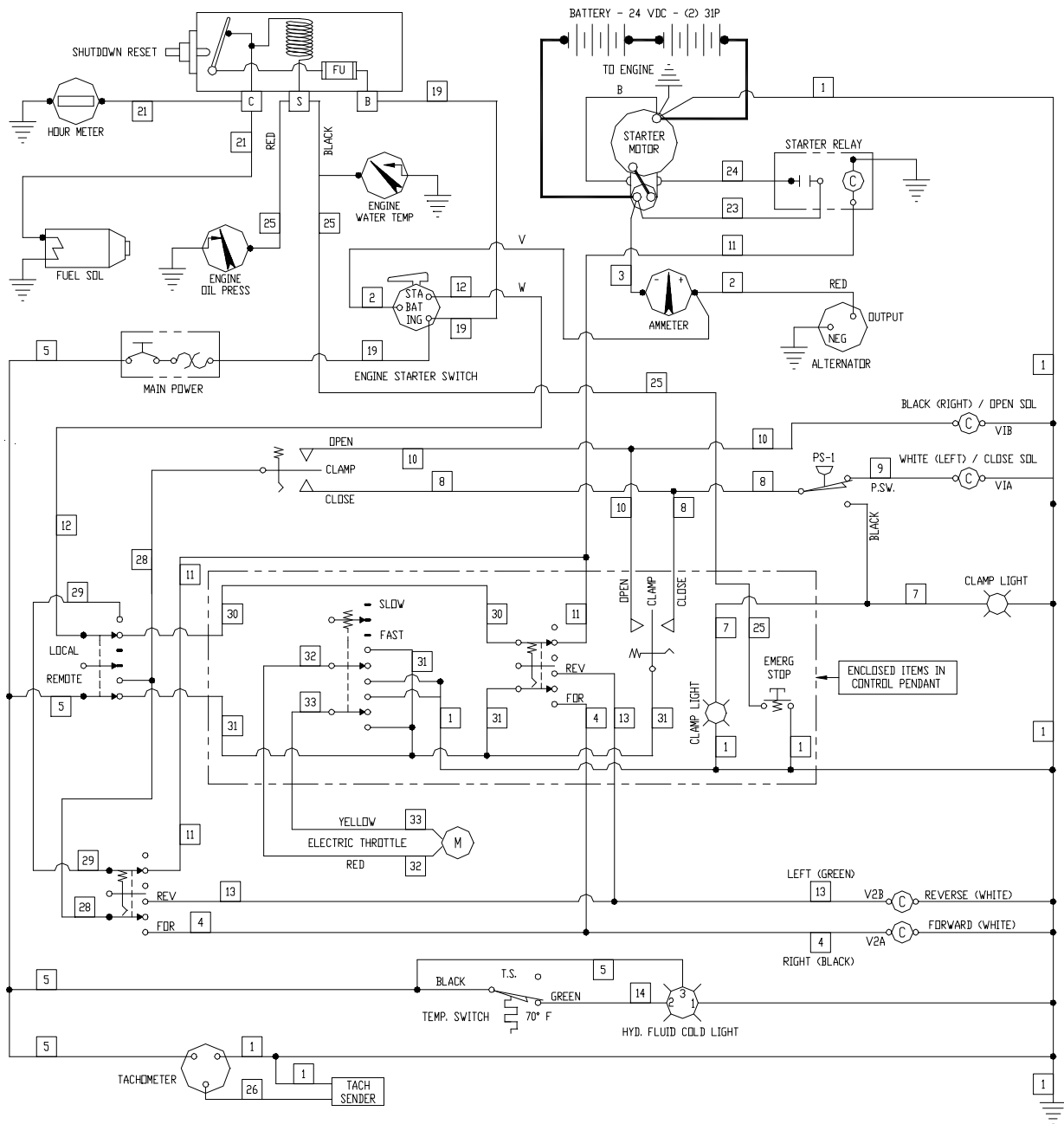
D. OTHER

With the MAIN POWER switch ON, the TEMPERATURE SWITCH turns on the HYDRAULIC FLUID COLD LIGHT if the temperature of the hydraulic fluid in the reservoir is below 60°F. At 60°F or above, the TEMPERATURE SWITCH turns off the HYDRAULIC FLUID COLD LIGHT.

Duplicate vibrator and clamp switches are located on the control pendant and on the control panel. Turning the LOCAL-REMOTE switch to LOCAL activates only the clamp and vibrator switches located on the control panel. Turning the LOCAL-REMOTE switch to REMOTE only permits operation of the clamp and vibrator from the control pendant.

VI. ELECTRICAL CIRCUITRY

ELECTRICAL SCHEMATIC



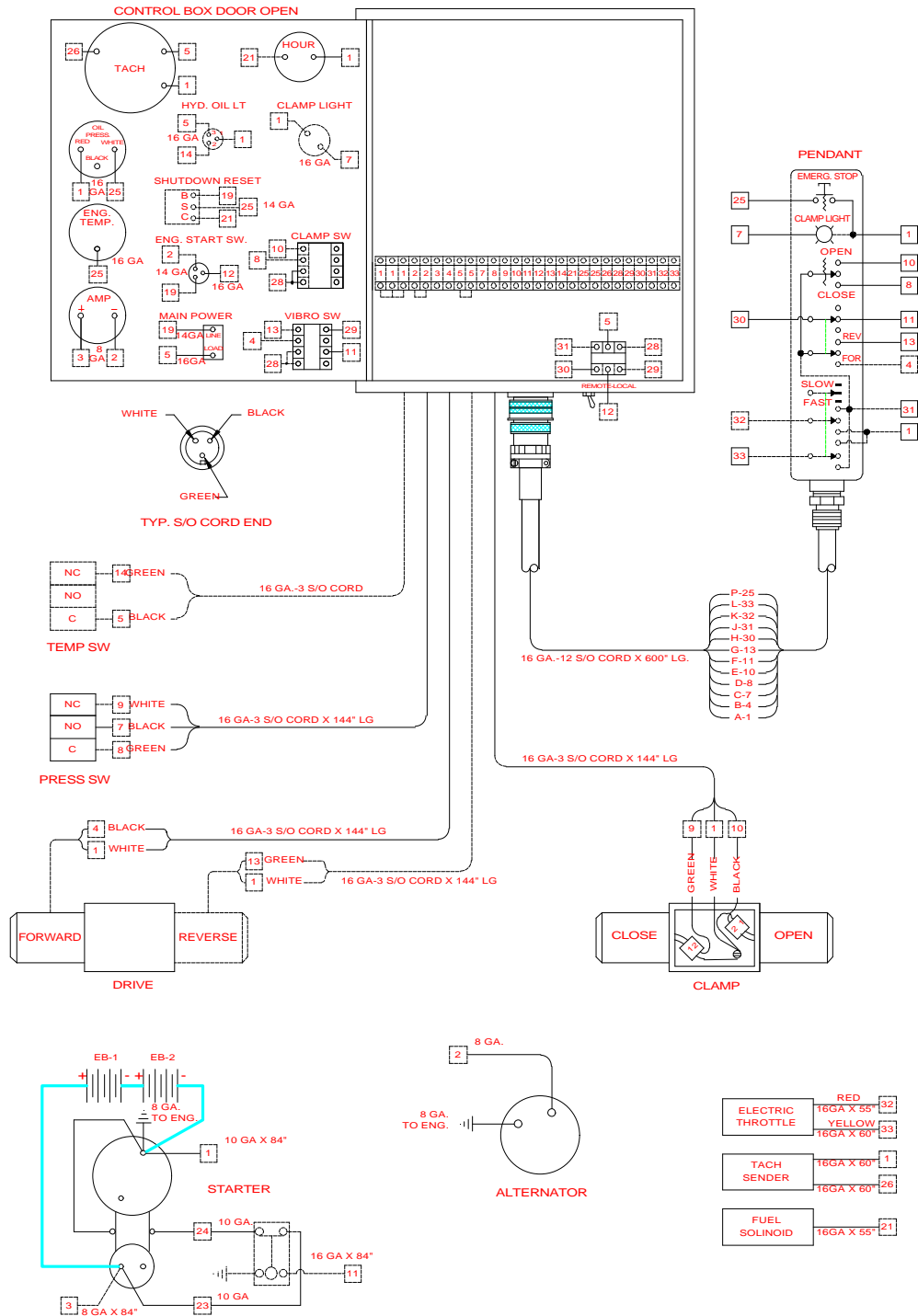
VI. ELECTRICAL CIRCUITRY

E. ELECTRICAL COMPONENTS LIST

Notation	Reference	Part Number	Page Ref.
ALTERNATOR	Alternator	See Cat. Parts Book	
AMMETER	Ammeter	110371	VIII-16
BATTERY	24-Volt Battery	400890	VIII-22
CLAMP LIGHT (2)	Clamp Light	100359	VIII-16
ENG. START SW.	Engine Start Switch	130259	VIII-16
FOR/REV (2)	Vibrator Switch (FWD/REV)	130155	VIII-16
FUEL SOL.	Fuel Solenoid Valve	See Cat. Parts Book	
HOUR METER	Hour Meter	100343	VIII-16
HYD. FLUID COLD	Hyd.Fluid Warning Light	100355	VIII-16
LOCAL-REMOTE	Local-Remote Switch	140361	VIII-16
M	Electric Throttle	110460	VIII-23
MAIN POWER	Main Power Circuit Breaker	400141	VIII-16
OIL PRESSURE	Oil Pressure Gage	100329	VIII-16
OPEN/CLOSE (2)	Clamp Switch (OPEN/CLOSE)	130155	VIII-16
PS-1	Pressure Switch	100627	VIII-32
STARTER MOTOR	Engine Starter	See Cat. Parts Book	
START RELAY	Engine Start Relay Switch	See Cat. Parts Book	
SHUTDOWN RESET	Shutdown Reset	130257	VIII-16
TACH	Tachometer	See Cat. Parts Book	
TACH SENDER	Tachometer Sender	100408	
TEMP. SWITCH	Temperature Switch	400115	VIII-23
V1A	Close-Clamp Solenoid (Valve)	110147	VIII-32
V1B	Open-Clamp Solenoid (Valve)	110147	VIII-32
V2A	Forward Solenoid (Valve)	810519	VIII-30
V2B	Reverse Solenoid (Valve)	810519	VIII-30
WATER TEMP.	Water Temperature Gage	130251	VIII-16
EMERGENCY STOP	Emergency Stop Button	130507	VIII-16
SLOW-FAST	Engine Throttle Switch	100566	VIII-16

VI. ELECTRICAL CIRCUITRY

ELECTRICAL DIAGRAM



VII. GENERAL DATA

A. ABBREVIATIONS

The abbreviations shown below are used throughout the parts lists and various other parts of the manual.

ASM.	Assembly
BHCS	Button Head Cap Screw
Cyl.	Cylinder
DC	Direct Current
FHCS	Flat Head Cap Screw
FLCS	Flanged Head Cap Screw
HC	High Collar
HHCS	Hex Head Cap Screw
HHPP	Hex Head Pipe Plug
HSSS	Hex Socket Set Screw
Hyd.	Hydraulic
Lg.	Long
mm	Millimeter
Mtg.	Mounting
NPT.	National Pipe Thread
PHMS	Phillips Head Machine Screw
P/N	Part Number
Qty.	Quantity
RHMS	Round Head Machine Screw
Sch.	Schedule
SHCS	Socket Head Cap Screw
SHPP	Socket Head Pipe Plug
SHSS	Socket Head Shoulder Screw
S/N	Serial Number
Sol.	Solenoid

B. SCREWS AND BOLTS

1. Practically all connections on the unit are made with socket head (Allen) cap screws. These high-strength screws are available at most industrial supply houses.
2. Screws and bolts are designated in the PARTS LIST in abbreviated form. (Refer to sub-section A, above, for specific abbreviations.) Listed below is a typical screw description:

.5 - 13 UNC x 1.50 LG SHCS .5 = Diameter
13 UNC = Threads Per Inch
1.50 LG = Length
SHCS = Screw Type Abbreviation

3. Some screws or bolts require a specific torque when replacing. For identification of these bolts and a more thorough understanding of torque, refer to Page VII-47.

VII. GENERAL DATA

C. SERIAL NUMBER LOCATIONS

1. The following ICE vibratory units are serial numbered separately:
 - a. Vibrator
 - b. Power unit
 - c. Piling Clamps
 - d. Caisson beams
 - e. 90 deg. clamp adapter

2. In addition to the serial number plate itself (on vibrators, power units and clamps), the serial number is stamped into each unit in one or more places as follows:
 - a. Vibrator stamped twice - once on top right side of suppressor housing, once on bottom lip of vibration case on right side of motors' side.
 - b. Power unit stamped twice - once on control panel side of unit at right corner of reservoir, once on sub-base inside door below hex-key rack.
 - c. Model 126 universal clamp is stamped three times - once between cylinder and pile guide, once above the grease fitting, and once on the flange of the cylinder housing.
 - d. Model 127 Z-Pile clamp is stamped three times once on top of each cylinder, and once above the grease fitting.
 - e. Model 80 caisson clamp stamped twice - once by the lifting eye, once by the adjusting screw.
 - f. Caisson beam is stamped three times- once on top center, once in center of both sides of flange.
 - g. 90 deg. clamp plate stamped twice - once on top center, once on side.

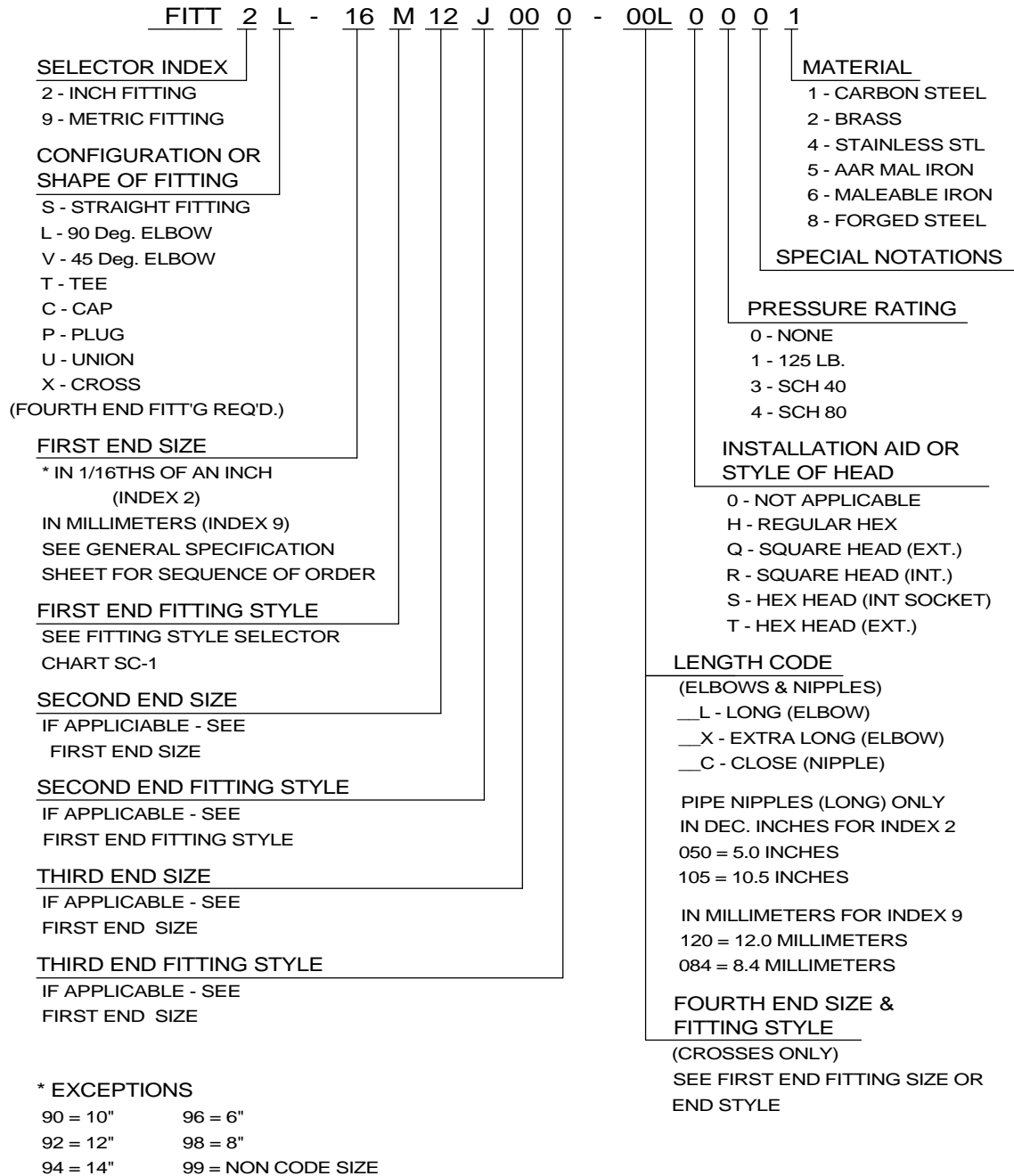
VIII. ORDERING PARTS

A. PROCEDURE

1. When ordering parts, be sure to include the model and serial number of the unit or component. The serial number may be located by referring to SECTION VII, SERIAL NUMBER LOCATION. Confirm all telephone orders immediately to avoid duplicating shipment.
2. ORIGINAL EQUIPMENT; Where component serial numbers are given, these apply only to equipment and components originally furnished with the unit. Where equipment has been changed or upgraded these numbers may not be an adequate description.
3. SHIPMENT; State to whom shipment is to be made and method of shipment desired, otherwise our own judgement will be used.
4. SHORTAGES; Claims for shortages or errors should be made immediately upon receipt of parts. No responsibility will be assumed for delay, damage or loss of material while in transit. Broken, damaged or lost material should be refused or a full description made of damage or loss to the carrier agent on the freight or express bill.
5. RETURN OF PARTS; If for any reason you desire to return parts to the factory or to any distributor from whom these parts were obtained, you must first secure permission to return the parts. Shipping instructions will be given along with this permission. A ten percent handling charge must be assessed against the returned shipment unless an error is made by the factory or by the distributor when filling your order.

VIII. ORDERING PARTS

B. FITTING DESCRIPTION KEY



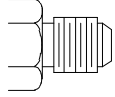
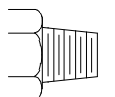
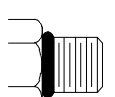
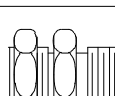


VIII. ORDERING PARTS

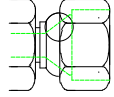
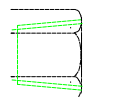
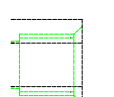
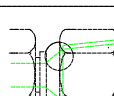
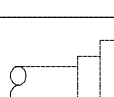
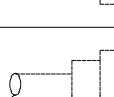
B. FITTING DESCRIPTION KEY (CONTINUED)

FITTING STYLE SELECTOR CHART

SC-1

FOR END FITTING STYLE SELECTION

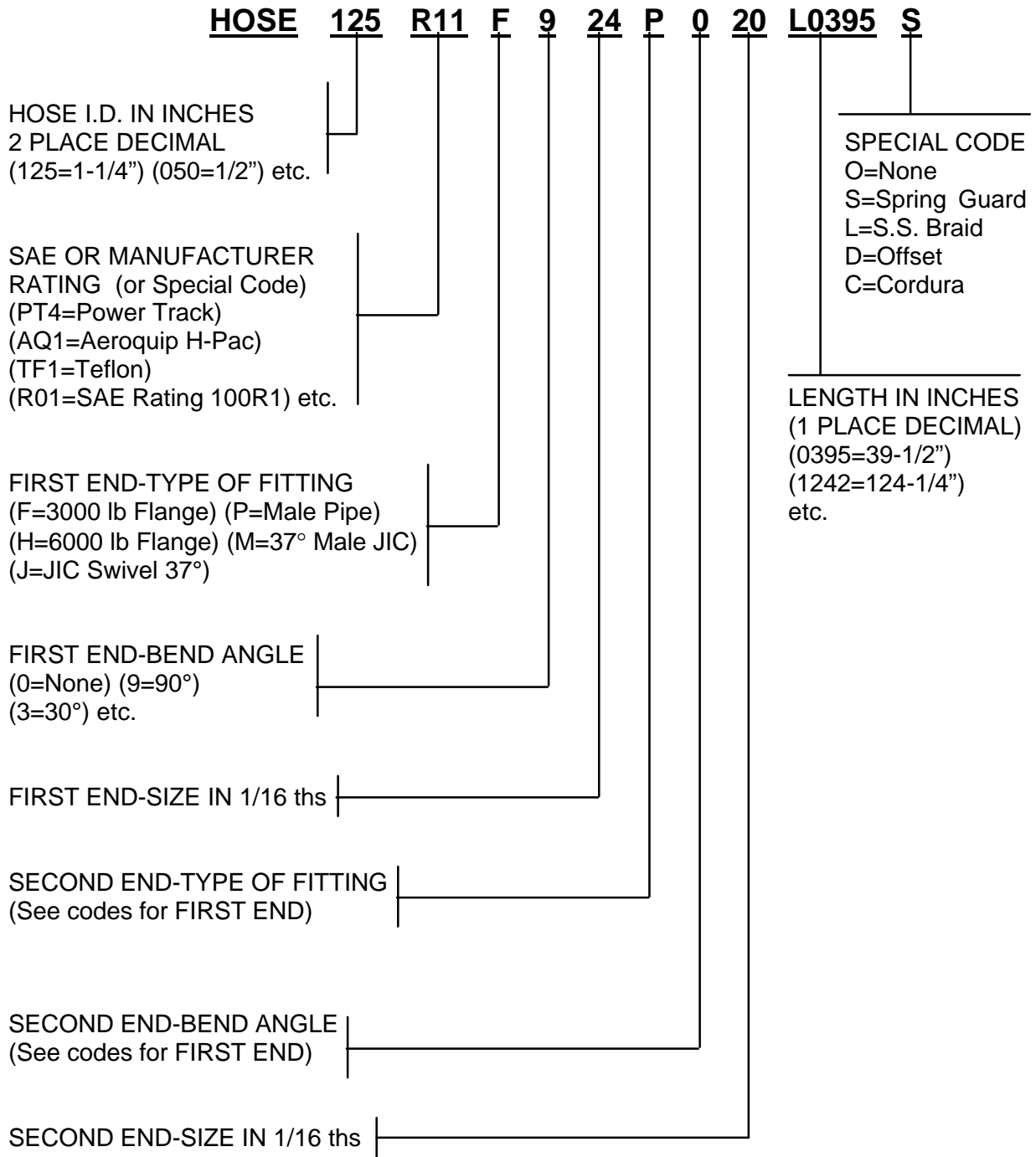
M		JIC MALE 37 Deg. FLARE
P		MALE PIPE NPT
R		S.A.E. MALE O-RING (& ADJUSTABLE)
B		JIC MALE 37 Deg. FLARE BULKHEAD
D		MALE PIPE NPT SWIVEL
S		B.S.P. MALE PIPE

J		JIC FEMALE 37 Deg. FLARE (& SWIVEL)
Q		FEMALE PIPE NPTF
K		S.A.E. FEMALE O-RING
N		FEMALE PIPE NPSM-SWIVEL
F		SPLIT FLANGE 3000 PSI. CODE 61
H		SPLIT FLANGE 6000 PSI. CODE 62

VIII. ORDERING PARTS

C. HOSE DESCRIPTION CODE

The HOSE DESCRIPTION CODE is a 24 digit number enabling easier and quicker identification whenever a hose replacement is desired. The key below explains the structure of the coded number in detail.



VIII. ORDERING PARTS

D. PARTS IDENTIFICATION

1. Parts lists and drawings are included on the following pages for the equipment components shown below:

a. VIBRATION SUPPRESSOR	800027
b. VIBRATION CASE	810037
c. HOSE ASSEMBLIES -INTERCONNECTING	800029
d. POWER UNIT - ENCLOSURE	800379
e. POWER UNIT - INTERNAL	800377
f. CONTROL BOX	810585
g. CONTROL MANIFOLD ASSEMBLY	810571
h. CLAMP MANIFOLD	810449
i. MODEL 126B CLAMP	800327
j. MODEL 127 Z-PILE CLAMP	800041
k. MODEL 80B CAISSON CLAMP	800047
l. CAISSON BEAM - 7 FOOT	800301
m. CLAMP EXTENSION - 10 FOOT	800423
n. 90 deg. CLAMP ADAPTER	800049

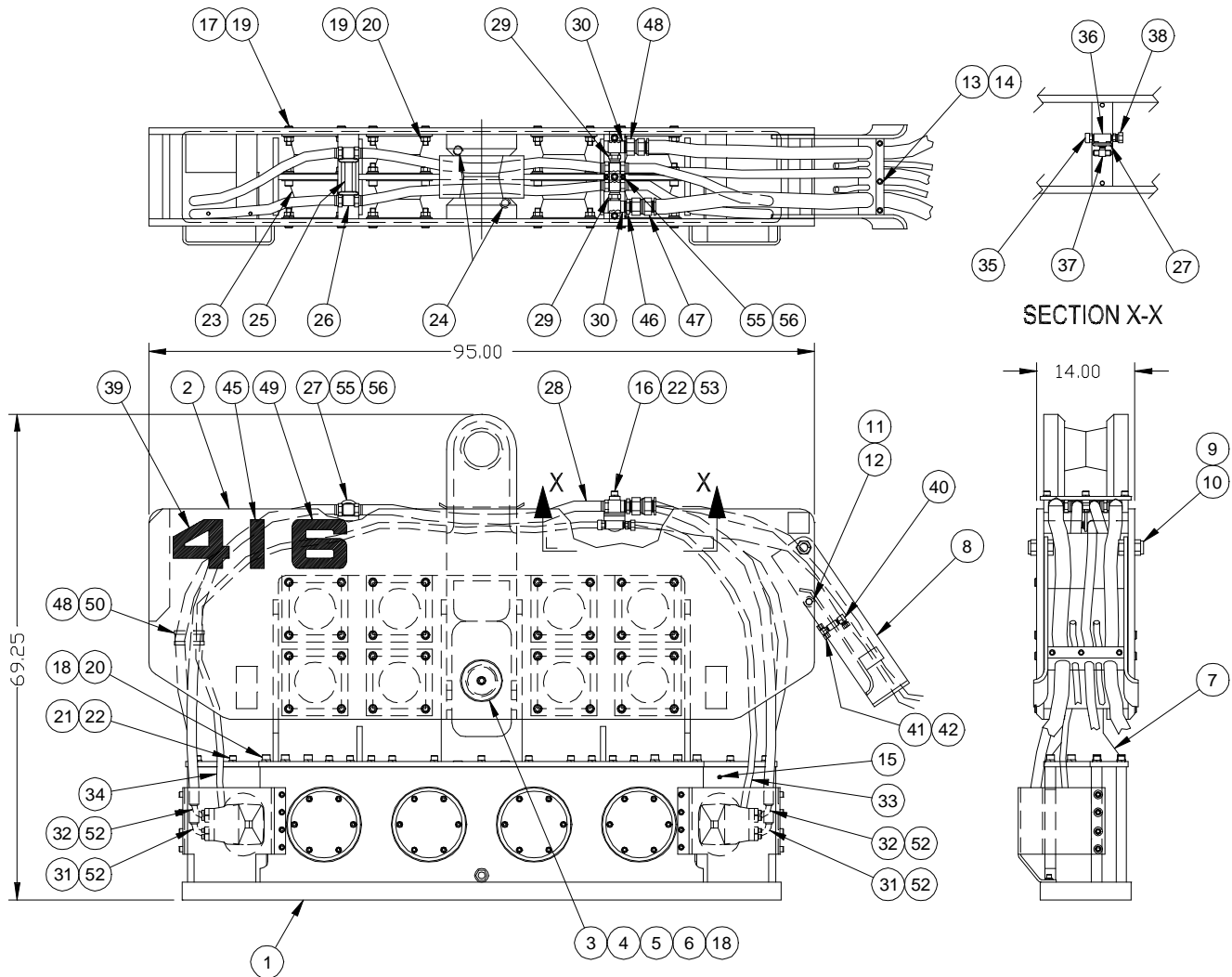
2. The spare parts list SECTION VIII - RECOMMENDED SPARE PARTS contains spare parts which may be very useful in keeping down-time to a minimum, especially in remote or secluded job sites where unforeseen communication problems could cause delay of the delivery of an awaited part.

These RECOMMENDED SPARE PARTS may be ordered beforehand, individually or as a package group as shown in the PARTS LIST.

VIII. ORDERING PARTS

VIBRATION SUPPRESSOR

800027



VIBRATION SUPPRESSOR

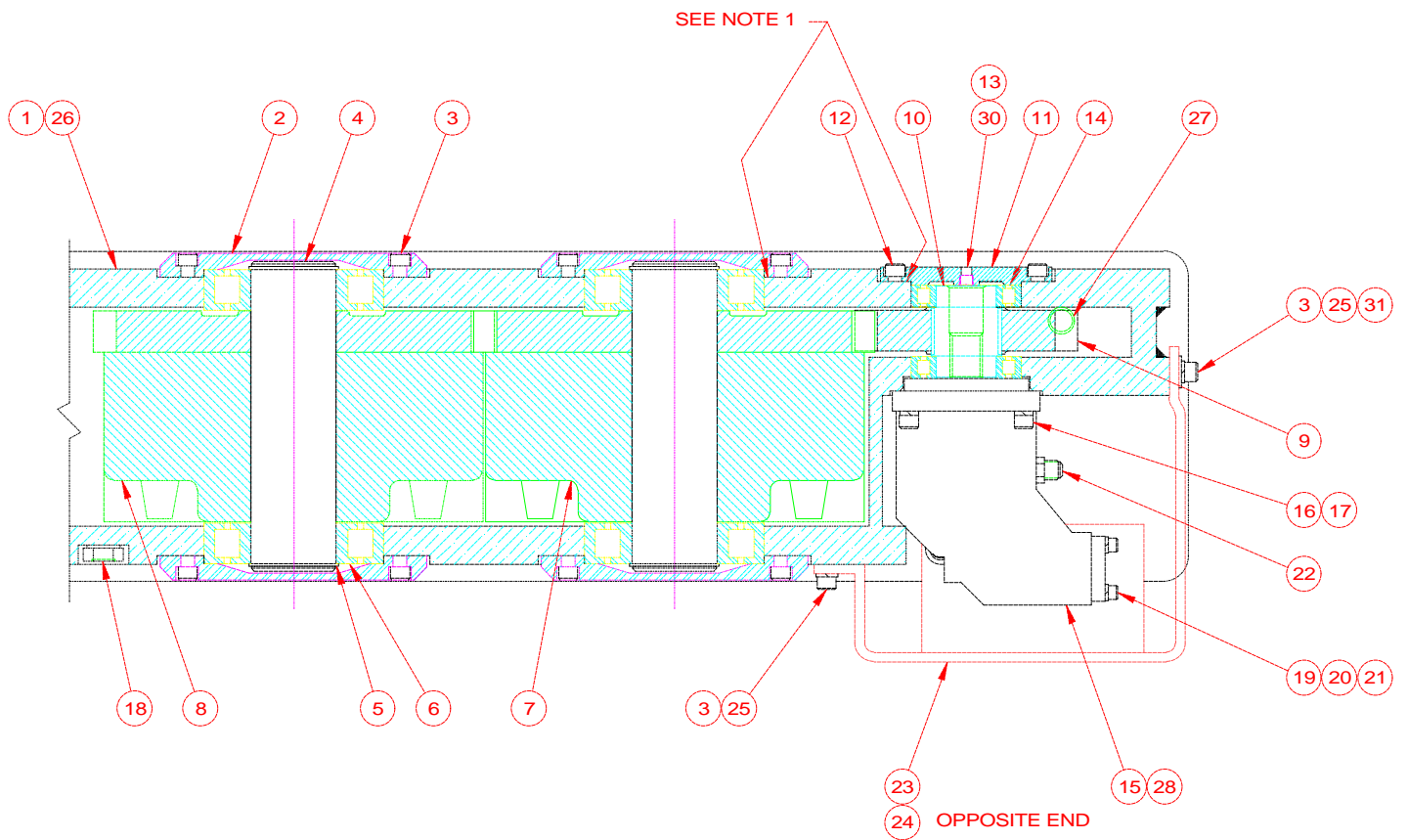
800027

Item	Part Number	Qty.	Description
1	810037	1	416L Transmission Case Asm.
2	100816	1	Suppressor Housing
3	100809	2	Retainer
4	100808	1	Stop Pin
5	100806	1	Spacer
6	400037	2	.75-10 X 1.25 Lg SHCS
7	100818	1	Transmission Adapter
8	100804	1	Hose Chute
9	100802	2	1.25-12 UNF X 2.5 Lg HHCS
10	120301	2	1.25 - 12 H. S. Hex Nut
11	400785	2	1-8 X 1.75 Lg SHCS
12	400787	2	1" H. C. Lock Washer
13	100392	1	Hose Clamp
14	100011	3	.5-13 X 2.0 Lg SHCS
15	100845	1	FITT2P-04P000000-000S007
16	130135	3	.625-11 X 3.5 Lg SHCS
17	400069	64	.75-10 x 2.0 Lg SHCS
18	100069	18	.75 Lock Washer Medium
19	100782	96	.75-10 Flange Nut
20	100067	48	.75-10 X 2.5 Lg SHCS Locwel
21	100071	28	.625-11 X 2.5 Lg SHCS Locwel
22	100007	31	.625 Lock Washer-Medium
23	100796	16	Elastomer
24	100063	2	FITT2P-16P000000-000S007
25	100800	1	1" Check Valve
26	100798	2	FITT2T-16M16M16P-000H001
27	100794	3	1.5 U-Bolt
28	100790	2	HOSE100PT6J016J016L0370C
29	100780	2	FITT2T-16M16M16J-000H001
30	110209	2	FITT2L-20P16M000-0000001
31	100432	2	HOSE075PT6H912J016L06400
32	100430	2	HOSE075PT4H912J016L06200
33	100788	1	HOSE050PT4J908J008L06200
34	100792	1	HOSE050PT4J908J008L10100
35	100032	1	Relief Valve
36	110838	1	FITT2T-08Q08Q08Q-0000306
37	300377	1	FITT2T-08M08M08P-0000001
38	400395	1	FITT2S-12N08P000-000H001
39	110745	2	4 Logo Plate
40	120525	1	FITT2L-06P06N000-00L000L

VIBRATION SUPPRESSOR (Continued)

800027

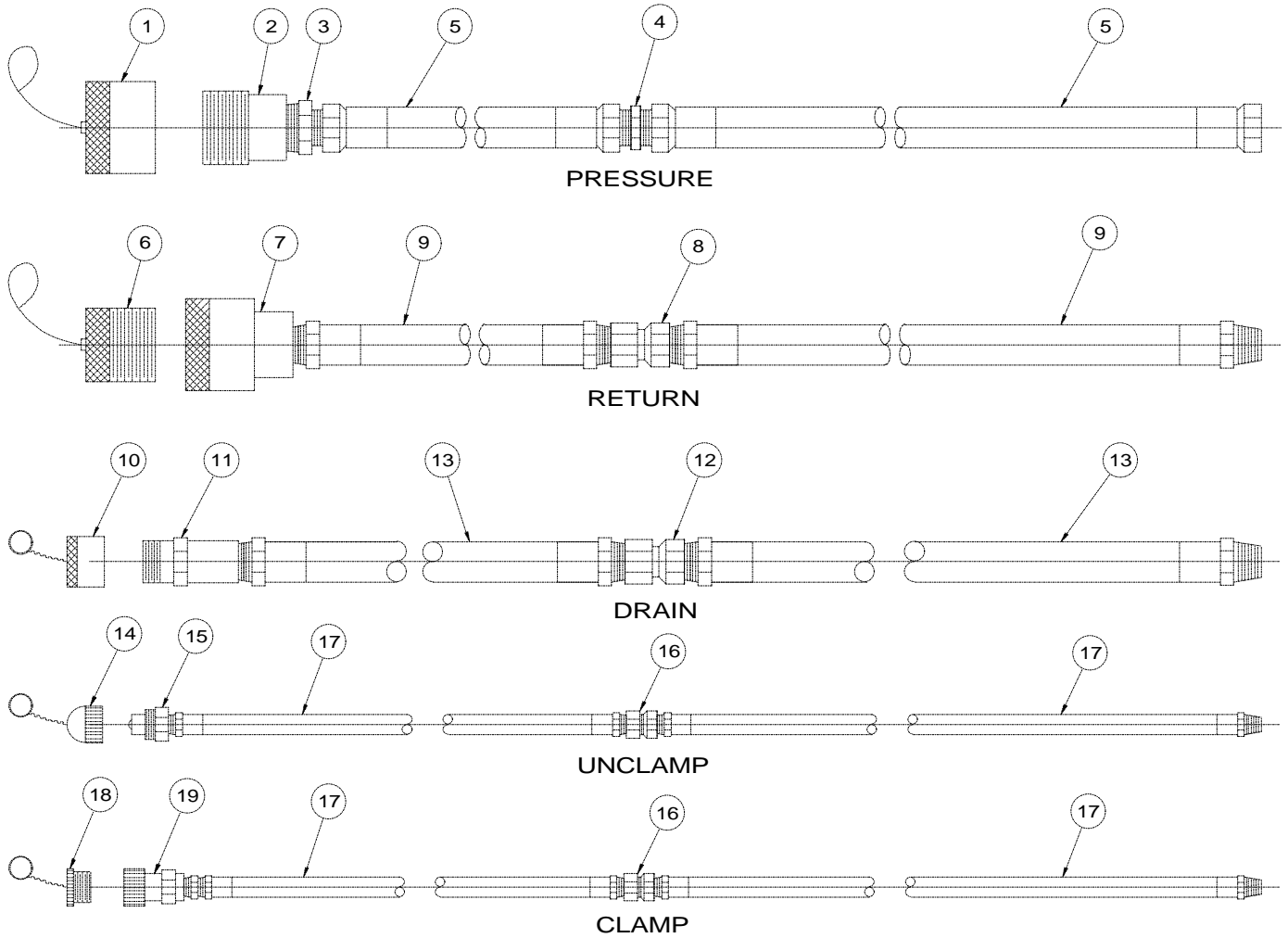
<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
41	120593	2	FITT2T-06M06M06P-000H001
42	100057	4	FITT2C-06J000000-000H001
45	110629	2	1 Logo Plate
46	400159	1	FITT2S-24P20Q000-000H001
47	110139	1	FITT2S-24Q24N000-000H001
48	400295	1	FITT2S-20M20Q000-000H001
49	110747	2	6 Logo Plate
50	100622	2	Hose Clamp Insert
51	100620	2	Band Clamp
52	100097	4	2-214 O-Ring 70 Duro
53	100378	1	Hold Down Bar
54	100410	4	416I-612 Load Gage Decal
55	100535	6	.375 -16 Hex Nut
56	400149	6	.375 Lock Washer
57	100905	1	Serial Number Plate
58	130381	4	Rivet



VIBRATION CASE

810037

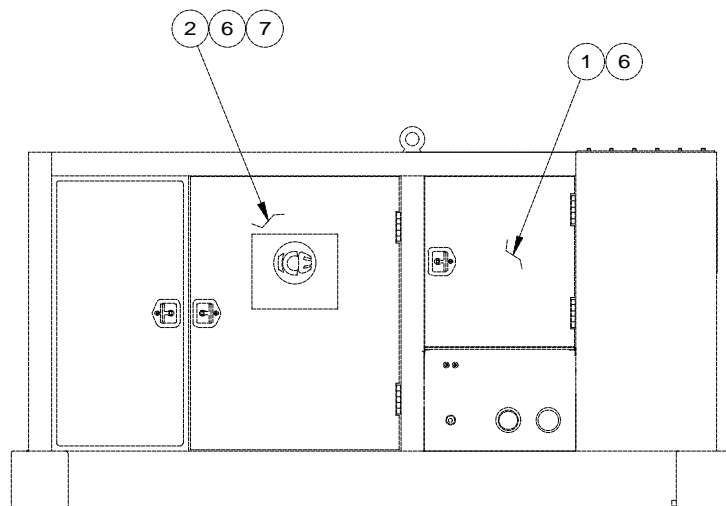
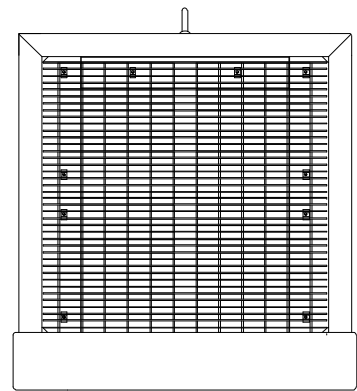
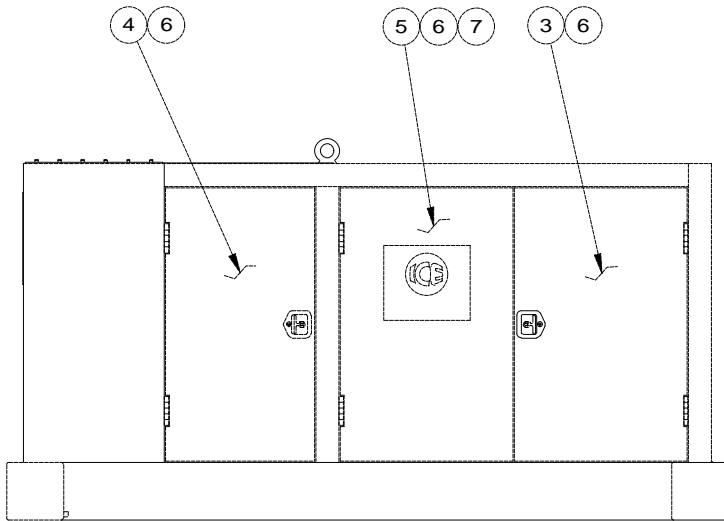
Item	Part Number	Qty.	Description
1	810051	1	416 Transmission Case Frame
2	100754	8	Bearing Cap
3	100119	68	.5-13 X 1.25 Lg SHCS Locwel
4	100752	4	Eccentric Shaft
5	100678	8	Snap Ring
6	100824	8	Bearing
7	810417	2	416 Eccentric Gear Asm
8	810437	2	416 Eccentric Gear Asm
9	100739	2	Motor Gear
10	100755	2	Motor Gear Shaft
11	100750	2	Bearing Housing
12	100445	8	.50-13 X 1.0 Lg SHCS Locwell
13	100822	2	Breather
14	100161	4	Motor Bearing
15	100434	2	Drive Motor 416L (V)
16	100163	8	.50-13 X 1.75 Lg SHCS Locwel
17	100027	8	.50 Hi-Collar Lock Washer
18	100185	1	Sight Gauge
19	140467	8	12PH Split Flange Half
20	130117	16	.375 X1.50 Lg SHCS
21	400149	16	.375 Lock Washer
22	100139	2	FITT2S-08M08R000-000H001
23	100742	1	RH Motor Guard
24	100744	1	LH Motor Guard
25	100121	20	.50 Lock Washer Medium
26	110444	3	Transmission Oil/Gal
27	100187	2	FITT2P-12P000000-000S0M7
28	110197	2	2-159 O-Ring
29	100814	1	Sealant
30	100662	2	Filter
31	100483	12	.50 Flat Washer



HOSE ASSEMBLIES - INTERCONNECTING

800029

Item	Part Number	Qty.	Description
1	110955	1	Dust Cap (1 - 1/2)
2	110690	1	Male Disconnect (1 - 1/2)
3	400183	1	FITT2S-24P20M000-000H001
4	100344	1	FITT2S-20M20M000-000H001
5	100346	2	HOSE125PT6J020J020L60000
6	110957	1	Dust Plug (1 - 1/2)
7	110692	1	Female Disconnect (1 - 1/2)
8	110139	1	FITT2S-24Q24N000-000H001
9	100911	2	HOSE150R02P024P024L60000
10	400253	1	Dust Cap (3/4)
11	400251	1	Male Disconnect (3/4)
12	100243	1	FITT2S-12Q12N000-000H001
13	100241	2	HOSE075RO9P012P012L62000
14	100257	1	Dust Cap (3/8)
15	100245	1	Male Disconnect (3/8)
16	100249	2	FITT2S-06Q06N000-000H001
17	100247	4	HOSE038R02P006P006L62000
18	100737	1	Dust Plug (3/8)
19	100777	1	Female Disconnect (3/8)
	130243	10	Rubber Tie Down



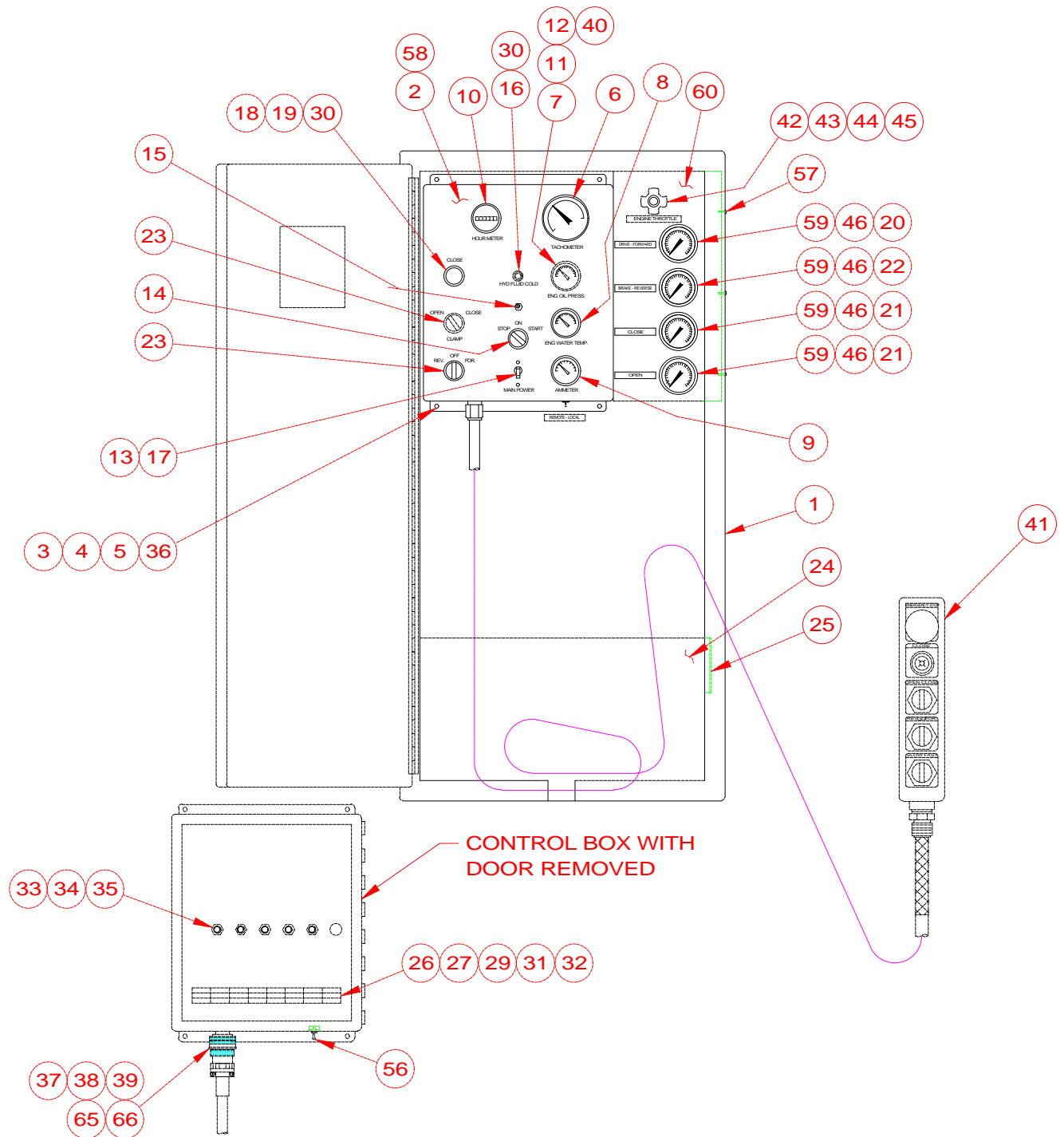
POWER UNIT ENCLOSURE - 325

800379

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	100550	1	Cover Door
2	100548	1	Cover Door
3	100546	1	Cover Door
4	100544	1	Cover Door
5	100542	1	Cover Door
6	100834	10	5" Door Hinge
7	100290	2	ICE Decal

CONTROL BOX

810585



CONTROL BOX

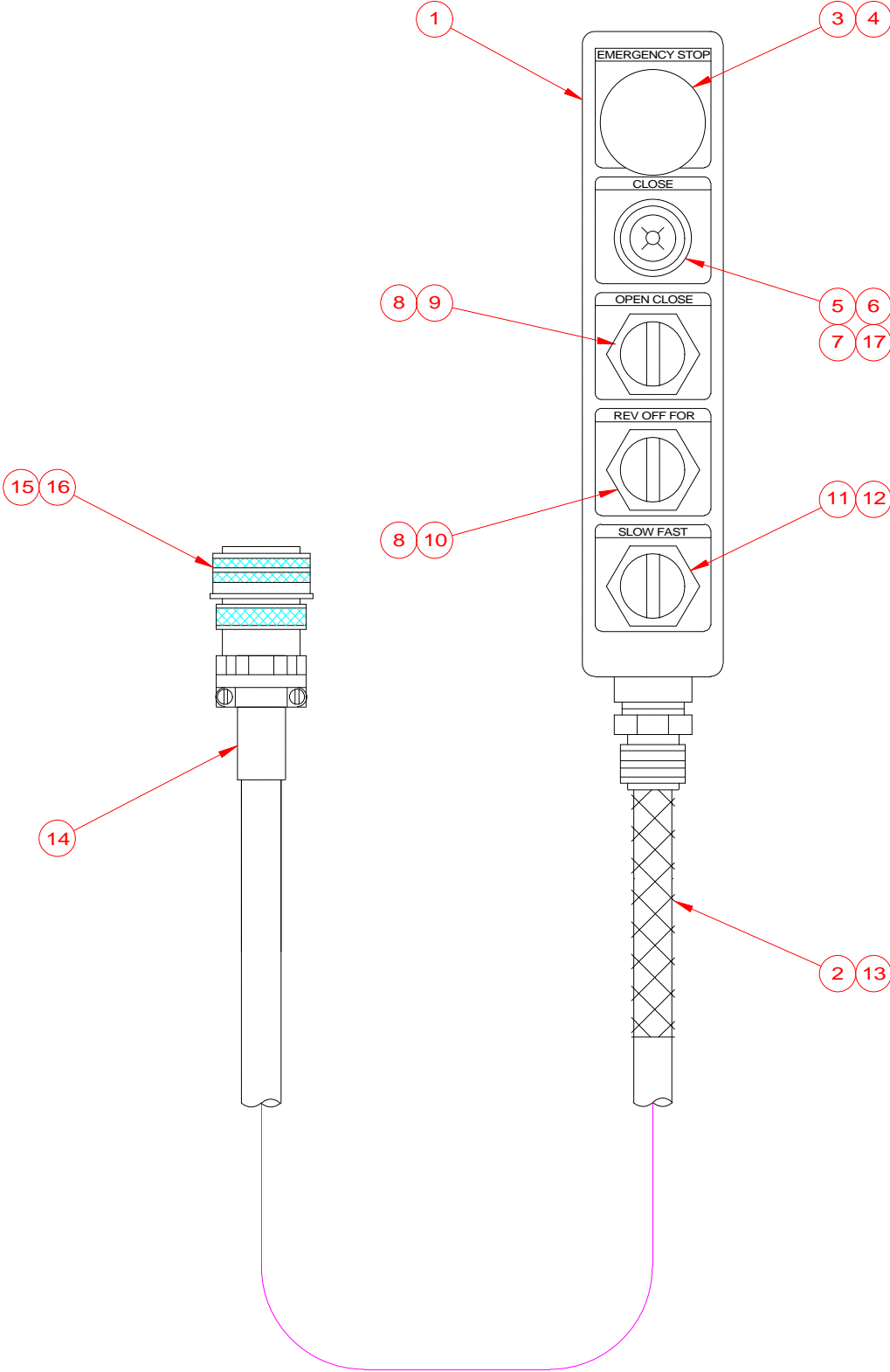
810585

Item	Part Number	Qty.	Description
1	130151	1	Control Box Enclosure
2	100740	1	250 Control Box
3	100576	4	.25-20 X .625 Lg SHCS
4	100559	4	.25 Lock Washer
5	100598	4	.25-20 Hex Nut
6	130465	1	175-250 Tachometer
7	100329	1	Oil Pressure Gauge
8	130251	1	Water Temp Gauge
9	110371	1	Ammeter
10	100343	1	Hourmeter
11	110415	5	.250 Oil Pressure Tube/Ft
12	100333	1	FITT2L-04E02Q000-000H002
13	400141	1	Circuit Breaker-10 A
14	130259	1	Start Switch
15	130257	1	Reset Button
16	100355	1	Dialight, Test
17	100331	2	#6-32 X .25 Lg BHCS
18	100359	1	Light, Pilot
19	100361	1	Lens, Clear-Pilot Lite
20	110680	1	HOSE019AQ1J004J004L40000
21	130205	2	HOSE019AQ1J004J004L09000
22	130393	1	HOSE019AQ1J004J004L11000
23	130155	2	Switch
24	130149	1	Box Panel
25	130387	1	Hose Bracket
26	400161	2	#10 Lock Washer
27	400163	2	#10-32 Hex Nut
29	110649	2	10-32 X .375 Lg PHMS
30	130305	2	Warning Light Bulb
31	110567	14	Terminal Block
32	110569	10	Terminal Mtg. Channel/In
33	100853	5	90 Deg S/O Comp Fitting
34	110841	5	.5 Plastic Bushing
35	110843	5	.5 Lock Nut
36	100597	4	.25 Flatwasher
37	110763	1	Female Amphenol Insert
38	100397	1	Amphenol Receptacle
39	110754	4	#6-32 X .375 Lg RHMS
40	110871	1	FITT2V-04P04E000-000H002

CONTROL BOX

810585

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
41	800393	1	175-325 Pendant Asm.
42	130255	1	Engine Throttle
43	100429	1	Throttle Cable Seal
44	110964	1	Throttle Cable Pivot
45	100577	1	Stop Cable Clamp
46	100321	4	FITT2L-04M04Q000-0000001
56	140361	1	Toggle Switch
57	100656	6	10-32 X .5 Lg PHMS-Self Tap
58	100468	1	300 Label Group
59	110600	4	0-6000 Psi Gage(GA1-4)
60	100738	1	Gage Panel
65	110696	4	#6 Lock Washer
66	110694	4	#6-32 Hex Nut



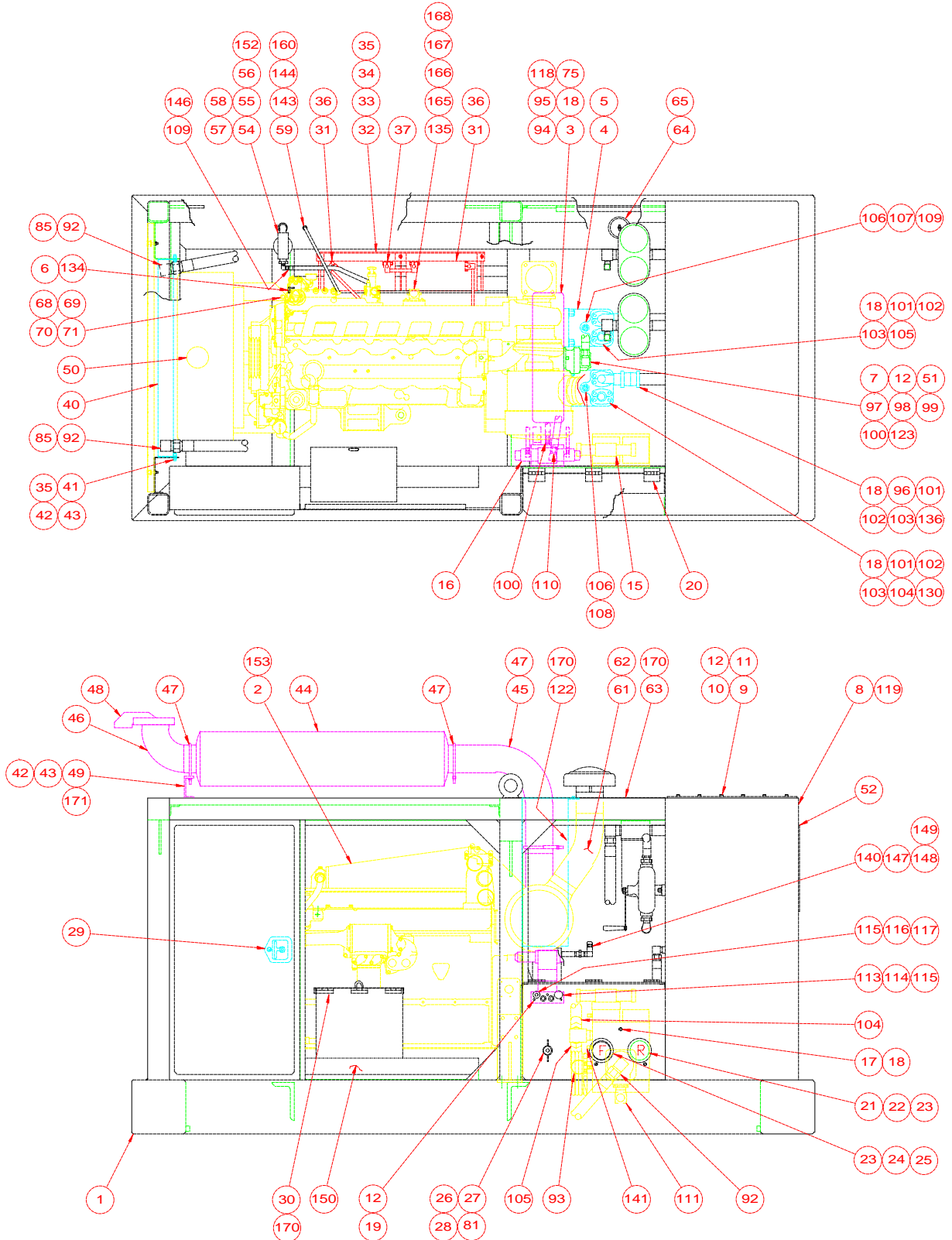
175-325 PENDANT ASSEMBLY

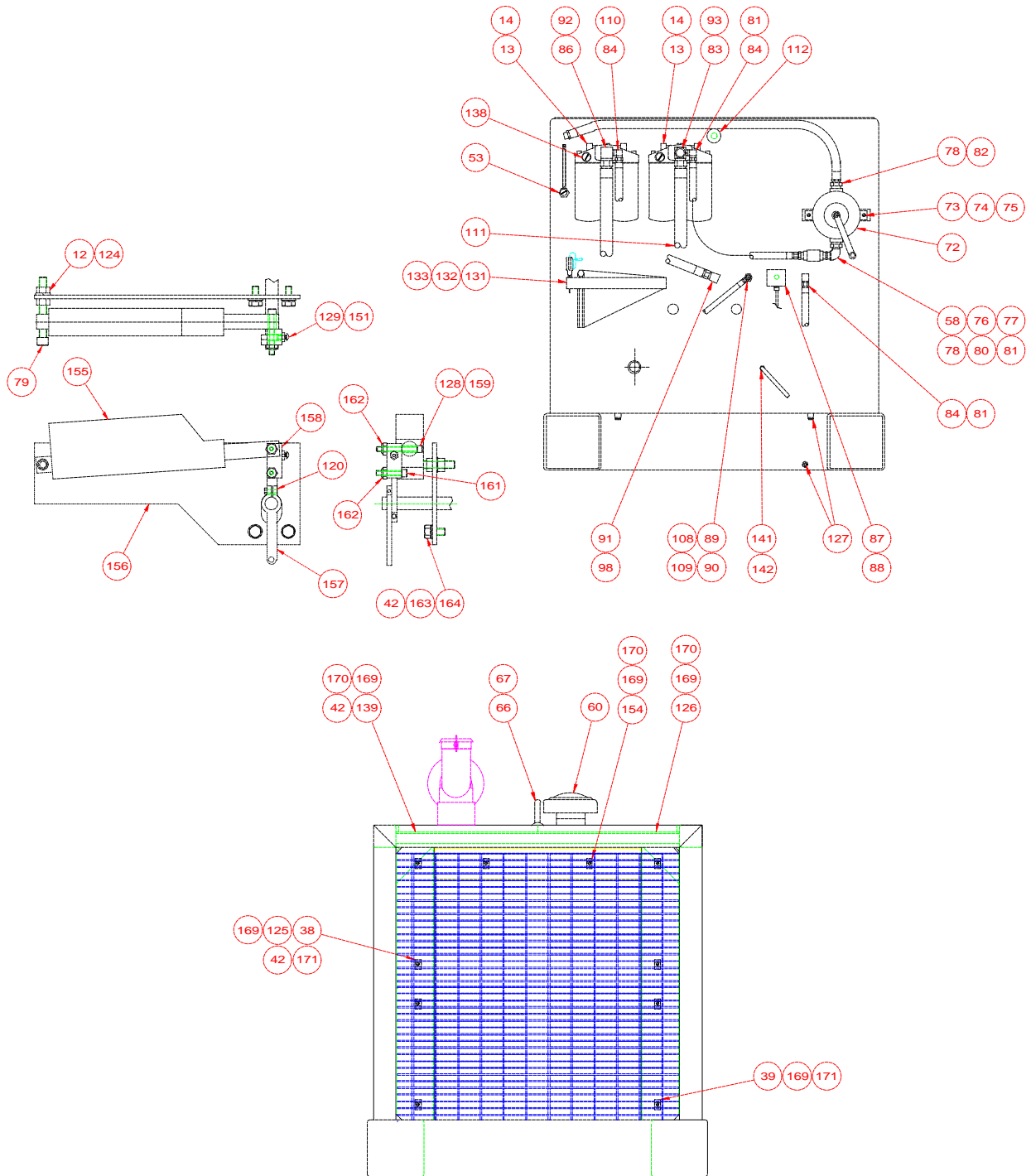
800393

Item	Number	Qty.	Description	Part
1	130505	1	Pendant Box	
2	110603	1	1.0 Strain Relief	
3	130507	1	Emergency Stop Button	
4	130509	1	Emergency Stop Label	
5	100359	1	Light, Pilot	
6	100361	1	Lens, Clear-Pilot Lite	
7	100403	1	Close Nameplate	
8	130155	2	Switch	
9	100401	1	Open/Close Nameplate	
10	100864	1	Rev-Off-For Namplate	
11	100566	1	Switch	
12	100562	1	Slow-Fast Nameplate	
13	100560	50	Pendant Cable/Ft	
14	100375	1	Strain Relief-Amphenol	
15	110761	1	Male Amphenol Insert-Plug	
16	100395	1	Amphenol Plug	
17	130305	1	Clamp Light Bulb	

325 POWER UNIT - INTERNAL

800377





325 POWER UNIT - INTERNAL

800377

Item	Part Number	Qty.	Description
1	810563	1	300 P.U. Fuel Base Asm.
2	100508	1	3306TA Diesel Engine (E)
3	100512	1	Multi-Pump Adapter
4	100406	2	Main Pump (P1)
5	100782	8	.75 Flanged Nut
6	100577	1	Stop Cable Clamp
7	100684	1	Clamp Pump (P2)
9	400129	1	Reservoir Cover
10	400225	1	Reservoir Gasket
11	100648	26	.375-16 X.875 Lg SHCS
12	400149	32	.375 Lock Washer
13	100520	2	Return Filter Asm. (F2)
14	100518	4	Return Filter Element
15	810571	1	300 Drive Manifold Asm.
16	810035	1	325 Clamp Manifold Assembly
17	100119	3	.5-13 X 1.25 Lg SHCS Locwel
18	100121	27	.5 Lock Washer Medium
19	100051	3	.375-16 X 1.0 Lg Shcs Locwel
21	110690	1	1.5 Male Disconnect (QD1)
22	110955	1	1.5 Dust Cap
23	110392	2	FITT2S-24R24P000-000H001
24	110692	1	1.5 Female Disconnect (QD2)
25	110957	1	1.5 Dust Plug
26	400095	1	.75 Female Disconnect (QD5)
27	400121	1	.75 Dust Plug
28	100387	1	FITT2S-12P12B000-000H001
29	810585	1	300 Control Box Asm.
30	100558	1	Tool Box
31	400890	2	Battery
32	400888	1	Battery Holddown
33	400231	3	Hold Down Stud
34	100831	3	.312 Wing Nut
35	100293	21	.312 Flat Washer
36	100537	2	Battery Cable-24"
37	110653	1	Battery Cable-6
40	400099	1	Heat Exchanger (HE)

325 POWER UNIT - INTERNAL

800377

Item	Part Number	Qty.	Description
41	100105	8	.312-18 X 1.0 Lg SHCS Locwel
42	100287	21	.312 Lock Washer
43	100289	10	.312-18 Hex Nut
44	400898	1	Muffler
45	100516	1	Exhaust Elbow (5"-Lg.)
46	400894	1	Exhaust Outlet Elbow
47	140369	3	5 In. U-Clamp
48	140411	1	5.0 Rain Cap
49	100532	1	Muffler Support
50	100726	7	Antifreeze/Gal
51	100700	2	.375-16 UNC X 1.25 HHCS
52	400277	1	I C E Logo Plate
53	130179	1	Sight Gauge And Thermometer
54	120611	1	Water Seperator Asm.
55	120425	1	FITT2S-16P16P000-1200301
56	110706	1	FITT2S-16P08Q000-000H001
57	110173	1	FITT2S-08M08P000-000H001
58	110377	2	FITT2L-16P16Q000-0000306
59	110633	1	HOSE038R02J006J006L03700
60	100514	1	Air Intake Bonnet
61	100951	20	Flexhaust/In
62	130237	2	Hose Clamp
63	100540	1	Unit Cover(300)
64	100417	1	FITT2C-48Q000000-0000306
65	100419	1	Petcock
68	100071	4	.625-11 X 2.5 Lg Shcs Locwel
69	130141	4	.625 Flat Washer
70	100007	4	.625 Lock Washer-Medium
71	100273	4	.625-11 Hex Nut
72	100447	1	Hand Pump (MP)
73	100439	2	.437-X1.75 Lg SHCS
74	400153	2	.437 Flat Washer
75	100443	14	.437 Lock Washer
76	100449	1	FITT2S-16P16P000-000H001
77	100451	1	Check Valve (CV4)
78	110089	2	FITT2S-20P16Q000-000H001
79	110913	1	.38-16UNC X 3.00 Lg SHCS
80	300119	1	FITT2S-16P12M000-000H001

325 POWER UNIT - INTERNAL

800377

Item	Part Number	Qty.	Description
81	130201	2	HOSE075R01J012J012L04000
82	400215	1	HOSE100R01P016P016L08400
83	810573	1	Special Tee
84	100489	3	FITT2L-12M12P000-0000001
85	100588	2	FITT2L-24M24P000-0000001
86	810575	1	Special 90 Elbow
87	400115	1	Temperature Switch (TS1)
88	110237	1	Str S/O Cord Adapter
89	400409	1	FITT2S-12P08Q000-000H001
90	300401	1	FITT2T-08M08P08M-0000001
91	120055	1	FITT2L-16M16P000-0000001
92	100500	2	HOSE150R01J024J024L11800
93	100334	1	FITT2L-24J24M000-0000001
94	100462	12	.437-14 UNC X 1.25 Lg HHCS
95	100445	8	.5-13 X 1.0 Lg SHCS Locwell
96	100454	2	2"Tube Flex Master
97	100938	1	FITT2L-16M12R000-000H001
98	100862	1	HOSE100R01J016J016L03300
99	300099	1	FITT2S-10R08M000-000H001
100	110461	1	HOSE050R09J008J908L04000
101	110986	8	#20 PH Split Flange Half
102	100037	4	2-222 O-Ring 70 Duro
103	400739	16	.5-13 UNC X 2.00 Lg HHCS
104	100492	1	HOSE100PT6J020H020L04000
105	100490	1	HOSE100PT6J020H920L06500
106	110325	2	FITT2S-12R08M000-000H001
107	100488	1	FITT2V-08M08J000-000H001
108	100486	1	HOSE050R01J008J008L01450
109	110265	2	HOSE050R01J008J008L02400
110	100484	1	HOSE075R01J012J012L08400
111	100482	2	HOSE150R02J024J024L07200
112	100455	1	Breather
113	100777	1	.375 Female Disconnect (QD3)
114	100737	1	.375 Dust Plug
115	110794	2	FITT2S-06P06P000-000H001
116	100245	1	.375 Male Disconnect (QD4)
117	100257	1	.375 Dust Cap
118	110444	2	Transmission Oil/Gal
119	140415	275	Hydraulic Fluid/Gal
120	810617	1	Modified Throttle Arm

325 POWER UNIT - INTERNAL

800377

Item	Part Number	Qty.	Description
122	100536	1	Exhaust Shield
123	100682	1	2-042 O-Ring
124	100535	2	.38 Hex Nut
125	100404	2	Intake Grill (300)
126	100400	1	Left Exhaust Grill
127	100423	4	FITT2P-08P000000-000S007
128	110244	1	Tube
129	110827	1	10-32 X .75 BHCS S.S.
130	100680	2	2-258 O-Ring
131	810045	1	Hex Key Group
132	100651	1	24 V Test Light
133	100600	1	Hex Key Rack
134	100502	1	Throttle Brkt.
135	100504	1	24v Solenoid
136	100458	2	90 Deg. Flanged Adapter
137	110231	5	S/O Cord 12' Lg
138	100436	2	Gage (0-60 Psi.) (GA5)
139	100402	1	Right Exhaust Grill
140	100476	1	FITT2S-08P08P000-0300301
141	100478	1	HOSE038R01J006J006L02000
142	130399	1	FITT2S-06M04P000-000H001
143	400411	1	FITT2L-06M06J000-000H001
144	100936	1	FITT2S-06M04R000-000H001
145	100063	1	FITT2P-16P0000000000H001
146	100787	1	FITT2L-08M08R000-000H001
147	300443	1	FITT2S-08Q08Q000-000H001
148	300067	1	FITT2L-08P08Q00-000H001
149	100474	1	Breather
150	100524	1	Tube-4x4x11 Ga X 33
151	400163	1	#10-32 Hex Nut
152	120613	1	Water Seperator Element
153	400247	28	Engine Oil/Quart
154	100394	1	Top Air Baffle
155	110246	1	Electric Actuator(24V) (M)
156	110254	1	Electric Throttle Bracket
157	110446	1	Throttle Arm
158	110448	1	Adjustable Link
159	100631	1	.25-20 X 2.0 Lg SHCS
160	400203	1	FITT2S-06M06P000-000H001

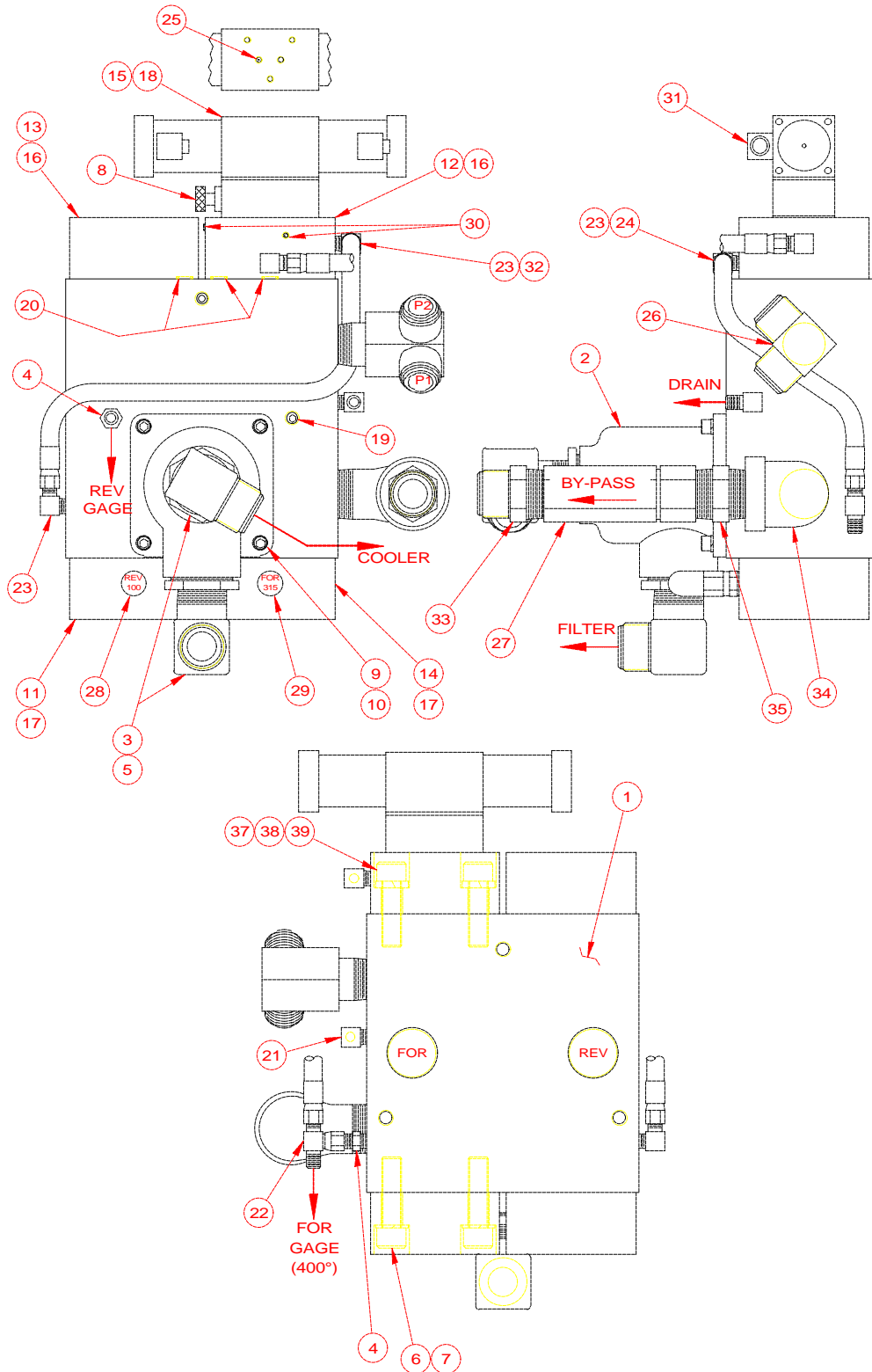
325 POWER UNIT - INTERNAL

800377

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
161	100595	1	.25-20 X 1.25 Lg SHCS
162	100422	2	.25-20 UNC Esna Nut
163	150179	2	.312-18 X .75 HHCS
165	100428	1	Solenoid Bracket
166	130061	2	#10-32 x .5 BHCS STN STL
167	300671	2	#10 Flat Washer
168	400161	2	#10 Lock Washer
169	100398	20	Saddle Clip
170	110830	32	.25 X 2.00 Hex Tex Screw
171	100396	10	.312-18UNC X 1.50 Lg. SHCS

CONTROL MANIFOLD ASSEMBLY

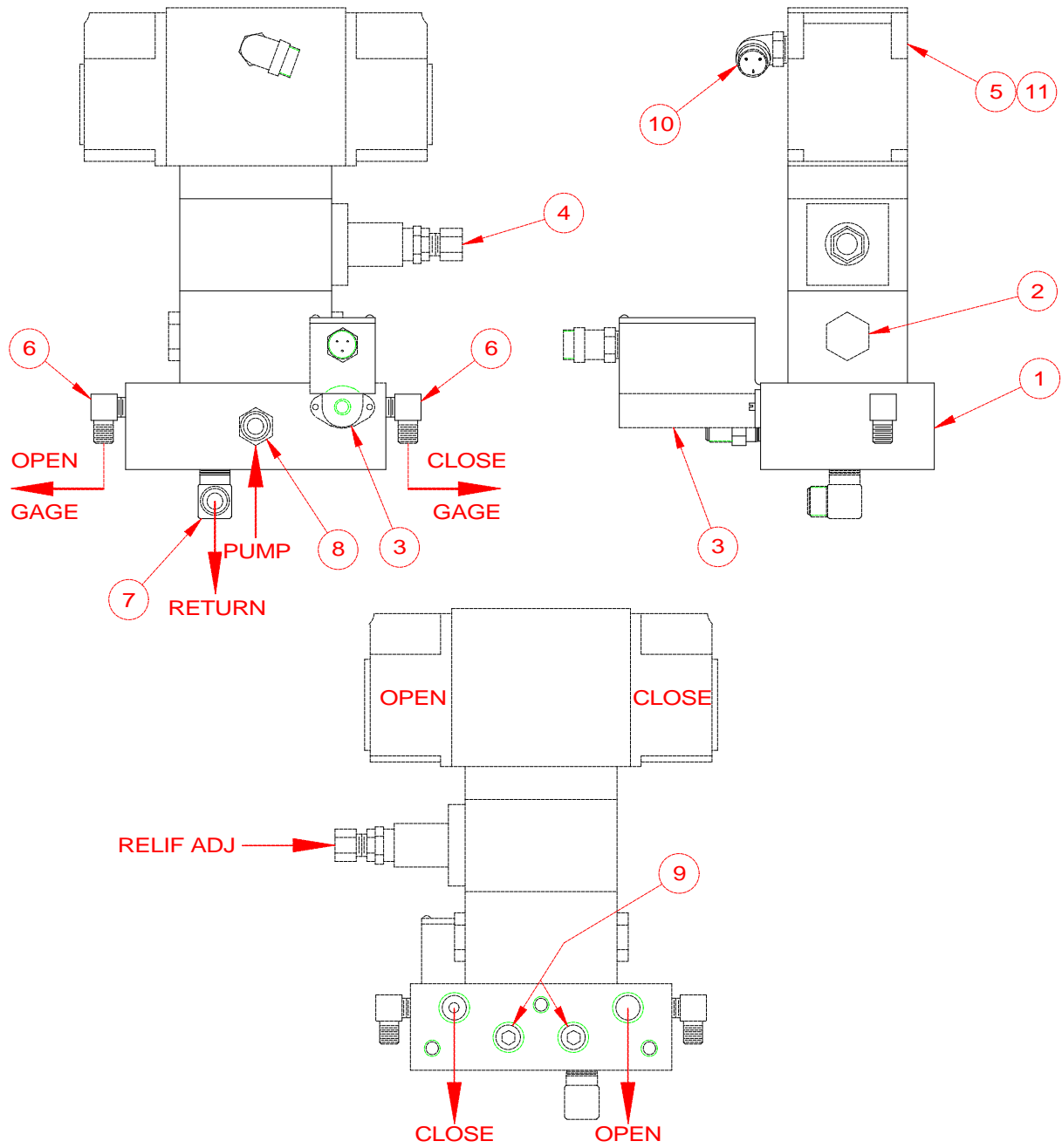
810571



CONTROL MANIFOLD ASSEMBLY

810571

Item	Part Number	Qty.	Description
1	100758	1	300 Manifold Block
2	110628	1	Cooler Valve (V3)
3	100588	2	FITT2L-24M24P000-0000001
4	110203	2	FITT2S-04M04P000-000H001
5	100547	2	FITT2S-32P24Q000-000H306
6	400039	12	.75-10UNC X 2.75 Lg SHCS
7	100069	12	.75 Lock Washer Medium
8	100654	1	Sandwich Shut-Off Valve (V4)
9	100143	4	.375-16 X 1.25 Lg SHCS Locwel
10	400149	4	.375 Lock Washer
11	110544	1	Cartridge Cover (CC4)
12	110530	1	Cartridge Cover (CC1)
13	110606	1	Cartridge Cover (Blank) (CC2)
14	110546	1	Cartridge Cover (CC3)
15	100650	4	.25-20 UNC X 4.5 Lg SHCS
16	110624	2	Cartridge A (CA1 & CA2)
17	110622	2	Cartridge B (CB1 & CB2)
18	810519	1	Modified Spool Valve (24) (V2)
19	100845	2	FITT2P-04P000000-000S007
20	110602	3	111 O-Ring
21	140581	1	FITT2L-06M04P000-0000001
22	100556	1	FITT2T-04M04M04J-0000001
23	100145	3	FITT2L-04M04P000-0000001
24	100149	1	HOSE025R02J004J004L01900
25	140387	1	Orifice-.059
26	100608	1	Special Tee
27	130339	1	1.5 Check Valve (CV2)
28	100630	1	Rev. Cartridge (100) (RV4)
29	100632	1	For. Cartridge (315) (RV1)
30	100646	2	FITT2P-02P000000-000S007
31	100990	2	Electrical Connector
32	100719	1	HOSE025R02J004J004L03000
33	100565	1	FITT2S-24M24P000-000H001
34	100446	1	FITT2L-24P24Q000-0000001
35	110037	1	FITT2S-24P24P000-000H001
36	110237	1	Str S/O Cord Adapter
37	110616	1	.25 X .625 Lg Roll Pin
38	100067	4	.75-10 X 2.5 Lg SHCS Locwel
39	400727	4	.75 Hi-Collar Lockwasher



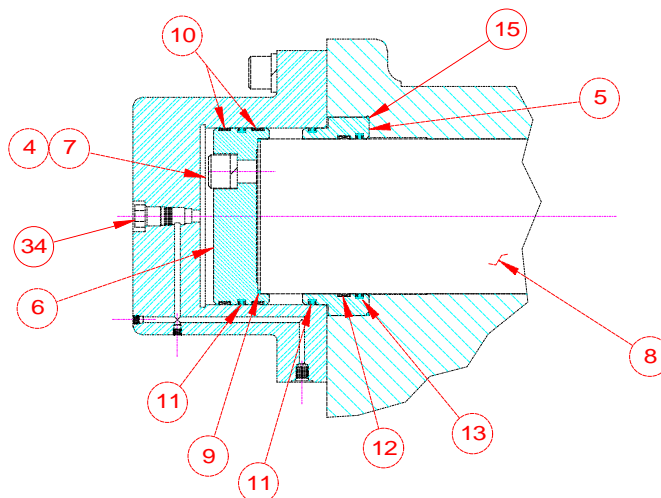
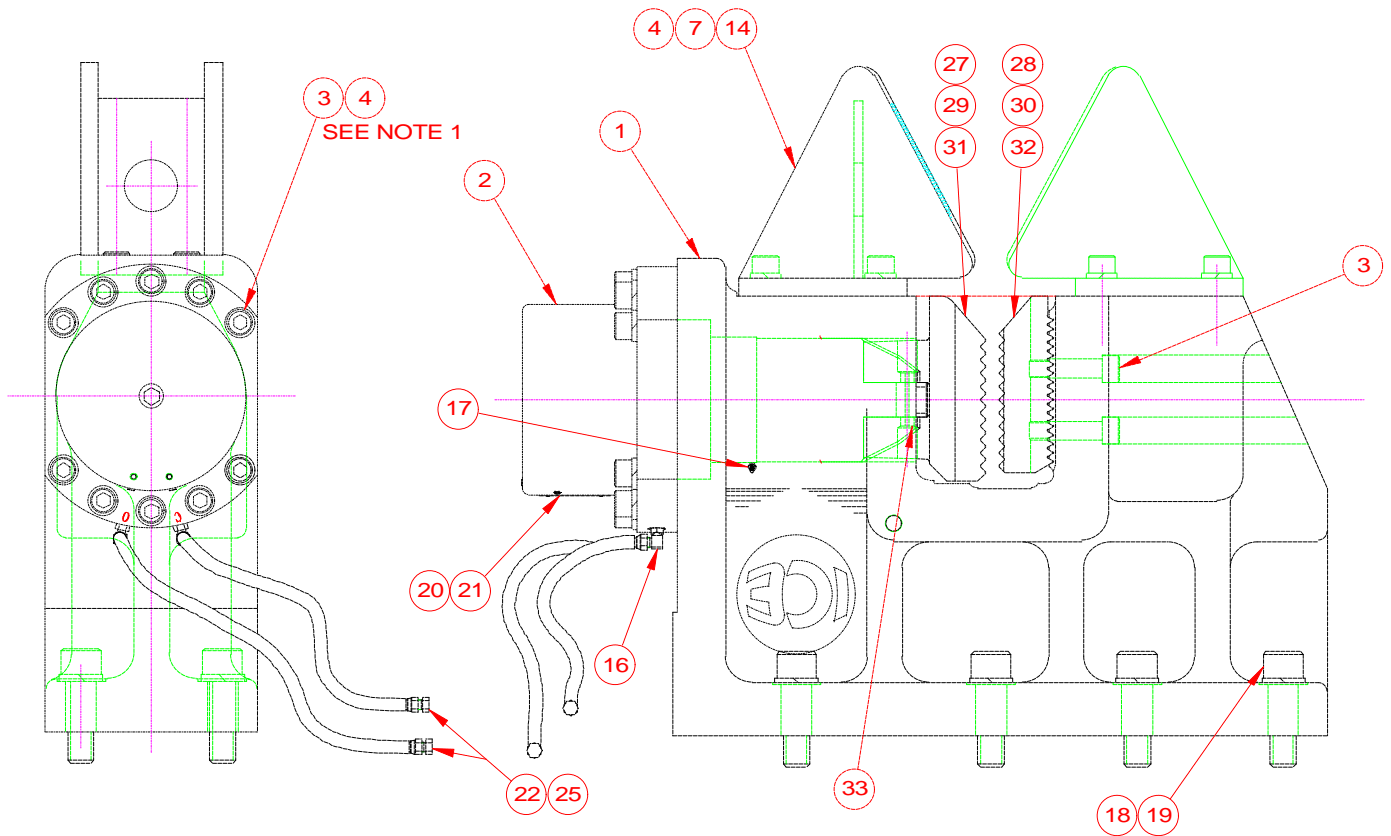
CLAMP MANIFOLD

810035

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	110642	1	Clamp Manifold Block
2	110149	1	Check Valve (CV5)
3	810033	1	Pressure Switch Assembly (PS1)
4	100898	1	Sandwich Relief (RV2)
5	110147	1	Control Valve (V1)
6	140539	2	FITT2L-04M02P000-0000001
7	110632	1	FITT2L-12M06P000-000H001
8	110630	1	FITT2S-08M06P000-000H001
9	400213	2	FITT2P-06P000000-000S007
10	110235	1	90 Deg S/O Cord Adapter
11	110634	4	.25-20 X 7.5 Lg SHCS

126B CLAMP ASSEMBLY (OPTIONAL)

800327



NOTE:
 1. TORQUE 1.00 SOCKET HEAD
 CAP SCREWS TO 1009 FT/LB.

CYLINDER DETAIL

126B CLAMP ASSEMBLY (OPTIONAL)

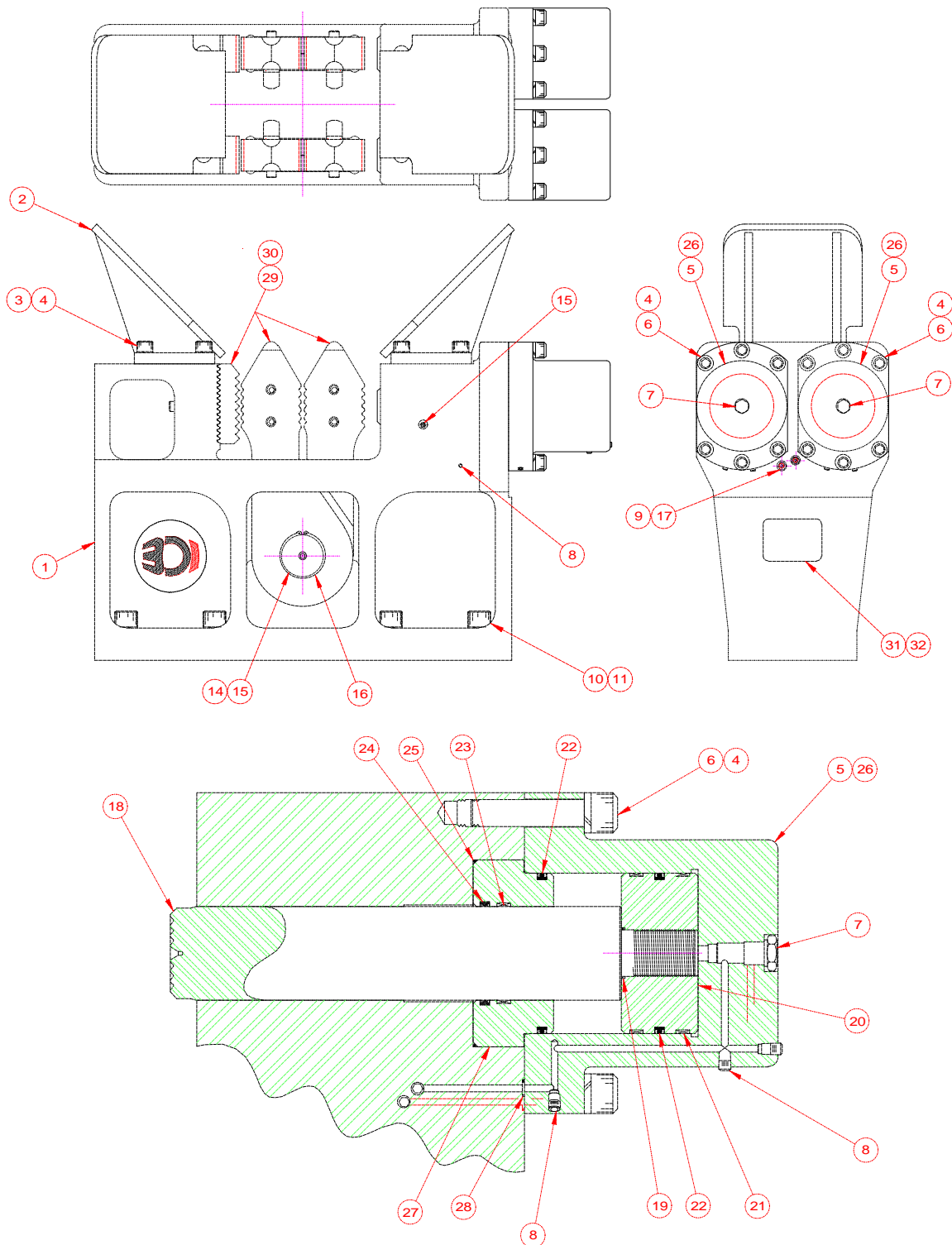
800327

Item	Part Number	Qty.	Description
1	810493	1	126 Clamp Body Asm.
2	810491	1	Welded Cylinder
3	100212	12	1-8UNC x 4.0 Lg SHCS
4	100209	17	1" Lock Washer
5	120567	1	Rod End Cap
6	120569	1	Piston
7	100213	7	1-8UNC x 2.50 Lg SHCS
8	120575	1	Cylinder Rod
9	120347	1	#261-O- Ring (Note)
10	120285	2	Piston Bearing (Note)
11	120283	2	Piston Seal (Note)
12	120555	1	Rod Bearing (Note)
13	120553	1	Rod Seal (Note)
14	100983	1	Pile Guide
15	120401	1	2-269 O-Ring 90 DURO (Note)
16	130057	1	FITT2L-06M06R000-000H001
17	100229	1	Grease Fitting
18	100193	8	1.5-6UNC x 5.0 Lg SHCS
19	100195	8	1.5 Lock Washer
20	120365	1	Clamp Label
21	130381	4	Rivet
22	100111	2	HOSE038R02J006J006L0875S
25	100230	2	FITT2P-06M000000-000T001
26	810515	1	126 Seal Kit
27	810495	1	Universal Movable Jaw
28	110515	1	Universal Fixed Jaw
29	810497	1	H-Beam Movable Jaw
30	110541	1	H-Beam Fixed Jaw
31	810499	1	DS-Movable Jaw
32	110419	1	DS-Fixed Jaw
33	130449	1	Spiral Roll Pin
34	120629	1	Holding Valve (CV7)

Note: Included in 126 Seal Kit

MODEL 127 Z-PILE CLAMP (OPTIONAL)

800041



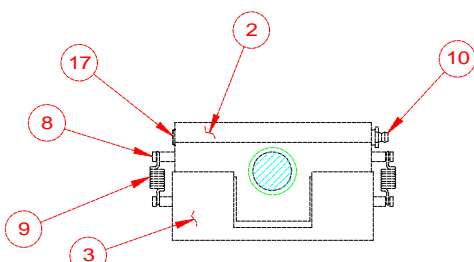
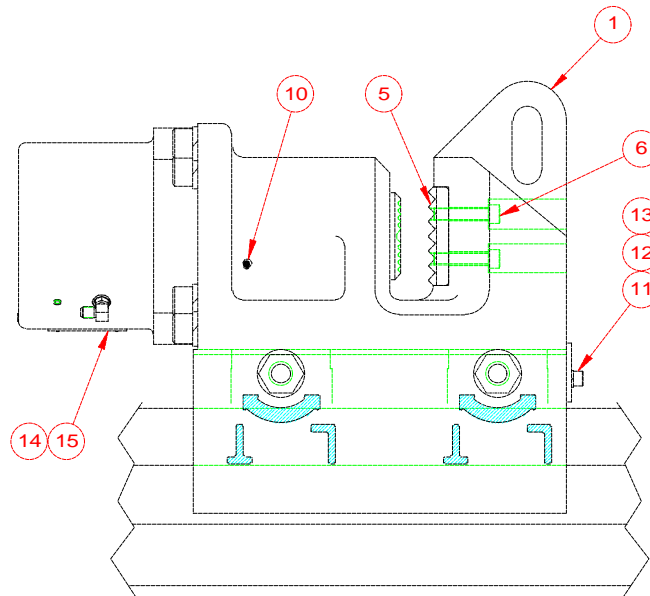
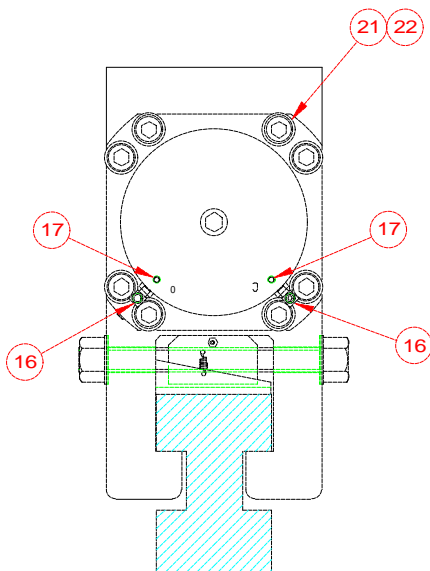
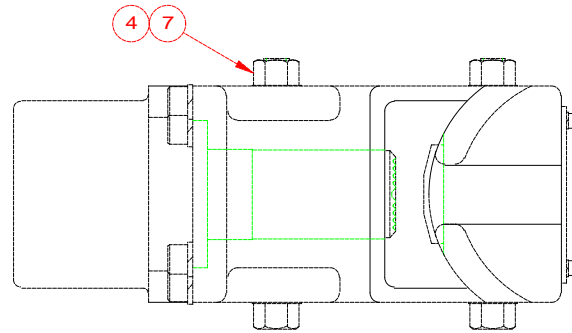
CYLINDER ASSEMBLY DETAIL

MODEL 127 Z-PILE CLAMP (OPTIONAL)

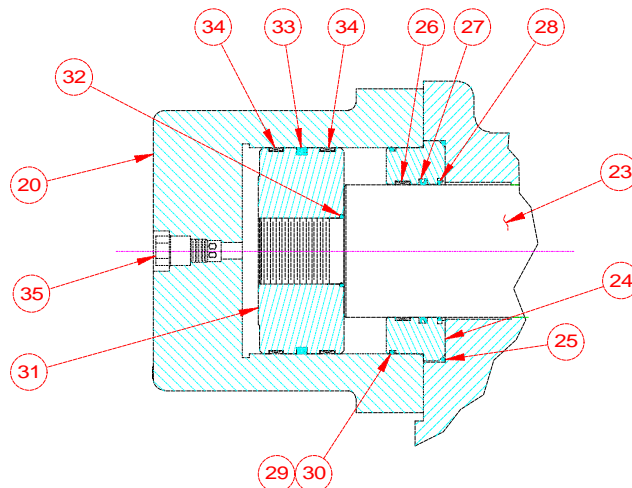
800041

Item	Part Number	Qty.	Description
1	810059	1	127 Z CLAMP BODY CASTING
2	120677	2	PILE GUIDE
3	100213	8	1.0-8 X 2.5 LG SHCS LOCWEL
4	100209	20	1.0 LOCKWASHER MEDIUM
5	120659	2	127B CYLINDER
6	100212	12	1.0-8 X 4 LG SHCS LOCWEL
7	120629	2	HOLDING VALVE CARTRIDGE
8	100646	10	FITT2P-02P000000-000S007
9	100053	2	FITT2S-06MO6R000-000H001
10	100193	8	1.5-6 X 5.0 LG SHCS
11	100195	8	1.5 LOCKWASHER EXTRA HEAVY
14	120155	1	SHAFT
15	100229	4	GREASE FITTING
16	120191	2	RETAINER RING
17	120009	2	HOSE038R02J006J006L0960S
18	120663	2	CYLINDER ROD(127B)
19	120239	2	2-132 O-RING
20	120241	2	PISTON-127
21	120243	4	PISTON BEARING
22	120245	4	PISTON SEAL
23	120665	2	ROD BEARING (127B)
24	120667	2	ROD SEAL (127B)
25	120347	2	2-261 O-RING 90 DURO
26	810629	2	127B Z SEAL KIT
27	120661	2	ROD END CAP(127B)
28	110602	4	111 O-RING
29	800419	1	12" MULTI-GRIP JAW SET (Note)
30	800417	1	13" MULTI-GRIP JAW SET (Note)
31	120181	1	127 S/N PLATE
32	130381	4	RIVET

Note : Not part of Final Assembly.



WEDGE LOCK DETAIL



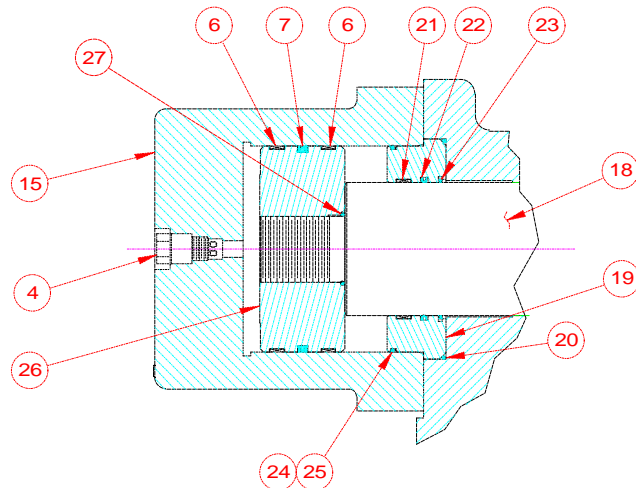
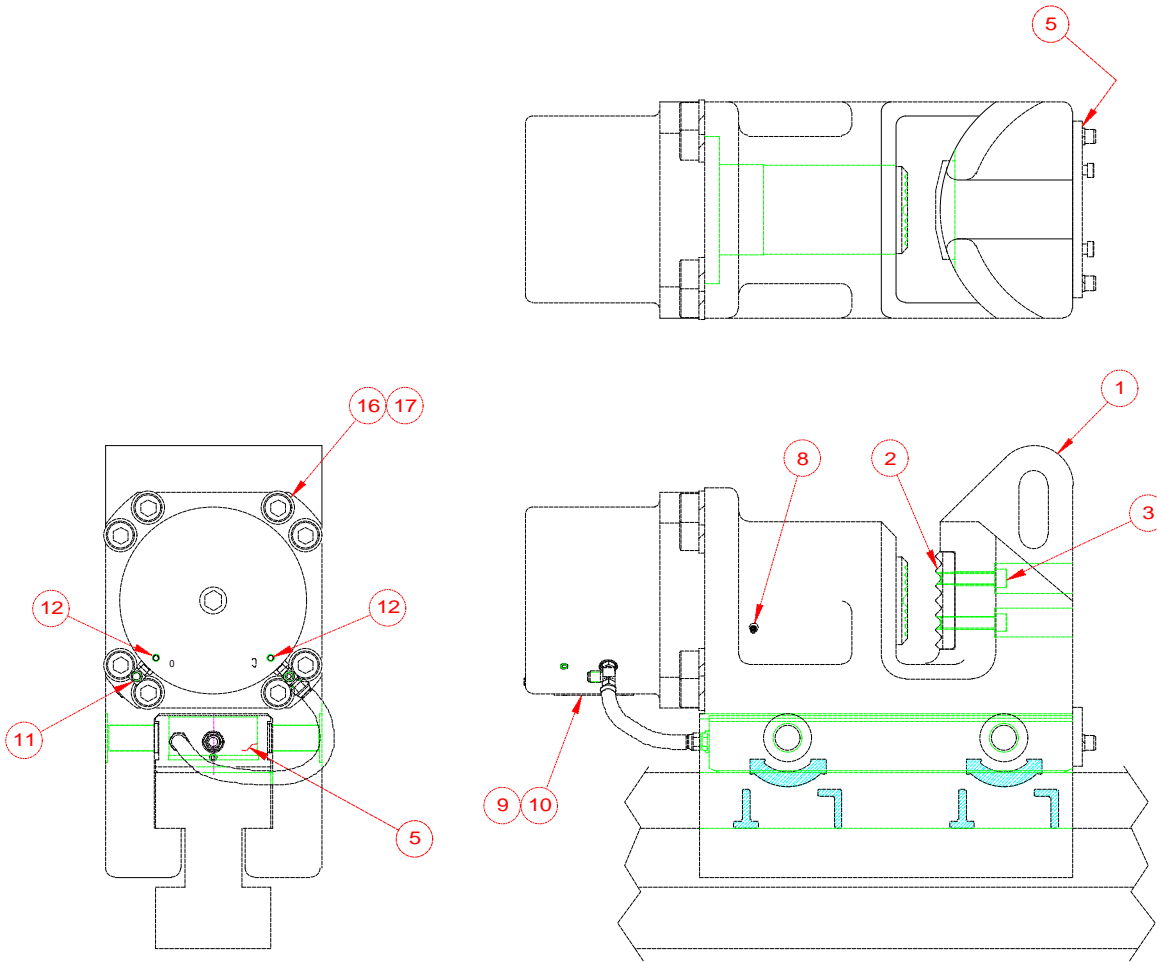
CYLINDER DETAIL

MODEL 80B CAISSON CLAMP (OPTIONAL)

800047

Item	Part Number	Qty.	Description
1	810061	1	Clamp Body
2	120101	2	Wedge
3	120103	2	Lock
4	810109	2	Screw Asm.
5	120107	1	Fixed Jaw
6	400157	2	.625-11UNC x 2.75 Lg SHCS
7	120111	4	1.25 H.S. Flat Washer
8	120113	8	.25 X 1.00 Type G Drive Pin
9	120115	4	Spring
10	100229	3	Grease Fitting
11	120119	1	Wedge Guard
12	100119	2	.5-13UNC x 1.25 Lg SHCS
13	100121	2	.5 Lock Washer
14	120159	1	Clamp Label
15	130381	4	Rivet
16	130057	2	FITT2L-06M06R000-000H001
17	100646	7	FITT2P-02P000000-000S007
20	120621	1	Cylinder
21	100212	8	1.0-8UNC x 4.00 Lg SHCS
22	100209	8	1.0 Lock Washer
23	120631	1	Cylinder Rod
24	120623	1	Rod End Cap
25	120100	1	263-O-Ring (Note)
26	120627	1	Rod Bearing (Note)
27	120625	1	Rod Seal (Note)
28	120345	1	Rod Wiper (Note)
29	120347	1	#261-O-Ring (Note)
30	120349	1	#261-Back-up Ring (Note)
31	120313	1	Piston
32	120281	1	#140-O-Ring (Note)
33	120357	1	Piston Seal (Note)
34	120355	2	Piston Bearing (Note)
35	120629	1	Holding Valve
36	810611	1	80 Seal Kit

Note: Included in Model 80B Seal Kit.



CYLINDER DETAIL

MODEL 80 CAISSON CLAMP (OPTIONAL) w/HYDRO LOCK

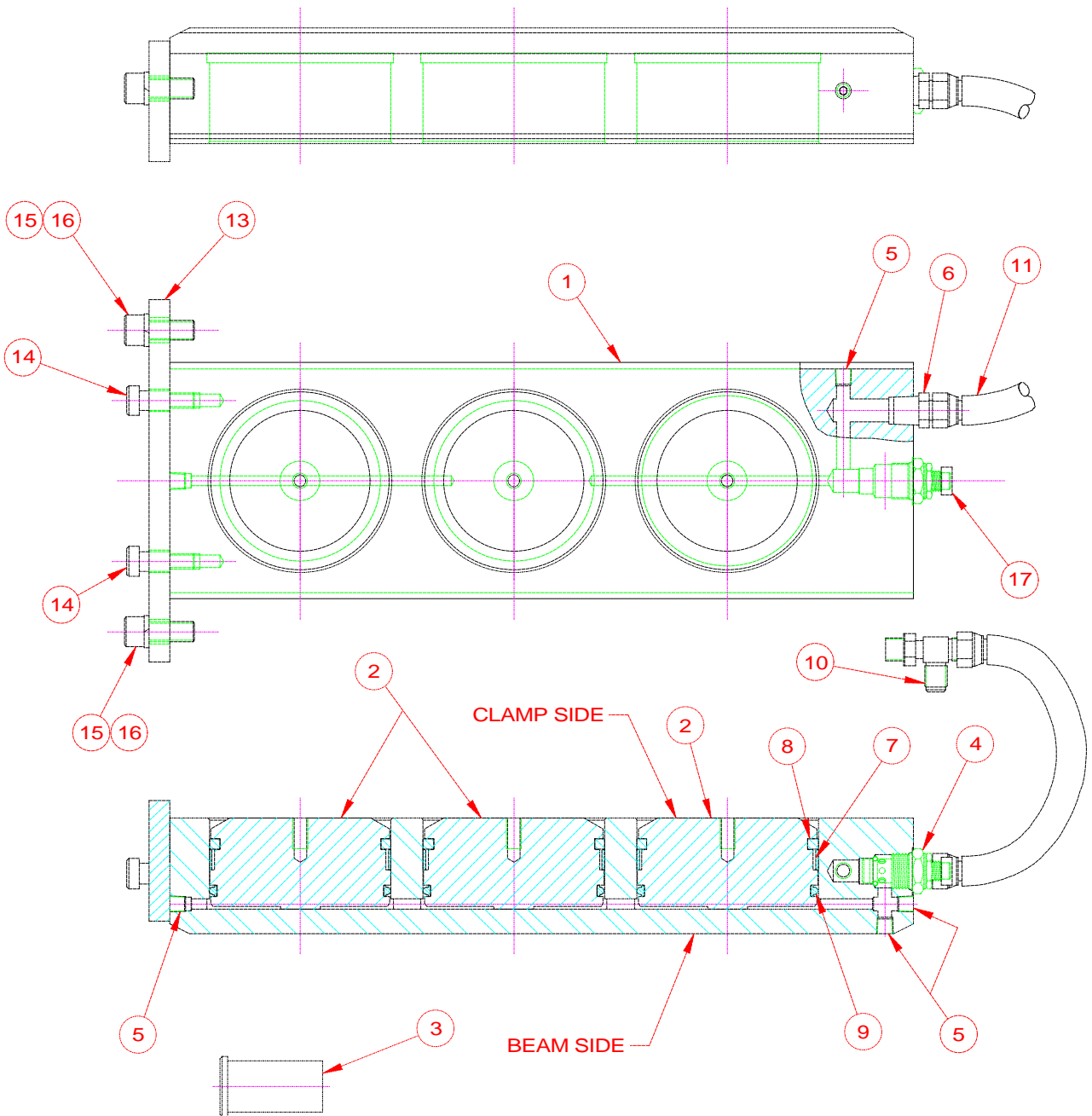
800413

Item	Number	Qty.	Description
1	810061	1	Caisson 80 Clamp Body Cast.
2	120107	1	Jaw
3	400157	2	.625-11 x 2.75 Lg SHCS
4	120629	1	Holding Valve Cartridge
5	800399	1	Lock Body Asm.
6	120355	2	Piston Bearing (Note)
7	120357	1	Piston Seal (Note)
8	100229	1	Grease Fitting
9	120159	1	80 S/N Plate
10	130381	4	Rivet
11	130057	1	FITT2L-06M06R000-000H001
12	100646	5	FITT2P-02P000000-000S007
15	120621	1	80 Cylinder
16	100212	8	1.0-8 X 4 Lg SHCS Locwel
17	100209	8	1.0 Lock Washer Medium
18	120631	1	Cylinder Rod (80 B)
19	120623	1	Rod End Cap (80 B)
20	120100	1	2-263 O-Ring 90 DURO (Note)
21	120627	1	Rod Bearing (80 B) (Note)
22	120625	1	Rod Seal (80 B) (Note)
23	120345	1	Rod Wiper (Note)
24	120347	1	2-261 O-Ring 90 DURO (Note)
25	120349	1	261 Back-Up Ring (Note)
26	120313	1	Piston - 80, 216, WPH
27	120281	1	2-140 O-Ring (Note)
28	810611	1	# 8 0 S e a l K i t

Note: Included in Model 80 Seal Kit.

HYDRO LOCK (OPTIONAL)

800399



HYDRO LOCK (OPTIONAL)

800399

Item	Number	Qty.	Description
1	120639	1	Lock Body
2	120641	3	Piston
3	120643	4	Button
4	120651	1	Lock Body Holding Valve
5	100646	4	FITT2P-02P000000-000S007
6	400203	1	FITT2S-06M06P000-000H001
7	120645	3	Piston Bearing
8	120649	3	Piston Wiper
9	120647	3	Piston Seal
10	130057	1	FITT2L-06R06M000-0000001
11	120657	1	HOSE038RO2J006J006L0090C
13	120653	1	L.B. Retainer Plate
14	140143	2	.5 X .75 Lg SHCS Shoulder
15	100119	2	.5-13 X 1.25 Lg SHCS Lockw
16	100121	2	.5 Lock Washer Medium

INSTALLATION PROCEDURE

Remove Plug on CLOSE side of the Cylinder and replace with Elbow. Connect hose from Lock Body to Elbow on Cylinder. Position Clamps on Beam to suit your Piling. Close Holding Valve Item 4 by turning CW, CLOSE Clamp to Energize HYDRO LOCK. To reposition Clamp on Beam, Open Holding Valve Item 4 by turning CCW, and OPEN Clamp to release HYDRO LOCK.

7 FOOT CAISSON BEAM (OPTIONAL)

800301

7 FOOT CAISSON BEAM (OPTIONAL)

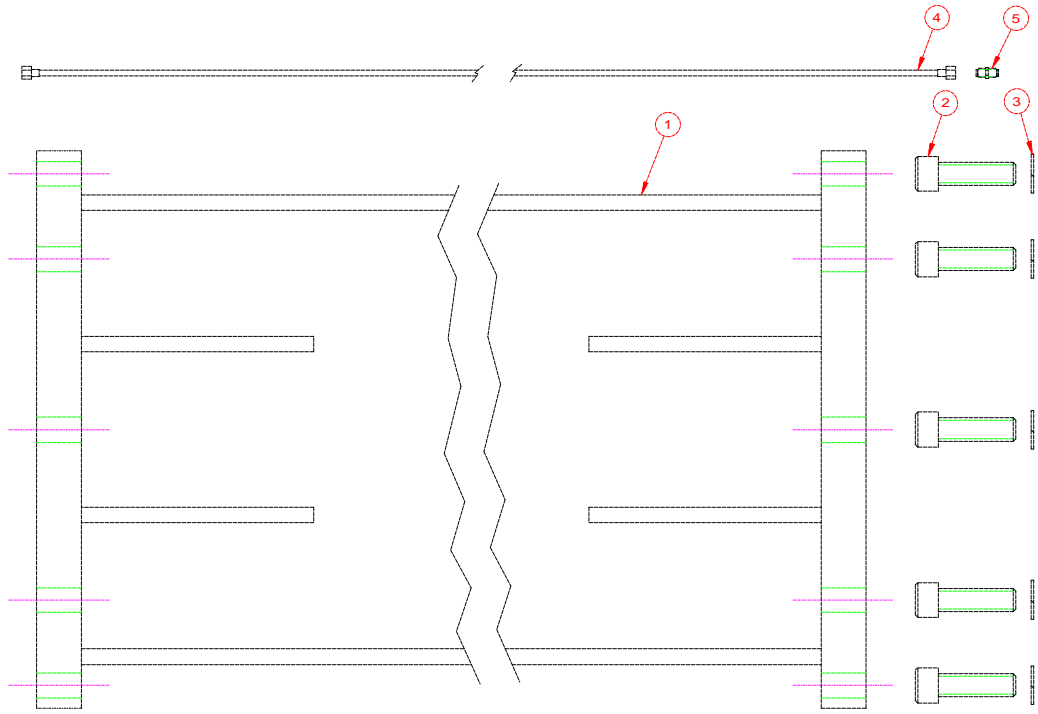
800301

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	120001	1	7' Caisson Beam
2	120011	2	Clamp Stop
3	400069	4	.75 - 10 UNC x 2" LG SHCS
4	100069	4	.75 Lockwasher
5	120007	15	1.50 - 6 UNC x 8" LG SHCS
6	810173	1	Adjustment Tool
*7	800047	2	Model 80 Caisson Clamp
8	100111	2	HOSE038R02J006J006L0875S
9	120595	2	HOSE038R02J006J006L1800S

*=Not part of Caisson Beam Asm.

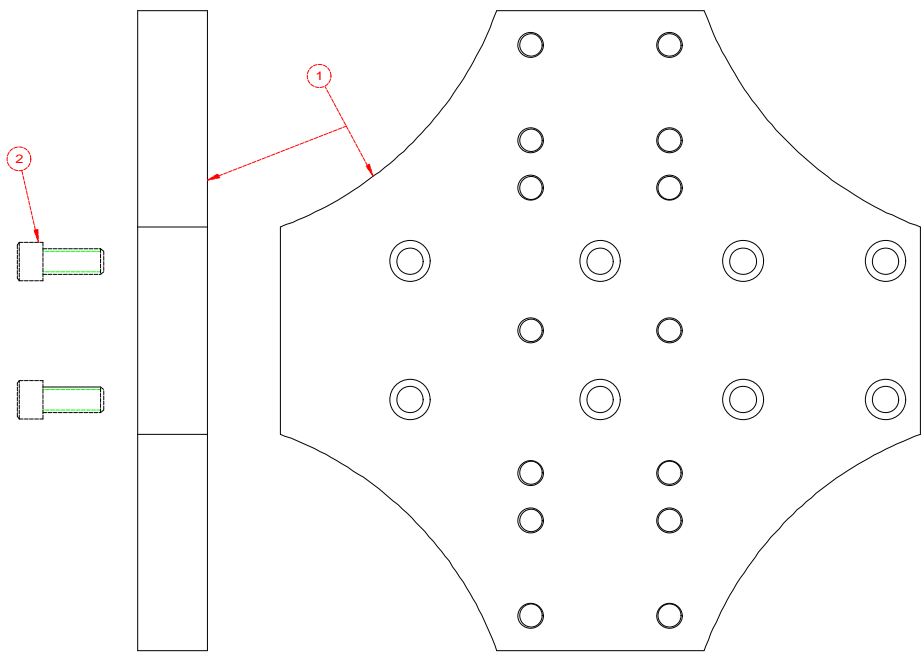
10 FOOT CLAMP EXTENSION (OPTIONAL)

800423



90 DEG. CLAMP ADAPTER (OPTIONAL)

800049



10 FOOT CLAMP EXTENSION (OPTIONAL)

800423

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	810655	1	10' Extension
2	100193	10	1.50-6 UNC x 5.00 LG. SHCS
3	100195	10	1.50 Lockwasher
4	120193	2	HOSE038R02J006J006L1320S
5	120081	2	FITT2S-06M06M000-000H001

90 Deg. CLAMP ADAPTER (OPTIONAL)

800049

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	120083	1	90 deg. Clamp Adapter
2	120077	8	1.50-6 UNC x 3.50 LG SHCS

VIII. ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES

1. Tools

<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
100651	1	24-Volt Test Light
810045	1	Set of Allen Wrenches - Includes All Wrenches Shown Below:
100655		(1) 1/16" Allen Wrench - Long Arm
100691		(1) 5/64" Allen Wrench - Long Arm
100659		(1) 3/32" Allen Wrench - Long Arm
100661		(1) 7/64" Allen Wrench - Long Arm
100663		(1) 1/ 8" Allen Wrench - Long Arm
100665		(1) 9/64" Allen Wrench - Long Arm
100667		(1) 5/32" Allen Wrench - Long Arm
100669		(1) 3/16" Allen Wrench - Long Arm
100671		(1) 7/32" Allen Wrench - Long Arm
100673		(1) 1/ 4" Allen Wrench - Long Arm
100657		(1) 5/16" Allen Wrench - Long Arm
100675		(1) 3/ 8" Allen Wrench - Long Arm
100677		(1) 7/16" Allen Wrench - Long Arm
100679		(1) 1/ 2" Allen Wrench - Long Arm
100681		(1) 9/16" Allen Wrench - Long Arm
100683		(1) 5/ 8" Allen Wrench - Long Arm
100685		(1) 3/ 4" Allen Wrench - Long Arm
100687		(1) 7/ 8" Allen Wrench - Short Arm
100689		(1) 1" Allen Wrench - Short Arm

2. Bulk

<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
810013	5 GAL	Hydraulic Fluid
810011	5 GAL	Vibration Case Lubricant
100726	1 GAL	Coolant/Anti-Freeze
100298	1 GAL	I C E Green Paint
100299	1 GAL	Primer

VIII. ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES (CONTINUED)

3. 416L Hose Group Kit - Internal 850085

Item	P/N	Qty.	Description	Page Ref.
28	100790	2	HOSE100PT4J016J016L03700	VIII-6
31	100432	2	HOSE075PT4H912J016L06400	VIII-6
32	100430	2	HOSE075PT4H912J016L06200	VIII-6
33	100788	1	HOSE050R01J908J008L06200	VIII-6
34	100792	1	HOSE050R01J908J008L10100	VIII-6

4. 325 Hose Group Kit - Internal 850105

Item	P/N	Qty.	Description	Page Ref.
59	110633	1	HOSE038R02J006J006L0370S	VIII-22
81	130201	2	HOSE075R01J012J012L04000	VIII-22 & 23
82	400215	1	HOSE100R01P016P016L08400	VIII-23
92	100500	2	HOSE150R01J024J024L18000	VIII-22
93	100498	1	HOSE150R02J924J024L07200	VIII-22
98	100862	1	HOSE100R01J016J016L03300	VIII-23
100	110461	1	HOSE050R09J008J008L04000	VIII-22
104	100492	1	HOSE100PT4J020H020L04000	VIII-22
105	100490	1	HOSE100PT4J020H920L06500	VIII-22
108	100486	1	HOSE050R01J008J008L01450	VIII-22
109	110265	1	HOSE050R01J008J008L02300	VIII-22 & 23
110	100484	1	HOSE075R01J012J012L08400	VIII-22
111	100482	1	HOSE150R02J024J024L07200	VIII-22 & 23

VIII. ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES (CONTINUED)

5. 416I/325 O-Ring Kit 850107

<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
100037	4	O-ring (#222)
110197	2	O-ring (#159)
110602	3	O-ring (#111)
100814	1	Sealant (tube)

6. Quick Disconnect Rebuild Kit 850067

<u>Qty.</u>	<u>Description</u>
1	Male Check Poppet Valve
1	Female Check Poppet Valve
2	Snap-Lock Ring
1	Snap-Ring Pliers

VIII. ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES (CONTINUED)

7. Cylinder Seal Kit

MODEL 126 CLAMP CYLINDER 810515 Refer to page VIII-34

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
9	120347	1	#261-O-Ring
10	120285	2	Piston
11	120283	2	Piston Seal
12	120555	1	Rod Bearing
13	120553	1	Rod Seal
34	120401	1	#269-O-Ring

MODEL 80 CAISSON CLAMP 800047 Refer to page VIII-38

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
25	120100	1	#263-O-Ring
26	120627	1	Rod Bearing
27	120625	1	Rod Seal
28	120345	1	Rod Wiper
29	120347	2	#261-O-Ring
30	120349	2	#261-Back-Up Ring
32	120281	1	#140-O-Ring
33	120357	1	Piston Seal
34	120355	2	Piston Bearing

VIII. ORDERING PARTS

F. RECOMMENDED SPARE PARTS

VIBRATION SUPPRESSOR 800027 Refer to page VIII-6

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
23	100796	1	Elastomer
35	100032	1	Relief Valve

VIBRATION CASE 810037 Refer to page VIII-10

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
18	100185	1	Sight Gage
28	110197	2	Motor O-Ring (#159)
--	100358	2	Motor Shaft Seal
29	100814	1	Sealant (Tube)
30	100662	2	Filter

HOSE ASSEMBLIES-INTERCONNECTING 800029 Refer to page VIII-12

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
5	100452	2	HOSE125R10P020P020L60000
9	100911	2	HOSE150R02P024P024L60000
13	100241	2	HOSE075R02P012P012L62000
17	100247	4	HOSE038R02P006P006L62000

POWER UNIT - INTERNAL (325) 800377 Refer to page VIII-22 & 23

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
--	100233	1	Oil Filter
14	100518	4	Hyd.Oil Filter
--	100450	1	Fuel Filter Element
--	100448	1	Air Filter Element
100	110461	1	HOSE050R09J008J008L04000
104	100492	1	HOSE100PT4J020H020L04000
105	100490	1	HOSE100PT4J020H020L06500
	110202	4	-231 O-Ring
	110204	4	Back-up Ring

VIII. ORDERING PARTS

F. RECOMMENDED SPARE PARTS (CONTINUED)

MODEL 126 CLAMP 800327 Refer to page VIII-34

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
16	130057	2	FITT2L-06M06R000-0000001
18	100193	8	1.5-6 UNC x 5.0 LG. SHCS
19	100195	8	1.5 Lockwasher
22	100111	2	HOSE038R02J006J00620875S
26	810515	1	126B Seal Kit
27	810495	1	Universal Movable Jaw
28	110515	1	Universal Fixed Jaw
29	810497	1	H-Beam Movable Jaw
30	110541	1	H-Beam Fixed Jaw
31	810499	1	DS-Movable Jaw
32	110419	1	DS-Fixed Jaw
33	130449	1	Spiral Roll Pin

MODEL 127 Z-PILE CLAMP 800041 Refer to page VIII-36

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
9	100053	2	FITT2S-06MO6R000-000H001
10	100193	8	1.5-6 X 5.0 LG SHCS (Head Bolts)
11	100195	8	1.5 LOCKWASHER EXTRA HEAVY
17	120009	2	HOSE038R02J006J006L00960
26	810629	2	127B Z SEAL KIT
28	110602	4	111 O-RING

VIII. ORDERING PARTS

F. RECOMMENDED SPARE PARTS (CONTINUED)

MODEL 80B CAISSON CLAMP

800047

Refer to page VIII-38

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
4	810109	1	Screw Assembly
5	120107	1	Fixed Jaw
6	400157	2	.625-11UNC x 2.75 LG SHCS
16	130057	2	FITT2L-06M06R000-000H001
35	120629	1	Holding Valve
36	810611	1	Seal Kit

G. RECOMMENDED TIGHTENING TORQUE

Nominal Screw Size	Nominal Socket Size	Tightening Torque Ft-Lbs. (Kg-M)	Nominal Screw Size	Nominal Socket Size	Tightening Torque Ft-Lbs. (Kg-M)
#10-24	5/32	6 Ft-Lbs. (.83 Kg-M)	#10-32	5/32	6 Ft-Lbs. (.83 Kg-M)
1/4-20	3/16	13 Ft-Lbs. (1.8 Kg-M)	1/4-28	3/16	15 Ft-Lbs. (2.1 Kg-M)
5/16-18	1/4	27 Ft-Lbs. (3.7 Kg-M)	5/16-24	1/4	30 Ft-Lbs. (4.2 Kg-M)
3/8-16	5/16	48 Ft-Lbs. (6.6 Kg-M)	3/8-24	5/16	55 Ft-Lbs. (7.6 Kg-M)
7/16-14	3/8	77 Ft-Lbs. (10.6 Kg-M)	7/16-20	3/8	86 Ft-Lbs. (11.9 Kg-M)
1/2-13	3/8	119 Ft-Lbs. (16.4 Kg-M)	1/2-20	3/8	133 Ft-Lbs. (18.4 Kg-M)
5/8-11	1/2	234 Ft-Lbs. (32.3 Kg-M)	5/8-18	1/2	267 Ft-Lbs. (36.9 Kg-M)
3/4-10	5/8	417 Ft-Lbs. (57.6 Kg-M)	3/4-16	5/8	467 Ft-Lbs. (64.5 Kg-M)
7/8-9	3/4	676 Ft-Lbs. (93.4 Kg-M)	7/8-14	3/4	742 Ft-Lbs. (102.5 Kg-M)
1-8	3/4	1,009 Ft-Lbs. (139.4 Kg-M)	1-12	3/4	1,126 Ft-Lbs. (155.6 Kg-M)
1-1/4-7	7/8	1,600 Ft-Lbs. (221.1 Kg-M)	1-1/4-12	7/8	1,800 Ft-Lbs. (248.8 Kg-M)
1-1/2-6	1	2,800 Ft-Lbs. (387 Kg-M)	1-1/2-12	1	3,000 Ft-Lbs. (414.6 Kg-M)

NOTE: These values are for Socket head cap screws only. Button heads, Flat heads and Set screws have different values. Check the Allen Hand Book for correct torque specifications.

